2019 INITIAL LICENSE NRC EXAM SCENARIO # 1

Catawba Nuclear Station NRC Exam September 2019

| Appendix D | | | | Sc | enario Outline | - <u></u> | Form ES-D-1 |
|--------------------------------|--------------------------|--|---|---|---|--|--|
| Facility: Catawb Examiners: | | a NRC Exam 2 | 2019 | Scenario No.: 1 Operators: | Op Test No.: SRO RO BOP | 2019301 | |
| Initial Co | nditions: | Un | it 1 is at 75% po | wer at | the EOL. Unit 2 is at 100% | power. | |
| Turnover | : | Unit 1 is for PMs. hours. D pump for 10% per | at 75% power at 1B CA Pump ha irection for the c emergent repai hour decrease i | t the E0 as beer rew is t r work. n react | DL. Unit 2 is at 100% powe i inoperable for 3 hours and o decrease reactor power f A reactivity plan has been or power. | r. 1B CA Pump is re I is expected to be i o 50% and secure provided by Reacto | emoved from service returned to service in 6 the 1A main feedwater or Engineering for a |
| Event No. | Malf | . No. | Event Type* | | De | Event scription | |
| 1 | | | R – RO N – BOP N – SRO | Decre | ease Reactor Power | | |
| 2 | ov_s | LIM16 | C – BOP C – SRO | Letdo | wn Heat Exchanger Tempe | erature Control Valv | ve (1KC-132) Failure |
| 3 | ENB | 013C | C – BOP C – SRO TS – SRO | N44 L | oss of Instrument Power | | |
| 4 | NC0 | 07F | C – RO C – SRO TS – SRO | PZR | PORV (1NC-34A) Fails Op | en / Isolated by Blo | ck Valve |
| 5 | FWP- FWP- | -012C -015C | C – RO C – SRO | 1A & Auto | 1B Main Feed Pumps Low Rx Trip Failure | Vacuum Trip / Mair | n Turbine Trip Failure / |
| 6 | CA0 | 04A | C – RO C – SRO | 1A C/ | A Pump Failure | | |
| 7 | CA | 006 | M – ALL | CAP1 | Discharge Isolated / Loss | of Secondary Heat | Sink |
| 8 | 8 IRX015F14 IRX015H10 | | C – BOP C – SRO | Two (| Control Rods not fully inser | ted | |
| * | (N)ormal | , (R)ea | ctivity, (I)nstru | ment, | (C)omponent, (M)ajor | | |

Appendix D

Scenario Outline

Form ES-D-1

<u> Scenario 1 – Summary</u>

Initial Condition

Unit 1 is at 75% power at the EOL. Unit 2 is at 100% power.

Turnover:

Unit 1 is at 75% power at the EOL. Unit 2 is at 100% power. 1B CA Pump is removed from service for PMs. 1B CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Direction for the crew is to decrease reactor power to 50% and secure the 1A main feedwater pump for emergent repair work. A reactivity plan has been provided by Reactor Engineering for a 10% per hour decrease in reactor power.

Event 1

BOP will perform an initial boration and RO will input desired load rate and target load into the main turbine. RO may also insert control rods prior to placing the main turbine in 'GO' to initiate the power decrease at 10%/hour.

Event History: 75% downpower at EOL used 17 (1).

Event 2

Letdown Heat Exchanger Temperature Control Valve (1KC-132) setpoint increases causing 1KC-132 to close and causing a letdown heat exchanger outlet high temperature alarm. Additionally, if letdown temperature exceeds 136°F, the letdown heat exchanger outlet three-way valve (1NV-153A) will fail to automatically reposition and align flow to the VCT (i.e. will continue flow through NV demineralizers). Crew will refer to Annunciator Response Procedure for 1AD-7 F/3 (Letdn HX Outlet Hi Temp), place 1KC-132 in Manual, and adjust CCW flow to restore letdown cooling, and position 1NV-153A as required.

Verifiable Action - BOP will manually control 1KC-132 and operate 1NV-153A as required.

Event History: This failure used 17 (2).

Event 3

Power Range NI N44 will fail low. Crew will enter AP/1/A/5500/016 (Malfunction of Nuclear Instrumentation). TS evaluation by the SRO is required.

Verifiable Action – The BOP will remove N44 from service.

Event History: This exact malfunction is new. IR channel malfunction used 17 (4). PR malfunction not used on previous 2 exams - N41 {15 (1)}.

Event 4

While the BOP is removing N44 from service, NC PORV 1NC-34A will fail open. Crew will enter AP/1/A/5500/011 (Pressurizer Pressure Anomalies) to address this failure. TS evaluation by the SRO is required.

Verifiable Action – RO will attempt to manually close 1NC-34A. This valve will not close. The RO will close the associated PORV isolation valve (1NC-33A). Crew will enter AP/1/A/5500/011 (Pressurizer Pressure Anomalies), Case I (Pressurizer Pressure Decreasing).

Event History: This exact malfunction not used on last 2 exams - {12 (1)}. Similar PORV failure (1NC-32B) used on 17 (1).

Appendix D

Scenario Outline

Form ES-D-1

Event 5

Main Feed Pump vacuum will rapidly decay resulting in a loss of 1A & 1B Main Feedwater Pumps. Upon loss of both feed pumps, AMSAC should trip the Main Turbine which will initiate a Reactor Trip since turbine power is greater than P-9 (69%). However, a failure of this AMSAC signal will require a manual Reactor and Turbine Trip. Crew will enter EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).

Verifiable Action – RO will manually trip the Reactor and manually trip the Main Turbine.

Event History: New malfunction

Event 6

Upon Reactor Trip, 1A CA Pump will fail to start in Auto or Manual.

Verifiable Action – RO will manually start CAPT #1.

Event History: This exact malfunction is new. Similar malfunction used on 16 (4) – failure of a 1B vs 1A CA Pump following trip of one CF Pump at low power vs trip of both CF Pumps at high power.

Event 7

A loss of secondary heat sink will occur following failure of 1A CA pump to start (1B CA pump tagged out) and CAPT #1 discharge valve closed. Crew will enter EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink).

Verifiable Action – BOP will direct performance of CA valve alignment verification. RO will restore Aux Feedwater flow to all S/Gs following notification of open CAPT discharge valve.

Event History: Loss of Heat Sink used on 17 (1) and 16 (2) but different success paths (Bleed and Feed and depressurize to establish feed path via condensate system).

Event 8

Two Control Rods will fail to fully insert on Reactor Trip.

Verifiable Action – BOP will initiate Emergency Boration and calculate required boric acid addition.

Event History: New malfunction

| | | Manual Control of Automatic Functions |
|-------|----------|---|
| Event | Position | Description |
| 2 | BOP | Manually control Automatic Letdown HX Temperature Control Valve (1KC-132) |

Appendix D

Scenario Outline

Form ES-D-1

<u>Critical Task 1</u> – Manually isolate failed open Pressurizer PORV (1NC-34A) prior to any RPS actuation.

<u>Critical Task 2</u> – Manually trip the reactor from the control room prior to S/G dryout conditions (<12% W/R level) occurs on any S/G.

<u>Critical Task 3</u> – Establish feedwater flow to at least one S/G before NC feed and bleed is required (<24% W/R level in 3 out of 4 S/G).

| | Target Quantitative Attributes (Per Scenario; See Section D.5.d) | Actual Attributes |
|----|--|-------------------|
| 1. | Total malfunctions (5–8) | 7 |
| 2. | Malfunctions after EOP entry (1–2) | 2 |
| 3. | Abnormal events (2–4) | 4 |
| 4. | Major transients (1–2) | 1 |
| 5. | EOPs entered/requiring substantive actions (1–2) | 1 |
| 6. | EOP contingencies requiring substantive actions (0–2) | 1 |
| 7. | Critical tasks (2–3) | 3 |

EXERCISE GUIDE WORKSHEET

- 1. INITIAL CONDITIONS:
 - 1.1 Reset to IC # 168 and load schedule file for NRC Scenario 1

START TIME:_____

| ✓ | ✓ | Trigger | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|---|---------|--|----------------|-------|------|--------------|-------|
| | | | LOA-CA018 (RACKOUT CA PUMP 1B) | RACK- OUT | | | | |
| | | | MAL-IPX001A (AUTO REACTOR TRIP FAILURE TRN A) | ACTIVE | | | | |
| | | | MAL-IPX001B (AUTO REACTOR TRIP FAILURE TRN B) | ACTIVE | | | | |
| | | 2 | OV_SLIM16SpIncPB (KC-132 Setpoint Increment pushbutton) | PRESSE D | | | :10 | 2 |
| | | 2 | OV_SLIM16manPB (KC-132 Man Pushbutton) | PRESSE D | :11 | | :01 | 2 |
| | | | VLV-NV035A (NV153A L/D HX DIVERSION FAIL AUTO ACTIONS) | ACTIVE | | | | 2 |
| | | 3 | MAL-ENB013D (P/R 44 BLOWN FUSE) | INSTRU MENT | | | | 3 |
| | | 11 | VLV-NC007F (NC34A PZR PORV FAIL TO POSITION) | 1 | | | | 4 |
| | | 10 | VLV-NC006C (NC33A PZR PORV ISOL VLV FAIL PWR) | ACTIVE | 10:00 | | | 4 |
| | | 5 | MAL-CF001A (LOSS OF CFPT 1A VACUUM) | 20 | | :30 | | 5 |
| | | 5 | MAL-CF001B (LOSS OF CFPT 1B VACUUM) | 20 | | :30 | | 5 |
| | | 5 | XMT-FWP001 (PCM_6700 CONDENSER VACUUM CFPT A MTR) | 15 | | :30 | | 5 |
| | | 5 | XMT-FWP002 (PCM_6710 CONDENSER VACUUM CFPT B METER) | 15 | | :30 | | 5 |
| | | 5 | OVR-FWP012C (CFPT 1A TRIP_RESET PB) | ON | :30 | | | 5 |
| | | 5 | OVR-FWP015C (CFPT 1B TRIP_RESET PB) | ON | :30 | | | 5 |
| | | | MAL-EHC002 (TURBINE TRIP FAILURE) | AUTO | | | | 5 |
| | | | MAL-CA004A (FAILURE OF CA PUMP A TO START) | BOTH | | | | 6 |
| | | | VLV-CA030F (SA2 CA PMP TURB STM SPLY VL FAIL TO POSTION) | 0 | | | | 6 |
| | | | VLV-CA031F (SA5 CA PMP TURB STM SPLY VL FAIL TO POSTION) | 0 | | | | 6 |
| | | 12 | LOA-NV078 (SEAL WATER LOW FLOW LCL REFLASH ACK (AD7,C4)) | ACKN | 2:00 | | | |

| 13 | VLV-CA030F (SA2 CA PMP TURB STM SPLY VL FAIL TO POSTION) | 0 | | | :01 | 6 |
|-------|---|---------------|----------|------|----------|--------|
| 13 | VLV-CA031F (SA5 CA PMP TURB STM SPLY VL FAIL TO POSTION) | 0 | | | :01 | 6 |
| 15 | MAL-ISE007A (AUTO CF ISOL SIGNAL TRN A) | BLOCK | 4:00 | | | |
| 15 | MAL-ISE007B (AUTO CF ISOL SIGNAL TRN B) | BLOCK | 5:00 | | | |
| | MAL-IRX015F14 (STUCK ROD F14 ON RX TRIP) | 24 | | | | 8 |
| | MAL-IRX015H10 (STUCK ROD H104 ON RX TRIP) | 60 | | | | 8 |
| | LOA-CA006 (CA21-CAPT DISCH TO CA COMM HDR) | 0 | | | | 7 |
| 14 | LOA-CA006 (CA21-CAPT DISCH TO CA COMM HDR) | 1 | | 2:00 | | 7 |
| | | | | | | |
| | | • | | | | |
| Ensur | e EVENT 11 = XWSJOL01W (1SI-19 NC-4 | 4L NUC OV | ER PWF | | ГОР СН.І | V BYP) |
| Ensur | e EVENT 12 = jpplp4(1) jpplp4(2) (Read | ctor Trip Eit | her Trai | n) | | |
| Ensur | e EVENT 13 = x10i091n (#1 CAPT to ON) | • | | - | | |
| | | | | | | |
| Place | cover on 1B CA Pump | | | | | |
| | | | | | | |

2. SIMULATOR BRIEFING

2.1 Control Room Assignments:

| Position | Name |
|----------|------|
| CRS | |
| RO | |
| BOP | |

2.2 Give a copy of Attachment 2 (Shift Turnover Information) to the CRS.

3. EXERCISE PRESENTATION

- 3.1 Familiarization Period
 - A. Allow examinees time to familiarize themselves with the Control Board alignments.

3.2 Scenario EVENT 1, Decrease Reactor Power

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF contacted as DEC-BA (Balancing Authority / SOC) by the crew to inform of |
| | commencing power decrease, REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN contacted as Secondary Chemistry to obtain maximum blowdown for appropriate |
| | load (step 3.2.3.9), REPORT "Maintain blowdown at current flow rates." |

3.3 **Scenario EVENT 2**, Letdown Heat Exchanger Temperature Control Valve (1KC-132) Fails Closed

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 2 to cause |
| | 1KC-132 to slowly close. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF the SWM is contacted to initiate an NCR or W/R for 1KC-132 or 1NV-153A, REPEAT |
| | the information. |

3.4 **Scenario EVENTS 3 & 4**, N44 Loss of Instrument Power / PZR PORV (1NC-34A) Fails Open

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 3 to cause a loss of N44. |

| ~ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate an NCR or W/R for N44, REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF contacted as IAE and directed to place bistables in the tripped condition per Model W/O |
| | #00874531. REPEAT the information. |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | IF contacted as Reactor Engineering informing of N44 failure, REPEAT the information. |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | IF the SWM is contacted to initiate an NCR or W/R for 1NC-34A, REPEAT the |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF an AO or the Unit Supervisor is contacted to create a clearance to remove power from |
| | 1NC-33A (1EMXC-F03C), REPEAT the information and INSERT Trigger 10 . |
| | After 10 minutes, contact the control room and REPORT "Power has been removed from |
| | 1NC-33A." |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF contacted as an AO to acknowledge seal water low flow alarm on reflash panel 1, |
| | REPEAT the information and INSERT Trigger 12. |
| | After 2 minutes, contact the crew and REPORT "Seal Water Low Flow alarm has been |
| | acknowledged". |

3.6 **Scenario EVENT 5**, 1A & 1B Main Feed Pump Low Vacuum Trip / Main Turbine Trip Failure / Auto Rx Trip Failure

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 5 to cause a |
| | loss of vacuum to 1A & 1B Main Feed Pumps. |

3.7 **Scenario EVENTS 6, 7 & 8,** 1A CA Pump Failure / CAPT #1 Discharge Valve Closed / Loss of Secondary Heat Sink / Control Rod Insertion Failure

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to expedite the return of 1B CA pump, REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF contacted as primary chemistry to periodically perform NC boron samples, REPEAT the |
| | information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF contacted as Reactor Group Duty Engineer to perform analysis to determine required |
| | shutdown margin, REPEAT the information. |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | IF maintenance is contacted to perform troubleshooting procedure EM/1/A/5200/007, |
| | REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF an AO is dispatched to verify CA Valve alignment per Enclosure 2, REPEAT the information. |
| | After 2 minutes, REPORT "1CA-21 (CA Pump No 1 Disch to S/G) is closed. |

| BOOTH INSTRUCTOR ACTION | |
|--------------------------------|--|
|--------------------------------|--|

IF AO is directed to open 1CA-21, **REPEAT** the information. **THEN INSERT SIMULATOR Trigger 14**.

After 2 minutes, **REPORT** "1CA-21 (CA Pump No 1 Disch to S/G) is open.

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF IAE is directed to reset CF Isolation following Safety Injection THEN INSERT |
| | SIMULATOR Trigger 15, REPEAT the information. |
| | After 5 minutes, REPORT "IAE has reset CF Isolation." |

1

| Appendix D | Required Operator Actions | s Form ES-D-2 | | | |
|--------------------|-----------------------------------|---------------|--|--|--|
| Op Test No.: | 301 Scenario # <u>1</u> Event # 1 | Page 12 of111 | | | |
| Event Description: | Decrease Reactor Power | | | | |
| | | | | | |

Note To Evaluator:

The scenario begins with a power decrease to 50% by the crew. This will involve several procedures to accomplish. The following procedures are included in this guide:

- OP/1/A/6150/009 Enclosure 4.2 (Boration)
- OP/1/A/6150/008 Enclosure 4.16 (Control Bank Manual Operation At Power)
- OP/0/B/6300/001 Enclosure 4.2 (Load Changing)

These procedures may be performed in any order by the crew. Instructions for continuing to the next Event are included at the end of OP/0/B/6300/001 Enclosure 4.2.

| Appendix D | | Required Operator Actions | | | | | | | n ES-D |)-2 | |
|-------------------|---|--|---|---|--|--|--|---|--|---------------------|--|
| Op Test No.: | 301 | Scena | rio # | 1 | Event # | 1 | Page | 13 | of | 111 | |
| Event Description | : | Decreas | e Reactor | Powe | r | | | | | | |
| | | | | | | | | | | | |
| | | | | | Enclosure 4 | 1.2 | 0 | OP/1/A | /6150/00 | 9 | |
| , | . | | | | Boration | l. | 1 | age 1 c | 010 | | |
| 1. | Lim | ts and P | recaution | 15 | | | | | | | |
| | 1.1 This procedure is Reactivity Management rela core reactivity by changing boron concentration | | | | | | | tivities | that can a | affect | |
| | 1.2 | The follo | The following Limits and Precautions are Reactivity Management related: (R.M.) | | | | | | | | |
| | | 1.2.1 | 1.2.1 If the boron concentration is being increased in the NC System, at least one NC pump or one ND pump shall be in operation, recirculating the NC System. | | | | | | | | |
| | 1.2.2 If the unit depletion may be lo | | | | If the unit has operated continuously for several months, significant Boron 10 depletion may have occurred. The effective boron concentration of the NC System may be lower than indicated by Chemistry samples. | | | | | | |
| | 1.3 | Maintain absorptic | ing VCT p m. VCT p | ressure ressure | e as low as practi can be reduced t | cal during large i by diverting letdo | e makeups will minimize gas down or by VCT purge. | | | | |
| | 1.4 | Due to E Unit 1 Be indication be used to 0208137 | lectromagn oric Acid C ns for the I by the Read 2). | netic In Counter Boric A ctor Op | terference within r may sporadicall Acid Xfer Pumps erators to validat | the Unit 1 Reac y count up durin and Closed indic e that sporadic c | tor Makeup g dilution ac cation for va ounts are in | Contro ctivities lve 1N dication | 1 System COFF V-238A o 1 only. (N | , the can ICR | |
| 2. | Initi | al Condi | tions | | | | | | | | |
| AA | 2.1 | <u>IF</u> in Mo AD-OP- | de 1, 2 or ALL-0203 | 3, ensu (React | re R2 reactivity r ivity Managemer | nanagement con it). (R.M.) | trols establis | shed | | | |
| AA | 2.2 | Verify th System). | e NV Syste | em is i | n operation per O | P/1/A/6200/001 | (Chemical : | and Vol | lume Cor | ntrol | |
| AA | 2.3 | Verify su planned l | officient RI boration op | HT volu peration | ume is available 1 1. | to receive the rea | actor coolant | t displa | ced durin | g the | |
| 3. | Proc | edure | | | | | | | | | |
| NO | DTE: | This enclo Reactivity Managem | osure will a 7 Managen 1ent). (R.N | affect r ient pe 1.) | eactivity of the co r the guidelines o | ore and is therefore f AD-OP-ALL-(| ore designate 0203 (Reacti | ed impo ivity | ortant to | | |
| ΔΔ | 3.1 | Focure 1 | alves are a | ligned | ner Enclosure 4 (| Waltre Checkle | ct) | | | | |

<u>AA</u> 3.1 Ensure valves are aligned per Enclosure 4.8 (Valve Checklist).

Page 13 of 111

| Appendix D | | R | equired | Operator A | Actions | | For | n ES- | D-2 | | |
|------------------|-------|--|---------------------------------------|--|--|-----------------------------|-------------------|----------------------|---------------|--|--|
| Op Test No.: | 301 | Scenario # | 1 | Event # | 1 | Page | 14 | of | 111 | | |
| Event Descriptio | n: | Decrease Reac | tor Powei | r | | | | | | | |
| | | | | | | | | | | | |
| | | | | Enclosur | e 4.2 | C | OP/ 1 /A | /6150/0 | 09 | | |
| | | | | Boratio | on | F | Page 2 o | of 6 | | | |
| | 3.2 | Ensure the following valve control switches in "AUTO": | | | | | | | | | |
| | | • <u>1NV-238A (E</u> | (1NV-238A (B/A To Blender Ctrl Vlv) | | | | | | | | |
| | | | /A Blende | er Otlt To VCI | COtlt) | | | | | | |
| | 3.3 | Ensure 1NV-238 | A (B/A X | fer Pmp To Bl | ender Ctrl) control | ler in auto. | | | | | |
| | 3.4 | Ensure at least of | ne boric ao | cid transfer pu | np is in "AUTO" o | r "ON". | | | | | |
| I | 3.5 | Record the desire | ed volume | of boric acid t | o be added. | gallon | S | | | | |
| | 3.6 | Adjust the boric | acid count | ter to the desire | ed volume of boric | acid to be a | dded. | (R.M.) | | | |
| | _ 3.7 | IF the blender is the setpoint of th | set up for e controlle | automatic mal er for 1NV-238 | keup per Enclosure 3A (B/A Xfer Pmp | 4.1 (Auton To Blender | natic M Ctrl). | akeup), | record gpm | | |
| | 3.8 | Place the "NC M | AKEUP N | MODE SELEC | T" switch in "BOR | ATE". | ĺ | | | | |
| N | OTE: | Boric Acid flow r | ates > 32 | gpm may resul | t in a boric acid flo | w deviation | n annun | ciator. | | | |
| | 2.0 | IF comicad adiu | at the ear | trailer for 1NR | D20A (D/A Vfor | Down To Pla | nder () | el) to th | | | |
| | _ 3.9 | desired flow. | st me con | | -238A (D/A Alei I | | | 11) 10 11 | c | | |
| N/A | 3.10 | IF NC System be equalize the bord OP/0/A/6200/05 | oron conce n concent 5 (Miscell | entration will b ration through aneous Compo | e changed by ≥ 50 out the system by c ment Operation). | ppm, initia operating ba | te PZR ckup h | spray to eaters p |) 21 | | |
| | 3.11 | IF AT ANY TIN (3-Way Divert T | ₫ <u>E</u> it is de o VCT-RI | esired to divert HT) as follows | letdown to the RH | T manually | operat | e 1NV-1 | 172A | | |
| | | 3.11.1 Place | he contro position. | l switch for 1N | IV-172A (3-Way D | ivert To V | CT-RH | T) to the | e | | |
| | | 3.11.2 Ensure | VCT lev | el is monitored | l continuously whil | le diverting | to the I | RHT. | | | |
| Ν | OTE: | Procedure may co | ntinue wh | ile performing | the following step |). | | | | | |
| | | 3.11.3 <u>WHE</u> RHT) | <u>N</u> desired to auto as | VCT level is r follows: | eached return 1NV | 7-172A (3-W | Vay Div | vert To V | VCT- | | |
| | | 3.11.3 | 1 Pla RH | ce the control s T) in the "VCI | switch for 1NV-17. [" position. | 2A (3-Way | Divert | To VCI | - | | |
| | | 3.11.3 | 2 Plao RH | ce the control s T) in the "AUT | witch for 1NV-17. FO" position. | 2A (3-Way | Divert | To VCI | - | | |

Catawba 2019 NRC Exam

| Appendix D | Req | uired Operator Acti | ons | Form ES-D |)-2 |
|--------------------|---|---|------------------------------------|---|-------------|
| Op Test No.: 301 | Scenario # | 1 Event # | 1 | Page <u>15</u> of | 111 |
| Event Description: | Decrease Reactor | Power | | | |
| | | | | | |
| | | Enclosure 4.2 Boration | 2 | OP/ 1 /A/6150/00 Page 3 of 6 | 9 |
| 3.12 | IF AT ANY TIME rate, adjust the setpo achieve the desired | during the makeup it bec bint for 1NV-238A (B/A) flow. | omes necessary Xfer Pmp To B | y to change the makeup flow lender Ctrl) as necessary to | v |
| 3.13 | IF AT ANY TIME stop the boration, pe | while boration is in prog rform the following: | ress it becomes | necessary <u>OR</u> it is desired | to |
| | 3.13.1 Place the | 'NC MAKEUP CONTR | OL" switch to t | the "STOP" position. | |
| | 3.13.2 Ensure th | e following valves close: | (R.M.) | | |
| | • 1NV-2 | 38A (B/A To Blender Ct | rl Vlv) | | |
| | • 1NV-1 | 86A (B/A Blender Otlt T | o VCT Otlt) | | |
| | 3.13.3 Record bo | oric acid volume added as gallons | s indicated on t | he Boric Acid counter. | |
| | 3.13.4 <u>WHEN</u> c | onditions allow resuming | g the boration, p | perform the following: | |
| | □ 3.13.4.1 | Determine remaining previously added (Ste (Step 3.5). | volume to be a p 3.13.3) from | dded by subtracting the amo the desired volume to be ad | ount ded |
| | | (Step 3.5) - (Step 3 | .13.3)= | gallons | |
| | 3.13.4.2 | Adjust boric acid cours Step 3.13.4.1. (R.M.) | nter to the volu | me of boric acid determined | l in |
| | 3.13.4.3 | Place the "NC MAKE position. (R.M.) | UP CONTROI | L" switch in the "START" | |
| | 3.13.4.4 | Verify the following: | | | |
| | | 1NV-238A (B/A 1 desired flow 1NV-186A (B/A 1 | Fo Blender Ctrl Blender Otlt To | Vlv) modulates to establish VCT Otlt) opens | 1 |
| | 3.13.4.5 | IF in "AUTO", verify | the boric acid j | pump starts. | |
| 3.14 | WHILE makeup is | in progress, monitor the t | following for e | spected results: | |
| | Control rod moti | 00 | | | |

Control rod motion
NC System Tavg
Reactor Power

| Appendix | D | Required Op | perator Actions | Form ES-D-2 | | | | | |
|---|---|---|--|--------------------------------|--|--|--|--|--|
| Op Test No.: | 301 | Scenario #1_ E | vent #1 | Page | | | | | |
| Event Description: Decrease Reactor Power | | | | | | | | | |
| <u></u> | | | | | | | | | |
| | | | Enclosure 4.2 | OP/1/A/6150/009 | | | | | |
| | | | Boration | Page 4 of 6 | | | | | |
| | NOTE: If a small makeup is being performed, placekeeping for Steps 3.15 through 3.18 may be performed after Step 3.19 is performed. | | | | | | | | |
| - | 3.15 | Place the "NC MAKEUP CON | NTROL" switch to the "STA | RT" position. (R.M.) | | | | | |
| - | 3.16 | Verify the following: | | | | | | | |
| | | □ (1NV-238A (B/A To Blender) □ (1NV-186A (B/A Blender) | ler Ctrl Vlv) modulates to es Otlt To VCT Otlt) opens | tablish desired flow | | | | | |
| - | 3.17 | IF in "AUTO", verify the bori | c acid transfer pump starts. | | | | | | |
| | 3.18 | Verify proper flow by observin | ng the Boric Acid Counter. | {PIP 96-0137} | | | | | |
| | NOTE: | The boric acid counter may cou | unt up 1 - 5 gallons after tern | ination. | | | | | |
| | 3.19 | WHEN the desired volume of following valves close: (R.M. | boric acid is reached on the | boric acid counter, ensure the | | | | | |
| | | INV-238A (B/A To Blender | er Ctrl Vlv) | | | | | | |
| | | • 1NV-186A (B/A Blender C | otlt To VCT Otlt) | | | | | | |

| Appendix | D | | Requ | uired | Operator A | Actions | | For | m ES-D- | -2 | |
|--------------|-----------------------|---|---|--|---|--|--|-------------------------------|--|-----------------|--|
| Op Test No.: | 301 | Scena | ario # | 1 | Event # | 1 | Page | 17 | of | 111 | |
| Event Descri | ption: | Decreas | e Reactor I | Power | | | | | | | |
| | | | | | | | | | | | |
| | | | | | Enclosur | e 4.2 | (| OP/ 1 /A | /6150/009 | | |
| | | | | | Boratio | on | I | Page 5 o | of 6 | | |
| | NOTE: | If addition line is <u>NO</u> | nal boration: <u>OT</u> recomme | s will t ended. | be performed (| over the course of | the shift, flu | shing ti | he makeup | | |
| <u>1</u> | <mark>1/A</mark> 3.20 | IF desire | d, flush the | makeu | ıp line as follo | WS: | | | | | |
| | [| 3.20.1 | Record the | cord the setpoint on 1NV-242A (RMWST To B/A Blender Ctrl): | | | | | | | |
| | | 3.20.2 | Place cont | roller | for 1NV-242A | (RMWST To B/ | A Blender C | trl) in r | nanual. | | |
| | | 3.20.3 | Increase d full open. | emand | on controller | for 1NV-242A (R | MWST To I | B/A Ble | ender Ctrl) | to | |
| | NOTE: | It is essen flush of ti will initia to signing | ntial for the o he makeup h te flow to th g off the step | operato ine. If ie mak os. | or to read and u a reactor make eup line. Step: | understand the folloup water pump is 3.20.4, 3.20.5, and | lowing steps currently or nd 3.20.6 ma | before , the fo y be pe | initiating : llowing sto rformed p | a ep rior | |
| | | 3.20.4 | Open the f | followi | ing valves: | | | | | | |
| | | | • 1NV-2 | 42A (F | RMWST To B | /A Blender Ctrl) | | | | | |
| | | | • 1NV-1 | 86A (E | 3/A Blender O | tlt To VCT Otlt) | | | | | |
| | | 3.20.5 | Ensure one reactor makeup water pump is in "ON". | | | | | | | | |
| | NOTE: | Valves in additiona | the followin l reactor mai | ng step keup w | shall be posit vater flow due | ioned as sequence to seat leak by on | ed to preclud 1NV-186A | e unant | icipated | | |
| | | 3.20.6 | <u>WHEN</u> ∼ close the f | 20 gal ollowi | lons of makeu ng valves: | p water have been | n flushed thr | ough th | e makeup i | line, | |
| | | | 3.20.6.1 | 1NV | V-242A (RMV | VST To B/A Blen | der Ctrl) | | | | |
| | | | 3.20.6.2 | 1NV | V-186A (B/A] | Blender Otlt To V | CT Otlt) | | | | |
| | | 3.20.7 | Place the f | followi | ing valve cont | rol switches in "A | UTO": | | | | |
| | | | • 1NV-2 | 42A (F | RMWST To B | /A Blender Ctrl) | | | | | |
| | | | • 1NV-1 | 86A (E | B/A Blender O | tlt To VCT Otlt) | | | | | |
| | | 3.20.8 | Ensure con value reco | ntrolle rded in | r for 1NV-242 1 Step 3.20.1. | A (RMWST To E (R.M.) | 8/A Blender | Ctrl) is | set to the | | |
| | | 3.20.9 | Place cont | roller | for 1NV-242A | (RMWST To B/ | A Blender C | trl) in a | uto. | | |

| Appendix D | | Requ | uired | Operator A | Actions | | | Forr | n ES-D- | 2 |
|-----------------------|-------------------------------|-----------------------------------|---------------------|-----------------------------------|-------------------------------------|------------------------|-------------------|----------------------|-----------------------|-------|
| Op Test No.: 301 | Scena | rio # | 1 | Event # | 1 | F | Page | 18 | of | 111 |
| Event Description: | Decrease Reactor | | | r | | | | | | |
| | | | | | | | | | | |
| | | Enclosure 4.2 | | | | | |) DP/ 1 /A | /6150/009 | |
| | | | | Borati | on | | P | age 6 o | fб | |
| | 3.20.10 | d for current p Step 3.20.5 in | , place the | e reacto | r make | up water | | | | |
| 3.21 | IF autom | atic makeup | p is de | sired, perform | one of the foll | lowing: | | | | |
| | _ 3.21.1 | <u>IF</u> it is des Enclosure | sired to 4.1 (A | o change the t automatic Ma | olender outlet b keup). | oron con | centrati | on, refe | r to | |
| | | OR | | | | | | | | |
| | _ 3.21.2 | IF makeup previously | p at the v align | e previous con ed per Enclos | ncentration is ac ure 4.1 (Autom | cceptable atic Mak | AND t eup), pe | he syst erform i | em was the followi | ing: |
| | | 3.21.2.1 | Ens is se | ure the contro et to the value | ller for 1NV-2. recorded in Sto | 38A (B/A ep 3.7. (I | A Xfer I R.M.) | Pmp To | Blender C | (trl) |
| | | 3.21.2.2 | Pla | ce the "NC M | AKEUP MODI | E SELEC | T" swi | tch in ". | AUTO". | |
| | | 3.21.2.3 | Place pos | ce the "NC M ition. (R.M.) | AKEUP CONI | FROL" sv | vitch to | the "S | FART" | |
| <mark>N/A</mark> 3.22 | <u>IF</u> initiat OP/0/A/6 | ed in Step 3 5200/055 (M | .10, te fiscell | rminate PZR aneous Comp | spray by securi onent Operation | ing backu n). | p heate | rs per | | |

3.23 Do NOT file this enclosure.

| Appendix D | | Required Operator Actions | Form ES-D-2 |
|-------------------------|-------------------------|--|---|
| Op Test No.: <u>301</u> | Scena | rio # <u>1</u> Event # <u>1</u> | Page <u>19</u> of <u>111</u> |
| Event Description: | Decrease | e Reactor Power | |
| | | | |
| | | Enclosure 4.16 | OP/ 1 /A/6150/008 |
| 1 1: | | Control Bank Manual Operation A | At Power Page 1 of 2 |
| I. Lim | its and Pi | recautions | |
| 1.1 | This proc affect con | edure is Reactivity Management related be re reactivity by changing control rod position | cause it controls activities that can n. (R.M.) |
| 1.2 | The follo | wing Limits and Precautions are Reactivity | Management related: (R.M.) |
| | 1.2.1 | When rods are being moved, observe "RO direction. | DS IN/RODS OUT" light for proper |
| | 1.2.2 | When rods are being moved, observe the oposition to verify proper operation of the F | lemand position and actual (digital) Rod Control System. |
| | 1.2.3 | Adjusting T-Avg \pm 1°F of T-Ref before tra- will prevent undesired rod movement. | ansferring rod control to "AUTO" |
| | 1.2.4 | Monitor startup rate continuously during a stable startup rate. | ny rod motion to ensure < 0.5 DPM |
| 1.3 | Automati power. | ic rod control shall <u>NOT</u> be used when less | than 15% (184 MW _e) turbine |
| 1.4 | Individua position 1 | al control bank positions on "CRD BANK S rods manually. (The automatic overlap featu | ELECT" switch shall not be used to re is disabled.) |
| 1.5 | After rele again wil | easing Rod Motion lever, waiting 2 seconds l allow all signals to clear the firing cards. | before attempting to move rods |
| 1.6 | A rod mo properly | otion demand below zero steps may result in engaging the drive shaft. | the movable grippers <u>NOT</u> |
| 2. Initi | al Condit | tions | |
| <u>AA</u> 2.1 | Ensure R Managen | eactivity Management controls established p nent. (RM) | per AD-OP-ALL-0203 (Reactivity |
| AA 2.2 | Verify U | nit 1 is <u>NOT</u> in an EP or AP. | |
| <u>AA</u> 2.3 | Verify on | e of the following exist: | |
| | 🗹 Contr | rol Bank movement required to increase/dec | rease Reactor Power |
| | □ Contr | ol Bank movement required to increase/dec | rease Tavg |
| | □ Contr | ol Bank movement required to maintain AF | D |
| | | ol Bank manual control required to support | tecting/maintenance activity |

| Appendix D | Required Operator Actions Form ES-D-2 | |
|--------------------|--|--|
| Op Test No.: _301 | Scenario # <u>1</u> Event # <u>1</u> Page <u>20</u> of <u>111</u> | |
| Event Description: | Decrease Reactor Power | |
| | | |
| | | |
| | Enclosure 4.16 OP/1/A/6150/008 | |
| | Control Bank Manual Operation At Power Page 2 of 2 | |
| 3. Proc | cedure | |
| NOTE: | Steps 3.1 through 3.6 may be signed off as time allows ensuring operator maintains proper focus on reactivity management. | |
| <u>AA</u> 3.1 | Monitor the following: | |
| • | Tavg/Tref | |
| • | Demand Counter positions | |
| • | DRPI rod positions | |
| • | ROD MOTION RODS-IN/RODS-OUT Light | |
| • | ROD MOTION DEMAND SIGNALS - TEMP ERROR/POWER MISMATCH | |
| • | Power Range instruments | |
| • | IR SUR (Startup Rate) | |
| <u>AA</u> 3.2 | IF MANUAL ROD movement is desired, perform the following: | |
| | Verify the "ALM" LED on circuit card A206 in the left side of 1ERCC0006 (Rod Control Logic Cabinet) is <u>NOT</u> illuminated. | |
| | Verify one GRP select light is illuminated on each power cabinet. | |
| <u>AA</u> 3.3 | IF plant conditions require, place the "CRD BANK SELECT" switch in "MAN". | |
| N/A 3.4 | IF withdrawing Control Banks, pull and hold the "ROD MOTION" lever "OUT" as required until control rods are in the desired position. (R.M.) | |
| 3.5 | IF inserting Control Banks, push and hold the "ROD MOTION" lever "IN" as required | |
| | until control rods are in the desired position. (K.M.) | |
| 3.6 | IF automatic rod control is desired, perform the following: | |
| | $3.6.1$ Verify Unit 1 Reactor Power is $\geq 15\%$ RTP. | |
| | 3.6.2 <u>WHEN</u> Tavg is within 1°F of Tref, place "CRD BANK SELECT" in "AUTO". | |
| 3.7 | Do <u>NOT</u> file this enclosure in the Control Copy folder of this procedure. | |

| Appendix D | Requ | ired Operator Ac | tions | Form ES-D-2 | | | | |
|--------------------|--|--|--|--|---|-----|--|--|
| Op Test No.: 301 | Scenario # | 1 Event # | 1 | Page | 21_ of | 111 | | |
| Event Description: | Decrease Reactor F | Power | | | | | | |
| <u> </u> | | | | | | | | |
| | | Enclosure 4 | 1.2 | OP/1/ | B/6300/001 | | | |
| | | Load Chang | ing | Page 4 | of 5 | | | |
| | 3.1.3.7 | Verify new load targ | et appears on Ta | arget Display | <i>t</i> . | | | |
| | 3.1.3.8 | Select "GO" and ver | ify it illuminate | s to start load | increase. | | | |
| | 3.1.3.9 | Coordinate with Sec flowrates to obtain a | ondary Chemist naximum blowd | ry to adjust S lown for the a | /G blowdown appropriate load | 1. | | |
| CAUTION | : 1. The load, hydr Data Book Fig | ogen pressure and pov ure 43 shall <u>NOT</u> be e | ver factor limits exceeded. | per the Unit (| One Revised | | | |
| | Rate of change exceed 150°F/l | e of First-Stage Bowl I hr (OAC point C1P12 | nner Surface Te 83 (First Stage M | mperature sh Metal Temp R | all <u>NOT</u> Rate)). | | | |
| | OAC point C1. (OAC point C2 maintained abo Changing Reco | A1140 (Turbine Lowe IP1588 (Design Total ove and to the left of c commendations". | r Inner Shell Te Main Steam Flo urve in the Unit | mp) vs. Perce w, Measured One OAC Da | ent Steam Flow I (%)) shall be atabook "Load- | | | |
| | Control valve of Surface Metal Temp), shall <u>N</u> Chest" in the U | casing difference, OAC point C1A0961 (Turb Valve Chest Inner Temp) minus C1A0967 (Turb Valve Chest Outer Surface Metal <u>VOT</u> exceed curve "Allowable Temp Difference on Turbine Valve Unit 1 OAC Databook. | | | | | | |
| 3.2 | IF decreasing turbine | generator load, perfo | m the following | <u>;</u> : | | _ | | |
| AA_ | 3.2.1 Ensure the AD-OP-AI | proper reactivity man LL-0203 (Reactivity N | agement control Ianagement). (F | s established C.M.) | per | | | |
| | 3.2.2 <u>WHILE</u> de | ecreasing turbine gene | rator load, perfo | rm the follow | ving: | | | |
| | <u>AA</u> 3.2.2.1 | IF CV4 fully closes verify 1SM-33 (Ctrl | (92% of full loa Vlv #4 Stm Lea | id, 1127 MW ad Drn) opens | e), s. | | | |
| | 3.2.2.2 | IF CV3 fully closes (Ctrl Vlv #3 Stm Le | (65% of full loa ad Drn) opens. | d, 796 MWe) |), verify 1SM-2 | 25 | | |
| | | | | | | | | |

| Appendix I | D | Req | uired Operator Ac | tions | | Form ES-D |)-2 |
|---------------|-----------|---|---|---|--------------------------------|-----------------------------|-----|
| Op Test No.: | 301 | Scenario # | 1 Event # | 1 | Page | 22_of | 111 |
| Event Descrip | otion: De | ecrease Reactor | Power | | | | |
| | | | | | | | |
| | | | Enclosure 4 Load Chang | l.2 ing | OP/ 1 /J Page 5 | B/6300/001 of 5 | |
| | CAUTION: | 1. Normal stead on Enclosure "Recommend | ly-state load change sha 4.7 (Generator Operati led Starting and Loadin | ll be made witho ng Limits) and in g Curves". | ut exceeding 1 the Unit 1 C | limits shown AC Databook | |
| | | 2. Unit One Rearamp rates. | actor Operating Data, Se | ection 2.4 shall b | e referred to | for allowable | |
| • | 3. | 2.3 Decrease | turbine generator load l | by performing the | e following: | | |
| | | 3.2.3.1 | Select "LOAD RAT | E" and verify it i | <mark>illuminates</mark> . | | |
| | | 3.2.3.2 | Input the desired loa | <mark>d rate.</mark> | | | |
| | | 3.2.3.3 | Select "ENTER" and | 1 verify "LOAD | RATE" goes | dark | |
| | | 3.2.3.4 | Select "TARGET" a | nd verify it illun | ninates. | | |
| | | 3.2.3.5 | Input the desired loa | d target. | | | |
| | | 3.2.3.6 | Select "ENTER" and | 1 verify "TARGI | ET" goes darl | k. | |
| | | 3.2.3.7 | Verify new load targ | get appears on Ta | arget Display. | | |
| | | 3.2.3.8 | Select "GO" and ver | ify it illuminates | to start load | decrease. | |

3.3 Do <u>NOT</u> file this enclosure in the Control Copy folder of this procedure.

Coordinate with Secondary Chemistry to adjust S/G blowdown flowrates to obtain maximum blowdown for the appropriate load,

Note to Evaluator:

3.2.3.9

At this point, the power decrease has begun. At the discretion of the Lead Evaluator, the scenario may continue to the next event by instructing the booth operator to INSERT Trigger 2 (1KC-132 Failure).

| Appendix D | | Required Operator Actions Form ES-D-2 | | | | | | | |
|-------------------|-----|---------------------------------------|---------|-------------|------------------|-----------|----|----|-----|
| Op Test No.: | 301 | Scenario # | 1 | Event # | 3 & 4 | Page | 23 | of | 111 |
| Event Description | : | N44 Loss of Instr | ument l | Power / PZR | PORV (NC-34A) Fa | ails Open | | | |
| | | | | | | | | | |

Control Room Indications 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - LIT 1KC-132 (Letdn Hx Otlt Temp Ctrl) closing Letdown temperature on 1NVPT5590 increasing DCS Alarm "Letdown HX TEMP CTRL IN MAN"

Note To Evaluator:

The crew response for this failure can be found in the annunciator response for 1AD-7, F/3 on the following page. The failure is on the setpoint increase button on the controller for 1KC-132 and will delete after 10 seconds and transfer the controller to Manual. The crew will manually control 1KC-132 to increase cooling flow to the Letdown Heat Exchanger. If letdown temperature exceeds 136°F, then letdown 3-way valve 1NV-153A should bypass the mixed bed demineralizers. This is also failed, so crew may need to take 1NV-153A to the VCT position to manually bypass the demineralizers.

| | ndix D Required Operator Actions Form ES-D-2 | | | | | | |
|------------------------------|--|---|---|--|---|--|-----|
| Dp Test No.: <u>301</u> Scen | ario # | 1 Event # | 3 & 4 | Page | 24 | of | 111 |
| Event Description: N44 Lo | ss of Instrum | ent Power / PZR PO | RV (NC-34A) I | Fails Open | | | |
| | | | | OP/1 | L/B/610 | 0/010 H | |
| | | PANEL: 1AD-7 | | Page | 34 of 6 | 3 | |
| LETDN HX OU | TLET HI 1 | EMP | | | F | /3 | |
| SETPOINT: | 128°F | | | | | | |
| ORIGIN: | Instrument INVPT5590 | DCS 1NVAA5590 | Desci LETDOWN | ription HX OTLT | TEMP | | |
| PROBABLE CAUSE: | 1. L 2. 1 n | etdown flow too high KC-132 (Letdn Hx Ot talfunction | lt Temp Ctrl) (o | controlled by | y 1NVS | <mark>85590)</mark> | |
| AUTOMATIC ACTIONS: | <u>IF</u> letdov 3-Way V | wn temp. continues to 'lv) will divert Letdow | rise, at 136°F 1 m to volume co | NV-153A (I ntrol tank. | Ltdn Hx | Otlt | |
| IMMEDIATE ACTIONS: | 1. <u>I</u> fi C 2. I | E due to hi letdown flo rom service and/or tak control Valve) as nece E due to a low KC flo | ow, reduce flow ing manual con ssary. w, attempt to re: | rate by rem trol of 1NV- store normal | ioving o -148 (Le <mark>1 flow, b</mark> | rifices etdn Press <mark>y taking</mark> | |
| | 3. <u>I</u> 10 | nanual control of 1KC <u>F</u> KC flow <u>CANNOT</u> efer to AP/1/A/5500/0 | 132 (Letdn Hx be restored to I 21 (Loss of Cor | Otlt Temp Letdown He nponent Co | <mark>Ctrl).</mark> at Excha oling). | anger, | |
| SUPPLEMENTAR ACTIONS: | XY 1 2. E 3. V 4. <u>D</u> 4. 4 | Ensure letdown flow insure ND letdown flow xceed 185 gpm. Verify that 1NV-148 (I ack pressure of 350 ps E letdown temperature (x Otlt 3-Way VIv) div 1 <u>WHEN</u> letdo ensure 1NV- | does <u>NOT</u> exce w in Modes 5, 6 Letdn Press Con ig. exceeds 136°F rerts flow to the own temperature 153A (Ltdn Hx | eed <u>120</u> gpn 5 or No Moo trol) is mair , ensure 1N VCT, e decreases 1 Otlt 3-Way | n de does <u>l</u> ntaining V-153A V-153A Vlv) dir | NOT proper (Ltdn 36°F, rects | |
| NOTE: Complet normal o | ion of the eval | letdown flow uation/inspection in th | to the NV dem e following step | ineralizers. 9 shall <u>NOT</u> | delay a | return to | 1 |
| | - 5. <u>I</u> d | EKC flow is lost to th ontact Engineering to ue to water hammer. | e Letdown Hx f evaluate/inspect | or greater th t for any pos | ian 30 se ssible da | econds, mage | _ |
| REFERENCES: | 1. C 2. C 3. W 4. C | N-1554-01.06 N-1573-01.02 Vestinghouse Precautio CNM-1201.00-39) NCE-10993 NM 1399 03-0269 00 | ons, Limitations 1 Drop 7 Sheet | and Setpoir | nts Doci | ument | |

| Appendix D | Required Operator Actions Form ES-D-2 | | | | | | | -D-2 | |
|-------------------|---------------------------------------|-------------------|---------|---------------|----------------|-----------|----|------|-----|
| Op Test No.: | 301 | Scenario # | 1 | Event # | 3 & 4 | Page | 25 | of | 111 |
| Event Description | : | N44 Loss of Instr | ument I | Power / PZR P | ORV (NC-34A) F | ails Open | | | |

| Control Room Indications |
|--|
| 1AD2, A/1 "P/R HI NEUTRON FLUX RATE ALERT" – LIT |
| 1AD2, A/3 "P/R HI NEUTRON FLUX HI SET POINT ALERT" – LIT |
| 1AD2, B/1 "P/R LOWER DET HI FLUX DEV OR AUTO DEFEAT" – LIT |
| 1AD2, B/2 "P/R UPPER DET HI FLUX DEV OR AUTO DEFEAT" – LIT |
| 1AD2, B/3 "COMPARATOR P/R CHANNEL DEVIATION" – LIT |
| 1AD2, B/5 "P/R HI VOLTAGE FAILURE" – LIT |
| 1AD2, E/8 "OVER POWER ROD STOP" – LIT |
| 1AD2, F/10 "DCS TROUBLE" – LIT |
| N44 Indication fails to bottom of scale |

| Appendix D | Required Operator Actions Form ES-D-2 | | | | | | | | -D-2 |
|--------------------|---------------------------------------|------------------|----------|-------------|------------------|-----------|----|----|------|
| Op Test No.: | 301 | Scenario # | 1 | Event # | 3 & 4 | Page | 26 | of | 111 |
| Event Description: | : 1 | N44 Loss of Inst | rument I | Power / PZR | PORV (NC-34A) Fa | ails Open | | | |



| Арре | endix D | x D Required Operator Actions Form ES-D-2 | | | | | | | | | D-2 | |
|---------|-------------|---|--|---|--|--|-------------------|---|---|--|--|-------------------------|
| Op Tes | st No.: | 301 | Scena | irio # | 1 | Event # | Ł | 3 & 4 | Page | 27 | of | 111 |
| Event [| Description | : | N44 Los | s of Inst | trument | Power / P | ZR | PORV (NC-34A) F | ails Open | 1 | | |
| | | | | | | | | | | | | |
| | AP/ | CNS 1/A/5500 |)/016 | MALF | FUNCTIO | ON OF NUC Powe | CLE/ (r Ra | AR INSTRUMENT/ Case IV inge Malfunction | ATION SYS | STEM | PAGE 12 o Revis | E NO. f 15 ion 27 |
| | | | ACTION/E | XPECTED | RESPON | ISE | | RES | PONSE NOT | OBTAI | NED | |
| | 6. | At the swit | orm the for cellaneous Place the a SYPASS" is hannel por (erify the a od stop ch 1SI-19) - I Place "POV witch to the Place "UPP lefeat switt (erify the " or the upp Place "LOV lefeat switt (erify the low prothe low (or the low) (compared) (co | ollowing s Contro appropria switch to sition.) affected hannel by LT.) WER MI he affect ollowing rent Con PER SE(to to the CHANN er sectio WER SE ich to the 'CHANN er sectio | g actions of And In ate "ROD o the affe pothe affe nuclear of ypassed SMATCH ed chann g actions nparator CTION" (affected on - LIT.) CTION" e affected in - LIT.) CTION" affected in - LIT.) | s at the ndication STOP cted overpower status light HBYPASS hel position s at the panel: channel d channel, d channel d channel EAT" light EAT" light EAT" light | | Note to Evaluat Manipulation of Event 4 (1NC-3 suspend action proper Immedia the OATC. Onc stabilized, the (order (completi | or: i this swit 4A failure s of AP/1 ate Action e plant co CRS will co on of AP/ | ch will). The 6 and 6 perfo ndition lecide 16 vs. | trigger CRS sh ensure rmance ns have procedu AP/11). | ould by ure |

| Арре | ndix D | Required Operato | r Actions | ndix D Required Operator Actions Form ES-D-2 | | | | | | | | | |
|---------|---|--|---|--|-------------------------------------|--|--|--|--|--|--|--|--|
| Op Tes | t No.: <u>301</u> Scenar | io # <u>1</u> Event # | 3 & 4 | Page 28 | of <u>111</u> | | | | | | | | |
| Event D | Description: N44 Loss | s of Instrument Power / PZ | R PORV (NC-34A) F | ails Open | | | | | | | | | |
| | | | | | | | | | | | | | |
| | CNS AP/1/A/5500/016 | MALFUNCTION OF NUC | LEAR INSTRUMENTA Case IV Range Malfunction | TION SYSTEM | PAGE NO. 13 of 15 Revision 27 | | | | | | | | |
| | ACTION/EX | PECTED RESPONSE | RESP | ONSE NOT OBTAIN | ED | | | | | | | | |
| | <u>NOTE</u> The follow 1AD-2, A/ 1AD-2, A/ 1AD-2, B/ | ing annunciators will actuate I "P/R HI NEUTRON FLUX 3 "P/R HI NEUTRON FLUX 5 "P/R HI VOLTAGE FAILUF | in the following step: RATE ALERT" HI SET POINT ALERT RE". | 11 | | | | | | | | | |
| | 9. De-energize th follows: | e affected channel as | | | | | | | | | | | |
| | a. (Remove the Power Ran | e control power fuses at ge A drawer. | | | | | | | | | | | |
| | <u>NOTE</u> Replace author b. Request the control pow c. Verify the a cabinet sho damage. | cement of the affected P/R c ization of the Superintenden e OSM to maintain the er fuses under his control. ffected Power Range ws no physical signs of | ontrol power fuses sha t of Operations or his o c. Remove th Power Rai | ll not occur withou lesignee. ne instrument pow nge B drawer. | t er fuses at | | | | | | | | |
| | 10. Ensure affecte the required st 1 (P/R Bistable Tripped). | ed channel bistables are in tate. <u>REFER TO</u> Enclosure es That Must Be | Note to Evaluat Enclosure 1 is i | <u>or:</u> ncluded as Atta | chment 3. | | | | | | | | |
| | 11. Ensure operat record on NIS | ole P/R channel selected to RECORDER. |) | | | | | | | | | | |
| | 12. Adjust control T-Ref. | rods to maintain T-Ave at | <u> </u> | ot move in manu: e load to maintaiı | al, <u>THEN</u> n T-Ave at | | | | | | | | |
| | 13. WHEN T-avg v auto rod contr control rods to | vithin 1°F of T-Ref, <u>AND</u> ol desired, <u>THEN</u> return o auto. | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| Appendix D | | Required Operator Actions Form ES-D-2 | | | | | | | |
|--------------------|-----|---------------------------------------|---------|---------------|----------------|-----------|----|----|-----|
| Op Test No.: | 301 | Scenario # | 1 | Event # | 3 & 4 | Page | 29 | of | 111 |
| Event Description: | | N44 Loss of Instr | ument I | Power / PZR P | ORV (NC-34A) F | ails Open | | | |

| CNS AP/1/A/5500/016 | MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Case IV Power Range Malfunction | PAGE NO. 14 of 15 Revision 27 |
|------------------------|---|-------------------------------------|
|------------------------|---|-------------------------------------|

-

Г

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|-----|--|---|
| 14. | Determine and correct cause of P/R malfunction. | TECH SPEC EVALUATION |
| 15. | Ensure compliance with appropriate Tech Specs: - • 3.2.4 (Quadrant Power Tilt Ratio (QPTR)) - • 3.3.1 (Reactor Trip System (RTS) | T.S. 3.3.1 <u>Condition D:</u> (Place Channel 4 of Power Range Neutron Flux High and Power Range Neutron Flux High Positive Rate in the tripped condition within 72 hours) |
| 16. | Instrumentation). Determine required notifications: | <u>Condition E:</u> (Place Channel 4 Overtemperature ΔT and Overpower ΔT in the tripped condition within 72 hours) |
| - | REFER TO RP/0/A/5000/001 (Classification Of Emergency) REFER TO RP/0/B/5000/013 (NRC) | <u>Condition R:</u> (Verify P-10 is in required state for existing unit conditions within 1 hour) |
| 17. | Notification Requirements). Notify Reactor Group Engineer of occurrence. | <u>Condition S:</u> (Verify P-7, P-8, and P-9 are in required state for existing unit conditions within 1 hour) |
| 18. | WHEN the affected P/R channel is repaired, THEN ensure IAE returns the channel to service. | NOTE: T.S. 3.2.4 SR 3.2.4.1 has a NOTE which allows the crew to use the remaining 3 operable channels to calculate QPTR as long as THERMAL POWER is < 75%. This calculation |
| 19. | Determine long term plant status. RETURN TO procedure in effect. | is not required until 12 hours after exceeding 50% power. The crew could also perform an incore flux map per SR 3.2.4.2 in lieu of performing SR 3.2.4.1. |
| | | END |
| | | |
| | | |

Г

| Appendix D | Required Operator Actions Form ES-D-2 | | | | | | | | -D-2 |
|--------------------|---------------------------------------|-------------------|---------|-------------|------------------|-----------|----|----|------|
| Op Test No.: | 301 | Scenario # | 1 | Event # | 3 & 4 | Page | 30 | of | 111 |
| Event Description: | : | N44 Loss of Instr | ument l | Power / PZR | PORV (NC-34A) Fa | ails Open | | | |
| | | | | | | | | | |

| Control Room Indications |
|---|
| 1AD-6, D/10 "PZR LO PRESS PORV NC32 & 36 BLOCKED" – LIT |
| 1AD-6, D/11 "PZR LO PRESS PORV NC34 BLOCKED" – LIT |
| 1AD-6, E/10 "PZR PORV DISCH HI TEMP" – LIT |
| 1AD-6, F/8 "PZR LO PRESS CONTROL" – LIT |
| 1AD-6, F/11 "PRT HI PRESS" – LIT |
| Pressurizer Pressure Channels on 1MC-10 decreasing |

| Арре | ndix D | | Requi | red Operato | r Actions | | | Forr | n ES-D |)-2 | | |
|---------|---|----------------|------------|-------------|--------------|------------------------------|---|--------------------------------------|--|----------|--|--|
| Op Test | o Test No.: 301 Scenario # 1 Event # 3 & 4 Page 31 of | | | | | | | | 111 | | | |
| Event D | nt Description: N44 Loss of Instrument Power / PZR PORV (NC-34A) Fails Open | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | CNS AP/1/A/55 | S 00/011 | I | PRESSURIZER | PRESSURE | ANOM/ | ALIES | | PAGE 2 of | NO. 9 | | |
| | | | | Pressurize | r Pressure D | Revis | ion 23 | | | | | |
| r | | ACTION/EX | PECTED RES | PONSE | | RES | PONSE NOT | OBTAI | NED | | | |
| | C. Operate | or Actions | | | | | | | | | | |
| | Ve | rify all Pzr P | ORVs - CLO | SED. | Perf | orm the | following: | _ | | | | |
| | _ | | | | a. (| CLOSE F | Pzr PORV(s zr PORV cai |). nnot be | closed, | | | |
| | | CBIT | | ACK #4 | THEN | | | | | | | |
| | | CKI | ICAL I | ASK #1 | | | | | | | | |
| | | | | | N/A 2 | be clo follow | ving: | perform | n the | IOL | | |
| | | | | | | a) <u>IF</u> O A L(| in Mode 3 <u>R</u> in Mode 4 P/1/A/5500/ OCA). | with CL 4, <u>THEN</u> 027 (SI | As isolat <u>I GO TO</u> hutdown | ed | | |
| | | | | | | b) T | rip Unit 1 re | actor. | | | | |
| | | | | | - | C) <u>W</u> Se S | /HEN reactor etpoint reactor /I initiated. | or trippe hed, <u>TH</u> | ed <u>OR</u> S/ I <u>EN</u> ensu | l ire | | |
| | | | | | | d) <u>G</u> (F In | O <u>TO</u> EP/1/ Reactor Trip ijection). | A/5000 or Safe | /E-0 ety | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| [| | | | | | | | | | | | |

| Appe | ppendix D Required Operator Actions Form ES | | | | | n ES-D |)-2 | | | | | |
|---------|---|-----------------|-------------|-------------|----------|------------|-----------|----------------------------------|--|-----------------------------------|-----------------------|--------------------|
| Op Test | t No.: | 301 | Scenar | io # | 1 | Event # | | 3 & 4 | Page | 32 | of | 111 |
| Event D | Descriptior | 1: | N44 Loss | s of Instru | ument P | ower / PZ | R PORV | ′ (NC-34/ | A) Fails Open | | | |
| | | | | | | | | | | | | |
| | AP/ | CNS 1/A/5500 | 0/011 | | PRE | SSURIZER | PRESS | URE ANC | MALIES | | PAGE 3 of Revis | NO. 9 ion 23 |
| | | | | | | Pressurize | r Pressur | e Decrea | sing | | | |
| ſ | | | ACTION/EX | PECTED | RESPONS | E | | R | ESPONSE NOT | OBTAIN | IED | |
| | NC |)TE | Control roo | ds may w | ithdraw | on decreas | ing NC p | ressure. | | | | |
| | 2 | Veri | fy Pzr spra | y valve(| s) - CLO | SED. | I | Perform t | he following: | | | |
| | | | | | | | | a. CLOS | E affected spr | ay valve | e(s). | |
| | | | | | | | I | D. <u>IF</u> affe <u>THEN</u> | cted spray val perform the fo | ve(s) wi bllowing: | II not clo | se, |
| | | | | | | | | 1) Se sp | lect "FAIL CL(ray valve(s) m | OSED" f ode sele | or affect | ed h: |
| | | | | | | | | _• | "1 NC-27 PZR MODE SELEC | SPRAY | (VLV | |
| | | | | | | | | _• | "1 NC-29 PZR MODE SELEC | SPRAY | Y VLV | |
| | | | | | | | | 2) <u>IF</u> Su trip | AT ANY TIME pervisor deter prequired, TH | Contro mines th | l Room hat react | or |
| | | | | | | | | a) | Trip Unit 1 re | actor. | | |
| | | | | | | | | b) | <u>WHEN</u> react 5%, <u>THEN</u> st and 1B. | or powe top NC F | r less tha Pumps 1 | an A |
| | | | | | | | | c) | GO TO EP/1 (Reactor Trip Injection). | /A/5000 or Safe | /E-0 ety | |
| | | | | | | | | 3) <u>IF</u> inc | NC pressure s reasing, <u>THE</u> | stable <u>O</u> N <u>GO</u> TO | <u>R</u> 0 Step 3 | |
| | | | | | | | | RNO con | tinued on next | t page) | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| Appendix D | F | Required Operator A | Form ES-D-2 | | | | |
|--------------------|----------------|------------------------|-----------------|-----------|----|----|-----|
| Op Test No.: | 301 Scenario # | 1 Event # | 3 & 4 | Page | 33 | of | 111 |
| Event Description: | N44 Loss of Ir | strument Power / PZR F | PORV (NC-34A) F | ails Open | | | |
| | | | | | | | |

| CNS AP/1/A/5500/011 | CNS AP/1/A/5500/011 Pressurizer Pressure Decreasing | | | | | |
|--|---|------------------|---|--|--|--|
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | | | | | | |
| 2. (Continued) | | | 4) <u>IF</u> NC pressure continue decrease, <u>THEN</u>: a) <u>IF</u> in Modes 1 or 2, <u>I</u> (1) Trip Unit 1 react (2) <u>WHEN</u> reactor p than 5%, <u>THEN</u> Pumps 1A and (3) <u>GO TO EP/1/A/</u> (Reactor Trip or Injection). b) Stop NC Pumps 1A at 10 NCPs stop one additional N d) REFER TO AP/1/A/5 | s to HEN: for. bower less stop NC 1B. 5000/E-0 Safety and 1B. fon, <u>THEN</u> ICP. 500/004 | | |
| 3. Verify all Pzr I | ieaters - ENERGIZED, | P a b c | Derform the following: IE Pzr pressure less than 22 AND stable or decreasing, 1 ensure all Pzr heaters energing IF Pzr pressure less than 22 AND increasing, THEN oper heaters as required to stabili pressure at 2235 PSIG. WHEN Pzr pressure returns AND automatic Pzr pressure desired, THEN place Pzr heater. | 20 PSIG HEN ized. 20 PSIG ate Pzr ze Pzr to normal aters in | | |

| Appendix D | ed Operato | ed Operator Actions | | | | | | | |
|-----------------------|--|---|---|----------------------|---|--|-------------------------------|------------------------------|----------|
|)p Test No.: <u>3</u> | 01 Scenar | io # | L Event # | | 3 & 4 | Page | 34 | of | 111 |
| Event Description: | N44 Loss | of Instrume | nt Power / PZ | R PORV (| NC-34A) F | ails Open | | | |
| | | | | | | | | | |
| C | NS | P | RESSURIZER | PRESSU | RE ANOMA | LIES | | PAGE N | 0. |
| AP/1/A | 5500/011 | - | Pressurize | Case I r Pressure | | | 23 | | |
| | ACTION/EX | PECTED RESP | ONSE | | RESP | ONSE NOT | OBTAIN | ED |] |
| | Ensure 1NV-37 | A (NV Supp | v To Pzr Aux | | | | | | |
| | Spray) - CLOS | ED. | | | | | | | |
| NOTE | Positive re | activity is inse | erted during an | increase i | n NC pressi | ure which r | nay cau | se | |
| | auto rod in | sertion. | | | | | | | |
| 5. | Verify NC pres NCREA S ING. | sure - STAB | LE OR | IE RI | pressure o EFER TO A | ontinues P/1/A/5500 | to decre D/010 (R | ease, <u>THEN</u> REACTOR | <u>۱</u> |
| | | | | | | LANJ. | | | |
| 6. | WHEN NC pres | sure stable. | THEN: | | | | | | |
| _ | Stabilize unit | at appropriat | e power level. | | | | | | |
| · · | Adjust the fol maintain T-A | lowing as req vg within 1°F | uired to of T-Ref: | | | | | | |
| - | Turbine loa Control roc | ad Is | | | | | | | |
| - | Boron con | centration. | | | | | | | |
| N/A 7. | E Pzr pressure perform follow | e channel fai ing: | led, <u>THEN</u> | | | | | | |
| | a. Verify "P-11 PERMISSIV required sta | PZR S/I BLC /E" status ligh te for unit cor | DCK ht (1SI-18) in hditions. | a. | Ensure co 3.3.2 (Eng Actuation Instrumen | mpliance v jineered Sa System (E tation). | vith Tec afety Fe SFAS) | h Spec atures | |
| | Notify IAE to affected cha #00874531. within 72 ho | o fail following Innel per Moo Bistables sh urs: |) bistables for lel W/O hall be tripped | | | | | | |
| | Pzr low p OT Delta Pzr high p Pzr low p | ressure S/I T pressure Rea ressure Reac | ctor Trip tor Trip. | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Appendix D Op Test No.: <u>301</u> Scer | Required Operato | or Actions | Form Page <u>35</u> | of <u>111</u> |
|--|---|--|--|---|
| Event Description: N44 Lo | ss of Instrument Power / P2 | ZR PORV (NC-34A) Fa | ills Open | |
| CNS AP/1/A/5500/011 | PRESSURIZE | R PRESSURE ANOMAL Case I er Pressure Decreasing | JES | PAGE NO. 6 of 9 Revision 23 |
| ACTION/ | EXPECTED RESPONSE | RESPO | NSE NOT OBTAIN | ED |
| 8. Ensure com - 3.3.1 (Real Instrument - 3.3.2 (Eng Actuation 3 Instrument - 3.3.2 (Eng Actuation 3 Instrument - 3.3.3 (Post Instrument - 3.3.4 (Ren - 3.3.4 (Ren - 3.4.1 (RCS - 3.4.4 (RCS - 3.4.5 (RCS - 3.4.6 (RCS - 3.4.10 (Pres - 3.4.10 (Pres - 3.4.13 (RC | pliance with appropriate ctor Trip System (RTS) ation) neered Safety Features System (ESFAS) ation) Accident Monitoring (PAM) ation) ote Shutdown System) Pressure, Temperature, and rture From Nucleate Boiling ts) Loops - MODES 1 and 2) Loops - MODES 1 and 2) Loops - MODE 3) Loops - MODE 4) surizer) essurizer Safety Valves) essurizer Power Operated es (PORVs)) S Operational Leakage). | TECH SPEC EVALU See Attachment 10 T.S. 3.4.11 Condition B: (Close associated block va restore PORV to OF hours) T.S. 3.4.1 Condition A: (Resto within limits in 2 ho NOTE: This LCO ma RCS pressure. OAC DNB limit) will notifi condition. Conditio cleared prior to Tec | JATION for applicable e and remove p alve within 1 ho PERABLE statu ore DNB param ours) ay apply depen C alarm (PZR Lo fy operators of in will mostly lil ch Spec review. | Tech Specs. ower from our and is within 72 eter to iding on ow Press this kely be |
| KETOKN TO | procedure in enect, | END | | |
| Note to Evaluator: This completes Eve directing the booth Turbine Trip / Failed | nts 3 & 4. At Lead Evalua operator to insert Trigger Auto Reactor Trip). | tor discretion, the sc 5 (1A & 1B Low Vaci | enario may cor uum Trip / Faile | ntinue by ed Main |

| Appendix D | | Re | Operator A | Form ES-D-2 | | | | | |
|-------------------|-----|---------------------|------------|--------------------|--------------------|------------|--------|--------|-----------------|
| Op Test No.: | 301 | Scenario # | 1 | Event # | 5 | Page | 36 | of | 111 |
| Event Description | : | 1A & 1B Main Fe | ed Pum | - Ip Low Vacuur | n Trip / Main Turb | ine Trip F | ailure | / Auto | Rx Trip Failure |
| | | | | · | | | | | - |

| Control Room Indications |
|--|
| 1AD-5, A/1 "CFPT A TRIPPED" – LIT |
| 1AD-5, A/4 "CFPT A COMMON TROUBLE" – LIT |
| 1AD-5, C/1 "CFPT B TRIPPED" – LIT |
| 1AD-5, C/4 "CFPT B COMMON TROUBLE" – LIT |
| OAC Alarms for 1A & 1B CFPT Vacuum - LO |

Note To Evaluator:

Following trip of the Main Feed Pumps, the OATC will initiate a manual Reactor trip in accordance with Immediate Actions of AP/1/A/5500/006 (see below) and then transition to E-0.

Manual trip of the Reactor is critical because Automatic trip of the Reactor and Main Turbine will be failed.
| Appendix D | D Required Operator Actions | | ctions | s Form ES-D-2 | | | -2 | |
|--------------------------|--------------------------------------|-------------|-----------------------------------|--|---|-----------------------------|-------------------------------|-------------------|
| Op Test No.: 30 | 01 Scenario # | 1 | Event # | 5 | Page | 37 | of | 111 |
| Event Description: | 1A & 1B Main | Feed Pum | p Low Vacuu | m Trip / Main Tu | rbine Trip I | Failure | / Auto Rx | Trip Failure |
| | | | | | | | | |
| CNS AP/1/A/55 | \$ 00/006 | | LOSS OF S/C Ca Loss of CF S | FEEDWATER Ise I Upply To S/Gs | | | PAGE N 2 of 21 Revision | NO. I n 43 |
| | ACTION/EXPECTED | RESPONSE | | RESP | ONSE NOT | OBTAIN | ED | \Box |
| C.Operat | or Actions | | | | | | | |
| 1_ Ver | ify reactor power | - LESS T | HAN 5%. | IF <u>AT ANY</u> lost, <u>THEN</u> | <u>TIME</u> all (perform | CF sup the foll | ply to S / owing: | <mark>G(s)</mark> |
| | CRIT | ICAL T | ASK #2 | _ a. (Trip rea | ctor. | | | |
| | | | | b. <u>GO TO</u> Trip or S | EP/1/A/50 Safety Inje | 00/E-0 ction). | (Reactor |) |
| ^{2.} Ver (1A | ify all S/G hi-hi le D-4) - DARK. | vel alert a | larms | <u>IF</u> 2/4 S/G I greater tha following: | N/R levels in 83%, <u>Tl</u> | s on any <u>HEN</u> pe | y one S/(erform th | G e |
| | | | | a. Verify al lights (1 | ll Feedwat SI-5) - LIT | er Isola Isolatio | tion statu | light |
| | | | | not lit, <u>T</u> | HEN perfo | orm the | following | l: |
| | | | | 1) Initia | te Feedwa | ater Isol | lation. | |
| | | | | 2) <u>IF</u> pr obta valve | oper statu ined, <u>THE</u> e(s). | is light i <u>N</u> CLOS | ndication SE affecte | ed |
| ^{3.} Ver AC | ify 1AD-2, F/9 "D TION" - DARK. | CS ALTER | NATE | <u>IF</u> all the fo | ollowing c | onditio | ons exist | : |
| | | | | 1AD-2, F function i | /9 in alarm n alternate | n for CF e action | control | |
| | | | | At least of | one CF pur | mp - IN | SERVIC | E |
| | | | | _• 1AD-3, C | /6 "CF ISC | OL TRN | A" - DAF | RK |
| | | | | • 1AD-3, D | /6 "CF ISC | OL TRN | B" - DAF | RK, |
| | | | | <u>Auto).</u> | <u>FO</u> Case I | II (CF C | Control No | ot in |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|-----------------------------------|--|--|
| Op Test No.: | 301 Scenario # <u>1</u> Event # <u>6, 7, 8</u> | | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | d / Loss of Secondary Heat Sink / | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|---------------------------------|--|--|
| Op Test No.: | | Page <u>39</u> of <u>111</u> | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR | IP OR SAFETY INJECTION | PAGE NO. 5 of 49 Revision 43 |
|------------------------|---|--|---|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAIN | ED |
| | 1 I I I I I I I I I I I I I I I I I I I | Perform the following: a. <u>IF 1ETA AND 1ETB determents of the GOTO EP/1/A/50 (Loss of All AC Power).</u> b. <u>WHEN time allows, THEI restore power to determent with the continuit procedure. REFER TO AP/1/A/5500/007 (Loss of Power).</u> | nergized, 00/ECA-0.0 <u>N</u> attempt to gized ng with this f Normal |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|-------------------|--|-----------------------------------|--|--|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | Page <u>40</u> of <u>111</u> | | |
| Event Description | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | I / Loss of Secondary Heat Sink / | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|---------------------------------|--|--|
| Op Test No.: | 301 Scenario # <u>1</u> Event # 6, 7, 8 | Page <u>41</u> of <u>111</u> | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|-----------------------------------|--|--|
| Op Test No.: | | _ Page of111 | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | d / Loss of Secondary Heat Sink / | | |

| CNS EP/1/A/5000/ES-0.1 | REACT | OR TRIP RESPONSE | | PAGE NO. 3 of 41 Revision 45 |
|--|--|---|---|---|
| ACTION/E | XPECTED RESPONSE |] | RESPONSE NOT OBTAIN | ED |
| 2. (Continued) 2. (Continued) 2. (Continued) 3. Announce "Unon-essential Unit 1 Turbin NOTE Enclosur subsequ 4. Control NC te Enclosure 2 (5. Determine recommended) | nit 1 Reactor Trip, personnel stay out of e bldg". The 2 (NC Temperature Co ent steps provide alternations) mperature. <u>REFER TO</u> NC Temperature Control NC Temperature Control RP/0/A/5000/001 | ntrol) sha tive NC te bl). Enc | d. <u>WHEN</u> N/R level greater any S/G, <u>THEN</u> THROTT further to achieve the foll Minimize cooldown Maintain at least one S greater than 11%. e. IF VI pressure less than 8 <u>THEN</u> perform the following Align N₂ to Pzr PORVs the following valves: 1NI-438A (Emer N2 To 1NC-34A) 1NI-439B (Emer N2 To 1NC-32B). Dispatch operator to environ valves operation <u>TO</u> AP/0/A/5500/022 (Instrument Air). | than 11% in 'LE feed flow owing: /G N/R level 35 PSIG, ing: by opening From CLA A From CLA B nsure proper on. <u>REFER</u> _oss of |
| (Classification) (Classification) (Notification) | on Of Emergency) RP/0/B/5000/013 (NRC) Requirements). | | | |

| Appendix D | Required Operator Actions | | | Form ES-D-2 | | | | |
|--------------------|--|--|-------------|-------------|----------|------------|-----|--|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | | | Page | 43 | of | 111 | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | | d / Loss of | Secon | idary He | eat Sink / | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|---------------------------------|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>1</u> Event # <u>6, 7, 8</u> | _ Page _ <u>44</u> _ of111 | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|-------------------|--|-----------------------------------|--|--|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | _ Page _ <u>45</u> _ of111 | | |
| Event Description | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | I / Loss of Secondary Heat Sink / | | |

| CNS EP/1/A/5000/ES-0.1 | REACT | OR TRIP RESPO | DNSE | PAGE NO. 6 of 41 Revision 45 | | | |
|-------------------------------|--|---------------|---|--|--|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED | | | |
| 8. Verify adequat follows: | 8. Verify adequate shutdown margin as follows: | | | | | | |
| a. <mark>(DRPI indica</mark> | tion - AVAILABLE, | a. V fo | erify adequate shutdow Ilows: | n margin as | | | |
| | | 1) | Emergency borate 10 of 7000 PPM boron so follows: | ,000 gallons olution as | | | |
| | | - | a) OPEN 1NV-236B To NV Pumps Suc | (Boric Acid :t). | | | |
| | | _ | b) <u>IF</u> 1NV-236B will r <u>THEN</u> dispatch op open 1NV-236B (F NV Pumps Suct) (HH-JJ, 53-54, Rm | not open, berator to Boric Acid To AB-550, 234). | | | |
| | | | c) <u>WHEN</u> 1NV-236B perform the follow | open, <u>THEN</u> ing: | | | |
| | | | (1) Start boric aci pumps. | id transfer | | | |
| | | | (2) Calculate req injection time boric acid flov | uired based on vrate. | | | |
| | | | (3) <u>WHEN</u> require injected, <u>THE</u> emergency bo | ed boric acid <u>N</u> secure pration. | | | |
| | | 2) | Notify Reactor Group Engineer to perform a determine required sh margin. | Duty analysis to nutdown | | | |
| | | 3) | GO TO Step 8.c. | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|-----------------------------------|
| Op Test No.: | | Page <u>46</u> of <u>111</u> |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | I / Loss of Secondary Heat Sink / |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|-----------------------------------|
| Op Test No.: | 301 Scenario # <u>1</u> Event # <u>6, 7, 8</u> | _ Page _ <u>47</u> _ of111 |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | I / Loss of Secondary Heat Sink / |

| CNS EP/1/A/5000/ES-0.1 | REACT | OR TRIP RESPONSE PAGE NO. 8 of 41 Revision 45 | | |
|---|---|---|--|---|
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | | | ED | |
| 8. (Continued) | | | | |
| d. All NC T-Colds - GREATER THAN 545°F. | | d. Pe 1) | erform the following: Determine lowest T-C | old. |
| | | 2) | Determine core burnu full power days (EFPI Point P1457 or from F Operators logbook). | ip in effective D) (OAC Reactor |
| | | 3) | Verify lowest current greater than or equal limit at present burnu <u>TO</u> Unit 1 ROD Book, | T-Cold to allowable p. <u>REFER</u> Section 2.6. |
| | | 4) | <u>IF</u> lowest T-Cold less allowable limit, <u>THEN</u> add 40 gallons of 700 solution at greater tha 30 GPM for each deg T-Cold below limit of U Book, Section 2.6. | than immediately 0 PPM boron n or equal to ree lowest Jnit 1 ROD |
| | | 5) | GO TO Step 9. | |
| e <u>IF AT ANY</u> down to less <u>THEN</u> perfo | TIME NC T-Colds trend s than or equal to 545°F rm Step 8.d. | | | |
| | | | | |
| | | | | |
| | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|--|-----------------------------------|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | Page <u>48</u> of <u>111</u> |
| Event Description | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | I / Loss of Secondary Heat Sink / |

| CNS EP/1/A/5000/ES-0.1 | REACTOR TRIP RESPONSE PAGE NO. 9 of 41 Revision 4 | | PAGE NO. 9 of 41 Revision 45 | |
|--------------------------------|---|---|---|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 9. Verify proper l follows: | Pzr level control as | | | |
| a. Verify VI pre 50 PSIG. | essure - GREATER THA | N | a. Perform the following: 1) IF Pzr Level less than perform the following: a) Ensure normal leter ISOLATED. b) Ensure all Pzr heat c) Control charging to level to greater that maintaining flow leter to greater that maintaining flow leter 180 GPM. d) WHEN Pzr level g 17%, THEN Depret "ON" pushbutton. 2) IF AT ANY TIME NV not maintaining stable flow, THEN perform to maintaining stable flow, THEN perform to the stable flow, THEN PERFORMANCE (AB-551, JJ-55, R maintain the follow) Pzr level - GRE 17% Pzr level - TREP "PZR REF LEVI (RNO continued on next paid (RNO continued on next paid) | down - tters - OFF. o restore Pzr an 17% while ess than reater than ess C Heater controllers e charging he following: flow less with radio to 295 (NV h Ctrl Isol) m 231) to ving: ATER THAN NDING TO EL". age) |

| Appendix D | Required Operator Actions | | Form ES-D-2 |
|-------------------|---|-------------------------|-------------------------|
| Op Test No.: | <u>301</u> Scenario # <u>1</u> Event # | 6, 7, 8 Page | |
| Event Description | 1A CA Pump Failure / CAPT #1 Discharge Control Rod Insertion Failure | e Valve Closed / Loss o | f Secondary Heat Sink / |

| CNS EP/1/A/5000/ES-0.1 | REACTOR TRIP RESPONSE | | PAGE NO. 10 of 41 Revision 45 | | |
|---------------------------|---|----|--|--|--|
| ACTION/EX | I/EXPECTED RESPONSE RESPONSE NOT OBTAINED | | | ED | |
| 9. (Continued) | 9. (Continued) | | | | |
| | | C) | Dispatch operator perform the follow | with radio to ing: | |
| | | _ | (1) THROTTLE 1 (Seal Wtr Inj F Byp) (AB-555 233) as requir maintain 32 G water flow in s steps. | NV-311 Flow Ctrl , JJ-54, Rm ed to PM total seal subsequent | |
| | | _ | (2) CLOSE 1NV- Wtr Inj Flow C (AB-554, JJ-5 | 308 (Seal Xtrl Isol) 4, Rm 233). | |
| | | d) | WHEN dispatched throttled 1NV-295 1NV-311, THEN d manual pushbutto output to 100% de position for 1NV-2 A&B Disch Flow C | operators and epress n and raise mand 94 (NV Pmps trl). | |
| | | e) | WHEN VI restored perform Step 9. | , <u>THEN</u> | |
| | | f) | GO TO Step 10. | | |
| | | | | | |
| | | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|-----------------------------------|
| Op Test No.: | | Page <u>50</u> of111 |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | d / Loss of Secondary Heat Sink / |



| Appendix D | Required Operator Actions | | Form ES-D-2 | |
|--------------------|---|---------------------------------|--------------------------|--|
| Op Test No.: | 301 Scenario # 1 Event | # <u>6, 7, 8</u> Page | <u>51</u> of <u>111</u> | |
| Event Description: | 1A CA Pump Failure / CAPT #1 [Control Rod Insertion Failure |)ischarge Valve Closed / Loss o | of Secondary Heat Sink / | |

| CNS EP/1/A/5000/ES-0.1 | CNS REACTOR TRIP RESPONSE PAGE N /5000/ES-0.1 PAGE N 12 of 41 Revision | | PAGE NO. 12 of 41 Revision 45 |
|-----------------------------------|---|---|---|
| ACTION/E | XPECTED RESPONSE | RESPONSE N | OT OBTAINED |
| 11. Verify 1A and | 1B NC pumps - ON. | Ensure Pzr spray pump - IN MANU/ | valve for stopped NC AL <u>AND</u> CLOSED. |
| 12. Verify Pzr pre TRENDING TO | ssure - STABLE AT OR D 2235 P SIG. | Perform one of the a. IF Pzr pressure AND trending of the following: | e following: e less than 2235 PSIG down, <u>THEN</u> perform Pzr PORVs - CLOSED. PORV cannot be <u>EN</u> CLOSE its isolation <u>OR</u> 1NC-34A cannot <u>PR</u> isolated, <u>THEN</u> following: to PORVs by opening wing valves: 38A (Emer N2 From A To 1NC-34A) 39B (Emer N2 From 3 To 1NC-32B). affected Pzr PORV. spray valves - ve(s) cannot be closed, orm the following: pumps 1A and 1B. 1C <u>AND</u> 1D NC pumps <u>N</u> stop one additional p. Pzr heaters - ON. p 13. |
| | | (RNO continued | on next page) |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|--|---------------------------------|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | _ Page _ <u>52</u> of111 |
| Event Description | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / |

| CNS EP/1/A/5000/ES-0.1 | REACT | REACTOR TRIP RESPONSE PAGE N 13 of 4 Revisio | |
|---|---|---|---|
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | | NED | |
| 12. (Continued) | | b. IF Pzr pressure greater 2235 PSIG AND trendir perform the following: 1) Ensure all Pzr heate 2) Control Pzr pressure Pzr spray. 3) IF normal Pzr spray <u>THEN</u> perform the fo a) IF letdown in ser control Pzr press aux spray. <u>REFI</u> Enclosure 4 (NV b) IF letdown not in NV aux spray no <u>THEN</u> control Pz follows: (1) Verify Pzr Pr maintain Pzi than - 2335 (2) IF AT ANY T pressure gre 2335 PSIG, pressure wit PORV in ma | than ing up, <u>THEN</u> ins - OFF. a using normal not available, ollowing: vice, <u>THEN</u> ure using NV <u>ER TO</u> Aux Spray). service <u>OR</u> t available, r pressure less PSIG. TIME Pzr iater than - <u>THEN</u> control h one Pzr inual. |
| 13. Control S/G le — a. Verify N/R le GREATER — b. THROTTLE N/R levels b | vels as follows: evel in any S/G - THAN 11%. feed flow to maintain S/ etween 11% and 50%. | a. Maintain total feed flow 450 GPM until at least of level greater than 11%. b. <u>IF</u> N/R level in any S/G trend up, <u>THEN</u> stop fee S/G. | greater than one S/G N/R continues to ed flow to that |

| Appendix D | Required Operator Actions | Form ES-D-2 | |
|--------------------|--|---------------------------------|--|
| Op Test No.: | <u>301</u> Scenario # <u>1</u> Event # <u>6, 7, 8</u> | Page <u>53</u> of <u>111</u> | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | |



| Appendix D | Required Operator Actions | Form ES-D-2 | |
|--------------------|---|---------------------------------------|--|
| Op Test No.: | | B Page54 of111 | |
| Event Description: | : 1A CA Pump Failure / CAPT #1 Discharge Valve C Control Rod Insertion Failure | losed / Loss of Secondary Heat Sink / | |

| CNS EP/1/A/5000/ES-0.1 | REACT | OR TRIP I | RESPONSE | PAGE NO. 15 of 41 Revision 45 |
|---|---|-----------|--|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| ACTION/EX 16. Transfer cond pressure contr a. Verify "C-9 of STM DUMP LIT. | PECTED RESPONSE enser steam dump to rol mode as follows: COND AVAILABLE FOR " status light (1SI-18) - | | RESPONSE NOT OBTAIN a. Perform the following: Place steam dumps in mode as follows: a) Place "STM DUMP manual. b) Adjust "STM DUMP output to 0% dema c) Using "STEAM DU SELECT" switch, p following: e. Reset C-7A and | ED P pressure P CTRL" in P CTRL" and. JMP perform the I C-7B |
| | | | Place steam durpressure mode. 2) Dump steam using S/ in subsequent steps. 3) GO TO Step 17. | mps in G PORV(s) |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|---------------------------------|
| Op Test No.: | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / |

| CNS EP/1/A/5000/ES-0.1 | REACT | REACTOR TRIP RESPONSE PAGE NO. 16 of 41 Revision 45 | | | PAGE NO. 16 of 41 Revision 45 |
|------------------------------|---|---|---|---|--------------------------------------|
| ACTION/EX | PECTED RESPONSE | | RESI | PONSE NOT OBTAIN | IED |
| 16. (Continued) | | | | | |
| b. <mark>Verify all M</mark> | SIVs - OPEN. | | b. Perform | the following: | |
| | | | <u>Note</u> | If Pzr is solid, o PORVs too rap cause a large o pressure. | pening S/G idly can Irop in NC |
| | | | 1) Dun usin | np steam from iso g S/G(s) PORV a | lated S/G(s) s follows: |
| | | a) Ensure NC pressure maintained stable while throttling PORVs. | | ıre while | |
| | | b) Operate PORVS as required to stabilize S/G pressures at 1090 PSIG. | | as required to sures at | |
| | c) Operate S/G PORVs as required in subsequent ste | | Vs as quent steps. | | |
| | | | 2) <u>IF</u> al Step | II MSIVs closed,]) 17. | <u>rhen go to</u> |
| c. <mark>Verify stean</mark> | n dumps in T-AVE mode |) | c. Perform | the following: | |
| | | | 1) Ensi AT 1 PRE | ure "STM DUMP 1090 PSIG STEA SSURE. | CTRL" - SET M HEADER |
| | | | 2) <u>IF</u> C | -7A and C-7B res <u>TO</u> Step 16.d.3. | set, <u>THEN</u> |
| | | | 3) Usin swite | g "STEAM DUM ch, perform the fo | P SELECT" Illowing: |
| Note to Evaluator: | a) Reset C-7A and C-7B. | | с-7В. | | |
| Transition to FR-H | l.1 | | b) Return steam dumps to pressure mode. | | nps to |
| | | | c) <u>(</u> | <u>GO TO</u> Step 16.d. | .3. |
| | | | | | |

| Appendix D | Req | Required Operator Actions | | | Form ES- | -D-2 |
|-------------------|--|--------------------------------------|-----------------|----------------|------------|-------------|
| Op Test No.: | 301 Scenario # | 1 Event # | 6, 7, 8 | Page | 56 of | 111 |
| Event Description | 1A CA Pump Failu Control Rod Insert | ire / CAPT #1 Dischar ion Failure | ge Valve Closed | d / Loss of Se | econdary H | leat Sink / |



| Appendix D | Required Operator Actions | tor Actions Form ES-D-2 | |
|-------------------|--|---------------------------------|--|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | _ Page _ <u>57</u> _ of111 | |
| Event Description | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | |



| Appendix D | Required Operator Actions | Form ES-D-2 | |
|--------------------|--|---------------------------------|--|
| Op Test No.: | 301 Scenario # <u>1</u> Event # <u>6, 7, 8</u> | Page <u>58</u> of 111 | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | |



| Appendix D | Required Operator | Actions | Form ES-D-2 | |
|-------------------|--|---------------------------|-----------------|------------|
| Op Test No.: | 301 Scenario # 1 Event # | 6, 7, 8 Page | <u>59</u> of | 111 |
| Event Description | 1A CA Pump Failure / CAPT #1 Disc Control Rod Insertion Failure | harge Valve Closed / Loss | of Secondary He | eat Sink / |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LO | RESPONSE TO LOSS OF SECONDARY HEAT SINK PAGE NO. 5 of 135 Revision 46 | | PAGE NO. 5 of 135 Revision 46 |
|---|--|---|--|--|
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | | ED | | |
| 7. (Continued) 2) <mark>1AD-5, 1</mark> TRIP" - | F/3 "CAPT MECH OS DARK, | | 2) Perform the following: a) Dispatch operator CAPT trip and throe CAPT trip and throe content of the conten | to reset ottle valve. CAPT trip reset prior to bleed form Step 7. |
| 3) (<mark>"CAPT 1</mark> | "RIP T/V CTRL" - OPEN | D | 3) Perform the following: a) OPEN valve. b) <u>IF</u> valve will not op dispatch operator CAPT trip and three | en, <u>THEN</u> to open ottle valve. |
| 4) Verify th ● 1SA-2 ● 1SA-5 d. Ensure all 0 | e following valves - OPE ((S/G 1B SM To CAPT) (S/G 1C SM To CAPT) CA isolation valves - | EN:) | 4) Place CA Pump #1 to | "ON". |
| e. Verify all C/ OPEN. | A flow control valves - | | e. Perform the following: 1) IF valve(s) closed as Step 37, THEN GO T 2) OPEN affected valve(| required by O Step 7.f. s). |
| f. <mark>Start all ava</mark> | illable CA pumps. | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | |
|--------------------|--|---------------------------------|--|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | Page <u>60</u> of111 | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|---------------------------------|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | Page <u>61</u> of <u>111</u> |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LOSS OF SECONDARY HEAT SINK PAGE NO 7 of 135 Revision 4 | | | PAGE NO. 7 of 135 Revision 46 |
|---|--|---------|---|---|
| ACTION/EX | PECTED RESPONSE |] [| RESPONSE NOT OBTAI | NED |
| 7. (Continued) | | | c) Dispatch operato proper CA valve a <u>REFER TO</u> Enclor CA Flowpath Res d) <u>IF AT ANY TIME</u> restored greater t prior to meeting fainitiation criteria, Step 7. 4) <u>IF no CA flow indicat perform the following</u> a) <u>IF no CA pump co THEN</u> dispatch o maintenance to Cattempt to restore pump to service. EM/1/A/5200/007 (Troubleshooting CA Pump(c) Ealig | r to verify alignment. osure 2 (Local storation). CA flow than 450 GPM eed and bleed <u>THEN</u> perform ed, <u>THEN</u> cone ca <u>REFER TO</u> Cause For na to Start) |
| Note to Eva Enclosure 2 | iluator: 2 is included as Attach | ment 9. | b) Dispatch operato proper CA valve a REFER TO Enclo CA Flowpath Res c) F AT ANY TIME | r to verify alignment. osure 2 (Local storation). CA flow |
| Note to Evaluator: Two minutes follow dispatched operato that 1CA-21 is clos opened two minute given. At that point restored and the cr 7. The correct path listed illustrated at | ving dispatch, the or will notify the crew ed. This valve will be es after direction is t, CA flow will be rew will re-perform Step through this step is page 66. | P | THEN perform St 5) GO TO Step 8. | ep 7. |

| Appendix D | Required Operator Actions | Form ES-D-2 | |
|--------------------|--|-----------------------------------|--|
| Op Test No.: | <u>301</u> Scenario # <u>1</u> Event # <u>6, 7, 8</u> | Page62of111 | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | ا / Loss of Secondary Heat Sink / | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|---------------------------------|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>1</u> Event # <u>6, 7, 8</u> | Page <u>63</u> of <u>111</u> | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | | |

| EP/1/A | CNS /5000/FR-H.1 | RESPONSE TO LOSS OF SECONDARY HEAT SINK PAGE NO. 9 of 135 Revision 44 | | PAGE NO. 9 of 135 Revision 46 | | |
|---------|--|--|---------|---|---|---|
| | ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT OBTAIN | ED |
| 10. | Verify CM Sys follows: • Hotwell pump • Condensate | tem in service as o(s) - ON Booster pump(s) - ON. | _ | Perfe a. P <u>T</u> a b. <u>IF</u> S | orm the following: lace CM System in serv <u>O</u> OP/1/A/6250/001 (Co nd Feedwater System). <u>CM System cannot be</u> ervice, <u>THEN</u> observe N tep 19 and <u>GO TO</u> Step | ice. <u>REFER</u> indensate placed in lote prior to 19. |
| 11. | Reset Feedwa a. Verify the fo DARK: - • 1AD-8, D TRAIN A - • 1AD-8, E TRAIN B - • 1AD-8, D TRAIN A - • 1AD-8, D TRAIN A - • 1AD-8, D TRAIN B | ter Isolation as follows ollowing annunciators - 7 "INNER DOGHOUSE LEVEL HI" 7 "INNER DOGHOUSE LEVEL HI" 78 "OUTER DOGHOUSE LEVEL HI" 78 "OUTER DOGHOUSE LEVEL HI". |) | a. <u>II</u> ev to F D | doghouse level greate qual to 11 inches, <u>THEN</u> bypass Feedwater Isol i-Hi doghouse level. <u>Rt</u> M/1/A/5200/008 (Bypas eedwater Isolation Due oghouse Level). | r than or I notify IAE ation due to <u>EFER TO</u> sing to Hi-Hi |
| _ | b. Verify S/I - I ACTUATED | HAS PREVIOUSLY). | -> N | b. P 1) I/A 2) 3) | erform the following: Reset Feedwater Isolation reset, <u>THEN</u> perform to a) Notify IAE to bypa: Isolation. <u>REFER</u> EM/1/A/5200/009 Feedwater Isolation b) <u>WHEN</u> IAE has by Feedwater Isolation <u>THEN</u> ensure Fee Isolation reset. <u>GO TO</u> Step 11.f. | ation. n will not the following: ss Feedwater <u>TO</u> (Bypassing n). passed n signal, dwater |

| Appendix D | Required Operator Actions | Form ES-D-2 | |
|--------------------|--|-----------------------------------|--|
| Op Test No.: | 301 Scenario # <u>1</u> Event # <u>6, 7, 8</u> | _ Page64of111 | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | I / Loss of Secondary Heat Sink / | |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LO | RESPONSE TO LOSS OF SECONDARY HEAT SINK | | PAGE NO. 10 of 135 Revision 46 | |
|---|--|---|---------------------|--|--|
| ACTION/EX | PECTED RESPONSE |] [| R | RESPONSE NOT OBTAIN | ED |
| 11. (Continued) c. Notify IAE to Isolation. R EM/1/A/520 Feedwater I d. WHEN IAE Isolation sig Feedwater e. Ensure S/I 1) ECCS. | o bypass Feedwater EFER TO 0/009 (Bypassing solation). has bypassed Feedwate nal, <u>THEN</u> ensure solation reset. RESET: | er - | 1) L E E N | ocally reset ECCS. P/1/A/5000/G-1 (Ge Inclosures), Enclosur Master Reset). | REFER TO neric re 4 (ECCS |
| 2) D/G load | d sequencers. | | 2) [s b _ | Dispatch operator to d equencer(s) control p preaker: 1EDE-F01F (Diesel Load Sequencer Pa 1DGLSA) (AB-577, 496) 1EDF-F01F (Diesel Load Sequencer Pa 1DGLSB) (AB-560, 372). | open affected oower Generator anel BB-46, Rm Generator anel BB-46, Rm |
| - ³⁾ IF AT AI <u>THEN</u> re previous | NY TIME B/O occurs, estart S/I equipment ly on. <u>TIME</u> subsequent solation occurs, <u>THEN</u> <u>O</u> Step 11. | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|---------------------------------|--|--|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | Page <u>65</u> of111 | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|---|----------------------------------|------------------------------------|--|--|
| Op Test No.: | 301 Scenario # 1 Event # 6, 7, 8 | Page66of111 | | |
| Event Description: 1A CA Pump Failure / CAPT #1 Discharge Va Control Rod Insertion Failure | | ed / Loss of Secondary Heat Sink / | | |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LOSS OF SECONDARY HEAT SINK 3 of 135 Revision 4 | | | PAGE NO. 3 of 135 Revision 46 |
|---|---|------------|---|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 5. Verify NC Syst required as fol | em feed and bleed lows: | | | |
| a. W/R level in THAN 24% | at least 3 S/Gs - LESS (36% ACC). | | a. Perform the following: 1) Monitor feed and blee criteria. <u>REFER TO E</u> (Foldout Page). 2) <u>WHEN</u> criteria satisfie <u>TO</u> Step 21. 3) <u>GO TO</u> Step 6. | ed initiation Enclosure 1 ed, <u>THEN GO</u> |
| b. <u>GO TO</u> Step 6. <u>Ensure S/G BE</u> <u>REFER TO Enc</u> NM Valve Chec 7. <u>Attempt to est</u> | and NM valves closed closure 9 (S/G BB and cklist). | 1 . | | |
| a. Verify 1AD-4 DARK. | 3, B/1 "UST LO LEVEL" | • | a. Perform the following: 1) <u>REFER TO</u> AP/1/A/53 (Loss of S/G Feedwa) 2) <u>GO TO</u> Step 7.c. | 500/006 ter). |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|---|--|--|
| Op Test No.: | | _ Page of111 | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | ے۔ ۱ / Loss of Secondary Heat Sink / | | |



| Appendix D | Required Operator Action | ons Form ES-D-2 | Form ES-D-2 | | |
|--|--|--|-------------|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>1</u> Event # | 6, 7, 8 Page <u>68</u> of <u>111</u> | | | |
| Event Description: 1A CA Pump Failure / CAPT #1 Discharge Valve Clo Control Rod Insertion Failure | | Valve Closed / Loss of Secondary Heat Sink / | | | |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LO | RESPONSE TO LOSS OF SECONDARY HEAT SINK 5 of 135 Revision 46 | | |
|--|--|--|--|--|
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | | | | ED |
| 7. (Continued) 2) <mark>1AD-5, 1</mark> TRIP" - | F/3 "CAPT MECH OS DARK, | | 2) Perform the following: a) Dispatch operator CAPT trip and thro b) IF AT ANY TIME of and throttle value reaching feed and criteria, THEN per c) GO TO Step 7.d. | to reset ottle valve. CAPT trip reset prior to bleed form Step 7. |
| 3) (<mark>"CAPT 1</mark> | "RIP T/V CTRL" - OPEN | D | 3) Perform the following: a) OPEN valve. b) <u>IF</u> valve will not op dispatch operator CAPT trip and three | en, <u>THEN</u> to open ttle valve. |
| 4) (Verify th ● 1SA-2 ● 1SA-5 d. Ensure all 0 | e following valves - OPE ((S/G 1B SM To CAPT) (S/G 1C SM To CAPT) CA isolation valves - | EN:) | 4) Place CA Pump #1 to | "ON". |
| e. Verify all C/ OPEN. | A flow control valves - | | e. Perform the following: 1) IF valve(s) closed as Step 37, THEN GO T 2) OPEN affected valve(| required by <u>0</u> Step 7.f. s). |
| f. <mark>Start all ava</mark> | illable CA pumps. | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|-----------------------------------|
| Op Test No.: | 301 Scenario # <u>1</u> Event # <u>6, 7, 8</u> | _ Page _ <u>69</u> _ of111 |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | I / Loss of Secondary Heat Sink / |

| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 7. (Continued) |
|---|
| 7. (Continued) g. Verify total CA flow - GREATER g. Perform the following: 1) IF only one motor driven CA pump on AMD its discharge path cannot be aligned to associated S/GS, THER vealuate aligning flow to other S/GS through motor driven CA train A/B cross-tie alignment. REFER TO Enclosure 3 (Motor Driven CA Pump Train A/B Cross-Tie Alignment). 2) IF any CA pump on AMD Step 37 has been implemented, THEN each or S/G CA Flow Restoration). 3) IF any feed flow to at least one S/G confided THEN perform the following: a) Maintain flow to restore N/R level in at least one S/G verified, THEN perform the following: a) Maintain flow to restore N/R level in at least one S/G verified, THEN perform the following: b) IF AT ANY TIME N/R level in at least one S/G trands up to greater than 11% (29% ACC). b) IF AT ANY TIME N/R level in at least one S/G trands up to greater than 11% (29% ACC). c) IF AT System OR S/G defined and bleed initiation criteria, THEN perform the following: a) NC pressure b) S/G pressure. c) RETURN TO procedure and step in effect. |
| () |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|---------------------------------|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>1</u> Event # <u>6, 7, 8</u> | | | |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | / Loss of Secondary Heat Sink / | | |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LO | SS OF SE | CONDARY HEA | T SINK | PAGE NO. 7 of 135 Revision 46 |
|---------------------------|-----------------|----------|--|---|---|
| ACTION/EX | PECTED RESPONSE | | RESPONS | E NOT OBTAIN | ED |
| 7. (Continued) | | | C) Disp prop REF CA F CA f CA f CA f CA f F no C/perform (IF no C | atch operator er CA valve a <u>ER TO</u> Enclos Towpath Rest T <u>ANY TIME</u> (ored greater the to meeting feetion criteria, <u>T</u> 7. A flow indicate the following: D CA pump ca <u>N</u> dispatch op tenance to C/ mpt to restore p to service. <u>1</u> 1/A/5200/007 ubleshooting (Pump(s) Failin atch operator er CA valve a <u>ER TO</u> Enclos Towpath Rest <u>T ANY TIME</u> (ored prior to m bleed initiation <u>N</u> perform Ste Step 8. | to verify lignment. sure 2 (Local oration). CA flow han 450 GPM ed and bleed HEN perform ed, THEN n be started, herator and A pumps to one CA REFER TO Cause For ig to Start). to verify lignment. sure 2 (Local oration). CA flow heeting feed n criteria, ep 7. |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|-----------------------------------|
| Op Test No.: | | Page71of111 |
| Event Description: | 1A CA Pump Failure / CAPT #1 Discharge Valve Closed Control Rod Insertion Failure | d / Loss of Secondary Heat Sink / |



Attachment List

Scenario 1

| ATTACHMENT 1 - | Crew Critical Task Summary |
|-----------------|--|
| ATTACHMENT 2 - | Shift Turnover Information |
| ATTACHMENT 3 - | AP/1/A/5500/016 Enclosure 1 (P/R Bistables That Must Be Tripped) |
| ATTACHMENT 4 - | EP/1/A/5000/E-0 Enclosure 1 (Foldout Page) |
| ATTACHMENT 5 - | EP/1/A/5000/ES-0.1 Enclosure 1 (Foldout Page) |
| ATTACHMENT 6 - | EP/1/A/5000/ES-0.1 Enclosure 2 (NC Temperature Control) |
| ATTACHMENT 7 - | EP/1/A/5000/FR-H.1 Enclosure 1 (Foldout Page) |
| ATTACHMENT 8 - | EP/1/A/5000/FR-H.1 Enclosure 9 (System Verification Following S/I Actuation) |
| ATTACHMENT 9 - | EP/1/A/5000/FR-H.1 Enclosure 2 (Local CA Flowpath Restoration) |
| ATTACHMENT 10 - | Scenario Specific Technical Specifications |
| | CREW CRITICAL TASK SUMMARY | | | | |
|-----|----------------------------|------|---|--|--|
| SAT | UNSAT | CT # | CRITICAL TASK | | |
| | | 1 | Manually isolate failed open Pressurizer PORV (1NC-32B) prior to any RPS actuation. | | |
| | | 2 | Manually trip the reactor from the control room prior to S/G dryout conditions (<12% W/R level) occurs on any S/G. | | |
| | | 3 | Establish feedwater flow to at least one S/G before NC feed and bleed is required (<24% W/R level in 3 out of 4 S/G). | | |

Comments:

| SHIFT TURNOVER INFORMATION | | | | | | |
|--|---|---------------|-------|--|--|--|
| Unit 1 Status | | | | | | |
| Power Level | Power History | NCS Boron | Xenon | | | |
| 75 % | 75 % EOL 187 PPM per OAC | | | | | |
| | Controlling | Procedure | | | | |
| OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.2 (Power Decrease). The steps up to step 3.18 are complete. | | | | | | |
| Other Information Needed to Assume the Shift | | | | | | |
| • Unit 1 is at 75% power at the EOL. Unit 2 is at 100% power. 1B CA Pump is removed from service for PMs. 1B CA Pump has been inoperable for 3 hours and is expected to be returned to service in 6 hours. Direction for the crew is to decrease reactor power to 50% and secure the 1A main feedwater pump for emergent repair work. A reactivity plan has been provided by Reactor Engineering for a 10% per hour decrease in reactor power. | | | | | | |
| AOs Available | | | | | | |
| S | Seven AOs are available as listed on the status board | | | | | |
| | METEOROLOGIC | AL CONDITIONS | | | | |
| Upper wind direction | n = 315 degrees, speed = | 3 mph | | | | |
| Lower wind direction | n = 315 degrees, speed = | 4.5 mph | | | | |
| Forecast calls for cle | ear skies over the next 24 | hours. | | | | |

| CNS AP/1/A/5500/016 | MALFUNCTION OF NUCLEAR INSTRUMENTATION SYSTEM Enclosure 1 - Page 1 of 1 P/R Bistables That Must Be Tripped | PAGE NO. 15 of 15 Revision 27 |
|---|---|-------------------------------------|
| | | |
| 1. Ensure the fol unit condition | lowing reactor trip system interlocks in required state (1SI-18) fo s within 1 hour: | r existing |
| _ • P-7 | | |
| • P-8 | | |
| • P-9 | | |
| • P-10. | | |
| 2. Ensure the fol within 72 hour | lowing bistables for the affected channel are placed in the trippe 's: | d condition |
| NC loop OT[NC loop OP[NC loop OP[| DT reactor trip status light (1SI-7) - LIT DT reactor trip status light (1SI-7) - LIT. | |
| <u>NOTE</u> The follow removal of | ing bistables can only be assured to stay in the tripped condition by the affected channel's control power fuses. | 10 |
| 3. Ensure the fol 72 hours: | lowing bistables for the affected channel are in the tripped condi | tion within |
| P/R high flux P/R high flux P/R high flux | t low setpoint status light (1SI-3) - LIT t high setpoint status light (1SI-3) - LIT t rate status light (1SI-3) - LIT. | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

REACTOR TRIP OR SAFETY INJECTION

| EP/1/ | /A/5000/E-0 | Enclosure 1 - Page 1 of 2 Foldout Page | 34 of 49 Revision 4 | | | |
|--|---|--|------------------------|--|--|--|
| | | | | | | |
| 1. | NC Pump Trip | Criteria: | | | | |
| | <u>IF</u> the followin injection flow | ng conditions satisfied, <u>THEN</u> trip all NC pumps while maintaini | ng seal | | | |
| Any NV or NI pump - DELIVERING S/I FLOW TO NC SYSTEM | | | | | | |
| | NC subcod | ling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F | : | | | |
| | Reactor po | wer - LESS THAN 5%. | | | | |
| 2. | CA Suction So | ource Switchover Criterion: | | | | |
| | <u>IF</u> 1AD-8, B/1 Feedwater). | 1 "UST LO LEVEL" lit, <u>THEN</u> <u>REFER</u> <u>TO</u> AP/1/A/5500/006 (Los | s of S/G | | | |
| 3. | Position Criter | ia for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Iso | I): | | | |
| | IF NC pressu 1NV-202B ar | re less than 1500 PSIG <u>AND</u> NV S/I flowpath aligned, <u>THEN</u> C nd 1NV-203A. | LOSE | | | |
| | IF NC pressu | re greater than 2000 PSIG, <u>THEN</u> OPEN 1NV-202B and 1NV- | 203A. | | | |
| 4. | Ruptured S/G | CA Isolation Criteria: | | | | |
| | • IF both the fo | llowing conditions met, <u>THEN</u> stop CA flow to affected S/G(s): | | | | |
| | Level incre | asing in uncontrolled manner or radiation level in that S/G abo | ormal | | | |
| | N/R level - | GREATER THAN 11% (29% ACC). | | | | |
| 5. | Faulted S/G C/ | A isolation Criteria: | | | | |
| | • IF all the follo | wing conditions met, THEN stop CA flow to affected S/G: | | | | |
| | S/G pressu | ire decreasing in uncontrolled manner or completely depressur | ized | | | |
| | Only one S | G diagnosed as faulted | | | | |
| | Secondary | heat sink criteria met: | | | | |
| | Total CA | flow - GREATER THAN 450 GPM | | | | |

OR

CNS EP/1/A/5000/E-0

ANY S/G(s) N/R level - GREATER THAN 11%(29% ACC).

PAGE NO. 34 of 49

Revision 43

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 35 of 49 Revision 43 |
|------------------------|---|-------------------------------------|
| | | |

| 6. NS Pump Trip Criterion: |
|---|
| IF NS pump in recirc and S/I occurs, <u>THEN</u> perform one of the following: |
| IF train affected ECCS and D/G load sequencer - RESET, THEN stop NS pump |
| OR |
| <u>WHEN</u> sequencer loading complete, <u>THEN</u> perform the following for affected train: |
| a. Notify Control Room Supervisor. |
| b. Reset ECCS. |
| c. Reset D/G load sequencer. |
| d. Secure NS pump. |
| e. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |

| EP/1/A/5000/ES-0.1 Enclosure 1 - Page 1 of 1 Foldout Page 2 of 41 Revision 45 |
|---|
|---|

| <u>IF</u> NC subcooling based on core exit T/Cs less than 0°F <u>OR</u> Pzr level ca maintained greater than 4%, <u>THEN</u> perform the following: | nnot be |
|---|--------------|
| a. Initiate S/I. | |
| b. GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). | |
| <u>IF</u> S/I actuation occurs, <u>THEN GO TO</u> EP/1/A/5000/E-0 (Reactor Trip or Injection). | Safety |
| 2. CA Suction Source Switchover Criterion: | |
| IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Feedwater). | (Loss of S/G |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

٦

| EP/1/A | CNS v5000/ES-0.1 | REACTO Enclo NC Te | OR TRIP R sure 2 - Pa mperature | ESPONSE ge 1 of 6 Control | PAGE NO. 28 of 41 Revision 45 |
|----------|---|---|---------------------------------------|--|--|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAI | NED |
| _ 1. | Verify at least | one NC pump - ON. | | Perform the following: a. Use NC T-Colds to dete temperature as required subsequent steps. b. IF all MSIVs closed, TH Step 4. c. Place steam dumps in p as follows: Using "STEAM DUM switch, perform the f Reset C-7A and C Place steam dump mode. 2) Ensure "STM DUMP AT 1090 PSIG STEA PRESSURE. 3) Ensure steam dump maintain steam head 1090 PSIG. d. GO TO Step 4. | rmine NC in EN GO TO ressure mode P SELECT" ollowing: -7B os in pressure CTRL" - SET M HEADER s control to ler pressure - |
| 2. 3. | Use NC T-Avg temperature as steps. IF AT ANY TIM <u>THEN</u> use NC temperature as steps. | to determine NC s required in subseque <u>E</u> NC pumps tripped, T-Colds to determine N s required in subseque | ent IC ent | | |

| CNS EP/1/A/5000/ES-0.1 | REACT Enclo NC Te | DR TRIP RESPONSE sure 2 - Page 3 of 6 mperature Control | PAGE NO. 30 of 41 Revision 45 |
|-----------------------------------|--|--|---|
| ACTION/E | XPECTED RESPONSE | RESPONSE NOT | OBTAINED |
| _ 7. Verify NC ten 557°F AND T | Aperature - LESS THAN RENDING DOWN. | Perform the followi a. IF NC temperatur <u>AND</u> trending up temperature at 55 — 1) IF steam dum — 2) IF steam dum <u>THEN</u> use S/0 b. IF the following c — • NC temperatur and stable — • Time and many <u>THEN</u> stabilize N 557°F as follows: — 1) IF steam dum <u>use steam du</u> — 2) IF steam dum <u>THEN</u> use S/0 _ c. <u>GO TO</u> Step 9. | ng: re greater than 557°F <u>THEN</u> stabilize NC 57°F as follows: ps available, <u>THEN</u> mps. ps not available, G PORVS. onditions exist: re greater than 557°F power available, C temperature at mps ps not available, <u>THEN</u> mps ps not available, G PORVS. |

| CNS EP/1/A/5000/ES-0.1 | REACTOR TRIP RESPONSE Enclosure 2 - Page 4 of 6 NC Temperature Control | | RESPONSE age 4 of 6 re Control | PAGE NO. 31 of 41 Revision 45 |
|--|---|------------------|---|-------------------------------------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | NED |
| Attempt to sto follows: a. IF steam du open, THEN pressure mo 1) Using "S switch, p — • Reset — • Place mode. — 2) Ensure " AT 1090 PRESSU — 3) Ensure s maintain 1090 PS _ b. Verify all S/0 _ c. Ensure S/G d. CLOSE the _ • 1SM-77A C/V) _ • 1SM-75A C/V) _ • 1SM-74B C/V). | p NC cooldown as mps open <u>AND</u> any MSI place steam dumps in ode as follows: TEAM DUMP SELECT" erform the following: C-7A and C-7B steam dumps in pressur STM DUMP CTRL" - SE PSIG STEAM HEADER JRE. steam dumps control to steam header pressure IG. G PORVs - CLOSED. blowdown isolated. following valves: (S/G 1A Ottt Hdr Bldwn (S/G 1C Ottt Hdr Bldwn (S/G 1D Ottt Hdr Bldwn | IV e T | b. IF any S/G PORV canno THEN CLOSE its isolatic | t be closed, on valve. |

| CNS EP/1/A/5000/ES-0.1 Enclosure 2 - Page 5 of 6 NC Temperature Control | | RESPONSE age 5 of 6 re Control | PAGE NO. 32 of 41 Revision 45 | |
|---|---|--------------------------------------|--|---|
| ACTION/EX | PECTED RESPONSE |] | RESPONSE NOT OBTAIN | IED |
| ACTION/EX 8. (Continued) e. Verify MSR supply valve - 1HM-1 (M Source) - 1HM-2 (N Source). f. Depress and SEAT DRN' (1MC-3) to (- 1SM-41 (5) Drn) - 1SM-44 (5) Drn) - 1SM-43 (5) Drn) - 1SM-42 (5) Drn). | PECTED RESPONSE Second Stage steam es - CLOSED: ISRH 1A&1B SSRH Stm ISRH 1C&1D SSRH Stm ISRH 1C&1D SSRH Stm ISRH 1C&1D SSRH Stm CLOSE" pushbutton close the following valve Stop VIv #1 Before Seat Stop VIv #2 Before Seat Stop VIv #3 Before Seat Stop VIv #4 Before Seat |) n s: | RESPONSE NOT OBTAIN e. Perform the following: 1) CLOSE MSR Second supply valve(s). 2) IF steam flowpath car isolated from Control CLOSE the following All MSIVs All MSIV bypass value | ED Stage steam not be Room, <u>THEN</u> valves: lives. |
| | | | | |

| CNS EP/1/A/5000/ES-0.1 | CNS REACTOR TRIP RESPONSE 1/A/5000/ES-0.1 Enclosure 2 - Page 6 of 6 NC Temperature Control | | PAGE NO. 33 of 41 Revision 45 | |
|---|---|--|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | NED |
| 8. (Continued) g. Verify NC cooldown - STOPPED. | | g. <u>IF</u> cooldown continues, <u>1</u> THROTTLE feed flow as 1) <u>IF</u> S/G N/R level less all S/G's, <u>THEN</u> THR flow to achieve the fo Minimize cooldown Maintain total feed than 450 GPM. | THEN follows: than 11% in OTTLE feed llowing: flow greater | |
| | | | 2) <u>WHEN</u> N/R level greatin any S/G, <u>THEN</u> Theed flow further to action following: Minimize cooldown Maintain at least or level greater than 1 3) <u>IF</u> cooldown continue CLOSE the following All MSIVs All MSIV bypass va 4) <u>IF</u> cooldown continue faulted S/G exists, <u>Theed</u> for the following faulted S/G. | ater than 11% IROTTLE chieve the ne S/G N/R 11%. es, <u>THEN</u> valves: alves. es <u>AND</u> <u>HEN</u> stop |
| 9. Continue to percention of the following: • NC temperat THAN OR ECOR • NC temperat 557°F. | erform actions of this equired to ensure one ure - STABLE AT LESS QUAL TO 557°F ure - TRENDING TO | of | | |

| CNS | RESPONSE TO LOSS OF SECONDARY HEAT SINK | PAGE NO. |
|--------------------|---|-------------|
| EP/1/A/5000/FR-H.1 | Enclosure 1 - Page 1 of 1 Foldout Page | Revision 46 |

| 1. | Feed and Bleed Initiation Criteria: |
|----|--|
| | <u>IF</u> W/R level in at least 3 S/Gs less than 24% (36% ACC), <u>THEN GO TO</u> Section C. (Operator Actions), Step 21. |
| 2. | <u>IF AT ANY TIME</u> a CA pump restored after Step 7 <u>AND</u> prior to meeting Feed and Bleed Initiation Criteria, <u>THEN</u> perform Section C. (Operator Actions), Step 7. |
| 3. | CA Suction Source Switchover Criterion: |
| | IF 1AD-8, B/1 "UST LO LEVEL" lit, <u>THEN REFER TO</u> AP/1/A/5500/006 (Loss of S/G Feedwater). |
| 4. | Cold Leg Recirc Switchover Criterion: |
| | <u>IF</u> FWST level lowers to 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL"), <u>THEN GO TO</u> EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation). |
| 5. | Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol): |
| | <u>IF</u> NC pressure less than 1500 PSIG <u>AND</u> NV S/I flowpath aligned, <u>THEN</u> CLOSE 1NV-202B and 1NV-203A. |
| | IF NC pressure greater than 2000 PSIG, <u>THEN</u> OPEN 1NV-202B and 1NV-203A. |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LO Enclo S/G BB a | SS OF SE sure 9 - Pa nd NM Va | CONDARY HEAT SINK age 1 of 2 Ive Checklist | PAGE NO. 101 of 135 Revision 46 |
|---|-------------------------------------|-------------------------------------|---|---------------------------------------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| NOTE The follow | ving valves are closed to |) minimize | e S/G inventory loss. | |
| 1. Verify the follo | wing valves - CLOSED |): | CLOSE valve(s). | |
| • 1BB-56A (S/ Insd) | G 1A Bldwn Cont Isol | | | |
| • 1BB-148B (S Byp) | /G 1A Bldwn Cont Isol | | | |
| ● 1BB-57B (S/ Otsd) | G 1A Bldwn Cont Isol | | | |
| • 1BB-19A (S/0 Insd) | G 1B Bldwn Cont Isol | | | |
| • 1BB-150B (S Byp) | /G 1B Bldwn Cont Isol | | | |
| • 1BB-21B (S/0 Otsd) | G 1B Bldwn Cont Isol | | | |
| - • 1BB-60A (S/ Insd) | G 1C Bldwn Cont Isol | | | |
| 1BB-149B (S/G 1C Bldwn Cont Isol Byp) | | | | |
| 1BB-61B (S/G 1C Bldwn Cont Isol Otsd) | | | | |
| _ • 1BB-8A (S/G | 1D Bldwn Cont Isol Inso | d) | | |
| • 1BB-147B (S Byp) | /G 1D Bldwn Cont Isol | | | |
| - 1BB-10B (S/0 Otsd) | G 1D Bldwn Cont Isol | | | |
| _ • 1NM-191B (S Isol) | 6/G 1A Smpl Hdr Cont | | | |
| • 1NM-201A (S Isol) | 6/G 1B Smpl Hdr Cont | | | |
| 1NM-211B (S/G 1C Smpl Hdr Cont Isol) | | | | |
| • 1NM-221A (S Isol) | S/G 1D Smpl Hdr Cont | | | |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LO Enclo S/G BB a | SS OF SE sure 9 - P nd NM Va | CONDARY HEAT SINK age 2 of 2 Ive Checklist | PAGE NO. 102 of 135 Revision 46 |
|--|--|------------------------------------|---|---------------------------------------|
| ACTION/EXPECTED RESPONSE RESPONSE | | RESPONSE NOT OBTAIN | ED | |
| 1. (Continued) - • 1NM-187A (S Cont Isol) - • 1NM-197B (S Cont Isol) - • 1NM-207A (S Cont Isol) - • 1NM-217B (S Cont Isol) - • 1NM-190A (S Isol) - • 1NM-200B (S Isol) - • 1NM-220B (S Isol) - • 1NM-220B (S Isol) | S/G A UPR Shell Smpl S/G B UPR Shell Smpl S/G C UPR Shell Smpl S/G D UPR Shell Smpl S/G 1A Bldwn Smpl Con S/G 1B Bldwn Smpl Con S/G 1C Bldwn Smpl Con S/G 1D Bldwn Smpl Con | t t t | | |

| CNS |
|--------------------|
| EP/1/A/5000/FR-H.1 |

| _ 1. | <u>IF AT ANY TIME</u> valve found out of indicated position while in this Enclosure, <u>THEN</u> contact Control Room to determine required position. |
|------|---|
| 2. | Verify the following valves - OPEN: |
| | <u>CA Pump 1A</u> : |
| | • 1CA-11A (CA Pump 1A Norm Suct Isol) (AB-541, AA-BB, 50-51, Rm 255) |
| | 1CA-25 (CA Pump 1A Suct Isol) (AB-535, AA-50, Rm 256) (Key #633) |
| | 1CA-55 (CA Pump 1A Disch To S/G 1B Inlet Isol) (AB-550, DD-52, Rm 250) (Key #633) |
| | 1CA-59 (CA Pump 1A Disch To S/G 1A Ctrl Inlet Isol) (AB-551, BB,49-50, Rm 250) (Ladder needed) (Key #633) |
| | 1CA-60 (CA Pump 1A Flow To S/G 1A) (AB-551, BB-CC, 49-50, Rm 250) (Ladder needed) |
| | • 1CA-62A (CA Pmp A Disch To S/G 1A Isol) (DH-587, DD-EE, 44-45, Rm 591) |
| | • 1CA-87 (CA Pump 1A Disch To S/G Isol) (AB-533, BB-49, Rm 256) (Key #633) |
| | 1CA-56 (CA Pump 1A Flow To S/G 1B) (AB-552, DD-52, Rm 250) (Ladder needed) |
| | 1CA-58A (CA Pmp A Disch To S/G 1B Isol) (DH-586, DD-EE, 52-53, Rm 572). |
| | • <u>CA Pump 1B</u> : |
| | 1CA-9B (CA Pump 1B Norm Suct Isol) (AB-538, AA-BB, 50-51, Rm 255) |
| | 1CA-30 (CA Pump 1B Suct) (AB-535, AA-51, Rm 255) (Key #633) |
| | 1CA-39 (CA Pump 1B Disch To S/G 1D Ctrl Inlet Isol) (AB-551, BB, 49-50, Rm 250) (Ladder needed) (Key #633) |
| | 1CA-43 (CA Pump 1B Disch To S/G 1C Ctrl Inlet Isol) (AB-552, DD-52, Rm 250) (Key #633) |
| | 1CA-42B (CA Pmp B Disch To S/G 1D Isol) (DH-586, DD-EE, 43-44, Rm 591) |
| | • 1CA-40 (CA Pump 1B Flow To S/G 1D) (AB-553, BB-49, Rm 250) (Ladder needed) |
| | 1CA-46B (CA Pmp B Disch To S/G 1C Isol) (DH-586, DD, 53-54, Rm 572) |
| | 1CA-88 (CA Pump 1B Disch To S/G Isol) (AB-533, BB-50, Rm 255) (Key #633) |
| | 1CA-44 (CA Pump 1B Flow To S/G 1C) (AB-552, CC-DD, 52-53, Rm 250) (Ladder needed). |

| CNS |
|--------------------|
| EP/1/A/5000/FR-H.1 |

RESPONSE TO LOSS OF SECONDARY HEAT SINK Enclosure 2 - Page 2 of 6 Local CA Flowpath Restoration

PAGE NO. 72 of 135 Revision 46

| 2. (Continued) |
|--|
| • <u>CA Pump #1</u> : |
| 1CA-19 (CA Pump No 1 Suct) (AB-530, AA-52, Rm 254) (Key #633) |
| 1CA-7A (CA Pump #1 Norm Suct Isol) (AB-537, AA-BB, 51-52, Rm 254) |
| 1CA-21 (CA Pump No 1 Disch To S/G) (AB-535, BB-51, Rm 254) (Key #633) |
| 1CA-35 (CA Pump No 1 Disch To S/G 1D Ctrl Inlet Isol) (AB-555, BB-50, Rm 250) (Ladder needed) (Key #633) |
| 1CA-47 (CA Pump No 1 Disch To S/G 1C Ctrl Inlet Isol) (AB-552, DD-53, Rm 250) (Key #633) |
| 1CA-51 (CA Pump No 1 Disch To S/G 1B Inlet Isol) (AB-552, DD-52, Rm 250) (Key #633) |
| 1CA-63 (CA Pump No 1 Disch To S/G 1A Ctrl Inlet Isol) (AB-556, BB-50, Rm 250) (Ladder needed) (Key #633) |
| 1CA-36 (CA Pump #1 Flow To S/G 1D) (AB-555, BB-CC, 49-50, Rm 250) (Ladder needed) |
| 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol) (DH-584, DD-EE, 43-44, Rm 591) |
| 1CA-64 (CA Pump #1 Flow To S/G 1A) (AB-556, BB-CC, 49-50, Rm 250) (Ladder needed) |
| 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol) (DH-584, DD-EE, 44-45, Rm 591) |
| 1CA-52 (CA Pump #1 Flow To S/G 1B) (AB-546, DD-53, Rm 217) |
| 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol) (DH-584, DD-EE, 52-53, Rm 572) |
| 1CA-48 (CA Pump #1 Flow To S/G 1C) (AB-551, DD-EE, 53, Rm 217) |
| 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol) (DH-584, EE-53, Rm 572) |
| 1SA-1 (1B S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock) |
| 1SA-3 (1B S/G Main Steam to CAPT Stop Check) (AB-551, DD-53, Rm 217) (Breakaway lock) |
| 1SA-4 (1C S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock) |
| |
| |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LOSS OF SECONDARY HEAT SINK Enclosure 2 - Page 3 of 6 Local CA Flowpath Restoration | PAGE NO. 73 of 135 Revision 46 | | | |
|---------------------------------------|---|--------------------------------------|--|--|--|
| | | | | | |
| 2. (Continued) | | | | | |
| • 1SA-6 (1C (Breakawa | S/G Main Steam to CAPT Stop Check) (AB-551, DD-53, Rm 2 y lock) (Ladder needed). | 17) | | | |
| 3. Verify the follo | owing valves - CLOSED: | | | | |
| CA Pump 1A | <u>L</u> | | | | |
| • 1CA-71 (C | A Pump 1A Disch To UST Dome Throttle) (AB-533, BB-49, Rm | 256) | | | |
| • 1CA-72 (C | A Pump 1A Disch To UST Dome Throttle Isol) (AB-551, BB-49, | Rm 250). | | | |
| <u>CA Pump 1B</u> | t: | | | | |
| • 1CA-69 (C | A Pump 1B Disch To UST Dome Throttle) (AB-533, BB-50, Rm | 255) | | | |
| • 1CA-70 (C | A Pump 1B Disch To UST Dome Throttle Isol) (AB-550, BB-50, | Rm 250). | | | |
| <u>CA Pump #1</u> | | | | | |
| _ • 1CA-67 (C | A Pump No 1 Disch To UST Dome Throttle) (AB-540, BB-51, R | m 254) | | | |
| • 1CA-68 (C | 1CA-68 (CA Pump No 1 Disch To UST Dome Throttle Isol) (AB-546, BB-51, Rm 250). | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

RESPONSE TO LOSS OF SECONDARY HEAT SINK

| EP/1/A/5000/FR-H.1 | | Enclosure 2 - Page 4 of 6 Local CA Flowpath Restoration | 74 of 135 Revision 46 | | | |
|--|---|---|--------------------------|--|--|--|
| | | | | | | |
| | <u>CAUTION</u> The following step is for verification only. Valve manipulation without Control Room Supervisor concurrence could result in loss of CA flow. | | | | | |
| | NOTE For the re indication available. | mainder of this enclosure, level values in parenthesis are local s, intended for use when Control Room indications are not | | | | |
| | 4. Verify CA suct | tion source alignment as follows: | | | | |
| | a. IF <u>AT ANY</u> Supervisor f | <u>TIME</u> valve(s) found out of position, <u>THEN</u> consult with Control for further guidance. | Room | | | |
| | b. Verify Uppe | r Surge Tank (UST) path as follows: | | | | |
| | 1) Determir or 1CSL | ne Upper Surge Tank (UST) level as indicated on Control Room G5970 (Upper Surge Tank Level) (TB-640, 1E-32). | indication | | | |
| <u>IF</u> UST level greater than 10% (5,000 gal), <u>THEN</u> verify the following value OPEN: | | | | | | |
| | • 1CS-1 #633) | 9 (CA Pumps Supply From Upper Surge Tank) (TB1-627, 1D-3 | 0) (Key | | | |
| | • 1CA-4 | (CA Pumps Suction From UST) (TB1-574, 1L-25). | | | | |
| | <u>IF</u> UST k following | evel less than or equal to 10% (5,000 gal), <u>THEN</u> verify at least y valves - CLOSED: | one of the | | | |
| | • 1CS-1 #633) | 9 (CA Pumps Supply From Upper Surge Tank) (TB1-627, 1D-3 | 0) (Key | | | |
| | OR | | | | | |
| | • 1CA-4 | (CA Pumps Suction From UST) (TB1-574, 1L-25). | | | | |
| | 4) <u>IF</u> UST v for furthe | valve(s) found out of position, <u>THEN</u> consult with Control Room er guidance. | Supervisor | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

CNS EP/1/A/5000/FR-H.1

PAGE NO. 74 of 135

| CNS |
|--------------------|
| EP/1/A/5000/FR-H.1 |

| 4. (Continued) |
|---|
| c. Verify Hotwell path as follows: |
| Determine Hotwell level as indicated on Control Room indication or sightglass 1CMLG5450 (Local Full Range Hotwell Level) (TB-548, 1J-26). |
| 2) IF Hotwell level greater than 6 inches, THEN verify the following valves - OPEN: |
| 1CM-374 (Condenser Hotwell to CA Pumps Suction) (TB1-554, 1M-24) |
| 1CA-2 (CA Pumps Suction From Hotwell Isol) (TB1-566, 1M-25). |
| IF Hotwell level less than or equal to 6 inches, <u>THEN</u> verify RN alignment as follows: |
| <u>Nuclear Service Water (RN) Train A</u>: |
| 1CA-116A (CA Pump #1 Suct Frm RN Hdr A) (AB-555, CC-BB, 52, Rm 250) (Ladder needed) - OPEN |
| 1CA-15A (CA Pump 1A Suct Frm RN Isol) (AB-553, CC-50, Rm 250) (Ladder needed) - OPEN |
| 1CA-300 (1A RN Train To CA Manual Isol) (AB-555, BB 52-53, Rm 250) (Ladder needed) (Key #633) - OPEN |
| 1RN-250A (1A RN Supply Header to CA Pumps Suction Isol) (AB-587, LL-55, Rm 400) - OPEN. |
| Nuclear Service Water (RN) Train B: |
| 1CA-85B (CA Pump #1 Suct Frm RN Hdr B) (AB-552, CC-52, Rm 250) - OPEN |
| 1CA-18B (CA Pump 1B Suct Frm RN Isol) (AB-554, CC, 51-52, Rm 250) (Ladder needed) - OPEN |
| 1CA-308 (1B RN Train To CA Manual Isol) (AB-552, CC-53, Rm 250) (Ladder needed) (Key #633) - OPEN |
| 1RN-310B (1B RN Header to CA Pumps Suction Isol) (AB-585, LL-55, Rm 400) - OPEN. |
| 4) <u>IF</u> valve(s) found out of position, <u>THEN</u> consult with Control Room Supervisor for further guidance. |
| |
| |
| |
| |

| CNS EP/1/A/5000/FR-H.1 | RESPONSE TO LOSS OF SECONDARY HEAT SINK Enclosure 2 - Page 6 of 6 Local CA Flowpath Restoration | PAGE NO. 76 of 135 Revision 46 |
|---------------------------------|---|--------------------------------------|
| | | |
| 4. (Continued) | | |
| d. Verify Cond | lenser Circulating Water (RC) path as follows: | |
| 1) Consult RC verif | with Control Room Supervisor to determine if CAPT #1 suction ication required. | path from |
| 2) <u>IF</u> verific | cation <u>NOT</u> required, <u>THEN GO TO</u> Step 5. | |
| Verify th | e following valves - OPEN: | |
| • 1CA-1 | 174 (RC To CA Suction Isol) (AB-544, CC-53, Rm 251) | |
| _ • 1CA-1 | 175 (RC To CA Suction Isol) (AB-544, CC-53, Rm 251). | |
| 4) <u>IF</u> valve further g | (s) found out of position, <u>THEN</u> consult with Control Room Supe juidance. | visor for |
| 5. Report status | to Control Room Supervisor. | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

EVENT #3 **RTS Instrumentation**

N44 Loss of Instrument Power

3.3 INSTRUMENTATION

3.3.1 Reactor Trip System (RTS) Instrumentation

The RTS instrumentation for each Function in Table 3.3.1-1 shall be LCO 3.3.1 OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

ACTIONS

---NOTE----Separate Condition entry is allowed for each Function.

| | | - | | |
|----|---|-----------|---|-----------------|
| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
| A. | One or more Functions with one or more required channels inoperable. | A.1 | Enter the Condition referenced in Table 3.3.1-1 for the channel(s). | Immediately |
| В. | One Manual Reactor Trip channel inoperable. | B.1 | Restore channel to OPERABLE status. | 48 hours |
| | | <u>OR</u> | | |
| | | B.2 | Be in MODE 3. | 54 hours |
| C. | One channel or train inoperable. | C.1 | Restore channel or train to OPERABLE status. | 48 hours |
| | | <u>OR</u> | | |
| | | C.2 | Open reactor trip breakers (RTBs). | 49 hours |
| | | | | (continued) |

(continued)

3.3.1

Catawba Units 1 and 2

3.3.1-1

Amendment Nos. 173/165

EVENT #3 RTS Instrumentation

N44 Loss of Instrument Power

3.3.1

| ACTIONS (continued) | | |
|----------------------------|------------------------------|---|
| CONDITION | REQUIRED ACTION | COMPLETION TIME |
| D. One channel inoperable. | REQUIRED ACTION | COMPLETION TIME 12 hours from discovery of THERMAL POWER > 75% RTP AND Once per 12 hours (thereafter) |
| | D.1.2 Place channel in trip. | 72 hours |
| | OR | |
| | D.2 Be in MODE 3. | 78 hours |
| | | |
| | | (continued) |

Catawba Units 1 and 2

3.3.1-2

Amendment Nos. 247/240

EVENT #3 RTS Instrumentation 3.3.1

| ACTIO | DNS (continued) | | | I | |
|-----------------------------|--|-----------------|--|-----------------|---|
| | CONDITION | REQUIRED ACTION | | COMPLETION TIME | _ |
| E. One channel inoperable.) | | | noperable channel may be used for up to 12 hours for illance testing of other nels. | | |
| | | E.1 OR | Place channel in trip. | (72 hours) | |
| | | E.2 | Be in MODE 3. | 78 hours | |
| F. | THERMAL POWER > P-6 and < P-10, one Intermediate Range Neutron Flux channel | F.1 OR | Reduce THERMAL POWER to < P-6. | 24 hours | |
| | inoperable. | F.2 | Increase THERMAL POWER to > P-10. | 24 hours | |
| G. | THERMAL POWER > P-6 and < P-10, two Intermediate Range Neutron Flux channels inoperable. | G.1 | NOTE Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. | | |
| | | | Suspend operations involving positive reactivity additions. | Immediately | |
| | | AND | | | |
| | | G.2 | Reduce THERMAL POWER to < P-6. | 2 hours | |
| | | | | (continued) | |

Catawba Units 1 and 2

3.3.1-3

Amendment Nos. 247/240

EVENT #3 RTS Instrumentation N44 Loss of Instrument Power

ACTIONS (continued)

| CONDITION | | | REQUIRED ACTION | COMPLETION TIME |
|-----------|--|------------------|--|--|
| H. | THERMAL POWER < P-6, one or two Intermediate Range Neutron Flux channels inoperable. | H.1 | Restore channel(s) to OPERABLE status. | Prior to increasing THERMAL POWER to > P-6 |
| l. | One Source Range Neutron Flux channel inoperable. | 1.1 | NOTE Limited boron concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. | Immediately |
| J. | Two Source Range Neutron Flux channels inoperable. | J.1 | Open RTBs. | Immediately |
| K. | One Source Range Neutron Flux channel inoperable. | к.1 <u>OR</u> | Restore channel to OPERABLE status. | 48 hours |
| | | K.2 | Open RTBs. | 49 hours |

(continued)

3.3.1

Catawba Units 1 and 2

3.3.1-4

Amendment Nos. 207/201

EVENT #3 **RTS** Instrumentation 3.3.1

| ACTIC | N44 NS (continued) | Loss of Instrument Power | 0.0.1 |
|-------|---|--|-----------------|
| | CONDITION | REQUIRED ACTION | COMPLETION TIME |
| L. | One channel inoperable. | NOTE The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. | |
| | | L.1 Place channel in trip. | 72 hours |
| | | L.2 Reduce THERMAL POWER to < P-7. | 78 hours |
| M. | One Reactor Coolant Flow - Low (Single Loop) channel inoperable. | NOTE The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. | |
| | | M.1 Place channel in trip. | 6 hours |
| | | M.2 Reduce THERMAL POWER to < P-8. | 10 hours |
| N. | One Turbine Trip - Stop Valve EH Pressure Low channel inoperable. | NOTE The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. | |

Catawba Units 1 and 2

3.3.1-5

<u>OR</u> N.2

N.1 Place channel in trip.

Reduce THERMAL

POWER to < P-9.

Amendment Nos. 247/240

72 hours

76 hours

(continued)

EVENT #3 RTS Instrumentation 3.3.1

ACTIONS (continued)

| CONDITION | | REQUIRED ACTION | | COMPLETION TIME | |
|-----------|--|-----------------------------------|--|-----------------|---|
| 0. | One or more Turbine Trip - Turbine Stop | 0.1 | Place channel(s) in trip. | 72 hours | I |
| | inoperable. | 0.2 | Reduce THERMAL POWER to < P-9. | 76 hours | |
| P. | One train inoperable. | One t to 4 h provid OPEF | rain may be bypassed for up ours for surveillance testing ded the other train is RABLE. | | |
| | | P.1 | Restore train to OPERABLE status. | 24 hours | I |
| | | <u>OR</u> | | | |
| | | P.2 | Be in MODE 3. | 30 hours | |
| | | | | (continued) | |

Catawba Units 1 and 2

3.3.1-6

Amendment Nos. 247/240

EVENT #3 RT

RTS Instrumentation 3.3.1

N44 Loss of Instrument Power

| ACTI | ONS (continued) | | | |
|------|---------------------------------------|----------------------------|---|-------------------------|
| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
| Q. | One RTB train inoperable. | One to 4 h provi OPE | train may be bypassed for up hours for surveillance testing, ded the other train is RABLE. | |
| | | Q.1 | Restore train to OPERABLE status. | 24 hours |
| | | OR | | |
| | | Q.2 | Be in MODE 3. | 30 hours |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| R. | One or more channel(s) inoperable. | R.1 | Verify interlock is in required state for existing unit conditions. | (<mark>1 hour</mark>) |
| | | <u>OR</u> | | |
| | | R.2 | Be in MODE 3. | 7 hours |
| | | 1 | | (continued) |

Catawba Units 1 and 2

3.3.1-7

Amendment Nos. 247/240

Catawba 2019 NRC Exam

EVENT #3 RTS Instrumentation 3.3.1

| ACTIONS (continued) | | | | |
|---------------------------------------|---|------------------|---|-----------------|
| CONDITION | | | REQUIRED ACTION | COMPLETION TIME |
| S. One or more channel(s) inoperable. | | <mark>S.1</mark> | Verify interlock is in required state for existing unit conditions. | (1 hour) |
| | | OR | | |
| | | <mark>S.2</mark> | Be in MODE 2. | (7 hours) |
| T. | One trip mechanism inoperable for one RTB. | T.1 | Restore inoperable trip mechanism to OPERABLE status. | 48 hours |
| | | <u>OR</u> | | |
| | | T.2 | Be in MODE 3. | 54 hours |
| U. | Two RTS trains inoperable. | U.1 | Enter LCO 3.0.3. | Immediately |

Catawba Units 1 and 2

3.3.1-8

Amendment Nos. 173/165

Catawba 2019 NRC Exam

EVENT #3

N44 Loss of Instrument Power RTS Instrumentation

3.3.1

Table 3.3.1-1 (page 1 of 8) Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|----|-----------------------------|--|----------------------|------------|--|--|--|
| 1. | Manual Reactor Trip | 1,2 | 2 | в | SR 3.3.1.14 | NA | NA |
| | | 3(a) _{. 4} (a) _{. 5} (a) | 2 | С | SR 3.3.1.14 | NA | NA |
| 2. | Power Range Neutron Flux | | | | | | |
| | a. <mark>(High</mark> | (1,2) | 4 | D | SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16 | ≤ 110.9% RTP | 109% RTP |
| | b. Low | 1 ^{(b),2} | 4 | E | SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16 | ≦ 27.1% RTP | 25% RTP |
| 3. | Power Range Neutron Flux | | | | | | |
| | High Positive Rate | 1,2 | 4 | D | SR 3.3.1.7 SR 3.3.1.11 | ≤ 6.3% RTP with time constant ≥ 2 sec | 5% RTP with time constant ≥ 2 sec |
| | | | | | | | (continued) |

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

Catawba Units 1 and 2

3.3.1-15

Amendment Nos. 263/259

EVENT #3

N44 Loss of Instrument Power RTS Instrumentation

3.3.1

Table 3.3.1-1 (page 2 of 8) Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | |
|----|------------------------------------|--|----------------------|------------|--|---------------------------------------|--|---|
| 4. | Intermediate Range Neutron Flux | 1 ^(b) , 2 ^(c) | 2 | F,G | SR 3.3.1.1 SR 3.3.1.8 ^{(I)(m)} SR 3.3.1.11 ^{(I)(m)} | <u><</u> 38% RTP | 25% RTP | |
| | | 2 ^(d) | 2 | н | SR 3.3.1.1 SR 3.3.1.8 ^{(I)(m)} SR 3.3.1.11 ^{(I)(m)} | <u>≤</u> 38% RTP | 25% RTP | I |
| 5. | Source Range Neutron Flux | 2 ^(d) | 2 | I,J | SR 3.3.1.1 SR 3.3.1.8 ^{(I)(m)} SR 3.3.1.11 ^{(I)(m)} | <u><</u> 1.44 E5 cps | 1.0 E5 cps | I |
| | | 3(a) _{. 4} (a) _{. 5} (a) | 2 | J,K | SR 3.3.1.1 SR 3.3.1.7 ^{(I)(m)} SR 3.3.1.11 ^{(I)(m)} | <u><</u> 1.44 E5 cps | 1.0 E5 cps | Ι |
| 6. | Overtemperature ∆T | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.10 SR 3.3.1.10 SR 3.3.1.17 | Refer to Note 1 (Page 3.3.1-19) | Refer to Note 1 (Page 3.3.1-19) | _ |

(continued)

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

- (I) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.
- (m) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the NOMINAL TRIP SETPOINT (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and the as-left tolerances are specified in the UFSAR.

Catawba Units 1 and 2

3.3.1-16

Amendment Nos. 278/274

EVENT #3

N44 Loss of Instrument Power RTS Instrumentation

3.3.1

Table 3.3.1-1 (page 3 of 8) Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|-----|-----------------------------------|--|----------------------|------------|---|---------------------------------------|--|
| 7. | Overpower ∆T. | 12 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.6 SR 3.3.1.10 SR 3.3.1.10 SR 3.3.1.17 | Refer to Note 2 (Page 3.3.1-20) | Refer to Note 2 (Page 3.3.1-20) |
| 8. | Pressurizer Pressure | | | | | | |
| | a. Low | 1 ^(e) | 4 | L | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16 | ≥ 1938 ^(f) psig | 1945 ^(f) psig |
| | b. High | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16 | ≤2399 psig | 2385 psig |
| 9. | Pressurizer Water Level - High | 1 ^(e) | 3 | L | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 | ≤ 93.8% | 92% |
| 10. | Reactor Coolant Flow - Low | | | | | | |
| | a. Single Loop | 1 ^(g) | 3 per loop | м | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16 | ≥ 89.7% | 91% |
| | b. Two Loops | 1 ^(h) | 3 per loop | L | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16 | ≥ 89.7% | 91% |
| | | | | | | | |

(continued)

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(f) Time constants utilized in the lead-lag controller for Pressurizer Pressure - Low are 2 seconds for lead and 1 second for lag.

- (g) Above the P-8 (Power Range Neutron Flux) interlock.
- (h) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

Catawba Units 1 and 2

3.3.1-17

Amendment Nos. 263/259

EVENT #3

N44 Loss of Instrument Power

RTS Instrumentation 3.3.1

Table 3.3.1-1 (page 4 of 8) Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|-----|---|--|----------------------|------------|--|---|---|
| 11. | Undervoltage RCPs | 1(e) | 1 per bus | L | SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16 | ≥ 5016 V | 5082 V |
| 12. | Underfrequency RCPs | 1(e) | 1 per bus | L | SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16 | ≥ 55.9 Hz | 56.4 Hz |
| 13. | Steam Generator (SG) Water Level - Low Low | 1,2 | 4 per SG | E | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.10 | ≥ 9% (Unit 1) ≥ 35.1% (Unit 2) of narrow range span | 10.7% (Unit 1) 36.8% (Unit 2) of narrow range span |
| 14. | Turbine Trip | | | | | | |
| | a. Stop Valve EH Pressure Low | 1(i) | 4 | Ν | SR 3.3.1.10 SR 3.3.1.15 | \ge 500 psig | 550 psig |
| | b. Turbine Stop Valve Closure | 1() | 4 | 0 | SR 3.3.1.10 SR 3.3.1.15 | ≥ 1% open | NA |
| 15. | Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS) | 1,2 | 2 trains | P | SR 3.3.1.5 SR 3.3.1.14 | NA | NA |

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(i) Not used.

(j) Above the P-9 (Power Range Neutron Flux) interlock.

Catawba Units 1 and 2

3.3.1-18

Amendment Nos. 263/259

(continued)

EVENT #3

N44 Loss of Instrument Power

RTS Instrumentation 3.3.1

Table 3.3.1-1 (page 5 of 8) Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | |
|-----|--|--|----------------------|------------|------------------------------|---|---|---|
| 16. | Reactor Trip System Interlocks | | | | | | | |
| | a. Intermediate Range Neutron Flux, P-6 | 2 ^(d) | 2 | R | SR 3.3.1.11 SR 3.3.1.13 | ≥ 6.6E-6% RTP | 1E-5% RTP | I |
| | b. Low Power Reactor Trips Block, P-7 | 8 | 1 per train | S | SR 3.3.1.5 | NA | NA | |
| | c. Power Range Neutron Flux, P-8 | 8 | 4 | S | SR 3.3.1.11 SR 3.3.1.13 | ≤ 50.2% RTP | 48% RTP | |
| | d. Power Range Neutron Flux, P-9 | 8 | 4 | S | SR 3.3.1.11 SR 3.3.1.13 | ≤ 70% RTP | 69% RTP | |
| | e. Power Range Neutron Flux, P-10 | 1.2 | 4 | R | SR 3.3.1.11 SR 3.3.1.13 | ≥ 7.8% RTP and ≦ 12.2% RTP | 10% RTP | |
| | f. Turbine Impulse Pressure, P-13 | 1 | 2 | S | SR 3.3.1.12 SR 3.3.1.13 | ≤ 12.2% RTP turbine impulse pressure equivalent | 10% RTP turbine impulse pressure equivalent | |
| 17. | Reactor Trip | 1,2 | 2 trains | Q,U | SR 3.3.1.4 | NA | NA | |
| | Breakers(*) | 3 ^(a) , 4 ^(a) , 5 ^(a) | 2 trains | С | SR 3.3.1.4 | NA | NA | |
| 18. | Reactor Trip Breaker Undervoltage and Shunt Trip | 1,2 | 1 each per RTB | т | SR 3.3.1.4 | NA | NA | |
| | Mechanisms | 3 ^(a) , 4 ^(a) , 5 ^(a) | 1 each per RTB | С | SR 3.3.1.4 | NA | NA | |
| 19. | Automatic Trip Logic | 1,2 | 2 trains | P,U | SR 3.3.1.5 | NA | NA | |
| | | 3(a) _{. 4} (a) _{. 5} (a) | 2 trains | С | SR 3.3.1.5 | NA | NA | |

(continued)

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

Catawba Units 1 and 2

3.3.1-19

Amendment Nos. 278/274

EVENT #4

PZR PORV Fails Open

RCS Pressure, Temperature, and Flow DNB Limits 3.4.1

3.4 REACTOR COOLANT SYSTEM (RCS)

- 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
- LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in Table 3.4.1-1.

APPLICABILITY: MODE 1.

Pressurizer pressure limit does not apply during:

- a. THERMAL POWER ramp > 5% RTP per minute; or
- b. THERMAL POWER step > 10% RTP.

ACTIONS

| | CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|----|---|-------------------|---|-----------------|
| A. | Pressurizer pressure or RCS average temperature DNB parameters not within limits. | A.1 | Restore DNB parameter(s) to within limit. | (2 hours) |
| B. | RCS total flow rate ≥ 99%, but < 100% of the limit specified in the COLR. | B.1 <u>AND</u> | Reduce THERMAL POWER to ≤ 98% RTP. | 2 hours |
| | | B.2 | Reduce the Power Range Neutron Flux – High Trip Setpoint below the nominal setpoint by 2% RTP. | 6 hours |
| | | I | | (continued) |

Note to Evaluator:

Violation of these limits will be indicated by OAC Alarm (PZR Low Press DNB Limit). This condition may NOT be entered based on pressure decrease and, if entered, will clear soon.

EVENT #4 PZR PORV Fails Open

RCS Pressure, Temperature, and Flow DNB Limits 3.4.1

ACTIONS (continued)

| CONDITION | | REQUIRED ACTION | | COMPLETION TIME |
|-----------|---|-----------------|---|-----------------|
| C. | RCS total flow rate < 99% of the value specified in the COLR. | C.1 | Restore RCS total flow rate to \geq 99% of the value specified in the COLR. | 2 hours |
| | | <u>OR</u> | | |
| | | C.2.1 | Reduce THERMAL POWER to < 50% RTP. | 2 hours |
| | | AND | | |
| | | C.2.2 | Reduce the Power Range Neutron Flux - High Trip Setpoint to \leq 55% RTP. | 6 hours |
| | | AND | | |
| | | C.2.3 | Restore RCS total flow rate to \geq 99% of the value specified in the COLR. | 24 hours |
| D. | Required Action and associated Completion Time not met. | D.1 | Be in MODE 2. | 6 hours |

Catawba Units 1 and 2

3.4.1-2

Amendment Nos. 210/204

Catawba 2019 NRC Exam
ATTACHMENT 10

EVENT #4

PZR PORV Fails Open

Pressurizer PORVs 3.4.11

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTES------Separate Condition entry is allowed for each PORV.

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
|----|--|-----|---|-------------------------|
| A. | One or more PORVs inoperable and capable of being manually cycled. | A.1 | Close and maintain power to associated block valve. | 1 hour |
| B. | One or two PORVs inoperable and not capable of being manually cycled. | B.1 | Close associated block valves. | (1 hour) |
| | | B.2 | Remove power from associated block valves. | (<mark>1 hour</mark>) |
| | | AND | | |
| | | B.3 | Restore PORV(s) to OPERABLE status | 72 hours |
| | | • | | (continued) |

Catawba Units 1 and 2

3.4.11-1

Amendment Nos. 213/207

ATTACHMENT 10

EVENT #4 PZR PORV Fails Open

Pressurizer PORVs 3.4.11

| ACTIO | NS (continued) | | | | |
|-------|--|-----|---|----------|-------------|
| | CONDITION | | REQUIRED ACTION | COMPLE | TION TIME |
| C. | One block valve inoperable. | C.1 | Place associated PORV in manual control. | 1 hour | |
| | | AND | | | |
| | | C.2 | Restore block valve to OPERABLE status. | 72 hours | |
| D. | Required Action and | D.1 | Be in MODE 3. | 6 hours | |
| | associated Completion Time of Condition A, B, | AND | | | |
| | or C not met. | D.2 | Be in MODE 4. | 12 hours | |
| E. | Three PORVs inoperable and not | E.1 | Close associated block valves. | 1 hour | |
| | manually cycled. | AND | | | |
| | | E.2 | Remove power from associated block valves. | 1 hour | |
| | | AND | | | |
| | | E.3 | Be in MODE 3. | 6 hours | |
| | | AND | | | |
| | | E.4 | Be in MODE 4. | 12 hours | |
| F. | More than one block valve inoperable. | F.1 | Place associated PORVs in manual control. | 1 hour | |
| | | AND | | | |
| | | | | | |
| | | | | | (continued) |

Catawba Units 1 and 2

3.4.11-2

Amendment Nos. 173/165

ATTACHMENT 10

EVENT #4 PZR PORV Fails Open

Pressurizer PORVs 3.4.11

ACTIONS

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
|----|--|---|--|-----------------|
| F. | (continued) | F.2 Restore one block valve to OPERABLE status if three block valves are inoperable. | | 2 hours |
| | | <u>AND</u> | | |
| | | F.3 | Restore remaining block valve(s) to OPERABLE status. | 72 hours |
| G. | Required Action and | G.1 | Be in MODE 3. | 6 hours |
| | associated Completion Time of Condition F not | AND | | |
| | met. | G.2 | Be in MODE 4. | 12 hours |

SURVEILLANCE REQUIREMENTS

| | SURVEILLANCE | FREQUENCY |
|-------------|---|--|
| SR 3.4.11.1 | Not required to be met with block valve closed in accordance with the Required Action of Condition B or E. | In accordance with the Surveillance Frequency Control Program |
| | | (continued) |

(continued)

Catawba Units 1 and 2

3.4.11-3

Amendment Nos. 263/259

2019 INITIAL LICENSE NRC EXAM SCENARIO # 2

.. . _ 0040

| | | a Nuclear | Sial | | | |
|--------------|---|--|--|---|---|--|
| Appe | endix D | | Sc | enario Outline | Fo | rm ES-D-1 |
| I | | | | | | |
| Facility: | Catawb | a NRC Exam 2 | 2019 | Scenario No.: 2 | Op Test No.: | 2019301 |
| Examine | ers: | | | Operators: | SRO | |
| | | | | _ | RO | |
| | | | | _ | BOP | |
| | | | | | | |
| Initial Co | nditions: Ur | nit 1 is at 100% p | ower a | t the MOL. Unit 2 is at 100 | % power. | |
| Turnover | : Unit 1 is AP/1/A/5 Generat complete Direction KC Pum The SO complete | at 100% power 5500/037 due to or Voltage Opera ed. The SOC is v n for the crew is f p per OP/1/A/64 C and site manage. | at the M a grid c ating So working to swap 00/005 gement | MOL. Unit 2 is at 100% pow listurbance. Main generate chedule due to this issue. A to restore grid voltage and operating KC Pumps by s (Component Cooling Syste have approved KC Pump | ver. Unit 1 has previou or voltage is currently I All applicable actions h will provide guidance tarting 1B1 KC Pump em), Enclosure 4.15 (S swap. 1B1 KC Pump p | usly entered ess than the CNS have been , as required. and securing 1B2 Shifting KC Pumps). bre-start check is |
| Event No. | Malf. No. | Event Type* | | De | Event scription | |
| 1 | | N – BOP N – SRO | Swap | CCW (KC) Pumps | | |
| 2 | | N – RO N – SRO | Resto | re Main Generator Voltage | 9 | |
| 3 | ND015 | TS – SRO | 1B RI | HR Pump Breaker Failure | | |
| 4 | KC023F | C – BOP C – SRO | RCP | CCW Return Header Conta | ainment Isolation (1KC | -424B) Fails Closed |
| 5 | OV_SLIM 42ManPB | C – BOP C – SRO | RCP | Seal Injection Flow Contro | l Valve (1NV-309) Fail | ure |
| 6 | EPD003D EHC011A | C – RO C – SRO TS – SRO | Zone | B Lockout / Auto Turbine F | Runback Failure | |
| 7 | IRX007A2 | C – RO C – SRO | Multip | le Control Rods drop | | |
| 8 | NC005F8 | M – ALL | Rod E | Ejection / LOCA | | |
| 9 | ISE002A ISE002B | C – BOP C – SRO | Safety Injection Auto Initiation Failure | | | |
| 10 | CF012A C – RO C – SRO 1CF-51 Feedwater Isolation Failure | | | | | |
| * | (N)ormal, (R)ea | nctivity, (I)nstru | ment, | (C)omponent, (M)ajor | | |

Appendix D

Scenario Outline

Form ES-D-1

<u> Scenario 2 – Summary</u>

Initial Condition

Unit 1 is at 100% power at the MOL. Unit 2 is at 100% power.

Turnover:

Unit 1 is at 100% power at the MOL. Unit 2 is at 100% power. Unit 1 has previously entered AP/1/A/5500/037 due to a grid disturbance. Main generator voltage is currently less than the CNS Generator Voltage Operating Schedule due to this issue. All applicable actions have been completed. The SOC is working to restore grid voltage and will provide guidance, as required. Direction for the crew is to swap operating KC Pumps by starting 1B1 KC Pump and securing 1B2 KC Pump per OP/1/A/6400/005 (Component Cooling System), Enclosure 4.15 (Shifting KC Pumps). The SOC and site management have approved KC Pump swap. 1B1 KC Pump pre-start check is complete.

Event 1

Shift operating Component Cooling (KC) Pumps. Start 1B1 KC Pump and secure 1B2 KC Pump.

Event History: Exact evolution not previously used. Similar evolution used on 16 (4) – "A" Train pump swap.

Event 2

The SOC will inform the crew that grid voltage issues have been resolved and request Main Generator Voltage be adjusted to comply with the CNS Generator Voltage Operating Schedule. The CRS will provide direction and the RO will manually raise Main Generator Voltage to meet operating schedule.

Verifiable Action – RO will manually increase Main Generator Voltage.

Event History: New malfunction.

Event 3

1B ND (Residual Heat Removal) Pump breaker will experience a loss of control power. Crew will refer to Annunciator Response Procedure for 1AD-11 D/1 (4KV ESS Power Train B Trouble) and 1.47 Bypass Panel alarm on OAC to determine source of failure. TS evaluation by the SRO is required.

Event History: New malfunction.

Event 4

1KC-424B (NC Pumps Ret Hdr Cont Isol) will close isolating the CCW Reactor Building Non-Essential Header. This Header supplies cooling to RCP bearing coolers and thermal barrier coolers. The crew will enter AP/1/A/5500/021 (Loss of Component Cooling) which contains guidance to re-open this valve. The crew may also utilize guidance contained in OMP 1-7 (Emergency/Abnormal Procedure Implementation Guidelines) to preserve the integrity of plant components to re-open the valve prior to AP/21 entry.

Verifiable Action – The BOP will re-open 1KC-424B.

Event History: New malfunction. Similar event (1KC-425A) not used on previous 2 exams {14 (2)}.

Event 5

1NV-309 (Seal Water Inj Flow) controller will transfer to Manual and throttle partially open decreasing RCP seal injection flow. Crew will refer to Annunciator Response Procedure for 1AD-7 C/4 (NCP Seal Water Lo Flow), and manually throttle 1NV-309 to restore seal injection flow.

Verifiable Action – BOP will manually control 1NV-309 Seal Injection Flow.

Event History: New malfunction.

Scenario #2

Appendix D

Scenario Outline

Form ES-D-1

Event 6

A Zone "B" Lockout will occur. The associated automatic Main Turbine runback to 48% power will fail. The crew will enter AP/1/A/5500/003 (Load Rejection), manually reduce turbine load, stabilize the plant, and borate to restore rod insertion limits. TS evaluation by the SRO is required to address the Zone "B" Lockout and Rod Insertion Limits.

Verifiable Action – RO will manually reduce Main Turbine load to ~48%. BOP will borate to restore rod insertion limits.

Event History: Not used on previous 2 exams {14 (2)}.

Event 7

Multiple control rods will drop into the core. The crew will initiate a reactor trip based on Immediate Actions of AP/1/A/5500/014 (Control Rod Misalignment). This procedure requires a reactor trip if two or more control rods are dropped or misaligned by greater than 24 steps.

Verifiable Action – RO will trip Unit 1 reactor.

Event History: Not used on previous 2 exams {14 (3)}.

Event 8

Upon the Reactor Trip, a rod ejection event will occur. The crew will enter EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and then transition to EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant).

Event History: Not used on previous 2 exams {14 (3)}.

<u>Event 9</u> Following the Rod Ejection, Safety Injection will fail to automatically initiate.

Verifiable Action – BOP will manually initiate both trains of Safety Injection.

Event History: Used 17 (2) with LBLOCA vs MBLOCA.

Event 10

Following the Reactor Trip and automatic Feedwater Isolation, 1CF-51 (S/G 1C CF Cont Isol) will fail to automatically close.

Verifiable Action - RO will manually close 1CF-51.

Event History: Exact failure is new. Similar (1CF-33) used on 17 (2).

Appendix D

Scenario Outline

Form ES-D-1

| Manual Control of Automatic Functions | | | | | |
|---------------------------------------|----------|---|--|--|--|
| Event | Position | Description | | | |
| 5 | BOP | Manually control failed Automatic RCP Seal Injection Flow Control Valve (1NV-309) | | | |
| 6 | RO | Manually control failed Automatic Turbine Runback | | | |

<u>Critical Task 1</u> – Manually re-open 1KC-424B (NC Pumps Ret Hdr Cont Isol) prior to reaching RCP motor bearing temperature of 195 degrees (RCP trip criteria). Simulator validation reveals this criteria will be met in approximately 8 minutes.

<u>Critical Task 2</u> – Manually decrease Main Turbine load prior to overcurrent trip of 1A Generator PCB.

Simulator validation reveals this criteria will be met in approximately 2 minutes. Following overcurrent trip of 1A Gen PCB, an OTAT Reactor Trip will occur.

| | Target Quantitative Attributes (Per Scenario; See Section D.5.d) | Actual Attributes |
|----|--|-------------------|
| 1. | Total malfunctions (5–8) | 8 |
| 2. | Malfunctions after EOP entry (1–2) | 2 |
| 3. | Abnormal events (2–4) | 5 |
| 4. | Major transients (1–2) | 1 |
| 5. | EOPs entered/requiring substantive actions (1–2) | 1 |
| 6. | EOP contingencies requiring substantive actions (0–2) | 0 |
| 7. | Critical tasks (2–3) | 2 |

EXERCISE GUIDE WORKSHEET

- 1. INITIAL CONDITIONS:
 - 1.1 Reset to IC # 170 and load schedule file for NRC Scenario 2

START TIME:_____

| ✓ | ✓ | Trigger | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|---|----------|---|--------------|-----------|-------|--------------|-------|
| | | 3 | LOA-ND015 (RACKOUT ND PMP 1B) | RACK- OUT | | | | 3 |
| | | 4 | VLV-KC023F (KC424B RTN HDR CONT ISOL INSIDE VLV FAIL TO POSITION) | 0 | | | | 4 |
| | | 11 | VLV-KC023F (KC424B RTN HDR CONT ISOL INSIDE VLV FAIL TO POSITION) | 0 | | | 1 SEC | 4 |
| | | 5 | OV_SLIM42ManPB (NV-309 Man Pushbutton) | PRESSED | | | :01 | 5 |
| | | 5 | OV_SLIM42OutIncPB (NV-309 Output Increment Pushbutton) | PRESSED | | | :02 | 5 |
| | | 6 | MAL-EP003D (ZONE 1B LOCKOUT) | ACTIVE | | | | 6 |
| | | | MAL-EHC003F (ALL TURBINE AUTO RUNBACK FAILURE) | BLOCK | | | | 6 |
| | | 7 | MAL-IRX007A2 (DROP ROD GROUP CBA2) | ACTIVE | | | | 7 |
| | | 12 | MAL-NC005F8 (ROD F8 EJECTION) | 2000 | 3 SEC | | | 8 |
| | | 12 | MAL-EDA001F8 (ROD F8 DRPI- OPEN/SHORTED COIL) | BOTH | 3 SEC | | | 8 |
| | | 12 | MAL-EDA001F10 (ROD F10 DRPI- OPEN/SHORTED COIL) | BOTH | 3 SEC | | | 8 |
| | | 12 | MAL-EDA001H8 (ROD H8 DRPI- OPEN/SHORTED COIL) | BOTH | 3 SEC | | | 8 |
| | | | MAL-ISE002A (AUTO SI TRN A FAILS TO ACTUATE) | ACTIVE | | | | 9 |
| | | | MAL-ISE002B (AUTO SI TRN B FAILS TO ACTUATE) | ACTIVE | | | | 9 |
| | | | VLV-CF012A (CF51 CF CONT ISOL VLV 1CF051 FAIL AUTO ACTIONS) | ACTIVE | | | | 10 |
| | | 10 | LOA-CNT002 H2 ANALYZERS | BOTH | 10:00 | | | |
| | | 13 | LOA-NV078 (SEAL WATER LOW FLOW LCL REFLASH ACK (AD7,C4)) | ACKN | 2:00 | | | |
| | _ | | | | | | | |
| | | Ensure T | RIGGER 11 = x11i3850 (KC-424B Ope | n Button D | epresse | d) | | |
| | | Ensure T | RIGGER 12 = jpplp4(1) jpplp4(2) (Re | actor Trip | Either Ti | rain) | | |
| | | Ensure 1 | B2 NG Pump in service | | | | | |
| | | | | | | | | |

2. SIMULATOR BRIEFING

2.1 Control Room Assignments:

| Position | Name |
|----------|------|
| CRS | |
| RO | |
| BOP | |

2.2 Give a copy of Attachment 2 (Shift Turnover Information) to the CRS.

3. EXERCISE PRESENTATION

- 3.1 Familiarization Period
 - A. Allow examinees time to familiarize themselves with the Control Board alignments.

3.2 Scenario EVENT 1, Swap CCW Pumps. Start 1B1 KC Pump and secure 1B2 KC Pump

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF AO dispatched to perform a pre-operational pump checkout, REPORT that the pump |
| | looks good for start. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | WHEN one minute has elapsed from the start of the 1B1 KC Pump, CALL the control |
| | room and inform them that the 1B1 KC Pump looks good for a continuous run. |

3.3 **Scenario EVENT 2**, Restore Main Generator Voltage

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | WHEN directed by the lead examiner, CALL the control room as the SOC and inform |
| | them grid issues have been resolved and that the SOC requests CNS Unit 1 Main |
| | Generator Voltage be restored to the CNS Generator Voltage Operating Schedule. Also |
| | inform the crew that switchyard (grid) voltage is adequate and reliable. |

3.4 **Scenario EVENT 3**, 1B ND Pump Breaker Failure

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 3 to cause |
| | 1B ND Pump control power to fail. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF Operator dispatched to investigate 1B ND Pump breaker, REPEAT back the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF the SWM is contacted to initiate an NCR or WR for 1B ND Pump, REPEAT back the information. |
| | After 5 minutes, contact the crew and REPORT "1B ND Pump Breaker Control Power Fuses have failed.". |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | IF Unit Supervisor is directed to initiate a clearance for 1B ND Pump, REPEAT back the information. |

3.5 **Scenario EVENT 4**, RCP CCW Return Header Containment Isolation (1KC-424B) Fails Closed

| BOOTH INSTRUCTOR ACTION |
|--|
| EN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 4 to close |
| E |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF Operator and/or Maintenance is dispatched to investigate 1KC-424B, REPEAT back |
| | the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate an NCR or WR for 1KC-424B, REPEAT back the information. |

3.6 Scenario EVENT 5, Seal Injection Control Valve (1NV-309) transfers to Manual

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 5 to cause |
| | 1NV-309 to transfer to Manual. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate an NCR or W/R for 1NV-309, REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF contacted as an AO to acknowledge seal water low flow alarm on reflash panel 1, REPEAT the information and INSERT Trigger 13 . |
| | After 2 minutes, contact the crew and REPORT "Seal Water Low Flow alarm has been acknowledged". |

3.7 **Scenario EVENT 6**, Zone B Lockout / Auto Turbine Runback Failure

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 6 to cause a |
| | Zone B Lockout. |

| √ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF the DEC TOP is contacted to investigate and repair loss of generator connection to with |
| | switchvard. REPEAT back information as required. |

BOOTH INSTRUCTOR ACTION

IF the DEC TOP is notified to calculate RTCA, **REPEAT** back information as required.

| ✓ | BOOTH INSTRUCTOR ACTION | | | | | | | |
|---|---|--|--|--|--|--|--|--|
| | IF the DEC BA is notified of unit status, REPEAT back information as required. | | | | | | | |
| ~ | BOOTH INSTRUCTOR ACTION | | | | | | | |
| | IF the SWM is contacted to initiate an NCR or WR for Zone B Lockout, REPEAT back the information. | | | | | | | |

| \checkmark | BOOTH INSTRUCTOR ACTION | | | | | |
|--------------|---|--|--|--|--|--|
| | IF the SWM is contacted to initiate an NCR or WR for the Turbine Control System, | | | | | |
| | REPEAT back the information. | | | | | |

| ✓ | BOOTH INSTRUCTOR ACTION | | | | | |
|---|---|--|--|--|--|--|
| | IF Radiation Protection is notified to sample and analyze gaseous effluents per SLC | | | | | |
| | 16.11-6, REPEAT back the information. | | | | | |

| ✓ | BOOTH INSTRUCTOR ACTION | | | | | | |
|---|--|--|--|--|--|--|--|
| | IF Primary Chemistry is notified to sample for isotopic analysis of iodine between 2 and 6 hours following power change in accordance with TS 3.4.16, REPEAT back the information. | | | | | | |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | IF the Reactor Group Engineer is notified of the occurrence, REPEAT back the |
| | information. |

3.8 Scenario EVENT 7, Multiple Control Rods Drop

| \checkmark | BOOTH INSTRUCTOR ACTION | | | | | | |
|--------------|--|--|--|--|--|--|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 7 to cause | | | | | | |
| | Control Bank A Group 2 rods to drop. | | | | | | |

 \checkmark

3.9 **Scenario EVENTS 8, 9, 10** Control Rod Ejection, Safety Injection Auto Initiation Failure, 1CF-51 Feedwater Isolation Failure

| ✓ | BOOTH INSTRUCTOR ACTION | | | | | | | |
|---|--|--|--|--|--|--|--|--|
| | IF AO is dispatched to place the containment H ₂ Analyzers in service per | | | | | | | |
| | OP/1/A/6450/010, REPEAT the information and INSERT Trigger 10 . | | | | | | | |
| | After 10 minutes contact the crew and REPORT "Ice Condenser Air Handling Units have been secured per G-1 Enclosure 11, and the H ₂ Analyzers have been placed in service per OP/1/A/6450/010". | | | | | | | |

| ✓ | BOOTH INSTRUCTOR ACTION | | | | |
|---|--|--|--|--|--|
| | IF Chemistry is notified to sample all S/Gs for activity, REPEAT the information. | | | | |

| \checkmark | BOOTH INSTRUCTOR ACTION | | | | | | |
|--------------|--|--|--|--|--|--|--|
| | IF Chemistry is notified to sample all S/Gs for activity, REPEAT the information. | | | | | | |
| | | | | | | | |
| ✓ | BOOTH INSTRUCTOR ACTION | | | | | | |
| | IF RP is notified to frisk all cation columns for activity, REPEAT the information. | | | | | | |

| ~ | BOOTH INSTRUCTOR ACTION | | | | | |
|---|--|--|--|--|--|--|
| | IF AO is dispatched to secure the 1A and/or 1B D/G and place in standby readiness per | | | | | |
| | OP/1/A/6350/002, REPEAT the information. | | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | | | | |
|---|--|---|--|--|--|--|--|
| Op Test No.: 301 | Scenario # 2 Event # 1 | Page2 of142 | | | | | |
| Event Description: | Swap CCW Pumps. Start 1B1 KC Pump and secure 7 | 1B2 KC Pump | | | | | |
| | | | | | | | |
| | Enclosure 4.15 | OP/ 1 /A/6400/005 | | | | | |
| | Shifting KC Pumps | Page 2 of 3 | | | | | |
| 3. Proc | cedure | | | | | | |
| N/A 3.1 | $\underline{\mathbf{IF}}$ shifting KC Train 1A pumps, perform the following: | | | | | | |
| | 3.1.1 Start the idle KC Train 1A pump: | | | | | | |
| | | | | | | | |
| | • "KC PUMP A2" | | | | | | |
| NOTE: | 1KC-C37A (Train A Miniflow Isol) may open during perfe | ormance of the next step. | | | | | |
| | 3.1.2 Adjust the following flow controllers on 1MC1 | 1 to zero gpm flow: | | | | | |
| | • 1KC-149 (KF Hx 1A Cool Wtr Otlt) | | | | | | |
| 1KC-156 (KF Hx 1B Cool Wtr Otit) | | | | | | | |
| 3.1.3 Stop the desired KC Train 1A pump: | | | | | | | |
| | • "KC PUMP A1" | | | | | | |
| | • "KC PUMP A2" | | | | | | |
| 3.1.4 IF KC Train 1A flow approaches 5700 gpm while performing the next step, ensure 1KC-C37A (Train A Miniflow Isol) is closed. | | | | | | | |
| | 3.1.5 Perform the following for the KF cooling loops | that are in service: | | | | | |
| | 3.1.5.1 IF 1A KF Cooling Loop is in servi Cool Wtr Otlt) flow controller on a necessary to maintain Spent Fuel F | ice, adjust 1KC-149 (KF Hx 1A 1MC11 to 3000 gpm or as Pool temperature < 125°F. | | | | | |
| | 3.1.5.2 IF 1B KF Cooling Loop is in servi Cool Wtr Otlt) flow controller on 1 necessary to maintain Spent Fuel P | ice, adjust 1KC-156 (KF Hx 1B 1MC11 to 3000 gpm or as Pool temperature < 125°F. | | | | | |



3.3 File this enclosure in the Control Copy folder of this procedure.

Note to Evaluator:

This completes Event 1. At Lead Evaluator discretion, the scenario may continue by directing the booth operator to contact the crew with instruction to restore Main Generator Voltage.

| Appendix D | | Required Operator Actions | | | Form ES-D-2 | | | | |
|--------------------|-----|---------------------------|---------|---------|-------------|------|----|----|-----|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 2 | Page | 14 | of | 142 |
| Event Description: | | Restore Main Ge | nerator | Voltage | | | | | |
| | | | | | | | | | |

| CNS AP/1/A/5500/037 | GENERATOR VC DI Abnormal C | PAGE NO. 4 of 20 Revision 04 | |
|---|---|---|---|
| ACTION/EX | PECTED RESPONSE | RESPONSE N | OT OBTAINED |
| C. Operator Actions | | | |
| ✓ 1. Verify Generat | or - TIED TO GRID. | Perform the follo | wing: |
| | | NOTE Shared s VA) requipower so a. IE notified by T switchyard (griders, THEN entre following Temperation) power so a. IE notified by T switchyard (griders, THEN entre following Temperation) power so | aystems (RN, VC, YC, ire an operable normal burce to be operable. CC degraded d) voltage conditions isure compliance with ech Specs. <u>REFER TO</u> D2C (Available Power bility Check). burces - Operating) ar Service Water WS) rol Room Area ystem (CRAVS)) rol Room Area Chilled m (CRACWS)) iary Building Filtered ystem ABFVS)). rocedure and step in |
| Verify Generat GENERATOR limits. <u>REFER</u> following: GENCAP (O. Enclosure 1 Capability Cu | or MVARs - EXCEED CAPABILITY CURVE TO one of the AC Graphic Display) (Unit 1 Generator irves). | Perform the follow a. <u>F AT ANY TIM</u> CAPABILITY C <u>THEN GO TO</u> ↓ b. Observe Note p <u>TO</u> Step 5. | wing: IE GENERATOR URVE limits exceeded, Step 3. prior to Step 5 and <u>GO</u> |

| CNS AP/1/A/5500/037 | GENERATOR VOLTAGE DISTURE Cas Abnormal Generat | AND ELECTRIC GRID ANCES e I or or Grid Voltage | PAGE NO. 5 of 20 Revision 04 |
|--|--|---|---|
| ACTION/ | EXPECTED RESPONSE | RESPONSE NOT OBTAI | NED |
| Perform the Generator M a. Adjust Ge within Ger limits as for the constraints of the constraint of the constraints of the constraint of the constraints of the constraint of the con | following to adjust VARs: nerator MVARs to operate perator Capability Curve ollows: * "LOWER" on VOLTAGE T to reduce lagging MVARs * "RAISE" on VOLTAGE T to reduce leading MVARs. | a. Perform the following: IF voltage regulator <u>THEN</u> perform the following: a) Place voltage regulator. b) Adjust MVARs to GENERATOR C CURVE limits. 2) IF unable to maintai within Generator Ca limits, <u>THEN</u> remove from service as follo IF reactor power or equal to 69%, the following: (1) Trip reactor. (2) <u>GO TO EP/7</u> (Reactor Triple following: (1) Trip turbine. (2) <u>GO TO AP/7</u> (Turbine Generator Ca P/2) | in "AUTO", ollowing: gulator in o within APABILITY n MVARs pability Curve e generator ws: greater than <u>THEN</u> perform I/A/5000/E-0 p or Safety less than orm the |

| Appendix D | | Required Operat | or Actions | 6 | | Forr | n ES-D-2 | 2 |
|---------------------------|--|---|---|---|--|--|--|----------|
| Op Test No.: | <u>301</u> Scenari | o # Event # | <u> </u> | 2 | Page | 16 | of | 142 |
| Event Description: | Restore M | lain Generator Voltage | | | | | | |
| | | | | | | | | _ |
| C AP/1/A/ | NS 5500/037 | GENERATOR VOL DIS Abnormal Ge | TAGE AND TURBANCE Case I enerator or (| ELECTRIC ES Grid Voltage | GRID | | PAGE NO 6 of 20 Revision | D. 04 |
| | ACTION/EXP | ECTED RESPONSE | | RESPON | ISE NOT C | BTAINE | ED |] |
| 3. (| Continued) | | | | | | | |
| с | . <u>IF</u> voltage reg <u>THEN</u> perform | ulator in "MANUAL", n the following: | | | | | | |
| - | 1) Notify TCC in manual | C/SOC voltage regulator | | | | | | |
| - | 2) <u>WHEN</u> vol to auto, <u>T</u> | tage regulator returned <u>IEN</u> notify TCC/SOC. | | | | | | |
| 4. N g | Notify Engineer penerator abnor conditions. | ing to evaluate mal operating Real Time Contingency | Analysis" (F | RTCA) prog | ram dete | rmines | if | |
| | the Unit will following a | have adequate switchy Unit Trip with Safety Inje | ard voltage action actua | e available fo ation. | or ECCS | loads | | |
| 5. V 0 in v s | /erify TCC repo Contingency An ndicates CN S s vould <u>NOT</u> be a should trip. | rted "Real Time alysis" (RTCA) witchyard voltage dequate if the unit | Pe N/ <u>A</u> a. ≯ | erform the <u>IF</u> TCC ha indications monitor "R Control Re | following is not rep s, <u>THEN</u> TCA" an com Supe | g: notify T nd repor ervisor. | RTCA" CC to rt results t | o |
| | | | b. | F AT AN indicates (would <u>NO</u> should trip | Y TIME T CNS swit T be ade), <u>THEN (</u> | CC rep chyard quate i GO TO | oorts "RTC voltage f the unit Step 6. | A" |
| | | | <u> </u> | GO TO St | ep 18. | to Ste | p to and | |
| 6. F C a | Record time TC CNS switchyard dequate. | C "RTCA" indicated I (grid) voltage <u>NOT</u> | _ | | | | | |
| 7. | itart 2 hour tim RTCA" indicate grid) voltage <u>N</u> | er from time TCC ed CNS switchyard <u>OT</u> adequate. | | | | | | |

| Appendix D | pendix D Required Operator Actions Form ES-D-2 | | | | | | | | |
|--|--|---|--|---|---------------|--------------------------|--------------------|--|--|
| Op Test No.: <u>301</u> Scena | ario # <u>2</u> Event | # | 2 | Page | 17 | of | 142 | | |
| Event Description: Restore | Main Generator Voltage | | | | | | | | |
| CNS AP/1/A/5500/037 ACTION/EX NOTE Do not ex | GENERATOR VC D Abnormal (PECTED RESPONSE ceed any generator limit | DLTAGE ANI ISTURBANG Case I Generator or | D ELECTRIC ES Grid Voltage RESP(usting gene | C GRID e DNSE NOT (erator volta | DBTAIN ge. | PAGE 12 of Revisio | NO. 20 on 04 | | |
| 18. Coordinate with SOC and perform generator voltage adjustments as follows: - • Adjust Unit 1 Generator Bus Voltage per, Unit 1 Revised Data Book Figure 23 (CNS Generator Voltage Operating Schedule) OR • OR - • Adjust Unit 1 Generator Bus Voltage per SOC request. - • Adjust Unit 1 Generator Bus Voltage per SOC request. - • Men SOC/TCC verifies switchyard (grid) voltage adequate and reliable, <u>THEN RETURN TO</u> procedure step in | | | | | | | | | |
| | | END | | | | | | | |

Note to Evaluator:

This completes Event 2. At Lead Evaluator discretion, the scenario may continue by directing the booth operator to insert Trigger 3 (1B ND Pump Breaker Failure).

| est No.: <u>301</u> Sce Description: 1B NI | enario # | 2 Event# | | | | | | | |
|---|----------------------|--|--|-------------------------------|---------------------------------|-----|--|--|--|
| Description: 1B NI | | Event # | 3 | Page | <u>18</u> of | 142 | | | |
| | D Pump E | Breaker Failure | | | | | | | |
| | | | | 1 | | | | | |
| | | PANEL - | 1AD-11 | OP/1/ | B/6100/010 L | | | | |
| | | i Articla | | 1 age 5 | D 14 | | | | |
| 4KV ESS PWR T | RAIN B | TROUBLE | | | D/1 | | | | |
| SETPOINT: | Local | alam actuated on 1RFM | MP3 | | | | | | |
| ORIGIN: | 1RFM | P3: Module 1RFM45, | 1RFM44, 1RFM43 | | | | | | |
| PROBABLE CAUSE: | 1. 2. 3. 4. | Loss of control power to breaker failure circuit. Loss of control power to the breaker mode select circuit. Loss of control power to any 4.16KV Essential breaker. | | | | | | | |
| | 5. | Loss of control power | to 1ETB degraded | bus voltage | circuit. | | | | |
| AUTOMATIC ACTIONS: | None | | | | | | | | |
| IMMEDIATE ACTIONS: | Dispat BB-49 | ch an operator to 1RFM) to determine the cause | 145 located on 1RFM e of alarm. | 4P3 (AB-56 | 0, | | | | |
| SUPPLEMENTARY ACTIONS: | ζ 1. | IF alarm is due to los 1EDF-F01C (SWGR. cause. | s of control power, o 1ETB Control Pow | lispatch an o er) and 1ETI | pperator to B to determine | | | | |
| | 2. | Ensure proper operati Control Power System | on of 125VDC/120 n per OP/1/A/6350/0 | VAC Vital Ir 008 (125 VD | nstrument and OC/120 VAC Vit | al | | | |
| | 3. | Ensure proper operati | on of 125VDC Dies | el Auxiliary | Power System p | ber | | | |
| | 4. | <u>IF</u> due to a breaker be | eing out of the CON | NECT positi | ion, ensure this | | | | |
| | 5. | condition is desirable Refer to Tech Specs 3 | and return to norma 3.8.9 and 3.8.10. | ll as soon as | possible. | | | | |
| REFERENCES: | 1. | CNEE-0115-01.42 | TECH SPEC E | | N | | | | |
| | 2. | CN-1705-01.01-01 | | | | | | | |
| | 3. | CNEE-0115-01.40 | See Attachmer | nt 13 for ap | plicable Tech | | | | |
| | 4. | CNL1-1/65-02.01 | Specs. | | | | | | |
| | | | T.S. 3.5.2 <u>Condition A:</u> (F OPERABLE sta | Restore tra atus within | in(s) to 72 hours) | | | | |
| | | | | | | | | | |

Note to Evaluator:

TS Evaluation completes this event. At Lead Evaluator discretion, the scenario may continue by directing the booth operator to insert Trigger 4 (1KC-424B Fails Closed).

| Appendix D | | Required Operator Actions Form ES-D-2 | | | | | -D-2 | | |
|--------------------|-----|---------------------------------------|---------|--------------|---------------------|-------------|---------|----|-----|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 4 | Page | 19 | of | 142 |
| Event Description: | | RCP CCW Retur | n Heade | er Containme | nt Isolation (1KC-4 | 124B) Fails | s Close | ed | |

Control Room Indications

1AD-6, C/1-4 "A,B,C,D MTR UPPER BRG KC OUTLET HI/LOW FLOW" - LIT

1AD-6, D/1-4 "A,B,C,D MTR LOWER BRG KC OUTLET LO FLOW" - LIT

1AD-6, E/1-4 "A,B,C,D THERMAL BARRIER KC OUTLET HI/LO FLOW" - LIT

1AD-20, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - LIT

1AD-21, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - LIT

1KC-424B CLOSED indicating light - LIT

Note To Evaluator:

The crew may take action to open 1KC-424B prior to and/or in place of AP/21 entry utilizing the guidance of OMP 1-7 (Emergency /Abnormal Procedure Implementation Guidelines) to "Take reasonable actions to preserve the integrity of plant components".

Opening 1KC-424B (per OMP 1-7 guidance or AP/21) completes this event. At Lead Evaluator discretion, the scenario may continue by directing the booth operator to insert Trigger 5 (1NV-309 Transfer to Manual).

| ppendix D | Required Opera | ator Act | ions | | F | orm E | S-D-2 | | |
|---|--|----------------------------------|---|---|---|----------------------------|--------------------|--|--|
| p Test No.: <u>301</u> Scena | rio # <u>2</u> Event | t# | 4 | [| Page 2 | 0_ of | 142 | | |
| vent Description: RCP CC | W Return Header Conta | ainment | solation (1 | 1KC-424 | B) Fails Cl | osed | | | |
| | | | | | | | | | |
| | 1000.05 | 00100 | | | | | | | |
| AP/1/A/5500/021 | LOSS OF | COMPOR | | LING | | PA 2 Re | of 36 vision 43 | | |
| ACTION/EXF | ECTED RESPONSE |] | F | RESPONSE | NOT OBTA | INED | | | |
| C. <u>Operator Actions</u> <u>CAUTION</u> Failure cooling to the | to restore NC pump g or NV seal injection NC pump seals result | seal coo within 1 ing in N | oling via ti 0 minute: C invento | hermal I s will ca ory loss. | barrier use dama | ıge | | | |
| | | <u>N</u> | ote to Eva | aluator: | | | | | |
| 1. Monitor Enclos | ure 1 (Foldout Page). | E | nclosure | 1 is incl | uded as A | ttachn | nent 3. | | |
| 2. Verify the follow | wing: | | Perform | n the fo | llowing: | | | | |
| • At least one K | At least one KC pump - ON | | | | a. Start additional KC pump(s) as necessary. | | | | |
| Flow to KC los | ads presently in service | 9. | b. <u>IF</u> no KC pump can be started, <u>THEN</u> perform the following: | | | | | | |
| | | | 1) <u> </u> | <u>F</u> S/I has THEN G | s actuated <u>0 TO</u> Step | on eith 4. | er unit, | | |
| | | | CAU | ITION | YD can o one Unit' a time. | nly su s NV p | pply ump at | | |
| | | | 2) [a | Determin alternate YD. | e which ur NV pump | nit will r cooling | receive from | | |
| | | | 3) <u> </u> | <u>F</u> Unit 2 cooling to <u>rO</u> Step | selected to 2A NV pt 4. | o receiv ump, <u>Tl</u> | ve YD HEN GO | | |
| | | | (RNO | continue | ed on next | page) | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Appendix D | Required Opera | tor Actions | For | n ES-D-2 |
|---|--|---|---|---|
| Op Test No.: <u>301</u> Scena | ario # <u>2</u> Event | # | Page 21 | of 142 |
| Event Description: RCP CC | CW Return Header Conta | inment Isolation (1KC- | -424B) Fails Close | ed |
| | | | | |
| CNS AP/1/A/5500/021 | LOSS OF (| | 3 | PAGE NO. 3 of 36 Revision 43 |
| ACTION/EX | PECTED RESPONSE | RESP | ONSE NOT OBTAIN | ED |
| 2. (Continued) | | | | |
| | | NOTE 4) Dispa cooli <u>TO E</u> To N 5) Maxi <u>REF</u> NV F 6) IF AT | NV pumps ma without regard water alignme Operating NV reach high ter conditions in approximately with no coolin atch operator to a ng to NV pump 1/ inclosure 2 (Altern V Pump 1A). mize NV pump ru ER TO Enclosure ump Run Time). | ay be started d to cooling ent. Pump will mperature / 15 minutes g water. lign YD A. <u>REFER</u> nate Cooling n time. 5 (Maximize |
| 3. <u>IF AT ANY TIM</u> <u>THEN RETURN</u> | I <u>E</u> all KC pumps lost, <u>V TO</u> STEP 2. | 6) <u>IF A</u> eithe oper- cooli Encle NV F 7) <u>GO 1</u> | <u>I ANY TIME</u> S/I of r unit, <u>THEN</u> notif ator to realign NV ng to normal. <u>Re</u> osure 2 (Alternate ^D ump 1A). <u>FO</u> Step 4. | vccurs on y dispatched Pump 1A <u>FER TO</u> Cooling To |

| Appendix D |) | Req | uired Op | perator <i>i</i> | Actio | ns | | Forr | n ES-D-2 | 2 |
|---------------------|--|---|---|------------------------------------|-----------------|---|--|---|---|-----------------|
| Op Test No.: | 301 Scen | ario # | 2 Ev | vent # | | 4 | Page | 23 | of | 142 |
| Event Descript | tion: RCP C | CW Return | Header C | containme | ent Isc | lation (1KC | -424B) Fail | s Close | ed | |
| | CNS | | LOSS | OF COM | PONE | | 3 | | PAGE NO | D. |
| | /1/A/5500/021 | | | | | | | | Revision | 43 |
| | ACTION/E) | (PECTED RE | SPONSE | | [| RESP | ONSE NOT (| OBTAIN | ED |] |
| 5. 6. | Verify both Ko - 90% AND ST | <u>ME</u> 1AD-7, EMP" lit, <u>T</u> C surge ta ABLE. | F/3 "LETI <u>HEN</u> perfe nk levels | DN HX orm <mark>- 50%</mark> | _ | Observe C <u>GO TO</u> Ste | aution prio p 8. | or to S | tep 8 and | |
| _ 7. | Start addition necessary to presently in s | al KC pum supply an ervice. | ıp(s) as y KC load | Is | _ | IF KC pum notify IAE f needed for IP/1/A/3890 Procedure) | p(s) dama to repair c recovery. 0/027A (Fir). | ged by ables 1 <u>REFE</u> e Dam | r fire, <u>THE</u> to pumps <u>ER TO</u> age Conti | <u>N</u> rol |
| <u>c</u> | CAUTION A los appro which | s of KC co bach to an h will resu | ooling to t overheat It in shaft | the NC po ed cond seizure. | umps ition i | results in in approxin | a gradual nately 10 r | ninute | s | |
| 8. | Verify KC flow follows: | r to NC pu "KC SUPF GS LOW" "KC SUPF GS LOW" | PLY HDR I - DARK PLY HDR I - DARK. | FLOW 🔎 FLOW | 7 | Perform th a. Ensure f — • (1KC-4 Cont I — • (1KC-3 Cont I | e following the followin (25A (NC F (sol)) (338B (NC F (sol)) | g: ng valve ^p umps ^p umps | es - OPEN Ret Hdr Sup Hdr | i: |
| | Note to Evaluato Opening 1KC-42 cooling. | o <u>r:</u> 4B will re- | establish | RCP | | - • 1KC-4 Cont I (RNO con | 24B (NC F sol). tinued on r | Pumps next pa | Ret Hdr ge) | |
| <u>Note</u> Open | to Evaluator: ing 1KC-424B com | Pletes this | AL TAS | SK #1 | luator | discretion, | the scenar | io may | continue | |
| by di | recting the booth o | perator to | insert Trig | ger 5 (1N | V-309 | Transfer to | Manual). | , | | |

| Appendix D | endix D Required Operator Actions Form ES | | | | | | Form ES-D-2 | | | | |
|-------------------|---|------------------|------------|----------------------------|--|--|--|------------------|--|--|--|
| Op Test No.: | 301 Scena | ario # <u>2</u> | Event # | 4 | Page | 24 | of | 142 | | | |
| Event Descriptior | 1: RCP CC | CW Return Header | Containmen | t Isolation (1KC | -424B) Fails | s Clos | ed | | | | |
| | | | | | | | | | | | |
| AP/1/ | CNS /A/5500/021 | LOS | S OF COMPO | DNENT COOLIN | G | | PAGE N 6 of 36 Revision | NO. 5 n 43 | | | |
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAINED | | | | | | | |
| 8 | (Continued) | | | | | | | | | | |
| | · · · · | | | b. IF AT A conditio | <u>NY TIME</u> a ns met: | ny of t | he follow | ing | | | |
| | | | | - • Time THAN | since loss o I 10 MINUT | of KC - TES | GREAT | ER | | | |
| | | | | OR | | | | | | | |
| | | | | Any N Enclo | IC pump tri sure 1 (Fol | p crite dout P | ria from 'age) met | | | | |
| | | | | <u>THEN</u> p | erform the | followi | ng: | | | | |
| | | | | 1) <u>IF</u> le the f | tdown isola ollowing: | ted, <u>T</u> | <u>HEN</u> perf | orm | | | |
| | | | | a) E a | insure NV p ligned to F | oump s WST a | suction as follows | : | | | |
| | | | | _ (| 1) 1NV-25 Suct Fre | 2A (N om FV | V Pumps /ST) - OF | PEN | | | |
| | | | | (| 2) 1NV-25 Suct Fre | 3B (N om FV | V Pumps /ST) - OF | PEN | | | |
| | | | | (| 3) 1NV-18 CLOSE | 8A (V(D | CT Oth Is | ol) - | | | |
| | | | | (4 | 4) 1NV-18 CLOSE | 9B (V(D. | CT Oth Is | ol) - | | | |
| | | | | b) <u>V</u> a n r | VHEN react ttempt to est naintain slor equired to n | tor trip stablis w cool maintai | ped, <u>THE</u> h and down as in PZR le | <u>N</u> vel. | | | |
| | | | | 2) Ensu PRE | ure steam d SSURE MO | lumps DDE. | - IN | | | | |
| | | | | 3) Ensu AT 1 PRE | ire "STM D 090 PSIG S SSURE. | ump (Stean | CTRL" - S M HEADE | SET ER | | | |
| | | | | 4) Ensi | ire reactor | - TRIP | PED. | | | | |
| | | | | (RNO con | tinued on n | next pa | iqe) | | | | |

| Appendix D | Required Oper | ator Actions | For | m ES-D-2 | |
|-------------------------------|-----------------------|---|---|---|---|
| Op Test No.: <u>301</u> Scena | ario # <u>2</u> Even | # 4 | Page25 | _ of14 | 2 |
| Event Description: RCP CC | CW Return Header Cont | ainment Isolation (1K0 | C-424B) Fails Clos | ed | |
| | | | | | |
| CNS AP/1/A/5500/021 | LOSS OF | COMPONENT COOLIN | IG | PAGE NO. 7 of 36 Revision 43 | |
| ACTION/EX | PECTED RESPONSE | RES | PONSE NOT OBTAIN | IED | |
| 8. (Continued) | | | | | |
| | | 5) <u>WH</u> 5%, | EN reactor power , THEN perform th | less than e following: | |
| | | a) b) | Trip all NC pumps Ensure normal spi associated with tri pump(s) - IN MAN CLOSED. | ray valve pped NC UAL AND | |
| | | 6) Sec | ure any dilutions i | n progress. | |
| | | 7) <u>IF</u> n clos folic pro- allo | eactor trip breaker sed, <u>THEN</u> perform wing while contin cedure as time an w: | rs were n one of the uing with this d conditions | |
| | | • [[| above P-11, <u>THE</u> P/1/A/5000/E-0 (F r Safety Injection) | EN GO TO Reactor Trip | |
| | | 0 | R | | |
| | | • [[A 0 | below P-11, <u>THE</u> P/1/A/5500/005 (F r Inadvertent S/I B | EN GO TO Reactor Trip Below P-11). | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Appendix D | Required Operator Actions Form E | | | | | | | m ES-l | D-2 | | | |
|-------------------|---|---|---|------|--|--|---|---|---|--|--|--|
| Op Test No.: | 301 Scena | <u>301</u> Scenario # <u>2</u> Event # <u>4</u> Page <u>26</u> or | | | | | | | 142 | | | |
| Event Description | Event Description: RCP CCW Return Header Containment Isolation (1KC-424B) Fails Closed | | | | | | | | | | | |
| <u> </u> | | | | | | | | | | | | |
| | CNS LOSS OF COMPONENT COOLING PAGE NO | | | | | | | | | | | |
| AP/1 | AP/1/A/5500/021 | | | | | | | | 36 on 43 | | | |
| | ACTION/EX | PECTED RESPONS | E | | RESE | PONSE NOT | OBTAIN | ED | \neg | | | |
| 9. | Verify KC avai | lable as follows | : | | | | | | | | | |
| | a. Verify the for non-essenti - OPEN: - (1KC-230/ Isol) - (1KC-3A (Isol) - (1KC-50A Isol) - (1KC-1A (Isol). | Ilowing Train A F al header isolatio A (Rx Bldg Non-Es (Aux Bldg Non-Es Aux Bldg Non-Es | KC on valves Ess Hdr s Ret Hd Ess Hdr ss Ret H | s) – | A. WHEN Train A Isol) "M of valve affected | The KC r header v reopened appropria switch is occur be 48% KC OAC alarm Low-Low L OI ACTUA closure kn i valve(s) o | non-esa alves o d when ate train reset. tween surge f n C1D2 .evel S TED" / nown, <u>I</u> open. | sential can be the n's level This sh 40% and 215 (KC urge Ta <u>AND</u> ca <u>HEN</u> er | iould d el. C ink use isure | | | |

| Appendix D Required Operator | | | | | r Actions Fo | | | | orm ES-D-2 | | |
|------------------------------|--|--|--------------------------------------|-----------------------------|---|--|--|--|---|----------------------------|--|
| Op Test No.: 3 | Op Test No.: 301 Scenario # 2 Event # 4 Page 27 of | | | | | | | | of | 142 | |
| Event Description: | RCP C | CW Return I | Header Cor | ntainment l | solatior | n (1KC- | 424B) Fail | ls Clos | ed | | |
| Event Description: | Verify the fr non-essent - OPEN: • 1KC-228 Isol) • 1KC-538 Isol) • 1KC-538 Isol) • 1KC-538 Isol) • 1KC-538 Isol) | CW Return I CW RETURN CW RETURN COMPACTION COM | in B KC LOSS O LOSS O PONSE | ves dr t Hdr t Hdr | b. W b. W b. W b. Ti ls of af | A (1KC- COLINC COLINC RESP OTE MEN (rain B I ol) " <u>NC</u> for alve fected Fected | The KC r header v reopened aswitch is occur bef 48% KC DAC alarm ow-Low L DAC alarm valve(s) of Procedure | alves of d when ate train reset. tween a surge for clD2.evel S TED" / pen. | ed PAGE 9 of 3 Revisi ED sential can be the n's level This sh tank leve 214 (KC urge Ta AND can tank leve 214 (KC urge Ta AND can the tank leve 214 (KC urge Ta AND can the tank leve | to FIND. 36 on 43 | |

| Op Test No.: 301 Scenario # 2 Event # 4 Page 28 of 142 |
|---|
| |
| Event Description: RCP CCW Return Header Containment Isolation (1KC-424B) Fails Closed |
| Event Description: RCP CCW Return Header Containment Isolation (1KC-424B) Fails Closed Image: CNS AP/1/A/5500021 LOSS OF COMPONENT COOLING PAGE NO. 10 of 36 Revision 43 ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED Image: CNS OF Support of the sup |

| Appe | pendix D Required Operator Actions Form ES-D- | | | | | | | | | |
|-------|--|-----------------------------------|------------------------------------|---|--|---|---------|--|--|--|
| Op Te | Test No.: <u>301</u> Scenario # <u>2</u> Event # <u>4</u> Page <u>30</u> of <u>1</u> | | | | | | | | | |
| Event | Description: RCP C | CW Return Header Conta | inment Isolation (| 1KC-424B) Fail | s Clos | ed | | | | |
| L | | | | | | | | | | |
| | CNS AP/1/A/5500/021 | PAGE NC 12 of 36 Revision 4 |). 43 | | | | | | | |
| | ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | | | | | | | | | |
| | 11. (Continued) | | | | | | <u></u> | | | |
| | (continued) | | e. <u>WH</u> Io-I foll 1) | I <u>EN</u> KC surge ta o level setpoint, owing: Ensure KC pun train - ON. | ank lev , <u>THEN</u> nps on | el above I perform th affected | ne | | | |
| | | | <u>NO</u> | TE The KC r header v reopened appropria switch is occur bet 48% KC | non-es alves d d when ate train reset. tween surge | sential the n's level This shoul 40% and tank level. | d | | | |
| | | | 2) | OPEN non-ess isolation valves as follows: | ential I for aff | neader fected train | | | | |
| | | | | • Train A: | | | | | | |
| | | | - - - | 1KC-230A Hdr Isol) 1KC-3A (R Ret Hdr Isol) 1KC-50A (<i>I</i> Hdr Isol) 1KC-1A (A Ret Hdr Iso | (Rx Bldg bl) Aux Bl ux Bld bl). | dg Non-Ess Non-Ess dg Non-Ess g Non-Ess | s | | | |
| | | | | OR | | | | | | |
| | | | | Train B: | | | | | | |
| | | | - | 1KC-228B Hdr Isol) 1KC-18B (Ret Hdr Iso 1KC-53B (Hdr Isol) 1KC-2B (A Ret Hdr Iso | (Rx Bl Rx Bld ol) Aux Bl ux Bld ol). | dg Non-Es g Non-Ess dg Non-Ess g Non-Ess | s s | | | |
| | | | (RNC |) continued on r | next pa | ige) | | | | |

| Appendix D Required Operator Actions Form ES-D- | | | | | | |
|--|------------------------|---------------------------------|---|--|--|--|
| Op Test No.: <u>301</u> Scena | ario # <u>2</u> Event | #4 | Page | 31 of | 142 | |
| Event Description: RCP CC | CW Return Header Conta | inment Isolation (1KC | -424B) Fails (| Closed | | |
| Op Test No.: <u>301</u> Scena Event Description: RCP CO AP/1/A/5500/021 ACTION/EX 11. (Continued) 11. (Continued) 12. Verify 1AD-10, A LO-LO LEVE | Ario # _2_ Event | # | Page Page Antipological Page Page Page Page Page Page Page Page | 31 of Closed PAGI 13 c Revis TAINED on-essential on-essential resore on-essential valves - ig Non-Ess Non-Ess Re ig Non-Ess ig Non-Ess | Hdr Hdr Hdr Hdr Hdr Hdr Hdr Hdr Hdr Hdr | |
| | | Isol). b. Ensure (RNO cor | both Train B | KC pumps xt page) | - ON. | |

| Appendix D | Required | ired Operator Actions | | | | Form ES-D-2 | | | |
|-------------------------------|--|-----------------------|---|--|------------------------|-------------------------------|---------|--|--|
| Op Test No.: <u>301</u> Scena | ario # | Event # | 4 | Page | 32 | of | 142 | | |
| Event Description: RCP CC | W Return Heade | er Containment I | solation (1KC | -424B) Fails | s Clos | ed | | | |
| | | | | | | | | | |
| CNS | CNS LOSS OF COMPONENT COOLING PAGE NO. | | | | | | | | |
| AP/1/A/5500/021 | AP/1/A/5500/021 | | | | | | | | |
| ACTION/EX | PECTED RESPONSE | | RESP | ONSE NOT C |)BTAIN | ED |] | | |
| 12. (Continued) | | | | | | | <u></u> | | |
| | | | c. <u>IF</u> KC S to trend perform | urge Tank down <u>OR</u> is the followir | 1A lev s emp ng: | el continu ty, <u>THEN</u> | es | | |
| | | | 1) Ensu esse AS N | ure the follo ntial equipr NEEDED: | wing 1 ment - | Train B IN SERVI | ICE | | |
| | | | - N - N - N - N - N - N - N - N - N | / Pump 1B Pump 1B O Pump 1B O Hx 1B A Pump 1B S Pump 1B F Pump 1B. | | | | | |
| | | | Ensuesse | ire the follo intial equipr | wing 1 ment - | Frain A OFF: | | | |
| | | | - N - N - N - N - C - C - N - C - N - K - K | / Pump 1A Pump 1A D Pump 1A A Pump 1A S Pump 1A Pump 1A. | | | | | |
| | | | 3) Ensu OFF | ire both Tra | ain A k | (C pumps | - | | |
| | | | 4) Loca esse | ite and isola intial heade | ate lea er. | ak on Trair | ηA | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Appendix D | | Required Operation | ator Acti | ons | | For | n ES-D | -2 |
|-----------------------------------|--------------------------------|---|---------------------------|--|---|---|--|--------------------------------|
| Op Test No.: Event Description | <u>301</u> Scena n: RCP CC | ario # <u>2</u> Even CW Return Header Cont | t # ainment Is | 4 solation (1KC | Page -424B) Fails | <u>33</u> s Close | of | 142 |
| | | | | | | | | |
| AP/1/ | CNS /A/5500/021 | LOSS OF | LOSS OF COMPONENT COOLING | | | | | NO. 36 n 43 |
| | ACTION/EX | PECTED RESPONSE |] | RESI | PONSE NOT C |)BTAIN | ED | |
| 13. | Verify 1AD-10, B LO-LO LEVE | A/2 "KC SURGE TAN | к — | Perform tr a. Ensure CLOSE - 1KC- Isol) - 1KC- - 1SC - | the following the following 228B (Rx B 228B (Rx B 18B (Rx Blo 53B (Aux Blo 53B (Aux Blo 53B (Aux Blo 2B (Aux Blo 2B (Aux Blo 2B (Aux Blo 53B (Aux Blo 2B (Aux Blo 53B (Aux Blo | g valve Idg No Idg Non Idg Idg Non Idg Idg Non Idg Idg Idg Idg Idg Idg Idg Idg Idg Idg | es - In-Ess Ho I-Ess Ret In-Ess Ret Dumps - C el continu ty, <u>THEN</u> Train A IN SERV | dr Hdr Hdr DN. Jes |
| Appendix D Required Operator Actions Form ES-D-2 | | | | | ES-D-2 | | | | | |
|--|--|---------------------------------|--------------|-------------------|-------------------------------|-------------|-----------|--|--|--|
| Op Test No.: 30 |)1 Scenario # | 2 Event | # | 4 | Page | <u>34</u> o | f 142 | | | |
| Event Description: | RCP CCW Retu | rn Header Conta | ainment Isol | ation (1KC- | 424B) Fails | Closed | | | | |
| | | | | | | | | | | |
| CNS AP/1/A/550 | CNS AP/1/A/5500/021 LOSS OF COMPONENT COOLING PAGE NO. 16 of 36 Revision 43 | | | | | | | | | |
| | ACTION/EXPECTED | RESPONSE |] [| RESP | DNSE NOT OB | BTAINED | | | | |
| 13. (C | Continued) | | | _ 4) Loca esse | te and isolat ntial header | te leak o | n Train B | | | |
| | | | | | | | | | | |
| 14. Ens mo ALI | sure KC heat excha de switches - PRO GNED. | anger outlet PERLY | | | | | | | | |
| 15. <mark>Det</mark> KC. | ermine and correc | t cause of loss | of | | | | | | | |
| 16. Ens Tec Cor | sure compliance w ch Specs and Selec mmitments Manual | ith appropriate ted Licensee |) | | | | | | | |
| -• ^s _P | LC 16.9-7 (Boration Path - Shutdown) | Systems Flow | | | | | | | | |
| _• ^s | LC 16.9-8 (Boration ath - Operating) | Systems Flow | | | | | | | | |
| _• \$ | LC 16.9-9 (Boration Shutdown) | Systems Pum | ps | | | | | | | |
| -• s | LC 16.9-10 (Boratio Charging Pumps - Op | n Systems perating) | | | | | | | | |
| _• 3 | .5.2 (ECCS - Opera | ting) | | | | | | | | |
| _•3 | .5.3 (ECCS - Shutdo | own) | | | | | | | | |
| _• 3 | .6.6 (Containment S | pray System) | | | | | | | | |
| _• ³ s | .7.5 (Auxiliary Feed system) | water <mark>(</mark> AFW) | | | | | | | | |
| _ • 3 (0 | .7.7 (Component Co CCW) System). | ooling Water | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| Appendix D | Required Opera | equired Operator Actions Form ES-D-2 | | | | | | | | |
|---|--|--|---|-------------------------|--|--|--|--|--|--|
| Op Test No.: <u>301</u> So | cenario # Event | #4 | Page <u>35</u> | of <u>142</u> | | | | | | |
| Event Description: RCF | PCCW Return Header Conta | inment Isolation (1KC-4 | 424B) Fails Close | d | | | | | | |
| | | | | | | | | | | |
| CNS AP/1/A/5500/021 | CNS AP/1/A/5500/021 LOSS OF COMPONENT COOLING PAGE NO. 17 of 36 Revision 43 | | | | | | | | | |
| ACTION | V/EXPECTED RESPONSE | RESPO | NSE NOT OBTAINE | D | | | | | | |
| 17. Determine | required notifications: | | | | | | | | | |
| • <mark></mark> | [<u>O</u> RP/0/A/5000/001 ation Of Emergency) | | | | | | | | | |
| • REFER 1 Notification | ORP/0/B/5000/013 (NRC) on Requirements). | | | | | | | | | |
| N/A18. IF KC Hx le perform the | eak to RN suspected, <u>THEI</u> e following: | <u>v</u> | | | | | | | | |
| Notify Ra potential have occ | diation Protection that a unmonitored release may urred. | | | | | | | | | |
| ● Notify Sta a KC Hx : | ation Management to evalua to RN leak. | te | | | | | | | | |
| 19. Verify KC s | surge tanks level as follow | s: <u>Return to</u> | <u>)</u> Step 9. | | | | | | | |
| Greater t Stable or | han 50% trending up. | | | | | | | | | |
| | | | | | | | | | | |
| 20. <u>WHEN</u> plan perform th | nt conditions permit, <u>THEN</u> e following: | <u>I</u> | | | | | | | | |
| — • <mark>Return K</mark> <u>REFER 1</u> (Compon | C pumps to normal operatio [<u>O</u> OP/1/A/6400/005 ent Cooling Water System). | n.) | | | | | | | | |
| Return N as applic (Alternate | V Pump 1A to normal coolin able. <u>REFER TO</u> Enclosure e Cooling To NV Pump 1A). | g. 2 | | | | | | | | |
| 21. Verify the f | following: | Perform the | following: | | | | | | | |
| ● <mark>1AD-7, F.</mark> TEMP" - | /3 "LETDN HX OUTLET HI DARK | a. <u>IF</u> letdow AP/1/A/5 Letdown | n isolated, <u>THEN</u> 500/012 (Loss of). | REFER TO Charging or | | | | | | |
| • (TAD-7, H • Normal le | etdown - IN SERVICE. | b. Do not co Step 21 o | ontinue in this pro conditions met. | cedure until | | | | | | |
| | | | | | | | | | | |

| Op Test No: 301 Scenario # 2 Event # 4 Page 36 of 142 Event Description: RCP CCW Return Header Containment Isolation (1KC424B) Fails Closed Image: transmission of the state intervent isolation (1KC424B) Fails Closed Image: transmission of the state intervent isolation (1KC424B) Fails Closed Image: transmission of transmission of the state intervent isolation (1KC424B) Fails Closed Image: transmission of treturn to transmission of transmission of transmission | Appendix D | | Required Operator Actions Form ES-D-2 | | | 2 | | | | | |
|--|------------------|--|--|---|------------|---------------|-------------|---------------------------------|----------|-----|--|
| Event Description: RCP CCW Return Header Containment Isolation (1KC-424B) Fails Closed Image: CNS and Control of Component Coolling PAGE NO. 18 of 38 o | Op Test No.: | 301 Scena | ario #2 | Event | # | 4 | Page | 36 | of | 142 | |
| Image: CNS APPLIADS SOURCE LOSS OF COMPONENT COOLING PAGE NO. 18 of 30. Revision 43 Image: CNS APPLIADS COMPONENT COOLING RESPONSE NOT OBTAINED Image: CNS APPLIAD RESPONSE RESPONSE NOT OBTAINED Image: CNS APPLIAD RESPONSE RESPONSE NOT OBTAINED Image: CNS APPLIAD RESPONSE Ref desired to align NV pump suction to VCT. THEN Perform the following: Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE SUCT From FWST) Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE SUCT From FWST Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE SUCT From FWST Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE SUCT From FWST Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE SUCT From FWST Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE SUCT From FWST Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE SUCT From FWST Image: CNS APPLIAD RESPONSE Image: CNS APPLIAD RESPONSE APPLIAD RESPONSE | Event Descriptio | n: RCP CC | CW Return Hea | ader Conta | ainment Is | solation (1KC | -424B) Fail | s Close | ed | | |
| AP/1/A/5500/021 LOSS OF COMPONENT COOLING PAGE NO. 18 of 36 Revision 43 ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 22. Ensure VCT and letdown path aligned as follows: Response NOT OBTAINED N/A a. IF desired to align NV pump suction to VCT. THEN perform the following: 0 1) OPEN the following valves: - 1NV-188A (VCT Ottl Isol) - 1NV-189B (VCT Ottl Isol) - 2) CLOSE the following valves: - 1NV-2532A (NV Pumps Suct From FWST) - NV-253B (NV Pumps Suct From FWST) - - NV-253B (NV Pumps Suct From FWST) - - NV-253B (NV Pumps Suct From FWST) - - 0.11 W-1253B (NV Pumps Suct From FWST) - - 0.11 W-1253A (NV Pumps Suct From FWST) - - 0.11 W-1253A (Letdon House Not 13 Valve) to "DEMINT" position and return to "AUTO" - 2.3. Determine long term plant status, RETURN TO procedure in affect. END | | | | | | | | | | | |
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 22. Ensure VCT and letdown path aligned as follows: . NAA a. IF desired to align NV pump suction to VCT, THEN perform the following: 1) OPEN the following valves: . - 1NV-188A (VCT Ottl Isol) _ 1 NV-189B (VCT Ottl Isol) _ 1 NV-252A (NV Pumps Suct From FWST) - 1 NV-253B (NV Pumps Suct From FWST). - 1 NV-253B (NV Pumps Suct From FWST). - NHEN NV suction aligned to VCT, THEN momentarity place 1NV-172A (SWay Divet To VCT-RHT) to "VCT" position and return to "AUTO". - C. If desired to restore letdown flow through NV demineralizers. THEN momentarity place 1NV-153A (Letdon Hz Ottl 3-Way Valve) to "DEMIN" position and return to "AUTO". - 23. Determine long term plant status. RETURN TO procedure in affect. | AP/1 | CNS /A/5500/021 | | LOSS OF | ENT COOLIN | G | | PAGE No 18 of 36 Revision |). 43 | | |
| 22. Ensure VCT and letdown path aligned as follows: N/A a. IF desired to align NV pump suction to VCT, <u>THEN</u> perform the following: 1) OPEN the following valves: - 1NV-188A (VCT Ottl Isol) - 1NV-189B (VCT Ottl Isol). 2) CLOSE the following valves: - 1NV-252A (NV Pumps Suct From FWST) - 1NV-253B (NV Pumps Suct From FWST). b. WHEN NV suction aligned to VCT, <u>THEN</u> momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". c. (IF desired to restore letdown flow) through NV demineralizers. <u>THEN</u> momentarily place 1NV-153A (Letdon Hx Ott 3-Way Valve) to "DEMIN" position and return to "AUTO". c. 23. Determine long term plant status. <u>RETURN TO proceedure in affect.</u> | | ACTION/E) | VPECTED RESPO | NSE |] | RESI | PONSE NOT (| DBTAINE | ED |] | |
| A. IF desired to align NV pump suction to VCT. <u>THEN</u> perform the following: 1) OPEN the following valves: 1 NV-188A (VCT Ottl Isol) 1 NV-189B (VCT Ottl Isol). 2) CLOSE the following valves: 1 NV-252A (NV Pumps Suct From FWST) 1 NV-253B (NV Pumps Suct From FWST). b. <u>WHEN NV suction aligned to VCT.</u> <u>THEN momentarity place 1NV-172A (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO".</u> c. If desired to restore letdown flow. How Muthod Phane and P | 22. | Ensure VCT a as follows: | nd letdown pa | ath aligne | d | | | | | | |
| 1) OPEN the following valves: 1) NV-188A (VCT Ottl Isol) 1) NV-189B (VCT Ottl Isol). 2) CLOSE the following valves: 1NV-252A (NV Pumps Suct From FWST) 1 NV-253B (NV Pumps Suct From FWST). b. WHEN NV suction aligned to VCT. THEN momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". c. If desired to restore letdown flow titrough NV demineralizers. THEN momentarily place 1NV-153A (Letdon Hx Ott 3-Way Valve) to "DEMIN" position and return to "AUTO". 23. Determine long term plant status. END | N/A | a. <u>IF</u> desired to VCT, THEN | o align NV pun I perform the fo | np suction ollowing: | to | | | | | | |
| - 1NV-188A (VCT Ottl Isol) - 1NV-189B (VCT Ottl Isol). 2) CLOSE the following valves: - 1NV-252A (NV Pumps Suct From FWST) - 1NV-253B (NV Pumps Suct From FWST). - NWHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". - C. If desired to restore letdown flow through NV demineralizers, THEN momentarily place 1NV-153A (Letdon Hx Ottl 3-Way Valve) to "DEMIN" position and return to "AUTO". - 23. Determine long term plant status. RETURN TO procedure in affect. | | OPEN the following valves: | | | | | | | | | |
| 1NV-189B (VCT Ottl Isol). CLOSE the following valves: 1NV-252A (NV Pumps Suct From FWST) 1NV-253B (NV Pumps Suct From FWST). b. WHEN NV suction aligned to VCT. THEN momentarily place 1NV-172A ('3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". c. IE desired to restore letdown flow. through NV demineralizers. THEN momentarily place 1NV-153A (Letdon Hx Ott 3-Way Valve) to "DEMIN" position and return to "AUTO". 23. Determine long term plant status. END | | • 1NV-1 | 188A (VCT Oth | Isol) | | | | | | | |
| 2) CLOSE the following valves: - • 1NV-252A (NV Pumps Suct From FWST) - • 1NV-253B (NV Pumps Suct From FWST). - b. WHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". - c. IF desired to restore letdown flow through NV demineralizers, THEN momentarily place 1NV-153A (Letdin Hx Ottl 3-Way Valve) to "DEMIN" position and return to "AUTO". - 23. Determine long term plant status. | | • 1NV-1 | 189B (VCT Oth | Isol). | | | | | | | |
| - • 1NV-252A (NV Pumps Suct From FWST) - • 1NV-253B (NV Pumps Suct From FWST). - • • WHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A, (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". - • • • • • • • • • • • • • • • • • • • | | 2) CLOSE | the following v | alves: | | | | | | | |
| - • 1NV-253B (NV Pumps Suct From FWST). b. WHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A. (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". c. IF desired to restore letdown flow ithrough NV demineralizers, THEN momentarily place 1NV-153A (Letdn Hx Ott 3-Way Valve) to "DEMIN" position and return to "AUTO". 23. Determine long term plant status. <u>RETURN TO</u> procedure in affect. | | - • 1NV-2 From | 252A (NV Pum FWST) | ps Suct | | | | | | | |
| b. WHEN NV suction aligned to VCT, THEN momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". c. IF desired to restore letdown flow through NV demineralizers, THEN momentarily place 1NV-153A (Letdn Hx Ott 3-Way Valve) to "DEMIN" position and return to "AUTO". 23. Determine long term plant status. <u>RETURN TO</u> procedure in affect. | | _ • 1NV-2 From | 253B (NV Pum FWST). | ps Suct | | | | | | | |
| C. IF desired to restore letdown flow, through NV demineralizers, <u>THEN</u> momentarily place 1NV-153A (Letdn Hx Ottl 3-Way Valve) to "DEMIN" position and return to "AUTO". 23. Determine long term plant status. <u>RETURN TO</u> procedure in affect. | - | b. WHEN NV THEN mom (3-Way Dive position and | suction aligned lentarily place ert To VCT-RH d return to "AU | I to VCT, 1NV-172/ IT) to "VC TO". | 4) T" | | | | | | |
| 23. Determine long term plant status. <u>RETURN TO</u> procedure in affect. <u>END</u> | - | c. <u>IF</u> desired t through NV momentarily Hx Otlt 3-W position and | o restore letdo ' demineralizer: y place 1NV-1{ /ay Valve) to "[d return to "AU | wn flow s, <u>THEN</u> 53A (Letdi DEMIN" TO". | n | | | | | | |
| | 23. | Determine Ion RETURN TO p | ig term plant s procedure in a | status. ffect. | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

| Appendix D | | Required Operator Actions | | | | | | Form ES-D-2 | | |
|--|-----|---------------------------|---|---------|---|------|----|-------------|-----|--|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 5 | Page | 37 | of | 142 | |
| Event Description: RCP Seal Injection Control Valve (1NV-309) transfer to Manual | | | | | | | | | | |

Control Room Indications

1AD-7, C/4 "NCP SEAL WATER LO FLOW" - LIT

Note To Evaluator:

This malfunction can be mitigated by use of the Annunciator Response for low seal water injection flow (1AD-7 C/4). Per the ARP, the crew may refer to AP/08 (Malfunction of Reactor Coolant Pump) although this procedure contains no substantive actions.

Once proper control of 1NV-309 is demonstrated, and at Lead Evaluator discretion, the scenario may continue by directing the booth operator to insert Trigger 6 (Zone B Lockout/Auto Turbine Runback Failure).

| Appendix D | Require | d Operator Act | ons | | Form ES-I | D-2 |
|-----------------------------|--|---|--|--|--|-----|
| Dp Test No.: <u>301</u> Sce | enario # 2 | Event # | 5 | Page | <u>38</u> of | 142 |
| Event Description: RCP | Seal Injection Cor | ntrol Valve (1NV-3 |)9) transfer to | Manual | | |
| | | PANEL: 1AD-7 | | OP/ 1 Page | /B/6100/010 H 22 of 63 | I |
| NCP SEAL W | ATER LO FLO | <u>ow</u> | | | C/4 | |
| SETPOINT: | 7 gpm | | | | | |
| ORIGIN: | Instrument 1NVFT5330 1NVFT5320 1NVFT5310 1NVFT5300 | DCS 1NVAA5330 1NVAA5320 1NVAA5310 1NVAA5300 | Desc NC PUMP NC PUMP NC PUMP NC PUMP | ription A SEAL W B SEAL W C SEAL W D SEAL W | IR FLOW IR FLOW IR FLOW IR FLOW | |
| PROBABLE CAUSE: | 1. Hi I 2. Los 3. Filli | D/P on seal water fil s of injection water ng the seal water inj | ter ection filter ho | ousing after f | îlter replaceme | nt |
| AUTOMATIC ACTIONS: | None | | | | | |
| IMMEDIATE ACTIONS: | 1. Ider 2. Posi seal 3. Refe 4. Refe | ntify which pump is ition 1NV-309 (Seal water flow, er to AP/1/A/5500/0 er to AP/1/A/5500/0 | alarming on th Water Inj Flov 08 (Malfunctio 12 (Loss of Ch | e DCS alarn w) as necess on of Reacto arging or Le | n screen. <mark>ary to increase</mark> r Coolant Pump etdown). |)). |
| SUPPLEMENTA ACTIONS: | ARY 1. <u>II</u> (Los 2. Ensu 3. Mon 4. <u>IF</u> f repl 4.1 4.2 5. Disp | any NC pump is tr ss of Reactor Coolar ure KC flow to NC nitor #1 seal leak-of illing the seal water acement, perform th Verify flow to the <u>WHEN</u> filling is patch an operator to | ipped, refer to at Pump). Pump thermal 1 f flow and #1 s injection filter e following: NCPs is main complete, verif 1RFM-14 on 1 | AP/1/A/550 barrier is nor eal outlet ter housing afte tained. ŷ flow retun RFMP1 (AF | 0/004 mal. nperature. er filter ns to normal. 3-574, BB-55, | |
| REFERENCES: | Rm 1. CN- 2. CNI 3. Wes (CN 4 CNI 5. CNI 6. CNI 7. CNI | 491) to acknowledg 1554-1.5 M-1201.01-157 stinghouse Precautio (M-1201.00-39) M 1399.03-0269.003 M 1399.03-0269.003 M 1399.03-0269.003 M 1399.03-0269.003 | e the alarm. ns, Limitations Drop 6 Sheet Drop 8 Sheet Drop 12 Sheet Drop 7 Sheet | s and Setpoir 317 312 st 319 323 | nts Document | |

Proper control of 1NV-309 and restoration of RCP Seal Injection flow completes Event 5. At Lead Evaluator discretion, the scenario may continue by directing the booth operator to insert Trigger 6 (Zone B Lockout/Auto Turbine Runback Failure).

| Appendix D Required Operator Actions Form ES-D-2 | | | | | | | |)-2 | | |
|--|--|----------------|-----------|-----------|---------------------|----------------|------------------|--------|------------------|-------------|
| Op Test No.: | 301 | Scenario # | 2 | Event # | £ | 5 | Page | 39 | of | 142 |
| Event Descriptic | on: R | CP Seal Inject | tion Cont | rol Valve | (1NV-30 | 9) transfer to | Manual | | | |
| | | | | | | | | | | |
| | CNS | | MALFUN | CTION OF | REACT | OR COOLAN | T PUMP | | PAGE | NO. |
| AP/1 | AP/1/A/5500/008 | | | | Case II Seal Wat | er Injection | | | 11 of Revisio | 24 on 19 |
| | ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | | | | | | | | | |
| c. <u>o</u> | perator Act | tions | | | | | | | | |
| 1. | Monitor | Enclosure 1 | (Foldout | Page). | Note t | o Evaluato | | | | |
| | | | - | | Enclo | sure 1 is in | - cluded as / | Attach | ment 12 | 2. |
| | | | | | | | | | | - |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| ppendix D | Required Operator A | Actions | Form | ES-D-2 |
|--------------------------|----------------------------------|---------------------------------------|---|-------------------------|
| Test No.: <u>301</u> Sce | enario # <u>2</u> Event # | 5 | Page <u>40</u> o | f <u>142</u> |
| ent Description: RCP | Seal Injection Control Valve (1N | V-309) transfer to N | lanual | |
| | | | | |
| CNS | MALFUNCTION OF RE | ACTOR COOLANT F | PUMP F | AGE NO. |
| | Ca Loss of Seal | ase II. Water Injection | F | Revision 19 |
| ACTION | EXPECTED RESPONSE | RESPON | SE NOT OBTAINED | |
| CAUTION Fail | ure to restore NC pump seal of | cooling within 10 r | ninutes will C inventory | |
| los | s. | care resourcing in N | e intentory | |
| 2. Verify the fo | llowing parameters for all | Perform the f | following: | |
| • #1 seal ou | tlet temperature - LESS | a. <u>IF</u> in Mode following: | e 1 or 2, <u>THEN</u> per | form the |
| • Lower bea | ring temperature - LESS | 1) <u>IF</u> all N perform | C pumps affected n the following: | , <u>THEN</u> |
| THAN 225 | Ita P - GREATER THAN | a) Plao mod | ce steam dumps i de. | n pressure |
| 200 PSID. | | b) Ens SET HE/ | ure "STM DUMP FAT 1090 PSIG S ADER PRESSUR | CTRL" - TEAM E. |
| | | 2) Trip rea | actor. | |
| | | 3) <u>WHEN</u> 5%, <u>TH</u> | reactor power les IEN perform the fo | s than bllowing: |
| | | _ a) Trip | affected NC pum | p(s). |
| | | b) Ens ass pun CL(| sure normal spray ociated with trippe np(s) - IN MANUA DSED. | valve ed NC L AND |
| | | 4) GO TO Trip or | EP/1/A/5000/E-0 Safety Injection). | (Reactor |
| | | b. Trip affect | ed NC pump(s). | |
| | | c. Ensure no with trippe MANUAL | rmal spray valve a d NC pump(s) - IN AND CLOSED. | associated |
| | | d. <u>GO TO</u> AF Reactor C | P/1/A/5500/004 (Lo oolant Pump). | oss of |
| | | | | |
| | | | | |
| | | | | |

| Required | | Form ES-D-2 | | | | | |
|--|---|---|--|---|--|---|--|
| I Scenario # 2 | Event # | 5 | Page | 41 | of | 142 | |
| Event Description: RCP Seal Injection Control Valve (1NV-309) transfer to Manual | | | | | | | |
| 1 | Scenario # _ 2 RCP Seal Injection Cont | Scenario # 2 Event # RCP Seal Injection Control Valve (1NV-309) t | Scenario # 2 Event # 5 RCP Seal Injection Control Valve (1NV-309) transfer to Magnetic terms | Scenario # 2 Event # 5 Page RCP Seal Injection Control Valve (1NV-309) transfer to Manual | Scenario # 2 Event # 5 Page 41 RCP Seal Injection Control Valve (1NV-309) transfer to Manual | Scenario # 2 Event # 5 Page 41 of RCP Seal Injection Control Valve (1NV-309) transfer to Manual | |

| | MALFUNCTION OF REACTOR COOLANT PUMP Case II. Loss of Seal Water Injection | | | |
|---|--|--|--|--|
| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAIN | ED | | |
| _ 3. Verify 1AD-7, C/1 "NCP #1 SEAL LEAKOFF HI FLOW" - DARK. | Perform the following: a. <u>IF</u> in Mode 1 or 2, <u>THEN</u> following: 1) <u>IF</u> all NC pumps affect perform the following: a) Place steam dump mode. b) Ensure "STM DUN SET AT 1090 PSM HEADER PRESSI 2) Trip reactor. 3) <u>WHEN</u> reactor power 5%, <u>THEN</u> perform the following in a sociated with trip pump(s) - IN MAN CLOSED. 4) <u>GO TO EP/1/A/5000/</u>Trip or Safety Injection b. Trip affected NC pump(s) c. Ensure normal spray valw with tripped NC pump(s) d. <u>GO TO AP/1/A/5500/004</u> Reactor Coolant Pump). | perform the ted, <u>THEN</u> os in pressure MP CTRL" - G STEAM JRE. less than e following: ump(s). ray valve pped NC UAL AND E-0 (Reactor n).). // re associated - IN (Loss of | | |

-

| Appendix D | Required Operator | Actions | For | m ES-D-2 | 2 |
|---|--|---|---|---|--------|
| Op Test No.: <u>301</u> Scen | ario # <u>2</u> Event # | 5 | Page <u>42</u> | of | 142 |
| Event Description: RCP Se | al Injection Control Valve (1N | IV-309) transfer to Ma | anual | | |
| CNS AP/1/A/5500/008 | MALFUNCTION OF RE | EACTOR COOLANT PL | UMP | PAGE NO 14 of 24 | D. |
| | Loss of Sea | ase II. Il Water Injection | | Revision | 19 |
| ACTION/E) | PECTED RESPONSE | RESPONS | E NOT OBTAIN | NED |] |
| <u>NOTE</u> In the foll any NC p | owing steps, seal injection flo ump that suffered a total loss | ow should be establis s of seal injection. | hed slowly to | | |
| — 4. Verify "N/R CI GREATER TH 32 GPM. | IRG LN FLOW" - AN OR EQUAL TO | N/A IF loss of seal by loss of cha AP/1/A/5500/0 Letdown), Cas | water inject rging, <u>THEN</u> 12 (Loss of (se I (Loss of | ion caused <u>GO TO</u> Charging o Charging). | i r |
| 5. Verify the follo alarms - DARI — • (1AD-7, B/4 " A HI D/P" — • (1AD-7, E/4 " B HI D/P". | owing seal injection filter (: SEAL INJECTION FILTER) SEAL INJECTION FILTER | Perform the for a. Dispatch op <u>REFER TO</u> (Chemical a System). b. <u>WHEN</u> notif shifted, <u>THE</u> through 9. c. <u>GO TO</u> Step | ollowing: operator to shif OP/1/A/6200 and Volume C fied by operat <u>EN</u> perform S p 10. | t filters.)/001 Control tor that filter teps 6 | 'S |
| 6. Verify "TOTAL GREATER TH 32 GPM. | SEAL WTR FLOW" - | Perform the for a. Slowly adjus Injection Flo "TOTAL SE b. I <u>F</u> seal wate established, following: 1) Determin loss of s 2) <u>GO TO s</u> c. <u>IF</u> seal wate established, (Seal Water | ollowing: st 1NV-309 (i ow) to establis AL WTR FLC er injection flo , <u>THEN</u> perfo ne and correct eal water injection Step 9. er injection flo r Injection Flo | Seal Water sh 32 GPM DW". orm the orm the ct cause of ection. ct cause of ection. ow not N 1NV-309 w). | |
| | | | | | |

| Appendix D | | Re | quired | Operator A | Form ES-D-2 | | | D-2 | |
|--|-----|------------|--------|------------|-------------|------|----|-----|-----|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 5 | Page | 43 | of | 142 |
| Event Description: RCP Seal Injection Control Valve (1NV-309) transfer to Manual | | | | | | | | | |
| | | | | | | | | | |

| AP/1 | CNS /A/5500/008 | MALFUNCTION O | F REACTOR COOLANT PUMP Case II. Seal Water Injection | PAGE NO. 15 of 24 Revision 19 |
|---------|---|--|--|--|
| | ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAINE | ED |
| _ 7. | Verify 1AD-7, (LO FLOW'' - D | C/4 "NCP SEAL WATER ARK. | Perform the following: a. Identify affected NC pump b. Dispatch operator to adjusting to affected p <u>REFER TO Enclosure 2 (Adjustment Of Seal Inject </u> | o(s). st seal oump(s). Manual ion Valves). |
| 8. | Determine and seal water inje | l correct cause of loss action. | of | |
| 9. | Verify the follo return isolatio 1NV-52A (NO 1NV-63B (NO 1NV-74A (NO 1NV-85B (NO | owing NC pump seal n valves - OPEN: C Pump 1A Seal Return) C Pump 1B Seal Return) C Pump 1C Seal Return) C Pump 1D Seal Return) | Perform the following: a. <u>IF</u> seal return isolation val due to #1 seal leakoff high conditions, <u>THEN GO TO</u> b. OPEN affected valve(s). | lve(s) closed h flow Step 10. |
| 10. | <u>WHEN</u> plant co perform PT/1// Seal Injection | onditions allow, <u>THEN</u> A/4150/001C (NC Pump Flow Verification). | | |
| 11. | Ensure complication Specs: • 3.4.5 (RCS L • 3.4.6 (RCS L • 3.4.13 (RCS • 3.5.5 (Seal Ir • SLC 16.7-9 (System). | iance with appropriate oops - MODE 3) oops - MODE 4) Operational Leakage) njection Flow) Standby Shutdown | | |

| Appendix D | R | equired Operator A | Form ES-D-2 | | | | |
|--|----------------|--------------------|-------------|------|----|----|-----|
| Op Test No.: | 301 Scenario # | 2 Event # | 5 | Page | 44 | of | 142 |
| Event Description: RCP Seal Injection Control Valve (1NV-309) transfer to Manual | | | | | | | |

| AP/1/ | CNS A/5500/008 | MALFUNCTION C | OF REACT Case I f Seal Wat | OR COOLANT PUMP I. er Injection | PAGE NO. 16 of 24 Revision 19 | |
|---------|---|---|----------------------------------|---------------------------------------|-------------------------------------|--|
| | ACTION/EX | PECTED RESPONSE |] | RESPONSE NOT OBTAIN | ED | |
| 12. | Determine req • <u>REFER TO F</u> (Classificatio • <u>REFER TO F</u> Notification F | uired notifications: RP/0/A/5000/001 n Of Emergency) RP/0/B/5000/013 (NRC) Requirements). | | | | |
| 13. | Determine lon <u>RETURN TO</u> p | g term plant status. rocedure in effect. | <u>END</u> | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Appendix D | R | equired Operator Act | Form ES-D-2 | | | |
|--------------------|-----------------|--------------------------|-------------|------|-------|-----|
| Op Test No.: | 301 Scenario # | 2 Event # | 6 | Page | 45 of | 142 |
| Event Description: | : Zone B Lockou | t / Auto Turbine Runback | Failure | | | |

Control Room Indications

1AD-11, C/1 "GEN BKR A OVER CURRENT" - LIT

1AD-11, F/3 "ZONE B LOCKOUT TRIP" - LIT

1AD-11, J/4 "7KV NORM AUX PWR SYSTEM TROUBLE" - LIT



| Appendix D | | Required Oper | rator Actions Form ES-D- | | | | | | |
|------------------|---|--|---------------------------------|--|---|--|---|-----------|--|
| Op Test No.: | 301 Scena | ario # <u>2</u> Ever | nt # | 6 | Page | 47 | of | 142 | |
| Event Descriptio | on: Zone B | Lockout / Auto Turbine | Runback F | ailure | | | | | |
| | | | | | | | | | |
| AP/1 | CNS I/A/5500/003 | L | OAD REJE Case r Connected | PAGE NO 4 of 56 Revision |). 46 | | | | |
| | ACTION/EX | PECTED RESPONSE | 7 | RES | PONSE NOT | OBTAIN | ED |] | |
| 3. | Verify proper | steam dump operatio | n | | | | | | |
| - | as ionows. _ a. Verify T-Rei AVAILABLE | instrumentation - | _ | a. <u>IF</u> T-Av THEN (<u>REFER</u> Followi | g Coastdov determine T <u>t TO</u> Enclos ng Runbacł | vn in pr -Ref fro sure 4 (k/Powe | ogress, om table. T-Ref Valu r Reductio | ie n). | |
| - | _ b. <mark>"C-9 COND</mark> DUMP" stat | AVAILABLE FOR STI us light (1SI-18) - LIT. | <u>л</u>) | b. Perform 1) Ope to m 2) <u>GO</u> | n the followi erate S/G Pi naintain T-A <u>TO</u> Step 4. | ing: ORVsa vgatT | as necessa -Ref. | ıry | |
| | c. Verify the fo - "C-7A LO COND DI - LIT. - Steam du MODULA | Illowing: SS OF LOAD INTLK JMP" status light (1SI- mp valves - TING, | 18) | c. <u>IF</u> stear T-Avg 3 perform 1) Plac mar 2) Plac mod | m dump val 3°F greater 1 the followi 1 ce "STM DU 1 ual. 1 ce steam du 1 e. | lves clo than T- ng: JMP C1 umps in | sed <u>AND</u> Ref, <u>THEN</u> FRL" in pressure | <u>4</u> | |
| | | | | 3) Ope valv 4) <u>IF</u> s ope nec POF T-R | erate conde es to maint team dump rate, <u>THEN</u> essary from RVs to mair ef. | nser ste ain T-A valves dump availat ntain T- | eam dump .vg at T-Re fail to steam as ble S/G Avg at | ef. | |

| Appendix D | Re | quired Operator Ac | Form ES-D-2 | | | | | | |
|--|----------------|--------------------|-------------|------|----|----|-----|--|--|
| Op Test No.: | 301 Scenario # | 2 Event # | 6 | Page | 48 | of | 142 | | |
| Event Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | | |
| Event Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | | |

| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 3. (Continued) |
|--|
| 3. (Continued) d. <u>T-Avg - TRENDING DOWN TO</u> d. Perform the following: 1) Place "STM DUMP CTRL" in manual. 2) Place steam dumps in pressure mode. 3) Operate condenser steam dump valves to maintain T-Avg at T-Ref. 4) I<u>F</u> steam dump valves fail to operate, <u>THEN</u> dump steam as necessary from available S/G PORVs to maintain T-Avg at T-Ref. |
| |

| Op Test No.: <u>301</u> Scenario # <u>2</u> Event # <u>6</u> Page <u>49</u> | of <u>142</u> |) | | | | | | |
|---|---------------|---|--|--|--|--|--|--|
| Event Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | |

| AP/1 | CNS /A/5500/003 | LC Generator (| AD REJE Case Connected | F | PAGE NO. 6 of 56 Revision 46 | |
|------|-----------------------------------|-------------------------------|------------------------------|---|--|-------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT | OBTAINED | |
| 4. | Verify Pzr POF status as follo | RV and Pzr spray valve ws: | i. | | | |
| _ | _ a. <mark>All Pzr POR</mark> | RVs - CLOSED. | | a. <u>IF</u> Pzr pressure le <u>THEN</u> perform th | ess than 23 e following | 15 PSIG, |
| | | | | 1) CLOSE Pzr P | ORV(s). | |
| | | | | 2) <u>IF</u> any Pzr PC closed, <u>THEN</u> valve. | RV cannot l close its is | t be solation |
| | | | | <u>IF</u> Pzr PORV cannot be close the following: | isolation va sed, <u>THEN</u> | alve perform |
| | | | | a) Trip Unit 1 | reactor. | |
| | | | | b) <u>WHEN</u> rea setpoint re S/I initiated | actor trippe ached, <u>TH</u> d. | d <u>OR</u> S/I <u>EN</u> ensure |
| | | | | c) <u>GO TO</u> EF (Reactor T Injection). | ?/1/A/5000/ rip or Safe | /E-0 ty |
| _ | _b. <mark>Normal Pzr</mark> | spray valves - CLOSED | | b. <u>IF</u> Pzr pressure le <u>THEN</u> perform th | ess than 21 e following | 50 PSIG, |
| | | | | 1) CLOSE affect | ed spray v | alve(s). |
| | | | | 2) <u>REFER TO</u> A (Pressurizer F | P/1/A/5500 Pressure Ai | //011 nomolies). |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | | |
|--|-----|---------------------------|---|---------|---|------|-------------|----|-----|--|--|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 6 | Page | 50 | of | 142 | | |
| Event Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | | | | |
| Event Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | | | | |



| Appendix D | | Required Operator Actions | | | | | | Form ES-D-2 | | | |
|--|-----|---------------------------|---|---------|---|------|----|-------------|-----|--|--|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 6 | Page | 51 | of | 142 | | |
| Event Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | | | | |

| CNS AP/1/A/5500/003 | LC Generator | AD REJECTION Case I Connected To Switchyard | PAGE NO. 8 of 56 Revision 46 |
|---|---|--|---|
| ACTION/E) | (PECTED RESPONSE | RESPONSE NOT OBTA | INED |
| 8. Verify reactor THAN 20%. | power - GREATER | Perform the following: a. Place "CRD BANK SE manual. b. Maintain control rods a limits. c. Operate control rods to at appropriate power leader of than or equal to 5%, <u>The following:</u> 1) Ensure steam dum mode. 2) Ensure turbine - TR 3) Ensure steam dum steam header press 1090 PSIG. 4) Concurrently insert shutdown the react OP/1/A/6150/008 (I 5) <u>GO TO</u> AP/1/A/550 Generator Trip). e. <u>GO TO</u> Step 10. | LECT" switch in bove insertion o stabilize unit evel. or power less <u>HEN</u> perform os in pressure RIPPED. os maintain sure at control rods to or. <u>REFER TO</u> Rod Control). 0/002 (Turbine |
| 9. <u>IF AT ANY TIN</u> than or equal Step 8 RNO. | <u>IE</u> reactor power less to 20%, <u>THEN</u> perform | | |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | | |
|--|-----|---------------------------|---|---------|---|------|-------------|----|-----|--|--|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 6 | Page | 52 | of | 142 | | |
| Event Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | | | | |
| | | | | | | | | | | | |

| CNS AP/1/A/5500/003 | LO Generator (| AD REJE Case I Connected | CTION I I To Switchyard | PAGE NO. 9 of 56 Revision 46 |
|---|---|--------------------------------|--|------------------------------------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | NED |
| 10. Maintain AS he follows: a. Verify runba 85%. | eader pressure as ick target load less than | | a. <u>GO TO</u> Step 10.d. | |
| b. Adjust 1AS- Steam) setp header pres | 2 (Main Stm To Aux oint to maintain AS sure at 165 PSIG. | _ | b. Adjust 1AS-2 as required AS header pressure at 1 | d to maintain 65 PSIG. |
| c. (<u>GO TO</u> Ster d. Verify AS he between 14 | o 11. eader pressure maintain 0 PSIG and 165 PSIG. | ed | d. Adjust 1AS-2 as required AS header pressure betw PSIG and 165 PSIG. | d to maintain ween 140 |
| 11. Adjust 1TL-4 (necessary to r pressure betw | Stm Seal Reg Byp) as naintain steam seal een 4 PSIG - 6 PSIG. | | | |
| 12. Monitor Enclo Limit Boration | sure 3 (Rod Insertion). | Note t | <u>to Evaluator:</u> sure 3 is included as Attach | nment 4. |

| Appendix D | Re | Required Operator Actions | | | | Form ES-D-2 | | |
|--------------------|----------------|---------------------------|------|--------------|-----|-------------|--|--|
| Op Test No.: | 301 Scenario # | 2 Event # | Page | <u>53</u> of | 142 | | | |
| Event Description: | Zone B Lockout | / Auto Turbine Runba | | | | | | |

| CNS AP/1/A/5500/003 | LO Generator (| AD REJECTION Case I Connected To Switchyard | PAGE NO. 10 of 56 Revision 46 |
|----------------------------|-------------------|--|---|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTA | INED |
| 13. Verify reactor 30%. | power - LESS THAN | Perform the following: N/A a. IF runback target load I <u>THEN</u> perform the follo - 1) WHEN time and ma <u>THEN</u> perform appli OP/1/A/6100/003 (C Procedure For Unit - 2) Do not continue in th until reactor power I - 3) WHEN reactor power 30%, <u>THEN GO TO</u> b. WHEN appropriate runt load reached, <u>THEN perfollowing</u> : - 1) Stabilize unit at app level. - 2) Maintain control rod insertion limits. 3) Adjust the following maintain T-Avg with T-Ref: - 0 Turbine load • Control rods - 0 Boron concentrati - c. GO TO Step 15. | ess than 30%, wing: npower permit, cable steps of controlling Operation). his procedure ess than 30%. er less than Step 14. back target form the ropriate power s above as required to in 1°F of |

| Re | quired Operator | Form ES-D-2 | | | |
|------------------|------------------------------------|---|--|---|--|
| 301 Scenario # | Event # | 6 | Page | 54 of | 142 |
| Zone B Lockout / | | | | | |
| | 301 Scenario # Zone B Lockout / | Required Operator 301 Scenario # 2 Event # Zone B Lockout / Auto Turbine Runb | Required Operator Actions 301 Scenario # 2 Event # 6 Zone B Lockout / Auto Turbine Runback Failure | Required Operator Actions 301 Scenario # 2 Event # 6 Page Zone B Lockout / Auto Turbine Runback Failure | Required Operator Actions Form ES- 301 Scenario # 2 Event # 6 Page 54 of Zone B Lockout / Auto Turbine Runback Failure |

| CNS AP/1/A/5500/003 | LO Generator (| AD REJE Case I Connected | CTION I I To Switchyard | PAGE NO. 11 of 56 Revision 46 |
|--|---|--------------------------------|---|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 14. Verify "RESET CF VALVES" s | " light on "AMSAC FO witch - DARK. | R | Perform the following: a. <u>IF</u> turbine impulse pressu 190 PSIG, <u>THEN</u> notify l/ cause of AMSAC failure f b. Depress "BYPASS" push "AMSAC FOR CF VALVE c. <u>WHEN</u> 2 minutes elapsed verify "RESET" light on "/ CF VALVES" switch remains | Ire less than AE to correct to deactivate. Ibutton on ES" switch. d, <u>THEN</u> AMSAC FOR ained dark. |
| 15. Adjust power i <u>REFER TO Un</u> Figure 43 Gen 16. <u>WHEN</u> appropreached, <u>THEN</u> Stabilize unit level. Maintain con limits. Adjust the fol maintain T-A Turbine loa Control root Boron cond | factor as necessary. it 1 Revised Data Book erator Capability Curve riate runback target loa <u>d</u> perform the following at appropriate power trol rods above insertion lowing as required to vg within 1°F of T-Ref: ad is centration. | ad I: | | |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|-------------------|---|---------------------------|--------|-------------------|------------|----|-------------|-----|--|--|
| Op Test No.: | | | | | Page | 55 | of | 142 | | |
| Event Description | : | Zone B Lockout / | Auto T | - urbine Runba | ck Failure | | | _ | | |
| | | | | | | | | | | |

| AP/1/ | CNS A/5500/003 | LO Generator (| AD REJE Case I Connected | CTION I To Switch | hyard | PAGE NO. 12 of 56 Revision 46 |
|---------|--|--|--------------------------------|--|--|---|
| | ACTION/EX | PECTED RESPONSE | | R | ESPONSE NOT OBTAIN | ED |
| 17. | ACTION/EX Verify at least RUNNING. Verify the follo • Generator br • Generator br • PCB 14 | OWING PCBs - CLOSED: eaker 1A eaker 1B | ~ | R Perform NOTE a. Rest servi b. <u>IE</u> flo cann THEI REF Gene Perform a. <u>IF</u> an switc follow 1) N | ESPONSE NOT OBTAIN The following: Maximum generating without KG flow is than 23%. ore at least one KG pro- ce. w from at least one I to be established with N shutdown turbine/of ER TO OP/1/B/6300, erator). The following: hygenerator connect shyard lost, THEN perving: lotify DEC TOP (Tran | ED ng time 1 hour at less pump to KG pump thin 1 hour, generator. /001 (Turbine ion with erform the msmission |
| | PCB 15 PCB 17 PCB 18. | | | (RNO (| perations) to investigations of generations of genera | gate and for connection -7791 494. age) |

| Rec | quired Operator Ac | Form ES-D-2 | | | | |
|---|---|---|--|---|---|--|
| 301 Scenario # | 2 Event # | 6 | Page | <u>56</u> of | 142 | |
| vent Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | |
| - | Red 301 Scenario # Zone B Lockout / | Required Operator Ac 301 Scenario # 2 Event # Zone B Lockout / Auto Turbine Runback | Required Operator Actions 301 Scenario # 2 Event # 6 Zone B Lockout / Auto Turbine Runback Failure | Required Operator Actions 301 Scenario # 2 Event # 6 Page Zone B Lockout / Auto Turbine Runback Failure | Required Operator Actions Form ES 301 Scenario # 2 Event # 6 Page 56 of Zone B Lockout / Auto Turbine Runback Failure | |

| CNS AP/1/A/5500/003 | LO Generator (| AD REJE Case I Connected | CTION To Switchyard | PAGE NO. 13 of 56 Revision 46 |
|------------------------|-------------------|--------------------------------|---|--|
| ACTION/EX | PECTED RESPONSE |] [| RESPONSE NOT OBTAIN | ED |
| 18. (Continued) | | | 2) <u>IF</u> any busline switchy connection lost as foll PCB 14 <u>AND</u> PCB OR PCB 17 <u>AND</u> PCB THEN notify DEC TO (Transmission Operaticalculate Catawba RT Time Contingency And Time Contingency And Time Contingency And The Connection with switch <u>REFER TO</u> Enclosure Power Restoration). b. <u>IF AT ANY TIME</u> the follow condition exists: Any switchyard bus en <u>AND</u> Any Unit Tie PCB will I greater than 1 hour, THEN coordinate with Management to evalua affected Unit Tie PCB (damage to PCB capace <u>REFER TO</u> OP/0/A/63 (Operation of Station E Disconnects). | vard ows: 15 OPEN 18 OPEN, 18 OPEN, Plions) to TCA (Real) alysis). power permit, d generator hyard. end to the generator hyard. end to the solating s) to prevent, itors. 50/010 ireakers and |

| Арре | endix D | | Required Opera | ator Actions | | Form ES-D-2 | | |
|-------|------------|--------------------|-------------------------------------|--|--------------------|-------------|-------------------------------|------------------|
| Ор Те | st No.: | <u>301</u> Scen | ario # 2 Event | # 6 | Page | 57 | of | 142 |
| Event | Descriptio | n: Zone B | Lockout / Auto Turbine F | Runback Failure | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | AP/1 | CNS /A/5500/003 | LC Generator | AD REJECTION Case I Connected To Switch | yard | | PAGE N 14 of 5 Revisior | IO. 6 1 46 |
| | AP/1 | CNS /A/5500/003 | LC Generator KPECTED RESPONSE | DAD REJECTION Case I Connected To Switch | yard SPONSE NOT | OBTAIN | PAGE N 14 of 5 Revisior | IO. 6 1 46 |

Red dispatcher phone
800-943-7586
BA satellite phone:

rejection.

• Local: 1-828-490-9313

20. Determine and correct cause of load

International: 011-8816-234-60905.

| Appendix D | Re | Required Operator Actions | | | | Form ES-D-2 | | | |
|--------------------|--|---------------------------|---|------|----|-------------|-----|--|--|
| Op Test No.: | <u>301</u> Scenario # | 2 Event # | 6 | Page | 58 | of | 142 | | |
| Event Description: | Event Description: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | |
| | | | | | | | | | |



| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|-------------------|--|------------------------------|--|--|--|--|-------------|----|-----|--|
| Op Test No.: | 301 | 301 Scenario # _ 2 Event # 6 | | | | | 59 | of | 142 | |
| Event Description | n: Zone B Lockout / Auto Turbine Runback Failure | | | | | | | | | |
| | | | | | | | | | | |

| CNS AP/1/A/5500/003 | LO Generator (| AD REJECTION Case I Connected To Switchyard | PAGE NO. 16 of 56 Revision 46 |
|--|--|--|--|
| ACTION/E) | (PECTED RESPONSE | RESPONSE NOT OBTAIN | ED |
| 22. Reset steam of a. Verify react b. Verify stear "T-AVG" Mo | lump valves as follows or power - STABLE, n dump valves - IN ODE. | a. Perform the following: 1) WHEN reactor power THEN perform Steps through 22.g. 2) GO TO Step 23. b. Perform the following: 1) IF using S/G PORVs, perform the following: a) WHEN T-Avg with T-Ref <u>AND</u> stable, CLOSE S/G PORV b) GO TO Step 22.d. 2) WHEN T-Avg within 1 <u>AND</u> stable, <u>THEN</u> per following: a) Ensure steam dun CLOSED. b) Perform Steps 22. through 22.g. 3) <u>GO TO</u> Step 23. | stable, 22.b THEN in 1°F of THEN /s. °F of T-Ref erform the nps - d |
| c. Verify stear | n dump valves - CLOSE | c. Perform the following: 1) WHEN steam dump v THEN perform Steps through 22.g. 2) GO TO Step 23. | alves closed, 22.d |
| d. Reset 07A STEAM DU RESET. | MP SELECT switch to | | |



| Appendix D | | Required Operator Actions | | | | | For | n ES-l | D-2 |
|--------------------|-----|---------------------------|--------|--------------|------------|------|-----|--------|-----|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 6 | Page | 61 | of | 142 |
| Event Description: | | Zone B Lockout / | Auto T | urbine Runba | ck Failure | | | | |
| | | | | | | | | | |

| AP/1/ | CNS A/5500/003 | LO, Generator C | AD REJE Case I Connected | CNS A/5500/003 LOAD REJECTION Case I Generator Connected To Switchyard | | | | | |
|---------|---|--|--|---|--|--|--|--|--|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED | | | | |
| 25. | Verify reactor GREATER TH/ IN A 1 HOUR F | power change - AN <u>OR</u> EQUAL TO 15% PERIOD. | | <u>GO TO</u> Step 27. | | | | | |
| 26. | Notify the follo appropriate sa Radiation Pro analyze gase Selected Lice Manual, Sect Primary Cher isotopic analy Tech Specs taken betwee following last than or equal | by the sections to take amples: otection to sample and cous effluents. <u>REFER T</u> ensee Commitments tion 16.11-6 mistry to sample for ysis of iodine. <u>REFER T</u> 3.4.16 (Sample must be a power change greater to 15% rated thermal | <u>0</u> 2 | | | | | | |
| 27. | Ensure compli Tech Specs: | a 1 nour period). | <u>See</u> Spec | H SPEC EVALUATION Attachment 13 for applicabl | <u>e Tech</u> | | | | |
| | 3.1.1 (Shutdo 3.1.6 (Contro 3.8.1 (AC So 3.7.8 (Nuclea (NSWS)) 3.7.10 (Contr System (CRA 3.7.11 (Contr Water Syster 3.7.12 (Auxili Ventilation E) SLC 16.8-2 (| own Margin (SDM)) I Bank Insertion Limits) urces - Operating) ar Service Water System rol Room Area Ventilatior AVS)) rol Room Area Chilled m (CRACWS)) iary Building Filtered xhaust System(ABFVES) 230 KV Switchvard | T.S. <u>Cone</u> Initia hour limit T.S. <u>Cone</u> oPE and statu T.S. <u>Cone</u> OPE | 3.1.6 <u>dition A</u> : (Verify SDM within the boration to resore SDM within AND Restore Control Bank in 2 hours) 3.8.1 <u>dition A</u> : (Perform SR 3.8.1.1 RABLE offsite circuit within Restore offsite circuit to OP Is within 72 hours) 3.7.8 <u>dition A</u> : (Restore NSWS tra RABLE status within 72 hou | 1 hour OR vithin 1 s to within I for 1 hour ERABLE in to Irs) | | | | |
| 28. | Systems). | ering of occurrence. | SLC Cone to no acco | 16.8-2 <u>dition A</u> : (Return switchyard ormal Commitment alignmen rdance with ERAT) | l equipment nt in | | | | |

| Appendix D | Re | quired Operator Act | | Form ES-I | D-2 | |
|--------------------|---|---------------------|---|-----------|-------|-----|
| Op Test No.: | 301 Scenario # | 2 Event # | 6 | Page | 62 of | 142 |
| Event Description: | Zone B Lockout / Auto Turbine Runback Failure | | | | | |

| CNS AP/1/A/5500/003 | LOAD REJECTION PAGE NO. Case I Generator Connected To Switchyard PAGE NO. 19 of 56 Revision 46 | | | | | |
|---|--|-------------------------|---|-------|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAI | NED | | |
| 29. Determine Ion <u>RETURN TO C</u> (Controlling P Operation). | g term plant status.)P/1/A/6100/003 rocedure For Unit | END | | | | |
| <u>Note to Evaluator:</u> This completes Event directing the booth op | 6. At Lead Evaluator d erator to insert Trigge | iscretion r 7 (Multi | , the scenario may continu ple Control Rods Drop). | ie by | | |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | |
|--------------------|-----|----------------------------|---|---------|---|------|-------------|----|-----|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 7 | Page | 63 | of | 142 |
| Event Description: | : | Multiple Control Rods Drop | | | | | | | |
| | | | | | | | | | |

Control Room Indications

1AD-2, D/9 "RPI AT BOTTOM ROD DROP" - LIT

1AD-2, E/9 "RPI TWO OR MORE RODS AT BOTTOM" - LIT

Note To Evaluator:

The OATC will initiate a Reactor Trip based on Immediate Actions of AP/1/A/5500/014 (shown below) and the crew will transition to EP/1/A/5000/E-0.

| Append | dix D | Required Operator Actions Form ES-D-2 | | | | | | 2 | |
|-----------|--------------------|---|--|---------------------------------------|--|--|--|---|-------------|
| Op Test N | No.: | <u>301</u> Scenario # <u>2</u> Event # <u>7</u> Page <u>64</u> of <u>1</u> | | | | | | | 142 |
| Event De | escription: | Multiple Control Rods Drop | | | | | | | |
| | | | | | | | | | 1 |
| | AP/1/A | CNS V5500/014 | | CONTROL F | ROD MISALIGNME Case I Rod Misalignment | NT | | PAGE N 2 of 10 Revision | IO. n 16 |
| | | ACTION/EX | PECTED RESPO | NSE | RE | SPONSE NOT | OBTAIN | IED | |
| | с. <u>Оре</u> 1 | erator Actions Verify only one Verify affected DARK. Verify Unit Pov | e rod - MISALI rod bottom li ver - STABLE | GNED. ght(s) - | IE two or m greater tha a. Manuall b. <u>GO TO</u> or Safet <u>IE</u> rod is dr (Dropped C IE turbine m perform the a. When ta perform | ore rods ar n 24 steps, y trip Reactor EP/1/A/5000 y Injection). opped, <u>THE</u> Control Rod unback in p e following: arget load re Steps 4 thro | e misali <u>THEN:</u> or. D/E-0 (R D/E-0 (R D/E-0 (R D): En GO T D): Drogress ached, 1 Dough 6. | igned by eactor Trip TO Case II s, <u>THEN</u> T <u>HEN</u> | |
| | 4. 5. 6. | Ensure "CRD & MANUAL. Stop any turbin progress. Adjust turbine within 1°F of T | BANK SELECT ne load chang load to maint -Ref. | Γ" switch - IN les in ain T-Avg | b. Observe <u>GO TO</u> | e Note prior f | to Step 7 | 7 and | |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|---|------------------------------------|
| Op Test No.: | 301 Scenario # <u>2</u> Event # <u>8, 9, 10</u> | Page65of142 |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Fa Failure | ilure / 1CF-51 Feedwater Isolation |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|------------------------|--|---------------------------------|--|--|
| Op Test No.: <u>30</u> | 01 Scenario # Event # 8, 9, 10 | _ Page <u>66</u> of142 | | |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failu Failure | re / 1CF-51 Feedwater Isolation | | |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION PAGE NO 5 of 49 Revision | | | | |
|-------------------------|---|--|---------------------------|--|--|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAI | NED | | |
| 4 Verify 1ETA ar | nd 1ETB - ENERGIZED. | Perform the following: a. IF 1ETA AND 1ETB de- <u>THEN GO TO EP/1/A/5</u> (Loss of All AC Power). b. WHEN time allows, THE restore power to de-ene switchgear while continu procedure. <u>REFER TO</u> AP/1/A/5500/007 (Loss Power). | energized, DOO/ECA-0.0 | | |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | |
|--------------------|---------------|---------------------------|----------|-----------------|-----------------------|-----------------|-------------|--------|------------------------|
| Op Test No.: | <u>301</u> Sc | enario # | 2 | Event # | 8, 9, 10 | Page | 67 | of | 142 |
| Event Description: | Cont Failu | rol Rod Eject re | ion / Sa | afety Injectior | n Auto Initiate Failu | - re / 1CF-5 | 1 Fee | dwater | ⁻ Isolation |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|---------------------------------|--|--|
| Op Test No.: | 301 Scenario # <u>2</u> Event # <u>8,</u> 9, 10 | _ Page <u>68</u> of142 | | |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failu Failure | re / 1CF-51 Feedwater Isolation | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | | |
|--|---------------------------|----------------------|--|--|--|
| Op Test No.: | | Page <u>69</u> of142 | | | |
| Event Description: Control Rod Ejection / Safety Injection Auto Initiate Failure / 1CF-51 Feedwater Isolation Failure | | | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION | | PAGE NO. 8 of 49 Revision 43 | |
|--------------------------------|--|-------------|---|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBT | AINED |
| 10. Verify Phase B follows: | actuation status as | | | |
| a. Verify contai REMAINED | inment pressure - HAS LESS THAN 3 PSIG. | - - - | a. Perform the following: 1) Verify Phase B Isola so follows: a) Phase B Isola lights - DARK. b) IF Phase B Isolation. c) Verify followin panel lights - I a) Group 1 Sp b) Group 5 Sp c) Group 5 St d) IF monitor ligh correct alignmensure correct 2) Stop all NC pump 3) Maintain seal inje 4) Energize H2 ignitt | olation actuated tion "RESET" dinitiate Phase g monitor light .IT: lights light L/11. t panel not in ent, <u>THEN</u> t alignment. s. ction flow. ers. |
| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|---|---------------------------------|
| Op Test No.: | 301 Scenario # <u>2</u> Event # <u>8, 9, 10</u> | Page <u>70</u> of <u>142</u> |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failur Failure | re / 1CF-51 Feedwater Isolation |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION | | | | PAGE NO. 9 of 49 Revision 43 |
|---|--|-----------|---------------------|--|---|
| ACTION/EX | | | RESPONSE NOT OBTAIN | ED | |
| 10. (Continued) | | | | | |
| | | | 5) | Dispatch operator to following: | perform the |
| | | | _ | a) Secure all ice cor handling units. <u>R</u> EP/1/A/5000/G-1 Enclosures), Enc (Securing All Ice Units). | ndenser air (<u>EFER TO</u> (Generic losure 11 Condenser |
| | | | _ | b) Place containment analyzers in servit <u>TO</u> OP/1/A/6450/ (Containment Hy Control Systems) | nt H ₂ ice. <u>REFER</u> /010 drogen |
| | | | 6) | <u>WHEN</u> 9 minutes ela verify proper VX syst operation. <u>REFER 1</u> Enclosure 5 (VX Sys Operation). | apsed, <u>THEN</u> tem <u>O</u> tem |
| | | | _ 7) | GO TO Step 11. | |
| b. IF AT ANY pressure ex procedure, | <u>TIME</u> containment ceeds 3 PSIG while in t THEN perform Step 10.a | nis a. | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Appendix D | | Required Operator Actions | | | | Form ES-D-2 | | | -D-2 |
|-------------------|-----|----------------------------------|-----------|----------------|-----------------------|-----------------|--------|--------|-------------|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 8, 9, 10 | Page | 71 | of | 142 |
| Event Description | : | — Control Rod Ejec Failure | tion / Sa | afety Injectio | n Auto Initiate Failu | - re / 1CF-5 | 51 Fee | dwater | r Isolation |



| Appendix D | | Required Operator Actions | | | | Form ES-D-2 | | | -D-2 |
|--------------------|-----|----------------------------------|-----------|-----------------|-----------------------|-----------------|--------|--------|-------------|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 8, 9, 10 | Page | 72 | of | 142 |
| Event Description: | : (| - Control Rod Ejec Failure | tion / Sa | afety Injection | n Auto Initiate Failu | - re / 1CF-5 | 51 Fee | dwater | r Isolation |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP | REACTOR TRIP OR SAFETY INJECTION | | |
|--|--|--|--|--|
| ACTION/ | EXPECTED RESPONSE | RESPONSE NOT OBTAIN | IED | |
| 13. Verify all KC | pumps - ON. | Perform the following for a train(s): a. Reset ECCS. b. Reset D/G load sequence c. Start affected pump(s). d. IF AT ANY TIME B/O occordstart S/L equipment pre- | affected er(s). curs, <u>THEN</u> viously on | |
| 14. <mark>Verify all Uni</mark> ON. | t 1 and Unit 2 RN pumps - | e. <u>IF</u> KC flow cannot be est NC pumps, <u>THEN</u> stop a Perform the following: a. <u>IF</u> any Unit 2 RN pump of | ablished to III NC pumps. | |
| | | b. IF any Unit 1 RN pump of perform the following for train(s): 1) Reset ECCS. 2) Reset D/G load sequences 3) Start affected pump of the following for train(s): 4) IF AT ANY TIME B/THEN restart S/I equipreviously on. | off, <u>THEN</u> affected uencer(s). (s). O occurs, uipment | |
| 15. Verify proper operation as — • REFER TO System Verification | r ventilation systems follows: Enclosure 2 (Ventilation ification) 2 operator to perform 3 (Opposite Unit Ventilation). | Note to Evaluator: Enclosure 2 is included as Atta | chment 6. | |

| Appendix D | Requir | Form ES-D-2 | | | | |
|-------------------|---------------------------------|----------------------|---------------------|-----------------|-------------|-----------|
| Op Test No.: | 301 Scenario # | 2 Event # | 8, 9, 10 | Page | 73 of | 142 |
| Event Description | Control Rod Ejection Failure | / Safety Injection A | Auto Initiate Failu | ire / 1CF-5 | 1 Feedwater | Isolation |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SAFE | TY INJECTION | PAGE NO. 12 of 49 Revision 43 |
|-------------------------------------|--|-------------|--|--|
| ACTION/E | XPECTED RESPONSE | | RESPONSE NOT OF | BTAINED |
| 16. Verify all S/G THAN 775 PS | pressures - GREATER IG. | P a | Perform the following: Verify Main Steam Is follows: All MSIVs - CLOS All MSIV bypass v All S/G PORVs - 0 IE any valve open, <u>1</u> following: 1) Initiate Main Ste 2) <u>IF</u> any valve stil CLOSE valve. | solation as ED valves - CLOSED CLOSED. THEN perform the eam Isolation. I open, <u>THEN</u> |
| 17. Verify proper a. "NV S/I FLO | S/I flow as follows: OW" - INDICATING FLO | ₩a | . Start NV pump(s) ar | nd align valves. |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|---------------------------------|
| Op Test No.: 3 | 301 Scenario # <u>2</u> Event # <u>8,</u> 9, 10 | Page <u>74</u> of <u>142</u> |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failu Failure | re / 1CF-51 Feedwater Isolation |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|-------------------|---|---------------------------------|--|--|
| Op Test No.: | | Page <u>75</u> of <u>142</u> | | |
| Event Description | Control Rod Ejection / Safety Injection Auto Initiate Failur Failure | re / 1CF-51 Feedwater Isolation | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|---|--------------------------------|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>2</u> Event # <u>8, 9, 10</u> | Page <u>76</u> of <u>142</u> | | |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failur Failure | e / 1CF-51 Feedwater Isolation | | |



| Appendix D | | Required Operator Actions | | | Form ES-D-2 | | | -D-2 | |
|-------------------|-----|------------------------------|----------|-----------------|---------------------|-------------|--------|-------|-------------|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 8, 9, 10 | Page | 77 | of | 142 |
| Event Description | : | Control Rod Eject Failure | ion / Sa | afety Injection | Auto Initiate Failu | ire / 1CF-5 | 51 Fee | dwate | r Isolation |

| ACTION/EXPECTE NOTE Enclosure 4 (No subsequent pro guidance. 22. Control NC tempera Enclosure 4 (NC Tempera 23. Verify Pzr PORV and status as follows: | D RESPONSE C Temperature Cont ocedures provide alte | RESPONSE NOT OBTAINED rol) shall remain in effect until emative NC temperature control |] |
|--|---|--|-----------|
| NOTE Enclosure 4 (No subsequent proguidance. 22. Control NC tempera Enclosure 4 (NC Tempera Enclosure 5 follows: 23. Verify Pzr PORV and status as follows: | C Temperature Cont ocedures provide alte | rol) shall remain in effect until ernative NC temperature control | |
| 22. Control NC tempera Enclosure 4 (NC Tel 23. Verify Pzr PORV and status as follows: | tura DEEED TO | | |
| status as follows: | d Pzr Spray Valve | Note to Evaluator: Enclosure 4 is included as Attachment 8. | |
| a. (All Pzr PORVs - C | d Pzr Spray Valve | a. IF Pzr pressure less than 2315 PSIC THEN perform the following: 1) CLOSE Pzr PORV(s). 2) IF any Pzr PORV cannot be closed, <u>THEN</u> CLOSE its isolation valve. 3) IF 1NC-32B OR 1NC-34A cann be closed <u>OR</u> isolated, <u>THEN</u> perform the following: a) Align N₂ to PORVs by opening the following valves | 3, iot |

| Appendix D | Required Operator Actions | Form ES-D-2 | | | |
|-------------------|---|----------------------------------|--|--|--|
| Op Test No.: | | Page78of142 | | | |
| Event Description | Control Rod Ejection / Safety Injection Auto Initiate Fail Failure | ure / 1CF-51 Feedwater Isolation | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR | IP OR SAFETY INJECTION | | | PAGE NC 17 of 49 Revision 4 |). 13 |
|------------------------|-----------------|------------------------|------|---|---|-----------------|
| ACTION/EX | PECTED RESPONSE |] | | RESPONSE NOT OBTAIN | ED | |
| 23. (Continued) | | | 4) | IF any Pzr PORV ca closed <u>OR</u> isolated, perform the following a) Energize H₂ ignit b) Dispatch operato the following: (1) Secure all ic air handling REFER TO EP/1/A/5000 (Generic End Enclosure 17 All Ice Conda (2) Place contail analyzers in REFER TO OP/1/A/6450 (Containment Control System) c) IF AT ANY TIME following condition Containment p HAS REMAINE THAN 3 PSIG Containment p BETWEEN 1 F 3 PSIG, THEN start one V secure normal co ventilation. REFI EP/1/A/5000/G-1 Enclosures), Enc (VX and Contain Ventilation Control | nnot be <u>THEN</u> J: ters. r to perform e condense units. /G-1 closures), I (Securing enser Units nment H ₂ service.)/010 t Hydrogen ens). both the ns exist: ressure - ED LESS ressure - SIG <u>AND</u> /X fan and ontainment <u>ER TO</u> (Generic losure 18 ment o). |). |
| | | | (RNC |) continued on next pa | age) | |

| Appendix D | | Required Operator Actions | | | Form ES-D-2 | | | | |
|--------------------|--|---------------------------|---|---------------------|-------------|--------|-------|-------------|-----|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 8, 9, 10 | Page | 79 | of | 142 |
| Event Description: | btion: Control Rod Ejection / Safety Injection Auto Initiate Fail Failure | | | Auto Initiate Failu | re / 1CF-5 | 51 Fee | dwate | r Isolation | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | | |
|--------------------|--|---------------------------------|--|--|--|
| Op Test No.: | | | | | |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failu Failure | re / 1CF-51 Feedwater Isolation | | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | | |
|--------------------|--|---------------------------------|--|--|--|
| Op Test No.: | 301 Scenario # <u>2</u> Event # <u>8,</u> 9, 10 | _ Page _ <u>81</u> _ of142 | | | |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failu Failure | re / 1CF-51 Feedwater Isolation | | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|---|---------------------------------|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>2</u> Event # <u>8,</u> 9, 10 | Page <u>82</u> of 142 | | |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failur Failure | re / 1CF-51 Feedwater Isolation | | |



| Appendix D | | Required Operator Actions | | | Form ES-D-2 | | | -D-2 | |
|-------------------|-----|-----------------------------|-----------|-----------------|-----------------------|------------|-------|--------|-------------|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 8, 9, 10 | Page | 83 | of | 142 |
| Event Description | : | Control Rod Ejec Failure | tion / Sa | afety Injection | n Auto Initiate Failu | re / 1CF-5 | 1 Fee | dwater | r Isolation |



| Appendix D | Requir | ed Operator Actio | ns | Form ES-D-2 | | |
|--------------------|-----------------------------------|-----------------------|---------------------------|-------------------------|---|--|
| Op Test No.: | 301 Scenario # _ 2 | 8, 9, 10 Pag | e <u>84</u> of <u>1</u> 4 | 42 | | |
| Event Description: | Control Rod Ejection / Failure | Safety Injection Auto | Initiate Failure / 1C | F-51 Feedwater Isolatio | n | |

| EP/1 | CNS LOSS OF REACTOR OR SECONDARY COOLANT EP/1/A/5000/E-1 | | | | PAGE NO. 4 of 35 Revision 32 |
|------|---|---|-----------------------|--|--|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 6. | Establish VI to follows: • Ensure 1VI-7 • Verify VI pres 85 PSIG. | Containment as 7B (VI Cont Isol) - OPE ssure - GREATER THAN | V | Perform the following: a. Align N₂ to Pzr PORVs b the following valves: 1NI-438A (Emer N2 Fr 1NC-34A) 1NI-439B (Emer N2 Fr 1NC-32B). b. <u>IF</u> VI pressure less than 8 <u>THEN</u> perform the following (1) Dispatch operator to e VI compressor operator (1) Dispatch operator to e VI compressor operator (2) Restore VI while contor this procedure. <u>REFE</u> AP/0/A/5500/022 (Los Instrument Air). | y opening om CLA A To om CLA B To 35 PSIG, ing: ensure proper ion. inuing with <u>ER TO</u> is of |
| 7. | Verify second a. Ensure the 1) CA Syste 2) KC NC N b. Align all S/C c. Perform at I (notify Chi for activity OR (Notify RP for activity | ary radiation - NORMAI following signals - RESE em valve control. NI NM St signals. Ss for Chemistry samplin east one of the following emistry to sample all S/G / | L: T: g.) Ss | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|--|----------------------------------|--|--|
| Op Test No.: 3 | 301 Scenario # _ 2 Event # 8, 9, 10 | Page85of142 | | |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Faile Failure | ure / 1CF-51 Feedwater Isolation | | |



| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--------------------|---|---------------------------------|--|--|
| Op Test No.: | 301 Scenario # <u>2</u> Event # 8, 9, 10 | Page <u>86</u> of 142 | | |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failur Failure | re / 1CF-51 Feedwater Isolation | | |



| Appendix D | Required Operator Actions | | | | | Form ES-D-2 | | |
|-------------------|---------------------------|--------------|----------------|------------------------|-------------|-------------|--------|-------------|
| Op Test No.: | 301 Scenario | ¢ <u>2</u> | Event # | 8, 9, 10 | Page | 87 | of | 142 |
| Event Description | Control Rod Failure | Ejection / S | afety Injectic | on Auto Initiate Failu | ure / 1CF-5 | 51 Fee | dwater | r Isolation |



| Appendix D | | Required Operator Actions | | | Form ES-D-2 | | | -D-2 | |
|--------------------|-----|-----------------------------|-----------|----------------|-----------------------|-----------------|--------|--------|-------------|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 8, 9, 10 | Page | 88 | of | 142 |
| Event Description: | : | Control Rod Ejec Failure | tion / Sa | afety Injectio | n Auto Initiate Failu | - re / 1CF-5 | 51 Fee | dwater | r Isolation |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|---|---------------------------------|
| Op Test No.: | 301 Scenario # <u>2</u> Event # 8, 9, 10 | Page 89 of 142 |
| Event Description | Control Rod Ejection / Safety Injection Auto Initiate Failur Failure | re / 1CF-51 Feedwater Isolation |



| Appendix D | | Required Operator Actions | | | Form ES-D-2 | | | -D-2 | |
|--------------------|-----|------------------------------|----------|-----------------|---------------------|-------------|--------|--------|-------------|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 8, 9, 10 | Page | 90 | of | 142 |
| Event Description: | : | Control Rod Eject Failure | ion / Sa | afety Injection | Auto Initiate Failu | ire / 1CF-5 | 51 Fee | dwater | r Isolation |



| Appendix D | Requ | Required Operator Actions | | | Form ES-D-2 | | | |
|-------------------|---------------------------------|---------------------------|--------------------|-------------|-------------|-------|-------------|--|
| Op Test No.: | 301 Scenario # | 2 Event # | 8, 9, 10 | Page | 91 | of | 142 | |
| Event Description | Control Rod Ejection Failure | n / Safety Injection A | uto Initiate Failu | ire / 1CF-5 | 1 Feed | lwate | r Isolation | |



| Appendix D | | Required Operator Actions | | | Actions | Form ES-D-2 | | | |
|--------------------|-----|-----------------------------|-----------|-----------------|-----------------------|-------------|--------|--------|-----------|
| Op Test No.: | 301 | Scenario # | 2 | Event # | 8, 9, 10 | Page | 92 | of | 142 |
| Event Description: | | Control Rod Ejec Failure | tion / Sa | afety Injectior | n Auto Initiate Failu | re / 1CF-5 | 51 Fee | dwater | Isolation |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|---------------------------------|
| Op Test No.: 30 | 1 Scenario # <u>2</u> Event # <u>8, 9, 10</u> | _ Page _ <u>93</u> _ of142 |
| Event Description: | Control Rod Ejection / Safety Injection Auto Initiate Failu Failure | re / 1CF-51 Feedwater Isolation |



Attachment List

Scenario 2

| ATTACHMENT 1 - | Crew Critical Task Summary |
|-----------------|---|
| ATTACHMENT 2 - | Shift Turnover Information |
| ATTACHMENT 3 - | AP/1/A/5500/021 Enclosure 1 (Foldout Page) |
| ATTACHMENT 4 - | AP/1/A/5500/003 Enclosure 3 (Rod Insertion Limit Boration) |
| ATTACHMENT 5 - | EP/1/A/5000/E-0 Enclosure 1 (Foldout Page) |
| ATTACHMENT 6 - | EP/1/A/5000/E-0 Enclosure 2 (Ventilation System Verification) |
| ATTACHMENT 7 - | EP/1/A/5000/G-1 Enclosure 1 (Unit 1 Spent Fuel Pool Monitoring) |
| ATTACHMENT 8 - | EP/1/A/5000/E-0 Enclosure 4 (NC Temperature Control) |
| ATTACHMENT 9 - | EP/1/A/5000/G-1 Enclosure 18 (VX and Containment Ventilation Control) |
| ATTACHMENT 10 - | EP/1/A/5000/E-1 Enclosure 1 (Foldout Page) |
| ATTACHMENT 11 - | EP/1/A/5000/E-1 Enclosure 2 (S/I Termination Criteria) |
| ATTACHMENT 12 - | AP/1/A/5500/008 Enclosure 1 (Foldout Page) |
| ATTACHMENT 13 - | Scenario Specific Technical Specifications |

| CREW CRITICAL TASK SUMMARY | | | | | |
|----------------------------|-------|------|--|--|--|
| SAT | UNSAT | CT # | CRITICAL TASK | | |
| | | 1 | Manually re-open 1KC-424B (NC Pumps Ret Hdr Cont Isol) prior to reaching RCT motor bearing temperature of 195 degrees (RCP trip criteria). | | |
| | | 2 | Manually decrease Main Turbine load prior to overcurrent trip of 1A Generator PCB. | | |

Comments:

| SHIFT TURNOVER INFORMATION | | | | | | | |
|--|---|----------------------------|-----------------------|--|--|--|--|
| Unit 1 Status | | | | | | | |
| Power Level Power History NCS Boron Xenon | | | | | | | |
| 100 % | MOL | 894 PPM | per OAC | | | | |
| | Controlling | Procedure | | | | | |
| OP/1/A/6100/003 (C Between 85% and 1 | ontrolling Procedure for l 00% Power) is complete. | Unit Operation), Enclosure | e 4.3 (Unit Operation | | | | |
| | Other Information Need | led to Assume the Shift | | | | | |
| AP/1/A/5500/037 due to CNS Generator Voltage completed. The SOC is Direction for the crew is 1B2 KC Pump per OP/1 Pumps). The SOC and start check is complete. | AP/1/A/5500/037 due to a grid disturbance. Main generator voltage is currently less than the CNS Generator Voltage Operating Schedule due to this issue. All applicable actions have been completed. The SOC is working to restore grid voltage and will provide guidance, as required. Direction for the crew is to swap operating KC Pumps by starting 1B1 KC Pump and securing 1B2 KC Pump per OP/1/A/6400/005 (Component Cooling System), Enclosure 4.15 (Shifting KC Pumps). The SOC and site management have approved KC Pump swap. 1B1 KC Pump prestart check is complete. | | | | | | |
| | AOs Av | ailable | | | | | |
| Se | even AOs are available a | s listed on the status boa | rd | | | | |
| | METEOROLOGIC | AL CONDITIONS | | | | | |
| Upper wind direction | ı = 315 degrees, speed = | 3 mph | | | | | |
| Lower wind direction | ı = 315 degrees, speed = | 4.5 mph | | | | | |
| Forecast calls for cle | ar skies over the next 24 | hours. | | | | | |

| CNS AP/1/A/5500/021 | LOSS OF COMPONENT COOLING | PAGE NO. |
|---|--|----------------------|
| 7171743300021 | Enclosure 1 - Page 1 of 2 Foldout Page | Revision 43 |
| | 1 | |
| | | |
| 1. SSF Manning | Criteria: | |
| | | |
| <u>CAUTION</u> Fa NV se | ilure to restore NC pump seal cooling via thermal barrier co / seal injection within ten minutes will cause damage to the als resulting in NC System inventory loss. | oling or NC pump |
| IF AT ANY TIN following: | <u>ME KC AND NV seal cooling for any NC pump lost, THEN perfor</u> | rm the |
| a. Dispatch op EP/1/A/500 Injection Fre | perator to SSF to establish NC pump seal injection. <u>REFER TO</u> 0/G-1 (Generic Enclosures), Enclosure 19 (Establishing NC Ma om The SSF). | keup/Seal |
| b. IF 1EMXS o | de-energized, THEN perform the following: | |
| 1) Dispatch 1EMXS. Alternate | h operator to 1ETA switchgear room to align alternate power su . <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure e Power Supply To 1EMXS). | pply to 20 (Align |
| 2) Notify op alternate | perator at SSF (Ext. 5251 or 5212) operator has been dispatche e power supply to 1EMXS. | d to align |
| 2. NC Pump Trip | Criteria: | |
| <u>IF</u> any of the | following NC pump trip criteria met: | |
| KC flow un | navailable to NC pumps - GREATER THAN 10 MINUTES | |
| OR | | |
| _ • #1 Seal ou | utlet temperature - GREATER THAN 235°F | |
| OR | | |
| Lower bea | ring temperature - GREATER THAN 225°F | |
| <u>OR</u> | | |
| Motor bear | ring temperature - GREATER THAN 195°F, | |
| THEN GO TO | Enclosure 6 (Rx Trip Sequence). | |
| | | |
| | | |
| | | |
| | | |

Γ

PAGE NO.

| CNS AP/1/A/5500/021 LOSS OF COMPONENT COOLING Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 20 of 36 Revision 43 |
|--|-------------------------------------|
|--|-------------------------------------|

| NOTE The following step prevents damage to the 1B2 KC pump as a result of deadheading. (NCR #01406467) | |
|--|---|
| 3. IF AT ANY TIME the following conditions met: | |
| Train B KC non-essential header isolation valves - CLOSED | |
| AND | |
| 1KC-81B (KC To ND Hx 1B Sup Isol) - CLOSED, | |
| THEN ensure less than 2 Train B KC pumps - IN SERVICE. | |
| <u>NOTE</u> Monitoring of the following steps must continue while KC malfunction exists even if a transition is made to the emergency procedures. | |
| IF AT ANY TIME both trains of KC lost, <u>THEN RETURN TO</u> Section C. (Operator Actions), Step 2. | |
| <u>IF</u> operators dispatched to align alternate cooling to NV pump 1A, <u>THEN</u> perform th following: | e |
| <u>WHEN</u> alternate cooling aligned, <u>THEN</u> perform Enclosure 5 (Maximize NV Pump Run Time), Step 7. | n |
| IF AT ANY TIME KC cooling to operating KF pump(s) lost, <u>THEN</u> perform the following: | |
| IF annunciator 1AD-13, D/6 "KF PUMP A MTR CLR HI TEMP" lit, <u>THEN</u> secure 1A KF pump and <u>REFER TO</u> AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). | |
| IF annunciator 1AD-13, D/7 "KF PUMP B MTR CLR HI TEMP" lit, <u>THEN</u> secure 1B KF pump and <u>REFER TO</u> AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). | |
| | |
| | |
| | |
| | |
| | |
| | |

| CNS | LOAD REJECTION | PAGE NO. |
|--|---|-------------------------|
| AP/1/A/5500/003 | Enclosure 3 - Page 1 of 2 Rod Insertion Limit Boration | 54 of 56 Revision 46 |
| | | |
| | | |
| <u>CAUTION</u> Failur insert | e to initiate boration within one hour of exceeding rod ion limits may violate Tech Spec 3.1.6. | |
| NOTE OAC poin R.O.D Bo | t C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) and ok (Section 2.2) provide rod insertion limit indication. | |
| 1. <u>IF</u> control rods following: | s cannot be maintained above rod insertion limits, <u>THEN</u> pe | rform the |
| a. Stop any dil | utions in progress. | |
| b. Ensure cont | rol rods restored above insertion limits within 2 hours of exceed | ling limits. |
| c. Ensure com | pliance with Tech Spec 3.1.6 (Control Bank Insertion Limits). | |
| 2. Perform one o | f the following to restore control rods above insertion limit | s: |
| a. <u>IF</u> initial reac control rods (Reactivity I | ctor power was 100%, <u>THEN</u> borate NC System as required to above insertion limits. <u>REFER TO</u> Unit 1 R.O.D. book, section Data Sheet). | restore 4.8 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| CNS AP/1/A/5500/003 | LOAD REJECTION Enclosure 3 - Page 2 of 2 Rod Insertion Limit Boration | PAGE NO. 55 of 56 Revision 46 |
|---|--|-------------------------------------|
| | | |
| 2. (Continued) | | |
| b. <u>IF</u> initial rea (Reactivity I restore cont | ctor power was less than 100% <u>OR</u> Unit 1 R.O.D. book, section Data Sheet) is <u>NOT</u> available, <u>THEN</u> perform the following as re trol rods above insertion limits: | 4.8 equired to |
| <u>NOTE</u> OA (Se | AC point C1P1448 (Low Bank Insertion Limit Margin) and R.O.D ection 2.2) provide rod insertion limit indication. | Book |
| 1) Determin | ne control rod insertion limit | |
| 2) Calculat position) | e "A" (reactivity difference between required rod position and cu). <u>REFER TO</u> Unit 1 R.O.D. book section 5.6.3. | irrent rod |
| R = Req | uired rod position IRW PCM | |
| P = Curr | rent rod position IRW PCM | |
| (R - P = | A PCM). | |
| 3) Determin | ne "B" (differential boron worth). <u>REFER TO</u> Unit 1 R.O.D. bool PCM/PPM. | k section 5.5 |
| 4) Calculat | e "C" (difference in reactivity) as follows: | |
| A / B = 0 | СРРМ. | |
| 5) Calculat | e "D" (required boron concentration) as follows: | |
| E = Curr | rent Boron concentration PPM. | |
| E + C = | D PPM. | |
| 6) Determin value "D REACT | ne required boric acid needed to raise NC System boron concer " calculated in Step 2.b.5. <u>REFER TO</u> Unit 1 R.O.D. book table Boration/Dilution module | ntration to 4.1 or |
| NOTE • | The boric acid added to the NC System should be added in sev increments within the first hour of the runback. | eral |
| • | Due to the post transient Xenon build-in rate, the total boric acid calculated in Step 2.b.6, may not need to be added to restore co above insertion limits. | l value ontrol rods |
| 7) Borate N | NC System as required to restore control rods above insertion lin | nits. |
| | | |

| CNS EP/1/A/5000/E-0 | | REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 2 Foldout Page | PAGE NO. 34 of 49 Revision 43 |
|------------------------|---|---|-------------------------------------|
| | | | |
| 1. | NC Pump Trip | Criteria: | |
| | <u>IF</u> the followinjection flow | ng conditions satisfied, <u>THEN</u> trip all NC pumps while maintaini : | ng seal |
| | Any NV or | NI pump - DELIVERING S/I FLOW TO NC SYSTEM | |
| | NC subcod | oling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F | |
| | Reactor po | ower - LESS THAN 5%. | |
| 2. | CA Suction So | ource Switchover Criterion: | |
| | • <u>IF</u> 1AD-8, B/ Feedwater). | 1 "UST LO LEVEL" lit, <u>THEN REFER TO</u> AP/1/A/5500/006 (Los | s of S/G |
| 3. | Position Criter | ria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol |): |
| | <u>IF</u> NC pressu 1NV-202B ar | ure less than 1500 PSIG <u>AND</u> NV S/I flowpath aligned, <u>THEN</u> C nd 1NV-203A. | LOSE |
| | IF NC pressu | re greater than 2000 PSIG, <u>THEN</u> OPEN 1NV-202B and 1NV-2 | 203A. |
| 4. | Ruptured S/G | CA Isolation Criteria: | |
| | • IF both the fo | ollowing conditions met, <u>THEN</u> stop CA flow to affected S/G(s): | |
| | Level incre | easing in uncontrolled manner or radiation level in that S/G abno | rmal |
| | N/R level - | GREATER THAN 11% (29% ACC). | |
| 5. | Faulted S/G C/ | A isolation Criteria: | |
| | • IF all the follo | owing conditions met, <u>THEN</u> stop CA flow to affected S/G: | |
| | S/G pressu | are decreasing in uncontrolled manner or completely depressuri | zed |
| | Only one S | 6/G diagnosed as faulted | |
| | Secondary | heat sink criteria met: | |
| | Total CA | flow - GREATER THAN 450 GPM | |
| | OR | | |
| | ANY S/0 | G(s) N/R level - GREATER THAN 11%(29% ACC). | |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 35 of 49 Revision 43 |
|------------------------|---|-------------------------------------|
| | | |

| 6. | NS Pump Trip Criterion: | | | | | |
|----|---|--|--|--|--|--|
| | IF NS pump in recirc and S/I occurs, THEN perform one of the following: | | | | | |
| | IF train affected ECCS and D/G load sequencer - RESET, THEN stop NS pump | | | | | |
| | OR | | | | | |
| | <u>WHEN</u> sequencer loading complete, <u>THEN</u> perform the following for affected train: | | | | | |
| | a. Notify Control Room Supervisor. | | | | | |
| | b. Reset ECCS. | | | | | |
| | c. Reset D/G load sequencer. | | | | | |
| | d. Secure NS pump. | | | | | |
| | e. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR Enclo Ventilatio | ACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 1 of 7 Ventilation System Verification | | PAGE NO 36 of 49 Revision 4 | 3 |
|---|--|--|---|---|--------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT O | BTAINED | |
| Verify proper V follows: a. Verify one trequipment i PYC chiller CR AHU- CRA AHL CRA PFT | /C/YC operation as rain of the following n operation: 1 -1 -1. | | a. Perform the followin 1) Shift operating <u>REFER TO</u> EP. (Generic Enclosure 17 (\$ VC/YC Trains). 2) <u>IF</u> no train can aligned, THEN and IAE/Mainte at least one trai REFER TO the OP/0/A/6450 Room Area \Water Syster EM/0/A/5200 (Troubleshoo Improper Op System). | ng: VC/YC trains. V1/A/5000/G-1 sures), Shifting Operating be properly dispatch operator enance to restore in of VC/YC. following: V011 (Control Ventilation/Chilled m) V/001 oting Cause For eration of VC/YC |) r |

| CNS REACTOR TRIP OR SAFETY INJECTION EP/1/A/5000/E-0 Enclosure 2 - Page 2 of 7 Ventilation System Verification | | PAGE NO. 37 of 49 Revision 43 | |
|--|---|---|---|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAIN | ED |
| 1. (Continued) b. Verify the fo - • 1AD-18, A CHLORIN - • 1AD-18, E CHLORIN - • 1AD-18, E CHLORIN - • 1AD-18, E CHLORIN | llowing alarms - DARK: V8 "UNIT 1 INTAKE HI E 1A" V8 "UNIT 1 INTAKE HI E 2A" 2/8 "UNIT 2 INTAKE HI E 2B". | b. IE chlorine odor detected Room, <u>THEN</u> perform the based on the status of given 1) IE detectors on both in alarm, <u>THEN</u> perform following: a) Ensure the follow intake dampers - 1VC-5B (CRA 1VC-6A (CRA 2VC-5B (CRA 2VC-5B (CRA 2VC-6A (CRA 2VC-6A (CRA b) <u>GO TO</u> Step 1.d. 2) IE Unit 1 intake HI ch detector(s) in alarm, perform the following a) Ensure the follow dampers - CLOS 1VC-5B (CRA 1VC-5B (CRA 1VC-6A (CRA b) Ensure the follow - OPEN: 2VC-5B (CRA 2VC-6A (CRA b) Ensure the follow - OPEN: 2VC-6A (CRA c) GO TO Step 1.d. (RNO continued on next participation of the state of the | in Control e following ven alarms: unit intakes form the ing VC CLOSED: Filt Inlet) Filt Inlet) Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). |

| CNS EP/1/A/5000/E-0 REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 3 of 7 Ventilation System Verification | | PAGE NO. 38 of 49 Revision 43 | | |
|--|---|-------------------------------------|--|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 1. (Continued) 1. (Continued) c. Ensure the f OPEN: 1VC-5B (1VC-5B (2VC-5B (2VC-5B (2VC-5A (d. Repeat Step notified by s follows: At least of OR Any time annunciat | following VC dampers - CRA Filt Inlet) CRA Filt Inlet) CRA Filt Inlet) CRA Filt Inlet). O 1 of this enclosure unti tation management as nce every 8 hours VC/YC related ors on 1AD-18 actuate. | 3) | IE Unit 2 intake Hi ch detector(s) in alarm, perform the following a) Ensure the follow dampers - CLOS - 2VC-5B (CRA • 2VC-6A (CRA b) Ensure the follow - OPEN: - 1VC-5B (CRA • 1VC-6A (CRA c) <u>GO TO</u> Step 1.d. | hlorine THEN g: ving VC ED: Filt Inlet) Filt Inlet). ving dampers Filt Inlet) Filt Inlet). |
| EP/ | CNS 1/A/5000/E-0 | REACTOR TR Enclo Ventilatio | ACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 4 of 7 Ventilation System Verification | | | PAGE NO. 39 of 49 Revision 43 |
|-----|---|---------------------------------------|--|------------------|------------|-------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE | NOT OBTAIN | ED |
| 2. | Ensure proper follows: | VA system operation | as | | | |
| | Ensure the for | llowing fans - OFF: | | | | |
| | ABUXF 1A ABUXF 1B | | | | | |
| | Ensure VA sy follows: | /stem filter in service as | | | | |
| | ● 1ABF-D-12 Dampers) · | 2 & 19 (VA Filter A Bypa: - CLOSED | SS | | | |
| | ● 1ABF-D-5 Dampers) | & 20 (VA Filter B Bypas: - CLOSED. | S | | | |
| | Ensure the for | llowing fans - ON: | | | | |
| | ABFXF-1A • ABFXF 1B | | | | | |
| 3. | Verify proper \ follows: | /E system operation a | 5 | | | |
| - | _a. VE fans - Ol | Ν. | _ | a. Start fan(s). | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR Enclo Ventilatio | IP OR SAFET sure 2 - Page on System Ver | Y INJECTION 5 of 7 rification | PAGE NO. 40 of 49 Revision 43 |
|--|--|---|--|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 3. (Continued) b. Annulus pre IN. WC AND | ssure - BETWEEN -1.4) -1.8 IN. WC. | b. | Perform the following: 1) IF annulus pressure positive than -1.4 in. perform the following a) Verify flow indicate following indicates a) Verify flow indicates b) IVEP5180 (VE Stack) b) IF flow not indicated dispatch operator status of the follo dampers based or indication or their piston rods being to 6": 1AVS-D-2 (VE Damp) (AB-60: 500) - CLOSEI 1AVS-D-7 (VE Damp) (AB-60: 500) - CLOSEI 1AVS-D-3 (VE Damp) (AB-60: 500) - OPEN 1AVS-D-8 (VE Damp) (AB-60: 500) - OPEN 1AVS-D-8 (VE Damp) (AB-60: 500) - OPEN Consult plant eng and notify IAE/Ma troubleshoot and REFER TO EM/1 (Troubleshooting VE System Hi/Lo d) GO TO Step 3.c. | more WC, <u>THEN</u> J: ted on the ons: 1A Flow To 1B Flow To ted, <u>THEN</u> to verify wing on their local operating extended 4" A Trn Recirc 3, JJ-51, Rm B Trn Recirc 3, JJ-51, Rm B Trn Exh 3, JJ-52, Rm B Trn Exh 3, JJ-52, Rm B Trn Exh 3, HH-52, Rm B Trn Exh 3, HH-52, Rm D B Trn Exh 3, HH-52, Rm D |

| EP/1/4 | CNS REACTOR TRIP OR SAFETY INJECTION (1/A/5000/E-0 Enclosure 2 - Page 6 of 7 Ventilation System Verification | | PAGE NO. 41 of 49 Revision 43 | | |
|--------|--|---|-------------------------------------|--|--|
| [| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTA | INED |
| 3. | (Continued) c. Repeat Step until notified | o 3.b every 30 minutes by station management | t. | 2) <u>IF</u> annulus pressur negative than -1.8 perform the followi a) Determine which indicates higher flow to stack. b) Within 2 hours, train that indicates discharge flow to secured. c) Consult plant e and notify IAE/I troubleshoot an <u>REFER TO</u> EM (Troubleshoot in VE System Hi/L) | e more in. WC, <u>THEN</u> ng: th VE train st discharge ensure VE tes highest to stack ngineering staff Maintenance to d repair. /1/A/5200/002 ng Cause For to Pressure). |

| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | EP/1// | CNS 4/5000/E-0 | REACTO E Vent | PAGE NO. 42 of 49 Revision 43 | | |
|---|--------|------------------------------------|------------------------------------|-------------------------------------|--------------|----------|
| 4. Record time ventilation systems verified on following table: | [| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT | OBTAINED |
| TIME SYSTEM (VC. VE) INITIALS | _ 4. | Record time ve verified on foll | entilation systems owing table: | | | |
| | | | | SYSTEM (VC. VE) | INITIALS | |

| CNS GENERIC EP/1/A/5000/G-1 Enclosur Unit 1 Spent f | | | OSURES age 1 of 8 ool Monitoring | PAGE NO. 3 of 109 Revision 11 | | |
|---|---|---------|--|-------------------------------------|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTA | INED | | |
| 1. Review the fol for Spent Fuel | lowing considerations Pool monitoring: | | | | | |
| Control Room 1KFP5130 is loop. Guidar temperature Spent Fuel P | n temperature indication a non-safety instrument ice is provided for local verification if access to ool available. | | | | | |
| Normal level non-safety in from 1RPA. local tempera to Spent Fue | indication 1KFP5120 is a strument loop powered Guidance is provided for ature verification if access I Pool available. | a S | | | | |
| If a loss of all to last greate Spent Fuel P instrumentati access to Sp | If a loss of all AC Power is anticipated to last greater than 6 hrs, portable Spent Fuel Pool level and temperature instrumentation can be installed if access to Spent Fuel Pool available. | | | | | |
| Seismic ever Fuel Pool inv of water. | t may cause loss of Spe entory due to "splashing | nt " | | | | |
| 2. Monitor Unit 1 as follows: | KF pump motor coolin | g | | | | |
| a. Verify the fo | llowing: | | a. Ensure affected Unit 1 OFF. | KF pump(s) - | | |
| • KF PUMF (1AD-13 I • KF PUMF (1AD-13 I | 2 A MTR CLR HI TEMP D/6) - DARK 2 B MTR CLR HI TEMP D/7) - DARK. | | | | | |
| b. IF AT ANY HI TEMP ar perform Ste | TIME KF PUMP MTR CL nunciator(s) lit, <u>THEN</u> p 2.a. | .R | | | | |
| 3. IF AT ANY TIM AND temperat unavailable in dispatch opera Spent Fuel Po Enclosure 24 (Monitoring). | I <u>E</u> Spent Fuel Pool leve ure indications Control Room, <u>THEN</u> ator to monitor Unit 1 ol. <u>REFER TO</u> Local Spent Fuel Pool | 1 | | | | |

| CNS EP/1/A/5000/G-1 | CNS GENERIC EP/1/A/5000/G-1 Enclosure Unit 1 Spent F | | | C ENCLOSURES F re 1 - Page 2 of 8 Fuel Pool Monitoring | | | PAGE NO. 4 of 109 Revision 11 | | |
|------------------------|---|----------------------------|------------------|--|--|---|---|--|--|
| ACTI | ION/EXPECTE | ED RESPONSE | | | RESPONSE NO |)T OBTAINE | D | | |
| NOTE Ste | NOTE Steps 4 and 5 may be performed concurrently. | | | | | | | | |
| 4. Monitor follows: | 4. Monitor Unit 1 Spent Fuel Pool level as follows: | | | | | | | | |
| a. Verify in Cor | Spent Fuel trol Room | Pool level i - AVAILABL | ndication .E. | a. GC | <u>TO</u> Step 4.6 | 2. | | | |
| b. Verify than - | b. Verify Spent Fuel Pool level greater than - 39 ft1) Unit 2) REF (Los Level | | | | tify Control R owing: Unit 1 Spent <u>REFER TO</u> (Loss of Spe Level). | Room Supe t Fuel Pool AP/1/A/550 ent Fuel Co | ervisor of the level. 00/041 poling or | | |
| c. Recor the fol | d Unit 1 Sp llowing table | ent Fuel Po e: | ol level in | | | | | | |
| | Fime U SF | Jnit 1 P Level | Time | Unit 1 SFP Level | Time | Unit 1 SFP Leve | 1 | | |
| d. <u>GO T</u> (| <u>0</u> Step 5. | | | | | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Spe | RIC ENCI sure 1 - P nt Fuel Po | LOSURES age 3 of 8 ool Monitoring | PAGE NO. 5 of 109 Revision 11 |
|--|--|--------------------------------------|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTA | INED |
| 4. (Continued) e. Determine S follows: 1) Dispatch determin area acc 2) <u>WHEN</u> (Continued) <u>WHEN</u> (Continued) <u>WHEN</u> (Continued) <u>area acc</u> <u>THEN</u> (Continued) <u>THEN</u> (Continued) <u>area acc</u> <u>THEN</u> (Continued) <u>area</u> <u>acc</u> <u>THEN</u> (Continued) <u>area</u> <u>acc</u> <u>THEN</u> (Continued) <u>area</u> <u>acc</u> <u>THEN</u> (Continued) <u>area</u> <u>area</u> | Spent Fuel Pool level as operator and RP to e if Unit 1 Spent Fuel Pool essible. Unit 1 Spent Fuel Pool essibility determined, erform the following: (Unit 1 Spent Fuel Pool - ACCESSIBLE. | bol | a) Notify Station Ma perform the follo (1) Evaluate alt to monitor L Fuel Pool le (2) IF AT ANY level estima 39 ft, THEN AP/1/A/550 Spent Fuel Level). | anagement to wing: ernate method Init 1 Spent vel. <u>TIME</u> Unit 1 ted less than - <u>REFER TO</u> J/041 (Loss of Cooling or |
| b) Notify perfo (1) [| / dispatched operator to rm the following: Determine Spent Fuel Poevel using the following eference points: Top of skimmer trough 40 Ft 1 Ft below lip of skimmer trough is 39 F Centerline of KF pump suction strainer is 37.5 Ft. Report level determination of Control Room. | ool is Et | (3) <u>GO TO</u> Ste | o 5. |



| CNS EP/1/A/5000/G-1 | GENERI Enclosu Unit 1 Spen t | IC ENCLOSURES ire 1 - Page 5 of 8 F uel Pool Monit o | PAGE NO. 7 of 109 Revision 11 | |
|---|--|---|--|-----------------------|
| ACTION/EX | PECTED RESPONSE | R | ESPONSE NOT OBTAIN | IED |
| 5. Monitor Unit 1 temperature as | Spent Fuel Pool follows: | | | |
| a. Verify Spent indication in AVAILABLE | Fuel Pool temperature Control Room - | a. <u>GO 1</u> | r <u>O</u> Step 5.e. | |
| b. Verify Spent less than - 1 | Fuel Pool temperature 25°F. | b. Notif follov | y Control Room Sup ving: | ervisor of the |
| | | 1) U te | nit 1 Spent Fuel Poo mperature. | bl |
| | | 2) R (L | EFER TO AP/1/A/55 oss of Spent Fuel C evel). | 500/041 Sooling or |
| c. Record Unit temperature | 1 Spent Fuel Pool in the following table: | | | |
| Time | Unit 1 Time SFP Temp | Unit 1 SFP Temp | Time Unit SFP Tr | 1 emp |
| | | | | |
| | | | | |
| | | | | |
| d GO TO Step |) 6. | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Spe | RIC ENCI sure 1 - P nt Fuel Po | NCLOSURES PAG - Page 6 of 8 Pool Monitoring | | |
|---|--|--------------------------------------|--|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED | |
| 5. (Continued) e. Determine S temperature 1) Verify ac Pool are 2) Verify Un ACCES | Spent Fuel Pool as follows: access to Unit 1 Spent Fu a previously determined | el | Perform the following a) Dispatch operator determine if Unit 1 Pool area accessi b) <u>WHEN</u> Unit 1 Spearea accessibility <u>THEN</u> perform Steathrough 5.e.4. c) <u>GO TO</u> Step 6. Notify station manage perform the following: a) Evaluate alternate monitor Unit 1 Spearea temperature. b) <u>IF AT ANY TIME</u> temperature estimation and PJ/1/A/5500/C Spent Fuel Coolin C) <u>GO TO</u> Step 6. | and RP to Spent Fuel ble. ent Fuel Pool determined, eps 5.e.2 ement to emethod to ent Fuel Pool Unit 1 hated greater EN REFER 041 (Loss of g or Level). | |
| 3) Notify disdeterminitemperation a) Obta from Cabin b) Scan for hi c) Repordeterminitemperation | spatched operator to le Unit 1 Spent Fuel Poo ture as follows: in infrared thermometer OSC "Emergency Supp net". Spent Fuel Pool surface ghest reading. Int temperature mination to Control Roo | ly e m. | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Spe | RIC ENCI sure 1 - P nt Fuel Po | OSURE age 7 of ool Moni | S 8 itoring | | PAGE NO. 9 of 109 Revision 11 | | |
|---|--|--------------------------------------|-------------------------------|---------------------|---------------------|-------------------------------------|--|--|
| ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT | OBTAIN | ED | | |
| 5. (Continued) | | | | | | | | |
| 4) <u>WHEN</u> of temperat following | <u>WHEN</u> operator reports temperature, <u>THEN</u> perform the following: | | | | | | | |
| a) Verify Spent Fuel Pool a) Notify Control Room Supervisor of the following: | | | | | | | | |
| 125° | τ. | | | (1) Unit 1 tempe | Spent F erature. | Fuel Pool | | |
| (2) <u>REFER TO</u> AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). | | | | | | | | |
| b) Record Unit 1 Spent Fuel Pool temperature in the following table: | | | | | | | | |
| Time | Unit 1 Time SFP Temp | Un SFP | it l Temp | Time | Unit SFP Te | 1 emp | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| _ 6. Notify Control Unit 1 Spent F temperature. | Room Supervisor of uel Pool level and | | | | | | | |

| EP/1 | CNS /A/5000/G-1 | GENE Enclo Unit 1 Spe | RIC ENC sure 1 - P nt Fuel P | IC ENCLOSURES PAGE N Ire 1 - Page 8 of 8 10 of 1 Fuel Pool Monitoring Revision | | |
|------|--|--|------------------------------------|---|---|--|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED | |
| _ 7. | Verify AP/1/A/ Fuel Cooling c IMPLEMENTE | 5500/041 (Loss of Sper r Level) - D. | .t | IF AT ANY TIME Unit 1 Spe cooling <u>NOT</u> established p reaching either of the follo conditions, <u>THEN</u> notify Co Supervisor, <u>REFER TO</u> AP/1/A/5500/041 (Loss of S Cooling or Level): • Unit 1 Spent Fuel Pool gre 125°F. • Unit 1 Spent Fuel Pool lev 39 ft. | ent Fuel Pool rior to wing ontrol Room Spent Fuel eater than - el less than - | |
| 8. | Repeat this en until notified b | closure every 2 hours by station management | | | | |

| EP/1 | CNS REACTOR TRIP OR SAFETY INJECTION F EP/1/A/5000/E-0 Enclosure 4 - Page 1 of 5 NC Temperature Control | | | PAGE NO. 44 of 49 Revision 43 | |
|------|---|---|-----------------|--|---------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 1. | Verify any NC | pump - ON. | | Perform the following: a. Use NC T-Colds to detern temperature as required subsequent steps. b. <u>GO TO</u> Step 4. | mine NC in |
| 2. | Use NC T-Avg temperature as steps. | to determine NC s required in subseque | nt | | |
| 3. | IF AT ANY TIM THEN use NC temperature as steps. | <u>E</u> all NC pumps tripped T-Colds to determine N s required in subseque | d, IC int | | |
| 4. | Verify one of the NC temperate THAN OR ECOR NC temperate 557°F. | he following: ure - STABLE AT LESS QUAL TO 557°F ure - TRENDING TO | | <u>GO TO</u> Step 8. | |
| 5. | Continue to m | onitor NC temperature | | | |
| 6. | Notify Control temperature co | Room Supervisor of N ontrol status. | с | | |

| EP/1 | CNS /A/5000/E-0 | REACTOR TR Enclo NC Te | REACTOR TRIP OR SAFETY INJECTIONPAGE NO.Enclosure 4 - Page 2 of 545 of 49NC Temperature ControlRevision 43 | | |). 13 | | |
|------|---|--|--|-----------------------|--|---|--|----------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAINED | | |] | |
| 7. | ACTION/EX Do not continu one of the folk • NC temperatures S57°F AND IS OR • NC temperatures OR • NC temperatures S57°F AND DE Verify NC temperatures S57°F AND DE | PECTED RESPONSE le in this enclosure un owing occurs: ure - GREATER THAN NCREASING IN AN LLED MANNER ure - GREATER THAN DECREASING IN AN LLED MANNER. DECREASING IN AN LLED MANNER. Derature - LESS THAN CREASING. | til | Pe a. b. | RESPON rform the f IF NC tem AND increate temperatur 1) IF steat use state 2) IF steat THEN state 557°F as f 1) IF steat use state 2) IF steat 557°F as f 1) IF steat use state 2) IF steat 1) IF st | following: perature greate asing, <u>THEN</u> s re at 557°F as am dumps ava team dumps ava team dumps not use S/G POR owing condition perature greate old manpower a bilize NC tempo follows: am dumps ava team dumps ava team dumps not use S/G POR am dumps not use S/G POR ep 10. | er than 557° tabilize NC follows: ilable, <u>THE</u> available, Vs. s exist: er than 557° vailable, erature at ilable, <u>THE</u> available, Vs. | °F № 'F № |
| | | | | | | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR Enclo NC Te | RIP OR SAN sure 4 - Pa emperature | FETY IN age 3 of e Contro | JECTION 5 01 | PAGE NO. 46 of 49 Revision 43 |
|--|--|---|---------------------------------|--|--------------------------------------|
| ACTION/EX | PECTED RESPONSE | [| | RESPONSE NOT OBTAIN | ED |
| 9. Attempt to sto follows: | p the NC cooldown as | | | | |
| a. Ensure all s b. Ensure all S | team dumps - CLOSED. 3/G PORVs - CLOSED. | | b. <u>IF</u> a <u>TH</u> | any S/G PORV cannot <u>EN</u> CLOSE its isolatio | t be closed, n valve. |
| c. Ensure S/G d. CLOSE the • 1SM-77A C/V) • 1SM-76B C/V) • 1SM-74B C/V). • 1SM-74B C/V). • 1SM-74B C/V). • 1SM-74B C/V). • 1HM-74B Source). | blowdown isolated. following valves: (S/G 1A Otlt Hdr Bldwn (S/G 1B Otlt Hdr Bldwn (S/G 1C Otlt Hdr Bldwn (S/G 1D Otlt Hdr Bldwn Second Stage steam es - CLOSED ISRH 1A&1B SSRH Stm ISRH 1C&1D SSRH Stm | 1 | e. Per 1) 2) | form the following: CLOSE MSR Secon steam supply valve(s IE steam flowpath ca isolated from Contro THEN CLOSE the fo valves: • All MSIVs • All MSIVs | d Stage s). I Room, Ilowing |

| CNS EP/1/A/5000/E-0 | REACTOR TR Enclo NC Te | RIP OR SA sure 4 - Pa emperatur | FETY age 4 e Cor | INJECTION of 5 htrol | PAGE NO. 47 of 49 Revision 43 |
|---|--|---------------------------------------|------------------------|---|--|
| ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT OBTA | INED |
| 9. (Continued) f. Depress and SEAT DRN' (1MC-3) to o • 1SM-41 (Drn) • 1SM-44 (Drn) • 1SM-43 (5) | d hold "S/V BEFORE "CLOSE" pushbutton close the following valve Stop VIv #1 Before Seat Stop VIv #2 Before Seat Stop VIv #3 Before Seat | s: | | | |
| Drn) • 1SM-42 (Drn). g. Verify NC co | Stop VIv #4 Before Seat | | g. <u>1</u> 1 | E cooldown continues THROTTLE feed flow at (29% ACC) in all S THROTTLE feed f the following: Minimize cooldo Maintain total fe than 450 GPM. WHEN N/R level of 11% (29% ACC) in THEN THROTTLE further to achieve Minimize cooldo Maintain at leas level greater tha (29% ACC). IE cooldown contin CLOSE the followi All MSIVs All MSIV bypass | A THEN as follows: ess than 11% S/G's, <u>THEN</u> low to achieve wn ed flow greater reater than any S/G, feed flow the following: wn t one S/G N/R n 11% nues, <u>THEN</u> ng valves: s valves. |

| EF | CNS 2/1/A/5000/E-0 | REACTOR TR Enclo NC Te | RIP OR SA sure 4 - P emperatur | FETY INJECTION age 5 of 5 re Control | PAGE NO. 48 of 49 Revision 43 |
|----|--|---|--------------------------------------|--|-------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBT | AINED |
| 10 | Continue to pe enclosure as r the following: | erform actions of this equired to ensure one | of | | |
| | NC temperate THAN OR EC | ure - STABLE AT LESS QUAL TO 557°F | | | |
| | OR | | | | |
| | NC temperate 557°F. | ure - TRENDING TO | | | |
| 11 | . Notify Control temperature co | Room Supervisor of N ontrol status. | С | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| CNS EP/1/A/5000/G-1 | GENERIC ENCLOSURES Enclosure 18 - Page 2 of 5 VX and Containment Ventilation Control | | | |
|--|---|-----|--|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 4. Start one VX C Fan as follows a. Verify Train fan and dam | ontainment Air Return : "A" containment air retur per - AVAILABLE. | m _ | a. GO TO Step 4.e. | |
| — ^{b.} Place "ARF- FAN" to "ON c. <u>WHEN</u> appr have elapse (ARF-1A Re | 1A CONT AIR RETURN I". oximately 10 seconds d, <u>THEN</u> verify ARF-D-2 t Fan Damper) - OPEN. | 1 | c. Perform the following: 1) OPEN damper ARF-E 2) IF ARF-D-2 open, TH Step 5. 3) IF ARF-D-2 remains of perform the following: a) Stop "ARF-1A CO RETURN FAN". b) Do not attempt to mericitation of the second s | D-2. EN GO TO Closed, <u>THEN</u> NT AIR start Train ir return fan. have isure 1VX-1A DL) - |
| d. <u>GO TO</u> Step e. Place "ARF- FAN" to "ON | 95. 1B CONT AIR RETURN ". | I | | |

| CNS EP/1/A/5000/G-1 | GENE Enclos VX and Conta | RIC ENCL sure 18 - F inment V | ENCLOSURES 18 - Page 3 of 5 Int Ventilation Control PAGE NO. 53 of 109 Revision 11 | | |
|--|---|-------------------------------------|--|---|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAINED | | |
| 4. (Continued) f. <u>WHEN</u> appr have elapse (ARF-1B Re | roximately 10 seconds ed, <u>THEN</u> verify ARF-D-4 et Fan Damper) - OPEN. | 1 | f. Perform the following: 1) OPEN damper ARF-I 2) IF ARF-D-4 open, TH Step 5. 3) IF ARF-D-4 remains of perform the following: a) Stop "ARF-1B CO RETURN FAN". b) Do not attempt to "A" containment a c) WHEN 9 minutes elapsed, THEN er (HSF-1B INLT ISC CLOSED. d) GO TO Step 6. | D-4. EN GO TO closed, <u>THEN</u> NT AIR start Train ir return fan. have usure 1VX-2B DL) - | |

| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 5. WHEN containment pressure less than 0.4 PSIG, THEN perform the following to prevent cycling of VX components: a. Ensure the following switches - IN AUTO: - "ARF-1A CONT AIR RETURN FAN" - "ARF-1B CONT AIR RETURN FAN". b. Ensure the following dampers - CLOSED: - • ARF-D-2 (ARF-1A Ret Fan Damper) - • ARF-D-4 (ARF-1B Ret Fan Damper) - • 1VX-1A (HSF-1A INLT ISOL) - • 1VX-2B (HSF-1B INLT ISOL). |
|---|
| 5. WHEN containment pressure less than 0.4 PSIG, <u>THEN</u> perform the following to prevent cycling of VX components: a. Ensure the following switches - IN AUTO: "ARF-1A CONT AIR RETURN FAN" "ARF-1B CONT AIR RETURN FAN". b. Ensure the following dampers - CLOSED: ARF-D-2 (ARF-1A Ret Fan Damper) ARF-D-4 (ARF-1B Ret Fan Damper) 1VX-1A (HSF-1A INLT ISOL) 1VX-2B (HSF-1B INLT ISOL). |
| |

| CNS EP/1/A/5000/G-1 | GENE Enclos VX and Conta | GENERIC ENCLOSURES PAGE NO. Enclosure 18 - Page 5 of 5 5 5 of 109 VX and Containment Ventilation Control Revision 11 | | |
|---|--|--|---|---|
| ACTION/E | XPECTED RESPONSE | | RESPONSE NOT OBTAIN | NED |
| 6. Secure conta follows: a. Ensure the Containme "OFF": • VV-UCV • VV-UCV • VV-UCV • VV-UCV • VV-UCV b. Ensure the Containme | inment ventilation as following Upper nt Ventilation switches in U-1A U-1B U-1C U-1D. following Lower | _ | a. CLOSE 1RN-404B (Upp Unit Sup). b. Dispatch operator to trip | er Cont Vent affected AHU |
| "OFF": • VV-LCVI • VV-LCVI • VV-LCVI | J-1A J-1B J-1C J-1D. | | MXQ-F03A (Lower C Ventilation Unit 1A Fai (AB-577, BB-50, Rm 4) 1MXP-F03A (Lower C Ventilation Unit 1B Fai (AB-560, BB-52, Rm 3) 1MXO-F03A (Lower C Ventilation Unit 1C Fai (AB-577, BB-52, Rm 4) 1MXR-F03A (Lower C Ventilation Unit 1D Fai (AB-560, BB-50, Rm 3) | ontainment n Motor) 96) ontainment n Motor) 70) ontainment n Motor) 94) ontainment n Motor) 72). |

| | EP/1 | CNS /A/5000/E-1 | LOSS OF REACTOR OR SECONDARY COOLANT Enclosure 1 - Page 1 of 3 Foldout Page | PAGE NO. 24 of 35 Revision 32 |
|---|------|---|---|-------------------------------------|
| | | | | |
| | 1. | NC Pump Trip | Criteria: | |
| | | <u>IF</u> the followinjection flow | ng conditions satisfied, <u>THEN</u> trip all NC pumps while maintaini : | ng seal |
| | | Any NV or NC subcode | NI pump - DELIVERING S/I FLOW TO NC SYSTEM bling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F | - |
| | 2. | S/I Reinitiation | n Criteria: | |
| | | <u>IF</u> NC subcoor maintained g restore subcoor | oling based on core exit T/Cs less than 0°F <u>OR</u> Pzr level cannot reater than 11% (30% ACC), <u>THEN</u> perform the following as ne poling and level: | t be cessary to |
| | | Start one of Realign N\ Enclosure | or more S/I pumps. / S/I flow path. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosu 14 (NV Alignment To S/I Mode). | res), |
| | 3. | Secondary Inte | egrity Criteria: | |
| | | <u>IF</u> any unisol depressurize | ated S/G pressure trending down in uncontrolled manner <u>OR</u> c d, <u>THEN GO TO</u> EP/1/A/5000/E-2 (Faulted Steam Generator Is | ompletely olation). |
| | 4. | SGTR Transiti | on Criteria: | |
| | | <u>IF</u> any SG leven <u>THEN</u> perform | vel trends up in uncontrolled manner <u>OR</u> any SG has abnormal m the following: | radiation, |
| | | a. Perform t T/Cs grea | he following as necessary to maintain NC subcooling based on ater than 0°F and Pzr level greater than 11% (30% ACC): | core exit |
| | | Start or Realign Enclose | ne or more S/I pumps n NV S/I flow path. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclo ure 14 (NV Alignment To S/I Mode). | osures), |
| | | b. <u>GO TO</u> E | P/1/A/5000/E-3 (Steam Generator Tube Rupture). | |
| | | | | |
| | | | | |
| | | | | |
| ĺ | | | | |

| CNS | LOSS OF REACTOR OR SECONDARY COOLANT | Τ |
|-----------------|---|---|
| EP/1/A/5000/E-1 | Enclosure 1 - Page 2 of 3 Foldout Page | |

| PAGE NO. 25 of 35 Revision 32 |
|-------------------------------------|
|-------------------------------------|

| 5. | 1AD-9, C/8 "FWST PRE-LO LEVEL" (27%) LIT Alarm Actions: |
|----|---|
| | a. Verify at least one of the following annunciators - LIT: |
| | 1AD-20, B/2 "CONT. SUMP LEVEL >2.5 ft" |
| | OR |
| | 1AD-21, B/2 "CONT. SUMP LEVEL >2.5 ft". |
| | <u>IF</u> both alarms dark, <u>THEN</u> perform the following for ND pumps with suction aligned to FWST or Containment Sump: |
| | 1) Ensure the following - RESET: |
| | ECCS D/G Load Sequencers. |
| | 2) Stop ND pumps. |
| | IF ND pump(s) will not stop, <u>THEN</u> perform the following for affected train(s): |
| | <u>ND Train 1A:</u> a) Place "PWR DISCON FOR 1NI-173A" switch in "ENABLE". |
| | b) CLOSE 1NI-173A (ND Hdr 1A To Cold Legs C&D). |
| | c) CLOSE 1ND-32A (ND Train 1A Hot Leg Inj Isol). |
| | • <u>ND Train 1B</u> : |
| | a) Place "PWR DISCON FOR 1NI-178B" switch in "ENABLE". |
| | b) CLOSE 1NI-178B (ND Hdr 1B To Cold Legs A&B). |
| | c) CLOSE 1ND-65B (ND Train 1B Hot Leg Inj Isol). |
| | Do not restart either ND pump until at least one "CONT. SUMP LEVEL >2.5 ft" annunciator - LIT. |
| | Ensure "S/I Reinitiation Criteria" of this foldout page monitored to determine if additional NV or NI SI flow needed. |
| 6. | Cold Leg Recirc Switchover Criterion: |
| | IE FWST level lowers to 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL"), THEN GO TO EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation). |
| | |

| CNS LO EP/1/A/5000/E-1 | SS OF REACTOR OR SECONDARY COOLANT Enclosure 1 - Page 3 of 3 Foldout Page | PAGE NO. 26 of 35 Revision 32 |
|---------------------------|---|-------------------------------------|
|---------------------------|---|-------------------------------------|

| 7. | CA Suction Source Switchover Criterion: |
|----|---|
| | IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Loss of S/G Feedwater). |
| 8. | Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol): |
| | IF NC pressure less than 1500 PSIG <u>AND</u> NV S/I flowpath aligned, <u>THEN</u> CLOSE 1NV-202B and 1NV-203A. IF NC pressure grade the 2000 PSIC. THEN OPEN 1NV 202B and 1NV 202A. |
| | • IF NC pressure greater than 2000 PSIG, THEN OPEN TNV-2028 and TNV-203A. |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| | CNS EP/1/A/5000/E-1 | LOSS OF REACTOR OR SECONDARY COOLANT Enclosure 2 - Page 1 of 1 S/I Termination Criteria | PAGE NO. 27 of 35 Revision 32 |
|--|------------------------|---|-------------------------------------|
|--|------------------------|---|-------------------------------------|

| 1. | Verify S/I termination criteria: |
|------|---|
| - | a. NC subcooling based on core exit T/Cs - GREATER THAN 0°F. |
| | b. Verify secondary heat sink as follows: |
| | Total feed flow to intact S/Gs - GREATER THAN 450 GPM |
| | OR |
| | N/R level in any intact S/G - GREATER THAN 11% (29% ACC). |
| _ | c. NC pressure - STABLE OR TRENDING UP. |
| _ | _ d. Pzr level - GREATER THAN 11% (30% ACC). |
| _ 2. | <u>WHEN</u> S/I termination criteria satisfied, <u>THEN</u> notify Control Room Supervisor to <u>RETURN TO</u> Section C. (Operator Actions), Step 9. |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| CNS AP/1/A/5500/008 MALFUNCTION OF REACTOR COOLANT PUMP Enclosure 1 - Page 1 of 2 Foldout Page | PAGE NO. 20 of 24 Revision 19 |
|--|-------------------------------------|
|--|-------------------------------------|

| NOTE • Monitoring of this step must continue while NC pump seal malfunction exists even if a transition is made to the emergency procedures. |
|--|
| Failure of #2 and #3 NC pump seals may occur unless the affected NC pump seal return valve is closed immediately after the NC pump has coasted down to zero speed (3-5 min). |
| 1. NC Pump Seal Return Isolation Criteria: |
| IF immediate NC pump(s) trip required due to #1 seal leakoff flow outside of operating limits (0.8 - 6.0 gpm) per section C. (Operator Actions) of this procedure, <u>THEN</u> CLOSE affected NC pump(s) seal return isolation valve as follows: |
| IF any NC pump continues to run, <u>THEN</u> perform the following: |
| <u>WHEN</u> affected NC pump off for 3 minutes, <u>THEN</u> immediately CLOSE affected NC pump seal return valve: |
| 1NV-52A (NC Pump 1A Seal Return) |
| 1NV-63B (NC Pump 1B Seal Return) |
| • 1NV-74A (NC Pump 1C Seal Return) |
| INV-85B (NC Pump 1D Seal Return). |
| IF all NC pumps off, THEN perform the following: |
| WHEN affected NC pump off for 5 minutes, <u>THEN</u> immediately CLOSE affected NC pump seal return valve: |
| • 1NV-52A (NC Pump 1A Seal Return) |
| • 1NV-63B (NC Pump 1B Seal Return) |
| • 1NV-74A (NC Pump 1C Seal Return) |
| • 1NV-85B (NC Pump 1D Seal Return). |
| |
| |
| |
| |
| |

| CNS AP/1/A/5500/008 | MALFUNCTION OF REACTOR COOLANT PUMP Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 21 of 24 Revision 19 |
|------------------------|--|-------------------------------------|
|------------------------|--|-------------------------------------|

| 2. | NC Pump Trip Criteria: |
|----|---|
| | IE any of the following NC pump trip criteria met: |
| _ | • #1 Seal outlet temperature - GREATER THAN 235°F |
| | OR |
| _ | Lower bearing temperature - GREATER THAN 225°F |
| | OR |
| _ | • #1 Seal delta P - LESS THAN 200 PSID |
| | <u>OR</u> |
| _ | Stator winding temperature - GREATER THAN 311°F |
| | OR |
| _ | Motor bearing temperature - GREATER THAN 195°F, |
| | THEN perform the following: |
| | a. IF in Mode 1 or 2, THEN perform the following: |
| | IF all NC pumps affected, <u>THEN</u> perform the following: |
| | a) Place steam dumps in pressure mode. |
| | b) Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE. |
| | 2) Trip reactor. |
| | WHEN reactor power less than 5%, <u>THEN</u> perform the following: |
| | a) Trip affected NC pump(s). |
| | b) Ensure normal spray valve associated with tripped NC pump(s) - IN MANUAL AND CLOSED. |
| | 4) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). |
| _ | b. Trip affected NC pump(s). |
| _ | c. Ensure normal spray valve associated with tripped NC pump(s) - IN MANUAL AND CLOSED. |
| _ | d. GO TO AP/1/A/5500/004 (Loss of Reactor Coolant Pump). |

EVENT #3

1B ND Pump

ECCS — Operating 3.5.2

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS—Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

-----NOTE-------In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.14.1.

ACTIONS

| CONDITION | | | REQUIRED ACTION | COMPLETION TIME |
|-----------|---|-------------------|---|-----------------|
| A. | One or more trains inoperable. | A.1 | Restore train(s) to OPERABLE status. | 72 hours |
| | AND | | | |
| | At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available. | | | |
| B. | Required Action and associated Completion Time not met. | B.1 <u>AND</u> | Be in MODE 3. | 6 hours |
| | | B.2 | Be in MODE 4. | 12 hours |

Catawba Units 1 and 2

3.5.2-1

Amendment Nos. 253/248

Catawba 2019 NRC Exam

EVENT #5

Zone B Lockout

3.1 REACTIVITY CONTROL SYSTEMS

3.1.6 Control Bank Insertion Limits

LCO 3.1.6 Control banks shall be within the insertion, sequence, and overlap limits specified in the COLR.

------NOTE------This LCO is not applicable while performing SR 3.1.4.2.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|--|-------------------------|
| A. Control bank insertion (limits not met. | A.1.1 Verify SDM is within the limit specified in the COLR. | (<mark>1 hour</mark>) |
| | OR | |
| | A.1.2 Initiate boration to restore SDM to within limit. | (<mark>1 hour</mark>) |
| | AND | |
| | A.2 Restore control bank(s) to within limits. | 2 hours |
| | | / C B |

(continued)

Catawba Units 1 and 2

3.1.6-1

Amendment Nos. 173/165

Control Bank Insertion Limits

3.1.6

Catawba 2019 NRC Exam

EVENT #5

Zone B Lockout

AC Sources - Operating 3.8.1

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources—Operating

| LCO 3.8.1 | The f | following AC electrical sources shall be OPERABLE: |
|----------------|-----------|--|
| | a. | Two qualified circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System; and |
| | b. | Two diesel generators (DGs) capable of supplying the Onsite Essential Auxiliary Power Systems; |
| | AND | |
| | The a OPE | automatic load sequencers for Train A and Train B shall be RABLE. |
| APPLICABILITY: | MOD |)ES 1, 2, 3, and 4. |

-----NOTE-----

ACTIONS

LCO 3.0.4.b is not applicable to DGs.

| | REQUIRED ACTION | COMPLETION TIME |
|---------------------------------------|--|---|
| A. One offsite circuit inoperable. | A.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit. | 1 hour AND Once per 8 hours thereafter |
| | A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable. | 24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s) |
| | (AND) | (continued) |

Catawba Units 1 and 2

3.8.1-1

Amendment Nos. 253/248

EVENT #5

Zone B Lockout

AC Sources - Operating 3.8.1

CONDITION REQUIRED ACTION COMPLETION TIME A.3 Α. (continued) Restore offsite circuit to 72 hours OPERABLE status. AND 6 days from discovery of failure to meet LCO Β. One DG inoperable. **B**.1 Perform SR 3.8.1.1 for the 1 hour offsite circuit(s). AND Once per 8 hours thereafter AND B.2 Declare required feature(s) 4 hours from supported by the discovery of inoperable DG inoperable Condition B when its required concurrent with redundant feature(s) is inoperability of redundant required inoperable. feature(s) AND B.3.1 Determine OPERABLE DG 24 hours is not inoperable due to common cause failure. OR B.3.2 Perform SR 3.8.1.2 for 24 hours OPERABLE DG. AND (continued)

Catawba Units 1 and 2

ACTIONS

3.8.1-2

Amendment Nos. 173/165

EVENT #5

Zone B Lockout

AC Sources - Operating 3.8.1

ACTIONS

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME | _ | |
|----|----------------------------------|-----|---|---|------|--|
| В. | (continued) | B.4 | Restore DG to OPERABLE status. | 72 hours AND 6 days from discovery of failure to meet LCO | | |
| C. | Two offsite circuits inoperable. | C.1 | Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. | 12 hours from discovery of Condition C concurrent with inoperability of redundant required features | • | |
| | | C.2 | Restore one offsite circuit to OPERABLE status. | 24 hours | - | |
| | (continued) | | | | | |

Catawba Units 1 and 2

3.8.1-3

Amendment Nos. 253/248

EVENT #5

Zone B Lockout

AC Sources - Operating 3.8.1

CONDITION REQUIRED ACTION COMPLETION TIME D. One offsite circuit -NOTE--inoperable. Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems— Operating," when Condition D is entered with no AC power source AND One DG inoperable. to any train. D.1 Restore offsite circuit to 12 hours OPERABLE status. OR D.2 Restore DG to OPERABLE 12 hours status. E. Two DGs inoperable. E.1 Restore one DG to 2 hours OPERABLE status. F. One automatic load F.1 Restore automatic load 12 hours sequencer inoperable. sequencer to OPERABLE status G. Required Action and G.1 Be in MODE 3. 6 hours associated Completion Time of Condition A, B, AND C, D, E, or F not met. G.2 Be in MODE 5. 36 hours H. Three or more AC H.1 Enter LCO 3.0.3. Immediately sources inoperable.

Catawba Units 1 and 2

ACTIONS (continued)

3.8.1-4

Amendment Nos. 173/165

EVENT #5 Zone B Lockout

NSWS 3.7.8

3.7 PLANT SYSTEMS

3.7.8 Nuclear Service Water System (NSWS)

LCO 3.7.8 Two NSWS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|-----------------------------|-----------------|
| ANOTE Not applicable while in Condition C of this LCO unless entry is directed by Note 2 of Condition C. One NSWS train inoperable. | A.1NOTES | (72 hours) |

(continued)

Catawba Units 1 and 2

3.7.8-1

Amendment Nos. 271/267

EVENT #5

Zone B Lockout

230 kV Switchyard Systems 16.8-2

16.8 ELECTRICAL POWER SYSTEMS

16.8-2 230 kV Switchyard Systems

COMMITMENT (The following switchyard equipment shall be in its normal) (alignment)

- Switchyard Unit 1 PCBs 14, 15, 17, and 18 including their associated manual disconnects, current transformers, interconnecting bus, and support structures (EBA system),
- Switchyard Unit 2 PCBs 20, 21, 23, and 24 including their associated manual disconnects, current transformers, interconnecting bus, and support structures (EBA system),
- Buslines 1A, 1B (from main stepup transformers to switchyard unit PCBs), including their associated motor operated disconnects, coupling capacitor voltage transformers, interconnecting bus, and support structures (EBA system),
- Buslines 2A, 2B (from main stepup transformers to switchyard unit PCBs), including their associated motor operated disconnects, coupling capacitor voltage transformers, interconnecting bus, and support structures (EBA system),
- Controls associated with the equipment above (EBE, ERE systems),
- Protective relaying associated with the equipment above (EBD, ERD systems),
- g. 480 VAC auxiliary power load centers STA for both units' Train A, STB for both units' Train B (EBI system), and
- h. 125 VDC auxiliary power (EBH system) per SLC 16.8-3.
- APPLICABILITY: At all times in accordance with Technical Specifications (all MODES) and Nuclear System Directive 403 (MODES 4, 5, 6, and No-MODE).

Catawba Units 1 and 2

16.8-2-1

Revision 2
ATTACHMENT 13

EVENT #5

Zone B Lockout

230 kV Switchyard Systems 16.8-2

REMEDIAL ACTIONS

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
|----|---|-----|---|--|
| A. | Switchyard equipment not in normal COMMITMENT alignment. | A.1 | Return switchyard equipment to normal COMMITMENT alignment. | In accordance with the Electronic Risk Assessment Tool |

TESTING REQUIREMENTS None

BASES Effective implementation of the Maintenance Rule, 10 CFR 50.65, requires the continuous assessment of systems determined to be risk significant in the protection against core damage or radiation release. It has been determined through probabilistic risk assessment (PRA) numerical methods that switchyard systems are risk significant from the standpoint of causing or being able to recover from Loss of Offsite Power events. This SLC serves two purposes. It defines the risk significant portions of the switchyard. It also provides a method of tracking the switchyard systems for the purposes of supporting 10 CFR 50.65. REFERENCES 1. 10 CFR 50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants. 2 Deleted 3 Deleted. 4. CNC-1535.00-00-0008. Severe Accident Analysis Report. CNS PRA Risk Significant SSCs for the Maintenance Rule. 5. CNS-010.01-EB-0001, Switchyard Design Basis Specification. 6. Technical Specification sections 3.8.1 and 3.8.2, LCOs for AC Power Sources during Operating and Shutdown MODES. 7.

 Nuclear System Directive 403, "Shutdown Risk Management (Modes 4, 5, 6, and No-Mode) per 10 CFR 50.65 (a)(4)."

Catawba Units 1 and 2

16.8-2-2

Revision 2

2019 INITIAL LICENSE NRC EXAM SCENARIO # 3

Catawba Nuclear Station NRC Exam September 2019

| Appe | Appendix D Scenario Outline Form ES-D-1 | | | | | |
|----------------------|---|--|--|--|---|--|
| | | | | | | |
| Facility: Examine | Catawb ers: | a NRC Exam 2 | 2019 | Scenario No.: 3 Operators: | Op Test No.: SRO | 2019301 |
| | | | | _ | BOP | |
| Initial Co | nditions: Un | iit 1 is at 50% po | wer at t | he EOL. Unit 2 is at 100% | power. | |
| Turnover | : Unit 1 is power. E securing (Shifting 3.1 of Er | stable at 50% po Direction for the o 1B LH pump pe Operating Hydra nolosure 4.3. | ower at crew is t er OP/1/l aulic Flu | the EOL while awaiting m o swap operating LH Pum B/6300/008 (Main Turbine id Pumps). Initial Conditio | anagement direction. hps by placing 1A LH p Hydraulic Oil System ons are complete. Cre | Unit 2 is at 100% oump in service and i), Enclosure 4.3 w is to begin at step |
| Event No. | Malf. No. | Event Type* | | De | Event escription | |
| 1 | | N – RO N – SRO | Shift C | Dperating Main Turbine Hy | ydraulic Oil (LH) Pump | DS |
| 2 | IPE003C | C – BOP C – SRO TS – SRO | PZR S | Spray Valve Fails Open / 1 | B PZR Heater Groun | d Fault |
| 3 | NC006 | TS – SRO | 1B RC | S (NC) Flow Channel 3 F | ails Low | |
| 4 | NV012F | C – BOP C – SRO | Letdov | wn Containment Isolation | Valve (1NV-15B) Fails | s Closed |
| 5 | MT012 | C – RO C – SRO | Steam | seal Regulating Valve (1 | TL-10) Fails Closed | |
| 6 | IRX009 | R – RO C – SRO | Spuric | ous Main Turbine Trip / Au | to Control Rod Failure | e |
| 7 | SM007C | M – ALL | 1B S/0 | G Fault Inside Containmer | nt | |
| 8 | SM003A | C – RO C – SRO | 1B MS | SIV (1SM-5) Auto Close Fa | ailure | |
| 9 | KC028 KC001A KC001C KC001D | C – BOP C – SRO | Opera on SI | ting CCW (KC) Pump Trip | os, all other KC Pump | s Fail to Auto Start |
| * | (N)ormal, (R)ea | ctivity, (I)nstru | ment, | (C)omponent, (M)ajor | | |

Appendix D

Scenario Outline

Form ES-D-1

<u> Scenario 3 – Summary</u>

Initial Condition

Unit 1 is at 50% power at the EOL. Unit 2 is at 100% power.

Turnover:

Unit 1 is stable at 50% power at the EOL while awaiting management direction. Unit 2 is at 100% power. Direction for the crew is to swap operating LH Pumps by placing 1A LH pump in service and securing 1B LH pump per OP/1/B/6300/008 (Main Turbine Hydraulic Oil System), Enclosure 4.3 (Shifting Operating Hydraulic Fluid Pumps). Initial Conditions are complete. Crew is to begin at step 3.1 of Enclosure 4.3.

Event 1

Main Turbine Hydraulic Oil Pump swap. The crew will start 1A LH Pump and secure 1B LH pump in accordance with OP/1/B/6300/008.

Event History: New Control Evolution.

Event 2

PZR Spray Valve (1NC-29) will fail open. On decreasing pressure all backup PZR heaters will energize. 1B PZR Heater will develop a ground fault 30 seconds after spray valve failure. The crew will refer to AP/1/A/5500/11 (Pressurizer Pressure Anomalies) to address decreasing RCS pressure or utilize OMP 1-7 guidance to place the Spray Valve in Manual and closed. TS evaluation by the SRO is required.

Verifiable Action – BOP will manually close 1NC-29.

Event History: Spray Valve failure not used on previous 2 exams {13 (3)}. Heater Ground Fault is new.

<u>Event 3</u> RCS Loop "B" flow Channel 3 will fail low. TS evaluation by the SRO is required.

Event History: Not used on previous 2 exams. Similar used {13 (3)} – Channel 2 vs. 3.

Event 4

1NV-15B (Letdown Isolation Valve) will fail closed. Crew will enter AP/1/A/5500/012 (Loss of Charging or Letdown). Crew will subsequently be informed that letdown isolation was caused by incorrect placement of a jumper (Catawba OE). Crew will re-open 1NV-15B and restore letdown.

Verifiable Action – The BOP will re-open 1NV-15B and restore letdown to service.

Event History: Not used on previous 2 exams {13 (2)}.

Event 5

1TL-10 (E Bleed Steam Seal Reg Valve) will fail closed. The Main Steam Seal Regulating Valve (1TL-3) will fail to open. This will cause Steam Seal header pressure, and subsequently Main Condenser Vacuum, to decrease. Crew will adjust 1TL-4 (Stm Seal Reg Byp) to increase steam seal pressure and recover main condenser vacuum. Crew may refer to AP/1/A/5500/023 (Loss of Condenser Vacuum) for guidance on restoring main condenser vacuum.

Verifiable Action – OATC will throttle 1TL-4 to increase steam seal pressure and recover condenser vacuum.

Event History: This exact malfunction is new. Similar malfunction requiring 1TL-4 operation not used on previous 2 exams {15 (2)} but was at low power and did not involve 1TL-10 failure.

Appendix D

Scenario Outline

Form ES-D-1

Event 6

The Main Turbine will trip on spurious actuation signal. Following the Turbine trip, Control Rods will fail to automatically insert. The crew will enter AP/1/A/5500/002 (Turbine Generator Trip), manually insert control rods, and stabilize the unit.

Verifiable Action – RO will manually insert control rods to control RCS temperature.

Event History: Not used on previous 2 exams {15 (1)} with Manual Turbine trip from >50% power. Automatic rod failure is used on Audit (3) but is combined with Loss of Load runback from a different power level.

Event 7

A Main Steam Line break will occur, from 1B S/G, inside Containment. The crew will trip the reactor and initiate Safety Injection.

Event History: Not used on previous 2 exams {14 (2)}.

Event 8

Following automatic Main Steam Isolation caused by Phase B (3.0 psig in containment) signal, 1B MSIV (1SM-5) will fail to automatically close.

Verifiable Action – RO will manually close 1SM-5.

Event History: Not used on previous 2 exams {15 (1)}.

Event 9

Following Safety Injection, the running KC pump will trip and the remaining KC pumps will fail to auto start on the Safety Injection signal. This will require the BOP to start the 3 remaining KC pumps to supply KC loads that are in service.

Verifiable Action – The BOP will reset S/I and the D/G load sequencers and start the 3 available KC pumps.

Event History: Not used on previous 2 exams {15 (1)}.

| | Manual Control of Automatic Functions | | | | | |
|-------|---------------------------------------|--|--|--|--|--|
| Event | Position | Description | | | | |
| 5 | RO | Manually control Main Turbine Steam Seal Supply via Regulating Valve Bypass (1TL-10) | | | | |

Appendix D

Scenario Outline

Form ES-D-1

<u>Critical Task 1</u> – Manually close Pzr spray valve prior to Low Pressurizer Pressure Reactor Trip at 1945 psig.

Simulator validation reveals this criteria will be met in approximately 2 minutes.

<u>Critical Task 2</u> – Restore Sealing Steam prior to Low Vacuum Main Turbine Trip. Simulator validation reveals this criteria will be met in approximately 12 minutes.

<u>Critical Task 3</u> – Manually start at least the minimum number of CCW pumps required to provide adequate component cooling for the operating safeguards train(s) before loss of any ECCS component occurs.

Simulator validation reveals 1A NV Pump will fail in approximately 15.5 minutes at a motor stator temperature of approximately 371 degrees.

| | Target Quantitative Attributes (Per Scenario; See Section D.5.d) | Actual Attributes |
|----|--|-------------------|
| 1. | Total malfunctions (5–8) | 7 |
| 2. | Malfunctions after EOP entry (1–2) | 2 |
| 3. | Abnormal events (2–4) | 5 |
| 4. | Major transients (1–2) | 1 |
| 5. | EOPs entered/requiring substantive actions (1–2) | 1 |
| 6. | EOP contingencies requiring substantive actions (0–2) | 0 |
| 7. | Critical tasks (2–3) | 3 |

EXERCISE GUIDE WORKSHEET

- 1. INITIAL CONDITIONS:
 - 1.1 Reset to IC # 169 and load schedule file for NRC Scenario 3

START TIME:_____

| ✓ | ~ | Trigger | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|----------|---|----------|---|--------------|-----------|------|--------------|-------|
| | | 1 | OVR-MT016D (HYDR FLUID PMP 1B ON PB) | ON | | | :01 | 1 |
| | | 2 | MAL-IPE003C (PZR SPRAY VLV NC-29 FAIL, MAN CTRL) | 100 | | | | 2 |
| | | 2 | MAL-IPE002B (PZR BACK-UP HEATER B FAILURE) | OFF | :30 | | | 2 |
| | | 3 | XMT-NC006 (FNC_5050 NC LOOP B FLOW MTR (FI-426)) | 0 | | | | 3 |
| | | 4 | VLV-NV012F (NV15B L/D ISOL OUTSIDE CNMT VLV FAIL TO POSITION) | 0 | | | :05 | 4 |
| | | 5 | MAL-MT012 (EXTRACTION STEAM SEAL REGULATOR FAILURE (1TL10)) | 0 | | | | 5 |
| | | | MAL-MT010 (GLAND STEAM REGULATOR FAILURE (TL3)) | 0 | | | | 5 |
| | | 6 | MAL-EHC001 (INADVERTENT TURBINE TRIP) | | | | | 6 |
| | | | MAL-IRX009 (RODS FAIL TO MOVE) | AUTO | | | | 6 |
| | | 7 | MAL-SM007B (STM LINE BRK ISIDE CONTAINMENT LOOP B) | 8.25e5 | | | | 7 |
| | | | VLV-SM003A (SM5 MSIV B FAIL AUTO ACTIONS) | ACTIVE | | | | 8 |
| | | | MAL-KC001A (KC PUMP 1A1 FAILURE) | AUTO | | | | 9 |
| | | | MAL-KC001C (KC PUMP 1B1 FAILURE) | AUTO | | | | 9 |
| | | | MAL-KC001D (KC PUMP 1B2 FAILURE) | AUTO | | | | 9 |
| | | 12 | LOA-KC028 (RACKOUT KC PMP 1A2) | RACK- OUT | | | | 9 |
| | | | ANN-AD11-B03 (TRANSFORMER A TROUBLE) | ON | | | | |
| | | | ANN-AD11-E03 (TRANSFORMER B TROUBLE) | ON | | | | |
| | | 10 | LOA-NV078 (SEAL WATER LOW FLOW LCL REFLASH ACK (AD7,C4)) | ACKN | 2:00 | | | |
| | | 13 | LOA-CNT002 (H2 ANALYZERS) | BOTH | 10:00 | | | |
| <u> </u> | | | | | | | | |
| | | Ensure T | RIGGER 12 = jppIsia jppIsib (Safety | Injection E | ither Tra | ain) | | |

| | Ensure 1B LH Pump is in service |
|--|----------------------------------|
| | Ensure 1A2 KC pump is in service |
| | |
| | |
| | |

2. SIMULATOR BRIEFING

2.1 Control Room Assignments:

| Position | Name |
|----------|------|
| CRS | |
| RO | |
| BOP | |

2.2 Give a copy of Attachment 2 (Shift Turnover Information) to the CRS.

3. EXERCISE PRESENTATION

- 3.1 Familiarization Period
 - A. Allow examinees time to familiarize themselves with the Control Board alignments.
- 3.2 Scenario EVENT 1, Shift Operating Main Turbine Hydraulic Oil (LH) Pumps

| √ | | BOOTH INSTRUCTOR ACTION |
|---|---|---|
| | WHEN AO is con | ntacted to perform local actions, REPORT the following: |
| | Step 3.1.3: | "1A LH Pump has started" "LH PUMP 1A RUNNING light is illuminated" "1LHPG5060 indicates 1700 psig" |
| | Step 3.1.6: Step 3.1.7: Step 3.1.9: | "1LHPG5070 indicates 0 psig". "1B LH Pump is completely stopped". After repeating instruction to Depress HFPM-B TEST - "1B LH Pump has started" "LH PUMP 1B RUNNING light is illuminated" "1LHPG5070 indicates 1700 psig". |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | WHEN contacted as AO to perform step 3.1.9, THEN INSERT SIMULATOR Trigger 1 to |
| | start 1B LH Pump. |
| | Report the following: LH Pump 1B has started, "LH Pump 1B Running" red light is |
| | illuminated, LH discharge pressure is 1700 psig. |

3.3 **Scenario EVENT 2**, PZR Spray Valve (1NC-29) Fails Open / 1B PZR Heater Ground Fault

| √ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 2 to cause |
| | 1NC-29 to fail open |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | IF dispatched to locally check the 1B PZR Heater breaker at 1LXH-6C, REPEAT the information. |
| | After 3 minutes, contact the crew and REPORT "1B Pressurizer Heater Breaker 1LXH-6C is tripped open". |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF dispatched to locally check the 1B PZR Heater Ground Monitor Panel 1LCCP in the |
| | Turbine Building, REPEAT the information. |
| | After 3 minutes, contact the crew and REPORT "1LCCP indicates 1B pressurizer heater |
| | bank has a ground condition". |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate an NCR for 1NC-29 and/or 1B PZR Heater, REPEAT |
| | the information. |

3.4 Scenario EVENT 3, 1B RCS (NC) Flow Channel 3 Fails Low

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 3 to cause |
| | 1B NC Flow Channel 3 to fail low. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate an NCR or W/R for 1B NC Flow Channel 3, REPEAT |
| | the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF IAE is contacted to place bistable in trip, per Model W/O #00874531, REPEAT the |
| | information. |

3.5 Scenario EVENT 4, Letdown Containment Isolation Valve (1NV-15B) Fails Closed

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 4 to cause an |
| | 1NV-15B to close. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate an NCR or W/R for 1NV-15B, REPEAT the information. |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | WHEN CREW determines that 1NV-15B is closed, THEN CALL THE CONTROL ROOM |
| | AND STATE "This is the WCC SRO. I have been informed that maintenance inadvertently |
| | installed test equipment on the wrong jumper in the cabinet that affects the letdown |
| | valves. The Unit Supervisor has verified that the test equipment has been removed. |
| | Letdown may be restored." |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | IF contacted as an AO to acknowledge seal water low flow alarm on reflash panel 1, |
| | REPEAT the information and INSERT Trigger 10. |
| | After 2 minutes, contact the crew and REPORT "Seal Water Low Flow alarm has been |
| | acknowledged". |

3.6 **Scenario EVENT 5**, Steam Seal Regulating Valve (1TL-10) Fails Closed

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 5 to cause |
| | 1TL-10 to fail closed. |

BOOTH INSTRUCTOR ACTION

IF contacted to consult with Station Management to determine if actual low condenser vacuum condition exists, **REPORT** "No environmental conditions exist which would result in improper condenser vacuum indications. Station Management directs the crew to continue with required procedural actions."

| ~ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF the SWM is contacted to initiate an NCR or W/R for 1TL-10 and/or 1TL-3, REPEAT the |
| | information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF contacted as AO to investigate 1TL-10 and/or 1TL-3 or to check for steam seal relief |
| | valve issues, REPEAT the information. |
| | After 10 minutes, contact the control room and REPORT no issues noted. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF dispatched to start the Main Vacuum Pumps per Enclosure 4, REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF dispatched to perform Enclosures 2 and/or 3, REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF Engineering is contacted to evaluate, REPEAT the information. |

3.7 Scenario EVENT 6, Spurious Main Turbine Trip / Auto Control Rod Failure

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 6 to cause a |
| | spurious trip of the Main Turbine. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF the SWM is contacted to initiate an NCR or W/R for Main Turbine Trip, REPEAT the |
| | information. |

1

| ~ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate an NCR or W/R for Control Rod Auto failure, REPEAT |
| | the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF dispatched to Transformers 1A and 1B to secure every other cooling bank of oil pumps |
| | and fans, REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF dispatched to perform AP/02 Enclosure 3 (Verification of Bleed Steam Piston Assisted |
| | Check Valves). REPEAT the information. |

3.8 **Scenario EVENTS 7, 8, 9**, 1B S/G Fault Inside Containment / 1B MSIV (1SM-5) Auto Close Failure / CCW (KC) Pump Trips, all other KC Pumps Fail to Auto Start on SI

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF AO is dispatched to place the containment H ₂ Analyzers in service per |
| | OP/1/A/6450/010, REPEAT the information and INSERT Trigger 13 . |
| | After 10 minutes contact the crew and REPORT "Ice Condenser Air Handling Units have |
| | been secured per G-1 Enclosure 11, and the H ₂ Analyzers have been placed in service |
| | per OP/1/A/6450/010". |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF contacted as Radiation Protection to frisk all Unit 1 S/G cation columns for activity, |
| | REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF contacted as Secondary Chemistry to sample all Unit 1 S/Gs for activity, REPEAT the |
| | information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF contacted as an AO to secure both D/Gs and place them in standby readiness per the |
| | OP, REPEAT the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF dispatched to unlock and close 1SA-1, REPEAT the information. |

| ppendix D | | | Requ | uired | Operator . | Actions | | | Forr | n ES-D-2 | 2 |
|-----------------|--------|-------------------------|------------------------------|-----------------|----------------------------------|-------------------------|----------------------------|-----------------------|------------------------------|-------------------|----------|
| o Test No.: | 301 | Scena | ario # | 3 | Event # | | 1 | Page | 13 | of | 147 |
| ent Description | : | Main Tu | Irbine Hydra | aulic (| Oil Pump (LH | l) Swap | | | | | |
| | | | Shif | ting O | Enclosus Operating Hyd | re 4.3 Iraulic Fl | uid Pumps | I | OP/ 1 /B/ Page 2 o | /6300/008 of 3 | |
| 3. | Proc | edure | | | | | | | | | |
| | 3.1 | IF swite followin | hing to Hyd g: | raulic | Fluid Pump 1 | A running | y with 1B in | standby, | perform | n the | |
| | | 3.1.1 | Depress ti | he "Ol | N" pushbutton | for "Hydi | r Fluid Pum | p 1A" (11 | MC1). | | |
| | | 3.1.2 | Depress the | he aut | o release "OFI | F" pushbut | tton for "Hy | dr Fluid | Pump 17 | A" (1MC1) | |
| | | 3.1.3 | At the por | wer ur | nit, verify the f | following | occurs: | | | | |
| | | | Hydra | ulic F | luid Pump 1A | starts. | ht illuminet | ar | | | |
| | | | | arge p | ressure increa | ses to 155 | 0-1750 psig | cs. on 1LH | PG5060 | (Main Tur | 0 |
| | | | Hyd C | Dil Pur | np A Disch Pi | ress)(on L | H Pump A | manifold | at TB-5 | 68, 1H-32) |). |
| | | - 3.1.4 | Allow Hy | drauli | c Fluid Pump | 1A to run | for at least | 30 secon | <mark>ds.</mark> | | |
| | | 3.1.5 | Stop "Hyd | ir Flui | id Pump 1B" (| 1MC1). | | | | | |
| | | 3.1.6 | Verify 1L (on LH P | HPG5 ump B | 5070 (Main Tu 8 manifold at T | ub Hyd O B-568, 11 | il Pump B I H-31) | Disch Pre | ss) indic | ates zero. | |
| | | 3.1.7 | Verify Hy | drauli | ic Fluid Pump | 1B is con | pletely stop | pped. | | | |
| | | 3.1.8 | Place "Hy | dr Flu | ud Pump 1B" | in "AUTC | 0" (1MC1) | | | | |
| | | 3.1.9 | At the por | wer ur | uit: | | | | | | |
| | | | 3.1.9.1 | De | press "HFPM | - B TEST | " pushbutto | n | | | |
| | | | 3.1.9.2 | | Hydraulic Flu | ing occur iid Pumo | s: 1B starts. | | | | |
| | | | | | LH PUMP 1 | B RUNN | ING" red li | ght illumi | inates. | | |
| | | | | | Discharge pro | essure inci 70 (Main | reases to 15 Turb Hvd (| 50-1750 j Dil Pump | psig B Disch | Press) | |
| | | . 3.1.10 | Allow Hy | drauli | c Fluid Pump | 1B to run | for at least | 30 secon | ds. | | |
| | | 3.1.11 | Stop "Hyd | ir Flui | id Pump 1B" (| 1MC1). | | | | | |
| | | 3.1.12 | Ensure the | at "Hy | dr Fluid Pum | o 1B" is in | AUTO" (| 1MC1). | | | |
| NO | TE: | At this po service p | oint, Hydrau er Enclosure | lic Fh 4.1 (| uid Pump 1B i Startup). | s in standl | by and Hyd | raulic Flu | id Pump | 1A is in | |
| Note to | o Evel | untor | | | | | | | | | |
| Note to | Eval | uator: | | | | | | | | | |
| This co | omple | tes Even | t 1. At Lea | d Eva | aluator disc | PZR Sp | e scenari rav Valve | o may c Failure / | ontinue | e by R Heater | |
| Groun | d Fau | lt). | perator to | | | | aj talte | | | euter | |

| Appendix D | | Ree | Form ES-D-2 | | | | | | |
|-------------------|-----|----------------------|-------------|--------------------|-------------------|----------|------|----|-----|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 2 | Page | 14 | of | 147 |
| Event Description | : | – PZR Spray Valve | (1NC-2 | - 29) Fails Ope | n / 1B PZR Heater | Ground F | ault | | |
| | | | | | | | | | |

Control Room Indications

1AD-6, F/8 "PZR LO PRESS CONTROL" - LIT

OAC Alarm "NORMAL PZR SPRAY FLOW ACTIVATED"

Decreasing Pressurizer Pressure

Following Heater Trip

1AD-6, A/11 "PZR HTR PROTECTIVE TRIP" - LIT

1AD-6, B/11 "PZR HTR GROUND FAULT" - LIT

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | | |
|--------------------|-----|---------------------------|--------|---------------|------------------|------------|-------------|----|-----|--|--|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 2 | Page | 15 | of | 147 | | |
| Event Description: | : | – PZR Spray Valve | (1NC-2 | 29) Fails Ope | n / 1B PZR Heate | r Ground F | ault | | | | |
| | | | | - | | | | | | | |

| CNS AP/1/A/5500/011 | PRESSURIZE | R PRESSURE Case I cer Pressure De | ANOMALIES | PAGE NO. 2 of 9 Revision 23 |
|----------------------------|----------------|--|--|--|
| ACTION/EXP | ECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| C. Operator Actions | | | | |
| C. <u>Operator Actions</u> | ORVs - CLOSED, | Perf a. (C b. <u> </u> 1 1 1 | orm the following: CLOSE Pzr PORV(s). E any Pzr PORV cannot be HEN:) CLOSE affected PORV(svalve.) IE Pzr PORV isolation va be closed, THEN perform following: a) IF in Mode 3 with CL <u>OR</u> in Mode 4, THEN AP/1/A/5500/027 (SH LOCA). b) Trip Unit 1 reactor. c) WHEN reactor trippe setpoint reached, TH S/I initiated. d) GO IO EP/1/A/5000 (Reactor Trip or Safe Injection). | closed, s) isolation alve cannot n the As isolated <u>I GO TO</u> butdown d <u>OR</u> S/I <u>EN</u> ensure /E-0 ty |

| Apper | ndix D | Required Opera | ator Actions | Fo | Form ES-D-2 | | | |
|---------|-------------------------|--------------------------|---|---|---|-----|--|--|
| Op Test | t No.: <u>301</u> Scena | rio # <u>3</u> Event | # <u>2</u> | Page 16 | 6 of | 147 | | |
| Event D | Description: PZR Spr | ay Valve (1NC-29) Fails | Open / 1B PZR Heat | er Ground Fault | | | | |
| | | | | | | | | |
| | CNS AP/1/A/5500/011 | PRESSURIZ | RIZER PRESSURE ANOMALIES Case I surizer Pressure Decreasing | | | | | |
| L | ACTION/E | (PECTED RESPONSE | RES | PONSE NOT OBT | AINED | | | |
| | <u>NOTE</u> Control ro | ds may withdraw on decre | easing NC pressure. | following | | | | |
| | 2. veniyi zi spi | | a. CLOSE | affected sprav va | alve(s). | | | |
| | CRITICAL TA | ASK #1 | A. OLOGI N/A b. IE affect THEN p 1) Sele sprat - "1 M - "1 M 2) IE A Supe trip r - a) T - b) Y | ed spray valve(s) erform the following ct "FAIL CLOSEI y valve(s) mode set NC-27 PZR SPF ODE SELECT" NC-29 PZR SPF ODE SELECT". <u>I ANY TIME</u> Correction equired, <u>THEN</u> : "rip Unit 1 reactor WHEN reactor po "%, <u>THEN</u> stop N and 1B. |) will not close, ing: D" for affected select switch: RAY VLV RAY VLV htrol Room s that reactor r. wer less than C Pumps 1A | | | |
| | | | c) ((3) <u>IE Ni</u> incre (RNO contir | <u>50 TO</u> EP/1/A/50 Reactor Trip or S njection). C pressure stable asing, <u>THEN</u> <u>GO</u> nued on next pag | 00/E-0 safety <u>9 TO</u> Step 3. e) | | | |

| Appendix D | | Ree | Form ES-D-2 | | | | | | |
|-------------------|-----|-----------------|-------------|---------------------|----------------|-------------|------|----|-----|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 2 | Page | 17 | of | 147 |
| Event Description | : | PZR Spray Valve | (1NC-2 | - 29) Fails Oper | / 1B PZR Heate | er Ground F | ault | | |
| | | | | | | | | | |

| AP/1 | CNS /A/5500/011 | PRESSURIZE | R PRESS Case I er Pressur | JRE ANOMALIES e Decreasing | PAGE NO. 4 of 9 Revision 23 |
|------|--------------------|---------------------|---------------------------------|---|-----------------------------------|
| | ACTION/EX | PECTED RESPONSE | [| RESPONSE NOT OBTAIN | IED |
| 2 | . (Continued) | | | | |
| | | | | IF NC pressure continue decrease, <u>THEN</u>: | s to |
| | | | | a) <u>IF</u> in Modes 1 or 2, <u>T</u> | HEN: |
| | | | | (1) Trip Unit 1 read | tor. |
| | | | | (2) <u>WHEN</u> reactor than 5%, <u>THEN</u> Pumps 1A and | oower less stop NC 1B. |
| | | | | (3) <u>GO TO</u> EP/1/A/ (Reactor Trip or Injection). | 5000/E-0 Safety |
| | | | | b) Stop NC Pumps 1A a | and 1B. |
| | | | | c) <u>IF</u> 1C and 1D NCPs stop one additional N | on, <u>THEN</u> ICP. |
| | | | | d) <u>REFER TO</u> AP/1/A/5 (Loss of Reactor Coo Pump). | 500/004 blant |
| 3. | Verify all Pzr h | eaters - ENERGIZED. | I | Perform the following: | |
| | | > | ► <mark>N/A</mark> a | <u>IF</u> Pzr pressure less than 22 <u>AND</u> stable or decreasing, <u>1</u> ensure all Pzr heaters energy | 20 PSIG T <u>HEN</u> jized. |
| | | | t | IF Pzr pressure less than 22 <u>AND</u> increasing, <u>THEN</u> open heaters as required to stabil pressure at 2235 PSIG. | 20 PSIG rate Pzr ize Pzr |
| | | | (| WHEN Pzr pressure returns AND automatic Pzr pressure desired, <u>THEN</u> place Pzr he auto. | to normal control aters in |
| | | | | | |
| | | | | | |

| Appendix D | Required Operate | or Actions | Form | ES-D-2 |
|--|--|--|---|-----------------------------|
| Dp Test No.: <u>301</u> Scenar | io # <u>3</u> Event # | 2 | Page <u>18</u> | of <u>147</u> |
| Event Description: PZR Spra | ay Valve (1NC-29) Fails (| Open / 1B PZR Heater | Ground Fault | |
| | | | | |
| CNS | PRESSURIZE | R PRESSURE ANOMA | LIES | PAGE NO. |
| AP/1/A/5500/011 | Pressuriz | Case I er Pressure Decreasing | | 5 of 9 Revision 23 |
| ACTION/EX | PECTED RESPONSE | RESP | ONSE NOT OBTAIN | ED |
| 4. (Ensure 1NV-3) | 7A (NV Supply To Pzr Au | ¢ | | |
| Spray) - CLOS | ED. | | | |
| NOTE Positive re | activity is inserted during a | n increase in NC press | ure which may caus | se |
| auto rod ir | | | | |
| 5. Verify NC pres INCREASING. | sure - STABLE OR | <u> </u> | ontinues to decre P/1/A/5500/010 (R EAK). | ease, <u>THEN</u> EACTOR |
| | | | | |
| 6. <u>WHEN</u> NC pre | ssure stable, <u>THEN</u> : | | | |
| • Stabilize unit | at appropriate power level |) | | |
| Adjust the fo maintain T-A | llowing as required to vg within 1°F of T-Ref: | | | |
| | ad) ds controtion | | | |
| | | | | |
| N/A /. IF Pzr pressur perform follow | e channel failed, <u>IHEN</u> ⁄ing: | | | |
| a. Verify "P-11 PERMISSIV required sta | PZR S/I BLOCK /E" status light (1SI-18) in te for unit conditions. | a. Ensure co 3.3.2 (Eng Actuation Instrumen | mpliance with Tech jineered Safety Fea System (ESFAS) tation). | n Spec atures |
| b. Notify IAE t affected ch #00874531 within 72 ho | o fail following bistables for annel per Model W/O . Bistables shall be tripped ours: | | | |
| Pzr low p OT Delta Pzr high Pzr low p | ressure S/I T pressure Reactor Trip ressure Reactor Trip. | | | |
| | | | | |
| | | | | |

| Appendix D | Required Operato | or Actions | Form | n ES-D-2 |
|--|---|---|--|---|
| Op Test No.: <u>301</u> Scenar | rio # <u>3</u> Event # | 2 | Page <u>19</u> | of <u>147</u> |
| Event Description: PZR Spra | ay Valve (1NC-29) Fails C |)pen / 1B PZR Heater G | Found Fault | |
| CNS | PRESSI IRIZEI | | FS | PAGE NO. |
| AP/1/A/5500/011 | Pressurize | Case I er Pressure Decreasing | | 6 of 9 Revision 23 |
| ACTION/EX | PECTED RESPONSE | RESPON | ISE NOT OBTAIN | ED |
| 8. Ensure compliated specs: 3.3.1 (Reactored instrumentated instrumentated) 3.3.2 (Engine Actuation Sylenstrumentated) 3.3.2 (Engine Actuation Sylenstrumentated) 3.3.3 (Post A Instrumentated) 3.3.4 (Record) 3.4.1 (RCS F Flow Departing) 3.4.4 (RCS Legend) 3.4.5 (RCS Legend) 3.4.6 (RCS Legend) 3.4.6 (RCS Legend) 3.4.10 (Pressing) 3.4.11 (Pressing) 3.4.13 (RCS Legend) 9. Determine Ion RETURN TO pressing) | iance with appropriate or Trip System (RTS) ion) eered Safety Features stem (ESFAS) ion) Accident Monitoring (PAM) ion) te Shutdown System) Pressure, Temperature, and ure From Nucleate Boiling Pressure, Temperature, and ure From Nucleate Boiling (PAM) to Ops - MODE 3 acops - MODE 3 acops - MODE 3 acops - MODE 4 acrizer) surizer Safety Valves) surizer Power Operated (PORVs)) Operational Leakage). g term plant status, rocedure in effect. | TECH SPEC EVALU/ See Attachment 13 f T.S. 3.4.1 Condition A: (Restor within limits in 2 hou NOTE: This LCO may RCS pressure. OAC DNB limit) will notify condition. Condition cleared prior to Tech T.S. 3.4.9 Condition B: (Restor heaters to OPERABL | ATION or applicable re DNB parame urs) y apply depen alarm (PZR Lo r operators of t will mostly lik n Spec review. re required gro LE withing 72 f | Tech Specs. eter to ding on ow Press this kely be oup of PZR hours). |
| | I | END | | |
| <u>Note to Evaluator:</u> This completes Event directing the booth op | 2. At Lead Evaluator di perator to insert Trigger | scretion, the scenario 3 (1B RCS Flow Chan |) may continu∉ nnel 3 Failure). | e by |

| Appendix D | | Re | Operator A | Form ES-D-2 | | | | | |
|-------------------|-----|----------------------|------------|----------------|---|------|----|----|-----|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 3 | Page | 20 | of | 147 |
| Event Description | : | - 1B RCS (NC) Flo | w Chan | nel 3 Fails Lo | w | | | | |
| | | . , | | | | | | | |

| Control Room Indications |
|---|
| 1AD-6, A/2 "LOOP B LO FLOW ALERT" - LIT |
| 1AD-2, F/10 "DCS TROUBLE" - LIT |
| 1B Loop RCS Flow indicates 0% |

| endix D | Required | | Form ES-D-2 | | | | |
|--|---|--|---|---|---|-------------------------------|-----|
| est No.: <u>301</u> Scenario | 0# <u>3</u> | Event # | 3 | Page | 21 | of | 147 |
| Description: 1B RCS (N | IC) Flow Chan | nel 3 Fails Lo | N | | | | |
| | | PANEL: 1 | AD-6 | OP/ 1 Page | /B/610 4 of 94 | 0/010 G | |
| LOOP B LO FLOV | W ALERT | | | | | A/2 | |
| SETPOINT: | 1/3 loop flow | <u><</u> 90% of full 1 | oad flow | | | | |
| ORIGIN: | 1. 1NCFT5 2. 1NCFT5 3. 1NCFT5 | 030 (NC Flow 040 (NC Flow 050 (NC Flow | Loop B Ch. 1) Loop B Ch. 2) Loop B Ch. 3) | | | | |
| NOTE: All three of impulse line | the flow transm would cause all | itters share a co l three transmit | ommon HP impuls ters to simultaneou | e line. A fa usly read m | ailure o inimun | f the HP n flow. | |
| PROBABLE CAUSE: | Testing Channel Reactor of Reactor of | <mark>failure</mark> coolant leak coolant pump n | alfunction or loss | of reactor of | coolant | pump | |
| AUTOMATIC ACTIONS: | None | | | | | | |
| NOTE: When \geq P-8 | , Rx will trip on | 2/3 lo flow on | any loop. | | | | |
| IMMEDIATE ACTIONS: | Verify ch Verify reconstruction Coolant I Verify reconstruction Werify reconstruction (Malfunction <u>IF</u> annum of Reactor | annel malfunct actor coolant le Leak). actor coolant p tion of Reactor ciator is due to or Coolant Pum | ion by checking o ak by use of AP/1 ump malfunction b Coolant Pump). NC Pump Trip, g p). | ther flow cl /A/5500/01 by use of Al o to AP/1/A | hannels 0 (Rea P/1/A/5 A/5500/ | ctor 5500/008 004 (Loss | |
| SUPPLEMENTARY ACTIONS: | IF a channel f 1. Refer to 2. Issue Mo 3. Initiate a | failure has occu IS Table 3.3.1 del W/O #0087 work request to | rred, perform the 1 for required nun '4531 to have IAE o have the channel | following: nber of char trip the bis repaired. | nnels. table. | | |
| REFERENCES: | 1. CNEE-01 | 174-01.15 | | | | | |
| TECH SPEC EVALUATION See Attachment 13 for a T.S. 3.3.1 <u>Condition M</u> : (Place cha | <u>pplicable</u> Tec nnel in trip wi | h Specs. | | | | | |
| Note to Evaluator: | | | | | | | 5 |
| This completes Event 3. | At Lead Evalu | uator discret | on, the scenari | o may coi | ntinue | by | |

| Op Test No.: <u>301</u> Scenario # <u>3</u> Event # <u>4</u> Page <u>22</u> of | ·2 | | | | |
|--|-----|--|--|--|--|
| | 147 | | | | |
| Event Description: Letdown Containment Isolation Valve (1NV-15B) Fails Closed | | | | | |

Control Room Indications

OAC Alarm "NV LETDOWN FLOW – LO LO"

Letdown Flow Indication – 0 gpm

| CNS AP/1/A/5500/012 | LOSS OF C | ARGING OR LETDOWN Case II oss of Letdown | PAGE NO. 15 of 32 Revision 35 |
|---|--|---|---|
| ACTION/E | KPECTED RESPONSE | RESPONSE N | OT OBTAINED |
| 1. Stop any power 2. Ensure the for values - CLOS 1NV-10A (Language) 1NV-11A (Language) 1NV-13A (Language) 3. Verify Pzr level | er changes. Ilowing letdown isolatio SED: etdn Orif 1B Ottt Cont Isol etdn Orif 1C Ottt Cont Isol etdn Orif 1A Ottt Cont Isol | n Perform the follow a. <u>IF</u> Pzr level less leak, <u>THEN GC</u> (Reactor Coola b. Maintain chargi 180 GPM. c. Raise charging level greater th d. Do not continue Pzr level greate | wing: s than 17% due to NC <u>2 TO</u> AP/1/A/5500/010 int Leak). ing flow less than flow to restore Pzr an 17%. e in this procedure until er than 17%. |
| 4. Control charg at program le seal injection | ing to stabilize Pzr leve vel while maintaining flow, | | |
| 5. Ensure "PZR | HTR GROUP 1C" - ON. | | |

| Op Test No.: 301 Scenario # 3 Event # 4 Page 24 of Event Description: Letdown Containment Isolation Valve (1NV-15B) Fails Closed | 147 |
|---|--------------------|
| Event Description: Letdown Containment Isolation Valve (1NV-15B) Fails Closed | |
| | |
| | |
| CNS AP/1/A/5500/012 Loss of Letdown Loss of Letdown | NO. 32 on 35 |
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | |
| 6. Control VCT level as follows: a. Verify NC System makeup - SET FOR DESIRED BORON CONCENTRATION. a. Adjust NC System makeup contro for desired boron concentration. | bls |
| b. Verify "NC MAKEUP MODE SELECT" b. Makeup to VCT as required to maintain VCT level greater than 2 <u>REFER TO</u> OP/1/A/6150/009 (Bo Concentration Control). | 23%. bron |
| 7. Determine and correct cause of loss of letdown. | |
| 8. IF AT ANY TIME excess letdown required, <u>THEN</u> establish excess letdown. <u>REFER TO</u> OP/1/A/6200/001 (Chemical and Volume Control System). | |
| 9. Verify proper VC/YC System operation. REFER TO EP/1/A/5000/G-1 (Generic | |
| Enclosures), Enclosure 16 (Control Room Ventilation Verification). | t 4. |
| | |

| Appendix D Required Operator Actions Form E | | | | | | n ES-D-2 | | |
|---|---------------|-------------------------------------|-------------------------------|------|----|-------------------------------------|--|--|
| Op Test No.: 30 |)1 Scenario # | 3 Event # | 4 | Page | 25 | of <u>147</u> | | |
| Event Description: Letdown Containment Isolation Valve (1NV-15B) Fails Closed | | | | | | | | |
| | | | | | | | | |
| CNS AP/1/A/550 | 00/012 | LOSS OF CHARGIN Cas Loss of L | NG OR LETDO e II etdown | WN | | PAGE NO. 17 of 32 Revision 35 | | |

| | ACTION/EXPECTED RESPONSE | | RESPONSE | NOT OBTAINED | |
|-----|--|----|----------------|--------------|--|
| 10. | Ensure compliance with appropriate Tech Specs: | | | | |
| _ | 3.3.1 (Reactor Trip System (RTS) Instrumentation) | | | | |
| _ | 3.3.3 (Post Accident Monitoring (PAN Instrumentation) | 1) | | | |
| | • 3.3.4 (Remote Shutdown System) | | | | |
| _ | 3.4.1 (RCS Pressure, Temperature, and Flow Departure From Nucleate Boiling (DNB) Limits) | | | | |
| | 3.4.12 (Low Temperature Overpressure Protection (LTOP) System) | | | | |
| | • 3.4.13 RCS (Operational Leakage) | | | | |
| | • 3.6.3 (Containment Isolation Valves). | | | | |
| 11. | Verify at least one of the following valves - CLOSED: | >- | GO TO Step 16. | | |
| | 1NV-1A (NC Letdn To Regen Hx Isol |) | | | |
| | OR | | | | |
| | 1NV-2A (NC Letdn To Regen Hx Isol |). | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Appendix D | Require | ed Operator Ac | tions | Fo | rm ES-D-2 | 2 |
|--------------------------------------|--|---|---|--|--|---------------|
| Op Test No.: 30 | 1 Scenario # <u>3</u> | Event # | 4 | Page <u>26</u> | of | 147 |
| Event Description: | Letdown Containment | Isolation Valve (1 | NV-15B) Fails C | losed | | |
| CNS AP/1/A/550 12. Veri Con | 0/012 ACTION/EXPECTED RESPO fy the following Letdn o t Isol valves - CLOSED | OSS OF CHARGIN Case Loss of L ISE | IG OR LETDOWN e II etdown RESPO Perform the a. CLOSE a | N NSE NOT OBTAI following: | PAGE NO 18 of 32 Revision NED |). 35] |
| | IV-10A (Letdn Orif 1B O IV-11A (Letdn Orif 1C O IV-13A (Letdn Orif 1A O | t Cont Isol) t Cont Isol) t Cont Isol). | a. CLOSE a b. Establish <u>TO</u> OP/1/ Volume C | ffected valve(s excess letdow A/6200/001 (C control System arging is maint n 32 GPM to e arging line dow V-309 (Seal W w) is pressuriz harging flow main an 32 GPM du surization. operator(s) to tdown line. RE e 1 (Pressuriza etdown Line). tep 15. | i). n. <u>REFER</u> themical and themical and themical and and sure nstream of ater Injection ed. aintained iring letdowr pressurize <u>FER TO</u> tion Of | |

| Appendix D | Required Opera | ator Actions | For | m ES-D-2 |
|---|---|---|--|---|
| Op Test No.: <u>301</u> Scen | ario # <u>3</u> Event | #4 | Page27 | of <u>147</u> |
| Event Description: Letdow | n Containment Isolation \ | /alve (1NV-15B) Fails | Closed | |
| | | | | |
| CNS AP/1/A/5500/012 | LOSS OF C | HARGING OR LETDOV Case II .oss of Letdown | VN | PAGE NO. 19 of 32 Revision 35 |
| ACTION/E | (PECTED RESPONSE | RESP | ONSE NOT OBTAIN | VED |
| NOTE • If eithe orifice line wil • If all va orifice 13. Verify all the f CLOSED BY A • 1NV-1A (NC • 1NV-2A (NC • 1NV-10A (Le • 1NV-13A (Le | r NC loop letdown valve isolation valves (1NV-10, I require local repressuria ilves closed from automa valves reached the close collowing valves - AUTOMATIC SIGNAL(s) Letdn To Regen Hx Isol Letdn To Regen Hx Isol Letdn Orif 1B Ottl Cont Iso etdn Orif 1C Ottl Cont Iso etdn Orif 1A Ottl Cont Iso | (1NV-1A or 1NV-2A) (A, 1NV-1A or 1NV-2A) (A, 1NV-1A and 1NV-zation. atic signal(s), it can be ed position first. Perform the either N is it can be ed position first. Perform the either N is it can be ed position first. Perform the either N is it can be ed position first. Perform the either N is it can be ed position first. Perform the either N is it can be ed position first. Perform the either N is it can be ed position first. Perform the either N is it can be ed position first. Perform the either N is it can be ed position first. Perform the either N is it can be ed position first. Nown to either N is it can be ed position first. Norte C it can be edded by | closed before all 13A), the letdown assumed the ie following: ifice isolation valv o have been clos IC loop letdown v <u>30 T0</u> Step 16. in excess letdown 1/A/6200/001 (Ch Control System). charging is mainta an 32 GPM to er harging line down NV-309 (Seal Wa low) is pressurize charging flow ma than 32 GPM dur ssurization. h operator(s) to p letdown line. <u>RE</u> I etdown l ine) | n ves are ed prior to alve closing, n. <u>REFER</u> nemical and ained greater nsure istream of ater Injection ed. iintained ring letdown pressurize the <u>FER TO</u> ion Of |
| | | e. <u>GO TO</u> | Step 15. | |
| 14. <u>GO TO</u> Step 1 | 6. | | | |

| Appendix D | Required Operato | r Actions Fo | orm ES-D-2 |
|---|---|---|---|
| Op Test No.: <u>301</u> | Scenario # <u>3</u> Event # | 4 Page _28 | 3 of 147 |
| Event Description: Lo | etdown Containment Isolation Val | ve (1NV-15B) Fails Closed | |
| CNS AP/1/A/5500/012 | LOSS OF CHA | RGING OR LETDOWN Case II s of Letdown | PAGE NO. 20 of 32 Revision 35 |
| ACT | ION/EXPECTED RESPONSE | RESPONSE NOT OBTA | INED |
| 15. Do not c one of th | ontinue in this procedure until the following met: d by dispatched operator that in line pressurized Management authorizes normal in restoration. h letdown as follows: ability to establish normal wn - RESTORED. Lator: I receive a phone call from the that the loss of letdown was properly placed jumper. The been removed and letdown ored. the following values _ OREN: | a. Perform the following: 1) Establish excess let <u>TO</u> OP/1/A/6200/00 and Volume Control 2) Do not continue in the until ability to estable letdown restored. | down. <u>REFER</u> 11 (Chemical 1 System). his procedure ish normal |
| c. Verify • 1N Iso • 1N Iso | The following valves - OPEN: /-1A (NC Letdn To Regen Hx) /-2A (NC Letdn To Regen Hx). | c. Perform the following: 1) OPEN affected valve 2) IF affected valve(s) <u>THEN</u> perform the f a) Establish excess <u>REFER TO</u> OP/ (Chemical and V System). b) <u>WHEN</u> normal le restored, <u>THEN</u> Step 11. c) <u>GO TO</u> Step 17. | e(s). will not open, ollowing: s letdown. 1/A/6200/001 /olume Control etdown can be <u>RETURN TO</u> |



| Арре | endix D | | Red | quired | Operat | or Acti | ons | | For | m ES-[| D-2 |
|--------|---|------------------|-----------|---------|---------------------------|---------------------------------|------------------------|--------------------------|---------|--------------------------|--------------------|
| Op Tes | est No.: <u>301</u> Scenario # <u>3</u> Event # <u>4</u> Paç | | | | | | Page | 30 | of | 147 | |
| Event | Event Description: Letdown Containment Isolation Valve (1NV-15B) Fails Closed | | | | | | | | | | |
| | | | | | | | | | | | |
| | CNS LOSS OF C | | | | SS OF CH | IARGING Case I oss of Let | OR LETDOV I down | VN | | PAGE 22 of Revisio | NO. 32 on 35 |
| | | ACTION/EX | PECTED R | ESPONSI | E | | RESP | ONSE NOT | OBTAIN | ED | |
| | 16 | 6. (Continued) | | | | | | | | | |
| | _ | i. Verify letdow | wn flow a | | i. Perform the following: | | | | | | |
| | | pressure - r | | | JF. | | 1) CLO | SE the foll | owing | valves: | |
| | | | | | | | — • 1N Ct | IV-849 (Le rl) | tdn Flo | w Var C | Drif |
| | | | | | | | —• 1N Co | IV-10A (Le ont Isol). | tdn Or | if 1B Otl | t |

- 2) Establish excess letdown. <u>REFER</u> <u>TO</u> OP/1/A/6200/001 (Chemical and Volume Control System).
- 3) <u>WHEN</u> normal letdown can be restored, <u>THEN</u> <u>RETURN TO</u> Step 11.
- _____ 4) GO TO Step 17.
- j. Adjust 1NV-148 (Letdn Press Control) to maintain letdown pressure between 150 - 200 PSIG.



| Appendix D | Required Operator A | ctions | | Form ES-I | D-2 |
|---|---|---|---|---|-----------------|
| p Test No.: <u>301</u> Scena | ario # <u>3</u> Event # | 4 | Page | 32 of | 147 |
| vent Description: Letdowr | n Containment Isolation Valve (| 1NV-15B) Fails (| Closed | | |
| | | | | | |
| CNS | LOSS OF CHARG | NG OR LETDOW | 'N | PAGE | NO. |
| AP/1/A/5500/012 | Ca: Loss of | e II Letdown | | 24 of Revisi | 32 on 35 |
| ACTION/EX | PECTED RESPONSE | RESPO | ONSE NOT O | BTAINED | \neg |
| 18. Verify excess | letdown - ISOLATED. | <u>WHEN</u> norm secure exc OP/1/A/620 Volume Co | nal letdow ess letdow 0/001 (Che ntrol Syste | /n restored, <u>T</u> vn. <u>REFER T</u> emical and em). | <u>HEN</u> O |
| 19. Determine Ion <u>RETURN TO</u> p | g term plant status. rocedure in effect. <u>END</u> | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| Note to Evaluator: | 4. At Lead Evaluator discreti | on the scenario | o may con | itinue by | |

| Appendix D | Re | quired Operator Act | | Form ES-I | D-2 | |
|-------------------|---|---------------------|---|-----------|--------------|-----|
| Op Test No.: | 301 Scenario # | 3 Event # | 5 | Page | <u>33</u> of | 147 |
| Event Description | Event Description: Steam Seal Reg Valve (1TL-10) Fails Closed | | | | | |

Control Room Indications

OAC Alarm for Turbine Steam Seal Header Pressure Low

1TLP5000 decreases to 0 psig

Main Condenser Vacuum begins to decrease

Note To Evaluator:

The crew may elect to throttle open 1TL-4 (Stm Seal Reg Byp) to restore steam seal header pressure per the OAC alarm response procedure or AP/1/A/5500/023.

Once steam seal header pressure is restored, and at Lead Evaluator discretion, the scenario may continue by directing the booth operator to insert Trigger 6 (Spurious Main Turbine Trip / Auto Control Rod Failure).

| Alarm Response | | | | | _ _ X |
|-----------------------------------|-------------------------|--------------|--------------------|-------------|--------------|
| Main Alarms Graphics Trends Point | tList Zoom Print Help | _ | | 21-JAN-201 | 9 07.23.04 |
| CURRENT FUNCTION: A | | _ | | 1.47 A 1.47 | B SPDS |
| C1A0983 TURB | INF STM SFAL HEADER PRI | FSS | 5.0 | PSIG | GOOD |
| MODE | LO-LO | LO | HI | HI-HI | acce |
| MODE 1 | N/A | 1.5 | 9.0 | N/A | PAGE |
| | | | | | 1 of 1 |
| | AUTOMATIC A | CTIONS | | | |
| NONE | | | | | |
| | RESPONS | SE | | | |
| LO - 1. ENSURE BACKU | JP SOURCE (AS OR SM) IS | S ALIGNED. | | | |
| 2. CHECK FOR S | TUCK OPEN RELIEF VALVE | | | | |
| HI - VERIFY POSITION | N OF 1TL-003 (STM SEAL | REG) AND 1TL | -004 (STM SEAL REG | BYP). | |
| | SETPOINT E | BASIS | | | |
| ADEQUATE STEAM SUPPL | LY TO STEAM SEALS | | | | |
| | DESCRIP | TION | | | |
| NONE | | | | | |
| | REFERENC | CES | | | |
| OP/1/B/6300/05, CN | -1608-1.0 | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| PREV CANC F1= | ANONYMOUS SEC LVI - 1 | | F4= | F5= FI | 6= |

| Appendix D | Required Opera | ator Actions Form ES-D-2 | | |
|---|--|--|--|--|
| Op Test No.: <u>301</u> | _ Scenario # Event | # <u>5</u> Page <u>34</u> of <u>147</u> | | |
| Event Description: Steam Seal Reg Valve (11L-10) Fails Closed | | | | |
| CNR | 1.025.05 | | | |
| AP/1/A/5500/0 | 123 | 2 of 21 Revision 24 | | |
| AC | CTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED | | |
| C. Operator A | Actions | Note to Evaluator: | | |
| 1. <mark>(Monito</mark> | or Enclosure 1 (Foldout Page). | Enclosure 1 is included as Attachment 3. | | |
| <u>NOTE</u> R | EFER TO OAC Graphic "CMCC | ND". | | |
| 2. Verify exist: | all of the following conditions | Observe Notes prior to Step 4 and <u>GO</u> <u>TO</u> Step 4. | | |
| • OAC Meta | point C1A1134 (Exhaust Hood Il Temp) - LESS THAN 136°F | A | | |
| • OAC Meta | point C1A1135 (Exhaust Hood Il Temp) - LESS THAN 129°F | B | | |
| • OAC Meta | point C1A1129 (Exhaust Hood Il Temp) - LESS THAN 124.5°F | <mark>0</mark> | | |
| •OAC Temp | point C1A0484 (Hotwell perature) - LESS THAN 134°F. | | | |
| 3. Monito follows | or actual vacuum conditions as s: | 8 | | |
| a. <mark>Con</mark> met | ntinue to monitor exhaust hood) tal and hotwell temperatures. | | | |
| b. Con requ con | nsult with Station Management a uired to determine if actual low denser vacuum conditions exist. | s) | | |
| c. Do i at le | not continue in this procedure un east one of the following: | ntil | | |
| _ • <mark>(</mark> | xhaust hood metal temperature ndicates low condenser vacuum | | | |
| — • <mark>H</mark> | lotwell temperature indicates low ondenser vacuum | | | |
| — • <mark>A</mark> | s directed by Station lanagement. | | | |
| | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|--|--|---|--|--|
| Op Test No.: <u>301</u> Scen | ario # <u>3</u> Event # <u>5</u> | 5 Page <u>35</u> of <u>147</u> | | |
| Event Description: Steam | Seal Reg Valve (1TL-10) Fails Closed | | | |
| | | | | |
| CNS AP/1/A/5500/023 | LOSS OF CONDENSER V | ACUUM PAGE NO. 3 of 21 Revision 24 | | |
| ACTION/E | (PECTED RESPONSE | RESPONSE NOT OBTAINED | | |
| NOTE Reducing turbine generator load to stabilize vacuum is only effective when low vacuum is due to reduced RC cooling | | | | |
| CA Syswater t | stem is inoperable when available Conde emperature is greater than 136°F. | ensate Storage System | | |
| 4. Lower turbine stabilize vacu | load as required to um as follows: | | | |
| a. Verify vacu RC cooling | um loss due to reduced a. P | Perform the following: IF AT ANY TIME vacuum loss due to reduced RC cooling, <u>THEN</u> <u>RETURN TO</u> Step 4. GO TO Step 5. | | |
| b. <u>IF</u> rapid pov <u>THEN</u> perfo | ver reduction required, orm the following: | | | |
| NOTE • | Any load reduction rate of greater than 2 manual mode. | 25 MW/Min must be performed in | | |
| • | Unloading rates greater than 60 MW/Mir interlock and may result in steam dump | n (5%/minute) will meet C-7A actuation. | | |
| • | In manual mode, the control valves are on minutes. | capable of full travel within 3 | | |
| 1) Select " VALVE load as | MANUAL" and "CONTROL LOWER" to reduce turbine required. | | | |
| 2) <u>REFER</u> (Rapid I | <u>TO</u> AP/1/A/5500/009 Downpower). | | | |
| 3) <u>GO TO</u> | Step 5. | | | |
| | | | | |
| | | | | |
| | | | | |
| Appe | endix D | Required Opera | ator Action | ons | | Form ES- | D-2 | | |
|-------------------|--|--|-------------|------------|------------|-----------------------|------------------------|--|--|
| Op Tes Event Г | st No.: <u>301</u> Scen Description: Steam | ario # <u>3</u> Even Seal Reg Valve (1TI -10) | Fails Clos | 5 | Page | <u>36</u> of | 147 | | |
| | | | | | | | | | |
| г | | | | | | | | | |
| | CNS AP/1/A/5500/023 | LOSS OF | CONDEN | SER VACUUN | И | PAGE 4 of Revis | E NO. 21 sion 24 | | |
| - | ACTION/E | XPECTED RESPONSE |] | RESP | ONSE NOT (| DBTAINED | | | |
| ſ | 4. (Continued) | | | | | | | | |
| | c. Perform appropriate controlling procedure to reduce power: | | | | | | | | |
| | OP/1/A/6 Procedure | 6100/003 (Controlling re For Unit Operation) | | | | | | | |
| | OR | . , | | | | | | | |
| | OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown). | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Form ES-D-2 | | | |
|-------------|--|--|--|
| 3_of147 | | | |
| | | | |
| 38 | | | |

| AP/1 | CNS /A/5500/023 | LOSS OF | LOSS OF CONDENSER VACUUM | | | | |
|------|--|--|--------------------------|---------------------|-----|--|--|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED | | |
| 6. | IF AT ANY TIM suspected to I dispatch opera vacuum pump aligning to cor Enclosure 4 (F Pumps in Serv | E cause of vacuum los be air inleakage, <u>THEN</u> ator to start main (s) in preparation for ndensers. <u>REFER TO</u> Placing Main Vacuum vice). | 35 | | | | |

| Appendix D | Re | Required Operator Actions | | | | Form ES-D-2 | | | |
|--------------------|----------------|---------------------------|------|------|-------|-------------|--|--|--|
| Op Test No.: 3 | 01 Scenario # | 3 Event # | 5 | Page | 39 of | 147 | | | |
| Event Description: | Steam Seal Reg | Valve (1TL-10) Fails Cl | osed | | | | | | |
| | | | | | | | | | |

| CNS AP/1/A/5500/023 | LOSS OF | CONDENSER VACUUM | PAGE NO. 7 of 21 Revision 24 |
|----------------------------------|---|---|--|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAIL | NED |
| 7. Verify 1SAP50 CSAE" - GREA | 10 "STM PRESS TO ATER THAN 140 PSIG. | Perform the following: a. Adjust 1AS-2 (Main Stm Steam) setpoint to maint header pressure 165 PS b. <u>IF</u> 1AS-2 will not control <u>THEN</u> manually adjust 1 maintain AS header press PSIG. c. <u>IF</u> 1AS-2 functional, <u>THE</u> Step 8. <u>CAUTION</u> Aligning the U system to sup- | To Aux ain AS IG. in auto, AS-2 to ssure 165 EN GO TO Init 2 AS oply Unit 1 |
| | | AS headers in small reactivit on Unit 2. d. IF Unit 2 available to sup header, THEN perform to | ay cause by changes oply Unit 1 AS the following: Stm To Aux header align Unit 2 Jnit 1 AS Hdr A-26) - nit 2 AS Hdr V-26). , <u>THEN</u> slowly Stm To Aux |

| Appendix D | Required Opera | tor Actions | For | m ES-D-2 |
|-------------------------------|---|-------------------|----------------|---------------------|
| p Test No.: <u>301</u> Scen | ario # <u>3</u> Event | # 5 | Page 40 | of 147 |
| vent Description: Steam | Seal Reg Valve (1TL-10) | Fails Closed | | |
| | | | | |
| [| | | |] |
| CNS AP/1/A/5500/023 | LOSS OF (| CONDENSER VACUUM | | PAGE NO. 8 of 21 |
| | | | | Revision 24 |
| ACTION/E) | PECTED RESPONSE | RESPO | NSE NOT OBTAIN | ED |
| 8. Verify steam s | eal header conditions a | is | | |
| a. Ensure at le | east one of the following | a. <u>GO TO</u> S | tep 10. | |
| valves - OF | EN: | | | |
| • 1TL-2 (M | ux Stm To Stm Seal Reg) | | AL TASK | #2 |
| | | | | |
| b. Adjust 11L- required to | 4 (Stm Seal Reg Byp) as obtain steam seal header | | | |
| c. Verify OAC | - AVAILABLE. | c. GO TO S | tep 9 RNO. | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |



| Appendix DRequired Operator ActionsForm ES-D | | | | | |
|---|---|--|--|--|--|
| Op Test No.: <u>301</u> Sco | enario # <u>3</u> Event # <u>5</u> | Page of147 | | | |
| Event Description: Stear | n Seal Reg Valve (11L-10) Fails Closed | | | | |
| CNS AP/1/A/5500/023 | LOSS OF CONDENSER VACU | JUM PAGE NO. 10 of 21 Revision 24 | | | |
| ACTION | EXPECTED RESPONSE | ESPONSE NOT OBTAINED | | | |
| <u>NOTE</u> Starting when h | g additional air ejectors or vacuum pump will n igh RC temperature is the reason for loss of v | not restore vacuum vacuum. | | | |
| 10. Verify cond follows: | enser vacuum status as | | | | |
| a. Verify car suspecte condense | use of vacuum loss d or identified to be ar air in-leakage. | <u>[O</u> Step 11. | | | |
| ^{b.} Condens TRENDI | er vacuum - STABLE OR NG UP. 1) IF va fo a) b] b] | orm the following: additional air removal will raise acuum, <u>THEN</u> perform the allowing: Dispatch operators to perform the following: Align main vacuum pump(s) for service. <u>REFER TO</u> Enclosure 4 (Placing Main Vacuum Pumps in Service). Align idle set of CSAE jet(s) for service. <u>REFER TO</u> OP/1/B/6300/006 (Main Vacuum). WHEN condenser vacuum trends down to less than 24.5 in. Hg., <u>THEN</u> align main vacuum pump(s) to condenser. <u>REFER TO</u> Enclosure 4 (Placing Main Vacuum Pumps in Service). O TO Step 11. | | | |
| <u>c</u> . <u>IF AT AN</u> trends do prior to S | I <u>Y TIME</u> condenser vacuum wn, <u>THEN</u> observe Note tep 10 and perform Step 10. | | | | |
| | | | | | |

| Op Test No.: <u>301</u> Scenario # <u>3</u> Event # <u>5</u> Page <u>43</u> of | Appendix D | Ree | Required Operator Actions | | | | Form ES-D-2 | | | |
|--|--------------|----------------|---------------------------|---|------|-------|-------------|--|--|--|
| | Op Test No.: | 301 Scenario # | 3 Event # | 5 | Page | 43 of | 147 | | | |
| Event Description: Steam Seal Reg Valve (1TL-10) Fails Closed | | | | | | | | | | |

| | AP/1 | CNS /A/5500/023 | LOSS OF | PAGE NO. 11 of 21 Revision 24 | | |
|-------------|---------|---|---|-------------------------------------|---------------------|----|
| _ | | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| - | 11. | Ensure proper System. <u>REFE</u> (Vacuum Prim | operation of ZP <u>ER TO</u> OP/0/B/6250/011 ing System). |) | | |
| - | 12. | Dispatch operation condenser sea loops operation Enclosure 2 (V Flows). | ator(s) to ensure al troughs and UST sea og properly. <u>REFER TC</u> /erification Of Seal | d)) | | |
| - | 13. | Dispatch oper- system and wa properly. <u>REF</u> (CFPT Stm Sea Verification). | ator to ensure CFPT se aterboxes operating <u>ER TO</u> Enclosure 3 al And Waterbox Vent | eal) | | |
| N <u>/A</u> | 14. | <u>IF</u> cause of vac <u>THEN</u> dispatcl CSAE operatio Enclosure 5 (V Operation). | cuum loss unknown, h operator to verify on. <u>REFER TO</u> /erification of C SA E | | | |
| - | 15. | Determine and vacuum. | l correct cause of loss | of | | |
| | 16. | Ensure complicient Completion (Condernation) 3.7.5 (Auxilian System) 3.7.6 (Condernation) SLC 16.7-9 (System (SSS) | iance with appropriate ry Feedwater (AFW) insate Storage System Standby Shutdown S). | | | |
| | 17. | Determine req • <u>REFER TO F</u> (Classificatio • <u>REFER TO F</u> Notification F | uired notifications: RP/0/A/5000/001 n Of Emergency) RP/0/B/5000/013 (NRC) Requirements). | | | |

| AP/1 | CNS /A/5500/023 | LOSS OF CO | NDENSER VACUU | М | PAGE No 12 of 21 Revision | D. 24 |
|------|---|---|---|--|---|-----------|
| | ACTION/EXPECTED |) RESPONSE | RESP | PONSE NOT OBT | AINED |] |
| 18. | Verify Steam Seal Sy NORMAL ALIGNMEN | /stem - IN NT. | → WHEN cor steam sea current pla OP/1/B/63 | nditions perm I system as re ant conditions 00/005 (Steam | it, <u>THEN</u> aligi equired for s. <u>REFER TO</u> ı Seal System | n) 1). |
| 19. | Initiate AR for ENG t inspect condenser fo damage due to the lo event. | o evaluate need to or potential oss of vacuum | | | | |
| 20. | Determine long term <u>RETURN</u> <u>TO</u> procedu | plant status. ure in affect. <u>El</u> | ND | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Appendix D | | Required Operator Actions | | | | Form ES-D-2 | | | |
|--|--|---------------------------|---|---------|---|-------------|----|----|-----|
| Op Test No.: 30 | | Scenario # | 3 | Event # | 6 | Page | 45 | of | 147 |
| Event Description: Spurious Main Turbine Trip / Auto Control Rod Failure | | | | | - | | | | |
| | | | | | | | | | |

| Control Room Indications |
|--|
| 1AD-1, C/6 "EXT TRAIN A-B/NON TRAIN TURB TRIP" - LIT |
| 1AD-1, C/7 "LOW ETS PRESS" - LIT |
| 1AD-1, D/7 "TURB STOP VLVS CLOSED" - LIT |
| 1AD-1, E/7 "TURB ETS HDR PRESS LO" - LIT |
| 1AD-1,F/3 "EHC IN MANUAL MODE" - LIT |

| Appendix D | Required Opera | tor Actions | Forr | n ES-D-2 |
|--------------------------------------|--------------------------------|--|---|---|
| Op Test No.: <u>301</u> Scena | ario # <u>3</u> Event | #6 | Page <u>46</u> | of <u>147</u> |
| Event Description: Spuriou | s Main Turbine Trip / Aut | o Control Rod Failure | | |
| | | | | |
| CNS AP/1/A/5500/002 | TURBIN | E GENERATOR TRIP | | PAGE NO. 2 of 29 Revision 34 |
| ACTION/E) | PECTED RESPONSE | RESPO | NSE NOT OBTAINE | ED |
| C. Operator Actions | | | | |
| 1. Verify reactor 69%. | power - LESS THAN | Perform the a. Ensure re b. <u>GO TO</u> El Trip or Sa | following: actor - TRIPPEI P/1/A/5000/E-0 fety Injection). |). (Reactor |
| 2 Verify Turbine • All turbine st | e Trip: op valves - CLOSED. | Perform the a. Trip turbin b. <u>IF</u> turbine the followi 1) Depres turbine 2) Rapidl simult "CONT" "FAST 3) <u>IF</u> turb perform a) Trip b) CL c) <u>GC</u> (Ref | following: ne. will not trip, <u>THI</u> ing: ss "MANUAL" pr e control panel. y CLOSE control aneously depres TROL VALVE LO RATE" pushbur ine will not runb m the following: p reactor. OSE the followin All MSIVs All MSIVs All MSIV bypass <u>0 TO</u> EP/1/A/500 eactor Trip or Sa ection). | EN perform ushbutton on ol valves by sing DWER" and ttons. ack, <u>THEN</u> ng valves: valves. 00/E-0 ifety |
| | | | | |

| Appendix D | Required Opera | ator Actions | Fo | orm ES-D-2 | 2 |
|------------------------|--------------------------------|--|------------------------|---------------------|-------------------|
| p Test No.: <u>301</u> | Scenario # <u>3</u> Event | # 6 | Page 47 | of | 147 |
| vent Description: Sp | urious Main Turbine Trip / Aut | to Control Rod Failure | | | |
| | | | | | |
| CNS | TURBIN | | | PAGE N | |
| AP/1/A/5500/002 | | | | 3 of 29 Revision | 34 |
| ACTI | ON/EXPECTED RESPONSE | RESPO | NSE NOT OBTAI | NED | |
| (3) Varify rat | | | ator than 1 5 | E higher th | |
| • Control | rods - IN "AUTO" AND | T-Ref, <u>THEN</u> | perform the | following: | |
| STEPP | ING IN | a. (Ensure "C a. (Ensure "C a. (Ensure "C a. (Ensure "C | CRD BANK SE UAL. | LECT" swite | : <mark>h)</mark> |
| | | b. Operate of following | ontrol rods un met: | til one of the | • |
| | | _ • Reactor | r power less th | nan 10% | |
| | | OR | | | |
| | | • <mark>T-Avg l</mark> | ess than 560°l | F.) | |
| | | | | | |
| 4. Ensure C | heater drain pumps - OFF. | Note to Evaluator | <u>1</u> | | |
| 5. Monitor E | nclosure 4 (Rod Insertion | Enclosure 4 is inc | cluded as Att | achment 5. | |
| Limit Bor | ation). | | | | - |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Appendix D | Required Operator | Actions | Foi | rm ES-D-2 |
|--|---|--|--|---|
| op Test No.: <u>301</u> Scena | rio # <u>3</u> Event # | 6 | Page 48 | _ of147 |
| vent Description: Spurious | s Main Turbine Trip / Auto Co | ontrol Rod Failure | | |
| | | | | |
| CNS AP/1/A/5500/002 | TURBINE G | ENERATOR TRIP | | PAGE NO. 4 of 29 Revision 34 |
| ACTION/EX | PECTED RESPONSE | RESPO | NSE NOT OBTAI | NED |
| 6. <u>WHEN</u> reactor <u>THEN</u> perform a. <mark>Place "CRD</mark> IN MANUAL | power less than 20%, the following: BANK SELECT" switch - | | | |
| b. Verify reactor THAN 5%. | or power - GREATER | b. Perform the second second | he following: r to Mode 3. <u>R</u> ng procedures 1/A/6150/008 (1/A/6100/002 (cedure For Unit <u>0</u> Step 7. | n to shutdown <u>EFER TO</u> the : Rod Control) Controlling t Shutdown). |
| c. Maintain con limits. d. Operate cor reactor pow e. <u>IF AT ANY</u> than or equa control rods Mode 3. <u>RE</u> procedures: • OP/1/A/6 ⁺ Procedure | ntrol rods above insertion trol rods to stabilize er between 6%-10%. <u>FIME</u> reactor power less al to 5%, <u>THEN</u> insert to shutdown reactor to <u>FER TO</u> the following 150/008 (Rod Control) 100/002 (Controlling e For Unit Shutdown). | | | |
| | | | | |

| Op Test No.: 301 Scenario # 3 Event # 6 Page 49 of 147 Event Description: Spurious Main Turbine Trip / Auto Control Rod Failure AP/11/A/5500/002 TURBINE GENERATOR TRIP PAGE NO. 5 of 29 Revision 34 ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 7. Verify proper steam dump operation as follows: a. Perform the following: |
|---|
| Event Description: Spurious Main Turbine Trip / Auto Control Rod Failure AP/1/A/5500/002 TURBINE GENERATOR TRIP PAGE NO. 5 of 29 Revision 34 ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 7. Verify proper steam dump operation as follows: a. Perform the following: |
| CNS AP/1/A/5500/002 TURBINE GENERATOR TRIP PAGE NO. 5 of 29 Revision 34 ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 7. Verify proper steam dump operation as follows: a. "C-9 COND AVAILABLE FOR STM DUMP" status light (1SI-18) - LIT. a. Perform the following: 1. IF reactor power greater than or equal to 5%, THEN perform the following: a) Trip reactor. b) GO TO EP/1/A/5000/E-0 (/Peactor Trip or Softw) |
| |

| Appendix D | Required Opera | tor Actions | Forn | n ES-D-2 |
|------------------------------|----------------------------|--|--|---|
| Op Test No.: <u>301</u> Scer | nario # <u>3</u> Event | # 6 | Page <u>50</u> | of <u>147</u> |
| Event Description: Spurior | us Main Turbine Trip / Aut | o Control Rod Failure | | |
| | | | | |
| CNS AP/1/A/5500/002 | TURBIN | E GENERATOR TRIP | | PAGE NO. 6 of 29 Revision 34 |
| ACTION/E | XPECTED RESPONSE | RESP | ONSE NOT OBTAINE | D |
| 7. (Continued) | | | | |
| b. <mark>Steam dun</mark> | np valves - MODULATING | 5. b. <u>IF</u> steam T-Avg 3 ^o perform 1) Place manu | dump valves clos F greater than T- the following: STM DUMP CT ial. | sed <u>AND</u> Ref, <u>THEN</u> 'RL" in |
| | | 2) Adjus dema | and. | TRL" to 0% |
| | | 3) Using switc | ; "STEAM DUMP h, perform the foll | SELECT" owing: |
| | | • En | sure C-7A and C- | 7B - RESET |
| | | • Pla mo | ice steam dumps ide. | in pressure |
| | | 4) Oper valve | ate condenser ste s to maintain T-A | eam dump vg at 560°F. |
| | | 5) <u>IF</u> ste opera follow | eam dump valves ate, <u>THEN</u> perforn ving: | fail to n the |
| | | a) <u>IF</u> or th | reactor power gr equal to 5%, <u>THI</u> e following: | eater than <u>EN</u> perform |
| | | (1 |) Trip reactor. | |
| | | (2 | <u>GO TO</u> EP/1/A (Reactor Trip of Injection). | /5000/E-0 or Safety |
| | | b) E M P 1' | nsure S/G PORVs AINTAIN ALL S/G RESSURES LES 125 PSIG. | s - S THAN |
| | | 6) <u>GO 1</u> | <u>'O</u> Step 8. | |
| | | | | |
| | | | | |
| | | | | |

| | Required Operat | or Actions | | ⊦or | m ES-D |)-2 |
|--|---|--------------------------------|---|-------------------------------|------------------------|------------|
| Test No.: <u>301</u> Scena | ario # <u>3</u> Event # | £ 6 | Page | 51 | of | 147 |
| ent Description: Spuriou | s Main Turbine Trip / Auto | Control Rod Failure | • | | | |
| | | | | | | |
| CNS | TURBINE | GENERATOR TRIP | | | PAGE | NO. |
| AP/1/A/5500/002 | | | | | 7 of 2 Revisio | 9 on 34 |
| ACTION/E) | PECTED RESPONSE | RES | PONSE NOT (| OBTAIN | ED | |
| 7. (Continued) | | | | | | |
| c | ENDING DOWN TO | c. Perforr | n the followi | ng: | | |
| | | 1) Pla mai | ce "STM DU nual. | IMP C | TRL" in | |
| | | 2) Adj den | ust "STM DI nand. | JMP C | CTRL" to | 0% |
| | | 3) Usi swi | ng "STEAM tch, perform | DUMF the fo | P SELEC | Т" |
| | | _• E | nsure C-7A | and C | -7B - RE | SET |
| | | — • F n | lace steam node. | dumps | s in press | sure |
| | | 4) Ope val | erate conder ves to maint | nser st ain T-/ | team dun Avg at 56 | np 0°F. |
| | | 5) <u>IF</u> s ope follo | team dump rate, <u>THEN</u> wing: | valves perfor | s fail to m the | |
| | | a) | IF reactor po or equal to 8 the following | ower g 5%, <u>TH</u> g: | reater th IEN perfo | an orm |
| | | _ | (1) Trip rea | actor. | | |
| | | _ | (2) <u>GO TO</u> (Reacto Injectio | EP/1/ or Trip n). | A/5000/E or Safety | -0 |
| Note to Evaluator | <u>:</u> | b) | Ensure S/G MAINTAIN / PRESSURE 1125 PSIG | POR\ ALL S/ ES LES | /s - 'G SS THAN | |
| Once the crew ha Lead Evaluator di may continue by operator to insert inside Containme | s stabilized the unit, at scretion, the scenario instructing the booth Trigger 7 (1B S/G Fault nt). | | | | | |

| Appendix D | Required Operato | or Actions | Form ES-D-2 | |
|--|--|--|---|--|
| Op Test No.: <u>301</u> Scena | ario # <u>3</u> Event # | 6 | Page <u>52</u> of <u>147</u> | |
| Event Description: Spuriou | s Main Turbine Trip / Auto | Control Rod Failure | | |
| | 1 | | | |
| CNS AP/1/A/5500/002 | TURBINE | GENERATOR TRIP | PAGE NO. 8 of 29 Revision 34 | |
| ACTION/E) | PECTED RESPONSE | RESPO | NSE NOT OBTAINED | |
| 8. Ensure genera a. Verify turbin output - LES ZERO MW. | ator tripped as follows: ne generator megawatt SS THAN <u>OR</u> EQUAL TO | a. Perform the second se | he following: mine and correct cause of ued turbine generator t. Maturbine generator watt output less than or to zero MW, <u>THEN</u> perform 8.b and Step 8.c. D Step 8.d. | |
| b. Ensure the MODs - OP | following breakers and EN: 3 and 1BT 3 and 1AT r Breaker 1A and 1B. n generator DN" - OFF. I/AUTO REG" select N" mode light - LIT. | d. Transfer t | to manual mode. | |

| Appendix D | Required Operato | or Actions | | Form ES-D |)-2 |
|--------------------------------------|-------------------------------|--|--|--|--|
| Dp Test No.: <u>301</u> Scena | ario # <u>3</u> Event # | 6 | Page | 53 of | 147 |
| Event Description: Spuriou | s Main Turbine Trip / Auto | Control Rod Failure | | | |
| | | | | | |
| CNS AP/1/A/5500/002 | TURBINE | GENERATOR TRIP | | PAGE 9 of 2 Revisio | NO. 9 in 34 |
| ACTION/EX | PECTED RESPONSE | RESPON | ISE NOT OB | BTAINED | |
| 9. Verify Pzr POF status as follo | RV and Pzr spray valve ws: | | | | |
| a. All Pzr POR | ws. Vs - CLOSED. | a. <u>IF Pzr pre</u> <u>THEN per</u> 1) CLOSI 2) <u>IF any</u> closed followii a) CLO isol b) <u>IF F</u> car per (1) (2) (3) | ssure less form the fo E Pzr PORV THEN peng: OSE affect ation valve Pzr PORV not be clo form the fo Trip Unit WHEN re S/I setpo THEN en GO TO E (Reactor | than 2315 PS blowing: (V(s). / cannot be erform the ted PORV(s) e. isolation valve sed, <u>THEN</u> blowing: 1 reactor. eactor tripped int reached, nsure S/I initia EP/1/A/5000/E | BIG, e <u>OR</u> ted. :-0 / |
| b. Normal Pzr | spray valves - CLOSED. | b. <u>IF</u> Pzr pre <u>THEN</u> per 1) CLOSI 2) <u>IF</u> affe closed AP/1/A Pressu | ssure less form the fo E spray va cted spray , THEN RE /5500/011 ire Anoma |). ollowing: Ive. valve cannot <u>EFER TO</u> I (Pressurizer lies). | SIG, be |
| 10. Verify Pzr leve PROGRAM. | I - TRENDING TO | Control char maintain pro | ging and gram leve | letdown to el. | |

| Appendix D | | Required | d Opera | tor Acti | ons | | For | m ES-I |)-2 |
|--------------------|-------------------------------|-----------------------------|-------------|-----------|---|---|--|--|-----------------------|
| Op Test No.: | 301 Scena | ario # <u>3</u> | Event | # | 6 | Page | 54 | of | 147 |
| Event Description: | Spuriou | s Main Turbine ⁻ | Trip / Auto | o Control | Rod Failure | | | | |
| | | | | | | | | | |
| AP/1/A | CNS /5500/002 | | TURBIN | E GENER | ATOR TRIP | | | PAGE 10 of Revisi | NO. 29 on 34 |
| | ACTION/EX | PECTED RESPONS | SE | | RESP | ONSE NOT (|)BTAIN | ED | |
| 11. | Verify S/G N/R TO OR STABL | levels - TREN E AT 39%. | TER THA | | Perform the a. Control \$ b. <u>IF</u> any S uncontro the follow 1) Trip 0 2) <u>GO 1</u> Trip 0 | e following S/G N/R lev /G N/R lev illed manne wing: Jnit 1 reac <u>O</u> EP/1/A/ or Safety Ir | g: vel(s) : el tren er, <u>TH</u> tor. 5000/M ijection | at 39%. ding dov EN perfo E-0 (Rea n). | vn in prm actor |

| Op Test No.: <u>301</u> Scenario # <u>3</u> Event # <u>6</u> Page | _55_ of147 |
|---|---|
| Event Description: Spurious Main Turbine Trip / Auto Control Rod Failure | |
| | |
| CNS TURBINE GENERATOR TRIP | PAGE NO. 11 of 29 Revision 34 |
| ACTION/EXPECTED RESPONSE RESPONSE NOT O | BTAINED |
| 13. Stabilize reactor power as follows: | |
| a. Maintain control rods above insertion limits. | |
| b. Operate control rods in manual to stabilize reactor power between 6%-10%. | |
| c. Verify all atmospheric steam dump valves - CLOSED. c. <u>WHEN</u> T-Avg less t than T-Ref, <u>THEN</u> p following: | than 11.5°F higher perform the |
| 1) Ensure all atmos dump valves - C | spheric steam COSED. |
| 2) <u>IF</u> atmospheric s valve(s) will not CLOSE affected steam dump(s) i | steam dump close, <u>THEN</u> d atmospheric isolation valve. |
| d. Verify condenser steam dump valves - MODULATING. d. <u>IF</u> steam dump valves - T-Avg 3°F greater the perform the following | ves closed <u>AND</u> than T-Ref, <u>THEN</u> ng: |
| 1) Place "STM DUI manual. | MP CTRL" in |
| 2) Adjust "STM DU demand. | JMP CTRL" to 0% |
| 3) Using "STEAM I switch, perform | DUMP SELECT" the following: |
| • Ensure C-7A : | and C-7B - RESET |
| Place steam of mode. | dumps in pressure |
| 4) Operate conden valves to mainta | nser steam dump ain T-Avg at 560°F. |
| | |
| | |
| | |

| Appendix D | Required Opera | tor Actions | | Form | IES-D-2 |
|---------------------------------|--|---------------------------------|--|--|--|
| rp Test No.: <u>301</u> Scen | ario # <u>3</u> Event | # <u>6</u> | Page | 56 | of <u>147</u> |
| vent Description: Spuriou | s wan rurone rnp / Aut | | е | | |
| CNS | TURBIN | E GENERATOR TRIF | | | PAGE NO. |
| | | | | | Revision 34 |
| ACTION/E | (PECTED RESPONSE | RE | SPONSE NOT | OBTAINE | D |
| 14. Align AS supp follows: | oly to CF pumps as | | | | |
| a. Adjust 1AS Steam) to r | -2 (Main Stm To Aux naintain 165 psig. | | | | |
| b. Ensure 1AS OPEN. | S-12 (AS To CFPT Isol) - | | | | |
| c. Dispatch op To CFPT 1 | perator to close 1SP-3 (S A & 1B) (TB1-640, 1G-24 | C). | | | |
| 15. Verify feed flo NOZZLES. | w - ALIGNED TO CA | Perform | the followir | ng: | |
| | | <u>NOTE</u> | CF tempera low limit of 3 hours afte Generator is | atures will 107°F ap er the Tur s off-line. | l reach the proximately bine |
| | | a. <u>IF</u> bot | h the followi | ing condit | tions met: |
| | | - • 1CA Noz cap | -151 (S/G 1 zle) inopera able of bein | IC CF By able and <u>I</u> g opened | rp To CA NOT I |
| | | AND | <u>)</u> | | |
| | | • Turl rest | oine Genera arted, | ator will <u>N</u> | <u>OT</u> be |
| | | THEN | perform the | e following | g: |
| | | 1) Inr <u>TC</u> Pr | OP/1/A/61 | snutdown 00/003 (C r Unit Ope | . <u>KEFER</u> Controlling eration). |
| | | 2) <u>G</u> (| 0 <u>TO</u> Step 1 | 6. | |
| | | b. Trans <u>REFE</u> Feed | fer feed flow <u>R TO</u> Enclo Flow From (| v to CA no sure 1 (T CF to CA | ozzles. ransferring Nozzles). |
| | | | | | |
| | | | | | |
| | | | | | |

| Appendix D | Red | quired Operat | or Action | ons | | Form | ES-D-2 |
|---|--|---|-----------|----------------|-----------|-------------|-------------------------|
| Dp Test No.: <u>301</u> | Scenario # | 3 Event # | <i>‡</i> | 6 | Page | <u>57</u> c | of <u>147</u> |
| Event Description: S | purious Main Tu | rbine Trip / Auto | Control | Rod Failure | | | |
| | | | | | | | |
| CNC | | TUDDING | | | | | |
| AP/1/A/5500/002 | 2 | TURBINE | GENER | ATOR TRIP | | F | 13 of 29 Revision 34 |
| ACTI | ION/EXPECTED R | ESPONSE | | RESPO | NSE NOT (| OBTAINED | |
| CAUTION | RC cold water damage. | temperatures l | below 55 | 5°F will cause | RC pipi | ng | |
| 16. Shut dov plant equ | wn the followin uipment: | g unnecessary | , | | | | |
| ● CF pur OP/1/A Feedw | mp. <u>REFER TO</u> V6250/001 (Cor ater System) | idensate and | | | | | |
| Stop R as nec inlet te protect OP/1/E Circula | C pumps and c essary to maint mperature great t RC piping. <u>RE</u> 3/6400/001A (Co ating Water Syst | ooling tower fan ain condenser ter than 60°F to <u>FER TO</u> ondenser em) | s | | | | |
| _ • Hotwel | ll pumps | | | | | | |
| • Conde | nsate booster p | umps. | | | | | |
| 17. Dispatch step-up secure e pumps a | n operator to pa Transformers f every other coo and fans as foll | anel at main IA and 1B to ling bank of oi ows: | I | | | | |
| • Banks | #1, 3, 5, 7, 9 | | | | | | |
| OR | | | | | | | |
| _ • Banks | #2, 4, 8, 10. | | | | | | |
| 18. Align ste for turbin Enclosu Valve Ali | eam supply and ne shutdown. re 2 (Steam Su ignments). | l drain valves <u>REFER TO</u> pply and Drain | | | | | |
| 19. Dispatch bleed ch <u>TO</u> Enclo Steam Pi | n operator to en neck valves alig osure 3 (Verific iston Assisted | nsure heater ned. <u>REFER</u> ation of Bleed Check Valves) | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Appendix D Required Operator Actions Form | n ES-D-2 |
|--|-------------------------------------|
| Op Test No.: 301 Scenario # 3 Event # 6 Page 58 Event Description: Spurious Main Turbing Trip / Auto Control Rod Failure | of <u>147</u> |
| | |
| | |
| CNS TURBINE GENERATOR TRIP | PAGE NO. 14 of 29 Revision 34 |
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | D |
| 20. Maintain the following stable plant | |
| Pzr pressure at 2235 PSIG | |
| Pzr level at program level | |
| S/G N/R levels greater than or equal to 39%. | |
| 21. Complete turbine generator shutdown. <u>REFER TO</u> OP/1/B/6300/001 (Turbine Generator). | |
| 22. Verify reactor power change <u>GO TO</u> Step 24. GREATER THAN <u>OR</u> EQUAL TO 15% IN A 1 HOUR PERIOD. | |
| 23. Notify the following sections to take appropriate samples: | |
| Radiation Protection to sample and analyze gaseous effluents. <u>REFER TO</u> Selected Licensee Commitments Manual, Section 16.11-6. | |
| Primary Chemistry to sample for isotopic analysis of iodine. <u>REFER TO</u> Tech Specs 3.4.16 (Sample must be taken between 2 hours and 6 hours following last power change greater than or equal to 15% rated thermal power within a 1 hour period). | |
| | |
| | |
| | |

| Appendix D | Required Operator Ac | tions | Form ES-D-2 | | | |
|--------------------|--|------------------------|----------------|---------------|--|--|
| Op Test No.: | 301 Scenario # _ 3 _ Event # | 7, 8, 9 Page | 59 of | 147 | | |
| Event Description: | 1B S/G Fault Inside Containment / 1B M | SIV (1SM-5) Auto Close | Failure / Runr | ning CCW (KC) | | |
| | Pump Trips, all other KC Pumps Fail to A | Auto Start on SI | | | | |

| Control Room Indications |
|--|
| 1FO-1, C/6 "PZR LO PRESS RX TRIP" - LIT |
| 1AD-3, C/6 "CF ISOL TRN A" - LIT |
| 1AD-3, D/6 "CF ISOL TRN B" - LIT |
| 1AD-4, A/5 "LO T-AVG & RX TRIP CF VLVS CLOSED" - LIT |
| 1AD-13, A/4 "CONTAINMENT HI PRESS" - LIT |
| 1AD-13, A/7 "ICE COND LOWER INLET DOORS OPEN" - LIT |
| Multiple other Alarms and Indications related to decreasing RCS temperature, Main Steam pressure, and Safety Injection |

| Appendix D | | Re | Form ES-D-2 | | | | | | |
|--------------------|-----|---|-------------------|-----------------------------|---|------------|--------|--------|---------------|
| Op Test No.: | 301 | 301 Scenario # <u>3</u> Event # 7, 8, 9 | | | | | | of | 147 |
| Event Description: | | 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | tainment / 1E Pumps Fail | 3 MSIV (1SM-5) Aut to Auto Start on SI | to Close I | ailure | / Runi | ning CCW (KC) |



| Appendix D | R | equired Operator A | Form ES-D-2 | | | | |
|--------------------|------------------------------------|---|--------------------------------------|-------------|--------|--------|---------------|
| Op Test No.: | 301 Scenario # | 3 Event # | Page | 61 | of | 147 | |
| Event Description: | 1B S/G Fault Ir Pump Trips, all | side Containment / 1B N other KC Pumps Fail to | /ISIV (1SM-5) Au Auto Start on SI | ito Close F | ailure | / Runi | ning CCW (KC) |

| CNS EP/1/A/5000/E-0 | REACTOR TR | P OR SAFETY INJEC | TION | PAGE NO. 5 of 49 Revision 43 |
|------------------------|----------------------|--|--|--|
| ACTION/EX | PECTED RESPONSE | RES | PONSE NOT OBTAIN | ED |
| (4) Verify 1ETA and | nd 1ETB - ENERGIZED. | Perform t - a. IF 1ET THEN (Loss of proced AP/1/A Power) | he following: A <u>AND</u> 1ETB de-e <u>GO TO</u> EP/11/A/500 of All AC Power). time allows, <u>THEP</u> power to de-energiear while continuin ure. <u>REFER TO</u> /5500/007 (Loss o). | nergized, DO/ECA-0.0 L attempt to gized ng with this f Normal |

| Appendix D | | Re | Form ES-D-2 | | | | | | |
|--------------------|-----|--|--------------------|----------------------------|--|------------|--------|--------|---------------|
| Op Test No.: | 301 | 301 Scenario # <u>3</u> Event # <u>7, 8, 9</u> | | | | | | of | 147 |
| Event Description: | | 1B S/G Fault Insi Pump Trips, all o | ide Con ther KC | tainment / 1 Pumps Fail | B MSIV (1SM-5) Au to Auto Start on SI | to Close F | ailure | / Runi | ning CCW (KC) |



| Appendix D | | Re | Operator A | Form ES-D-2 | | | | | |
|--------------------|-----|--|--------------------|-----------------------------|--|------------|--------|--------|---------------|
| Op Test No.: | 301 | 01 Scenario # <u>3</u> Event # 7, 8, 9 | | | | | 63 | of | 147 |
| Event Description: | : | 1B S/G Fault Insi Pump Trips, all o | ide Con ther KC | tainment / 1B Pumps Fail | MSIV (1SM-5) Au to Auto Start on SI | to Close I | ailure | / Runi | ning CCW (KC) |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|--|---|
| Op Test No.: | <u>301</u> Scenario # <u>3</u> Event # <u>7, 8,</u> | 9 Page <u>64</u> of <u>147</u> |
| Event Description | 1B S/G Fault Inside Containment / 1B MSIV (1SM Pump Trips, all other KC Pumps Fail to Auto Star | I-5) Auto Close Failure / Running CCW (KC) t on SI |



| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|-------------------|-----|--|-------------------|-----------------------------|--|------------|-------------|--------|---------------|--|
| Op Test No.: | 301 | 301 Scenario # 3 Event # 7, 8, 9 | | | | | 65 | of | 147 | |
| Event Description | : | 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | tainment / 1I Pumps Fail | 3 MSIV (1SM-5) Au to Auto Start on SI | to Close F | ailure | / Runi | ning CCW (KC) | |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SAF | ETY IN | JECTION | PAGE NO. 9 of 49 Revision 43 |
|--|---|------------|--------|--|---|
| ACTION/E) | (PECTED RESPONSE |] [| | RESPONSE NOT OBTAIN | ED |
| 10. (Continued) | | | | | |
| | | | 5) | Dispatch operator to following: | perform the |
| | | | _ | a) Secure all ice con handling units. <u>R</u> EP/1/A/5000/G-1 Enclosures), Enc (Securing All Ice Units). | ndenser air (<u>EFER TO</u> (Generic losure 11 Condenser |
| | | | _ | b) Place containment analyzers in serv <u>TO</u> OP/1/A/6450/ (Containment Hy Control Systems) | nt H ₂ ice. <u>REFER</u> /010 drogen |
| Note to Evaluator: | | | 6) | WHEN 9 minutes ela verify proper VX syst | apsed, <u>THEN</u> tem |
| Enclosure 5 is include | ed as Attachment 7. | | | operation. <u>REFER I</u> Enclosure 5 (VX Sys Operation). | o tem |
| | | | _ 7) | GO TO Step 11. | |
| b. <u>IF AT ANY</u> pressure ex procedure, | <u>TIME</u> containment ceeds 3 PSIG while in t <u>THEN</u> perform Step 10.a | his a. | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Appendix D | | Re | Form ES-D-2 | | | | | | |
|--------------------|-----|--|--------------------|----------------------------|--|------------|--------|-------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 66 | of | 147 |
| Event Description: | | 1B S/G Fault Insi Pump Trips, all o | ide Con ther KC | tainment / 1 Pumps Fail | B MSIV (1SM-5) Au I to Auto Start on SI | to Close I | ailure | / Run | ning CCW (KC) |



| Appendix D | | Re | Form ES-D-2 | | | | | | |
|-------------------|--|------------|-------------|---------|---------|------|----|--------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 67 | of | 147 |
| Event Description | n: 1B S/G Fault Inside Containment / 1B MSIV (1SM-5) Auto Close Failure / Run Pump Trips, all other KC Pumps Fail to Auto Start on SI | | | | | | | / Runr | ning CCW (KC) |



| Appendix D | | Re | Operator | Form ES-D-2 | | | | | |
|-------------------|-----|---|----------|-------------|---------|------|--------|--------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 68 | of | 147 |
| Event Description | : | 1B S/G Fault Inside Containment / 1B MSIV (1SM-5) Au Pump Trips, all other KC Pumps Fail to Auto Start on Sl | | | | | ailure | / Runi | ning CCW (KC) |



| Appendix D | | Required Operator Actions | | | | | | Form ES-D-2 | | | |
|--------------------|---|---------------------------|---|---------|---------|------|--------|-------------|---------------|--|--|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 69 | of | 147 | | |
| Event Description: | 1B S/G Fault Inside Containment / 1B MSIV (1SM-5) Au Pump Trips, all other KC Pumps Fail to Auto Start on SI | | | | | | ailure | / Run | ning CCW (KC) | | |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|--|---|
| Op Test No.: | 301 Scenario # 3 Event # 7, 8, 9 | Page 70 of 147 |
| Event Description | 1B S/G Fault Inside Containment / 1B MSIV (1SM- Pump Trips, all other KC Pumps Fail to Auto Start o | 5) Auto Close Failure / Running CCW (KC) on SI |

| CNS EP/1/A/5000/E-0 | CNS REACTOR TRIP OR SAFETY INJECTION EP/1/A/5000/E-0 | | | | | |
|---|--|------------------|--|--|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPON | ISE NOT OBTAIN | ED | |
| 17. (Continued) | P - I ESS THAN 285 PSI | G | d Perform th | e following: | | |
| d. NC pressur | e - LESS THAN 200 PSI | с. | a. Penomination a. 1) Ensure on op OPEN b. IF ND cannot the for the for | e following. e ND pump miniflow erating ND pum pump miniflow to be opened, <u>T</u> llowing for affect eset ECCS. eset D/G load s op ND pump. <u>AT ANY TIME</u> teriously on. <u>AT ANY TIME</u> creases to less 5 PSIG in unco anner, <u>THEN</u> re- imp. <u>O</u> Step 18. | niflow valve np(s) - / valve(s) HEN perform cted train(s): equencer. B/O occurs, equipment NC pressure than ontrolled estart ND | |
| e. ND pumps C-LEGS. | - INDICATING FLOW TO |) _ | _ e. Start ND p | oump(s) and ali | gn valves. | |
| 18. <u>WHEN</u> time an (within two ho monitor Spent temperature. EP/1/A/5000/G Enclosure 1 (U Monitoring). | nd manpower permit urs of event), <u>THEN</u> Fuel Pool level and <u>REFER TO</u> -1 (Generic Enclosures Jnit 1 Spent Fuel Pool | <mark>Not</mark> | te to Evaluator | <u>:</u> cluded as Atta | chment 9. | |

| Appendix D | Required Operator Actions | | | | | | Form ES-D-2 | | | |
|--------------------|---|------------|---|---------|---------|------|-------------|--------|---------------|--|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 71 | of | 147 | |
| Event Description: | 1B S/G Fault Inside Containment / 1B MSIV (1SM-5) Αι Pump Trips, all other KC Pumps Fail to Auto Start on Sl | | | | | | Failure | / Runi | ning CCW (KC) | |


| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|---|
| Op Test No.: | 301 Scenario # <u>3</u> Event # 7, 8 | , 9 Page <u>72</u> of 147 |
| Event Description: | 1B S/G Fault Inside Containment / 1B MSIV (1SM Pump Trips, all other KC Pumps Fail to Auto Star | I-5) Auto Close Failure / Running CCW (KC) t on SI |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR S | AFETY IN | IJECTION | PAGE NO. 16 of 49 Revision 43 | | |
|---|---|---------------------------|--|---|-------------------------------------|--|--|
| ACTION/EX | PECTED RESPONSE |] | | RESPONSE NOT OBTAIN | ED | | |
| <u>NOTE</u> Enclosure subseque guidance | e 4 (NC Temperature Co ent procedures provide a | ontrol) sh Ilternative | all remai e NC ten | n in effect until nperature control | | | |
| 22. Control NC ter Enclosure 4 (N | nperature. <u>REFER TO</u> IC Temperature Contro | ol). | ote to Ev nclosure | v <u>aluator:</u> e 4 is included as Att | achment 10. | | |
| 23. Verify Pzr POF status as follo | RV and Pzr Spray Valve ws: | e | | | | | |
| a. <mark>All Pzr POF</mark> | Vs - CLOSED. | | a. IF <u>TH</u> | Pzr pressure less than <u>EN</u> perform the follow | 2315 PSIG, ing: | | |
| | | | 1) | CLOSE Pzr PORV(s | s). | | |
| | | | 2) | <u>IF</u> any Pzr PORV ca closed, <u>THEN</u> CLOS isolation valve. | nnot be SE its | | |
| | | | <u>IF</u> 1NC-32B <u>OR</u> 1NC-34A be closed <u>OR</u> isolated, <u>TH</u> perform the following: | | | | |
| | | | | a) Align N₂ to POR opening the follo | Vs by wing valves: | | |
| | | | | - • 1NI-438A (Em CLA A To 1NC | er N2 From -34A) | | |
| | | | | 1NI-439B (Em CLA B To 1NC | er N2 From -32B). | | |
| | | | _ | b) CLOSE affected | Pzr PORV. | | |
| | | | (RNC | D continued on next pa | age) | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | | |
|-------------------|---|-------------------------------------|--|--|--|
| Op Test No.: | 301 Scenario # 3 Event # 7, 8, 9 | _ Page of147 | | | |
| Event Description | 1B S/G Fault Inside Containment / 1B MSIV (1SM-5) Au Pump Trips, all other KC Pumps Fail to Auto Start on SI | to Close Failure / Running CCW (KC) | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SA | FETY INJECTION | PAGE NO. 17 of 49 Revision 43 |
|------------------------|-----------------|-----------|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 23. (Continued) | | | 4) IF any Pzr PORV caclosed <u>OR</u> isolated, perform the following: a) Energize H₂ ignite b) Dispatch operator the following: (1) Secure all ichair handling in <u>REFER TO</u> EP/1/A/5000 (Generic End Enclosure 1/ All Ice Conder Control System) (2) Place contair analyzers in <u>REFER TO</u> OP/1/A/6450 (Containmer Control System) c) IF AT ANY TIME following condition (2) Containment per HAS REMAINE THAN 3 PSIG (3) Containment per Signal (4) Containment per Signal (5) Containment per Signal | nnot be <u>THEN</u> J: rers. r to perform e condenser units. /G-1 closures), 1 (Securing enser Units). nment H2 service.)/010 t Hydrogen ems). both the ns exist: ressure - ED LESS ressure - PSIG <u>AND</u> /X fan and intainment <u>ER TO</u> (Generic losure 18 ment ol). |
| | | | (RNO continued on next pa | age) |

| Appendix D | | Re | Operator | Form ES-D-2 | | | | | |
|--------------------|-----|---|--------------------|-------------|---------|--------|---------------|----|-----|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 74 | of | 147 |
| Event Description: | | - 1B S/G Fault Insi Pump Trips, all o | ide Con ther KC | to Close F | ailure | / Runi | ning CCW (KC) | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SA | P OR SAFETY INJECTION | | | | |
|--|--|-----------|--|---|--|--|--|
| ACTION/E) | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED | | | |
| 23. (Continued) | spray valves - CLOSED | | d) Concurrently perfollowing: Implement EP/ (Critical Safety Status Trees) GO TO EP/1/A (Loss of React Secondary Cod b. IF Pzr pressure less than <u>THEN</u> perform the follow 1) CLOSE spray valve(s) car closed, <u>THEN</u> perfor following: a) Stop NC pumps b) IE both 1C <u>AND</u> pumps on, <u>THEN</u> additional pump. | form the (1/A/5000/F-0 Function /5000/E-1 or or olant). 12150 PSIG, ing: 13. 14. 15. 10 NC 15. 10 NC 15. 10 NC 15. 10 NC | | | |
| c. <mark>At least one - OPEN.</mark> | Pzr PORV isolation val | ve | c. IF power available, THE Pzr PORV isolation valve was closed to isolate an PORV. | ┫ OPEN one e unless it open Pzr | | | |
| 24. Verify NC sub exit T/Cs - GR | cooling based on core EATER THAN 0°F. | _ | IE any NV <u>OR</u> NI pump on, perform the following: a. Ensure all NC pumps - C b. Maintain seal injection flo | <u>THEN</u> IFF. IW. | | | |

| Appendix D | | Re | Form ES-D-2 | | | | | | |
|--------------------|-----|--|-------------------|--|------------|--------|--------|---------------|-----|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 75 | of | 147 |
| Event Description: | | 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | MSIV (1SM-5) Au to Auto Start on SI | to Close I | ailure | / Runi | ning CCW (KC) | |



| Appendix D | | Re | Form ES-D-2 | | | | | | |
|--------------------|-----|--|--------------------|-----------------------------|--|------------|--------|-------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 76 | of | 147 |
| Event Description: | : | 1B S/G Fault Insi Pump Trips, all o | ide Con ther KC | tainment / 1E Pumps Fail | 3 MSIV (1SM-5) Au to Auto Start on SI | to Close I | ailure | / Run | ning CCW (KC) |



| Appendix D | | Re | quired | Form ES-D-2 | | | | | |
|--------------------|-----|--|--|-------------|---------|--------|---------------|----|-----|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 77 | of | 147 |
| Event Description: | | 1B S/G Fault Insi Pump Trips, all o | B MSIV (1SM-5) Au I to Auto Start on SI | to Close I | ailure | / Runi | ning CCW (KC) | | |



| Appendix D | | Re | Operator | Form ES-D-2 | | | | | |
|--------------------|-----|--|----------|-------------|---------|------|--------|--------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Event # | 7, 8, 9 | Page | 78 | of | 147 |
| Event Description: | : | 1B S/G Fault Inside Containment / 1B MSIV (1SM-5) Au Pump Trips, all other KC Pumps Fail to Auto Start on S | | | | | ailure | / Runi | ning CCW (KC) |

| CNS EP/1/A/5000/E-2 | FAULTED STE/ | AM GENE | PAGE NO. 4 of 26 Revision 15 | |
|--|-----------------------|---------|--|--|
| ACTION/EXF | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 10. (Isolate all faulta • <u>S/G 1A</u> : a. Verify S/G status ligh | ed S/G(s) as follows: | | a. Perform the following: Ensure the following v CLOSED: 1CF-28 (S/G 1A CF) 1CF-30 (S/G 1A CF) 1CF-33 (S/G 1A CF) 1CF-90 (S/G 1A CF) 1CF-90 (S/G 1A CF) Syp) 1CA-149 (S/G 1A CF) 1CA-185 (S/G 1A CF) 1CA-185 (S/G 1A CF) IE 1CA-185 (S/G 1A CF) THEN perform the foll CLOSE the following isol) cannot THEN perform the foll CLOSE the following 1CF-100 (S/G CF) | alves - Ctrl) Byp Ctrl) Cont Isol Cont Isol Cont Isol F Byp To A Nozz A Nozz A Nozz A Nozz Nozz (alve For CF-156 THEN to close CA Nozz (TB1-580, needed) (alve For 577, 1H-33)). |

| Appendix D | | Required | | Form ES-D-2 | | | | |
|--------------------|---------------------|-------------|---------|-------------|---------------|----|----|-----|
| Op Test No.: | 301 Scena | rio #3 | Event # | 7, 8, 9 | Page | 79 | of | 147 |
| Event Description: | 1B S/G I Pump Tr | uto Close F | ailure | / Runi | ning CCW (KC) | | | |



| Appendix D | | Re | quired | Operator . | Form ES-D-2 | | | |
|--------------------|-----|---|-------------------|------------|-------------|--------|---------------|--|
| Op Test No.: | 301 | Scenario # | 3 | Page | 80 | of | 147 | |
| Event Description: | : | - 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | to Close F | ailure | / Runi | ning CCW (KC) | |



| Appendix D | | Re | quired | Operator . | Form ES-D-2 | | | |
|--------------------|-----|--|-------------------|------------|-------------|--------|---------------|--|
| Op Test No.: | 301 | Scenario # | 3 | Page | 81 | of | 147 | |
| Event Description: | : | 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | to Close F | ailure | / Runr | ning CCW (KC) | |

| CNS EP/1/A/5000/E-2 | FAULTED STE | AM GENE | RATOR ISOLATION | PAGE NO. 11 of 26 Revision 15 | | | | |
|---|--|---------|--|--|--|--|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED | | | | |
| 10. (Continued) | | | | | | | | |
| | | | 2) Ensure feed flow main available to S/G used steam to CA Pump #1 | tained to supply | | | | |
| | | | 3) <u>IF</u> desired to isolate C, from 1B S/G, <u>THEN G</u> Step 10.d. | A Pump #1 <u>O TO</u> | | | | |
| | | | 4) GO TO Step 10.f. | | | | | |
| d. CLOSE 1 To S/G 1 | ICA-54B (CA Pmp 1 Disch B Isol). |) | d. Perform the following: | | | | | |
| | | | 1) CLOSE 1CA-52 (CA Pump #1 Flow To S/G 1B). | | | | | |
| | | | 2) Dispatch operator to close 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol) (DH-584, DD-EE, 52-53, Rm 572). | | | | | |
| | | | 3) <u>IF</u> interior doghouse n accessible <u>OR</u> CA car isolated, <u>THEN</u> dispate to unlock and close 10 Pump No 1 Disch To 5 Isol) (AB-552, DD-52, (Key #633). | ot nnot be ch operator CA-51 (CA S/G 1B Inlet Rm 250) | | | | |
| e. <mark>Dispatch close 1S/ CAPT Ma FF-53, R</mark> | operator to unlock and A-1 (1B S/G Main Steam to aintenance Isol) (DH-624, m 572) (Breakaway lock). |) - | e. Dispatch operator to unloo close 1SA-3 (1B S/G Mair CAPT Stop Check) (AB-5 Rm 217) (Breakaway lock | ck and h Steam to 51, DD-53,). | | | | |
| f. Verify the isolation | e following blowdown valves - CLOSED: | | | | | | | |
| 1) <mark>(1BB-</mark> (nsd) | 19A (S/G 1B Bldwn Cont Is , | sol | 1) CLOSE valve. | | | | | |
| | | | | | | | | |

| Appendix D | | Re | quired | Form ES-D-2 | | | | | |
|--------------------|-----|--|-------------------|-----------------------------|---|-----------|---------|-------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Page | 82 | of | 147 | | |
| Event Description: | : | 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | tainment / 1I Pumps Fail | 3 MSIV (1SM-5) Aut to Auto Start on SI | o Close I | Failure | / Run | ning CCW (KC) |



| Appendix D | | Re | quired | Operator | Form ES-D-2 | | | |
|--------------------|-----|--|------------|----------|-------------|---------------|-----|--|
| Op Test No.: | 301 | Scenario # | 3 | Page | 83 | of | 147 | |
| Event Description: | | 1B S/G Fault Insi Pump Trips, all o | to Close F | ailure | / Run | ning CCW (KC) | | |



| Appendix D | | Re | quired | Operator / | Form ES-D-2 | | | | |
|--------------------|-----|--|-------------------|-------------------------------------|--|------------|--------|--------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Page | 84 | of | 147 | | |
| Event Description: | | 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | - tainment / 1B ⊱Pumps Fail t | MSIV (1SM-5) Au to Auto Start on SI | to Close F | ailure | / Runi | ning CCW (KC) |



| Appendix D | | Re | quired | Operator . | Form ES-D-2 | | | |
|--------------------|-----|---|-------------------|------------|-------------|--------|---------------|--|
| Op Test No.: | 301 | Scenario # | 3 | Page | 85 | of | 147 | |
| Event Description: | : | - 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | to Close F | ailure | / Runi | ning CCW (KC) | |



| Appendix D | | Red | quired | Operator | Form ES-D-2 | | | | |
|--------------------|------------|--|-------------------|-----------------------------|--|------------|--------|--------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Page | 86 | of | 147 | | |
| Event Description: | : 1B Pu | 8 S/G Fault Insid Imp Trips, all ot | de Cont her KC | tainment / 1I Pumps Fail | 3 MSIV (1SM-5) Au to Auto Start on SI | to Close F | ailure | / Runi | ning CCW (KC) |



| Appendix D | | Requ | uired | Operator | Form ES-D-2 | | | | |
|--------------------|-----------------|-----------------------------------|-----------------|----------------------------|--|-------------|--------|--------|---------------|
| Op Test No.: | | enario # | 3 | Page | 87 | of | 147 | | |
| Event Description: | : 1B S/ Pump | G Fault Inside Trips, all othe | e Cont er KC | ainment / 1I Pumps Fail | B MSIV (1SM-5) Au to Auto Start on SI | ito Close F | ailure | / Runr | ning CCW (KC) |



| Appendix D | | Re | quired | Operator A | Form ES-D-2 | | | | |
|--------------------|-----|---|--------------------|-----------------------------|---|------------|--------|--------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Page | 88 | of | 147 | | |
| Event Description: | : | - 1B S/G Fault Insi Pump Trips, all o | de Cont ther KC | tainment / 1E Pumps Fail | MSIV (1SM-5) Aut to Auto Start on SI | to Close F | ailure | / Runi | ning CCW (KC) |



| Appendix D | | Re | quired | Operator / | Form ES-D-2 | | | | |
|--------------------|-----|---|--------|------------|-------------|----|-----|--------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Page | 89 | of | 147 | | |
| Event Description: | | 1B S/G Fault Inside Containment / 1B MSIV (1SM-5) Au Pump Trips, all other KC Pumps Fail to Auto Start on SI | | | | | | / Runi | ning CCW (KC) |



| Appendix D | | Re | quired | Operator | Form ES-D-2 | | | | |
|--------------------|-----|--|-------------------|-----------------------------|--|------------|---------|-------|---------------|
| Op Test No.: | 301 | Scenario # | 3 | Event # | Page | 90 | of | 147 | |
| Event Description: | | 1B S/G Fault Insi Pump Trips, all o | de Con ther KC | tainment / 1E Pumps Fail | 3 MSIV (1SM-5) Au to Auto Start on SI | to Close I | Failure | / Run | ning CCW (KC) |



Attachment List

Scenario 3

| ATTACHMENT 1 - | Crew Critical Task Summary | |
|-----------------|--|--|
| ATTACHMENT 2 - | Shift Turnover Information | |
| ATTACHMENT 3 - | AP/1/A/5500/023 Enclosure 1 (Foldout Page) | |
| ATTACHMENT 4 - | EP/1/A/5000/G-1 Enclosure 16 (Control Room Ventilation Verification) | |
| ATTACHMENT 5 - | AP/1/A/5500/002 Enclosure 4 (Rod Insertion Limit Boration) | |
| ATTACHMENT 6 - | EP/1/A/5000/E-0 Enclosure 1 (Foldout Page) | |
| ATTACHMENT 7 - | EP/1/A/5000/E-0 Enclosure 5 (VX System Operation) | |
| ATTACHMENT 8 - | EP/1/A/5000/E-0 Enclosure 2 (Ventilation System Verification) | |
| ATTACHMENT 9 - | EP/1/A/5000/G-1 Enclosure 1 (Unit1 Spent Fuel Pool Monitoring) | |
| ATTACHMENT 10 - | EP/1/A/5000/E-0 Enclosure 4 (NC Temperature Control) | |
| ATTACHMENT 11 - | EP/1/A/5000/E-2 Enclosure 1 (Foldout Page) | |
| ATTACHMENT 12 - | EP/1/A/5000/ES-1.1 Enclosure 1 (Foldout Page) | |
| ATTACHMENT 13 - | Scenario Specific Technical Specifications | |
| ATTACHMENT 14 - | EP/1/A/5000/E-1 | |

| | CREW CRITICAL TASK SUMMARY | | | | |
|-----|------------------------------|---|--|--|--|
| SAT | SAT UNSAT CT # CRITICAL TASK | | | | |
| | | 1 | Manually close Pzr spray valve prior to Low Pressurizer Pressure Reactor Trip at 1945 psig. | | |
| | | 2 | Restore Sealing Steam prior to Low Vacuum Main Turbine Trip. | | |
| | | 3 | Manually start at least the minimum number of CCW pumps required to provide adequate component cooling for the operating safeguards train(s) before loss of any ECCS component occurs. | | |

Comments:

| SHIFT TURNOVER INFORMATION | | | | |
|---|---|-----------|---------|--|
| | Unit 1 | Status | | |
| Power Level | Power History | NCS Boron | Xenon | |
| 50 % | EOL | 244 PPM | per OAC | |
| | Controlling | Procedure | | |
| OP/1/A/6100/003 (C Decrease). The step | OP/1/A/6100/003 (Controlling Procedure for Unit Operation), Enclosure 4.2 (Power Decrease). The steps up to step 3.24 are complete. | | | |
| Other Information Needed to Assume the Shift | | | | |
| Unit 1 is stable at 50% power at the EOL while awaiting management direction. Unit 2 is at 100% power. Direction for the crew is to swap operating LH Pumps by placing 1A LH pump in service and securing 1B LH pump per OP/1/B/6300/008 (Main Turbine Hydraulic Oil System), Enclosure 4.3 (Shifting Operating Hydraulic Fluid Pumps). Initial Conditions are complete. Crew is to begin at step 3.1 of Enclosure 4.3. | | | | |
| AOs Available | | | | |
| S | Seven AOs are available as listed on the status board | | | |
| METEOROLOGICAL CONDITIONS | | | | |
| Upper wind direction | n = 315 degrees, speed = | 3 mph | | |
| Lower wind direction | n = 315 degrees, speed = | 4.5 mph | | |
| Forecast calls for cle | ear skies over the next 24 | hours. | | |

| AP/1/A/5500/023 Enclosure 1 - Page 1 of 2 Foldout Page 1 |
|---|
|---|

| <u>NOTE</u> | If trend down in vacuum is rapid, using the reactor trip guidance for loss of CF pumps may be more appropriate. |
|-------------------|---|
| 1. Rea | ctor Trip Criteria: |
| • <u>IF</u> do | reactor power greater than or equal to 69% <u>AND</u> main condenser vacuum trending own to 22 in. Hg in any condenser section imminent, <u>THEN</u> perform the following: |
| a. | Trip reactor. |
| b. | GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). |
| • <u>IF</u> | in Mode 1 or 2 <u>AND</u> vacuum trending down to 16.9 in. Hg in both CF pump ondensers imminent, <u>THEN</u> perform the following: |
| a. | Trip reactor. |
| b. | WHEN reactor trip verified, THEN trip CF pumps. |
| C. | GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection). |
| 2. Turl | bine Trip Criteria: |
| • <u>IF</u> H | reactor power less than 69% <u>AND</u> main condenser vacuum trending down to 22 in. g in any condenser section imminent, <u>THEN</u> perform the following: |
| a. | Trip turbine. |
| b. | REFER TO AP/1/A/5500/002 (Turbine Generator Trip). |
| • <u>IF</u> te | turbine impulse pressure less than or equal to 370 psig <u>AND</u> exhaust hood mperature trending up to 225°F imminent, <u>THEN</u> perform the following: |
| a. | Trip turbine. |
| b. | REFER TO AP/1/A/5500/002 (Turbine Generator Trip). |
| • <u>IF</u> do | turbine load less than or equal to 360 MWs <u>AND</u> main condenser vacuum trending own to 24.3 in. Hg in any condenser section imminent, <u>THEN</u> perform the following: |
| a. | Trip turbine. |
| b. | <u>REFER TO</u> AP/1/A/5500/002 (Turbine Generator Trip). |
| | |
| | |
| | |

| CNS AP/1/A/5500/023 LOSS OF CONDENSER VACUUM Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 14 of 21 Revision 24 |
|---|-------------------------------------|
|---|-------------------------------------|

| 3. | CF Pump Trip Criteria: |
|----|---|
| | <u>IF</u> in Mode 1 or 2 <u>AND</u> vacuum trending down to 16.9 in. Hg in both CF pump condensers imminent, <u>THEN</u> perform the following: |
| | a. Trip reactor. |
| | b. <u>WHEN</u> reactor trip verified, <u>THEN</u> trip CF pumps. |
| | c. <u>GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection)</u> . |
| | <u>IF</u> vacuum trending down to 16.9 in. Hg in one CF pump condenser imminent, <u>THEN</u> perform the following: |
| | a. Trip affected CF pump. |
| | b. <u>IF</u> load rejection occurred <u>OR</u> required, <u>THEN REFER TO</u> AP/1/A/5500/003 (Load Rejection). |
| | c. Ensure turbine load - REDUCED TO LESS THAN 65%. |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

| CNS EP/1/A/5000/G-1 | GENE Enclos Control Roo | RIC ENCLOSURES PAGE N sure 16 - Page 1 of 3 m Ventilation Verification Revision | |
|--|--|--|---|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAINED | |
| 1. Verify one train equipment in c • YC chiller • CR AHU-1 • CRA AHU-1 • CRA PFT-1. | n of the following operation: | Perform the following: a. Shift operating VC/YC trains. <u>REF</u>TO Enclosure 17 (Shifting Operatin VC/YC Trains). b. <u>IF</u> no train can be properly aligned <u>THEN</u> dispatch operator and IAE/Maintenance to restore at leas one train of VC/YC. <u>REFER TO</u> the following: OP/0/A/6450/011 (Control Room Area Ventilation/Chilled Water System) EM/0/A/5200/001 (Troubleshoot Cause For Improper Operation of VC/YC System). | ER)g , it le 1 ing of |
| 2. Verify the follo DARK: - • 1AD-18, A/8 ' CHLORINE 1 - • 1AD-18, B/8 ' CHLORINE 2 - • 1AD-18, D/8 ' CHLORINE 2 - • 1AD-18, E/8 ' CHLORINE 2 | Wing annunciators - I'UNIT 1 INTAKE HI I'UNIT 1 INTAKE HI B" I'UNIT 2 INTAKE HI A" I'UNIT 2 INTAKE HI B". | IF chlorine odor is detected in Cont Room, <u>THEN</u> perform the following based on status of given alarms: IF detectors on both unit intakes in alarm, <u>THEN</u> perform the following Ensure the following VC intake dampers - CLOSED: 1VC-5B (CRA Filt Inlet) 1VC-6A (CRA Filt Inlet) 2VC-5B (CRA Filt Inlet) 2VC-6A (CRA Filt Inlet) 2VC-6A (CRA Filt Inlet) 20 GO TO Step 4. | rol I |

| CNS EP/1/A/5000/G-1 | CNS GENERIC ENCLOSURES PAGE (A/5000/G-1 Enclosure 16 - Page 2 of 3 Control Room Ventilation Verification Revision | | PAGE NO. 47 of 109 Revision 11 | |
|----------------------------|---|---|--|----------------------------------|
| ACTION/EX | PECTED RESPONSE |] | RESPONSE NOT OBTAIN | NED |
| 2. (Continued) | | | | |
| | | | b. <u>IF</u> Unit 1 intake HI chlorin in alarm, <u>THEN</u> perform | ne detector(s) the following: |
| | | | Ensure the following CLOSED: | VC dampers - |
| | | | • 1VC-5B (CRA Filt I • 1VC-6A (CRA Filt I | nlet) nlet). |
| | | | Ensure the following OPEN: | dampers - |
| | | | • 2VC-5B (CRA Filt • 2VC-6A (CRA Filt | nlet) nlet). |
| | | | 3) GO TO Step 4. | |
| | c. <u>IF</u> Unit 2 intake Hi chlorine detect in alarm, <u>THEN</u> perform the follow | | ne detector(s) the following: | |
| | | | Ensure the following CLOSED: | VC dampers - |
| | | | • 2VC-5B (CRA Filt I • 2VC-6A (CRA Filt I | nlet) nlet). |
| | | | Ensure the following OPEN: | dampers - |
| | | | • 1VC-5B (CRA Filt I • 1VC-6A (CRA Filt I | nlet) nlet). |
| | | | 3) GO TO Step 4. | |
| | | | | |
| 3. Ensure the fol OPEN: | lowing VC dampers - | | | |
| | A Filt Inlet) A Filt Inlet) A Filt Inlet) A Filt Inlet). | | | |
| | | | | |

| EP/ | CNS /1/A/5000/G-1 | GENE Enclos Control Roo | RIC ENC sure 16 - F m Ventil a | LOSURES Page 3 of 3 ttion Verification | PAGE NO. 48 of 109 Revision 11 |
|-----|--------------------------------------|---|---|--|--------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 4. | Repeat this en Station Manag | closure until notified b ement as follows: | у | | |
| · | OR | every o hours | | | |
| | OR • Any time VC/ on 1AD-18 ad | YC related annunciators | 5 | | |
| | | | | | |
| | | | | | |

| | CNS AP/1/A/5500/002 | TURBINE GENERATOR TRIP Enclosure 4 - Page 1 of 1 Rod Insertion Limit Boration | PAGE NO. 29 of 29 Revision 34 |
|--|------------------------|---|-------------------------------------|
|--|------------------------|---|-------------------------------------|

| <u>CAUTION</u> Failure to initiate boration within one hour of exceeding rod insertion limits may violate Tech Spec 3.1.6. |
|--|
| • OAC point C1L4409 (Ctrl Bank Tech Spec Insertion Lmt Reached) and R.O.D Book (Section 2.2) provide rod insertion limit indication. |
| The "Reactivity Data Sheet" provides boration data to restore control rods above rod insertion limits. |
| <u>IF</u> the control rods cannot be maintained above the rod insertion limits, <u>THEN</u> perform the following: |
| a. Stop any dilutions in progress. |
| b. Borate NC System as required, to restore rods above insertion limits. |
| c. Ensure control rods restored above insertion limits within 2 hours of exceeding limits. |
| d. Ensure compliance with Tech Spec 3.1.6 (Control Bank Insertion Limits). |
| |

| | EP/1 | CNS 1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 2 Foldout Page | PAGE NO. 34 of 49 Revision 43 | | | | |
|---|------|---|---|-------------------------------------|--|--|--|--|
| _ | | | | | | | | |
| | 1. | NC Pump Trip Criteria: | | | | | | |
| | | IF the following conditions satisfied, <u>THEN</u> trip all NC pumps while maintaining seal injection flow: | | | | | | |
| | | Any NV or NI pump - DELIVERING S/I FLOW TO NC SYSTEM | | | | | | |
| | | NC subcooling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F | | | | | | |
| | | Reactor power - LESS THAN 5%. | | | | | | |
| | 2. | CA Suction So | ource Switchover Criterion: | | | | | |

- IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Loss of S/G Feedwater).
- 3. Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):
 - IF NC pressure less than 1500 PSIG <u>AND</u> NV S/I flowpath aligned, <u>THEN</u> CLOSE 1NV-202B and 1NV-203A.
 - IF NC pressure greater than 2000 PSIG, THEN OPEN 1NV-202B and 1NV-203A.

4. Ruptured S/G CA Isolation Criteria:

- IF both the following conditions met, THEN stop CA flow to affected S/G(s):
 - Level increasing in uncontrolled manner or radiation level in that S/G abnormal
 - N/R level GREATER THAN 11% (29% ACC).
- 5. Faulted S/G CA isolation Criteria:
 - IF all the following conditions met, THEN stop CA flow to affected S/G:
 - S/G pressure decreasing in uncontrolled manner or completely depressurized
 - · Only one S/G diagnosed as faulted
 - · Secondary heat sink criteria met:
 - Total CA flow GREATER THAN 450 GPM
 OR
 - ANY S/G(s) N/R level GREATER THAN 11%(29% ACC).

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 35 of 49 Revision 43 |
|------------------------|---|-------------------------------------|
| | | |

| 6. NS Pump Trip Criterion: | | | | | |
|---|--|--|--|--|--|
| IF NS pump in recirc and S/I occurs, <u>THEN</u> perform one of the following: | | | | | |
| IF train affected ECCS and D/G load sequencer - RESET, THEN stop NS pump | | | | | |
| OR | | | | | |
| WHEN sequencer loading complete, <u>THEN</u> perform the following for affected tra | | | | | |
| a. Notify Control Room Supervisor. | | | | | |
| b. Reset ECCS. | | | | | |
| c. Reset D/G load sequencer. | | | | | |
| d. Secure NS pump. | | | | | |
| e. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR Enclos VX S | IP OR SAI sure 5 - Pa system Op | ETY INJECTION age 1 of 1 veration | PAGE NO. 49 of 49 Revision 43 | |
|---|--|---------------------------------------|---|---|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAINED | | |
| 1. Verify the follo return fan dam — • ARF-D-2 (AR (1MD-4, I/5) — • ARF-D-4 (AR (1MD-4, I/8). | wing containment air pers - OPEN: RF-1A Ret Fan Damper) RF-1B Ret Fan Damper) | _ | <u>IF</u> equipment not in proper <u>THEN</u> align equipment. | alignment, | |
| (1MD-4, 1/5) ARF-D-4 (ARF-1B Ret Fan Damper) (1MD-4, 1/8). Verify the following equipment alignment: 1VX-1A (HSF-1A Init Isol) (1MD-4, 1/6) OPEN 1VX-2B (HSF-1B Init Isol) (1MD-4, 1/7) OPEN ARF-1A (Cont Air Return Fan) (1MD-4, 1/7) OPEN ARF-1B (Cont Air Return Fan) (1MD-4, 1/3) - ON HSF-1A (H₂ Skimmer Fan) (1MD-4, 1/10) - ON HSF-1B (H₂ Skimmer Fan) (1MD-4, 1/9) - ON HSF-1B (H₂ Skimmer Fan) (1MD-4, 1/9) - ON. 3. Verify containment air return fans operate as containment pressure changes as follows: IF AT ANY TIME containment pressure containment air return fans - ON. IF AT ANY TIME containment pressure containment air return fans - OFF. | | ;) 7) 4, 4, re re | IF equipment not in proper <u>THEN</u> perform the followin a. IE containment pressure 0.3 PSIG, <u>THEN</u> verify th Monitor Light Panel Grou - DARK: - I/3 - I/10. b. Align or start affected cor c. IE any VX system equipm be started, <u>THEN REFEP</u> OP/1/A/6450/010 (Contal Hydrogen Control System further actions. | r alignment, ig: less than le following lp 1 Sp lights mponent(s). nent cannot <u>R TO</u> inment ns), for | |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 1 of 7 Ventilation System Verification | | PAGE NO 36 of 49 Revision 4 | 3 | |
|---|--|----------------|---|---|--------|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT O | | BTAINED | |
| Verify proper V follows: a. Verify one trequipment i PYC chiller CR AHU- CRA AHL CRA PFT | /C/YC operation as rain of the following n operation: 1 -1 -1. | | a. Perform the followin 1) Shift operating <u>REFER TO</u> EP. (Generic Enclosure 17 (\$ VC/YC Trains). 2) <u>IF</u> no train can aligned, THEN and IAE/Mainte at least one trai REFER TO the OP/0/A/6450 Room Area \Water Syster EM/0/A/5200 (Troubleshoo Improper Op System). | ng: VC/YC trains. V1/A/5000/G-1 sures), Shifting Operating be properly dispatch operator enance to restore in of VC/YC. following: V011 (Control Ventilation/Chilled m) V/001 oting Cause For eration of VC/YC |) r |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFE Enclosure 2 - Pac Ventilation System | | FETY INJECTION age 2 of 7 1 Verification | PAGE NO. 37 of 49 Revision 43 |
|---|---|--|--|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 1. (Continued) b. Verify the fol - • 1AD-18, A CHLORIN - • 1AD-18, E CHLORIN - • 1AD-18, E CHLORIN - • 1AD-18, E CHLORIN | llowing alarms - DARK: V8 "UNIT 1 INTAKE HI IE 1A" 3/8 "UNIT 1 INTAKE HI IE 2A" 5/8 "UNIT 2 INTAKE HI IE 2B". | | b. IF chlorine odor detected Room, <u>THEN</u> perform the based on the status of giv 1) IF detectors on both in alarm, <u>THEN</u> perform following: a) Ensure the follow intake dampers - 1VC-5B (CRA 1VC-6A (CRA 2VC-5B (CRA 2VC-5B (CRA 2VC-6A (CRA b) GO TO Step 1.d. 2) IF Unit 1 intake HI cf detector(s) in alarm, perform the following a) Ensure the follow dampers - CLOS (RNO continued on next pa | in Control e following ven alarms: unit intakes form the cLOSED: Filt Inlet) Filt Inlet) Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). filt Inlet). filt Inlet). filt Inlet). |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 3 of 7 Ventilation System Verification | | | PAGE NO. 38 of 49 Revision 43 |
|--|--|---|---|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 1. (Continued) 1. (Continued) c. Ensure the f OPEN: - 1VC-5B (- 1VC-6A (- 2VC-5B (- 2VC-5B (- 2VC-6A (d. Repeat Step notified by s follows: - At least of OR - Any time s | following VC dampers - CRA Filt Inlet) CRA Filt Inlet) CRA Filt Inlet) CRA Filt Inlet) CRA Filt Inlet). 0 1 of this enclosure unti tation management as nce every 8 hours VC/YC related ors on 1AD-18 actuate. | 3 | IE Unit 2 intake Hi ch detector(s) in alarm, perform the following a) Ensure the follow dampers - CLOS 2VC-5B (CRA 2VC-6A (CRA b) Ensure the follow - OPEN: 1VC-5B (CRA 1VC-6A (CRA c) GO TO Step 1.d. | Informe THEN g: ving VC ED: Filt Inlet) Filt Inlet). Ving dampers Filt Inlet). Filt Inlet). |

| CNS EP/1/A/5000/E-0 | | REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 4 of 7 Ventilation System Verification | | | | PAGE NO. 39 of 49 Revision 43 |
|------------------------|---|--|----|------------------|------------|-------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE | NOT OBTAIN | ED |
| 2. | Ensure proper follows: | VA system operation | as | | | |
| | Ensure the formatter | llowing fans - OFF: | | | | |
| | ABUXF 1A ABUXF 1B | | | | | |
| | Ensure VA sy follows: | /stem filter in service as | | | | |
| | ● 1ABF-D-12 Dampers) · | 2 & 19 (VA Filter A Bypa: - CLOSED | SS | | | |
| | ● 1ABF-D-5 Dampers) | & 20 (VA Filter B Bypas: - CLOSED. | S | | | |
| | Ensure the formatter | llowing fans - ON: | | | | |
| | ABFXF-1A ABFXF 1B | | | | | |
| 3. | Verify proper \ follows: | /E system operation a | 5 | | | |
| - | _ a. VE fans - Ol | Ν. | _ | a. Start fan(s). | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | 143 |
|--|--|
| | |
| 3. (continued) b. Annulus pressure - BETWEEN -1.4 IN. WC AND -1.8 IN. WC. b. Perform the following: 1) IF annulus pressure nore positive than -1.4 in. WC, THI perform the following: a) Verify flow indicated on the following indications: - 1YEP5200 (VE 1A Flow Stack). b) IF flow not indicated, THE dispatch operator to verify status of the following dampers based on their lo indication or their operatin piston rods being extende to 6°: - 1AVS-D-2 (VE A Trn Re Damp) (AB-603, JJ-51, 500) - CLOSED - 1AVS-D-3 (VE A Trn Ex Damp) (AB-603, HI-52, 500) - OPEN. - 1AVS-D-3 (VE A Trn Ex Damp) (AB-603, HI-52, 500) - OPEN. - C Consult plant engineering and notify (AE/Maintenant trobleshoot and repair. REFER TO EW1/A/5200/ (Troubleshoot and repair. | To To To al circ Rm h Rm h Rm h Rm h Rm b r Do Do Do Do Do Do |
| EP/1/ | CNS A/5000/E-0 | REACTOR TR Enclo Ventilatio | RIP OR SA sure 2 - Pa on System | FETY INJECTION age 6 of 7 1 Verification | PAGE NO. 41 of 49 Revision 43 |
|-------|---|---|---------------------------------------|--|--|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAI | NED |
| 3 | . (Continued) c. Repeat Step until notified | o 3.b every 30 minutes by station management | t. | 2) <u>IF</u> annulus pressure negative than -1.8 i perform the followir a) Determine which indicates highes flow to stack. b) Within 2 hours, train that indicates discharge flow to secured. c) Consult plant er and notify IAE/N troubleshoot and <u>REFER TO EM</u> (Troubleshooting VE System Hi/L) | e more n. WC, <u>THEN</u> g: n VE train t discharge ensure VE es highest o stack gineering staff laintenance to d repair. 1/A/5200/002 g Cause For o Pressure). |

| EP/1/A | CNS V5000/E-0 | REACTO E Vent | R TRIP OR SAFE Enclosure 2 - Pag illation System V | ETY INJECTION Je 7 of 7 /erification | PAGE NO. 42 of 49 Revision 43 |
|--------|------------------------------------|------------------------------------|--|--|-------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT | OBTAINED |
| _ 4. | Record time ve verified on foll | entilation systems owing table: | | | |
| | | | SYSTEM (VC, VE) | INITIALS | |
| | | | | | |
| | | | | | |

| CNS EP/1/A/5000/G-1 | GENERIC ENCLOSURES PAGE Enclosure 1 - Page 1 of 8 Unit 1 Spent Fuel Pool Monitoring | | | |
|---|--|---------|-------------------------------------|-------------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 1. Review the fol for Spent Fuel | lowing considerations Pool monitoring: | | | |
| Control Room 1KFP5130 is loop. Guidan temperature Spent Fuel P | n temperature indication a non-safety instrument ice is provided for local verification if access to ool available. | | | |
| Normal level non-safety in from 1RPA. local tempera to Spent Fuel | indication 1KFP5120 is a strument loop powered Guidance is provided for ature verification if access I Pool available. | a S | | |
| If a loss of all to last greate Spent Fuel P instrumentati access to Sp | AC Power is anticipated r than 6 hrs, portable ool level and temperatur on can be installed if ent Fuel Pool available. | e | | |
| Seismic even Fuel Pool inv of water. | It may cause loss of Spe entory due to "splashing" | nt " | | |
| 2. Monitor Unit 1 as follows: | KF pump motor coolin | g | | |
| a. Verify the fo | llowing: | _ | a. Ensure affected Unit 1 K OFF. | F pump(s) - |
| • KF PUMF (1AD-13 I • KF PUMF (1AD-13 I | 9 A MTR CLR HI TEMP D/6) - DARK 9 B MTR CLR HI TEMP D/7) - DARK. | | | |
| b. IF AT ANY HI TEMP an perform Ste | TIME KF PUMP MTR CL inunciator(s) lit, <u>THEN</u> p 2.a. | .R | | |
| 3. IF AT ANY TIM AND temperation unavailable in dispatch opera Spent Fuel Por Enclosure 24 (Monitoring). | E Spent Fuel Pool leve ure indications Control Room, <u>THEN</u> ator to monitor Unit 1 ol. <u>REFER TO</u> Local Spent Fuel Pool | I | | |

| CNS EP/1/A/5000/G-1 | Unit | GENERIC ENCLOSURES Enclosure 1 - Page 2 of 8 Unit 1 Spent Fuel Pool Monitoring | | | | PAGE NO. 4 of 109 Revision 11 | |
|---------------------------|--|--|---------------|-------------------------------------|---------------------------|-------------------------------------|--|
| ACTIO | N/EXPECTED RESPONSE | | ŀ | RESPONSE NO | T OBTAINE | D | |
| NOTE Steps | NOTE Steps 4 and 5 may be performed concurrently. | | | | | | |
| 4. Monitor Ur follows: | nit 1 Spent Fuel Pool | level as | | | | | |
| a. Verify S in Contr | pent Fuel Pool level in ol Room - AVAILABLE | dication | a. <u>GO</u> | <u>TO</u> Step 4.e | 2. | | |
| b. Verify S than - 3 | Verify Spent Fuel Pool level greater than - 39 ft. | | | fy Control R wing: | oom Supe | rvisor of the | |
| | | | 2) <u>F</u> | REFER TO / Loss of Spe evel). | AP/1/A/550 Int Fuel Co | 00/041 oling or | |
| c. Record the follo | Unit 1 Spent Fuel Poo wing table: | l level in | | | | | |
| Ti | me Unit 1 SFP Level | Time Ur SFP | it 1 Level | Time | Unit 1 SFP Leve | 1 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| d. <u>GO TO</u> | d. <u>GO TO</u> Step 5. | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Spe | RIC ENCI sure 1 - P nt Fuel Po | LOSURES age 3 of 8 ool Monitoring | PAGE NO. 5 of 109 Revision 11 |
|---|--|--------------------------------------|--|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBT | AINED |
| 4. (Continued) e. Determine S follows: 1) Dispatch determin area acc 2) <u>WHEN</u> U <u>area acc</u> <u>THEN</u> po a) Verify area | Spent Fuel Pool level as operator and RP to le if Unit 1 Spent Fuel Pool essible. Jnit 1 Spent Fuel Pool essibility determined, erform the following: / Unit 1 Spent Fuel Pool - ACCESSIBLE. | bol | a) Notify Station I perform the fol (1) Evaluate a to monitor Fuel Pool (2) IF AT AN level estim 39 ft, THE AP/1/A/55 Spent Fue | Management to lowing: alternate method Unit 1 Spent level. <u>Y TIME</u> Unit 1 lated less than - <u>N REFER TO</u> 00/041 (Loss of I Cooling or |
| b) Notify perfo (1) [- - - - - - - - - - - - - - - - - - - | / dispatched operator to rm the following: Determine Spent Fuel Poevel using the following eference points: Top of skimmer trough 40 Ft 1 Ft below lip of skimmer trough is 39 F Centerline of KF pump suction strainer is 37.5 Ft. Report level determination of Control Room. | ool is ft | (3) <u>GO TO</u> St | ep 5. |

| CNS EP/1/A/5000/G-1 | GENEF Enclos Unit 1 Spen | RIC ENCLOSUR ure 1 - Page 4 t Fuel Pool Mo | RES of 8 onitoring | PAGE NO. 6 of 109 Revision 11 | | | | |
|--|---|--|--------------------------|-------------------------------------|--|--|--|--|
| ACTION/E) | PECTED RESPONSE | | RESPONSE NOT OBTAI | NED | | | | |
| 4. (Continued) | | | | | | | | |
| c) WHE THE | c) <u>WHEN</u> operator reports level, THEN perform the following: | | | | | | | |
| (1) Verify level greater than(1) Notify Control Ro 39 ftSupervisor of the | | | | | | | | |
| | 1. Unit_1 Sper | | | | | | | |
| | 0 500/041 (Loss Fuel Cooling | | | | | | | |
| (2) | Record Unit 1 Spent Fuel Pool level in the following table: | | | | | | | |
| Time | Unit 1 Time SFP Level | Unit 1 SFP Level | Time Unit SFP Le | 1 vel | | | | |
| | | | | _ | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | I | |] | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Spe | RIC ENCLOSURE sure 1 - Page 5 of 8 nt Fuel Pool Monit | S 3 toring | PAGE NO. 7 of 109 Revision 11 | | | |
|--|--|--|---------------------------------------|-------------------------------------|--|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED | | | |
| 5. Monitor Unit 1 temperature as | Spent Fuel Pool s follows: | | | | | | |
| a. Verify Spen indication in AVAILABLE | t Fuel Pool temperature Control Room - | a. <u>GO</u> | TO Step 5.e. | | | | |
| b. Verify Spen less than - 1 | t Fuel Pool temperature 25°F. | Notify Control Room Supervisor of the following: | | | | | |
| | | _ 1) | Unit 1 Spent Fuel Poo temperature. | bl | | | |
| | 2) <u>REFER TO</u> AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). | | | | | | |
| c. Record Unit temperature | 1 Spent Fuel Pool in the following table: | | | | | | |
| Time | Unit 1 Time SFP Temp | Unit 1 SFP Temp | Time Unit SFP T | 1 emp | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| d GO <u>TO</u> Step | o 6. | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Spe | GENERIC ENCLOSURES Enclosure 1 - Page 6 of 8 Unit 1 Spent Fuel Pool Monitoring | | |
|---|---|--|--|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 5. (Continued) e. Determine S temperature - 1) Verify ac Pool are - 2) Verify U - ACCES | Spent Fuel Pool e as follows: ccess to Unit 1 Spent Fu a previously determined | el | Perform the following: a) Dispatch operator determine if Unit 1 Pool area accessil b) WHEN Unit 1 Spearea accessibility THEN perform Steathrough 5.e.4. c) GO TO Step 6. Notify station manage perform the following: a) Evaluate alternate monitor Unit 1 Spearea accession b) IF AT ANY TIME I temperature estimation than - 125°F, THE TO AP/1/A/5500/0 Spent Fuel Coolin c) GO TO Step 6. | and RP to Spent Fuel ble. Int Fuel Pool determined, eps 5.e.2 ement to method to ent Fuel Pool Unit 1 ated greater <u>N REFER</u> 41 (Loss of g or Level). |
| 3) Notify di determir tempera a) Obta from Cabi b) Scan for hi c) Repo deter | spatched operator to le Unit 1 Spent Fuel Poo ture as follows: OSC "Emergency Supp net". Spent Fuel Pool surface ghest reading. ort temperature mination to Control Roo | l y e m. | | |

| CNS EP/1/A/5000/G-1 | GENE Enck Unit 1 Spe | RIC ENCI sure 1 - P nt Fuel Po | _OSURE age 7 of ool Mon | ES 8 itoring | | PAGE NO. 9 of 109 Revision 11 | |
|--|---|--------------------------------------|-------------------------------|---------------------|---------------------|-------------------------------------|--|
| ACTION/EX | PECTED RESPONSE |] | | RESPONSE NOT | OBTAINE | D | |
| 5. (Continued) | | | | | | | |
| 4) <u>WHEN</u> of tempera following | perator reports ture, <u>THEN</u> perform the I [:] | | | | | | |
| a) Verify Spent Fuel Pool a) Notify Control Room temperature - LESS THAN Supervisor of the following: | | | | | | | |
| 123 | Γ. | | | (1) Unit 1 tempe | Spent F erature. | uel Pool | |
| | (2) <u>REFER TO</u> AP/1/A/5500/041 (Loss or Spent Fuel Cooling or Level). | | | | | | |
| b) Reco temp table | rd Unit 1 Spent Fuel Po erature in the following | ol | | | | | |
| Time | Unit 1 Time SFP Temp | e Un SFP | it l Temp | Time | Unit SFP Ter | 1 np | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 6. Notify Control Unit 1 Spent F temperature. | Room Supervisor of uel Pool level and | | | | | | |
| | | | | | | | |

| EP/1 | CNS /A/5000/G-1 | GENERIC ENCLOSURES PAGE N Enclosure 1 - Page 8 of 8 Unit 1 Spent Fuel Pool Monitoring Revision | | | |
|------|--|--|--------|---|---|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| _ 7. | Verify AP/1/A/ Fuel Cooling o IMPLEMENTE | 5500/041 (Loss of Spen r Level) - D. | .t | IF AT ANY TIME Unit 1 Spe cooling <u>NOT</u> established p reaching either of the follo conditions, <u>THEN</u> notify Co Supervisor, <u>REFER TO</u> AP/1/A/5500/041 (Loss of S Cooling or Level): • Unit 1 Spent Fuel Pool gre 125°F. • Unit 1 Spent Fuel Pool lev 39 ft. | ent Fuel Pool rior to wing ontrol Room Spent Fuel eater than - el less than - |
| 8. | Repeat this en until notified b | closure every 2 hours y station management | | | |

| EP/1 | CNS /A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION PA Enclosure 4 - Page 1 of 5 4 NC Temperature Control Re | | | |
|------|--|---|-----------------|--|---------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 1. | Verify any NC | pump - ON. | | Perform the following: a. Use NC T-Colds to detern temperature as required subsequent steps. b. <u>GO TO</u> Step 4. | mine NC in |
| 2. | Use NC T-Avg temperature as steps. | to determine NC s required in subseque | nt | | |
| 3. | IF AT ANY TIM THEN use NC temperature as steps. | <u>E</u> all NC pumps tripped T-Colds to determine N s required in subseque | d, IC int | | |
| 4. | Verify one of the NC temperate THAN OR ECOR NC temperate 557°F. | he following: ure - STABLE AT LESS QUAL TO 557°F ure - TRENDING TO | | <u>GO TO</u> Step 8. | |
| 5. | Continue to m | onitor NC temperature | | | |
| 6. | Notify Control temperature co | Room Supervisor of N ontrol status. | с | | |

| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 7. Do not continue in this enclosure until one of the following occurs: • NC temperature - GREATER THAN 557°F AND INCREASING IN AN UNCONTROLLED MANNER OR • NC temperature - GREATER THAN 557°F AND STABLE OR • NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER. 8. Verify NC temperature - LESS THAN 557°F AND DECREASING. Perform the following: a. IF NC temperature greater than 557°F AND DECREASING. a. IF NC temperature greater than 557° AND DECREASING. 8. Verify NC temperature - LESS THAN 557°F AND DECREASING. Perform the following: a. IF NC temperature at 557°F AND DECREASING. 1 IF stabilize NC temperature at 557°F as follows: 1) IF steam dumps not available, THEN use S/G PORVs. 1 IF steam dumps not available, THEN use S/G PORVs. b. IF the following conditions exist: • NC temperature greater than 557°F and stable | EP/1/ | CNS A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION PAG Enclosure 4 - Page 2 of 5 45 0 NC Temperature Control Revision | | | PAGE NO. 45 of 49 Revision 43 | |
|---|-------|--|--|-----|-------------|---|--|
| 7. Do not continue in this enclosure until one of the following occurs: NC temperature - GREATER THAN 557°F AND INCREASING IN AN UNCONTROLLED MANNER OR NC temperature - GREATER THAN 557°F AND STABLE OR NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER. 8. Verify NC temperature - LESS THAN 557°F AND DECREASING IN AN UNCONTROLLED MANNER. 8. Verify NC temperature - LESS THAN 557°F AND DECREASING. 9. Perform the following: a. IF NC temperature greater than 557° AND DECREASING. 9. IF NC temperature at 557°F as follows: 1) IF steam dumps available, THEN use s/G PORVS. b. IE the following conditions exist: NC temperature greater than 557° and stable Time and manpower available, THEN stabilize NC temperature at 557°F and stable | | ACTION/EX | PECTED RESPONSE | [| | RESPONSE NOT OBTAIN | ED |
| 1) <u>IF</u> steam dumps available, <u>THEN</u> use steam dumps. 2) <u>IF</u> steam dumps not available, <u>THEN</u> use S/G PORVs. c. <u>GO TO</u> Step 10. | 7. | ACTION/EX Do not continu one of the follo • NC temperatu 557°F AND II UNCONTRO OR • NC temperatu 557°F AND S OR • NC temperatu 557°F AND DE UNCONTRO Verify NC temp 557°F AND DE | PECTED RESPONSE The in this enclosure universed of the initial of | til | Per a. [| RESPONSE NOT OBTAIN form the following: IF NC temperature greate AND increasing, THEN stemperature at 557°F as 1) IF steam dumps avaiuse steam dumps. 2) IF steam dumps not THEN use S/G POR IE the following condition: • NC temperature greate and stable • Time and manpower avaiuse steam dumps. 1) IF steam dumps not THEN stabilize NC temperature greate and stable • Time and manpower avaiuse steam dumps. 1) IF steam dumps avaiuse steam dumps avaiuse steam dumps. 2) IF steam dumps avaiuse steam dumps avaiuse steam dumps. 1) IF steam dumps avaiuse steam dumps avaiuse steam dumps. 2) IF steam dumps avaiuse steam dumps. 2) IF steam dumps not THEN use S/G POR GO TO Step 10. | ED er than 557°F tabilize NC follows: ilable, <u>THEN</u> available, Vs. s exist: er than 557°F vailable, erature at ilable, <u>THEN</u> available, erature at ilable, <u>THEN</u> |

| EP/1 | CNS /A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 3 of 5 NC Temperature Control | | | | PAGE NO. 46 of 49 Revision 43 |
|------|---|---|---|--------------------------|---|--|
| | ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT OBTAIN | ED |
| 9. | Attempt to sto follows: a. Ensure all s | p the NC cooldown as team dumps - CLOSED. | | | | |
| | b. Ensure all S | /G PORVs - CLOSED. | | b. <u>IF</u> <u>T</u> | any S/G PORV canno <u>IEN</u> CLOSE its isolatio | t be closed, n valve. |
| | c. Ensure S/G d. CLOSE the | blowdown isolated. following valves: | | | | |
| | 1SM-77A C/V) 1SM-76B | (S/G 1A Ottt Hdr Bldwn (S/G 1B Ottt Hdr Bldwn | | | | |
| | • 1SM-75A C/V) | (S/G 1C Otlt Hdr Bldwn | | | | |
| | 1SM-74B C/V). | (S/G 1D Otlt Hdr Bldwn | | | | |
| | e. Verify MSR supply valve | Second Stage steam es - CLOSED | | е. Ре 1) | erform the following: CLOSE MSR Secon | d Stage |
| | THM-1 (M Source) 1HM-2 (M Source). | ISRH 1C&1D SSRH Stm | 1 | 2) | IE steam flowpath ca isolated from Contro <u>THEN</u> CLOSE the fo valves: | s). annot be I Room, illowing |
| | | | | | All MSIVs | |
| | | | | | All MSIV bypass v | alves. |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 4 of 5 NC Temperature Control | | | | JECTION 5 01 | PAGE NO. 47 of 49 Revision 43 | | | |
|--|---|--|----|---|---|--|--|--|--|
| ACTION/EX | PECTED RESPONSE | | | | RESPONSE NOT OBTAIN | ED | | | |
| 9. (Continued) | | | | | | | | | |
| f. Depress and SEAT DRN (1MC-3) to o | f. Depress and hold "S/V BEFORE SEAT DRN" "CLOSE" pushbutton (1MC-3) to close the following valves: | | | | | | | | |
| • 1SM-41 (Drn) | Stop VIv #1 Before Seat | | | | | | | | |
| • 1SM-44 (: Drn) | Stop VIv #2 Before Seat | | | | | | | | |
| • 1SM-43 (Drn) | Stop VIv #3 Before Seat | | | | | | | | |
| • 1SM-42 (Drn). | Stop VIv #4 Before Seat | | | | | | | | |
| g. Verify NC co | ooldown - STOPPED. | | g. | IE (TH | cooldown continues, <u>T</u> ROTTLE feed flow as | HEN follows: | | | |
| | | | | 1) | IF S/G N/R level less (29% ACC) in all S/G THROTTLE feed flow the following: | s than 11% S's, <u>THEN</u> w to achieve | | | |
| | | | | | Minimize cooldowr | ı | | | |
| | | | | | Maintain total feed than 450 GPM. | flow greater | | | |
| | | | | 2) | WHEN N/R level gre 11% (29% ACC) in a <u>THEN</u> THROTTLE fe further to achieve the | ater than ny S/G, eed flow e following: | | | |
| | | | | | Minimize cooldowr | n | | | |
| | | | | Maintain at least o level greater than (29% ACC). | ne S/G N/R 11% | | | | |
| | | | 3) | IF cooldown continue CLOSE the following | es, <u>THEN</u> valves: | | | | |
| | | | | | All MSIVs All MSIV bypass v | alves. | | | |
| | | | | | | | | | |

| EF | CNS 2/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 5 of 5 NC Temperature Control | | | PAGE NO. 48 of 49 Revision 43 | | | |
|----|--|---|----|------------------|-------------------------------------|--|--|--|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBT | AINED | | | |
| 10 | Continue to pe enclosure as r the following: | erform actions of this equired to ensure one | of | | | | | |
| | NC temperate THAN OR EC | ure - STABLE AT LESS QUAL TO 557°F | | | | | | |
| | OR | | | | | | | |
| | NC temperate 557°F. | ure - TRENDING TO | | | | | | |
| 11 | . Notify Control temperature co | Room Supervisor of N ontrol status. | С | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| CNS EP/1/A/5000/E-2 | FAULTED STEAM GENERATOR ISOLATION Enclosure 1 - Page 1 of 1 Foldout Page | PAGE NO. 26 of 26 Revision 15 | | | | | |
|--|--|-------------------------------------|--|--|--|--|--|
| | | | | | | | |
| 1. Cold Leg Recirc Switchover Criterion: | | | | | | | |

| <u>IF</u> FWST level decreases to 20% 1AD-9, D/8 "FWST 2/4 LO LEVEL" lit), <u>THEN GO TO</u> EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation). |
|---|
|---|

- 2. CA Suction Source Switchover Criterion:
- IE 1AD-8, B/1 "UST LO LEVEL" lit, <u>THEN REFER TO</u> AP/1/A/5500/006 (Loss of S/G Feedwater).
- 3. Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):
- IE NC pressure less than 1500 PSIG AND NV S/I flowpath aligned, THEN CLOSE 1NV-202B and 1NV-203A.
- IF NC pressure greater than 2000 PSIG, THEN OPEN 1NV-202B and 1NV-203A.

| CNS | |
|--------------------|--|
| EP/1/A/5000/ES-1.1 | |

SAFETY INJECTION TERMINATION Enclosure 1 - Page 1 of 1 Foldout Page

| 1. | S/I Reinitiation Criteria: |
|----|--|
| | IF NC subcooling based on core exit T/Cs less than 0°F <u>OR</u> Pzr level cannot be maintained greater than 11% (30% ACC), <u>THEN</u> perform the following: |
| | a. Start one or more S/I pumps. |
| | Realign NV S/I flow path. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (NV Alignment To S/I Mode). |
| | c. <u>IF</u> Step 11 has been completed, <u>THEN</u> <u>GO</u> <u>TO</u> EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant). |
| 2. | Secondary Integrity Criteria: |
| | IF any unisolated S/G pressure trending down in uncontrolled manner <u>OR</u> completely depressurized, <u>THEN GO TO</u> EP/1/A/5000/E-2 (Faulted Steam Generator Isolation). |
| 3. | Cold Leg Recirc Switchover Criterion: |
| | • IF FWST level lowers to 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL"), THEN GO TO EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation). |
| 4. | CA Suction Source Switchover Criterion: |
| | IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Loss of S/G Feedwater). |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

EVENT #2

PZR Spray Valve / Heater Failure

RCS Pressure, Temperature, and Flow DNB Limits 3.4.1

3.4 REACTOR COOLANT SYSTEM (RCS)

- 3.4.1 RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
- LCO 3.4.1 RCS DNB parameters for pressurizer pressure, RCS average temperature, and RCS total flow rate shall be within the limits specified in Table 3.4.1-1.

APPLICABILITY: MODE 1.

Pressurizer pressure limit does not apply during:

- a. THERMAL POWER ramp > 5% RTP per minute; or
- b. THERMAL POWER step > 10% RTP.

ACTIONS

| CONDITION | | | REQUIRED ACTION | COMPLE | TION TIME |
|-----------|---|-------------------|---|---------|-------------|
| A. | Pressurizer pressure or RCS average temperature DNB parameters not within limits. | A.1 | Restore DNB parameter(s) to within limit. | 2 hours | |
| B. | RCS total flow rate ≥ 99%, but < 100% of the limit specified in the COLR. | B.1 <u>AND</u> | Reduce THERMAL POWER to ≤ 98% RTP. | 2 hours | |
| | | B.2 | Reduce the Power Range Neutron Flux – High Trip Setpoint below the nominal setpoint by 2% RTP. | 6 hours | |
| | | • | | | (continued) |

Note to Evaluator:

Violation of these limits will be indicated by OAC Alarm (PZR Low Press DNB Limit). This condition may NOT be entered based on pressure decrease and , if entered, will clear soon.

EVENT #2

PZR Spray Valve / Heater Failure

RCS Pressure, Temperature, and Flow DNB Limits 3.4.1

ACTIONS (continued)

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
|----|---|-----------|---|-----------------|
| C. | RCS total flow rate < 99% of the value specified in the COLR. | C.1 | Restore RCS total flow rate to \geq 99% of the value specified in the COLR. | 2 hours |
| | | <u>OR</u> | | |
| | | C.2.1 | Reduce THERMAL POWER to < 50% RTP. | 2 hours |
| | | <u>A</u> | <u>1D</u> | |
| | | C.2.2 | Reduce the Power Range Neutron Flux - High Trip Setpoint to \leq 55% RTP. | 6 hours |
| | | AND | | |
| | | C.2.3 | Restore RCS total flow rate to \geq 99% of the value specified in the COLR. | 24 hours |
| D. | Required Action and associated Completion Time not met. | D.1 | Be in MODE 2. | 6 hours |

Catawba Units 1 and 2

3.4.1-2

Amendment Nos. 210/204

EVENT #2

Pressurizer 3.4.9

PZR Spray Valve / Heater Failure

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.9 Pressurizer

LCO 3.4.9 The pressurizer shall be OPERABLE with:

- a. Pressurizer water level < 92% (1656 ft³); and
- Two groups of pressurizer heaters OPERABLE with the capacity of each group ≥ 150 kW and capable of being powered from an emergency power supply.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
|----|---|-------------------|---|-----------------|
| A. | Pressurizer water level not within limit. | A.1 | Be in MODE 3 with reactor trip breakers open. | 6 hours |
| | | AND | | |
| | | A.2 | Be in MODE 4. | 12 hours |
| B. | One required group of pressurizer heaters inoperable. | B.1 | Restore required group of pressurizer heaters to OPERABLE status. | 72 hours |
| C. | Required Action and associated Completion Time of Condition B not | C.1 <u>AND</u> | Be in MODE 3. | 6 hours |
| | met. | C.2 | Be in MODE 4. | 12 hours |

Catawba Units 1 and 2

3.4.9-1

Amendment Nos. 173/165

EVENT #2

PZR Spray Valve / Heater Failure

| BASES | |
|-------------------------------|--|
| APPLICABLE SAFETY ANALYSES | In MODES 1, 2, and 3, the LCO requirement for pressurizer level to remain within the required range is consistent with the accident analyses. Safety analyses performed for lower MODES are not limiting. All analyses performed from a critical reactor condition assume the existence of a steam bubble and saturated conditions in the pressurizer. In making this assumption, the analyses neglect the small fraction of noncondensible gases normally present. |
| | Safety analyses presented in the UFSAR (Ref. 1) do not take credit for pressurizer heater operation; however, an initial condition assumption of the safety analyses is that the RCS is operating at normal pressure. |
| | The maximum pressurizer water level limit satisfies Criterion 2 of 10 CFR 50.36 (Ref. 2). Although the heaters are not specifically used in accident analysis, the need to maintain subcooling in the long term during loss of offsite power, as indicated in NUREG-0737 (Ref. 3), is the reason for providing an LCO. |
| LCO | The LCO requirement for the pressurizer to be OPERABLE with a water volume ≤ 1656 cubic feet, which is equivalent to 92%, ensures that a steam bubble exists. Limiting the LCO maximum operating water level preserves the steam space for pressure control. The LCO has been established to ensure the capability to establish and maintain pressure control for steady state operation and to minimize the consequences of potential overpressure transients. Requiring the presence of a steam bubble is also consistent with safety analysis analytical assumptions. |
| | The LCO requires two groups of OPERABLE pressurizer heaters, each with a capacity≥ 150 kW, capable of being powered from the emergency |
| | power supply. Only heater groups A and B are capable of being powered from the emergency power supply. Each of these heater groups receives power from the emergency power supply by the transfer of that train of the 4160 VAC Blackout Auxiliary Power System to be fed from the 4160 VAC Essential Auxiliary Power System. OPERABILITY of the associated diesel generator is not required to meet the LCO. The minimum heater capacity required is sufficient to maintain the RCS near normal operating pressure when accounting for heat losses through the pressurizer insulation. By maintaining the pressure near the operating conditions, a wide margin to subcooling can be obtained in the loops. The amount needed to maintain pressure is dependent on the heat losses. |

Catawba Units 1 and 2

B 3.4.9-2

Revision No. 3

EVENT #3

1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

3.3 INSTRUMENTATION

3.3.1 Reactor Trip System (RTS) Instrumentation

LCO 3.3.1 The RTS instrumentation for each Function in Table 3.3.1-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.1-1.

ACTIONS

-----NOTE------Separate Condition entry is allowed for each Function.

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
|----|---|-----------|---|-----------------|
| A. | One or more Functions with one or more required channels inoperable. | A.1 | Enter the Condition referenced in Table 3.3.1-1 for the channel(s). | (Immediately) |
| В. | One Manual Reactor Trip channel inoperable. | B.1 | Restore channel to OPERABLE status. | 48 hours |
| | | <u>OR</u> | | |
| | | B.2 | Be in MODE 3. | 54 hours |
| C. | One channel or train inoperable. | C.1 | Restore channel or train to OPERABLE status. | 48 hours |
| | | <u>OR</u> | | |
| | | C.2 | Open reactor trip breakers (RTBs). | 49 hours |
| | | | | 1 6 0 |

(continued)

Catawba Units 1 and 2

3.3.1-1

Amendment Nos. 173/165

EVENT #3 1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

ACTIONS (continued) CONDITION REQUIRED ACTION COMPLETION TIME D. One channel inoperable. -NOTE--The inoperable channel may be bypassed for up to 12 hours for surveillance testing and setpoint adjustment of other channels. D.1.1 -----NOTE--Only required to be performed when the Power Range Neutron Flux input to QPTR is inoperable. Perform SR 3.2.4.2. 12 hours from discovery of THERMÁL POWER > 75% RTP AND Once per 12 hours thereafter AND D.1.2 Place channel in trip. 72 hours OR D.2 Be in MODE 3. 78 hours

(continued)

Catawba Units 1 and 2

3.3.1-2

Amendment Nos. 247/240

EVENT #3 1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

ACTIONS (continued) CONDITION REQUIRED ACTION COMPLETION TIME Ε. One channel inoperable. -NOTE--The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. E.1 Place channel in trip. 72 hours OR E.2 Be in MODE 3. 78 hours F. THERMAL POWER F.1 Reduce THERMAL 24 hours POWER to < P-6. > P-6 and < P-10, one Intermediate Range Neutron Flux channel OR inoperable. F.2 Increase THERMAL 24 hours POWER to > P-10. THERMAL POWER G.1 G ---NOTE----> P-6 and < P-10, two Limited boron Intermediate Range concentration changes Neutron Flux channels associated with RCS inoperable. inventory control or limited plant temperature changes are allowed. Suspend operations Immediately involving positive reactivity additions. AND G.2 Reduce THERMAL 2 hours POWER to < P-6.

(continued)

Catawba Units 1 and 2

3.3.1-3

Amendment Nos. 247/240

EVENT #3

1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

ACTIONS (continued) CONDITION REQUIRED ACTION COMPLETION TIME H. THERMAL POWER H.1 Restore channel(s) to Prior to increasing THERMAL POWER OPERABLE status. < P-6, one or two Intermediate Range to > P-6 Neutron Flux channels inoperable. Ι. One Source Range 1.1 ---NOTE----Neutron Flux channel Limited boron inoperable. concentration changes associated with RCS inventory control or limited plant temperature changes are allowed. Suspend operations involving positive reactivity Immediately additions. Two Source Range J.1 Open RTBs. Immediately J. Neutron Flux channels inoperable. Restore channel to K. One Source Range K.1 48 hours Neutron Flux channel OPERABLE status. inoperable. OR K.2 Open RTBs. 49 hours (continued)

Catawba Units 1 and 2

3.3.1-4

Amendment Nos. 207/201

EVENT #3 1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

ACTIONS (continued) CONDITION REQUIRED ACTION COMPLETION TIME L. One channel inoperable. -NOTE---The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. Place channel in trip. L.1 72 hours OR L.2 Reduce THERMAL 78 hours POWER to < P-7. -NOTE--М One Reactor Coolant Flow - Low (Single Loop) channel inoperable. The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. Place channel in trip. 6 hours M.1 OR M.2 Reduce THERMAL 10 hours POWER to < P-8. One Turbine Trip - Stop Valve EH Pressure Low --NOTE--N. The inoperable channel may be channel inoperable. bypassed for up to 12 hours for surveillance testing of other channels. 72 hours N.1 Place channel in trip. OR N.2 Reduce THERMAL 76 hours POWER to < P-9. (continued)

Catawba Units 1 and 2

3.3.1-5

Amendment Nos. 247/240

EVENT #3

1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

ACTIONS (continued)

| CONDITION | | | REQUIRED ACTION | COMPLETION TIME | |
|-----------|--|----------------------|--|-----------------|---|
| 0. | One or more Turbine Trip - Turbine Stop Valve Closure channels | 0.1 OR | Place channel(s) in trip. | 72 hours | |
| | inoperable. | 0.2 | Reduce THERMAL POWER to < P-9. | 76 hours | |
| P. | One train inoperable. | One to 4 h provid | rain may be bypassed for up ours for surveillance testing ded the other train is RABLE. | | |
| | | P.1 | Restore train to OPERABLE status. | 24 hours | I |
| | | <u>OR</u> | | | |
| | | P.2 | Be in MODE 3. | 30 hours | |
| | | | | (continued) | |

Catawba Units 1 and 2

3.3.1-6

Amendment Nos. 247/240

Catawba 2019 NRC Exam

EVENT #3

1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

ACTIONS (continued) CONDITION REQUIRED ACTION COMPLETION TIME Q. One RTB train --NOTE--inoperable. One train may be bypassed for up to 4 hours for surveillance testing, provided the other train is OPERABLE. Q.1 Restore train to 24 hours OPERABLE status. <u>OR</u> Q.2 Be in MODE 3. 30 hours R. One or more channel(s) R.1 Verify interlock is in 1 hour required state for existing inoperable. unit conditions. OR R.2 Be in MODE 3. 7 hours (continued)

Catawba Units 1 and 2

3.3.1-7

Amendment Nos. 247/240

EVENT #3

1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

ACTIONS (continued)

| | CONDITION | REQUIRED ACTION | | COMPLETION TIME | |
|----|---|-----------------|---|-----------------|--|
| S. | One or more channel(s) inoperable. | S.1 | Verify interlock is in required state for existing unit conditions. | 1 hour | |
| | | <u>OR</u> | | | |
| | | S.2 | Be in MODE 2. | 7 hours | |
| T. | One trip mechanism inoperable for one RTB. | T.1 | Restore inoperable trip mechanism to OPERABLE status. | 48 hours | |
| | | <u>OR</u> | | | |
| | | T.2 | Be in MODE 3. | 54 hours | |
| U. | Two RTS trains inoperable. | U.1 | Enter LCO 3.0.3. | Immediately | |

Catawba Units 1 and 2

3.3.1-8

Amendment Nos. 173/165

Catawba 2019 NRC Exam

EVENT #3

1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

Table 3.3.1-1 (page 1 of 8) Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|----|-----------------------------|--|----------------------|------------|--|--|--|
| 1. | Manual Reactor Trip | 1,2 | 2 | в | SR 3.3.1.14 | NA | NA |
| | | 3(a) _{.4} (a) _{.5} (a) | 2 | с | SR 3.3.1.14 | NA | NA |
| 2. | Power Range Neutron Flux | | | | | | |
| | a. High | 1,2 | 4 | D | SR 3.3.1.1 SR 3.3.1.2 SR 3.3.1.7 SR 3.3.1.11 SR 3.3.1.16 | ≤ 110.9% RTP | 109% RTP |
| | b. Low | 1 ^(b) ,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11 SR 3.3.1.16 | ≦ 27.1% RTP | 25% RTP |
| 3. | Power Range Neutron Flux | | | | | | |
| | High Positive Rate | 1,2 | 4 | D | SR 3.3.1.7 SR 3.3.1.11 | ≤ 6.3% RTP with time constant ≥ 2 sec | 5% RTP with time constant ≥ 2 sec |
| | | | | | | | (continued) |

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

Catawba Units 1 and 2

3.3.1-15

Amendment Nos. 263/259

EVENT #3

1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

Table 3.3.1-1 (page 2 of 8) Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | |
|----|------------------------------------|--|----------------------|------------|---|---------------------------------------|--|---|
| 4. | Intermediate Range Neutron Flux | 1 ^(b) , 2 ^(c) | 2 | F,G | SR 3.3.1.1 SR 3.3.1.8 ^{(I)(m)} SR 3.3.1.11 ^{(I)(m)} | <u><</u> 38% RTP | 25% RTP | |
| | | 2 ^(d) | 2 | н | SR 3.3.1.1 SR 3.3.1.8 ^{(I)(m)} SR 3.3.1.11 ^{(I)(m)} | <u>≤</u> 38% RTP | 25% RTP | I |
| 5. | Source Range Neutron Flux | 2 ^(d) | 2 | I,J | SR 3.3.1.1 SR 3.3.1.8 ^{(I)(m)} SR 3.3.1.11 ^{(I)(m)} | <u><</u> 1.44 E5 cps | 1.0 E5 cps | I |
| | | 3(a) _{, 4} (a) _{, 5} (a) | 2 | J,K | SR 3.3.1.1 SR 3.3.1.7 ^{(I)(m)} SR 3.3.1.11 ^{(I)(m)} | <u><</u> 1.44 E5 cps | 1.0 E5 cps | I |
| 6. | Overtemperature ∆T | 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.10 SR 3.3.1.10 | Refer to Note 1 (Page 3.3.1-19) | Refer to Note 1 (Page 3.3.1-19) | _ |

(continued)

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

- (I) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.
- (m) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the NOMINAL TRIP SETPOINT (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and the as-left tolerances are specified in the UFSAR.

Catawba Units 1 and 2

3.3.1-16

Amendment Nos. 278/274

EVENT #3 1B RCS Flow Channel 3

RTS Instrumentation

3.3.1

Table 3.3.1-1 (page 3 of 8) Reactor Trip System Instrumentation

| | | CONDITIONS | REQUIREMENTS | ALLOWABLE VALUE | TRIP SETPOINT |
|--|---|-----------------------|--|---|--|
| 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16 SR 3.3.1.17 | Refer to Note 2 (Page 3.3.1-20) | Refer to Note 2 (Page 3.3.1-20) |
| | | | | | |
| 1 ^(e) | 4 | L | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.10 | ≥ 1938 ^(f) psig | 1945(f) psig |
| 1,2 | 4 | E | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16 | ≤ 2399 psig | 2385 psig |
| 1 ^(e) | 3 | L | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 | ≤ 93.8% | 92% |
| | | | | | |
| 1 ^(g) | 3 per loop | M | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16 | ≥ 89.7% | 91% |
| 1 ^(h) | 3 per loop | L | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.16 | ≥89.7% | 91% |
| 1,2 1 ^(e) 1,2 1 ^(e) 1 ^(g) 1 ^(h) | 4 4 3 3 per loop 3 per loop | E L L L L | REQUIREMENTS SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1 | Refer to Note 2 (Page 3.3.1-20) ≥ 1938 ^(f) psig ≤ 2399 psig ≤ 93.8% ≥ 89.7% ≥ 89.7% | |

(continued)

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(f) Time constants utilized in the lead-lag controller for Pressurizer Pressure - Low are 2 seconds for lead and 1 second for lag.

(g) Above the P-8 (Power Range Neutron Flux) interlock.

(h) Above the P-7 (Low Power Reactor Trips Block) interlock and below the P-8 (Power Range Neutron Flux) interlock.

Catawba Units 1 and 2

3.3.1-17

Amendment Nos. 263/259

EVENT #3

1B RCS Flow Channel 3

RTS Instrumentation 3.3.1

Table 3.3.1-1 (page 4 of 8) Reactor Trip System Instrumentation

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED | CONDITIONS | SURVEILLANCE | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|-----|---|--|-----------|------------|--|---|---|
| 11. | Undervoltage RCPs | 1(e) | 1 per bus | L | SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16 | ≥ 5016 V | 5082 V |
| 12. | Underfrequency RCPs | 1(e) | 1 per bus | L | SR 3.3.1.9 SR 3.3.1.10 SR 3.3.1.16 | ≥ 55.9 Hz | 56.4 Hz |
| 13. | Steam Generator (SG) Water Level - Low Low | 1,2 | 4 per SG | E | SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.10 | ≥ 9% (Unit 1) ≥ 35.1% (Unit 2) of narrow range span | 10.7% (Unit 1) 36.8% (Unit 2) of narrow range span |
| 14. | Turbine Trip | | | | | | |
| | a. Stop Valve EH Pressure Low | 1() | 4 | Ν | SR 3.3.1.10 SR 3.3.1.15 | ≥ 500 psig | 550 psig |
| | b. Turbine Stop Valve Closure | 1() | 4 | 0 | SR 3.3.1.10 SR 3.3.1.15 | ≥ 1% open | NA |
| 15. | Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS) | 1,2 | 2 trains | P | SR 3.3.1.5 SR 3.3.1.14 | NA | NA |

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(i) Not used.

(j) Above the P-9 (Power Range Neutron Flux) interlock.

Catawba Units 1 and 2

3.3.1-18

Amendment Nos. 263/259

(continued)

EVENT #3

RTS Instrumentation 3.3.1

1B RCS Flow Channel 3

Table 3.3.1-1 (page 5 of 8) Reactor Trip System Instrumentation

| | F | | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT | • |
|-----|-------------|--|--|----------------------|------------|------------------------------|---|---|---|
| 16. | Rea Inte | actor Trip System rlocks | | | | • | | | • |
| | a. | Intermediate Range Neutron Flux, P-6 | 2 ^(d) | 2 | R | SR 3.3.1.11 SR 3.3.1.13 | ≥ 6.6E-6% RTP | 1E-5% RTP | I |
| | b. | Low Power Reactor Trips Block, P-7 | 1 | 1 per train | S | SR 3.3.1.5 | NA | NA | |
| | C. | Power Range Neutron Flux, P-8 | 1 | 4 | S | SR 3.3.1.11 SR 3.3.1.13 | ≤ 50.2% RTP | 48% RTP | |
| | d. | Power Range Neutron Flux, P-9 | 1 | 4 | S | SR 3.3.1.11 SR 3.3.1.13 | ≤ 70% RTP | 69% RTP | |
| | e. | Power Range Neutron Flux, P-10 | 1,2 | 4 | R | SR 3.3.1.11 SR 3.3.1.13 | ≥ 7.8% RTP and ≦ 12.2% RTP | 10% RTP | |
| | f. | Turbine Impulse Pressure, P-13 | 1 | 2 | S | SR 3.3.1.12 SR 3.3.1.13 | ≤ 12.2% RTP turbine impulse pressure equivalent | 10% RTP turbine impulse pressure equivalent | |
| 17. | Rea | actor Trip | 1,2 | 2 trains | Q,U | SR 3.3.1.4 | NA | NA | |
| | Bre | akers ^(K) | $_{3}(a)_{,4}(a)_{,5}(a)$ | 2 trains | С | SR 3.3.1.4 | NA | NA | |
| 18. | Rea Und | actor Trip Breaker dervoltage and unt Trip | 1,2 | 1 each per RTB | т | SR 3.3.1.4 | NA | NA | |
| | Me | chanisms | 3 ^(a) , 4 ^(a) , 5 ^(a) | 1 each per RTB | С | SR 3.3.1.4 | NA | NA | |
| 19. | Aut | omatic Trip Logic | 1,2 | 2 trains | P,U | SR 3.3.1.5 | NA | NA | |
| | | | 3(a) _{.4} (a) _{.5} (a) | 2 trains | с | SR 3.3.1.5 | NA | NA | |

(continued)

I

(a) With RTBs closed and Rod Control System capable of rod withdrawal.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

(k) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

Catawba Units 1 and 2

3.3.1-19

Amendment Nos. 278/274

| | 11010102 |
|---|---|
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTA | INED |
| C. <u>Operator Actions</u> | |
| 1. Monitor Enclosure 1 (Foldout Page). | |
| _ 2. Verify NC subcooling based on core exit T/Cs - GREATER THAN 0°F. IF any NV <u>OR</u> NI pump o perform the following: | n, <u>THEN</u> |
| a. Ensure all NC pumps - | OFF. |
| b. Maintain seal injection | flow. |
| 3. Verify main steamlines intact: All S/G pressures - STABLE OR TRENDING UP • All S/Gs - PRESSURIZED: IF any faulted S/G(s) fails steamlines not isolated perform the following: 1) IF EP/1/A/5000/E-2 Steam Generator Is been performed for THEN GO TO Step 2) GO TO EP/1/A/500 Steam Generator Is b. IF affected S/G(s) fault containment, THEN re perform the following: 1) Monitor area of stear radiation. 2) Notify Control Roor abnormal radiation | ending down <u>OR</u> from the eedlines <u>OR</u> (Faulted iolation) has affected S/G, 3, RNO b. 0/E-2 (Faulted colation). ed outside quest RP to am fault for n of any conditions. |

| CNS EP/1/A/5000/E-1 | LOSS OF REACTO | LOSS OF REACTOR OR SECONDARY COOLANT | | | | |
|---|---|--------------------------------------|---|--|--|--|
| ACTION/EX | PECTED RESPONSE |] [| RESPONSE NOT OBTAI | NED | | |
| 4. Control intact follows: a. Verify N/R I GREATER | S/G N/R levels as evel in any intact S/Gs - THAN 11% (29% ACC). | | a. Maintain total feed flow 450 GPM until any intac level greater than 11% (| greater than t S/G N/R 29% ACC). | | |
| b. THROTTLE intact S/G N (29% ACC) | Feed flow to maintain all I/R levels between 11% and 50%. |) _ | b. <u>IF</u> N/R level in any S/G trend up in uncontrolled <u>THEN GO TO</u> EP/1/A/5 (Steam Generator Tube | continues to manner, 000/E-3 Rupture). | | |
| 5. Reset the folic a. <mark>ECCS.</mark> | owing: | _ | a. Locally reset ECCS. <u>Rt</u> EP/1/A/5000/G-1 (Gene Enclosures), Enclosure Master Reset). | FER TO ric 4 (ECCS | | |
| b. <mark>D/G load se</mark> | equencers. | | b. Dispatch operator to operator sequencer(s) control por sequencer(s) control por sequencer Panel 1DC (AB-577, BB-46, Rm 4) 1EDF-F01F (Diesel G Sequencer Panel 1DC (AB-560, BB-46, Rm 3) | en affected wer breaker: enerator Load 3LSA) 496) enerator Load 3LSB) 372). | | |
| c. Phase A. d. Phase B. e IF AT ANY restart S/I e | <u>TIME</u> B/O occurs, <u>THEN</u> quipment previously on. | L | | | | |
| EP/ | CNS EP/1/A/5000/E-1 | | | CONDARY COOLANT | PAGE NO. 4 of 35 Revision 32 |
|--------------|--|---|----------------------|---|---|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 6. - - | Establish VI to follows: • Ensure 1VI-7 • Verify VI pres 85 PSIG. | Containment as 7B (VI Cont Isol) - OPE ssure - GREATER THAN | V • | Perform the following: a. Align N₂ to Pzr PORVs b the following valves: 1NI-438A (Emer N2 Fr 1NC-34A) 1NI-439B (Emer N2 Fr 1NC-32B). b. <u>IF</u> VI pressure less than a <u>THEN</u> perform the follow 1) Dispatch operator to a VI compressor operator this procedure. <u>REFE</u> AP/0/A/5500/022 (Los Instrument Air). | y opening om CLA A To om CLA B To 85 PSIG, ing: ensure proper tion. inuing with <u>ER TO</u> ss of |
| 7. | Verify seconda a. Ensure the 1) CA Syste 2) KC NC N b. Align all S/G c. Perform at I 0R • Notify Ch for activity OR | ary radiation - NORMA following signals - RESE em valve control, NI NM St signals, St for Chemistry samplin east one of the following emistry to sample all S/C () to frisk all cation column () | L: T: 33 15 | | |

| CNS EP/1/A/5000/E-1 | LOSS OF REACTOR | OR SECONDARY COOLANT | PAGE NO. 5 of 35 Revision 32 |
|--|---|--|--|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAI | NED |
| 7. (Continued) d. Verify the fo DARK: - • 1EMF-33 Exhaust) - • 1EMF-26 • 1EMF-27 • 1EMF-28 - • 1EMF-29 | (Condenser Air Ejector (Steamline 1A) (Steamline 1B) (Steamline 1C) (Steamline 1D). | d. <u>GO TO</u> EP/1/A/5000/E-3 Generator Tube Rupture | 3 (Steam 9). |
| e. Verify all S/ All S/G pr TRENDIN All S/Gs - | GS - INTACT: ressures - STABLE <u>OR</u> IG UP PRESSURIZED. | e. <u>IF</u> any S/G(s) faulted ou containment, <u>THEN</u> requestions for the following: Monitor area of steam radiation Notify Control Room of abnormal radiation control radiation | tside uest RP to fault for of any nditions. |
| WHEN activ verify all S/0 | vity results reported, <u>THEN</u> Gs indicate no activity. | f. Perform the following: 1) Notify Station Managevaluate S/G(s) activity 2) IF S/G(s) activity ind THEN GO TO EP/1// (Steam Generator To State) | jement to vity results. icate SGTR, A/5000/E-3 ube Rupture). |
| | | | |

| CNS EP/1/A/5000/E-1 | LOSS OF REACTO | OR OR SEC | CONDARY COOLANT | Г | PAGE NO. 6 of 35 Revision 32 |
|--|--|-----------|---|---|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NO | T OBTAINE | D |
| 8. Verify Pzr POR a. Power to all valves - AV/ | RVs and Isolation Valve Pzr PORV isolation AILABLE. | es: — | a. Evaluate cause initiate actions to affected isolation | of power I o restore p n valve(s). | oss and oower to |
| b. All Pzr POR | Vs - CLOSED | - | b. <u>IF</u> Pzr pressure <u>THEN</u> perform the <u>THEN</u> perform the <u>THEN</u> perform the closed, <u>THE</u> valve. 3) <u>IF</u> 1NC-32B, be closed <u>OI</u> perform the follow a) Align N₂ the follow 1NI-43 CLA A = 1NI-43 CLA B b) CLOSE a | less than i he followir PORV(s). ORV cann N CLOSE OR 1NC-3 Cisolated, following: to PORVs ing valves 8A (Emer To 1NC-3 9B (Emer To 1NC-3 | 2315 PSIG, ng: not be its isolation 34A cannot 5 by opening 5 by opening 5 N2 From 4A) N2 From 2B). zr PORV. |
| C. Any Pzr PO OPEN. | RV isolation valve - | _ | c. OPEN one Pzr F unless it was clo open Pzr PORV | PORV isol osed to iso | ation valve plate an |
| <u>IF AT ANY</u> opens due to after Pzr pre 2315 PSIG, isolated. | TIME any Pzr PORV o high pressure, THEN essure lowers to less tha ensure PORV closes or | n | | | |

| CNS EP/1/A/5000/E-1 | LOSS OF REACTO | OR OR SECONDARY COOLANT | PAGE NO. 7 of 35 Revision 32 |
|---|---|--|--|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAI | NED |
| 9. Verify S/I term a. <mark>NC subcool</mark> T/Cs - GRE | ination criteria: ing based on core exit ATER THAN 0°F. | a. <u>GO TO</u> Step 9.f. | |
| b. Secondary I — • Any intac GREATE OR — • Total feed GREATE | heat sink: t <mark>S/G N/R level -</mark> R THAN 11% (29% ACC I flow to intact S/Gs - R THAN 450 GPM. | b. <u>GO TO</u> Step 9.f. | |
| c. NC pressur TRENDING | e - STABLE OR UP. | c. GO TO Step 9.f. | |
| d. (<mark>Pzr level - G</mark> (30% ACC). | BREATER THAN 11% | d. Perform the following: 1) <u>IF</u> NC pressure trend normal Pzr spray avaattempt to stabilize N using normal Pzr spr 2) <u>GO TO</u> Step 9.f. | ling up <u>AND</u> ailable, <u>THEN</u> IC pressure ay. |
| e. GO TO EP/ Injection Te | 1/A/5000/ES-1.1 (Safety rmination). | | |
| f. Monitor S/I i REFER TO Termination | termination criteria. Enclosure 2 (S/I Criteria). | | |
| g. <u>IF AT ANY</u> criteria met <u>THEN RET</u> | TIME S/I termination while in this procedure, JRN TO Step 9. | | |

2019 INITIAL LICENSE NRC EXAM SCENARIO # 4

| Appe | endix D | | Scenario Outline | Form ES-D-1 | | | | |
|--|--|---|--|---|--|--|--|--|
| Facility: Catawba NRC Exam 2 Examiners: | | 2019 Scenario No.: 4 Operators: | Op Test No.: 2019301 SRO | | | | | |
| Initial Co | nditions: Ur | nit 1 is at 1 x 10 ⁻³ | ³ % power at BOL. Unit 2 is at 10 | BOP 0% power. | | | | |
| Turnover | :: Unit 1 is NV Pum System) complet begin at increase | at 1 x 10 ⁻³ % po p in service and , Enclosure 4.13 e. Operator is sta step 3.1 of Enclo e reactor power to | wer at BOL. Unit 2 is at 100% po secure 1B NV pump per OP/1/A (Shifting the Operating Charging anding by for post start check. In osure 4.13. Following NV Pump o ~14% in preparation for placing | ower. Direction for the crew is to place 1A /6200/001 (Chemical and Volume Control g Pump). Pre-start check of 1A NV Pump is itial Conditions are complete. Crew is to swap the crew is to withdraw control rods to g the Main Turbine online. | | | | |
| Event No. | Malf. No. | Event Type* | D | Event escription | | | | |
| 1 | | N – BOP N – SRO | Swap Centrifugal Charging (NV) Pumps | | | | | |
| 2 | | R – RO | Withdraw Control Rods to Increase Reactor Power | | | | | |
| 3 | RN002A | C – BOP C – SRO TS – SRO | 1A Nuclear Service Water (RN | l) Strainer Hi D/P | | | | |
| 4 | SG094 SG095 | C – BOP C – SRO | 1B S/G W/R Signal Fails Low / | Feed Reg Bypass Valve Opens | | | | |
| 5 | FW002 | TS – SRO | FWST Channel 2 Fails Low | | | | | |
| 6 | IDE003C IDE003H | C – RO C – SRO | Condenser Steam Dumps (1S | B-9 and 1SB-24) Fail Intermediate | | | | |
| 7 | NCP002B | C – RO C – SRO | 1B Reactor Coolant (NC) Pum | p Shaft Shear | | | | |
| 8 | IPX003A IPX003B | M – ALL | ATWS | | | | | |
| 9 | ND009C | M – ALL | LOCA Outside Containment | | | | | |
| 10 | ISE007A ISE007B | C – RO C – SRO | Auto Main Feedwater (CF) Iso | lation Failure | | | | |
| 11 | NI001F NI002A | C – BOP C – SRO | Cold Leg Injection Isolation (1NI-9A) Fails to Closed Position, Cold Leg Injection Isolation (1NI-10B) Auto Open Fails | | | | | |
| * | (N)ormal, (R)ea | uctivity, (I)nstru | ment, (C)omponent, (M)ajor | | | | | |

Appendix D

Scenario Outline

Form ES-D-1

<u> Scenario 4 – Summary</u>

Initial Condition

Unit 1 is at 1×10^{-3} % power at BOL. Unit 2 is at 100% power.

Turnover:

Unit 1 is at 1×10^{-3} % power at BOL. Unit 2 is at 100% power. Direction for the crew is to place 1A NV Pump in service and secure 1B NV pump per OP/1/A/6200/001 (Chemical and Volume Control System), Enclosure 4.13 (Shifting the Operating Charging Pump). Pre-start check of 1A NV Pump is complete. Operator is standing by for post start check. Initial Conditions are complete. Crew is to begin at step 3.1 of Enclosure 4.13. Following NV Pump swap the crew is to withdraw control rods to increase reactor power to ~14% in preparation for placing the Main Turbine online.

Event History: Similar reactivity evolution used 17 (4). Slightly different power level.

Event 1

Shift NV Pumps by starting 1A NV pump and securing 1B NV Pump.

Event History: Exact NV pump swap evolution is new. Similar used on 16 (2) – start 1B vs. starting 1A NV pump.

Event 2

Raise reactor power to 14%. Crew will withdraw control rods to increase Reactor Power.

Event History: This reactivity evolution used 17 (4). Additionally, power increase via control rod withdrawal used on Audit (4) but from a different power level (>POAH).

Event 3

1A RN (Nuclear Service Water) strainer Hi D/P. Crew will enter AP/0/A/5500/020 (Loss of Nuclear Service Water), start another RN Pump and secure 1A RN Pump. TS evaluation by the SRO is required.

Verifiable Action – BOP will start an alternate RN Pump and secure 1A RN Pump.

Event History: This exact malfunction not previously used. Similar malfunction used on 16 (1). 1B RN Pump Strainer on only RN pump in service. This scenario includes two operating RN Pumps.

Event 4

1B S/G W/R level signal fails LOW causing the associated Feed Reg. Bypass Valve to open. Crew will enter AP/1/A/5500/006 (Loss of SG Feedwater).

Verifiable Action – RO will take manual control of 1B FRV/Bypass valve and control S/G level.

Event History: This exact malfunction not used on previous 2 exams. Similar malfunction used on 16 (4) – D S/G W/R signal failure.

Event 5

FWST level channel 2 will fail low. TS evaluation by the SRO is required.

Event History: This malfunction not used on previous 2 exams. Similar malfunction {13 (3)} - Channel 1.

Appendix D

Scenario Outline

Form ES-D-1

Event 6

1SB-9 (SM Byp to Cond Ctrl #9) and 1SB-24 (SM Byp to Cond Ctrl #24) will fail intermediate. Crew may enter AP/1/A/5500/028 (Secondary Steam Leak) for guidance to isolate the leak. Alternatively, the crew may use OMP 1-7 (Emergency/Abnormal Procedure Implementation Guidelines) guidance to address failure.

Verifiable Action - The RO will place Steam Dump Control switches to "Off-Reset".

Event History: This exact malfunction not used on previous 2 exams. Similar Steam Dump failure used on 17 (3) – 1SB-27.

Event 7

The 1B RCP will experience a shaft shear. There is no "Low Loop Flow" Reactor Trip at the present power level. The RO will attempt to trip the reactor based on Immediate Action step of AP/1/A/5500/004 (Loss of Reactor Coolant Pump). The Reactor will fail to trip manually.

Verifiable Action - RO will manually insert control rods.

Event History: New Malfunction.

Event 8

The reactor will fail to trip from the control room requiring entry into FR-S.1. Once emergency boration flowpath is aligned (1NV-236B open), the reactor will trip.

Verifiable Action – RO will manually insert control rods and BOP will initiate emergency boration.

Event History: This major event used 16 (2) with a different entry – loss of all feed vs. loss of RCP.

Event 9

Following the Reactor Trip, a LOCA outside containment will occur. The crew will transition from EP/1/A/5000/FR-S.1 to EP/1/A/5000/E-0, initiate Safety Injection, and then to EP/1/A/5000/ECA-1.2. The crew will isolate the leak by closing 1NI-173A (ND Hdr 1A To Cold Legs C&D).

Verifiable Action – BOP will close 1NI-173A.

Event History: New Major event not previously used.

Event 10

Both trains of Automatic Feedwater Isolation will fail to actuate on Safety Injection.

Verifiable Action – RO will manually actuate A and B Train Main Feedwater Isolation.

Event History: This malfunction used 17 (3) combined with a S/G Tube Rupture.

Event 11

1NI-9A (Cold Leg Injection Valve) will not open. 1NI-10B (Cold Leg Injection Valve) fails to open in Auto. Manual opening of 1NI-10B will be successful.

Verifiable Action – BOP will manually open 1NI-10B.

Event History: This malfunction not used on previous 2 exams. Similar malfunction {14 (2)} – Opposing valves.

Appendix D

Scenario Outline

Form ES-D-1

| Manual Control of Automatic Functions | | | | | |
|---------------------------------------|----------|---|--|--|--|
| Event | Position | Description | | | |
| 4 | RO/BOP | Manually control Automatic Feed Reg Bypass Valve for 1B S/G | | | |

<u>Critical Task 1</u> – Manually control 1B S/G level to prevent Hi-Hi S/G Level (P-14) at 83% or S/G Lo-Lo Reactor Trip at 11%.

<u>Critical Task 2</u> – Insert negative reactivity, via manual control rod insertion, within 50 seconds of receipt of valid Reactor Trip "First Out" Annunciator.

The following information is contained within CNS Action Request #01423553-01 (Engineering determine validity of "Drive Control Rods if Reactor Does Not Trip (ATWS)"):

The PRA Group has confirmed that the action "Drive Control Rods if Reactor Does Not Trip (ATWS)" (QRODSINDHE) is a valid, time critical operator action. Time critical actions are those actions whose failure would result in an increase in core damage frequency (CDF) or Large Early Release Frequency (LERF) corresponding to the NRC definition of a "white" finding in the Significance Determination Process (SDP). Scenario Details. If the reactor fails to trip due to a failure of the trip breakers to open, the operator would first attempt to manually scram the reactor. If this failed, then he may be able to shut down the reactor by driving in the control rods. Engineering has calculated that this action must be accomplished within 50 seconds to prevent core damage (Time Available). The PRA Human Error calculation has input a median Operator Action Time of 30 seconds (Median Response Time). This is the time from the start of the event until the operator has begun driving in the control rods.

<u>Critical Task 3</u> – Isolate the LOCA outside containment before transition out of ECA-1.2.

| | Target Quantitative Attributes (Per Scenario; See Section D.5.d) | Actual Attributes |
|----|--|-------------------|
| 1. | Total malfunctions (5–8) | 7 |
| 2. | Malfunctions after EOP entry (1–2) | 3 |
| 3. | Abnormal events (2–4) | 5 |
| 4. | Major transients (1–2) | 2 |
| 5. | EOPs entered/requiring substantive actions (1–2) | 2 |
| 6. | EOP contingencies requiring substantive actions (0–2) | 2 |
| 7. | Critical tasks (2–3) | 3 |

EXERCISE GUIDE WORKSHEET

- 1. INITIAL CONDITIONS:
 - 1.1 Reset to IC # 171

START TIME:_____

| ~ | ~ | Trigger | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|---|---------|---|--------|-------|------|--------------|-------|
| | | 3 | MAL-RN002A (RN STRAINER 1A HI D/P) | 100 | | | | 3 |
| | | 4 | XMT-SG095 [XCF_5621 S/G B W/R LVL CH 1 TO DCS/ELSEWHERE (CFAA5621)] | 40 | | 3:00 | | 4 |
| | | 4 | XMT-SG094 [XCF_5620 S/G B W/R LVL CH 2 TO DCS/ELSEWHERE (CFAA5620)] | 40 | | 3:00 | | 4 |
| | | 5 | XMT-FW002 (LFW_5010 WR FWST LVL CH 2 TO DCS (FWAA5010)) | 0 | | | | 5 |
| | | 6 | MAL-IDE003H (STEAM DUMP VLV SB24 FAIL TO POSITION) | 30 | | | | 6 |
| | | 6 | MAL-IDE003C (STEAM DUMP VLV SB9 FAIL TO POSITION) | 30 | | | | 6 |
| | | 13 | LOA-IDE003 (SB8-INLET ISOL) | 0 | 5:00 | | | 6 |
| | | 13 | LOA-IDE008 (SB23–INLET ISOL) | 0 | 5:00 | | | 6 |
| | | 11 | MAL-IDE003H (STEAM DUMP VLV SB24 FAIL TO POSITION) | 50 | | | :01 | 6 |
| | | 11 | MAL-IDE003C (STEAM DUMP VLV SB9 FAIL TO POSITION) | 100 | | | :01 | 3 |
| | | 7 | MAL-NCP002B (NCP B SHAFT BREAK) | | | | | 7 |
| | | | MAL-IPX003A (REACTOR TRIP BKR A FAILURE) | ACTIVE | | | | 8 |
| | | | MAL-IPX003B (REACTOR TRIP BKR B FAILURE) | ACTIVE | | | | 8 |
| | | 12 | MAL-IPX003A (REACTOR TRIP BKR A FAILURE) | ACTIVE | | | :01 | 8 |
| | | 12 | MAL-IPX003B (REACTOR TRIP BKR B FAILURE) | ACTIVE | | | :02 | 8 |
| | | 9 | MAL-ND004A (ND SYS TRN A DISCH LINE RUPTURE) | 2500 | | :05 | | 9 |
| | | 9 | MAL-ND009C (ND TO NC CHK VLV 1NI175 AND 82 LEAKAGE) | 15 | | :05 | | 9 |
| | | 9 | MAL-EMF1.01 (AUX BLDG COR EL 522 FF 57 FALSE READING) | 20 | :10 | 4:00 | | |
| | | | MAL-ISE007A (AUTO CF ISOL SIGNAL TRN A) | BLOCK | | | | 10 |
| | | | MAL-ISE007B (AUTO CF ISOL SIGNAL TRN B) | BLOCK | | | | 10 |
| | | | VLV-NI001F (NI9A B.I.T. DISCHARGE ISOL VLV FAIL TO POSITION) | 0 | | | | 11 |

| | | VLV-NI002A (NI10B B.I.T. DISCHARGE ISOL VLV FAIL AUTO ACTIONS) | | | | | 11 |
|--|---------------------------------|--|--------------|---------|-----------|-------|----|
| | | ANN-AD11-B03 (TRANSFORMER A TROUBLE) | ON | | | | |
| | | ANN-AD11-E03 (TRANSFORMER B TROUBLE) | ON | | | | |
| | 10 | LOA-VC039 (MNL RST LATCH FOR CHILLER B HI COND PRESS TRP DUE TO LOSS RN) | RESET | 10:00 | | | |
| | | | | | | | |
| | | | | | | | |
| | Ensure E | VENT 11 = x02i184I x02i186I (Steam | Dump Sele | ect OFF | Either Ti | rain) | |
| | Ensure E | vent 12 = x10i247o (1NV-236B Open) | | | | | |
| | Ensure 1B NV Pump is in service | | | | | | |
| | Provide of | copy of OP/1/A/6100/001, Encl. 4.1 ope | en to step 3 | .184 | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

2. SIMULATOR BRIEFING

2.1 Control Room Assignments:

| Position | Name |
|----------|------|
| CRS | |
| RO | |
| BOP | |

2.2 Give a copy of Attachment 2 (Shift Turnover Information) to the CRS.

3. EXERCISE PRESENTATION

3.1 Familiarization Period

A. Allow examinees time to familiarize themselves with the Control Board alignments.

3.2 **Scenario EVENT 1**, Centrifugal Charging (NV) Pump Swap. Start 1A NV and secure 1B NV Pump

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | Following start of 1A NV pump, wait one minute and REPORT "1A NV Pump is good for |
| | continued operation". |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | WHEN dispatched to evaluate NV Pump Vibration Panel alarms per OP/0/A/6500/115, |
| | REPORT "No alarm present on NV Pump Vibration Panel". |

3.3 **Scenario EVENT 2**, Withdraw Control Rods to Increase Reactor Power to 1%

3.4 Scenario EVENT 3, 1A Nuclear Service Water (RN) Pump Strainer Hi D/P

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 3 to cause |
| | 1A RN Strainer Hi D/P. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF the SWM is contacted to investigate the problem with 1A RN Strainer and/or breaker, |
| | REPEAT back the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF an Operator and/or Maintenance are dispatched to investigate the 1A RN Strainer |
| | and/or breaker, REPEAT back the information. |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | IF an Operator is dispatched to reset VC/YC, THEN INSERT SIMULATOR Trigger 10. |
| | After 10 minutes has elapsed, REPORT VC/YC has been reset. |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | WHEN contacted concerning Unit 2 RN valve position, REPORT 2RN-67A and 69B are |
| | Open. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF an Operator is dispatched to perform post start check of RN Pump, REPEAT back the information. |
| | After 5 minutes has elapsed, REPORT RN Pump is good for continued operation. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF Environmental Chemistry is contacted, REPEAT back the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF indication of 2AD-12 C/2 and C/5 are requested, REPORT that both annunciators are |
| | dark. |

3.5 Scenario EVENT 4, 1B S/G W/R Signal Fails Low / Feed Reg Bypass Valve Opens

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 4 to cause a |
| | failure of the 1B S/G WR Level. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF the SWM is contacted to initiate an NCR or W/R for the 1B S/G WR level channel, |
| | REPEAT back the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF Operator is dispatched to verify S/G level indication on the Aux Shutdown Panels, |
| | REPORT 1B S/G Level is reading 40%. |

3.6 Scenario EVENT 5, FWST Channel 2 Fails Low

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 5 to cause |
| | FWST Channel 2 to fail low. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate an NCR or W/R for Channel 2 FWST level, REPEAT |
| | the information. |

IF IAE is contacted to issue Model W/O 01069040, **REPEAT** the information.

3.7 Scenario EVENT 6, Condenser Steam Dumps (1SB-9 & 1SB-24) Fail Intermediate

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 6 to cause |
| | Condenser Dump Valves (1SB-9 and 1SB-24) to fail intermediate. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|---|
| | IF contacted as an AO or Unit Supervisor to create a clearance to isolate 1SB-9 and 1SB- |
| | 24, REPEAT the information and INSERT Trigger 13 . |
| | After 5 minutes, contact the control room and REPORT "1SB-8 and 1SB-23 are manually |
| | closed to isolate 1SB-9 and 1SB-24." |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF the SWM is contacted to initiate a W/R and NCR for 1SB-9 and 1SB-24, REPEAT the |
| | information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF contacted as Radiation Protection notifying of steam leak from 1SB-9 and 1SB-24 |
| | failing open, REPEAT the information. |

3.8 Scenario EVENTS 7, 8, 1B Reactor Coolant (NC) Pump Shaft Shear / ATWS

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 7 to cause a |
| | shaft shear of the 1B NCP. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF AO is contacted to locally open RX Trip Breakers and MG Set Output Breakers, |
| | REPEAT back the information. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF contacted as Chemistry with instruction to sample for NC System Boron, REPEAT the |
| | information. |

3.9 **Scenario EVENTS 9, 10, 11**, LOCA Outside Containment / Auto Main Feedwater (CF) Isolation Failure / Cold Leg Injection (1NI-10B) Fails to Closed Position, Cold Leg Injection (1NI-9A) Auto Open Fails

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | WHEN directed by the lead examiner, THEN INSERT SIMULATOR Trigger 9 to cause a |
| | LOCA Outside Containment. |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|---|
| | IF Secondary Chemistry is notified to sample all S/Gs for activity, REPEAT the order. |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF RP is notified to frisk all cation columns for activity, REPEAT the order. |

| \checkmark | BOOTH INSTRUCTOR ACTION |
|--------------|--|
| | IF an AO is dispatched to locate a potential Unit 1 NC System leak, REPEAT the |
| | information. |
| | After 10 minutes, contact the control room and REPORT "The 522' Elevation is full of |
| | water and steam". |

| ✓ | BOOTH INSTRUCTOR ACTION |
|---|--|
| | IF Operator is dispatched to check both ND and NS pumps for seal leaks, REPEAT the |
| | order. |

| Appendix D | Requ | Form ES-D-2 | | | | | | |
|--|---|---|---|--|--|--|--|--|
| Op Test No.: 301 | st No.: <u>301</u> Scenario # <u>4</u> Event # <u>1</u> Page <u>13</u> of | | | | | | | |
| Event Description: Centrifugal Charging (NV) Pump Swap | | | | | | | | |
| | | | | | | | | |
| | | Enclosure 4.13 | OP/ 1 /A/6200/001 | | | | | |
| 2 Duo | Shifti | ng The Operating Charging Pump | Page 2 of 4 | | | | | |
| 5. Proc | cedure | | | | | | | |
| NOTE: | This enclosure will af Reactivity Manageme Management). (R.M. | fect reactivity of the core and is there ent per the guidelines of AD-OP-ALI) | efore designated important to L-0203 (Reactivity | | | | | |
| N/A 3.1 | IF shifting from 1A | NV Pump in service to 1B NV Pump | in service, perform the following: | | | | | |
| CAUTIO | CAUTION: If an NV Pump has been idle for an extended period of time, a boron transient may be initiated when it is placed in service. The volume of 1B NV Pump and associated piping is 65 gallons; the magnitude of the transient will be minimal. | | | | | | | |
| | in service will packages. Op flow. (PIP 09- | result in hydraulic transients being p erating experience shows that these t 2596) | placed on the NC Pump seal ransients will affect seal return | | | | | |
| NOTE: | A loss of 1EPD with indicated loss of both of 1NC-32B (PZR PC either the 1A NV Pun | only the 1B NV Pump running will is charging pumps; the loss of 1EPD w DRV) creating a challenge to LTOP. np is in service or ND Letdown is in | solate normal letdown due to an vill also disable the LTOP function This challenge does <u>NOT</u> occur if service. (PIP C-12-1241) | | | | | |
| | 3.1.1 <u>IF</u> Unit 1 is in Mode 4 with any RCS cold leg ≤ 210°F, or Mode 5, or Mode 6 when the reactor vessel head on, make log entry for 1NC-32B (PZR PORV) per the applicable: | | | | | | | |
| | 3.1.1.1 | IF only normal letdown is in servi inoperable for Tech. Spec. 3.4.12 (| ice, log 1NC-32B (PZR PORV) as (LTOP). | | | | | |
| | 3.1.1.2 | \underline{IF} ND Letdown is in service, log tracking item for being inoperable | 1NC-32B (PZR PORV) as a for Tech. Spec. 3.4.12 (LTOP). | | | | | |
| | _ 3.1.2 Ensure VO Press) (1M | CT pressure is between 18-40 psig as IC5). | read on 1NVP5500 (VCT Vent | | | | | |

| Appendix | D Required Operator Actions Form ES-D-2 | | | | | |
|--|--|--|--|--|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>4</u> Event # <u>1</u> Page <u>14</u> of <u>140</u> | | | | | |
| Event Description: Centrifugal Charging (NV) Pump Swap | | | | | | |
| | | | | | | |
| | Enclosure 4.13 OP/1/A/6200/001 | | | | | |
| | Shifting The Operating Charging Pump Page 3 of 4 | | | | | |
| | NOTE: If in an emergency situation, the 30 second delay after starting the Aux Oil Pump is <u>NOT</u> required before starting the NV pump. | | | | | |
| | 3.1.3 30 seconds prior to starting 1B NV pump, place "NV PUMP 1B AUX OIL PUMP" in the "ON" position. | | | | | |
| | 3.1.4 Start "NV PUMP 1B". (R.M.) | | | | | |
| | 3.1.5 Place "NV PUMP 1B AUX OIL PUMP" in "AUTO". | | | | | |
| | 3.1.6 Stop "NV PUMP 1A". | | | | | |
| | 3.1.7 Verify proper charging flow rate. | | | | | |
| | 3.1.8 Dispatch an AO to evaluate the NV Pump Vibration Panel for any alarms per OP/0/A/6500/115 (Operator Rounds). | | | | | |
| - | 3.2 IF shifting from 1B NV Pump in service to 1A NV Pump in service, perform the following: | | | | | |
| | CAUTION: • If an NV Pump has been idle for an extended period of time, a boron transient may be initiated when it is placed in service. The volume of 1A NV Pump and associated piping is 103 gallons; the magnitude of the transient will be minimal. | | | | | |
| | Shifting charging pumps at low NC System pressures (< 1000 psig) with NC Pump(s) in service will result in hydraulic transients being placed on the NC Pump seal packages. Operating experience shows that these transients will affect seal return flow. (PIP 09-2596) | | | | | |
| | 3.2.1 Ensure VCT pressure is between 18-40 psig as read on 1NVP5500 (VCT Vent Press) (1MC5). | | | | | |
| | NOTE: If in an emergency situation, the 30 second delay after starting the Aux Oil Pump is <u>NOT</u> required before starting the NV pump. | | | | | |
| | 3.2.2 30 seconds prior to starting 1A NV pump, place "NV PUMP 1A AUX OIL PUMP" in the "ON" position. | | | | | |
| | 3.2.3 Start "NV PUMP 1A". (R.M.) | | | | | |
| | 3.2.4 Place "NV PUMP 1A AUX OIL PUMP" in "AUTO". | | | | | |
| | 3.2.5 Stop "NV PUMP 1B". | | | | | |
| | | | | | | |

| Appendix I | opendix D Required Operator Actions | | | | | | | For | n ES-D |)-2 |
|---------------|--|-------|---------------------------------------|-------------------------------------|---|--|--------------------------|--------------------------------------|-------------------------------|--------------------|
| Op Test No.: | 301 | Scena | ario # | 4 | Event # | 1 | Page | 15 | of | 140 |
| Event Descrip | Event Description: Centrifugal Charging (NV) Pump Swap | | | | | | | | | |
| | | 3.2.7 | Shif Dispatc OP/0/A | fting The h an AO /6500/11 | Enclosure 4. e Operating C to evaluate the 5 (Operator R | 13 harging Pump NV Pump Vibrat punds). | O P tion Panel fo | P/ 1 /A age 4 o r any a | /6200/001 f 4 larms per | |
| | NOTE: A loss of 1EPD with only the 1B NV Pump running will isolate normal letdown due to an indicated loss of both charging pumps; the loss of 1EPD will also disable the LTOP function of 1NC-32B (PZR PORV) creating a challenge to LTOP. This challenge does <u>NOT</u> occur if either the 1A NV Pump is in service or ND Letdown is in service. (PIP C-12-1241) | | | | | | | | | n tion ur if |
| | N/A sro | 3.2.8 | <u>IF</u> Unit when th being in | 1 is in N e reactor toperable | fode 4 with an r vessel head o e for Tech. Spe | y RCS cold leg ≤ 2 n, log 1NC-32B (I c. 3.4.12 (LTOP). | 210°F, or M PZR PORV) | ode 5, o as a tra | or Mode 6 ocking iter | 5 m for |

3.3 File this enclosure in the Control Copy folder of this procedure.

| pendix D | Require | ed Operator Ac | | Form ES-D-2 | | | | |
|------------------------------|--|---|--|---|----------------------------------|---|-----|--|
| Test No.: 301 | Scenario # 4 | Event # | 2 | Page | 16 | of | 140 | |
| nt Description: | 14% | | | | | | | |
| | | | | | | | | |
| | | Enclosure 4 | .1 | (| OP/ 1 /A/ | 6100/001 | | |
| <u> </u> | | Unit Startu | р | I | Page 72 o | of 92 | _ | |
| CAUTIO | N: Per SOER 07-1 (Read periods of time is <u>NO</u> risk of operations in o | ctivity Management <u>T</u> recommended. So ff-normal condition |) Reactor Opera Station Manage is such as low p | ations at low ment shall ca power. (R.M | power f arefully ([.) | or extended consider the | | |
| NOTE: | 1. Control rod withdraw in Unit One R.O.D. S | al shall <u>NOT</u> excee ection 2.3. | d the temporar | y rod withdr | awal lim | its specified | | |
| | 2. Refer to Unit One R.O | O.D. Section 2.4 for | the rate at whi | ch reactor po | ower can | be changed | | |
| | The throttling of a S/ Therefore, SM/CF ΔI | G bypass reg valve P needs to be monito | affects the other ored as the unit | r S/G bypass approaches i | reg valv POAH. | res. | | |
| | If NC boron concentr sensitive above the P Section 5.10 provides | ation is greater than OAH due to a positi MTC at the curren | i 1000 ppmB, T ive MTC. Unit t conditions. | -AVG contr One R.O.D. | ol may b | e very | | |
| | When approaching the startup rate of < 0.2 d when performing PT/ placed on line. (AD- | e beginning of the l pm is required. Th 0/A/4150/001 J (Ze OP-ALL-0203 (Rea | Power Range N e < .2 dpm rate ro Power Physi loctivity Manage | I indication shall <u>NOT</u> t ics Testing), ment)). (R.1 | (.1% on the exceed until the M.) | the PR), a ded, except turbine is | | |
| | Per SOER 07-01 (Reamonitor multiple indi Instrumentation, Stea power reactivity chan | (Reactivity Management) it is recommended that Plant Operators le indications such as Thermal Power Best Estimate, Nuclear Steam Pressure, ΔT's, CF Flowrate, and Turbine Load when making y changes. (R.M.) | | | | | | |
| 3.184 | Increase reactor power to | o 1%. <mark>(R.M.)</mark> | | | | | | |
| 3.185 | Begin performance of Er Power Increase) to begin EQ. ACTIVITY (MAN. | nclosure 4.15 (Dete a updating the value ENTRY)). | mination of Xe for OAC point | e-133 Equiva C1K0186 (1 | alent Act FOTAL I | ivity During NC XE-133 | ļ | |
| 3.186 | Begin reviewing the iten all substeps of 3.195 are | ns listed in Step 3.1 signed off. | 95 so that Unit | 1 will <u>NOT</u> | enter Mo | ode 1 until | | |
| 3.187 | IF necessary, continue h | eatup to no load T | AVG (557°F). | | | | | |
| 3.188 | 3.188 Maximize S/G blowdown flowrate within the guidelines of OP/1/A/6250/008 (Steam Generator Blowdown). (R.M.) | | | | | | | |
| 3.189 | <u>WHILE</u> increasing reac flowrate can be subseque | tor power coordinat ently reduced. | e with Chemist | ry to determ | ine wher | n blowdown | | |
| Note to Evalu | lator: | | | | | | 1 | |
| This step fro Reactor pow | m the "Controlling Pro er. The following proce | cedure for Unit s edure provides g | Startup" prov uidance for u | ides guida Ise on Cor | nce to trol Ro | increase ds. | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | | | | | |
|--------------------|---|---|--|--|--|--|--|--|
| Op Test No.: 301 | <u>301</u> Scenario # <u>4</u> Event # <u>2</u> Page <u>17</u> of | | | | | | | |
| Event Description: | vent Description: Withdraw Control Rods to Increase Reactor Power to 14% | | | | | | | |
| | | | | | | | | |
| | Enclosure 4.4 | OP/1/A/6150/008 | | | | | | |
| 2. Initi | Rod Withdrawal al Conditions | Page 2 of 7 | | | | | | |
| <u>AA</u> 2.1 | Verify Unit Startup is in progress per OP/1/A/6100/001 (Con Startup) or Unit Fast Recovery in progress per OP/1/A/6100/ | atrolling Procedure for Unit 005 (Unit Fast Recovery). | | | | | | |
| NOTE: | The following LED lights can indicate a fault or power supply addressed prior to rod withdrawal. CNS-2013-03999 | y swap that must be | | | | | | |
| <u>AA</u> 2.2 | IF this is the initial rod withdrawal, complete Enclosure 4.17 Lights Verification) to verify the following: | (Circuit Cards LED Status | | | | | | |
| | Fault status lights are extinguished. | | | | | | | |
| | Firing Circuit Card power supply LEDs (4 per card) for c are lit. | ards A1, A2, D1, D2 and G1 | | | | | | |
| 3. Proc | edure | | | | | | | |
| NOTE: | This enclosure will affect reactivity of the core and is there Reactivity Management per the guidelines of AD-OP-ALI Management). (R.M.) | efore designated important to L-0203 (Reactivity | | | | | | |
| | The SDM boron concentration at 400°F is always greater to concentration at 212°F. | than the critical boron | | | | | | |
| <u>N/A</u> 3.1 | <u>IF</u> < P-11 <u>AND</u> cycle burnup (C1P1457) > 350 EFPD, prior banks, verify K-eff will remain < 0.99 with shutdown banks following: {PIP 04-6307} | to withdrawing shutdown withdrawn for one of the | | | | | | |
| | ☐ <u>IF</u> NC temperature ≥ 400°F, verify SDM per OP/0/A/610 Calculation) using 400°F. | 00/006 (Reactivity Balance | | | | | | |
| | □ <u>IF</u> NC temperature < 400°F, verify SDM per OP/0/A/610 Calculation) using current NC temperature. | 00/006 (Reactivity Balance | | | | | | |
| <u>AA</u> 3.2 | AA 3.2 IF > P-11 OR cycle burnup (C1P1457) ≤ 350 EFPD, prior to withdrawing shutdown banks, verify K-eff will remain < 0.99 with shutdown banks withdrawn. Refer to OP/0/A/6100/006 (Reactivity Balance Calculation). | | | | | | | |
| | | | | | | | | |

| Appendix | D | Required Operator Actions | | | | | Forr | n ES-D- | -2 | | |
|--------------|---|--|-------------------------------------|----------------------------|---|---|----------------------------|---------------------------|---------------------|------------------------|--|
| Op Test No.: | 301 | Scenario # <u>4</u> Event # <u>2</u> Page <u>18</u> of | | | | | | 140 | | | |
| Event Descri | Event Description: Withdraw Control Rods to Increase Reactor Power to 14% | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | Enclosu Rod With | ıre 4.4 ıdrawal | | OP/ 1 Page | /A/615 3 of 7 | 0/008 | |
| | NOTE: | If in Mode only shute | e 4 or shutd lown banks | own ba A and | anks are bein B. {PIP 97- | g withdraw 0693} | n for tripp | able rod w | orth, w | ithdraw | |
| | 3.3 | Withdrav for Unit S | v shutdown Startup) or (| banks OP/1/A | in accordanc 1/6100/005 (1 | e with OP/ Unit Fast R | 1/A/6100/ ecovery) a | 001 (Contr s follows: | olling l | Procedure | |
| | AA | 3.3.1 | Dispatch o "GRP SEI Cabinet G | operato LECT'' RP Se | or to Rod Cor lights illumi lect Lights). | ntrol Power nate per Er | Cabinets iclosure 4. | to verify se 13 (Rod C | elected ontrol I | banks ?ower | |
| | AA | 3.3.2 | <u>IF NOT</u> f | ùlly wi | ithdrawn, wit | hdraw Shu | tdown Ba | nk A as fol | lows: | | |
| | CAUTIO | N: Failur result | e to pause a in dropping | t each rods. | bank position | n with the " | CRD BAI | NK SELEC | "T" swi | tch may | |
| | | AA | 3.3.2.1 | Plac | e "CRD BAI | NK SELEC | "T" in the | "SBA" pos | ition or | 1 MC1. | |
| | | AA | 3.3.2.2 | Ver Cab Cab | ify that "GRI inets 1AC an inet GRP Sel | P SELECT nd 2AC per lect Lights) | ' light "C" Enclosure | illuminate e 4.13 (Rod | s on Ro I Contro | od Control ol Power | |
| | | AA | 3.3.2.3 | WE mov | HLE moving vement by the | grods in the following | e followin indication | g step, veri 1s: | fy prop | er rod | |
| | | | | • | Proper "ROI Proper step of DRPI indicat Reactor pow T-Avg chans | DS IN/ROI lemand cou tion er changes ges. | OS OUT" (inter move | direction liį ement | ght | | |
| | | AA | 3.3.2.4 | Usii posi | ng the "IN-O ition specifie | UT" switch d by COLR | ı, withdrav t (T.S. 3.1 | v shutdowr .5). (R.M.) | ı bankı | rods to | |
| | | <u>AA</u> | 3.3.2.5 | Obs GR(eacl | erve "S/D BA OUP 2" coun h other. | ANK A GR ters indicat | OUP 1" a te withdra | nd "S/D B. wal steps w | ANK A vithin o | ne step of | |
| | | AA | 3.3.2.6 | Ver DRI | ify that the sl PI display. | utdown ba | nk mecha | nisms are r | noving | on the | |
| | | | | | | | | | | | |

| Appendix D | | | Required Operator Actions | | | Form ES-D-2 | | | -2 | |
|-------------------|-----|-----------|---------------------------------|--------------------|--|---|-------------------------------------|--------------------|------------------|-----|
| Op Test No.: | 301 | Scena | irio # | 4 | Event # | 2 | Page | 19 | of | 140 |
| Event Description | : | Withdrav | w Control F | Rods to | o Increase Re | actor Power to 14 | 1% | | | |
| | | | | | Enclosure | e 4.4 | OP/ | /A/615 | 50/008 | |
| | | | | | Rod Withd | rawal | Page | 4 of 7 | | |
| | AA | 3.3.3 | IF NOT f | ully w | ithdrawn, with | Iraw Shutdown Ba | nk B as fol | lows: | 11/01 | |
| | | <u>AA</u> | 3.3.3.1 | Plac | ce "CRD BANI | X SELECT" in the | "SBB" pos | ition or | I IMCI. | |
| | | <u>AA</u> | 5.5.5.2 | illu: Enc | ning that the sele minates on Rod losure 4.13 (Ro | cted banks "GRP 3 Control Cabinets od Control Power (| 1BD and 2 Cabinet GR | BD per P Selec | t Lights). | |
| | | AA | 3.3.3.3 | <u>WE</u> mov | <u>HLE</u> moving r vement by the f | ods in the followin ollowing indication | g step, veri ns: | fy prop | er rođ | |
| | | | | | Proper "RODS Proper step der DRPI indicatio Reactor power T-Avg change | S IN/RODS OUT" (mand counter mov) on changes s. | direction lij ement | ght | | |
| | | AA | 3.3.3.4 | Usi pos | ng the "IN-OU ition specified 1 | T" switch, withdrav by COLR (T.S. 3.1 | w shutdown .5). (R.M.) | ı bankı | rods to | |
| | | AA | 3.3.3.5 | Obs GR eacl | serve "S/D BAN OUP 2" counte h other. | NK B GROUP 1" a rs indicate withdra | nd "S/D B. wal steps v | ANK B | ne step of | |
| | | AA | 3.3.3.6 | Ver DR | ify that the shu PI display. | tdown bank mecha | nisms are 1 | noving | on the | |
| | N/A | 3.3.4 | <u>IF</u> shutdow then proce | wn bar eed to s | nks A and B ha Step 3.12. | ve been withdrawn | for trippat | ole rod v | worth only | у, |
| | AA | 3.3.5 | Withdraw | Shutd | lown Bank C as | follows: | | | | |
| | | AA | 3.3.5.1 | Plac | ce "CRD BANI | X SELECT" in the | "SBC" pos | ition or | 1MC1. | |
| | | <u>AA</u> | 3.3.5.2 | Ver illu Enc | ify that the sele minates on Rod losure 4.13 (Ro | ected banks "GRP & Control Cabinet S od Control Power C | SELECT" 1 SCDE per Cabinet GR | ight "A P Selec | " et Lights). | |
| | | AA | 3.3.5.3 | WE mov | HLE moving r vement by the f | ods in the followin ollowing indication | g step, veri ns: | fy prop | er rođ | |
| | | | | | Proper "RODS Proper step der DRPI indicatio Reactor power T-Avg change | S IN/RODS OUT" (mand counter move on changes s. | direction li ement | ght | | |
| | | AA | 3.3.5.4 | Usi pos | ng the "IN-OU ition specified 1 | T" switch, withdrav by COLR (T.S. 3.1 | w shutdown .5). (R.M.) | ı bankı | rods to | |
| | | <u>AA</u> | 3.3.5.5 | Ver DR | ify that the shu PI display. | tdown bank mecha | nisms are 1 | noving | on the | |
| | | | | | | | | | | |

| Appendix D | Requ | ons | Form ES-D-2 | | | | | |
|--------------------|--------------------|---|---|-------------------------------------|---------------------------|------|--|--|
| Op Test No.: 301 | Scenario # | 4 Event # | 2 | Page | <u>20</u> of | 140 | | |
| Event Description: | Withdraw Control R | ods to Increase Reacto | r Power to 1 | 4% | | | | |
| | | | | | | | | |
| | | Enclosure 4.4 | | OP/1 | A/6150/008 | | | |
| ۵۵ | 226 Withdraw | Rod Withdraw Shutdown Bank D as foll | al | Page | 5 of 7 | | | |
| <u></u> | AA 3361 | Place "CRD BANK SF | LECT" in the | "SBD" nos | sition on 1MC | 1 | | |
| | AA 3.3.6.2 | Verify that the selected | banks "GRP | SELECT" 1 | ight "B" | •- | | |
| | <u></u> | illuminates on Rod Con Enclosure 4.13 (Rod C | ntrol Cabinet ontrol Power | SCDE per Cabinet GR | P Select Ligh | ts). | | |
| | <u>AA</u> 3.3.6.3 | WHILE moving rods movement by the follo | in the followir wing indicatio | ng step, veri ms: | ify proper rod | | | |
| | | Proper "RODS IN/ Proper step deman | RODS OUT" d counter mov | direction li vement | ght | | | |
| | | DRPI indication Reactor power char | nges | | | | | |
| | | T-Avg changes. | 0 | | | | | |
| | <u>AA</u> 3.3.6.4 | Using the "IN-OUT" sy position specified by C | witch, withdra OLR (T.S. 3.1 | w shutdown 1.5). (R.M.) | n bank rods to | | | |
| | <u>AA</u> 3.3.6.5 | Verify that the shutdow DRPI display. | n bank mech | anisms are 1 | moving on the | | | |
| AA | 3.3.7 Withdraw | Shutdown Bank E as foll | ows: | | | | | |
| | AA 3.3.7.1 | Place "CRD BANK SE | LECT" in the | "SBE" pos | ition on 1MC | 1. | | |
| | <u>AA</u> 3.3.7.2 | Verify that the selected illuminates on Rod Cor Enclosure 4.13 (Rod C | banks "GRP ntrol Cabinet ontrol Power | SELECT" 1 SCDE per Cabinet GR | ight "C" P Select Ligh | ts). | | |
| | <u>AA</u> 3.3.7.3 | WHILE moving rods movement by the follo | in the followin wing indicatio | ng step, veri ms: | ify proper rod | | | |
| | | Proper "RODS IN/ Proper step demander DRPI indication Reactor power changes. | RODS OUT" d counter mov nges | direction li vement | ght | | | |
| | <u>AA</u> 3.3.7.4 | Using the "IN-OUT" su position specified by C | witch, withdra OLR (T.S. 3.1 | w shutdown 1.5). (R.M.) | n bank rods to | | | |
| | <u>AA</u> 3.3.7.5 | Verify that the shutdow DRPI display. | n bank mech | anisms are 1 | moving on the | | | |

| Appendix D | Require | | Form | ES-D-2 | | | | | | |
|--------------------|--|---|---|---|--------------------------------|--------------------|--|--|--|--|
| Op Test No.: 301 | <u>301</u> Scenario # <u>4</u> Event # <u>2</u> Page <u>21</u> of <u>1</u> | | | | | | | | | |
| Event Description: | Event Description: Withdraw Control Rods to Increase Reactor Power to 14% | | | | | | | | | |
| <u></u> | | | | | | | | | | |
| | | Enclosure Rod Withdu | 4.4 awal | OP/] Page | L/A/6150/ | 008 | | | | |
| NOTE: | If the A206 circuit card "A move. | ALM" light is lit , | there is the possib | ility that th | ne wrong b | ank may | | | | |
| <u>AA</u> 3.4 | Verify the "ALM" LED o Logic Cabinet) is <u>NOT</u> il | n circuit card A20 luminated. | 06 in the left side (| of 1ERCC | 0006 (Rod | Control | | | | |
| CAUTIO | N: Failure to pause at eac result in dropping rods | h bank position w | ith the "CRD BAI | NK SELEO | CT" switch | ı may | | | | |
| <u>AA</u> 3.5 | Place the "CRD BANK S | ELECT " switch | in the "MAN" pos | ition. | | | | | | |
| <u>AA</u> _ 3.6 | WHILE moving rods in indications: | the following Step | o, verify proper ro | d moveme | nt by the f | ollowing | | | | |
| | Proper "RODS IN/RO Proper step demand of DRPI indication Reactor power chang T-Avg changes. | DDS OUT" direct: counter movement es | ion light | | | | | | | |
| N/ <u>A AA</u> 3.7 | IF AT ANY TIME durin or a dropped rod results in of the following: (R.M.) | ng Unit Startup a 1 n a return to subci | od has dropped or iticality from a cri | n an approa itical cond | ach to criti ition, perfo | cality, orm one | | | | |
| | 3.7.1 IF the malfunc | tion is in the Con | trol banks, reinser | t ONLY th | e Control | banks. | | | | |
| | _ 3.7.2 <u>IF</u> the malfunc banks | tion is in the Shu | down banks, reins | sert Contro | l and Shut | down | | | | |
| N/ <u>A AA</u> 3.8 | IF AT ANY TIME a sta manually trip the reactor. | ble startup rate of (R.M.) | > 1.0 DPM is ach | ieved duri | ng rod mot | tion, | | | | |
| <u>AA</u> _ 3.9 | Withdraw control banks t OP/1/A/6100/001 (Contro Fast Recovery). (R.M.) | o achieve critical olling Procedure f | ity as directed by or Unit Startup) o | r OP/1/A/0 | 5100/005 (| Unit | | | | |
| NOTE: | Per SOER 07-01 (Reactiv monitor multiple indicatio Instrumentation, Steam Pr power reactivity changes. | ity Management) ns such as Therm essure. ΔT's, CF I (R.M.) | it is recommended al Power Best Esti Flowrate, and Turb | l that Plant imate, Nuc pine Load | Operators lear when maki | ; ing at | | | | |
| 3.10 | For power operation, ensu curves on Unit One Reac | ure control rods n tor Operating Dat | aintain their prop a Book. | er insertior | n limits by | use of | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | | | | | |
|-------------------------|---|-------------------------------|--|--|--|--|--|--|
| Op Test No.: <u>301</u> | Scenario # Event # 2 | _ Page of140 | | | | | | |
| Event Description: | Withdraw Control Rods to Increase Reactor Power to 14 | 4% | | | | | | |
| | | | | | | | | |
| | Enclosure 4.4 | OP/ 1 /A/6150/008 | | | | | | |
| | Rod Withdrawal | Page 7 of 7 | | | | | | |
| 3.11 | WHEN greater than 15% Impulse pressure (1SI-18.9-01 "C | 5 LO TURB IMPULSE | | | | | | |
| | PRESS ROD BLOCK" status light cleared), perform the foll | lowing: | | | | | | |
| | _ 3.11.1 Adjust T-Avg within ± 1°F of T-Ref (rod motion used for comparison). (R.M.) | demand signal meters shall be | | | | | | |
| | 3.11.2 Place "CRD BANK SELECT" switch in "AUTO" | . (R.M.) | | | | | | |
| 3.12 | Verify the following: | | | | | | | |
| | OAC and control board demand indication for all shutdown and control rod banks agree within ± 1 step. (Control Rod Position Information, RODS) OAC and control board DRPI indication for each shutdown and control rod agrees within ± 1 step. (Control Rod Position Information, RODS) Rod position indication system and demand position indication system shall agree on rod position within ± 12 steps. | | | | | | | |

3.13 File this enclosure in the Control Copy folder of this procedure.

Note to Evaluator:

Once the crew has withdrawn control rods and established a positive startup rate, Event 2 is complete. At the discretion of the Lead Evaluator, the scenario may continue by instructing the booth operator to insert Trigger 3 (1A RN Strainer Hi D/P).

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|---|-----|---------------------------|---|---------|-------------------|------|-------------|----|-----|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 3 | Page | 23 | of | 140 | |
| Event Description: 1A Nuclear Service Water (RN) Pump Strainer Hi | | | | | o Strainer Hi D/P | | | | | |

Control Room Indications 1AD-12, A/1 "RN PUMP A FLOW HI/LO" - LIT 1AD-12, C/2 "RN PMP A STRAINER HI D/P" - LIT 1A RN Flow indication indicates 0 gpm

| CNS AP/0/A/5500/020 | LOSS OF NUC | CLEAR SERVICE WATER Case I ss of RN Train | PAGE NO. 6 of 117 Revision 44 |
|---|---|--|---|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAI | NED |
| 1. Start idle RN p 2. Ensure Unit 1 monitors Encl 3. Verify RN System | oump(s) as required. and Unit 2 OATC osure 1 (Foldout Page). tem in normal alignment | Note to Evaluator: Enclosure 1 is included as Atta Perform the following: | achment 4. |
| as follows: • Both RN Sup <u>AND</u> • Both RN Disc ALIGNED. | ply headers - ALIGNED | a. IF RN aligned for single operation with "A" train isolated, THEN GO TO of RN With "A" Supply I Isolated). b. IF RN aligned for single operation with "B" train isolated, THEN GO TO of RN With "B" Supply I Isolated). c. IF RN aligned for single header operation with "/ discharge header isolat TO Case V (Loss of RN Discharge Header Isola d. IF RN aligned for single header operation with "I discharge header isolat TO Case VI (Loss of RN Discharge Header Isola e. IF RN aligned for single header operation with "I discharge header isolat TO Case VI (Loss of RN Discharge Header Isola f. IF RN aligned for single discharge header operation with "Go TO Case VII (Loss of RN Discharge header operation isolater isolat TO Case VII (Loss of RN Discharge header operation isolater isolat TO Case VII (Loss of RN Discharge header operation discharge header operation | supply header Case III (Loss leader supply header Case IV (Loss leader discharge A" train ed, <u>THEN GO</u> With "A" ted). discharge B" train ed, <u>THEN GO</u> With "B" ted). SNSWP tion with "A" solated, <u>THEN</u> of RN With "A" solated, <u>THEN</u> of RN With "B" solated, <u>THEN</u> of RN With "B" |

| Appendix D | Required Operator Act | Form ES-D-2 | | | |
|--------------------|---------------------------------------|---------------|------|-------|-----|
| Op Test No.: 30 | 1 Scenario # _ 4 Event # | 3 | Page | 25 of | 140 |
| Event Description: | 1A Nuclear Service Water (RN) Pump St | rainer Hi D/P | | | |
| | | | | | |
| | | | | | |

| CI AP/0/A/5 | NS 5500/020 | LOSS OF NU | CLEAR SI Case I oss of RN | ERVICE WATER Train | PAGE NO. 7 of 117 Revision 44 |
|----------------|---|-----------------------------------|---------------------------------|---|--|
| | ACTION/EX | PECTED RESPONSE | [| RESPONSE NOT OBTAIN | ED |
| 4. V | Verify each op lischarge flow ,600 GPM. | erating RN pump - GREATER THAN | | Perform the following: a. Stop any RN pump(s) not support system operation b. Ensure the following suct Lake - OPEN: - 1RN-1A (RN P/H Pit A Lake) - 1RN-2B (RN P/H Pit A Lake) - 1RN-5A (RN P/H Pit B Lake) - 1RN-6B (RN P/H Pit B Lake). c. Ensure the following esset isolation valves for require OPEN: - 1RN-67A (RN Hdr 1A S - 1RN-69B (RN Hdr 1B S - 2RN-67A (RN Hdr 2A S - 2RN-69B (RN Hdr 2B S d. Ensure the following RN f discharge valves - OPEN - 1RN-57A (Station RN I Sys). (RNO continued on next pa | t required to ion valves to Isol From Isol From Isol From Isol From Isol From ential header ed trains - Supply Isol) Supply Isol) Supply Isol) Supply Isol) Supply Isol) Disch To RL |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|---|-----|---------------------------|---|---------|---|------|-------------|----|-----|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 3 | Page | 26 | of | 140 | |
| Event Description: 1A Nuclear Service Water (RN) Pump Strainer Hi D/P | | | | | | | | | | |

| CNS AP/0/A/5500/020 | LOSS OF NU | ICLEAR SERVICE WATER Case I oss of RN Train | PAGE NO. 8 of 117 Revision 44 |
|------------------------|-----------------|---|--|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAIN | NED |
| 4. (Continued) | | e. Ensure one of the followindischarge valves - OPEN 1RL-54 (RN System D) 0R 1RL-62 (RN System D) Resure the following stat discharge header crosso OPEN: 1RN-54A (Station RN X-Over) 1RN-53B (Station RN X-Over). N/A g. IF either of the following met: RN cannot be aligned OR No flow indicated on or pump(s), | Ing RL isch To A RL isch To B RL isch To B RL ion RN ver valves - Disch Hdr Disch Hdr conditions to Lake perating RN age) |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|---|-----|---------------------------|---|---------|---|------|-------------|----|-----|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 3 | Page | 27 | of | 140 | |
| Event Description: 1A Nuclear Service Water (RN) Pump Strainer Hi D/P | | | | | | | | | | |

| CNS AP/0/A/5500/020 | LOSS OF NU | JCLEAR SERV Case I oss of RN Trai | /ICE WATER | PAGE NO. 9 of 117 Revision 44 |
|------------------------|-----------------|---|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| 4. (Continued) | | | | |
| | | | THEN align RN to SNSW | /P as follows: |
| | | _ | Align valves for RN st SNSWP. <u>REFER TO</u> (RN Valve Alignment to SNSWP). | wap to Enclosure 2 for RN Swap |
| | | _ | IF WL discharge in pr <u>THEN</u> coordinate with Chemistry to secure a WL discharges. | ogress, n Radwaste all controlled |
| | | _ | <u>IF</u> any RN chemical a progress, <u>THEN</u> notify to secure it. | ddition in y Chemistry |
| | | _ | <u>WHEN</u> corrective actitaten, <u>THEN</u> restore alignment. <u>REFER T</u> Enclosure 3 (Returnir alignment To Normal Transfer To SNSWP) | on has been RN to normal O RN After |
| | | h. | Verify the following alarm | <mark>is - DARK</mark> : |
| | | — | AD-12, C/2 "RN PMP STRAINER HI D/P" | A |
| | | _ | AD-12, C/5 "RN PMP STRAINER HI D/P" | B |
| | | _ | AD-12, C/2 "RN PMP STRAINER HI D/P" | A |
| | | _ | 2AD-12, C/5 "RN PMP STRAINER HI D/P". | B |
| | | i. | IF any of the previous ala THEN backflush affected <u>REFER TO</u> OP/0/A/6400 (Nuclear Service Water S | arms lit, I strainer. /006C System). |
| | | | | |
| | | | | |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|---|-----|---------------------------|---|---------|---|------|-------------|----|-----|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 3 | Page | 28 | of | 140 | |
| Event Description: 1A Nuclear Service Water (RN) Pump Strainer Hi D/P | | | | | | | | | | |
| | | | | · · | | | | | | |

| CNS AP/0/A/5500/020 | LOSS OF NU | CLEAR SERVICE WAT Case I oss of RN Train | ER | PAGE NO. 10 of 117 Revision 44 | | |
|---|--|---|--|---|--|--|
| ACTION/E) | PECTED RESPONSE | RESP | ONSE NOT OBTAIN | ED | | |
| 5. Verify each or discharge flov GPM. | perating RN pump v - LESS THAN 23,000 | Perform the | e following: | | | |
| | | CAUTION | The following result in loss of essential head opposite train started. | steps may of an ler until an pump is | | |
| | | a. Ensure t valves - | the following RN CLOSED: | isolation | | |
| | | • 1RN-4 | 47A (RN Supply 3 | X-Over Isol) | | |
| | | • 1RN-4 | 48B (RN Supply 2 | X-Over Isol) | | |
| | | • 2RN-4 | 17A (RN Supply 2 | X-Over Isol) | | |
| | | 2RN-48B (RN Supply X-Over Isc | | | | |
| | | • 1RN-5 | t Hdr Isol) | | | |
| | | • 1RN-5 | 52B (Non-Ess Re | t Hdr Isol) | | |
| | | • 2RN-5 | 51A (Non-Ess Re | t Hdr Isol) | | |
| | | • 2RN-5 | 52B (Non-Ess Re | t Hdr Isol). | | |
| | | b. Ensure 1 SNSWP | 1RN-58B (RN Ho) - OPEN. | Ir B Ret To | | |
| | | c. <u>WHEN</u> 1 the follow | IRN-58B open, <u>T</u> wing valves: | HEN CLOSE | | |
| | | • 1RN-5 X-Ove | 54A (Station RN I er) | Disch Hdr | | |
| | | — • 1RN-5 X-Ove | 53B (Station RN er). | Disch Hdr | | |
| | | d. <u>IF</u> flow ro <u>TO</u> Step | eturning to norma | al, <u>THEN GO</u> | | |
| | | (RNO con | tinued on next pa | age) | | |
| | | | | | | |

| Appendix D | Re | equired Operator Ac | Form ES-D-2 | | | |
|---|---------------|---------------------|-------------|------|-------|-----|
| Op Test No.: 3 | 01 Scenario # | 4 Event # | 3 | Page | 29 of | 140 |
| Event Description: 1A Nuclear Service Water (RN) Pump Strainer Hi D/P | | | | | | |

| CNS AP/0/A/5500/020 | LOSS OF NU | ICLEAR SERVICE WA Case I oss of RN Train | PAGE NO. 11 of 117 Revision 44 | |
|--|---|---|---|---|
| ACTION/EX | PECTED RESPONSE | RES | PONSE NOT OBTAIN | ED |
| 5. (Continued) 5. (Continued) 6. Ensure RN pu NEEDED. 7. Ensure proper Hx(s) as follow a. Verify RN - SERVICE K | mps - IN OPERATION A r alignment of RN to KC vs: ALIGNED TO IN C HX(s). | e. <u>IF</u> flow the foll 1) Ens affe 2) Dis pipi AP/ S a. Shift K <u>REFEF</u> • OP/1 Cool | still excessive, <u>TH</u> owing: sure both RN pump ected train - OFF. patch operators to ng leaks. <u>REFER</u> 0/A/5500/030 (Pla C train in service a <u>R TO</u> the following 1/A/6400/005 (Con ing Water System) | IEN perform D(s) on locate any TO nt Flooding). Is needed. procedures: nponent |
| b. Ensure KC PROPERLY 8. Verify each op discharge flov 8,600 GPM. | Hx Otit Mode switches - Y ALIGNED. Perating RN pump v - GREATER THAN | Perform t Cool Perform t b. Align F needee pump's 8,600 (OP/0/A Water | VA/6400/005 (Com ing Water System) he following: exceed 4650 GPN with through NS to raise each ope s discharge flow to GPM. <u>REFER TO</u> V6400/006C (Nucl System). | nponent). A through an S Hx(s) as grating RN greater than ear Service |

| Appendix D | | Required Operator Actions | | | | Form ES-D-2 | | | | |
|---|-----|---------------------------|---|---------|---|-------------|----|----|-----|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 3 | Page | 30 | of | 140 | |
| Event Description: 1A Nuclear Service Water (RN) Pump Strainer Hi D/P | | | | | | | | | | |
| <u> </u> | | | | | | | | | | |



| Appendix D | | Required Operator Actions | | | | Form ES-D-2 | | | | |
|---|-----|---------------------------|---|---------|---|-------------|----|----|-----|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 3 | Page | 31 | of | 140 | |
| Event Description: 1A Nuclear Service Water (RN) Pump Strainer Hi D/P | | | | | | | | | | |
| | | | | | | | | | | |

| CNS AP/0/A/5500/020 | LOSS OF NU | PAGE NO. 13 of 117 Revision 44 | | | | | | |
|--|---|---|--|--|--|--|--|--|
| ACTION/E) | (PECTED RESPONSE | RESPONSE NOT OBTAINED | | | | | | |
| 12. Ensure compl Tech Specs an Commitments | iance with appropriate nd Selected Licensee Manual: | | | | | | | |
| SLC 16.7-6 (Instrumentat | (RN Discharge ion) | | | | | | | |
| • 3.6.5 (Conta | inment Air Temperature) | | | | | | | |
| • 3.6.6 (Conta | inment Spray System) | | | | | | | |
| | ainment Valve Injection m (CVIWS)) | TECH SPEC EVALUATION | | | | | | |
| | ary Feedwater (AFW) | See Attachment 9 for applicable Tech Specs. | | | | | | |
| - • 3.7.7 (Comp (CCW) Syste | onent Cooling Water em) | T.S. 3.7.8 <u>Condition A:</u> (Restore NSWS train to OPERABLE status within 72 hours) | | | | | | |
| • <mark>3.7.8 (Nuclea (NSWS))</mark> | ar Service Water System | | | | | | | |
| • 3.7.10 (Cont System (CR) | rol Room Area Ventilatior AVS)) | 1 | | | | | | |
| • 3.7.11 (Cont Water System | rol Room Area Chilled m (CRACWS)) | | | | | | | |
| • 3.8.1 (A.C. S | ources - Operating) | | | | | | | |
| _ • 3.8.2 (A.C. S | ources - Shutdown). | | | | | | | |
| 13. Determine rec | uired notifications: | | | | | | | |
| • <u>REFER TO</u> ((Classificatio | RP/0/A/5000/001 on Of Emergency) | | | | | | | |
| - • REFER TO I Notification F | RP/0/B/5000/013 (NRC Requirements). | | | | | | | |
| 14. Notify Enviror RN pump shif 15. Determine lon RETURN TO p | nmental Chemistry of ar ts. og term plant status. procedure in effect. | Note to Evaluator: This completes Event 3. At Lea discretion, the scenario may co directing the booth operator to Trigger 4 (Feed Reg Bypass Va | d Evaluator ontinue by insert Ive Opens). | | | | | |
| | | END | | | | | | |

| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|--|-----|---------------------------|---|---------|---|------|-------------|----|-----|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 4 | Page | 32 | of | 140 | |
| Event Description: 1B S/G W/R Signal Fails Low / Feed Reg Bypass Valve Opens | | | | | | | | | | |

Control Room Indications

1CF-39 (S/G 1B CF BYP CTRL) begins to open

CA Flow to S/G 1B indication increases to top of scale

S/G 1B level begins to increase

1AD-4 E/5 "CFCV ISOL VLVS CLSD" - LIT

1AD-2 F/10 "DCS TROUBLE" - LIT

1AD-2 B/2 "S/G B LEVEL DEVIATION" – Will alarm if S/G level deviates from program by 5%
| Appendix D | Required Opera | tor Actions | For | rm ES-D-2 |
|--|---|---|---------------------------|-------------------------------------|
| Op Test No.: <u>301</u> Scena Event Description: 1B S/G | ario # <u>4</u> Event W/R Signal Fails Low / Fe | #4 eed Reg Bypass Valve | _ Page <u>33</u> Opens | _ of140 |
| | | | | 1 |
| CNS AP/1/A/5500/006 | LOSS C | OF S/G FEEDWATER Case III Control Not in Auto | | PAGE NO. 15 of 21 Revision 43 |
| ACTION/EX | PECTED RESPONSE | RESPO | NSE NOT OBTAIN | NED |
| C.Operator Actions 1. IF AT ANY TIM approaching: - 83% N/R level Trip) OR - - 11% N/R level Trip), IHEN perform - - 11% N/R level Trip), IHEN perform - - 0.00000000000000000000000000000000000 | E S/G levels el (S/G HI-HI Level Turb el (S/G LO-LO Level Rx the following: 1/A/5000/E-0 (Reactor ty Injection). wing: CF pump - IN SERVICE CF ISOL TRN A" - DARK CF ISOL TRN B" - DARK CF ISOL TRN | <u>GO TO</u> Cas S/Gs). | e I (Loss of CF | Supply To |



| ppendix D | Required C | perator A | ctions | | Form | n ES-D-2 | 2 |
|---|--|--|---|-------------------------|----------------------|---------------------------|------|
| Test No.: <u>301</u> Scen | ario # 1 | Event # | 4 | Page | 35 | of | 140 |
| ent Description: 1B S/G | W/R Signal Fails Lo | ow / Feed Re | eg Bypass Valve | Opens | | | |
| | | | | | | | |
| CNS | L | OSS OF S/G | FEEDWATER | | | PAGE NO |). |
| AP11705500/000 | | Cas CF Control | e III Not in Auto | | | Revision | 43 |
| ACTION/E) | PECTED RESPONSE | | RESPO | NSE NOT | OBTAINE | D |] |
| 6. Verify the follo | owing: | | Perform the | followin | g: | | |
| _ • S/G level(s) | - STABLE | \rightarrow | a. Continue S/G CF fl | to contro low rates | I CF/SN to stabil | 1 D/P and lize level i | |
| - S/G level(s) PROGRAM | - APPROXIMATEL | Y AT | affected s program | S/G(s) ap level. | proxima | ately at | |
| _ • Malfunction | CORRECTED. | | b. WHEN al met: | ll the follo | wing co | nditions | |
| | | | • S/G lev | vel(s) - ST | ABLE | | |
| | | | • S/G lev AT PR | /el(s) - AF OGRAM | PROXI | MATELY | |
| | | | _• Malfun | ction - CC | RREC | TED, | |
| | | | THEN GO | <mark>0 TO</mark> Step | p 7. | | |
| | | | c. Do not co all condit | ontinue in ions met. | this pro | cedure ur | ntil |
| | | | | | | | |
| 7. <u>WHEN</u> malfun return affecte <u>REFER TO</u> OF (Distributed C Operations). | ction corrected, <u>T</u> d controller(s) to a P/1/A/6750/010 ontrol System (D0 | <u>HEN</u> auto. CS) | | | | | |
| 8. Determine lon <u>RETURN TO</u> p effect. | g term plant statu rocedure and ste | ıs. p in | | | | | |
| | | END | | | | | |
| | | | | | | | |
| | | | | | | | |
| Note to Evaluator: | | | | | | | |
| Once the crew has es been satisfied. At Lea booth operator to inse | tablished control d Evaluator discre ert Trigger 5 (FWS | of 1B S/G le etion, the so T Channel : | evel the verifiabl enario may cor 2 Fails Low). | le action ntinue by | of this directi | event has ng the | 5 |
| | | | | | | | |

| Appendix D | Required Operator Actions | | | | For | m ES | -D-2 | | |
|-------------------|---------------------------|---------------------|-----------|---------|-----|------|------|----|-----|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 5 | Page | 36 | of | 140 |
| Event Description | : | - FWST Channel 2 | 2 Fails L | ow | | | | | |
| | | | | | | | | | |

| Control Room Indications |
|--------------------------------------|
| 1AD-9, B/4 "FWST LO LEVEL" - LIT |
| 1AD-9, C/8 "FWST PRE-LO LEVEL" - LIT |
| 1AD-9, E/8 "FWST LO-LO LEVEL" - LIT |

Note To Evaluator:

This event is provided only as a Tech Spec determination by the CRS. The ARP for 1AD-9 B/4 is provided below. However, all three listed ARPs contain the same guidance to refer to T.S. 3.3.2.

| Appendix | D | | Require | ed Operator A | ctions | | Forn | n ES-D |)-2 |
|--------------|-------------------------|--|---|--|--|---|---|---|----------|
| Op Test No.: | 301 | Scenario | # _4 | Event # | 5 | Page | 37 | of | 140 |
| Event Descri | otion: | FWST Cha | nnel 2 Fails | s Low | | | | | |
| | <u>FWST I</u> SETPOR | LO LEVEL | 19.6% on | Panel 1AD-9 1/4 channels | | O H | P/ 1 /A/0 Page 14 | 5100/010 of 58 B/4 | 1 |
| | ORIGIN: | Inst 1FW 1FW 1FW 1FW | rument LT5000 LT5010 LT5120 LT5130 | DCS 1FWAA5000 (1FWAA5010) 1FWAA5120 1FWAA5130 | Descr FWST WR I FWST WR I FWST WR I FWST WR I | iption LEVEL CH <mark>LEVEL CH</mark> LEVEL CH LEVEL CH | I 1 I 2 I 3 I 4 | | |
| | NOTE: | The indication lost while its is expected to | on for any F associated o automatica | WST Level Channe Surge Protective D ally return once the | el which is being a evice (SPD) shunt transient has clea | affected by is the high red. | lightnin voltage. | g may be The sign | e nal |
| | PROBAB CAUSE: | IE | 1. Fill 2. Sat 3. Lea 4. Ina 5. Ins | ing refueling cavit èty Injection ak in system dvertent draining c trument malfunctio | y of FWST on | | | | |
| | AUTOM ACTION | ATIC S: | None | | | | | | |
| | IMMEDI ACTION | ATE S: | Verify low | level by checking | against the other o | channels. | | | |
| | SUPPLE | MENTARY S: | 1. <u>IF</u> pos 2. <u>IF</u> Car 3. Re: 4. <u>IF</u> 4.1 4.2 4.2 | low level due to lesible. low level due to lesible. fer to OP/1/A/6200 a channel failure h Refer to Tech S requirements. * Issue the appropriet emergency reparation of the second of 01069040 - 01069040 - 01069041 - 01069042 - Initiate a work INUED ON TH | ak <u>OR</u> failure of real AND level <u>CA</u> SLC 16.9-11 and S (014 (Refueling V as occurred, perfor- priate Model W/O infrom the affected 1FWLT5000: Rep 1FWLT5120: Rep 1FWLT5130: Rep request to have the HE NEXT PAG | elated pipin <u>NNOT</u> be SLC 16.9-1 Vater Syste rm the folk imum oper- to to have L t channel(s pair CH 1 1 pair CH 2 1 pair CH 3 1 pair CH 4 1 pair CH 4 1 channel r GE | ng, isola maintain 2 for op m) for n owing.) able cha AE prov): FWST L FWST I FWST I FWST I FWST I FWST I | ite if ned, refer perability. nakeup. nakeup. nakeup. nakeup. vide vide vevel vevel vevel vevel | r to |

^{*} The status light for a failed channel "FWST LO LEVEL" located on SI-12 will remain dark when the failed channel is bypassed.

| Appendix D | Required Operator Actions | Form ES-D-2 |
|------------------------------|----------------------------------|---|
| Op Test No.: <u>301</u> Scer | nario # 5 | Page <u>38</u> of <u>140</u> |
| Event Description: FWST | Channel 2 Fails Low | |
| | | |
| | Panel 1AD-9 | OP/ 1 /A/6100/010 J Page 15 of 58 |
| FWST LO LEV | <u>/EL</u> (Cont.) | B /4 |
| REFERENCES: | 1. CNEE-0173-03.15 2. CE-9668 | |

- 3. CNM 1399.03-0629.001 Drop 5 Sheet 395
- CNM 1399.03-0629.001 Drop 8 Sheet 313
- 5. CNM 1399.03-0629.001 Drop 12 Sheet 315
- 6. CNM 1399.03-0629.001 Drop 7 Sheet 319

TECH SPEC EVALUATION

See Attachment 9 for applicable Tech Specs.

T.S. 3.3.2 <u>Condition N</u>: (Place channel in bypass within 6 hours)

Additionally, a tracking entry for T.S 3.3.3 Condition B may be specified.

Note to Evaluator:

TS Evaluation completes Event 5. At Lead Evaluator discretion, the scenario may continue by directing the booth operator to insert Trigger 6 (Condenser Dump Valves Fail Intermediate).

| Appendix D | Re | Required Operator Actions | | | | | 2 |
|-------------------|------------------|---------------------------|----------------|------|----|----|-----|
| Op Test No.: | 301 Scenario # | 4 Event # | 6 | Page | 39 | of | 140 |
| Event Description | : Condenser Stea | m Dumps (1SB-9 & 1SB | -24) Fail Open | | | | |

Control Room Indications

OAC Alarm for 1SB-24 - OPEN

Main Steam Header Pressure - DECREASING

Reactor Power - INCREASING

RED OPEN light for 1SB-24 - LIT

Note To Evaluator:

Once the failure is identified, the crew may elect to invoke OMP 1-7 guidance to isolate a known leak by placing the "STEAM DUM INTLK BYP" switches to the "OFF RESET" position and/or enter AP/28.

| Appendix D | | Required | Operator | Actions | | Form | 1 ES-D-2 | |
|-------------------|---------------------------------|-----------------------------|-----------------------|-----------------------------------|---------------------------|-----------------------|-----------------------------------|-----|
| Op Test No.: | <u>301</u> Scenari | o# <u>4</u> | Event # | 6 | Page | 40 | of | 140 |
| Event Description | n: Condense | er Steam Dump | s (1SB-9 & | 1SB-24) Fail Oper | ו | | | |
| | | | | | | | | - |
| AP/ | CNS 1/A/5500/028 | | SECONDA | ARY STEAM LEAK | | | PAGE NO. 2 of 41 Revision 8 | |
| | ACTION/EX | PECTED RESPON | SE | RES | PONSE NOT | OBTAIN | ED | |
| c. <u>c</u> | perator Actions | | | Note to Evalua | tor: | | | |
| _ 1 | . Monitor Enclos | ure 1 (Foldout | Page). | Enclosure 1 is | included | as Atta | chment 3. | |
| _2 | . Verify turbine - | ONLINE. | | GO TO Ste | <mark>o 6.</mark> | | | |
| | | | | | | | | |
| 3 | . Verify the follo | wing: | | Perform the | following | : | | |
| | Reactor power EQUAL TO 1 | er - LESS THAN 00% POWER | OR | a. Select "I panel. | MANUAL" o | n turbine | control | |
| | • T-Avg - WITH | IIN 1.5°F OF T-F | Ref. | b. Depress pushbut maintain | "CONTRO on and red | L VALVE uce turbir | S LOWER" ne load to | |
| | | | | • React EQUA | or power - l L TO 100% | LESS TH | AN OR R | |
| | | | | • T-Avg | - WITHIN 1 | 1.5°F OF | T-Ref. | |
| 4 | . Verify proper re | eactor respons | e as | IE T-Avg gr | eater than | 1.5°F hig | her than | |
| | Control rods - | IN AUTO AND | STEPPING | required to T-Ref. | maintain T | -Avg wit | s as hin 1°F of | |
| | IN P/R neutron f | lux - DECREAS | ING. | | | | | |
| 5 | . IF AT ANY TIM than 100% TH | E reactor powe | r greater p 3 RNO. | | | | | |
| | Vorify Drr level | STABLE OD | | Porform the | following | | | |
| - ° | INCREASING. | - STADLE UK | | a. Maintain | charging f | ow less tl | han | |
| | | | | 180 GPI (RNO contin | /I. wed on nex | t page) | | |
| | | | | | | page/ | | |

| Appe | ndix D | | Required Opera | tor Action | S | | Forr | n ES-D- | -2 |
|---------|-------------|--------------------|-----------------------|-------------|--|---|--|--|------------------|
| Op Tes | t No.: | <u>301</u> Scenar | io # <u>4</u> Event | # | 6 | Page | 41 | of | 140 |
| Event D | Description | Condens | er Steam Dumps (1SB-§ | 9 & 1SB-24) | Fail Open | | | | |
| L | | | | | | | | | |
| | AP/1 | CNS /A/5500/028 | SECO | NDARY STE | AM LEAK | | | PAGE 3 of 4 Revisio | NO. 1 vn 8 |
| | | ACTION/EX | PECTED RESPONSE |] [| RESPO | NSE NOT | OBTAIN | IED | |
| | 6 | . (Continued) | | | | | | | |
| | | | | b | . THROTTLI Disch Flow | E 1NV-29 Ctrl) to s | 4 (NV P tabilize | mps A&B Pzr level. | |
| | | | | c. | IF Pzr leve THEN GO | l stable <u>O</u> <u>TO</u> Step | R increa 7. | asing, | |
| | | | | d | . <u>IF</u> Pzr leve <u>THEN</u> perf | l continue orm the fo | es to dec ollowing | rease, | |
| | | | | | 1) Reduce follows | e letdown | flow to 4 | 45 GPM a | s |
| | | | | | a) <u>IF</u> 1 Cor the | INV-10A nt Isol) op following | (Letdn C en, <u>THE</u> : | Drif 1B Otlt <u>N</u> perform | n |
| | | | | | (1) | Control Press C letdown 375 - 40 | 1NV-14 control) t pressur 00 PSIG | 8 (Letdn o establish re betweer | h 1 |
| | | | | | (2) | THROT (Letdn F for 45 G | TLE 1N Flow Var SPM letd | V-849 Orif Ctrl) own flow. | |
| | | | | | (3) | WHEN flow est adjust 1 Press C letdown 350 PSI | 45 GPM ablished NV-148 control) t pressur IG. | letdown I, <u>THEN</u> (Letdn o maintair re at | 1 |
| | | | | | (4) | WHEN stable a place 11 Press C | letdown t 350 PS NV-148 control) i | pressure SIG, <u>THEN</u> (Letdn n auto. | <u>1</u> |
| | | | | (F | RNO continue | ed on nex | t page) | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| | -2 |
|---|-----------|
| Op Test No.: 301 Scenario # 4 Event # 6 Page 42 of | 140 |
| Event Description: Condenser Steam Dumps (1SB-9 & 1SB-24) Fail Open | |
| | |
| CNS SECONDARY STEAM LEAK PAGE | NO. |
| AP/1/A/5500/028 4 of 4 Revisio | 1 on 8 |
| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED | |
| 6. (Continued) | |
| b) <u>IF</u> 1NV-13A (Letdn Orif 1A Ott Cont Isol) open, <u>THEN</u> perform the following: | t n |
| (1) Control 1NV-148 (Letdn Press Control) to establis letdown pressure betwee 150 - 200 PSIG. | h n |
| (2) OPEN 1NV-11A (Letdn C 1C Otit Cont Isol). | Drif |
| (3) Adjust 1NV-148 (Letdn Press Control) to establis letdown pressure betwee 375 - 400 PSIG. | h n |
| (4) CLOSE 1NV-13A (Letdn Orif 1A Ottl Cont Isol). | |
| (5) Adjust 1NV-148 (Letdn Press Control) to maintai letdown pressure at 350 PSIG. | n |
| (6) <u>WHEN</u> letdown pressure stable at 350 PSIG, <u>THE</u> place 1NV-148 (Letdn Press Control) in auto. | N |
| 2) <u>IF</u> Pzr level stable <u>OR</u> increasing, <u>THEN GO TO</u> Step 7. | |
| (RNO continued on next page) | |
| | |
| | |
| | |
| | |
| | |

| Appendix D | Required | Operator Act | ions | | Forn | n ES-D-2 |) |
|--|--|---|--|--|---|-------------------------------------|---------|
| p Test No.: <u>301</u> So | enario #4 | Event # | 6 | Page | 43 | of | 140 |
| vent Description: Con | denser Steam Dump | os (1SB-9 & 1SB | -24) Fail Open | | | | |
| | | | | | | | |
| | | | | | | | |
| CNS AP/1/A/5500/028 | | SECONDARY | STEAM LEAK | | | PAGE N 5 of 41 Revision | 0. 8 |
| ACTIO | N/EXPECTED RESPON | SE | RESP | ONSE NOT | OBTAIN | IED |] |
| 6. (Continued | | | | | | | |
| | | | 3) <u>IF</u> Pzr <u>OR</u> P: greate the fo | level conti zr level can than 11% lowing: | inues to inot be r 6, <u>THEN</u> | decrease naintained perform | |
| | | | a) 11 b) Cl | OSE the f | ollowing | valves: | |
| | | | _• | All MSIVs | - | | |
| | | | _• | All MSIV b | ypass v | alves. | |
| | | | c) Ini | tiate S/I. | | | |
| | | | d) <u>G(</u> (R Inj | <u>0 TO</u> EP/1/ eactor Trip ection). | /A/5000/ or Safe | /E-0 ety | |
| 7.IF AT AND Pzr level of manner, 18.IF AT AND 23%, THE FWST asa.OPEN-1NV FWS-1NV FWS-1NV FWS-1NV FWS | (<u>TIME</u> while in this p decreasing in an unc <u>HEN RETURN TO</u> St (<u>TIME VCT level goe</u> <u>N align NV pump suc</u> follows: the following valves: -252A (NV Pumps Su ST) -253B (NV Pumps Su ST). E the following valves: (1994 (VCT Off Isol) | procedure controlled tep 6. es below ction to uct From uct From | | | | | |

| Op Test No.: 301 Scenario # 4 Event # 6 Page 44 of 140 Event Description: Condenser Steam Dumps (1SB-9 & 1SB-24) Fail Open AP/1/A/5500/028 SECONDARY STEAM LEAK PAGE NO. 6 of 41 Revision 8 ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 9. Attempt to identify and isolate leak as follows: a. Perform the following: - a. Verify the following conditions - NORMAL: a. Perform the following: - - b. Containment temperature - Containment pressure - - c. Containment floor & equipment sump evel. - b. Start all lower containment ventilation units in "MAX" cooling. 3. IE AT ANY TIME containment pressure reaches 1.2 PSIG. THEN - PIace all upper and lower containment ventilation units in "MAX" cooling. | Appendix D | Required Operat | or Actions | Forr | n ES-D-2 |
|--|-------------------------------|--|---|---|-----------------------------------|
| Event Description: Condenser Steam Dumps (1SB-9 & 1SB-24) Fail Open AP/11/A/5500/028 SECONDARY STEAM LEAK PAGE NO. 6 of 41 Revision 8 ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 9. Attempt to identify and isolate leak as follows: a. Perform the following: | Op Test No.: <u>301</u> Scena | ario # <u>4</u> Event # | 66 | Page 44 | of <u>140</u> |
| CNS AP/1/A/5500/028 SECONDARY STEAM LEAK PAGE NO. 6 of 41 Revision 8 ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED 9. Attempt to identify and isolate leak as follows: a. Perform the following: | Event Description: Conden | ser Steam Dumps (1SB-9 | & 1SB-24) Fail Open | | |
| | Event Description: Conden | SECON SECON SECON EXPECTED RESPONSE entify and isolate leak as following conditions - ment temperature ment pressure ment humidity ment floor & equipment sum | a. Perform the a. Perform the a. Perform the a. 1) Evacual 2) Perform a) Star vent b) Star vent c) Plac cont "MA 3) IF AT A pressur perform a) Ens c) CLC a, A a, CLC a, A b) Ens c) CLC a, A c) | DIVSE NOT OBTAIN e following: ate containment. In the following: rt all lower contain tilation units in low rt all upper contain tilation units. ce all upper and I tainment ventilati tilation units. ce all upper contain re reaches 1.2 PS in the following: sure Unit 1 reactor sure S/I initiated. DSE the following aure S/I initiated. DSE the following actor Trip or Safe ection). g Step 10. | PAGE NO. 6 of 41 Revision 8 |

| | dix D Required Operator Actions Form ES-D-2 | | | | | | | | | | | |
|--------|---|---|---|--|--|--|--|--|--|--|--|--|
| p Tes | st No.: <u>301</u> Scenario # <u>4</u> | Event # 6 | B Page | 45 of <u>140</u> | | | | | | | | |
| /ent [| Description: Condenser Steam Dump | s (1SB-9 & 1SB-24) Fa | il Open | | | | | | | | | |
| | | | | | | | | | | | | |
| | CNS | | IEAK | | | | | | | | | |
| | AP/1/A/5500/028 | SECONDART STEAM | LEAN | 7 of 41 Revision 8 | | | | | | | | |
| | ACTION/EXPECTED RESPONS | SE | RESPONSE NOT OB | BTAINED | | | | | | | | |
| | 9. (Continued) | | | | | | | | | | | |
| | c. Verify S/G PORVs - CLOSE | D. c. <u>I</u> F | S/G pressure less the | an 1090 PSIG, | | | | | | | | |
| | | 1 |) CLOSE affected S/ | G PORV. | | | | | | | | |
| | | 2 |) IF S/G PORV still o perform the followin | pen, <u>THEN</u> ig: | | | | | | | | |
| | | - | a) CLOSE affected isolation valve. | S/G PORV | | | | | | | | |
| | | - | b) <u>IF</u> S/G PORV is open, <u>THEN</u> dis to close S/G PO valve. | olation valve still patch operator)RV isolation | | | | | | | | |
| | d. Verify condenser dump valve CLOSED. | es - d. [[| steam dumps require <u>HEN</u> perform the follo Select "OFF RESE following switches | ed to be closed, wing: T" on the | | | | | | | | |
| | Note to Evaluator: | _ | • "STEAM DUMP I | NTLK BYP TRN | | | | | | | | |
| | Applicants may chose not place ste dumps in "OFF RESET"due to curre plant conditions. | eam ent | A" - • ("STEAM DUMP I B".) | NTLK BYP TRN | | | | | | | | |
| | | <mark>N/A</mark> 2) | <u>IE</u> valve will not close dispatch operator to condenser dump valve. | se, <u>THEN</u> o close affected alve isolation | | | | | | | | |
| | | (RNC |) continued on next pa | age) | | | | | | | | |
| | | | | | | | | | | | | |
| | Note to Evaluator: Placing Steam Dump Interlock Switc the verifiable action of this event. At | hes to "OFF RESET" Lead Evaluator discre sert Trigger 7 (1B RC) | isolates the leak ar etion, the scenario 2 Shaft Shear / ATV | nd completes may continue WS). | | | | | | | | |

| Apper | ndix D | | Required | Operato | r Actions | Form ES-D-2 | | | |
|---------|------------|--|-------------------|------------|--|--|---|--|--|
| Op Test | No.: | 301 Scenar | io # | Event # | 6 | Page | 46 | of | 140 |
| Event D | escription | : Condense | er Steam Dumps | s (1SB-9 & | a 1SB-24) Fail Oper | I | | | |
| | | | | | | | | | |
| Γ | | CNS | | SECONE | DARY STEAM LEAK | | | PAGE | NO. |
| | AP/1 | /A/5500/028 | | | | | | 8 of Revis | 41 ion 8 |
| L | L | ACTION/EX | DECTED DESDONS | F | DEC | DUNCE NUT | ORTAT | | |
| ۱ | | (Continued) | FECTED RESPONS | - | RE5 | FONSE NOT | UDIAI | | |
| | - | . (Continued) e. (Verify atmor CLOSED. | spheric dump valv | /es - | 3) WHE valve return "ON" - • "S' A" - • "S' B" e. I <u>F</u> steam <u>THEN</u> pe 1) Selec follow - • "S' B" - 2) <u>IF</u> va CLOS valve - 3) <u>IF</u> iso <u>THEU</u> affec 4) <u>WHE</u> valve return "ON" - • "S' B" | N leaking co isolated OF isolated OF isolated OF isolated OF TEAM DUM dumps requerform the for our "OFF RES ving switche TEAM DUM IVE will not co SE affected isolation valve N dispatch of ted atmosphinic N leaking at isolated OF isolated OF isolated OF isolated OF isolated OF | ondens: repair ng switc P INTLI P INTLI uired to llowing SET" on S: P INTLI close, <u>T</u> atmosp live. will not perator heric du tmosph repair ng switc P INTLI P INTLI P INTLI P INTLI | er dump ed, <u>THEI</u> ches to K BYP TI K BYP TI be close the K BYP TI K BYP TI heric dur close, to fail ain mp valve eric dum ed, <u>THEI</u> ches to K BYP TI | NI RN RN d, RN RN mp rto P NI RN RN |
| | | | | | | | | | |
| l | | | | | | | | | |

| Append | lix D | | Require | าร | Form ES-D-2 | | | | | |
|-----------|-----------------|-------------------------------------|----------------------------------|----------------------------|--------------|---|--|--|---|-----|
| Op Test N | lo.: <u>3</u> (| 01 Scenar | io #4 | Event # | <u>ـــــ</u> | 6 | Page | 47 | of | 140 |
| Event Des | scription: | Condense | er Steam Du | mps (1SB-9 | & 1SB-24 |) Fail Oper | 1 | | | |
| | | | | | | | | | | |
| | | NS | | SECON | IDARY ST | EAM LEAK | | | PAGE N | 10. |
| | AFTIAG | 500/028 | | | | | | | Revision | n 8 |
| _ | | ACTION/EX | PECTED RESP | ONSE | [| RES | PONSE NOT | OBTAIN | IED |] |
| | 9. (C | ontinued) | | | | | | | | |
| | f. | Verify CA P | MP #1 - OFF. | | f | LE operat uncontro CA PMP CA PMP | tion of CA P Iled cooldov #1 not requ #1. | MP #1 (wn <u>AND</u> uired, <u>TH</u> | causing flow from <u>IEN</u> stop | |
| | | | | | | | | | | |
| | N/A g | I. <u>IF</u> leak susp THEN CLOS | ected to be ir SE the followi | n a doghouse ng valves: | , | | | | | |
| | | Outside E |)H: | | | | | | | |
| | | • 1SM-7 C/V) | 7A (S/G 1A 0 | tlt Hdr Bldwn | | | | | | |
| | | | 4B (S/G 1D 0 | tit Hdr Bidwn | l | | | | | |
| | | OR | I. | | | | | | | |
| | | • Inside DF | 1. 6B (S/G 1B O | tit Hdr Bidwn | | | | | | |
| | | C/V) • 1SM-7 C/V). | 5A (S/G 1C 0 | tit Hdr Bidwn | I | | | | | |
| | 10. (|)etermine req | uired notifica | ntions: | | | | | | |
| | _• | REFER TO F | RP/0/A/5000/0 n Of Emerger | 001 1cy) | | | | | | |
| | _• | REFER TO F Notification R | P/0/B/5000/0 equirements) |)13 (NRC)). | | | | | | |
| | _ 11. 🚺 | lotify RP of le | ak. | | | | | | | |
| | 12. 🛛 | /erify - LEAK I | SOLATED. | | | <u>50 TO</u> Step | 14. | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| Appe | ndix D | | R | lequired | uired Operator Actions | | | | Form ES-D-2 | | | | |
|---------|-------------|---|--|--|---|----------|---|---------------------------|-------------|-------------------|------------|--|--|
| Op Test | t No.: | <u>301</u> So | enario # | 4 | Event # | | 6 | Page | 48 | of | 140 | | |
| Event D | escription: | Cone | denser Ste | am Dump | s (1SB-9 a | & 1SB-24 |) Fail Ope | n | | | | | |
| | | | | | | | | | | | | | |
| | | CNS | | | SECON | DARY ST | FAMIFAK | | | PAGE | NO | | |
| | AP/1 | /A/5500/028 | | | 0200N | DAILY OF | | | | 10 of Revision | 41 on 8 | | |
| | | ACTIO | N/EXPECTE | D RESPONS | ε | [| RE | SPONSE NOT | OBTAIN | ED | | | |
| | 13. | Determine <u>RETURN</u> effect. | e long term <u>TO</u> proced |) plant stat ure and sta | tus. ep in | | | | | | | | |
| | 14. | Verify US | T level - ST ING. | ABLE OR | | I | Perform the | e following: | 1 | | | | |
| | | | | | | _ : | a. Initiate r | nakeup to U | ST. | | | | |
| | | | | | | ' | Notify S increase | econdary Ch ed makeup. | nemistry (| of | | | |
| | | | | | | | | | | | | | |
| | 15. | Evaluate | unit shutdo | own as foll | ows: | | | | | | | | |
| | - | a. Verify | Unit 1 statu | s - IN MOD |)E 1 <u>OR</u> 2. | | a. <u>GO TO</u> | Step 18. | | | | | |
| | | b. Detern reducti followin | nine if Unit ion warrant ng criteria: | 1 shutdown ed based o | or load n the | | | | | | | | |
| | | Size | of leak | | | | | | | | | | |
| | | • Loca | ation of leal | (| | | | | | | | | |
| | | • Rate inve | e of depletion ntory | on of secon | dary | | | | | | | | |
| | | • Stea repa | am leak can iired at pow | not be isola /er | ated or | | | | | | | | |
| | | _• OSM | / judgment | | | | | | | | | | |
| | | • IE st heat <u>THE</u> redu relie | team leakin ter relief <u>OF</u> <u>N</u> reducing te pressur f valve. | g from seco MSR relie turbine loa e enough to | ondary if valve, ad may o close | | | | | | | | |
| | | • <u>IF</u> tu <u>THE</u> an o and 1. | irbine trip w <u>N</u> it may be rderly shut maintain re | ill isolate st e desirable down of the actor powe | team leak, to perform turbine tr in Mode | | | | | | | | |
| | | | | | | | | | | | | | |
| l | | | | | | | | | | | | | |

| Appendix D | | Re | quired | Actions | Form ES-D-2 | | | | |
|-------------------|-----|-----------------|---------|--------------|--------------|------|----|----|-----|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 7, 8 | Page | 49 | of | 140 |
| Event Description | : | 1B Reactor Cool | ant (NC |) Pump Shaft | Shear / ATWS | | | | |

| Control Room Indications |
|--|
| 1AD-6 A/2 "LOOP B LO FLOW ALERT" - LIT |
| 1AD-6 A/5 "NCP HI VIBRATION" - LIT |
| 1AD-6 B/5 "NCP HI-HI VIBRATION" - LIT |
| All 1B NC Loop flow indications decreasing |

1B NCP Amperage indicates near zero

Note To Evaluator:

The crew will initiate a Reactor Trip, and transition to E-0, based on Immediate Actions of AP/04 (below). The crew will then transition to FR-S.1 due to failed Reactor Trip.

| AP/1/A/5500/004 | LOSS OF R | EACTOR CO | OLANT PUN | IP | PAGE NO. 2 of 2 Revision 16 |
|---|--|-----------|--|--|-----------------------------------|
| ACTION/E | XPECTED RESPONSE |] [| RESPO | NSE NOT OBTAI | NED |
| Verify all con | trol banks - INSERTED. | > | Perform the a. Ensure re b. GOTO Trip or Sa | following: eactor - TRIPPE P/1/A/5000/E-0 afety Injection). | ED.) (Reactor |
| 2. Ensure norm with tripped I MANUAL AN | al spray valve associate NC pump(s) - IN D CLOSED. | ed | | | |
| 3. Stop any dilu | tions in progress. | | | | |
| 4. Ensure comp Tech Specs: | liance with appropriate | | | | |
| • 3.4.5 (RCS | Loops - MODE 3) | | | | |
| _ • 3.4.6 (RCS | Loops - MODE 4). | | | | |
| 5. Determine re | quired notifications: | | | | |
| <u>REFER TO</u> (Classification) | RP/0/A/5000/001 on Of Emergency) | | | | |
| _ • <u>REFER</u> TO Notification | RP/0/B/5000/013 (NRC Requirements). | | | | |
| 6. Determine an | d correct cause of loss | of | | | |
| NC pump(s). | | | | | |



| Appendix D | Required Operato | or Actions | Fo | Form ES-D-2 | | |
|---|--|---|--|--|-----------------------|--|
| Op Test No.: <u>301</u> Scena | rio # <u>4</u> Event # | 7, 8 | Page 52 | of | 140 | |
| Event Description: 1B Read | tor Coolant (NC) Pump Sł | naft Shear / ATWS | | | | |
| | | | | | | |
| CNS | RESPONSE TO NUCLE | AR POWER GENERAT | TION/ATWS | PAGE N | 0. | |
| EP/1/A/5000/FR-S.1 | | | | 2 of 33 Revision | 24 | |
| ACTION/EX | PECTED RESPONSE | RESPO | NSE NOT OBTAI | NED | | |
| C. Operator Actions | | | | | | |
| CAUTION NC pu 5% to 1. Verify Reactor - All rod bottom - All reactor trip OPEN - I/R power - Ti | mps should <u>NOT</u> be trip prevent fuel damage. Trip: h lights - LIT o and bypass breakers - RENDING DOWN. | Perform the a. Trip reactor b. IF reactor | wer greater th TASK #2 following: tor, r will not trip, <u>T</u> | an <u>HEN</u> insert |) | |
| 2. Verify Turbine • All turbine sto | Trip: op valves - CLOSED | Perform the a. Trip turbin b. <u>IF</u> turbine the follow 1) Depre turbine 2) Rapid simult "CON "FAST 3) <u>IF</u> con <u>THEN</u> • All I | e following: ne. e will not trip, <u>T</u> ving: ess "MANUAL" e control panel ly CLOSE cont taneously depro TROL VALVE T RATE" pusht trol valves will <u>I</u> CLOSE the fo MSIVs MSIV bypass v | HEN perform pushbutton trol valves to essing LOWER" and buttons. not close, ollowing: alves. | m i on by nd | |
| | | | | | | |

| Appendix D | | Required Operator Ac | | Form ES-D-2 | | | |
|-------------------|----------------|---------------------------|--------------|-------------|----|----|-----|
| Op Test No.: | 301 Scenario # | 4 Event # | 7, 8 | Page | 53 | of | 140 |
| Event Description | : 1B Reactor (| Coolant (NC) Pump Shaft S | Shear / ATWS | | | | |



| Appendix D | Required Operato | or Actions | For | m ES-D-2 |
|--|---|--|---|---|
| Op Test No.: <u>301</u> Scena Event Description: 1B Read | ario # Event # ctor Coolant (NC) Pump Sh | 7, 8 aft Shear / ATWS | Page <u>54</u> | of <u>140</u> |
| <u></u> | | | | |
| CNS EP/1/A/5000/FR-S.1 | RESPONSE TO NUCLEA | AR POWER GENERAT | FION/ATWS | PAGE NO. 4 of 33 Revision 24 |
| ACTION/EX | PECTED RESPONSE | RESPO | NSE NOT OBTAIN | ED |
| 4. (Continued) e. Verify the for isolation val = • 1NV-312 • 1NV-314 | ollowing charging line lves - OPEN: A (Chrg Line Cont Isol) B (Chrg Line Cont Isol). | e. Perform t 1) Align as foll a) OF b) CL c) 2) Ensur OPEN e 1NI | the following: NV pump suction ows: PEN the followin 1NV-252A (NV F From FWST) 1NV-253B (NV F From FWST). _OSE the following v 1NV-189B (VCT are the following v -9A (NV Pmp C) -10B (NV Pmp C) | n to FWST g valves: Pumps Suct Pumps Suct ng valves: Ottl Isol) Ottl Isol). ralves - |
| f. Verify Pzr p 2335 PSIG. | ressure - LESS THAN | f. Perform t 1) Verify () • All • All • All • All 1) • Porv requir less th | the following: the following va Pzr PORVs Pzr PORV isolat / Pzr PORV(s) <u>C</u> s closed, <u>THEN</u> /(s) and isolatior ed to reduce Pz han 2135 PSIG. | lves - OPEN. ion valves. <u>OR</u> isolation OPEN Pzr o valves as r pressure to |

| Appendix D | | Re | quired | Form ES-D-2 | | | | | |
|--------------------|-----|-----------------|---------|-------------------|--------------|------|----|----|-----|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 7, 8 | Page | 55 | of | 140 |
| Event Description: | | IB Reactor Cool | ant (NC | -) Pump Shaft | Shear / ATWS | - | | - | |



| Appendix D | | Re | quired | Form ES-D-2 | | | | | |
|-------------------|-----|-----------------|----------|-------------|----------------|------|----|----|-----|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 7, 8 | Page | 56 | of | 140 |
| Event Description | : | 1B Reactor Cool | ant (NC) |) Pump Shaf | t Shear / ATWS | | | | |



| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|--|-----|---------------------------|---|---------|------|------|-------------|----|-----|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 7, 8 | Page | 57 | of | 140 | |
| Event Description: 1B Reactor Coolant (NC) Pump Shaft Shear / ATWS | | | | | | | | | | |
| | | | | | | | | | | |

| CNS EP/1/A/5000/FR-S.1 | RESPONSE TO NUCL | EAR POW | AR POWER GENERATION/ATWS PAGE NO. 7 of 33 Revision 24 | | | | | |
|---|--|---------|---|--|---|--|--|--|
| ACTION/EX | PECTED RESPONSE |] [| | RESPONSE NOT OBTAIN | IED | | | |
| 9. Control S/G le a. Verify N/R le GREATER | vels as follows: evel in at least one S/G - THAN 11% (29% ACC). | | a. Pe 1) 2) 3) 4) | erform the following: <u>IF</u> total CA flow less to 1000 GPM, <u>THEN</u> state align valves as require Maintain total CA flow 1000 GPM until N/R I than 11% (29% ACC) one S/G. <u>WHEN</u> N/R level great (29% ACC) in at lease <u>THEN</u> perform Step 9 <u>GO TO</u> Step 9.c. | han art pumps and ed. / greater than evel greater in at least ater than 11% t one S/G, 9.b. | | | |
| b. THROTTLE S/G N/R lev (29% ACC) c. <u>WHEN</u> 1AD lit, <u>THEN RI</u> AP/1/A/550 Feedwater). | Feed flow to maintain all rels between 11% and 50%. I-8, B/1 "UST LO LEVEL EFER TO D/006 (Loss of S/G | " | | | | | | |
| 10. Ensure all dilu follows: a. Place NC m "STOP". b. Place reacto "OFF". | ition paths isolated as nakeup control switch to or makeup water pumps | to | | | | | | |

| | Required Operat | or Actions | For | m ES-D-2 | | | | |
|--|--|--|---|---|--|--|--|--|
| p Test No.: <u>301</u> Scen | ario # Event # | ŧ <u>7,</u> 8 | Page <u>58</u> | of <u>140</u> | | | | |
| vent Description: 1B Rea | ctor Coolant (NC) Pump S | haft Shear / ATWS | | | | | | |
| | | | | | | | | |
| | 1 | | | 1 | | | | |
| CNS EP/1/A/5000/FR-S.1 | RESPONSE TO NUCLE | EAR POWER GENERAT | ION/ATWS | PAGE NO. 8 of 33 Revision 24 | | | | |
| ACTION/E | KPECTED RESPONSE | RESPO | NSE NOT OBTAIN | ED | | | | |
| 11. Verify main st follows: | eamlines intact as | | | | | | | |
| a. Verify the f | ollowing: | a. <u>IF</u> any S/ | G depressurized | d <mark>OR</mark> | | | | |
| • All S/G p TRENDI | ressures - STABLE OR NG UP | uncontrol the follow | led manner, <u>TH</u> ing: | EN perform | | | | |
| • All S/Gs | - PRESSURIZED. | Ensure the following valves - CLOSED: | | | | | | |
| | | All MSIVs All MSIV bypass valves. | | | | | | |
| | | 2) <u>IF</u> any pressu down <u>THEN</u> (Fault | S/G depressur ure in any S/G s in uncontrolled i <u>GO TO</u> Enclos ed S/G Isolation | ized <u>OR</u> till trending manner, ure 3 | | | | |
| b. <u>GO TO</u> Ste | p 13. | X | | , | | | | |
| 12. <u>WHEN NC T-F</u> <u>THEN</u> dump s PORVs to sta | lots start to trend up, team from intact S/G bilize NC T-Hots. | | | | | | | |
| 13. Verify all NC TRENDING U | -Colds - STABLE OR P. | Stop any co progress as | ntrolled cooldo follows: | own in | | | | |
| | | THROTTL while main as follows: | E feed flow to st taining adequat | top cooldown e heat sink | | | | |
| | | • At least than 119 | one S/G N/R lev % (29% ACC) | vel greater | | | | |
| | | OR | | | | | | |
| | | Total fee 450 GPN | ed flow greater t M. | han | | | | |
| | | THROTTL PORVs as | E steam dumps needed to stop | or S/G cooldown. | | | | |
| | | | | | | | | |
| | | | | | | | | |

| Appendix D | Required Operator Actions F | | | | | | orm ES-D-2 | | |
|--|-----------------------------|--------------|-------------|-----------|----|------------------------------------|------------|--|--|
| Op Test No.: <u>301</u> S | cenario #4 | Event # | 7, 8 | Page | 59 | of1 | 40 | | |
| Event Description: 1B Reactor Coolant (NC) Pump Shaft Shear / ATWS | | | | | | | | | |
| | | | | | | | _ | | |
| CNS EP/1/A/5000/FR-S.1 | RESPONSE | TO NUCLEAR P | OWER GENERA | TION/ATW: | S | PAGE NO. 9 of 33 Revision 24 | | | |

| ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED - 14. Verify Core Exit T/Cs - LESS THAN 1200°F. - IF Core Exit temperatures greater than 1200°F AND trending up, THEN GO TO EG/1/A/SAMG/SAG-1 (Main Control Room Severe Accident Guideline Initial Response). 15. Verify reactor subcritical as follows: - Perform the following: • P/R channels - LESS THAN 5% - U/R channels - LESS THAN 5% • W/R NEUTRON POWER channels - LESS THAN 5% - IF boration not available, THEN allow NC System to heat up. • U/R SUR - NEGATIVE. - C. Concurrently perform actions of any other Critical Safety Function procedures in effect that do not cooldown NC System or add positive reactivity to the core. - 16. Ensure all malfunctioning NC pumps - STOPPED. - 16. Ensure all malfunctioning NC pumps - STOPPED. | | 4/5000/FR-5.1 | | | Revision 24 |
|---|----------------|--|---|---|--|
| 14. Verify Core Exit T/Cs - LESS THAN 1200°F. If Core Exit temperatures greater than 1200°F AND trending up, THEN GO TO EG(1/A/SAMG/SAG-1 (Main Control Room Severe Accident Guideline Initial Response). 15. Verify reactor subcritical as follows: Perform the following: • P/R channels - LESS THAN 5% • • I/R SUR - NEGATIVE. • <t< th=""><th></th><th>ACTION/E)</th><th>PECTED RESPONSE</th><th>RESPONSE NOT OBTA</th><th>INED</th></t<> | | ACTION/E) | PECTED RESPONSE | RESPONSE NOT OBTA | INED |
| 15. Verify reactor subcritical as follows: P/R channels - LESS THAN 5% V/R channels - LESS THAN 5% W/R NEUTRON POWER channels - LESS THAN 5% V/R SUR - NEGATIVE. a. Continue to borate. b. IF boration not available, THEN allow NC System to heat up. c. Concurrently perform actions of any other Critical Safety Function procedures in effect that do not cooldown NC System or add positive reactivity to the core. d. RETURN TO Step 4. | 14. | Verify Core Ex 1200°F. | tit T/Cs - LESS THAN | IF Core Exit temperature 1200°F <u>AND</u> trending up, EG/1/A/SAMG/SAG-1 (Ma Room Severe Accident G Initial Response). | s greater than , <u>THEN GO TO</u> ain Control Suideline |
| | 15. 16. | Verify reactor • P/R channels • I/R channels • W/R NEUTR LESS THAN • I/R SUR - NE • I/R SUR - NE | subcritical as follows: s - LESS THAN 5% ON POWER channels - 5% EGATIVE. Ifunctioning NC pumps - | Perform the following: a. Continue to borate. b. IF boration not availabl NC System to heat up. c. Concurrently perform a other Critical Safety Fu procedures in effect tha cooldown NC System of reactivity to the core. d. <u>RETURN TO</u> Step 4. | e, <u>THEN</u> allow actions of any nction at do not or add positive |

| Appendix D | R | Required Operator Actions | | | | | Form ES-D-2 | | | |
|--|----------------|---------------------------|------|------|----|----|-------------|--|--|--|
| Op Test No.: | 301 Scenario # | 4 Event # | 7, 8 | Page | 60 | of | 140 | | | |
| Event Description: 1B Reactor Coolant (NC) Pump Shaft Shear / ATWS | | | | | | | | | | |



| Appendix D | R | Required Operator Actions | | | Form ES-D-2 | | | |
|-------------------|--|---------------------------|-----------|------|-------------|----|-----|--|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 61 | of | 140 | |
| Event Description | cription: LOCA Outside Containment / Auto Main Feedwater (CF) Isolation Failure / Cold Leg Injection (1NI-9A) Fails to Closed Position, Cold Leg Injection (1NI-10B) Auto Open Fails | | | | | | | |



| Appendix D | | Required Operator Actions | | | | | Form ES-D-2 | | | |
|--------------------|-----|--------------------------------------|-------------------|---------------------------------|--|---------------------------|-------------------|---------------------|----------------------|--|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 9, 10, 11 | Page | 62 | of | 140 | |
| Event Description: | : | LOCA Outside Co (1NI-9A) Fails to | ontainm Closed | ent / Auto Ma Position, Colo | ain Feedwater (CF d Leg Injection (1N |) Isolation II-10B) Au | Failur ito Ope | e / Col en Fails | d Leg Injection s | |

| CNS EP/1/A/5000/E-0 | REACTOR TR | IP OR SAFETY INJECTION | PAGE NO. 5 of 49 Revision 43 |
|------------------------|--------------------|---|---|
| ACTION/EX | PECTED RESPONSE | RESPONSE NOT OBTAIN | IED |
| (4) Verify 1ETA and | d 1ETB - ENERGIZED | Perform the following: a. IF 1ETA AND 1ETB de-etite GO TO EP/1//A/50 (Loss of All AC Power). b. WHEN time allows, THEI restore power to de-ener switchgear while continuit procedure. REFER TO AP/1/A/5500/007 (Loss of Power). | energized, 00/ECA-0.0 M attempt to gized ing with this of Normal |

| Appendix D | Required Operator Actions | | | | Form ES-D-2 | | |
|-------------------|--|---|--------------------------------------|------------------------------|---------------------------------|---------------|--|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 63 of | 140 | |
| Event Description | LOCA Outside Co (1NI-9A) Fails to (| ntainment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation Ⅱ-10B) Au | Failure / Cold to Open Fails | Leg Injection | |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|---|---|
| Op Test No.: | 301 Scenario # _ 4 _ Event # _ 9, 10, 11 | Page64of140 |
| Event Description: | LOCA Outside Containment / Auto Main Feedwater ((1NI-9A) Fails to Closed Position, Cold Leg Injection | CF) Isolation Failure / Cold Leg Injection (1NI-10B) Auto Open Fails |



| Appendix D | R | Required Operator Actions | | | | | Form ES-D-2 | | | |
|-------------------|----------------------------------|--|---------------------------------------|---------------------------|---------------------|-------------------|-----------------|--|--|--|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 65 | of | 140 | | | |
| Event Description | LOCA Outside (1NI-9A) Fails t | Containment / Auto Ma o Closed Position, Cold | in Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure ito Opei | / Colo n Fails | d Leg Injection | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION PAGE NO 8 of 49 Revision | | | PAGE NO. 8 of 49 Revision 43 | |
|---|---|--|--|---|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED | |
| ACTION/EXPECTED RESPONSE 10. Verify Phase B actuation status as follows:a. Verify containment pressure - HAS REMAINED LESS THAN 3 PSIG. | | a. Perform the following: Verify Phase B Isolation act as follows: | | | |
| | | 2) 3) 4) | Group 5 St light p correct alignment ensure correct al Stop all NC pumps. Maintain seal injection Energize H₂ igniters | it L/11. anel not in t, <u>THEN</u> ignment. on flow. | |
| | | (RN | O continued on next pa | age) | |

| Appendix D | R | Required Operator Actions | | | Form ES-D-2 | | |
|-------------------|----------------------------------|--|---|---------------------------|--------------------|-------------------|----------------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 66 | of | 140 |
| Event Description | LOCA Outside (1NI-9A) Fails t | Containment / Auto Ma ວ Closed Position, Cold | in Feedwater (CF I Leg Injection (1N |) Isolation II-10B) Au | Failure ito Ope | e / Col n Fail | d Leg Injection s |

| CNS EP/1/A/5000/E-0 | REACTOR TR | REACTOR TRIP OR SAFETY INJECTION | | | PAGE NO. 9 of 49 Revision 43 |
|---|--|----------------------------------|------|--|---|
| ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT OBTAIN | ED |
| 10. (Continued) | | | | | |
| | | | 5) | Dispatch operator to following: | perform the |
| | | | _ | a) Secure all ice cor handling units. <u>R</u> EP/1/A/5000/G-1 Enclosures), Enc (Securing All Ice Units). | ndenser air (<u>EFER TO</u> (Generic losure 11 Condenser |
| | | | _ | b) Place containment analyzers in servi <u>TO</u> OP/1/A/6450/ (Containment Hy Control Systems) | nt H ₂ ice. <u>REFER</u> /010 drogen |
| | | | 6) | <u>WHEN</u> 9 minutes ela verify proper VX syst operation. <u>REFER 1</u> Enclosure 5 (VX Sys Operation). | apsed, <u>THEN</u> tem <u>O</u> tem |
| | | | _ 7) | GO TO Step 11. | |
| b. IF AT ANY pressure ex procedure, | <u>TIME</u> containment ceeds 3 PSIG while in t l <u>THEN</u> perform Step 10.a | nis 1. | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|-------------------|---|---|--|--|
| Op Test No.: | 301 Scenario # _ 4 Event # _ 9, 10, 11 | Page670f140 | | |
| Event Description | LOCA Outside Containment / Auto Main Feedwater (C (1NI-9A) Fails to Closed Position, Cold Leg Injection (1 | F) Isolation Failure / Cold Leg Injection 1NI-10B) Auto Open Fails | | |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|---|--|
| Op Test No.: | 301 Scenario # _ 4 _ Event # _ 9, 10, 11 | Page <u>68</u> of140 |
| Event Description: | LOCA Outside Containment / Auto Main Feedwater ((1NI-9A) Fails to Closed Position, Cold Leg Injection | (CF) Isolation Failure / Cold Leg Injection (1NI-10B) Auto Open Fails |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION PAGE 11 of 4 Revision | | | PAGE NO. 11 of 49 Revision 43 | |
|--|---|----------|--|--|--|
| ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT OBTAIN | ED |
| 13. Verify all KC p | umps - ON. | | Perfor train(s a. Re b. Re c. Sta d. IF res e. IF I NC | m the following for a set ECCS. set D/G load sequence art affected pump(s). <u>AT ANY TIME</u> B/O occ tart S/I equipment pre KC flow cannot be est pumps, <u>THEN</u> stop a | ffected er(s). curs, <u>THEN</u> viously on. ablished to II NC pumps. |
| 14. Verify all Unit ON. <u>Note to Evalua</u> The crew may load sequence due to previou | <mark>1 and Unit 2 RN pumps</mark> tor: elect to reset ECC S and r and secure 1A RN Pu s strainer issue. | d D/G | Perfor a. <u>IF</u> : sta b. <u>IF</u> : trai 1) 2) | rm the following: any Unit 2 RN pump o rt affected pump(s). any Unit 1 RN pump o form the following for in(s): Reset ECCS. Reset D/G load sequ | ff, <u>THEN</u> ff, <u>THEN</u> affected iencer(s). |
| 15. Verify proper v operation as for | ventilation systems ollows: Enclosure 2 (Ventilation ication) operator to perform (Opposite Unit Ventilation | N. Er | 3) 4) | Start affected pump(<u>IF AT ANY TIME</u> B/C <u>THEN</u> restart S/I equ previously on. <u>Iluator:</u> 2 is included as Attac | s). D occurs, ipment |
| Appendix D | Re | Form ES-D-2 | | | D-2 | | |
|-------------------|-------------------------------------|---|--------------------------------------|---------------------------|---------------------|-------------------|---------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 69 | of | 140 |
| Event Description | LOCA Outside C (1NI-9A) Fails to | containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure ito Oper | / Cold n Fails | Leg Injection |



| Appendix D | Re | equired Operator A | Form ES-D-2 | | | |
|-------------------|-------------------------------------|---|--------------------------------------|---------------------------|----------------------------------|---------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | | 140 |
| Event Description | LOCA Outside C (1NI-9A) Fails to | Containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure / Colo ito Open Fails | Leg Injection |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SAF | ETY IN | JECTION | PAGE NO. 13 of 49 Revision 43 |
|---|------------------|------------|----------------------|---|---|
| ACTION/EX | PECTED RESPONSE |] [| | RESPONSE NOT OBTAIN | ED |
| 17. (Continued) b. NC pressure 1620 PSIG. | - LESS THAN | | b. Per 1) | form the following: Ensure ND pump mi on operating ND pur OPEN. IF ND pump miniflow cannot be opened, <u>I</u> the following for affe a) Reset ECCS. b) Reset D/G load s c) Stop ND pump. d) IF AT ANY TIME <u>THEN</u> restart S/I previously on. e) IF AT ANY TIME decreases to less 285 PSIG in unco manner, <u>THEN</u> res pump. <u>GO TO</u> Step 18. | niflow valve np(s) - v valve(s) <u>HEN</u> perform cted train(s): equencer. B/O occurs, equipment NC pressure s than ontrolled estart ND |
| c. <mark>NI pumps -</mark> | INDICATING FLOW) | | c. Sta | rt NI pump(s) and alig | n valves. |

| Appendix D | Required Operator Actions | | | | Form ES-D-2 | | |
|-------------------|-------------------------------------|---|--------------------------------------|---------------------------|--------------------|---------------------|-----------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 71 | of | 140 |
| Event Description | LOCA Outside C (1NI-9A) Fails to | Containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure ito Ope | e / Colo n Fails | d Leg Injection |



| Appendix D | Required Operator Actions | | | | | | For | m ES- | -D-2 |
|--------------------|---------------------------|--------------------------------------|-------------------|---------------------------------------|---------------------------------------|----------------------------|-------------------|----------------------|---------------|
| Op Test No.: | 301 | Scenario # | 4 | Event # | 9, 10, 11 | Page | 72 | of | 140 |
| Event Description: | | LOCA Outside Co (1NI-9A) Fails to | ontainm Closed | - nent / Auto Ma Position, Colo | in Feedwater (CF Leg Injection (11 | :) Isolation NI-10B) Au | Failur ito Ope | e / Colo en Fails | Leg Injection |



| Appendix D | Re | equired Operator A | | Form ES | S-D-2 | |
|--------------------|-------------------------------------|---|--------------------------------------|---------------------------|------------------------------|------------------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 73 of | 140 |
| Event Description: | LOCA Outside ((1NI-9A) Fails to | Containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure / Co to Open Fail | ld Leg Injection Is |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SAFETY INJECTION PAGE NO. 16 of 49 Revision 4 | | | | |
|---|---|--|---------------------|---|---------------------------------------|--|
| ACTION/E) | KPECTED RESPONSE |] | | RESPONSE NOT OBTAIN | ED | |
| <u>NOTE</u> Enclosure subseque guidance | e 4 (NC Temperature Co ent procedures provide a | ontrol) sha Iternative | all remai NC ten | n in effect until nperature control | | |
| 22. Control NC te Enclosure 4 (I | mperature. <u>REFER TO</u> NC Temperature Contro | ol). End | e to Eva | a <u>luator:</u> 4 is included as Atta | chment 8. | |
| 23. Verify Pzr POI status as follo | RV and Pzr Spray Valve ows: | • | | | | |
| a. <mark>All Pzr POF</mark> | RVs - CLOSED. | | a. IF <u>TH</u> | Pzr pressure less than <u>EN</u> perform the follow | 2315 PSIG, ing: | |
| | | | _ 1) | CLOSE Pzr PORV(s | ;). | |
| | | | 2) | <u>IF</u> any Pzr PORV ca closed, <u>THEN</u> CLOS isolation valve. | nnot be SE its | |
| | | | 3) | IF 1NC-32B OR 1NC be closed OR isolate perform the following | C-34A cannot ed, <u>THEN</u> g: | |
| | | | | a) Align N ₂ to POR opening the follo | Vs by wing valves: | |
| | | | | - • 1NI-438A (Em CLA A To 1NC | er N2 From -34A) | |
| | | | | [•] 1NI-439B (Emo CLA B To 1NC | er N2 From -32B). | |
| | | | _ | b) CLOSE affected | Pzr PORV. | |
| | | | (RNC |) continued on next pa | age) | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| Appendix D | Required Operator Action | IS Form ES-D-2 |
|-------------------|---|---|
| Op Test No.: | | 9, 10, 11 Page <u>74</u> of <u>140</u> |
| Event Description | LOCA Outside Containment / Auto Main Fee (1NI-9A) Fails to Closed Position, Cold Leg I | edwater (CF) Isolation Failure / Cold Leg Injection njection (1NI-10B) Auto Open Fails |

| CNS EP/1/A/5000/E-0 | REACTOR TR | DR TRIP OR SAFETY INJECTION PAGE 18 of Revisi | | |
|--|--|---|--|--|
| ACTION/E) | (PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 23. (Continued) | spray valves - CLOSED | | d) Concurrently perfollowing: Implement EP/ (Critical Safety Status Trees) GO TO EP/1/A (Loss of React Secondary Cod b. IF Pzr pressure less than <u>THEN</u> perform the follow 1) CLOSE spray valve(2) IF spray valve(s) car closed, <u>THEN</u> perfor following: a) Stop NC pumps on <u>THEN</u> | form the (1/A/5000/F-0 Function /5000/E-1 or or olant). 2150 PSIG, ing: s). nnot be m the 1A and 1B. 1D NC stop one |
| c. <mark>At least one - OPEN.</mark> | Pzr PORV isolation valv | ve | c. <u>IF</u> power available, <u>THE</u> Pzr PORV isolation valve was closed to isolate an PORV. | ┫ OPEN one e unless it open Pzr |
| 24. Verify NC sub exit T/Cs - GR | cooling based on core EATER THAN 0°F. | → - | IF any NV <u>OR</u> NI pump on, perform the following: a. Ensure all NC pumps - C b. Maintain seal injection flo | THEN FF. w. |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|---|--|
| Op Test No.: | <u>301</u> Scenario # <u>4</u> Event # <u>9, 10, 1</u> | 1 Page <u>75</u> of 140 |
| Event Description | LOCA Outside Containment / Auto Main Feedwater (1NI-9A) Fails to Closed Position, Cold Leg Injectior | (CF) Isolation Failure / Cold Leg Injection n (1NI-10B) Auto Open Fails |



| Appendix D | | Required Operator Actions | | | | Form ES-D-2 | | |
|--------------------|-------------------------|-----------------------------|---------------------------------|--|---------------------------|--------------------|--------------------|----------------------|
| Op Test No.: | 301 Scenario | ¢ _ 4 | Event # | 9, 10, 11 | Page | 76 | of | 140 |
| Event Description: | LOCA Outsi (1NI-9A) Fai | de Containr ls to Closed | nent / Auto N I Position, Co | lain Feedwater (CF Id Leg Injection (1N |) Isolation II-10B) Au | Failure Ito Ope | e / Col en Fail | d Leg Injection s |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|---|---|
| Op Test No.: | 301 Scenario # 4 Event # 9, 10, 11 | |
| Event Description | LOCA Outside Containment / Auto Main Feedwater (CF (1NI-9A) Fails to Closed Position, Cold Leg Injection (1N |) Isolation Failure / Cold Leg Injection II-10B) Auto Open Fails |



| Appendix D | Re | Required Operator Actions | | | Form ES-D-2 | | |
|-------------------|-------------------------------------|---|--------------------------------------|---------------------------|---------------------|-------------------|---------------|
| Op Test No.: | 301 Scenario # 4 Event # 9, 10, 11 | | | Page | 78 | of | 140 |
| Event Description | LOCA Outside C (1NI-9A) Fails to | containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure ito Oper | / Cold n Fails | Leg Injection |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SAFETY INJECTION PAGE 22 o Revis | | |
|--------------------------------------|--|---|--|------------------------------------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 29. Reset the follo | owing: | | | |
| a. ECCS. | | _ | a. Locally reset ECCS. <u>RE</u> EP/1/A/5000/G-1 (Gener Enclosures), Enclosure 4 Master Reset). | EER TO c (ECCS |
| b. D/G load se | quencers. | | b. Dispatch operator to oper sequencer(s) control pow | n affected /er breaker: |
| | | | 1EDE-F01F (Diesel Ge Sequencer Panel 1DG (AB-577, BB-46, Rm 4) | enerator Load LSA) 96) |
| | | | 1EDF-F01F (Diesel Ge Sequencer Panel 1DG (AB-560, BB-46, Rm 3) | enerator Load LSB) 72). |
| c. <u>IF AT ANY</u> restart S/I e | <u>TIME</u> B/O occurs, <u>THEN</u> quipment previously on. | L | | |
| 30. Ensure only of | ne NV pump - ON. | | | |
| — 31. Verify NC pres INCREASING. | ssure - STABLE OR | _ | Perform the following: a. Implement EP/1/A/5000/I Safety Function Status T | F-0 (Critical rees). |
| | | _ | b. <u>GO TO</u> EP/1/A/5000/ES- LOCA Cooldown and Depressurization). | 1.2 (POST |
| 32. Verify VI press 50 PSIG. | sure - GREATER THAN | | In subsequent steps, Cont control lost for the followin and local operation will be | rol Room ng valves required: |
| | | _ | • 1NV-294 (NV Pmps A&B I Ctrl) | Disch Flow |
| | | _ | • 1NV-309 (Seal Water Inje | ction Flow). |

| Appendix D | Re | Required Operator Actions | | | Form ES | -D-2 |
|--------------------|-------------------------------------|---|---------------------------------------|---------------------------|---------------------------------|-----------------|
| Op Test No.: | 301 Scenario # | Scenario # 4 Event # 9, 10, 11 | | | 79 of | 140 |
| Event Description: | LOCA Outside C (1NI-9A) Fails to | Containment / Auto Mai Closed Position, Cold | in Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure / Colo to Open Fails | d Leg Injection |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SAFET | P OR SAFETY INJECTION PAGE N 23 of 4 Revision | | |
|---------------------------------------|---|--------------|--|--|--|
| ACTION | EXPECTED RESPONSE | | RESPONSE NOT OBTAIN | IED | |
| 33. Isolate NV S a. Verify the | A flowpath as follows: following valves - OPEN: 03A (NV Pumps A&B Recirco 02B (NV Pmps A&B Recirco | a. | Perform the following: 1) OPEN affected valve 2) <u>IF</u> 1NV-203A <u>AND</u> 1 open, <u>THEN GO TO</u> 3) Dispatch operator to affected valve(s): 1NV-203A (NV Pu Recirc Isol) (AB-55 54-55, Rm 231) (L needed) 1NV-202B (NV Pr Recirc Isol) (AB-55 54-55, Rm 231) (L needed). 4) Align charging with N isolated. <u>GO TO</u> EP/1/A/5000/G-1 (G Enclosures), Enclosi (Aligning Charging V Miniflow Valves Clos 5) <u>WHEN 1NV-203A A</u> 1NV-202B open, <u>TH</u> flow may be reduced 80 GPM. 6) <u>GO TO</u> Step 35. | e(s). NV-202B Step 33.b. open Imps A&B 54, HH-JJ, adder NV miniflow eneric ure 13 Vith NV sed). ND EN charging d below | |

| Appendix D | Re | Required Operator Actions | | | Form ES-D-2 | | |
|-------------------|-------------------------------------|---|--------------------------------------|---------------------------|-----------------------------|--------------------------|--|
| Op Test No.: | 301 Scenario # 4 Event # 9, 10, 11 | | | Page | <u>80</u> of | 140 | |
| Event Description | LOCA Outside C (1NI-9A) Fails to | Containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation NI-10B) Au | Failure / Co ito Open Fa | old Leg Injection ils | |



| Appendix D | Red | Required Operator Actions | | | Form ES- | D-2 |
|--------------------|--------------------------------------|--|--------------------------------------|---------------------------|---------------------------------|---------------|
| Op Test No.: | 301 Scenario # | Scenario # 4 Event # 9, 10, 11 | | | 81 of | 140 |
| Event Description: | LOCA Outside Co (1NI-9A) Fails to | ontainment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation NI-10B) Au | Failure / Cold to Open Fails | Leg Injection |

| CNS EP/1/A/5000/E-0 | REACTOR TR | RIP OR SAFETY INJECTION PAGE 25 of Revisio | | | PAGE NO. 25 of 49 Revision 43 |
|--|---|--|--|--|---|
| ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT OBTAIN | ED |
| 34. (Continued) b. CLOSE 1N\ Injection Flo | /-309 (Seal Water w). | | b. Dis per 1) 2) 3) | patch operator with ra form the following: CLOSE 1NV-308 (Se Flow Ctrl Isol) (AB-5: Rm 233) (Ladder new Do not continue until CLOSED. THROTTLE 1NV-31 Inj Flow Ctrl Byp) (Al Rm 233) to maintain seal water flow in su steps. | dio to eal Wtr Inj 54, JJ-54, eded). 1 NV-308 - 1 (Seal Wtr B-555, JJ-54, 32 GPM bsequent |
| c. Ensure one OPEN: - • 1NV-32B Isol) OR - • 1NV-39A Isol). - d. Ensure 1NV Aux Spray) e. OPEN the fo - • 1NV-314E | of the following valves - (NV Supply To Loop A (NV Supply To Loop D -37A (NV Supply To Pzr - CLOSED. bllowing valves: A (Chrg Line Cont Isol) 3 (Chrg Line Cont Isol). | r | e. Dis val end — • E E () | spatch operator to oper ve(s). <u>REFER TO</u> the closure(s) for affected EP/1/A/5000/G-1 (Gen Enclosures), Enclosure Open 1NV-312A) EP/1/A/5000/G-1 (Gen Enclosures), Enclosure Open 1NV-314B). | n affected following valve(s): eric e 6 (Locally eric e 8 (Locally |

| Appendix D | Re | Required Operator Actions | | | Form | ES-D-2 |
|-------------------|-------------------------------------|---|--------------------------------------|---------------------------|-------------------------|-----------------------------|
| Op Test No.: | 301 Scenario # | 301 Scenario # 4 Event # 9, 10, 11 | | | <u>82</u> c | of 140 |
| Event Description | LOCA Outside C (1NI-9A) Fails to | Containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (11 |) Isolation NI-10B) Au | Failure / ito Open l | Cold Leg Injection Fails |

| CNS EP/1/A/5000/E-0 | REACTOR TR | IP OR SA | FETY INJEC | TION | PAGE NO. 26 of 49 Revision 43 |
|----------------------------------|--|----------|--|---|--|
| ACTION/EX | PECTED RESPONSE | | RES | PONSE NOT OBTAIN | IED |
| ACTION/EX 34. (Continued) | PECTED RESPONSE 309 - ABLE TO BE 0 FROM THE CONTROL 309 in auto. following: charging flow less than 32 GPM seal water flow. ing as follows: rging flow to maintain Pz evel - STABLE OR IG. | r | f. <u>GO TO</u> f. <u>GO TO</u> b. <u>IF</u> Pzr I with ma perform 1) OF 2) CL | PONSE NOT OBTAIN Step 34.h. Step 34.h. EVEL continues to aximum charging, In the following: PEN the following: PEN the following 1NI-9A (NV Pmp 1NI-10B (NV Pmp 0.0SE the following | decrease THEN valves: C/L Inj Isol) C/L Inj Isol). g valves: |
| | | | 2) CL 1 3) Im (Ci (Ci Tre 4) <u>GC</u> De | OSE the following INV-312A (Chrg I Isol) INV-314B (Chrg I Isol). plement EP/1/A/5 ritical Safety Func ees). <u>O TO</u> EP/1/A/5000 OST LOCA Coold pressurization). | g valves: Line Cont Line Cont 000/F-0 tion Status I/ES-1.2 own and |

| Appendix D | Required Operator Actions | Form ES-D-2 | | |
|-------------------|---|--|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>4</u> Event # <u>9, 10, 11</u> | Page83of140 | | |
| Event Description | LOCA Outside Containment / Auto Main Feedwater (CF (1NI-9A) Fails to Closed Position, Cold Leg Injection (1) | [:]) Isolation Failure / Cold Leg Injection NI-10B) Auto Open Fails | | |



| Appendix D | Re | Required Operator Actions | | | Form | n ES-D-2 |
|-------------------|-------------------------------------|--|--------------------------------------|---------------------------|--------------------|---------------------------------|
| Op Test No.: | 301 Scenario # | 301 Scenario # 4 Event # 9, 10, 11 | | | 84 | of 140 |
| Event Description | LOCA Outside C (1NI-9A) Fails to | ontainment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure to Open | / Cold Leg Injection n Fails |

| CNS EP/1/A/5000/E-0 | REACTOR TR | IP OR SA | PAGE NO. 28 of 49 Revision 43 | |
|---|--|----------|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT | OBTAINED |
| 40. Control S/G le a. Verify N/R le GREATER | vels as follows: evel in any S/G - THAN 11%. | _ | a. Maintain total feed 450 GPM until any greater than 11%. | flow greater than S/G N/R level |
| b. <mark>THROTTLE</mark> S/G N/R lev 50%. | feed flow to maintain al els between 11% and |) _ | b. <u>IF</u> N/R level in any increase in uncont <u>THEN GO TO</u> EP/ (Steam Generator | S/G continues to rolled manner, 1/A/5000/E-3 Tube Rupture). |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>4</u> Event # <u>9, 10, 11</u> | Page of140 |
| Event Description: | LOCA Outside Containment / Auto Main Feedwater (Cl (1NI-9A) Fails to Closed Position, Cold Leg Injection (1 | F) Isolation Failure / Cold Leg Injection NI-10B) Auto Open Fails |



| Appendix D | Required Operator Actions | | | | Form ES | S-D-2 |
|--------------------|--|--|--------------------------------------|---------------------------|-------------------------------|-----------------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 86 of | 140 |
| Event Description: | LOCA Outside Co (1NI-9A) Fails to (| ontainment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure / Col to Open Fail | ld Leg Injection s |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|--|---|
| Op Test No.: | | Page87 of140 |
| Event Description | LOCA Outside Containment / Auto Main Feedwater (C (1NI-9A) Fails to Closed Position, Cold Leg Injection (| F) Isolation Failure / Cold Leg Injection 1NI-10B) Auto Open Fails |



| Appendix D | Re | quired Operator A | ctions | | Form ES-I | D-2 |
|-------------------|-------------------------------------|---|--------------------------------------|---------------------------|---------------------------------|---------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 88 of | 140 |
| Event Description | LOCA Outside C (1NI-9A) Fails to | Containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Au | Failure / Cold to Open Fails | Leg Injection |



| Appendix D | Required Operator Actions | Form ES-D-2 |
|-------------------|--|--|
| Op Test No.: | | Page89of140 |
| Event Description | LOCA Outside Containment / Auto Main Feedwater (Cl (1NI-9A) Fails to Closed Position, Cold Leg Injection (1 | F) Isolation Failure / Cold Leg Injection NI-10B) Auto Open Fails |



| Appendix D | Re | equired Operator A | Actions | | Form | n ES- | -D-2 |
|-------------------|---------------------------------------|--|---|---------------------------|---------------------|-------------------|-----------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 90 | of | 140 |
| Event Description | : LOCA Outside C (1NI-9A) Fails to | Containment / Auto Ma Closed Position, Colo | in Feedwater (CF d Leg Injection (11 |) Isolation NI-10B) Au | Failure ito Opei | / Colo n Fails | d Leg Injection |

| CNS EP/1/A/5000/ECA-1.2 | LOCA OU | LOCA OUTSIDE CONTAINMENT PA 5 Re | | |
|--|---|--|---|-----------------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 2. (Continued) b. Isolate ND f follows: 1) Place "P 1NI-1788 2) CLOSE 20 CLOSE 00 CLO | neader 1B to cold legs as WR DISCON FOR 3" in "ENABLE". 1NI-178B (ND Hdr 1B To is A&B). the following to ie if NC System leak rstem pressure tel. C System leak - ED. | 5 | 4) Perform the following: a) OPEN 1NI-178B. b) Place "PWR DISC 1NI-178B" in "DISC | ON FOR CON". |
| 5) <u>GO TO</u> 5 | Step 3. | | c) <u>GO 10</u> Step 2.c. | |

| Appendix D | Required Operator Actions | Form ES-D-2 |
|--------------------|--|--|
| Op Test No.: | <u>301</u> Scenario # <u>4</u> Event # <u>9, 10, 11</u> | Page <u>91_</u> of140 |
| Event Description: | LOCA Outside Containment / Auto Main Feedwater (C (1NI-9A) Fails to Closed Position, Cold Leg Injection (| EF) Isolation Failure / Cold Leg Injection 1NI-10B) Auto Open Fails |

| CNS EP/1/A/5000/ECA-1.2 | LOCA OU | JTSIDE CO | ONTAINMENT | PAGE NO. 6 of 7 Revision 04 |
|--|--|-------------|---|-------------------------------------|
| ACTION/EX | PECTED RESPONSE |] | RESPONSE NOT OBTAIN | ED |
| 2. (Continued) c. Isolate NI he follows: 1) Verify fol valves - - • 1NI-11 Isol) - • 1NI-12 Isol) - • 1NI-14 FWST - 2) Place "P 1NI-162/ - 3) CLOSE Inj Hdr Is 4) Evaluate determin isolated: - • NC Sy - • RVLIS - • Pzr lev ISOLATI | eader to cold legs as llowing NI pump miniflov OPEN: 15A (NI Pump 1A Miniflo 14A (NI Pump 1B Miniflo 14A (NI Pump 1A Miniflo 14A (NI Pump 1B Miniflo 14A (NI Pump 1A Miniflo 1 | y w w | 1) Stop NI pumps. 5) Perform the following: a) OPEN 1NI-162A. b) Place "PWR DISC 1NI-162A" in "DISC 1NI-164A" in "DISC 1NI-164A" | ON FOR CON". stopped, nps. |
| 6) Initiate a complete | ctions as required to e leak isolation. | | | |

| Appendix D | Re | equired Operator A | ctions | | Form ES | 5-D-2 |
|--------------------|-------------------------------------|---|--------------------------------------|----------------------------|------------------------------|-----------------------|
| Op Test No.: | 301 Scenario # | 4 Event # | 9, 10, 11 | Page | 92 of | 140 |
| Event Description: | LOCA Outside C (1NI-9A) Fails to | Containment / Auto Mai Closed Position, Cold | n Feedwater (CF Leg Injection (1N |) Isolation II-10B) Aut | Failure / Co to Open Fail | ld Leg Injection s |

| CNS EP/1/A/5000/ECA-1.2 | CNS LOCA OUTSIDE CONTAINMENT PAGE NO 7 of 7 Revision | | | PAGE NO. 7 of 7 Revision 04 |
|--|--|--------------------|---|-----------------------------------|
| ACTION/E | XPECTED RESPONSE |] [| RESPONSE NOT OBTAIN | ED |
| 3. Verify leak pa a. Evaluate th NC System | th isolated as follows: le following to determine leak isolated: em pressure servation. ons as required to eak isolation: /1/A/5000/E-1 (Loss of Secondary Coolant). | ĒND | a. <u>GO TO</u> EP/1/A/5000/EC/ Emergency Coolant Reci | 4-1.1 (Loss of rculation). |
| Once the leak has booth operator to | been isolated, the scen place the simulator in F | ario may REEZE. | be terminated by instructin | g the |

Attachment List

Scenario 4

| h | |
|----------------|---|
| ATTACHMENT 1 - | Crew Critical Task Summary |
| ATTACHMENT 2 - | Shift Turnover Information |
| ATTACHMENT 3 - | AP/1/A/5500/028 Enclosure 1 (Foldout Page) |
| ATTACHMENT 4 - | AP/0/A/5500/020 Enclosure 1 (Foldout Page) |
| ATTACHMENT 5 - | EP/1/A/5000/E-0 Enclosure 1 (Foldout Page) |
| ATTACHMENT 6 - | EP/1/A/5000/E-0 Enclosure 2 (Ventilation System Verification) |
| ATTACHMENT 7 - | EP/1/A/5000/G-1 Enclosure 1 (Unit 1 Spent Fuel Pool Monitoring) |
| ATTACHMENT 8 - | EP/1/A/5000/E-0 Enclosure 4 (NC Temperature Control) |
| ATTACHMENT 9 - | Scenario Specific Technical Specifications |

| | CREW CRITICAL TASK SUMMARY | | | | |
|---------------|----------------------------|------|---|--|--|
| SAT UNSAT CT# | | CT # | CRITICAL TASK | | |
| | | 1 | Manually control 1B S/G level to prevent Hi-Hi S/G Level (P-14) at 83% or S/G Lo-Lo Reactor Trip at 11%. | | |
| | | 2 | Insert negative reactivity, via manual control rod insertion, within 50 seconds of receipt of valid Reactor Trip "First Out" Annunciator. | | |
| | | 3 | Isolate the LOCA outside containment before transition ou ECA-1.2. | | |

Comments:

| SHIFT TURNOVER INFORMATION | | | | | | | |
|---|--|----------------------------|------------------------|--|--|--|--|
| | Unit 1 Status | | | | | | |
| Power Level | Power Level Power History NCS Boron Xenon | | | | | | |
| 1x10 ⁻³ % | BOL | 1937 PPM | per OAC | | | | |
| | Controlling | Procedure | | | | | |
| OP/1/A/6100/001 (C steps up to 3.184 ar | controlling Procedure for l e complete. | Jnit Startup), Enclosure 4 | .1 (Unit Startup). The | | | | |
| | Other Information Need | led to Assume the Shift | | | | | |
| Unit 1 is at 1 x 10⁻³ % power at BOL. Unit 2 is at 100% power. Direction for the crew is to place 1A NV Pump in service and secure 1B NV pump per OP/1/A/6200/001 (Chemical and Volume Control System), Enclosure 4.13 (Shifting the Operating Charging Pump). Pre-start check of 1A NV Pump is complete. Operator is standing by for post start check. Initial Conditions are complete. Crew is to begin at step 3.1 of Enclosure 4.13. Following NV Pump swap the crew is to withdraw control rods to increase reactor power to ~14% in preparation for placing the Main Turbine online. | | | | | | | |
| | AOs Available | | | | | | |
| Se | even AOs are available a | s listed on the status boa | rd | | | | |
| METEOROLOGICAL CONDITIONS | | | | | | | |
| Upper wind direction = 315 degrees, speed = 3 mph | | | | | | | |
| Lower wind direction = 315 degrees, speed = 4.5 mph | | | | | | | |
| Forecast calls for cle | ear skies over the next 24 | hours. | | | | | |

| CNS AP/1/A/5500/028 | SECONDARY STEAM LEAK Enclosure 1 - Page 1 of 2 Foldout Page | PAGE NO. 24 of 41 Revision 8 | | | |
|--|---|------------------------------------|--|--|--|
| | | | | | |
| 1. Reactor trip cr | iteria: | | | | |
| IF any of the fo | llowing conditions exist: | | | | |
| Steam leak e | endangering personnel or jeopardizing plant equipment | | | | |
| S/G levels - I | DECREASING IN AN UNCONTROLLED MANNER | | | | |
| Tavg 5°F les | s than T-Ref AND decreasing in an uncontrolled manner | | | | |
| Reactor pow | Reactor power - INCREASING IN AN UNCONTROLLED MANNER | | | | |
| Secondary containing on the secondary of the | ondensate inventory - DECREASING IN AN UNCONTROLLED MAN | NER. | | | |
| THEN perform | the following: | | | | |
| a. Trip Unit 1 reactor. | | | | | |
| b. CLOSE the | b. CLOSE the following valves: | | | | |
| All MSIVe | All MSIVs | | | | |
| All MSIV | All MSIV bypass valves. | | | | |
| <u>GO TO EP/1/A/5000/E-0</u> (Reactor Trip or Safety Injection). | | | | | |
| | | | | | |
| | | | | | |

| | CNS AP/1/A/5500/028 | SECONDARY STEAM LEAK Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 25 of 41 Revision 8 | |
|--|--------------------------------|---|------------------------------------|--|
| Г | | | | |
| L | 2. Uncontrolled | cooldown: | | |
| IF Tavg less than 554°F AND decreasing, THEN perform one of the following: | | | | |
| IE reactor power less than 1%, THEN perform the following: | | | | |
| | a. CLOSE the following valves: | | | |
| | • All MS | | | |
| All MSIV bypass valves. | | | | |
| | b. IE cooldo | | | |
| | 1) Trip Unit 1 reactor. | | | |

- 2) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
- IF reactor power less than 69%, THEN perform the following:
- a. Trip Unit 1 turbine.
 - b. IE cooldown continues, THEN perform the following:
 - Trip Unit 1 reactor.
 - 2) CLOSE the following valves:
 - All MSIVs
 - All MSIV bypass valves.
 - ____3) GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).
- ____ c. REFER TO AP/1/A/5500/002 (Turbine Generator Trip).
- 3. IF steam leak size increases, THEN RETURN TO C. (Operator Actions), Step 2.

CNS AP/0/A/5500/020

Enclosure 1 - Page 1 of 2 Foldout Page PAGE NO. 46 of 86 Revision 43

| 1. SSF Manning Criteria: |
|--|
| IF AT ANY TIME 1EMXS OR 2EMXS is de-energized, THEN perform the following: |
| Dispatch operator to align alternate power supply(s). <u>REFER TO</u> Enclosure 4 (Align Alternate Power Supply To 1EMXS OR 2EMXS). |
| b. Notify operator at SSF (Ext. 5251 or 5212) operator has been dispatched to align alternate power supply to 1EMXS (2EMXS). |
| <u>CAUTION</u> Increased KC System temperature due to loss of RN could result in a loss of KC and NV pumps supplying NC pump seal cooling. Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within ten minutes will cause damage to NC pump seals resulting in NC System inventory loss. |
| IF AT ANY TIME RN cooling to operating KC Hx is lost, THEN dispatch operator to SSF to standby at the SSF to establish seal injection. |
| IE AT ANY TIME KC AND NV seal cooling for any NC pump is lost, THEN ensure operator dispatched to SSF to establish NC pump seal injection. <u>REFER TO</u> Enclosure 5 (Establishing NC Makeup/Seal Injection From The SSF) for the affected Unit(s). |
| 2. Alternate Cooling to NV Pump Criteria: |
| a. IF S/I is actuated on either Unit, THEN discontinue monitoring this criterion. |
| b. IE RN is not available to KC, THEN perform the following: |
| <u>CAUTION</u> YD can only supply one Unit's NV pump at a time. |
| Determine which unit will receive alternate NV pump cooling from YD. |
| <u>IF</u> Unit 1 selected, <u>THEN</u> align alternate YD cooling to 1A NV pump. <u>REFER TO</u> Enclosure 8 (Maximize NV Pump 1A Run Time). |
| IF Unit 2 selected, THEN align alternate YD cooling to 2A NV pump. <u>REFER TO</u> Enclosure 9 (Maximize NV Pump 2A Run Time). |
| |
| |
| |
| |

| CNS AP/0/A/5500/020 | LOSS OF NUCLEAR SERVICE WATER Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 47 of 86 Revision 43 | | | | | |
|---------------------------------|---|-------------------------------------|--|--|--|--|--|
| | | | | | | | |
| 3. Spent Fuel Pool Criteria: | | | | | | | |
| • <u>IF AT ANY T</u> | IME RN cooling to operating KC Hx is lost, THEN perform the following | ng: | | | | | |
| a. <u>IF</u> either AP/1/A/5 | of the following Unit 1 annunciators lit, <u>THEN</u> secure KF pump(s) and 500/041 (Loss of Spent Fuel Cooling or Level). | REFER TO | | | | | |
| • 1AD-1 | 3, D/6 "KF PUMP A MTR CLR HI TEMP" | | | | | | |
| OR | | | | | | | |
| • 1AD-1 | 3, D/7 "KF PUMP B MTR CLR HI TEMP" | | | | | | |
| b. <u>IF</u> either AP/2/A/5 | of the following Unit 2 annunciators lit, <u>THEN</u> secure KF pump and <u>R</u> 500/041 (Loss of Spent Fuel Cooling or Level). | EFER TO | | | | | |
| • 2AD-1 | 3, D/6 "KF PUMP A MTR CLR HI TEMP" | | | | | | |
| OR | | | | | | | |
| • 2AD-1 | 3, D/7 "KF PUMP B MTR CLR HI TEMP" | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| EP/ | CNS 1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 1 of 2 Foldout Page | PAGE NO. 34 of 49 Revision 43 |
|-----|---|---|-------------------------------------|
| | | | |
| 1. | NC Pump Trip | Criteria: | |
| | <u>IF</u> the followinjection flow | ng conditions satisfied, <u>THEN</u> trip all NC pumps while maintaini : | ng seal |
| | Any NV or | NI pump - DELIVERING S/I FLOW TO NC SYSTEM | |
| | NC subcod | oling based on core exit T/Cs - LESS THAN OR EQUAL TO 0°F | : |
| | Reactor po | ower - LESS THAN 5%. | |
| 2. | CA Suction So | ource Switchover Criterion: | |
| | IF 1AD-8, B/ Feedwater). | 1 "UST LO LEVEL" lit, <u>THEN REFER TO</u> AP/1/A/5500/006 (Los | s of S/G |
| 3. | Position Criter | ria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol |): |
| | <u>IF</u> NC pressu 1NV-202B ar | ure less than 1500 PSIG <u>AND</u> NV S/I flowpath aligned, <u>THEN</u> C nd 1NV-203A. | LOSE |
| | IF NC pressu | re greater than 2000 PSIG, <u>THEN</u> OPEN 1NV-202B and 1NV-2 | 203A. |
| 4. | Ruptured S/G | CA Isolation Criteria: | |
| | <u>IF</u> both the formation | ollowing conditions met, <u>THEN</u> stop CA flow to affected S/G(s): | |
| | Level incre | asing in uncontrolled manner or radiation level in that S/G abno | ormal |
| | N/R level - | GREATER THAN 11% (29% ACC). | |
| 5. | Faulted S/G C/ | A isolation Criteria: | |
| | • IF all the follo | owing conditions met, <u>THEN</u> stop CA flow to affected S/G: | |
| | S/G pressu | are decreasing in uncontrolled manner or completely depressuri | zed |
| | Only one S | B/G diagnosed as faulted | |
| | Secondary | heat sink criteria met: | |
| | Total CA | flow - GREATER THAN 450 GPM | |
| | OR | | |
| | ANY S/G | G(s) N/R level - GREATER THAN 11%(29% ACC). | |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 1 - Page 2 of 2 Foldout Page | PAGE NO. 35 of 49 Revision 43 |
|------------------------|---|-------------------------------------|
| | | |

| 6. | NS Pump Trip Criterion: | | | | | |
|----|--|--|--|--|--|--|
| | <u>IF</u> NS pump in recirc and S/I occurs, <u>THEN</u> perform one of the following: <u>IF</u> train affected ECCS and D/G load sequencer - RESET, <u>THEN</u> stop NS pump OR | | | | | |
| | | | | | | |
| | | | | | | |
| | <u>WHEN</u> sequencer loading complete, <u>THEN</u> perform the following for affected train: | | | | | |
| | a. Notify Control Room Supervisor. | | | | | |
| | b. Reset ECCS. | | | | | |
| | c. Reset D/G load sequencer. | | | | | |
| | d. Secure NS pump. | | | | | |
| | e. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 1 of 7 Ventilation System Verification | | PAGE NO 36 of 49 Revision 4 |). 13 | |
|---|--|--|---|---|--------------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT O | BTAINED | |
| Verify proper V follows: a. Verify one trequipment i PYC chiller CR AHU- CRA AHL CRA PFT | /C/YC operation as rain of the following n operation: 1 -1 -1. | | a. Perform the followin 1) Shift operating <u>REFER TO</u> EP (Generic Enclosed Enclosure 17 (SVC/YC Trains)) 2) <u>IF</u> no train can aligned, THEN and IAE/Mainte at least one tra REFER TO the OP/0/A/6450 Room Area V Water System EM/0/A/52000 (Troubleshood Improper Op System). | ng: VC/YC trains. V1/A/5000/G-1 sures), Shifting Operating be properly dispatch operato enance to restore in of VC/YC. following: V011 (Control ventilation/Chilled m) V001 oting Cause For eration of VC/YC | 9 אר 1 |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 2 of 7 Ventilation System Verification | | FETY INJECTION age 2 of 7 I Verification | PAGE NO. 37 of 49 Revision 43 |
|--|---|--|---|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| 1. (Continued) b. Verify the fo - • 1AD-18, A CHLORIN - • 1AD-18, E CHLORIN - • 1AD-18, E CHLORIN - • 1AD-18, E CHLORIN | llowing alarms - DARK: V8 "UNIT 1 INTAKE HI IE 1A" 3/8 "UNIT 1 INTAKE HI IE 2A" 5/8 "UNIT 2 INTAKE HI IE 2B". | | b. IE chlorine odor detected Room, <u>THEN</u> perform the based on the status of given 1) IE detectors on both in alarm, <u>THEN</u> perform following: a) Ensure the follow intake dampers - 1VC-5B (CRAI • 1VC-6A (CRAI • 2VC-5B (CRAI • 2VC-6A (CRAI • 2VC-6A (CRAI • 2VC-6A (CRAI • 2VC-6A (CRAI • 1VC-5B (CRAI • 1VC-5B (CRAI • 1VC-6A (CRAI • 1VC-6A (CRAI • 1VC-6A (CRAI • 1VC-6A (CRAI • 1VC-6A (CRAI • 2VC-6A (CRAI) | in Control e following ven alarms: unit intakes form the ing VC CLOSED: Filt Inlet) Filt Inlet) Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). Filt Inlet). |

| CNS EP/1/A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 3 of 7 Ventilation System Verification | | | PAGE NO. 38 of 49 Revision 43 |
|--|---|----|--|---|
| ACTION/EXPECTED RESPONSE | | | RESPONSE NOT OBTAINED | |
| 1. (Continued) 1. (Continued) c. Ensure the f OPEN: 1VC-5B (1VC-6A (2VC-5B (2VC-5B (2VC-6A (d. Repeat Step notified by s follows: At least of OR Any time annunciat | following VC dampers - CRA Filt Inlet) CRA Filt Inlet) CRA Filt Inlet) CRA Filt Inlet). o 1 of this enclosure unti tation management as nce every 8 hours VC/YC related ors on 1AD-18 actuate. | 3) | IE Unit 2 intake Hi ch detector(s) in alarm, perform the following a) Ensure the follow dampers - CLOS - 2VC-5B (CRA • 2VC-6A (CRA b) Ensure the follow - OPEN: - 1VC-5B (CRA • 1VC-6A (CRA c) <u>GO TO</u> Step 1.d. | hlorine THEN J: ving VC ED: Filt Inlet) Filt Inlet). ving dampers Filt Inlet) Filt Inlet). |
| EP/ | CNS 1/A/5000/E-0 | REACTOR TR Enclo Ventilatio | REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 4 of 7 Ventilation System Verification | | | PAGE NO. 39 of 49 Revision 43 |
|-----|---|---------------------------------------|--|------------------|------------|-------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE | NOT OBTAIN | ED |
| 2. | Ensure proper follows: | VA system operation | as | | | |
| | Ensure the for | llowing fans - OFF: | | | | |
| | ABUXF 1A ABUXF 1B | | | | | |
| | Ensure VA sy follows: | /stem filter in service as | | | | |
| | ● 1ABF-D-12 Dampers) · | 2 & 19 (VA Filter A Bypa: - CLOSED | SS | | | |
| | ● 1ABF-D-5 Dampers) | & 20 (VA Filter B Bypas: - CLOSED. | S | | | |
| | Ensure the for | llowing fans - ON: | | | | |
| | ABFXF-1A • ABFXF 1B | | | | | |
| 3. | Verify proper \ follows: | /E system operation a | 5 | | | |
| - | _a. VE fans - Ol | Ν. | _ | a. Start fan(s). | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| CNS EP/1/A/5000/E-0 | CNS EP/1/A/5000/E-0 REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 5 of 7 Ventilation System Verification | | | P/ 4 Re | AGE NO. 10 of 49 evision 43 |
|--|--|---|--|--|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT | OBTAINED | |
| 3. (Continued) b. Annulus pre IN. WC ANE | ssure - BETWEEN -1.4) -1.8 IN. WC. | E | b. Perform the follow 1) IF annulus prepositive than - perform the following in a) Verify flow following in - 1VEP51 Stack) 1VEP52 Stack). 1VEP52 Stack). b) IF flow not dispatch o status of the dampers beindication opiston rods to 6": 1AVS-D Damp) (500) - C Charpen (500) - C Consult pla and notify troublesho <u>REFER TO</u> (Troublesho VE System _ d) <u>GO TO State</u> | ing: essure mor 1.4 in. WC illowing: indicated on dications: 80 (VE 1A 00 (VE 1B indicated, perator to vi- be following based on the or their ope s being external -2 (VE A Ti AB-603, JJ LOSED -7 (VE B Ti AB-603, HI LOSED -3 (VE A Ti AB-603, HI LOSED -3 (VE A Ti AB-603, HI PEN -8 (VE B Ti AB-603, HI PEN -8 (VE B Ti AB-603, HI PEN. ant enginee IAE/Mainte ot and rep Det I/IA/5 nooting Cau h Hi/Lo Pre ep 3.c. | e , <u>THEN</u> on the Flow To Flow To Flow To THEN /erify eir local erating ended 4" m Recirc I-51, Rm m Recirc H-52, Rm m Exh I-52, Rm m Exh H-52, Rm m Exh H-52, Rm ering staff enance to air. 200/002 use For ssure). |

| CNS EP/1/A/5000/E-0 | REACTOR TR Enclo Ventilatio | REACTOR TRIP OR SAFETY INJECTION Enclosure 2 - Page 6 of 7 Ventilation System Verification | | PAGE NO. 41 of 49 Revision 43 |
|------------------------|---|--|---|---|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTA | INED |
| 3. (Continued) | p 3.b every 30 minutes by station management | t. | 2) <u>IF</u> annulus pressu negative than -1.8 perform the follow a) Determine whi indicates higher flow to stack. b) Within 2 hours train that indica discharge flow secured. c) Consult plant e and notify IAE/ troubleshoot at <u>REFER TO EN</u> (Troubleshooti VE System Hi/) | INED re more in. WC, <u>THEN</u> ing: ch VE train set discharge ensure VE ates highest to stack engineering staff Maintenance to nd repair. I/1/A/5200/002 ng Cause For Lo Pressure). |

| EP/1/A | CNS V5000/E-0 | REACTO E Vent | PAGE NO. 42 of 49 Revision 43 | | |
|--------|------------------------------------|------------------------------------|-------------------------------------|--------------|----------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT | OBTAINED |
| _ 4. | Record time ve verified on foll | entilation systems owing table: | | | |
| | | | SYSTEM (VC, VE) | INITIALS | |
| | | | | | |
| | | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Sp e | OSURES age 1 of 8 pol Monitoring | PAGE NO. 3 of 109 Revision 11 | |
|--|--|--|---|-------------------|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED |
| ACTION/EX ACTION/EX 1. Review the fol for Spent Fuel - Control Room 1KFP5130 is loop. Guidan temperature of Spent Fuel P - Normal level non-safety in from 1RPA. local temperat to Spent Fuel - If a loss of all to last greate Spent Fuel P instrumentati access to Sp - Seismic even Fuel Pool inv of water. 2. Monitor Unit 1 as follows: a. Verify the fo - KF PUMP (1AD-13 I - | Enclo Unit 1 Spectro PECTED RESPONSE lowing considerations Pool monitoring: In temperature indication a non-safety instrument ice is provided for local verification if access to ool available. indication 1KFP5120 is a strument loop powered Guidance is provided for ature verification if access I Pool available. AC Power is anticipated of than 6 hrs, portable ool level and temperature on can be installed if ent Fuel Pool available. t may cause loss of Specentory due to "splashing KF pump motor cooling Ilowing: A MTR CLR HI TEMP D/6) - DARK B MTR CLR HI TEMP D/7) - DARK. | sure 1 - P. nt Fuel P. a a s d s t t e ent | age 1 of 8 ool Monitoring RESPONSE NOT OBTAIN . a. Ensure affected Unit 1 KI OFF. | ED F pump(s) - |
| b. IF AT ANY HI TEMP an perform Ste 3. IF AT ANY TIM AND temperat unavailable in dispatch opera Spent Fuel Por Enclosure 24 (Monitoring). | TIME KF PUMP MTR CL nunciator(s) lit, <u>THEN</u> p 2.a. E Spent Fuel Pool leve ure indications Control Room, <u>THEN</u> ator to monitor Unit 1 ol. <u>REFER TO</u> Local Spent Fuel Pool | _R •I | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo: Unit 1 Spe | RIC ENCLOSURES sure 1 - Page 2 of 8 nt Fuel Pool Monito | PAGE NO. 4 of 109 Revision 11 | | | |
|---------------------------------|---|---|--|---------------|--|--|
| ACTION/E | XPECTED RESPONSE | R | ESPONSE NOT OBT/ | AINED | | |
| NOTE Steps 4 a | and 5 may be performed (| concurrently. | | | | |
| 4. Monitor Unit 1 follows: | l Spent Fuel Pool level a | 15 | | | | |
| a. Verify Sper in Control F | It Fuel Pool level indicatio Room - AVAILABLE. | n _a. <u>GO</u> | <u>ГО</u> Step 4.e. | | | |
| b. Verify Sper than - 39 ft. | It Fuel Pool level greater | b. Notif follov 1) U 2) <u>R</u> (I | b. Notify Control Room Supervisor of the following: 1) Unit 1 Spent Fuel Pool level. 2) <u>REFER TO</u> AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). | | | |
| c. Record Uni the followin | t 1 Spent Fuel Pool level g table: | in | | | | |
| Time | Unit 1 Time SFP Level | Unit 1 SFP Level | Time Uni SFP | it 1 Level | | |
| d. <u>GO TO</u> Ste | p 5. | | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Spe | RIC ENC sure 1 - P nt Fuel P | LOSURE age 3 of ool Mon | ES 8 itoring | | PAGE NO 5 of 109 Revision 1 | 1 |
|--|--|------------------------------------|-------------------------------|-----------------------------|--|--|--------|
| ACTION/EX | PECTED RESPONSE | | | RESPON | ISE NOT OBTAIN | ED | |
| 4. (Continued) e. Determine S follows: | Spent Fuel Pool level as operator and RP to le if Unit 1 Spent Fuel Pool essible. Unit 1 Spent Fuel Pool essibility determined, erform the following: Ounit 1 Spent Fuel Pool - ACCESSIBLE. | bol | | a) Not per (1) (2) | ify Station Mar form the follow Evaluate alter to monitor Un Fuel Pool leve IF AT ANY TI level estimate 39 ft, <u>THEN R</u> AP/1/A/5500/0 Spent Fuel Co Level). | agement to ing: nate method it 1 Spent el. ME Unit 1 d less than EFER TO D41 (Loss of poling or | d f |
| b) Notify perfo (1) | / dispatched operator to m the following: Determine Spent Fuel Poevel using the following reference points: Top of skimmer trough 40 Ft 1 Ft below lip of skimmer trough is 39 F Centerline of KF pump suction strainer is 37.5 Ft. Report level determination of Control Room. | ool is t | | _ (3) | GO TO Step 8 | 5. | |

| CNS EP/1/A/5000/G-1 | | | | |
|------------------------|--|--------------------|---|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAI | NED |
| 4. (Continued) | | | | |
| c) WHE THE | <u>N</u> operator reports level, perform the following: | | | |
| (1) | √erify level greater than - | | (1) Notify Contro Supervisor o | ol Room |
| | 50 K. | | 1. Unit 1 Sp | ent Fuel Pool |
| | | | evel. 2. <u>REFER 1</u> AP/1/A/5: of Spent or Level). | 'O 500/041 (Loss Fuel Cooling |
| (2) | Record Unit 1 Spent Fuel Pool level in the following able: | | | |
| Time | Unit 1 Time SFP Level | Unit 1 SFP Leve | Time Unit SFP Le | 1 vel |
| | | | | |
| | | | | |
| | | | | |
| | | | |] |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo: Unit 1 Sp er | RIC ENCLOSURE: sure 1 - Page 5 of 8 nt Fuel Pool Monit | IC ENCLOSURES ire 1 - Page 5 of 8 Fuel Pool Monitoring | | | | | |
|--|--|--|---|-----------------------|--|--|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED | | | | |
| 5. Monitor Unit 1 temperature a | Spent Fuel Pool s follows: | | | | | | | |
| a. Verify Spen indication in AVAILABLE | t Fuel Pool temperature Control Room - | a. <u>GO</u> | TO Step 5.e. | | | | | |
| b. Verify Spen less than - 1 | t Fuel Pool temperature 25°F. | b. Noti follo | ify Control Room Sup wing: | ervisor of the | | | | |
| | | - " - | temperature. | | | | | |
| | | 2) [| <u>REFER TO</u> AP/1/A/58 (Loss of Spent Fuel C Level). | 500/041 Sooling or | | | | |
| c. Record Unit temperature | 1 Spent Fuel Pool in the following table: | | | | | | | |
| Time | Unit 1 Time SFP Temp | Unit 1 SFP Temp | Time Unit SFP T | 1 emp | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| d. <u>GO TO</u> Step | d. <u>GO TO</u> Step 6. | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| CNS EP/1/A/5000/G-1 | GENE Enclo Unit 1 Spe | RIC ENCI sure 1 - Pa nt Fuel Pa | RIC ENCLOSURES ure 1 - Page 6 of 8 t Fuel Pool Monitoring | | |
|---|---|---------------------------------------|---|--|--|
| ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | IED | |
| 5. (Continued) e. Determine S temperature — 1) Verify ac Pool are 2) Verify Ur - ACCES | Spent Fuel Pool as follows: ccess to Unit 1 Spent Fu a previously determined | el | Perform the following a) Dispatch operator determine if Unit 1 Pool area accessi b) WHEN Unit 1 Spearea accessibility THEN perform Steathrough 5.e.4. c) GO TO Step 6. Notify station manage perform the following: a) Evaluate alternate monitor Unit 1 Spearementure. b) IF AT ANY TIME I temperature estimation than - 125°F, THE TO AP/1/A/5500/0 Spent Fuel Coolin c) GO TO Step 6. | and RP to Spent Fuel ble. Int Fuel Pool determined, eps 5.e.2 ement to method to ent Fuel Pool Unit 1 hated greater IN REFER M 1 (Loss of g or Level). | |
| 3) Notify diadeterminited determinitemperation a) Obta from Cabin b) Scan for hi c) Repordeterminited determinitemperation | spatched operator to le Unit 1 Spent Fuel Poo ture as follows: OSC "Emergency Supp net". Spent Fuel Pool surface ghest reading. Int temperature mination to Control Roo | ly e m. | | | |

| CNS EP/1/A/5000/G-1 | GENI Encl Unit 1 S p | GENERIC ENCLOSURES Enclosure 1 - Page 7 of 8 Unit 1 Spent Fuel Pool Monitoring | | | | PAGE NO. 9 of 109 Revision 11 |
|---|--|--|--------------|---|---|-------------------------------------|
| ACTION/EX | PECTED RESPONSE |] | | RESPONSE NOT | OBTAIN | ED |
| 5. (Continued) | | | | | | |
| 4) <u>WHEN</u> of tempera following | perator reports ture, <u>THEN</u> perform the I: | | | | | |
| a) Verify temp | y Spent Fuel Pool erature - LESS THAN | | | a) Notify Cor Superviso | ntrol Roo r of the f | m ollowing: |
| 125° | F. | | | (1) Unit 1 tempe | Spent Ferature. | uel Pool |
| | | | | (2) <u>REFE</u> AP/1/ Spen Level | ER <u>TO</u> A/5500/0 t Fuel Co). | 041 (Loss of poling or |
| b) Reco temp table | rd Unit 1 Spent Fuel Po erature in the following | ol | | | | |
| Time | Unit 1 Tim SFP Temp | e Un SFP | it l Temp | Time | Unit SFP Te | 1 mp |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| _ 6. Notify Control Unit 1 Spent F temperature. | Room Supervisor of uel Pool level and | | | | | |

| EP/1 | CNS /A/5000/G-1 | GENE Enclo Unit 1 Spe | NERIC ENCLOSURES PAGE closure 1 - Page 8 of 8 pent Fuel Pool Monitoring PAGE | | |
|------|--|---|--|---|---|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED |
| _ 7. | Verify AP/1/A/ Fuel Cooling o IMPLEMENTE | 5500/041 (Loss of Spen r Level) - D. | .t | IF AT ANY TIME Unit 1 Spe cooling <u>NOT</u> established p reaching either of the follo conditions, <u>THEN</u> notify Co Supervisor, <u>REFER TO</u> AP/1/A/5500/041 (Loss of S Cooling or Level): • Unit 1 Spent Fuel Pool gre 125°F. • Unit 1 Spent Fuel Pool lev 39 ft. | Int Fuel Pool rior to wing ontrol Room opent Fuel eater than - el less than - |
| 8. | Repeat this en until notified b | closure every 2 hours y station management | | | |

| EP/1 | CNS /A/5000/E-0 | REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 1 of 5 NC Temperature Control | | PAGE NO. 44 of 49 Revision 43 | |
|------|--|---|-----------------|---|---------------|
| | ACTION/EX | PECTED RESPONSE |] | RESPONSE NOT OBTAIN | ED |
| 1. | Verify any NC | pump - ON. | | Perform the following: a. Use NC T-Colds to detern temperature as required is subsequent steps. b. <u>GO TO</u> Step 4. | mine NC in |
| 2. | Use NC T-Avg temperature as steps. | to determine NC s required in subseque | ent | | |
| 3. | IF AT ANY TIM <u>THEN</u> use NC temperature as steps. | <u>E</u> all NC pumps trippe T-Colds to determine N s required in subseque | d, NC ent | | |
| 4. | Verify one of the NC temperate THAN OR ECOR NC temperate 557°F. | he following: ure - STABLE AT LESS QUAL TO 557°F ure - TRENDING TO | | <u>GO TO</u> Step 8. | |
| 5. | Continue to m | onitor NC temperature | | | |
| 6. | Notify Control temperature co | Room Supervisor of N ontrol status. | IC | | |

| EP/1/ | CNS EP/1/A/5000/E-0 REACTOR TRIP OR SAFETY INJECTION Enclosure 4 - Page 2 of 5 NC Temperature Control | | PAGE NC 45 of 49 Revision 4 |). 43 | | | | |
|-------|--|--|-----------------------------------|-----------------|---|--|--|--------------------|
| [| ACTION/EX | PECTED RESPONSE | | | RE | SPONSE NOT OBTAIN | ED |] |
| 7. | ACTION/EX Do not continu one of the follo • NC temperatu 557°F AND II UNCONTRO OR • NC temperatu 557°F AND S OR • NC temperatu 557°F AND DE Verify NC temp 557°F AND DE | PECTED RESPONSE The in this enclosure union wing occurs: Ture - GREATER THAN VCREASING IN AN LLED MANNER TABLE THE - LESS THAN DECREASING IN AN LLED MANNER. Derature - LESS THAN CREASING. | til | Pe a. b. | IF NC AND tempe 1) II 2) II IE the • NC and • Tim THEN 557°F 1) 11 12 13 14 1557°F 1) 11 12 13 14 | the following: the following: temperature greate increasing, <u>THEN</u> s erature at 557°F as E steam dumps ava ise steam dumps ava ise steam dumps not <u>HEN</u> use S/G POR temperature greate d stabile he and manpower ava stabilize NC temperature temperature greate d stabile he and manpower ava stabilize NC temperature temperature greate d stabile he and manpower ava stabilize NC temperature temperature greate temperature greated temperature greated | ED ED ED er than 557' tabilize NC follows: ilable, <u>THE</u> available, Vs. s exist: er than 557° vailable, erature at ilable, <u>THE</u> available, Vs. |] °F № *F |
| | | | | U. | <u>60 I</u> | <u>o</u> step tu. | | |

| CNS RE EP/1/A/5000/E-0 | | REACTOR TR Enclo NC Te | IP OR SA sure 4 - P emperatur | FETY I age 3 c re Cont | NJECTION of 5 irol | PAGE NO. 46 of 49 Revision 43 |
|---------------------------|--|-----------------------------------|-------------------------------------|------------------------------|---|-------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT OBTAIN | IED |
| 9. | Attempt to sto follows: | p the NC cooldown as | | | | |
| | a. Ensure all s | team dumps - CLOSED. | | | | |
| | b. Ensure all S | /G PORVs - CLOSED. | | b. IF T | any S/G PORV cannot <u>HEN</u> CLOSE its isolatio | t be closed, n valve. |
| | c. Ensure S/G | blowdown isolated. | | | | |
| | d. CLOSE the | following valves: | | | | |
| | 1SM-77A C/V) | (S/G 1A Otlt Hdr Bldwn | | | | |
| | 1SM-76B C/V) | (S/G 1B Otlt Hdr Bldwn | | | | |
| | 1SM-75A C/V) | (S/G 1C Otlt Hdr Bldwn | | | | |
| | 1SM-74B C/V). | (S/G 1D Otlt Hdr Bldwn | | | | |
| | e. Verify MSR supply valve | Second Stage steam es - CLOSED | | e. P | erform the following: | d Stage |
| | 1HM-1 (M Source) | ISRH 1A&1B SSRH Stm | 1 | 1) | steam supply valve(| d Stage s). |
| | • 1HM-2 (M Source). | ISRH 1C&1D SSRH Stm | ı | 2) | <u>IF</u> steam flowpath ca isolated from Contro <u>THEN</u> CLOSE the fo valves: | annot be I Room, bllowing |
| | | | | | All MSIVs | |
| | | | | | All MSIV bypass v | alves. |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| CNS EP/1/A/5000/E-0 | REACTOR TR Enclo NC Te | RIP OR SA sure 4 - Pa emperatur | FETY age 4 e Cor | INJECTION of 5 htrol | PAGE NO. 47 of 49 Revision 43 |
|---|--|---------------------------------------|------------------------|---|--|
| ACTION/EX | PECTED RESPONSE | | | RESPONSE NOT OBTA | INED |
| 9. (Continued) f. Depress and SEAT DRN' (1MC-3) to o • 1SM-41 (Drn) • 1SM-44 (Drn) • 1SM-43 (5) | d hold "S/V BEFORE "CLOSE" pushbutton close the following valve Stop VIv #1 Before Seat Stop VIv #2 Before Seat Stop VIv #3 Before Seat | s: | | | |
| Drn) • 1SM-42 (Drn). g. Verify NC co | Stop VIv #4 Before Seat | | g. <u>1</u> 1 | E cooldown continues THROTTLE feed flow at (29% ACC) in all S THROTTLE feed f the following: Minimize cooldo Maintain total fe than 450 GPM. WHEN N/R level of 11% (29% ACC) in THEN THROTTLE further to achieve Minimize cooldo Maintain at leas level greater tha (29% ACC). IE cooldown contin CLOSE the followi All MSIVs All MSIV bypass | A THEN as follows: ess than 11% S/G's, <u>THEN</u> low to achieve wn ed flow greater reater than any S/G, feed flow the following: wn t one S/G N/R n 11% nues, <u>THEN</u> ng valves: s valves. |

| EF | CNS 2/1/A/5000/E-0 | REACTOR TR Enclo NC Te | RIP OR SA sure 4 - P emperatur | FETY INJECTION age 5 of 5 re Control | PAGE NO. 48 of 49 Revision 43 | |
|----|--|---|--------------------------------------|--|-------------------------------------|--|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBT | AINED | |
| 10 | Continue to pe enclosure as r the following: | erform actions of this equired to ensure one | of | | | |
| | NC temperate THAN OR EC | ure - STABLE AT LESS QUAL TO 557°F | | | | |
| | OR | | | | | |
| | NC temperate 557°F. | ure - TRENDING TO | | | | |
| 11 | . Notify Control temperature co | Room Supervisor of N ontrol status. | С | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

EVENT #3 RN Strainer Hi D/P

NSWS 3.7.8

3.7 PLANT SYSTEMS

3.7.8 Nuclear Service Water System (NSWS)

LCO 3.7.8 Two NSWS trains shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|--|-----------------------------|-----------------|
| ANOTE Not applicable while in Condition C of this LCO unless entry is directed by Note 2 of Condition C. One NSWS train inoperable. | A.1NOTES | (72 hours) |

(continued)

Catawba Units 1 and 2

3.7.8-1

EVENT #3 RN Strainer Hi D/P

NSWS 3.7.8

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|--|-----------------|
| BNOTES 1. Entry into this Condition shall only be allowed for pre- planned activities as described in the Bases of this Specification. | B.1 Restore NSWS supply header to OPERABLE status. | 30 days |
| Immediately enter Condition A of this LCO if one or more NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. | | |
| Immediately enter LCO 3.0.3 if one or more NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. One NSWS supply header inoperable due to NSWS being aligned for single supply header operation. | | |

(continued)

Catawba Units 1 and 2

3.7.8-2

Amendment Nos. 271/267

Catawba 2019 NRC Exam

EVENT #3 RN Strainer Hi D/P

NSWS 3.7.8

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|----------------------------|
| CONDITION CNOTES 1. Entry into this Condition shall only be allowed for Unit 1 and for pre-planned activities as described in the Bases of this Specification. Entry into this Condition shall not be allowed while Unit 2 is in MODE 1, 2, 3, or 4. 2. Immediately enter Condition A of this LCO if one or more Unit 1 required NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. 3. Immediately enter LCO 3.0.3 if one or more Unit 1 required NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. | C.1 Restore NSWS train to OPERABLE status. | COMPLETION TIME 14 days |
| One NSWS train inoperable due to NSWS being aligned for single Auxiliary Building discharge header operation. | | (continued) |

Catawba Units 1 and 2

3.7.8-3

EVENT #3 RN Strainer Hi D/P

NSWS 3.7.8

ACTIONS (continued)

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME | |
|---|---------------|---------------|-----------------|-----------------|--|
| D. Required Action and associated Completion Time of Condition A, B, or C not met. | D.1 AND | Be in MODE 3. | 6 hours | | |
| | or C not met. | D.2 | Be in MODE 5. | 36 hours | |

SURVEILLANCE REQUIREMENTS

| | SURVEILLANCE | FREQUENCY |
|------------|--|--|
| SR 3.7.8.1 | NOTE Isolation of NSWS flow to individual components does not render the NSWS inoperable. | |
| | Verify each NSWS manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position. | In accordance with the Surveillance Frequency Control Program |
| SR 3.7.8.2 | NOTENOTENOTENOTE | |
| | Verify each NSWS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |
| SR 3.7.8.3 | Verify each NSWS pump starts automatically on an actual or simulated actuation signal. | In accordance with the Surveillance Frequency Control Program |

Catawba Units 1 and 2

3.7.8-4

Amendment Nos. 271/267

EVENT #4

FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

3.3 INSTRUMENTATION

3.3.2 Engineered Safety Feature Actuation System (ESFAS) Instrumentation

LCO 3.3.2 The ESFAS instrumentation for each Function in Table 3.3.2-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.2-1.

ACTIONS

-----NOTE------Separate Condition entry is allowed for each Function.

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
|----|---|-----------|--|-----------------|
| A. | One or more Functions with one or more required channels or trains inoperable. | A.1 | Enter the Condition referenced in Table 3.3.2-1 for the channel(s) or train(s). | Immediately |
| В. | One channel or train inoperable. | B.1 | Restore channel or train to OPERABLE status. | 48 hours |
| | | <u>OR</u> | | |
| | | B.2.1 | Be in MODE 3. | 54 hours |
| | | AN | D | |
| | | B.2.2 | Be in MODE 5. | 84 hours |
| | | | | |

(continued)

Catawba Units 1 and 2

3.3.2-1

Amendment Nos. 173/165

EVENT #4

FWST Channel 2 Failure ESFAS Instrumentation 3.3.2

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME | |
|--|--------------------|---|-----------------|---|
| C. One train inoperable. | C.1 | NOTE Dne train may be bypassed for up to 4 hours or surveillance testing provided the other train is DPERABLE. | | |
| | F | Restore train to DPERABLE status. | 24 hours | |
| | <u>OR</u> | | | |
| | C.2.1 E | Be in MODE 3. | 30 hours | ۱ |
| | AND | <u>)</u> | | |
| | C.2.2 E | Be in MODE 5. | 60 hours | |
| D. One channel inoperable. | D.1 1 1 1 | NOTE The inoperable channel may be bypassed for up to 12 hours for surveillance esting of other channels. | | I |
| | F | Place channel in trip. | 72 hours | l |
| | <u>OR</u> | | | |
| | D.2.1 E | Be in MODE 3. | 78 hours | |
| | AND | 2 | | |
| | D.2.2 E | Be in MODE 4. | 84 hours | |
| *[For the function Auxiliary Feedwater Loss of Offsite Power proposed changes to this Condition will be evaluated in a future amendment. The existing Technical Specification requirements for Bypass test time of 4 hours and Required Action D:1 Place channel in trip time of 6 hours and Required Action D.2.1 Be in MODE 3 in 12 hours and Action D.2.2 Be in MODE 4 in 18 hours in remains in effect] | 1 | | (continued) | |
| Catawba Units 1 and 2 | 3.3. | .2-2 Amendmen | t Nos. 247/240 | |

EVENT #4 FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

ACTIONS (continued)

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME | |
|----|--|-----------|--|-----------------|--|
| E. | One Containment Pressure channel inoperable. | E.1 | NOTE One additional channel may be bypassed for up to 12 hours for surveillance testing. | | |
| | | | Place channel in bypass. | 72 hours | |
| | | <u>OR</u> | | | |
| | | E.2.1 | Be in MODE 3. | 78 hours | |
| | | <u>A</u> | <u>ND</u> | | |
| | | E.2.2 | Be in MODE 4. | 84 hours | |
| F. | One channel or train inoperable. | F.1 | Restore channel or train to OPERABLE status. | 48 hours | |
| | | OR | | | |
| | | F.2.1 | Be in MODE 3. | 54 hours | |
| | | <u>AN</u> | <u>ND</u> | | |
| | | F.2.2 | Be in MODE 4. | 60 hours | |
| G. | One Steam Line Isolation Manual | G.1 | Restore channel to OPERABLE status. | 48 hours | |
| | channel inoperable. | OR | | | |
| | | G.2 | Declare associated steam line isolation valve inoperable. | 48 hours | |
| | | | | (C B | |

(continued)

Catawba Units 1 and 2

3.3.2-3

EVENT #4 FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

ACTIONS (continued)

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME | |
|----|-----------------------|-------------------------|--|-----------------|---|
| H. | One train inoperable. | e train inoperable. H.1 | | | |
| | | | Restore train to OPERABLE status. | 24 hours | I |
| | | <u>OR</u> | | | |
| | | H.2.1 | Be in MODE 3. | 30 hours | I |
| | | AN | D | | |
| | | H.2.2 | Be in MODE 4. | 36 hours | |
| I. | One train inoperable. | I.1 | One train may be bypassed for up to 4 hours for surveillance testing provided the other train is OPERABLE. | | • |
| | | | Restore train to OPERABLE status. | 24 hours | |
| | | <u>OR</u> | | | |
| | | 1.2 | Be in MODE 3. | 30 hours | |
| | | | | | |

(continued)

Catawba Units 1 and 2

3.3.2-4

EVENT #4 FWST Channel 2 Failure ESFAS Instrumentation

3.3.2

ACTIONS (continued)

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME | |
|----|---|------------------|--|-----------------|--|
| J. | J. One channel inoperable. | | NOTE The inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels. | | |
| | | | Place channel in trip. | 72 hours | |
| | | <u>OR</u> | | | |
| | | J.2 | Be in MODE 3. | 78 hours | |
| K. | One Main Feedwater Pumps trip channel inoperable. | K.1 <u>OR</u> | Place channel in trip. | 1 hour | |
| | | K.2 | Be in MODE 3. | 7 hours | |
| | | | | (continued) | |

Catawba Units 1 and 2

3.3.2-5

Amendment Nos. 264/260

EVENT #4 FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

ACTIONS (continued)

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME | |
|----|----------------------------|-----------|---|-----------------|--|
| L. | L. One channel inoperable. | | The inoperable channel may be bypassed for up to 2 hours for surveillance testing of other channels. | | |
| | | | Place channel in trip. | 6 hours | |
| | | <u>OR</u> | | | |
| | | L.2 | Be in MODE 3. | 12 hours | |

(continued)

Catawba Units 1 and 2

3.3.2-6

Amendment Nos. 264/260

Catawba 2019 NRC Exam

EVENT #4

FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

| ACTIC | NS (continued) | | | |
|-------|-------------------------|-----------|---|-----------------|
| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
| М. | One channel inoperable. | M.1 | Place channel in trip. | 1 hour |
| | | OR | | |
| | | M.2.1 | Be in MODE 3. | 7 hours |
| | | AN | <u>1D</u> | |
| | | M.2.2 | Be in MODE 4. | 13 hours |
| N. | One channel inoperable; | N.1 | One additional channel may be bypassed for up to 2 hours for surveillance testing. | |
| | | | Place channel in bypass. | 6 hours |
| | | <u>OR</u> | | |
| | | N.2.1 | Be in MODE 3. | 12 hours |
| | | AN | <u>ID</u> | |
| | | N.2.2 | Be in MODE 5. | 42 hours |
| | | I | | (continued) |

Catawba Units 1 and 2

3.3.2-7

Amendment Nos. 249/243

EVENT #4

FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

| ACTIC | ACTIONS (continued) | | | | | | |
|-------|---|-----------|---|-----------------|--|--|--|
| | CONDITION | | REQUIRED ACTION | COMPLETION TIME | | | |
| 0. | One channel inoperable. | 0.1 | Verify interlock is in required state for existing unit condition. | 1 hour | | | |
| | | <u>OR</u> | | | | | |
| | | 0.2.1 | Be in MODE 3. | 7 hours | | | |
| | | AN | <u>ID</u> | | | | |
| | | 0.2.2 | Be in MODE 4. | 13 hours | | | |
| P. | One or more Containment Pressure Control System channel(s) inoperable. | P.1 | Declare affected supported system inoperable. | Immediately | | | |
| Q. | One Nuclear Service Water Suction Transfer- Low Pit Level channel in one or more pits inoperable. | Q.1 | NOTE The inoperable channel may be bypassed for up to 2 hours for surveillance testing of other channels. | | | | |
| | | | Place channel in trip. | 4 hours | | | |
| | | <u>OR</u> | | | | | |
| | | Q.2 | Align the Nuclear Service Water System for Standby Nuclear Service Water Pond recirculation. | 4 hours | | | |
| | | <u>OR</u> | | | | | |
| | | Q.3.1 | Be in MODE 3. | 10 hours | | | |
| | | AN | <u>1D</u> | | | | |
| | | Q.3.2 | Be in MODE 5. | 40 hours | | | |

(continued)

Catawba Units 1 and 2

3.3.2-8

Amendment Nos. 249/243

EVENT #4

FWST Channel 2 Failure ESFAS Instrumentation

3.3.2

ACTIONS (continued)

| | CONDITION | | REQUIRED ACTION | COMPLETION TIME |
|----|---|------------------|---|-----------------|
| R. | Two or more Nuclear Service Water Suction Transfer-Low Pit Level channels in one or more pits inoperable. | R.1 <u>OR</u> | Align the Nuclear Service Water System for Standby Nuclear Service Water Pond recirculation. | 4 hours |
| | | | Be in MODE 3. | 10 hours |
| | | AN | <u>D</u> | |
| | | R.2.2 | Be in MODE 5. | 40 hours |

Catawba Units 1 and 2

3.3.2-9

Amendment Nos. 249/243

Catawba 2019 NRC Exam

EVENT #4

FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

I

Table 3.3.2-1 (page 1 of 6) Engineered Safety Feature Actuation System Instrumentation

| | | | | | | - | | |
|----------|-----|---|--|----------------------|------------|---|--------------------|-----------------------------|
| FUNCTION | | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
| 1. | Saf | ety Injection ^(b) | | | | | | |
| | a. | Manual initiation | 1,2,3,4 | 2 | в | SR 3.3.2.8 | NA | NA |
| | b. | Automatic Actuation Logic and Actuation Relays | 1,2,3,4 | 2 trains | с | SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 | NA | NA |
| | c. | Containment Pressure - High | 1,2,3 | 3 | D | SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10 | ≤ 1.4 psig | 1.2 psig |
| | d. | Pressurizer Pressure - Low | 1,2,3(a) | 4 | D | SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10 | ≥ 1839 psig | 1845 psig |

2. Deleted.

| 3. | Cor Isol | itainr ation | nent | | | | | | |
|----|-------------|-----------------|--|-------------------|----------------------|-------------------|--|---------|-------------|
| | a. | Pha Isol | ase A ation | | | | | | |
| | | (1) | Manual Initiation | 1,2,3,4 | 2 | в | SR 3.3.2.8 | NA | NA |
| | | (2) | Automatic Actuation Logic and Actuation Relays | 1,2,3,4 | 2 trains | с | SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 | NA | NA |
| | | (3) | Safety Injection | Refer to Function | n 1 (Safety Injectio | n) for all initia | tion functions and requir | ements. | (continued) |

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) The requirements of this Function are not applicable to Containment Purge Ventilation System and Hydrogen Purge System components, since the system containment isolation valves are sealed closed in MODES 1, 2, 3, and 4.

Catawba Units 1 and 2

3.3.2-13

EVENT #4

FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

Table 3.3.2-1 (page 2 of 6)

| E | Contrato Francisco | A should be Double and | In the second section of the second section of the second se |
|------------|--------------------|------------------------|--|
| -noineered | Safety Feature | Actuation System | Instrumentation |
| Engineeree | ourcey reators | Protocolor Oystern | In su annen tattori |
| - | | | |

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|--------------|--|--|--------------------------|------------|---|--------------------|-----------------------------|
| 3. Co (co | ontainment Isolation ontinued) | | | | | | |
| b. | Phase B Isolation | | | | | | |
| | (1) Manual Initiation | 1,2,3,4 | 1 per train, 2 trains | в | SR 3.3.2.8 | NA | NA |
| | (2) Automatic Actuation Logic and Actuation Relays | 1,2,3,4 | 2 trains | с | SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 | NA | NA |
| | (3) Containment Pressure - High High | 1,2,3 | 4 | E | SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10 | ≤ 3.2 psig | 3.0 psig |
| 4. St | eam Line Isolation | | | | | | |
| a. | Manual Initiation | | | | | | |
| | (1) System | 1,2 ^(b) ,3 ^(b) | 2 trains | F | SR 3.3.2.8 | NA | NA |
| | (2) Individual | 1,2 ^(b) ,3 ^(b) | 1 per line | G | SR 3.3.2.8 | NA | NA |
| b. | Automatic Actuation Logic and Actuation Relays | 1,2 ^(b) ,3 ^(b) | 2 trains | н | SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 | NA | NA |
| c. | Containment Pressure - High High | 1,2 ^(b) ,3 ^(b) | 4 | E | SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10 | ≤ 3.2 psig | 3.0 psig |
| d. | Steam Line Pressure | | | | | | |
| | (1) Low | 1,2 ^(b) ,3 ^{(a)(b)} | 3 per steam line | D | SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10 | ≥ 744 psig | 775 psig |
| | | | | | | | (continued) |

(a)Above the P-11 (Pressurizer Pressure) interlock.

(b) Except when all MSIVs are closed and de-activated.

Catawba Units 1 and 2

3.3.2-14

EVENT #4

FWST Channel 2 Failure

ESFAS Instrumentation

3.3.2

I

Table 3.3.2-1 (page 3 of 6) Engineered Safety Feature Actuation System Instrumentation

| | FL | INCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE | NOMINAL TRIP SETPOINT |
|----|------------------|--|--|---------------------------------------|-------------------------------|--|--|--|
| 4. | Steam (contin | Line Isolation ued) | • | | | | | |
| | | (2) Negative Rate - High | 3(p)(c) | 3 per steam line | D | SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10 | ≤ 122.8(d) psi | 100 ^(d) psi |
| 5. | Turbi Feed | ne Trip and water Isolation | | | | | | |
| | a. | Turbine Trip | | | | | | |
| | | (1) Automatic Actuation Logic and Actuation Relays | 1,2 | 2 trains | I. | SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 | NA | NA |
| | | (2) SG Water Level- High-High (P-14) | 1,2 | 4 per SG | L | SR 3.32.1 SR 3.32.2 SR 3.32.4 SR 3.32.5 SR 3.32.6 SR 3.32.0 SR 3.32.10 | ≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2) | 83.9% (Unit 1) 77.1% (Unit 2) |
| | | (3) Safety Injection | Refer to Function Item 5.a.(1) for A | n 1 (Safety Injecti pplicable MODE | ion) for all initiatior S. | n functions and require | ments. See | |
| | b. | Feedwater Isolation | | | | | | |
| | | (1) Automatic Actuation Logic and Actuation Relays | 1,2 ^(e) ,3 ^(e) | 2 trains | н | SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 | NA | NA |
| | | | • | • | • | • | • | (continued) |

(b) Except when all MSIVs are closed and de-activated.

(c) Trip function automatically blocked above P-11 (Pressurizer Pressure) interlock and may be blocked below P-11 when Steam Line Isolation Steam Line Pressure - Low is not blocked.

(d) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(e) Except when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

Catawba Units 1 and 2

3.3.2-15

EVENT #4

FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

Table 3.3.2-1 (page 4 of 6) Engineered Safety Feature Actuation System Instrumentation

| FUNCTION | | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMIN TRIP SETPO |
|-------------|--|--|--------------------------------------|------------------------------|---|--|--------------------------------------|
| (2) | SG Water Level- High High (P-14) | 1,2(e),3(e) | 4 per SG | D | SR 3.3.2.1 SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.5 SR 3.3.2.6 SR 3.3.2.9 SR 3.3.2.10 | ≤ 85.6% (Unit 1) ≤ 78.9% (Unit 2) | 83.99 (Unit 1 77.19 (Unit 2 |
| (3) Sa | afety Injection | Refer to Function Item 5.b.(1) for A | n 1 (Safety Inject pplicable MODE | ion) for all initiatio S. | n functions and requir | ements. See | |
| (4) | Tavg-Low | _{1,2} (e) | 4 | J | SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 | ≥ 561°F | 564° |
| coin Rea | cident with ctor Trip, P-4 | Refer to Func | tion 8.a (Reactor | r Trip, P-4) for all i | nitiation functions and | requirements. | |
| (5) | Doghouse WaterLevel - High High | _{1,2} (e) | 3 per train per doghouse | L | SR 3.3.2.8 SR 3.3.2.9 SR 3.3.2.12 | ≤ 12 inches above 577 ft floor level | 11 inch above 5 ft floor l |
| | | | | | | | |

(e) Except when all MFIVs, MFCVs, and associated bypass valves are closed and de-activated or isolated by a closed manual valve.

Catawba Units 1 and 2

3.3.2-16

EVENT #4

FWST Channel 2 Failure

Table 3.3.2-1 (page 5 of 6) Engineered Safety Feature Actuation System Instrumentation ESFAS Instrumentation 3.3.2

| | FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|-------------|---|--|----------------------|------------|---|--|--|
| 6. <i>I</i> | Auxiliary Feedwater | | | • | | | |
| a | Automatic Actuation Logic and Actuation Relays | 1,2,3 | 2 trains | н | SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 | NA | NA |
| ł | SG Water Level Low Low | 1,2,3 | 4 per SG | D | SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10 | ≥ 9% (Unit 1) ≥ 35.1% (Unit 2) | 10.7% (Unit 1) 36.8% (Unit 2) |
| 0 | c. Safety Injection Refer to Function 1 (Safety Injection) for all initiation functions and requirements. | | | | | | |
| ¢ | I. Loss of Offsite Power | 1,2,3 | 3 per bus | D | SR 3.3.2.3 ^{(7)(g)} SR 3.3.2.9 ^{(7)(g)} SR 3.3.2.10 | ≥ 3396 V | 3450 V |
| • | e. Trip of all Main Feedwater Pumps | 1,2 | 3 per pump | к | SR 3.3.2.8 SR 3.3.2.10 | NA | NA |
| f | Auxiliary Feedwater Pump Train A and Train B Suction | 1,2,3 | 3 per train | м | SR 3.3.2.8 SR 3.3.2.10 | A) ≥ 9.5 psig | A) 10.5 psig |
| | Transfer on Suction Pressure - Low | | | | | B)≥ 5.2 psig (Unit 1) ≥ 5.0 psig (Unit 2) | (Unit 1) 6.0 psig (Unit 2) |
| | | | | • | | | (continued) |

(f) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

(g) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and the as-left tolerances are specified in the UFSAR.

Catawba Units 1 and 2

3.3.2-17

EVENT #4

FWST Channel 2 Failure

ESFAS Instrumentation 3.3.2

I

Table 3.3.2-1 (page 6 of 6)

| Table 3.3.2-1 (page 0 of 0) | | | | | | | | |
|-----------------------------|------------------|----------------|--------------|--|--|--|--|--|
| Engineered Safet | y Feature Actuat | ion System Ins | trumentation | | | | | |

| | FUNCTION | | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|-----|-------------------------|--|--|--------------------------|------------------------|---|---------------------------|-----------------------------|
| 7. | Aut to C | omatic Switchover Containment Sump | | | | | • | |
| | a. | Automatic Actuation Logic and Actuation Relays | 1,2,3,4 | 2 trains | с | SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6 | NA | NA |
| | b. | Refueling Water Storage Tank (RWST) Level – Low | (1.2,3,4) | 4 | N | SR 3.3.2.1 SR 3.3.2.7 ^{(a)(b)} SR 3.3.2.9 ^{(a)(b)} SR 3.3.2.10 | ≥91.9 inches | 95 inches |
| | | Coincident with Safety Injection | Refer to Function | 1 (Safety Injecti | on) for all initiation | functions and require | ments. | |
| 8. | ESI | FAS Interlocks | | | | | | |
| | a. | Reactor Trip, P-4 | 1,2,3 | 1 per train, 2 trains | F | SR 3.3.2.8 | NA | NA |
| | b. | Pressurizer Pressure, P-11 | 1,2,3 | 3 | 0 | SR 3.3.2.5 SR 3.3.2.9 | ≥ 1944 and ≤ 1966 psig | 1955 psig |
| | C. | T _{avg} - Low Low, P-12 | 1,2,3 | 1 per loop | 0 | SR 3.3.2.5 SR 3.3.2.9 | ≥ 550°F | 553°F |
| 9. | Cor Pre Sys | ntainment ssure Control stem | | | | | | |
| | a. | Start Permissive | 1,2,3,4 | 4 per train | Ρ | SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9 | ≤ 1.0 psid | 0.9 psid |
| | b. | Termination | 1,2,3,4 | 4 per train | P | SR 3.3.2.1 SR 3.3.2.7 SR 3.3.2.9 | ≥ 0.25 psid | 0.35 psid |
| 10. | Nuc Wa Tra Lev | clear Service ter Suction nsfer - Low Pit rel | 1,2,3,4 | 3 per pit | Q,R | SR 3.3.2.1 SR 3.3.2.9 SR 3.3.2.11 SR 3.3.2.12 | ≥ El. 555.4 ft | El. 557.5 ft |

(a) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

(b) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and the as-left tolerances are specified in the UFSAR.

Catawba Units 1 and 2

3.3.2-18
JPM A

| <u>Task:</u> | EVALUATION SHEET Initiate RCS Bleed and Feed following loss of Secondary Heat Sink. | | | | | ink. | |
|--|--|----------------------|---|---|---|---|---|
| Alternate Path: Yes | | | | | | | |
| Facility JPM | #: | New | , | | | | |
| Safety Funct | tion: | 4P | <u>Title:</u> | Establish NC System | n Bleed and F | eed | |
| <u>K/A</u> EPE E05 Ability to EA1.1 of Seco safety s modes, | | | Ability to of Secor safety sy modes, | o operate and/or monitor t ndary Heat Sink); Compo ystems, including instrum and automatic and manua | he following a nents, and fur entation, signa al features. | s they apply actions of co als, interlock | y to the (Loss ontrol and <s, failure<="" th=""></s,> |
| <u>Rating(s):</u> | 4.1/4 | 4.0 | <u>CFR:</u> | 41.7 / 45.5 / 45.6 | | | |
| Preferred Ev | aluati | on Lo | cation: | Preferre | ed Evaluation | Method: | |
| S imulator | X | In-I | Plant | Perform | X | S imula | ate |
| <u>References</u> : | | EP/1 | I/A/5000/F | FR-H.1 | | | |
| <u>Task Standa</u> | <u>ard:</u> | Appl H.1 of Sa | licant aligi (Respons afety Injec | ns RCS for bleed and fee e to Loss of Secondary H stion and opening PZR PC | d in accordanc eat Sink) by a DRVs 1NC-34 | ce with EP/1 Ictuating at I A and 1NC- | I/A/5000/FR- least one train 36B. |
| Validation Ti | <u>ime:</u> | 5 mir | nutes ======= | <u>Time Cr</u> | <u>itical:</u> ============= | Yes | NoX |
| Applicant: NAME | | | | Docket # | Ti Ti | ime Start: ime Finish: | |
| Performance Rating: | | | | P | erformance | Time | |
| SAT U | SAT UNSAT | | | | | | |
| <u>Examiner:</u> | | 1 | NAME | | SIGNATU | JRE | / |
| COMMENTS | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

SIMULATOR OPERATOR INSTRUCTIONS:

- 1. ENSURE NRC Examination Security has been established.
- 2. Reset to IC # 150
- 3. Enter the password.
- 4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
- 5. Ensure simulator setup per table below.
- 6. Place simulator in RUN and acknowledge any alarms.
- 7. ENSURE "Extra Operator" is present in the simulator.
- 8. Place simulator in FREEZE until Examiner cue is given.

| ✓ | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|---|--------|-------|------|-----------|-------|
| | MAL-CA003A, CAPT SA2 FAILS TO START | Active | | | | |
| | MAL-CA003B, CAPT SA5 FAILS TO START | Active | | | | |
| | MAL-CA004A , FAILURE OF CA PUMP A TO START | Both | | | | |
| | MAL-CA004B , FAILURE OF CA PUMP B TO START | Both | | | | |
| | VLV-NC005F, NC32B PZR PORV FAIL TO POSITION | 0 | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | - | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

A Reactor Trip has occurred due to a loss of both main feedwater pumps. The CA System will not function. Attempts to restart the CFPT's and align RY system flow have been unsuccessful. EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink) has been entered following a validated Heat Sink "RED PATH" encountered while performing EP/1/A/5000/ES-0.1 (Reactor Trip Response). Bleed and feed initiation criteria has been met.

INITIATING CUES:

The Control Room Supervisor has directed you to initiate NC System bleed and feed beginning at step 21 of EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink). Inform the Control Room Supervisor when the bleed and feed path has been initiated and verified.

EXAMINER NOTE: After reading Initiating Cue, provide the applicant with a copy of EP/1/A/5000/FR-H.1, Pages 42-49

START TIME: _____

| | STEP/STANDARD | SAT/UNSAT |
|---|---|-----------|
| <u>STEP 1</u> : 21 Perform St removal by | teps 22 through 26 quickly to establish NC heat / NC bleed and feed. | |
| <u>STANDARD</u> : | | SAT |
| Acknowledges step and | proceeds. | LINGAT |
| COMMENTS: | | |

| STEP 2 22 Ensure all NC Pumps - OFF | |
|--|-----|
| STANDARD: Verifies OFF indications for 1A, 1B, 1C, and 1D NC Pumps (1MC-10) | SAT |
| <u>COMMENTS:</u> | |
| | |

| STEP/STANDARD | SAT/UNSAT |
|--|------------------|
| <u>STEP 3</u> 23 Initiate S/I. <u>STANDARD</u> : | CRITICAL STEP |
| Depresses Train A and B "SAFETY INJECTION INITIATE" pushbuttons. Verifies "SAFETY INJECTION ACTUATED" status light lit (1SI-13) or "ECCS TRN A (B)" YELLOW "RESET" lights dark (1MC-11). | |
| Examiner Note: This step is critical to ensure that high pressure S/I flow is available to the NC system and to ensure that containment is isolated to ensure that reactor coolant released from Pzr PORV operation in the following steps is confined to containment. Only one train of S/I is required to meet this requirement. | SAT UNSAT |
| <u>COMMENTS:</u> | |

| STEP 4 24 Verify "NV S/I FLOW - INDICATING FLOW. | |
|--|-------|
| STANDARD: | SAT |
| Verifies flow on 1NVP6080, (1MC-3). | |
| COMMENTS: | UNSAT |
| | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 5 25. Establish NC System bleed path as follows: | |
| a. Ensure all Pzr PORV isolation valves - OPEN | |
| STANDARD: | SAT |
| Verifies the red 'OPEN' lights lit and green "CLSD" lights dark for 1NC- 31B, 1NC-33A and 1NC-35B. | UNSAT |
| COMMENTS: | |
| | |

| <u>STEP 6</u> 25.b. Se • | elect "OPEN" on the following PZR PORVs: 1NC34A (PZR PORV) 1NC32B (PZR PORV) | CRITICAL STEP |
|-----------------------------|--|------------------|
| STANDARD: | | |
| Rotates the swi | tches for 1NC-32B and 1NC-34A to the 'OPEN' position. | |
| Examiner Note: | This begins the alternate path of this JPM. | SAT |
| Examiner Note: | Although 1NC-32B will not open, this step is critical to provide one bleed path via 1NC-34A. | UNSAT |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 7 25.c. Align N ₂ to the Pzr PORVs by opening the following valves: | |
| 1NI-438A (Emer N2 FROM CLA A To 1NC-34A) | |
| 1NI-439B (Emer N2 FROM CLA B To 1NC-32B) | |
| | SAT |
| <u>STANDARD</u> : | UNSAT |
| Depresses the 'OPEN' pushbuttons for 1NI-438A and 1NI-439B. Verifies the red 'OPEN' lights lit and the green "CLSD" lights dark. | |
| <u>COMMENTS:</u> | |

| <u>STEP 8</u> 25.d. Verify power to all Pzr PORV isolation valves - AVAILABLE. | |
|---|-----|
| STANDARD: | SAT |
| Verifies red "OPEN' lights lit for 1NC-31B, 1NC-33A, and 1NC-35B on 1MC-10. | |
| COMMENTS: | |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|-------------------|---|-----------|
| <u>STEP 9</u> 26. | Verify the following valves - OPEN: | |
| | • 1NC-31B (PZR PORV Isol) | |
| | 1NC-32B (PZR PORV) | |
| | 1NC-33A (PZR PORV Isol) | |
| | • 1NC-34A (PZR PORV) | SAT |
| STANDARD: | | UNSAT |
| Verifies all lis | ted valves are open except 1NC-32B. Transitions to RNO. | |
| COMMENTS: | | |
| | | |

| <u>STEP 10</u> | 26 RNO a. | Ensure Phase B containment isolation signals - RESET. | |
|----------------|-----------------|--|-------|
| STANDAR | <u>RD</u> : | | SAT |
| Verifies | s Train A & B P | hase B Containment Isolation Reset lights lit. | UNSAT |
| | <u>TS:</u> | | |
| | | | |

| STEP 11 26 RNO b. Ensure 1VI-77B (VI Cont Isol) -OPEN | |
|--|-----|
| STANDARD: | SAT |
| Verifies red 'OPEN' lights lit and green "CLSD" lights dark for 1VI-77B. | |
| COMMENTS: | |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|---------------------------|--|-----------|
| <u>STEP 12</u> 26 RNO c. | IF VI pressure less than 85 PSIG, THEN dispatch operator to ensure proper VI compressor operation. REFER TO AP/0/A/5500/022 (Loss of Instrument Air) | |
| STANDARD: | | SAT |
| Verifies VI pressure N/A. | is greater than 85 psig and determines this step is | |
| COMMENTS: | | |

| <u>STEP 13</u> 26 RNO d. | Ensure the following valves – OPEN: 1NC-35B (PZR PORV Isol) 1NC 26B (PZR PORV) | CRITICAL STEP |
|--------------------------------------|---|------------------|
| | • INC-30D (PZR FURV) | |
| STANDARD: | | |
| Rotates the switch for | 1NC-36B to the 'OPEN' position. | |
| Examiner Note: This requi acco | This step is critical to provide the additional required bleed path via 1NC-36B. This may be accomplished per this step or subsequent step. | |
| COMMENTS: | | |
| | | |

| | | STEP/STANDARD | SAT/UNSAT |
|----------------|---------------|--|-----------|
| <u>STEP 14</u> | 26 RNO e. | Ensure two Pzr PORVs and associated Pzr PORV isolation valves - OPEN. | |
| <u>STANDAF</u> | <u>RD</u> : | | |
| | | | SAT |
| Verifies | s 1NC-34A, 1N | C-36B and associated PORV Isolation valves are | LINSAT |
| ореп. | | | |
| <u>COMMEN</u> | <u>TS:</u> | | |
| | | | |
| | | | |
| | | | |

| <u>STEP 15</u> 26 R | RNO f. IF two Pzr PORV flow paths open, THEN GO TO Step 27. | |
|-----------------------------|---|-------|
| STANDARD: | | |
| Verifies that t Step 27. | two PZR PORV flow paths are available and continues to | SAT |
| Examiner Cue: | Upon determination that two PZR PORV flow paths have been established "This JPM is complete." | UNSAT |
| <u>COMMENTS:</u> | | |

STOP TIME_____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

A Reactor Trip has occurred due to a loss of both main feedwater pumps. The CA System will not function. Attempts to restart the CFPT's and align RY system flow have been unsuccessful. EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink) has been entered following a validated Heat Sink "RED PATH" encountered while performing EP/1/A/5000/ES-0.1 (Reactor Trip Response). Bleed and feed initiation criteria has been met.

INITIATING CUES:

The Control Room Supervisor has directed you to initiate NC System bleed and feed beginning at step 21 of EP/1/A/5000/FR-H.1 (Response to Loss of Secondary Heat Sink). Inform the Control Room Supervisor when the bleed and feed path has been initiated and verified.

_

_

PAGE NO. 42 of 135 Revision 46

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|-------|---|------------------------------------|
| 1 | 9. (Continued) | |
| | bb. Align CA control valves as follows to ensure CA flow will be reestablished in a controlled manner: | o d |
| | 1) Reset CA System valve control. | |
| | 2) CLOSE all CA flow control valves. | |
| | cc. <u>WHEN</u> other feedwater source available, <u>THEN</u> review Enclosure (Align Additional Feedwater Source After RY Feeds S/Gs) prior to aligning other source. | 17 |
| 20. | Verify NC System feed and bleed should be initiated as follows: | |
| | a. Steps 22 through 26 - HAVE BEEN PREVIOUSLY PERFORMED. | a. <u>GO TO</u> Step 20.c. |
| _ | b. <u>GO</u> <u>TO</u> Step 37. c. W/R level in at least three S/Gs - LESS THAN 24% (36% ACC). | c. <u>RETURN</u> <u>TO</u> Step 1. |
| _ 21. | Perform Steps 22 through 26 quickly to establish NC heat removal by NC System feed and bleed. | |
| _ 22. | Ensure all NC pumps - OFF. | |
| _ 23. | Initiate S/I. | |
| | | |
| | | |
| | | |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED | |
|-----|--|--|--------|
| 24. | Verify "NV S/I FLOW" - INDICATING FLOW. | Perform the following: a. Perform the following for affected train(s): | |
| | | NOTE Following S/I actuation, 6 seconds must elapse pric to reseting ECCS. | 0 r |
| | | 1) Reset ECCS. | |
| | | 2) Reset D/G load sequencer. | |
| | | 3) Ensure the following pumps - O | N: |
| | | NV Pumps NI Pumps. | |
| | | 4) IF AT ANY TIME B/O occurs, <u>THEN</u> restart S/I equipment previously on. | |
| | | (RNO continued on next page) | |
| | | | |
| | | | |
| | | | |
| | | | |

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--------------------------|---|
| 24. (Continued) | |
| | b. <u>IF</u> at least one NV pump in service, <u>THEN</u> perform the following: |
| | Ensure the following valves - OPEN: |
| | 1NV-252A (NV Pumps Suct From FWST) |
| | 1NV-253B (NV Pumps Suct From FWST). |
| | Ensure the following valves - CLOSED: |
| | 1NV-188A (VCT Otlt Isol) |
| | ● 1NV-189B (VCT Otit Isol). |
| | Ensure the following valves - OPEN: |
| | ● 1NI-9A (NV Pmp C/L Inj Isol) |
| | ● 1NI-10B (NV Pmp C/L Inj Isol). |
| | 4) <u>IF</u> any NV pump in service <u>AND</u> S/I flowpath established, <u>THEN</u> <u>GO</u> <u>TO</u> Step 25. |
| | c. <u>IF</u> NI Pump 1A in service, <u>THEN</u> ensure the following valves - OPEN: |
| | • 1NI-103A (NI Pump 1A Suct) |
| | 1NI-118A (NI Pump 1A C-Leg Inj Isol) |
| | 1NI-162A (NI To C-Legs Inj Hdr Isol) |
| | • 1NI-100B (NI Pmps Suct From FWST). |
| | (RNO continued on next page) |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--------------------------|---|
| 2 | 4. (Continued) | |
| | | d. <u>IF</u> NI Pump 1B in service, <u>THEN</u> ensure the following valves - OPEN: |
| | | • 1NI-135B (NI Pump 1B Suct) |
| | | 1NI-150B (NI Pump 1B C-Leg Inj Isol) |
| | | 1NI-162A (NI To C-Legs Inj Hdr Isol) |
| | | 1NI-100B (NI Pmps Suct From FWST). |
| | | e. <u>IF</u> both of the following conditions exist, <u>THEN</u> <u>GO</u> <u>TO</u> Step 25: |
| | | Any NI pump in service <u>AND</u> S/I flowpath established |
| | | AND |
| | | Time between reactor trip and implementation of this procedure - GREATER THAN 90 MINUTES. |
| | | (RNO continued on next page) |
| | | |
| | | |
| | | |
| | | |

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--------------------------|--|
| 24. (Continued) | |
| | IF no feed path can be aligned, THEN perform the following: |
| | 1) Continue attempts to restore ECCS flow. |
| | 2) Continue attempts to restore feed flow to S/Gs. |
| | 3) IF AT ANY TIME both the following conditions exist: |
| | Containment pressure - GREATER THAN 20 PSIG |
| | FWST level - GREATER THAN 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL"), |
| | <u>THEN</u> contact Station Management for guidance to mitigate containment pressure. |
| | IF any of the following procedures have been previously implemented, <u>THEN</u> <u>RETURN</u> <u>TO</u> Step 6: |
| | EP/1/A/5000/FR-S.1 (Response to Nuclear Power Generation/ATWS) |
| | EP/1/A/5000/FR-C.1 (Response to Inadequate Core Cooling). |
| | 5) Energize H ₂ Igniters (1MC-7). |
| | Ensure operator dispatched to secure all Unit 1 ice condenser air handling units. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 11 (Securing All Ice Condenser Units). |
| | 7) <u>RETURN</u> <u>TO</u> Step 6. |
| | |

PAGE NO. 47 of 135 Revision 46

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|
| 25. Establish NC System bleed path as follows: | |
| a. Ensure all Pzr PORV isolation valves OPEN. | S - |
| b. Select "OPEN" on the following PZR PORVs: | |
| • 1NC-34A (PZR PORV) • 1NC-32B (PZR PORV). | |
| c. Align N₂ to Pzr PORVs by opening the following valves: | c. Perform the following: |
| • 1NI-438A (Emer N2 From CLA A 1NC-34A) | To1) Ensure Phase B containment isolation signals - RESET. |
| • 1NI-439B (Emer N2 From CLA B - 1NC-32B) | To2) Ensure 1VI-77B (VI Cont Isol) - OPEN. |
| 1110-52D). | <u>IF</u> VI pressure less than 85 PSIG, <u>THEN</u> dispatch operator to ensure proper VI compressor operation. <u>REFER TO</u> AP/0/A/5500/022 (Loss of Instrument Air). |
| d. Verify power to all Pzr PORV isolatic valves - AVAILABLE. | on d. Perform the following: |
| | 1) Evaluate cause of power loss and initiate actions to restore power to affected isolation valve(s). |
| | 2) WHEN power restored, THEN perform the following: |
| | a) OPEN Pzr PORV isolation valves. |
| | b) Ensure two Pzr PORVs and associated Pzr PORV isolation valves - OPEN. |
| | |

RESPONSE TO LOSS OF SECONDARY HEAT SINK

PAGE NO. 48 of 135 Revision 46

ACTION/EXPECTED RESPONSE **RESPONSE NOT OBTAINED** 26. Verify the following valves - OPEN: Perform the following: 1NC-31B (PZR PORV Isol) a. Ensure Phase B containment isolation signals - RESET. 1NC-32B (PZR PORV) b. Ensure 1VI-77B (VI Cont Isol) - 1NC-33A (PZR PORV Isol) OPEN. _____ c. IF VI pressure less than 85 PSIG, 1NC-34A (PZR PORV). **THEN** dispatch operator to ensure proper VI compressor operation. **REFER TO** AP/0/A/5500/022 (Loss of Instrument Air). d. Ensure the following valves - OPEN: 1NC-35B (PZR PORV Isol) • 1NC-36B (PZR PORV). e. Ensure two Pzr PORVs and associated Pzr PORV isolation valves - OPEN. _____f. <u>IF</u> two Pzr PORV flow paths open, THEN GO TO Step 27. g. Align train A head vent path by opening the following valves: 1NC-250A (Rx Head Vent Block) 1NC-251B (Rx Head Vent). (RNO continued on next page)

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|-----|--|---|---|
| 2 | 6. (Continued) | | |
| | | | IF train A head vent path cannot be aligned, <u>THEN</u> align train B head vent path as follows: |
| | | | Ensure the following valves - CLOSED: |
| | | | INC-250A (Rx Head Vent Block) INC-251B (Rx Head Vent). |
| | | | Dispatch operator to close the following breakers: |
| | | | 1EMXL-F10C (Reactor Vessel Head Vent Motor (1NC252B)) (AB-560, BB-47, Rm 372) |
| | | | 1EMXS-F03E (Reactor Vessel Head Vent Motor (1NC253A)) (AB-577, BB-49, Rm 496). |
| | | | 3) OPEN the following valves: |
| | | | 1NC-252B (Rx Head Vent Block) |
| | | | • 1NC-253A (Rx Head Vent). |
| | | | |
| 27. | Isolate NV Recirc flowpath as follows | : | |
| | a. CLOSE the following valves: | | |
| | 1NV-202B (NV Pmps A&B Recirc Isol) | | |
| | • 1NV-203A (NV Pumps A&B Recirc Isol). | 2 | |
| | b. Maintain NV recirc valves closed unless directed to open by subsequent steps. | | |

JPM B

EVALUATION SHEET

| Tack | | | | EVALUAI | ION SHEET | | | |
|---|----------------------------|--|------------------|--|---|-----------------------------|---|------------------|
| | | LUSS | | -21 Step 0 (11 | | ice) | | |
| Alternate Pa | <u>ath:</u> | Yes | | | | | | |
| Facility JPM #: PSS-ł | | | -KC-083 | | | | | |
| Safety Fund | tion: | 8 | <u>Title:</u> | Compone | nt Cooling Water | System | | |
| <u>K/A</u> | 008 A | A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of CCW pump | | | ose | | | |
| Rating(s): | 3.3/3 | 3.6 | CFR: | 41.5 / 43.5 / 4 | 15.3 / 45.13 | | | |
| Preferred E | valuati | on Lo | cation: | | Preferred Eval | uation M | ethod: | |
| S imulator | X | In- F | Plant | | Perform | X | S imulate | |
| <u>References</u> | : | AP/1 | I/A/5500/ | 021 (Loss of Co | omponent Cooling |) rev. 42 | | |
| Task Standard: Aligns steam dumps to pressure mode, trips the reactor and when reactor power is < 5%, trips all NC pumps per AP/1/A/5500/021 (Loss of Component Cooling) step 8. | | | | | | | | |
| Validation T | ime: | 5 mir | nutes | | Time Critical: | Y | es No | х |
| Validation T | <u>'ime:</u> ===== | 5 mir | nutes ====== | =========== | Time Critical: | Y(| es No | <u>X</u> ==== |
| Validation T ==================================== | <u>'ime:</u> ===== | 5 mir | nutes ======= | ====================================== | <u>Time Critical:</u> ==================================== | Yo ======= Tin Tin | es No ======== ne Start: ne Finish: | <u>X</u> ==== |
| Validation T Applicant: NAME Performanc SAT U | Time: ====== e Ratir | 5 mir ===== <u>ng:</u> | nutes ====== | ====== Docke | <u>Time Critical:</u> | Tir Pe | es No ======= ne Start: ne Finish: rformance Time | <u>X</u> ==== |
| Validation T Applicant: NAME Performanc SAT U | <u>ime:</u> • Ratir | 5 mir | nutes ====== | ====== Docke | <u>Time Critical:</u> | Tir Pe | es No ne Start: ne Finish: rformance Time | <u>X</u> ==== |
| Validation T Applicant: NAME Performanc SAT U Examiner: | ime: e Ratir | 5 mir ===== <u>ng:</u> | NAME | ====== Docke | <u>Time Critical:</u> | Tir Tir Pe | es No ======== ne Start: ne Finish: rformance Time / | |
| Validation T Applicant: NAME Performanc SAT Examiner: | ime: e Ratir | 5 mir ===== <u>ng:</u> | NAME | Docke | <u>Time Critical:</u> | Tir Tir Pe | es No ne Start: ne Finish: rformance Time / | |
| Validation T Applicant: NAME Performanc SAT Examiner: | ime: e Ratir | 5 mir | NAME | Docke | <u>Time Critical:</u> | Tir Tir Pe | es No ne Start: ne Finish: rformance Time / | <u>x</u> |
| Validation T Applicant: NAME Performanc SAT Examiner: | ime: e Ratir | 5 mir | NAME | Docke | <u>Time Critical:</u> | Tir Tir Pe | es No ne Start: ne Finish: rformance Time / | <u>x</u> |
| Validation T Applicant: NAME Performanc SAT L Examiner: | ime: e Ratir | 5 mir | NAME | Docke | <u>Time Critical:</u> | Tir Tir Pe | es No ne Start: ne Finish: rformance Time / | |
| Validation T Applicant: NAME Performanc SAT | ime: e Ratir | 5 mir | NAME | Docke | Time Critical: et # | Tin Tin Pe | es No ne Start: ne Finish: rformance Time / | |

SIMULATOR OPERATOR INSTRUCTIONS:

- 1. ENSURE NRC Examination Security has been established.
- 2. Reset to IC # 151.
- 3. Enter the password.
- 4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
- 5. Ensure simulator setup per table below.
- 6. Place simulator in RUN and acknowledge any alarms.
- 7. ENSURE "Extra Operator" is present in the simulator.
- 8. Place simulator in FREEZE until Examiner cue is given.

| ~ | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|---|-------|-------|------|-----------|-------|
| | VLV-KC024F (KC425A Rtn Hdr Cont Isol Outside VLV Fail To Position) | 0 | | | | |
| | Manually close 1KC-338B & 1KC-424B | | | | | |
| | Perform actions of AP-21 up to step 8. | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is at 100% power.
- AP/1/A/5500/021 (Loss of Component Cooling) has been entered.

INITIATING CUES:

• The CRS instructs you to perform step 8 of AP/1/A/5500/021.

EXAMINER NOTE: After reading cue, provide the applicant with a copy of AP/1/A/5500/021 (Loss of Component Cooling) completed through step 7.

START TIME: _____

| | JAI/UNJAI |
|--|----------------------------------|
| <u>CAUTION</u> A loss of KC cooling to the NC pumps results in a gradual a overheated condition in approximately 10 minutes which will seizure. | pproach to an result in shaft |
| STEP 1 8. Verify KC flow to NC pumps as follows: 1AD-20, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" – DARK 1AD-21, A/1 "KC SUPPLY HDR FLOW TO NCP BRGS LOW" - DARK | SAT |
| STANDARD: | 3A1 UNSAT |
| Applicant determines that the listed alarms are lit and transitions to the RNO. | |
| <u>COMMENTS:</u> | |

| STEP 2 8.RNO.a. | Ensure the following valves – OPEN: | |
|---|---|-----|
| | 1KC-425A (NC Pumps Ret Hdr Cont Isol) 1KC-338B (NC Pumps Sup Hdr Cont Isol) 1KC-424B (NC Pumps Ret Hdr Cont Isol) | |
| STANDARD: | | SAT |
| Applicant determin OPEN pushbutton determines that 1K | es all three valves are closed and depresses the red for 1KC-425A, 1KC-338B, & 1KC-424B. Applicant C-425A will not open. | |
| EXAMINER NOTE: T | his begins the alternate path of this JPM. | |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT | |
|--|--------------|--|
| STEP 3 8.RNO.b. IF AT ANY TIME any of the following conditions are met: • Time since loss of KC – GREATER THAN 10 MINUTES • MINUTES • Any NC pump trip criteria from Enclosure 1 (Foldout Page) is met • THEN perform the following: | SAT/UNSAT | |
| EXAMINER CUE: "Loss of KC occurred greater than 10 minutes ago." | SAT UNSAT | |
| STANDARD: | | |
| Applicant determines that it has been > 10 minutes since loss of KC per examiner cue and continues with step b.1) of the RNO. | | |
| <u>COMMENTS:</u> | | |
| | | |

| STEP 4 8.RNO.b.1) IF letdown is isolated, THEN perform the following: | |
|--|-------|
| STANDARD: | SAT |
| Applicant determines that letdown is in service and that this step is N/A. | UNSAT |
| COMMENTS: | |

| | STEP/STANDARD | SAT/UNSAT |
|--|---|------------------|
| STEP 5 8.RNO.b.2) Ens | sure steam dumps – IN PRESSURE MODE. | CRITICAL STEP |
| STANDARD: | | |
| Applicant places steam | dump select switch to "PRESS". | |
| Examiner Note: This s contro subse | tep is critical to ensure proper temperature I following trip of the NC pumps in quent steps. | SAT |
| COMMENTS: | | |
| | | |

| <u>STEP 6</u> 8.RNO.b.3) Ensure "STM DUMP CTRL"– SET AT 1090 PSIG STEAM HEADER PRESSURE. | |
|--|-------|
| STANDARD: | SAT |
| Applicant adjusts Steam Dump Controller setpoint to 1090 psig. | UNSAT |
| COMMENTS: | |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|-------------------------------------|---|------------------|
| <u>STEP 7</u> 8.RNO.b | .4) Ensure the Reactor – TRIPPED. | CRITICAL STEP |
| Applicant rotate to the trip positi | es the reactor trip breaker pistol grips counter-clockwise on. | |
| EXAMINER CUE: | SAT | |
| Examiner Note: | This step is critical to ensure reactor power is < 5% prior to tripping the NC pumps in subsequent steps. | UNSAT |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| <u>STEP 8</u> 8.RNO.b.5) <u>WHEN</u> reactor power less than 5%, <u>THEN</u> perform the following: a) Trip all NC pumps. | CRITICAL STEP |
| b) Ensure normal spray valve associated with tripped NC pump(s) – IN MANUAL AND CLOSED <u>STANDARD</u>: | |
| Applicant depresses the green OFF pushbutton for NC pumps 1A, 1B, 1C, and 1D and verifies the green OFF light lit and red ON light dark for each NC pump. Applicant will depress the [M] button on 1NC-27 & 1NC-29 controllers and depress the [\downarrow] demand pushbutton on each valve until the demand is reading 0%. | 0.17 |
| Examiner Note: This step is critical to protect the NC pumps from failure due to a loss of cooling water supply. It is also critical to place the normal spray valves in manual and closed to align the system for future option of using NV aux spray for NC system pressure reduction. | UNSAT |
| <u>COMMENTS:</u> | |

| STEP 9 8.RNO.b.6) Secure any dilutions in progress. | |
|--|--------------|
| STANDARD: | |
| Applicant determines that no dilutions are in progress and continues to the next step. | SAT UNSAT |
| COMMENTS: | |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|--|---|-----------|
| <u>STEP 10</u> 8.RNO.b.7) | IF reactor trip breakers were closed, THEN perform one of the following while continuing with this procedure as time and conditions allow: | |
| | IF above P-11, THEN GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) OR IF below P-11, THEN GO TO AP/1/A/5500/005 (Reactor Trip or Inadvertent S/I Below P-11) | 0.17 |
| STANDARD: | | SAT |
| <u></u> . | | UNSAT |
| Applicant determine | es the need to go to E-0. | |
| <u>EXAMINER CUE</u> : <mark>"Th</mark> pei coi | e CRS has pulled E-0 and another RO will form the immediate actions of E-0. This JPM is nplete." | |
| COMMENTS: | | |
| | END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is at 100% power.
- AP/1/A/5500/021 (Loss of Component Cooling) has been entered.

INITIATING CUES:

• The CRS instructs you to perform step 8 of AP/1/A/5500/021.

| CNS |
|-----------------|
| AP/1/A/5500/021 |

LOSS OF COMPONENT COOLING

PAGE NO. 2 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED | | |
|--|--|--|--|--|
| C. <u>O</u> p | perator Actions | | | |
| <u>CAUTION</u> Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within 10 minutes will cause damage to the NC pump seals resulting in NC inventory loss. | | | | |
| ✓ 1. | Monitor Enclosure 1 (Foldout Page). | | | |
| 2. | Verify the following: | Perform the following: | | |
| \checkmark | • At least one KC pump - ON | a. Start additional KC pump(s) as necessary. | | |
| \checkmark | • Flow to KC loads presently in service. | b. <u>IF</u> no KC pump can be started, <u>THEN</u> perform the following: | | |
| | | <u>IF</u> S/I has actuated on either unit, <u>THEN</u> <u>GO</u> <u>TO</u> Step 4. | | |
| | | <u>CAUTION</u> YD can only supply one Unit's NV pump at a time. | | |
| | | 2) Determine which unit will receive alternate NV pump cooling from YD. | | |
| | | <u>IF</u> Unit 2 selected to receive YD cooling to 2A NV pump, <u>THEN</u> <u>GO</u> <u>TO</u> Step 4. | | |
| | | (RNO continued on next page) | | |
| | | | | |
| | | | | |
| | | | | |

PAGE NO. 3 of 36 Revision 43

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|
| 2. (Continued) | |
| | |
| | NOTE • NV pumps may be started without regard to cooling water alignment. |
| | Operating NV Pump will reach high temperature conditions in approximately 15 minutes with no cooling water. |
| | 4) Dispatch operator to align YD cooling to NV pump 1A. <u>REFER</u> <u>TO</u> Enclosure 2 (Alternate Cooling To NV Pump 1A). |
| | 5) Maximize NV pump run time. <u>REFER</u> <u>TO</u> Enclosure 5 (Maximize NV Pump Run Time). |
| | 6) <u>IF AT ANY TIME</u> S/I occurs on either unit, <u>THEN</u> notify dispatched operator to realign NV Pump 1A cooling to normal. <u>REFER TO</u> Enclosure 2 (Alternate Cooling To NV Pump 1A). |
| | 7) GO TO Step 4. |
| 3. <u>IF AT ANY TIME</u> all KC pumps lost, <u>THEN RETURN TO</u> STEP 2. | |

LOSS OF COMPONENT COOLING

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|
| <u>NOTE</u> Uncooled letdown may result in lo minutes. | ss of NV pumps within a matter of |
| 4. Verify the following: ✓ • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK AND ✓ • At least one KC pump - ON. | IF KC flow unavailable to letdown HX, THEN isolate letdown as follows: a. Ensure the following valves - CLOSED: 1NV-10A (Letdn Orif 1B Oth Cont Isol) 1NV-11A (Letdn Orif 1C Oth Cont Isol) 1NV-13A (Letdn Orif 1A Oth Cont Isol). b. Control charging to stabilize Pzr level at program level while maintaining seal injection flow. c. Ensure 1NV-153A (Letdn Hx Oth 3-Way Valve) - ALIGNED TO VCT. d. Ensure 1NV-172A (3-Way Divert To VCT-RHT) - ALIGNED TO RHT. e. Ensure VCT makeup - IN AUTO. f. WHEN time and manpower permit, <u>THEN REFER TO</u> AP/1/A/5500/012 (Loss of Charging or Letdown). g. IF AT ANY TIME the following conditions exist: VCT level - LESS THAN 23% OR PZR level - GREATER THAN 85% AND TRENDING UP, THEN GO TO Enclosure 6 (Rx Trip Sequence). h. GO TO Step 6. |

| | AP/1/ | CNS A/5500/021 | LOSS OF COMPONENT COOLING | | PAGE NO. 5 of 36 Revision 43 | | | |
|---|--|--|---|---|---|---|--|--|
| | ACTION/EX | | PECTED RESPONSE | | RESPONSE NOT OBTAIN | ED | | |
| | _5. | <u>IF AT ANY TIM</u> OUTLET HI TE Step 4 RNO. | E 1AD-7, F/3 "LETDN H MP" lit, <u>THEN</u> perform | ΗX | | | | |
| | <u>√</u> 6. | Verify both KC - 90% AND ST | surge tank levels - 50 ABLE. | % | Observe Caution prior to S <u>GO TO</u> Step 8. | itep 8 and | | |
| | ✓ 7. Start additional KC pump(s) as necessary to supply any KC loads presently in service. | | _ | IF KC pump(s) damaged by fire, THEN notify IAE to repair cables to pumps needed for recovery. <u>REFER TO</u> IP/1/A/3890/027A (Fire Damage Control Procedure). | | | | |
| | <u>CAUTION</u> A loss of KC cooling to the NC pumps results in a gradual approach to an overheated condition in approximately 10 minutes which will result in shaft seizure. | | | | | | | |
| | 8. | Verify KC flow | to NC pumps as | | Perform the following: | | | |
| | | 1AD-20, A/1 TO NCP BR0 1AD-21, A/1 TO NCP BR0 | "KC SUPPLY HDR FLO GS LOW" - DARK "KC SUPPLY HDR FLO GS LOW" - DARK. | w | a. Ensure the following valve 1KC-425A (NC Pumps Cont Isol) 1KC-338B (NC Pumps Cont Isol) 1KC-424B (NC Pumps Cont Isol). (RNO continued on next particular terms) | es - OPEN: Ret Hdr Sup Hdr Ret Hdr | | |
| Í | | | | | | | | |

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED | |
|---|--------------------------|--------------------|---|-----------------|
| 8 | . (Continued) | | | |
| | | b. <u>IF</u> co | AT ANY TIME any of the following nditions met: | g |
| | | •] | Time since loss of KC - GREATEF THAN 10 MINUTES | २ |
| | | 9 | OR | |
| | | • / | Any NC pump trip criteria from Enclosure 1 (Foldout Page) met, | |
| | | <u>TH</u> | IEN perform the following: | |
| | | 1) | IF letdown isolated, THEN perfor the following: | m |
| | | | a) Ensure NV pump suction aligned to FWST as follows: | |
| | | | (1) 1NV-252A (NV Pumps Suct From FWST) - OPE | N |
| | | | (2) 1NV-253B (NV Pumps Suct From FWST) - OPE | N |
| | | | (3) 1NV-188A (VCT Otil Isol CLOSED |) - |
| | | | (4) 1NV-189B (VCT Otil Isol CLOSED. |) - |
| | | _ | b) <u>WHEN</u> reactor tripped, <u>THEN</u> attempt to establish and maintain slow cooldown as required to maintain PZR leve | <u>l</u> el. |
| | | 2) | Ensure steam dumps - IN PRESSURE MODE. | |
| | | 3) | Ensure "STM DUMP CTRL" - SE AT 1090 PSIG STEAM HEADER PRESSURE. | T R |
| | | 4) | Ensure reactor - TRIPPED. | |
| | | (RN | O continued on next page) | |
PAGE NO. 7 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|---|--------------------------|---|--|
| 8 | . (Continued) | | |
| | | 5 |) <u>WHEN</u> reactor power less than 5%, <u>THEN</u> perform the following: |
| | | - | a) Trip all NC pumps. |
| | | - | b) Ensure normal spray valve associated with tripped NC pump(s) - IN MANUAL AND CLOSED. |
| | | 6 |) Secure any dilutions in progress. |
| | | 7 | <u>IF</u> reactor trip breakers were closed, <u>THEN</u> perform one of the following while continuing with this procedure as time and conditions allow: |
| | | - | IF above P-11, THEN GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) |
| | | | OR |
| | | - | IF below P-11, <u>THEN GO TO</u> AP/1/A/5500/005 (Reactor Trip or Inadvertent S/I Below P-11). |
| | | | |
| | | | |
| | | | |
| | | | |

PAGE NO. 8 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | | RESP | ONSE NOT OBTAINED | |
|----|--|-----|--|---|---|
| 9. | Verify KC available as follows: | | | | |
| | | | <u>NOTE</u> | The KC non-essential header valves can be reopened when the appropriate train's level switch is reset. This should occur between 40% and 48% KC surge tank level. | ł |
| | a. Verify the following Train A KC non-essential header isolation valves - OPEN: | 6 — | a. <u>WHEN</u> OAC alarm C1D2215 (KC Train A Low-Low Level Surge Tank Isol) " <u>NOT</u> ACTUATED" <u>AND</u> caus of valve closure known, <u>THEN</u> ens affected valve(s) open. | 0 | |
| | 1KC-230A (Rx Bldg Non-Ess Hdr Isol) | | | valve(s) open. | D |
| | 1KC-3A (Rx Bldg Non-Ess Ret Hd lsol) | r | | | |
| | • 1KC-50A (Aux Bldg Non-Ess Hdr Isol) | | | | |
| | • 1KC-1A (Aux Bldg Non-Ess Ret H Isol). | dr | | | |

PAGE NO. 9 of 36 Revision 43

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|
| 9. (Continued) | |
| | NOTE The KC non-essential header valves can be reopened when the appropriate train's level switch is reset. This should occur between 40% and 48% KC surge tank level. |
| b. Verify the following Train B KC non-essential header isolation valves OPEN: | b. <u>WHEN</u> OAC alarm C1D2214 (KC Train B Low-Low Level Surge Tank Isol) "<u>NOT</u> ACTUATED" <u>AND</u> cause |
| 1KC-228B (Rx Bldg Non-Ess Hdr Isol) | of valve closure known, <u>THEN</u> ensure affected valve(s) open. |
| 1KC-18B (Rx Bldg Non-Ess Ret Hd Isol) | lr |
| 1KC-53B (Aux Bldg Non-Ess Hdr Isol) | |
| 1KC-2B (Aux Bldg Non-Ess Ret Hd Isol). | lr |
| c. Start additional KC pump(s) as necessary to supply any KC loads presently in service. | c. IF KC pump(s) damaged by fire, <u>THEN</u> notify IAE to repair cables to pumps needed for recovery. <u>REFER</u> <u>TO</u> IP/1/A/3890/027A (Fire Damage Control Procedure). |

PAGE NO. 10 of 36 Revision 43

| | | 1 | | | |
|-----|---|---|-------|--|---------|
| | ACTION/EXPECTED RESPONSE | | | RESPONSE NOT OBTAINED | |
| 10. | Verify KC surge tank levels normal a follows: | S | | | |
| a | a. Verify both KC surge tank levels - | | a. Pe | erform the following: | |
| | 50 % - 90 % AND STABLE. | 1 | 1) | Dispatch operator to initiate makeup to surge tank(s) by opening appropriate valve(s): | |
| | | | | 1KC-107 (1A KC Surge Tank YM M/U) (AB-601, PP-59, Rm 500) | |
| | | | | OR | |
| | | | | 1KC-111 (1B KC Surge Tank YM M/U) (AB-601, PP-59, Rm 500). | |
| | | | 2) | Dispatch operators to locate and isolate KC System leakage. | |
| | | | 3) | <u>WHEN</u> affected KC surge tank(s) level greater than or equal to 90% <u>THEN</u> notify dispatched operator to secure makeup. | , 0, |
| | | | 4) | <u>GO</u> <u>TO</u> Step 11. | |
| _ | b. <u>GO</u> TO Step 14. | | | | |

PAGE NO. 11 of 36 Revision 43

ACTION/EXPECTED RESPONSE

11. Verify at least one KC surge tank above lo-lo level as follows:

 1AD-10, A/1 "KC SURGE TANK A LO-LO LEVEL" - DARK

OR

 1AD-10, A/2 "KC SURGE TANK B LO-LO LEVEL" - DARK. RESPONSE NOT OBTAINED

Perform the following:

- a. Verify the following:
- ____1) Both Unit 1 RN essential headers -PRESSURIZED.
- 2) <u>IF</u> only one RN essential header pressurized, <u>THEN</u> use it for surge tank makeup.
- 3) <u>IF</u> at any time RN essential header being used for makeup becomes depressurized, <u>THEN</u> notify dispatched operator to secure makeup from RN.
- **NOTE** Preference should be given to the surge tank with the highest stable level and available pumps.
- b. Dispatch operator to makeup to available train of KC from YM and RN.
 <u>REFER TO</u> Enclosure 3 (Surge Tank Makeup).
- ____ c. Dispatch operators to locate and isolate KC System leakage.
- _____d. Notify Chemistry of RN makeup to KC System.

(RNO continued on next page)

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--------------------------|---|
| 11. (Continued) | |
| | e. <u>WHEN</u> KC surge tank level above lo-lo level setpoint, <u>THEN</u> perform the following: |
| | 1) Ensure KC pumps on affected train - ON. |
| | NOTE The KC non-essential header valves can be reopened when the appropriate train's level switch is reset. This should occur between 40% and 48% KC surge tank level. |
| | OPEN non-essential header isolation valves for affected train as follows: |
| | • Train A: |
| | 1KC-230A (Rx Bldg Non-Ess Hdr Isol) 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol) 1KC-50A (Aux Bldg Non-Ess Hdr Isol) 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol). |
| | OR |
| | • Train B: |
| | 1KC-228B (Rx Bldg Non-Ess Hdr Isol) 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) 1KC-53B (Aux Bldg Non-Ess Hdr Isol) 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol). |
| | (RNO continued on next page) |

| CNS |
|-----------------|
| AP/1/A/5500/021 |

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|---------|---------------------------------|---|---|
| 11. (0 | Continued) | | |
| | | _ | f. <u>WHEN</u> one train's non-essential header isolation valves open, <u>THEN</u> perform Steps 12 and 13. |
| | | | g. <u>GO</u> <u>TO</u> Step 14. |
| 12. Vei | rify 1AD-10, A/1 "KC SURGE TANK | ζ | Perform the following: |
| AL | LU-LU LEVEL - DARK. | | a. Ensure the following valves - CLOSED: |
| | | | 1KC-230A (Rx Bldg Non-Ess Hdr Isol) |
| | | | 1KC-3A (Rx Bldg Non-Ess Ret Hdr Isol) |
| | | | • 1KC-50A (Aux Bldg Non-Ess Hdr Isol) |
| | | | • 1KC-1A (Aux Bldg Non-Ess Ret Hdr Isol). |
| | | | b. Ensure both Train B KC pumps - ON. |
| | | | (RNO continued on next page) |
| | | | |
| | | | |
| | | | |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--------------------------|---|
| 1 | 2. (Continued) | |
| | | c. <u>IF</u> KC Surge Tank 1A level continues to trend down <u>OR</u> is empty, <u>THEN</u> perform the following: |
| | | Ensure the following Train B essential equipment - IN SERVICE AS NEEDED: |
| | | NV Pump 1B NI Pump 1B ND Pump 1B ND Hx 1B CA Pump 1B NS Pump 1B KF Pump 1B. |
| | | Ensure the following Train A essential equipment - OFF: |
| | | NV Pump 1A NI Pump 1A ND Pump 1A CA Pump 1A NS Pump 1A KF Pump 1A. |
| | | 3) Ensure both Train A KC pumps - OFF. |
| | | 4) Locate and isolate leak on Train A essential header. |
| | | |
| | | |
| | | |
| | | |

PAGE NO. 15 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|-----|-----------------------------------|-----|---|
| 13. | Verify 1AD-10, A/2 "KC SURGE TANK | κ (| Perform the following: |
| | BLO-LOLLVLL - DARR. | | Ensure the following valves - CLOSED: |
| | | | 1KC-228B (Rx Bldg Non-Ess Hdr Isol) |
| | | | • 1KC-18B (Rx Bldg Non-Ess Ret Hdr Isol) |
| | | | 1KC-53B (Aux Bldg Non-Ess Hdr Isol) |
| | | | • 1KC-2B (Aux Bldg Non-Ess Ret Hdr Isol). |
| | | _ | b. Ensure both Train A KC pumps - ON. |
| | | | c. <u>IF</u> KC Surge Tank 1B level continues to trend down <u>OR</u> is empty, <u>THEN</u> perform the following: |
| | | | Ensure the following Train A essential equipment - IN SERVICE AS NEEDED: |
| | | | NV Pump 1A NI Pump 1A ND Pump 1A ND Hx 1A CA Pump 1A NS Pump 1A KF Pump 1A. |
| | | | Ensure the following Train B essential equipment - OFF: |
| | | | NV Pump 1B NI Pump 1B ND Pump 1B CA Pump 1B NS Pump 1B KF Pump 1B. |
| | | | 3) Ensure both Train B KC pumps - OFF. |
| | | | (RNO continued on next page) |

LOSS OF COMPONENT COOLING

PAGE NO. 16 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | | | RESPONSE NOT OBTAINED |] |
|-----|---|----|----|---|---|
| 1 | 3. (Continued) | | | | |
| | | | 4) | Locate and isolate leak on Train lessential header. | В |
| | | | | | |
| 14. | Ensure KC heat exchanger outlet mode switches - PROPERLY ALIGNED. | | | | |
| 15. | Determine and correct cause of loss KC. | of | | | |
| 16. | Ensure compliance with appropriate Tech Specs and Selected Licensee Commitments Manual: | | | | |
| _ | • SLC 16.9-7 (Boration Systems Flow Path - Shutdown) | | | | |
| | SLC 16.9-8 (Boration Systems Flow Path - Operating) | | | | |
| _ | SLC 16.9-9 (Boration Systems Pump - Shutdown) |)S | | | |
| _ | SLC 16.9-10 (Boration Systems Charging Pumps - Operating) | | | | |
| _ | • 3.5.2 (ECCS - Operating) | | | | |
| _ | • 3.5.3 (ECCS - Shutdown) | | | | |
| _ | • 3.6.6 (Containment Spray System) | | | | |
| _ | 3.7.5 (Auxiliary Feedwater (AFW) System) | | | | |
| _ | 3.7.7 (Component Cooling Water (CCW) System). | | | | |
| | | | | | |

PAGE NO. 17 of 36 Revision 43

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|
| 17. Determine required notifications: | |
| <u>REFER</u> <u>TO</u> RP/0/A/5000/001 (Classification Of Emergency) | |
| • REFER TO RP/0/B/5000/013 (NRC Notification Requirements). | |
| 18. <u>IF KC Hx leak to RN suspected, THEN</u> perform the following: | |
| Notify Radiation Protection that a potential unmonitored release may have occurred. | |
| Notify Station Management to evaluate a KC Hx to RN leak. | : |
| 19. Verify KC surge tanks level as follows: | <u>RETURN TO</u> Step 9. |
| ● Greater than 50% | |
| Stable or trending up. | |
| | |
| 20. WHEN plant conditions permit, <u>THEN</u> perform the following: | |
| Return KC pumps to normal operation. <u>REFER TO</u> OP/1/A/6400/005 (Component Cooling Water System). | |
| Return NV Pump 1A to normal cooling as applicable. <u>REFER TO</u> Enclosure 2 (Alternate Cooling To NV Pump 1A). | |
| 21. Verify the following: | Perform the following: |
| • 1AD-7, F/3 "LETDN HX OUTLET HI TEMP" - DARK | a. <u>IF</u> letdown isolated, <u>THEN</u> <u>REFER</u> <u>TO</u> AP/1/A/5500/012 (Loss of Charging or Letdown). |
| ● 1AD-7, H/3 "VCT HI TEMP" - DARK | b. Do not continue in this procedure until |
| Normal letdown - IN SERVICE. | Step 21 conditions met. |

PAGE NO. 18 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED | |
|-------|--|-----|-----------------------|--|
| 22. | Ensure VCT and letdown path aligned as follows: | | | |
| | IF desired to align NV pump suction t VCT, <u>THEN</u> perform the following: | 0 | | |
| | 1) OPEN the following valves: | | | |
| | 1NV-188A (VCT Otit Isol) | | | |
| | • 1NV-189B (VCT Otit Isol). | | | |
| | 2) CLOSE the following valves: | | | |
| | 1NV-252A (NV Pumps Suct From FWST) | | | |
| | 1NV-253B (NV Pumps Suct From FWST). | | | |
| | b. <u>WHEN</u> NV suction aligned to VCT, <u>THEN</u> momentarily place 1NV-172A (3-Way Divert To VCT-RHT) to "VCT" position and return to "AUTO". | | | |
| | c. <u>IF</u> desired to restore letdown flow through NV demineralizers, <u>THEN</u> momentarily place 1NV-153A (Letdn Hx Otlt 3-Way Valve) to "DEMIN" position and return to "AUTO". | | | |
| _ 23. | Determine long term plant status. <u>RETURN</u> <u>TO</u> procedure in affect. | | | |
| | Ē | END | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Enclosure 1 - Page 1 of 2 Foldout Page

1. SSF Manning Criteria:

<u>CAUTION</u> Failure to restore NC pump seal cooling via thermal barrier cooling or NV seal injection within ten minutes will cause damage to the NC pump seals resulting in NC System inventory loss.

IF AT ANY TIME KC **AND** NV seal cooling for any NC pump lost, **THEN** perform the following:

- a. Dispatch operator to SSF to establish NC pump seal injection. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 19 (Establishing NC Makeup/Seal Injection From The SSF).
 - b. **IF** 1EMXS de-energized, **THEN** perform the following:
 - Dispatch operator to 1ETA switchgear room to align alternate power supply to 1EMXS. <u>REFER TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 20 (Align Alternate Power Supply To 1EMXS).
 - 2) Notify operator at SSF (Ext. 5251 or 5212) operator has been dispatched to align alternate power supply to 1EMXS.

2. NC Pump Trip Criteria:

- **IF** any of the following NC pump trip criteria met:
- KC flow unavailable to NC pumps GREATER THAN 10 MINUTES

<u>OR</u>

• #1 Seal outlet temperature - GREATER THAN 235°F

<u>OR</u>

Lower bearing temperature - GREATER THAN 225°F

- Motor bearing temperature GREATER THAN 195°F,
- THEN GO TO Enclosure 6 (Rx Trip Sequence).

Enclosure 1 - Page 2 of 2 Foldout Page

NOTE The following step prevents damage to the 1B2 KC pump as a result of deadheading. (NCR #01406467) 3. IF AT ANY TIME the following conditions met: Train B KC non-essential header isolation valves - CLOSED AND 1KC-81B (KC To ND Hx 1B Sup Isol) - CLOSED, **THEN** ensure less than 2 Train B KC pumps - IN SERVICE. NOTE Monitoring of the following steps must continue while KC malfunction exists even if a transition is made to the emergency procedures. IF AT ANY TIME both trains of KC lost, THEN RETURN TO Section C. (Operator 4. Actions), Step 2. IF operators dispatched to align alternate cooling to NV pump 1A, THEN perform the 5. following: a. WHEN alternate cooling aligned, THEN perform Enclosure 5 (Maximize NV Pump Run Time), Step 7. 6. IF AT ANY TIME KC cooling to operating KF pump(s) lost, THEN perform the following: • IF annunciator 1AD-13, D/6 "KF PUMP A MTR CLR HI TEMP" lit, THEN secure 1A KF pump and REFER TO AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level). IF annunciator 1AD-13, D/7 "KF PUMP B MTR CLR HI TEMP" lit, THEN secure 1B KF pump and REFER TO AP/1/A/5500/041 (Loss of Spent Fuel Cooling or Level).

Enclosure 2 - Page 1 of 7 Alternate Cooling To NV Pump 1A



1. CLOSE the following valves:

- 1KC-E31 (YD B/U To 1A NV Pump Mtr Tell-Tale) (AB-545, JJ-56, Rm 200)
- 2KC-E31 (YD B/U To 2A NV Pump Mtr Inlet Tell-Tale) (AB-546, HH-58, Rm 200)

<u>CAUTION</u> Attempting additional valve movement after reaching the mechanical end stop may damage the valve operator of the following valves.

- 1KC-E29 (1A NV Pump Motor Inlet Isol) (AB-551, JJ-56, Rm 200)
- 1KC-A53 (1A NV Pump Motor Cooler Outlet Isol) (AB-551, HH-56, Rm 200)
- 1KC-A59 (1A NV Pump Oil Coolers Outlet Isol) (AB-550, JJ-KK, 56, Rm 200).

2. **OPEN the following valves:**

- ___a. 1YD-431 (YD Alternate Cooling to 1A & 2A NV Pumps Isol) (AB-549, JJ-56, Rm 200).
- b. 1KC-E30 (YD B/U To 1A NV Pump Mtr Isol) (AB-549, JJ-56, Rm 200).
- c. 1KC-E32 (1A NV Pump Mtr Clr YD Outlet Isol) (AB-546, HH-56, Rm 200).
- ____d. 1KC-E33 (1A NV Pump Oil Clrs YD Outlet Isol) (AB-547, JJ-56, Rm 200).

3. THROTTLE YD flow to 1A NV pump as follows (ladder needed):

- Unlock and THROTTLE 1KC-A52 (1A NV Pump Motor Cooler Outlet Throttle) (AB-551, HH-56, Rm 200) to obtain 30-35 GPM on 1KCPG8280 "1A NV PUMP MOTOR COOLER KC FLOW" (AB-548, HH, 55-56, Rm 200).
- Unlock and THROTTLE 1KC-A58 (1A NV Pump Oil Coolers Outlet Throttle) (AB-551, JJ-56, Rm 200) to obtain 32-35 GPM on 1KCPS8330 "1A NV PUMP OIL COOLERS KC FLOW" (AB-543 HH, 55-56, Rm 200).

4. Notify Control Room Supervisor of the following:

- Status of alternate cooling
- Enter 1A NV pump in TSAIL.

Enclosure 2 - Page 2 of 7 Alternate Cooling To NV Pump 1A

| 5. | Notify Radwaste Chemistry (Ext. 5558) of YD flow to ND/NS sump. |
|-----------|--|
| <u>NC</u> | DTE The following step is to reduce YD drainage to the ND/NS sump and thereby minimize radwaste. |
| 6. | WHEN time and conditions permit, <u>THEN</u> perform the following: |
| | a. Reduce motor cooler flow as follows: |
| | Notify Control Room to monitor Unit 1 OAC graphic NVPMP1A while performing the following steps. |
| | 2) In the following step, do not exceed 160°F on motor bearings and 240°F on stator. |
| | |
| | NOTE Adequate time should be allotted between adjustments to allow motor bearing and stator temperatures to stabilize. |
| | Slowly THROTTLE closed 1KC-A52 (1A NV Pump Motor Cooler Outlet Throttle) to maintain the following temperatures: |
| | Motor bearings 150°F Stator 230°F. |
| | b. Reduce oil cooler flow as follows: |
| | 1) Monitor 1A NV pump gear drive and outboard thrust bearing temperatures locally. |
| | 2) In the following step, do not exceed 155°F on pump bearings. |
| | |
| | NOTE Adequate time should be allotted between adjustments to allow pump bearing temperatures to stabilize. |
| | Slowly THROTTLE closed 1KC-A58 (1A NV Pump Oil Coolers Outlet Throttle) to maintain bearing temperatures at 150°F. |
| 7. | Return this Enclosure to Control Room Supervisor. |
| 8. | Do not continue in this enclosure until notified by Control Room to realign 1A NV pump cooling water to normal. |
| | |

Enclosure 2 - Page 3 of 7 Alternate Cooling To NV Pump 1A

9. <u>WHEN</u> notified by Control Room to realign 1A NV pump cooling water to normal, <u>THEN</u> obtain the following:

- 2 10 inch pipe wrenches
- 30 feet of air line
- 1/2" female fitting
- 1/4" female fitting.

<u>CAUTION</u> The following sequence involves components on both units, many with very similar numbers and nomenclature.

- 10. CLOSE the following valves:
 - 1YD-431 (YD Alternate Cooling to 1A & 2A NV Pumps Isol) (AB-549, JJ-56, Rm 200)
 - 1KC-E30 (YD B/U To 1A NV Pump Mtr Isol) (AB-549, JJ-56, Rm 200)
 - 1KC-A51 (1A NV Pump Motor Cooler Inlet) (AB-551, HH,JJ-56, Rm 200) (Ladder needed)
 - 1KC-A56 (1A NV Pump Speed Reducer Oil Cooler Inlet) (AB-545, HH-56, Rm 230)
 - 1KC-A57 (1A NV Pump Bearing Oil Cooler Inlet) (AB-545, JJ-56, Rm 230).
 - **<u>NOTE</u>** YD water is purged to the ND/NS sump to minimize chloride contamination of the KC System.
- 11. Attach air line to 1VI-2293 (Available VI Isol) (AB-549, HH-56, Rm 200).
 - 12. Perform the following:
 - ____a. Remove pipe cap from 1KCPX8310 (AB-551, JJ-56, Rm 200) (Ladder Needed).
 - _____b. Attach air line.
 - ____ c. OPEN root valve for 1KCPX8310.

13. OPEN 1VI-2293 (Available VI Isol).

Enclosure 2 - Page 4 of 7 Alternate Cooling To NV Pump 1A

- ____ 14. OPEN 1KC-A51 (1A NV Pump Motor Cooler Inlet) for 5 minutes.
- 15. CLOSE 1KC-A51 (1A NV Pump Motor Cooler Inlet).
- 16. OPEN 1KC-A56 (1A NV Pump Speed Reducer Oil Cooler Inlet) for 5 minutes.
- ____ 17. CLOSE 1KC-A56 (1A NV Pump Speed Reducer Oil Cooler Inlet).
- 18. OPEN 1KC-A57 (1A NV Pump Bearing Oil Cooler Inlet).
- 19. WHEN 5 minutes elapsed, THEN CLOSE 1VI-2293 (Available VI Isol).
- 20. Remove air line from 1VI-2293 (Available VI Isol).

21. Perform the following:

- ____a. CLOSE root valve for 1KCPX8310.
- _____b. Remove air line.
- _____ c. Replace pipe cap on 1KCPX8310.
- 22. CLOSE the following valves:
 - 1KC-E32 (1A NV Pump Mtr Clr YD Outlet Isol)
 - 1KC-E33 (1A NV Pump Oil Clrs YD Outlet Isol).

23.

LOSS OF COMPONENT COOLING

Enclosure 2 - Page 5 of 7 Alternate Cooling To NV Pump 1A

a. Connect drain tubing to pipe downstream of 2KC-E31 (YD B/U To 2A NV Pump Mtr Inlet Tell-Tale) (AB-546,HH-58,Rm 200).
b. Route tubing to collection bucket.
c. OPEN 2KC-E31.
d. WHEN drainage stops, THEN remove tubing from pipe at 2KC-E31.
e. Connect drain tubing to the pipe downstream of 1KC-E31 (YD B/U To 1A NV Pump Mtr Tell-Tale) (AB-545, JJ-56, Rm 200).
f. Route tubing to collection bucket.
g. OPEN 1KC-E31.

h. WHEN drainage stops, THEN remove tubing from pipe at 1KC-E31.

24. **OPEN the following valves:**

• 1KC-A51 (1A NV Pump Motor Cooler Inlet)

Align and drain YD supply section as follows:

• 1KC-A56 (1A NV Pump Speed Reducer Oil Cooler Inlet).

<u>CAUTION</u> Attempting additional valve movement after reaching the mechanical end stop may damage the valve operator of the following valve.

25. Slowly OPEN 1KC-E29 (1A NV Pump Motor Inlet Isol) to initiate fill of 1A NV pump motor and oil coolers.

Enclosure 2 - Page 6 of 7 Alternate Cooling To NV Pump 1A

26. Vent 1A NV pump coolers as follows:

- a. Vent motor cooler as follows:
- 1) Ensure 1KC-A54 (1A NV Pump Motor Cooler Inlet Vent) (AB-553, HH-56, Rm 230) (ladder needed) - CLOSED.
- 2) Remove pipe cap from 1KC-A54.
- 3) Attach vent hose assembly to vent.
- 4) Crack open 1KC-A54.
- 5) **WHEN** solid stream of water issues from vent, **THEN** CLOSE 1KC-A54.
- ____ 6) Remove vent hose assembly.
- ____7) Install pipe cap on 1KC-A54.
- 8) Ensure 1KC-A55 (1A NV Pump Motor Cooler Outlet Vent) (AB-553, HH-56, Rm 230) (ladder needed) CLOSED.
- 9) Remove pipe cap from 1KC-A55.
- ____ 10) Attach vent hose assembly to vent.
- ____11) Crack open 1KC-A55.
- 12) **WHEN** solid stream of water issues from vent, **THEN** CLOSE 1KC-A55.
- ____13) Remove vent hose assembly.
- ____ 14) Install pipe cap on 1KC-A55.
- b. Vent oil coolers as follows:
- 1) Ensure 1KC-C23 (1A NV Pump Oil Coolers Inlet Vent) (AB-551, JJ-56, Rm 230) -CLOSED.
- ____ 2) Remove pipe cap from 1KC-C23.
- ____ 3) Attach vent hose assembly to vent.
- ____ 4) Crack open 1KC-C23.
- 5) **WHEN** solid stream of water issues from vent, **THEN** CLOSE 1KC-C23.
- ____ 6) Remove vent hose assembly.
 - 7) Install pipe cap on 1KC-C23.

Enclosure 2 - Page 7 of 7 Alternate Cooling To NV Pump 1A

<u>CAUTION</u> Attempting additional valve movement after reaching the mechanical end stop may damage the valve operator of the following valves.

27. **OPEN the following valves:**

- 1KC-A53 (1A NV Pump Motor Cooler Outlet Isol)
- 1KC-A59 (1A NV Pump Oil Coolers Outlet Isol).

28. THROTTLE KC flow to 1A NV pump as follows:

- _____a. THROTTLE 1KC-A52 (1A NV Pump Motor Cooler Outlet Throttle) to obtain 30 60 GPM on 1KCPG8280 "1A NV PUMP MOTOR COOLER KC FLOW".
- ____ b. Lock 1KC-A52.
- __ c. THROTTLE 1KC-A58 (1A NV Pump Oil Coolers Outlet Throttle) to obtain 32 48 GPM on 1KCPS8330 "1A NV PUMP OIL COOLERS KC FLOW".
- _____ d. Lock 1KC-A58.
- 29. Notify Control Room Supervisor to make appropriate TSAIL entry that PT/1/A/4400/003I (KC System Essential Header Flow Balance) must be completed prior to entry into Mode 4.
- 30. Return this Enclosure to Control Room Supervisor.

Establish communications with Control Room. 1. Initiate makeup to affected KC surge tank by ensuring the following valves - OPEN: 2. KC Surge Tank 1A: • 1RN-E81 (1A KC Surge Tank Assured M/U Supply Isol) (AB-589, KK-56, Rm 400) (Ladder needed) 1RN-E99 (1A KC Surge Tank Assured M/U Isol) (AB-585, KK-56, Rm 400) (Ladder needed) • 1KC-107 (1A KC Surge Tank YM M/U) (AB-601, PP-59, Rm 500) 1KC-494 (1A KC Surge Tank Emergency RN M/U) (AB-601, NN-59, Rm 500) 1KC-496 (1A KC Surge Tank Emergency RN M/U) (AB-601, NN-59, Rm 500). OR KC Surge Tank 1B: 1RN-E83 (1B KC Surge Tank Assured M/U Supply Isol) (AB-588, KK-56, Rm 400) (Ladder needed) 1RN-E43 (1B KC Surge Tank Assured M/U Isol) (AB-589, KK-55, Rm 400) (Ladder) needed) • 1KC-111 (1B KC Surge Tank YM M/U) (AB-601, PP-59, Rm 500) 1KC-497 (1B KC Surge Tank Emergency RN M/U) (AB-601, MM-59, Rm 500) 1KC-499 (1B KC Surge Tank Emergency RN M/U) (AB-598, MM-59, Rm 500). 3. Perform the following: a. Notify Control Room to monitor affected KC surge tank level. b. Monitor the Emergency RN makeup line for leaks. c. IF either of the following occurs, **THEN** secure RN makeup to affected KC surge tank: Leak develops on the Emergency RN makeup line. Affected KC surge tank level does not trend up. WHEN notified by Control Room, THEN secure makeup to KC surge tank. 4.

Enclosure 3 - Page 2 of 2 Surge Tank Makeup

5. **Return this Enclosure to Control Room Supervisor.**

LOSS OF COMPONENT COOLING

Enclosure 4 - Page 1 of 2 NV Pump 1A Controlled Restart

PAGE NO. 30 of 36 Revision 43

| | | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|----|---|-----------------------|
| _ | 1. | OPEN 1NV-309 (Seal Water Injection Flow) to full open. | |
| _ | 2. | CLOSE 1NV-294 (NV Pmps A&B Disc Flow Ctrl). | h |
| _ | 3. | Start NV pump 1A aux oil pump. | |
| | 4. | Start NV pump 1A. | |
| | 5. | Stop NV pump 1A aux oil pump. | |
| | 6. | Verify charging header aligned to NC loop as follows: | |
| | | a. 1NV-312A (Chrg Line Cont Isol) - OPEN. | a. OPEN valve. |
| | | b. 1NV-314B (Chrg Line Cont Isol) - OPEN. | b. OPEN valve. |
| | | c. Verify one of the following valves - OPEN: | c. OPEN either valve. |
| | | 1NV-32B (NV Supply To Loop A Isol) | |
| | | OR | |
| | | 1NV-39A (NV Supply To Loop D Isol). | |
| | 7. | THROTTLE 1NV-294 (NV Pmps A&B Disch Flow Ctrl) to establish greater than 32 GPM "N/R CHRG LN FLOW". | |

| CNS | |
|-----------------|--|
| AP/1/A/5500/021 | |

Enclosure 4 - Page 2 of 2 NV Pump 1A Controlled Restart PAGE NO. 31 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--------|--|---|
| 8. | Verify the following: - "TOTAL SEAL WTR FLOW" - GREATER THAN 32 GPM - 1NV-309 (Seal Water Injection Flow) - IN AUTO. | Perform the following: a. Slowly THROTTLE 1NV-309 (Seal Water Injection Flow) to establish 32 GPM "TOTAL SEAL WTR FLOW". b. Place 1NV-309 in auto. |
| 9. | Verify Pzr level - GREATER THAN 17% | 6. Perform the following: a. IF Pzr level less than 17% due to NC leak, <u>THEN GO TO</u> AP/1/A/5500/010 (Reactor Coolant Leak). b. Maintain charging flow less than 180 GPM. c. Raise charging flow to restore Pzr level greater than 17%. d. Do not continue in this procedure until Pzr level greater than 17%. |
| 10. | Control charging to stabilize Pzr level greater than 17%. | |
| 11. | Return this enclosure to Control Roor Supervisor. | n |

| (AP/1/A | CNS /5500/021 | LOSS OF (Enclo Maximiz | COMPONENT osure 5 - Page 2e NV Pump F | COOLING P 1 of 3 Run Time R | AGE NO. 32 of 36 evision 43 |
|-------------|-------------------------------|-------------------------------|--|---|--------------------------------------|
| | ACTION/EX | PECTED RESPONSE | | RESPONSE NOT OBTAINED | |
| 1. | Record approx to NV pumps: | imate time of loss of H | KC | | |
| NOT | E NV pumps | s may be started withou | t regard to co | ooling water alignment. | |
| 2. | Ensure NV pur | np 1B - ON. | Pe | erform the following: | |
| | | | a. | Ensure NV pump 1A - ON. | |
| | | | b. | Monitor OAC graphic NVPM | P1A. |
| | | | <u>NC</u> | DTE NV Pump thrust bearing reach high temperature conditions in approxime minutes with no cooling | ng will e ately 15 g water. |
| | | | C. | IF AT ANY TIME Hi-Hi tempo on NV pump 1A motor reach THEN stop NV pump 1A. | eratures ed, |
| | | | d. | <u>WHEN</u> 10 minutes elapsed for recorded above, <u>THEN</u> perfor following: | rom time orm the |
| | | | _ | <u>IF</u> alternate cooling aligned pump 1A, <u>THEN</u> return the enclosure to Control Root Supervisor. | ed to NV is m |
| | | | _ | <u>IF</u> alternate cooling <u>NOT</u> NV pump 1A, <u>THEN</u> stop pump 1A. | aligned to NV |
| | | | e. | <u>GO</u> <u>TO</u> Step 7. | |
| 3. | Ensure NV pur | np 1A - OFF. | | | |
| 4. | Monitor OAC g | raphic NVPMP1B. | | | |

Γ,

LOSS OF COMPONENT COOLING

Enclosure 5 - Page 2 of 3 Maximize NV Pump Run Time

PAGE NO. 33 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |] | | |
|--|--|-----------------------|--|---|--|--|
| NOTE NV Pump thrust bearing will reach high temperature conditions in approximately 15 minutes with no cooling water. | | | | | | |
| 5. | <u>WHEN</u> 10 minutes elapsed from time recorded above <u>OR</u> Hi-Hi temperatur on NV pump 1B motor reached, <u>THE</u> perform the following: | es <u>N</u> | | | | |
| | a. Start NV pump 1A as follows: | | | | | |
| | 1) Start NV pump 1A aux oil pump. | | | | | |
| | 2) Start NV pump 1A. | | | | | |
| | 3) Stop NV pump 1A aux oil pump. | | | | | |
| | b. Stop NV pump 1B. | | | | | |
| 6. | <u>WHEN</u> NV pump 1A in service, <u>THEN</u> perform the following: a. Record approximate time NV pump 1A started: | | | | | |
| | b. Monitor OAC graphic NVPMP1A. | | | | | |
| | NOTE NV Pump thrust bearing will reapproximately 15 minutes with | ach high no coolir | temperature conditions in ng water. | | | |
| | c. <u>IF AT ANY TIME</u> Hi-Hi temperatures on NV pump 1A reached, <u>THEN</u> sto NV pump 1A. | s p | | | | |
| _ | d. <u>WHEN</u> 10 minutes elapsed from tim recorded above, <u>THEN</u> verify alternate cooling aligned to NV pum 1A. | e | _d. Stop NV pump 1A. | | | |
| | | | | | | |

LOSS OF COMPONENT COOLING

Enclosure 5 - Page 3 of 3 Maximize NV Pump Run Time

PAGE NO. 34 of 36 Revision 43

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|----|---|-----------------------|
| 7. | <u>WHEN</u> alternate cooling aligned to NV pump 1A, <u>THEN</u> perform the following: | |
| _ | a. <u>IF</u> NV pump 1A in service, <u>THEN</u> return this enclosure to Control Room Supervisor. | |
| | b. <u>IF</u> NV pump 1B in service, <u>THEN</u> perform the following: | |
| | 1) Start NV pump 1A as follows: | |
| | a) Start NV pump 1A aux oil pump. | |
| | b) Start NV pump 1A. | |
| | c) Stop NV pump 1A aux oil pump. | |
| | 2) Stop NV pump 1B. | |
| | 3) Return this enclosure to Control Room Supervisor. | |
| _ | c. <u>IF</u> no NV pump in service, <u>THEN</u> restart NV pump 1A. <u>REFER TO</u> Enclosure 4 (NV Pump 1A Controlled Restart). | |
| 8. | <u>IF AT ANY TIME</u> S/I occurs on either unit, <u>THEN</u> notify dispatched operator to realign NV Pump 1A cooling to normal. <u>REFER TO</u> Enclosure 2 (Alternate Cooling To NV Pump 1A). | |
| 9. | <u>WHEN</u> the following conditions met: | |
| | KC restored to service | |
| | NV pump 1B in service | |
| | ● NV pump 1A is off, | |
| _ | <u>THEN</u> notify dispatched operator to return NV pump 1A cooling to normal. <u>REFER</u> <u>TO</u> Enclosure 2 (Alternate Cooling To NV Pump 1A). | |

LOSS OF COMPONENT COOLING

Enclosure 6 - Page 1 of 2 Rx Trip Sequence PAGE NO. 35 of 36 Revision 43

| | | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|----|---|-----------------------|
| _ | 1. | Verify normal letdown - ISOLATED | <u> </u> |
| | | | |
| | 2. | Ensure NV pump suction aligned to FWST as follows: | |
| | | a. 1NV-252A (NV Pumps Suct From FWST) - OPEN | |
| | | b. 1NV-253B (NV Pumps Suct From FWST) - OPEN | |
| | | c. 1NV-188A (VCT Otlt Isol) - CLOSED |) |
| | | d. 1NV-189B (VCT Otilt Isol) - CLOSED |). |
| _ | 3. | <u>WHEN</u> reactor tripped, <u>THEN</u> attempt to establish and maintain a slow cooldown as required to maintain PZ level. | R |
| | 4. | Secure any dilutions in progress. | |
| | 5. | Ensure steam dumps - IN PRESSURE MODE. | E |
| | 6. | Ensure "STM DUMP CTRL" - SET AT 1090 PSIG STEAM HEADER PRESSURE. | |
| | 7. | Ensure reactor - TRIPPED. | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| CNS AP/1/A/5500/021 | LOSS OF (Enclo Rx | LOSS OF COMPONENT COOLING Enclosure 6 - Page 2 of 2 Rx Trip Sequence | | PAGE NO. 36 of 36 Revision 43 |
|--|--|---|------------------|-------------------------------------|
| ACTION/EXE | PECTED RESPONSE | RES | PONSE NOT OBTAIN | ED |
| 8. Verify at least of conditions exists | one of the following st: | <u>GO TO</u> Ste | ep 10. | |
| • KC flow unav | ailable to NC pumps | | | |
| OR | | | | |
| #1 Seal outlet THAN 235°F | t temperature - GREATE | R | | |
| OR | | | | |
| - • Lower bearing GREATER T | g temperature - HAN 225°F | | | |
| OR | | | | |
| Motor bearing GREATER THE | temperature - HAN 195°F. | | | |
| 9. <u>WHEN reactor</u> <u>THEN perform</u> a. Trip all NC p b. Ensure norm with tripped I MANUAL AN 10. <u>IF reactor trip to</u> <u>THEN perform</u> while continuir as time and co IF above P-11 EP/1/A/5000// Safety Injection OR IF below P-11 AP/1/A/5500// Inadvertent S. | power less than 5%, the following: numps. hal spray valve associate NC pump(s) - IN ND CLOSED. breakers were closed, one of the following ng with this procedure nditions allow: 1, <u>THEN GO TO</u> E-0 (Reactor Trip or on) | ed | | |

JPM C

EVALUATION SHEET

| Task: | Isolate faulte | d S/G 1A in accordance v | vith EP/1/A/5000/E | Ξ-2. |
|---|---|---|---|---|
| Alternate Path: | Yes | | | |
| Facility JPM #: | New | | | |
| Safety Function | 4S Title | Auxiliary / Emerger | icy Feedwater Sys | stem |
| K (A 035 / | $100 \frac{1100}{100}$ | | or monitor in the co | ontrol room: S/C |
| <u>NA</u> 0337 | isolatio | n on steam leak or tube r | upture/leak | |
| Rating(s): 4.5 / | 4.6 <u>CFR:</u> | 41.7 / 45.5 | | |
| Preferred Evaluati | on Location: | Preferr | ed Evaluation M | ethod: |
| Simulator X | In- P lant | Perforn | n <u>X</u> | Simulate |
| References: | EP/1/A/5000/ | E-2 | | |
| <u>Task Standard:</u> | Applicant cor 1CA-60, and Generator Iso | npletes isolation of faulte 1CA-66B in accordance plation). | d S/G 1A by closir with EP/1/A/5000/ | ng 1CF-100, 1CF-156, E-2 (Faulted Steam |
| Validation Time: | 10 minutes | <u>Time C</u> | ritical: Ye | es No _ X |
| | | | | |
| Applicant: | | | Time | • Start: |
| Applicant: NAME | | Docket # | Time | e Start: • Finish: |
| Applicant: NAME Performance Ratio | <u>ng:</u> | Docket # | Time Time Time | Start: |
| Applicant: NAME Performance Rations SAT UNSAT | ng: | Docket # | Time Time Time | Start: |
| Applicant: NAME Performance Ratin SAT UNSAT | <u>ng:</u> | Docket # | Time Time Perfo | Start: |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | ng: | Docket # | Time Time Perfo | Start: |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | ng: NAME | Docket # | Time Time Perfo SIGNATURE | e Start: |
| Applicant: NAME Performance Rations SAT UNSAT Examiner: | ng: NAME | Docket # | Time Time Perfo | Start: |
| Applicant: NAME Performance Rations SAT UNSAT Examiner: | ng: NAME | Docket # | Time Time Perfo | <pre> start: Finish: ormance Time / DATE </pre> |
| Applicant: NAME Performance Rations SAT UNSAT Examiner: | ng: NAME | Docket # | Time Time Perfo | <pre> start: Finish: ormance Time / DATE </pre> |
| Applicant: NAME Performance Rations SAT UNSAT Examiner: | ng: NAME | Docket # | Time Time Perfo | <pre> start: Finish: ormance Time / DATE </pre> |
| Applicant: NAME Performance Rations SAT UNSAT Examiner: | ng: NAME | Docket # | Time Time Perfo | <pre> start: Finish: ormance Time / DATE</pre> |

SIMULATOR OPERATOR INSTRUCTIONS:

- 1. ENSURE NRC Examination Security has been established.
- 2. Reset to IC # 152
- 3. Enter the password.
- 4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
- 5. Ensure simulator setup per table below.
- 6. Place simulator in RUN and acknowledge any alarms.
- 7. ENSURE "Extra Operator" is present in the simulator.
- 8. Place simulator in FREEZE until Examiner cue is given.

| ✓ | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|--|--------|-------|------|-----------|-------|
| | VLV-CA026F, CA185 S/G 1A CF TEMPERING FLOW FAIL TO POSITION | 1 | | | | |
| | VLV-CA015F, CA62A CA PMP A DISCH TO S/G A ISOL FAIL TO POSITION | 1 | | | | |
| | MAL-SM007A, STM LIN BRK INSIDE CONTAINMENT LOOP A | 2.25e6 | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- A Reactor Trip and Safety Injection has occurred due to a fault of the 1A S/G inside Containment.
- The crew has completed applicable steps of EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and transitioned to EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).

INITIATING CUES:

• The Control Room Supervisor has directed you to isolate 1A S/G, in accordance with E-2, beginning at Step 10.

EXAMINER NOTE: After reading Initiating Cue, provide the applicant with a copy of EP/1/A/5000/E-2 completed through step 9

START TIME: _____

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 1: 10 Isolate all faulted S/G(s) as follows: | |
| • S/G 1A: | |
| a. Verify S/G 1A Feedwater Isolation status light (1SI-5) - LIT. | |
| STANDARD: | |
| Applicant determines that the 1A Feedwater Isolation Status light is dark and transitions to the RNO. | UNSAT |
| COMMENTS: | |
| | |

| <u>STEP 2</u> : | 10 | RNO a. Perform the following: 1) Ensure the following valves -CLOSED: 1CF-28 (S/G 1A CF Ctrl) 1CF-30 (S/G 1A CF Byp Ctrl) 1CF-33 (S/G 1A CF Cont Isol) 1CF-90 (S/G 1A CF Cont Isol Byp) 1CA-149 (S/G 1A CF Byp To CA Nozzle) 1CA-185 (S/G 1A CA Nozz Tempering Isol). | SAT | | | |
|--|------------|--|-------|--|--|--|
| STANDARD | <u>)</u> : | | UNSAT | | | |
| Applicant determines that all listed valves are closed, except 1CA-185. Depresses CLOSE pushbutton for 1CA-185, determines the valve will not close, and continues with RNO steps. | | | | | | |
| COMMENTS: | | | | | | |
| | | | | | | |

| | SAT/UNSAT | | |
|--------------------|---|------------------|--|
| <u>STEP 3</u> : 10 | RNO a. 2) IF 1CA-185 (S/G 1A CA Nozz Tempering Isol) cannot be closed, THEN perform the following: | CRITICAL STEP | |
| | a) CLOSE the following valves: | | |
| | 1CF-100 (S/G CA Nozz Tempering Ctrl) 1CF-156 (Byp Valve For 1CF-100). | | |
| STANDARD: | SAT | | |
| Applicant close | | | |
| Examiner Note: | This step is critical to isolate Auxiliary Feed flow into the faulted S/G. | UNSAT | |
| COMMENTS: | | | |
| | | | |

| STEP 4 | <u>4</u> : | 10 | RNO a. | | | | | |
|---|------------|----|---|--|--|--|--|--|
| | | | b) IF 1CF-100 OR 1CF-156 cannot be closed, THEN dispatch operator to close affected valve(s): | | | | | |
| <u>STANE</u> | SAT | | | | | | | |
| Applicant determines that valves have closed and this step is not applicable. | | | | | | | | |
| COMMENTS: | | | | | | | | |
| | | | | | | | | |
| | | STEP/STANDARD | SAT/UNSAT | |
|--|------------|--|-----------|--|
| <u>STEP 5</u> : | 10 | RNO a. | | |
| | | IF more than one Feedwater Isolation valve above open AND CM still aligned to feed faulted S/G, THEN evaluate alternate means to stop CM flow to faulted S/G.: | SAT | |
| <u>STANDARD</u> : | | | UNSAT | |
| Applicant determines that this step is not applicable. | | | | |
| <u>COMMENT</u> | <u>'S:</u> | | | |
| | | | | |

| <u>STEP 6</u> : | 10b. | CLOSE the following valves: | |
|---------------------------|------|---|-------|
| | | 1) 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V). | |
| STANDARD: | | | SAT |
| Applicant closes 1SM-77A. | | | UNSAT |
| COMMENTS: | | | |
| | | | |

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| <u>STEP 7</u> : 10b. | |
| 2) 1CA-62A (CA Pmp A Disch To S/G 1A Isol). | |
| STANDARD: | SAT |
| Applicant depresses the CLOSED pushbutton for 1CA-62A and determines this valve will not close. Transitions to RNO. | |
| COMMENTS: | |
| | |
| | |
| STEP 8: 10b. RNO 2) Perform the following: | CRITICAL |
| a) CLOSE 1CA-60 (CA Pump 1A Flow To S/G 1A). | STEP |
| STANDARD: | |
| Applicant closes 1CA-60 by rotating the knob in the counterclockwise direction until demand is ~0% (NOTE: <35% demand will close the valve). | |

| Examiner Note: Examiner Note: | This begins the alternate path of this JPM. This step is critical to isolate Auxiliary Feed flow into the faulted S/G. | SAT UNSAT |
|----------------------------------|--|--------------|
| COMMENTS: | | L |

| | STEP/STANDARD | SAT/UNSAT |
|---|---|-----------|
| <u>STEP 9</u> : 10 | o. RNO 2) | |
| | b) Dispatch operator to close 1CA-62A (CA Pmp A Disch To S/G 1A Isol) (DH-587, DD-EE, 44-45, Rm 591). | |
| STANDARD: | | SAT |
| Applicant dispatches operator to locally close 1CA-62A. | | UNSAT |
| Examiner Cue: | "Operator has been dispatched to close 1CA-62A." | |
| COMMENTS: | | |
| | | |

| <u>STEP 10</u> : | 10b. | RNO 2) | | |
|--|-----------|--|-------|--|
| | | c) IF exterior doghouse not accessible OR CA cannot be isolated, THEN dispatch operator to unlock and close 1CA-59 (CA Pump 1A Disch To S/G 1A Ctrl Inlet Isol) (AB-551, BB,49-50, Rm 250) (Ladder needed) (Key #633). | SAT | |
| STANDARD | : | | UNSAT | |
| Applicant determines that this step is not applicable. | | | | |
| COMMENTS | <u>S:</u> | | | |

| | STEP/STANDARD | SAT/UNSAT |
|-----------------------|--|------------------|
| <u>STEP 11</u> : 10b. | 3) 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol). | CRITICAL STEP |
| <u>STANDARD</u> : | | |
| Applicant close | es 1CA-66B. | |
| Examiner Note: | At this point all critical steps are complete. If desired, examiner can allow the applicant to complete step 10 by verifying blowdown isolation valves 1BB-56A, 1BB-148B, and 1BB-57B are closed and then provide the following cue. | SAT |
| Examiner Cue: | Upon completion of this step, "This JPM is complete." | |
| Examiner Note: | This step is critical to isolate Auxiliary Feed flow into the faulted S/G. | |
| <u>COMMENTS:</u> | | |

STOP TIME_____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- A Reactor Trip and Safety Injection has occurred due to a fault of the 1A S/G inside Containment.
- The crew has completed applicable steps of EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) and transitioned to EP/1/A/5000/E-2 (Faulted Steam Generator Isolation).

INITIATING CUES:

• The Control Room Supervisor has directed you to isolate 1A S/G, in accordance with E-2, beginning at Step 10.

| | Procedure No. |
|-------------|---------------------------|
| | |
| | |
| | |
| | |
| | Revision No. |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | Electronic Reference No |
| | Electronic Reference 100. |
| | |
| | |
| | |
| PERFORMANCE | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

A. Purpose

This procedure provides actions to identify and isolate a faulted S/G.

B. Symptoms or Entry Conditions

This procedure is entered from:

- a. EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection), Step 25, with the following symptoms:
 - 1) Any S/G pressure decreasing in an uncontrolled manner.
 - 2) Any S/G completely depressurized.
- b. EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant), Step 3, EP/1/A/5000/ECA-3.1 (SGTR With Loss Of Reactor Coolant Subcooled Recovery Desired), Step 9, EP/1/A/5000/ECA-3.2 (SGTR With Loss Of Reactor Coolant Saturated Recovery Desired), Step 6 with the following symptoms and/or conditions:
 - 1) Any S/G pressure decreasing in an uncontrolled manner.
 - 2) Any S/G completely depressurized.
 - 3) Faulted S/G isolation not verified.
- c. EP/1/A/5000/FR-H.5 (Response To Steam Generator Low Level), Step 4, when affected S/G is identified as faulted.
- d. Foldout page of other procedures whenever a faulted S/G is identified.
- e. EP/1/A/5000/ECA-2.1 (Uncontrolled Depressurization Of All Steam Generators), Enclosure 1 (Foldout Page), Step 3, if any S/G pressure increases.

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED | | | |
|---------------------------------|---|---|--|--|--|--|
| C. <u>Operator Actions</u> | | | | | | |
| <u>√</u> 1. | Monitor Enclosure 1 (Foldout Page). | | | | | |
| <u>✓</u> 2. | Maintain any faulted S/G or secondary break isolated during subsequent recovery actions unless needed for NC System cooldown. | | | | | |
| 3. | Verify the following valves - CLOSED: | — | CLOSE valve(s). | | | |
| $\frac{\mathbf{v}}{\mathbf{v}}$ | All MSIVs All MSIV bypass valves. | | | | | |
| 4. | WHEN TSC staffed, <u>THEN</u> notify TSC of the following: | F | | | | |
| _ | • IF feedline OR steamline break has occurred inside doghouse, THEN ensur affected doghouse curtains are opened within 24 hours of rupture inside of the doghouse. | e | | | | |
| <u>√</u> 5. | Verify any S/G pressure - STABLE OR INCREASING. | | IF all S/Gs faulted, <u>THEN GO TO</u> EP/1/A/5000/ECA-2.1 (Uncontrolled Depressurization Of All Steam Generators). | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|-------------|--|---|
| 6. ✓ | Identify faulted S/G(s) as follows: • Verify any S/G pressure - DECREASIN IN AN UNCONTROLLED MANNER OR • Verify any S/G - DEPRESSURIZED. | G a. Dispatch operators to search for initiating break at the following locations: |
| <u>√</u> 7. | Maintain at least one S/G available for NC System cooldown in subsequent steps. | |
| <u>√</u> 8. | Verify faulted S/G(s) PORV - CLOSED. | Perform the following: a. CLOSE faulted S/G(s) PORV. b. IF S/G PORV cannot be closed, THEN CLOSE S/G PORV isolation valve. c. IF S/G PORV isolation valve cannot be closed, THEN dispatch operator to close valve. |
| ⊻ 9. | Ensure CA System valve control - RESET. | |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|-----|--|--|
| 10. | Isolate all faulted S/G(s) as follows: | |
| | • <u>S/G 1A</u> : | |
| | a. Verify S/G 1A Feedwater Isolation | a. Perform the following: |
| | Status light (131-3) - LTT. | Ensure the following valves - CLOSED: |
| | | 1CF-28 (S/G 1A CF Ctrl) |
| | | 1CF-30 (S/G 1A CF Byp Ctrl) |
| | | 1CF-33 (S/G 1A CF Cont Isol) |
| | | — • 1CF-90 (S/G 1A CF Cont Isol Byp) |
| | | 1CA-149 (S/G 1A CF Byp To CA Nozzle) |
| | | 1CA-185 (S/G 1A CA Nozz Tempering Isol). |
| | | <u>IF</u> 1CA-185 (S/G 1A CA Nozz Tempering Isol) cannot be closed, <u>THEN</u> perform the following: |
| | | a) CLOSE the following valves: |
| | | 1CF-100 (S/G CA Nozz Tempering Ctrl) |
| | | 1CF-156 (Byp Valve For 1CF-100). |
| | | b) <u>IF</u> 1CF-100 <u>OR</u> 1CF-156 cannot be closed, <u>THEN</u> dispatch operator to close affected valve(s): |
| | | 1CF-100 (S/G CA Nozz Tempering Ctrl) (TB1-580, 1H-33) (Ladder needed) |
| | | 1CF-156 (Byp Valve For 1CF-100) (TB1-577, 1H-33) (Ladder needed). |
| | | (RNO continued on next page) |

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|---|---|---|--|
| 1 | 0. (Continued) | | 3) IF more than one Feedwater |
| | | | S) <u>IF</u> more than one recovater Isolation valve above open <u>AND</u> CM still aligned to feed faulted S/G, <u>THEN</u> evaluate alternate means to stop CM flow to faulted S/G. |
| | b. CLOSE the following valves: | | |
| | 1) 1SM-77A (S/G 1A Otlt Hdr Bldw C/V). | n | 1) Dispatch operator to close 1SM-77A (S/G 1A Otlt Hdr Bldwn C/V) (DH-583, FF-GG, 43-44, Rm 591). |
| | 2) 1CA-62A (CA Pmp A Disch To | | 2) Perform the following: |
| | 5/G TA ISOI). | | a) CLOSE 1CA-60 (CA Pump 1A Flow To S/G 1A). |
| | | | b) Dispatch operator to close 1CA-62A (CA Pmp A Disch To S/G 1A Isol) (DH-587, DD-EE, 44-45, Rm 591). |
| | | | c) <u>IF</u> exterior doghouse not accessible <u>OR</u> CA cannot be isolated, <u>THEN</u> dispatch operator to unlock and close 1CA-59 (CA Pump 1A Disch To S/G 1A Ctrl Inlet Isol) (AB-551, BB,49-50, Rm 250) (Ladder needed) (Key #633). |
| | | | |
| | | | |

PAGE NO. 6 of 26 Revision 15

| <u>_</u> | |
|---|---|
| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
| 10. (Continued) | |
| 3) 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol). | 3) Perform the following: |
| | a) CLOSE 1CA-64 (CA Pump #1 Flow To S/G 1A). |
| | b) Dispatch operator to close 1CA-66B (CA Pmp 1 Disch To S/G 1A Isol) (DH-584, DD-EE, 44-45, Rm 591). |
| | c) <u>IF</u> exterior doghouse not accessible <u>OR</u> CA cannot be isolated, <u>THEN</u> dispatch operator to unlock and close 1CA-63 (CA Pump No 1 Disch To S/G 1A Ctrl Inlet Isol) (AB-556, BB-50, Rm 250) (Ladder needed) (Key #633). |
| c. Verify the following blowdown isolation valves - CLOSED: | |
| 1) 1BB-56A (S/G 1A Bldwn Cont Isol Insd). | 1) CLOSE valve. |
| | |
| | |
| | |
| | |
| | |
| | |

PAGE NO. 7 of 26 Revision 15

PAGE NO. 8 of 26 Revision 15

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|---|--|----|---|
| 1 | 0. (Continued) | | |
| | 3) 1BB-57B (S/G 1A Bldwn Cont Is Otsd). | ol | 3) Perform the following: |
| | | | a) CLOSE valve. |
| | | | b) <u>IF</u> valve will not close <u>AND</u> 1BB-56A open, <u>THEN</u> perform the following: |
| | | | (1) Ensure "S/G A BLDWN FLOW CTRL" - CLOSED. |
| | | | (2) Dispatch operators to ensure the following valves - CLOSED: |
| | | | 1BB-57B (S/G 1A Bldwn Cont Isol Otsd) (DH-580, EE-FF, 44-45, Rm 591) |
| | | | 1BB-81 (1A S/G Blowdown Penetration Valve Test Isol) (DH-583, EE-FF, 44, Rm 591). |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

RESPONSE NOT OBTAINED ACTION/EXPECTED RESPONSE 10. (Continued) • <u>S/G 1B</u>: a. Verify S/G 1B Feedwater Isolation a. Perform the following: status light (1SI-5) - LIT. 1) Ensure the following valves -CLOSED: • 1CF-37 (S/G 1B CF Ctrl) • 1CF-39 (S/G 1B CF Byp Ctrl) • 1CF-42 (S/G 1B CF Cont Isol) • 1CF-89 (S/G 1B CF Cont Isol Byp) • 1CA-150 (S/G 1B CF Byp To CA Nozzle) • 1CA-186 (S/G 1B CA Nozz Tempering Isol). 2) IF 1CA-186 (S/G 1B CA Nozz Tempering Isol) cannot be closed, **THEN** perform the following: a) CLOSE the following valves: • 1CF-100 (S/G CA Nozz Tempering Ctrl) • 1CF-156 (Byp Valve For 1CF-100). b) **IF** 1CF-100 **OR** 1CF-156 cannot be closed, **THEN** dispatch operator to close affected valve(s): • 1CF-100 (S/G CA Nozz Tempering Ctrl) (TB1-580, 1H-33) (Ladder needed) • 1CF-156 (Byp Valve For 1CF-100) (TB1-577, 1H-33) (Ladder needed). (RNO continued on next page)

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|---|---|---|--|
| 1 | 0. (Continued) | | 3) <u>IF</u> more than one Feedwater Isolation valve above open <u>AND</u> CM still aligned to feed faulted S/G, <u>THEN</u> evaluate alternate means to stop CM flow to faulted S/G. |
| | b. CLOSE the following values: 1) 1SM-76B (S/G 1B Oth Hdr Bldw C/V). | n | 1) Dispatch operator to close 1SM-76B (S/G 1B Otlt Hdr Bldwn C/V) (DH-583, FF-53, Rm 572). |
| | 2) 1CA-58A (CA Pmp A Disch To S/G 1B Isol). | | 2) Perform the following: a) CLOSE 1CA-56 (CA Pump 1A Flow To S/G 1B). b) Dispatch operator to close 1CA-58A (CA Pmp A Disch To S/G 1B Isol) (DH-586, DD-EE, 52-53, Rm 572). c) IF interior doghouse not accessible <u>OR</u> CA cannot be isolated, <u>THEN</u> dispatch operator to unlock and close 1CA-55 (CA Pump 1A Disch To S/G 1B Inlet Isol) (AB-550, DD-52, Rm 250) (Key #633). |
| | c. Verify CA Pump 1A or 1B - AVAILABLE. | | c. <u>IF</u> CA Pump #1 only source of feedwater, <u>THEN</u> perform the following: 1) Maintain at least one S/G available to supply steam to CA Pump #1. (RNO continued on next page) |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|----|--|---|
| 1(| 0. (Continued) | |
| | | 2) Ensure feed flow maintained available to S/G used to supply steam to CA Pump #1. 3) <u>IF</u> desired to isolate CA Pump #1 |
| | | Step 10.d. |
| | | 4) GO TO Step 10.f. |
| | d. CLOSE 1CA-54B (CA Pmp 1 Disch | d. Perform the following: |
| | | 1) CLOSE 1CA-52 (CA Pump #1 Flow To S/G 1B). |
| | 2) Dispatch operator to close 1CA-54B (CA Pmp 1 Disch To S/G 1B Isol) (DH-584, DD-EE, 52-53, Rm 572). | |
| | | 3) <u>IF</u> interior doghouse not accessible <u>OR</u> CA cannot be isolated, <u>THEN</u> dispatch operator to unlock and close 1CA-51 (CA Pump No 1 Disch To S/G 1B Inlet Isol) (AB-552, DD-52, Rm 250) (Key #633). |
| | e. Dispatch operator to unlock and close 1SA-1 (1B S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock). | e. Dispatch operator to unlock and close 1SA-3 (1B S/G Main Steam to CAPT Stop Check) (AB-551, DD-53, Rm 217) (Breakaway lock). |
| | f. Verify the following blowdown isolation valves - CLOSED: | |
| | 1) 1BB-19A (S/G 1B Bldwn Cont Is Insd). | ol 1) CLOSE valve. |
| | | |

PAGE NO. 12 of 26 Revision 15

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|---|
| 1 | 0. (Continued) | |
| 1 | O. (Continued) 2) 1BB-150B (S/G 1B Bldwn Cont Isol Byp). | 2) Perform the following: a) CLOSE valve. b) IF valve will not close AND 1BB-19A open, THEN perform the following: (1) Ensure "S/G B BLDWN FLOW CTRL"-CLOSED. (2) Dispatch operators to ensure the following valves - CLOSED: (1) 1BB-150B (S/G 1B Bldwn Cont Isol Byp) (DH-580, FF, 52-53, Rm 572) (1) 1BB-83 (1B S/G Blowdown Penetration Valve Test Isol) (DH-580, FF-53, Rm 572). |
| | | |

PAGE NO. 13 of 26 Revision 15

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|
| 10. (Continued) | |
| 3) 1BB-21B (S/G 1B Bldwn Cont Isol Otsd) | 3) Perform the following: |
| 0.000 | a) CLOSE valve. |
| | b) <u>IF</u> valve will not close <u>AND</u> 1BB-19A open, <u>THEN</u> perform the following: |
| | (1) Ensure "S/G B BLDWN FLOW CTRL" - CLOSED. |
| | (2) Dispatch operators to ensure the following valves - CLOSED: |
| | 1BB-21B (S/G 1B Bldwn Cont Isol Otsd) (DH-580, FF, 52-53, Rm 572) |
| | 1BB-83 (1B S/G Blowdown Penetration Valve Test Isol) (DH-580, FF-53, Rm 572). |
| | |
| | |
| | |
| | |
| | |

Revision 15 RESPONSE NOT OBTAINED ACTION/EXPECTED RESPONSE 10. (Continued) • <u>S/G 1C</u>: a. Verify S/G 1C Feedwater Isolation a. Perform the following: status light (1SI-5) - LIT. 1) Ensure the following valves -CLOSED: • 1CF-46 (S/G 1C CF Ctrl) • 1CF-48 (S/G 1C CF Byp Ctrl) • 1CF-51 (S/G 1C CF Cont Isol) • 1CF-88 (S/G 1C CF Cont Isol Byp) • 1CA-151 (S/G 1C CF Byp To CA Nozzle) • 1CA-187 (S/G 1C CA Nozz Tempering Isol). 2) IF 1CA-187 (S/G 1C CA Nozz Tempering Isol) cannot be closed, **THEN** perform the following: a) CLOSE the following valves: • 1CF-100 (S/G CA Nozz Tempering Ctrl) • 1CF-156 (Byp Valve For 1CF-100). b) **IF** 1CF-100 **OR** 1CF-156 cannot be closed, **THEN** dispatch operator to close affected valve(s): • 1CF-100 (S/G CA Nozz Tempering Ctrl) (TB1-580, 1H-33) (Ladder needed) • 1CF-156 (Byp Valve For 1CF-100) (TB1-577, 1H-33) (Ladder needed). (RNO continued on next page)

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|--|
| 1 | 0. (Continued) | 3) <u>IF</u> more than one Feedwater Isolation valve above open <u>AND</u> CM still aligned to feed faulted S/G, <u>THEN</u> evaluate alternate means to stop CM flow to faulted S/G. |
| | b. CLOSE the following values: 1) 1SM-75A (S/G 1C Otlt Hdr Bldw C/V). | vn 1) Dispatch operator to close 1SM-75A (S/G 1C Otlt Hdr Bldwn C/V) (DH-580, GG-52/53, Rm 572). |
| | 2) 1CA-46B (CA Pmp B Disch To S/G 1C Isol). | 2) Perform the following: a) CLOSE 1CA-44 (CA Pump 1B Flow To S/G 1C). b) Dispatch operator to close 1CA-46B (CA Pmp B Disch To S/G 1C Isol) (DH-586, DD, 53-54, Rm 572). c) IF interior doghouse not accessible OR CA cannot be isolated, THEN dispatch operator to unlock and close 1CA-43 (CA Pump 1B Disch To S/G 1C Ctrl Inlet Isol) (AB-552, DD-52, Rm 250) (Key #633). |
| | c. Verify CA Pump 1A or 1B - AVAILABLE. | c. <u>IF</u> CA Pump #1 only source of feedwater, <u>THEN</u> perform the following: 1) Maintain at least one S/G available to supply steam to CA Pump #1. (RNO continued on next page) |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|--|
| 1 | 0. (Continued) | |
| | | 2) Ensure feed flow maintained available to S/G used to supply steam to CA Pump #1. |
| | | 3) IF desired to isolate CA Pump #1 from 1C S/G, THEN GO TO Step 10.d. |
| | | 4) GO TO Step 10.f. |
| | d. CLOSE 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol). | d. Perform the following: |
| | | 1) CLOSE 1CA-48 (CA Pump #1 Flow To S/G 1C). |
| | | 2) Dispatch operator to close 1CA-50A (CA Pmp 1 Disch To S/G 1C Isol) (DH-584, EE-53, Rm 572). |
| | | 3) <u>IF</u> interior doghouse not accessible <u>OR</u> CA cannot be isolated, <u>THEN</u> dispatch operator to unlock and close 1CA-47 (CA Pump No 1 Disch To S/G 1C Ctrl Inlet Isol) (AB-552, DD-53, Rm 250) (Key #633). |
| | e. Dispatch operator to unlock and close 1SA-4 (1C S/G Main Steam to CAPT Maintenance Isol) (DH-624, FF-53, Rm 572) (Breakaway lock installed). | e. Dispatch operator to unlock and close 1SA-6 (1C S/G Main Steam to CAPT Stop Check) (AB-551, DD-53, Rm 217) (Breakaway lock) (Ladder needed). |
| | f. Verify the following blowdown isolation valves - CLOSED: | |
| | 1) 1BB-60A (S/G 1C Bldwn Cont Is Insd). | sol1) CLOSE valve. |
| | | |

PAGE NO. 17 of 26 Revision 15

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|
| 10. (Continued) | |
| 2) 1BB-149B (S/G 1C Bldwn Cont Isol Byp). | 2) Perform the following: a) CLOSE valve. |
| | b) IF valve will not close AND 1BB-60A open, THEN perform the following: |
| | (1) Ensure "S/G C BLDWN FLOW CTRL" - CLOSED. |
| | (2) Dispatch operators to ensure the following valves - CLOSED: |
| | 1BB-149B (S/G 1C Bldwn Cont Isol Byp) (DH-578, FF-GG, 52, Rm 572) |
| | 1BB-82 (1C S/G Blowdown Penetration Valve Test Isol) (DH-583, FF-53, Rm 572). |
| | |
| | |
| | |
| | |
| | |

PAGE NO. 18 of 26 Revision 15

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|
| 10. (Continued) | |
| 3) 1BB-61B (S/G 1C Bldwn Cont Isol Otsd) | 3) Perform the following: |
| | a) CLOSE valve. |
| | b) <u>IF</u> valve will not close <u>AND</u> 1BB-60A open, <u>THEN</u> perform the following: |
| | (1) Ensure "S/G C BLDWN FLOW CTRL" - CLOSED. |
| | (2) Dispatch operators to ensure the following valves - CLOSED: |
| | 1BB-61B (S/G 1C Bldwn Cont Isol Otsd) (DH-578, FF-GG, 52, Rm 572) |
| | 1BB-82 (1C S/G Blowdown Penetration Valve Test Isol) (DH-583, FF-53, Rm 572). |
| | |
| | |
| | |
| | |
| | |

Revision 15 RESPONSE NOT OBTAINED ACTION/EXPECTED RESPONSE 10. (Continued) • <u>S/G 1D</u>: a. Verify S/G 1D Feedwater Isolation a. Perform the following: status light (1SI-5) - LIT. 1) Ensure the following valves -CLOSED: • 1CF-55 (S/G 1D CF Ctrl) • 1CF-57 (S/G 1D CF Byp Ctrl) • 1CF-60 (S/G 1D CF Cont Isol) • 1CF-87 (S/G 1D CF Cont Isol Byp) • 1CA-152 (S/G 1D CF Byp To CA Nozzle) • 1CA-188 (S/G 1D CA Nozz Tempering Isol). 2) IF 1CA-188 (S/G 1D CA Nozz Tempering Isol) cannot be closed, **THEN** perform the following: a) CLOSE the following valves: • 1CF-100 (S/G CA Nozz Tempering Ctrl) • 1CF-156 (Byp Valve For 1CF-100). b) **IF** 1CF-100 **OR** 1CF-156 cannot be closed, **THEN** dispatch operator to close affected valve(s): • 1CF-100 (S/G CA Nozz Tempering Ctrl) (TB1-580, 1H-33) (Ladder needed) • 1CF-156 (Byp Valve For 1CF-100) (TB1-577, 1H-33) (Ladder needed). (RNO continued on next page)

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|
| 10. (Continued) | <u>IF</u> more than one Feedwater Isolation valve above open <u>AND</u> CM still aligned to feed faulted S/G, <u>THEN</u> evaluate alternate means to stop CM flow to faulted S/G. |
| b. CLOSE the following valves: 1) 1SM-74B (S/G 1D OtIt Hdr Bldw C/V). | n 1) Dispatch operator to close 1SM-74B (S/G 1D Otlt Hdr Bldwn C/V) (DH-583, FF-GG, 44-45, Rm 591). |
| 2) 1CA-42B (CA Pmp B Disch To S/G 1D Isol). | 2) Perform the following: a) CLOSE 1CA-40 (CA Pump 1B Flow To S/G 1D). b) Dispatch operator to close 1CA-42B (CA Pmp B Disch To S/G 1D Isol) (DH-586, DD-EE, 43-44, Rm 591). c) IF exterior doghouse not accessible <u>OR</u> CA cannot be isolated, <u>THEN</u> dispatch operator to unlock and close 1CA-39 (CA Pump 1B Disch To S/G 1D Ctrl Inlet Isol) (AB-551, BB, 49-50, Rm 250) (Ladder needed) (Key #633). |

PAGE NO. 21 of 26 Revision 15

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|
| 10. (Continued) | |
| 3) 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol). | 3) Perform the following: a) CLOSE 1CA-36 (CA Pump #1 Flow To S/G 1D). b) Dispatch operator to close 1CA-38A (CA Pmp 1 Disch To S/G 1D Isol) (DH-584, DD-EE, 43-44, Rm 591). c) IF exterior doghouse not accessible <u>OR</u> CA cannot be isolated, <u>THEN</u> dispatch operator to unlock and close 1CA-35 (CA Pump No 1 Disch To S/G 1D Ctrl Inlet Isol) (AB-555, BB-50, Rm 250) (Ladder needed) (Key #633). |
| c. Verify the following blowdown isolation valves - CLOSED: | |
| 1) 1BB-8A (S/G 1D Bldwn Cont Iso Insd). | I1) CLOSE valve. |

PAGE NO. 22 of 26 Revision 15

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED | | | | | | |
|--|---|--|--|--|--|--|--|
| 10. (Continued) | | | | | | | |
| 2) 1BB-147B (S/G 1D Bldwn Cont Isol Byp). | 2) Perform the following: | | | | | | |
| | a) CLOSE valve. | | | | | | |
| | b) <u>IF</u> valve will not close <u>AND</u> 1BB-8A open, <u>THEN</u> perform the following: | | | | | | |
| | (1) Ensure "S/G D BLDWN FLOW CTRL" - CLOSED. | | | | | | |
| | (2) Dispatch operators to ensure the following valves - CLOSED: | | | | | | |
| | 1BB-147B (S/G 1D Bldwn Cont Isol Byp) (DH-582, EE-FF, 44, Rm 591) | | | | | | |
| | 1BB-80 (1D S/G Blowdown Penetration Valve Test Isol) (DH-583,EE-FF, 44, Rm 591). | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

PAGE NO. 23 of 26 Revision 15

| | i | | | | |
|-----|--|---------------------------|--|--|--|
| [| ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED | | |
| 1(| J. (Continued) | | | | |
| | 3) 1BB-10B (S/G 1D Bldwn Cont Is | 3) Perform the following: | | | |
| | Olsuj. | | a) CLOSE valve. | | |
| | | | b) <u>IF</u> valve will not close <u>AND</u> 1BB-8A open, <u>THEN</u> perform the following: | | |
| | | | (1) Ensure "S/G D BLDWN FLOW CTRL" - CLOSED. | | |
| | | | (2) Dispatch operators to ensure the following valves - CLOSED: | | |
| | | | 1BB-10B (S/G 1D Bldwn Cont Isol Otsd) (DH-582, EE-FF, 44, Rm 591) | | |
| | | | 1BB-80 (1D S/G Blowdown Penetration Valve Test Isol) (DH-583,EE-FF, 44, Rm 591). | | |
| 11. | <u>WHEN</u> NC T-Hots start to increase, <u>THE</u> dump steam from intact S/G PORVs to stabilize NC T-Hots. | <u>N</u> | | | |
| 12. | Verify secondary radiation normal as follows: | | | | |
| | a. Ensure the following signals - RESET: | | | | |
| | 1) Phase A Containment Isolations. | | | | |
| | 2) CA System valve control. | | | | |
| | 3) KC NC NI NM St signals. | | | | |
| _ | _ b. Align all S/Gs for Chemistry sampling. | | | | |

CNS EP/1/A/5000/E-2

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|
| 12. (Continued) | |
| c. Perform at least one of the following: | |
| Notify Chemistry to sample all S/Gs for activity | |
| OR | |
| Notify RP to frisk all cation columns for activity. | |
| Verify the following EMF trip 1 lights - DARK: | d. <u>GO</u> <u>TO</u> EP/1/A/5000/E-3 (Steam Generator Tube Rupture). |
| 1EMF-33 (Condenser Air Ejector Exhaust) | |
| 1EMF-26 (Steamline 1A) | |
| 1EMF-27 (Steamline 1B) | |
| 1EMF-28 (Steamline 1C) | |
| 1EMF-29 (Steamline 1D). | |
| e. Verify S/G(s) fault - INSIDE CONTAINMENT. | e. Request RP to perform the following: |
| | 1) Monitor area of steam fault for radiation. |
| | 2) Notify Control Room of any abnormal radiation conditions. |
| f. <u>WHEN</u> activity results reported, <u>THEN</u> notify station management to evaluate S/G(s) activity results. | |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED | | | |
|-----|--|--|--|--|--|
| 13. | Verify S/I termination criteria: | | | | |
| - | a. NC subcooling based on core exit T/C - GREATER THAN 0°F. | Csa. <u>GO</u> <u>TO</u> Step 14. | | | |
| | b. Verify secondary heat sink as follows: | :b <u>GO</u> <u>TO</u> Step 14. | | | |
| | Any intact S/G N/R level - GREATE THAN 11% (29% ACC) | ER | | | |
| | OR | | | | |
| | Total feed flow to intact S/Gs - GREATER THAN 450 GPM. | | | | |
| - | _ c. NC pressure - STABLE OR INCREASING. | c. <u>GO</u> <u>TO</u> Step 14. | | | |
| - | _ d. Pzr level - GREATER THAN 11% (30% ACC). | d. <u>GO</u> <u>TO</u> Step 14. | | | |
| - | e. <u>GO</u> <u>TO</u> EP/1/A/5000/ES-1.1 (Safety Injection Termination). | | | | |
| 14. | <u>GO TO</u> EP/1/A/5000/E-1 (Loss Of Reactor Or Secondary Coolant). | | | | |
| END | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Enclosure 1 - Page 1 of 1 Foldout Page

1. Cold Leg Recirc Switchover Criterion:

- **IF** FWST level decreases to 20% 1AD-9, D/8 "FWST 2/4 LO LEVEL" lit), **THEN GO TO** EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirculation).
- 2. CA Suction Source Switchover Criterion:
 - IF 1AD-8, B/1 "UST LO LEVEL" lit, THEN REFER TO AP/1/A/5500/006 (Loss of S/G Feedwater).
- 3. Position Criteria for 1NV-202B and 1NV-203A (NV Pumps A&B Recirc Isol):
 - IF NC pressure less than 1500 PSIG AND NV S/I flowpath aligned, THEN CLOSE 1NV-202B and 1NV-203A.
- IF NC pressure greater than 2000 PSIG, THEN OPEN 1NV-202B and 1NV-203A.

JPM D

EVALUATION SHEET

| <u>Task:</u> | Task: Transfer the Emergency Core Coolant System to the Cold Leg Recirculation | | | |
|--|--|---|--|--|
| Alternate Path: | Yes | | | |
| Facility JPM #: | NI-088 | | | |
| Safety Function: | 2 <u>Title</u> | e: Emergency Core Cooling System (ECCS) | | |
| <u>K/A</u> 006 / | A4.07 Ability pumps | 4.07 Ability to manually operate and/or monitor in the control room: ECCS pumps and valves. | | |
| Rating(s): 4.4 / | 4.4 <u>CFR:</u> | 41.7 / 45.5 to 45.8 | | |
| Preferred Evaluat | ion Location: | Preferred Evalua | tion Method: | |
| Simulator X | In- P lant | Perform | X Simulate | |
| <u>References</u> : | EP/1/A/5000 | /ES-1.3 (Transfer to Cold Leg Recire | culation) rev. 29 | |
| Task Standard:EP/1/A/5000/ES-1.3 Transfer to Cold Leg Recirculation) step 6 is performed and the 1A and 1B NV (Chemical Volume and Control System) and NI (Safety Injection System) pumps are secured. | | | | |
| Validation Time: | 12 minutes | Time Critical: | Yes <u>No X</u> | |
| Annlicant [,] | | | Time Start: | |
| NAME | | Docket # | | |
| NAME | ng: | Docket # | Performance Time | |
| NAME Performance Rati | <u>ng:</u> | Docket # | Performance Time | |
| Applicant: NAME Performance Rati SAT UNSAT Examiner: | <u>ng:</u> | Docket # | Time Finish: Performance Time | |
| Applicant: NAME Performance Rati SAT UNSAT Examiner: | ng: NAME | Docket # SIGN | Time Finish: Performance Time //// | |
| Applicant: NAME Performance Rati SAT UNSAT Examiner: | ng: NAME | Docket # | Time Finish: Performance Time / JATURE DATE | |
| Applicant: NAME Performance Rati SAT UNSAT Examiner: ==================================== | ng: NAME | Docket # SIGN COMMENTS | Time Finisn: Performance Time / JATURE DATE | |
| Performance Rati SAT UNSAT Examiner: | ng: NAME | Docket # SIGN COMMENTS | Time Finisn: Performance Time / JATURE DATE | |
| Performance Rati SAT UNSAT Examiner: | ng: NAME | Docket # SIGN | Performance Time Performance Time / IATURE DATE | |
| Performance Rati SAT UNSAT Examiner: | ng: NAME | Docket # SIGN | I ime Finisn: Performance Time / IATURE DATE | |

SIMULATOR OPERATOR INSTRUCTIONS:

- 1. ENSURE NRC Examination Security has been established.
- 2. Reset to IC #153
- 3. Enter the password.
- 4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
- 5. Ensure simulator setup per table below.
- 6. Place simulator in RUN and acknowledge any alarms.
- 7. ENSURE "Extra Operator" is present in the simulator.
- 8. Place simulator in FREEZE until Examiner cue is given.

| ✓ | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|--|-------|-------|------|-----------|-------|
| | VLV-NI037F (NI184B CNMT SUMP LINE 1B ISOL (STEM) FAIL TO POSITION) | 0 | | | | |
| | MAL-NC013A (NC COLD LEG A LEAK) | 27.5 | | | | |
| | VLV-ND005F (ND28A ND HX A OUTLET TO CHARG A <u>B</u> FAIL TO POSITION. | 0 | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

• A LOCA has occurred on Unit 1.

INITIATING CUES:

- 1AD-9, E/8 'FWST LO-LO LEVEL' annunciator is lit and the Control Room Supervisor instructs you, as the BOP, to transfer to Cold Leg Recirculation using EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation) step 6.
- **EXAMINER NOTE:** After reading the cue, provide the applicant with a copy of EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation) complete through step 8 with step 6 flagged.
START TIME: _____

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| STEP 1: 6. WHEN FWST level decreases to 5% (1AD-9, E/8 "FWST LO-LO LEVEL"), <u>THEN</u> align NV and NI Systems for recirc as follows: | |
| a. Ensure Enclosure 1 (Foldout Page) is monitored. | |
| STANDARD: | SAT |
| Applicant reads the step. | UNSAT |
| Examiner Cue: "The OATC will monitor Enclosure 1" | |
| COMMENTS: | |
| | |

| NOTE | CSF | should not be implemented until directed by this procedure. | |
|---|-------------|---|-------|
| <u>STEP 2</u> | b. | Verify at least one of the following annunciators - LIT: | |
| | | • 1AD-20, B/2 "CONT. SUMP LEVEL >2.5 ft" | |
| | | OR | |
| | | • 1AD-21, B/2 "CONT. SUMP LEVEL >2.5 ft". | SAT |
| <u>STANDA</u> | <u>RD</u> : | | UNSAT |
| Applicant determines that one or both annunciators are lit. | | | |
| COMME | NTS: | | |
| | | | |

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| <u>STEP 3</u> c. Verify both ND pumps - ON. <u>STANDARD</u> : | |
| Applicant determines that only 1 ND pump is running and transitions to the RNO | |
| COMMENTS: | |
| | |

| STEP 4 6.c. RNO c. Perform the following: | |
|---|-------|
| IF 1NI-185A (ND Pump 1A Cont Sump Suct) is open, THEN start ND pump 1A. | |
| STANDARD: | SAT |
| Applicant determines that ND PUMP 1A is on by verifying the red ON light is lit on 1MC-11. | UNSAT |
| COMMENTS: | |
| | |

| STEP 52)IF1NI-184B (ND Pump 1B Cont Sump Suct) is open, THEN start ND pump 1B. | |
|---|--------------|
| STANDARD: | |
| Applicant determines that 1NI-184B is not open by verifying the green CLSD light is lit on 1MC-11 and determines that the step is not applicable. | SAT UNSAT |
| COMMENTS: | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| <u>STEP 6</u> 3) <u>IF</u> any ND pump running with suction aligned to sump, <u>THEN GO TO</u> Step 6.d. | |
| STANDARD: | |
| | SAT |
| Applicant determines that ND Pump 1A is running with suction aligned | |
| to the sump and proceeds to step 6.d. | UNSAT |
| COMMENTS: | |
| | |
| | |
| | |

| <u>STEP 7</u> 6.d. | Ensure the following valves - CLOSED: 1ND-32A (ND Train 1A Hot Leg Inj Isol) 1ND-65B (ND Train 1B Hot Leg Inj Isol). | CRITICAL STEP |
|---------------------------|---|------------------|
| STANDARD: Applicant de | presses the green CLOSE pushbuttons for 1ND-32A and | |
| Examiner Note | This step is critical to prevent pump run out should only one ND pump be running. Only one of the valves need to be closed to satisfy the critical step since the valves are in series. | SAT UNSAT |
| COMMENTS: | | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| <u>STEP 8</u> 6.e. Isolate NI Pump Miniflow as follows: 1) Verify NC pressure - LESS THAN 1620 PSIG. | |
| STANDARD: | SAT |
| Applicant determines that NC (Reactor Coolant System) pressure is less than 1620 psig. | UNSAT |
| <u>COMMENTS:</u> | |

| STEP 9 | 2) Ensure the following valves - CLOSED: | |
|-------------------|---|-------|
| | 1NI-115A (NI Pump 1A Miniflow Isol) 1NI-144A (NI Pump 1B Miniflow Isol). | |
| <u>STANDAR</u> | <u>D</u> : | SAT |
| Applica and 1N | nt determines that the green CLSD lights are lit for 1NI-115A -144A on 1MC-11. | UNSAT |
| | <u>-S:</u> | |
| | | |

| STEP 10 3) Ensure "PWR DISCON FOR 1NI-147B" switch in "ENABLE". | | |
|--|-----|--|
| STANDARD: | SAT | |
| Applicant determines that the "PWR DISCON FOR 1NI-147B" is in "ENABLE" on 1MC-11. | | |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| STEP 11 4) Ensure 1NI-147B (NI Miniflow Hdr To FWST Isol) - CLOSED. | |
| STANDARD: | |
| | SAT |
| Applicant determines that the green CLSD light is lit for 1NI-147B on | |
| | |
| COMMENTS: | |
| | |
| | |
| | |

| <u>STEP 12</u> 6.f. | Verify at least one of the following NV pumps miniflow valves - CLOSED: | |
|-------------------------|---|-------|
| | 1NV-203A (NV Pumps A&B Recirc Isol) | |
| | OR | |
| | • 1NV-202B (NV Pmps A&B Recirc Isol). | SAT |
| STANDARD: | | UNSAT |
| Applicant de 1NV-202B o | etermines that the green CLSD lights are lit for 1NV-203A & on 1MC-10. | |
| COMMENTS: | | |
| | | |

| | STEP/STANDARD | SAT/UNSAT |
|-------------------|---|-----------|
| <u>STEP 13</u> g. | Ensure 1NI-334B (NI Pump Suct X-Over From ND) - OPEN. | |
| STANDARD: | | SAT |
| Applicant de | etermines the red OPEN light is lit for 1NI-334B on 1MC-11. | |
| COMMENTS: | | |

| <u>STEP 14</u> h. | OPEN the following valves: | CRITICAL |
|---|--|--------------|
| | 1NI-332A (NI Pump Suct X-Over From ND) 1NI-333B (NI Pump Suct From ND). | STEP |
| STANDARD: | | |
| Applicant de 333B on 1M | epresses the red OPEN pushbuttons for 1NI-332A and 1NI- IC-11. | |
| Examiner Note: This step is critical to align a flowpath from 1A ND pump to the suction of the NV and NI pumps. | | SAT UNSAT |
| COMMENTS: | | |
| | | |

| | STEP/STANDARD | SAT/UNSAT |
|--|--|-----------|
| <u>STEP 15</u> i. | <u>> 15</u> i. Align ND discharge to suction of NI and NV pumps as follows: | |
| | 1) OPEN 1ND-28A (ND Supply To NV & 1A NI Pmps) | |
| | 1 mpo). | |
| STANDARD: | | |
| Applicant depresses the red OPEN pushbutton for 1ND-28A on 1MC-11 and determines that the valve will not open and continues. | | |
| | | SAT |
| Examiner Note | : This step is critical to align a flowpath from 1A ND pump to the suction of the NV and NI pumps. | UNSAT |
| COMMENTS: | | |
| | | |
| | | |
| | | |

| <u>STEP 16</u> 2) O | PEN 1NI-136B (ND Supply To NI Pump 1B). | |
|---|--|-------|
| STANDARD: | | |
| Applicant depresses the red OPEN pushbutton for 1NI-136B on 1MC- 11, determines that the valve will not open and proceeds to the next step. | | SAT |
| Examiner Note: | 1NI-136B will not open due to an interlock with 1NI- 184B | UNSAT |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| STEP 17 j. Verify at least one ND train aligned to provide suction to NV and NI as follows: | |
| • <u>A Train</u> : | |
| 1A ND pump running 1ND-28A (ND Supply To NV & 1A NI Pmps) - OPEN. | SAT |
| STANDARD: | |
| Applicant determines no train can be aligned to provide suction to NV and NI and proceeds to the RNO. | |
| EXAMINER Note: This begins the alternate path of this JPM. | |
| COMMENTS: | |
| | |

| <u>STEP 18</u> 6.j. | RNO j. Perform the following: | |
|---|---|-------|
| | <u>IF</u> either valve is in intermediate position, <u>THEN</u> allow 20 seconds for valve to open. | |
| STANDARD: | | SAT |
| Applicant determines that this step does not apply. | | UNSAT |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 192)IF either value is open AND its associated ND pump on, THEN GO TO Step 6.k. | |
| STANDARD: | SAT |
| Applicant determines that this step does not apply. | LINGAT |
| <u>COMMENTS:</u> | |

| STEP 20 | B) IF both A train and B train unavailable, THEN trip all NV and NI pumps. | CRITICAL STEP |
|---------------------------------|--|------------------|
| Applicant dete depresses the | | |
| NI PMP 1A an | a NI PUMP 1B. | |
| Examiner Note: | This step is critical to protect the NV and NI pumps from damage from loss of suction and allow them to be available later when the FWST has been refilled. | SAT |
| EXAMINER CUE | "Another operator will complete ES-1.3. This JPM is complete." | |
| COMMENTS: | | |
| | END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

• A LOCA has occurred on Unit 1.

INITIATING CUES:

• 1AD-9, E/8 'FWST LO-LO LEVEL' annunciator is lit and the Control Room Supervisor instructs you, as the BOP, to transfer to Cold Leg Recirculation using EP/1/A/5000/ES-1.3 (Transfer to Cold Leg Recirculation) step 6.

A. Purpose

This procedure provides the necessary instructions for transferring the safety injection system and containment spray system to the recirculation mode.

B. Symptoms or Entry Conditions

This procedure is entered from:

- EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant), Step 17, on low FWST level.
- EP/1/A/5000/ECA-2.1 (Uncontrolled Depressurization of All Steam Generators), Step 11, on low FWST level.
- Other procedures whenever FWST level reaches the switchover setpoint (1AD-9, D/8 "FWST 2/4 LO LEVEL").

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|
| C. Operator Actions | |
| ✓ 1. Monitor Enclosure 1 (Foldout Page). | |
| NOTE CSF should not be implemented u | until directed by this procedure. |
| 2. Verify at least one of the following annunciators - LIT: | <u>IF</u> both alarms dark, <u>THEN</u> perform the following: |
| ✓ • 1AD-20, B/2 "CONT. SUMP LEVEL >2.5 ff" | a. Ensure S/I - RESET: |
| ~2.5 It | 1) ECCS. |
| • 1AD-21 B/2 "CONT SUMPLEVEL | 2) D/G load sequencers. |
| >2.5 ft". | b. Ensure ND pumps - OFF. |
| | IF either ND pump continues to run, <u>THEN</u> isolate affected trains discharge path as follows: |
| | 1) <u>IF</u> train "A" affected, <u>THEN</u> CLOSE: |
| | 1NI-173A (ND Hdr 1A To Cold Legs C&D) |
| | 1ND-32A (ND Train 1A Hot Leg Inj Isol). |
| | 2) <u>IF</u> train "B" affected, <u>THEN</u> CLOSE: |
| | 1NI-178B (ND Hdr 1B To Cold Legs A&B) |
| | 1ND-65B (ND Train 1B Hot Leg Inj Isol). |
| | (RNO continued on next page) |
| | |

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--------------------------|--|
| 2. (Continued) | |
| | d. Verify ND suction alignment: |
| | Ensure the following valves - CLOSED: |
| | — • 1FW-27A (ND Pump 1A Suct From FWST) |
| | 1FW-55B (ND Pump 1B Suct From FWST). |
| | IF 1FW-27A or 1FW-55B will not close, THEN perform the following: |
| | a) Depress the following "DEFEAT" pushbutton(s) for affected train(s): |
| | - • "C-LEG RECIR FWST TO CONT SUMP SWAP TRN A" |
| | "C-LEG RECIR FWST TO CONT SUMP SWAP TRN B". |
| | b) CLOSE associated ND pump(s) containment sump suction valve(s). |
| | e. <u>IF</u> FWST level less than 20% (1AD-9, D/8 "FWST 2/4 LO LEVEL" - LIT) due to FWST puncture, <u>THEN</u> <u>RETURN</u> <u>TO</u> procedure and step in effect. |
| | f. <u>IF</u> LOCA inside containment has occurred, <u>THEN</u> perform the following: |
| | Do <u>NOT</u> start ND pump(s) until at least one "CONT. SUMP LEVEL >2.5 ft" annunciator - LIT. |
| | 2) <u>GO TO</u> Step 3. |
| | (RNO continued on next page) |

| RESPONSE NOT OBTAINED |
|--|
| |
| g. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). |
| h. <u>GO</u> <u>TO</u> EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation). |
| |
| a. Locally reset ECCS. <u>REFER</u> <u>TO</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 4 (ECCS Master Reset). |
| b. Dispatch operator to open affected sequencer(s) control power breaker: |
| 1EDE-F01F (Diesel Generator Load Sequencer Panel 1DGLSA) (AB-577, BB-46, Rm 496) |
| 1EDF-F01F (Diesel Generator Load Sequencer Panel 1DGLSB) (AB-560, BB-46, Rm 372). |
| |
| |
| |
| |
| |
| |

| | ACTION/EXPECTED RESPONSE | | | RESPONSE NOT OBTAINED |] |
|----|---|------|----------------------------|--|---------|
| 4. | Align ND System for recirc as follows | 6: | | | |
| | a. Verify following valves - OPEN: | | a. Pe | rform the following: | |
| | ✓ • 1NI-185A (ND Pump 1A Cont Sun Suct) | np M | N <u>/A</u> 1) 7 | <u>IF</u> all affected valve(s) intentionally closed by previous guidance, <u>THEN GO TO</u> | |
| | 1NI-184B (ND Pump 1B Cont Sun Suct). | np | | Step 4.b. | |
| | | | <u>✓</u> 2) | OPEN affected containment sump suction valve(s). | |
| | | | 3) | IF affected containments sump valve(s) not open, THEN perform the following: | m |
| | | | <u>×</u> | a) Stop ND pump(s) associated with closed containment sun suction valve(s). | t np |
| | | | | b) CLOSE associated ND pump(s) suction valve from the FWST: | |
| | | | | 1FW-27A (ND Pump 1A Suct From FWST) | |
| | | | | • 1FW-55B (ND Pump 1B Suct From FWST). | |
| | | | | c) <u>WHEN</u> ND pump(s) suction valve from FWST closed, <u>THEN</u> OPEN affected containment sump suction valve(s): | |
| | | | | • 1NI-185A (ND Pump 1A Cont Sump Suct) | |
| | | | | • 1NI-184B (ND Pump 1B Cont Sump Suct). | |
| | | | (RNC | D continued on next page) | |

| | ACTION/EXPECTED RESPONSE | | | RESPONSE NOT OBTAINED |] |
|---|--------------------------|---|------------------|---|-----------------|
| 4 | . (Continued) | | N/A | d) IF all the following criteria m THEN start ND pump | et, |
| | | | | previously running: ND pump secured by this step | |
| | | | | Affected containment sum suction valve - OPEN | р |
| | | N | /A ⁴⁾ | Adequate sump level exist IF both containment sump suctively valves closed, <u>THEN</u> perform the following: | ts. on าย |
| | | | | a) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). | |
| | | | | b) <u>GO</u> <u>TO</u> EP/1/A/5000/ECA-1. (Loss of Emergency Coolant Recirculation). | .1 t |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

ACTION/EXPECTED RESPONSE

- 4. (Continued)
 - b. Verify following valves CLOSED:
 - ✓ 1FW-27A (ND Pump 1A Suct From FWST)
 - ✓ 1FW-55B (ND Pump 1B Suct From FWST).

RESPONSE NOT OBTAINED

- b. Perform the following:
- ____1) CLOSE affected valve(s).
- 2) <u>IF</u> associated containment sump valve closed by previous guidance, <u>THEN GO TO</u> Step 4.c.
 - 3) <u>**IF**</u> valve(s) will not close, <u>**THEN**</u> perform the following:
 - a) Stop associated ND pump(s).
 - b) Depress the following "DEFEAT" pushbutton(s) for affected train(s):
 - "C-LEG RECIR FWST TO CONT SUMP SWAP TRN A"
 - "C-LEG RECIR FWST TO CONT SUMP SWAP TRN B".
 - ___ c) CLOSE associated ND pump(s) containment sump suction valve(s).
 - d) <u>IF</u> both containment sump suction valves closed, <u>THEN</u> perform the following:
 - (1) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees).
 - (2) GO TO EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation).

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|
| 4. (Continued) | |
| c. Verify ND pumps - ON. | c. Perform the following: |
| | (1) IF any ND pump aligned to sump AND available to start after adequate sump level exists, THEN GO TO Step 5. |
| | N/A 2) IF no ND pump available OR no ND train can be aligned for recirc, THEN perform the following: |
| | a) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). |
| | b) <u>GO TO</u> EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation). |
| 5. Verify FWST LO-LO level as follows: | Perform the following: |
| ● 1AD-9, E/8 "FWST LO-LO LEVEL" - | |
| 1AD-9, E/8 "FWST LO-LO LEVEL" - LIT OR FWST level - LESS THAN 5%. | <u>CAUTION</u> The following step takes priority over any other EP guidance if sump recirc capabilities exist. |
| 1AD-9, E/8 "FWST LO-LO LEVEL" - LIT OR FWST level - LESS THAN 5%. | CAUTION The following step takes priority over any other EP guidance if sump recirc capabilities exist. → |
| 1AD-9, E/8 "FWST LO-LO LEVEL" - LIT OR FWST level - LESS THAN 5%. | CAUTION The following step takes priority over any other EP guidance if sump recirc capabilities exist. A. WHEN FWST level at 5% (1AD-9, E/8 "FWST LO-LO LEVEL" - LIT), THEN immediately GO TO Step 6 to align NV and NI pumps for cold leg recirc. ✓ b. Ensure Step 6 flagged to complete later. |
| 1AD-9, E/8 "FWST LO-LO LEVEL" - LIT OR FWST level - LESS THAN 5%. | CAUTION The following step takes priority over any other EP guidance if sump recirc capabilities exist. A. WHEN FWST level at 5% (1AD-9, E/8 "FWST LO-LO LEVEL" - LIT), THEN immediately GO TO Step 6 to align NV and NI pumps for cold leg recirc. ✓ b. Ensure Step 6 flagged to complete later. ✓ c. GO TO Step 7. |
| • 1AD-9, E/8 "FWST LO-LO LEVEL" - LIT • FWST level - LESS THAN 5%. | CAUTION The following step takes priority over any other EP guidance if sump recirc capabilities exist. A. WHEN FWST level at 5% (1AD-9, E/8 "FWST LO-LO LEVEL" - LIT), THEN immediately GO TO Step 6 to align NV and NI pumps for cold leg recirc. ✓ b. Ensure Step 6 flagged to complete later. ✓ c. GO TO Step 7. |
| • 1AD-9, E/8 "FWST LO-LO LEVEL" - LIT • FWST level - LESS THAN 5%. | CAUTION The following step takes priority over any other EP guidance if sump recirc capabilities exist. A WHEN FWST level at 5% (1AD-9, E/8 "FWST LO-LO LEVEL" - LIT), THEN immediately GO TO Step 6 to align NV and NI pumps for cold leg recirc. ✓ b. Ensure Step 6 flagged to complete later. ✓ c. GO TO Step 7. |
| • 1AD-9, E/8 "FWST LO-LO LEVEL" - LIT OR • FWST level - LESS THAN 5%. | CAUTION The following step takes priority over any other EP guidance if sump recirc capabilities exist. → • • • • • • • • • • • • • • • • • • • |

PAGE NO. 9 of 42 Revision 30

| ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|--|-------------|--|
| 6. <u>WHEN</u> FWST level decreases to 5% (1AD-9, E/8 "FWST LO-LO LEVEL" - LIT), <u>THEN</u> align NV and NI Systems for recirc as follows: a. Ensure Enclosure 1 (Foldout Page) monitored. | | |
| NOTE CSF should not be implemented | ed until di | directed by this procedure. |
| b. Verify at least one of the following annunciators - LIT: | | b. <u>IF</u> both annunciators dark, <u>THEN</u> perform the following: |
| • 1AD-20, B/2 "CONT. SUMP LEVE >2.5 ft" | EL | 1) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). |
| • 1AD-21, B/2 "CONT. SUMP LEVE >2.5 ft". | EL | 2) <u>GO</u> <u>TO</u> EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation). |
| | | |
| | | |
| | | |
| | | |

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |] |
|---|---|--------|---|---------|
| 6 | . (Continued) | | | |
| _ | c. Verify both ND pumps - ON. | c. Per | form the following: | |
| | | 1) | IF 1NI-185A (ND Pump 1A Con Sump Suct) open, <u>THEN</u> start N pump 1A. | t JD |
| | | 2) | IF 1NI-184B (ND Pump 1B Con Sump Suct) open, <u>THEN</u> start N pump 1B. | t ID |
| | | 3) | IF any ND pump running with suction aligned to sump, <u>THEN</u> <u>GO</u> <u>TO</u> Step 6.d. | |
| | | 4) | IF no ND pump running with suction aligned to sump, THEN perform the following: | |
| | | | a) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). | |
| | | _ | b) <u>GO</u> <u>TO</u> EP/1/A/5000/ECA-1. (Loss of Emergency Coolant Recirculation). | .1 t |
| | | | | |
| | d. Ensure the following valves - CLOSED: | | | |
| | • 1ND-32A (ND Train 1A Hot Leg Inj Isol) | | | |
| | • 1ND-65B (ND Train 1B Hot Leg Inj Isol). | | | |
| | | | | |
| | | | | |

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|
| ACTION/EXPECTED RESPONSE 6. (Continued) e. Isolate NI pump miniflow as follows: _ 1) Verify NC pressure - LESS THA 1620 PSIG. 2) Ensure the following valves - CLOSED: _ • 1NI-115A (NI Pump 1A Miniflow Isol) _ • 1NI-144A (NI Pump 1B Miniflow Isol). _ 3) Ensure "PWR DISCON FOR 1NI-147B" switch in "ENABLE". _ 4) Ensure 1NI-147B (NI Miniflow Hdr To FWST Isol) - CLOSED. | N 1) Stop NI pumps. |
| Verify at least one of the following N pumps miniflow valves - CLOSED: 1NV-203A (NV Pumps A&B Recirc Isol) OR 1NV-202B (NV Pmps A&B Recirc Isol). | v f. Perform the following: 1) <u>IF</u> 1NI-9A (NV Pmp C/L Inj Isol) <u>AND</u> 1NI-10B (NV Pmp C/L Inj Isol) closed, <u>THEN</u> maintain charging flow greater than 80 GPM. 2) CLOSE the following valves: • 1NV-203A (NV Pumps A&B Recirc Isol) • 1NV-202B (NV Pmps A&B Recirc Isol). |
| g. Ensure 1NI-334B (NI Pump Suct X-Over From ND) - OPEN. | |

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|
| 6. (Continued) | |
| h. OPEN the following valves: | |
| • 1NI-332A (NI Pump Suct X-Over From ND) | |
| • 1NI-333B (NI Pump Suct From ND). | |
| Align ND discharge to suction of NI and NV pumps as follows: | |
| 1) OPEN 1ND-28A (ND Supply To NV & 1A NI Pmps). | |
| 2) OPEN 1NI-136B (ND Supply To NI Pump 1B). | |
| j. Verify at least one ND train aligned to provide suction to NV and NI as follows: <u>A Train</u>: 1A ND pump running 1ND-28A (ND Supply To NV & 1A NI Pmps) - OPEN. OR <u>B Train</u>: 1B ND pump running 1NI-136B (ND Supply To NI Pump 1B) - OPEN. | j. Perform the following: 1) IF either valve in intermediate position, <u>THEN</u> allow 20 seconds for valve to open. 2) IF either valve open <u>AND</u> associated ND pump on, <u>THEN</u> <u>GO TO</u> Step 6.k. 3) IF both A train and B train unavailable, <u>THEN</u> trip all NV and NI pumps. |

_

TRANSFER TO COLD LEG RECIRCULATION

PAGE NO. 13 of 42 Revision 30

| | ACTION/EXPECTED RESPONSE | | R | ESPONSE NOT OBTAINED |] |
|------|--|-----|--|--|---|
| 6 | 6. (Continued) k. Isolate FWST from NV and NI pump | s | | | |
| | 1) Place "PWR DISCON FOR 1NI-100B" switch in "ENABLE". | | | | |
| | 2) CLOSE 1NI-100B (NI Pmps Suc From FWST). | ct | | | |
| | 3) CLOSE the following valves: | | | | |
| | 1NV-252A (NV Pumps Suct From FWST) | | | | |
| | 1NV-253B (NV Pumps Suct From FWST). | | | | |
| _ 7. | Verify Enclosure 2 (Aligning NS for Recirculation) - PREVIOUSLY COMPLETED. | > ✓ | NOTE Align Na Enclosu Recircu | An invalid SPDS orange path may briefly exist between opening NS suction valve from sump and starting NS pump. FR-Z.1 should not be entered unless NS pump fails to start. S for recirc. <u>REFER TO</u> are 2 (Aligning NS for lation). | l |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|----|--------------------------|--|
| 8. | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED Perform the following while NV and NI pumps lower FWST level to 5% (1AD-9, E/8 "FWST LO-LO LEVEL" - LIT): ✓ a. Ensure continuous action of Step 5 RNO monitored AND takes priority over any other EP guidance. b. Isolate NI pump miniflow in preparation for swap to cold leg recirc as follows: N/A 1) IF NC pressure greater than 1620 PSIG, THEN stop NI pumps. 2) CLOSE the following valves: ✓ • 1NI-115A (NI Pump 1A Miniflow Isol) ✓ • 1NI-144A (NI Pump 1A Miniflow Isol) ✓ • 1NI-1447B (NI Pump 1B Miniflow Isol). ✓ 1) CLOSE 1NI-147B (NI Miniflow Hdr To FWST Isol). c. Establish KC flow to ND Hx(s) as follows: 1) Ensure the following valves open: ✓ • 1KC-81B (KC To ND Hx 1B Sup Isol). N/A 2) IF KC flow path not established, THEN evaluate local actions to establish KC flow to ND train(s) in service. |
| | | (RNO continued on next page) |

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--------------------------|---|
| 8. (Continued) | |
| | d. <u>IF</u> ND flow to NC loops established, <u>THEN</u> perform the following: |
| | \checkmark 1) Monitor ND pumps for proper operation. |
| | (Loss of Emergency Coolant Recirculation). |
| | e. IF AT ANY TIME B/O occurs, THEN restart S/I equipment previously on. |
| | ✓ f. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). |
| | \mathbf{M} g. <u>RETURN</u> <u>TO</u> procedure and step in effect. |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

CNS EP/1/A/5000/ES-1.3

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|-----------|---|--|
| <u>CA</u> | If a B/O occurs after aligning sequence on without adeq the only running ND pump piping will void. The step is hammer when ND pump(s) This guidance takes prioritiequipment previously on a sequence on without adeq the only running ND pump(s) | ning to Cold Leg Recirc, NV pumps will equate suction and void ND piping. If np trips while in Cold Leg Recirc, ND p sequence below will minimize water s) restarted. rity over other EP steps that restart after a B/O. |
| 9. | <u>IF AT ANY TIME</u> B/O occurs, <u>THEN</u> perform the following: | |
| | a. Wait for sequencer to start RN pump on bus energized by D/G. | np |
| | b. Reset D/G sequencer(s). | |
| | IF both ND pumps off, THEN perform the following: | orm |
| | 1) Ensure all NV and NI pumps - OFF. | |
| | 2) Wait one minute to allow ND discharge piping to refill. | |
| | 3) Restart ND pump(s). | |
| | _d. Restart S/I equipment previously on. | n. |
| | | |

| | ACTION/EXPECTED RESPONSE | | | RESPONSE NOT OBTAINED |
|-----------|--|----|--------|--|
| <u>CA</u> | <u>CAUTION</u> • S/I recirculation flow to NC System must be maintained at all times. | | | |
| | Aux Bldg radiation may be higher due to Cold Leg Recirc alignment. | | | old Leg Recirc |
| 10. | Verify proper Cold Leg Recirc flow an valve alignment as follows: | nd | | |
| | a. Verify proper recirc flow as follows: | | a. Per | form the following: |
| | • "NV S/I FLOW" - INDICATING FLOW | | 1) | IF any S/I pump on without suction flowpath, THEN stop |
| | Both NI pumps - INDICATING FLOW | | 2) | IF at least one flow path cannot |
| | Both ND pumps - INDICATING FLOW. | | | sump to NC System, <u>THEN</u> perform the following: |
| | | | | a) Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). |
| | | | | b) <u>GO</u> <u>TO</u> EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation). |
| | | | 3) | WHEN time and manpower |

3) <u>WHEN</u> time and manpower permit, <u>THEN</u> continue attempts to establish maximum Cold Leg Recirc capability.

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|
| 10. (Continued) | |
| b. Verify KC flow to ND heat exchange - GREATER THAN 5000 GPM. | rs b. Establish KC flow to affected ND Hx(s) as follows: |
| | 1) Ensure the following valves open: |
| | 1KC-56A (KC To ND Hx 1A Sup Isol) |
| | 1KC-81B (KC To ND Hx 1B Sup Isol). |
| | 2) <u>IF</u> KC flow path not established, <u>THEN</u> evaluate local actions to establish KC flow to ND train(s) in service. |
| c. Verify the following valves - CLOSEI 1NI-100B (NI Pmps Suct From FWST) 1NV-252A (NV Pumps Suct From FWST) 1NV-253B (NV Pumps Suct From FWST). | D: c. IF accessible, THEN dispatch operator to close affected valve(s): 1NI-100B (NI Pmps Suct From FWST) (AB-552, HH-JJ, 53-54, Rm 234) 1NV-252A (NV Pumps Suct From FWST) (AB-554, HH-53, Rm 234) (Ladder needed) 1NV-253B (NV Pumps Suct From FWST) (AB-554, HH-JJ, 53-54, Rm 234) (Ladder needed). |
| | |

CNS EP/1/A/5000/ES-1.3

| | ACTION/EXPE | CTED RESPONSE | | | RESPONSE NOT OBTAINED | |
|------------------------------------|--|---|----------------|--|---|---|
| 1 | 0. (Continued) d. Verify the follo — • 1NV-89A (N Isol) — • 1NV-91B (N Isol). | wing valves - CLOSE IC Pmps Seal Ret Cor IC Pmps Seal Ret Cor | D: ht ht | d. <u>IF</u> the 1) - - 2) - | both valves open, <u>THEN</u> perform e following: <u>IF</u> NC System pressure less tha 385 PSIG, <u>THEN</u> perform the following: a) Stop NC pump(s). b) Wait 5 minutes for NC pump coastdown. CLOSE the following valves: 1NV-89A (NC Pmps Seal Ret Cont Isol) 1NV-91B (NC Pmps Seal Ret Cont Isol). | n |
| <u>CA</u> | <u>CAUTION</u> Monitoring the following pumps must be performed as long as ECCS pumps are aligned to sump. | | | | | |
| 11. | 11. Monitor Cold Leg Recirc capability as follows: | | | | | |
| a. Monitor the following pumps for | | | | | | |

- proper operation:
 - NV pumpsND pumps
- NI pumps
- NS pumps.
- b. IF AT ANY TIME loss of S/I recirc flow to NC System occurs, THEN GO TO EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation).
- Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). 12.

ACTION/EXPECTED RESPONSE

- 13. Monitor ECCS leakage normal as follows:
 - a. Verify auxiliary building radiation normal:
 - All area monitor EMF trip 1 lights -DARK
 - EMF-41 (Aux Bldg Ventilation) trip 1 light - DARK.
 - b. <u>IF AT ANY TIME</u> Unit 1 ECCS leakage into auxiliary building suspected, <u>THEN</u> perform Step 13.

RESPONSE NOT OBTAINED

Identify and isolate leak as follows:

- a. Monitor the following to determine location of activity:
 - OAC EMF alarms
- OAC VA graphic
- Area monitor EMFs.
- ____b. Dispatch operator to locate potential Unit 1 leak.
 - **NOTE** EP/1/A/5000/ECA-1.2 (LOCA Outside Containment) should not be entered once the transfer to cold leg recirculation has occurred because it may isolate the recirc flowpath. Core cooling is the overriding concern.
 - IF Unit 1 ECCS leakage into auxiliary building identified, THEN notify TSC to determine leak isolation using the following guidance:
 - At least one train of ECCS must remain in service to provide core cooling
 - Local area habitability and off site dose rates should be evaluated
 - Sufficient containment sump inventory must be maintained
 - <u>IF</u> leak on only available ECCS train, <u>THEN</u> restoring redundant train is high priority.

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED | |
|-----|--|--------|---|---|
| 14. | Initiate makeup to FWST as follows: | | | |
| | a. Verify the following valves - CLOSED: | a. Per | form the following: | |
| | • 1NV-252A (NV Pumps Suct From FWST) | 1) | WHEN time and manpower permit, THEN coordinate with | 4 |
| | • 1NV-253B (NV Pumps Suct From FWST) | | valve(s). | ג |
| | • 1FW-27A (ND Pump 1A Suct From FWST) | 2) | <u>WHEN</u> all valves closed, <u>THEN</u> perform Step 14. | |
| | • 1FW-55B (ND Pump 1B Suct From FWST). | 3) | <u>GO</u> <u>TO</u> Step 15. | |
| | • 1NI-100B (NI Pmps Suct From FWST) | | | |
| | • 1NS-20A (NS Pump 1A Suct From FWST) | | | |
| | • 1NS-3B (NS Pump 1B Suct From FWST). | | | |

_

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED | | | |
|--|--|--|--|--|
| 14. (Continued) | | | | |
| • Makeup to FWST greater than 50,000 gallons may violate containment flooding assumptions. | | | | |
| Makeup to FWST at con Tech Spec value may vi assumptions. | icentrations other than the minimum iolate containment sump chemistry | | | |
| b. Initiate makeup to FWST as follows: | | | | |
| 1) Verify Unit 1 RMWST available | 1) Perform the following: | | | |
| for FWST makeup. | a) Initiate makeup of 50,000 gallons to FWST at minimum Tech Spec boron concentration. <u>REFER TO</u> OP/1/A/6200/014 (Refueling Water System). | | | |
| | b) GO TO Step 15. | | | |
| 2) Initiate makeup of 50,000 gallon to FWST at minimum Tech Spect boron concentration. <u>REFER</u> TO Enclosure 3 (FWST Makeup). | is c O | | | |
| 15. Verify procedure entered from EP/1/A/5000/E-1 (Loss of Reactor or Secondary Coolant). | Consult station management to evaluate the potential need for transfer to hot leg recirc. | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED | |
|-----|---|--|---|
| 16. | Verify ND & NS rooms sump pump interlock status as follows: | | |
| | Verify "ON" released on the following switches: | ga. Depress "LCL" on affected switch(s) to release "ON" button. | |
| | "ND & NS ROOM SMP PMP 1A" "ND & NS ROOM SMP PMP 1B" "ND & NS ROOM SMP PMP 2A" (2MC11) "ND & NS ROOM SMP PMP 2B" (2MC11). | | |
| | b. Verify "RESET" lights dark. "ND & NS ROOM SMP PMP 1A" "ND & NS ROOM SMP PMP 1B" "ND & NS ROOM SMP PMP 2A" (2MC11) "ND & NS ROOM SMP PMP 2B" (2MC11). | b. Dispatch operator to place local control switch for affected pump(s) to "STDBY" on 1ELCP0243 (AB-547, MM-53, Rm 212). |) |
| | Place protective shrouds over the following control switches to prevent inadvertent reset: | t | |
| | "ND & NS ROOM SMP PMP 1A" "ND & NS ROOM SMP PMP 1B" "ND & NS ROOM SMP PMP 2A" (2MC11) "ND & NS ROOM SMP PMP 2B" (2MC11). | | |
| _ | d. Consult station management for recommendation and concurrence prior to resetting interlocks. | | |

| | ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED |
|-------|---|
| NO | The SNSWP is not analyzed for KF System heat load during a Cold Leg Recirc alignment. RN is considered aligned to the SNSWP when both RN suction and discharge are aligned to the SNSWP. |
| 17. | <u>IF AT ANY TIME</u> Unit 1 aligned for Cold Leg Recirc <u>AND</u> RN aligned to SNSWP, <u>THEN</u> secure opposite unit Spent Fuel Pool Cooling System as follows: |
| | a. Shutdown Unit 2 KF System. <u>REFER</u> <u>TO</u> OP/2/A/6200/005 (Spent Fuel Cooling System). |
| | b. Monitor Unit 2 Spent Fuel Pool level and temperature. <u>REFER TO</u> AP/2/A/5500/041 (Loss of Spent Fuel Cooling or Level). |
| _ 18. | <u>RETURN</u> <u>TO</u> procedure and step in effect. |
| | END |
| | |
| | |
| | |
| | |

Enclosure 1 - Page 1 of 1 Foldout Page

1. 1AD-9, E/8 "FWST LO-LO LEVEL" (5%) LIT Alarm Actions: • WHEN FWST level reaches 5% "FWST LO-LO LEVEL", THEN perform the following: a. Record time of "FWST LO-LO LEVEL" b. Ensure any ND or NS pump(s) aligned to FWST - OFF. c. IF NV or NI pump run for more than 5 minutes after going below 5% "FWST LO-LO LEVEL" with suction only from FWST, **THEN** stop NV and NI pumps. d. IF FWST level goes below 2% (use OAC indication if available) with suction only from FWST, THEN stop NV and NI pumps. e. IF NV or NI pump(s) stopped per guidance above, THEN restart available NV and NI pumps tripped by this step after alignment to cold leg recirculation. 2. Loss Of Emergency Coolant Recirculation: • IF Section C. (Operator Actions), Step 4, has been completed AND recirc flow cannot be aligned or maintained, **THEN** perform the following: a. Implement EP/1/A/5000/F-0 (Critical Safety Function Status Trees). b. GO TO EP/1/A/5000/ECA-1.1 (Loss of Emergency Coolant Recirculation). 3. S/I Reinitiation Criteria: • IF NC subcooling based on core exit T/Cs less than 0°F OR Pzr level cannot be maintained greater than 11% (30% ACC), THEN perform the following to restore subcooling and level: Start one or more S/I pumps. Realign NV S/I flow path. REFER TO EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 14 (NV Alignment To S/I Mode).

CNS EP/1/A/5000/ES-1.3

TRANSFER TO COLD LEG RECIRCULATION

Enclosure 2 - Page 1 of 12 Aligning NS for Recirculation

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|----|---------------------------------------|--|
| 1. | Verify both NS pumps - OFF. | Perform the following: |
| | | a. IF all the following conditions met: |
| | | NS in service |
| | | NS suction aligned to containment sump |
| | | RN established to associated NS Hx, |
| | | |
| | | b. Ensure both NS pumps - OFF. |
| | | |
| 2. | CLOSE the following valves: | |
| _ | • 1NS-20A (NS Pump 1A Suct From FWST) | |
| _ | • 1NS-3B (NS Pump 1B Suct From FWST). | |
| 3. | Verify containment pressure - | Perform the following: |
| | GREATER THAN 3 PSIG. | a. Wait up to 20 seconds for 1NS-20A and 1NS-3B to close. |
| | | b. OPEN 1NS-18A (NS Pmp A Suct From Cont Sump). |
| | | c. OPEN 1NS-1B (NS Pmp B Suct From Cont Sump). |
| | | d. <u>IF AT ANY TIME</u> containment pressure goes above 3 PSIG, <u>THEN</u> perform Enclosure 2 (Aligning NS for Recirculation). |
| | | e. <u>RETURN TO</u> procedure section and step in effect. |
| | | |
CNS EP/1/A/5000/ES-1.3

TRANSFER TO COLD LEG RECIRCULATION

Enclosure 2 - Page 2 of 12 Aligning NS for Recirculation

PAGE NO. 27 of 42 Revision 30

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|--|---|
| 4. Verify at least one of the following annunciators - LIT: | Perform the following: a. <u>WHEN</u> at least one "CONT. SUMP |
| 1AD-20, B/3 "CONT. SUMP LEVEL >3.3 ft" | LEVEL >3.3 ft" annunciator - LIT, THEN GO TO Step 5. |
| OR — • 1AD-21, B/3 "CONT. SUMP LEVEL >3.3 ft". | b. Do not continue in this enclosure until at least one annunciator - LIT. |
| 5. Align NS train 1A to containment sump as follows: | |
| a. Verify NS pump 1A - AVAILABLE TO RUN. | a. <u>GO TO</u> Step 6. |
| b. Verify 1NI-185A (ND Pump 1A Cont Sump Suct) - OPEN. | b. <u>GO TO</u> Step 6. |
| c. Verify NS pump 1B - OFF. | c. <u>IF</u> NS pump 1B running <u>AND</u> RN established to NS Hx 1B, <u>THEN</u> perform the following: |
| | 1) Ensure 1NS-20A (NS Pump 1A Suct From FWST) - CLOSED. |
| | 2) Ensure 1NS-18A (NS Pmp A Suct From Cont Sump) - OPEN. |
| | 3) <u>GO TO</u> Step 7. |
| d. OPEN 1NS-29A (NS Spray Hdr 1A Cont Isol). | d. <u>GO TO</u> Step 6. |
| e. OPEN 1NS-32A (NS Spray Hdr 1A Cont Isol). | e. <u>GO TO</u> Step 6. |

| CNS |
|--------------------|
| EP/1/A/5000/ES-1.3 |

Enclosure 2 - Page 3 of 12 Aligning NS for Recirculation

| ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|---|
| 5. (Continued) | |
| f. Verify 1NS-20A (NS Pump 1A Suct From FWST) - CLOSED. | f. IF 1NS-20A remained OPEN or INTERMEDIATE for over 20 seconds, <u>THEN GO TO</u> Step 6. |
| g. OPEN 1NS-18A (NS Pmp A Suct From Cont Sump). | |
| h. Verify the following valves - OPEN: | h. IF any valve remains CLOSED or |
| 1NS-29A (NS Spray Hdr 1A Cont Isol) | THEN GO TO Step 6. |
| 1NS-32A (NS Spray Hdr 1A Cont Isol) | |
| 1NS-18A (NS Pmp A Suct From Cont Sump). | |
| i. Verify containment pressure - | i. Perform the following: |
| GREATER THAN 1 PSIG. | 1) CLOSE the following valves: |
| | 1NS-29A (NS Spray Hdr 1A Cont Isol) 1NS-32A (NS Spray Hdr 1A Cont Isol). |
| | 2) IF AT ANY TIME containment pressure exceeds 1 PSIG, <u>THEN</u> <u>RETURN</u> <u>TO</u> Step 4. |
| | 3) GO TO Step 7. |
| j. Start NS pump 1A. | j. <u>GO TO</u> Step 6. |

Enclosure 2 - Page 4 of 12 Aligning NS for Recirculation

ACTION/EXPECTED RESPONSE **RESPONSE NOT OBTAINED** 5. (Continued) CAUTION Exceeding 4650 GPM RN flow through an NS Hx will cause damage to the Hx tubes. k. Align RN to NS Hx 1A as follows: 1) Verify at least one of the 1) Perform the following to support following: NS Hx cooling flow: ____a) IF only one A train RN pump • All Unit 1 and Unit 2 RN pumps on, THEN CLOSE Unit 2 - ON 2RN-48B (RN Supply X-Over OR Isol). RN System - ALIGNED FOR b) IF only A train RN pumps on, THEN CLOSE one of the SINGLE SUPPLY HEADER following Unit 2 valves: OPERATION. 2RN-47A (RN Supply) X-Over Isol) OR 2RN-48B (RN Supply X-Over Isol). 2) OPEN 1RN-144A (NS Hx 1A Inlet Isol). WHEN 1RN-144A begins to 3) open, THEN OPEN 1KN-148A (NS Hx 1A Otlt Isol).

| CNS |
|--------------------|
| EP/1/A/5000/ES-1.3 |

Enclosure 2 - Page 5 of 12 Aligning NS for Recirculation

| RESPONSE NOT OBTAINED |
|---|
| |
| a. <u>GO</u> <u>TO</u> Step 7. |
| b. <u>IF</u> NS pump 1A running <u>AND</u> RN established to NS Hx 1A, <u>THEN</u> perform the following: |
| 1) Ensure 1NS-3B (NS Pump 1B Suct From FWST) - CLOSED. |
| 2) Ensure 1NS-1B (NS Pmp B Suct From Cont Sump) - OPEN. |
| 3) <u>GO TO</u> Step 7. |
| c. <u>GO</u> <u>TO</u> Step 7. |
| d. <u>GO</u> <u>TO</u> Step 7. |
| e. <u>IF</u> 1NS-3B remained OPEN or INTERMEDIATE for over 20 seconds, <u>THEN GO TO</u> Step 7. |
| |
| |

CNS EP/1/A/5000/ES-1.3

TRANSFER TO COLD LEG RECIRCULATION

Enclosure 2 - Page 6 of 12 Aligning NS for Recirculation

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|---|--|---|
| 6 | 6. (Continued) g. Verify the following valves - OPEN: 1NS-15B (NS Spray Hdr 1B Cont Isol) 1NS-12B (NS Spray Hdr 1B Cont Isol) 1NS-1B (NS Pmp B Suct From Cont Sump). | g. <u>IF</u> any valve remains CLOSED or INTERMEDIATE for over 25 seconds, <u>THEN GO TO</u> Step 7. |
| | h. Verify containment pressure - GREATER THAN 1 PSIG. | h. Perform the following: 1) CLOSE the following valves: 1NS-15B (NS Spray Hdr 1B Cont Isol) 1NS-12B (NS Spray Hdr 1B Cont Isol). 2) IF AT ANY TIME containment pressure exceeds 1 PSIG, THEN RETURN TO Step 4. 3) GO TO Step 7. |
| _ | _ i. Start NS pump 1B. | |

Enclosure 2 - Page 7 of 12 Aligning NS for Recirculation

ACTION/EXPECTED RESPONSE **RESPONSE NOT OBTAINED** 6. (Continued) CAUTION Exceeding 4650 GPM RN flow through an NS Hx will cause damage to the Hx tubes. j. Align RN to NS Hx 1B as follows: 1) Verify at least one of the 1) Perform the following to support NS Hx cooling flow: following: ____a) IF only one B train RN pump • All Unit 1 and Unit 2 RN pumps on, THEN CLOSE Unit 2 - ON 2RN-47A (RN Supply X-Over OR Isol). RN System - ALIGNED FOR b) **IF** only B Train RN pumps on, SINGLE SUPPLY HEADER THEN CLOSE one of the following Unit 2 valves: OPERATION. 2RN-48B (RN Supply) X-Over Isol) OR 2RN-47A (RN Supply) X-Over Isol). 2) OPEN 1RN-225B (NS Hx 1B Inlet Isol). WHEN 1RN-225B begins to 3) open, THEN OPEN 1RN-229B (NS Hx 1B Otht Isol).

Enclosure 2 - Page 8 of 12 Aligning NS for Recirculation

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|----|---|--|
| 7. | Verify proper NS alignment as follows | S: |
| | a. Verify1NS-18A (NS Pmp A Suct From Cont Sump) - OPEN. | a. Perform the following: 1) IF 1NI-185A (ND Pump 1A Cont Sump Suct) open AND 1NS-20A (NS Pump 1A Suct From FWST) closed, THEN OPEN 1NS-18A. 2) DO NOT start 1A NS pump until aligned to containment sump. |
| | b. Verify1NS-1B (NS Pmp B Suct From Cont Sump) - OPEN. | b. Perform the following: 1) IF 1NI-184B (ND Pump 1B Cont Sump Suct) open AND 1NS-3B (NS Pump 1B Suct From FWST) closed, THEN OPEN 1NS-1B. 2) DO NOT start 1B NS pump until aligned to containment sump. |
| | c. Verify NS pump 1A - ON. | c. Ensure the following valves - CLOSED: 1NS-29A (NS Spray Hdr 1A Cont Isol) 1NS-32A (NS Spray Hdr 1A Cont Isol). |
| | d. Verify NS pump 1B - ON. | d. Ensure the following valves - CLOSED: 1NS-15B (NS Spray Hdr 1B Cont Isol) 1NS-12B (NS Spray Hdr 1B Cont Isol). |

CNS EP/1/A/5000/ES-1.3

TRANSFER TO COLD LEG RECIRCULATION

Enclosure 2 - Page 9 of 12 Aligning NS for Recirculation

PAGE NO. 34 of 42 Revision 30

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED | |
|----|---|-----|---|---|
| 8. | <u>IF AT ANY TIME</u> NS flow lost <u>OR</u> RN flow lost to operating NS Hx, <u>THEN</u> start other NS pump as follows: | | | |
| | _a. Ensure affected NS pump - OFF. | | | |
| | b. CLOSE the following values for affected train: | | | |
| | <u>A Train</u>: 1NS-29A (NS Spray Hdr 1A Corlsol) 1NS-32A (NS Spray Hdr 1A Corlsol) 1RN-148A (NS Hx 1A Ottl Isol) 1RN-144A (NS Hx 1A Inlet Isol). | nt | | |
| | • <u>B Train</u> : | | | |
| | 1NS-12B (NS Spray Hdr 1B Corlsol) 1NS-15B (NS Spray Hdr 1B Corlsol) 1RN-229B (NS Hx 1B Otlt Isol) 1RN-225B (NS Hx 1B Inlet Isol). | nt | | |
| | c. Verify both the following Unit 2 values - OPEN: | s _ | c. <u>IF</u> affected valve closed to support NS Hx cooling flow, <u>THEN</u> ensure valve - | 3 |
| | 2RN-47A (RN Supply X-Over Isol) 2RN-48B (RN Supply X-Over Isol) | | ALIGNMENT. | |
| | d. RETURN TO Step 4 in this enclosure | 9. | | |

Enclosure 2 - Page 10 of 12 Aligning NS for Recirculation

ACTION/EXPECTED RESPONSE

- 9. Verify adequate RN heat sink as follows:
 - RN System SUCTION ALIGNED TO LAKE WYLIE
 - RN essential header temperatures at one of the following locations - LESS THAN OR EQUAL TO 93°F:
 - 1MC-9

OR

• RO Logbook.

RESPONSE NOT OBTAINED

Perform the following:

- a. Ensure the following valves OPEN:
- 1RN-3A (RN P/H Pit A Isol From SNSWP)
- 1RN-4B (RN P/H Pit B Isol From SNSWP)
- 1RN-58B (RN Hdr B Ret To SNSWP)
- 1RN-63A (RN Hdr A Ret To SNSWP)
- 1RN-846A (D/G 1A Hx Ret To SNSWP)
- 1RN-848B (D/G 1B Hx Ret To SNSWP)
- 2RN-846A (D/G 2A Hx Ret To SNSWP)
- 2RN-848B (D/G 2B Hx Ret To SNSWP).

(RNO continued on next page)

| CNS |
|--------------------|
| EP/1/A/5000/ES-1.3 |

Enclosure 2 - Page 11 of 12 Aligning NS for Recirculation PAGE NO. 36 of 42 Revision 30

| | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED |
|-------|--------------------------|---|
| 9. (| (Continued) | |
| | | Ensure the following valves - CLOSED: |
| | | 1RN-1A (RN P/H Pit A Isol From Lake) |
| | | 1RN-2B (RN P/H Pit A Isol From Lake) |
| | | 1RN-5A (RN P/H Pit B Isol From Lake) |
| | | 1RN-6B (RN P/H Pit B Isol From Lake) |
| | | 1RN-53B (Station RN Disch Hdr X-Over) |
| | | 1RN-54A (Station RN Disch Hdr X-Over) |
| | | 1RN-57A (Station RN Disch To RL Sys) |
| | | 1RN-843B (Station RN Disch To RL Sys) |
| | | 1RN-847A (D/G 1A Hx Ret To Lake) |
| | | 1RN-849B (D/G 1B Hx Ret To Lake) |
| | | 2RN-847A (D/G 2A Hx Ret To Lake) |
| | | 2RN-849B (D/G 2B Hx Ret To Lake). |
| | | |
| 10. 🕚 | Verify any NS pump - ON. | Exit this enclosure. |
| | | |

CNS EP/1/A/5000/ES-1.3

TRANSFER TO COLD LEG RECIRCULATION

Enclosure 2 - Page 12 of 12 Aligning NS for Recirculation

PAGE NO. 37 of 42 Revision 30

| | ACTION/EXPECTED RESPONSE | | RESPONSE NOT OBTAINED |
|-----|--|----------|---|
| 11. | Notify Control Room Supervisor this enclosure shall remain in effect until current or subsequent procedures provide alternate guidance. | | |
| 12. | <u>IF AT ANY TIME</u> containment pressur less than 1 PSIG, <u>THEN</u> perform the following: | ſe | |
| _ | a. Ensure NS pump - OFF. | | |
| | b. CLOSE the following values for affected train: | | |
| | <u>A Train</u>: 1NS-29A (NS Spray Hdr 1A Corlsol) 1NS-32A (NS Spray Hdr 1A Corlsol) 1RN-148A (NS Hx 1A Otlt Isol) 1RN-144A (NS Hx 1A Inlet Isol) | nt nt | |
| | • <u>B Train</u> : | | |
| | 1NS-12B (NS Spray Hdr 1B Corlsol) 1NS-15B (NS Spray Hdr 1B Corlsol) 1RN-229B (NS Hx 1B Ottl Isol) 1RN-225B (NS Hx 1B Inlet Isol) | nt nt | |
| | c. Verify both the following Unit 2 valve - OPEN: | s _ | c. IF affected valve closed to support NS Hx cooling flow, THEN ensure valve - |
| | 2RN-47A (RN Supply X-Over Isol) 2RN-48B (RN Supply X-Over Isol) |)). | ALIGNMENT. |
| | d. IF AT ANY TIME containment pressure exceeds 3 PSIG, <u>THEN</u> <u>RETURN</u> <u>TO</u> Step 4 in this enclosure | e. | |

Enclosure 3 - Page 1 of 5 FWST Makeup

| 1. | Verify boron concentration control systems available. |
|--------|---|
| 2. | Do not continue in this enclosure until boron concentration control available. |
| 3. | Coordinate with Primary Chemistry to ensure proper blend for duration of makeup as follows: |
| | _ a. Have Primary Chemistry sample blender outlet immediately when blended makeup initiated <u>AND</u> once an hour thereafter during makeup. |
| | b. WHEN sample results known, THEN adjust makeup flow as necessary to ensure proper boron concentration obtained for duration of makeup. |
| 4. | Ensure S/I - RESET: |
| | a. ECCS. |
| _ | _ b. D/G load sequencers. |
| 5. | Record current boron concentration in Boric Acid Tank = Ca. |
| 6. | Record required minimum FWST boron concentration (from Tech Spec) = Cf. |
| 7. | Record boron concentration of water in RMWST = Cw. |
| 8. | Determine amount of boric acid and reactor makeup water to add to produce a 50,000 gallon makeup at required concentration (Cf) as follows: |
| _ | _ a. Determine amount of boric acid to be added (Va): |
| | Va = <u>50,000 (Cf - Cw)</u> = <u>50,000 (-)</u> = gal. |
| | b. Determine amount of RMWST water to be added (Vw): |
| | Vw = 50,000 - Va Vw = gal. |
| | |

Enclosure 3 - Page 2 of 5 FWST Makeup

| 9. | Determine final counter readings as follows: |
|-----|---|
| | _a. Record initial "TOTAL MAKEUP COUNTER" reading = TMi. |
| | b. Record initial "BORIC ACID COUNTER" reading = TBi. |
| | c. Determine final "TOTAL MAKEUP COUNTER" reading (TMf): |
| | TMf = TMi + 50,000 TMf = |
| | d. Determine final "BORIC ACID COUNTER" reading (TBf) using Va obtained in Step 8.a: |
| | TBf = TBi + Va TBf = |
| 10. | Set the following blender flow controllers to achieve desired boron concentration and volume: |
| | • 1NV-238A (B/A To Blender Ctrl VIv) |
| | • 1NV-242A (RMWST To B/A Blender Ctrl). |
| 11. | Ensure selector switches for the following valves - IN AUTO: |
| | ● 1NV-238A (B/A To Blender Ctrl VIv) |
| | • 1NV-242A (RMWST To B/A Blender Ctrl). |
| 12. | Set the following counters to achieve desired boron concentration and volume: |
| | • "BORIC ACID COUNTER" |
| | • "TOTAL MAKEUP COUNTER". |
| 13. | Ensure 1NI-96B (C-Leg Accum Chk VIv Tst Isol) - CLOSED. |
| | |
| | |
| | |
| | |

Enclosure 3 - Page 3 of 5 FWST Makeup

1

| 14. | Dispatch operator to perform the following: |
|-----|---|
| - | CLOSE 1NB-5 (Unit 1 VCT To NB Evap Feed Demin Isol) (1ELCC0024) (AB-560, MM-52) |
| _ | OPEN 1NV-183 (Boric Acid Blender Outlet To FWST & RHT Isol) (AB-585, KK-51, Rm 419) |
| _ | • OPEN 1NV-185 (Boric Acid To FWST Isol) (AB-581, KK-51, Rm 419). |
| 15. | Place switches for the following valves in "CLOSE": |
| | 1NV-181A (B/A Blender Otlt To VCT) |
| | 1NV-186A (B/A Blender Otlt To VCT Otlt). |
| 16. | Place "NC MAKEUP MODE SELECT" switch in manual. |
| 17. | Ensure the following switches - IN AUTO: |
| _ | ● "RX M/U WTR PUMP 1A" |
| _ | • "RX M/U WTR PUMP 1B" |
| | ● "B/A XFER PUMP 1A" |
| _ | ● "B/A XFER PUMP 1B". |
| 18. | Ensure the following reset: |
| _ | ● "B/A XFER PUMP 1A RESET" |
| _ | ● "B/A XFER PUMP 1B RESET". |
| 19. | Do not continue until Step 14 complete. |
| 20. | Place "NC MAKEUP CONTROL" switch in "START". |
| | |
| | |
| | |

Enclosure 3 - Page 4 of 5 FWST Makeup

21. Ensure the following:

- Selected Reactor Makeup Water Pump(s) start
- Selected Boric Acid Transfer Pump(s) start
- 1NV-238A (B/A To Blender Ctrl VIv) positions to produce desired boric acid flow
- 1NV-242A (RMWST To B/A Blender Ctrl) positions to produce desired total makeup flow.
- 22. Request TSC to periodically (every 2-4 hours) monitor FWST makeup as part of long term recovery as follows:
 - Verify total makeup volume added to FWST
 - Verify corresponding FWST level increase
 - Verify FWST makeup at required minimum FWST boron concentration
 - Secure FWST makeup at 50,000 gallons.
- 23. <u>WHEN</u> 50,000 gallons of makeup added to FWST, <u>THEN</u> place "NC MAKEUP CONTROL" switch in "STOP".

24. Ensure the following:

- Selected Reactor Makeup Water pump(s) stop
- Selected Boric Acid Transfer pump(s) stop
- 1NV-238A (B/A To Blender Ctrl VIv) closes
- 1NV-242A (RMWST To B/A Blender Ctrl) closes.

25. Dispatch operator to close the following valves:

- 1NV-183 (Boric Acid Blender Outlet To FWST & RHT Isol) (AB-585, KK-51, Rm 419)
- 1NV-185 (Boric Acid To FWST Isol) (AB-581, KK-51, Rm 419).

Enclosure 3 - Page 5 of 5 FWST Makeup

26. IF needed to support plant conditions, THEN place desired switch in "ON":

- "RX M/U WTR PUMP 1A"
- "RX M/U WTR PUMP 1B"
- "B/A XFER PUMP 1A"
- "B/A XFER PUMP 1B".
- 27. Place switches for the following valves in auto:
 - 1NV-181A (B/A Blender Otlt To VCT)
 - 1NV-186A (B/A Blender Otlt To VCT Otlt).
- 28. Align for makeup to the VCT. <u>REFER TO</u> OP/1/A/6150/009 (Boron Concentration Control).

JPM E

EVALUATION SHEET

| Task: | | Rest | ore Norm | nal Power to | 1ETA From The | Control Roo | om | | |
|--|---|--------------|-----------------------|---------------------------------|--------------------------|---|---|--|------------------------|
| Alternate Pa | ath: | No | | | | | | | |
| Facility JPN | <u>// #:</u> | DG3 | -003 | | | | | | |
| Safety Fund | ction: | 6 | <u>Title:</u> | Emerge | ency Diesel Gen | erator (ED/G | G) System | | |
| <u>K/A</u> | 064 A | 4.07 | Ability to ED/G (v | o manually o vith load) to g | perate and/or m grid. | onitor in the | control roo | om: Trar | nsfer |
| Rating(s): | 3.4 / 3 | 3.4 | CFR: | 41.7 / 45.5 | to 45.8 | | | | |
| Preferred E | <u>valuati</u> | on Lo | cation: | | Preferred I | Evaluation | <u>Method:</u> | | |
| S imulator | X | In- F | Plant | | Perform | X | S imula | ate | |
| <u>References</u> | : | OP/ | I/A/6350/ | 002 Rev 189 |) | | | | |
| Task Standard:1ETA power being supplied from offsite through 1ATC and 1A D/G secured from the control room without a reverse power trip in accordance with OP/1/A/6350/002 (Diesel Generator Operation) Enclosure 4.17 (Shutdown of D/G 1A After An Automatic Start). | | | | | | | | | |
| | | | | | / | | | | |
| Validation 1 | <u>Гіте:</u> ===== | 12.5 | minutes ====== | | | <u>al:</u> | Yes | No | X === |
| Validation 1 ======= Applicant: NAME | <u>[ime:</u> ===== | 12.5 | minutes ====== | ====== Doc | | <u>:al:</u> ==================================== | Yes ======= ime Start: ime Finish | No ======= n: | X === |
| Validation 1 Applicant: NAME Performanc | <u>Fime:</u> ====== | 12.5 | minutes ====== | Doc | | <u>:al:</u> T T F | Yes Time Start: Time Finish Performanc | No ======= n: ce Time _ | X === |
| Validation 1 | Time: ====== :e Ratir JNSAT | 12.5 | minutes ====== | ====== Doc | | <u>:al:</u> T T F | Yes ime Start: ime Finish Performanc | No ======= n: ce Time _ | X === |
| Validation 1 Applicant: NAME Performanc SAT U Examiner: | <u>Fime:</u> ====== :e Ratir JNSAT | 12.5 | minutes ====== | ===== Doc | | <u>:al:</u> T T | Yes ime Start: ime Finish Performanc | No ======= n: ce Time _ / | X === |
| Validation 1 Applicant: NAME Performanc SAT U | <u>Fime:</u> ====== :e Ratir JNSAT | 12.5 | Minutes | Doc | | signatur | Yes ime Start: ime Finish Performanc | No ======= n: ce Time _ / D | X === |
| Validation 1 Applicant: NAME Performanc SAT Examiner: | <u>Fime:</u> ====== :e Ratir JNSAT | 12.5 | minutes ====== | Doc | <u>Time Critic</u> | signatur | Yes ime Start: ime Finish Performanc | No n: ce Time _ / D | X === |
| Validation 1 Applicant: NAME Performanc SAT | <u>Fime:</u> ====== :e Ratir JNSAT | 12.5 | Minutes | Doc | <u>Time Critic</u> | signatur | Yes ime Start: ime Finish Performanc | No n: ce Time _ | X === ATE === |
| Validation 1 Applicant: NAME Performanc SAT L Examiner: | <u>Fime:</u> ====== JNSAT | 12.5 | Minutes | Doc | <u>Time Critic</u> | signatur | Yes ime Start: ime Finish Performanc | No n: ce Time _ | X === ATE === |
| Validation 1 Applicant: NAME Performanc SAT C Examiner: | <u>Fime:</u> ====== JNSAT | 12.5 | Minutes | Doc | <u>Time Critic</u> | signatur | Yes ime Start: ime Finish Performanc | No n: ce Time _ | X === ATE === |
| Validation 1 Applicant: NAME Performanc SAT C Examiner: | <u>Fime:</u> ====== JNSAT | 12.5 | Minutes | Doc | <u>Time Critic</u> | signatur | Yes ime Start: ime Finish Performanc | No n: ce Time _ | X === ATE === |

SIMULATOR OPERATOR INSTRUCTIONS:

- 1. ENSURE NRC Examination Security has been established.
- 2. Reset to IC #154
- 3. Enter the password.
- 4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
- 5. Ensure simulator setup per table below.
- 6. Place simulator in RUN and acknowledge any alarms.
- 7. ENSURE "Extra Operator" is present in the simulator.
- 8. Place simulator in FREEZE until Examiner cue is given.

| ✓ | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|-------------------|-------|-------|------|-----------|-------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is recovering from a blackout per AP/1/A/5500/007 Case I (Loss of Normal Power to an Essential Train).
- 1ATC is energized and available to supply 1ETA.
- D/G 1A Mode Select Switch is in the "CTRL-RM" position.
- D/G 1A Load Sequencer has been reset.

INITIATING CUES:

- The Control Room Supervisor instructs you to parallel D/G 1A to 1ETA's normal power source (1ATC) and shutdown D/G 1A per OP/1/A/6350/002 (Diesel Generator Operation) Enclosure 4.17 (Shutdown of D/G 1A After an Automatic Start) Step 3.4.
- Initial Conditions are complete.
- Concurrent Verification has been waived.

EXAMINER NOTE: After reading cue, provide the applicant with a copy of OP/1/A/6350/002 Enclosure 4.17 complete through step 3.3.

START TIME: _____

| STEP/STANDARD | SAT/UNSAT |
|---|--------------|
| STEP 1: 3.4 IF shutting down the diesel from the <u>Control Room</u> , perform the following: | |
| 3.4.1 IF both the normal (ETA Norm Fdr Frm ATC) <u>AND</u> alternate (ETA Alt Fdr Frm SATA) incoming feeder breakers are open, perform the following: | |
| CAUTION: It is essential for the Operator to read and understand the following steps before attempting to re-synchronize the D/G and bus to the normal or alternate power source. Quick response to any changes in load and power factor when the breaker closes is required to reduce the likelihood of a reverse power D/G Breaker trip. | SAT UNSAT |
| 3.4.1.1 Adjust voltage using "D/G 1A Volt Adjust" to allow "D/G 1A Volts" to be one half to two divisions (50 to 200 volts) higher than "Line Volts". STANDARD: Applicant uses the D/G voltage control pushbuttons to set D/G 1A VOLTS 50 to 200 volts higher than LINE VOLTS on 1MC-8. COMMENTS: | |

| STEP/STANDARD | SAT/UNSAT |
|--|------------------|
| STEP 2: 3.4.1.2 Place the "D/G 1A Sync" Switch in the "ON" position. STANDARD: | CRITICAL STEP |
| Applicant rotates the D/G 1A Sync switch clockwise to the ON position. | |
| Examiner Note: This step is critical to ensure that D/G 1A is in sync with the grid prior to closing the 1ETA normal incoming breaker. | SAT |
| COMMENTS: | |
| | |
| | |
| STEP 3 3.4.1.3 Adjust D/G speed using "D/G 1A Gov Ctrl" such that the | |

| <u>STEP 3</u> 3.4.1.3 Adjust D/G speed using "D/G 1A Gov Ctrl" such that the Synchroscope is moving slowly in the "FAST" direction, (approximately 1 revolution per 30 seconds). | CRITICAL STEP |
|--|------------------|
| <u>STANDARD</u> : | |
| Applicant uses the D/G 1A Gov Ctrl pushbuttons to ensure that the Synchroscope is rotating slowly in the FAST direction. | слт. |
| Examiner Note: This step is critical to prevent a reverse power trip once the Normal Feeder breaker to 1ETA is closed. | |
| COMMENTS: | |

| STEP/STANDARD | SAT/UNSAT |
|---|------------|
| <u>STEP 4</u> CAUTION: The following three steps shall be performed prior to signi off either step to reduce the likelihood of a reverse power Breaker trip | ng D/G |
| 3.4.1.4 As the indicator reaches 1.5 min. before the vertical (synchronized) position, close <u>one</u> of following breakers: ETA Norm Fdr Frm ATC | the |
| ETA Alt Fdr Frm SATA | |
| STANDARD: | SAT |
| Once the Synchroscope indicator reaches the 1.5 min. before the vertical position, the applicant will depress the red CLOSE pushbut and verify the red CLSD light lit and green OPEN light dark on the 'Norm Fdr Frm ATC' breaker. The applicant will then immediately perform the next step to prevent a reverse power D/G Breaker trip. | ton ETA |
| Examiner Note: This step is critical to parallel 1A D/G to the norr offsite circuit to meet the task standard. | nal |
| COMMENTS: | |

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| <u>STEP 5</u> 3.4.1.5 Stabilize the D/G with a positive load and a lagging power factor. | CRITICAL STEP |
| Applicant depresses the D/G 1A Gov Ctrl RAISE pushbutton to ensure that D/G 1A picks up a positive load. | |
| Examiner Note: This step is critical to ensure the 1A D/G is stabilized with a positive load to prevent a reverse power D/G Breaker trip. | |
| Examiner Note: As long as the applicant ensured that D/G 1A volts were 50 to 200 volts higher than line volts, power factor will be lagging, and depending on how much higher D/G 1A volts were than line volts, may be severely lagging. | SAT UNSAT |
| <u>COMMENTS:</u> | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| <u>STEP 6</u> 3.4.1.6 <u>IF</u> the power factor meter indicates severely leading, (pegs high) <u>AND</u> power output decreases to 0 KW (pegs low), <u>THEN</u> <u>IMMEDIATELY</u> trip D/G 1A Bkr To ETA. | |
| STANDARD: | SAT |
| Applicant determines that this step is not applicable and continues. | UNSAT |
| COMMENTS: | |
| | |
| | |

| STEP 7 3.4.1.7 Place the "D/G 1A Sync" Switch in the "OFF" position. | |
|--|-----|
| Record time | |
| STANDARD: | SAT |
| Applicant rotates the D/G 1A Sync Switch counterclockwise to the OFF position. | |
| COMMENTS: | |
| | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 8 3.4.2 Verify one of the following breakers is closed: | |
| • ETA Norm Fdr Frm ATC | |
| OR | |
| ETA Alt Fdr Frm SATA | SAT |
| STANDARD: | UNSAT |
| Applicant verifies the red CLSD light lit for the ETA Norm Fdr Frm ATC breaker. | |
| COMMENTS: | |
| | |

| STEP 9 3.4.3 IF D/G 1A Bkr To ETA is open, go to Step 3.4.7. | | | | |
|--|-----|--|--|--|
| STANDARD: | | | | |
| Applicant determines that D/G 1A Bkr To ETA is closed by verifying the red CLSD light lit and this step is not applicable. | SAT | | | |
| <u>COMMENTS:</u> | | | | |
| | | | | |

| STEP/STANDARD | SAT/UNSAT | | |
|--|------------------|--|--|
| <u>STEP 10</u> 3.4.4 <u>IF</u> D/G load is < 2000 KW, <u>WHILE</u> maintaining power factor at approximately .95 lagging using "D/G 1A Volt Adjust", adjust generator load using "D/G 1A Gov Ctrl" per the following: {PIP 96-1185} | CRITICAL STEP | | |
| CAUTION: The following two steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip. | | | |
| 3.4.4.1 Reduce D/G load to 200 KW | | | |
| 3.4.4.2 Trip D/G 1A Bkr To ETA. | | | |
| STANDARD: | | | |
| Applicant depresses the D/G 1A Gov Ctrl LOWER pushbutton to decrease D/G 1A load to 200 KW while depressing the D/G 1A Volt Adjust LOWER pushbutton to maintain power factor at .95 lagging. Once 200 KW load is attained, the applicant depresses the green OPEN pushbutton for D/G 1A Bkr To ETA and verifies the green OPEN light is lit. | | | |
| Examiner Note: If applicant loaded 1A D/G to > 2000 KW, step 3.2.5 will have them lower load to 2000 KW and after 15 minutes at this load, will have them decrease load to 200 KW and trip the D/G 1A breaker. If this is the case, once the applicant decreases D/G 1A load to 2000 KW, provide the following cue: "15 minutes have elapsed". | | | |
| Examiner Note: Steps 3.4.5 and 3.4.6 should be not applicable. | | | |
| COMMENTS: | | | |
| | | | |

| STEP/STANDARD | SAT/UNSAT | | | |
|---|-----------|--|--|--|
| STEP 11 3.4.7 Allow diesel to idle unloaded for a minimum of 5 minutes or until the following conditions are met: | | | | |
| Jacket water outlet temperature is <a> 170°F. Lube oil temperature is <a> 170°F. Turbocharger exhaust temperatures have stabilized. | | | | |
| STANDARD: | SAT | | | |
| Applicant acknowledges step and continues. | UNSAT | | | |
| Examiner Cue: "5 minutes has elapsed." | | | | |
| COMMENTS: | | | | |
| | | | | |

| STEP 12 3.4.8 Ensure one of the following conditions is met: | | | | |
|---|-------|--|--|--|
| • The D/G Sequencer is "RESET". | | | | |
| OR | | | | |
| Power has been removed from the D/G Sequencer. | SAT | | | |
| STANDARD: | UNSAT | | | |
| Applicant determines based off the initiating cue that D/G 1A load sequencer has been RESET and continues with the procedure. | | | | |
| COMMENTS: | | | | |
| | | | | |

1

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| STEP 13 3.4.9 Depress D/G 1A "OFF" pushbutton. Record time | CRITICAL STEP |
| <u>STANDARD</u> : | |
| Applicant depresses the D/G 1A green OFF pushbutton. | |
| Examiner Note: This step is critical to shutdown 1A D/G to meet the JPM standard. | SAT |
| COMMENTS: | UNSAT |
| | |

| <u>STEP 14</u> 3.4.10 <u>WHEN</u> the engine stops, dispatch Operators as necessary to verify the following: | |
|---|-------|
| STANDARD: | |
| Applicant describes contacting and dispatching an AO to perform this step. | SAT |
| Examiner Cue: <mark>"An AO has been dispatched. Another operator will complete the remaining steps. This JPM is complete."</mark> | UNSAT |
| <u>COMMENTS:</u> | |
| END OF TASK | |

-

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is recovering from a blackout per AP/1/A/5500/007 Case I (Loss of Normal Power to an Essential Train).
- 1ATC is energized and available to supply 1ETA.
- D/G 1A Mode Select Switch is in the "CTRL-RM" position.
- D/G 1A Load Sequencer has been reset.

INITIATING CUES:

- The Control Room Supervisor instructs you to parallel D/G 1A to 1ETA's normal power source (1ATC) and shutdown D/G 1A per OP/1/A/6350/002 (Diesel Generator Operation) Enclosure 4.17 (Shutdown of D/G 1A After an Automatic Start) Step 3.4.
- Initial Conditions are complete.
- Concurrent Verification has been waived.

Shutdown of D/G 1A After an Automatic Start Page 1 of 13

1. Limits and Precautions

- 1.1 Maximum exhaust temperature on turbochargers is 1200°F.
- 1.2 Lube oil and cooling water at the engine inlets and outlets shall be 120-190°F while the engine is in standby.
- 1.3 If loading the D/G onto an isolated bus (D/G only on the bus), the voltage control button has no effect on power factor, only voltage.
- 1.4 Observe Tech Spec limits of TS 3.8.1, 3.8.2, 3.8.3 & SLC 16.8-5.
- 1.5 Starting air pressure shall be \geq 160 psig before auto starts.
- 1.6 A diesel generator will **<u>NOT</u>** start manually within 2 minutes of a manual stop.
- 1.7 Both diesels shall <u>NOT</u> be run simultaneously under normal conditions.
- 1.8 Do <u>NOT</u> operate D/G parallel to the bus during inclement weather (e.g. lightning or heavy winds) when run can be postponed to prevent jeopardizing operability.
- 1.9 Running a D/G only as long and at as much load as is necessary will aid in extending time between D/G overhauls.
- 1.10 Starting a D/G will trip the FD Recirc Pump if it is running and block it from starting until the D/G is shutdown. Plans shall be made to restart the pump If required after the D/G is secured (e.g. Open Item).
- 1.11 If a step calls for a parameter to be taken on the OAC, and the same parameter is also measured on the 1A (1B) D/G Alarm Monitor Panel 1ELMC0029 (1ELMC0030), the Alarm Monitor Panel may be used to satisfy the intent of the step.
- 1.12 Starting an RN Pump while its associated D/G is paralleled to the grid may result in an overcurrent trip of the D/G breaker. {PIP 99-1648}
- 1.13 If loading the D/G onto an isolated bus (D/G only on the bus), loading one or more pumps onto the bus helps to stabilize the D/G.
- 1.14 When paralleling a D/G to the Essential Switchgear, the in-service KC and/or NV Pumps are aligned to the opposite train to prevent the simultaneous loss of NC Pump Seal Injection and Thermal Barrier Cooling if a D/G failure results in the loss of the Essential Switchgear. If both KC and NV in-service Pumps are powered from the same bus as the D/G being tested, KC is swapped to the opposite train. (PIP 99-3510)
- 1.15 The Diesel Battery Enclosure Ventilation System shall remain in operation to provide cooling for the batteries and to prevent accumulation of hydrogen gas in the D/G Battery Enclosure.

Shutdown of D/G 1A After an Automatic Start Page 2 of 13

1.16 Do <u>NOT</u> operate the D/G at no load or light loads for long periods of time to prevent buildup of carbon and sludge in the engine

2. Initial Conditions

- **AA** 2.1 Verify D/G 1A is in operation and was started by an automatic signal.
- **BB** 2.2 Verify the following:
 - ☑ 1A Sequencer is reset.
 - \blacksquare Plant conditions allow the following:
 - Transfer of 1ETA to its normal or alternate source
 - Shutdown of D/G 1A

3. Procedure

SRO

- AA 3.1 Have operator obtain the following:
 - ☑ Key #207 (1A/1B Diesel Generator Control Panel) (for thermography of voltage regulator diodes)
 - ☑ FLIR Thermal Image Camera
 - $\mathbf{\overline{M}}$ A container to sample fuel oil for water.
 - An appropriate container to hold waste sample oil.
 - **NOTE:** The following item shall be performed just prior to shut down of the D/G.
 - Once the DGCP right door is open, immediately perform thermography measurement of the diodes, CR1 CR6, to observe maximum diode temperature.
 - All of the diodes temperature readings may be captured in a single thermography scan.

AA 3.2 Prior to shut down of the D/G have local operator perform thermography on the D/G voltage regulator diodes as follows:

- ☑ 3.2.1 Open the Diesel Generator Control Panel right side door.
- $\mathbf{\Sigma}$ 3.2.2 Take the thermography reading on diodes CR1-CR6.
- $\mathbf{\Sigma}$ 3.2.3 Close the Diesel Generator Control Panel right side door.

| | NOTE: | Diode ter | Diode temperatures are expected to range between 230°F and 285°F. | | |
|-----|--------|------------------|---|--|--|
| | | ☑ 3.2.4 | Document t thermograp | the highest temperature from the voltage regulator diodes hy scan. | |
| | | | Highest Ter | mperature <u>240</u> °F | |
| | N/A_A | AA 3.2.5 | IF a diode t THEN imm actions for | temperature was greater than 300 °F, nediately notify the SM to contact ENG to discuss any required the diode temperature. | |
| N/A | AA 3.3 | <u>IF</u> shutti | ing down D/G | 1A LOCALLY, perform the following: | |
| | | 3.3.1 | Close 1VN | -1 (1A D/G Eng Exhaust Silencer Drain) (DB-557, CC-38). | |
| | | 3.3.2 | Transfer sta | arting control to the local control panel per <u>one</u> of the following: | |
| | | | _ 3.3.2.1 | <u>IF</u> possible, have the Control Room Operator transfer control as follows: | |
| | | | | A. Place the "D/G 1A Ctrl Location" Switch on 1MC11 in the "LOCAL" position. | |
| | | | | B. Verify 1SI-15, A/3 "ETA INCOMING BKRS CONTROL LOCAL" is lit. | |
| | | | _ 3.3.2.2 | IF there is an emergency OR remote circuitry malfunction preventing Step 3.3.2.1 from being performed, actuate the "Control Room Override" at the break glass station on 1DGCPA. | |

Shutdown of D/G 1A After an Automatic Start Page 4 of 13

3.3.3 IF both the normal (Normal Bkr 1ETA3) AND alternate (Stand-By Bkr 1ETA4) feeder breakers are open, perform the following:

CAUTION: It is essential for the Operator to read and understand the following steps before attempting to re-synchronize the D/G and bus to the normal or alternate power source. Quick response to any changes in load and power factor when the breaker closes is required to reduce the likelihood of a reverse power D/G Breaker trip.

 3.3.3.1
 Adjust voltage using "Voltage Control" to allow "D/G Voltage" to be one half to two divisions (50 to 200 volts) higher than "Line Voltage".

 3.3.3.2
 Place the "Synchroscope Selector Switch" in the "ON" position.

 3.3.3.3
 Adjust D/G speed such that the synchroscope is moving slowly in the "FAST" direction, (approximately 1 revolution per 30 seconds.)

CAUTION: The following three steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip.

| | 3.3.3.4 A | As the indicator reaches 1.5 min. before the vertical synchronized) position and the "Synchronized" light is lit, close <u>one</u> of the following breakers: | |
|-------|---|--|--|
| | | Normal Bkr 1ETA3 | |
| | | OR | |
| | | Stand-By Bkr 1ETA4 | |
| | 3.3.3.5 S | tabilize the D/G with a positive load and a lagging power factor. | |
| | 3.3.3.6 I c A | <u>F</u> the power factor meter indicates severely leading, (pegs lockwise) <u>AND</u> power output decreases to 0 KW, <u>THEN</u> <u>IMMEDIATELY</u> trip Diesel Gen Bkr 1ETA18. | |
| | 3.3.3.7 P | Place the "Synchroscope Selector Switch" in the "OFF" position. | |
| 3.3.4 | Verify one of the following breakers is closed: | | |
| | □ Normal Bkr 1ETA3 | | |
| | OR | | |
| | □ Stand-By | Bkr 1ETA4 | |

Shutdown of D/G 1A After an Automatic Start Page 5 of 13

- 3.3.5 **IF** Diesel Gen Bkr 1ETA18 is open, go to Step 3.3.9.
- 3.3.6 <u>IF</u> D/G load is < 2000 KW, <u>WHILE</u> maintaining power factor at approximately .95 lagging using "Voltage Control", adjust generator load using "Speed Control" per the following: {PIP 96-1185}

CAUTION: The following two steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip.

- 3.3.6.1 Reduce D/G load to 200 KW.
- 3.3.6.2 Trip Diesel Gen Bkr 1ETA18.
- 3.3.7 IF D/G load is between 2000 KW to 3000 KW, WHILE maintaining power factor at approximately .95 lagging using "Voltage Control", adjust generator load using "Speed Control" per the following: {PIP 96-1185}
 - _____ 3.3.7.1 Slowly reduce D/G load to 2000 KW (1850-2150 KW). {PIP 97-2796}

Record time_____

- **NOTE:** When using the D/G to transfer Essential Bus power supplies, the 5 minute time limit specified in the following step may be extended as needed.
 - 3.3.7.2 **AFTER** 15 minutes, perform the following within 5 minutes:

CAUTION: The following two steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip.

- A. Reduce D/G load to 200 KW.
- B. Trip Diesel Gen Bkr 1ETA18.

| Shutdov | wn of D/G 1A After an Automatic Start Page 6 of 13 | |
|---|---|--|
| IF D/G load is > 3000 KW, WHILE maintaining power factor at approximately .95 lagging using "Voltage Control", adjust generator load using "Speed Control" per the following: {PIP 96-1185} | | |
| 3.3.8.1 | Reduce load to 4800 KW (4650-4950 KW). {PIP 97-2796} Record time | |
| 3.3.8.2 | AFTER 5 minutes, reduce load to 3850 KW (3700-4000 KW). Record time | |
| 3.3.8.3 | AFTER 5 minutes, reduce load to 2900 KW (2750-3050 KW). Record time | |
| 3.3.8.4 | AFTER 5 minutes, reduce load to 2000 KW (1850-2150 KW). Record time | |
| 3.3.8.5 | Ensure total load reduction time is \geq 15 minutes, prior to performing Step 3.3.8.6. | |
| | Shutdov IF D/G load approximat using "Spee 3.3.8.1 3.3.8.2 3.3.8.3 3.3.8.3 3.3.8.4 3.3.8.4 | |

NOTE: When using the D/G to transfer Essential Bus power supplies, the 5 minute time limit specified in the following step may be extended as needed.

3.3.8.6 **AFTER** 5 minutes, perform the following within 5 minutes:

CAUTION: The following two steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip

- A. Reduce D/G load to 200 KW.
- B. Trip Diesel Gen Bkr 1ETA18.
- 3.3.9 Allow diesel to idle unloaded for a minimum of 5 minutes or until the following conditions are met:
 - \Box Jacket water outlet temperature is $\leq 170^{\circ}$ F.
 - \Box Lube oil outlet temperature is $\leq 170^{\circ}$ F.
 - □ Turbocharger exhaust temperatures have stabilized.
Shutdown of D/G 1A After an Automatic Start Page 7 of 13

- 3.3.10 Ensure <u>one</u> of the following conditions is met:
 - \Box The D/G Sequencer is "RESET".

OR

- \Box Power has been removed from the D/G Sequencer.
- 3.3.11 Depress "STOP" pushbutton on the control panel.
- 3.3.12 **WHEN** the diesel stops, verify the following:
 - □ The "L.O. Pump & Heater" light indicates "ON".
 - □ The "J.W. Pump & Heater" light indicates "ON".
 - □ 1RN-232A (1A D/G Hx Inlet Isol) (DB-565, EE-38) closes.
 - ____ 3.3.13 Have the Control Room Operator place D/G 1A control in the "CTRL RM" position on 1MC11.

| | Enclosure 4.17 | OP/ 1 /A/6350/002 |
|----------|--|--|
| | Shutdown of D/G 1A After an Automatic Start | Page 8 of 13 |
| <u> </u> | shutting down the diesel from the Control Room, perform the | following: |
| 3. | 4.1 <u>IF both</u> the normal (ETA Norm Fdr Frm ATC) <u>AND</u> a Frm SATA) incoming feeder breakers are open, perfor | alternate (ETA Alt Fdr rm the following: |
| CAUTION: | It is essential for the Operator to read and understand the follo attempting to re-synchronize the D/G and bus to the normal of Quick response to any changes in load and power factor when required to reduce the likelihood of a reverse power D/G Brea | wing steps before r alternate power source. the breaker closes is ker trip. |
| | 3.4.1.1 Adjust voltage using "D/G 1A Volt Adjust Volts" to be one half to two divisions (50 | st" to allow "D/G 1A |

| | than "Line Volts". |
|---------|--|
| 3.4.1.2 | Place the "D/G 1A Sync" Switch in the "ON" position. |
| 3.4.1.3 | Adjust D/G speed using "D/G 1A Gov Ctrl" such that the Synchroscope is moving slowly in the "FAST" direction, (approximately 1 revolution per 30 seconds). |

CAUTION: The following three steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip.

3.4

| 3.4.1.4 | As the indicator reaches 1.5 min. before the vertical (synchronized) position, close <u>one</u> of the following breakers: |
|---------|---|
| | □ ETA Norm Fdr Frm ATC |
| | OR |
| | □ ETA Alt Fdr Frm SATA |
| 3.4.1.5 | Stabilize the D/G with a positive load and a lagging power factor. |
| 3.4.1.6 | <u>IF</u> the power factor meter indicates severely leading, (pegs high) <u>AND</u> power output decreases to 0 KW (pegs low), <u>THEN</u> <u>IMMEDIATELY</u> trip D/G 1A Bkr To ETA. |
| 3.4.1.7 | Place the "D/G 1A Sync" Switch in the "OFF" position. Record time |

| | | Enclosure 4.17 | OP/ 1 /A/6350/002 |
|-----------------------------------|---|---|--|
| | Shutdow | n of D/G 1A After an Automatic Start | Page 9 of 13 |
| 3.4.2 | Verify <u>one</u> of | f the following breakers is closed: | |
| | □ ETA Nor | rm Fdr Frm ATC | |
| | OR | | |
| | □ ETA Alt | Fdr Frm SATA | |
| 3.4.3 | <u>IF</u> D/G 1A E | 3kr To ETA is open, go to Step 3.4.7. | |
| 3.4.4 | <u>IF</u> D/G load approximate using "D/G 1 | is < 2000 KW, <u>WHILE</u> maintaining pow ly .95 lagging using "D/G 1A Volt Adjust A Gov Ctrl" per the following: {PIP 96-1 | er factor at ", adjust generator load 185} |
| CAUTION: The fo the lik | llowing two s elihood of a re | teps shall be performed prior to signing of everse power D/G Breaker trip | ff either step to reduce |
| | 3.4.4.1 | Reduce D/G load to 200 KW. | |
| | 3.4.4.2 | Trip D/G 1A Bkr To ETA. | |
| 3.4.5 | IF D/G load factor at appr generator loa | is between 2000 KW to 3000 KW, <u>WHII</u> roximately .95 lagging using "D/G 1A Vo ad using "D/G 1A Gov Ctrl" per the follow | <u>LE</u> maintaining power lt Adjust", adjust ving: {PIP 96-1185} |
| | 3.4.5.1 | Slowly reduce D/G load to 2000 KW (185 {PIP 97-2796} | 50-2150 KW). |
| | | Record time | |
| NOTE: When usin specified i | ng the D/G to in the followin | transfer Essential Bus power supplies, the ng step may be extended as needed. | 5 minute time limit |
| | 3.4.5.2 | AFTER 15 minutes, perform the followir | ng within 5 minutes: |
| CAUTION: The for the like | llowing two s elihood of a ro | teps shall be performed prior to signing of everse power D/G Breaker trip | ff either step to reduce |
| | | A. Reduce D/G load to 200 KW. | |
| | | $\mathbf{D}. \mathbf{\Pi} \mathbf{P} \mathbf{D} / \mathbf{U} \mathbf{I} \mathbf{A} \mathbf{D} \mathbf{K} \mathbf{\Gamma} \mathbf{I} 0 \mathbf{E} \mathbf{I} \mathbf{A}.$ | |

OP/1/A/6350/002

Enclosure 4.17

| | Shutdov | vn of D/G 1A After an Automatic Start Page 10 of 13 |
|-------|--|--|
| 3.4.6 | <u>IF</u> D/G load approximat using "D/G | d is > 3000 KW, <u>WHILE</u> maintaining power factor at ely .95 lagging using "D/G 1A Volt Adjust", adjust generator load 1A Gov Ctrl" per the following: {PIP 96-1185} |
| | 3.4.6.1 | Reduce load to 4800 KW (4650-4950 KW). {PIP 97-2796} Record time |
| | 3.4.6.2 | AFTER 5 minutes, reduce load to 3850 KW (3700-4000 KW). Record time |
| | 3.4.6.3 | AFTER 5 minutes, reduce load to 2900 KW (2750-3050 KW). Record time |
| | 3.4.6.4 | AFTER 5 minutes, reduce load to 2000 KW (1850-2150 KW). Record time |
| | 3.4.6.5 | Ensure total load reduction time is \geq 15 minutes, prior to performing Step 3.4.6.6. |

NOTE: When using the D/G to transfer Essential Bus power supplies, the 5 minute time limit specified in the following step may be extended as needed.

3.4.6.6 **AFTER** 5 minutes, perform the following within 5 minutes:

CAUTION: The following two steps shall be performed prior to signing off either step to reduce the likelihood of a reverse power D/G Breaker trip.

- A. Reduce D/G load to 200 KW.
- B. Trip D/G 1A Bkr To ETA.
- 3.4.7 Allow diesel to idle unloaded for a minimum of 5 minutes or until the following conditions are met:
 - \Box Jacket water outlet temperature is $\leq 170^{\circ}$ F.
 - \Box Lube oil outlet temperature is $\leq 170^{\circ}$ F.
 - □ Turbocharger exhaust temperatures have stabilized.

| | | Enclosure 4.17 | OP/ 1 /A/6350/002 |
|---------|--------------------------------|---|--------------------------|
| | | Shutdown of D/G 1A After an Automatic Start | Page 11 of 13 |
| | 3.4.8 | Ensure <u>one</u> of the following conditions is met: | |
| | | □ The D/G Sequencer is "RESET". | |
| | | OR | |
| | | \Box Power has been removed from the D/G Sequencer. | |
| | 3.4.9 | Depress D/G 1A "OFF" pushbutton. | |
| | | Record time | |
| | 3.4.10 | <u>WHEN</u> the engine stops, dispatch Operators as necess following: | ary to verify the |
| | | □ The "L.O. Pump & Heater" light indicates "ON". | |
| | | □ The "J.W. Pump & Heater" light indicates "ON". | |
| | | □ 1RN-232A (1A D/G Hx Inlet Isol) (DB-565, EE-38 | 8) closes. |
| 3.5 | Record to | tal time D/G 1A was run (min) | |
| 3.6 | Start the I | Diesel Building Normal Vent Fan 1A. | |
| 3.7 | <u>IF</u> the "C returned t | ontrol Room Override" break glass station on 1DGCPA o normal as follows: | was used, ensure it is |
| | 3.7.1 | Reset the switch. | |
| | 3.7.2 | Initiate a Work Request to replace the break glass. | |
| 3.8 | <u>IF</u> the D/ Day Tank | G was in operation for ≥ 1 hour, drain any accumulated by performing the following: | water from the Fuel Oil |
| | 3.8.1 | Place a container downstream of 1FD-96 (1A D/G Eng Sample Outside Isol) (DB-557, DD-38). | g Fuel Oil Day Tank 1A |
| | 3.8.2 | Open 1FD-95 (1A D/G Eng Fuel Oil Day Tank 1A San (DB-557, DD-38). | mple Inside Isol) |
| | 3.8.3 | Slowly open 1FD-96 (1A D/G Eng Fuel Oil Day Tank Isol). | A 1A Sample Outside |
| | 3.8.4 | WHEN the sample has been obtained, close 1FD-96 (Day Tank 1A Sample Outside Isol). | l A D/G Eng Fuel Oil |
| | 3.8.5 | <u>AFTER</u> allowing the sample to settle for approximate the container for water. | ly 10 minutes, inspect |

_

| NOTE: | All used o Oil). | il shall be disposed of per Nuclear Environmental Work Practice 2.8 (Used |
|----------|------------------------------|---|
| | 3.8.6 | Dump container contents in waste oil container. |
| | 3.8.7 | <u>IF</u> sample is <u>NOT</u> free of water, repeat Step 3.8.1 through Step 3.8.6. |
| | 3.8.8 | Ensure the following valves are closed: |
| | | 1FD-95 (1A D/G Eng Fuel Oil Day Tank 1A Sample Inside Isol) 1FD-96 (1A D/G Eng Fuel Oil Day Tank 1A Sample Outside Isol) |
| 3.9 | Ensure 1V | VN-1 (1A D/G Eng Exhaust Silencer Drain) (DB-557, CC-38) is open. |
| 3.10 | Drain any | accumulated oil out of the crankcase vent drip leg as follows: |
| | 3.10.1 | Verify 1ZD-1 (1A D/G Eng Crankcase Vent Drip Leg Drain) (DB-556, DD-39) is closed. |
| | 3.10.2 | Remove pipe cap downstream of 1ZD-1 (1A D/G Eng Crankcase Vent Drip Leg Drain). |
| | 3.10.3 | Place the waste oil container downstream of 1ZD-1 (1A D/G Eng Crankcase Vent Drip Leg Drain). |
| | 3.10.4 | Open 1ZD-1 (1A D/G Eng Crankcase Vent Drip Leg Drain) to drain any accumulated oil. |
| | 3.10.5 | <u>WHEN</u> oil has drained, close 1ZD-1 (1A D/G Eng Crankcase Vent Drip Leg Drain). |
| | 3.10.6 | Replace pipe cap downstream of 1ZD-1 (1A D/G Eng Crankcase Vent Drip Leg Drain). |
| 3.11 | <u>IF</u> the D/ Alarm Mo | G run was normal <u>AND</u> the D/G did <u>NOT</u> trip, perform the following at the onitor Panel (1ELMC0029): |
| | 3.11.1 | Depress and hold the "Alarm Ack" button for 1 second. |
| | 3.11.2 | Verify that any "A" or "B" alarm lights that were flashing are now illuminated solid. |

Shutdown of D/G 1A After an Automatic Start Page 13 of 13

| 3. | .12 | Complete | e the following enclosures: |
|------|-----|----------------------------|--|
| | | • Enclo | osure 4.6 (D/G 1A Checklist for ES Actuation) |
| | | • Enclo | osure 4.7 (D/G 1A Independent Verification Checklist for ES Actuation) |
| 3. | .13 | <u>WHEN</u> t discharge | the D/G has been shutdown for at least 45 minutes, verify the lube oil strainer e check valves do <u>NOT</u> indicate back leakage as follows: {PIP 00-3598} |
| _ | | 3.13.1 | Verify LD pre-lube pump is running. |
| | | 3.13.2 | Measure and record the temperature of the piping approximately 6" upstream and downstream of each of the following: |
| | | | □ 1LD-17 (1A D/G Eng Lube Oil Strainer 1A1 Check) |
| | | | Upstream°F Downstream°F |
| | | | □ 1LD-18 (1A D/G Eng Lube Oil Strainer 1A2 Check) |
| | | | Upstream <u>°</u> F Downstream <u>°</u> F |
| | | 3.13.3 | Verify the delta T across each is $> 5^{\circ}$ F. |
| | | | □ 1LD-17 delta T°F |
| | | | □ 1LD-18 delta T°F |
| | | 3.13.4 | <u>IF</u> the delta T across 1LD-17 <u>OR</u> 1LD-18 is \leq 5°F, contact Engineering for an operability determination. |
| | | | Person notified |
| | | 3.13.5 | <u>IF</u> the delta T across either value is \leq 5°F, initiate a CR for tracking. |
| NOTI | E: | All used o Oil). | oil shall be disposed of per Nuclear Environmental Work Practice 2.8 (Used |
| 3. | .14 | Ensure and disposed | ny used oil generated during this test (as a result of sampling, etc.) is properly of. |
| 3. | .15 | Place the and route | ES Checklist and the IV Checklist in the Control Copy folder of this procedure the outdated enclosures with this enclosure. |
| 3. | .16 | Complete | e D/G Logbook entries per OMP 2-28 (Diesel Generator Logbook). |
| NOTI | E: | D/G 1A is | s now aligned per Enclosure 4.1(Diesel Alignment for ES Actuation). |
| | | | |

3.17 Do **<u>NOT</u>** file this enclosure in the Control Copy folder of this procedure.

JPM F

| Catawba Nuclear Station | | | | | | |
|---|------------------------|--------------------------------------|--|--|--|--|
| JPM F September 2019 NRC Exam | | | | | | |
| EVALUATION SHEET | | | | | | |
| <u>Task:</u> | Shift Lower Co | ontainment Vent Units | | | | |
| Alternate Path: | No | | | | | |
| Facility JPM #: | | | | | | |
| Safety Function: | 5 <u>Title:</u> | Containment Cooling System | | | | |
| <u>K/A</u> 022 A | 4.01 Ability to | manually operate and/or monitor in | n the control room: CCS Fans | | | |
| Rating(s): 3.6 / 3 | 3.6 <u>CFR:</u> | 41.7 / 45.5 to 45.8 | | | | |
| Preferred Evaluation | on Location: | Preferred Evaluation | tion Method: | | | |
| Simulator X | _ Control Roon | n Perform | Simulate X | | | |
| <u>References</u> : | OP/1/A/6450/0 | 001 (Containment Ventilation (VV) \$ | Systems rev.040 | | | |
| Task Standard: | 1B LCVU runn | ing and 1A LCVU off. | | | | |
| Validation Time: | 8 minutes | Time Critical: | Yes No X | | | |
| | | | | | | |
| Applicant: | | Docket # | Time Start: Time Finish: | | | |
| Applicant: NAME Performance Ratin | | Docket # | Time Start: Time Finish: Performance Time | | | |
| Applicant: NAME Performance Ratin | <u>Ig:</u> | Docket # | Time Start: Time Finish: Performance Time | | | |
| Applicant: NAME Performance Ratin SAT UNSAT | | Docket # | Time Start: Time Finish: Performance Time | | | |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | <u>e======</u> | Docket # | | | | |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | <u>Ig:</u> NAME | Docket # SIGN | Time Start: Time Finish: Performance Time / ATURE DATE | | | |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | ng: | Docket #SIGN | Time Start: Time Finish: Performance Time / ATURE DATE | | | |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | ng: NAME | Docket #SIGN | Time Start: Time Finish: Performance Time / ATUREDATE | | | |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | NAME | Docket # SIGN COMMENTS | Time Start: Time Finish: Performance Time / ATURE DATE | | | |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | NAME | Docket # SIGN COMMENTS | Time Start: Time Finish: Performance Time / ATURE ATURE | | | |
| Applicant: NAME Performance Ratin SAT UNSAT Examiner: | NAME | Docket # SIGN COMMENTS | Time Start: Time Finish: Performance Time / ATURE DATE | | | |

SIMULATOR OPERATOR INSTRUCTIONS:

- 1. ENSURE NRC Examination Security has been established.
- 2. Reset to IC 155
- 3. Enter the password.
- 4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
- 5. Ensure simulator setup per table below.
- 6. Place simulator in RUN and acknowledge any alarms.
- 7. ENSURE "Extra Operator" is present in the simulator.
- 8. Place simulator in FREEZE until Examiner cue is given.

| ~ | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|-------------------|-------|-------|------|-----------|-------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is in MODE 1.

INITIATING CUES:

- The Control Room Supervisor has instructed you to shift Lower Containment Vent Units in accordance with OP/1/A/6450/001 (Containment Ventilation Systems), Enclosure 4.13 (Shifting Operating Lower Containment Ventilation Units and Pipe Tunnel Booster Fans)
- You are directed to secure the 1A LCVU and start the 1B LCVU.
- Steps 3.1 and 3.3 were marked N/A during the pre-job brief.
- Peer checks have been waived.

EXAMINER NOTE: After reading cue, provide the applicant with a copy of OP/1/A/6450/001 Containment Ventilation (VV) Systems, Enclosure 4.13.

START TIME: _____

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| STEP 1: 3.2 IF three LCVUs are operating AND it is desired, shift the operating units as follows: | CRITICAL STEP |
| 3.2.1 IF the LCVUs are operating in "LOW" speed, perform the following: | |
| | |
| 3.2.1.1 Stop the LCVU to be removed from service by placing its control switch in the "OFF" position: | |
| "VV LCVU 1A" | |
| STANDARD: | SAT |
| Applicant places the switch for VV LCVU 1A to the OFF position. | UNSAT |
| This step is critical to shut down the desired Lower Containment Vent Unit | |
| COMMENTS: | |
| | |
| | |

| NOTE: The procedure may continue up to and including Step 3.2.1.8 before completing the following step. | |
|--|-------|
| STEP 2 3.2.1.2 Verify the green indicating light illuminates for the | |
| STANDARD: | SAT |
| Applicant determines the green indicating light is LIT for VV LCVU 1A. | INSAT |
| COMMENTS: | |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|---|--|-----------|
| <u>STEP 3</u> 3.2.1.3 V th <u>STANDARD</u> : | /erify the red "MAX" indicating light extinguishes for ne LCVU stopped. | |
| Applicant determines the red "MAX" indicating light for VV LCVU 1A MAX is DARK. | | |
| COMMENTS: | | |
| | | |

| STEP 4 3.2.1.4 Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped. | | |
|---|-----|--|
| STANDARD: | SAT | |
| Applicant determines the green "CLOSED" indicating light for 1LCVU-D- 1 LWR CONT VENT DAMPER is LIT. | | |
| COMMENTS: | | |
| | | |

Г

٦

Т

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| NOTE: If Unit 1 is in Mode 1 and LCVU 1C or 1D is the idle unit that is being placed in service, a delay of approximately 15 to 30 minutes may be needed before starting LCVU 1C or 1D to allow lower containment air temperature to increase. This will prevent exceeding the Tech Spec low limit for air temperature. {PIP 00- | CRITICAL STEP |
| 0763, PIP 05-3785} Adequate margin of VQ pressure may be required to allow containment temperature increase if waiting 15 to 30 minutes to start LCVU 1C or 1D. | |
| STEP 5 3.2.1.5 Start the idle LCVU by placing its control switch in the "LOW" position: | |
| • "VV LCVU 1B" | SAT |
| STANDARD: | UNSAT |
| Applicant places the switch for VV LCVU 1B in the LOW position. | |
| This step is critical to start the desired LCVU. | |
| COMMENTS: | |
| | |

| STEP 6 3.2.1.6 Verify the red indicating light illuminates for the LCVU placed in service. | | |
|--|-------|--|
| STANDARD: | | |
| Applicant determines the red (middle) indicating light for VV LCVU 1B is LIT. | UNSAT | |
| <u>COMMENTS:</u> | | |

| STEP/STANDARD | SAT/UNSAT | |
|---|-----------|--|
| STEP 7 3.2.1.7 Verify the red "OPEN" indicating light illuminates for the LCVU damper associated with the LCVU started. | | |
| STANDARD: | | |
| SAT | | |
| Applicant determines the red "OPEN" indicating light for 1LCVU-D-2 | | |
| | | |
| COMMENTS: | | |
| | | |
| | | |

| <u>STEP 8</u> 3.2.1.8 Verify the red "MAX" indicating light illuminates f LCVU placed in service. | or the | |
|---|--------|--|
| STANDARD: | | |
| Applicant determines the red light for VV LCVU 1B MAX is LIT | | |
| COMMENTS: | | |

| STEP 93.2.2IF the LCVUs are operating in "HIGH" speed, perform the following:STANDARD: | CAT |
|---|-------|
| Applicant determines that this step does not apply. | SAT |
| <u>COMMENTS:</u> | UNSAT |
| | |

| STEP/STANDARD | | SAT/UNSAT |
|--|---|-----------|
| <u>STEP 10</u> 3.4 | Indicate below the operating Pipe Tunnel Booster Fan: | |
| | "PIPE TUNNEL BSTR FAN 1A""PIPE TUNNEL BSTR FAN 1B" | |
| STANDARD: | | SAT |
| Applicant marks the box for the operating Pipe Tunnel Booster Fan. | | UNSAT |
| COMMENTS: | | |
| | | |

| <u>STEP 11</u> 3.5 | Indicate below the operating LCVUs: | |
|--------------------|--|-------|
| | "VV LCVU 1A" "VV LCVU 1B" "VV LCVU 1C" "VV LCVU 1D" | SAT |
| <u>STANDARD</u> : | | UNSAT |
| Applicant marks | the blocks for the 1B, 1C and 1D LCVUs. | |
| COMMENTS: | | |
| | | |
| | END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 1 is in MODE 1.

INITIATING CUES:

- The Control Room Supervisor has instructed you to shift Lower Containment Vent Units in accordance with OP/1/A/6450/001 (Containment Ventilation Systems), Enclosure 4.13 (Shifting Operating Lower Containment Ventilation Units and Pipe Tunnel Booster Fans)
- You are directed to secure the 1A LCVU and start the 1B LCVU.
- Steps 3.1 and 3.3 were marked N/A during the pre-job brief.
- Peer checks have been waived.

| Duke Energy Catawba Nuclear Station | Procedure No. OP/ 1 /A/6450/001 Revision No. |
|---|---|
| Containment Ventilation (VV) Systems | 043 |
| | |
| Continuous Use | Electronic Reference No. CN005FM9 |

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

1. Limits and Precautions

- 1.1 Observe the upper and lower containment temperature limits of Tech Spec 3.6.5.
- 1.2 All operating lower containment ventilation units, and the operating pipe tunnel booster fan, are normally operated at the same speed.
- 1.3 When CLAs are pressurized above 175 psig, lower containment temperature shall be maintained greater than 60°F to maintain accumulator temperature greater than 60°F due to brittle fracture concerns of the accumulator vessel.

2. Initial Conditions

None

3. Procedure

- N/A AA 3.1 IF two LCVUs are operating <u>AND</u> it is desired, shift the operating units as follows:
 - 3.1.1 **IF** the LCVUs are operating in "LOW" speed, perform the following:

NOTE: If two LCVUs are to remain in service, it is preferable to run a vent unit in each fan room (A/D, B/C) in order to maximize air distribution in the lower containment. Due to the temperature characteristics in lower containment and the Digital Rod Position Indication (DRPI) Panels area, use of the 1D LCVU is preferred. Failure to operate with at least one vent unit in each fan room during Modes 1 - 3 can result in high pressurizer and/or steam generator cavity air temperatures.

- 3.1.1.1 Start an idle LCVU by placing its control switch in the "LOW" position:
 - "VV LCVU 1A"
 - "VV LCVU 1B"
 - "VV LCVU 1C"
 - "VV LCVU 1D"
- _____ 3.1.1.2 Verify the red indicating light illuminates for the LCVU placed in service.
- 3.1.1.3 Verify the red "OPEN" indicating light illuminates for the LCVU dampers associated with the LCVU placed in service.
- _____ 3.1.1.4 Verify the red "MAX" indicating light illuminates for the LCVU placed in service.

OP/**1**/A/6450/001 Page 2 of 7

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

3.1.1.5 Stop the LCVU to be removed from service by placing its control switch in the "OFF" position:

- "VV LCVU 1A"
- "VV LCVU 1B"
- "VV LCVU 1C"
- "VV LCVU 1D"

NOTE: The procedure may continue up to and including Step 3.1.1.8 before completing the following step.

- 3.1.1.6 Verify the green indicating light illuminates for the LCVU stopped.
- _____ 3.1.1.7 Verify the red "MAX" indicating light extinguishes for the LCVU stopped.
- 3.1.1.8 Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped.
- 3.1.2 **IF** the LCVUs are operating in "HIGH" speed, perform the following:

CAUTION: Operating the lower containment vent units in "HIGH" speed for more than 24 hours will cause bearing problems in the fans.

- NOTE: It is preferable to run a vent unit in each fan room (A/D, B/C) in order to maximize air distribution in the lower containment. Due to the temperature characteristics in lower containment and the Digital Rod Position Indication (DRPI) Panels area, use of the 1D LCVU is preferred. Failure to operate with at least one vent unit in each fan room during Modes 1 3 can result in high pressurizer and/or steam generator cavity air temperatures.
 - Operating the lower containment vent units in "HIGH" speed will fail the bypass chilled water valves open.
 - 3.1.2.1 Start an idle LCVU by placing its control switch in the "HIGH" position:
 - "VV LCVU 1A"
 - "VV LCVU 1B"
 - "VV LCVU 1C"
 - "VV LCVU 1D"
 - 3.1.2.2 Verify the red indicating light illuminates for the LCVU placed in service.

OP/**1**/A/6450/001 Page 3 of 7

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

- _____ 3.1.2.3 Verify the red "OPEN" indicating light illuminates for the LCVU damper associated with the LCVU started.
- 3.1.2.4 Verify the red "OPEN" light illuminates for the valve corresponding to the LCVU started (rear of 1MC3):

"1RN-473 LWR CONT VENT UNT 1A FULL FLOW"
 "1RN-455 LWR CONT VENT UNT 1B FULL FLOW"
 "1RN-447 LWR CONT VENT UNT 1C FULL FLOW"
 "1RN-481 LWR CONT VENT UNT 1D FULL FLOW"

- 3.1.2.5 Stop the LCVU to be removed from service by placing its control switch in the "OFF" position:
 - "VV LCVU 1A"
 - "VV LCVU 1B"
 - "VV LCVU 1C"
 - "VV LCVU 1D"

NOTE: The procedure may continue up to and including Step 3.1.2.8 before completing the following step.

- 3.1.2.6 Verify the green indicating light illuminates for the LCVU stopped.
- 3.1.2.7 Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped.
- 3.1.2.8 Verify the green "CLOSED" light illuminates for the valve corresponding to the LCVU stopped (rear of 1MC3):

"1RN-473 LWR CONT VENT UNT 1A FULL FLOW"
 "1RN-455 LWR CONT VENT UNT 1B FULL FLOW"
 "1RN-447 LWR CONT VENT UNT 1C FULL FLOW"
 "1RN-481 LWR CONT VENT UNT 1D FULL FLOW"

_____ 3.1.2.9 Inform Engineering that lower containment vent units have been placed in "HIGH" speed.

Engineer notified _____

OP/**1**/A/6450/001 Page 4 of 7

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

- 3.2 **IF** three LCVUs are operating <u>AND</u> it is desired, shift the operating units as follows:
 - 3.2.1 <u>IF</u> the LCVUs are operating in "LOW" speed, perform the following:
 - 3.2.1.1 Stop the LCVU to be removed from service by placing its control switch in the "OFF" position:
 - "VV LCVU 1A"
 - "VV LCVU 1B"
 - "VV LCVU 1C"
 - "VV LCVU 1D"

NOTE: The procedure may continue up to and including Step 3.2.1.8 before completing the following step.

- 3.2.1.2
 Verify the green indicating light illuminates for the LCVU stopped.

 3.2.1.3
 Verify the red "MAX" indicating light extinguishes for the LCVU stopped.

 3.2.1.4
 Verify the green "CLOSED" indicating light illuminates for the
 - _____ 3.2.1.4 Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped.
- If Unit 1 is in Mode 1 and LCVU 1C or 1D is the idle unit that is being placed in service, a delay of approximately 15 to 30 minutes may be needed before starting LCVU 1C or 1D to allow lower containment air temperature to increase. This will prevent exceeding the Tech Spec low limit for air temperature. {PIP 00-0763, PIP 05-3785}
 - Adequate margin of VQ pressure may be required to allow containment temperature increase if waiting 15 to 30 minutes to start LCVU 1C or 1D.
 - 3.2.1.5 Start the idle LCVU by placing its control switch in the "LOW" position:
 - "VV LCVU 1A"
 - "VV LCVU 1B"
 - "VV LCVU 1C"
 - "VV LCVU 1D"
 - _____ 3.2.1.6 Verify the red indicating light illuminates for the LCVU placed in service.
 - 3.2.1.7 Verify the red "OPEN" indicating light illuminates for the LCVU damper associated with the LCVU started.

OP/**1**/A/6450/001 Page 5 of 7

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

- _____ 3.2.1.8 Verify the red "MAX" indicating light illuminates for the LCVU placed in service.
- 3.2.2 **IF** the LCVUs are operating in "HIGH" speed, perform the following:
 - 3.2.2.1 Stop the lower containment vent unit to be removed from service by placing its control switch in the "OFF" position:
 - "VV LCVU 1A"
 - "VV LCVU 1B"
 - "VV LCVU 1C"
 - "VV LCVU 1D"

NOTE: The procedure may continue up to and including Step 3.2.2.8 before completing the following step.

| 3.2.2.2 | Verify the green indicating light illuminates for the LCVU stopped. |
|---------|--|
| 3.2.2.3 | Verify the green "CLOSED" indicating light illuminates for the LCVU damper associated with the LCVU stopped. |
| 3.2.2.4 | Verify the green "CLOSED" light illuminates for the valve corresponding to the LCVU stopped (rear of 1MC3): |
| | "1RN-473 LWR CONT VENT UNT 1A FULL FLOW" "1RN-455 LWR CONT VENT UNT 1B FULL FLOW" "1RN-447 LWR CONT VENT UNT 1C FULL FLOW" "1RN-481 LWR CONT VENT UNT 1D FULL FLOW" |

CAUTION: Operating the lower containment vent units in "HIGH" speed for more than 24 hours will cause bearing problems in the fans.

NOTE: Operating the lower containment vent units in "HIGH" speed will fail the bypass chilled water valves open.

3.2.2.5 Start the idle lower containment vent unit by placing its control switch in the "HIGH" position:

- "VV LCVU 1A"
- "VV LCVU 1B"
- "VV LCVU 1C"
- "VV LCVU 1D"

OP/**1**/A/6450/001 Page 6 of 7

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

| | 3.2.2.6 | Verify the red indicating light illuminates for the LCVU placed in service. |
|--------|---------|---|
| | 3.2.2.7 | Verify the red "OPEN" indicating light illuminates for the LCVU damper associated with the LCVU started. |
| | 3.2.2.8 | Verify the red "OPEN" light illuminates for the valve corresponding to the LCVU started (rear of 1MC3): |
| | 3.2.2.9 | "1RN-473 LWR CONT VENT UNT 1A FULL FLOW" "1RN-455 LWR CONT VENT UNT 1B FULL FLOW" "1RN-447 LWR CONT VENT UNT 1C FULL FLOW" "1RN-481 LWR CONT VENT UNT 1D FULL FLOW" Inform Engineering that lower containment vent units have been placed in "HIGH" speed. Engineer notified |
| - 1.0. | | |

- N/<u>A AA</u> 3.3 <u>IF</u> shifting the operating pipe tunnel booster fan, perform the following:
 - 3.3.1 Stop the operating fan by placing its control switch in the "OFF" position:
 - "PIPE TUNNEL BSTR FAN 1A"
 - "PIPE TUNNEL BSTR FAN 1B"
 - 3.3.2 Verify the green indicating light illuminates for the pipe tunnel booster fan stopped.
 - 3.3.3 **IF** the operating lower containment ventilation units are running in "LOW" speed, start the pipe tunnel booster fan to be placed in service by placing its control switch in the "LOW" speed position:
 - "PIPE TUNNEL BSTR FAN 1A"
 - "PIPE TUNNEL BSTR FAN 1B"
 - 3.3.4 **IF** the operating lower containment ventilation units are running in "HIGH" speed, start the pipe tunnel booster fan to be placed in service by placing its control switch in the "HIGH" speed position:
 - "PIPE TUNNEL BSTR FAN 1A"
 - "PIPE TUNNEL BSTR FAN 1B"
 - 3.3.5 Verify that the red indicating light illuminates for the pipe tunnel booster fan placed in service.

OP/**1**/A/6450/001 Page 7 of 7

Shifting Operating Lower Containment Ventilation Units And Pipe Tunnel Booster Fans

- 3.4 Indicate below the operating Pipe Tunnel Booster Fan:
 - □ "PIPE TUNNEL BSTR FAN 1A" □ "PIPE TUNNEL BSTR FAN 1B"
- 3.5 Indicate below the operating LCVUs:
 - □ "VV LCVU 1A"
 - □ "VV LCVU 1B"
 - □ "VV LCVU 1C"
 - □ "VV LCVU 1D"
 - 3.6 File this enclosure in the Control Copy folder of this procedure.

JPM G

EVALUATION SHEET

| <u>Task:</u> | Initiate a VQ (Co OP/1/A/6450/017 | Initiate a VQ (Containment Air Release And Addition System) release per OP/1/A/6450/017 Enclosure 4.2 steps 3.5 through 3.12. | | | |
|--------------------|--------------------------------------|---|--------------------------------------|----------------------|--|
| Alternate Path: | None | | | | |
| Facility JPM #: | N/A | | | | |
| Safety Function: | 7 <u>Title:</u> | Process Radiation Monitorin | g System | | |
| <u>K/A</u> 073 A | A4.02 Ability to m monitoring | nanually operate and/or monito system control panel | r in the control room: | Radiation | |
| Rating(s): 3.7 / | 3.7 | <u>CFR:</u> 41.7/45.5 to | 9 45.8 | | |
| Preferred Evaluati | on Location: | Preferred Evalu | ation Method: | | |
| Simulator X | In- P lant | Perform | X Simulate | | |
| References: | OP/1/A/6450/01 | 7 Encl. 4.2, OP/0/A/6500/080 E | Encl. 4.3. | | |
| Task Standard: | Applicant aligns | VQ valves for release and initia | ates a Containment A | ir release. | |
| Validation Time: | 10 minutes | Time Critical: | Yes N | lo <u>X</u> | |
| Applicant: NAME | | Docket # | Time Start: Time Finish: | | |
| | | | | | |
| Performance Rati | <u>ıg:</u> | | Performance Tir | ne | |
| Performance Ration | <u>ng:</u> | | Performance Tir | ne | |
| Performance Ration | <u>ng:</u> | | Performance Tir | ne | |
| Performance Ration | <u>ng:</u> NAME | | Performance Tir / / SNATURE | ne | |
| Performance Ration | <u>ng:</u> NAME | SIG SIG COMMENTS | Performance Tir / SNATURE | ne DATE ====== | |
| Performance Ration | <u>ng:</u> NAME | SIG | Performance Tir / SNATURE | DATE | |
| Performance Ratio | <u>ng:</u> NAME | COMMENTS | Performance Tir / SNATURE | ne DATE ====== | |
| Performance Ratii | <u>ng:</u> NAME | COMMENTS | Performance Tir / SNATURE | ne DATE ====== | |
| Performance Ratii | <u>ng:</u> NAME | COMMENTS | Performance Tir / SNATURE | DATE | |

SIMULATOR OPERATOR INSTRUCTIONS:

- 1. ENSURE NRC Examination Security has been established.
- 2. Reset to IC # 156
- 3. Enter the password.
- 4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
- 5. Ensure simulator setup per table below.
- 6. Place simulator in RUN and acknowledge any alarms.
- 7. ENSURE "Extra Operator" is present in the simulator.
- 8. Place simulator in FREEZE until Examiner cue is given.

| ✓ | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|---|-------|-------|------|-----------|-------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | Ensure 1VQ-10 is at 350 and on setpoint | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

• Unit 1 is operating at 100% power.

INITIATING CUES:

• The Unit 2 BOP has performed OP/1/A/6450/017 (Containment Air Release and Addition System) Enclosure 4.2 (Air Release Mode) steps 2.1 through step 3.4. You have been tasked to initiate a Containment Air Release by performing steps 3.5 through 3.12 using 'A' Train equipment. All Peer Checks have been waived.

EXAMINER NOTE: After reading Initiating Cue, provide the applicant with a copy of OP/1/A/6450/017 Enclosure 4.2 and OP/0/A/6500/080, Enclosure 4.3.

START TIME: _____

| | | STEP/STANDARD | SAT/UNSAT |
|-----------------|------------------------------------|--|-----------|
| NOTE: | The pers individua Steps 3.2 | on performing Step 3.5 or 3.6 shall NOT be the same I who originally performed the associated actions in 2.1.3, 3.2.1.4 or 3.4.3. | |
| <u>STEP 1</u> : | 3.5 | IF 1EMF-39L is functional, perform the following: | |
| STANDA | <u>.RD</u> : | 3.5.1 Independently verify trip setpoints are set to the values as specified in "SETPOINT DATA" section on the Gaseous Waste Release Permit Report using OP/0/A/6500/080 (EMF RP86A Output Modules). | SAT |
| Applic on 1E | cant will ve MF-39L p | erify trip setpoints (Trip 1 – 870 cpm, Trip 2 – 1240 cpm) er procedure. | UNSAT |
| Exam | iner NOT | E: OP/0/A/6500/080 Enclosure 4.3 is available on the rear of panel 1MC-13. | |
| <u>COMME</u> | NTS: | | |
| | | | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| OP/0/A/6500/080 Enclosure 4.3 | |
| NOTE: 1. The setpoints given on release permits are already rounded to 3 significant digits and are entered into the EMF as is. Setpoints for non-release conditions are rounded up or down to 3 significant digits using standard mathematical rules for rounding. | |
| Necessary setpoint adjustments are made per Enclosure 4.2 (EMF RP86A Trip Setpoint Adjustment). | SAT |
| STEP 23.1Press the function key [FUN] to bring up the "SELECTFUNCTION" screen. | UNSAT |
| STANDARD: | |
| Applicant will press the [FUN] key on 1EMF-39L. | |
| COMMENTS: | |
| | |

| STEP 3 3.2 Press [4] to bring up the data screen. | |
|---|-------|
| STANDARD: | SAT |
| Applicant will press the [4] key on 1EMF-39L | |
| COMMENTS: | UNSAT |
| | |

| | | STEP/STANDARD | SAT/UNSAT |
|---|-------------|---|-----------|
| <u>STEP 4</u> | 3.3 | Verify the Trip 1 and Trip 2 setpoints are the same as the desired setpoints. | |
| STANDAR | <u>RD</u> : | | SAT |
| Applicant will verify the trip setpoints are set correctly. | | | LINGAT |
| <u>COMMEN</u> | <u>TS:</u> | | |
| | | | |

| STEP 5 | 3.4 | Press the clear key [CLR] twice to return to the normal display screen. | |
|---------------|-------------|---|-------|
| STANDAR | <u>RD</u> : | | SAT |
| Applica | ant will d | lepress the [CLR] key twice on 1EMF-39L | UNSAT |
| <u>COMMEN</u> | <u>TS:</u> | | |
| | | | |

| STEP 6 3.5 Verify that the correct EMF setpoints are documented in the Control Room EMF Setpoint Logbook. | |
|---|-------|
| STANDARD: | SAT |
| Applicant will verify the correct EMF setpoints are documented in the Control Room EMF Setpoint Logbook. | UNSAT |
| COMMENTS: | |
| | |

| | | STEP/STANDARD | SAT/UNSAT |
|-----------------------------------|-------------|---|-----------|
| STEP 7 | 3.6. | If required for IV purposes, ensure that the IV block is signed on Control Room EMF Setpoint Log. | |
| STANDAR | <u>RD</u> : | | SAT |
| Applicant will sign the IV block. | | | LINGAT |
| <u>COMMEN</u> | <u>TS:</u> | | |

| | | OP/1/A/6450/017 Enclosure 4.2 | |
|-----------------------------|-------------------------------------|---|-------|
| <u>STEP 8</u> | 3.5.2 | Sign off the "Independent Verification (IV)" blank on the "VQ release monitored by EMF 39L" sheet of the Gaseous Waste Release (GWR) Record | |
| <u>STANDAF</u> | STANDARD: | | |
| Applica blank c Waste | ant will si on the "V Release | gn off the "EMF39L Operable and Source Checked" IV Q release monitored by EMF 39L" sheet of the Gaseous (GWR) Record | UNSAT |
| <u>COMMEN</u> | <u>TS:</u> | | |
| | | | |

| <u>STEP 9</u> | 3.6 | Independently verify "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller is set to \leq the "Recommended Release Rate (cfm)" on the Gaseous Waste Release Permit Report. | |
|------------------------------------|--|---|-------|
| <u>STANDAF</u> | <u>RD</u> : | | SAT |
| Applica Releas <u>COMMEN</u> | ant will ve e Rate ([:] <u>TS:</u> | erify "1VQ-10 controller is set to <u><</u> the "Recommended 350 cfm) on the Gaseous Waste Release Permit Report. | UNSAT |

| | STEP/STANDARD | SAT/UNSAT |
|------------------------------------|---|-----------|
| <u>STEP 10</u> 3.7 | Reset Totalizer on "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller (1MC5) by performing the following: | |
| | 3.7.1 Depress the "D" pushbutton until "VQ0100.T" appears in the display window. | CAT |
| STANDARD: | | UNSAT |
| Applicant will de VQ100T appear | epress the "D" pushbutton on 1VQ-10 controller until rs in the display window. | |
| <u>COMMENTS:</u> | | |

| STEP 113.7.2Depress the "Reset Total" pushbutton and verify a "0" appears in the display window.STANDARD: | CRITICAL STEP |
|---|------------------|
| Applicant will depress the "Reset Total" pushbutton on the 1VQ-10 controller and verify that 0 appears in the display window. | |
| This step is critical to ensure that amount of the release is properly quantified. | SAT |
| COMMENTS: | UNSAT |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|---------------------------------|---|-----------|
| <u>STEP 12</u> 3.8 | IF AT ANY TIME during the release using 1EMF-39 the following conditions are met, immediately terminate the release. | |
| STANDARD: | | SAT |
| Applicant will det unsigned. | UNSAT | |
| COMMENTS: | | |

| <u>STEP 13</u> 3.9 | IF AT ANY TIME during the release using 1EMF-36 the following conditions are met, immediately terminate the release. | |
|--------------------|---|-----|
| STANDARD: | | SAT |
| Applicant will det | UNSAT | |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | | | SAT/UNSAT |
|---|------------|---|------------------|
| <u>STEP 14</u> | 3.10 | Open the following valves (1MC5): Record time first valve is opened • 1VQ-2A (VQ Fan Suct From Cont Isol) | CRITICAL STEP |
| | | 1VQ-3B (VQ Fan Suct From Cont Isol) | |
| STANDAR Applica | | | |
| | | | SAT |
| This step is critical to align a flow path for the air release. | | | |
| Examiner | UNSAT | | |
| | <u>TS:</u> | | |
| | | | |
| | | | |

| STEP 15 3.11 IF 1EMF-39L AND 1EMF-36L are non-functional, independently verify the following valves are open: | |
|---|-------|
| STANDARD: | SAT |
| Applicant will determine that this step does not apply. | UNSAT |
| <u>COMMENTS:</u> | |
| STEP/STANDARD | SAT/UNSAT |
|---|--------------|
| CAUTION: Operation of VQ Fans below 120 cfm will produce surge noise and vibration. Operation below 50 cfm results in heat buildup and may lead to fan failure. | |
| STEP 16 3.12 Place one VQ train in service as follows (1MC5): | |
| 3.12.1 IF placing A train in service, perform the following: | |
| 3.12.1.1 Place "VQ Filt Htr A" in the "AUTO" position. | SAT UNSAT |
| STANDARD: | |
| Applicant will place "VQ Filt Htr A" in the "AUTO" position. | |
| <u>COMMENTS:</u> | |
| | |

| STEP 173.12.1.2Start "Cont Air Rel Fan 1A".STANDARD: | CRITICAL STEP |
|---|------------------|
| Applicant will start "Cont Air Release Fan 1A" by depressing the Red "ON" pushbutton and verifying the Red "ON" light is lit. | |
| This step is critical to initiate the air release. | SAT |
| COMMENTS: | UNSAT |
| | |

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| STEP 18 3.12.2 IF placing B train in service, perform the following: | |
| STANDARD: | |
| | SAT |
| Applicant will determine that this step does not apply. | |
| COMMENTS: | UNSAT |
| END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

• Unit 1 is operating at 100% power.

INITIATING CUES:

• The Unit 2 BOP has performed OP/1/A/6450/017 Enclosure 4.2 steps 2.1 through step 3.4. You have been tasked to initiate a Containment Air Release by performing steps 3.5 through 3.12 using 'A' Train equipment. All Peer Checks have been waived.

Air Release Mode

1. Limits and Precautions

- 1.1 Do **NOT** exceed Containment Pressure Limits of -0.08 psig and +0.25 psig. Tech Spec Containment Pressure Limits are -0.1 psig to +0.3 psig.
- 1.2 When manually operating any motor operated valve, minimize the torque applied to the handwheel.
- 1.3 After manual operation, maintenance, or packing adjustment of any motor operated Safety Related valve, it shall be cycled electrically to ensure reliable automatic operation.
- 1.4 Pressure switches for valve operation shall <u>NOT</u> be manually overridden since ice condenser doors are very sensitive to over or under pressure conditions.
- 1.5 When Containment Air Release Filter unit pre-filter or absolute filter differential pressure reaches 2.5 inches H₂O, the standby fan is placed in service and action initiated to replace the dirty filter(s).
- 1.6 A new Gaseous Waste Release (GWR) sample is required if:
 - 24 hours has elapsed since the last sample.
 - VQ release is automatically terminated due to a valid controlling EMF actuation. If actuation is due to an EMF spike, the release may be re-attempted twice before a new sample is required.
- 1.7 A VP, VQ, or Unit Vent Sample is required if:
 - Rx Trip or Startup occurs.
 - Rated Thermal Power change of ≥ 15% in one hour occurs followed by a Thermal Power Stabilization (power level constant at desired power level).
- 1.8 If in Modes 5 or 6 and automatic termination of a release is <u>NOT</u> available, actions of SLC 16.11-7 apply.

2. Initial Conditions

- AA 2.1 Verify Containment Pressure > 0.09 psig.
- AA 2.2 Verify Control Room Supervisor has signed and dated the appropriate sheet of the Gaseous Waste Release (GWR) Record authorizing releases:

✓ "VQ release monitored by EMF 39(L)"
□ "VQ release monitored by EMF 36(L)"

AA 2.3 Verify Containment pressure increase is **NOT** due to a LOCA or steam line break.

Enclosure 4.2

Air Release Mode

AA 2.4 Verify EMF is aligned per the "SPECIAL INSTRUCTIONS FOR RELEASE" section on the Gaseous Waste Release Permit Report.

3. Procedure

- AA 3.1 Ensure the following enclosures are complete:
 - Enclosure 4.4 (Auxiliary Building Valve Checklist)
 - Enclosure 4.5 (Reactor Building Valve Checklist)
 - Enclosure 4.6 (Auxiliary Building Independent Verification Valve Checklist)
 - Enclosure 4.7 (Reactor Building Independent Verification Valve Checklist)

NOTE: Enclosure 4.3 (Initiation and Termination of a Gaseous Waste Release Permit Report) provides information on initiation and termination of a GWR Permit Report.

- 3.2 Perform <u>one</u> of the following:
- AA 3.2.1 **IF** 1EMF-39 (low range) is functional, perform the following:
 - AA 3.2.1.1 Verify 1EMF-39L is specified for use on the Gaseous Waste Release Permit Report.
 - AA 3.2.1.2 Verify 1EMF-39L is functional per SLC 16.11-7 using OP/0/A/6500/080 (EMF Output Modules).
 - AA 3.2.1.3 Set 1EMF-39 (low range) setpoints to the value specified in the "SETPOINT DATA" section on the Gaseous Waste Release Permit Report using OP/0/A/6500/080 (EMF Output Modules).
 - AA 3.2.1.4 Sign off the "EMF39(L) Functional and Source Checked" blank on the "VQ release monitored by EMF 39(L)" sheet of the Gaseous Waste Release (GWR) Record.

3.2.2.2 Verify 1EMF-36L is functional using OP/0/A/6500/080 (EMF Output Modules).

NOTE: 1EMF-36 (low range) trip setpoints are pre-established for offsite dose.

- 3.2.2.3 Verify trip setpoints are set to the values as specified in "SETPOINT DATA" section on the Gaseous Waste Release Permit Report using OP/0/A/6500/080 (EMF Output Modules).
- 3.2.2.4 Sign off the "EMF36(L) Functional and Source Checked" blank on the "VQ release monitored by EMF 36(L)" sheet of the Gaseous Waste Release (GWR) Record.
- 3.2.2.5 N/A the "Independent Verification (IV)" blank on the "VQ release monitored by EMF 36(L)" sheet of the Gaseous Waste Release (GWR) Record.
- N/A AA 3.2.3 IF 1EMF-39L AND 1EMF-36L are non-functional, perform the following:
 - 3.2.3.1 Verify EMF39L <u>AND</u> EMF36L are N/A'd on the Gaseous Waste Release Permit Report.
 - _____ 3.2.3.2 Verify RP has obtained grab samples per HP/0/B/1004/005 (Radioactive Gaseous Waste Release - VQ & VP System). RP contact ______
 - 3.2.3.3 N/A the "EMF36(L) <u>AND</u> EMF39(L) are both non-functional" blank on the "VQ release with EMF 39(L) <u>AND</u> EMF 36(L) Nonfunctional" sheet of the Gaseous Waste Release (GWR) Record.
 - 3.2.3.4 N/A the "IV" blank on the "VQ release with EMF 39(L) <u>AND</u> EMF 36(L) Non-functional" sheet of the Gaseous Waste Release (GWR) Record.
 - 3.2.3.5 N/A steps 3.3 and 3.23.4.

- **NOTE:** Monitoring for highest count rate during release using a digital EMF chart recorder does <u>NOT</u> require an initial setup.
 - The procedure may continue while performing the following step.
- AA 3.3 **IF** using the OAC to obtain the highest count rate during release, monitor the applicable OAC point:
 - ✓ C1E0155 (EMF39L Containment Gas Monitor)
 - C1E0135 (EMF36L Unit Vent Gas Monitor)
 - 3.4 Adjust "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller (1MC5) by performing the following:
 - AA 3.4.1 Depress the "A/M" pushbutton until the "A" light (auto) is illuminated.
 - AA 3.4.2 Verify "VQ0100.S" appears in the display window.
 - <u>AA</u> 3.4.3 Rotate the manual loader in the clockwise direction to open the valve to \leq the "Recommended Release Rate (cfm)" on the Gaseous Waste Release Permit Report.
 - **NOTE:** The person performing Step 3.5 or 3.6 shall <u>NOT</u> be the same individual who originally performed the associated actions in Steps 3.2.1.3, 3.2.1.4 or 3.4.3.
 - 3.5 **IF** 1EMF-39L is functional, perform the following:
 - ^{IV} 3.5.1 Independently verify trip setpoints are set to the values as specified in "SETPOINT DATA" section on the Gaseous Waste Release Permit Report using OP/0/A/6500/080 (EMF Output Modules).
 - <u>IV</u> 3.5.2 Sign off the "Independent Verification (IV)" blank on the "VQ release monitored by EMF 39(L)" sheet of the Gaseous Waste Release (GWR) Record.
 - $\frac{3.6}{1^{V}}$ 3.6 Independently verify "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller is set to \leq the "Recommended Release Rate (cfm)" on the Gaseous Waste Release Permit Report.
 - 3.7 Reset Totalizer on "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller (1MC5) by performing the following:
 - 3.7.1 Depress the "D" pushbutton until "VQ0100.T" appears in the display window.
 - _____ 3.7.2 Depress the "Reset Total" pushbutton and verify a "0" appears in the display window.

Air Release Mode

- 3.8 **IF AT ANY TIME** during the release using 1EMF-39 all of the following conditions are met, immediately terminate the release.
 - OAC point C1E0155 (EMF39L Containment Gas Monitor) is being used to monitor release per Step 3.3.
 - 1EMF-39 digital chart recorder 1MICR6640 is out of service.
 - Loss of Unit 1 OAC.
- 3.9 **IF AT ANY TIME** during the release using 1EMF-36 all of the following conditions are met, immediately terminate the release.
 - OAC point C1E0135 (EMF36L Unit Vent Gas Monitor) is being used to monitor release per Step 3.3.
 - 1EMF-36 digital chart recorder 1MICR6650 is out of service.
 - Loss of Unit 1 OAC.
 - 3.10 Open the following valves (1MC5): Record time first valve is opened _____
 - 1VQ-2A (VQ Fan Suct From Cont Isol)
 - 1VQ-3B (VQ Fan Suct From Cont Isol)
 - 3.11 **IF** 1EMF-39L **AND** 1EMF-36L are non-functional, independently verify the following valves are open:
 - 1VQ-2A (VQ Fan Suct From Cont Isol)
 - 1VQ-3B (VQ Fan Suct From Cont Isol)

CAUTION: Operation of VQ Fans below 120 cfm will produce surge noise and vibration. Operation below 50 cfm results in heat buildup and may lead to fan failure.

- 3.12 Place <u>one</u> VQ train in service as follows (1MC5):
 - 3.12.1 **IF** placing A train in service, perform the following:
 - 3.12.1.1 Place "VQ Filt Htr A" in the "AUTO" position.
 - 3.12.1.2 Start "Cont Air Rel Fan 1A".
- 3.12.2 **IF** placing B train in service, perform the following:
 - 3.12.2.1 Place "VQ Filt Htr B" in the "AUTO" position.
 - 3.12.2.2 Start "Cont Air Rel Fan 1B".

Enclosure 4.2

Air Release Mode

| 3.13 | Perform the following: |
|-------|---|
| NOTE: | Step 3.13.2 may be performed prior to Step 3.13.1. |
| | 3.13.1 Record the VQ start date/time on the following: |
| | Appropriate Gaseous Waste Release (GWR) Record Control Room Log |
| | _ 3.13.2 Enter "0" in the "Initial Integrator Reading" blank of the appropriate Gaseous Waste Release (GWR) Record. |
| NOTE: | Containment pressure is monitored to ensure 1VQ-10 (VQ Fans Disch To Unit Vent) closes at 0 psig to prevent a negative pressure inside containment. |
| 3.14 | IF AT ANY TIME during the release the OAC OR Computer Point C1P1112 (Average Containment Pressure, Best) is out of service, record containment pressure as read on 1VQP5040 (Containment Pressure) on 1MC5 every 30 minutes in the Control Room Log for the duration of the VQ Release. {PIP 93-0074} |
| 3.15 | IF the VQ fan does NOT automatically shutdown at approximately 0 psig, perform the following: |
| | N/A Step 3.16. Perform Step 3.17. |
| 3.16 | <u>WHEN</u> Containment pressure decreases to approximately 0 psig, verify that "1VQ-10 VQ FANS DISCH TO UNIT VENT" closes by performing the following: |
| | _ 3.16.1 Depress the "D" pushbutton until "VQ0100.P" appears in the display window. |
| | _ 3.16.2 Verify no flow indicated on the controller display window. |
| NOTE: | Solenoid 1VQSV0100 (VQ Containment Purge Flow Sol) will <u>NOT</u> reset 1VQSS0100 (VQ Fans Disch To Unit Vent) until a low containment pressure (lower containment pressure greater than 0 psig) or high radiation signal condition (EMF35 or EMF36) is no longer present. |
| 3.17 | Reset solenoid 1VQSV0100 (VQ Containment Purge Flow Sol) by performing the following at"1VQ-10 VQ FANS DISCH TO UNIT VENT" controller: |
| | _ 3.17.1 Depress the "A/M" pushbutton until the "M" light (manual) is illuminated. |
| | _ 3.17.2 Verify "VQ0100.V" appears in the display window. |
| | $3.17.3$ Rotate the manual loader counterclockwise until the display reads ≤ 0 . |

Enclosure 4.2

Air Release Mode

- 3.18 Secure the VQ train placed in service in Step 3.12 as follows:
 - 3.18.1 **IF** securing A train, perform the following:
 - 3.18.1.1 Ensure "Cont Air Rel Fan 1A" has stopped.
 - 3.18.1.2 Place "VQ Filt Htr A" in the "OFF" position.
 - 3.18.2 **IF** securing B train, perform the following:
 - 3.18.2.1 Ensure "Cont Air Rel Fan 1B" has stopped.
 - 3.18.2.2 Place "VQ Filt Htr B" in the ""OFF" position.
- 3.19 Close the following valves: Record time both valves are closed ______
 - 1VQ-2A (VQ Fan Suct From Cont Isol)
 - 1VQ-3B (VQ Fan Suct From Cont Isol)
- _ 3.20 <u>IF</u> 1EMF-39L <u>AND</u> 1EMF-36L are non-functional, independently verify the following valves are closed:
 - 1VQ-2A (VQ Fan Suct From Cont Isol)
 - 1VQ-3B (VQ Fan Suct From Cont Isol)
 - 3.21 Obtain the totalized flow by performing the following:
 - 3.21.1 On "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller, depress the display ("D") pushbutton until "VQ0100.T" (Totalized Flow) is displayed.
 - 3.21.2 Record the totalizer reading _____
 - 3.22 Record the VQ terminate date/time on the Control Room Log.
- **NOTE:** Enclosure 4.3 (Initiation and Termination of a Gaseous Waste Release Permit Report) provides information on initiation and termination of a GWR Permit Report.
 - 3.23 Perform the following on the appropriate Gaseous Waste Release (GWR) Record:
 - 3.23.1 Record the VQ terminate date/time.
 - 3.23.2 Record totalizer value from Step 3.21.2 in "Final Integrator Reading" blank.
 - 3.23.3 Record the "Final Integrator Reading" value in the 'Volume" blank.

| | | | Enclosure 4.2 | OP/ 1 /A/6450/017 |
|-------|-----------|-----------------|--|---|
| | | | Air Release Mode | Page 8 of 10 |
| | 3.23.4 | Enter the "l | Highest EMF Reading" during the release from | n <u>one</u> of the following: |
| | | 3.23.4.1 | Highest reading from the OAC. | |
| | | | <u>OR</u> | |
| | | 3.23.4.2 | Perform the following on the applicable digi | tal EMF chart recorder: |
| | | | A. Depress the "Historical" icon. (Located of keyboard icon) | at bottom of screen, left |
| | | | B. Select "Memory". | |
| | | | C. Select "Start of History". (Binocular ico | n) |
| | | | D. Select "Search by Time". | |
| | | | E. Enter the start date and start time. | |
| | | | F. Select "Search". | |
| NOTE: | Time inte | ervals per incl | h can be changed by depressing the "+" or "-" | buttons. |
| | | | G. While viewing the digital values on the scroll across the trend by depressing the obtain the highest reading. | left side of the screen, ">" or ">>" buttons and |
| | | | H. Depress the "Historical" icon to exit his | tory. |
| | 3.23.5 | Sign the "C | Control Room Operator" blank. | |
| 3.24 | IF the O | AC was used | to monitor release per Step 3.3, ensure Step 3 | .3 has been signed off. |

| Enclosure 4 | 1.2 |
|--------------------|-----|
|--------------------|-----|

Air Release Mode

- 3.25 **IF** 1EMF-39L was used for this release, perform the following to reset EMF trip setpoints:
 - 3.25.1 **IF** in Mode 5, 6, or No Mode **AND** 1EMF39L reading \leq 6.96E+2 cpm, the trip setpoints shall be as follows:
 - Trip 2 = 1.16E+3 cpm
 - Trip 1 = 8.12E+2 cpm
 - 3.25.2 IF in Mode 5, 6, or No Mode AND 1EMF39L reading > 6.96E+2 cpm, contact RP for the trip setpoints.
- 3.25.3 **IF** in Mode 1, 2, 3, or 4, the trip setpoints shall be set and recorded as follows:
 - Trip 2 = 3 X (Containment Atmosphere Activity as indicated by the EMF) = _____ cpm
 - Trip 1 = Trip 2 X .70 = _____ cpm
- 3.25.4 Reset 1EMF-39 (low range) trip setpoints using OP/0/A/6500/080 (EMF Output Modules).
- 3.25.5 Signoff "EMF39(L) Setpoints reset to non-release value" blank on the "VQ release monitored by EMF 39(L)" sheet of the Gaseous Waste Release (GWR) Record.
- **NOTE:** The person performing Step 3.26 or 3.27 shall **<u>NOT</u>** be the same individual who originally performed the associated actions in steps 3.17.3 or 3.25.
- $\frac{1}{1}$ 3.26 **IF** 1EMF-39L is functional, independently verify trip setpoints are reset as described in Step 3.25 using OP/0/A/6500/080 (EMF Output Modules).
 - 3.27 Independently verify "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller is reset by performing the following:
 - <u>IV</u> 3.27.1 On "1VQ-10 VQ FANS DISCH TO UNIT VENT" controller depress the "D" pushbutton until "VQ0100.V" appears in the display window.
 - $__{\rm IV}$ 3.27.2 Display reads ≤ 0 .

Air Release Mode

- 3.28 <u>IF</u> 1EMF-36L was used for this release, perform the following:
 - 3.28.1 The 1EMF-36L trip setpoints shall be as follows:
 - Trip 2 = 1.50E+2 cpm plus existing reading <u>NOT</u> to exceed 8.36E+3 cpm
 - Trip 1 = Trip 2 times 0.7 cpm OR
 - Setpoints as provided by RP
 - 3.28.2 Sign the "EMF36(L) Setpoints per OPS Setpoint Log" blank on the "VQ release monitored by EMF 36(L)" sheet of the Gaseous Waste Release (GWR) Record.
 - 3.29 Do **<u>NOT</u>** file this enclosure in the Control Copy folder of this procedure.

Enclosure 4.3

Verification of EMF RP86A and RM1000 Trip Page 1 of 1 Setpoints Information Use

1. Limits and Precautions

- 1.1 The EMF RP86A and RM1000 green "OPERATE" light goes dark and the failure relay de-energizes under any of the following conditions:
 - The operate/calibrate switch is set to calibrate
 - Loss of high voltage
 - Loss of signal (0 counts in 2 minutes)
 - Safety loop open
 - Loss of power
- 1.2 If an EMF RP86A and RM1000 Trip 1 is set higher than Trip 2, the entered value will be accepted.

2. Initial Conditions

Verify a need to check the EMF trip setpoints.

3. Procedure

- **NOTE:** 1. The setpoints given on release permits are already rounded to 3 significant digits and are entered into the EMF as is. Setpoints for non-release conditions are rounded up or down to 3 significant digits using standard mathematical rules for rounding.
 - 2. Necessary setpoint adjustments are made per Enclosure 4.2 (EMF RP86A and RM1000 Trip Setpoint Adjustment).
 - 3.1 Press the function key [FUN] to bring up the "SELECT FUNCTION" screen.
 - 3.2 Press [4] to bring up the data screen.
 - 3.3 Verify the Trip 1 and Trip 2 setpoints are the same as the desired setpoints.
 - 3.4 Press the clear key [CLR] twice to return to the normal display screen.
 - 3.5 Verify that the correct EMF setpoints are documented in the Control Room EMF Setpoint Logbook.
 - 3.6 **<u>IF</u>** required for IV purposes, ensure that the IV block is signed on Control Room EMF Setpoint Log.

Enclosure 4.6

OP/**0**/A/6500/080 Page 1 of 1

Control Room EMF Setpoint Log

Use Enclosure 4.7 for EMF35 or EMF38 and Enclosure 4.8 for EMF-71, EMF-72, EMF-73, or EMF-74.

Unit #____1 EMF #___39L___

| DATE/TIME | Present Reading Circle one: cpmmrem/hr,rem/hr,gpd | TRIP 2 | TRIP 1 | PERFORMED BY (SIGNATURE) | IV BY (SIGNATURE) | COMMENTS (or RP name): |
|-----------------|---|--------|--------|-----------------------------|----------------------|---------------------------|
| Foday/5 min ago | 350 | 1240 | 870 | Operator AA | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

IV = Independent Verification

Do **<u>NOT</u>** File this enclosure in the Control Copy folder of this procedure.

INFORMATION ONLY

RETDAS v3.5.1 <DPCCN5 Rev.4.0>

CANBERRA

•

GASEOUS WASTE RELEASE PERMIT REPORT

GWR Number: 2019020 Release ID: Unit 1 Cont Air Release 5 Addition(VQ)

| | 1 Unit Releasing 2/2 Station Limit (U=1) | 2 Units Releasing 1/2 Station Limit (U=2) |
|--|--|---|
| Total body dose release rate (cfm) Skin and Gamma air dose release rate (cfm) Food, Ground, Inhalation dose release rate (cfm) | 1.82E+06 7.45E+06 3.01E+10 | 9.08E+05 3.72E+06 1.51E+10 |
| Most restrictive release rate (cfm) Recommonded release rate (cfm) | •••••• | 9.08E+05 3.50E+02 |
| <pre>multiple Release calculation ====================================</pre> | 99993333333 <u>3</u> 9999999999999999999999999 | ···· 1.19E-03 |
| was SETPOINT DATA substances and a substances and a substance and a substance and a substances and a substan | | YES 1.79E+02 3.24E+02 |
| EMF36L Monitor Operable7. EMF36L Entered Background (cpm) EMF36L Expected CPN Entgred Unit Vent Flowrate (cfm) | •••••••••••••••• | NA NA NA NA |
| Xc-133 Equivalence (uCi/cc) userstates | | 5.46E-06 |
| Trip 1 Setpoint (cpm) Trip 2 Setpoint (cpm) | | 8.70E402 |
| criormed by: Man Da | <u> 09/c</u> | 1/19 |

ignature Date: 09/01/19 erified by: Signature

ESE SPECIAL INSTRUCTIONS FOR RELEASE == GWR INSTRUCTIONS FOR 1VQ WITH 1 EMF 39 FUNCTIONAL AND CONTROLLING RELEASE: *Align 1 EMF 38 & 39 to lower cont & incore rm during releases & non-release per This GWR may be used for consecutive 24-hour periods with RP approval. RP may request alternate EMF alignments. **Notify RP of any Trip 1 or Trip 2 alarms**

INFORMATION ONLY

Enclosure 5.3

HP/**0**/B/1004/005

Gaseous Waste Release (GWR) Record (VQ Release by EMF 39(L))

Page 1 of 1

Reference Use

Unit _1_ VQ release monitored by EMF 39(L)

Control Room Supervisor or Designee authorizing GWR release (signature required): <u>Control Room Supervisor</u> Date/Time <u>09/01/19</u>/0400 GWR 2019020

| ⁽¹⁾ Date/Time VQ Release Initiated (Notify RP) | Initial Integrator Reading | Final Integrator Reading | ⁽²⁾ EMF 39(L) Functional and Source CheckedIndependent Verification (IV) | ⁽⁵⁾ Highest EMF 39(L) reading during release | ⁽³⁾ EMF 39(L) setpoints reset to non-release value | Date/Time Release Suspended or Terminated (Notify RP) | ⁽⁴⁾ VQ volume | ⁽²⁾ Control Room Operator (signature required) |
|--|----------------------------------|--------------------------------|--|---|--|---|--------------------------|--|
| | | | Operator AA | | | | | |
| | | | | | | | | |
| | | | (IV) | | | | | |
| | | | (IV) | _ | | | | |
| | | | (IV) | | | | | |
| | | | (IV) | | | | | |
| | | | (IV) | - | | | | |
| | | | (IV) | | | | | |
| | | | (IV) | | | | | |
| | | | | | Total | volume released: | | ft ³ |

IF used, ensure EMF chart recorder is stamped at start of release and at completion of each release. Note 1

Note 2 IF consecutive VQ releases are made ensure GWR record is updated for each release. IF EMF 39(L) is removed from service AND EMF 36(L) is used to monitor the release, request a new GWR from RP Compliance. Not Applicable (N/A) may be used on this GWR record.

Reset EMF 39(L) Trip 1 and 2 setpoints to non-release setpoints when VQ System is NOT in service. Update Control Room EMF Setpoint Log. Note 3

Note 4 Volume for each VQ release = Final Integrator Reading

IF both the OAC and the EMF chart recorder are simultaneously out of service AND the Trip 1 setpoint was not exceeded during the release, document < [Trip 1 setpoint value] for the Highest EMF Note 5 reading during release.

| "This copy has been compared with Control | Initial | Date/Time | Initial | Date/Time | Initial | Date/Time |
|---|---------|-----------|---------|-----------|---------|-----------|
| Copy and verified correct" | | | | | | |

Termination of GWR release acknowledged by Control Room Supervisor or Designee (signature required) _____ Date/Time _____ / ____

JPM H

| Task: Perform a Manual Makeup to the VCT | | | | | | | | | |
|--|---|------------------------------|---|--|----------------------------|--------------------------------------|------------------------------------|---------------------------|---------------------------|
| Alternate Pa | ath: | No | | | | | | | |
| Facility JPN | <u>/ #:</u> | NV-´ | 121 | | | | | | |
| Safety Function: 1 | | | 1 <u>Title:</u> Chemical and Volume Control System | | | | | | |
| K/A 004 A4.12 Ability to batch cor | | | Ability to batch cor | operate and/or monitor i ntrol | n the cont | rol roon | n: Boratio | on/dilutio | on |
| Rating(s): 3.8 / 3.3 CFR: | | | <u>CFR:</u> | 41.7 / 45.5 / 45.8 | | | | | |
| Preferred E | <u>valuati</u> | <u>on Lo</u> | cation: | Preferre | ed Evalua | tion Me | ethod: | | |
| S imulator | X | In- I | Plant | Perform | | Х | S imula | te | |
| <u>References</u> : OP/1/A/6150/009 (Boron Concentration Cont | | | | | n Control) | | | | |
| Task Standard: Volume Control Tank level is increased to approximately 55% (+ 1%) using the correct boron concentration. Validation Times 15 minutes | | | | | | | | | |
| Validation 1 | lime: | 15 m | inutes | Time Cr | ritical: | Ye | S | Νο | x |
| Validation 1 | <u>Гіте:</u> ===== | 15 m | inutes ======= | <u>Time Cr</u> | <u>ritical:</u> ======= | Ye ====== | S ======= Stort: | _ No _ ====== | X ==== |
| Validation 1 ========== Applicant: NAME | <u>[ime:</u> ===== | 15 m | inutes ====== | <u>Time Cr</u> Docket # | <u>'itical:</u> ====== | Ye ===== Time Time | s Start: Finish: | _ No | X ==== |
| Validation 1 | <u>Fime:</u> ====== :e Ratir | 15 m ====== | inutes ======= | <u>Time Cr</u> | <u>'itical:</u> | Ye ===== Time Time Perfo | s Start: Finish: rmance | _ No | X ==== |
| Validation T | <u>Fime:</u> ====== :e Ratir | 15 m ====== | inutes ======= | <u>Time Cr</u> | <u>'itical:</u> ====== | Ye ===== Time Time Perfo | s Start: Finish: rmance | _ No ====== Time | X ==== |
| Validation 1 | <u>Fime:</u> ====== :e Ratir JNSAT | 15 m | inutes ====== | <u>Time Cr</u> | <u>'itical:</u> | Ye ===== Time Time Perfo | s Start: Finish: rmance | _ No | X ==== |
| Validation 1 Applicant: NAME Performanc SAT U Examiner: | <u>Fime:</u> ====== :e Ratir | 15 m ====== <u>ng:</u> | inutes ======= | <u>Time Cr</u> Docket # | <u>'itical:</u> | Ye Time Time Perfo | s Start: Finish: rmance | _ No _ Time / | X ==== |
| Validation 1 | <u>Fime:</u> ====== :e Ratir JNSAT | 15 m | inutes ======= | | <u>itical:</u> | Ye Time Time Perfo | s Start: Finish: rmance | _ No Time / | X |
| Validation 1 Applicant: NAME Performanc SAT L Examiner: | <u>Fime:</u> ====== :e Ratir JNSAT | 15 m | inutes ======= | <u>Time Cr</u> Docket # | <u>'itical:</u> | Ye Time Time Perfo | s Start: Finish: rmance | _ No Time _ / | X |
| Validation 1 | <u>Fime:</u> ====== :e Ratir JNSAT | 15 m | inutes ======= | <u>Time Cr</u> Docket # | <u>itical:</u> | Ye Time Time Perfo | s Start: Finish: rmance | _ No Time / | X |
| Validation 1 | <u>Fime:</u> ====== ze Ratir JNSAT | 15 m | inutes ======== | <u>Time Cr</u> Docket # COMMENTS | <u>itical:</u> | Ye Time Time Perfo | s Start: Finish: rmance | _ No | X ==== |
| Validation 1 Applicant: NAME Performance SAT Examiner: | <u>Fime:</u> ====== ze Ratir JNSAT | 15 m | Inutes Inutes | <u>Time Cr</u> Docket # COMMENTS | <u>fitical:</u> | Ye Time Time Perfo | s Start: Finish: rmance · | _ No Time / | X ==== PATE ==== |

SIMULATOR OPERATOR INSTRUCTIONS:

- 1. ENSURE NRC Examination Security has been established.
- 2. Reset to IC # 157
- 3. Enter the password.
- 4. Select "Yes" on the INITIAL CONDITION RESET pop-up window.
- 5. Ensure simulator setup per table below.
- 6. Place simulator in RUN and acknowledge any alarms.
- 7. ENSURE "Extra Operator" is present in the simulator.
- 8. Place simulator in FREEZE until Examiner cue is given.

| ✓ | Instructor Action | Final | Delay | Ramp | Delete In | Event |
|---|-------------------|-------|-------|------|-----------|-------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- The unit is at 100% power, steady state condition.
- The Reactor Coolant System boron concentration is <u>860 PPM</u>.
- The Volume Control Tank level is 35%.
- VCT automatic makeup is out of service for calibration by IAE.

INITIATING CUES:

- The Control Room Supervisor directs you to perform a manual blended makeup to increase the VCT level to 55% per OP/1/A/6150/009 Boron Concentration Control, Enclosure 4.5. Initial conditions have been completed. Begin at step 3.2.
- The OATC is monitoring the control boards.
- Independent verification and peer checks have been waived.

EXAMINER NOTE: After reading initiating cue, provide examinee a copy of OP/1/A/6150/009 Boron Concentration Control, Enc. 4.5.

START TIME: _____

| | STEP/STANDARD | SAT/UNSAT |
|---------------------------------|--|-----------|
| <u>STEP 1</u> : 3.2 | IF the blender is set up for automatic makeup per Enclosure 4.1 (Automatic Makeup), record the setpoint of the following controllers: | |
| | 1NV-238A (B/A Xfer Pmp To Blender Ctrl)gpm | |
| | 1NV-242A (RMWST To B/A Blender Ctrl)gpm | SAT |
| STANDARD: | | UNSAT |
| Determines step does not apply. | | |
| COMMENTS: | | |
| | | |

| STEP 23.3Determine the volume of makeup desired.Total desired makeup:gal | CRITICAL STEP |
|---|------------------|
| STANDARD: | |
| Uses Databook curve on OAC or "thumb rule" of 20 gals / percent to determine amount of make-up. Operator should determine 380-400 gals. | |
| Examiner Note: Amount required is 381.2 gal per databook | SAT |
| Examiner Note: This step is critical to meet the JPM standard for final VCT level. | UNSAT |
| COMMENTS: | |
| | |

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| NOTE: The RMWST boron concentration has an insignificant effect on the calculation at higher outlet concentrations. The RMWST boron concentration term may be considered "0" when the desired concentration is greater than 100 ppm. | CRITICAL STEP |
| If performing a large blended makeup for demin saturation during BOL, the boric acid should be blended in evenly over the entire makeup to preclude changes in NC temperature and reactor power. | |
| Examiner Cue: If asked, "RMWST [B] = 0 ppm, BAT [B] = 7500 ppm" | |
| STEP 33.4IF the NC system boron concentration is greater than 25 ppm, calculate the amount of boric acid to be added as follows: (R.M.) | SAT UNSAT |
| <u>STANDARD</u> : | |
| Correctly calculates the boron volume dependent on amount of makeup. A 380 gal makeup requires 43.6 gal of boric acid. A 400 gal makeup requires 45.8 gal of boric acid. (42 – 47 gals is acceptable). | |
| Examiner Note: Critical to ensure correct blend for reactivity management. | |
| <u>COMMENTS:</u> | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| NOTE: The intent of the following step is to account for known inaccuracies. The Control Room Supervisor shall be involved in determining the amount of correction to apply. | |
| STEP 4 3.4.2 IF previous makeups have demonstrated an inability to achieve the desired boric acid volume, determine the amount of correction needed gallons | |
| STANDARD: | SAT |
| Applicant determines step is not applicable. | UNSAT |
| Examiner Cue: If asked, "CRS has determined NO amount of correction needed." | |
| COMMENTS: | |
| | |

| NOTE: | NOTE: The intent of the following step is to adjust the blend concentration to intentionally change NC System Tavg. The Control Room Supervisor shall be involved in determining the amount of adjustment to apply. Adjustment is limited to <u>+</u> 5 gallons of Boric Acid per 100 gallons of total makeup volume. | | |
|--|--|-----|--|
| <u>STEP 5</u> | 3.4.3 IF desired to adjust blend concentration for the purpose of changing Tavg, determine the amount of adjustment to be made gallons | SAT | |
| <u>STANDA</u> | UNSAT | | |
| Applic | | | |
| Examiner Cue: If asked, "CRS has determined NO adjustment is needed." | | | |
| <u>COMMEI</u> | | | |
| | | | |

| | STEP/STANDARD | SAT/UNSAT |
|---|---|------------------|
| <u>STEP 6</u> 3.4.4 | Determine the volume of boric acid to be added as follows: Volume = Boric Acid gal (Step 3.4.1) + correction (Step | CRITICAL STEP |
| | 3.4.2) + adjustment (Step 3.4.3) = gallons | |
| <u>STANDARD</u> : Correctly ca of makeup. | SAT | |
| Examiner Note | This step is critical to ensure correct blend for reactivity management. | UNSAT |
| COMMENTS: | | |

| IF boric acid is to be added, ensure one boric acid transfer pump is in "ON". | CRITICAL STEP |
|--|--|
| t one boric acid transfer pump by placing the switch to | |
| ifying the red light LIT. | |
| This step is critical to ensure boron is added. | SAT |
| | UNSAT |
| | |
| | IF boric acid is to be added, ensure one boric acid transfer pump is in "ON". ast one boric acid transfer pump by placing the switch to rifying the red light LIT. This step is critical to ensure boron is added. |

| STEP/STANDARD | SAT/UNSAT | | |
|---|------------------|--|--|
| STEP 8 3.6 IF reactor makeup water is to be added, ensure one reactor makeup water pump is in "ON". | CRITICAL STEP | | |
| STANDARD: | | | |
| Starts at least one reactor makeup water pump by placing the switch(es) to "ON" and verifying the red light(s) LIT. | | | |
| Examiner Note: This step is critical to ensure reactor make-up water is added. | SAT | | |
| COMMENTS: | UNSAT | | |
| | | | |

| NOTE: | Norma preferr VCT) r source | CRITICAL STEP | |
|------------------------------------|--------------------------------------|--|--|
| <u>STEP 9</u> | 3.7 | Place one of the following in the "OPEN" position to align a flowpath to the VCT. (R.M.) 1NV-186A (B/A Blender Otlt To VCT Otlt) OR 1NV-181A (B/A Blender Otlt To VCT) | |
| STANDARD: | | SAT | |
| Opens either 1NV-186A or 1NV-181A. | | UNSAT | |
| Examine | r Note: | This step is critical to establish flowpath for make- up. | |
| <u>COMME</u> | <u>NTS:</u> | | |

| | STEP/STANDARD | SAT/UNSAT |
|--|---|--------------|
| <u>STEP 10</u> 3.8 | IF NC System boron concentration will be changed by ≥ 50 ppm, initiate PZR spray to equalize the boron concentration throughout the system by operating backup heaters per OP/0/A/6200/055 (Miscellaneous Component Operation). | |
| STANDARD: | | SAT UNSAT |
| Applicant determines step is not applicable. | | |
| COMMENTS: | | |

| SAT |
|-------|
| UNSAT |
| |
| |

| STEP 12 3.10 IF AT ANY TIME it is desired to divert letdown to the RHT manually operate 1NV-172A (3-Way Divert To VCT-RHT) as follows: | |
|--|-------|
| STANDARD: | SAT |
| Applicant notes this step and moves on. | UNSAT |
| COMMENTS: | |
| | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 13 3.11 WHILE makeup is in progress, monitor the following for expected results: | |
| Control rod motion NC System Tavg Reactor Power | SAT |
| STANDARD: | UNSAT |
| Monitors control rods, T-Avg, and reactor power during makeup. | |
| COMMENTS: | |
| | |

| NOTE: | Steps 3 to achie | .12 and 3.13 may be performed concurrently, as required, eve the proper blend | CRITICAL STEP |
|---|---------------------|---|------------------|
| <u>STEP 14</u> | 3.12 | IF reactor makeup water is to be added, perform the following: | |
| | NOTE | : If blended makeup is being added, 1NV-242A (RMWST To B/A Blender Ctrl) may be manually controlled to allow proper blending of makeup. | |
| | 3.12.1 | Operate 1NV-242A (RMWST To B/A Blender Ctrl) as required. (R.M.) | |
| <u>STANDAR</u> | <u>RD</u> : | | SAT |
| Operates 1NV-242A as required to achieve correct blend. | | UNSAT | |
| Examiner | Note: | This step is critical to ensure correct blend for reactivity management. | |
| COMMENTS: | | | |
| | | | |

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| STEP 15 3.12.2 Monitor the total makeup counter. | |
| STANDARD: | 0.4.7 |
| Monitors the total makeup counter. | SAT |
| COMMENTS: | UNSAT |
| | |

Г

| <u>STEP 16</u> | 3.13 | IF boric acid is to be added, perform the following: | |
|----------------|-------------|---|-------|
| | NOTE | : If blended makeup is being added, 1NV-238A (B/A To Blender Ctrl VIv) may be manually controlled to allow | SILF |
| | | proper biending of makeup. | |
| | 3.12.1 | Operate 1NV-238A (B/A To Blender Ctrl VIv) as required. (R.M.) | |
| | - | | |
| <u>STANDAR</u> | <u>:</u> D: | | |
| | | | SAT |
| Operate | es 1NV | -238A as required for correct blend. | |
| Examiner | Note: | This step is critical to ensure correct blend for | UNSAT |
| | | reactivity management. | |
| | | | |
| <u>COMMEN</u> | <u>TS:</u> | | |
| | | | |
| | | | |
| | | | |

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| STEP 17 3.13.2 Monitor the boric acid counter. | SAT |
| Monitors the boric acid counter. | |
| <u>COMMENTS:</u> | UNSAT |

| NOTE: The boric acid and/or total makeup counter may count up 1 - 5 gallons after termination. | |
|--|-----|
| STEP 18 3.14 WHEN the desired volume(s) as determined in Step 3.3 | |
| AND IF applicable, Step 3.4.4 is(are) reached on the total makeup counter and/or the boric acid counter, ensure the following valves are closed to secure manual makeup: (R.M.) | |
| 1NV-242A (RMWST To B/A Blender Ctrl) | |
| OR | |
| 1NV-238A (B/A To Blender Ctrl VIv) | |
| STANDADD | SAT |
| <u>STANDARD</u> . | |
| Closes 1NV-242A and 1NV-238A by placing their control switches to the "CLOSE" or "AUTO" position and verifying the green light LIT. | |
| Examiner Note: This step is critical to secure make-up flow. | |
| COMMENTS: | |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|----------------------------------|---|-----------|
| STEP 19 3.15 | Close the valve opened in Step 3.7. | |
| | 1NV-186A (B/A Blender Otlt To VCT Otlt) OR | |
| | 1NV-181A (B/A Blender Otlt To VCT) | |
| | | SAT |
| STANDARD: | | |
| | | |
| Closes valve of or "AUTO" pos | opened in step 3.7 by placing the switch to the "CLOSE" sition and verifying the green light LIT. | |
| COMMENTS: | | |

| <u>STEP 20</u> 3.16 <u>IF</u> <u>NOT</u> required for current plant conditions, place switch for boric acid transfer pump started in Step 3.5, ir "OFF". | 1 |
|--|-----|
| STANDARD: | SAT |
| Secures pump started in step 3.5 by placing the respective control switch to "OFF" and verifying the green light LIT. | |
| COMMENTS: | |
| | |

| SAT/UNSAT |
|-----------|
| |
| SAT |
| UNSAT |
| |
| |

| NOTE: | If additional boric acid additions will be performed over the course of the shift, flushing the makeup line is <u>NOT</u> recommended. | |
|---------------|---|-------|
| STEP 22 | 3.18 IF boric acid only was added <u>AND</u> it is desired, flush the makeup line as follows: | SAT |
| <u>STANDA</u> | <u>RD</u> : | UNSAT |
| Applic | cant determines step is not applicable. | |
| <u>COMME</u> | NTS: | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 23 3.19 Reset the following: | |
| Total Makeup Counter | |
| Boric Acid Counter | |
| STANDARD: | SAT |
| Resets the Total Makeup Counter and the Boric Acid Counter by depressing the "F1/RST" pushbuttons and verifying the counter indication goes to 0. | UNSAT |
| COMMENTS: | |

| STEP 24 3.20 IF automatic makeup is desired, perform one of the following: | |
|---|-------|
| STANDARD: | |
| Applicant determines step is not applicable. | SAT |
| Examiner Cue: <u>"Automatic makeup is not desired."</u> | UNSAT |
| COMMENTS: | |
| | |

| | | STEP/STANDARD | SAT/UNSAT |
|--|-------------|--|-----------|
| <u>STEP 25</u> | 3.21 | IF initiated in Step 3.8, terminate PZR spray by securing backup heaters per OP/0/A/6200/055 (Miscellaneous Component Operation). | |
| STANDAR | <u>RD</u> : | | SAT |
| Applicant determines step is not applicable. | | | UNSAT |
| COMMENTS: | | | |
| | | | |
| | | | |

| STEP 26 3.22 | Do <u>NOT</u> file this enclosure in the Control Copy folder of this procedure. | |
|--|--|-------|
| STANDARD: | | |
| Procedure sh | ould be routed. | SAT |
| | | |
| Examiner Cue: <mark>complete."</mark> | "The CRS will review this procedure. JPM is | UNSAT |
| Examiner Cue: complete." COMMENTS: | "The CRS will review this procedure. JPM is | UNSAT |

STOP TIME_____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- The unit is at 100% power, steady state condition.
- The Reactor Coolant System boron concentration is <u>860 PPM</u>.
- The Volume Control Tank level is 35%.
- VCT automatic makeup is out of service for calibration by IAE.

INITIATING CUES:

- The Control Room Supervisor directs you to perform a manual blended makeup to increase the VCT level to 55% per OP/1/A/6150/009 Boron Concentration Control, Enclosure 4.5. Initial conditions have been completed. Begin at step 3.2.
- The OATC is monitoring the control boards.
- Independent verification and peer checks have been waived.

Manual Operation Of The Makeup Controls

1. Limits and Precautions

- 1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing boron concentration. (R.M.)
- 1.2 The following Limits and Precautions are Reactivity Management related: (R.M.)
 - 1.2.1 When performing dilutions at or near 100% power, batch additions to the VCT (instead of continuous dilution at low flow rates) are the preferred method. {PIP C99-0587}
 - 1.2.2 If the NC System is filled and vented and the boron concentration is being reduced in the NC System, at least one NC pump shall be in operation, recirculating the NC System. {PIP C99-2510}
 - 1.2.3 If the boron concentration is being increased in the NC System, at least one NC pump or one ND pump shall be in operation, recirculating the NC System.
 - 1.2.4 If the unit has operated continuously for several months, significant Boron 10 depletion may have occurred. The effective boron concentration of the NC System may be lower than indicated by Chemistry samples.
- 1.3 Continuous dilution operations will affect the NC System H₂ concentration.
- 1.4 With BAT boron concentration greater than or equal to 7200 ppm, it is recommended that only manual makeup be performed when the NC System boron concentration is \geq 1300 ppm. Automatic or manual makeup can be used when NC System boron concentration is < 1300 ppm. {PIP 03-7305}
- 1.5 With BAT boron concentration less than 7200 ppm, it is recommended that only manual makeup be performed when the NC System boron concentration is \geq 1250 ppm. Automatic or manual makeup can be used when NC System boron concentration is < 1250 ppm. {PIP 03-7305}
- 1.6 With a reactor makeup water pump running following an auto start, repositioning its control switch to "ON" can cause the pump motor breaker to trip. Therefore, the control switches for these pumps shall only be repositioned with the associated pump off.
- 1.7 Maintaining VCT pressure as low as practical during large makeups will minimize gas absorption. VCT pressure can be reduced by diverting letdown or by VCT purge.
- 1.8 Due to Electromagnetic Interference within the Unit 1 Reactor Makeup Control System, the Unit 1 Boric Acid Counter may sporadically count up during dilution activities. OFF indications for the Boric Acid Xfer Pumps and Closed indication for valve 1NV-238A can be used by the Reactor Operators to validate that sporadic counts are indication only. (NCR 02081372).
OP/**1**/A/6150/009 Page 2 of 8

- 2. Initial Conditions
- <u>AA</u> 2.1 <u>IF</u> in Mode 1, 2 or 3 <u>AND</u> a blended makeup is being performed with the intention of maintaining current NC System boron concentration, ensure R3 reactivity management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)
- N/A AA 2.2 IF in Mode 1, 2 or 3 AND a makeup is being performed with the intention of changing NC System boron concentration, ensure R2 reactivity management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)
 - **AA** 2.3 Verify the NB System is in operation per OP/1/A/6200/012 (Reactor Makeup Water).
 - **AA** 2.4 Verify the NV System is in operation per OP/1/A/6200/001 (Chemical and Volume Control System).

3. Procedure

IV

| NOTE: | | This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of AD-OP-ALL-0203 (Reactivity Management). (R.M.) |
|-------|--------------|---|
| ŀ | A 3.1 | Ensure valves are aligned per Enclosure 4.8 (Valve Checklist). |
| | 3.2 | \underline{IF} the blender is set up for automatic makeup per Enclosure 4.1 (Automatic Makeup), record the setpoint of the following controllers: |
| | | □ 1NV-238A (B/A Xfer Pmp To Blender Ctrl)gpm □ 1NV-242A (RMWST To B/A Blender Ctrl)gpm |
| | 3.3 | Determine the volume of makeup desired. Total desired makeup: gal |

| NOTE: | • The Fourthermonetary outlet when | RMWST boron concentration has an insignificant effect on the calculation at higher concentrations. The RMWST boron concentration term may be considered "0" the desired concentration is greater than 100 ppm. |
|-------|--|---|
| | • If per shoul temper | forming a large blended makeup for demin saturation during BOL, the boric acid d be blended in evenly over the entire makeup to preclude changes in NC erature and reactor power. |
| 3.4 | <u>IF</u> the N acid to b | C system boron concentration is greater than 25 ppm, calculate the amount of boric e added as follows: (R.M.). |
| | _ 3.4.1 | Determine the volume of boric acid required to achieve the desired concentration: |
| H | Boric acid g | $al = \frac{V_f (C_f - C_w)}{(C_a - C_w)} = gallons$ |
| | where | V _f is the total makeup volume from Step 3.3 C _f is the desired boron concentration C _w is the RMWST boron concentration C _a is the BAT boron concentration |
| NOTE: | The inter Supervise | t of the following step is to account for known inaccuracies. The Control Room or shall be involved in determining the amount of correction to apply. |
| IV | _ 3.4.2 | IF previous makeups have demonstrated an inability to achieve the desired boric acid volume, determine the amount of correction needed gallons |
| NOTE: | The inter NC Syste amount o gallons o | It of the following step is to adjust the blend concentration to intentionally change em Tavg. The Control Room Supervisor shall be involved in determining the f adjustment to apply. Adjustment is limited to ± 5 gallons of Boric Acid per 100 f total makeup volume. |
| IV | _ 3.4.3 | IF desired to adjust blend concentration for the purpose of changing Tavg, determine the amount of adjustment to be made gallons |
| | _ 3.4.4 | Determine the volume of boric acid to be added as follows: |
| IV | | Volume = Boric acid gal (Step 3.4.1) + correction (Step 3.4.2) + adjustment (Step 3.4.3) = gallons |
| 3.5 | <u>IF</u> boric | acid is to be added, ensure one boric acid transfer pump is in "ON". |
| 3.6 | IF reacted | or makeup water is to be added, ensure one reactor makeup water pump is in "ON". |
| | | |

IV

- **NOTE:** Normally 1NV-186A (B/A Blender Otlt To VCT Otlt) is the preferred makeup flowpath. 1NV-181A (B/A Blender Otlt To VCT) may be used to limit oxygen addition from the makeup source.
 - 3.7 Place one of the following in the "OPEN" position to align a flowpath to the VCT. (R.M.)
 - 1NV-186A (B/A Blender Otlt To VCT Otlt) OR
 - 1NV-181A (B/A Blender Otlt To VCT)
- 3.8 IF NC System boron concentration will be changed by \geq 50 ppm, initiate PZR spray to equalize the boron concentration throughout the system by operating backup heaters per OP/0/A/6200/055 (Miscellaneous Component Operation).
- 3.9 **IF AT ANY TIME** a dilution is in progress with the reactor subcritical the Nuclear Instrumentation increases by a factor of two, perform the following:
 - 3.9.1 Ensure the following valves are closed:
 - 1NV-242A (RMWST To B/A Blender Ctrl)
 - 1NV-238A (B/A To Blender Ctrl Vlv)
 - 3.9.2 Continue with this enclosure at Step 3.15.
 - 3.10 **IF AT ANY TIME** it is desired to divert letdown to the RHT manually operate 1NV-172A (3-Way Divert To VCT-RHT) as follows:
 - _____ 3.10.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the "RHT" position.
 - 3.10.2 Ensure VCT level is monitored continuously while diverting to the RHT.

NOTE: Procedure may continue while performing the following step.

- 3.10.3 <u>WHEN</u> desired VCT level is reached return 1NV-172A (3-Way Divert To VCT-RHT) to auto as follows:
 - _____ 3.10.3.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "VCT" position.
 - _____ 3.10.3.2 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "AUTO" position.

_ 3.11 <u>WHILE</u> makeup is in progress, monitor the following for expected results:

□ Control rod motion □ NC System Tavg

□ Reactor Power

NOTE: Steps 3.12 and 3.13 may be performed concurrently, as required, to achieve the proper blend.

3.12 **IF** reactor makeup water is to be added, perform the following:

NOTE: If blended makeup is being added, 1NV-242A (RMWST To B/A Blender Ctrl) may be manually controlled to allow proper blending of makeup.

- 3.12.1 Operate 1NV-242A (RMWST To B/A Blender Ctrl) as required. (R.M.)
 - 3.12.2 Monitor the total makeup counter.
- 3.13 **<u>IF</u>** boric acid is to be added, perform the following:

NOTE: If blended makeup is being added, 1NV-238A (B/A To Blender Ctrl Vlv) may be manually controlled to allow proper blending of makeup.

- 3.13.1 Operate 1NV-238A (B/A To Blender Ctrl Vlv) as required. (R.M.)
 - 3.13.2 Monitor the boric acid counter.

NOTE: The boric acid and/or total makeup counter may count up 1 - 5 gallons after termination.

- 3.14 <u>WHEN</u> the desired volume(s) as determined in Step 3.3 <u>AND IF</u> applicable, Step 3.4.4 is(are) reached on the total makeup counter and/or the boric acid counter, ensure the following valves are closed to secure manual makeup: (R.M.)
 - 1NV-242A (RMWST To B/A Blender Ctrl)
 - 1NV-238A (B/A To Blender Ctrl Vlv)
- 3.15 Close the valve opened in Step 3.7.
- 1NV-186A (B/A Blender Otlt To VCT Otlt) OR
 - 1NV-181A (B/A Blender Otlt To VCT)
- 3.16 **<u>IF NOT</u>** required for current plant conditions place switch for boric acid transfer pump started in Step 3.5, in "OFF".

- _ 3.17 IF NOT required for current plant conditions, place switch for reactor makeup water pump started in Step 3.6, in "OFF".
- **NOTE:** If additional boric acid additions will be performed over the course of the shift, flushing the makeup line is <u>NOT</u> recommended.
- 3.18 **IF** boric acid only was added **AND** it is desired, flush the makeup line as follows:
 - 3.18.1 Ensure controller for 1NV-242A (RMWST To B/A Blender Ctrl) is in manual.
 - 3.18.2 Increase demand on controller for 1NV-242A (RMWST To B/A Blender Ctrl) to full open
 - 3.18.3 Open 1NV-242A (RMWST To B/A Blender Ctrl).
 - 3.18.4 Open valve which was opened in Step 3.7:
 - 1NV-186A (B/A Blender Otlt To VCT Otlt) OR
 - 1NV-181A (B/A Blender Otlt To VCT)
 - 3.18.5 Ensure one reactor makeup water pump is in "ON".
 - 3.18.6 <u>WHEN</u> ~ 20 gallons of makeup water have been flushed through the makeup line, ensure the following valves are closed:
 - 3.18.6.1 1NV-242A (RMWST To B/A Blender Ctrl)
 - _____ 3.18.6.2 1NV-186A (B/A Blender Otlt To VCT Otlt)
 - 3.18.6.3 1NV-181A (B/A Blender Otlt To VCT)
 - _____ 3.18.7 Ensure controller for 1NV-242A (RMWST To B/A Blender Ctrl) is set to the value recorded in Step 3.2.
 - 3.18.8 Place controller for 1NV-242A (RMWST To B/A Blender Ctrl) in auto.
 - 3.18.9 **IF** NOT required for current plant conditions, place switch for reactor makeup water pump started in Step 3.18.5, in "OFF".
 - 3.18.10 **IF** reactor makeup water pump started in Step 3.18.5, was in "AUTO", **THEN** place switch for reactor makeup water pump started in Step 3.18.5, in "AUTO".

Reset the following: 3.19 • Total Makeup Counter Boric Acid Counter **IF** automatic makeup is desired, perform one of the following: 3.20 3.20.1 **IF** it is desired to change the blender outlet boron concentration, refer to Enclosure 4.1 (Automatic Makeup). OR 3.20.2 **IF** makeup at the previous concentration is acceptable **AND** the system was previously aligned per Enclosure 4.1 (Automatic Makeup), perform the following: Ensure the following valve control switches in "AUTO": 3.20.2.1 1NV-181A (B/A Blender Otlt To VCT) 1NV-186A (B/A Blender Otlt To VCT Otlt) 1NV-238A (B/A To Blender Ctrl Vlv) 1NV-242A (RMWST To B/A Blender Ctrl) 3.20.2.2 Ensure the controller for 1NV-238A (B/A Xfer Pmp To Blender Ctrl) is set to the value recorded in Step 3.2. (R.M.) 3.20.2.3 Ensure the controller for 1NV-242A (RMWST To B/A Blender Ctrl) is set to the value recorded in Step 3.2. (R.M.) 3.20.2.4 Ensure the following valve controllers in auto: 1NV-242A (RMWST To B/A Blender Ctrl) ٠ 1NV-238A (B/A Xfer Pmp To Blender Ctrl) • 3.20.2.5 **IF** a boric acid transfer pump was placed in "OFF" in Step 3.16, ensure it is returned to "AUTO". **IF** a reactor makeup water pump was placed in "OFF" in Step 3.17, 3.20.2.6 ensure it is returned to "AUTO". Ensure the "NC MAKEUP MODE SELECT" switch in "AUTO". 3.20.2.7 NOTE: If automatic makeup has been disabled per Enclosure 4.1 step 3.1.1, then N/A step 3.20.2.8.

_____ 3.20.2.8 Place the "NC MAKEUP CONTROL" switch to the "START" position. (R.M.)

- 3.21 **IF** initiated in Step 3.8, terminate PZR spray by securing backup heaters per OP/0/A/6200/055 (Miscellaneous Component Operation).
 - 3.22 Do **<u>NOT</u>** file this enclosure.

JPM I

EVALUATION SHEET

| <u>Task:</u> | Brea | ak Conden | ser Vacuum Lo | ocally | | |
|---|------------------------------|---|--|---|--|--|
| Alternate Path: | No | | | | | |
| Facility JPM #: | CA- | CA-084 | | | | |
| Safety Function: | 4S | <u>Title:</u> | Main Turb | ine Generator (MT/0 | G) System | |
| <u>K/A</u> 045 | A1.06 | Ability to exceedin controls following | predict and/or ng design limits including: Exp T/G trip | monitor changes in associated with op ected response of s | parameters (to prevent perating the MT/G system secondary plant parameters | |
| Rating(s): 3.3 | / 3.7 | <u>CFR:</u> | 41.5 / 45.5 | | | |
| Preferred Evalua | tion Lo | cation: | | Preferred Evalua | tion Method: | |
| Simulator | In- | Plant _ | X | Perform | X Simulate | |
| References: | AP/2 | 2/A/5500/0 | 06 (Loss of S/ | G Feedwater) Enclo | sure 3 | |
| <u>Task Standard:</u> | Enc 10 n | losure 3 ha ninutes. | as been compl | eted with the first va | cuum breaker opened within | |
| Validation Time: 8 minutes | | | | Time Critical: | Yes <u>X</u> No | |
| | | | | | | |
| Applicant: | | | Dock | et # | Time Start: Time Finish: | |
| Applicant: NAME Performance Rat SAT UNSA | ====== t <u>ing:</u> T | | Dock | et # | Time Start: Time Finish: Time Critical (<10 minutes) Time Start: Time Finish: Performance Time | |
| Applicant: NAME Performance Rat SAT UNSA Examiner: | ====== ting: T | NAME | Dock | et # | Time Start: Time Finish: Time Critical (<10 minutes) Time Start: Time Finish: Performance Time / JATURE DATE | |
| Applicant: NAME Performance Rat SAT UNSA Examiner: | ting: T | NAME | Dock | et # | Time Start: Time Finish: Time Critical (<10 minutes) Time Start: Time Finish: Performance Time / IATURE | |
| Applicant: NAME Performance Rat SAT UNSA Examiner: | ting: T | NAME | Dock | et # | Time Start: Time Finish: Time Critical (<10 minutes) Time Start: Time Finish: Performance Time / / NATURE | |
| Applicant: NAME Performance Rate SAT UNSA Examiner: | ting: T | NAME | Dock | et # | Time Start: Time Finish: Time Critical (<10 minutes) Time Start: Time Finish: Performance Time / IATURE | |
| Applicant: NAME Performance Rate SAT UNSA Examiner: | ting: T | NAME | Dock | et # | Time Start: Time Finish: Time Critical (<10 minutes) Time Start: Time Finish: Performance Time / IATURE | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

• Unit 2 is in Mode 3 following a reactor trip.

INITIATING CUES:

 The Control Room Supervisor instructs you to perform AP/2/A/5500/006 (Loss of S/G Feedwater) Enclosure 3 (Local Actions to Break Condenser Vacuum).

This JPM is TIME CRITICAL; time begins when you acknowledge the task.

EXAMINER NOTE: Provide applicant with a copy of AP/2/A/5500/006, Enclosure 3.

Critical Time Start: Record Time that applicant acknowledges the task _____.

| | STEP/STANDARD | SAT/UNSAT |
|---|---|------------------|
| CAUTION High air flow first opened | v rates will exist when vacuum breakers are I. Stay clear of pipe end. | CRITICAL STEP |
| STEP 1: 1 Break co valves: | ndenser vacuum by opening the following | |
| • 2CM 600, | 1-368 (2A Main Cond Shell Vacuum Bkr) (TB2- 2F-2G, 26) (Ladder needed) | |
| • 2CN 600, | 1-369 (2B Main Cond Shell Vacuum Bkr) (TB2- 2F, 24-25) (Ladder needed) | |
| • 2CM 609, | 1-370 (2C Main Cond Shell Vacuum Bkr) (TB2- 2F-22) (Ladder needed). | |
| Examiner Note: The c descr of the | ritical end time is when the applicant ibes opening the first valve. Due to the height valves, no fall protection will be required. | |
| Examiner Cue: When handv valve | applicant describes engaging lever and rotating wheel counter clockwise to open the following then: " A large volume of airflow is heard." | SAT UNSAT |
| Examiner Note: This s for br | step is critical in order to open correct valves eaking vacuum. | |
| Critical Time End: | | |
| STANDARD: | | |
| Applicant will describe 370. | opening the valves: 2CM-368, 2CM-369, 2CM- | |
| COMMENTS: | | |
| | | |

| | STEP/STANDARD | SAT/UNSAT |
|---------------------------------|---|------------------|
| <u>STEP 2</u> 2 Se a. | ecure steam to CSAEs as follows: Close the following valves: | CRITICAL STEP |
| | • 2SA-22 (Main Steam To CSAE) (TB2-614, 2M-32) | |
| | 2SA-27 (Aux Steam To CSAE) (TB-614, 2L-2M, 27). | |
| STANDARD: | | |
| Applicant will de | escribe closing 2SA-22 and 2SA-27. | |
| Examiner Cue: | As applicant properly describes closing the valves give cue as appropriate, " Valve turns until resistance is felt." | SAT UNSAT |
| Examiner Note: | This step is critical, because if it is not performed, the CSAEs will continue to pull vacuum | |
| COMMENTS: | | |

| <u>STEP 3</u> b. | <u>WHEN</u> time and manpower permit, <u>THEN</u> complete the shutdown of the CSAEs. REFER TO OP/2/B/6300/006 (Main Vacuum). | |
|------------------|--|-------|
| STANDARD: | | |
| Applicant wi | I read the step | SAT |
| Examiner Cue: | The Control Room Supervisor has instructed another operator to complete the shutdown of the CSAEs. | UNSAT |
| COMMENTS: | | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 4 3. WHEN requested by Control Room Supervisor, THEN verify condenser vacuum broken as follows: | |
| a. Inspect each vacuum breaker for absence of air flow into condenser. | |
| b. Notify Control Room Supervisor of results. | |
| STANDARD: | SAT |
| Applicant will inspect each vacuum breaker for the absence of air flow into the condenser and will report to the Control Room Supervisor. | UNSA1 |
| Examiner Cue: After each inspection, "No air flow into condenser." | |
| COMMENTS: | |
| | |

STOP TIME_____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

• Unit 2 is in Mode 3 following a reactor trip.

INITIATING CUES:

 The Control Room Supervisor instructs you to perform AP/2/A/5500/006 (Loss of S/G Feedwater) Enclosure 3 (Local Actions to Break Condenser Vacuum).

This JPM is TIME CRITICAL; time begins when you acknowledge the task.

LOSS OF S/G FEEDWATER

Enclosure 3 - Page 1 of 1 Local Actions To Break Condenser Vacuum

<u>CAUTION</u> High air flow rates will exist when vacuum breakers are first opened. Stay clear of pipe end.

- 1. Break condenser vacuum by opening the following valves:
 - 2CM-368 (2A Main Cond Shell Vacuum Bkr) (TB2-600, 2F-2G, 26) (Ladder needed)
 - 2CM-369 (2B Main Cond Shell Vacuum Bkr) (TB2-600, 2F, 24-25) (Ladder needed)
 - 2CM-370 (2C Main Cond Shell Vacuum Bkr) (TB2-609, 2F-22) (Ladder needed).

2. Secure steam to CSAEs as follows:

- a. CLOSE the following valves:
- 2SA-22 (Main Steam To CSAE) (TB2-614, 2M-32)
- 2SA-27 (Aux Steam To CSAE) (TB-614, 2L-2M, 27).
- b. <u>WHEN</u> time and manpower permit, <u>THEN</u> complete shutdown of CSAEs. <u>REFER TO</u> OP/2/B/6300/006 (Main Vacuum).
- 3. <u>WHEN</u> requested by Control Room Supervisor, <u>THEN</u> verify condenser vacuum broken as follows:
 - ____a. Inspect each vacuum breaker for absence of air flow into condenser.
 - ____b. Notify Control Room Supervisor of results.

JPM J

EVALUATION SHEET

| <u>Task:</u> | | Tran | sfer Cont | trol to Standby | v Shutdown Syste | em | | | |
|---|--|------------------------------|--|---|--|--|---|----------------------------|----------------|
| Alternate Path: | | No | | | | | | | |
| Facility JPM #: | | AD-(| 001 | | | | | | |
| Safety Fund | <u>ction:</u> | 3 | <u>Title:</u> | Reactor | Pressure Control | | | | |
| <u>K/A</u> | APE AA1.2 | 068 21 | Ability to Room E panel of | o operate and/ Evacuation: Tra r local control | or monitor the fo ansfer of controls | llowing as t from contr | hey apply ol room to | to the (shutdo | Control own |
| <u>Rating(s):</u> | 3.9/ | 4.1 | CFR: | 41.7 / 45.5 / | 45.6 | | | | |
| Preferred E | valuati | <u>on Lo</u> | cation: | | Preferred Ev | aluation M | lethod: | | |
| S imulator | . <u></u> | In- I | Plant | <u> </u> | Perform | X | _ Simula | ate | |
| <u>References</u> | : | OP/(|)/B/6100/ | 013 (Standby | Shutdown Facilit | y Operatior | ı) | | |
| Task Standa | ard: | Cont valve A Ne | trol is trar e disconn eutron Mo | nsferred to the ects transferre onitoring Syste | Standby Shutdo ed, CAPT T&T va em power is trans | wn System Ive power i ferred. | , solenoid s transfer | isolatio red and | n I Train |
| | | | | | | | | | |
| Validation T | <u>ime:</u> | 10 m | inutes | | <u>Time Critical</u> | <u>:</u> Y | es | No | X |
| Validation 1 ==================================== | <u>ime:</u> ===== | 10 m ===== | inutes ====== | Doc | <u>Time Critical</u> | <u>: </u> | es ======= e Start: e Finish: | _ No ====== | X ==== |
| Validation 1 | ime: ====== e Ratii | 10 m ====== <u>ng:</u> | inutes ====== | Doc | Time Critical | :Y ======== Time Time Perf | es ======= e Start: e Finish: ormance | _ No ====== Time | X ==== |
| Validation 1 Applicant: NAME Performanc SAT L | <u>ime:</u> •• Ratii | 10 m | inutes ====== | ====== Doc | Time Critical | : Time Time Perf | es ====== e Start: e Finish: ormance | No | X ==== |
| Validation 1 Applicant: NAME Performanc SAT | <u>ime:</u> ====== :e Ratii | 10 m ====== <u>ng:</u> | inutes ====== | Doc | Time Critical | : Time Time Perf | es e Start: e Finish: ormance | No ====== Time | X ==== |
| Validation 1 Applicant: NAME Performanc SAT | <u>ime:</u> e Ratin | 10 m | inutes ====== | Doc | Time Critical | <u> </u> | es e Start: e Finish: ormance E | No Time / | X ==== |
| Validation 1 Applicant: NAME Performanc SAT L Examiner: | ime: e Ratii | 10 m | inutes ======= | | Time Critical | :Time Time Perf | es Start: Finish: ormance | No Time / | X ==== |
| Validation 1 Applicant: NAME Performanc SAT | <u>ime:</u> ====== : :e Ratii | 10 m | inutes ======= | Doc | <u>Time Critical</u> ket # | :Time Time Perf | es e Start: e Finish: ormance E | No | X ==== |
| Validation 1 Applicant: NAME Performanc SAT | <u>ime:</u> ====== JNSAT | 10 m | NAME | Doc | <u>Time Critical</u> ket # | :Time Time Perf | es e Start: e Finish: ormance E | No | X ==== |
| Validation 1 Applicant: NAME Performanc SAT L Examiner: | ime: e Ratin JNSAT | 10 m | inutes ======= NAME ======= | Doc | Time Critical | <u> </u> | es e Start: e Finish: ormance E | No | X ==== |
| Validation 1 Applicant: NAME Performanc SAT | ime: e Ratin JNSAT | 10 m | inutes | Doc | Time Critical IMENTS | :Time Time Perf | es e Start: e Finish: ormance E | No | X ==== |
| Validation 1 Applicant: NAME Performanc SAT | ime: e Ratin JNSAT | 10 m | Inutes ======= NAME ======= | Doc | Time Critical IMENTS | <u> </u> | es e Start: e Finish: ormance E | No Time | X ==== |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 2 has just suffered a fire that results in evacuation of the control room.

INITIATING CUES:

Transfer control to the Standby Shutdown System per OP/0/B/6100/013 Enclosure 4.2 steps 3.1 through 3.4. All initial conditions have been satisfied.

- **EXAMINER NOTE:** After reading Initiating Cue, provide the examinee with copy of OP/0/B/6100/013 (Standby Shutdown Facility Operation), Enclosure 4.2 with initial conditions completed.
- **EXAMINER NOTE:** Pictures of cabinet interior components are included to allow the candidate to describe necessary actions without opening cabinets.

Critical Time Start: Record Time that applicant acknowledges the task _____.

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| NOTE: 1. NC System will <u>NOT</u> be able to be cooled down below approximately 567°F, because the lowest steam line safety valve is set at 1175 psig. | CRITICAL STEP |
| Steps 3.1 through 3.5 may be in progress per AP/2/A/5500/017 (Loss of Control Room), Enclosure 8 (Transfer Control to SSF) and AP/1/A/5500/017 (Loss of Control Room), Enclosure 10 (SSF D/G Startup). Steps 3.1 through 3.4 may be performed concurrently with Steps 3.5 through 3.8. For a list of valves affected by the transfer, see Enclosure 4.6 (Equipment Affected on Transfer). | |
| STEP 1: 3.1 Transfer control to the Standby Shutdown System (SSS) as follows: | |
| NOTE: These breakers are kirk-key interlocked to prevent both feeders from being closed at the same time. | |
| 3.1.1 Open 2EMXS-F01A (Normal Incoming Breaker Fed From Motor Control Center 2EMXA) (AB-577, BB-65, Rm 486). | SAT |
| STANDARD: | UNSAT |
| Applicant simulates inserting the locking tab and rotating 2EMXS-F01A in the counter clockwise direction until a click is heard and breaker indication points to "OFF'. | |
| Examiner Cue: Once proper demonstration of breaker operation is satisfied, "2EMXS-F01A is OFF" | |
| Examiner Note: This step is critical to provide power to vital plant components from an available and controlled power source (SSF). | |
| COMMENTS: | |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|--|---|-----------|
| <u>STEP 2</u> 3.1.2 CI M <u>STANDARD</u> : | CRITICAL STEP | |
| Applicant simula Then inserts Kin rotates 2EMXS- indication points Examiner Cue: Or sa | ates rotating Kirk-Key in 2EMXS-F01A and removes. rk-Key in 2EMXS-F03A and rotates. Inserts tab and -F03A clockwise until a click is heard and breaker s to "ON". nce proper demonstration of breaker operation is atisfied, "2EMXS-F03A is ON" | SAT |
| Examiner Note: | UNSAT | |
| COMMENTS: | | |

| <u>STEP 3</u> 3.1.3 C (2 V | lose 2EMXS-F03E (Reactor Vessel Head Vent Motor 2NC253A) to restore power to 2NC-253A (Rx Head ent). | CRITICAL STEP |
|--|--|------------------|
| <u>STANDARD</u> : | | |
| Applicant simul in the clockwise points to "ON'. | lates inserting the locking tab and rotating 2EMXS-F03E e direction until a click is heard and breaker indication | |
| Examiner Cue: O sa | nce proper demonstration of breaker operation is atisfied, "2EMXS-F03E is ON" | SAT |
| Examiner Note: | This step is critical to ensure Rx Head vents are aligned to an available power source (SSF). | UNSAT |
| COMMENTS: | | |
| | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|--|------------------|
| STEP 4: 3.2 Ensure significant solenoid isolation valves are closed by transferring disconnects as follows: | CRITICAL STEP |
| CAUTION: The plugs shall be inserted squarely and the ring tightened to ensure proper connection of all pins. | |
| 3.2.1 Remove Train A Plug 1 disconnect from the "PLUG 1: PLANT MODE" receptacle and connect to the "PLUG 1: SSF MODE" receptacle located in terminal box 2TBOX0396 (Train A SSF Disconnect Enclosure) (AB-577, BB-69, Rm 486). | |
| STANDARD: | |
| Applicant simulates rotation of the lock ring and removal of Train "A" Plug 1 from "PLUG 1: PLANT MODE" and places it in "PLUG 1: SSF MODE" receptacle and tightens lock ring. | |
| Examiner Cue: Once the proper terminal box is located, present a copy of Picture #1 and Picture #2 and allow the applicant to demonstrate proper completion of this step. TBOX door should not be opened. | SAT UNSAT |
| Examiner Cue: Once proper demonstration is satisfied, "Train "A" Plug 1 is installed in "SSF Mode" | |
| Examiner Note: This step is critical to ensure proper control of primary system components via SSF power. | |
| COMMENTS: | |
| | |

| | STEP/STANDARD | SAT/UNSAT |
|--|--|------------------|
| <u>STEP 5</u> 3.2.2 R P S 2 | Remove Train A Plug 2 disconnect from the "PLUG 2: PLANT MODE" receptacle and connect to the "PLUG 2: SSF MODE" receptacle located in terminal box TBOX0396 (Train A SSF Disconnect Enclosure) (AB- | CRITICAL STEP |
| 5 | 77, BB-09, RM 480). | |
| STANDARD: | | |
| Applicant simul Plug 2 from "Pl MODE" recepta Examiner Cue: O Pi de Si | lates rotation of the lock ring and removal of Train "A" LUG 2: PLANT MODE" and places it in "PLUG 2: SSF acle and tightens lock ring. Once the proper terminal box is located, present a copy of icture #1 and Picture #2 and allow the applicant to emonstrate proper completion of this step. TBOX door hould not be opened. | SAT |
| Examiner Cue: O | nce proper demonstration is satisfied. | |
| <mark>۴۳</mark> | Train "A" Plug 2 is installed in "SSF Mode" | |
| Examiner Note: | This step is critical to ensure proper control of primary system components via SSF power. | |
| COMMENTS: | | |
| | | |

| | STEP/STANDARD | SAT/UNSAT |
|---|---|------------------|
| <u>STEP 6</u> 3.2.3 Rem OPE OPE SSF | nove Train B disconnect from the "PLANT ERATION" receptacle and connect to the "SSF ERATION" receptacle located in 2TBOX0395 (Train B Disconnect Enclosure) (inside small door "Unit 2 | CRITICAL STEP |
| 486) |). | |
| STANDARD: | | |
| Applicant simulate disconnect from "I OPERATION" rec | es rotation of the locking ring and removal of Train "B" PLANT OPERATION" and places it in "SSF ceptacle and tightens lock ring. | |
| Examiner Cue: Once the proper enclosure is located, present a copy of Picture #3 and allow the applicant to demonstrate proper | | |
| com | pletion of this step. Enclosure door should not be | SAT |
| oper | <mark>lec</mark> . | UNSAT |
| Examiner Cue: Once | e proper demonstration is satisfied, "Train "B" | |
| aisc | connect is installed in "SSF OPERATION" | |
| Examiner Note: 7 | This step is critical to ensure proper control of primary system components via SSF power. | |
| COMMENTS: | | |
| | | |
| | | |

| STEP/STANDARD | | SAT/UNSAT |
|--|---|-----------|
| NOTE: | NOTE: The power disconnect breaker for 2NC-252B (Rx Head Vent Block) is located in 2TBOX0395 (Train B SSF Disconnect Enclosure) (inside small door "Unit 2 Auxiliary Building SSF Disconnect") (AB-577, BB-69, Rm 486). | |
| <u>STEP 7</u> | 3.2.4 Ensure the 600V power disconnect breaker (SSF Pwr Disconnect For 2NC-252B) for 2NC-252B (Rx Head Vent Block) is in the "OFF" position. | |
| STANDARD: SAT | | |
| Ensures 2NC-252B disconnect BKR in "OFF" position. | | |
| Examine | r Cue: Once the proper terminal box is located, present a copy of Picture #4 and allow the applicant to demonstrate proper completion of this step. TBOX door should not be opened. | UNSAT |
| Examiner Cue: <mark>"2NC-252 disconnect BKR is in the OFF position"</mark> | | |
| <u>COMME</u> | <u>NTS:</u> | |

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| STEP 8: 3.3 Transfer power for CAPT Trip and Throttle valve as follows: | CRITICAL STEP |
| NOTE: Breakers are Kirk-Key interlocked to prevent both feeders from being closed at the same time. Breakers are on 2ELCP0250 (125 VDC CAPT Trip And Throttle Valve Power Transfer Panel) (AB-577, BB-64, Rm 486). 3.3.1 Open 2ELCP0250-F01B (Incoming Line From 2EDE 125 VDC 1E) (AB-577, BB-64, Rm 486). | |
| STANDARD: | |
| Rotate 2ELCP0250-F01B, switch to "OFF". | SAT |
| Examiner Cue: Once proper demonstration is satisfied, "2ELCP0250-F01B is OFF" | UNSAT |
| Examiner Note: This step is critical to ensure CAPT control is aligned to an available power source (SSF). | |
| <u>COMMENTS:</u> | |

| | STEP/STANDARD | SAT/UNSAT |
|---|--|------------------|
| <u>STEP 9</u> 3.3.2 Cl 12 <u>STANDARD</u> : | lose 2ELCP0250-F01C (Incoming Line From SDSP2 25 VDC NE). | CRITICAL STEP |
| Rotate Kirk-Key 2ELCP0250-F0 Examiner Cue: Or "2 | y in 2ELCP0250-F01B and remove. Insert Kirk-Key in 01C and rotate. Rotate 2ELCP0250-F01C switch to "ON" nce proper demonstration is satisfied, ELCP0250-F01C switch to "ON" | |
| Examiner Note: | Kirk Key must be obtained from 2ELCP0250-F01B to be inserted into 2ELCP0250-F01C. | SAT |
| Examiner Note: | This step is critical to ensure CAPT control is aligned to an available power source (SSF). | |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | | SAT/UNSAT |
|---|--|------------------|
| <u>STEP 10</u> 3.4 | Transfer power to Train A Neutron Monitoring System as follows: (2TBOX0603,(SSF/Plant Power Transfer Enclosure For ENC Monitor), AB-577, BB-62, Rm 486) | CRITICAL STEP |
| | 3.4.1 Disconnect the power plug from the "NORMAL IE OPERATION" receptacle. | |
| STANDARD: | | |
| Rotate lock ring and remove plug from "NORMAL IE OPERATION" | | |
| Examiner Cue: (| Dnce the proper terminal box is located, <mark>present a copy of Picture #5 and allow the applicant to demonstrate proper completion of this step</mark> . TBOX door should not be opened . | SAT |
| Examiner Cue: | Once proper demonstration is satisfied, "Power Plug is disconnected" | UNSAT |
| Examiner Note: | This step is critical to ensure Source Range indication is aligned to an available power supply (SSF). | |
| <u>COMMENTS:</u> | | |

| STEP/STANDARD | SAT/UNSAT | |
|---|------------------|--|
| CAUTION: The plug shall be inserted squarely and the ring tightened to ensure proper connection of all pins. <u>STEP 11</u> 3.4.2 Connect the power plug to the "SSF NE OPERATION" | CRITICAL STEP | |
| STANDARD: | | |
| OPERATION" receptacle and tighten lock ring. Examiner Cue: Once the proper terminal box is located, present a copy of | | |
| Picture #5 and allow the applicant to demonstrate proper completion of this step. TBOX door should not be opened. | SAT | |
| Examiner Cue: Once proper demonstration is satisfied, "Power Plug is connected" | UNSAT | |
| Examiner Note: This step is critical to ensure Source Range indication is aligned to an available power supply (SSF). | | |
| <u>COMMENTS:</u> | | |

STOP TIME_____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Unit 2 has just suffered a fire that results in evacuation of the control room.

INITIATING CUES:

Transfer control to the Standby Shutdown System per OP/0/B/6100/013 Enclosure 4.2 steps 3.1 through 3.4. All initial conditions have been satisfied.











Maintaining Unit 2 in Hot Standby Following Pag a Fire Event

1. Limits and Precautions

- 1.1 Standby makeup pump is started within 10 minutes of losing seal injection to re-establish seal injection to NC pumps so that integrity of NC pump seals is <u>NOT</u> lost.
- 1.2 CA Room sump pumps running continuously may be indicative of a RC to CA pump suction pipe break. If normal suction supply sources are available to the CAPT, the below RC supply sources are closed as required:
 - 1CA-178 (RC Supply To CA Pumps Isol)
 - 2CA-178 (RC Supply To CA Pumps Isol)
- 1.3 The PZR Heater Group D is energized within 15 hours of reactor trip to ensure the bubble remains in the PZR. The PZR heaters in Group D controlled from the SSF will **NOT** de-energize on Lo PZR level.
- 1.4 If an ongoing fire or security event causes equipment or components required to maintain Hot Standby to become inoperable, then operators are sent to the SSF and ETA switchgear room to establish communications in preparation for quickly transferring control to SSF if Control Room and Auxiliary Shutdown Controls become unavailable.
- 1.5 Due to time and manpower considerations, independent verification is **NOT** required by this procedure.
- 1.6 In a loss of all AC power handheld "EMERGENCY USE ONLY", flashlights available in Control Room can be used to reach the SSF since outdoor lights may <u>NOT</u> be available. The recommended pathway is via 594 Elevation Electrical Penetration Room through exterior door SEC1. Security is contacted if use of this door is anticipated.
- 1.7 When the CAPT is stopped, it is <u>NOT</u> restarted for two minutes. This will allow the CAPT to coast down to zero speed. If a start attempt is made prior to reaching zero speed, the CAPT may trip on overspeed.

Maintaining Unit 2 in Hot Standby Following a Fire Event

2. Initial Conditions

NOTE: The Auxiliary Shutdown Panels are <u>NOT</u> designed to address a fire event.

- <u>AA</u> 2.1 Verify the preferred controls necessary to maintain Hot Standby (Control Room) are unresponsive or <u>NOT</u> accessible due to fire.
- <u>AA</u> 2.2 Verify the following actions have been completed by AP/2/A/5500/017 (Loss of Control Room).
 - Reactor tripped
 - ☑ Turbine tripped
 - All NC pumps tripped
 - ☑ CFPTs tripped

3. Procedure

| NOTE: | 1. | NC System will <u>NOT</u> be able to be cooled down below approximately 567°F, because the lowest steam line safety valve is set at 1175 psig. |
|-------|----|--|
| | 2. | Steps 3.1 through 3.5 may be in progress per AP/2/A/5500/017 (Loss of Control Room), Enclosure 8 (Transfer Control to SSF) and AP/1/A/5500/017 (Loss of Control Room), Enclosure 10 (SSF D/G Startup). |
| | 3. | Steps 3.1 through 3.4 may be performed concurrently with Steps 3.5 through 3.8. |
| | 4. | For a list of valves affected by the transfer, see Enclosure 4.6 (Equipment Affected on Transfer). |
| 3.1 | Т | ransfer control to the Standby Shutdown System (SSS) as follows: |

NOTE: These breakers are kirk-key interlocked to prevent both feeders from being closed at the same time.

- □ 3.1.1 Open 2EMXS-F01A (Normal Incoming Breaker Fed From Motor Control Center 2EMXA) (AB-577, BB-65, Rm 486).
- □ 3.1.2 Close 2EMXS-F03A (Alternate Incoming Bkr Fed From Motor Control Center SMXG).
- □ 3.1.3 Close 2EMXS-F03E (Reactor Vessel Head Vent Motor (2NC253A)) to restore power to 2NC-253A (Rx Head Vent).
Maintaining Unit 2 in Hot Standby Following Page 3 of 14 a Fire Event

_ 3.2 Ensure significant solenoid isolation valves are closed by transferring disconnects as follows:

CAUTION: The plugs shall be inserted squarely and the ring tightened to ensure proper connection of all pins.

- □ 3.2.1 Remove Train A Plug 1 disconnect from the "PLUG 1: PLANT MODE" receptacle and connect to the "PLUG 1: SSF MODE" receptacle located in terminal box 2TBOX0396 (Train A SSF Disconnect Enclosure) (AB-577, BB-69, Rm 486).
- □ 3.2.2 Remove Train A Plug 2 disconnect from the "PLUG 2: PLANT MODE" receptacle and connect to the "PLUG 2: SSF MODE" receptacle located in terminal box 2TBOX0396 (Train A SSF Disconnect Enclosure) (AB-577, BB-69, Rm 486).
- □ 3.2.3 Remove Train B disconnect from the "PLANT OPERATION" receptacle and connect to the "SSF OPERATION" receptacle located in 2TBOX0395 (Train B SSF Disconnect Enclosure) (inside small door "Unit 2 Auxiliary Building SSF Disconnect") (AB-577, BB-69, Rm 486).
- **NOTE:** The power disconnect breaker for 2NC-252B (Rx Head Vent Block) is located in 2TBOX0395 (Train B SSF Disconnect Enclosure) (inside small door "Unit 2 Auxiliary Building SSF Disconnect") (AB-577, BB-69, Rm 486).

□ 3.2.4 Ensure the 600V power disconnect breaker (SSF Pwr Disconnect For 2NC-252B) for 2NC-252B (Rx Head Vent Block) is in the "OFF" position.

- 3.3 Transfer power for CAPT Trip and Throttle valve as follows:
- **NOTE:** Breakers are Kirk-Key interlocked to prevent both feeders from being closed at the same time.
 - Breakers are on 2ELCP0250 (125 VDC CAPT Trip And Throttle Valve Power Transfer Panel) (AB-577, BB-64, Rm 486).
 - □ 3.3.1 Open 2ELCP0250-F01B (Incoming Line From 2EDE 125 VDC 1E).
 - □ 3.3.2 Close 2ELCP0250-F01C (Incoming Line From SDSP2 125 VDC NE).

Maintaining Unit 2 in Hot Standby Following Page 4 of 14 a Fire Event

- _____ 3.4 Transfer power to Train A Neutron Monitoring System as follows: (2TBOX0603 (SSF/Plant Power Transfer Enclosure For ENC Monitor), AB-577, BB-62, Rm 486)
 - □ 3.4.1 Disconnect the power plug from the "NORMAL IE OPERATION" receptacle.

CAUTION: The plug shall be inserted squarely and the ring tightened to ensure proper connection of all pins.

- \Box 3.4.2 Connect the power plug to the "SSF NE OPERATION" receptacle.
- 3.5 **IF AT ANY TIME** power is lost to 1SLXG as indicated by "LINE VOLTS" voltmeter (located on SSF Control Console panel), place SSF diesel in operation as follows:
 - □ 3.5.1 Ensure all material that may be drawn into the SSF D/G radiator fan by its suction is removed from its inlet area. (i.e. oil pads, rags, paper, plastic)

CAUTION: The emergency mode overrides the SSF Diesel Generator "High Jacket Water Temperature" and "Low Lube Oil Pressure" trips.

- □ 3.5.2 Ensure the "SSF D/G MODE" switch is in the "EMERG" position on the SSF console.
- \Box 3.5.3 Place the "SSF D/G" switch in the "ON" position.
- 3.5.4 **IF** the engine does **NOT** start within 30 seconds, perform the following:
 - \Box 3.5.4.1 Place the "SSF D/G" switch in the "OFF" position.
 - 3.5.4.2 **IF** D/G turned over but did **NOT** fire during the D/G start attempt, turn the manual override knob on the shutdown valve (shown in Enclosure 4.7, Top View of Fuel Oil Pump) <u>clockwise</u> to permit fuel flow through the valve.
 - \Box 3.5.4.3 After 1 to 2 minutes has passed, return to Step 3.5.3 to attempt to re-start the D/G.
 - □ 3.5.5 Adjust "SSF D/G VOLT ADJUST" until generator voltage is 600 -660 volts.
 - □ 3.5.6 Adjust the "SSF D/G GOV CTRL" to bring frequency to 60 61.2 Hz.
 - □ 3.5.7 Press the "TRIP" pushbutton on "1SLXG NORM FDR FRM 1TA" on the SSF console.

Enclosure 4.2

Maintaining Unit 2 in Hot Standby Following Page 5 of 14 a Fire Event

- 3.5.8 Open the following breakers on 1SLXG:
 - □ 1SLXG-4C (Motor Control Center SMXG Supply)
 - □ 1SLXG-4D (SSF Normal Battery Charger SDSC1 Feeder)
 - □ 1SLXG-5C (SSF Normal Battery Charger SDSC2 Feeder)
 - □ 1SLXG-5D (SSF Standby Battery Charger SDSCS Feeder)
- □ 3.5.9 Press the "CLOSE" pushbutton for the "SSF D/G BKR" on the SSF Control Console panel.
- □ 3.5.10 After allowing the diesel generator to run for 10 seconds, close 1SLXG-4C (Motor Control Center SMXG Supply).
 - 3.5.11 Close the following breakers on 1SLXG at 10 second intervals:
 - □ 1SLXG-4D (SSF Normal Battery Charger SDSC1 Feeder)
 - □ 1SLXG-5C (SSF Normal Battery Charger SDSC2 Feeder)
 - □ 1SLXG-5D (SSF Standby Battery Charger SDSCS Feeder)
- □ 3.5.12 <u>WHEN</u> another operator arrives, have the operator refer to OP/0/B/6350/011 (Standby Shutdown Facility Diesel Operations), Enclosure 4.5 (Emergency Operation) for continued operation of the SSF diesel.
- 3.6 Verify "UNIT 2 SSF CONTROLS ENGAGED" light is lit.
- **NOTE:** Valves 2ND-2A (ND Pump 2A Suct Frm Loop B) and 2ND-37A (ND Pump 2B Suct Frm Loop C) are normally closed with their breakers in the "OFF" position. If no indication is seen at the SSF, the 2A and 2B ND Pump Suction Pressure gauges can be used to determine ND suction source. If ND suction pressure is < NC pressure, the associated ND train loop suction is closed.
 - 2NDPG5100 (2A ND Pump Suction Pressure) (AB-522, FF-60, Rm 112)
 - 2NDPG5110 (2B ND Pump Suction Pressure) (AB-523, GG-61, Rm 112)
 - 3.7 Ensure the following valves are closed:
 - □ 2ND-2A (ND Pump 2A Suct Frm Loop B)
 - □ 2ND-37A (ND Pump 2B Suct Frm Loop C)
 - □ 2NV-89A (NC Pmps Seal Ret Cont Isol)
 - □ 2NV-876 (Stdby M/U To Cont Equip Smp 2A)

Maintaining Unit 2 in Hot Standby Following a Fire Event

- 3.8 Ensure the following valves are open:
 - □ 2NV-865A (Stdby M/U Pmp Suct Frm Xfr Tube)
 - □ 2NV-872A (Stdby M/U Pmp Filt Otlt)
 - □ 2NV-877 (Stdby M/U To NC Pmp Seal Inj)
 - 3.9 Start Standby Makeup Pump #2. (Stdby M/U Pump #2)
- **NOTE:** Operator dispatched to transfer control to the SSF in AP/2/A/5500/017 (Loss of Control Room), Enclosure 8 (Transfer Control to SSF) has guidance on how to perform Step 3.10.
 - The procedure may continue while Step 3.10 is in progress.
 - 3.10 Pull all control power fuses and manually "TRIP" the following 4160V breakers:
 - □ 2ETA-12 (2A NV Pump Motor)
 - □ 2ETA-13 (2A CA Pump Motor)
 - □ 2ETB-12 (2B NV Pump Motor)
 - □ 2ETB-13 (2B CA Pump Motor)
- **NOTE:** 1. Give operator option to close and disable either valve based on accessibility to valve and its associated breaker.
 - 2. The procedure may continue while Step 3.11 is in progress.
 - 3.11 Dispatch operator to isolate FWST makeup to Spent Fuel Pool with <u>one</u> of the listed valves as follows:
 - 3.11.1 Locally, ensure selected valve is closed:
 - □ 2KF-103A (FWST to Spent Fuel Pool) (AB-589, JJ-61, Rm 400)
 - □ 2KF-101B (FWST to Spent Fuel Pool) (AB-583, JJ-61, Rm 400)
 - 3.11.2 Ensure selected valve supply breaker is open:
 - □ 2EMXI F03D (Spent Fuel Pool M/U from FWST Motor (2KF103A)) (AB-577, EE-60, Rm 469)
 - 2EMXB F03D (Spent Fuel Pool M/U from FWST Motor (2KF101B)) (AB-560, FF-58, Rm 320)

Maintaining Unit 2 in Hot Standby Following Page 7 of 14 a Fire Event

- 3.12 **WHILE** Standby Makeup Pump #2 is in service, perform the following:
 - 3.12.1 Periodically dispatch operator to read 2NVPG6160 (Standby Makeup Pump Filter D/P) (Annul 559', 153°-59').
 - 3.12.2 **IF AT ANY TIME** 2NVPG6160 (Standby Makeup Pump Filter D/P) exceeds 25 psig, contact supervisor.
- _ 3.13 In the compartment (Incore Thermocouple Transfer (NC)) on the left hand side of the SSF Control Console panel, transfer the incore thermocouples indication to the SSF Control Console panel by disconnecting the cable from the "ICS INCORE THERMOCOUPLE" receptacle and connecting the cable to the "SSF INCORE THERMOCOUPLE" receptacle.
- 3.14 Verify transfer to SSF control is complete by the following indicating lights being lit:
 - □ "UNIT 2 SSF CONTROLS ENGAGED"
 - □ "UNIT 2 SSF DISCONNECT ENGAGED"

CAUTION: The PZR heaters in Group D controlled from the SSF will <u>NOT</u> de-energize on Low PZR level. Operator action will be required to prevent the loss of the heaters if PZR level goes below 17%.

- 3.15 Select "LOCAL" on "PZR HTR GRP 2D MODE".
- 3.16 **IF** W/R level in two S/Gs is less than 45%, depress "ON" for 2SA-5 (S/G 2C To CAPT).
 - 3.17 Ensure "CAPT #2 RM SUMP PMP 2A" in "AUTO".
- **NOTE:** 1. Control switches and indicating lights for 2WL-847 and 2WL-848 are located on the Auxiliary Waste Processing Control Panel (1ELCC0013) (AB-543, MM-53, Rm 200).
 - 2. 2WL-847 will fail open and 2WL-848 will fail closed on loss of VI air pressure.
 - 3. Procedure may continue while performing the following step.
 - 3.17.1 As time permits (within 2 hrs), ensure one of the following valves is open:
 - 2WL-847 (Floor Drain Sump C Disch To ND / NS Sump) (AB-555, BB-62, Rm 260)
 - 2WL-848 (Floor Drain Sump C Disch To Turbine Building Sump) (AB-551, CC-62, Rm 260)
 - 3.18 Ensure "SSF SUMP PUMP" in "AUTO".

- **NOTE:** Natural Circulation is occurring if the NC System is subcooled and primary to secondary heat transfer is occurring.
 - 3.19 <u>WHILE</u> performing this enclosure now and every hour after, record NC System subcooled condition by completing a column in table below per the following:
- **NOTE:** Indication for the five core exit thermocouples is provided on Chart Recorder 2ENCR9005. These thermocouple temperature signals are automatically compensated for any changes in reference junction temperature. {CNCE 61598}
 - 3.19.1 Determine NC Saturation Pressure from highest core temperature using Unit 2 Revised Data Book Figure 57 (Reactor Coolant Saturation Curve, Wide Range).
 - 3.19.2 Subcooling margin (PSAT MAR) is Loop B Pressure minus NC Saturation Pressure
 - 3.19.3 **IF** Loop B Pressure is greater than NC Saturation Pressure then NC System is subcooled.

| Time | | | | | |
|--|--|--|--|--|--|
| Unit 2 Highest Core Temperature from 2ENCR9005 | | | | | |
| NC Saturation Pressure (from table) | | | | | |
| Unit 2 Loop B Pressure | | | | | |
| Subcooling Margin | | | | | |
| Subcooled (1) | | | | | |

- 3.20 **WHILE** performing this enclosure, maintain NC System subcooled as follows:
 - 3.20.1 **IF AT ANY TIME** losing subcooling margin is indicated by a decreasing NC System pressure, establish larger subcooling margin by increasing NC System pressure per Step 3.24.1.
 - 3.20.2 **IF AT ANY TIME** losing subcooling margin is indicated by an increasing NC temperature, establish better heat sink conditions by increasing secondary side inventory per Step 3.25 and Step 3.26.

- **NOTE:** S/G pressure is controlled by S/G safeties while operating at the SSF. The lowest S/G Safety setpoint is 1175 psig. If actual S/G pressure is <u>NOT</u> known, use 1175 psig in the following step.
 - Revised Data Book Figure 57 (Reactor Coolant Saturation Curve, Wide Range) can be used to determine saturation temperature of steam even-though the X axis is labeled NC System Temperature and the Y axis is labeled NC System Pressure.
 - 3.21 <u>WHILE</u> performing this enclosure now and every hour after, record primary to secondary heat transfer condition by completing a column in table below as follows:

3.21.1 Determine if heat transfer is occurring by comparing UNIT 2 C-LEG TEMP for LOOP 2B <u>AND/OR</u> LOOP 2C with saturation temperature for their S/G pressure using Unit 2 Revised Data Book Figure 57 (Reactor Coolant Saturation Curve, Wide Range), indicate results in table below.

| Time | | | | | |
|------------------------------|--|--|--|--|--|
| Unit 2 C-Leg Temp Loop 2B | | | | | |
| S/G 2B Pressure | | | | | |
| Heat transfer (\checkmark) | | | | | |
| Unit 2 C-Leg Temp Loop 2C | | | | | |
| S/G 2C Pressure | | | | | |
| Heat transfer (\checkmark) | | | | | |

- 3.22 **WHILE** performing this enclosure, maintain primary to secondary heat transfer as follows:
 - 3.22.1 **IF AT ANY TIME** losing heat transfer is indicated by decreasing C-Leg temperature(s), compress any flow inhibiting primary system steam bubbles by increasing NC System pressure per Step 3.24.1.
 - 3.22.2 **IF AT ANY TIME** losing heat transfer is indicated by decreasing S/G pressure(s), establish better heat sink conditions by increasing secondary side inventory per Step 3.25 and Step 3.26.

NOTE: Cold leg temperatures near S/G saturation temperatures (derived from pressure) indicate heat transfer is occurring.

NOTE: Steps 3.23 (PZR level), 3.24 (NC pressure), and 3.25 (S/G levels) are continuous actions to maintain plant parameters and are referred to as needed.

- 3.23 Maintain Pzr level between 25% and 92% (2NCP5154 (Unit 2 PZR Level)) as follows:
 - 3.23.1 **IF** PZR level needs to be decreased, perform the following:
 - 3.23.1.1 Open the following valves:
 - 2NC-250A (Rx Head Vent Block)
 - 2NC-253A (Rx Head Vent)
 - 3.23.1.2 <u>WHEN one of the following is met close the above head vents:</u>
 - Desired level is reached
 - NCS pressure is approaching saturation pressure as determined from Unit 2 Revised Data Book Figure 57 (Reactor Coolant Saturation Curve, Wide Range) in Step 3.19.1.
 - 3.23.2 **IF** PZR level is continuously decreasing, dispatch operator to ensure 2NV-101A (NC Pumps #1 Seal Bypass) is closed by failing air locally to the valve (CV-557, 56'-181°).
 - 3.23.3 **IF** PZR level decreases to 17%, de-energize "PZR HTR GROUP 2D" on SSF Control Console panel.

Enclosure 4.2

Maintaining Unit 2 in Hot Standby Following Page 11 of 14 a Fire Event

- 3.24 Maintain NC System pressure (2NCP5121 (Unit 2 Loop B Press)) as needed to meet the below listed conditions per the following steps:
 - NC System pressure ≤ 2250 psig
 - Natural circulation exists and NC System subcooled, recorded in Step 3.19
 - Primary to secondary heat transfer exists, recorded in Step 3.21
 - 3.24.1 **IF** NC System pressure needs to be increased, perform the following:
 - 3.24.1.1 **IF** PZR level > 17%, energize "PZR HTR GROUP 2D" on SSF Control Console panel.

NOTE: Valves 2ND-2A (ND Pump 2A Suct Frm Loop B) and 2ND-37A (ND Pump 2B Suct Frm Loop C) are normally closed with their breakers in the "OFF" position. If no indication is seen at the SSF, the 2A and 2B ND Pump Suction Pressure gauges can be used to determine ND suction source. If ND suction pressure is < NC pressure, the associated ND train loop suction is closed.

- 2NDPG5100 (2A ND Pump Suction Pressure) (AB-522, FF-60, Rm 112)
- 2NDPG5110 (2B ND Pump Suction Pressure) (AB-523, GG-61, Rm 112)
 - 3.24.1.2 **IF** NC pressure continues to decrease, ensure the following valves are closed:
 - 2ND-2A (ND Pump 2A Suct Frm Loop B)
 - 2ND-37A (ND Pump 2B Suct Frm Loop C)
 - 2NV-89A (NC Pmps Seal Ret Cont Isol)
 - 2NC-250A (Rx Head Vent Block)
 - 2NC-253A (Rx Head Vent)
- 3.24.2 **IF** NC System pressure needs to be decreased, perform the following:
 - 3.24.2.1 Ensure "PZR HTR GROUP 2D" are de-energized on SSF Control Console panel.
 - 3.24.2.2 **IF** NC System pressure continues to increase uncontrollably, dispatch operator to ensure the following breakers are open:
 - 2LXI-6C (2A NC Pzr Heater Power Panel (PHP2A) Feeder)
 - 2LXH-6C (2B NC Pzr Heater Power Panel (PHP2B) Feeder)
 - 2LXC-5C (2C Reactor Coolant Pressurizer Heater Power Panel (PHP2C))
 - 2LXD-5C (2D Reactor Coolant Pressurizer Heater Power Panel (PHP2D))

- **NOTE:** If suction supply sources to the CAPT #2 are lost, 2CA-174 (RC To CA Suct Isol) will open and align the pump to the embedded RC pipe provided 2CA-178 (RC Supply To CA Pumps Isol) and 2CA-175 (RC To CA Suct Isol) are open.
 - 3.25 Maintain S/G levels between 65% and 70% WR (as read on SSF gauges) by controlling CA using one or more of the four (4) following methods, as conditions warrant:
- **NOTE:** If either of the below conditions exist, depressing "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel will <u>NOT</u> secure steam to CAPT #2:
 - An auto start signal has failed open 2SA-2 (S/G 2B SM To CAPT) providing an alternate steam supply from S/G 2B,
 - Any two S/Gs reach their Lo-Lo level setpoint (less than 45% WR Indicated) failing open 2SA-5 (S/G 2C SM To CAPT).
 - Start and stop CAPT #2 by pressing "ON" or "OFF" on the switch for 2SA-5 (S/G 2C SM To CAPT) on the SSF Control Console panel.
 - Manually throttle CA flow to each S/G with <u>one</u> valve from each pair of the following valves:

□ 2CA-48 (CA Pump #2 Flow To S/G 2C) (AB-552, DD-61, Rm 227) <u>OR</u> □ 2CA-50A (CA Pmp 2 Disch To S/G 2C Isol) (DH-585, DD-61, Rm 562)

□ 2CA-52 (CA Pump #2 Flow To S/G 2B) (AB-550, DD-62, Rm 227) <u>OR</u> □ 2CA-54B (CA Pmp 2 Disch To S/G 2B Isol) (DH-585, DD-61, Rm 562)

□ 2CA-36 (CA Pump #2 Flow To S/G 2D) (AB-554, BB-65, Rm 260) <u>OR</u> □ 2CA-38A (CA Pmp 2 Disch To S/G 2D Isol) (DH-585, DD-70, Rm 581)

□ 2CA-64 (CA Pump #2 Flow To S/G 2A) (AB-557, BB-64, Rm 260) <u>OR</u> □ 2CA-66B (CA Pmp 2 Disch To S/G 2A Isol) (DH-585, DD-69, Rm 581)

- Manually throttle steam flow to CAPT #2 by removing breakaway locks and throttling the following valves:
 - SA-6 (2C S/G Main Steam to Unit 2 CAPT Stop Check) (AB-553, DD-61, Rm 227)
 - SA-3 (2B S/G Main Steam to Unit 2 CAPT Stop Check) (AB-553, DD-60, Rm 227)

NOTE: The use of the CAPT Trip and Throttle valve shall only be as a last resort. If it is used to start the pump, there is a possibility that the CAPT will overspeed.

• Start and stop the CAPT #2 by pressing "OPEN" or "CLS/TRIP" on the "CAPT 2 TRIP T/V CTRL" switch on the SSF Control Console panel.

Enclosure 4.2 OP/**0**/B/6100/013 Maintaining Unit 2 in Hot Standby Following a Fire Event Page 13 of 14

- 3.26 **IF** S/G levels continue to decrease, ensure an available CA flowpath to S/Gs as follows:
 - 3.26.1 Ensure the following valves are open by locally failing air to the valves:
 - 2CA-48 (CA Pump #2 Flow To S/G 2C) (AB-552, DD-61, Rm 227)
 - 2CA-52 (CA Pump #2 Flow To S/G 2B) (AB-550, DD-62, Rm 227)
 - 2CA-36 (CA Pump #2 Flow To S/G 2D) (AB-554, BB-65, Rm 260)
 - 2CA-64 (CA Pump #2 Flow To S/G 2A) (AB-557, BB-64, Rm 260)
 - 3.26.2 Ensure the following valves are open by locally opening the valves:
 - 2CA-50A (CA Pmp 2 Disch To S/G 2C Isol) (DH-585, DD-61, Rm 562)
 - 2CA-54B (CA Pmp 2 Disch To S/G 2B Isol) (DH-585, DD-61, Rm 562)
 - 2CA-38A (CA Pmp 2 Disch To S/G 2D Isol) (DH-585, DD-70, Rm 581)
 - 2CA-66B (CA Pmp 2 Disch To S/G 2A Isol) (DH-585, DD-69, Rm 581)
- 3.27 **IF** accessible, close the following valves to prevent the possible exposure of personnel in the Auxiliary Building:
 - 2WL-869B (Unit 2 Vent Unit Condensate Drain Tank Containment Isol) (AB-553, CC-62, Rm 260)
 - 2WL-827B (Cont Smp Pmps Disch Cont Isol) (AB-554, JJ-63, Rm 227)

CAUTION: Use borated water only to makeup to the spent fuel pool.

- **NOTE:** It takes approximately 10 hours for the Standby Makeup pump to pump the Fuel Pool down 1 foot.
 - 3.28 <u>WHILE</u> performing this enclosure periodically (about every 8 hours) check the spent fuel pool level and makeup to it as necessary to maintain level between approximately 2 ft. below and equal to the skimmer trough elevation. Makeup per OP/2/A/6200/005 (Spent Fuel Cooling System).
 - 3.29 Perform OP/2/A/6100/020 (Operational Guidelines For Achieving Cold Shutdown Following a Fire in the Plant) in conjunction with <u>one</u> of the following for guidance on accessing systems as required:
 - OP/2/A/6100/002 (Controlling Procedure for Unit Shutdown) OR
 - OP/2/A/6100/004 (Shutdown Outside the Control Room From Hot Standby To Cold Shutdown)

NOTE: This enclosure is kept at the Unit Control Center until normal shutdown conditions are achieved.

3.30 File this enclosure in the Control Copy folder of this procedure.

JPM K

EVALUATION SHEET

| <u>Task:</u> | | 1B C | 1B D/G local start using AP/1/A/5500/007 (Loss of Normal Power). | | | | |
|---------------------|---|---------------|--|---|--------------|-----------------------------|------------|
| Alternate Pa | <u>ith:</u> | Yes | | | | | |
| Facility JPM | # <u>:</u> | DG3 | -009 | | | | |
| Safety Func | tion: | 6 | <u>Title:</u> | Emergency Diesel Genera | tors | | |
| <u>K/A</u> | 064 A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Failure modes of water, oil, and air valves. | | | | | ons, use nose valves. | |
| Rating(s): | 3.1/3 | 3.3 | <u>CFR:</u> | 41.5 / 43.5 / 45.3 to 45.13 | | | |
| Preferred Ev | aluatio | on Lo | cation: | Preferred Eva | luation Me | ethod: | |
| S imulator | X | _ In- | Plant | Perform | X | S imulate | |
| <u>References</u> : | | AP/1 | /A/5500/0 | 007 (Loss of Normal Power) End | cl. 11 | | |
| <u>Task Standa</u> | ard: | 1B C the [|)/G started)/G is shu | d locally. When it is recognized Itdown. | that no coo | bling water is a | available, |
| Validation T | <u>ime:</u> | 16 m | inutes ====== | <u>Time Critical:</u> | Ye | s No | <u> </u> |
| Applicant: NAME | | | | Docket # | Time Time | Start: Finish: | |
| Performanc | e Ratin | <u>ig:</u> | | | Perfo | rmance Time | |
| SAT U | NSAT_ | | | | | | |
| Examiner: | | | | | | / | |
| | | 1 | NAME | S | IGNATURE | | DATE |
| | | | | COMMENTS | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | _ |
| | | | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provide you.

INITIAL CONDITIONS:

- Unit 1 has experienced a loss of all AC power to 1ETB.
- The reason for the loss of AC power has been corrected.
- 1ETB load shed is complete.

INITIATING CUES:

- You are to energize 1ETB from 1B D/G by performing AP/1/A/5500/007 (Loss of Normal Power) Enclosure 11.
- Peer checks have been waived for this task.

EXAMINER NOTE: After reading initiating cue, provide applicant with a copy of AP/1/A/5500/007 (Loss of Normal Power) Enclosure 11.

START TIME: _____

| | STEP/STANDARD | SAT/UNSAT |
|--------------------------------|---|-----------|
| <u>STEP 1</u> : 1 Obt | ain the following: | |
| | Key #746 (1A/1B D/G Test Start Switch) from WCC Key Locker | |
| | Flashlight. | |
| STANDARD: | | SAT |
| Applicant states t flashlight. | that they would obtain key #746 from the WCC and a | UNSAT |
| Examiner Cue: "H | Key #746 and flashlight have been obtained." | |
| COMMENTS: | | |
| | | |

| <u>STEP 2</u> : 2 | Do not continue in this enclosure until notified that load shed of 1ETB is complete. | |
|-------------------|--|--------|
| STANDARD: | | SAT |
| Applicant de | etermines from initiating cue that the load shed is complete. | LINSAT |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|--|------------------|
| STEP 3 3 Start D/G 1B as follows: a. Notify Control Room Operator to place the "D/G 1B CTRL LOCATION" switch on 1MC11 in "LOCAL" position. | CRITICAL STEP |
| STANDARD: | |
| Applicant notifies the control room to place 1B D/G control location to the LOCAL position. | |
| Examiner Cue: When requested "Control room operator reports that 1B D/G control location is in the LOCAL position." | SAT |
| Examiner Note: This step is critical because it must be performed in order for the D/G to be started locally. | UNSAT |
| COMMENTS: | |
| | |

| <u>STEP 4</u> : 3.b <u>IF</u> unable to transfer diesel to Local Control, <u>THEN</u> actuate "CONTROL ROOM OVERRIDE" at breakglass station on 1DGCPB. | |
|--|-------|
| STANDARD: | SAT |
| Applicant determines that this step is N/A. | UNSAT |
| COMMENTS: | |
| | |

ſ

| STEP/STANDARD | SAT/UNSAT |
|--|------------------|
| STEP 53.cPlace key in "MANUAL TEST START" keyswitch and turn to "START" position.STANDARD: | CRITICAL STEP |
| Applicant places key in the MANUAL TEST START keyswitch and rotates the key clockwise to the START position. Applicant listens for the D/G to start and come up to normal rated speed. | |
| Examiner Cue: "The Diesel has started" | SAT |
| Examiner Note: This step is critical because it must be performed to locally start the D/G and meet the JPM standard. | |
| COMMENTS: | |
| | |

| STEP 6 3.d Ensure "SPEED CONTROL" is adjusted to obtain frequency of between 58.8 and 61.2 Hz. | |
|--|-------|
| STANDARD: | |
| Applicant locates the D/G frequency meter and indicates they are looking for between 58.8 and 61.2 Hz. | SAT |
| Examiner Cue: "Frequency is reading 60 Hz." | UNSAT |
| COMMENTS: | |
| | |

| STEP/STANDARD | SAT/UNSAT |
|---|------------------|
| STEP 73.eEnsure "VOLTAGE CONTROL" is adjusted to obtain "D/G VOLTAGE" between 4160 and 4580 Volts.STANDARD: | CRITICAL STEP |
| Applicant locates the D/G voltage meter and explains that he is looking for voltage to be between 4160 and 4600 Volts | |
| | |
| Examiner Cue: "Voltage is 4000 Volts." | |
| STANDARD: | |
| After examiner cue is given, applicant uses the VOLTAGE CONTROL RAISE pushbutton to increase voltage into the desired band. | SAT |
| Examiner Cue: "Voltage is 4200 Volts." | |
| Examiner Note: This step is critical to provide proper voltage to the essential bus following D/G alignment. | |
| COMMENTS: | |
| | |
| | |

| <u>STEP 8</u> 4 <u>WHEN</u> D/G is running, <u>THEN</u> close "DIESEL GEN BKR 1ETB18" breaker. | |
|--|--------------|
| STANDARD: | |
| Applicant indicates that the D/G is running at proper frequency and voltage, and closes 1B D/G breaker by depressing the red CLOSE pushbutton and verifying the red CLSD light is lit and green OPEN light is dark on DIESEL GEN BKR 1ETB18 CLOSE/TRIP switch. | SAT UNSAT |
| Examiner Cue: "Red CLSD light is lit." | |
| COMMENTS: | |
| | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 9 5 IF D/G breaker will not close, THEN: | |
| STANDARD: | |
| | SAT |
| Applicant determines that this step is N/A. | |
| <u>COMMENTS:</u> | UNSAT |

| <u>STEP 10</u> 6 | STEP 10 6 Close the following essential load center normal incoming breakers: | | |
|--|---|---|-------|
| | | 1ELXB-4B (Normal Incoming Breaker Fed From Xfmr 1ETXB) (AB-560, AA-47, Rm 372) | |
| | | 1ELXD-4B (Normal Incoming Breaker Fed from Xfmr 1ETXD) (AB-560, AA-46, Rm 372). | |
| STANDARD: | | | |
| Applicant closes breakers 1ELXB-4B and 1ELXD-4B by rotating the CLOSE/TRIP handles clockwise to the CLOSE position and verifying the red light is lit and green light dark for these breakers and hearing the breaker closing. | | | |
| Examiner Cue: | : <mark>"Br</mark> | eakers are closed." | UNSAT |
| Examiner Note | e: Ti | his step is critical to align power to 600V loads. | |
| COMMENTS: | | | |
| | | | |

| | STEP/STANDARD | SAT/UNSAT |
|--|---|--------------|
| <u>STEP 11</u> 7 | Ensure RN flow through the KD Hx as follows: a. Verify 1RN-292B (1B D/G Hx Inlet Isol) (D1B-566, AA-38) - OPEN. | |
| STANDARD: | | |
| Applicant checks the position indicator on 1RN-292B pointing to OPEN. Examiner Cue: "Position indicator is pointing to CLOSED." | | SAT UNSAT |
| Examiner Note | : This begins the alternate path of this JPM. | |
| COMMENTS: | | |
| | | |

| <u>STEP 12</u> 7.b | IF 1RN-292B (1B D/G Hx Inlet Isol) does not open, <u>THEN</u> perform the following: | |
|--|---|-----|
| | 1) Open 1EMXF-F01A (1B Diesel Generator Hx Inlet Isol Motor (1RN292B)) (DB-556, AA-39). | |
| STANDARD: | | CAT |
| Applicant ex counter-cloc out on 1EM | plains inserting locking tab, rotating the breaker handle kwise to the OFF position, and pulling the locking tab back <td></td> | |
| Examiner Cue: | "Breaker switch is pointing to the OFF position." | |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|--|-----------|
| STEP 13 7.b2) Open 1RN-292B (1B D/G Hx Inlet Isol). | |
| STANDARD: | |
| Applicant explains obtaining a ladder, engages the manual operation clutch, and turns valve handwheel on 1RN-292B counter-clockwise direction to open the valve. | SAT |
| Examiner Cue: "Valve is NOT moving. 1RN-292B position indicator still shows CLOSED." | UNSAT |
| COMMENTS: | |
| | |

| <u>STEP 14</u> 8 | IF RN flow cannot be established, <u>THEN</u>:a. Stop D/G 1B by depressing "STOP" on 1DECPB. | CRITICAL STEP |
|------------------|---|------------------|
| STANDARD: | | |
| Applicant de | epresses the STOP pushbutton on 1DECPB to stop the D/G. | |
| Examiner Cue | "D/G has been secured." | |
| Examiner Note | e: This step is critical because it prevents damaging the D/G due to a lack of cooling water supply. | SAT UNSAT |
| COMMENTS: | | |
| | | |

| STEP/STANDARD | SAT/UNSAT |
|---|-----------|
| STEP 15 8.b. Notify the Control Room Supervisor of status. | |
| Applicant calls the CRS at x5164 and informs him that 1B D/G has been secured due to no cooling water flow being available. | SAT |
| Examiner Cue: Examiner repeats back information given | |
| COMMENTS: | |

| <u>STEP 16</u> 8.c. | Return this enclosure to the Control Room Supervisor. | |
|---------------------|---|-------|
| STANDARD: | | |
| Applicant ex | plains returning the enclosure to the CRS. | |
| | 5 | SAT |
| Examiner Cue: | "The CRS has taken the enclosure. This JPM is | |
| | complete." | UNSAT |
| | | |
| | | |
| <u>COMMENTS:</u> | | |
| | | |
| | | |

STOP TIME_____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 has experienced a loss of all AC power to 1ETB.
- The reason for the loss of AC power has been corrected.
- 1ETB load shed is complete.

INITIATING CUES:

- You are to energize 1ETB from 1B D/G by performing AP/1/A/5500/007 (Loss of Normal Power) Enclosure 11.
- Peer checks have been waived for this task.

LOSS OF NORMAL POWER

Enclosure 11 - Page 1 of 2 Energizing 1ETB From D/G

| 1. | Obtain the following: Key #746 (14/18 D/C Test Start Switch) from W/CC Key Locker |
|--------------|--|
| | Elashlight |
| | • Flashight. |
| 2. | Do not continue in this enclosure until notified load shed of 1ETB complete. |
| 3. | Start D/G 1B as follows: |
| | a. Notify Control Room Operator to place "D/G 1B CTRL LOCATION" switch on 1MC11 "LOCAL" position. |
| | b. <u>IF</u> unable to transfer diesel to Local Control, <u>THEN</u> actuate "CONTROL ROOM OVERRIDE" at breakglass station on 1DGCPB. |
| | c. Place key in "MANUAL TEST START" keyswitch and turn to "START" position. |
| | d. Ensure "SPEED CONTROL" adjusted to obtain frequency of between 58.8 and 61.2 Hz. |
| | e. Ensure "VOLTAGE CONTROL" adjusted to obtain "D/G VOLTAGE" between 4160 ar 4580 Volts. |
| | |
| 4. | <u>WHEN</u> D/G running, <u>THEN</u> CLOSE "DIESEL GEN BKR 1ETB18" breaker. |
| 4. 5. | <u>WHEN</u> D/G running, <u>THEN</u> CLOSE "DIESEL GEN BKR 1ETB18" breaker. <u>IF</u> D/G breaker will not close, <u>THEN</u> perform the following: |
| 4. 5. | <u>WHEN</u> D/G running, <u>THEN</u> CLOSE "DIESEL GEN BKR 1ETB18" breaker. <u>IF</u> D/G breaker will not close, <u>THEN</u> perform the following: a. Stop D/G 1B by depressing "STOP" on 1DECPB. |
| 4. 5. | WHEN D/G running, THEN CLOSE "DIESEL GEN BKR 1ETB18" breaker. IF D/G breaker will not close, THEN perform the following: a. Stop D/G 1B by depressing "STOP" on 1DECPB. b. Coordinate following with Control Room Supervisor: |
| 4. 5. | WHEN D/G running, THEN CLOSE "DIESEL GEN BKR 1ETB18" breaker. IF D/G breaker will not close, THEN perform the following: a. Stop D/G 1B by depressing "STOP" on 1DECPB. b. Coordinate following with Control Room Supervisor: • Inform Control Room Supervisor of D/G 1B status |
| 4. 5. | WHEN D/G running, THEN CLOSE "DIESEL GEN BKR 1ETB18" breaker. IF D/G breaker will not close, THEN perform the following: a. Stop D/G 1B by depressing "STOP" on 1DECPB. b. Coordinate following with Control Room Supervisor: a. Inform Control Room Supervisor of D/G 1B status b. Inform Control Room Supervisor of intention to perform Enclosure 18 (D/G 1B Local Breaker Closure) |
| 4. 5. | WHEN D/G running, THEN CLOSE "DIESEL GEN BKR 1ETB18" breaker. IF D/G breaker will not close, THEN perform the following: a. Stop D/G 1B by depressing "STOP" on 1DECPB. b. Coordinate following with Control Room Supervisor: Inform Control Room Supervisor of D/G 1B status Inform Control Room Supervisor of intention to perform Enclosure 18 (D/G 1B Local Breaker Closure) IF manpower available, THEN arrange for additional operator(s) to staff diesel panel |
| 4. 5 | WHEN D/G running, THEN CLOSE "DIESEL GEN BKR 1ETB18" breaker. IF D/G breaker will not close, THEN perform the following: a. Stop D/G 1B by depressing "STOP" on 1DECPB. b. Coordinate following with Control Room Supervisor: Inform Control Room Supervisor of D/G 1B status Inform Control Room Supervisor of intention to perform Enclosure 18 (D/G 1B Local Breaker Closure). IF manpower available, THEN arrange for additional operator(s) to staff diesel panel GO TO Enclosure 18 (D/G 1B Local Breaker Closure). |

LOSS OF NORMAL POWER

Enclosure 11 - Page 2 of 2 Energizing 1ETB From D/G

CLOSE the following essential load center normal incoming breakers: 6. 1ELXB-4B (Normal Incoming Breaker Fed From Xfmr 1ETXB) (AB-560, AA-47, Rm 372) 1ELXD-4B (Normal Incoming Breaker Fed From Xfmr 1ETXD) (AB-560, AA-46, Rm) 372). Ensure RN flow through KD Hx as follows: 7. a. Verify 1RN-292B (1B D/G Hx Inlet Isol) (D1B-566, AA-38) - OPEN. b. IF 1RN-292B (1B D/G Hx Inlet Isol) does not open, THEN perform the following: 1) OPEN 1EMXF-F01A (1B Diesel Generator Hx Inlet Isol Motor (1RN292B)) (DB-556, AA-39). 2) OPEN 1RN-292B (1B D/G Hx Inlet Isol). 8. IF RN flow cannot be established, THEN perform the following: a. Stop D/G 1B by depressing "STOP" on 1DECPB. b. Notify Control Room Supervisor of status. c. Return this enclosure to Control Room Supervisor. Notify Control Room Operator to place "D/G 1B CTRL LOCATION" switch on 1MC11 9. in "CTRL-RM" position. CLOSE 1VN-2 (1B D/G Exhaust Silencer Drain) (DB-557, BB-39). 10. 11. Ensure the following: "LO PUMP & HEATER" indicating light - OFF "JW PUMP & HEATER" indication light - OFF "DIESEL BLDG GEN VENT FAN 1B1" - ON "DIESEL BLDG GEN VENT FAN 1B2" - ON. 12. Monitor D/G operating parameters. REFER TO OP/1/A/6350/002 (Diesel Generator **Operation**).

JPM A.1-1R

RO

NOTE This JPM is to be administered on the same day as SRO JPM A.1-1S

EVALUATION SHEET

| Task: Perfor | m a Manual NC Sys | stem Leakage Calculati | on | | | |
|---|----------------------|-------------------------------|---------------|----------------------|-------------|-----|
| Alternate Path: | N/A | | | | | |
| Facility JPM #: | NC-094 Modified | I | | | | |
| Safety Function: | N/A | | | | | |
| K/A G 2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. | | | | | | |
| Importance: | 4.4 / 4.7 <u>CFI</u> | R: 41.5 / 43.5 / 45.12 | 2 / 45.13 | | | |
| Preferred Evaluat | tion Location: | <u>Preferre</u> | d Evaluatio | on Method | <u>l:</u> | |
| Simulator | Classroom | X Perform | | X Sim | ulate | |
| <u>References</u> : | PT/1/A/4150/001 | D (NC System Leakag | ge Calculatio | on) rev 86 | | |
| Task Standard:A manual NC System Leakage Calculation is performed per PT/1/A/4150/001 D (NC System Leakage Calculation) and the following results reported: Unidentified Leakage 8.628 – 8.828 gpm, Identified Leakage 2.272 – 2.372 gpm, Total Accumulated Leakage 21.664 – 21.91 gpm. Determines that LCOs of T.S. 3.4.13 and SLC 16.7-9 are not currently met. | | | | | | |
| Validation Time: | 30 minutes | <u>Time Cr</u> | itical: | Yes | No | X |
| Applicant: NAME | | Docket # | | Time Sta Time Fin | rt: ish: | |
| Performance Rat | ing: | | | Performa | ince Time _ | |
| SAT UNSAT | r | | | | | |
| Examiner: | NAME | | SIGNA | TURE | /DA | ATE |
| COMMENTS | | | | | | |
| | | COMMENTS | | | | |
| | | COMMENTS | | | | |
| | | COMMENTS | | | | |
| | | COMMENTS | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is in Mode 1 at 100% power.
- The OAC is out of service due to emergent system failures and will not be returned to service for 24 hours.
- Other operators are performing PT/1/A/4600/009 (Loss of Operator Aid Computer) and OP/1/A/6700/003 (Operation With the Operator Aid Computer Out of Service).

INITIATING CUES:

- The CRS directs you to perform an NC System Leakage Calculation per PT/1/A/4150/001 D (NC System Leakage Calculation).
- Steps are complete through 12.12.
- You are to perform step 12.13.
- The Open Item Summary has been updated. The background leakage is .072 gpm (Orbisphere flow reported by Primary Chemistry).
- Using the attached Data Sheet and PT/1/A/4150/001 D, calculate and report the following information back to the CRS:

| Identified Leakage | gpm |
|---------------------------|-----|
| Unidentified Leakage | gpm |
| Total Accumulated Leakage | gpm |

List all applicable TS / SLCs (if any) in which the LCO is not currently met. State the reason (if LCO is not met):

EXAMINER NOTE: Each applicant should receive a copy of attached Data Sheets and a copy of PT/1/A/4150/001 D (Rev 86) body signed off through step 12.12 and Enclosure 13.3.

| STEP / STANDARD | SAT / |
|-----------------|-------|
| | UNSAT |

START TIME: _____

| <u>STEP 1</u> 12.13 <u>IF</u> the OAC is partially or wholly unavailable <u>OR</u> Unit 1 is <u>NOT</u> at or near normal operating temperature and pressure (i.e. Tavg ≤ 550°F and W/R pressure ≤ 2200 psig), perform Enclosure 13.3 (Manual Leakage Calculation). | |
|--|-------|
| STANDARD: | SAT |
| Applicant determines that this step is applicable and goes to Enclosure 13.3 for a manual leakage calculation. | UNSAT |
| <u>COMMENTS:</u> | |

| STEP 2 Enclosure 13.3 step 1.1 Verify the following valves are closed: | |
|--|-------|
| 1NC-56B (RMW Pump Disch Cont Isol) 1NV-181A (B/A Blender Otlt to VCT) 1NV-186A (B/A Blender Otlt to VCT Outlet) 1NV-236B (Boric Acid to NV Pumps Suct) 1NV-252A (NV Pumps Suct From FWST) 1NV-253B (NV Pumps Suct From FWST) 1NI-9A (NV Pump C/L Inj Isol) 1NI-10B (NV Pump C/L Inj Isol) | SAT |
| STANDARD: | UNSAT |
| Applicant determines from the data sheet provided that all of the listed valves are closed. | |
| COMMENTS: | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|--|----------------|
| STEP 3 1.2 Record "Initial Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available). | |
| STANDARD: | |
| Applicant records initial data on Enclosure 13.3.1 using the provided data sheet. | SAT |
| COMMENTS: | UNSAT |
| | |
| NOTE: Calculation accuracy improves as the time between initial and final da | ata increases. |
| STEP 4 1.3 Wait at least 60 minutes prior to obtaining final data. | |
| STANDARD: | SAT |
| Applicant is given data for 64 minutes after initial data. | |
| COMMENTS: | UNSAT |
| | |

| <u>STEP 5</u> 1.4 Record "Final Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available). | |
|---|-------|
| STANDARD: | SAT |
| Applicant records final data on Enclosure 13.3.1 using the provided data sheet. | SAT |
| COMMENTS: | UNSAT |
| | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|--|----------------|
| <u>STEP 6</u> 1.5 Using data from Enclosure 13.3.1 (Manual Leakage Data), calculate change in T-Avg: | |
| P = °F | |
| STANDARD: | SAT |
| Applicant calculates change in T-Avg to be .2°F . | UNSAT |
| COMMENTS: | |
| | |
| | |

| NOTE: | |
|-------|---|
| _ | - |

- Procedure may continue while performing the following step.
- If change in T-Avg is greater than 0.25°F (0.1°F if using OAC), calculation is invalid and must be repeated.

| <u>STEP 7</u> 1.6 IF change in T-Avg is less than or equal to 0.25°F (0.1°F if using OAC), perform all calculations on Enclosure 13.3.2 (Manual Calculation). | |
|--|-------|
| STANDARD: | SAT |
| Applicant determines from previous step that T-Avg is 0.2°F and performs calculations from Enclosure 13.3.2. | 3A1 |
| COMMENTS: | UNSAT |
| | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|---|------------------|
| STEP 8 Enclosure 13.3.2 (Manual Calculation) STANDARD: Applicant performs the required calculations and comes up with the | CRITICAL STEP |
| <pre>Applicant performs the required calculations and comes up with the following results: VCT Leakage Rate = 11.042 gpm (Allowable range 11.0 – 11.1 gpm) PZR Leakage Rate = 0 gpm Total Leakage Rate = 0 gpm PRT Leakage Rate = 2.216 gpm (Allowable range 2.2 – 2.3 gpm) Identified Leakage = 2.288 gpm (Allowable range 2.272 – 2.372 gpm) Unidentified Leakage = 8.754 gpm (Allowable range 8.628 – 8.828 gpm) Total Accumulated Leakage = 21.752 gpm (Allowable range 21.6 – 21.91 gpm)</pre> | SAT UNSAT |
| These steps are critical to ensure accurate leakage values will be used to determine compliance with Technical Specifications/Selected License Commitments for NC system leakage. <u>COMMENTS:</u> | |

| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| STEP 9 Determine TS/SLCs in which LCO is not currently met. | |
| STANDARD: | CRITICAL STEP |
| Tech Spec 3.4.13 | |
| SLC 16.7-9 | |
| Applicant determines that T.S. 3.4.13 is not met due to unidentified leakage > 1 gpm. | |
| Applicant determines that SLC 16.7-9 is not met due to total accumulated leakage being > 20 gpm. | SAT |
| This step is critical to meet the task and standard of this JPM. | UNSAT |
| COMMENTS: | |
| | |
| END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is in Mode 1 at 100% power.
- The OAC is out of service due to emergent system failures and will not be returned to service for 24 hours.
- Other operators are performing PT/1/A/4600/009 (Loss of Operator Aid Computer) and OP/1/A/6700/003 (Operation With the Operator Aid Computer Out of Service).

INITIATING CUES:

- The CRS directs you to perform an NC System Leakage Calculation per PT/1/A/4150/001 D (NC System Leakage Calculation).
- Steps are complete through 12.12.
- You are to perform step 12.13.
- The Open Item Summary has been updated. The background leakage is .072 gpm (Orbisphere flow reported by Primary Chemistry).
- Using the attached Data Sheet and PT/1/A/4150/001 D, calculate and report the following information back to the CRS:

| Identified Leakage | gpm |
|---------------------------|-----|
| Unidentified Leakage | gpm |
| Total Accumulated Leakage | gpm |

List all applicable TS / SLCs (if any) in which the LCO is not currently met. State the reason (if LCO is not met):
APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DATA SHEET

The following valves are closed:

- 1NC-56B (RMW Pump Disch Cont Isol)
- 1NV-181A (B/A Blender Otlt to VCT)
- 1NV-186A (B/A Blender Otlt to VCT Outlet)
- 1NV-236B (Boric Acid to NV Pumps Suct)
- 1NV-252A (NV Pumps Suct From FWST)
- 1NV-253B (NV Pumps Suct From FWST)
- 1NI-9A (NV Pump C/L Inj Isol)
- 1NI-10B (NV Pump C/L Inj Isol)

| Parameter | Instrument | 2000 hours Data | 2104 hours Data | |
|---------------|------------|-----------------|-----------------|--|
| NC Avg. Temp. | 1NCCR5421 | 584.7 °F | 584.5 °F | |
| VCT Level | 1NVP5761 | 66% | 29% | |
| PZR Level | 1NCP5164 | 55% | 55% | |
| NCDT Level | 1WLP5630 | 50% | 50% | |
| PRT Level | 1NCP5131 | 69% | 70% | |

| 1A NC Pump #1 Seal Leakoff Flow | 2.46 GPM |
|---------------------------------|----------|
| 1B NC Pump #1 Seal Leakoff Flow | 2.77 GPM |
| 1C NC Pump #1 Seal Leakoff Flow | 2.60 GPM |
| 1D NC Pump #1 Seal Leakoff Flow | 2.88 GPM |

| 1EMF-71 Leakage | 1 GPD |
|-----------------|--------|
| 1EMF-72 Leakage | 84 GPD |
| 1EMF-73 Leakage | 77 GPD |
| 1EMF-74 Leakage | 1 GPD |

Background leakage: .072 gpm (Orbisphere flow)

KEY

| Duke Energy Catawba Nuclear Station | Procedure No. PT/ 1 /A/4150/001 D Revision No. | | |
|--|---|--|--|
| NC System Leakage Calculation | 086 | | |
| Continuous Use | Electronic Reference No. CN005FZZ | | |





PT/**1**/A/4150/001 D Page 14 of 17

- □ N. <u>WHEN</u> the current background leakage has been determined and documented <u>OR</u> the source of inleakage has been isolated, start a new PT/1/A/4150/001 D (NC System Leakage Calculation).
- \Box O. N/A the remaining steps of this procedure.
- 12.12.7 Record the individual NC Pump seal leakoff flows:
 - NC Pump 1A: _____ gpm
 - NC Pump 1B: _____ gpm
 - NC Pump 1C: _____ gpm
 - NC Pump 1D :_____ gpm
 - Total NC Pump seal leakoff: _____ gpm
- 12.12.8 Record total NC Pump seal leakoff on Enclosure 13.1 (Data Sheet).
- 12.12.9 Calculate Total Accumulative Leakage on Enclosure 13.1 (Data Sheet).
- 12.12.10 Document primary to secondary leakage on Enclosure 13.1 (Data Sheet).
- 12.12.11 Determine PZR steam leak rate to PRT on Enclosure 13.1 (Data Sheet).
- 12.12.12 **IF** a value was inserted for OAC Point C1P0203 (Average NCDT Level) in Step 12.12.1.1, restore that point to processing.
- **NOTE:** The calculation will stop after 180 minutes. It is <u>NOT</u> necessary to abort the calculation in the following step.
 - _ 12.12.13 Exit the NC System Leakage Calculations program.

12.13 **<u>IF</u>** the OAC is partially or wholly unavailable <u>**OR**</u> Unit 1 is <u>**NOT**</u> at or near normal operating temperature and pressure (i.e. Tavg \leq 550°F and W/R pressure \leq 2200 psig), perform Enclosure 13.3 (Manual Leakage Calculation).

____ 12.14 Return the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the position recorded in Step 12.9.1.



12.15 Realign the NCDT as follows:

- 12.15.1 Ensure 1WL-807B (NCDT Pumps Disch Cont Isol) is open.
 - _ 12.15.2 Ensure 1WL-805A (NCDT Pump Disch Cont Isol) is open.
- **NOTE:** If unable to reduce NCDT level in the following step, the in-service NB evaporator feed filter may need to be swapped / replaced due to high DP. (NCR 01515934)
 - 12.15.3 **IF** NCDT level is greater than setpoint, perform the following:
 - 12.15.3.1 Throttle open "NCDT LVL CTRL" to slowly reduce level.
 - 12.15.3.2 <u>WHEN</u> NCDT level is at the desired value, close "NCDT LVL CTRL".
 - _____ 12.15.4 Place "NCDT LVL CTRL" in "AUTO".
 - 12.15.5 Ensure "NCDT LVL CTRL" is set for 50%.
 - 12.15.6 **IF** 1WL-807B (NCDT Pumps Disch Cont Isol) is being maintained closed per OP/1/A/6500/014 (Operations Controlled Liquid Waste Systems), close 1WL-807B (NCDT Pumps Disch Cont Isol).
- NOTE: NM automation flow, as documented in Step 12.10, is classified as Non-RCPB (Reactor Coolant Pressure Boundary) leakage per WCAP-16423-NP (Reference 2.6). NM sample flow is manually routed and shall <u>NOT</u> count as Identified Leakage. The NM sample flow shall still be included in Total Leakage. (PIP M-12-5474).
 - The Net Identified Leakage rate will be entered in the Control Room log Leakage Data stamp and the OAC Manual Value Update. It is <u>NOT</u> used for determining Total Accumulative Leakage for the purpose of verifying SSF capabilities in Enclosure 13.1 (Data Sheet) or 13.3.2 (Manual Calculation).
 - 12.16 Calculate Net Identified Leakage rate:



KFY



Manual Leakage Calculation

PT/**1**/A/4150/001 D Page 1 of 1

| 1 | l. Pro | cedure | | | | | | | |
|---|--------------|--|--|--|--|--|--|--|--|
| | / 1.1 | Verify the following valves are closed: | | | | | | | |
| | | ☑ 1NC-56B (RMW Pump Disch Cont Isol) ☑ 1NV-181A (B/A Blender Otlt To VCT) ☑ 1NV-186A (B/A Blender Otlt To VCT Outlet) ☑ 1NV-236B (Boric Acid To NV Pumps Suct) ☑ 1NV-252A (NV Pumps Suct From FWST) ☑ 1NV-253B (NV Pumps Suct From FWST) ☑ 1NI-9A (NV Pump C/L Inj Isol) ☑ 1NI-10B (NV Pump C/L Inj Isol) | | | | | | | |
| | / 1.2 | Record "Initial Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available). | | | | | | | |
| I | NOTE: | Calculation accuracy improves as the time between initial and final data increases. | | | | | | | |
| ~ | 1.3 | Wait at least 60 minutes prior to obtaining final data. | | | | | | | |
| ~ | <u>/</u> 1.4 | Record "Final Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available). | | | | | | | |
| ~ | 1.5 | Using data from Enclosure 13.3.1 (Manual Leakage Data), calculate change in T-Avg: | | | | | | | |
| | | $\frac{584.7}{\text{NC Average temp initial}} - \frac{584.5}{\text{NC Average temp final}} = \frac{0.2}{\text{C}} \text{°F}$ | | | | | | | |
| I | NOTE: | • Procedure may continue while performing the following step. | | | | | | | |
| | | • If change in T-Avg is greater than 0.25°F (0.1°F if using OAC), calculation is invalid and must be repeated. | | | | | | | |
| | 1.6 | <u>IF</u> change in T-Avg is less than or equal to 0.25°F (0.1°F if using OAC), perform all calculations on Enclosure 13.3.2 (Manual Calculation). | | | | | | | |
| | 1.7 | Return to Step 12.13. | | | | | | | |

KEY



Manual Leakage Data

PT/**1**/A/4150/001 D Page 1 of 1

- **NOTE:** If available, OAC points can be used.
 - Where applicable, the same instrument channel (meter) shall be used for obtaining the initial and final data.
 - When using OAC Point indication for NCDT and PRT level changes, minor instrument fluctuations that result in a indicated level decrease may be treated as zero level change.

| Parameter | Units | Instrument / OAC Point | Initial Data | Final Data |
|------------------------|-------|------------------------|--------------|------------|
| | | Used | (Step 1.2) | (Step 1.4) |
| NC Average Temperature | °F | 1NCCR5421 | 584.7 | 584.5 |
| VCT Level | % | 1NVP5761 | 66 | 29 |
| PZR Level | % | 1NCP5164 | 55 | 55 |
| NCDT Level | % | 1NCP5630 | 50 | 50 |
| PRT Level | % | 1NCP5131 | 69 | 70 |

Record time Initial Data obtained 2000

Record time Final Data obtained 2104

Elapsed time <u>64</u> minutes





Manual Calculation Pag

PT/**1**/A/4150/001 D Page 1 of 4

<u>VCT</u>

| VCT Leakage Rate = [Initial Level (%) - Final Level (%)] x 19.1 gal/% Elapsed time | | | | | | |
|---|---|--|--|--|--|--|
| | = | $\frac{[(66) - (29)] \times 19.1 \text{ gal}}{(64) \text{ min}}$ | | | | |
| | = | gal/min (Acceptable Range 11.0 - 11.1) | | | | |
| <u>PZR</u> | | | | | | |
| PZR Leakage Rate | = | [Initial Level (%) - Final Level (%)] x (124.7 Gal/%) x (0.5983 ^a) Elapsed time | | | | |
| | = | $\frac{[(55) - (55)] \times (124.7 \text{ Gal/\%}) \times (0.5983)}{(64) \min}$ | | | | |
| | = | gal/min | | | | |
| <u>Total Leakage</u> | = | (VCT Leakage Rate) + (Pzr Leakage Rate) | | | | |
| | = | (11.042)+(0) | | | | |
| | = | 11.042 gpm | | | | |
| | | (Acceptable Range 11.0 - 11.1) | | | | |

^a This is the density ratio to normalize leakage at PZR conditions to leakage at 100°F





Manual Calculation

PT/**1**/A/4150/001 D Page 2 of 4

<u>NCDT</u>

| Initial NCDT Volume <u>50</u> % | 6 = <u>177.254</u> Gal (OAC point C1P5079 (U1 NCDT Volume) or Enclosure 13.3.3 (NCDT Level Conversion)) |
|---------------------------------|--|
| Final NCDT Volume <u>50</u> % | = <u>177.254</u> Gal (OAC point C1P5079 (U1 NCDT Volume) or Enclosure 13.3.3 (NCDT Level Conversion)) |
| NCDT Leakage Rate | = <u>Final Volume (Gal) - Initial Volume (Gal)</u> Elapsed time |
| | = (177.254) - (177.254) (64) min |
| | = gpm |
| <u>PRT</u> | |
| Initial PRT Volume <u>69</u> % | = <u>9496.66</u> Gal (OAC point C1P5078 (U1 PRT Volume) or Enclosure 13.3.4 (PRT Level Conversion)) |
| Final PRT Volume <u>70</u> % | = <u>9638.47</u> Gal (OAC point C1P5078 (U1 PRT Volume) or Enclosure 13.3.4 (PRT Level Conversion)) |
| PRT Leakage Rate | = <u>Final Volume (Gal) - Initial Volume (Gal)</u> Elapsed time |
| | = (9638.47) - (9496.66) (64) min |
| | = <u>2.216</u> gpm (Acceptable Range 2.2 - 2.3) |
| Background Leakage = | Any quantified/measured leakage |
| = | gpm |
| Identified Leakage = | NCDT Leakage Rate + PRT Leakage Rate + Background Leakage |
| = | gpm +2.216 gpm +0.072 gpm |
| = | 2.288 gpm (Acceptable Range 2.272 - 2.372) |
| <u>Unidentified Leakage</u> = | Total Leakage - Identified Leakage |
| = | <u>11.042</u> gpm - <u>2.288</u> gpm |
| = | <u>8.754</u> gpm ^b |
| | (Acceptable Range 8.628 -8.828) |

^b This value is an acceptance criteria of this procedure.



Manual Calculation

PT/**1**/A/4150/001 D Page 3 of 4

Total NC Pump Seal Leakoff

- 1A NC Pump #1 Seal Leakoff = 2.46 gpm
- 1B NC Pump #1 Seal Leakoff = 2.77 gpm
- 1C NC Pump #1 Seal Leakoff = 2.60 gpm
- 1D NC Pump #1 Seal Leakoff = 2.88 gpm

Total NC Pump Seal Leakoff: <u>10.71</u> gpm

<u>Total Accumulative Leakage</u> = Sum of Identified Leakage, Unidentified, and NC Pumps #1 Seal Leakoffs

Identified Leakage <u>2.288</u> gpm

Unidentified Leakage <u>8.754</u> gpm

Total NC Pump Seal Leakoff _____ 10.71 gpm

<u>IF</u> any Identified or Unidentified value is negative, enter "0" below in its applicable space.

Identified + Unidentified + Total NC Pump Seal Leakoff = Total Accumulative Leakage

<u>2.288</u> + <u>8.754</u> + <u>10.71</u> = <u>21.752</u>

(Acceptable Range 21.664 - 21.91)

Verify Total Accumulative Leakage:

 $\Box \leq 20 \text{ gpm } \{\text{PIP C-99-0606}\}$

OR

 $\square > 20$ gpm, refer to Step 12.19.

| Performed By | Date: | Time: |
|--------------|-----------|-------|
| Verified By | Date: | Time: |



Manual Calculation

PT/**1**/A/4150/001 D Page 4 of 4

<u>Primary to Secondary Leakage</u> as determined by one of the following:

N/A <u>IF</u> in Mode 1 <u>AND</u> 1EMF-33 is functional^c <u>AND</u> the OAC is available, record the reading of OAC Point C1P0189 (Pri To Sec Leakrate 15 Min Running Avg). gpd

OR

- ✓ IF in Mode 1 AND the OAC is NOT available AND Unit 1 is \ge 40% RTP, record the readings from the N-16 Leakage Monitors:
 - 1EMF-71 ____ gpd
 - 1EMF-72 84 gpd
 - 1EMF-73 **77** gpd
 - 1EMF-74 _____ gpd

- N/A IF in Mode 1 AND 1EMF-33 is non-functional^c AND Unit 1 is \geq 40% RTP, record the readings from the N-16 Leakage Monitors:
 - 1EMF-71 _____ gpd
 - 1EMF-72 _____ gpd
 - 1EMF-73 _____ gpd
 - 1EMF-74 _____ gpd

OR

N/A IF in Mode 1 AND 1EMF-33 is non-functional^c AND Unit 1 is < 40% RTP, record the primary to secondary leak rate as determined by Chemistry. _____ gpd

OR

N/A IF in Mode 2, 3, 4 or Pre-Mode 4, record the primary to secondary leak rate value as determined by Chemistry. _____ gpd

OR

^c For the purposes of this procedure, OAC Point C1P0189 (Pri To Sec Leakrate 15 Minute Running Avg) must be functional for 1EMF-33 to be considered functional.

PT/**1**/A/4150/001 D Page 1 of 1

NCDT Level Conversion

| % | Gal | % | Gal | % | Gal | % | Gal | % | Gal |
|----|--------|----|---------|----|---------|----|---------|-----|---------|
| 1 | 19.897 | 21 | 74.240 | 41 | 143.787 | 61 | 218.067 | 81 | 286.505 |
| 2 | 22.085 | 22 | 77.410 | 42 | 147.478 | 62 | 221.721 | 82 | 289.571 |
| 3 | 24.343 | 23 | 80.613 | 43 | 151.178 | 63 | 225.360 | 83 | 292.600 |
| 4 | 26.669 | 24 | 83.871 | 44 | 154.888 | 64 | 228.983 | 84 | 295.590 |
| 5 | 29.058 | 25 | 87.176 | 45 | 158.604 | 65 | 232.587 | 85 | 298.539 |
| 6 | 31.509 | 26 | 90.517 | 46 | 162.327 | 66 | 236.173 | 86 | 301.447 |
| 7 | 34.019 | 27 | 93.894 | 47 | 166.055 | 67 | 239.738 | 87 | 304.312 |
| 8 | 36.585 | 28 | 97.304 | 48 | 169.786 | 68 | 243.281 | 88 | 307.131 |
| 9 | 39.206 | 29 | 100.743 | 49 | 173.519 | 69 | 246.801 | 89 | 309.904 |
| 10 | 41.880 | 30 | 104.212 | 50 | 177.254 | 70 | 250.296 | 90 | 312.628 |
| 11 | 44.604 | 31 | 107.706 | 51 | 180.989 | 71 | 253.765 | 91 | 315.302 |
| 12 | 47.376 | 32 | 111.226 | 52 | 184.722 | 72 | 257.204 | 92 | 317.923 |
| 13 | 50.196 | 33 | 114.770 | 53 | 188.453 | 73 | 260.614 | 93 | 320.489 |
| 14 | 53.060 | 34 | 118.335 | 54 | 192.181 | 74 | 263.990 | 94 | 322.999 |
| 15 | 55.968 | 35 | 121.921 | 55 | 195.904 | 75 | 267.332 | 95 | 325.450 |
| 16 | 58.918 | 36 | 125.525 | 56 | 199.620 | 76 | 270.636 | 96 | 327.839 |
| 17 | 61.908 | 37 | 129.148 | 57 | 203.329 | 77 | 273.894 | 97 | 330.164 |
| 18 | 64.937 | 38 | 132.787 | 58 | 207.030 | 78 | 277.098 | 98 | 332.423 |
| 19 | 68.003 | 39 | 136.440 | 59 | 210.720 | 79 | 280.267 | 99 | 334.611 |
| 20 | 71.104 | 40 | 140.108 | 60 | 214.400 | 80 | 283.403 | 100 | 336.726 |



PT/**1**/A/4150/001 D Page 1 of 1

| PRT Level Conversion |
|----------------------|
|----------------------|

| % | Gal | % | Gal | % | Gal | % | Gal | % | Gal |
|----|---------|----|---------|----|---------|-----------------|----------------------|-----|---------|
| 1 | 383.572 | 21 | 2476.15 | 41 | 5302.48 | 61 | 8328.88 | 81 | 11109.4 |
| 2 | 458.035 | 22 | 2605.43 | 42 | 5452.77 | 62 | 8477.55 | 82 | 11233.2 |
| 3 | 536.720 | 23 | 2736.38 | 43 | 5603.50 | 63 | 8625.56 | 83 | 11355.0 |
| 4 | 619.374 | 24 | 2868.93 | 44 | 5754.61 | 64 | 8772.86 | 84 | 11474.8 |
| 5 | 705.776 | 25 | 3003.00 | 45 | 5906.04 | 65 | 8919.40 | 85 | 11592.4 |
| 6 | 795.729 | 26 | 3138.52 | 46 | 6057.74 | 66 | 9065.10 | 86 | 11707.7 |
| 7 | 889.054 | 27 | 3275.43 | 47 | 6209.65 | 67 | 9209.92 | 87 | 11820.7 |
| 8 | 985.589 | 28 | 3413.66 | 48 | 6361.73 | 68 | 9353.79 | 88 | 11931.3 |
| 9 | 1085.19 | 29 | 3553.15 | 49 | 6513.91 | <mark>69</mark> | <mark>9496.66</mark> | 89 | 12039.3 |
| 10 | 1187.70 | 30 | 3693.82 | 50 | 6666.17 | 70 | <mark>9638.47</mark> | 90 | 12144.6 |
| 11 | 1293.02 | 31 | 3835.63 | 51 | 6818.38 | 71 | 9779.14 | 91 | 12247.1 |
| 12 | 1401.00 | 32 | 3978.50 | 52 | 6970.56 | 72 | 9918.63 | 92 | 12346.7 |
| 13 | 1511.55 | 33 | 4122.37 | 53 | 7122.64 | 73 | 10056.9 | 93 | 12443.2 |
| 14 | 1624.54 | 34 | 4267.19 | 54 | 7274.55 | 74 | 10193.8 | 94 | 12536.6 |
| 15 | 1739.89 | 35 | 4412.89 | 55 | 7426.25 | 75 | 10329.3 | 95 | 12626.5 |
| 16 | 1857.49 | 36 | 4559.43 | 56 | 7577.68 | 76 | 10463.4 | 96 | 12712.9 |
| 17 | 1977.25 | 37 | 4706.73 | 57 | 7728.79 | 77 | 10595.9 | 97 | 12795.6 |
| 18 | 2099.08 | 38 | 4854.74 | 58 | 7879.51 | 78 | 10726.9 | 98 | 12874.3 |
| 19 | 2222.89 | 39 | 5003.40 | 59 | 8029.81 | 79 | 10856.1 | 99 | 12948.7 |
| 20 | 2348.61 | 40 | 5152.67 | 60 | 8179.92 | 80 | 10983.7 | 100 | 13018.7 |

KEY

| Duke Energy Catawba Nuclear Station | Procedure No. PT/ 1 /A/4150/001 D | | |
|--|---|--|--|
| | Revision No. | | |
| NC System Leakage Calculation | 086 | | |
| | | | |
| | | | |
| Continuous Use | Electronic Reference No. | | |
| | CN005FZZ | | |

REVISION SUMMARY

Reference AR(s): 02248976; 02229228; 02179037; 02178839

Added new step 12.3 to notify chemistry to determine the primary to secondary leak rate and report the value to the control room.

In step 12.6.1 added OP NC LEAK1 and OP NC LEAK2 to the bulleted items to match the radio buttons on the NC LEAKAGE graphic if accessing the point list from the graphics.

Added a note prior to step 12.15.3 stating that the NB feed filter may need to be swapped if unable to reduce NCDT level.

Deleted old step 12.17 to attach the OAC printout to the PT. Per ENG there is no need to attach this data to the PT.

PT/**1**/A/4150/001 D Page 3 of 17

NC System Leakage Calculation

1. Purpose

To ensure that NC System leakage is calculated at least once per 72 hours. (TS SR 3.4.13.1 and SR 3.4.13.2)

2. References

- 2.1 Technical Specifications:
 - TS SR 3.4.13.1
 - TS SR 3.4.13.2
 - TS LCO 3.4.15, REQUIRED ACTION A.1, B.1, C.1.1 and E.1
 - SLC 16.7-9, Remedial Action Condition B
- 2.2 Catawba Nuclear Station Operator Aid Computer Documentation
- 2.3 UFSAR Table 18-1, Reactor Coolant Operational Leakage Monitoring Program
- 2.4 Catawba Nuclear Station License Renewal Basis Specification CNS-1274.00-00-0016, Section 4.27
- 2.5 WCAP-16465-NP (Pressurized Water Reactors Owners Group Standard RCS Leakage Action Levels and Response Guidelines for Pressurized Water Reactors)
- 2.6 WCAP-16423-NP (Pressurized Water Reactors Owners Group Standard Process and Methods for Calculating RCS Leak Rate for Pressurized Water Reactors)

3. Time Required

- 3.1 Manpower Two Operators
- 3.2 Time 3 hours
- 3.3 Frequency -
 - Once per 72 hours in Modes 1, 2, 3 and 4 per SR 3.4.13.1 during steady state operation.
 - Once per 24 hours if required by TS LCO 3.4.15, REQUIRED ACTION A.1, B.1, C.1.1 or E.1.

4. Prerequisite Test

None

5. Test Equipment

None

6. Limits and Precautions

- 6.1 If more than twelve hours of grace time have elapsed and this PT has <u>NOT</u> been completed, then contact the OWPM Group.
- 6.2 Changing Lower Containment Ventilation Unit alignments can affect indicated NCDT and PRT levels by changing reference leg temperatures on the associated transmitters.

7. Required Unit Status

<u>AA</u> Verify the following parameters are being maintained steady:

- ☑ NC System temperature
- ☑ NC System pressure

8. Prerequisite System Conditions

AA Verify the NCDT capacity is adequate to receive leakage for duration of run.

9. Test Method

- 9.1 At least once per 72 hours with the OAC available, the OAC NC System Leakage Calculation will be initiated. The calculation will automatically run for 3 hours. During the first 15 minutes of the calculation, no correlation coefficient will be displayed. Calculation results may be used for the leakage calculation when elapsed time of the calculation reaches 60 minutes and the correlation coefficient for total leakage is greater than or equal to 0.75 OR when elapsed time of the calculation reaches 120 minutes and Total Leakage Best is less than or equal to 0.2 gpm. If plant stability <u>CANNOT</u> be maintained and elapsed time reaches 30 minutes and the correlation coefficient for total leakage is greater than or equal to 0.5, then the program data may be used.
- 9.2 At least once per 72 hours with the OAC partially or wholly unavailable, NC System leakage will be calculated manually. Using Control Room indications (or OAC if partially available), initial and final data will be recorded, separated by at least a 60 minute interval. Recorded data will be used in leakage calculations. Tank volume / gallon conversions and water densities are used in equations to determine NC System leakage.
- 9.3 Primary to secondary leakage will be verified to be less than or equal to 150 gpd through any steam generator by either EMF indications or Chemistry grab samples.
- 9.4 NC Pump seal leak-off will be recorded and "TOTAL ACCUMULATIVE LEAKAGE" will be calculated.

9.5 The NCS Unidentified Leakage result will be evaluated to verify an acceptably low leakage rate.

10. Data Required

- 10.1 If the OAC is available, complete Enclosures 13.1 (Data Sheet) and 13.2 (Evaluation of NCS Unidentified Leakage Results).
- 10.2 If the OAC is partially or wholly unavailable, complete Enclosure 13.3 (Manual Leakage Calculation).

11. Acceptance Criteria

- NOTE: Negative values of Unidentified Leakage more negative than -0.10 gpm invalidates the current OAC leakage calculation.
 If a negative leakage value of less than (more negative than) -0.10 gpm is due to plant stability issues then a manual leakage calculation per Enclosure 13.3 (Manual Leakage Calculation) may be necessary.
 Negative values of Unidentified Leakage between 0.000 gpm and -0.020 gpm are considered zero leakage.
 - 11.1 NC System leakage is calculated and the values are: (SR 3.4.13.1)
 - Unidentified Leakage less than or equal to 1 gpm
 - Identified Leakage (net) less than or equal to 10 gpm (Step 12.16)
 - 11.2 Primary to secondary leakage is determined to be less than or equal to 150 gpd through any steam generator. (SR 3.4.13.2)
 - 11.3 If in Mode 1, 2, 3 or Pre-Mode 3, Total Accumulative Leakage is determined to be less than or equal to 20 gpm. {PIP C-99-0606}

12. Procedure

- <u>AA</u> 12.1 Ensure that the Identified Leakage associated with any system condition changes (NV Pump swap, seal injection filter swap, etc.) has been updated in the open item summary.
- N/<u>A AA</u> 12.2 <u>IF</u> Unidentified Leakage is more negative than -0.020 gpm on the previous 3 NC System leakage calculations, then re-measure background leakage.

PT/**1**/A/4150/001 D Page 6 of 17

N/<u>A AA</u> 12.3 <u>IF</u> in Mode 2, 3, 4, or Pre-Mode 4, notify Chemistry to determine the primary to secondary leak rate <u>AND</u> report value to the control room.

| Person Notified |
|-----------------|
|-----------------|

NOTE: All leakage calculation results, valid and invalid, shall be entered into the Control Room log.

- N/<u>A AA</u> 12.4 **IF** more than one leakage calculation performed per shift, enter a brief explanation into the Control Room log indicating the reason for repeating the calculation.
 - <u>AA</u> 12.5 Ensure > 60 minutes has elapsed since any makeup to NCP standpipes.
 - **NOTE:** OAC points C1P1023, C1P1024, C1P1025, and C1P1026 will indicate NCAL until the leakage program is started.
- N/<u>A AA</u> 12.6 **IF** the OAC is available for performing the leakage calculation, perform the following:
 - 12.6.1 Examine values and quality codes of OAC points in the following Group Displays:
 - OPNCLEK1 (OP NC LEAK1 if accessing from NC LEAKAGE graphic)
 - OPNCLEK2 (OP NC LEAK2 if accessing from NC LEAKAGE graphic)
 - 12.6.2 **IF** any obvious erroneous or invalid value or quality code for OAC points in group displays OPNCLEK1 or OPNCLEK2 are found that have **NOT** been previously addressed, they shall be investigated and resolved prior to the start of the calculation.

- N/A AA 12.7 IF desired to lower NCDT level due to known high inputs, perform the following:
 - 12.7.1 **IF** 1WL-807B (NCDT Pumps Disch Cont Isol) is being maintained closed per OP/1/A/6500/014 (Operations Controlled Liquid Waste Systems), perform the following:
 - _____ 12.7.1.1 Place "NCDT LVL CTRL" in "MANUAL".
 - 12.7.1.2 Close "NCDT LVL CTRL".
 - 12.7.1.3 Open 1WL-807B (NCDT Pumps Disch Cont Isol).
 - _____ 12.7.2 Ensure "NCDT LVL CTRL" is in "MANUAL".
 - 12.7.3 Throttle open "NCDT LVL CTRL".
 - 12.7.4 **<u>WHEN</u>** NCDT level is \approx 30%, perform the following:
 - _____ 12.7.4.1 Close "NCDT LVL CTRL".
 - _____ 12.7.4.2 **IF** Step 12.7.1 was performed, close 1WL-807B (NCDT Pumps Disch Cont Isol).
 - 12.7.4.3 Return "NCDT LVL CTRL" to "AUTO".
 - 12.8 Align the NCDT as follows:

NOTE: 1WL-802 is the NCDT level control valve.

- AA 12.8.1 Ensure 1WL-802 (NCDT Level Control) is closed as follows:
 - AA 12.8.1.1 Place "NCDT LVL CTRL" in "MANUAL".
 - AA 12.8.1.2 Close "NCDT LVL CTRL".
- N/A AA 12.8.2 IF necessary due to known or suspected leakage past 1WL-802 (NCDT Level Control), close 1WL-807B (NCDT Pumps Disch Cont Isol).
- N/A AA 12.8.3 IF necessary due to known or suspected leakage past 1WL-807B (NCDT Pumps Disch Cont Isol), close 1WL-805A (NCDT Pump Disch Cont Isol).
 - 12.9 Align 1NV-172A (3-Way Divert To VCT-RHT) as follows:
 - <u>AA</u> 12.9.1 Record the position of the control switch for 1NV-172A (3-Way Divert To VCT-RHT). <u>AUTO / V</u>CT
 - AA 12.9.2 Place 1NV-172A (3-Way Divert To VCT-RHT) in the "VCT" position.

AA 12.10 Contact Primary Chemistry to perform the following:

- Inform them that an NC System leakage calculation is being initiated.
- Ensure that sampling is <u>NOT</u> performed while the calculation is in progress.
- Verify current NM automation flowrate for entry into background leakage. Record value used for NM automation flowrate <u>0.072</u> gpm Chemistry contact Mcleod
- <u>AA</u> 12.11 Ensure > 30 minutes has elapsed since the performance of any activity involving NC System parameters, including charging, letdown (including demineralizers), pressurizer, and/or VCT evolutions. {PIP 07-7077}
- N/<u>A AA</u> 12.12 <u>IF</u> the OAC is available <u>AND</u> Unit 1 is at or near normal operating temperature and pressure (i.e. Tavg > 550°F and W/R pressure > 2200 psig), perform the following:

NOTE: Maximum run-time for NC System Leakage Calculation is three hours.

12.12.1 Complete the following steps to initiate a NC System Leakage Calculation:

NOTE: The following step provides an inserted value for NCDT level indication. Use of an inserted value will result in input into the tank to be measured as NCS unidentified leakage.

- 12.12.1.1 **IF** the NCDT level indication is **NOT** providing stable input rate, insert the current value of C1A0494 (NCDT Level) into OAC Point C1P0203 (Average NCDT Level).
- □ 12.12.1.2 Activate NC System Leakage Calculations program (RCSLEAK).
- <u>12.12.1.3</u> <u>IF</u> a calculation is currently in progress, then perform one of the following:
 - A. <u>IF</u> it is <u>NOT</u> desired to initiate a new calculation, then exit the NC System Leakage Calculations program.

OR

B. **<u>IF</u>** it is desired to initiate a new calculation, abort the current calculation per Step 12.12.3.

PT/**1**/A/4150/001 D Page 9 of 17

- **NOTE:** It is recommended that initiation of the leakage calculation be synchronized with fluctuations of indicated VCT level. Initiating the program in Step 12.12.1.4 approximately half way between the maximum and minimum values observed during the fluctuation will improve the accuracy of the data.
 - □ 12.12.1.4 Select "INITIATE".
 - □ 12.12.1.5 Enter background leakage obtained from the following:
 - Open Item Summary Logbook.
 - NM Automation from Primary Chemistry (if <u>NOT</u> already in Open Item Summary Logbook).
 - \Box 12.12.1.6 Enter desired start time.
 - □ 12.12.1.7 Select "SAVE".
 - \Box 12.12.1.8 Enter user name.
 - \Box 12.12.1.9 Enter reason for calculation.
 - \square 12.12.1.10 Select "OK" to continue.
 - □ 12.12.1.11 Select "OK" to acknowledge "New NC Leakage Calculation Scheduled" message.
 - 12.12.2 **<u>IF AT ANY TIME</u>** during the calculation it is desired to obtain a printout of NC System Leakage Calculation Summary, perform the following:
- **NOTE:** If the calculation is still running, it is recommended to wait at least ten seconds after a data update before printing. The program updates every minute.
 - □ 12.12.2.1 Ensure NC System Leakage Calculations program (RCSLEAK) is activated.
 - □ 12.12.2.2 Select "PRINT".

PT/**1**/A/4150/001 D Page 10 of 17

- 12.12.3 **IF AT ANY TIME** during the calculation it becomes necessary to abort a NC System Leakage Calculation due to calculation or plant issues, perform the following:
- **NOTE:** Upon abort, the application will terminate calculating. Results up to the time of termination are available.
 - □ 12.12.3.1 Ensure NC System Leakage Calculations program (RCSLEAK) is activated.
 - □ 12.12.3.2 Verify "NC System Leakage Calculation" summary displayed.
 - □ 12.12.3.3 Select "ABORT".
 - □ 12.12.3.4 Verify message "On Demand NC System Leakage Calculations Will Be Aborted" displayed.
 - □ 12.12.3.5 Select "OK" to acknowledge "On Demand NC System Leakage Calculations Will Be Aborted" message and to abort the NC System Leakage Calculation in progress.
 - □ 12.12.3.6 Verify the "NC System Leakage Calculations" summary is displayed with the results of the aborted calculation up to time of termination.
 - <u>12.12.3.7</u> <u>IF</u> desired to restart the calculation, return to Step 12.12.1.

| NOTE: | Disregard the correlation coefficient "-" (negative) symbol when determining the correlation coefficient. The "-" symbol signifies out leakage from the NC System. The absence of the "-" symbol signifies in leakage into the NC system from an external source. | | | | | | | | | | |
|-------|---|--|--|--|--|--|--|--|--|--|--|
| | In the following step, use of either of the first two conditions is preferred. The third condition is intended to only be used for transient conditions. | | | | | | | | | | |
| | • To provide highest quality results, a "CALC ELAPSED TIME" of greater than or equal to 120 minutes is recommended and is to be used in the following step whenever plant conditions allow. | | | | | | | | | | |
| | 12.12.4 <u>WHEN</u> any of the following sets of conditions are met, then obtain a printout of the "NC System Leakage Calculation" summary as follows: | | | | | | | | | | |
| | □ "CALC ELAPSED TIME" ≥ 60 minutes, and □ The absolute value for the "TOTAL LEAKAGE CORRELATION COEFF." ≥ 0.75. | | | | | | | | | | |
| | OR | | | | | | | | | | |
| | □ "CALC ELAPSED TIME" \geq 120 minutes, and □ "TOTAL LEAKAGE BEST" < 0.2 gpm. | | | | | | | | | | |
| | OR | | | | | | | | | | |
| | □ Plant stability <u>CANNOT</u> be maintained, and □ "CALC ELAPSED TIME" \geq 30 minutes, and □ The absolute value for the "TOTAL LEAKAGE CORRELATION COEFF." \geq 0.5. | | | | | | | | | | |
| NOTE: | If the calculation is still running, it is recommended to wait at least ten seconds after a data update before printing. The program updates every minute. | | | | | | | | | | |
| | □ 12.12.4.1 Ensure NC System Leakage Calculations program (RCSLEAK) is activated. | | | | | | | | | | |

□ 12.12.4.2 Select "PRINT".

PT/**1**/A/4150/001 D Page 12 of 17

| 12.12.5 Record the following values on Enclosure 13.1 (Data Snee |
|--|
|--|

- □ 12.12.5.1 "TOTAL LEAKAGE BEST" value as Total Leakage.
- □ 12.12.5.2 "IDENTIFIED LEAKAGE BEST" value as Identified Leakage.
- □ 12.12.5.3 "UNIDENTIFIED LEAKAGE BEST" value as Unidentified Leakage.
- _____ 12.12.6 **IF** the value for "UNIDENTIFIED LEAKAGE BEST" is negative, perform the following:

NOTE: Negative values of Unidentified Leakage between 0.000 gpm and -0.020 gpm is considered zero leakage. For trending purposes, the actual leakage results shall always be recorded.

12.12.6.1 **IF** the value for "UNIDENTIFIED LEAKAGE BEST" is between -0.02 and -0.10 gpm, use the displayed value of "UNIDENTIFIED LEAKAGE BEST" while completing this procedure.

NOTE: Unidentified leakage values more negative than -0.10 gpm are indicative of either inleakage or a significant reduction of background leakage. Either situation invalidates the current leakage calculation.

12.12.6.2 **IF** the value for "UNIDENTIFIED LEAKAGE BEST" is more negative than -0.10 gpm, perform the following:

NOTE: The NC System Leakage Calculation will time out after three hours.

- A. **<u>IF</u>** necessary, abort the current calculation per Step 12.12.3.
- B. <u>IF</u> necessary, return the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the position recorded in Step 12.9.1.
- C. **<u>IF</u>** necessary, realign the NCDT per Step 12.15.
- D. **IF** a value was inserted for OAC Point C1P0203 (Average NCDT Level) in Step 12.12.1.1, restore that point to processing.

PT/**1**/A/4150/001 D Page 13 of 17

| | E. | IF the negative value for "UNIDENTIFIED LEAKAGE BEST" is suspected to be due to plant stability issues, perform the following: |
|---------|------|---|
| | | 1. Perform manual leakage calculation per Enclosure 13.3 (Manual Leakage Calculation). |
| | | 2. N/A Steps 12.12.6.2F through 12.13. |
| | □ F. | Inform Primary Chemistry that the NC System leakage calculation has been suspended. Chemistry contact |
| | □ G. | Record the individual NC Pump seal leakoff flows: |
| | | NC Pump 1A: gpm NC Pump 1B: gpm NC Pump 1C: gpm NC Pump 1D : gpm Total NC Pump seal leakoff: gpm |
| | □ H. | Record total NC Pump seal leakoff on Enclosure 13.1 (Data Sheet). |
| | □ I. | Calculate Total Accumulative Leakage on Enclosure 13.1 (Data Sheet). |
| | □ J. | Document primary to secondary leakage on Enclosure 13.1 (Data Sheet). |
| | □ K. | Enter the NCS Leakage Calculation Data into the Control Room log using Unit 1 NCS Leakage Data stamp. Include comment that this is an invalid calculation due to high negative leakage result. |
| | □ L. | Re-measure background leakage. |
| c · 1 1 | 1 | |

NOTE: Examples of inleakage could include flush water leakage into low pressure portions of the NV System, KC leakage into the Seal Return Hx and/or NW leakage.

M. **IF** the background leakage has **<u>NOT</u>** changed significantly, identify and isolate the source of inleakage.

PT/**1**/A/4150/001 D Page 14 of 17

- □ N. <u>WHEN</u> the current background leakage has been determined and documented <u>OR</u> the source of inleakage has been isolated, start a new PT/1/A/4150/001 D (NC System Leakage Calculation).
- \Box O. N/A the remaining steps of this procedure.
- 12.12.7 Record the individual NC Pump seal leakoff flows:
 - NC Pump 1A: _____ gpm
 - NC Pump 1B: _____ gpm
 - NC Pump 1C: _____ gpm
 - NC Pump 1D :_____ gpm
 - Total NC Pump seal leakoff: _____ gpm
- 12.12.8 Record total NC Pump seal leakoff on Enclosure 13.1 (Data Sheet).
- 12.12.9 Calculate Total Accumulative Leakage on Enclosure 13.1 (Data Sheet).
- 12.12.10 Document primary to secondary leakage on Enclosure 13.1 (Data Sheet).
- 12.12.11 Determine PZR steam leak rate to PRT on Enclosure 13.1 (Data Sheet).
- 12.12.12 **IF** a value was inserted for OAC Point C1P0203 (Average NCDT Level) in Step 12.12.1.1, restore that point to processing.
- **NOTE:** The calculation will stop after 180 minutes. It is <u>NOT</u> necessary to abort the calculation in the following step.
 - 12.12.13 Exit the NC System Leakage Calculations program.
- 12.13 **IF** the OAC is partially or wholly unavailable **OR** Unit 1 is **NOT** at or near normal operating temperature and pressure (i.e. Tavg $\leq 550^{\circ}$ F and W/R pressure ≤ 2200 psig), perform Enclosure 13.3 (Manual Leakage Calculation).
- 12.14 Return the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the position recorded in Step 12.9.1.

PT/**1**/A/4150/001 D Page 15 of 17

12.15 Realign the NCDT as follows:

- 12.15.1 Ensure 1WL-807B (NCDT Pumps Disch Cont Isol) is open.
 - _ 12.15.2 Ensure 1WL-805A (NCDT Pump Disch Cont Isol) is open.
- **NOTE:** If unable to reduce NCDT level in the following step, the in-service NB evaporator feed filter may need to be swapped / replaced due to high DP. (NCR 01515934)
 - 12.15.3 **IF** NCDT level is greater than setpoint, perform the following:
 - 12.15.3.1 Throttle open "NCDT LVL CTRL" to slowly reduce level.
 - 12.15.3.2 <u>WHEN</u> NCDT level is at the desired value, close "NCDT LVL CTRL".
 - _____ 12.15.4 Place "NCDT LVL CTRL" in "AUTO".
 - 12.15.5 Ensure "NCDT LVL CTRL" is set for 50%.
 - 12.15.6 **IF** 1WL-807B (NCDT Pumps Disch Cont Isol) is being maintained closed per OP/1/A/6500/014 (Operations Controlled Liquid Waste Systems), close 1WL-807B (NCDT Pumps Disch Cont Isol).
- NOTE: NM automation flow, as documented in Step 12.10, is classified as Non-RCPB (Reactor Coolant Pressure Boundary) leakage per WCAP-16423-NP (Reference 2.6). NM sample flow is manually routed and shall <u>NOT</u> count as Identified Leakage. The NM sample flow shall still be included in Total Leakage. (PIP M-12-5474).
 - The Net Identified Leakage rate will be entered in the Control Room log Leakage Data stamp and the OAC Manual Value Update. It is <u>NOT</u> used for determining Total Accumulative Leakage for the purpose of verifying SSF capabilities in Enclosure 13.1 (Data Sheet) or 13.3.2 (Manual Calculation).
 - 12.16 Calculate Net Identified Leakage rate:

| gpm - | gpm = | gpm |
|---|---------------------------------|------------------------|
| Identified Leakage Best (Step 12.12.5.2) | NM automation flow (Step 12.10) | Net Identified Leakage |
| or Identified Leakage in Enclosure 13.3.2 | | |
| (Manual Calculation) | | |

- 12.17 Enter the NCS Leakage Calculation Data into the following:
 - 12.17.1 The Control Room log using Unit 1 NCS Leakage Data stamp as follows:
 - 12.17.1.1 Enter "Net Identified Leakage" calculated in Step 12.16 as the Identified Leakage Rate.
 - 12.17.1.2 Record the remaining data required in the stamp as presented on printout or as calculated by Enclosure 13.3 (Manual Leakage Calculation).
- 12.17.2 **IF** the "Plant stability **CANNOT** be maintained" option was used in Step 12.12.4, ensure this is noted in the Control Room log entry.
- 12.17.3 **IF** a manual calculation was performed per Enclosure 13.3 (Manual Leakage Calculation), ensure this is noted in the Control Room log entry.
- _____ 12.17.4 OAC Manual Value Update NCLEAK (NC System Leakage Calc) program as follows:
 - _____ 12.17.4.1 Enter "Net Identified Leakage" calculated in Step 12.16 as the Identified Leakage Rate.
 - 12.17.4.2 Record the remaining data required as presented on printout or as calculated by Enclosure 13.3 (Manual Leakage Calculation).
- 12.18 Evaluate the acceptance criteria by performing one of the following:
- _____ 12.18.1 Verify the acceptance criteria specified in Section 11 is met. OR
- 12.18.2 **IF** the acceptance criteria is **NOT** met, perform the following:
 - \Box Notify the Unit/WCC SRO that the acceptance criteria is <u>NOT</u> met.

Unit/WCC SRO Contacted

__/ ____ Time

Date

- □ Initiate a CR to document the test failure.
- Document all issues on an Equipment Problem Evaluation Form.
- ^{SRO} 12.19 **IF** in Mode 1, 2, 3 or Pre-Mode 3 <u>AND</u> Total Accumulative Leakage > 20 gpm, then declare the Standby Makeup Pump non-functional per SLC16.7-9.
- 12.20 Inform Primary Chemistry that the NC System leakage calculation is complete. Chemistry contact

PT/**1**/A/4150/001 D Page 17 of 17

- 12.21 **IF** the leakage calculation was performed by the OAC <u>AND</u> Unit 1 is in Modes 1 through 4, evaluate Unidentified Leakage results per Enclosure 13.2 (Evaluation of NCS Unidentified Leakage Results).
- 12.22 **IF** any discrepancy is noted during the performance of this test that does **NOT** keep the test from meeting the acceptance criteria, it shall be given to the Unit/WCC SRO for evaluation via an Equipment Problem Evaluation Form.

13. Enclosures

- 13.1 Data Sheet
- 13.2 Evaluation of NCS Unidentified Leakage Results
 - 13.2.1 Auxiliary Building Potential Leak Sources
- 13.3 Manual Leakage Calculation
 - 13.3.1 Manual Leakage Data
 - 13.3.2 Manual Calculation
 - 13.3.3 NCDT Level Conversion
 - 13.3.4 PRT Level Conversion

Manual Leakage Calculation

1. Procedure

- 1.1 Verify the following valves are closed:
 - □ 1NC-56B (RMW Pump Disch Cont Isol)
 - □ 1NV-181A (B/A Blender Otlt To VCT)
 - □ 1NV-186A (B/A Blender Otlt To VCT Outlet)
 - □ 1NV-236B (Boric Acid To NV Pumps Suct)
 - □ 1NV-252A (NV Pumps Suct From FWST)
 - □ 1NV-253B (NV Pumps Suct From FWST)
 - □ 1NI-9A (NV Pump C/L Inj Isol)
 - □ 1NI-10B (NV Pump C/L Inj Isol)
- 1.2 Record "Initial Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available).

NOTE: Calculation accuracy improves as the time between initial and final data increases.

- 1.3 Wait at least 60 minutes prior to obtaining final data.
- 1.4 Record "Final Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available).
- 1.5 Using data from Enclosure 13.3.1 (Manual Leakage Data), calculate change in T-Avg:

NC Average temp initial NC Average temp final

- **NOTE:** Procedure may continue while performing the following step.
 - If change in T-Avg is greater than 0.25°F (0.1°F if using OAC), calculation is invalid and must be repeated.

°F

- 1.6 **IF** change in T-Avg is less than or equal to 0.25°F (0.1°F if using OAC), perform all calculations on Enclosure 13.3.2 (Manual Calculation).
- 1.7 Return to Step 12.14.

- **NOTE:** If available, OAC points can be used.
 - Where applicable, the same instrument channel (meter) shall be used for obtaining the initial and final data.
 - When using OAC Point indication for NCDT and PRT level changes, minor instrument fluctuations that result in a indicated level decrease may be treated as zero level change.

| Parameter | Units | Instrument / OAC Point | Initial Data | Final Data | |
|------------------------|-------|------------------------|--------------|------------|--|
| | | Used | (Step 1.2) | (Step 1.4) | |
| NC Average Temperature | °F | | | | |
| VCT Level | % | | | | |
| PZR Level | % | | | | |
| NCDT Level | % | | | | |
| PRT Level | % | | | | |

Record time Initial Data obtained _____

Record time Final Data obtained _____

Elapsed time _____ minutes

<u>VCT</u>

| VCT Leakage Rate | = | [Initial Level (%) - Final Level (%)] x 19.1 gal/% Elapsed time | | | | |
|------------------|---|--|--|--|--|--|
| | = | [() - ()] x 19.1 gal/% () min | | | | |
| | = | gal/min | | | | |
| <u>PZR</u> | | | | | | |
| PZR Leakage Rate | = | [Initial Level (%) - Final Level (%)] x (124.7 Gal/%) x (0.5983 ^a) Elapsed time | | | | |
| | = | [() - ()] x (124.7 Gal/%) x (0.5983) () min | | | | |
| | = | gal/min | | | | |
| Total Leakage | = | (VCT Leakage Rate) + (Pzr Leakage Rate) | | | | |
| | = | ()+() | | | | |
| | = | gpm | | | | |

 $^{^{\}rm a}$ This is the density ratio to normalize leakage at PZR conditions to leakage at 100 $^{\circ}{\rm F}$

PT/**1**/A/4150/001 D Page 2 of 4

Manual Calculation

| NCDT |
|------|
|------|

| Initial NCDT Volume | % | ó = | Gal (OAC point C1P5079 (U1 NCDT Volume) or Enclosure 13.3.3 (NCDT Level Conversion)) |
|-----------------------------|---|-----|---|
| Final NCDT Volume | % | = | Gal (OAC point C1P5079 (U1 NCDT Volume) or Enclosure 13.3.3 (NCDT Level Conversion)) |
| NCDT Leakage Rate | | = | <u>Final Volume (Gal) - Initial Volume (Gal)</u> Elapsed time |
| | | = | () - () () min |
| | | = | gpm |
| <u>PRT</u> | | | |
| Initial PRT Volume | % | = | Gal (OAC point C1P5078 (U1 PRT Volume) or Enclosure 13.3.4 (PRT Level Conversion)) |
| Final PRT Volume | % | = | Gal (OAC point C1P5078 (U1 PRT Volume) or Enclosure 13.3.4 (PRT Level Conversion)) |
| PRT Leakage Rate | | = | <u>Final Volume (Gal) - Initial Volume (Gal)</u> Elapsed time |
| | | = | () - () () min |
| | | = | gpm |
| Background Leakage | = | Ar | ny quantified/measured leakage |
| | = | | gpm |
| Identified Leakage | = | N | CDT Leakage Rate + PRT Leakage Rate + Background Leakage |
| | = | | gpm + gpm + gpm |
| | = | | gpm |
| <u>Unidentified Leakage</u> | = | To | otal Leakage - Identified Leakage |
| | = | | gpm gpm |
| | = | | gpm ^b |

^b This value is an acceptance criteria of this procedure.

Manual Calculation

PT/**1**/A/4150/001 D Page 3 of 4

Total NC Pump Seal Leakoff

- 1A NC Pump #1 Seal Leakoff = _____ gpm
- 1B NC Pump #1 Seal Leakoff = _____ gpm
- 1C NC Pump #1 Seal Leakoff = _____ gpm
- 1D NC Pump #1 Seal Leakoff = _____ gpm
- Total NC Pump Seal Leakoff: _____ gpm

<u>Total Accumulative Leakage</u> = Sum of Identified Leakage, Unidentified, and NC Pumps #1 Seal Leakoffs

Identified Leakage _____ gpm

Unidentified Leakage _____ gpm

Total NC Pump Seal Leakoff _____ gpm

IF any Identified or Unidentified value is negative, enter "0" below in its applicable space.

Identified + Unidentified + Total NC Pump Seal Leakoff = Total Accumulative Leakage

_____+ _____+ _____= _____

Verify Total Accumulative Leakage:

 $\Box \leq 20 \text{ gpm } \{ \text{PIP C-99-0606} \}$

OR

 \square > 20 gpm, refer to Step 12.19.

| Performed By | Date: | _Time: |
|--------------|-----------|--------|
| Verified By | Date: | _Time: |

Manual Calculation

Primary to Secondary Leakage as determined by one of the following:

<u>IF</u> in Mode 1 <u>AND</u> 1EMF-33 is functional^c <u>AND</u> the OAC is available, record the reading of OAC Point C1P0189 (Pri To Sec Leakrate 15 Min Running Avg). <u>gpd</u>

OR

IF in Mode 1 **<u>AND</u>** the OAC is <u>**NOT**</u> available <u>**AND**</u> Unit 1 is $\ge 40\%$ RTP, record the readings from the N-16 Leakage Monitors:

- 1EMF-71 _____ gpd
- 1EMF-72 _____ gpd
- 1EMF-73 _____ gpd
- 1EMF-74 _____ gpd

OR

<u>IF</u> in Mode 1 <u>AND</u> 1EMF-33 is non-functional^c <u>AND</u> Unit 1 is \ge 40% RTP, record the readings from the N-16 Leakage Monitors:

- 1EMF-71 _____ gpd
- 1EMF-72 _____ gpd
- 1EMF-73 _____ gpd
- 1EMF-74 _____ gpd

OR

<u>IF</u> in Mode 1 <u>AND</u> 1EMF-33 is non-functional^c <u>AND</u> Unit 1 is < 40% RTP, record the primary to secondary leak rate as determined by Chemistry. <u>gpd</u>

OR

<u>IF</u> in Mode 2, 3, 4 or Pre-Mode 4, record the primary to secondary leak rate value as determined by Chemistry. _____ gpd

^c For the purposes of this procedure, OAC Point C1P0189 (Pri To Sec Leakrate 15 Minute Running Avg) must be functional for 1EMF-33 to be considered functional.

PT/**1**/A/4150/001 D Page 1 of 1

NCDT Level Conversion

| % | Gal | % | Gal | % | Gal | % | Gal | % | Gal |
|----|--------|----|---------|----|---------|----|---------|-----|---------|
| 1 | 19.897 | 21 | 74.240 | 41 | 143.787 | 61 | 218.067 | 81 | 286.505 |
| 2 | 22.085 | 22 | 77.410 | 42 | 147.478 | 62 | 221.721 | 82 | 289.571 |
| 3 | 24.343 | 23 | 80.613 | 43 | 151.178 | 63 | 225.360 | 83 | 292.600 |
| 4 | 26.669 | 24 | 83.871 | 44 | 154.888 | 64 | 228.983 | 84 | 295.590 |
| 5 | 29.058 | 25 | 87.176 | 45 | 158.604 | 65 | 232.587 | 85 | 298.539 |
| 6 | 31.509 | 26 | 90.517 | 46 | 162.327 | 66 | 236.173 | 86 | 301.447 |
| 7 | 34.019 | 27 | 93.894 | 47 | 166.055 | 67 | 239.738 | 87 | 304.312 |
| 8 | 36.585 | 28 | 97.304 | 48 | 169.786 | 68 | 243.281 | 88 | 307.131 |
| 9 | 39.206 | 29 | 100.743 | 49 | 173.519 | 69 | 246.801 | 89 | 309.904 |
| 10 | 41.880 | 30 | 104.212 | 50 | 177.254 | 70 | 250.296 | 90 | 312.628 |
| 11 | 44.604 | 31 | 107.706 | 51 | 180.989 | 71 | 253.765 | 91 | 315.302 |
| 12 | 47.376 | 32 | 111.226 | 52 | 184.722 | 72 | 257.204 | 92 | 317.923 |
| 13 | 50.196 | 33 | 114.770 | 53 | 188.453 | 73 | 260.614 | 93 | 320.489 |
| 14 | 53.060 | 34 | 118.335 | 54 | 192.181 | 74 | 263.990 | 94 | 322.999 |
| 15 | 55.968 | 35 | 121.921 | 55 | 195.904 | 75 | 267.332 | 95 | 325.450 |
| 16 | 58.918 | 36 | 125.525 | 56 | 199.620 | 76 | 270.636 | 96 | 327.839 |
| 17 | 61.908 | 37 | 129.148 | 57 | 203.329 | 77 | 273.894 | 97 | 330.164 |
| 18 | 64.937 | 38 | 132.787 | 58 | 207.030 | 78 | 277.098 | 98 | 332.423 |
| 19 | 68.003 | 39 | 136.440 | 59 | 210.720 | 79 | 280.267 | 99 | 334.611 |
| 20 | 71.104 | 40 | 140.108 | 60 | 214.400 | 80 | 283.403 | 100 | 336.726 |
Enclosure 13.3.4

PT/**1**/A/4150/001 D Page 1 of 1

PRT Level Conversion

| % | Gal | % | Gal | % | Gal | % | Gal | % | Gal |
|----|---------|----|---------|----|---------|----|---------|-----|---------|
| 1 | 383.572 | 21 | 2476.15 | 41 | 5302.48 | 61 | 8328.88 | 81 | 11109.4 |
| 2 | 458.035 | 22 | 2605.43 | 42 | 5452.77 | 62 | 8477.55 | 82 | 11233.2 |
| 3 | 536.720 | 23 | 2736.38 | 43 | 5603.50 | 63 | 8625.56 | 83 | 11355.0 |
| 4 | 619.374 | 24 | 2868.93 | 44 | 5754.61 | 64 | 8772.86 | 84 | 11474.8 |
| 5 | 705.776 | 25 | 3003.00 | 45 | 5906.04 | 65 | 8919.40 | 85 | 11592.4 |
| 6 | 795.729 | 26 | 3138.52 | 46 | 6057.74 | 66 | 9065.10 | 86 | 11707.7 |
| 7 | 889.054 | 27 | 3275.43 | 47 | 6209.65 | 67 | 9209.92 | 87 | 11820.7 |
| 8 | 985.589 | 28 | 3413.66 | 48 | 6361.73 | 68 | 9353.79 | 88 | 11931.3 |
| 9 | 1085.19 | 29 | 3553.15 | 49 | 6513.91 | 69 | 9496.66 | 89 | 12039.3 |
| 10 | 1187.70 | 30 | 3693.82 | 50 | 6666.17 | 70 | 9638.47 | 90 | 12144.6 |
| 11 | 1293.02 | 31 | 3835.63 | 51 | 6818.38 | 71 | 9779.14 | 91 | 12247.1 |
| 12 | 1401.00 | 32 | 3978.50 | 52 | 6970.56 | 72 | 9918.63 | 92 | 12346.7 |
| 13 | 1511.55 | 33 | 4122.37 | 53 | 7122.64 | 73 | 10056.9 | 93 | 12443.2 |
| 14 | 1624.54 | 34 | 4267.19 | 54 | 7274.55 | 74 | 10193.8 | 94 | 12536.6 |
| 15 | 1739.89 | 35 | 4412.89 | 55 | 7426.25 | 75 | 10329.3 | 95 | 12626.5 |
| 16 | 1857.49 | 36 | 4559.43 | 56 | 7577.68 | 76 | 10463.4 | 96 | 12712.9 |
| 17 | 1977.25 | 37 | 4706.73 | 57 | 7728.79 | 77 | 10595.9 | 97 | 12795.6 |
| 18 | 2099.08 | 38 | 4854.74 | 58 | 7879.51 | 78 | 10726.9 | 98 | 12874.3 |
| 19 | 2222.89 | 39 | 5003.40 | 59 | 8029.81 | 79 | 10856.1 | 99 | 12948.7 |
| 20 | 2348.61 | 40 | 5152.67 | 60 | 8179.92 | 80 | 10983.7 | 100 | 13018.7 |

JPM A.1-1S

SRO

NOTE This JPM is to be administered on the same day as RO JPM A.1-1R

EVALUATION SHEET

| Task: Perform | m a Manual NC Syst | em Leakage Calculation | | | | |
|---|---|---------------------------------------|---|---|--|--|
| Alternate Path: | N/A | | | | | |
| Facility JPM #: | NC-094 Modified | | | | | |
| Safety Function: | N/A | | | | | |
| <u>К/А</u> G 2.1.7 | <u>K/A</u> G 2.1.7 Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation. | | | | | |
| Importance: | 4.4 / 4.7 <u>CFR</u> | <u>.</u> 41.5 / 43.5 / 45.12 / 45.13 | 3 | | | |
| Preferred Evaluat | ion Location: | Preferred Eval | Preferred Evaluation Method: | | | |
| Simulator | Classroom | X Perform | X Sim | ulate | | |
| <u>References</u> : | PT/1/A/4150/001 | D (NC System Leakage Calc | ulation) rev 86 | | | |
| Task Standard:A manual NC System Leakage Calculation is performed per PT/1/A/415 D (NC System Leakage Calculation) and the following results reported: Unidentified Leakage 8.628 – 8.828 gpm, Identified Leakage 2.272 – 2.3 gpm, Total Accumulated Leakage 21.664 – 21.91 gpm. Determines tha 3.4.13 Condition A and SLC 16.7-9 Condition B are applicable. | | | | T/1/A/4150/001 eported: .272 – 2.372 nines that T.S. | | |
| | | | | | | |
| Validation Time: | 30 minutes | Time Critical: | Yes | NoX | | |
| Validation Time: Applicant: NAME | 30 minutes | <u>Time Critical:</u> Docket # | Yes Time Stat | NoX t:sh: | | |
| Validation Time: Applicant: NAME Performance Rati | 30 minutes | <u>Time Critical:</u> | Yes Time Sta Time Fini Performa | No t: sh: nce Time | | |
| Validation Time: Applicant: NAME Performance Ration SAT UNSAT | 30 minutes | <u>Time Critical:</u> | Yes Time Star Time Fini Performa | NoX | | |
| Validation Time: Applicant: NAME Performance Rati SAT UNSAT Examiner: | 30 minutes | <u>Time Critical:</u> Docket # | Yes Time Star Time Fini Performa | NoX | | |
| Validation Time: Applicant: NAME Performance Rati SAT UNSAT Examiner: | 30 minutes | Time Critical: Docket # | Yes Time Stat Time Fini Performa | NoX | | |
| Validation Time: Applicant: NAME Performance Rati SAT UNSAT Examiner: | 30 minutes | Time Critical: Docket # | Yes Time Stat Time Fini Performa | NoX | | |
| Validation Time: Applicant: NAME Performance Rati SAT UNSAT Examiner: | 30 minutes | Time Critical: Docket # | Time Star Time Star Time Fini Performa | NoX | | |
| Validation Time: Applicant: NAME Performance Rati SAT UNSAT Examiner: | 30 minutes | Time Critical: Docket #SIO | Time Star Time Star Time Fini Performa | NoX | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is in Mode 1 at 100% power.
- The OAC is out of service due to emergent system failures and will not be returned to service for 24 hours.
- Other operators are performing PT/1/A/4600/009 (Loss of Operator Aid Computer) and OP/1/A/6700/003 (Operation With the Operator Aid Computer Out of Service).

INITIATING CUES:

- The CRS directs you to perform an NC System Leakage Calculation per PT/1/A/4150/001 D (NC System Leakage Calculation).
- Steps are complete through 12.12.
- You are to perform step 12.13.
- The Open Item Summary has been updated. The background leakage is .072 gpm (Orbisphere flow reported by Primary Chemistry).
- Using the attached Data Sheet and PT/1/A/4150/001 D, calculate and report the following information back to the CRS:

| Identified Leakage | gpm |
|---------------------------|-----|
| Unidentified Leakage | gpm |
| Total Accumulated Leakage | gpm |

List all applicable Tech Specs and/or SLCs (if any), including Required Actions. Also state the reason (if any LCO is not met):

EXAMINER NOTE: Each applicant should receive a copy of attached Data Sheets and a copy of PT/1/A/4150/001 D (Rev 86) body signed off through step 12.12 and Enclosure 13.3.

START TIME: _____

| STEP / STANDARD | SAT / UNSAT |
|---|----------------|
| STEP 1 12.13 IF the OAC is partially or wholly unavailable OR Unit 1 is NOT at or near normal operating temperature and pressure (i.e. Tavg ≤ 550°F and W/R pressure ≤ 2200 psig), perform Enclosure 13.3 (Manual Leakage Calculation). STANDARD: | SAT |
| Applicant determines that this step is applicable and goes to Enclosure 13.3 for a manual leakage calculation. | UNSAT |

| <u>STEP 2</u> Enclosure 13.3 step 1.1 Verify the following valves are closed: | |
|--|-------|
| 1NC-56B (RMW Pump Disch Cont Isol) 1NV-181A (B/A Blender Otlt to VCT) 1NV-186A (B/A Blender Otlt to VCT Outlet) 1NV-236B (Boric Acid to NV Pumps Suct) 1NV-252A (NV Pumps Suct From FWST) 1NV-253B (NV Pumps Suct From FWST) 1NI-9A (NV Pump C/L Inj Isol) 1NI-10B (NV Pump C/L Inj Isol) | SAT |
| STANDARD: | UNSAT |
| Applicant determines from the data sheet provided that all of the listed valves are closed. | |
| COMMENTS: | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|--|----------------|
| STEP 3 1.2 Record "Initial Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available). | |
| STANDARD: | SAT |
| Applicant records initial data on Enclosure 13.3.1 using the provided data sheet. | |
| COMMENTS: | UNSAT |
| | |
| NOTE: Calculation accuracy improves as the time between initial and final da | ata increases. |
| STEP 4 1.3 Wait at least 60 minutes prior to obtaining final data. | |
| STANDARD: | SAT |
| Applicant is given data for 64 minutes after initial data. | |
| COMMENTS: | UNSAT |

| STEP5 1.4 Record "Final Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available). | |
|---|-------|
| STANDARD: | SAT |
| Applicant records final data on Enclosure 13.3.1 using the provided data sheet. | |
| COMMENTS: | UNSAT |
| | |

| STEP / STANDARD | SAT / UNSAT |
|---|----------------|
| STEP 6 1.5 Using data from Enclosure 13.3.1 (Manual Leakage Data), calculate change in T-Avg: | |
| <u>584.7</u> - <u>584.5</u> = <u>0.2</u> °F NC Average temp initial NC Average temp final | 0.17 |
| STANDARD: | SAT |
| Applicant calculates change in T-Avg to be .2°F . | UNSAT |
| COMMENTS: | |
| | |

NOTE:

- Procedure may continue while performing the following step.
- If change in T-Avg is greater than 0.25°F (0.1°F if using OAC), calculation is invalid and must be repeated.

| <u>STEP 7</u> | 1.6 | IF change in T-Avg is less than or equal to 0.25°F (0.1°F if using OAC), perform all calculations on Enclosure 13.3.2 (Manual Calculation). | | |
|-----------------------|-------------|--|-----|--|
| <u>STANDAF</u> | <u>RD</u> : | | SAT | |
| Applicant calculation | UNSAT | | | |
| COMMENTS: | | | | |
| | | | | |

| STEP / STANDARD | SAT / UNSAT | | | |
|---|------------------|--|--|--|
| STEP 8 Enclosure 13.3.2 (Manual Calculation) STANDARD: Applicant performs the required calculations and comes up with the | CRITICAL STEP | | | |
| following results: VCT Leakage Rate = 11.042 gpm (Allowable range 11.0 – 11.1 gpm) PZR Leakage Rate = 0 gpm Total Leakage = 11.042 gpm (Allowable range 11.0 – 11.1 gpm) NCDT Leakage Rate = 0 gpm PRT Leakage Rate = 2.216 gpm (Allowable range 2.2 – 2.3 gpm) Identified Leakage = 2.288 gpm (Allowable range 2.272 – 2.372 gpm) Unidentified Leakage = 8.754 gpm (Allowable range 8.628 – 8.828 gpm) Total Accumulated Leakage = 21.752 gpm (Allowable range 21.6 – 21.91 gpm) | SAT UNSAT | | | |
| These steps are critical to ensure accurate leakage values will be used to determine compliance with Technical Specifications/Selected License Commitments for NC system leakage. | | | | |
| <u>COMMENTS:</u> | | | | |

| STEP / STANDARD | SAT / UNSAT |
|---|------------------|
| STEP 9 Determine applicable Tech Specs/SLCs. | |
| STANDARD: | CRITICAL STEP |
| Tech Spec 3.4.13 Condition A | |
| SEC 10.7-9 Conditions A & B | |
| Applicant determines that T.S. LCO 3.4.13 is not met due to unidentified leakage > 1 gpm and that Condition A needs to be entered. | |
| Due to total accumulated leakage being > 20 gpm, SLC 16.7-9 Condition B should also be entered. This action will direct immediate entry into Condition A. | |
| Although total primary to secondary leakage is > 150 gpd, no single S/G exceeds the requirements of LCO 3.4.13. Therefore T.S. 3.4.13 Condition B and/or T.S. 3.4.18 Condition B should NOT be entered. | SAT UNSAT |
| This step is critical to meet the task and standard of this JPM. | |
| COMMENTS: | |
| | |
| END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is in Mode 1 at 100% power.
- The OAC is out of service due to emergent system failures and will not be returned to service for 24 hours.
- Other operators are performing PT/1/A/4600/009 (Loss of Operator Aid Computer) and OP/1/A/6700/003 (Operation With the Operator Aid Computer Out of Service).

INITIATING CUES:

- The CRS directs you to perform an NC System Leakage Calculation per PT/1/A/4150/001 D (NC System Leakage Calculation).
- Steps are complete through 12.12.
- You are to perform step 12.13.
- The Open Item Summary has been updated. The background leakage is .072 gpm (Orbisphere flow reported by Primary Chemistry).
- Using the attached Data Sheet and PT/1/A/4150/001 D, calculate and report the following information back to the CRS:

| Identified Leakage | gpm |
|---------------------------|-----|
| Unidentified Leakage | gpm |
| Total Accumulated Leakage | gpm |

List all applicable Tech Specs and/or SLCs (if any), including Required Actions. Also state the reason (if any LCO is not met):

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DATA SHEET

The following valves are closed:

- 1NC-56B (RMW Pump Disch Cont Isol)
- 1NV-181A (B/A Blender Otlt to VCT)
- 1NV-186A (B/A Blender Otlt to VCT Outlet)
- 1NV-236B (Boric Acid to NV Pumps Suct)
- 1NV-252A (NV Pumps Suct From FWST)
- 1NV-253B (NV Pumps Suct From FWST)
- 1NI-9A (NV Pump C/L Inj Isol)
- 1NI-10B (NV Pump C/L Inj Isol)

| Parameter | Instrument | 2000 hours Data | 2104 hours Data | |
|---------------|------------|-----------------|-----------------|--|
| NC Avg. Temp. | 1NCCR5421 | 584.7 °F | 584.5 °F | |
| VCT Level | 1NVP5761 | 66% | 29% | |
| PZR Level | 1NCP5164 | 55% | 55% | |
| NCDT Level | 1WLP5630 | 50% | 50% | |
| PRT Level | 1NCP5131 | 69% | 70% | |

| 1A NC Pump #1 Seal Leakoff Flow | 2.46 GPM |
|---------------------------------|----------|
| 1B NC Pump #1 Seal Leakoff Flow | 2.77 GPM |
| 1C NC Pump #1 Seal Leakoff Flow | 2.60 GPM |
| 1D NC Pump #1 Seal Leakoff Flow | 2.88 GPM |

| 1EMF-71 Leakage | 1 GPD |
|-----------------|--------|
| 1EMF-72 Leakage | 84 GPD |
| 1EMF-73 Leakage | 77 GPD |
| 1EMF-74 Leakage | 1 GPD |

Background leakage: .072 gpm (Orbisphere flow)

KEY

| Duke Energy Catawba Nuclear Station | Procedure No. PT/ 1 /A/4150/001 D Revision No. | | |
|--|---|--|--|
| NC System Leakage Calculation | 086 | | |
| Continuous Use | Electronic Reference No. CN005FZZ | | |





PT/**1**/A/4150/001 D Page 14 of 17

- □ N. <u>WHEN</u> the current background leakage has been determined and documented <u>OR</u> the source of inleakage has been isolated, start a new PT/1/A/4150/001 D (NC System Leakage Calculation).
- \Box O. N/A the remaining steps of this procedure.
- 12.12.7 Record the individual NC Pump seal leakoff flows:
 - NC Pump 1A: _____ gpm
 - NC Pump 1B: _____ gpm
 - NC Pump 1C: _____ gpm
 - NC Pump 1D :_____ gpm
 - Total NC Pump seal leakoff: _____ gpm
- 12.12.8 Record total NC Pump seal leakoff on Enclosure 13.1 (Data Sheet).
- 12.12.9 Calculate Total Accumulative Leakage on Enclosure 13.1 (Data Sheet).
- 12.12.10 Document primary to secondary leakage on Enclosure 13.1 (Data Sheet).
- 12.12.11 Determine PZR steam leak rate to PRT on Enclosure 13.1 (Data Sheet).
- 12.12.12 **IF** a value was inserted for OAC Point C1P0203 (Average NCDT Level) in Step 12.12.1.1, restore that point to processing.
- **NOTE:** The calculation will stop after 180 minutes. It is <u>NOT</u> necessary to abort the calculation in the following step.
 - _ 12.12.13 Exit the NC System Leakage Calculations program.

12.13 **<u>IF</u>** the OAC is partially or wholly unavailable <u>**OR**</u> Unit 1 is <u>**NOT**</u> at or near normal operating temperature and pressure (i.e. Tavg \leq 550°F and W/R pressure \leq 2200 psig), perform Enclosure 13.3 (Manual Leakage Calculation).

____ 12.14 Return the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the position recorded in Step 12.9.1.



12.15 Realign the NCDT as follows:

- 12.15.1 Ensure 1WL-807B (NCDT Pumps Disch Cont Isol) is open.
 - _ 12.15.2 Ensure 1WL-805A (NCDT Pump Disch Cont Isol) is open.
- **NOTE:** If unable to reduce NCDT level in the following step, the in-service NB evaporator feed filter may need to be swapped / replaced due to high DP. (NCR 01515934)
 - 12.15.3 **IF** NCDT level is greater than setpoint, perform the following:
 - 12.15.3.1 Throttle open "NCDT LVL CTRL" to slowly reduce level.
 - 12.15.3.2 <u>WHEN</u> NCDT level is at the desired value, close "NCDT LVL CTRL".
 - _____ 12.15.4 Place "NCDT LVL CTRL" in "AUTO".
 - 12.15.5 Ensure "NCDT LVL CTRL" is set for 50%.
 - 12.15.6 **IF** 1WL-807B (NCDT Pumps Disch Cont Isol) is being maintained closed per OP/1/A/6500/014 (Operations Controlled Liquid Waste Systems), close 1WL-807B (NCDT Pumps Disch Cont Isol).
- NOTE: NM automation flow, as documented in Step 12.10, is classified as Non-RCPB (Reactor Coolant Pressure Boundary) leakage per WCAP-16423-NP (Reference 2.6). NM sample flow is manually routed and shall <u>NOT</u> count as Identified Leakage. The NM sample flow shall still be included in Total Leakage. (PIP M-12-5474).
 - The Net Identified Leakage rate will be entered in the Control Room log Leakage Data stamp and the OAC Manual Value Update. It is <u>NOT</u> used for determining Total Accumulative Leakage for the purpose of verifying SSF capabilities in Enclosure 13.1 (Data Sheet) or 13.3.2 (Manual Calculation).
 - 12.16 Calculate Net Identified Leakage rate:



KFY



Manual Leakage Calculation

PT/**1**/A/4150/001 D Page 1 of 1

| 1 | l. Pro | cedure | | | | | | | |
|---|--------------|--|--|--|--|--|--|--|--|
| | / 1.1 | Verify the following valves are closed: | | | | | | | |
| | | ☑ 1NC-56B (RMW Pump Disch Cont Isol) ☑ 1NV-181A (B/A Blender Otlt To VCT) ☑ 1NV-186A (B/A Blender Otlt To VCT Outlet) ☑ 1NV-236B (Boric Acid To NV Pumps Suct) ☑ 1NV-252A (NV Pumps Suct From FWST) ☑ 1NV-253B (NV Pumps Suct From FWST) ☑ 1NI-9A (NV Pump C/L Inj Isol) ☑ 1NI-10B (NV Pump C/L Inj Isol) | | | | | | | |
| | / 1.2 | Record "Initial Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available). | | | | | | | |
| I | NOTE: | Calculation accuracy improves as the time between initial and final data increases. | | | | | | | |
| ~ | 1.3 | Wait at least 60 minutes prior to obtaining final data. | | | | | | | |
| ~ | <u>/</u> 1.4 | Record "Final Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available). | | | | | | | |
| ~ | 1.5 | Using data from Enclosure 13.3.1 (Manual Leakage Data), calculate change in T-Avg: | | | | | | | |
| | | $\frac{584.7}{\text{NC Average temp initial}} - \frac{584.5}{\text{NC Average temp final}} = \frac{0.2}{\text{C}} \text{°F}$ | | | | | | | |
| I | NOTE: | • Procedure may continue while performing the following step. | | | | | | | |
| | | • If change in T-Avg is greater than 0.25°F (0.1°F if using OAC), calculation is invalid and must be repeated. | | | | | | | |
| | 1.6 | <u>IF</u> change in T-Avg is less than or equal to 0.25°F (0.1°F if using OAC), perform all calculations on Enclosure 13.3.2 (Manual Calculation). | | | | | | | |
| | 1.7 | Return to Step 12.13. | | | | | | | |

KEY



Enclosure 13.3.1

Manual Leakage Data

PT/**1**/A/4150/001 D Page 1 of 1

- **NOTE:** If available, OAC points can be used.
 - Where applicable, the same instrument channel (meter) shall be used for obtaining the initial and final data.
 - When using OAC Point indication for NCDT and PRT level changes, minor instrument fluctuations that result in a indicated level decrease may be treated as zero level change.

| Parameter | Units | Instrument / OAC Point | Initial Data | Final Data |
|------------------------|-------|------------------------|--------------|------------|
| | | Used | (Step 1.2) | (Step 1.4) |
| NC Average Temperature | °F | 1NCCR5421 | 584.7 | 584.5 |
| VCT Level | % | 1NVP5761 | 66 | 29 |
| PZR Level | % | 1NCP5164 | 55 | 55 |
| NCDT Level | % | 1NCP5630 | 50 | 50 |
| PRT Level | % | 1NCP5131 | 69 | 70 |

Record time Initial Data obtained 2000

Record time Final Data obtained 2104

Elapsed time <u>64</u> minutes





Manual Calculation Pag

PT/**1**/A/4150/001 D Page 1 of 4

<u>VCT</u>

| VCT Leakage Rate = [Initial Level (%) - Final Level (%)] x 19.1 gal/% Elapsed time | | | | | | |
|---|---|--|--|--|--|--|
| | = | $\frac{[(66) - (29)] \times 19.1 \text{ gal}}{(64) \text{ min}}$ | | | | |
| | = | gal/min (Acceptable Range 11.0 - 11.1) | | | | |
| <u>PZR</u> | | | | | | |
| PZR Leakage Rate | = | [Initial Level (%) - Final Level (%)] x (124.7 Gal/%) x (0.5983 ^a) Elapsed time | | | | |
| | = | $\frac{[(55) - (55)] \times (124.7 \text{ Gal/\%}) \times (0.5983)}{(64) \min}$ | | | | |
| | = | gal/min | | | | |
| <u>Total Leakage</u> | = | (VCT Leakage Rate) + (Pzr Leakage Rate) | | | | |
| | = | (11.042)+(0) | | | | |
| | = | 11.042 gpm | | | | |
| | | (Acceptable Range 11.0 - 11.1) | | | | |

^a This is the density ratio to normalize leakage at PZR conditions to leakage at 100°F





Manual Calculation

PT/**1**/A/4150/001 D Page 2 of 4

<u>NCDT</u>

| Initial NCDT Volume <u>50</u> % | 6 = <u>177.254</u> Gal (OAC point C1P5079 (U1 NCDT Volume) or Enclosure 13.3.3 (NCDT Level Conversion)) |
|---------------------------------|--|
| Final NCDT Volume <u>50</u> % | = <u>177.254</u> Gal (OAC point C1P5079 (U1 NCDT Volume) or Enclosure 13.3.3 (NCDT Level Conversion)) |
| NCDT Leakage Rate | = <u>Final Volume (Gal) - Initial Volume (Gal)</u> Elapsed time |
| | = (177.254) - (177.254) (64) min |
| | = gpm |
| <u>PRT</u> | |
| Initial PRT Volume <u>69</u> % | = <u>9496.66</u> Gal (OAC point C1P5078 (U1 PRT Volume) or Enclosure 13.3.4 (PRT Level Conversion)) |
| Final PRT Volume <u>70</u> % | = <u>9638.47</u> Gal (OAC point C1P5078 (U1 PRT Volume) or Enclosure 13.3.4 (PRT Level Conversion)) |
| PRT Leakage Rate | = <u>Final Volume (Gal) - Initial Volume (Gal)</u> Elapsed time |
| | = (9638.47) - (9496.66) (64) min |
| | = <u>2.216</u> gpm (Acceptable Range 2.2 - 2.3) |
| Background Leakage = | Any quantified/measured leakage |
| = | gpm |
| Identified Leakage = | NCDT Leakage Rate + PRT Leakage Rate + Background Leakage |
| = | gpm +2.216 gpm +0.072 gpm |
| = | 2.288 gpm (Acceptable Range 2.272 - 2.372) |
| <u>Unidentified Leakage</u> = | Total Leakage - Identified Leakage |
| = | <u>11.042</u> gpm - <u>2.288</u> gpm |
| = | <u>8.754</u> gpm ^b |
| | (Acceptable Range 8.628 -8.828) |

^b This value is an acceptance criteria of this procedure.



Manual Calculation

PT/**1**/A/4150/001 D Page 3 of 4

Total NC Pump Seal Leakoff

- 1A NC Pump #1 Seal Leakoff = 2.46 gpm
- 1B NC Pump #1 Seal Leakoff = 2.77 gpm
- 1C NC Pump #1 Seal Leakoff = 2.60 gpm
- 1D NC Pump #1 Seal Leakoff = 2.88 gpm

Total NC Pump Seal Leakoff: <u>10.71</u> gpm

<u>Total Accumulative Leakage</u> = Sum of Identified Leakage, Unidentified, and NC Pumps #1 Seal Leakoffs

Identified Leakage <u>2.288</u> gpm

Unidentified Leakage <u>8.754</u> gpm

Total NC Pump Seal Leakoff _____ 10.71 gpm

<u>IF</u> any Identified or Unidentified value is negative, enter "0" below in its applicable space.

Identified + Unidentified + Total NC Pump Seal Leakoff = Total Accumulative Leakage

<u>2.288</u> + <u>8.754</u> + <u>10.71</u> = <u>21.752</u>

(Acceptable Range 21.664 - 21.91)

Verify Total Accumulative Leakage:

 $\Box \leq 20 \text{ gpm } \{\text{PIP C-99-0606}\}$

OR

 $\square > 20$ gpm, refer to Step 12.19.

| Performed By | Date: | Time: |
|--------------|-----------|-------|
| Verified By | Date: | Time: |



Manual Calculation

PT/**1**/A/4150/001 D Page 4 of 4

<u>Primary to Secondary Leakage</u> as determined by one of the following:

N/A <u>IF</u> in Mode 1 <u>AND</u> 1EMF-33 is functional^c <u>AND</u> the OAC is available, record the reading of OAC Point C1P0189 (Pri To Sec Leakrate 15 Min Running Avg). gpd

OR

- ✓ IF in Mode 1 AND the OAC is NOT available AND Unit 1 is \ge 40% RTP, record the readings from the N-16 Leakage Monitors:
 - 1EMF-71 ____ gpd
 - 1EMF-72 84 gpd
 - 1EMF-73 **77** gpd
 - 1EMF-74 _____ gpd

- N/A IF in Mode 1 AND 1EMF-33 is non-functional^c AND Unit 1 is \geq 40% RTP, record the readings from the N-16 Leakage Monitors:
 - 1EMF-71 _____ gpd
 - 1EMF-72 _____ gpd
 - 1EMF-73 _____ gpd
 - 1EMF-74 _____ gpd

OR

N/A IF in Mode 1 AND 1EMF-33 is non-functional^c AND Unit 1 is < 40% RTP, record the primary to secondary leak rate as determined by Chemistry. _____ gpd

OR

N/A IF in Mode 2, 3, 4 or Pre-Mode 4, record the primary to secondary leak rate value as determined by Chemistry. _____ gpd

OR

^c For the purposes of this procedure, OAC Point C1P0189 (Pri To Sec Leakrate 15 Minute Running Avg) must be functional for 1EMF-33 to be considered functional.

KEY Enclosure 13.3.3

PT/**1**/A/4150/001 D Page 1 of 1

NCDT Level Conversion

| % | Gal | % | Gal | % | Gal | % | Gal | % | Gal |
|----|--------|----|---------|----|---------|----|---------|-----|---------|
| 1 | 19.897 | 21 | 74.240 | 41 | 143.787 | 61 | 218.067 | 81 | 286.505 |
| 2 | 22.085 | 22 | 77.410 | 42 | 147.478 | 62 | 221.721 | 82 | 289.571 |
| 3 | 24.343 | 23 | 80.613 | 43 | 151.178 | 63 | 225.360 | 83 | 292.600 |
| 4 | 26.669 | 24 | 83.871 | 44 | 154.888 | 64 | 228.983 | 84 | 295.590 |
| 5 | 29.058 | 25 | 87.176 | 45 | 158.604 | 65 | 232.587 | 85 | 298.539 |
| 6 | 31.509 | 26 | 90.517 | 46 | 162.327 | 66 | 236.173 | 86 | 301.447 |
| 7 | 34.019 | 27 | 93.894 | 47 | 166.055 | 67 | 239.738 | 87 | 304.312 |
| 8 | 36.585 | 28 | 97.304 | 48 | 169.786 | 68 | 243.281 | 88 | 307.131 |
| 9 | 39.206 | 29 | 100.743 | 49 | 173.519 | 69 | 246.801 | 89 | 309.904 |
| 10 | 41.880 | 30 | 104.212 | 50 | 177.254 | 70 | 250.296 | 90 | 312.628 |
| 11 | 44.604 | 31 | 107.706 | 51 | 180.989 | 71 | 253.765 | 91 | 315.302 |
| 12 | 47.376 | 32 | 111.226 | 52 | 184.722 | 72 | 257.204 | 92 | 317.923 |
| 13 | 50.196 | 33 | 114.770 | 53 | 188.453 | 73 | 260.614 | 93 | 320.489 |
| 14 | 53.060 | 34 | 118.335 | 54 | 192.181 | 74 | 263.990 | 94 | 322.999 |
| 15 | 55.968 | 35 | 121.921 | 55 | 195.904 | 75 | 267.332 | 95 | 325.450 |
| 16 | 58.918 | 36 | 125.525 | 56 | 199.620 | 76 | 270.636 | 96 | 327.839 |
| 17 | 61.908 | 37 | 129.148 | 57 | 203.329 | 77 | 273.894 | 97 | 330.164 |
| 18 | 64.937 | 38 | 132.787 | 58 | 207.030 | 78 | 277.098 | 98 | 332.423 |
| 19 | 68.003 | 39 | 136.440 | 59 | 210.720 | 79 | 280.267 | 99 | 334.611 |
| 20 | 71.104 | 40 | 140.108 | 60 | 214.400 | 80 | 283.403 | 100 | 336.726 |



PT/**1**/A/4150/001 D Page 1 of 1

| PRT Level Conversion |
|----------------------|
|----------------------|

| % | Gal | % | Gal | % | Gal | % | Gal | % | Gal |
|----|---------|----|---------|----|---------|-----------------|----------------------|-----|---------|
| 1 | 383.572 | 21 | 2476.15 | 41 | 5302.48 | 61 | 8328.88 | 81 | 11109.4 |
| 2 | 458.035 | 22 | 2605.43 | 42 | 5452.77 | 62 | 8477.55 | 82 | 11233.2 |
| 3 | 536.720 | 23 | 2736.38 | 43 | 5603.50 | 63 | 8625.56 | 83 | 11355.0 |
| 4 | 619.374 | 24 | 2868.93 | 44 | 5754.61 | 64 | 8772.86 | 84 | 11474.8 |
| 5 | 705.776 | 25 | 3003.00 | 45 | 5906.04 | 65 | 8919.40 | 85 | 11592.4 |
| 6 | 795.729 | 26 | 3138.52 | 46 | 6057.74 | 66 | 9065.10 | 86 | 11707.7 |
| 7 | 889.054 | 27 | 3275.43 | 47 | 6209.65 | 67 | 9209.92 | 87 | 11820.7 |
| 8 | 985.589 | 28 | 3413.66 | 48 | 6361.73 | 68 | 9353.79 | 88 | 11931.3 |
| 9 | 1085.19 | 29 | 3553.15 | 49 | 6513.91 | <mark>69</mark> | <mark>9496.66</mark> | 89 | 12039.3 |
| 10 | 1187.70 | 30 | 3693.82 | 50 | 6666.17 | 70 | <mark>9638.47</mark> | 90 | 12144.6 |
| 11 | 1293.02 | 31 | 3835.63 | 51 | 6818.38 | 71 | 9779.14 | 91 | 12247.1 |
| 12 | 1401.00 | 32 | 3978.50 | 52 | 6970.56 | 72 | 9918.63 | 92 | 12346.7 |
| 13 | 1511.55 | 33 | 4122.37 | 53 | 7122.64 | 73 | 10056.9 | 93 | 12443.2 |
| 14 | 1624.54 | 34 | 4267.19 | 54 | 7274.55 | 74 | 10193.8 | 94 | 12536.6 |
| 15 | 1739.89 | 35 | 4412.89 | 55 | 7426.25 | 75 | 10329.3 | 95 | 12626.5 |
| 16 | 1857.49 | 36 | 4559.43 | 56 | 7577.68 | 76 | 10463.4 | 96 | 12712.9 |
| 17 | 1977.25 | 37 | 4706.73 | 57 | 7728.79 | 77 | 10595.9 | 97 | 12795.6 |
| 18 | 2099.08 | 38 | 4854.74 | 58 | 7879.51 | 78 | 10726.9 | 98 | 12874.3 |
| 19 | 2222.89 | 39 | 5003.40 | 59 | 8029.81 | 79 | 10856.1 | 99 | 12948.7 |
| 20 | 2348.61 | 40 | 5152.67 | 60 | 8179.92 | 80 | 10983.7 | 100 | 13018.7 |

KEY

| Duke Energy Catawba Nuclear Station | Procedure No. PT/ 1 /A/4150/001 D |
|--|---|
| | Revision No. |
| NC System Leakage Calculation | 086 |
| | |
| | |
| Continuous Use | Electronic Reference No. |
| | CN005FZZ |

REVISION SUMMARY

Reference AR(s): 02248976; 02229228; 02179037; 02178839

Added new step 12.3 to notify chemistry to determine the primary to secondary leak rate and report the value to the control room.

In step 12.6.1 added OP NC LEAK1 and OP NC LEAK2 to the bulleted items to match the radio buttons on the NC LEAKAGE graphic if accessing the point list from the graphics.

Added a note prior to step 12.15.3 stating that the NB feed filter may need to be swapped if unable to reduce NCDT level.

Deleted old step 12.17 to attach the OAC printout to the PT. Per ENG there is no need to attach this data to the PT.

PT/**1**/A/4150/001 D Page 3 of 17

NC System Leakage Calculation

1. Purpose

To ensure that NC System leakage is calculated at least once per 72 hours. (TS SR 3.4.13.1 and SR 3.4.13.2)

2. References

- 2.1 Technical Specifications:
 - TS SR 3.4.13.1
 - TS SR 3.4.13.2
 - TS LCO 3.4.15, REQUIRED ACTION A.1, B.1, C.1.1 and E.1
 - SLC 16.7-9, Remedial Action Condition B
- 2.2 Catawba Nuclear Station Operator Aid Computer Documentation
- 2.3 UFSAR Table 18-1, Reactor Coolant Operational Leakage Monitoring Program
- 2.4 Catawba Nuclear Station License Renewal Basis Specification CNS-1274.00-00-0016, Section 4.27
- 2.5 WCAP-16465-NP (Pressurized Water Reactors Owners Group Standard RCS Leakage Action Levels and Response Guidelines for Pressurized Water Reactors)
- 2.6 WCAP-16423-NP (Pressurized Water Reactors Owners Group Standard Process and Methods for Calculating RCS Leak Rate for Pressurized Water Reactors)

3. Time Required

- 3.1 Manpower Two Operators
- 3.2 Time 3 hours
- 3.3 Frequency -
 - Once per 72 hours in Modes 1, 2, 3 and 4 per SR 3.4.13.1 during steady state operation.
 - Once per 24 hours if required by TS LCO 3.4.15, REQUIRED ACTION A.1, B.1, C.1.1 or E.1.

4. Prerequisite Test

None

5. Test Equipment

None

6. Limits and Precautions

- 6.1 If more than twelve hours of grace time have elapsed and this PT has <u>NOT</u> been completed, then contact the OWPM Group.
- 6.2 Changing Lower Containment Ventilation Unit alignments can affect indicated NCDT and PRT levels by changing reference leg temperatures on the associated transmitters.

7. Required Unit Status

<u>AA</u> Verify the following parameters are being maintained steady:

- ☑ NC System temperature
- ☑ NC System pressure

8. Prerequisite System Conditions

AA Verify the NCDT capacity is adequate to receive leakage for duration of run.

9. Test Method

- 9.1 At least once per 72 hours with the OAC available, the OAC NC System Leakage Calculation will be initiated. The calculation will automatically run for 3 hours. During the first 15 minutes of the calculation, no correlation coefficient will be displayed. Calculation results may be used for the leakage calculation when elapsed time of the calculation reaches 60 minutes and the correlation coefficient for total leakage is greater than or equal to 0.75 OR when elapsed time of the calculation reaches 120 minutes and Total Leakage Best is less than or equal to 0.2 gpm. If plant stability <u>CANNOT</u> be maintained and elapsed time reaches 30 minutes and the correlation coefficient for total leakage is greater than or equal to 0.5, then the program data may be used.
- 9.2 At least once per 72 hours with the OAC partially or wholly unavailable, NC System leakage will be calculated manually. Using Control Room indications (or OAC if partially available), initial and final data will be recorded, separated by at least a 60 minute interval. Recorded data will be used in leakage calculations. Tank volume / gallon conversions and water densities are used in equations to determine NC System leakage.
- 9.3 Primary to secondary leakage will be verified to be less than or equal to 150 gpd through any steam generator by either EMF indications or Chemistry grab samples.
- 9.4 NC Pump seal leak-off will be recorded and "TOTAL ACCUMULATIVE LEAKAGE" will be calculated.

9.5 The NCS Unidentified Leakage result will be evaluated to verify an acceptably low leakage rate.

10. Data Required

- 10.1 If the OAC is available, complete Enclosures 13.1 (Data Sheet) and 13.2 (Evaluation of NCS Unidentified Leakage Results).
- 10.2 If the OAC is partially or wholly unavailable, complete Enclosure 13.3 (Manual Leakage Calculation).

11. Acceptance Criteria

- NOTE: Negative values of Unidentified Leakage more negative than -0.10 gpm invalidates the current OAC leakage calculation.
 If a negative leakage value of less than (more negative than) -0.10 gpm is due to plant stability issues then a manual leakage calculation per Enclosure 13.3 (Manual Leakage Calculation) may be necessary.
 Negative values of Unidentified Leakage between 0.000 gpm and -0.020 gpm are considered zero leakage.
 - 11.1 NC System leakage is calculated and the values are: (SR 3.4.13.1)
 - Unidentified Leakage less than or equal to 1 gpm
 - Identified Leakage (net) less than or equal to 10 gpm (Step 12.16)
 - 11.2 Primary to secondary leakage is determined to be less than or equal to 150 gpd through any steam generator. (SR 3.4.13.2)
 - 11.3 If in Mode 1, 2, 3 or Pre-Mode 3, Total Accumulative Leakage is determined to be less than or equal to 20 gpm. {PIP C-99-0606}

12. Procedure

- <u>AA</u> 12.1 Ensure that the Identified Leakage associated with any system condition changes (NV Pump swap, seal injection filter swap, etc.) has been updated in the open item summary.
- N/<u>A AA</u> 12.2 <u>IF</u> Unidentified Leakage is more negative than -0.020 gpm on the previous 3 NC System leakage calculations, then re-measure background leakage.

PT/**1**/A/4150/001 D Page 6 of 17

N/<u>A AA</u> 12.3 <u>IF</u> in Mode 2, 3, 4, or Pre-Mode 4, notify Chemistry to determine the primary to secondary leak rate <u>AND</u> report value to the control room.

| Person Notified |
|-----------------|
|-----------------|

NOTE: All leakage calculation results, valid and invalid, shall be entered into the Control Room log.

- N/<u>A AA</u> 12.4 **IF** more than one leakage calculation performed per shift, enter a brief explanation into the Control Room log indicating the reason for repeating the calculation.
 - <u>AA</u> 12.5 Ensure > 60 minutes has elapsed since any makeup to NCP standpipes.
 - **NOTE:** OAC points C1P1023, C1P1024, C1P1025, and C1P1026 will indicate NCAL until the leakage program is started.
- N/<u>A AA</u> 12.6 **IF** the OAC is available for performing the leakage calculation, perform the following:
 - 12.6.1 Examine values and quality codes of OAC points in the following Group Displays:
 - OPNCLEK1 (OP NC LEAK1 if accessing from NC LEAKAGE graphic)
 - OPNCLEK2 (OP NC LEAK2 if accessing from NC LEAKAGE graphic)
 - 12.6.2 **IF** any obvious erroneous or invalid value or quality code for OAC points in group displays OPNCLEK1 or OPNCLEK2 are found that have **NOT** been previously addressed, they shall be investigated and resolved prior to the start of the calculation.

- N/A AA 12.7 IF desired to lower NCDT level due to known high inputs, perform the following:
 - 12.7.1 **IF** 1WL-807B (NCDT Pumps Disch Cont Isol) is being maintained closed per OP/1/A/6500/014 (Operations Controlled Liquid Waste Systems), perform the following:
 - _____ 12.7.1.1 Place "NCDT LVL CTRL" in "MANUAL".
 - 12.7.1.2 Close "NCDT LVL CTRL".
 - 12.7.1.3 Open 1WL-807B (NCDT Pumps Disch Cont Isol).
 - _____ 12.7.2 Ensure "NCDT LVL CTRL" is in "MANUAL".
 - 12.7.3 Throttle open "NCDT LVL CTRL".
 - 12.7.4 **<u>WHEN</u>** NCDT level is \approx 30%, perform the following:
 - _____ 12.7.4.1 Close "NCDT LVL CTRL".
 - _____ 12.7.4.2 **IF** Step 12.7.1 was performed, close 1WL-807B (NCDT Pumps Disch Cont Isol).
 - 12.7.4.3 Return "NCDT LVL CTRL" to "AUTO".
 - 12.8 Align the NCDT as follows:

NOTE: 1WL-802 is the NCDT level control valve.

- AA 12.8.1 Ensure 1WL-802 (NCDT Level Control) is closed as follows:
 - AA 12.8.1.1 Place "NCDT LVL CTRL" in "MANUAL".
 - AA 12.8.1.2 Close "NCDT LVL CTRL".
- N/A AA 12.8.2 IF necessary due to known or suspected leakage past 1WL-802 (NCDT Level Control), close 1WL-807B (NCDT Pumps Disch Cont Isol).
- N/A AA 12.8.3 IF necessary due to known or suspected leakage past 1WL-807B (NCDT Pumps Disch Cont Isol), close 1WL-805A (NCDT Pump Disch Cont Isol).
 - 12.9 Align 1NV-172A (3-Way Divert To VCT-RHT) as follows:
 - <u>AA</u> 12.9.1 Record the position of the control switch for 1NV-172A (3-Way Divert To VCT-RHT). <u>AUTO / VCT</u>
 - AA 12.9.2 Place 1NV-172A (3-Way Divert To VCT-RHT) in the "VCT" position.

AA 12.10 Contact Primary Chemistry to perform the following:

- Inform them that an NC System leakage calculation is being initiated.
- Ensure that sampling is <u>NOT</u> performed while the calculation is in progress.
- Verify current NM automation flowrate for entry into background leakage. Record value used for NM automation flowrate <u>0.072</u> gpm Chemistry contact Mcleod
- <u>AA</u> 12.11 Ensure > 30 minutes has elapsed since the performance of any activity involving NC System parameters, including charging, letdown (including demineralizers), pressurizer, and/or VCT evolutions. {PIP 07-7077}
- N/<u>A AA</u> 12.12 <u>IF</u> the OAC is available <u>AND</u> Unit 1 is at or near normal operating temperature and pressure (i.e. Tavg > 550°F and W/R pressure > 2200 psig), perform the following:

NOTE: Maximum run-time for NC System Leakage Calculation is three hours.

12.12.1 Complete the following steps to initiate a NC System Leakage Calculation:

NOTE: The following step provides an inserted value for NCDT level indication. Use of an inserted value will result in input into the tank to be measured as NCS unidentified leakage.

- 12.12.1.1 **IF** the NCDT level indication is **NOT** providing stable input rate, insert the current value of C1A0494 (NCDT Level) into OAC Point C1P0203 (Average NCDT Level).
- □ 12.12.1.2 Activate NC System Leakage Calculations program (RCSLEAK).
- <u>12.12.1.3</u> <u>IF</u> a calculation is currently in progress, then perform one of the following:
 - A. <u>IF</u> it is <u>NOT</u> desired to initiate a new calculation, then exit the NC System Leakage Calculations program.

OR

B. **<u>IF</u>** it is desired to initiate a new calculation, abort the current calculation per Step 12.12.3.

PT/**1**/A/4150/001 D Page 9 of 17

- **NOTE:** It is recommended that initiation of the leakage calculation be synchronized with fluctuations of indicated VCT level. Initiating the program in Step 12.12.1.4 approximately half way between the maximum and minimum values observed during the fluctuation will improve the accuracy of the data.
 - □ 12.12.1.4 Select "INITIATE".
 - □ 12.12.1.5 Enter background leakage obtained from the following:
 - Open Item Summary Logbook.
 - NM Automation from Primary Chemistry (if <u>NOT</u> already in Open Item Summary Logbook).
 - \Box 12.12.1.6 Enter desired start time.
 - □ 12.12.1.7 Select "SAVE".
 - \Box 12.12.1.8 Enter user name.
 - \Box 12.12.1.9 Enter reason for calculation.
 - \square 12.12.1.10 Select "OK" to continue.
 - □ 12.12.1.11 Select "OK" to acknowledge "New NC Leakage Calculation Scheduled" message.
 - 12.12.2 **<u>IF AT ANY TIME</u>** during the calculation it is desired to obtain a printout of NC System Leakage Calculation Summary, perform the following:
- **NOTE:** If the calculation is still running, it is recommended to wait at least ten seconds after a data update before printing. The program updates every minute.
 - □ 12.12.2.1 Ensure NC System Leakage Calculations program (RCSLEAK) is activated.
 - □ 12.12.2.2 Select "PRINT".

PT/**1**/A/4150/001 D Page 10 of 17

- 12.12.3 **IF AT ANY TIME** during the calculation it becomes necessary to abort a NC System Leakage Calculation due to calculation or plant issues, perform the following:
- **NOTE:** Upon abort, the application will terminate calculating. Results up to the time of termination are available.
 - □ 12.12.3.1 Ensure NC System Leakage Calculations program (RCSLEAK) is activated.
 - □ 12.12.3.2 Verify "NC System Leakage Calculation" summary displayed.
 - □ 12.12.3.3 Select "ABORT".
 - □ 12.12.3.4 Verify message "On Demand NC System Leakage Calculations Will Be Aborted" displayed.
 - □ 12.12.3.5 Select "OK" to acknowledge "On Demand NC System Leakage Calculations Will Be Aborted" message and to abort the NC System Leakage Calculation in progress.
 - □ 12.12.3.6 Verify the "NC System Leakage Calculations" summary is displayed with the results of the aborted calculation up to time of termination.
 - <u>12.12.3.7</u> <u>IF</u> desired to restart the calculation, return to Step 12.12.1.

| NOTE: | • Disregard the correlation coefficient "-" (negative) symbol when determining the correlation coefficient. The "-" symbol signifies out leakage from the NC System. The absence of the "-" symbol signifies in leakage into the NC system from an external source. | | |
|-------|---|--|--|
| | In the following step, use of either of the first two conditions is preferred. The third condition is intended to only be used for transient conditions. | | |
| | • To provide highest quality results, a "CALC ELAPSED TIME" of greater than or equal to 120 minutes is recommended and is to be used in the following step whenever plant conditions allow. | | |
| | 12.12.4 <u>WHEN</u> any of the following sets of conditions are met, then obtain a printout of the "NC System Leakage Calculation" summary as follows: | | |
| | □ "CALC ELAPSED TIME" ≥ 60 minutes, and □ The absolute value for the "TOTAL LEAKAGE CORRELATION COEFF." ≥ 0.75. | | |
| | OR | | |
| | □ "CALC ELAPSED TIME" \geq 120 minutes, and □ "TOTAL LEAKAGE BEST" < 0.2 gpm. | | |
| | OR | | |
| | □ Plant stability <u>CANNOT</u> be maintained, and □ "CALC ELAPSED TIME" \geq 30 minutes, and □ The absolute value for the "TOTAL LEAKAGE CORRELATION COEFF." \geq 0.5. | | |
| NOTE: | If the calculation is still running, it is recommended to wait at least ten seconds after a data update before printing. The program updates every minute. | | |
| | □ 12.12.4.1 Ensure NC System Leakage Calculations program (RCSLEAK) is activated. | | |

□ 12.12.4.2 Select "PRINT".

PT/**1**/A/4150/001 D Page 12 of 17

| 12.12.5 Record the following values on Enclosure 13.1 (Data Snee |
|--|
|--|

- □ 12.12.5.1 "TOTAL LEAKAGE BEST" value as Total Leakage.
- □ 12.12.5.2 "IDENTIFIED LEAKAGE BEST" value as Identified Leakage.
- □ 12.12.5.3 "UNIDENTIFIED LEAKAGE BEST" value as Unidentified Leakage.
- _____ 12.12.6 **IF** the value for "UNIDENTIFIED LEAKAGE BEST" is negative, perform the following:

NOTE: Negative values of Unidentified Leakage between 0.000 gpm and -0.020 gpm is considered zero leakage. For trending purposes, the actual leakage results shall always be recorded.

12.12.6.1 **IF** the value for "UNIDENTIFIED LEAKAGE BEST" is between -0.02 and -0.10 gpm, use the displayed value of "UNIDENTIFIED LEAKAGE BEST" while completing this procedure.

NOTE: Unidentified leakage values more negative than -0.10 gpm are indicative of either inleakage or a significant reduction of background leakage. Either situation invalidates the current leakage calculation.

12.12.6.2 **IF** the value for "UNIDENTIFIED LEAKAGE BEST" is more negative than -0.10 gpm, perform the following:

NOTE: The NC System Leakage Calculation will time out after three hours.

- A. **<u>IF</u>** necessary, abort the current calculation per Step 12.12.3.
- B. <u>IF</u> necessary, return the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the position recorded in Step 12.9.1.
- C. **<u>IF</u>** necessary, realign the NCDT per Step 12.15.
- D. **IF** a value was inserted for OAC Point C1P0203 (Average NCDT Level) in Step 12.12.1.1, restore that point to processing.

PT/**1**/A/4150/001 D Page 13 of 17

| | E. | IF the negative value for "UNIDENTIFIED LEAKAGE BEST" is suspected to be due to plant stability issues, perform the following: |
|---------|------|---|
| | | 1. Perform manual leakage calculation per Enclosure 13.3 (Manual Leakage Calculation). |
| | | 2. N/A Steps 12.12.6.2F through 12.13. |
| | □ F. | Inform Primary Chemistry that the NC System leakage calculation has been suspended. Chemistry contact |
| | □ G. | Record the individual NC Pump seal leakoff flows: |
| | | NC Pump 1A: gpm NC Pump 1B: gpm NC Pump 1C: gpm NC Pump 1D : gpm Total NC Pump seal leakoff: gpm |
| | □ H. | Record total NC Pump seal leakoff on Enclosure 13.1 (Data Sheet). |
| | □ I. | Calculate Total Accumulative Leakage on Enclosure 13.1 (Data Sheet). |
| | □ J. | Document primary to secondary leakage on Enclosure 13.1 (Data Sheet). |
| | □ K. | Enter the NCS Leakage Calculation Data into the Control Room log using Unit 1 NCS Leakage Data stamp. Include comment that this is an invalid calculation due to high negative leakage result. |
| | □ L. | Re-measure background leakage. |
| C · 1 1 | 1 | |

NOTE: Examples of inleakage could include flush water leakage into low pressure portions of the NV System, KC leakage into the Seal Return Hx and/or NW leakage.

M. **IF** the background leakage has **<u>NOT</u>** changed significantly, identify and isolate the source of inleakage.

PT/**1**/A/4150/001 D Page 14 of 17

- □ N. <u>WHEN</u> the current background leakage has been determined and documented <u>OR</u> the source of inleakage has been isolated, start a new PT/1/A/4150/001 D (NC System Leakage Calculation).
- \Box O. N/A the remaining steps of this procedure.
- 12.12.7 Record the individual NC Pump seal leakoff flows:
 - NC Pump 1A: _____ gpm
 - NC Pump 1B: _____ gpm
 - NC Pump 1C: _____ gpm
 - NC Pump 1D :_____ gpm
 - Total NC Pump seal leakoff: _____ gpm
- 12.12.8 Record total NC Pump seal leakoff on Enclosure 13.1 (Data Sheet).
- 12.12.9 Calculate Total Accumulative Leakage on Enclosure 13.1 (Data Sheet).
- 12.12.10 Document primary to secondary leakage on Enclosure 13.1 (Data Sheet).
- 12.12.11 Determine PZR steam leak rate to PRT on Enclosure 13.1 (Data Sheet).
- 12.12.12 **IF** a value was inserted for OAC Point C1P0203 (Average NCDT Level) in Step 12.12.1.1, restore that point to processing.
- **NOTE:** The calculation will stop after 180 minutes. It is <u>NOT</u> necessary to abort the calculation in the following step.
 - 12.12.13 Exit the NC System Leakage Calculations program.
- 12.13 **IF** the OAC is partially or wholly unavailable **OR** Unit 1 is **NOT** at or near normal operating temperature and pressure (i.e. Tavg $\leq 550^{\circ}$ F and W/R pressure ≤ 2200 psig), perform Enclosure 13.3 (Manual Leakage Calculation).
- 12.14 Return the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the position recorded in Step 12.9.1.
PT/**1**/A/4150/001 D Page 15 of 17

12.15 Realign the NCDT as follows:

- 12.15.1 Ensure 1WL-807B (NCDT Pumps Disch Cont Isol) is open.
 - _ 12.15.2 Ensure 1WL-805A (NCDT Pump Disch Cont Isol) is open.
- **NOTE:** If unable to reduce NCDT level in the following step, the in-service NB evaporator feed filter may need to be swapped / replaced due to high DP. (NCR 01515934)
 - 12.15.3 **IF** NCDT level is greater than setpoint, perform the following:
 - 12.15.3.1 Throttle open "NCDT LVL CTRL" to slowly reduce level.
 - 12.15.3.2 <u>WHEN</u> NCDT level is at the desired value, close "NCDT LVL CTRL".
 - 12.15.4 Place "NCDT LVL CTRL" in "AUTO".
 - 12.15.5 Ensure "NCDT LVL CTRL" is set for 50%.
 - 12.15.6 **IF** 1WL-807B (NCDT Pumps Disch Cont Isol) is being maintained closed per OP/1/A/6500/014 (Operations Controlled Liquid Waste Systems), close 1WL-807B (NCDT Pumps Disch Cont Isol).
- NOTE: NM automation flow, as documented in Step 12.10, is classified as Non-RCPB (Reactor Coolant Pressure Boundary) leakage per WCAP-16423-NP (Reference 2.6). NM sample flow is manually routed and shall <u>NOT</u> count as Identified Leakage. The NM sample flow shall still be included in Total Leakage. (PIP M-12-5474).
 - The Net Identified Leakage rate will be entered in the Control Room log Leakage Data stamp and the OAC Manual Value Update. It is <u>NOT</u> used for determining Total Accumulative Leakage for the purpose of verifying SSF capabilities in Enclosure 13.1 (Data Sheet) or 13.3.2 (Manual Calculation).
 - 12.16 Calculate Net Identified Leakage rate:

| gpm - | gpm = | gpm |
|---|---------------------------------|------------------------|
| Identified Leakage Best (Step 12.12.5.2) | NM automation flow (Step 12.10) | Net Identified Leakage |
| or Identified Leakage in Enclosure 13.3.2 | | |
| (Manual Calculation) | | |

- 12.17 Enter the NCS Leakage Calculation Data into the following:
 - 12.17.1 The Control Room log using Unit 1 NCS Leakage Data stamp as follows:
 - 12.17.1.1 Enter "Net Identified Leakage" calculated in Step 12.16 as the Identified Leakage Rate.
 - 12.17.1.2 Record the remaining data required in the stamp as presented on printout or as calculated by Enclosure 13.3 (Manual Leakage Calculation).
- 12.17.2 **IF** the "Plant stability **CANNOT** be maintained" option was used in Step 12.12.4, ensure this is noted in the Control Room log entry.
- 12.17.3 **IF** a manual calculation was performed per Enclosure 13.3 (Manual Leakage Calculation), ensure this is noted in the Control Room log entry.
- _____ 12.17.4 OAC Manual Value Update NCLEAK (NC System Leakage Calc) program as follows:
 - _____ 12.17.4.1 Enter "Net Identified Leakage" calculated in Step 12.16 as the Identified Leakage Rate.
 - 12.17.4.2 Record the remaining data required as presented on printout or as calculated by Enclosure 13.3 (Manual Leakage Calculation).
- 12.18 Evaluate the acceptance criteria by performing one of the following:
- _____ 12.18.1 Verify the acceptance criteria specified in Section 11 is met. OR
- 12.18.2 **IF** the acceptance criteria is **NOT** met, perform the following:
 - \Box Notify the Unit/WCC SRO that the acceptance criteria is <u>NOT</u> met.

Unit/WCC SRO Contacted

__/____ Time

Date

- □ Initiate a CR to document the test failure.
- Document all issues on an Equipment Problem Evaluation Form.
- ^{SRO} 12.19 **IF** in Mode 1, 2, 3 or Pre-Mode 3 <u>AND</u> Total Accumulative Leakage > 20 gpm, then declare the Standby Makeup Pump non-functional per SLC16.7-9.
- 12.20 Inform Primary Chemistry that the NC System leakage calculation is complete. Chemistry contact

PT/**1**/A/4150/001 D Page 17 of 17

- 12.21 **IF** the leakage calculation was performed by the OAC <u>AND</u> Unit 1 is in Modes 1 through 4, evaluate Unidentified Leakage results per Enclosure 13.2 (Evaluation of NCS Unidentified Leakage Results).
- 12.22 **IF** any discrepancy is noted during the performance of this test that does **NOT** keep the test from meeting the acceptance criteria, it shall be given to the Unit/WCC SRO for evaluation via an Equipment Problem Evaluation Form.

13. Enclosures

- 13.1 Data Sheet
- 13.2 Evaluation of NCS Unidentified Leakage Results
 - 13.2.1 Auxiliary Building Potential Leak Sources
- 13.3 Manual Leakage Calculation
 - 13.3.1 Manual Leakage Data
 - 13.3.2 Manual Calculation
 - 13.3.3 NCDT Level Conversion
 - 13.3.4 PRT Level Conversion

Manual Leakage Calculation

1. Procedure

- 1.1 Verify the following valves are closed:
 - □ 1NC-56B (RMW Pump Disch Cont Isol)
 - □ 1NV-181A (B/A Blender Otlt To VCT)
 - □ 1NV-186A (B/A Blender Otlt To VCT Outlet)
 - □ 1NV-236B (Boric Acid To NV Pumps Suct)
 - □ 1NV-252A (NV Pumps Suct From FWST)
 - □ 1NV-253B (NV Pumps Suct From FWST)
 - □ 1NI-9A (NV Pump C/L Inj Isol)
 - □ 1NI-10B (NV Pump C/L Inj Isol)
- 1.2 Record "Initial Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available).

NOTE: Calculation accuracy improves as the time between initial and final data increases.

- 1.3 Wait at least 60 minutes prior to obtaining final data.
- 1.4 Record "Final Data" on Enclosure 13.3.1 (Manual Leakage Data) using Control Room indications or OAC (if available).
- 1.5 Using data from Enclosure 13.3.1 (Manual Leakage Data), calculate change in T-Avg:

NC Average temp initial NC Average temp final

- **NOTE:** Procedure may continue while performing the following step.
 - If change in T-Avg is greater than 0.25°F (0.1°F if using OAC), calculation is invalid and must be repeated.

°F

- 1.6 **IF** change in T-Avg is less than or equal to 0.25°F (0.1°F if using OAC), perform all calculations on Enclosure 13.3.2 (Manual Calculation).
- 1.7 Return to Step 12.14.

- **NOTE:** If available, OAC points can be used.
 - Where applicable, the same instrument channel (meter) shall be used for obtaining the initial and final data.
 - When using OAC Point indication for NCDT and PRT level changes, minor instrument fluctuations that result in a indicated level decrease may be treated as zero level change.

| Parameter | Units | Instrument / OAC Point | Initial Data | Final Data |
|------------------------|-------|------------------------|--------------|------------|
| | | Used | (Step 1.2) | (Step 1.4) |
| NC Average Temperature | °F | | | |
| VCT Level | % | | | |
| PZR Level | % | | | |
| NCDT Level | % | | | |
| PRT Level | % | | | |

Record time Initial Data obtained _____

Record time Final Data obtained _____

Elapsed time _____ minutes

<u>VCT</u>

| VCT Leakage Rate | = | [Initial Level (%) - Final Level (%)] x 19.1 gal/% Elapsed time |
|------------------|---|--|
| | = | [() - ()] x 19.1 gal/% () min |
| | = | gal/min |
| <u>PZR</u> | | |
| PZR Leakage Rate | = | [Initial Level (%) - Final Level (%)] x (124.7 Gal/%) x (0.5983 ^a) Elapsed time |
| | = | [() - ()] x (124.7 Gal/%) x (0.5983) () min |
| | = | gal/min |
| Total Leakage | = | (VCT Leakage Rate) + (Pzr Leakage Rate) |
| | = | ()+() |
| | = | gpm |

 $^{^{\}rm a}$ This is the density ratio to normalize leakage at PZR conditions to leakage at 100 $^{\circ}{\rm F}$

PT/**1**/A/4150/001 D Page 2 of 4

Manual Calculation

| NCDT |
|------|
|------|

| Initial NCDT Volume | % | ó = | Gal (OAC point C1P5079 (U1 NCDT Volume) or Enclosure 13.3.3 (NCDT Level Conversion)) |
|-----------------------------|---|-----|---|
| Final NCDT Volume | % | = | Gal (OAC point C1P5079 (U1 NCDT Volume) or Enclosure 13.3.3 (NCDT Level Conversion)) |
| NCDT Leakage Rate | | = | <u>Final Volume (Gal) - Initial Volume (Gal)</u> Elapsed time |
| | | = | () - () () min |
| | | = | gpm |
| <u>PRT</u> | | | |
| Initial PRT Volume | % | = | Gal (OAC point C1P5078 (U1 PRT Volume) or Enclosure 13.3.4 (PRT Level Conversion)) |
| Final PRT Volume | % | = | Gal (OAC point C1P5078 (U1 PRT Volume) or Enclosure 13.3.4 (PRT Level Conversion)) |
| PRT Leakage Rate | | = | <u>Final Volume (Gal) - Initial Volume (Gal)</u> Elapsed time |
| | | = | () - () () min |
| | | = | gpm |
| Background Leakage | = | Ar | ny quantified/measured leakage |
| | = | | gpm |
| Identified Leakage | = | N | CDT Leakage Rate + PRT Leakage Rate + Background Leakage |
| | = | | gpm + gpm + gpm |
| | = | | gpm |
| <u>Unidentified Leakage</u> | = | To | otal Leakage - Identified Leakage |
| | = | | gpm gpm |
| | = | | gpm ^b |

^b This value is an acceptance criteria of this procedure.

Manual Calculation

PT/**1**/A/4150/001 D Page 3 of 4

Total NC Pump Seal Leakoff

- 1A NC Pump #1 Seal Leakoff = _____ gpm
- 1B NC Pump #1 Seal Leakoff = _____ gpm
- 1C NC Pump #1 Seal Leakoff = _____ gpm
- 1D NC Pump #1 Seal Leakoff = _____ gpm
- Total NC Pump Seal Leakoff: _____ gpm

<u>Total Accumulative Leakage</u> = Sum of Identified Leakage, Unidentified, and NC Pumps #1 Seal Leakoffs

Identified Leakage _____ gpm

Unidentified Leakage _____ gpm

Total NC Pump Seal Leakoff _____ gpm

IF any Identified or Unidentified value is negative, enter "0" below in its applicable space.

Identified + Unidentified + Total NC Pump Seal Leakoff = Total Accumulative Leakage

_____+ _____+ _____= _____

Verify Total Accumulative Leakage:

 $\Box \leq 20 \text{ gpm } \{\text{PIP C-99-0606}\}$

OR

 \square > 20 gpm, refer to Step 12.19.

| Performed By | Date: | _Time: |
|--------------|-----------|--------|
| Verified By | Date: | _Time: |

Manual Calculation

Primary to Secondary Leakage as determined by one of the following:

<u>IF</u> in Mode 1 <u>AND</u> 1EMF-33 is functional^c <u>AND</u> the OAC is available, record the reading of OAC Point C1P0189 (Pri To Sec Leakrate 15 Min Running Avg). <u>gpd</u>

OR

IF in Mode 1 **<u>AND</u>** the OAC is <u>**NOT**</u> available <u>**AND**</u> Unit 1 is $\ge 40\%$ RTP, record the readings from the N-16 Leakage Monitors:

- 1EMF-71 _____ gpd
- 1EMF-72 _____ gpd
- 1EMF-73 _____ gpd
- 1EMF-74 _____ gpd

OR

<u>IF</u> in Mode 1 <u>AND</u> 1EMF-33 is non-functional^c <u>AND</u> Unit 1 is \ge 40% RTP, record the readings from the N-16 Leakage Monitors:

- 1EMF-71 _____ gpd
- 1EMF-72 _____ gpd
- 1EMF-73 _____ gpd
- 1EMF-74 _____ gpd

OR

<u>IF</u> in Mode 1 <u>AND</u> 1EMF-33 is non-functional^c <u>AND</u> Unit 1 is < 40% RTP, record the primary to secondary leak rate as determined by Chemistry. <u>gpd</u>

OR

<u>IF</u> in Mode 2, 3, 4 or Pre-Mode 4, record the primary to secondary leak rate value as determined by Chemistry. _____ gpd

^c For the purposes of this procedure, OAC Point C1P0189 (Pri To Sec Leakrate 15 Minute Running Avg) must be functional for 1EMF-33 to be considered functional.

PT/**1**/A/4150/001 D Page 1 of 1

NCDT Level Conversion

| % | Gal | % | Gal | % | Gal | % | Gal | % | Gal |
|----|--------|----|---------|----|---------|----|---------|-----|---------|
| 1 | 19.897 | 21 | 74.240 | 41 | 143.787 | 61 | 218.067 | 81 | 286.505 |
| 2 | 22.085 | 22 | 77.410 | 42 | 147.478 | 62 | 221.721 | 82 | 289.571 |
| 3 | 24.343 | 23 | 80.613 | 43 | 151.178 | 63 | 225.360 | 83 | 292.600 |
| 4 | 26.669 | 24 | 83.871 | 44 | 154.888 | 64 | 228.983 | 84 | 295.590 |
| 5 | 29.058 | 25 | 87.176 | 45 | 158.604 | 65 | 232.587 | 85 | 298.539 |
| 6 | 31.509 | 26 | 90.517 | 46 | 162.327 | 66 | 236.173 | 86 | 301.447 |
| 7 | 34.019 | 27 | 93.894 | 47 | 166.055 | 67 | 239.738 | 87 | 304.312 |
| 8 | 36.585 | 28 | 97.304 | 48 | 169.786 | 68 | 243.281 | 88 | 307.131 |
| 9 | 39.206 | 29 | 100.743 | 49 | 173.519 | 69 | 246.801 | 89 | 309.904 |
| 10 | 41.880 | 30 | 104.212 | 50 | 177.254 | 70 | 250.296 | 90 | 312.628 |
| 11 | 44.604 | 31 | 107.706 | 51 | 180.989 | 71 | 253.765 | 91 | 315.302 |
| 12 | 47.376 | 32 | 111.226 | 52 | 184.722 | 72 | 257.204 | 92 | 317.923 |
| 13 | 50.196 | 33 | 114.770 | 53 | 188.453 | 73 | 260.614 | 93 | 320.489 |
| 14 | 53.060 | 34 | 118.335 | 54 | 192.181 | 74 | 263.990 | 94 | 322.999 |
| 15 | 55.968 | 35 | 121.921 | 55 | 195.904 | 75 | 267.332 | 95 | 325.450 |
| 16 | 58.918 | 36 | 125.525 | 56 | 199.620 | 76 | 270.636 | 96 | 327.839 |
| 17 | 61.908 | 37 | 129.148 | 57 | 203.329 | 77 | 273.894 | 97 | 330.164 |
| 18 | 64.937 | 38 | 132.787 | 58 | 207.030 | 78 | 277.098 | 98 | 332.423 |
| 19 | 68.003 | 39 | 136.440 | 59 | 210.720 | 79 | 280.267 | 99 | 334.611 |
| 20 | 71.104 | 40 | 140.108 | 60 | 214.400 | 80 | 283.403 | 100 | 336.726 |

PT/**1**/A/4150/001 D Page 1 of 1

PRT Level Conversion

| % | Gal | % | Gal | % | Gal | % | Gal | % | Gal |
|----|---------|----|---------|----|---------|----|---------|-----|---------|
| 1 | 383.572 | 21 | 2476.15 | 41 | 5302.48 | 61 | 8328.88 | 81 | 11109.4 |
| 2 | 458.035 | 22 | 2605.43 | 42 | 5452.77 | 62 | 8477.55 | 82 | 11233.2 |
| 3 | 536.720 | 23 | 2736.38 | 43 | 5603.50 | 63 | 8625.56 | 83 | 11355.0 |
| 4 | 619.374 | 24 | 2868.93 | 44 | 5754.61 | 64 | 8772.86 | 84 | 11474.8 |
| 5 | 705.776 | 25 | 3003.00 | 45 | 5906.04 | 65 | 8919.40 | 85 | 11592.4 |
| 6 | 795.729 | 26 | 3138.52 | 46 | 6057.74 | 66 | 9065.10 | 86 | 11707.7 |
| 7 | 889.054 | 27 | 3275.43 | 47 | 6209.65 | 67 | 9209.92 | 87 | 11820.7 |
| 8 | 985.589 | 28 | 3413.66 | 48 | 6361.73 | 68 | 9353.79 | 88 | 11931.3 |
| 9 | 1085.19 | 29 | 3553.15 | 49 | 6513.91 | 69 | 9496.66 | 89 | 12039.3 |
| 10 | 1187.70 | 30 | 3693.82 | 50 | 6666.17 | 70 | 9638.47 | 90 | 12144.6 |
| 11 | 1293.02 | 31 | 3835.63 | 51 | 6818.38 | 71 | 9779.14 | 91 | 12247.1 |
| 12 | 1401.00 | 32 | 3978.50 | 52 | 6970.56 | 72 | 9918.63 | 92 | 12346.7 |
| 13 | 1511.55 | 33 | 4122.37 | 53 | 7122.64 | 73 | 10056.9 | 93 | 12443.2 |
| 14 | 1624.54 | 34 | 4267.19 | 54 | 7274.55 | 74 | 10193.8 | 94 | 12536.6 |
| 15 | 1739.89 | 35 | 4412.89 | 55 | 7426.25 | 75 | 10329.3 | 95 | 12626.5 |
| 16 | 1857.49 | 36 | 4559.43 | 56 | 7577.68 | 76 | 10463.4 | 96 | 12712.9 |
| 17 | 1977.25 | 37 | 4706.73 | 57 | 7728.79 | 77 | 10595.9 | 97 | 12795.6 |
| 18 | 2099.08 | 38 | 4854.74 | 58 | 7879.51 | 78 | 10726.9 | 98 | 12874.3 |
| 19 | 2222.89 | 39 | 5003.40 | 59 | 8029.81 | 79 | 10856.1 | 99 | 12948.7 |
| 20 | 2348.61 | 40 | 5152.67 | 60 | 8179.92 | 80 | 10983.7 | 100 | 13018.7 |

JPM A.1-2R

RO

EVALUATION SHEET

| Task: Perfo | rm Manual Shutdown | Margin Calculation | |
|-----------------------|--|--|--|
| Alternate Path: | N/A | | |
| Facility JPM #: | RB-127 - Modified | | |
| Safety Function: | N/A | | |
| <u>K/A</u> 2.1.25 | Ability to interpr | et reference materials, such as | s graphs, curves, tables, etc. |
| Importance: | 3.9 / 4.2 CFR: | 41.10 / 43.5 / 45.12 | |
| Preferred Evalua | tion Location: | Preferred Evalua | tion Method: |
| Simulator | ClassroomX | C Perform | X Simulate |
| <u>References</u> : | OP/0/A/6100/006 (ROD Book Rev 83 | Reactivity Balance Calculation |) |
| <u>Task Standard:</u> | Using OP/0/A/6100 pcm and determine plant conditions. T required by T.S. 3. | 0/006 Enclosure 4.3, calculates es that adequate shutdown ma This JPM must be complete wit 1.4. | s shutdown margin to be 1343 Irgin does exist for current hin the 1 hour completion time |
| Validation Time: | 15 minutes | Time Critical: | Yes <u>X</u> No |
| Applicant: NAME | | _ Docket # | Time Start: Time Finish: Time Critical (<1 hour) Time Start: Time Finish: |
| Performance Rat | ting: | | Performance Time |
| SAT UNSA | Τ | | |
| Examiner: | NAME | SIGN | / IATURE DATE |
| | | COMMENTS | |
| | | | |
| | | | |
| | | | |
| | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- The Reactor Eng Analysis and Calc Toolkit (REACT) CNS is inoperable.
- During performance of PT/0/A/4150/030 (RCCA Bank Repositioning), it was determined that Control Rods B6 and H8 were immovable and untrippable.
- IAE is investigating.
- Unit 1 conditions:
 - Mode 1 at 100% RTP
 - Cycle burnup is 25 EFPD
 - Control Bank 'D' position is 215 steps withdrawn
 - All other rods are at 226 steps withdrawn
 - Current Boron Concentration is 1370 ppmB

INITIATING CUES:

- The Shift Manager has directed you to perform a shutdown margin calculation using OP/0/A/6100/006 (Reactivity Balance Calculations).
- Calculation is to be performed for current date and time.
- Initial conditions have been verified.
- Independent Verification has been waived.
- This JPM is time critical.

Calculated shutdown margin for current conditions _____ pcm Adequate shutdown margin exists (YES/NO) _____

EXAMINER NOTE:

After reading cue, provide applicant with a copy of OP/0/A/6100/006.

STEP / STANDARD

SAT / UNSAT

START TIME: _____

| STEP 1: NOTE: "C | 3.1 [Quantity o | Determine the following ir f Misaligned Rods" refers to rods the fal number of rods is required. (R.M | nformation: at are misaligned bu | t remain trippable. | | | |
|--|---------------------|---|-------------------------------------|--|-------|--|--|
| | Step | Description | Reference | Value | | | |
| | 3.1.1 | Unit | N/A | 1 | | | |
| | 3.1.2 | Date/Time | N/A | Today's Date / Time | | | |
| | 3.1.3 | Present Power | P1385 | 100 % | | | |
| | 3.1.4 | NC System Boron Concentration | Latest sample | 1370 ppm | | | |
| | 3.1.5 | Current burnup | P1457 | 25 EFPD | | | |
| | 3.1.6 | Present control bank position | OAC or Control Board | _ <u>215</u> SWD on Control Bank_D | SAT | | |
| | 3.1.7 | Present shutdown bank position | OAC or Control Board | A <u>226</u> B <u>226</u> C <u>226</u> D <u>226</u> E <u>226</u> | UNSAT | | |
| | 3.1.8 | Quantity of misaligned rods | N/A | 0 | | | |
| | 3.1.9 | Number of untrippable RCCAs | N/A | 2 | | | |
| | 3.1.10 | Untrippable RCCA(s) core location(s) | N/A | B6, H8 | | | |
| STANDARD: From the cue, the applicant records the information per the table above. COMMENTS: | | | | | | | |

| STEP / STANDARD | SAT / UNSAT |
|---|------------------|
| <u>STEP 2:</u> 3.2 IF using the REACT program to complete the calculation, perform the following: <u>STANDARD</u>: Applicant determines based of the initiating cue that this step is not applicable. <u>COMMENTS:</u> | SAT UNSAT |
| NOTE: 1. A dropped rod is considered trippable. (R.M.) 2. All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e. () pcm], the sign provided with data must be recorded. The calculations account for these sign conventions. (R.M.) | CRITICAL STEP |
| STEP 3: 3.3 IF performing the calculation manually, perform the following: 3.3.1 Determine available reactivity worth of trippable RCCAs for conditions in Step 3.1: NOTE: Interpolation is NOT required in Step 3.3.1.1. Reactivity worth may be determined by choosing the lowest reactivity worth from Section 5.7 of the R.O.D. Manual associated with cycle burnups that bound the present cycle burnup recorded in Step 3.1. (R.M.) 3.3.1.1 Determine Total Available Rod Worth pcm (Section 5.7 of R.O.D. manual) STANDARD: Applicant determines Total Available Rod Worth is 5008 pcm from R.O.D. Book Section 5.7. Examiner Note: This step is critical to ensure accurate result for final calculation. COMMENTS: | SAT UNSAT |

| STEP / STANDARD | SAT / UNSAT |
|--|----------------|
| <u>STEP 4:</u> 3.3.1.2 <u>IF</u> only one RCCA is untrippable, determine reactivity worth penalty for untrippable RCCA core location of Step 3.1.10 (Section 5.8 of R.O.D. manual) pcm | |
| STANDARD: | SAT |
| Applicant determines that this step is not applicable. | UNSAT |
| COMMENTS: | |
| | |
| STEP 5: 3.3.1.3 IF there are multiple untrippable RCCAs, perform the following: | |
| A. Determine untrippable RCCA of Step 3.1.10 with the highest reactivity worth penalty (Section 5.8 of R.O.D. manual). Core Location | |
| STANDARD: | SAT |
| Applicant determines that RCCA Core Location H8 has the highest reactivity worth penalty. | UNSAT |
| COMMENTS: | |
| | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|---|------------------|
| <u>STEP 6:</u> 3.3.1.3 B. Record reactivity worth of the untrippable RCCA of Step 3.3.1.3.A (Section 5.8 of R.O.D. Manual). pcm | CRITICAL STEP |
| STANDARD: | |
| Applicant determines the reactivity worth of rod H8 per R.O.D. Section 5.8 is 580 pcm. | |
| Examiner Note: This step is critical to ensure accurate result for final calculation. | SAT UNSAT |
| COMMENTS. | |
| <u>STEP 7:</u> 3.3.1.3 C. Determine maximum stuck rod worth during cycle (Section 5.7 of the R.O.D. manual). | CRITICAL STEP |
| STANDARD: | |
| Applicant determines maximum stuck rod worth from R.O.D. manual section 5.7 is 1010 pcm. | |
| Examiner Note: This step is critical to ensure accurate result for final calculation. | SAT |
| COMMENTS: | UNSAT |
| | |

| STE | SAT / UNSAT | | | |
|---|---------------------------------|---------------------|--|--|
| STEP 8: 3.3.1.3 D. Calculate to penalty belo | h CRITICAL STEP | | | |
| Description | Reference | Value | | |
| A.Number of Untrippable RCCAs | Step 3.1.9 | 2 | | |
| B. Highest Worth Penalty | Step 3.3.1.3 B | 580 pcm | | |
| C. Max Stuck Rod | Step 3.3.1.3 C | 1010 pcm | | |
| Total untrippable RCCA Worth Penalty for Multiple RCCAs | $ \{ [(A) - 1] X (C) \} + (B) $ | 1590 ^{pcm} | | |
| STANDARD: Applicant calculates the Total untrippable RCCA worth penalty to be 1590 pcm. Examiner Note: This step is critical to ensure accurate result for final calculation. COMMENTS: | | | | |
| STEP 9: 3.3.1.4 Record Total Untrippable RCCA Penalty from Step 3.3.1.2 or Step 3.3.1.3D, whichever is applicable. | | | | |
| STANDARD: | | | | |
| Applicant records 1590 pcm f | SAT | | | |
| COMMENTS: | UNSAT | | | |

| STE | P / STANDAR | D | SAT / UNSAT | |
|---|---|--|----------------|--|
| NOTE: Interpolation is <u>NOT</u> red be determined by choos Section 5.6.3 of the R.0 that bound the present | CRITICAL STEP | | | |
| STEP 10: 3.3.1.5 Determine In positions: | nserted Rod Wo | orth for present bank | | |
| Description | Reference | Value | | |
| A. HFP, Eq Xenon IRW for current control bank position and current cycle burnup | Step 3.1.6 Step 3.1.5 (Section 5.6.3 of R.O.D. manual) | <u>9</u> pcm | | |
| B. HFP, Eq Xenon IRW for current shutdown bank positions and current cycle burnup | Step 3.1.7 Step 3.1.5 (Section 5.6.3 of R.O.D. manual) | SD E 0 pcm SD D 0 pcm SD C 0 pcm SD B 0 pcm SD A 0 pcm | SAT | |
| Inserted Worth of Present Position | Sum of above | 9 pcm | UNSAT | |
| Position 9 pcm UNSAT STANDARD: Applicant calculates Inserted Worth of Present rod positions to be 9 pcm. Image: Comparison of the second | | | | |

| S | SAT / UNSAT | | | | |
|--|---------------------------------|--------------|-------------------|-----|--|
| STEP 11: 3.3.1.6 Calculate | CRITICAL STEP | | | | |
| A Total Available Rod Worth | Sten 3 3 1 1 | 5000 00 | m | | |
| B Untrippable RCCAs Penalty | Step 3 3 1 4 | 1590 PC | m | | |
| C. Inserted Worth of Present Position | Step 3.3.1.5 | 9 pc | m | | |
| Available Reactivity Worth of Trippable RCCAs | (A) - (B) - (C) | 3409 pc | m | | |
| STANDARD: Applicant calculates Available Reactivity Worth of Trippable RCCAs to be 3409 pcm. Examiner Note: This step is critical to ensure accurate result for final calculation. COMMENTS: | | | | | |
| STEP 12: 3.3.1.7 Calculate | total misaligned F | RCCA reactiv | vity worth below: | | |
| Description | Reference | Value | e | | |
| A. Quantity of Misaligned Rods | Step 3.1.8 | 0 | | | |
| B. Maximum Dropped or Misaligne Rod Worth | ed Section 5.7 of ROD Manual | f 200 | pcm | | |
| Total misaligned RCCA Reactivi Worth | ty (A) X (B) | 0 | рст | SAT | |
| STANDARD: | UNSAT | | | | |
| pcm. | | | | | |
| COMMENTS: | | | | | |

| STEP / S | SAT / UNSAT | | | |
|--|---------------------------------|----------|-----|--|
| NOTE: Interpolation of Power Defect Bounding burnups and power highest Power Defect from S (R.M.) | CRITICAL STEP | | | |
| STEP 13: 3.3.2 Calculate SDM for | present condit | ions: | | |
| Description | Reference | Value | | |
| A. Available reactivity worth of Trippable RCCAs | Step 3.3.1.6 | 3409 | pcm | |
| B. Total misaligned RCCA reactivity Worth | Step 3.3.1.7 | 0 | pcm | |
| C. Total Power Defect at present thermal power (Step 3.1.3) and current cycle burnup (Step 3.1.5) | Section 5.9 of R.O.D. manual | 1554 | pcm | |
| D. Transient Flux Redistribution Allowance | Section 5.7 of R O D manual | 512 | | |
| Present SDM | (A) - (B) - (C) - (D) | (+) 1343 | pcm | |
| <u>STANDARD</u> : | SAT UNSAT | | | |
| Applicant calculates Present SDN | | | | |
| Examiner Note: It is not critical fo in the above calcu incorrectly record above, then this o | gn | | | |
| Examiner Note: This step is critica calculation and to for present plant | 31 | | | |
| COMMENTS: | | | | |
| | | | | |

| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| <u>STEP 14:</u> Adequate shutdown margin exists (YES/NO). | CRITICAL STEP |
| Applicant determines that 1300 pcm of SDM is required for the current plant conditions and that an actual SDM of 1343 pcm is adequate. Applicant records YES for 2 nd part of answer. | |
| Examiner Note: This step is critical to determine that adequate SDM does exist for the current plant conditions. | SAT |
| COMMENTS: | UNSAT |
| | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- The Reactor Eng Analysis and Calc Toolkit (REACT) CNS is inoperable.
- During performance of PT/0/A/4150/030 (RCCA Bank Repositioning), it was determined that Control Rods B6 and H8 were immovable and untrippable.
- IAE is investigating.
- Unit 1 conditions:
 - Mode 1 at 100% RTP
 - Cycle burnup is 25 EFPD
 - Control Bank 'D' position is 215 steps withdrawn
 - All other rods are at 226 steps withdrawn
 - Current Boron Concentration is 1370 ppmB

INITIATING CUES:

- The Shift Manager has directed you to perform a shutdown margin calculation using OP/0/A/6100/006 (Reactivity Balance Calculations).
- Calculation is to be performed for current date and time.
- Initial conditions have been verified.
- Independent Verification has been waived.
- This JPM is time critical.

Calculated shutdown margin for current conditions _____ pcm Adequate shutdown margin exists (YES/NO) _____

Enclosure 4.3

Shutdown Margin - Untrippable / Misaligned RCCA(s) - Modes 1 & 2

OP/**0**/A/6100/006 Page 2 of 7

3. Procedure

3.1 Determine the following information:

NOTE: "Quantity of Misaligned Rods" refers to rods that are misaligned but remain trippable. Only the total number of rods is required. (R.M.)

| Step | Description | Reference | Value |
|--------|---|-------------------------|-------------------------------------|
| 3.1.1 | Unit | N/A | 1 |
| 3.1.2 | Date/Time | N/A | Today's Date / Time |
| 3.1.3 | Present Power | P1385 | 100 % |
| 3.1.4 | NC System Boron Concentration | Latest sample | 1370 ppm |
| 3.1.5 | Current burnup | P1457 | 25 EFPD |
| 3.1.6 | Present control bank position | OAC or Control Board | _215_ SWD on Control Bank_D |
| 3.1.7 | Present shutdown bank position | OAC or Control Board | A 226 B 226 C 226 D 226 E 226 |
| 3.1.8 | Quantity of misaligned rods | N/A | 0 |
| 3.1.9 | Number of untrippable RCCAs | N/A | 2 |
| 3.1.10 | Untrippable RCCA(s) core location(s) | N/A | B6, H8 |

N/A 3.2 **IF** using the REACT program to complete the calculation, perform the following:

- □ 3.2.1 Access "Reactor Eng Analysis and Calc Toolkit (REACT) CNS" from DAE.
- □ 3.2.2 Select "View" then "Reactivity Balance Calculations" on toolbar.
- □ 3.2.3 Select "SDM Mode 1 or 2" tab in Reactivity Balance Calculations window.

Enclosure 4.3

OP/**0**/A/6100/006 Page 3 of 7

Shutdown Margin - Untrippable / Misaligned RCCA(s) - Modes 1 & 2

CAUTION: All inputs must be checked carefully and corrected as needed before calculating results. The correct Unit must be specified.

| NOTE: | Untrip shu | pab 1tdo | le control roo wn banks ar | ds are input by clicking "Select Inoperable Rods" and any inserted e input using "Shutdown Banks Inserted" tab. (R.M.) | |
|-------|--|-------------|---|---|--|
| | _ 3.2.4 | | Enter appropriate values from Step 3.1 in "Input Data" section for the following: | | |
| | | | □ "Shutdo | own Margin" tab | |
| | | | □ "Shutdo | own Banks Inserted" tab | |
| | _ 3.2.5 | | Obtain resu | lts as follows: | |
| | | | 3.2.5.1 | Click "Calculate" button. | |
| | | | 3.2.5.2 | Print program results. | |
| | | | 3.2.5.3 | Label printout appropriately. | |
| | | | 3.2.5.4 | Attach printout to this enclosure. | |
| | 3.2.6 | | Sign below | to document performance: | |
| | | | Performed | byDate/Time:/ | |
| | _ 3.2.7 | | Ensure that performed. | an independent calculation per this enclosure has been separately | |
| NOTE: | NOTE: Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise. | | | | |

Verify that both performances of this enclosure yield equivalent results 3.2.8

Enclosure 4.3

OP/**0**/A/6100/006 Page 4 of 7

Shutdown Margin - Untrippable / Misaligned F RCCA(s) - Modes 1 & 2

3.2.9 Perform one of the following based on results of the calculations: 3.2.9.1 **IF** Effective Shutdown Margin for a Present Position is greater than the Required Shutdown Margin, notify the CRS that Effective Shutdown Margin is acceptable. OR 3.2.9.2 IF Effective Shutdown Margin for a Present Position is less than the Required Shutdown Margin, notify the CRS to apply the applicable Technical Specification Action. 3.2.10 Submit both performances of this enclosure to the Control Room Supervisor for review. **NOTE:** 1. A dropped rod is considered trippable. (R.M.) 2. All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e. ()_____ pcm], the sign provided with data must be recorded. The calculations account for these sign conventions. (R.M.) 3.3 **IF** performing the calculation manually, perform the following: Determine available reactivity worth of trippable RCCAs for conditions in 3.3.1 Step 3.1: NOTE: Interpolation is **NOT** required in Step 3.3.1.1. Reactivity worth may be determined by choosing the lowest reactivity worth from Section 5.7 of the R.O.D Manual associated with cycle burnups that bound the present cycle burnup recorded in Step 3.1. (R.M.) **5008** 3.3.1.1 Determine Total Available Rod Worth pcm (Section 5.7 of R.O.D. manual) N/A 3.3.1.2 **IF** only one RCCA is untrippable, determine reactivity worth penalty for untrippable RCCA core location of Step 3.1.10 (Section 5.8 of R.O.D. manual). _____ pcm 3.3.1.3 **IF** there are multiple untrippable RCCAs, perform the following: □ A. Determine untrippable RCCA of Step 3.1.10 with the highest reactivity worth penalty (Section 5.8 of ROD Manual). Core Location <u>H-8</u>

Enclosure 4.3

OP/**0**/A/6100/006 Page 5 of 7

Shutdown Margin - Untrippable / Misaligned Page 5 c RCCA(s) - Modes 1 & 2

- □ B. Record reactivity worth of the untrippable RCCA of Step 3.3.1.3.A (Section 5.8 of ROD Manual).
 <u>580</u> pcm
- □ C. Determine maximum stuck rod worth during cycle (Section 5.7 of the R.O.D. manual). <u>1010</u> pcm
- □ D. Calculate total untrippable RCCA reactivity worth penalty below:

| Description | Reference | Value | |
|--|-------------------------------|-------|-----|
| A.Number of Untrippable RCCAs | Step 3.1.9 | 2 | |
| B. Highest Worth Penalty | Step 3.3.1.3 B | 580 | pcm |
| C. Max Stuck Rod | Step 3.3.1.3 C | 1010 | pcm |
| Total untrippable RCCA Worth Penalty for Multiple RCCAs | { [(A) - 1] X (C) } + (B) | 1590 | pcm |

_____ 3.3.1.4 Record Total Untrippable RCCA Penalty from Step 3.3.1.2 or Step 3.3.1.3D, whichever is applicable. _____ pcm

NOTE: Interpolation is <u>NOT</u> required in Step 3.3.1.5. Reactivity worth may be determined by choosing the highest reactivity worth from Section 5.6.3 of the R.O.D Manual associated with rod positions that bound the present rod position. (R.M.)

| 3.3.1.5 | Determine Inse | rted Rod Worth | h for present b | ank positions: |
|---------|----------------|----------------|-----------------|----------------|
|---------|----------------|----------------|-----------------|----------------|

| Description | Reference | Value |
|---|---|--|
| A. HFP, Eq Xenon IRW for current control bank position and current cycle burnup | Step 3.1.6 Step 3.1.5 (Section 5.6.3 of R.O.D. manual) | 9 pcm |
| B. HFP, Eq Xenon IRW for current shutdown bank positions and current cycle burnup | Step 3.1.7 Step 3.1.5 (Section 5.6.3 of R.O.D. manual) | SD E 0 pcm SD D 0 pcm SD C 0 pcm SD B 0 pcm SD A 0 pcm |
| Inserted Worth of Present Position | Sum of above | 9 pcm |

Enclosure 4.3

OP/**0**/A/6100/006 Page 6 of 7

Shutdown Margin - Untrippable / Misaligned Pa RCCA(s) - Modes 1 & 2

3.3.1.6 Calculate available reactivity worth of trippable RCCAs:

| Description | Reference | Value |
|-------------------------------|-----------------|-----------------|
| A. Total Available Rod Worth | Step 3.3.1.1 | 5008 pcm |
| B. Untrippable RCCAs Penalty | Step 3.3.1.4 | 1590 pcm |
| C. Inserted Worth of Present | Step 3.3.1.5 | 9 pcm |
| Position | | • |
| Available Reactivity Worth of | | |
| Trippable RCCAs | (A) - (B) - (C) | 3409 pcm |

3.3.1.7 Calculate total misaligned RCCA reactivity worth below:

| Description | Reference | Value |
|---|------------------------------|----------------|
| A. Quantity of Misaligned Rods | Step 3.1.8 | 0 |
| B. Maximum Dropped or Misaligned Rod Worth | Section 5.7 of ROD Manual | 200 pcm |
| Total misaligned RCCA Reactivity Worth | (A) X (B) | 0 pcm |

NOTE: Interpolation of Power Defect is <u>NOT</u> required for Step 3.3.2. Bounding burnups and power levels may be used to select the highest Power Defect from Section 5.9 of the R.O.D. manual. (R.M.)

_____ 3.3.2 Calculate SDM for present conditions:

| Description | Reference | | Value | |
|--|-------------------|-------|-------|-----|
| A. Available reactivity worth of | Step 3.3.1.6 | pcm | | pcm |
| Trippable RCCAs | | 3409 | | |
| B. Total misaligned RCCA reactivity | Step 3.3.1.7 | o pcr | | pcm |
| Worth | | | • | |
| C. Total Power Defect at present thermal | Section 5.9 of | | 4554 | pcm |
| power (Step 3.1.3) and current cycle | R.O.D. manual | 1554 | | |
| burnup (Step 3.1.5) | | | | |
| D. Transient Flux Redistribution | Section 5.7 of | 512 | | |
| Allowance | R.O.D. manual | | 012 | |
| Present SDM | (A) - (B) - (C) - | (+) | 4242 | pcm |
| | (D) | | 1343 | - |

Enclosure 4.3

Shutdown Margin - Untrippable / Misaligned P RCCA(s) - Modes 1 & 2

3.3.3 Sign below to document performance: Performed by_____Date/Time:____/ 3.3.4 Ensure that an independent calculation per this enclosure has been separately performed NOTE: Independently performed calculations may **NOT** yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise. 3.3.5 Verify that both performances of this enclosure yield equivalent results 3.3.6 Perform one of the following based on results of the calculations: **IF** present SDM is \geq 1300 pcm per the applicable Technical 3.3.6.1 Specification via COLR, notify the CRS that present SDM is acceptable. OR

_____ 3.3.6.2 **IF** present SDM is < 1300 pcm notify the CRS to apply the applicable Technical Specification Action.

JPM A.1-2 KEY

OP/**0**/A/6100/006

Page 7 of 7

| | Procedure No. |
|-------------|---------------------------|
| | |
| | |
| | |
| | |
| | Revision No. |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | Electronic Reference No |
| | Electronic Reference 100. |
| | |
| | |
| | |
| PERFORMANCE | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

Reactivity Balance Calculation

1. Purpose

| NOTE: | Reactivity Management Related | |
|--------|---|--|
| 1.1 | To estimate critical NC System boron concentration before criticality based on other assumed core reactivity conditions. | |
| 1.2 | To estimate critical control bank position before criticality based on other assumed core reactivity conditions. | |
| 1.3 | To calculate shutdown margin in Modes 1 and 2 with untrippable and/or misaligned RCCAs. (TS 3.1.4) | |
| 1.4 | To calculate the NC System boron concentration at which shutdown margin will <u>NOT</u> be met in Modes 2 (with K-eff < 1.0), 3, 4, and 5. (TS 3.1.1) | |
| 1.5 | To verify K-eff < 0.99 with shutdown banks withdrawn. | |
| 1.6 | To calculate the NC System boron concentration at which refueling boron concentration will <u>NOT</u> be met in Mode 6. (TS 3.9.1) | |
| 2. Lin | 2. Limits and Precautions | |

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 2.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 2.2 Ensure all data used by this procedure are for the correct unit.
- 2.3 NC System T-AVG shall be maintained within ± 1 °F of T-REF in Modes 1 and 2 to reduce uncertainties in calculations.
- 2.4 Shutdown margin (SDM) shall be \geq 1000 pcm in Mode 5. (Tech Spec 3.1.1 and Enclosure 4.5 and 4.6)
- 2.5 SDM shall be \geq 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)
- 2.6 Required refueling boron concentration is obtained from Tech Spec 3.9.1 and Enclosure 4.6.
- 2.7 **<u>IF</u>** T-AVG < 500 °F, credit for only 50% of xenon worth can be taken when verifying SDM.

OP/**0**/A/6100/006 Page 3 of 4

- 2.8 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.
- 2.9 Criticality shall <u>NOT</u> be obtained outside the maximum window (±750 pcm) of estimated critical position.
- 2.10 Desired critical control bank position shall <u>NOT</u> be below the control bank insertion limits <u>OR</u> above any temporary control bank withdrawal limits.
- 2.11 Verification of K-eff < 0.99 with shutdown banks withdrawn shall only be performed above 200 °F.
- 2.12 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 2.13 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.
- 2.14 Shutdown Margin is satisfied if NC System Boron Concentration ≥ to the Refueling Boron Concentration per the COLR.
- 2.15 Maintaining Boron Dilution Mitigation System (BDMS) operability with no reactor coolant pumps in service when in Modes 4 or 5 requires an additional boron penalty be added to Shutdown Margin calculations.

3. Procedure

Refer To Section 4 (Enclosures).

4. Enclosures

| NOTE: | For enclosures that require an independent verification, separate enclosures shall be printed out for both parties performing the calculations. | |
|-------|---|--|
| 4.1 | Estimated Critical Boron Concentration (ECB) | |
| 4.2 | Estimated Critical Position (ECP) | |
| 4.3 | Shutdown Margin - Untrippable / Misaligned RCCA(s) - Modes 1 and 2 | |
| 4.4 | Shutdown Margin Within Two Hours Of A Reactor Trip | |
| 4.5 | Shutdown Margin (With or Without Xenon Credit) Using REACT Program | |
| 4.6 | Shutdown Margin (With or Without Xenon Credit) Manual Calculation | |
| 4.7 | Verification of K-eff < 0.99 with Shutdown Banks Withdrawn | |

OP/**0**/A/6100/006 Page 4 of 4

- 4.8 Shutdown Boron Concentration Mode 6
- 4.9 Shutdown Fission Product Correction Factor

Enclosure 4.1 Estimated Critical Boron Concentration (ECB)

1. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 1.2 Ensure all data used by this procedure are for the correct unit.
- 1.3 NC System T-AVG shall be maintained within ± 1 °F of T-REF in Modes 1 and 2 to reduce uncertainties in calculations.
- 1.4 SDM shall be \geq 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)
- 1.5 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.
- 1.6 Criticality shall <u>NOT</u> be obtained outside the maximum window (±750 pcm) of estimated critical position.
- 1.7 Desired critical control bank position shall <u>NOT</u> be below the control bank insertion limits <u>OR</u> above any temporary control bank withdrawal limits.
- 1.8 Verification of K-eff < 0.99 with shutdown banks withdrawn shall only be performed above 200 °F.
- 1.9 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 1.10 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

2. Initial Conditions

- 2.1 Ensure latest NC system boron sample has been entered into the OAC.
- 2.2 Verify with Reactor Engineer that OAC MVU group "Boron 10 Depletion" is current.

Enclosure 4.1 Estimated Critical Boron Concentration (ECB)

3. Procedure

- **NOTE:** 1. All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e.()_____pcm], the sign provided with data must be entered. The calculations account for these sign conventions. (R.M.)
 - 2. All ECB calculations must be performed independently by a Qualified Reactor Engineer (per NSD 304) and a Licensed Operator.
- 3.1 Determine the following information:

| Step | Description | Reference | Value |
|-------|---|--|------------------------|
| 3.1.1 | Unit | N/A | |
| 3.1.2 | Cycle Burnup | P1457 | EFPD |
| 3.1.3 | Anticipated Date/Time of Criticality | N/A | |
| 3.1.4 | NC System Effective Boron Concentration | P5614 | ppm |
| 3.1.5 | Desired Critical Rod Position At least 1000 pcm above HZP Rod Insertion Limit in Section 2.2 of ROD Manual | Duty Rx Eng | SWD on Control Bank |
| 3.1.6 | Xenon Worth at Time of Criticality | REACT OAC Predict or Rx Eng | pcm |
| 3.1.7 | Diff. Between Eq. and Present Sm Worth | P1475, REACT, OAC Predict or Rx Eng | () pcm |
| 3.1.8 | Shutdown Fission Product Correction Factor | $\frac{\mathbf{IF}}{\mathbf{ELSE}}$ Cycle Burnup < 12 EFPD = 0, $\underline{\mathbf{ELSE}}$ per Enclosure 4.9 | ppm |
| 3.1.9 | BAT Boron Concentration | Latest sample | ppm |

3.2 Access "Reactor Eng Analysis and Calc Toolkit (REACT) - CNS" from DAE.

3.3 Select "View" then "Reactivity Balance Calculations" on toolbar.

3.4 Select ECB (Estimated Critical Boron Concentration) tab in Reactivity Balance Calculations window.
CAUTION: All inputs must be checked carefully and corrected as needed before calculating results. The correct Unit must be specified.

| NOTE: | Sign must be provided with Difference from Equilibrium Samarium [i.e., () | pcm] |
|-------|---|------|
| | (R.M.) | |

- _____ 3.5 Enter appropriate values from Step 3.1 in "Input Data" section.
- _____ 3.6 Obtain results as follows:
 - \Box 3.6.1 Click "C<u>a</u>lculate" button.
 - \Box 3.6.2 Print program results.
 - □ 3.6.3 Label printout appropriately.
 - \Box 3.6.4 Attach printout to this enclosure.
 - 3.7 Sign below to document performance.

| Performed by: | Date/Time: | / | |
|--|------------|---|--|
| Circle One: Qualified Reactor Engineer / Licensed Operat | or | | |

- 3.8 Ensure that an independent calculation per this enclosure has been separately performed.
- **NOTE:** Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.
- 3.9 Verify that both performances of this enclosure yield equivalent results.

Estimated Critical Position (ECP)

1. Limits and Precautions

- **NOTE:** All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)
 - 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
 - 1.2 Ensure all data used by this procedure are for the correct unit.
 - 1.3 NC System T-AVG shall be maintained within ± 1 °F of T-REF in Modes 1 and 2 to reduce uncertainties in calculations.
 - 1.4 SDM shall be \geq 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)
 - 1.5 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.
 - 1.6 Criticality shall <u>NOT</u> be obtained outside the maximum window (±750 pcm) of estimated critical position.
 - 1.7 Desired critical control bank position shall <u>NOT</u> be below the control bank insertion limits <u>OR</u> above any temporary control bank withdrawal limits.
 - 1.8 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
 - 1.9 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

2. Initial Conditions

- 2.1 Ensure latest NC system boron sample has been entered into the OAC.
- 2.2 Verify with Reactor Engineer that OAC MVU group "Boron 10 Depletion" is current.

Estimated Critical Position (ECP)

3. Procedure

| NOTE: | 1. | All values are assumed positive unless otherwise indicated by parentheses. If |
|-------|----|---|
| | | parentheses precede the value [i.e.()pcm], the sign provided with data |
| | | must be entered. The calculations account for these sign conventions. (R.M.) |
| | 2. | All ECP calculations must be performed independently by a Qualified Reactor Engineer and a Licensed Operator. |

| Step | Description | Reference | Value |
|-------|---|--|--------|
| 3.1.1 | Unit | N/A | |
| 3.1.2 | Cycle Burnup | P1457 | EFPD |
| 3.1.3 | Anticipated Date/Time of Criticality | N/A | |
| 3.1.4 | NC System Effective Boron Concentration | P5614 | ppm |
| 3.1.5 | Xenon Worth at Time of Criticality | REACT, OAC Predict or Rx Eng | pcm |
| 3.1.6 | Diff. Between Eq. and Present Sm Worth | P1475, REACT, OAC Predict or Rx Eng | () pcm |
| 3.1.7 | Shutdown Fission Product Correction Factor | $\underline{IF} Cycle Burnup < 12 EFPD = 0,$ $\underline{ELSE} per Enclosure 4.9$ | ppm |

_ 3.1 Determine the following information:

3.2 Access "Reactor Eng Analysis and Calc Toolkit (REACT) - CNS" from DAE.

3.3 Select "View" then "Reactivity Balance Calculations" on toolbar.

3.4 Select ECP (Estimated Critical Position) tab in Reactivity Balance Calculations window.

CAUTION: All inputs must be checked carefully and corrected as needed before calculating results. The correct Unit must be specified.

NOTE: Sign must be provided with Difference from Equilibrium Samarium [i.e., () ____ pcm] (R.M.)

3.5 Enter appropriate values from Step 3.1 in "Input Data" section.

Estimated Critical Position (ECP)

| _ | 3.6 | | Obtain res | Obtain results as follows: | | | | | |
|---|-------|---|--|---|--|--|--|--|--|
| | | | 3.6.1 Click "C <u>a</u> lculate" button. | | | | | | |
| | | | 3.6.2 | Print program results. | | | | | |
| | | | 3.6.3 | Label printout appropriately. | | | | | |
| | | | 3.6.4 | Attach printout to this enclosure. | | | | | |
| | 3.7 | | Verify that Withdraw results. | at Rod Insertion Limits (R.O.D. Manual Section 2.2) and (if applicable) Rod val Limits (R.O.D. Manual Section 2.3) will <u>NOT</u> be violated based on ECP | | | | | |
| | 3.8 | | Sign belo | w to document performance. | | | | | |
| | | Performed by: Date/Time:/ Circle One: Qualified Reactor Engineer / Licensed Operator | | | | | | | |
| | 3.9 | | Ensure the | at an independent calculation per this enclosure has been separately performed. | | | | | |
| | NOTE: | | Independe data taken questions a | ntly performed calculations may <u>NOT</u> yield exactly the same results due to at different times. The CRS and Reactor Engineering may be contacted if arise. | | | | | |
| | 3.10 | 0 | Verify that | at both performances of this enclosure yield equivalent results. | | | | | |

Shutdown Margin - Untrippable / Misaligned F RCCA(s) - Modes 1 & 2

1. Limit and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 1.2 Ensure all data used by this procedure are for the correct unit.
- 1.3 NC System T-AVG shall be maintained within ± 1 °F of T-REF in Modes 1 and 2 to reduce uncertainties in calculations.
- 1.4 SDM shall be \geq 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)
- 1.5 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 1.6 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

2. Initial Conditions

None

3. Procedure

3.1 Determine the following information:

NOTE: "Quantity of Misaligned Rods" refers to rods that are misaligned but remain trippable. Only the total number of rods is required. (R.M.)

| Step | Description | Reference | Value |
|--------|--------------------------------|----------------|--------------|
| 3.1.1 | Unit | N/A | |
| 3.1.2 | Date/Time | N/A | |
| 3.1.3 | Present Power | P1385 | |
| | | | % |
| 3.1.4 | NC System Boron Concentration | Latest sample | ppm |
| 3.1.5 | Current burnup | P1457 | |
| | 1 | | EFPD |
| 3.1.6 | Present control bank position | OAC or Control | SWD on |
| | | Board | Control Bank |
| 3.1.7 | Present shutdown bank position | OAC or Control | A B |
| | 1 | Board | C D |
| | | | E |
| 3.1.8 | Quantity of misaligned rods | N/A | |
| 3.1.9 | Number of untrippable RCCAs | N/A | |
| 3.1.10 | Untrippable RCCA(s) core | N/A | |
| | location(s) | | |

3.2 **IF** using the REACT program to complete the calculation, perform the following:

- □ 3.2.1 Access "Reactor Eng Analysis and Calc Toolkit (REACT) CNS" from DAE.
- □ 3.2.2 Select "View" then "Reactivity Balance Calculations" on toolbar.
- □ 3.2.3 Select "SDM Mode 1 or 2" tab in Reactivity Balance Calculations window.

CAUTION: All inputs must be checked carefully and corrected as needed before calculating results. The correct Unit must be specified.

| NOTE: | Untrippable control rods are input by clicking "Select Inoperable Rods" and any inserted |
|-------|--|
| | shutdown banks are input using "Shutdown Banks Inserted" tab. (R.M.) |

- _____ 3.2.4 Enter appropriate values from Step 3.1 in "Input Data" section for the following:
 - □ "Shutdown Margin" tab
 - □ "Shutdown Banks Inserted" tab
 - 3.2.5 Obtain results as follows:
 - \Box 3.2.5.1 Click "Calculate" button.
 - \Box 3.2.5.2 Print program results.
 - \Box 3.2.5.3 Label printout appropriately.
 - \Box 3.2.5.4 Attach printout to this enclosure.

3.2.6 Sign below to document performance:

Performed by_____Date/Time:____/

_____ 3.2.7 Ensure that an independent calculation per this enclosure has been separately performed.

NOTE: Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

3.2.8 Verify that both performances of this enclosure yield equivalent results

| | | OP/ 0 /A/6100/006 | | | | |
|-------|--|---|---|--|--|--|
| | | Shutdo | wn Margin - Untrippable / Misaligned RCCA(s) - Modes 1 & 2 | Page 4 of 7 | | |
| | _ 3.2.9 | Perform one | e of the following based on results of the c | alculations: | | |
| | | 3.2.9.1 | 2.9.1 IF Effective Shutdown Margin for a Present Position is greater than the Required Shutdown Margin, notify the CRS that Effective Shutdown Margin is acceptable. | | | |
| | | | OR | | | |
| | | 3.2.9.2 | IF Effective Shutdown Margin for a Pres the Required Shutdown Margin, notify th applicable Technical Specification Action | ent Position is less than e CRS to apply the 1. | | |
| | _ 3.2.10 | Submit both for review. | performances of this enclosure to the Con | ntrol Room Supervisor | | |
| NOTE: | A drop All va parent data n | pped rod is co lues are assu heses preceden ust be record | onsidered trippable. (R.M.) ned positive unless otherwise indicated by e the value [i.e. () pcm], led. The calculations account for these sign | v parentheses. If the sign provided with a conventions. (R.M.) | | |
| 3.3 | IF perfor | ming the calc | culation manually, perform the following: | | | |
| | _ 3.3.1 | Determine a Step 3.1: | wailable reactivity worth of trippable RCC | CAs for conditions in | | |
| NOTE: | Interpolat choosing with cycle | ion is <u>NOT</u> reaction is <u>NOT</u> reaction is <u>NOT</u> reaction of the second se | equired in Step 3.3.1.1. Reactivity worth r activity worth from Section 5.7 of the R.O. bound the present cycle burnup recorded | nay be determined by D Manual associated in Step 3.1. (R.M.) | | |
| | | 3.3.1.1 | Determine Total Available Rod Worth (Section 5.7 of R.O.D. manual) | pcm | | |
| | | 3.3.1.2 | IF only one RCCA is untrippable, determ penalty for untrippable RCCA core locati (Section 5.8 of R.O.D. manual). | nine reactivity worth on of Step 3.1.10 pcm | | |
| | | 3.3.1.3 | \underline{IF} there are multiple untrippable RCCAs | , perform the following: | | |
| | | | A. Determine untrippable RCCA of Step reactivity worth penalty (Section 5.8 Core Location | p 3.1.10 with the highest of ROD Manual). | | |

Shutdown Margin - Untrippable / Misaligned Page 5 of 7 RCCA(s) - Modes 1 & 2

Enclosure 4.3

- □ B. Record reactivity worth of the untrippable RCCA of Step 3.3.1.3.A (Section 5.8 of ROD Manual).
- □ C. Determine maximum stuck rod worth during cycle (Section 5.7 of the R.O.D. manual). _____ pcm
- □ D. Calculate total untrippable RCCA reactivity worth penalty below:

| Description | Reference | Value |
|--|------------------------------------|-------|
| A.Number of Untrippable RCCAs | Step 3.1.9 | |
| B. Highest Worth Penalty | Step 3.3.1.3 B | pcm |
| C. Max Stuck Rod | Step 3.3.1.3 C | pcm |
| Total untrippable RCCA Worth Penalty for Multiple RCCAs | $\{ [(A) - 1] X (C) \} + (B) \}$ | рст |

_____ 3.3.1.4 Record Total Untrippable RCCA Penalty from Step 3.3.1.2 or Step 3.3.1.3D, whichever is applicable. _____ pcm

NOTE: Interpolation is <u>NOT</u> required in Step 3.3.1.5. Reactivity worth may be determined by choosing the highest reactivity worth from Section 5.6.3 of the R.O.D Manual associated with rod positions that bound the present rod position. (R.M.)

| 3.3.1.5 | Determine | Inserted | Rod | Worth fo | r present | bank | positions: |
|---------|-----------|----------|-----|----------|-----------|------|------------|
|---------|-----------|----------|-----|----------|-----------|------|------------|

| Description | Reference | Value |
|---|---|-------------------------------------|
| A. HFP, Eq Xenon IRW for current control bank position and current cycle burnup | Step 3.1.6 Step 3.1.5 (Section 5.6.3 of R.O.D. manual) | pcm |
| B. HFP, Eq Xenon IRW for current shutdown bank positions and current cycle burnup | Step 3.1.7 Step 3.1.5 (Section 5.6.3 of R.O.D. manual) | SD EpcmSD DpcmSD CpcmSD BpcmSD Apcm |
| Inserted Worth of Present Position | Sum of above | pcm |

3.3.1.6 Calculate available reactivity worth of trippable RCCAs:

| Description | Reference | Value |
|--|-----------------|-------|
| A. Total Available Rod Worth | Step 3.3.1.1 | pcm |
| B. Untrippable RCCAs Penalty | Step 3.3.1.4 | pcm |
| C. Inserted Worth of Present Position | Step 3.3.1.5 | pcm |
| Available Reactivity Worth of Trippable RCCAs | (A) - (B) - (C) | pcm |

3.3.1.7 Calculate total misaligned RCCA reactivity worth below:

| Description | Reference | Value |
|---|----------------|-------|
| A. Quantity of Misaligned Rods | Step 3.1.8 | |
| B. Maximum Dropped or Misaligned | Section 5.7 of | pcm |
| Rod Worth | ROD Manual | |
| Total misaligned RCCA Reactivity Worth | (A) X (B) | рст |

NOTE: Interpolation of Power Defect is <u>NOT</u> required for Step 3.3.2. Bounding burnups and power levels may be used to select the highest Power Defect from Section 5.9 of the R.O.D. manual. (R.M.)

_____ 3.3.2 Calculate SDM for present conditions:

| Description | Reference | Value |
|--|-------------------|---------|
| A. Available reactivity worth of | Step 3.3.1.6 | pcm |
| Trippable RCCAs | | |
| B. Total misaligned RCCA reactivity | Step 3.3.1.7 | pcm |
| Worth | | |
| C. Total Power Defect at present thermal | Section 5.9 of | pcm |
| power (Step 3.1.3) and current cycle | R.O.D. manual | |
| burnup (Step 3.1.5) | | |
| D. Transient Flux Redistribution | Section 5.7 of | |
| Allowance | R.O.D. manual | |
| Present SDM | (A) - (B) - (C) - | () pcm |
| | (D) | |

| | | Shutdo | Enclosure 4.3 own Margin - Untrippable / Misaligned RCCA(s) - Modes 1 & 2 | OP/ 0 /A/6100/006 Page 7 of 7 |
|-------|--------------------------------------|---|---|---|
| | 3.3.3 | Sign below | to document performance: | |
| | | Performed | byDate/Tin | ne:/ |
| | _ 3.3.4 | Ensure that performed | an independent calculation per this enclos | ure has been separately |
| NOTE: | Independe data taker questions | dently performed calculations may <u>NOT</u> yield exactly the same results due to en at different times. The CRS and Reactor Engineering may be contacted if as arise. | | |
| | _ 3.3.5 | Verify that | both performances of this enclosure yield | equivalent results |
| | _ 3.3.6 | Perform on | e of the following based on results of the c | alculations: |
| | | 3.3.6.1 | <u>IF</u> present SDM is \geq 1300 pcm per the ap Specification via COLR, notify the CRS acceptable. | oplicable Technical that present SDM is |
| | | | OR | |
| | | 3.3.6.2 | IF present SDM is < 1300 pcm notify the applicable Technical Specification Actio | e CRS to apply the n. |

1. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 1.2 Ensure all data used by this procedure are for the correct unit.
- 1.3 NC System T-AVG shall be maintained within ± 1 °F of T-REF in Modes 1 and 2 to reduce uncertainties in calculations.
- 1.4 SDM shall be \geq 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)
- 1.5 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.
- 1.6 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 1.7 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

2. Initial Conditions

None

Enclosure 4.4 Shutdown Margin Within Two Hours Of A Reactor Trip

3. Procedure

- Interpolation is <u>NOT</u> required in Step 3.1. The Minimum NC Temperature may be determined by choosing the highest temperature from Section 2.6 of the R.O.D Manual associated with the current cycle burnup that bound the present cycle burnup. (R.M.)
 - This enclosure is valid only if all control rods are fully inserted. With one or more rods <u>NOT</u> fully inserted, use Enclosure 4.5 (Shutdown Margin (With or Without Xenon Credit) Using REACT Program) or Enclosure 4.6 (Shutdown Margin (With or Without Xenon Credit) Manual Calculation).
 - This Enclosure is only valid for two hours from the time of the Reactor trip.
- 3.1 Record the following information:

| Step | Description | Reference | Value |
|-------|-------------------------------|----------------|-------|
| 3.1.1 | Unit | N/A | |
| 3.1.2 | Cycle Burnup | P1457 | EFPD |
| 3.1.3 | Present NC System T-AVG | OAC or Control | °F |
| | | Board | |
| 3.1.4 | Minimum Moderator Temperature | R.O.D. Manual | °F |
| | Following Reactor Trip | Section 2.6 | |

- - 3.3 Sign below to document performance.

Performed by: _____ Date/Time: ____/___

- 3.4 Ensure that separate, independent comparison of T-AVG versus Minimum Moderator Temperature has been performed per this enclosure.
- **NOTE:** Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.
- 3.5 Verify that both performances of this enclosure yield equivalent results.

Shutdown Margin (With or Without Xenon Credit) Using REACT Program

1. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 1.2 Ensure all data used by this procedure are for the correct unit.
- 1.3 Shutdown margin (SDM) shall be \geq 1000 pcm in Mode 5. (Tech Spec 3.1.1 and Enclosure 4.5 and 4.6)
- 1.4 SDM shall be \geq 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)
- 1.5 Required refueling boron concentration is obtained from Tech Spec 3.9.1 and Enclosure 4.6.
- 1.6 \underline{IF} T-AVG < 500 °F, credit for only 50% of xenon worth can be taken when verifying SDM.
- 1.7 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.
- 1.8 Verification of K-eff < 0.99 with shutdown banks withdrawn shall only be performed above 200 °F.
- 1.9 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 1.10 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.
- 1.11 Shutdown Margin is satisfied if NC System Boron Concentration ≥ to the Refueling Boron Concentration per the COLR.
- 1.12 Maintaining Boron Dilution Mitigation System (BDMS) operability with no reactor coolant pumps in service when in Modes 4 or 5 requires an additional boron penalty be added to Shutdown Margin calculations.

Shutdown Margin (With or Without Xenon **Credit) Using REACT Program**

OP/**0**/A/6100/006 Page 2 of 7

2. Initial Conditions

IF using effective boron concentration, ensure latest NC system boron sample has been 2.1 entered into the OAC Manual Data Log (MLOG).

3. Procedure

| NOTE: | 1. | All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e.()pcm], the sign provided with data must be entered. The calculations account for these sign conventions. (R.M.) |
|-------|----|--|
| | 2. | If latest NC boron sample is used instead of effective boron concentration, a ppm penalty, obtained from applicable Unit R.O.D. manual Section 5.14, is applied to account for B-10 depletion. Interpolation of Section 5.14 is <u>NOT</u> required. Using the larger value of the applicable burnup range provides conservatism. (R.M.) |
| | 3. | "SDM – Mode 5, 4, or 3" option also applies to Mode 2 with K-eff < 1.0 . (R.M.) |
| | 4. | Step 3.1.5 is only applicable when a boration is in progress in support of a NC System cooldown. The PZR is then considered a potential dilution source and a penalty must |

be included when calculating SDM. Otherwise a Value of $\underline{0}$ is entered in Step 3.1.5.

| Step | Description | Reference | Value |
|-------|-------------------------------------|--------------------|------------|
| 3.1.1 | Unit | N/A | |
| 3.1.2 | Date/Time | N/A | |
| 3.1.3 | Present NC System Boron Conc | Latest Sample | nnm |
| | OR | OR | PPm |
| | Effective Boron Concentration | P5614 | |
| 3.1.4 | IF NOT using Effective Boron | R.O.D. manual | ppm |
| | Concentration in Step 3.1.3, record | Section 5.14 | |
| | B-10 correction | | |
| 3.1.5 | IF PZR Boron Conc NOT verified | OP/1(2)/A/6100/002 | ppm |
| | to be within 50 ppm of NC System | | |
| | Boron Conc, record PZR mixing | | |
| | penalty of 100 ppm | | |
| 3.1.6 | Adjusted NC System Boron Conc | References used in | = |
| | Step 3.1.3 minus Step 3.1.4 minus | Steps 3.1.3, 3.1.4 | ppm |
| | Step 3.1.5. | and 3.1.5 | <u>OR</u> |
| | (IF sum negative record 0) | | <u>(0)</u> |

3.1 Determine the following information:

Shutdown Margin (With or Without Xenon Credit) Using REACT Program

| 3.2 | IF NC S per the | System Boron Concentration \geq to the Refueling Operations Boron Concentration COLR, Section 2.15, then Shutdown Margin is met and perform the following: | | |
|-------|-----------------------------------|---|--|--|
| | 3.2.1 | Sign below to document performance. | | |
| | | Performed by: Date/Time:/ | | |
| | _ 3.2.2 | Ensure that an independent calculation per this enclosure has been separately performed. | | |
| NOTE: | Independ data take question | dently performed calculations may <u>NOT</u> yield exactly the same results due to en at different times. The CRS and Reactor Engineering may be contacted if is arise. | | |
| | _ 3.2.3 | Verify that both performances of this enclosure yield equivalent results. | | |
| | _ 3.2.4 | Submit both performances of this enclosure to the Control Room Supervisor for review. | | |
| | _ 3.2.5 | N/A the remaining steps of this enclosure. | | |

Shutdown Margin (With or Without Xenon Credit) Using REACT Program

| Step | Description | Reference | Value |
|--------|-------------------------------------|---------------------|--------|
| 3.3.1 | Present NC System Temperature | OAC or Control | ° F |
| | | Board | |
| 3.3.2 | Desired NC System Temperature | N/A | ° F |
| 3.3.3 | Present cycle burnup | P1457 or Duty | EFPD |
| | | Reactor Engineer | |
| 3.3.4 | Present Difference from | P1475 or Duty | |
| | Equilibrium Samarium Worth | Reactor Engineer | |
| | - | | () pcm |
| 3.3.5 | Number of Known Untrippable | OAC or Control | |
| | Control Rods | Board | |
| 3.3.6 | Untrippable RCCA Core | OAC or Control | |
| | Locations | Board | |
| 3.3.7 | Date and time of latest valid | Duty Reactor | |
| | Iodine and Xenon concentrations; | Engineer or current | / |
| | N/A if xenon free. | time if using OAC | |
| 3.3.8 | Iodine concentration at time listed | P0124 or Duty | |
| | in Step 3.3.7; 0 if xenon free. | Reactor Engineer | atm/cc |
| 3.3.9 | Xenon concentration at time listed | P0125 or Duty | |
| | in Step 3.3.7; 0 if xenon free. | Reactor Engineer | atm/cc |
| 3.3.10 | Shutdown Fission Product | IF Cycle Burnup | |
| | Correction Factor | < 12 EFPD = 0, | |
| | | ELSE per | |
| | | Enclosure 4.9 | ppm |

_____ 3.3 Determine the following information:

3.4 Both Trains of DRPI indicate all rods on bottom:

 \Box YES (All Rods at Bottom)

OR

□ NO (Assume Most Reactive Rod Stuck Out)

Shutdown Margin (With or Without Xenon Credit) Using REACT Program

- 3.5 **IF** Unit is in Mode 4 or 5 <u>AND</u> no reactor coolant pumps are in service perform the following:
 - _____ 3.5.1 Record boron penalty from ROD Manual Section 5.15 for desired NC system temperature (Step 3.3.2), cycle burnup (Step 3.3.3) and rod configuration (Step 3.4). Boron Penalty______ppm
 - _____ 3.5.2 Calculate boron concentration for Shutdown Margin (SDM):

 $\frac{1}{(\text{Step 3.1.6})} - \frac{1}{(\text{Step 3.5.1})} = \underline{\qquad} \text{ppm } \underline{\mathbf{OR}} (0)$

- ------ 3.6 Access "Reactor Eng Analysis and Calc Toolkit (REACT) CNS" from DAE.
 - 3.7 Select "View" then "Reactivity Balance Calculations" on toolbar.

NOTE: "SDM – Mode 5, 4, or 3" option also applies to Mode 2 with K-eff < 1.0. (R.M.)

3.8 Select "SDM – Mode 5, 4, or 3" tab in Reactivity Balance Calculations window.

CAUTION: All inputs must be checked carefully and corrected as needed before calculating results. The correct Unit must be specified.

- **NOTE:** 1. Sign must be provided with Difference from Equilibrium Samarium [i.e., () _____ pcm] (R.M.)
 - 2. In REACT, "Inoperable RCCAs" refers to untrippable RCCAs. (R.M.)
 - 3. Rod locations are put in REACT in a text only format (e.g. B12 or B-12). REACT uses the maximum stuck rod worth for all known untrippable RCCAs. (R.M.)
- _____ 3.9 Enter appropriate values from Steps 3.1, 3.3, 3.4 and 3.5 in "Input Data" section.
- ____ 3.10 Obtain results as follows:
 - \Box 3.10.1 Click "C<u>a</u>lculate" button.
 - \Box 3.10.2 Print program results.
 - □ 3.10.3 Label printout appropriately.
 - \Box 3.10.4 Attach printout to this enclosure.

Shutdown Margin (With or Without Xenon Credit) Using REACT Program

- Compare the "Effective Shutdown Margin for Present Conditions" to adjusted NC 3.11 system boron concentration recorded in Step 3.1.6 **OR** if applicable, Step 3.5.2. 3.12 IF Xenon Credit was selected AND a potential boron deficit is indicated in the calculation results, complete the following steps: 3.12.1 Record "Adjusted SDM Deficit" from Reactivity Balance Calculation output: _____pcm Select "View" then "Xenon/Samarium Calculations" on toolbar. 3.12.2 3.12.3 Select "Xenon" for Isotope and "Transient Prediction" for Calculation Type. 3.12.4 Enter initial concentrations from Steps 3.1 and 3.3. **CAUTION:** The time in the initial entry for the power history must be the same time from when initial concentrations are taken. Mismatched times for power history initial time step and initial concentrations will cause REACT to predict incorrect xenon concentrations. (R.M.) 3.12.5 Enter appropriate power history as follows: 3.12.5.1 The date/time in step 3.3. 3.12.5.2 The power level at the time in step 3.3. 3.12.5.3 **IF** the current power level is different than the power level in step 3.3., then enter the date/time of power change and the current power level. 3.12.5.4 Enter a date/time approximately two days later after the last recorded date/time. After all data has been entered, use the "Calculate" button to obtain program 3.12.6 results. Print program results. 3.12.7
 - _____ 3.12.8 Label printout appropriately.
 - _____ 3.12.9 Attach printout to this enclosure.

Shutdown Margin (With or Without Xenon Credit) Using REACT Program

| CAUTIO | N: SDM is ensured until the Date/Time recorded below at the present NC System boron or higher. After that time, NC System boration will be required to maintain SDM. {PIP C-03-04173} (R.M.) |
|--------|---|
| | _ 3.12.10 Record the last Date/Time from the xenon predict of Step 3.12.7 that is greater than the xenon worth of Step 3.12.1 |
| | Loss of SDM Date/Time/ |
| 3.13 | Sign below to document performance. |
| | Performed by: Date/Time:/ |
| 3.14 | Ensure that an independent calculation per this enclosure has been separately performed. |
| NOTE: | Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise. |

3.15 Verify that both performances of this enclosure yield equivalent results.

1. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 1.2 Ensure all data used by this procedure are for the correct unit.
- 1.3 Shutdown margin (SDM) shall be \geq 1000 pcm in Mode 5. (Tech Spec 3.1.1 and Enclosure 4.5 and 4.6)
- 1.4 SDM shall be \geq 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)
- 1.5 Required refueling boron concentration is obtained from Tech Spec 3.9.1 and Enclosure 4.6.
- 1.6 \underline{IF} T-AVG < 500 °F, credit for only 50% of xenon worth can be taken when verifying SDM.
- 1.7 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.
- 1.8 Verification of K-eff < 0.99 with shutdown banks withdrawn shall only be performed above 200 °F.
- 1.9 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 1.10 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.
- 1.11 Shutdown Margin is satisfied if NC System Boron Concentration ≥ to the Refueling Boron Concentration per the COLR.
- 1.12 Maintaining Boron Dilution Mitigation System (BDMS) operability with no reactor coolant pumps in service when in Modes 4 or 5 requires an additional boron penalty be added to Shutdown Margin calculations.

Shutdown Margin (With or Without Xenon Credit) Manual Calculation

2. Initial Conditions

2.1 **IF** using effective boron concentration, ensure latest NC system boron sample has been entered into the OAC.

3. Procedure

| NOTE: | 1. | All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e.()pcm], the sign provided with data must be entered. The calculations account for these sign conventions. (R.M.) |
|-------|----|--|
| | 2. | If latest NC boron sample is used instead of effective boron concentration, a ppm penalty, obtained from applicable Unit R.O.D. manual Section 5.14, is applied to account for B-10 depletion. Interpolation of Section 5.14 is <u>NOT</u> required. Using the larger value of the applicable burnup range provides conservatism. (R.M.) |
| | 2 | Stan 2.1.5 is only applicable when a horation is in progress in support of a NC System |

- 3. Step 3.1.5 is only applicable when a boration is in progress in support of a NC System cooldown. The PZR is then considered a potential dilution source and a penalty must be included when calculating SDM. Otherwise a Value of $\underline{0}$ is entered in Step 3.1.5.
- Description Step Reference Value 3.1.1 N/A Unit N/A 3.1.2 Date/Time Present NC System Boron Conc Latest Sample 3.1.3 ____ ppm OR OR Effective Boron Concentration P5614 **IF NOT** using Effective Boron R.O.D. manual 3.1.4 ____ ppm Concentration in Step 3.1.3, record Section 5.14 B-10 correction IF PZR Boron Conc NOT verified OP/1(2)/A/6100/002 3.1.5 ____ ppm to be within 50 ppm of NC System Boron Conc, record PZR mixing penalty of 100 ppm Adjusted NC System Boron Conc 3.1.6 References used in = Step 3.1.3 minus Step 3.1.4 minus Steps 3.1.3, 3.1.4 __ ppm Step 3.1.5. and 3.1.5 <u>OR</u> (**IF** sum negative record 0) (0)
- 3.1 Determine the following information:

Shutdown Margin (With or Without Xenon Credit) Manual Calculation

| 3.2 | IF NC Sper the | <u>IF</u> NC System Boron Concentration \geq the Refueling Operations Boron Concentration per the COLR, Section 2.15, then Shutdown Margin is met and perform the following: | | |
|-------|-----------------------------------|---|-----|--|
| | _ 3.2.1 | Sign below to document performance. | | |
| | | Performed by:Date/Time:/ | | |
| | _ 3.2.2 | Ensure that an independent calculation per this enclosure has been separate performed. | ely | |
| NOTE: | Independ data take question | lently performed calculations may <u>NOT</u> yield exactly the same results due to an at different times. The CRS and Reactor Engineering may be contacted if s arise. |) | |
| | _ 3.2.3 | Verify that both performances of this enclosure yield equivalent results. | | |
| | _ 3.2.4 | Submit both performances of this enclosure to the Control Room Supervise for review. | or | |
| | _ 3.2.5 | N/A the remaining steps of this enclosure. | | |

NOTE: All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e.()_____pcm], the sign provided with data must be entered. The calculations account for these sign conventions. (R.M.)

3.3 Determine the following information:

| Step | Description | Reference | Value |
|--------|-------------------------------------|---------------------|--------|
| 3.3.1 | Present NC System Temperature | OAC or Control | ° F |
| | | Board | |
| 3.3.2 | Desired NC System Temperature | N/A | °F |
| 3.3.3 | Present cycle burnup | P1457 or Duty | EFPD |
| | | Reactor Engineer | |
| 3.3.4 | Present Difference from | P1475 or Duty | |
| | Equilibrium Samarium Worth | Reactor Engineer | () pcm |
| | | | |
| 3.3.5 | Number of Known Untrippable | OAC or Control | |
| | Control Rods | Board | |
| 3.3.6 | Untrippable RCCA Core | OAC or Control | |
| | Locations | Board | |
| 3.3.7 | Date and time of latest valid | Duty Reactor | |
| | Iodine and Xenon concentrations; | Engineer or current | |
| | N/A if xenon free. | time if using OAC | / |
| | | | |
| 3.3.8 | Iodine concentration at time listed | P0124 or Duty | |
| | in Step 3.3.7; 0 if xenon free. | Reactor Engineer | atm/cc |
| 3.3.9 | Xenon concentration at time listed | P0125 or Duty | |
| | in Step 3.3.7; 0 if xenon free. | Reactor Engineer | atm/cc |
| 3.3.10 | Shutdown Fission Product | IF Cycle Burnup | |
| | Correction Factor | < 12 EFPD = 0, | |
| | | ELSE per Enclosure | |
| | | 4.9 | ppm |

NOTE: Interpolation is <u>NOT</u> required for Step 3.4. Bounding temperatures and burnups may be used to select the highest boron concentration in Section 5.11 of R.O.D manual. (R.M.)

3.4 Select the <u>highest</u> boron concentration for the T-AVGs between the range of Step 3.3.1 (Present NC System Temperature) and Step 3.3.2 (Desired NC System Temperature) at current cycle burnup (Step 3.3.3) in Section 5.11 of the R.O.D. manual. {PIP 0-C99-0318} _____ ppm

- 3.5 Calculate additional boron concentration penalties:
 - _____ 3.5.1 Calculate untrippable RCCA penalty:

| Description | Reference | Value |
|---|-------------|-------|
| A. Number of Untrippable RCCA(s) NOT fully | Step 3.3.5 | |
| inserted | | |
| B. Boron Penalty per Untrippable rod | ROD Book | |
| (Maximum stuck rod worth during cycle (ppmb)) | Section 5.7 | |
| Untrippable RCCA Penalty | (A) X (B) | ppm |

- 3.5.2 **IF** physics testing is **NOT** complete enter Zero Power Physics Testing penalty of 100 ppm, otherwise, enter 0 ppm. _____ ppm
- _____ 3.5.3 Enter Shutdown Fission Product Correction Factor from Step 3.3.10.
- _____ 3.5.4 **IF** Unit is in Mode 4 or 5 <u>AND</u> no reactor coolant pumps are in service, record boron penalty from ROD Manual Section 5.15 for desired NC temperature (Step 3.3.2) and cycle burnup (Step 3.3.3) with the most reactive rod stuck out. ______ppm
- 3.5.5 Calculate total additional boron concentration penalty:

| Description | Reference | Value |
|---|-------------|-------|
| A. Untrippable RCCA Penalty | Step 3.5.1 | ppm |
| B. Additional Boron Conc Penalty for ZPPT | Step 3.5.2 | ppm |
| C. Shutdown Fission Product Correction Factor | Step 3.5.3 | ppm |
| D. Penalty for No NCPs in Modes 4 or 5 | Step 3.5.4 | ppm |
| Total Boron Penalty | (A) + (B) + | ppm |
| | (C) + (D) | |

3.6 Calculate total required boron concentration for SDM:

| Description | Reference | Value |
|--|-----------------------------|-------|
| A. Required SDM Boron | Step 3.4 | ppm |
| B. Total Boron Penalty | Step 3.5.5 | ppm |
| Total Required Boron Concentration for SDM (Xenon Free) | (A) + (B) | ppm |

3.7 Determine the Boron Difference between Required Boron Concentration for SDM and current NC System boron concentration.

| Description | Reference | Value |
|---|------------|--------|
| A. Total Required Boron Concentration for SDM | Step 3.6 | ppm |
| B. Adjusted NC System Boron Conc recorded in Step 3.1.6 | Step 3.1.6 | ppm |
| Boron Difference | (A) - (B) | () ppm |

- _____ 3.7.1 **IF** the Boron Difference determined in Step 3.7 is negative, SDM is maintained for Xenon free conditions.
 - 3.7.2 **IF** the Boron Difference determined in Step 3.7 is positive <u>AND</u> Xenon credit is <u>NOT</u> being used, NCS boration is required to maintain SDM.
- 3.8 **<u>IF</u>** the Boron Difference determined in Step 3.7 is positive <u>AND</u> Xenon credit is being used, determine the Xenon Credit as follows:
 - **NOTE:** Interpolation is <u>NOT</u> required for Step 3.8.1. Bounding NC System T-AVG and cycle burnup may be used to select the highest Differential Boron Worth (most negative) from Section 5.3 of R.O.D manual. (R.M.)
 - 3.8.1 Determine the ARI, Differential Boron Worth at lower T-AVG of Step 3.3.1 or 3.3.2 <u>AND</u> cycle burnup of Step 3.3.3 from Section 5.3 of the R.O.D.manual. _____ pcm/ppm
 - 3.8.2 Calculate the reactivity worth of the boron difference:

| Description | Reference | Value |
|--------------------------------------|------------|---------|
| A. Boron Difference | Step 3.7 | ppm |
| B. ARI Differential Boron Worth | Step 3.8.1 | pcm/ppm |
| Reactivity Worth of Boron Difference | (A) X (B) | рст |

Shutdown Margin (With or Without Xenon Credit) Manual Calculation

- _ 3.8.3 Calculate the xenon worth that is required to ensure SDM at the present NC System boron.
 - $_$ 3.8.3.1 **IF** the desired T-AVG from Step 3.3.2 is \ge 500°F, calculate the Xenon Worth as follows:

| Description | Reference | Value |
|--------------------------------|---------------------------|--------|
| A. Reactivity Worth | Step 3.8.2 | pcm |
| B. Difference from Eq Sm Worth | Step 3.3.4 | () pcm |
| Xenon Worth | $\{(A) - (B)\} \div 0.85$ | рст |

 $_$ 3.8.3.2 **IF** the desired T-AVG is < 500°F from Step 3.3.2, calculate the Xenon Worth as follows:

| Description | Reference | Value |
|--------------------------------|-------------------|--------|
| A. Reactivity Worth | Step 3.8.2 | pcm |
| B. Difference from Eq Sm Worth | Step 3.3.4 | () pcm |
| Xenon Worth | ${(A) - (B)} X 2$ | pcm |

- 3.8.3.3 Predict Xenon for approximately two days into the future using OAC Xenon Predict Program or REACT program and data from steps 3.1 and 3.3.
- **CAUTION:** SDM is ensured until the Date/Time recorded below at the present NC System boron or higher. After that time, NC System boration will be required to maintain SDM. {PIP C-03-04173} (R.M.)
 - 3.8.3.4 Record the last Date/Time from the xenon predict of Step 3.8.3.3 that is greater than the xenon worth of Step 3.8.3.1 or step 3.8.3.2 in the following step.
 - _____ 3.8.3.5 Loss of SDM Date/Time ____/____
 - 3.9 Sign below to document performance.

| Performed by: Date/ | Time:/ |
|---------------------|--------|
|---------------------|--------|

- 3.10 Ensure that an independent calculation per this enclosure has been separately performed.
- **NOTE:** Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.
- 3.11 Verify that both performances of this enclosure yield equivalent results.

Banks Withdrawn

1. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 1.2 Ensure all data used by this procedure are for the correct unit.
- 1.3 Shutdown margin (SDM) shall be \geq 1000 pcm in Mode 5. (Tech Spec 3.1.1 and Enclosure 4.5 and 4.6)
- 1.4 SDM shall be \geq 1300 pcm in Modes 1, 2, 3, and 4. (Tech Spec 3.1.1 and Enclosure 4.3, 4.4, 4.5 or 4.6)
- 1.5 \underline{IF} T-AVG < 500 °F, credit for only 50% of xenon worth can be taken when verifying SDM.
- 1.6 NC system T-AVG changes in Modes 3, 4 and 5 shall only be performed to a temperature where measured NC System boron concentration is ≥ boron concentration required for SDM.
- 1.7 Verification of K-eff < 0.99 with shutdown banks withdrawn shall only be performed above 200 °F.
- 1.8 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 1.9 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

2. Initial Conditions

2.1 Ensure latest NC system boron sample has been entered into the OAC Manual Data Log (MLOG).

Enclosure 4.7 Verification of K-eff < 0.99 With Shutdown Banks Withdrawn

3. Procedure

NOTE: All values are assumed positive unless otherwise indicated by parentheses. If parentheses precede the value [i.e.()_____pcm], the sign provided with data must be entered. The calculations account for these sign conventions. (R.M.)

_____ 3.1 Determine the following information:

| Step | Description | Reference | Value |
|-------|--|--|--------|
| 3.1.1 | Unit | N/A | |
| 3.1.2 | Cycle Burnup | P1457 | EFPD |
| 3.1.3 | Present Effective/Desired NC System Boron Concentration | P5614 or Duty Rx Eng | ppm |
| 3.1.4 | Desired NC System Temperature | N/A | °F |
| 3.1.5 | Diff. Between Eq. and Present Sm Worth | P1475, REACT, OAC Predict or Rx Eng | () pcm |
| 3.1.6 | Shutdown Fission Product Correction Factor | $\frac{\mathbf{IF}}{\mathbf{ELSE}}$ Cycle Burnup < 12 EFPD = 0, $\frac{\mathbf{ELSE}}{\mathbf{ELSE}}$ per Enclosure 4.9 | ppm |

3.2 Access "Reactor Eng Analysis and Calc Toolkit (REACT) - CNS" from DAE.

3.3 Select "View" then "Reactivity Balance Calculations" on toolbar.

3.4 Select "Mode 3 Verification" tab in Reactivity Balance Calculations window.

CAUTION: All inputs must be checked carefully and corrected as needed before calculating results. The correct Unit must be specified.

NOTE: Sign must be provided with Difference from Equilibrium Samarium [i.e.()____pcm]. (R.M.)

3.5 Enter appropriate values from Step 3.1 in "Input Data" section.

Verification of K-eff < 0.99 With Shutdown Banks Withdrawn

| 3.6 | Obtain re | sults as follows: |
|-------|--------------------------------------|--|
| | 3.6.1 | Click "Calculate" button. |
| | 3.6.2 | Print program results. |
| | 3.6.3 | Label printout appropriately. |
| |] 3.6.4 | Attach printout to this enclosure. |
| 3.7 | <u>IF</u> output will rema | states "Boron Concentration Acceptable", K-eff will be less than 0.99 (unit in in Mode 3) with Shutdown Banks withdrawn. |
| 3.8 | IF Xenon | Worth is <u>NOT</u> zero <u>AND</u> the output shows a Potential Mode 2 Boron Deficit: |
| | _ 3.8.1 | Obtain and attach printout of Xenon Predict from OAC program or REACT program for current and future xenon worth. |
| NOTE: | Mode 3 sh this date a shutdown | hall be maintained until the date and time recorded below. Prior to exceeding nd time, boration will be required to maintain Mode 3 (k-eff < 0.99) with banks withdrawn. (R.M.) |
| | _ 3.8.2 | Record last date and time xenon worth on printout attached per Step 3.8.1 is greater than Adjusted Mode 2 Deficit on REACT printout. |
| | | Date Time |
| 3.9 | Sign belo | w to document performance. |
| | Performe | d by: Date/Time:/ |
| 3.10 | Ensure th | at an independent calculation per this enclosure has been separately performed. |
| NOTE: | Independe data taken questions | ently performed calculations may <u>NOT</u> yield exactly the same results due to at different times. The CRS and Reactor Engineering may be contacted if arise. |

_____ 3.11 Verify that both performances of this enclosure yield equivalent results.

Shutdown Boron Concentration - Mode 6

1. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 1.2 Ensure all data used by this procedure are for the correct unit.
- 1.3 Required refueling boron concentration is obtained from Tech Spec 3.9.1 and Enclosure 4.6.
- 1.4 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 1.5 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.
- 1.6 Shutdown Margin is satisfied if NC System Boron Concentration \geq to the Refueling Boron Concentration per the COLR.

2. Initial Conditions

None

3. Procedure

| 3.1 | Determine present boron concentration of the o | perating ND train. | ppm |
|-----|---|--------------------------------|---------------|
| 3.2 | Record Tech Spec Refueling Boron Concentration from bottom of pp page of Section 5.11 of the R.O.D. manual. | | ppm |
| 3.3 | Verify present boron concentration of Step 3.1 concentration of Step 3.2. | is greater than refueling bore | on |
| 3.4 | Sign below to document performance. | | |
| | Performed by: | Date/Time: | / |
| 3.5 | Ensure that an independent calculation per this | enclosure has been separate | ly performed. |

Shutdown Boron Concentration - Mode 6

- **NOTE:** Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.
- _____ 3.6 Verify that both performances of this enclosure yield equivalent results.

Shutdown Fission Product Correction Factor

1. Limits and Precautions

NOTE: All curves/tables used in this procedure are found in Unit One (Two) Reactor Operating Data (R.O.D.) manual. (R.M.)

- 1.1 This procedure is reactivity management related because it is used to verify proper balance and manipulation of reactivity using various tools (REACT, R.O.D. Manual, etc.).
- 1.2 Ensure all data used by this procedure are for the correct unit.
- 1.3 REACT and manual calculations may <u>NOT</u> yield equal results due to minor differences in methods (i.e. interpolation). Reactor Engineering may be contacted if questions arise.
- 1.4 Independently performed calculations may <u>NOT</u> yield exactly the same results due to data taken at different times. The CRS and Reactor Engineering may be contacted if questions arise.

2. Initial Conditions

None

Shutdown Fission Product Correction Factor

3. Procedure

- **NOTE:** Interpolation is <u>NOT</u> required for the following steps. Bounding times may be used to select the highest shutdown fission product correction per Section 5.13 of R.O.D manual. (R.M.)
- 3.1 **IF** the Unit operated for > 3 EFPD from the previous shutdown to the current shutdown, determine the Shutdown Fission Product Correction Factor as follows:

| Description | Reference | Value |
|---|---------------------------|-------|
| A. Date/Time of current Unit Trip or Shutdown: | Control Room Log Books | / |
| B. Current Date/Time or projected time used in the appropriate calculation: | N/A | / |
| C. Duration of Shutdown | (B) - (A) | hours |
| D. Shutdown Fission Product Correction Factor(using duration from 3.1.C) | ROD Manual (Sec 5.13) | ppm |

3.2 **IF** the Unit operated for < 1 EFPD from the previous shutdown to the current shutdown, determine the Shutdown Fission Product Correction Factor as follows:

| Description | Reference | Value |
|--|---------------------------|-------|
| A. Date/Time of previous Unit Trip or Shutdown: | Control Room Log Books | / |
| B. Current Date/Time or projected time used in the appropriate calculation: | N/A | / |
| C. Duration of Shutdown | (B) - (A) | hours |
| D. Shutdown Fission Product Correction Factor (using duration from 3.2.C) | ROD Manual (Sec 5.13) | ppm |

Shutdown Fission Product Correction Factor Page 3 of

3.3 **IF** the Unit operated between 1 and 3 EFPD from the previous shutdown to the current shutdown **AND** the current shutdown duration is > 72 hours, determine the Shutdown Fission Product Correction Factor as follows:

| Description | Reference | Value |
|--|---------------------------|-------|
| A. Date/Time of current Unit Trip or Shutdown: | Control Room Log Books | / |
| B. Current Date/Time or projected time used in the appropriate calculation: | N/A | / |
| C. Duration of Shutdown | (B) - (A) | hours |
| D. Shutdown Fission Product Correction Factor for Present Shutdown (using duration from 3.3.C) | ROD Manual (Sec 5.13) | ppm |

_____ 3.4 <u>IF</u> the Unit operated between 1 and 3 EFPD from the previous shutdown to the current shutdown <u>AND</u> the current shutdown duration is \leq 72 hours, determine the Shutdown Fission Product Correction Factor as follows:

| Description | Reference | Value |
|---|------------------------------------|-------|
| A. Date/Time of previous Unit Trip or Shutdown: | Control Room Log Books | / |
| B. Date/Time of previous Unit Startup: | Control Room Log Books | / |
| C. Duration of Previous Shutdown | (B) - (A) | hours |
| D. Shutdown Fission Product Correction Factor for Previous Shutdown (using duration from 3.4.C) | ROD Manual (Sec 5.13) | ppm |
| E. Date/Time of current Unit Trip or Shutdown: | Control Room Log Books | / |
| F. Current Date/Time or projected time used in the appropriate calculation: | N/A | / |
| G. Duration of current Shutdown | (F) - (E) | hours |
| H. Shutdown Fission Product Correction Factor for Current Shutdown (using duration from 3.4.F) | ROD Manual (Sec 5.13) | ppm |
| I. Shutdown Fission Product Correction Factor | (Step 3.4.D)/ 2 + (Step 3.4.H) | ppm |
Shutdown Fission Product Correction Factor Pag

| 3.5 | Sign below to document performance. | |
|-------|--|---|
| | Performed by: | Date/Time:/ |
| 3.6 | Ensure that an independent calculation per this enclosure | has been separately performed. |
| NOTE: | Independently performed calculations may <u>NOT</u> yield ex data taken at different times. The CRS and Reactor Engin questions arise. | actly the same results due to eering may be contacted if |

_____ 3.7 Verify that both performances of this enclosure yield equivalent results.

JPM A.1-2S

SRO

EVALUATION SHEET

| <u>Task:</u> | Determine Final BAT level for a Rapid Boration and evaluate Selected License |
|--------------|--|
| | Commitments |

| Alternate Path: | N/A | | | | |
|---------------------------|---|--|----------------------------|------------|----------|
| Facility JPM #: | NV-126 Modified | | | | |
| Safety Function: | N/A | | | | |
| <u>K/A</u> 2.1.23 | Ability to perform modes of plant op | specific system and integrate peration. | ed plant procedu | ıres duriı | ng all |
| Importance: | 4.3 / 4.4 <u>CFR:</u> | 41.10 / 43.5 / 45.2 / 45.6 | | | |
| Preferred Evaluat | ion Location: | Preferred Evalua | tion Method: | | |
| Simulator | Classroom X | Perform | Perform X Simulate | | |
| <u>References</u> : | OP/1/A/6150/009 Reactor Operating D Unit 1 COLR | 0ata (R.O.D.) Book | | | |
| Task Standard: | Applicant determines Condition A applies. | s that a final BAT #1 level of | 43 – 44% and S | LC 16.9- | 12 |
| Validation Time: | 20 minutes | Time Critical: | Yes | No _ | <u>X</u> |
| Applicant: NAME | | Docket # | Time Start: Time Finish | : | |
| Performance Rati | <u>ng:</u> | | Performance | e Time _ | |
| SAT UNSAT | | | | | |
| Examiner: | NAME | SIGN | IATURE | _/ | ATE |
| COMMENTS | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is in Mode 3, shutting down to investigate a loose parts issue discovered in the reactor vessel. OP/1/A/6100/002 (Controlling Procedure for Unit Shutdown) Enclosure 1 (Unit Shutdown to Mode 3) is in progress.
- The cooldown has NOT been initiated.
- Currently Unit 1 is at 50 EFPD.
- The REACT program is not available.
- Preparations are being made to perform a rapid boration to reach the required refueling boron concentration.
- It is <u>NOT</u> desired to use BAT #2 for any of the boric acid addition required.
- Current NC system Boron concentration is 1740 ppm per the latest sample taken by primary chemistry.
- Current BAT #1 level is 75%.

INITIATING CUES:

- The Control Room Supervisor directs you to:
 - Determine the final BAT #1 level required to reach the <u>MINIMUM</u> required refueling boron concentration per the COLR by performing OP/1/A/6150/009 (Boron Concentration Control) Enclosure 4.9 (Rapid Boration) steps 3.3 through 3.7.
 - Determine applicable Tech Spec / SLC actions, if any, following Boric Acid addition.

Final BAT #1 level: _____%

Tech Spec / SLC actions (if any):_____

EXAMINER NOTE:

After reading the cue, provide the examinee with a copy of Enclosure 4.9 with steps complete thru 3.2, a calculator and access to a copy of the ROD Book.

START TIME: _____

| STEP / STANDARD | SAT / UNSAT |
|--|----------------|
| NOTE: If Unit shutdown is for a Refueling Outage, the boron concentration in the next step shall be greater than or equal to the refueling boron concentration as stated in the COLR. | |
| STEP 1: 3.3 Record the desired NC System boron concentration. Desired concentration ppm | STEP |
| STANDARD: | |
| Operator determines that the required MINIMUM boron concentration for refueling operations per 2.15 of the COLR is 2700 ppm. | SAT |
| Examiner Note: This step is critical to determine the minimum required boron concentration needed for refueling operations. | UNSAT |
| COMMENTS: | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| NOTE: If Unit shutdown is for a Refueling Outage, approximately 41,000 gallons will be required to achieve 2900 ppmB (Mode 6 boron concentration plus 200 ppmB margin). | CRITICAL STEP |
| STEP 2: 3.4 Determine the volume of boric acid required to achieve the concentration in Step 3.3 using the Unit 1 Rod Manual or REACT program. (R.M.) | |
| gallons | |
| STANDARD: | |
| Operator determines using the Unit 1 Rod Manual that 12,339 gallons of Boric Acid are required to be added to the NC system to increase NC system Boron concentration to 2700 ppm from the present value of 1740 ppm. | SAT |
| Examiner Note: This step is critical to determine the total number of gallons of Boric Acid that need to be added to increase the NC system Boron concentration to the minimum refueling concentration of 2700 ppm. | UNSAT |
| <u>COMMENTS:</u> | |

| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| STEP 3: 3.5 Determine equivalent BAT level change corresponding to the volume determined in Step 3.4 as follows: gallons =% | CRITICAL STEP |
| 392 gal/% | |
| STANDARD: | |
| Operator calculates a BAT level change of 31.5 %. Depending on how the operator rounds, 31% - 32% is acceptable. | SAT |
| Examiner Note: This step is critical in order to determine the final BAT #1 level needed to meet the JPM standard. | UNSAT |
| COMMENTS: | |
| | |

| <u>STEP 4:</u> 3.6 | IF aligned per Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1) <u>AND</u> it is desired to use BAT #2 to supply a portion of the total boric acid to be added, perform the following: (R.M.) | |
|--------------------|--|-----|
| STANDARD: | | SAT |
| | | |
| Operator should | determine that this step is N/A per the initiating cue. | |
| COMMENTS: | | |
| | | |

| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| STEP 5: 3.7 Determine final BAT #1 level as follows: (R.M.) 3.7.1 Record initial BAT #1 level % | CRITICAL STEP |
| 3.7.2 Subtract the volume to be added (Step 3.4 or 3.5.4) from the initial level (Step 3.7.1) to determine final BAT #1 level. | |
| $\frac{1}{(\text{Step 3.7.1})} \% - \frac{1}{(\text{Step 3.5 or 3.6.4})} \% = 20\%$ | |
| STANDARD: | SAT |
| Operator should determine a final BAT #1 level of 43.5%. Acceptable range is 43 – 44%. | UNSAT |
| Examiner Note: This step is critical to determine the final BAT #1 level and meet the JPM standard. | |
| COMMENTS: | |
| | |

| <u>STEP 6:</u> Determine applicable Tech Spec / SLC actions, if any, following Boric Acid addition. | |
|---|-------|
| STANDARD: | SAT |
| Operator should determine Boric Acid Tank below the minimum volume specified in the COLR and SLC 16.9-12 Condition A is required to be entered. | UNSAT |
| COMMENTS: | |
| | |

1

STOP TIME _____

г

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 is in Mode 3, shutting down to investigate a loose parts issue discovered in the reactor vessel. OP/1/A/6100/002 (Controlling Procedure for Unit Shutdown) Enclosure 1 (Unit Shutdown to Mode 3) is in progress.
- The cooldown has NOT been initiated.
- Currently Unit 1 is at 50 EFPD.
- The REACT program is not available.
- Preparations are being made to perform a rapid boration to reach the required refueling boron concentration.
- It is <u>NOT</u> desired to use BAT #2 for any of the boric acid addition required.
- Current NC system Boron concentration is 1740 ppm per the latest sample taken by primary chemistry.
- Current BAT #1 level is 75%.

INITIATING CUES:

- The Control Room Supervisor directs you to:
 - Determine the final BAT #1 level required to reach the <u>MINIMUM</u> required refueling boron concentration per the COLR by performing OP/1/A/6150/009 (Boron Concentration Control) Enclosure 4.9 (Rapid Boration) steps 3.3 through 3.7.
 - Determine applicable Tech Spec / SLC actions, if any, following Boric Acid addition.

Final BAT #1 level: _____%

Tech Spec / SLC actions (if any):_____



Rapid Boration

OP/**1**/A/6150/009 Page 2 of 6

3. Procedure

Г

| NOTE: | This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of AD-OP-ALL-0203 (Reactivity Management). (R.M.) |
|---------------|---|
| AA 3.1 | Ensure valves are aligned per one of the following: |
| | Enclosure 4.8 (Valve Checklist) OR Enclosure 4.7 (Placing Darie Acid Tark #2 In Service For Unit #1) |
| | L Enclosure 4.7 (Placing Boric Acid Tank #2 in Service For Unit #1) |
| <u>AA</u> 3.2 | Record the position of the Boric Acid Transfer Pumps switches. |
| | B/A Xfer Pmp 1AAuto |
| | □ B/A Xfer Pmp 1B |
| NOTE: | If Unit shutdown is for a Refueling Outage, the boron concentration in the next step shall be greater than or equal to the refueling boron concentration as stated in the COLR. |
| 3.3 | Record the desired NC System boron concentration. Desired concentration 2700 ppm |
| NOTE: | If Unit shutdown is for a Refueling Outage, approximately 41,000 gallons will be required to achieve 2900 ppmB (Mode 6 boron concentration plus 200 ppmB margin). |
| 3.4 | Determine the volume of boric acid required to achieve the concentration in Step 3.3 using the Unit 1 Rod Manual or REACT program. (R.M.) |
| | 12,339 gallons |
| 3.5 | Determine equivalent BAT level change corresponding to the volume determined in Step 3.4 as follows: |
| | 10.000 |

= <u>31.5</u> % 12,339 gallons 392 gal / % (Acceptable Range 31 - 32%)

KEY



OP/**1**/A/6150/009 Page 3 of 6

Rapid Boration

- <u>N/A</u> 3.6 <u>IF</u> aligned per Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1) <u>AND</u> it is desired to use BAT #2 to supply a portion of the total boric acid to be added, perform the following: (R.M.)
 - \Box 3.6.1 Record initial BAT #2 level. _____%
 - **NOTE:** Minimum BAT #2 level required to maintain the tank functional for Unit 2 when Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1) is completed is contained in the Unit 2 COLR.
 - Primary AOM may be contacted to determine BAT #2 final level and volume.
 - \Box 3.6.2 Record desired BAT #2 final level. %
 - □ 3.6.3 Determine change in BAT #2 level as follows:

 $\frac{\%}{\text{Initial level (Step 3.6.1)}} - \frac{\%}{\text{Final level (Step 3.6.2)}} = \frac{\%}{\%}$

 \Box 3.6.4 Determine remaining volume to be added from BAT #1 as follows:

| % | - | % | = | % |
|----------------------|---|--------------------|---|---|
| Equivalent BAT level | | Change in BAT #2 | | - |
| change (Step 3.5) | | level (Step 3.6.3) | | |

3.7 Determine final BAT #1 level as follows: (R.M.)

- \Box 3.7.1 Record initial BAT #1 level. <u>75</u> %
- □ 3.7.2 Subtract the volume to be added (Step 3.5 or 3.6.4) from the initial level (Step 3.7.1) to determine final BAT #1 level.

 $\frac{75}{(\text{Step 3.7.1})} \% - \frac{31.5}{(\text{Step 3.5 or 3.6.4})} \% = \frac{43.5}{(\text{Acceptable Range 43 - 44\%})}$

- 3.8 Ensure letdown flow is maximized per OP/1/A/6200/001 (Chemical And Volume Control System).
- 3.9 Place at least two of the following banks of Pressurizer heaters in "MAN":
- PZR Htr Group 1A
- PZR Htr Group 1B
- PZR Htr Group 1D

KEY



Catawba 1 Cycle 24 Core Operating Limits Report

2.18 Boration Systems Borated Water Source - Operating (SLC 16.9-12)

2.18.1 Volume and boron concentrations for the Boric Acid Tank (BAT) and the Refueling Water Storage Tank (RWST) during MODES 1, 2, and 3 and MODE 4 with all RCS cold leg temperatures > 210°F*.

* NOTE: The SLC 16.9-12 applicability is down to MODE 4 temperatures of > 210°F. The minimum volumes calculated support cooldown to 200°F to satisfy UFSAR Chapter 9 requirements.

| Parameter | Limit | | | |
|--|---------------------------|--|--|--|
| NOTE: When cycle burnup is ≥ 481 EFPD, Figure 6 may be used to determine the required BAT Minimum Level. | | | | |
| BAT minimum boron concentration | 7,000 ppm | | | |
| Volume of 7,000 ppm boric acid solution required to maintain SDM at 210°F | 13,500 gallons | | | |
| BAT Minimum Shutdown Volume (Includes the additional volumes listed in SLC 16.9-12) | 25,200 gallons (45.8%) | | | |
| RWST minimum boron concentration | 2,700 ppm | | | |
| Volume of 2,700 ppm boric acid solution required to maintain SDM at 210 °F | 57,107 gallons | | | |
| RWST Minimum Shutdown Volume (Includes the additional volumes listed in SLC 16.9-12) | 98,607 gallons (22.0%) | | | |





| Desired | | | | | | | | | | | |
|---------|------|------|-------|-----------|----------|------------|----------|--------|-------|-------|-------|
| Boron | | | | Present I | Boron Co | ncentratio | on (ppmB | i) 🔪 🖊 | | | |
| Conc. | | | | | | | | ¥ | | | |
| (ppmB) | 1600 | 1620 | 1640 | 1660 | 1680 | 1700 | 1720 | 1740 | 1760 | 1780 | 1800 |
| 1400 | 9037 | 9878 | 10708 | 11529 | 12339 | 13140 | 13932 | 14714 | 15488 | 16252 | 17009 |
| 1420 | 8077 | 8918 | 9748 | 10569 | 11379 | 12180 | 12972 | 13754 | 14528 | 15292 | 16049 |
| 1440 | 7131 | 7971 | 8802 | 9622 | 10433 | 11234 | 12025 | 12808 | 13581 | 14346 | 15102 |
| 1460 | 6197 | 7038 | 7868 | 8689 | 9499 | 10300 | 11092 | 11874 | 12648 | 13412 | 14168 |
| 1480 | 5276 | 6117 | 6947 | 7768 | 8578 | 9379 | 10171 | 10953 | 11727 | 12491 | 13248 |
| 1500 | 4368 | 5209 | 6039 | 6859 | 7670 | 8471 | 9262 | 10045 | 10818 | 11583 | 12339 |
| 1520 | 3471 | 4312 | 5143 | 5963 | 6773 | 7574 | 8366 | 9148 | 9922 | 10687 | 11443 |
| 1540 | 2587 | 3427 | 4258 | 5078 | 5889 | 6690 | 7481 | 8264 | 9037 | 9802 | 10558 |
| 1560 | 1713 | 2554 | 3385 | 4205 | 5016 | 5816 | 6608 | 7390 | 8164 | 8929 | 9685 |
| 1580 | 851 | 1692 | 2522 | 3343 | 4153 | 4954 | 5746 | 6528 | 7302 | 8066 | 8823 |
| 1600 | 0 | 841 | 1671 | 2492 | 3302 | 4103 | 4895 | 5677 | 6450 | 7215 | 7971 |
| 1620 | 230 | 0 | 830 | 1651 | 2461 | 3262 | 4054 | 4836 | 5610 | 6374 | 7131 |
| 1640 | 460 | 231 | 0 | 820 | 1631 | 2432 | 3223 | 4006 | 4779 | 5544 | 6300 |
| 1660 | 692 | 462 | 231 | 0 | 811 | 1611 | 2403 | 3185 | 3959 | 4724 | 5480 |
| 1680 | 924 | 694 | 464 | 232 | 0 | 801 | 1593 | 2375 | 3148 | 3913 | 4669 |
| 1700 | 1157 | 927 | 697 | 465 | 233 | 0 | 792 | 1574 | 2347 | 3112 | 3868 |
| 1720 | 1391 | 1161 | 930 | 699 | 467 | 234 | 0 | 782 | 1556 | 2321 | 3077 |
| 1740 | 1625 | 1395 | 1165 | 934 | 701 | 468 | 235 | 0 | 773 | 1538 | 2294 |
| 1760 | 1861 | 1631 | 1400 | 1169 | 937 | 704 | 470 | 235 | 0 | 765 | 1521 |
| 1780 | 2097 | 1867 | 1637 | 1405 | 1173 | 940 | 706 | 472 | 236 | 0 | 756 |
| 1800 | 2334 | 2104 | 1874 | 1642 | 1410 | 1177 | 943 | 709 | 473 | 237 | 0 |
| 1820 | 2572 | 2342 | 2111 | 1880 | 1648 | 1415 | 1181 | 947 | 711 | 475 | 238 |
| 1840 | 2811 | 2581 | 2350 | 2119 | 1887 | 1654 | 1420 | 1185 | 950 | 714 | 477 |
| 1860 | 3050 | 2820 | 2590 | 2358 | 2126 | 1893 | 1659 | 1425 | 1189 | 953 | 716 |
| 1880 | 3291 | 3061 | 2830 | 2599 | 2367 | 2134 | 1900 | 1665 | 1430 | 1194 | 957 |
| 1900 | 3532 | 3302 | 3071 | 2840 | 2608 | 2375 | 2141 | 1907 | 1671 | 1435 | 1198 |
| 1920 | 3774 | 3544 | 3314 | 3082 | 2850 | 2617 | 2383 | 2149 | 1913 | 1677 | 1440 |
| 1940 | 4017 | 3787 | 3557 | 3325 | 3093 | 2860 | 2626 | 2392 | 2156 | 1920 | 1683 |
| 1960 | 4261 | 4031 | 3800 | 3569 | 3337 | 3104 | 2870 | 2636 | 2400 | 2164 | 1927 |
| 1980 | 4506 | 4276 | 4045 | 3814 | 3582 | 3349 | 3115 | 2880 | 2645 | 2409 | 2172 |





Page 17 of 21 Source: Unit 1 ROD 4.1 Hot RCS.XLS Prepared By: S G Adams Revision 243, February 18, 1999

| Desired | | | | | | | | | | | |
|---------|------|------|------|---------|----------|-------------|----------|-------|-------|-------|-------|
| Boron | | | | Present | Boron Co | oncentratio | on (ppmB | 5) | | V | |
| Conc. | | | | | | | | | | | |
| (ppmB) | 1800 | 1820 | 1840 | 1860 | 1880 | 1900 | 1920 | 1940 | 1960 | 1980 | 2000 |
| 1600 | 7971 | 8719 | 9459 | 10191 | 10914 | 11631 | 12339 | 13041 | 13735 | 14422 | 15102 |
| 1620 | 7131 | 7878 | 8618 | 9350 | 10074 | 10790 | 11498 | 12200 | 12894 | 13581 | 14261 |
| 1640 | 6300 | 7048 | 7788 | 8519 | 9243 | 9959 | 10668 | 11369 | 12064 | 12751 | 13431 |
| 1660 | 5480 | 6228 | 6967 | 7699 | 8423 | 9139 | 9848 | 10549 | 11243 | 11930 | 12610 |
| 1680 | 4669 | 5417 | 6157 | 6888 | 7612 | 8329 | 9037 | 9739 | 10433 | 11120 | 11800 |
| 1700 | 3868 | 4616 | 5356 | 6088 | 6811 | 7528 | 8236 | 8938 | 9632 | 10319 | 10999 |
| 1720 | 3077 | 3825 | 4564 | 5296 | 6020 | 6736 | 7445 | 8146 | 8840 | 9527 | 10207 |
| 1740 | 2294 | 3042 | 3782 | 4514 | 5237 | 5954 | 6662 | 7364 | 8058 | 8745 | 9425 |
| 1760 | 1521 | 2269 | 3008 | 3740 | 4464 | 5180 | 5889 | 6590 | 7284 | 7971 | 8652 |
| 1780 | 756 | 1504 | 2244 | 2975 | 3699 | 4415 | 5124 | 5825 | 6520 | 7207 | 7887 |
| 1800 | 0 | 748 | 1487 | 2219 | 2943 | 3659 | 4368 | 5069 | 5763 | 6450 | 7131 |
| 1820 | 238 | 0 | 740 | 1471 | 2195 | 2911 | 3620 | 4321 | 5016 | 5703 | 6383 |
| 1840 | 477 | 239 | 0 | 732 | 1456 | 2172 | 2880 | 3582 | 4276 | 4963 | 5643 |
| 1860 | 716 | 478 | 240 | 0 | 724 | 1440 | 2149 | 2850 | 3544 | 4231 | 4911 |
| 1880 | 957 | 719 | 480 | 240 | 0 | 716 | 1425 | 2126 | 2820 | 3507 | 4188 |
| 1900 | 1198 | 960 | 721 | 482 | 241 | 0 | 709 | 1410 | 2104 | 2791 | 3471 |
| 1920 | 1440 | 1202 | 963 | 724 | 483 | 242 | 0 | 701 | 1395 | 2083 | 2763 |
| 1940 | 1683 | 1445 | 1206 | 967 | 726 | 485 | 243 | 0 | 694 | 1381 | 2061 |
| 1960 | 1927 | 1689 | 1450 | 1211 | 970 | 729 | 487 | 244 | 0 | 687 | 1367 |
| 1980 | 2172 | 1934 | 1695 | 1456 | 1215 | 974 | 732 | 489 | 245 | 0 | 680 |
| 2000 | 2417 | 2179 | 1941 | 1701 | 1461 | 1219 | 977 | 734 | 490 | 246 | 0 |
| 2020 | 2664 | 2426 | 2187 | 1948 | 1707 | 1466 | 1224 | 981 | 737 | 492 | 247 |
| 2040 | 2911 | 2673 | 2435 | 2195 | 1955 | 1713 | 1471 | 1228 | 984 | 740 | 494 |
| 2060 | 3160 | 2922 | 2683 | 2444 | 2203 | 1962 | 1720 | 1477 | 1233 | 988 | 742 |
| 2080 | 3409 | 3171 | 2932 | 2693 | 2452 | 2211 | 1969 | 1726 | 1482 | 1237 | 992 |
| 2100 | 3659 | 3421 | 3183 | 2943 | 2703 | 2461 | 2219 | 1976 | 1732 | 1487 | 1242 |
| 2120 | 3910 | 3672 | 3434 | 3194 | 2954 | 2712 | 2470 | 2227 | 1983 | 1739 | 1493 |
| 2140 | 4162 | 3924 | 3686 | 3446 | 3206 | 2964 | 2722 | 2479 | 2235 | 1991 | 1745 |
| 2160 | 4415 | 4177 | 3939 | 3699 | 3459 | 3217 | 2975 | 2732 | 2488 | 2244 | 1998 |
| 2180 | 4669 | 4431 | 4193 | 3953 | 3713 | 3471 | 3229 | 2986 | 2742 | 2498 | 2252 |





| - | | | | | | | | | | | |
|---------|------|------|------|-----------|----------|-------------|----------|-------|-------|-------------------|-------|
| Desired | | | | | | | | | | | |
| Boron | | | | Present I | Boron Co | oncentratio | on (ppmB | 8) | | V | |
| Conc. | | | | | | | | | | | |
| (ppmB) | 2000 | 2020 | 2040 | 2060 | 2080 | 2100 | 2120 | 2140 | 2160 | 2180 | 2200 |
| 1800 | 7131 | 7804 | 8471 | 9131 | 9785 | 10433 | 11074 | 11710 | 12339 | 12963 | 13581 |
| 1820 | 6383 | 7056 | 7723 | 8383 | 9037 | 9685 | 10326 | 10962 | 11591 | 12215 | 12833 |
| 1840 | 5643 | 6317 | 6983 | 7644 | 8298 | 8945 | 9587 | 10222 | 10852 | 11476 | 12094 |
| 1860 | 4911 | 5585 | 6252 | 6912 | 7566 | 8214 | 8855 | 9490 | 10120 | 10744 | 11362 |
| 1880 | 4188 | 4861 | 5528 | 6188 | 6842 | 7490 | 8131 | 8767 | 9396 | 10020 | 10638 |
| 1900 | 3471 | 4145 | 4812 | 5472 | 6126 | 6773 | 7415 | 8050 | 8680 | 9304 | 9922 |
| 1920 | 2763 | 3436 | 4103 | 4763 | 5417 | 6065 | 6706 | 7342 | 7971 | 8595 | 9213 |
| 1940 | 2061 | 2735 | 3402 | 4062 | 4716 | 5363 | 6005 | 6640 | 7270 | 7894 | 8512 |
| 1960 | 1367 | 2041 | 2707 | 3368 | 4022 | 4669 | 5311 | 5946 | 6576 | 7200 | 7818 |
| 1980 | 680 | 1354 | 2020 | 2681 | 3335 | 3982 | 4624 | 5259 | 5889 | 6513 | 7131 |
| 2000 | 0 | 673 | 1340 | 2000 | 2654 | 3302 | 3944 | 4579 | 5209 | 5832 | 6450 |
| 2020 | 247 | 0 | 667 | 1327 | 1981 | 2629 | 3270 | 3906 | 4535 | 5159 | 5777 |
| 2040 | 494 | 247 | 0 | 660 | 1314 | 1962 | 2603 | 3239 | 3868 | 4492 | 5110 |
| 2060 | 742 | 496 | 248 | 0 | 654 | 1302 | 1943 | 2579 | 3208 | 3832 | 4450 |
| 2080 | 992 | 745 | 498 | 249 | 0 | 648 | 1289 | 1925 | 2554 | 3178 | 3796 |
| 2100 | 1242 | 995 | 748 | 499 | 250 | 0 | 642 | 1277 | 1907 | 2530 | 3148 |
| 2120 | 1493 | 1246 | 999 | 751 | 501 | 251 | 0 | 635 | 1265 | 1889 | 2507 |
| 2140 | 1745 | 1498 | 1251 | 1003 | 753 | 503 | 252 | 0 | 630 | 1253 | 1871 |
| 2160 | 1998 | 1751 | 1504 | 1256 | 1006 | 756 | 505 | 253 | 0 | 624 | 1242 |
| 2180 | 2252 | 2005 | 1758 | 1510 | 1260 | 1010 | 759 | 507 | 254 | 0 | 618 |
| 2200 | 2507 | 2260 | 2013 | 1765 | 1515 | 1265 | 1014 | 762 | 509 | 255 | 0 |
| 2220 | 2763 | 2516 | 2269 | 2020 | 1771 | 1521 | 1270 | 1018 | 765 | 511 | 256 |
| 2240 | 3020 | 2773 | 2526 | 2277 | 2028 | 1778 | 1527 | 1275 | 1022 | 768 | 513 |
| 2260 | 3277 | 3031 | 2783 | 2535 | 2286 | 2036 | 1784 | 1532 | 1279 | 1025 | 771 |
| 2280 | 3536 | 3290 | 3042 | 2794 | 2545 | 2294 | 2043 | 1791 | 1538 | 1284 | 1029 |
| 2300 | 3796 | 3549 | 3302 | 3054 | 2804 | 2554 | 2303 | 2051 | 1798 | 1544 | 1289 |
| 2320 | 4057 | 3810 | 3563 | 3314 | 3065 | 2815 | 2564 | 2312 | 2059 | 1805 | 1550 |
| 2340 | 4319 | 4072 | 3825 | 3576 | 3327 | 3077 | 2826 | 2574 | 2321 | 2067 | 1812 |
| 2360 | 4581 | 4335 | 4087 | 3839 | 3590 | 3340 | 3089 | 2836 | 2583 | 2330 | 2075 |
| 2380 | 4845 | 4599 | 4351 | 4103 | 3854 | 3604 | 3352 | 3100 | 2847 | <mark>2593</mark> | 2338 |





| Desired | | | | | | | | | | | |
|---------|------|------|------|-----------|----------|-----------|----------|-------|-------|-------------------|-------|
| Boron | | | | Present I | Boron Co | ncentrati | on (ppmB | 5) | | | |
| Conc. | | | | | | | | | | ¥ | |
| (ppmB) | 2200 | 2220 | 2240 | 2260 | 2280 | 2300 | 2320 | 2340 | 2360 | 2380 | 2400 |
| 2000 | 6450 | 7063 | 7670 | 8271 | 8868 | 9459 | 10045 | 10626 | 11202 | 11773 | 12339 |
| 2020 | 5777 | 6389 | 6996 | 7598 | 8194 | 8785 | 9371 | 9952 | 10528 | 11099 | 11666 |
| 2040 | 5110 | 5723 | 6330 | 6931 | 7528 | 8119 | 8705 | 9286 | 9862 | 10433 | 10999 |
| 2060 | 4450 | 5062 | 5669 | 6271 | 6867 | 7458 | 8044 | 8625 | 9201 | 9772 | 10339 |
| 2080 | 3796 | 4409 | 5016 | 5617 | 6213 | 6804 | 7390 | 7971 | 8547 | 9118 | 9685 |
| 2100 | 3148 | 3761 | 4368 | 4969 | 5566 | 6157 | 6743 | 7324 | 7900 | 8471 | 9037 |
| 2120 | 2507 | 3119 | 3726 | 4328 | 4924 | 5515 | 6101 | 6682 | 7258 | 7829 | 8396 |
| 2140 | 1871 | 2484 | 3091 | 3692 | 4289 | 4880 | 5466 | 6047 | 6623 | 7194 | 7760 |
| 2160 | 1242 | 1854 | 2461 | 3063 | 3659 | 4250 | 4836 | 5417 | 5993 | 6564 | 7131 |
| 2180 | 618 | 1231 | 1838 | 2439 | 3035 | 3626 | 4212 | 4793 | 5369 | 5941 | 6507 |
| 2200 | 0 | 612 | 1219 | 1821 | 2417 | 3008 | 3594 | 4175 | 4751 | 5322 | 5889 |
| 2220 | 256 | 0 | 607 | 1209 | 1805 | 2396 | 2982 | 3563 | 4139 | 4710 | 5276 |
| 2240 | 513 | 257 | 0 | 602 | 1198 | 1789 | 2375 | 2956 | 3532 | 4103 | 4669 |
| 2260 | 771 | 515 | 258 | 0 | 596 | 1187 | 1773 | 2354 | 2930 | 3501 | 4068 |
| 2280 | 1029 | 773 | 517 | 259 | 0 | 591 | 1177 | 1758 | 2334 | 2905 | 3471 |
| 2300 | 1289 | 1033 | 776 | 519 | 260 | 0 | 586 | 1167 | 1743 | 2314 | 2880 |
| 2320 | 1550 | 1294 | 1037 | 779 | 521 | 261 | 0 | 581 | 1157 | 1728 | 2294 |
| 2340 | 1812 | 1556 | 1299 | 1041 | 782 | 523 | 262 | 0 | 576 | 1147 | 1713 |
| 2360 | 2075 | 1819 | 1562 | 1304 | 1045 | 785 | 525 | 263 | 0 | 571 | 1137 |
| 2380 | 2338 | 2083 | 1826 | 1568 | 1309 | 1049 | 788 | 527 | 264 | 0 | 566 |
| 2400 | 2603 | 2347 | 2091 | 1833 | 1574 | 1314 | 1053 | 792 | 529 | 265 | 0 |
| 2420 | 2869 | 2613 | 2357 | 2099 | 1840 | 1580 | 1319 | 1057 | 795 | 531 | 266 |
| 2440 | 3136 | 2880 | 2624 | 2366 | 2107 | 1847 | 1586 | 1324 | 1062 | 798 | 533 |
| 2460 | 3404 | 3148 | 2892 | 2634 | 2375 | 2115 | 1854 | 1593 | 1330 | 1066 | 801 |
| 2480 | 3673 | 3417 | 3161 | 2903 | 2644 | 2384 | 2123 | 1862 | 1599 | 1335 | 1070 |
| 2500 | 3944 | 3688 | 3431 | 3173 | 2914 | 2654 | 2394 | 2132 | 1869 | 1605 | 1340 |
| 2520 | 4215 | 3959 | 3702 | 3444 | 3185 | 2926 | 2665 | 2403 | 2140 | 1876 | 1611 |
| 2540 | 4487 | 4231 | 3974 | 3717 | 3458 | 3198 | 2937 | 2675 | 2413 | 2149 | 1884 |
| 2560 | 4761 | 4505 | 4248 | 3990 | 3731 | 3471 | 3211 | 2949 | 2686 | 2422 | 2157 |
| 2580 | 5035 | 4779 | 4522 | 4265 | 4006 | 3746 | 3485 | 3223 | 2961 | <mark>2697</mark> | 2432 |





Page 20 of 21 Source: Unit 1 ROD 4.1 Hot RCS.XLS Prepared By: S G Adams Revision 243, February 18, 1999

Unit One Reactor Operating Data Section 4.1 Boration and Dilution Tables Hot RCS (Modes 1, 2 and 3)

| Desired | | | | | | | | | | | |
|---------|------|------|------|---------|----------|-----------|----------|------|-------|--------------|-------|
| Boron | | | | Present | Boron Co | ncentrati | on (ppmB | 8) | | \mathbf{V} | |
| Conc. | | | | | | | | | | | |
| (ppmB) | 2400 | 2420 | 2440 | 2460 | 2480 | 2500 | 2520 | 2540 | 2560 | 2580 | 2600 |
| 2200 | 5889 | 6450 | 7007 | 7560 | 8108 | 8652 | 9191 | 9726 | 10257 | 10783 | 11306 |
| 2220 | 5276 | 5838 | 6395 | 6947 | 7495 | 8039 | 8578 | 9113 | 9644 | 10171 | 10693 |
| 2240 | 4669 | 5231 | 5788 | 6340 | 6888 | 7432 | 7971 | 8506 | 9037 | 9564 | 10086 |
| 2260 | 4068 | 4629 | 5186 | 5739 | 6287 | 6831 | 7370 | 7905 | 8436 | 8962 | 9485 |
| 2280 | 3471 | 4033 | 4590 | 5143 | 5691 | 6234 | 6773 | 7308 | 7839 | 8366 | 8889 |
| 2300 | 2880 | 3442 | 3999 | 4552 | 5100 | 5643 | 6182 | 6717 | 7248 | 7775 | 8298 |
| 2320 | 2294 | 2856 | 3413 | 3966 | 4514 | 5057 | 5596 | 6131 | 6662 | 7189 | 7712 |
| 2340 | 1713 | 2275 | 2832 | 3385 | 3933 | 4476 | 5016 | 5551 | 6081 | 6608 | 7131 |
| 2360 | 1137 | 1699 | 2256 | 2809 | 3357 | 3900 | 4440 | 4975 | 5505 | 6032 | 6555 |
| 2380 | 566 | 1128 | 1685 | 2238 | 2786 | 3329 | 3868 | 4403 | 4934 | 5461 | 5984 |
| 2400 | 0 | 562 | 1119 | 1671 | 2219 | 2763 | 3302 | 3837 | 4368 | 4895 | 5417 |
| 2420 | 266 | 0 | 557 | 1110 | 1658 | 2201 | 2740 | 3275 | 3806 | 4333 | 4856 |
| 2440 | 533 | 267 | 0 | 552 | 1100 | 1644 | 2183 | 2718 | 3249 | 3776 | 4298 |
| 2460 | 801 | 535 | 268 | 0 | 548 | 1092 | 1631 | 2166 | 2697 | 3223 | 3746 |
| 2480 | 1070 | 804 | 537 | 269 | 0 | 544 | 1083 | 1618 | 2149 | 2675 | 3198 |
| 2500 | 1340 | 1074 | 807 | 539 | 270 | 0 | 539 | 1074 | 1605 | 2132 | 2654 |
| 2520 | 1611 | 1346 | 1079 | 811 | 541 | 271 | 0 | 535 | 1066 | 1593 | 2115 |
| 2540 | 1884 | 1618 | 1351 | 1083 | 814 | 544 | 272 | 0 | 531 | 1057 | 1580 |
| 2560 | 2157 | 1891 | 1624 | 1356 | 1087 | 817 | 546 | 273 | 0 | 527 | 1049 |
| 2580 | 2432 | 2166 | 1899 | 1631 | 1362 | 1092 | 820 | 548 | 275 | 0 | 523 |
| 2600 | 2707 | 2442 | 2175 | 1907 | 1637 | 1367 | 1096 | 824 | 550 | 276 | 0 |
| 2620 | 2984 | 2718 | 2451 | 2183 | 1914 | 1644 | 1373 | 1100 | 827 | 552 | 277 |
| 2640 | 3262 | 2996 | 2729 | 2461 | 2192 | 1922 | 1651 | 1378 | 1105 | 830 | 555 |
| 2660 | 3541 | 3275 | 3008 | 2740 | 2471 | 2201 | 1930 | 1658 | 1384 | 1110 | 834 |
| 2680 | 3822 | 3556 | 3289 | 3021 | 2752 | 2481 | 2210 | 1938 | 1664 | 1390 | 1114 |
| 2700 | 4103 | 3837 | 3570 | 3302 | 3033 | 2763 | 2492 | 2219 | 1946 | 1671 | 1395 |
| 2720 | 4386 | 4120 | 3853 | 3585 | 3316 | 3045 | 2774 | 2502 | 2228 | 1954 | 1678 |
| 2740 | 4669 | 4403 | 4136 | 3868 | 3599 | 3329 | 3058 | 2786 | 2512 | 2238 | 1962 |
| 2760 | 4954 | 4688 | 4421 | 4153 | 3884 | 3614 | 3343 | 3070 | 2797 | 2522 | 2247 |
| 2780 | 5240 | 4975 | 4708 | 4440 | 4170 | 3900 | 3629 | 3357 | 3083 | 2809 | 2533 |

2880 + 2498 + 2593 + 2697 + 1671 = 12,339

KEY

Rapid Boration

1. Limits and Precautions

- 1.1 This procedure is Reactivity Management related because it controls activities that can affect core reactivity by changing boron concentration. (R.M.)
- 1.2 If the boron concentration is being increased in the NC System, at least one NC pump or one ND pump shall be in operation, recirculating the NC System. (R.M.)
- 1.3 When manually operating any motor operated valve, minimize the torque applied to the handwheel.
- 1.4 After manual operation, maintenance or packing adjustment of any motor operated safety related valve, it shall be cycled electrically to ensure reliable automatic operation.
- 1.5 Maintaining VCT pressure as low as practical during large makeups will minimize gas absorption. VCT pressure can be reduced by diverting letdown or by VCT purge.

2. Initial Conditions

- <u>AA</u> 2.1 <u>IF</u> in Mode 1, 2 or 3, ensure R2 reactivity management controls established per AD-OP-ALL-0203 (Reactivity Management). (R.M.)
- <u>AA</u> 2.2 Verify Unit 1 shutdown is in progress per OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown).
- <u>AA</u> 2.3 Verify NV Pump 1A or 1B is in operation per OP/1/A/6200/001 (Chemical and Volume Control).
- <u>AA</u> 2.4 Verify at least one NC Pump in service.
- **AA** 2.5 Ensure adequate pressurizer spray flow exists by verifying at least one of the following:

 $\mathbf{\underline{M}}$ 1B NC Pump is in service

□ 1A, 1C and 1D NC Pumps are in service

Auxiliary PZR spray flow established

<u>AA</u> 2.6 Verify Pressurizer Pressure Master is in auto.

3. Procedure

| | NOTE: | This enclosure will affect reactivity of the core and is therefore designated important to Reactivity Management per the guidelines of AD-OP-ALL-0203 (Reactivity Management). (R.M.) |
|----------|--------------|---|
| ŀ | A 3.1 | Ensure valves are aligned per one of the following: |
| | | Enclosure 4.8 (Valve Checklist) OR |
| | | □ Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1) |
| <u> </u> | AA 3.2 | Record the position of the Boric Acid Transfer Pumps switches. |
| | | \mathbf{A} B/A Xfer Pmp 1A Auto |
| | | B/A Xfer Pmp 1B Auto |
| | NOTE: | If Unit shutdown is for a Refueling Outage, the boron concentration in the next step shall be greater than or equal to the refueling boron concentration as stated in the COLR. |
| | 3.3 | Record the desired NC System boron concentration. Desired concentration ppm |
| | NOTE: | If Unit shutdown is for a Refueling Outage, approximately 41,000 gallons will be required to achieve 2900 ppmB (Mode 6 boron concentration plus 200 ppmB margin). |
| | 3.4 | Determine the volume of boric acid required to achieve the concentration in Step 3.3 using the Unit 1 Rod Manual or REACT program. (R.M.) |
| | | gallons |
| _ | 3.5 | Determine equivalent BAT level change corresponding to the volume determined in Step 3.4 as follows: |
| | | gallons% |

392 gal / %

Rapid Boration

OP/**1**/A/6150/009 Page 3 of 7

- 3.6 **IF** aligned per Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1) **AND** it is desired to use BAT #2 to supply a portion of the total boric acid to be added, perform the following: (R.M.)
 - \Box 3.6.1 Record initial BAT #2 level. _____%
 - **NOTE:** Minimum BAT #2 level required to maintain the tank functional for Unit 2 when Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1) is completed is contained in the Unit 2 COLR.
 - Primary AOM may be contacted to determine BAT #2 final level and volume.
 - \Box 3.6.2 Record desired BAT #2 final level. _____%
 - □ 3.6.3 Determine change in BAT #2 level as follows:

 $\frac{\%}{\text{Initial level (Step 3.6.1)}} - \frac{\%}{\text{Final level (Step 3.6.2)}} = \frac{\%}{\%}$

□ 3.6.4 Determine remaining volume to be added from BAT #1 as follows:

| % | - | % | = | % |
|----------------------|---|--------------------|---|-------|
| Equivalent BAT level | | Change in BAT #2 | | |
| change (Step 3.5) | | level (Step 3.6.3) | | |

3.7 Determine final BAT #1 level as follows: (R.M.)

- \Box 3.7.1 Record initial BAT #1 level. _____%
- □ 3.7.2 Subtract the volume to be added (Step 3.5 or 3.6.4) from the initial level (Step 3.7.1) to determine final BAT #1 level.

(Step 3.7.1) % - (Step 3.5 or 3.6.4) % = ------%

- 3.8 Ensure letdown flow is maximized per OP/1/A/6200/001 (Chemical And Volume Control System).
- 3.9 Place at least two of the following banks of Pressurizer heaters in "MAN":
- PZR Htr Group 1A
- PZR Htr Group 1B
- PZR Htr Group 1D

- 3.10 Ensure the Pressurizer heater banks selected in Step 3.9 are in "ON":
 - PZR Htr Group 1A
 - PZR Htr Group 1B
- PZR Htr Group 1D
- 3.11 Verify Pressurizer Spray Valves open to maintain pressure.
 - □ 1NC-27 (PZR Spray Ctrl Frm Loop A)
 - □ 1NC-29 (PZR Spray Ctrl Frm Loop B)
- 3.12 **IF AT ANY TIME** it is desired to divert letdown to the RHT manually operate 1NV-172A (3-Way Divert To VCT-RHT) as follows:
 - _____ 3.12.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) to the "RHT" position.
 - 3.12.2 Ensure VCT level is monitored continuously while diverting to the RHT.

NOTE: Procedure may continue while performing the following step.

- 3.12.3 <u>WHEN</u> desired VCT level is reached return 1NV-172A (3-Way Divert To VCT-RHT) to auto as follows:
 - _____ 3.12.3.1 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "VCT" position.
 - _____ 3.12.3.2 Place the control switch for 1NV-172A (3-Way Divert To VCT-RHT) in the "AUTO" position.
- 3.13 Open 1NV-236B (Boric Acid To NV Pumps Suct). (R.M.)
- **NOTE:** If BAT #2 is aligned to Unit 1 per Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1), starting Boric Acid Transfer Pumps in the next step will result in transferring approximately 10 gpm from BAT #2 to BAT #1 via the pump miniflow line.
 - 3.14 Place both Boric Acid Transfer Pumps in "ON". (R.M.)
 - B/A Xfer Pmp 1A
 - B/A Xfer Pmp 1B

- **NOTE:** The following step will secure the rapid boration and complete this enclosure prior to adding the volume of boric acid that was initially calculated. <u>IF</u> it is desired to resume a rapid boration, a new enclosure will be performed.
- _____ 3.15 IF AT ANY TIME it is desired to secure the boration, THEN perform the following:
 - 3.15.1 Place both Boric Acid Transfer Pumps in "OFF".
 - B/A Xfer Pmp 1A
 - B/A Xfer Pmp 1B
 - 3.15.2 **IF** BAT #2 is supplying boric acid per Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1)<u>AND</u> it is desired to secure from that alignment, **THEN** complete Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1).
 - 3.15.3 N/A Step 3.16, <u>AND</u> complete the remaining steps in this enclosure.

- **NOTE:** During the re-alignment of valves in Enclosure 4.7, the Unit 1 BAT is aligned to supply the Unit 1 Boric Acid Transfer Pumps prior to isolating the Unit 2 BAT from Unit 1. It is acceptable to leave the Boric Acid Transfer Pumps "ON" during the re-alignment.
- 3.16 **IF** BAT #2 is supplying boric acid per Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1), **WHEN** the desired final BAT #2 level as recorded in Step 3.6.2 is reached, perform the following:
 - ______ 3.16.1 Complete Enclosure 4.7 (Placing Boric Acid Tank #2 In Service For Unit #1).
- **NOTE:** Enclosure 4.7 will have the operator notify the control room when the re-alignment is complete.
 - IF a cooldown is in progress, the cooldown rate and charging flow may need to be adjusted to maintain VCT level if the following step is required to be performed.
 - _____ 3.16.2 IF <u>AT ANY TIME</u> the Unit 2 BAT approaches 50% level, <u>THEN</u> perform the following:
 - 3.16.2.1 Place both Boric Acid Transfer Pumps in "OFF".
 - B/A Xfer Pmp 1A
 - B/A Xfer Pmp 1B
 - 3.16.2.2 <u>WHEN</u> notified by the operator completing Enclosure 4.7, that the Unit 2 BAT is no longer aligned to supply the Unit 1 Boric Acid Transfer Pumps, <u>THEN</u> place both Boric Acid Transfer Pumps in "ON" (R.M.)
 - B/A Xfer Pmp 1A
 - B/A Xfer Pmp 1B
- 3.17 <u>WHEN</u> the final BAT #1 level determined in Step 3.7.2 is reached, <u>THEN</u> place both Boric Acid Transfer Pumps in "OFF". (R.M.).
 - B/A Xfer Pmp 1A
 - B/A Xfer Pmp 1B
 - _ 3.18 Close 1NV-236B (Boric Acid To NV Pumps Suct).

Rapid Boration

- 3.19 Return the switches for the Boric Acid Transfer Pumps to the position recorded in Step 3.2.
 - B/A Xfer Pmp 1A
 - B/A Xfer Pmp 1B
- 3.20 Operate Pressurizer heaters as directed in OP/1/A/6100/002 (Controlling Procedure For Unit Shutdown).
- 3.21 **IF** increased letdown flow is **NOT** required for other reasons, reduce letdown flow to normal per OP/1/A/6200/001 (Chemical And Volume Control System).
- 3.22 Document volume of boric acid added to the NC system in the Log based on changes in BAT#2 AND BAT #1 levels.
 - 3.23 Do <u>NOT</u> file this enclosure.

JPM A.2

RO

EVALUATION SHEET

| Task: Use Flow Diagrams, Electrical Prints and Load Lists To Determine Leak Isolation Boundary | | | | | | |
|--|--|----------------------|-----------------------------|--|--|--|
| Alternate Path: | N/A | | | | | |
| Facility JPM #: | 2017 NRC Exam | | | | | |
| Safety Function: | N/A | | | | | |
| <u>K/A</u> 2.2.41 | A 2.2.41 Ability to obtain and interpret station electrical and mechanical drawings. | | | | | |
| Importance: | 3.5 / 3.9 <u>CFR:</u> 4 | 1.10 / 45.12 / 45.13 | | | | |
| Preferred Evalua | tion Location: | Preferred Eval | uation Method: | | | |
| Simulator | Classroom X | Perform | X Simulate | | | |
| <u>References</u> : | References: Flow diagrams of the CM system (CN 1590-1.5, CN 1590-1.7), Load List for 1MXB, 6.9 KV bus one line electrical drawings | | | | | |
| Task Standard: | Task Standard:Mechanical and electrical isolation boundary determined for work on 1CM-327per JPM A.2 key. | | | | | |
| Validation Time: | 30 minutes | Time Critical: | Yes NoX | | | |
| Applicant: NAME | _ | Docket # | Time Start: Time Finish: | | | |
| Performance Rat | ting: | | Performance Time | | | |
| SAT UNSA | Т | | | | | |
| <u>Examiner:</u> | NAME | | / | | | |
| COMMENTS | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

• The 1B Condensate Booster Pump has been shutdown in accordance with OP/1/A/6250/001 (Condensate and Feedwater System) and is to be tagged out for removal and replacement of 1CM-327 (1B Condensate Booster Pump Suction Header Relief Valve).

INITIATING CUES:

- The SM has directed you to use the provided materials to determine the required boundary for isolation for this work.
- You are to use the valves closest to the work being performed for isolation to minimize drain and fill time.
- Identify components, including the required position, for creation of a Clearance for replacement of 1CM-327, including:
 - Mechanical isolations
 - Electrical isolations
 - Applicable Vent and Drain path
- Record your answer in the table on the following page.

EXAMINER NOTE:

After reading cue, provide applicant with a copy of CM flow diagrams (CN 1590-1.5 and CN 1590-1.7), load list for 1MXB, and 6.9 KV Switchgear one line diagrams (CN 1702-1.1, CN 1702-1.2, CN 1702-1.3, and CN 1702-1.4).

| | SAT / |
|---------------|-------|
| STEP/STANDARD | UNSAT |

START TIME: _____

| <u>STEP 1:</u> Determine clearance boundary for 1CM-327 boundary. | CRITICAL STEP |
|---|------------------|
| Applicant identifies clearance boundary per table on the next page. Note that only one vent valve or one drain valve is needed to meet the critical step. | |
| Examiner Note: This step is critical to be able to correctly isolate the 1B Condensate Booster Pump for replacement of 1CM-327. <u>COMMENTS:</u> | SAT UNSAT |

| STEP / STANDA | SAT / UNSAT | | | | |
|------------------|----------------|------|--|--|--|
| Component | Position | | | | |
| 1TB-11 | Racked Out | | | | |
| 1CM-93 | Closed | | | | |
| 1CM-94 | Closed | | | | |
| 1CM-96 | Closed | | | | |
| 1CM-97 | Closed | | | | |
| 1CM-58 | Closed | | | | |
| 1CM-306 | Closed | | | | |
| 1MXB F01D | Off/Open | | | | |
| 1MXB-R01B | Off/Open | | | | |
| *1CM-334 (Drain) | Open | | | | |
| *1CM-335 (Drain) | Open | | | | |
| *1CM-424 (Drain) | Open | | | | |
| *1CM-916 (Vent) | Open | | | | |
| *1CM-330 (Vent) | Open | | | | |
| *1CM-917 (Vent) | Open | Open | | | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

 The 1B Condensate Booster Pump has been shutdown in accordance with OP/1/A/6250/001 (Condensate and Feedwater System) and is to be tagged out for removal and replacement of 1CM-327 (1B Condensate Booster Pump Suction Header Relief Valve).

INITIATING CUES:

- The SM has directed you to use the provided materials to determine the required boundary for isolation for this work.
- You are to use the valves closest to the work being performed for isolation to minimize drain and fill time.
- Identify components, including the required position, for creation of a Clearance for replacement of 1CM-327, including:
 - Mechanical isolations
 - Electrical isolations
 - Applicable Vent and Drain path
- Record your answer in the table on the following page.

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

<u>Answer</u>

| Component | Position |
|-----------|----------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |



| | | | | | | | | | | | | CATAWB | A NUCLEAR |
|-------|--------------------------|-----|----------------------|------|---------------------------|------|-------------------|-------|-------|-------------|----------------|---------------------|--------------|
| | | | | | | | | | | | | | FLOW DI |
| | | | | | | | | | | | | | CONDENSA |
| | | | | | | | | | | | | | ((|
| 17 | REV PER EC 109199 | TLC | $ 9^{-16}_{14} _{0}$ | CGA | 9-16 14 | WEH | 9-17 14 | -W- | -W- | -W- | | | |
| 16 | REV PER EC 106831 | TLC | 2 = 21 | CGA | $\frac{2}{13}$ | WEH | $\frac{2-26}{13}$ | -W- | -W- | -W- | | | |
| 15 | REV PER EC 101959 | TLC | 13-12 | CGA | $\frac{12 - 14}{12 - 14}$ | WEH | 13-14 | -W- | -W- | -W- | DESIGNER_MISEN | <u>HEIMER</u> DAT E | 10-30-75 |
| ORIG. | ORIGINAL DRAWING RETIRED | TLC | 13-12 | | | | | | | | DRAWN T JONES | DATE | 10 - 21 - 75 |
| NO. | REVISIONS | DRN | DATE C | СНКД | DATE | APPR | DATE | CIVIL | ELEC. | MECH. ED | SCALE DWG. | <u>. NO.</u> | CN-159 |
| g | 10 | | | | 1 1 | | | | | 1: | > | | 13 |



ERN:CNØØØHSV

4

| | | | | | | | | | | | | DUKE PO Catawba Nucle | WER COMI Ar stati |
|-----------|-------------------|-----|------|--------|------|------|------|-------|---------|------|------------------------|---------------------------|----------------------|
| | | | | | | | | | | | | FLOW [|)IAGRAM C |
| | | | | | | | | | | | | CONDENS | SATE SYST |
| | | | | | | | | | | | | | (CM) |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| EV PER CE | -9745, IMP 8-6-98 | RSF | 8-11 | WBL | 8-11 | RGW | 8-12 | .Ink | ПНН | .INK | DESIGNER_MISENHE | EIMER DATE <u>6-22-76</u> | INSP. <u>Wa</u> |
| RIGINAL D | RAWING RETIRED | | | | | | | | | | DRAWN <u>EB CASKEY</u> | DATE <u>5-24-76</u> | INSP. <u>TC</u> |
| | | | | | | | | CIVII | FLEC | месн | CHECKED CH FAVO | R DATE <u>6-22-76</u> | APPR. I |
| REVISIONS | | DRN | DATE | e Chkd | DATE | APPR | DATE | IN | NSPECTI | ED | DWG. | NO. CN-159 | 0/0 - 1.7 |
| | 1 Ø | | | | 11 | | | | | 12 | 2 | 13 | |

| 1, 7 10 1, 7 10 1, 7 1 | | 14 | | |
|---|--|--|--------------------|---|
| Image: Signal state of the series of the | 1.7 | | REV. | L |
| ST 5 5 5 5 5 5 5 5 5 5 5 5 5 | | | | K |
| ST -5 -5 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 | | | | J |
| 4' H IO FDWP SEALS G CL I-8 ION UNIT 1 I ION ION UNIT 1 ION ION UNIT 1 ION ION ION ION ION ION ION ION ION ION ION | ST -5 | | | I |
| ТО FDWP SEALS CL I-8 CN-1591-2.0 F | > | | | H |
| мралу ION UNIT 1 OF STEM MARKEN IA I I I I I I I I I I I I I | TO FDWP SE CL CN-1591-2 | EALS I-8 | | G |
| MPANY ION UNIT 1 OF STEM MAIVED C. MOMEEKIN DATE C. MOMEEKIN C. MOMEEN C. MOME | | | | F |
| MPANY ION UNIT 1 OF STEM A VAIVED DATE | | | | E |
| MPANY ION UNIT 1 OF STEM MAIVED DATE IC MOMEEKIN DATE 6-29-76 WYKE DATE 6-30-76 WYKE DATE 6-30-76 WYKE DATE 6-30-76 WYKE 04 TE 700 WYKE 7 | | | | D |
| MPANY ION UNIT 1 OF STEM VAIVED DATE IC MCMEEKIN DATE 6-29-76 IWYKE DATE 6-30-76 REV. 3 14 | | | | С |
| MPANY ION UNIT 1 OF STEM VAIVED DATE IC MCMEEKIN DATE 6-29-76 E WYKE DATE 6-30-76 REV. 3 14 | | | | В |
| • | MPANY ION UNIT OF STEM VAIVED IC Momeekin E Wyke | 1 DATE DATE <u>6-29-</u> DATE <u>6-30-</u> 1 4 | -76 -76 REV. | A |



TIMD035 - EQUIPMENT CONFIGURATION CONTROL

VENTYX # 1MXB Load List

TIMD035 - Export Grid

JPM A.2 KEY

| | ASSET SUITE | | | | | | | | | | | |
|-------|-------------|---|------------------|---------------|---|---------------|-----|---------|---|--|--|--|
| Compo | Component | Equipment Name | Manufact | Model | в | Serial Number | UTC | Catalog | Р | | | |
| nent | | | urer | | 0 | | | ID | Q | | | |
| Type | | | | | м | | | | L | | | |
| BK | F01A | 1A HOTWELL PUMP DISCHARGE ISOL MOTOR (1CM4) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F01B | 1B HOTWELL PUMP DISCHARGE ISOL MOTOR (1CM13) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F01C | 1C HOTWELL PUMP DISCHARGE ISOL MOTOR (1CM22) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F01D | (1E CONDENSATE BOOSTER PUMP SUCTION ISOL MOTOR) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F02A | 1A CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F02B | 1B CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F02C | 1C CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F02D | 1A CONDENSATE POL DEMIN BACKWASH TANK PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F02E | 1A GENERATOR PCB COMPRESSOR NORMAL SUPPLY | | | | | | | | | | |
| вк | F02F | 1MXB BUS POTENTIAL XFMR LOSS OF VOLTAGE RELAY | | | | | | | | | | |
| вк | F03A | 1D CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | F03B | 1E CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| | | 1 | | | 1 | | | | | | | |

TIMD035 - EQUIPMENT CONFIGURATION CONTROL

VENTYX # 1MXB Load List

A GOET OLUTE

TIMD035 - Export Grid

JPM A.2 KEY

| | ASSETSUITE | | | | | | | | | | | |
|-----------------------|------------|--|------------------|---------------|-------------|---------------|-----|---------------|-------------|--|--|--|
| Compo nent Type | Component | Equipment Name | Manufact urer | Model | в О М | Serial Number | UTC | Catalog ID | P Q L | | | |
| вк | R01A | 1A CONDENSATE BOOSTER PUMP DISCH ISOL MOTOR (1CM88) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | R01B | 1B CONDENSATE BOOSTER PUMP DISCH ISOL MOTOR (1CM96) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| ВК | R01C | 1C CONDENSATE BOOSTER PUMP DISCH ISOL MOTOR (1CM104) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| ВК | R01D | 1G3 LOW PRESSURE HEATER INLET ISOL MOTOR (1CM68) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| BK | R02A | 1A HOTWELL PUMP SUCTION ISOL MOTOR (1CM2) | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| BK | R02B | HOTWELL PUMP 1B SUCTION ISOLATION VALVE 1CM11 | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| BK | R02C | HOTWELL PUMP 1A DISCHARGE VENT VALVE 1CM10 | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| BK | R02D | HOTWELL PUMP 1C SUCTION ISOLATION VALVE 1CM20 | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| ВК | R03A | HOTWELL PUMP 1C DISCHARGE VENT VALVE 1CM28 | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| вк | R03B | HOTWELL PUMP 1B DISCHARGE VENT VALVE 1CM19 | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| ВК | R03C | CONDENSER A VACUUM BREAKER VALVE 1CM368 | CUTLER- HAMME | SEE ENG NOTES | | | | | | | | |
| | | | | | | | | | | | | |


| | | | | | | | | | | | | | | וות | <f f<="" th=""></f> |
|-------|--------------------------|-----|--------------------|------|--------------------|------|-------------------|-------|------------------|-------------|------------------|----------|--------------------------|-------------------------|---------------------|
| | | | | | | | | | | | | СА | TAWB | A NUCL | _EAR |
| | | | | | | | | | | | | | | FLO' | w di |
| | | | | | | | | | | | | | | COND | ENSA |
| | | | | | | | | | | | | | | | ((|
| 17 | REV PER EC 109199 | TLC | $ 9^{-16} _{14}$ | CGA | 9-16 14 | WEH | 9-17 14 | -W- | -W- | -W- | | | | | |
| 16 | REV PER EC 106831 | TLC | 2-21 | CGA | $\frac{2-26}{13}$ | WEH | $\frac{2-26}{13}$ | -W- | -W- | -W- | | | | | |
| 15 | REV PER EC 101959 | TLC | $\frac{1}{2}$ - 12 | CGA | $\frac{12-14}{12}$ | WEH | 13-14 | -W- | -W- | -W- | DESIGNER_MIS | SENHEIME | <u>er</u> dat e | 10-30-75 |) |
| ORIG. | ORIGINAL DRAWING RETIRED | TLC | 12-12 | | <u></u> | | | | | | DRAWN <u>TJO</u> | | DATE | <u>10-21-75</u> | J |
| NO. | REVISIONS | DRN | DATE (| СНКД | DATE | APPR | DATE | CIVIL | ELEC. NSPECTE | MECH. ED | SCALE | /G. N(| <u>UAIE</u>). | $\frac{10-30-75}{CN-1}$ | .59(|
| g | 10 | | | | 1 1 | | | | | 1 | 2 | | | 13 | |



ERN:CNØØØHSV

4

| | | | | | | | | | | | DUKE POWER COMP Catawba Nuclear Static |
|-----------|-------------------|-----|-------------|------|-------------|------|-------------|-------|-------|-------------|--|
| | | | | | | | | | | | FLOW DIAGRAM O |
| | | | | | | | | | | | CONDENSATE SYST (CM) |
| | | | | | | | | | | | |
| EV PER CE | -9745, IMP 8-6-98 | RSF | 8-11 -98 | WBL | 8-11 -98 | RGW | 8-12 -98 | JDK | | JDK | DESIGNER MISENHEIMER DATE 6-22-76 INSP. WAI |
| RIGINAL D | RAWING RETIRED | | | | | | | | | | $\begin{array}{c c} DRAWN \underline{EB} \underline{CHSRET} \\ \hline DATE 6-22-76 \\ \hline DATE 7-76 \\ \hline DATE 7-76 \\ \hline DATE 7-76 \\ \hline DATE 7-76 \\ \hline $ |
| | REVISIONS | DRN | DATE | СНКД | DATE | APPR | DATE | CIVIL | ELEC. | MECH. ED | scale DWG. NO. CN-1590-1.7 |
| | 1 Ø | | | | 1 1 | | | | | 12 | 2 13 |

| | | | 14 | 4 | | | |
|-----------------|-------------------------|---------------------|---------------|---|----------------|------|---|
| <u>j —</u> | 1. | 7 | | | | REV. | |
| | | | | | | | |
| | | | | | | | К |
| | | | | | | | |
| | | | | | | | J |
| | | | | | | | |
| IAL AY K | IST -5 | | | | | | Ι |
| | 4" | | | | | | |
| | | | | | | | |
| | | | | | | | G |
| | CL CN- | <u>1591–</u> | I I 2.0 | -8 | | | |
| | | | | | | | F |
| | | | | | | | |
| | | | | | | | E |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | С |
| | | | | | | | |
| | | | | | | | В |
| со АТ аМ | MP 4 I ON OF | ny UNI | Τ 1 | | | | |
| 5P. 5P. 7 | WAIVE TC Mg T Wyk | ED Smeekin Se | | IAT E IAT E <u>6-</u> IAT E <u>6-</u> | 29-76 30-76 | | A |
| | | | 1 4 | 4 | 4 | | |

VENTYX 🎒 1MXB Load List

| | ASSE | T SUITE | | | | | | | |
|-------|-------------|---|------------------|---------------|---|---------------|-----|---------|---|
| Compo | Component | Equipment Name | Manufact | Model | в | Serial Number | UTC | Catalog | Ρ |
| nent | | | urer | | 0 | | | ID | Q |
| Туре | | | | | М | | | | L |
| вк | F01A | 1A HOTWELL PUMP DISCHARGE ISOL MOTOR (1CM4) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F01B | 1B HOTWELL PUMP DISCHARGE ISOL MOTOR (1CM13) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F01C | 1C HOTWELL PUMP DISCHARGE ISOL MOTOR (1CM22) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F01D | 1B CONDENSATE BOOSTER PUMP SUCTION ISOL MOTOR (1CM93) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F02A | 1A CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F02B | 1B CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F02C | 1C CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F02D | 1A CONDENSATE POL DEMIN BACKWASH TANK PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F02E | 1A GENERATOR PCB COMPRESSOR NORMAL SUPPLY | | | | | | | |
| вк | F02F | 1MXB BUS POTENTIAL XFMR LOSS OF VOLTAGE RELAY | | | | | | | |
| вк | F03A | 1D CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | F03B | 1E CONDENSATE POL DEMIN HOLDING PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| L | | | | | | | | | |

VENTYX 🎒 1MXB Load List

| | ASSE | T SUITE | | | | | | | |
|-------|-------------|--|------------------|---------------|---|---------------|-----|-----------|----|
| Compo | Component | Equipment Name | Manufact | Model | в | Serial Number | UTC | Catalog 1 | P |
| nent | | | urer | | 0 | | | ID (| Q |
| Туре | | | | | м | | | i | E, |
| BK | F03C | CONDENSATE POL DEMIN RESIN FEED TANK 1 AGITATOR MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F03D | 1B CONDENSATE POL DEMIN BACKWASH TANK PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F03E | WELDING FEEDER | | | | | | | |
| вк | FO3F | HAZARDOUS WASTE STOR BLDG AHU (CN0VKAH-0005) STTR 0CMTS0020 | | | | | | | |
| BK | F04A | NORMAL INCOMING BREAKER FED FROM LOAD CENTER 1LXB | | | | | | | |
| вк | F04B | FEEDER B TO 1T1A AUX XFMR AUXILIARIES | | | | | | | |
| вк | F04C | FEEDER B TO 1T1B AUX XFMR AUXILIARIES | | | | | | | |
| вк | F04D | FEEDER B TO 1T2A AUX XFMR AUXILIARIES | | | | | | | |
| вк | F04E | 1A CONDENSATE BOOSTER PUMP SUCTION ISOL MOTOR (1CM85) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| ВК | F05A | 1C CONDENSATE BOOSTER PUMP SUCTION ISOL MOTOR (1CM101) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| ВК | F05B | 1A CONDENSATE BOOSTER PUMP AUX LUBE OIL PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | F05C | 1B CONDENSATE BOOSTER PUMP AUX LUBE OIL PUMP MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F05D | LIGHTING XFMR 1TL2 FEEDER | | | | | | | |
| | | | | | | | | | |

VENTYX 🎒 1MXB Load List

| | ASSE | T SUITE | | | | | | | |
|-------|-----------|---|------------------|---------------|---|---------------|-----|---------|---|
| Compo | Component | Equipment Name | Manufact | Model | в | Serial Number | UTC | Catalog | Р |
| nent | | | urer | | 0 | | | ID | Q |
| Туре | | | | _ | M | | | | L |
| вк | F05E | LIGHTING XFMR 1TL3 FEEDER | | | | | | | |
| вк | F05F | CA PUMPS SUCTION FROM HOTWELL MOTOR (1CA2) | | | | | | | |
| вк | F06A | ALTERNATE INCOMING BREAKER FED FROM LOAD CENTER 1LXE | | | | | | | |
| вк | F06B | SPARE SIZE 1 CFVR STARTER | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F06C | SPARE SIZE 1 CFVR STARTER | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F07A | CONDENSATE POL DEMIN RECIRCULATION TANK AGITATOR MOTOR | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | F07B | TURBINE BUILDING YH SECONDARY PUMP MOTOR (1TB- P-1) | | | | | | | |
| вк | F07C | PANELBOARD TRANSFORMER 0XFMR0009 (1TL19) FEEDER | | | | | | | |
| вк | F07D | POWER PANELBOARD XFMR 1KTB FEEDER | | | | | | | |
| вк | F07E | 1TA/1TB 6.9KV SWITCHGEAR ROOM AIR HANDLING UNIT (1TB-AHU-3) | | | | | | | |
| вк | F07F | HOTWELL STRAINERS 4 TON MONORAIL HOIST (T012) | | | | | | | |
| вк | F07G | TURBINE BUILDING YH SECONDARY PUMP MOTOR (1TB- P-3) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| ВК | F07H | TURBINE BUILDING YH SECONDARY PUMP MOTOR (1TB- P-4) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| | | | | | | | | | |

VENTYX 🎒 1MXB Load List

| | ASSE | T SUITE | | | | | | | |
|-------|-------------|--|------------------|---------------|---|---------------|-----|---------|---|
| Compo | Component | Equipment Name | Manufact | Model | в | Serial Number | UTC | Catalog | Р |
| nent | | | urer | | 0 | | | ID | Q |
| Туре | | | | | М | | | | L |
| ВК | R01A | 1A CONDENSATE BOOSTER PUMP DISCH ISOL MOTOR (1CM88) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | R01B | 1B CONDENSATE BOOSTER PUMP DISCH ISOL MOTOR (1CM96) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | R01C | 1C CONDENSATE BOOSTER PUMP DISCH ISOL MOTOR (1CM104) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| ВК | R01D | 1G3 LOW PRESSURE HEATER INLET ISOL MOTOR (1CM68) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | R02A | 1A HOTWELL PUMP SUCTION ISOL MOTOR (1CM2) | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | R02B | HOTWELL PUMP 1B SUCTION ISOLATION VALVE 1CM11 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| ВК | R02C | HOTWELL PUMP 1A DISCHARGE VENT VALVE 1CM10 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | R02D | HOTWELL PUMP 1C SUCTION ISOLATION VALVE 1CM20 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | R03A | HOTWELL PUMP 1C DISCHARGE VENT VALVE 1CM28 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | R03B | HOTWELL PUMP 1B DISCHARGE VENT VALVE 1CM19 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | R03C | CONDENSER A VACUUM BREAKER VALVE 1CM368 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| | | | | | | | | | |

VENTYX 🎒 1MXB Load List

| | ASSE | T SUITE | | | | | | | |
|-------|-----------|---|------------------|---------------|---|---------------|-----|---------|---|
| Compo | Component | Equipment Name | Manufact | Model | в | Serial Number | UTC | Catalog | Р |
| nent | | | urer | | 0 | | | ID | Q |
| Туре | | | | | М | | | | L |
| вк | R03D | CONDENSER B VACUUM BREAKER VALVE 1CM369 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | R04A | CONDENSER C VACUUM BREAKER VALVE 1CM370 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| ВК | R04B | FEEDER B TO 1T2B AUX XFMR AUXILIARIES | | | | | | | |
| ВК | R04C | FEEDER A TO 1ATE AUX XFMR AUXILIARIES | | | | | | | |
| ВК | R04D | TURBINE BUILDING SUMP PUMP MOTOR 1B | | | | | | | |
| BK | R04E | MOTOR OPERATED DISCONNECT SWITCH 1AT MOTOR | | | | | | | |
| вк | R04F | TURB BLDG HEATING WATER SECONDARY PUMP MOTOR 1TB-P-2 | | | | | | | |
| ВК | R05A | STEPUP TRANSFORMER BASE DRAINAGE SUMP PUMP MOTOR 1A | | | | | | | |
| ВК | R05B | CP DEMINERALIZER PRECOAT PUMP MOTOR 1 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| BK | R05C | MOTOR OPERATED DISCONNECT SWITCH 1AG MOTOR | | | | | | | |
| вк | R05D | SPARE SIZE 2 CFVR STARTER | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | R05E | CT LAB ANNEX FINAL COOLING PUMP #39 | CUTLER- HAMME | SEE ENG NOTES | | | | | |
| вк | R05F | SPARE 100 AMP FEEDER BREAKER | | | | | | | |





ERN:CN000ITY

| | | - | DUKE ENERGY |
|-----|-------------------|-------|--------------------------------|
| | | (| CATAWBA NUCLEAR STATION UNIT 1 |
| | | - | ONE LINE DIAGRAM |
| | | | 6900V NORMAL AUXILIARY |
| | | | POWER SYSTEM (EPB) |
| | | | 6900V SWITCHGEAR NO. 1TB |
| 17 | REV PER EC 109178 |] | |
| 16 | REV PER EC 404478 | | |
| NO. | REVISIONS | SCALE | DWG. NO. CN-1702-01.02 |





ERN: CNØØØIUØ



| NO | ■ CN-17Ø2-Ø1.Ø4 | REV. 11 |
|-----|--|------------|
| | | |
| | | |
| | | |
| | | |
| AMP | BUS | |
| | | |
| | | |
| | 15 16 | |
| | $ \begin{array}{c} \overrightarrow{1200A} \\ 1200A \\ \end{array} \begin{array}{c} \overrightarrow{1200A} \\ 1200A \\ \end{array} \begin{array}{c} \overrightarrow{1200A} \\ \overrightarrow{1200A} \\ \overrightarrow{1200A} \\ \end{array} \begin{array}{c} \overrightarrow{1200A} \\ \overrightarrow{1200A} \\ \overrightarrow{1200A} \\ \end{array} \begin{array}{c} \overrightarrow{1200A} \\ \overrightarrow{1200A} \\ \overrightarrow{1200} \end{array} \begin{array}{c} \overrightarrow{1200A} \\ \overrightarrow{1200} \\ \overrightarrow{1200} \end{array} \begin{array}{c} \overrightarrow{1200} \overrightarrow{1200} \end{array} \end{array}$ | |
| | | |
| | | |
| | $ \begin{array}{c} 8 \\ 8 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1$ | |
| > | | |
| R | | |
| R | | |
|) | | |
| G | (50G) $(50G)$ | |
| | | |
| | 1EPD5Ø7 - 3/ C#2/Ø | |
| | OB OT | |
| , | | |
| | | |

TRANSF. 703-02.01 TRAN 6900/600V No. 1TXF DWG. CN-17

INSPECTED

DUKE ENERGY CATAWBA NUCLEAR STATION UNIT 1 ONE LINE DIAGRAM 6900V NORMAL AUXILIARY POWER SYSTEM (EPB)

6900V SWGR. NO.1TD

| ER <u>HERRINGT</u> | DN_DATE <u>7-16-76</u> INSP. <u>WAIVED</u> | DATE <u>7-16-76</u> |
|--------------------|--|---------------------|
| RA RAMSEY | DATE <u>7-9-76</u> INSP. <u>WAIVED</u> | DATE <u>7-16-76</u> |
| D <u>JR WYNNE</u> | DATE <u>7-16-76_</u> APPR. <u>RH_WALTMAN</u> | DATE <u>7-16-76</u> |
| . NO. | CN-17Ø2-Ø1.Ø4 | REV. 11 |
| | | |

JPM A.2S

SRO

EVALUATION SHEET

| Task: Determi | ine Fire Rated Assembly req | uirements per SLC 16.9 | 9-5 | |
|----------------------|--|---|---|--------------------------------------|
| Alternate Path: | N/A | | | |
| Facility JPM #: | New | | | |
| Safety Function: | 2 | | | |
| <u>K/A</u> G 2.2.40 | Ability to apply Technica | I Specifications for a sy | vstem. | |
| Importance: 3 | .4 / 4.7 <u>CFR:</u> 41.10 | / 43.2 / 43.5 / 45.3 | | |
| Preferred Evaluation | on Location: | Preferred Evaluation | on Method: | |
| Simulator | Classroom X | Perform | X Simulate | |
| <u>References</u> : | SLC 16.9-5, Aux Bldg Serie 1105-06.08, CN-1105-09, O Drawings (CN-1209-10.10, CN-1209-10.14, CN-1209- | es 1105 Drawings (CN-´ CN-1105-10, CN-1105-1 CN-1209-10.11, CN-12 I0.15) | 1105-01, CN-1105 11), Aux Bldg Seri 209-10.12, CN-120 | 5-03, CN- es 1209-10 09-10.13, |
| Task Standard: | The Required Actions of SL implemented for failure of a Elevation 560' between col | C 16.9-5 Condition A a committed boundary lo umns BB47 and BB48. | re required to be ocated at Auxiliary | Building |
| Validation Time: | 15 minutes | Time Critical: | Yes N | lo X |
| Applicant: NAME | Docł | ket # | Time Start: Time Finish: Performance T | |
| | <u>9.</u> | | I chomanee I | inic |
| SATUNSAT_ | | | | |
| Examiner: | NAME | SIGNA | / TURE | DATE |
| | CON | IMENTS | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Both Units are at 100% power.
- A Maintenance Technician has reported an opening in a wall. He has stated that the opening passes completely through the wall and the other side is visible. Reported location:
 - 1ETB Switchgear Room
 - Auxiliary Building, Elevation 560'
 - Between Columns BB47 and BB48

INITIATING CUES:

• The SM directs you to determine remedial actions required due to this report.

T.S. / SLC LCO

Condition(s)

EXAMINER NOTE: Provide each applicant with a copy of the applicable CN-1105 and CN-1209-10 drawing for each of the following Auxiliary Building Elevations: 522', 543', 560' 577', 594', and 605' (12 total drawings).

START TIME: _____

| | STEP / STANDARD | SAT / UNSAT |
|----------------------|--|----------------|
| STEP 1 | REMEDIAL ACTIONS | |
| | IF the required Fire Rated Assembly sealing device is a Fire Door, see Table 16.9-5-1. | |
| <u>STANDAF</u> | <u>RD</u> : | SAT |
| Applicant and deterr | UNSAT | |
| | TS: | |
| | | |
| | | |
| | | |

| STEP 2 IF the required Fire Rated Assembly sealing device is Damper see Table 16.5-9-2. | s a Fire |
|---|----------|
| STANDARD: | SAT |
| Applicant determines a Fire Damper is not impacted. | |
| COMMENTS: | UNSAT |
| | |

| | STEP / STANDARD | SAT / UNSAT |
|-----------------------|--|----------------|
| STEP 3 | IF required Fire Rated Assembly is a Fire Barrier or Penetration Seal: | |
| | Identify the location of the impaired fire protection feature by elevation, column, and building | |
| <u>STANDAF</u> | <u>RD</u> : | SAT |
| Applicant information | determines a Fire Barrier could be impacted and notes location n provided in Initial Conditions. | UNSAT |
| | ITS: | |
| | | |

| STEP 42. Verify the wall, floor/ceiling is a committed boundary on the CN-1105 drawing series (if not a committed boundary, SLC 16.9-5 does not apply)STANDARD: | CRITICAL STEP |
|---|------------------|
| Applicant locates the applicable drawing (CN-1105-06.08) and determines the identified area is a committed boundary. | |
| Examiner Note: This step is critical in order to determine proper application of SLC requirements and determine the correct answer. | SAT |
| <u>COMMENTS:</u> | UNSAT |
| | |

| STEP / STANDARD | SAT / UNSAT |
|---|------------------|
| STEP 5 3. Refer to CN-1209-10 series drawings to identify the Fire Area on both sides of the impaired feature STANDARD: | CRITICAL STEP |
| Applicant locates the applicable drawing (CN-1209-10.12) and determines that Fire Areas 6 and 8 are impaired. | |
| Examiner Note: This step is critical in order to determine proper application of SLC requirements and determine the correct answer. | SAT |
| COMMENTS: | UNSAT |
| | |

| STEP 64.IF either of the Fire Areas is identi Significant (HSS) (see Table 16.9- REQUIRED ACTION CONDITIONSTANDARD: | fied as High Safety -5-3) then implement the I A STEP |
|---|---|
| Applicant refers to Table 16.9-5-3 and determines identified as High Safety Significant and impleme Condition A. | s that Fire Area 6 is nts the Required Action of |
| Examiner Note: This step is critical in order to application of SLC requireme correct answer. | o determine proper nts and determine the |
| <u>COMMENTS:</u> | |

| SAT / UNSAT |
|----------------|
| |
| SAT |
| UNSAT |
| |
| - |

The SM directs you to determine remedial actions required due to this report.

T.S. / SLC LCO <u>SLC 16.9-5</u>

Condition(s)

CONDITION A

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Both Units are at 100% power.
- A Maintenance Technician has reported an opening in a wall. He has stated that the opening passes completely through the wall and the other side is visible. Reported location:
 - 1ETB Switchgear Room
 - Auxiliary Building, Elevation 560'
 - Between Columns BB47 and BB48

INITIATING CUES:

• The SM directs you to determine remedial actions required due to this report.

T.S. / SLC LCO

Condition(s)

16.9 AUXILIARY SYSTEMS

16.9-5 Fire Rated Assemblies

COMMITMENT All required Fire Rated Assemblies (walls, floors/ceilings, cable enclosures and other fire barriers) and all sealing devices in fire rated assembly penetrations (fire doors, fire dampers, and penetration seals) as shown on the CN-1105 drawing series shall be FUNCTIONAL.

APPLICABILITY: At all times.

REMEDIAL ACTIONS

IF the required Fire Rated Assembly sealing device is a Fire Door, see Table 16.9-5-1

IF the required Fire Rated Assembly sealing device is a Fire Damper see Table 16.9-5-2

IF required Fire Rated Assembly is a Fire Barrier or Penetration Seal:

- 1. Identify the location of the impaired fire protection feature by elevation, column, and building
- 2. Verify the wall, floor/ceiling is a committed boundary on the CN-1105 drawing series (if not a committed boundary, SLC 16.9-5 does not apply)
- 3. Refer to CN-1209-10 series drawings to identify the Fire Area on <u>both</u> sides of the impaired feature
- 4. IF either of the Fire Areas is identified as High Safety Significant (HSS) (see Table 16.9-5-3) then implement the REQUIRED ACTION **CONDITION A**
- 5. IF the Fire Areas are not HSS, then identify the associated shutdown trains/methods of the Fire Areas on each side of the barrier using Table 16.9-5-4 and implement the REQUIRED ACTION as identified in the following Chart:

| Shutdown Train (Side 1 & Side 2) | А | В | SSS | A or B | A and B |
|-------------------------------------|-----------|-----------|-----------|-----------|-----------|
| А | CONDITION | CONDITION | CONDITION | CONDITION | CONDITION |
| | C | B | B | C | B |
| В | CONDITION | CONDITION | CONDITION | CONDITION | CONDITION |
| | B | C | B | C | B |
| SSS | CONDITION | CONDITION | CONDITION | CONDITION | CONDITION |
| | B | B | C | B | B |
| A or B | CONDITION | CONDITION | CONDITION | CONDITION | CONDITION |
| | C | C | B | C | B |
| A and B | CONDITION | CONDITION | CONDITION | CONDITION | CONDITION |
| | B | B | B | B | C |

REMEDIAL ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|--|-----------------|--|---|
| A. One or more HSS* required Fire Rated Assemblies is non- | A.1 | Establish a continuous fire watch on at least one side of the assembly. | 1 hour |
| iuncional. | <u>OR</u> | | |
| | A.2.1 | Verify at least one side of the assembly has FUNCTIONAL fire detection instrumentation. | 1 hour |
| | | AND | |
| | A.2.2 | Establish an hourly fire watch patrol on at least one side of the assembly. | 1 hour |
| | <u>OR</u> | | |
| | A.3 | Complete an evaluation as permitted by NRC RIS 2005-07 to institute required action(s). | Prior to terminating Required Action A.1 or A.2 |
| | | | (continued) |

REMEDIAL ACTIONS (continued)

| CONDITION | | REQUIRED ACTION | | COMPLETION TIME |
|-----------|---|-----------------|--|---|
| В. | One or more LSS** required Fire Rated Assemblies is non- functional. | B.1 | Establish an hourly fire watch on at least one side of the assembly. | 1 hour |
| | | <u>OR</u> | | |
| | | B.2.1 | Verify at least one side of the assembly has FUNCTIONAL fire detection instrumentation. | 1 hour |
| | | | AND | |
| | | B.2.2 | Establish a once per shift fire watch patrol on at least one side of the assembly. | 1 hour |
| | | <u>OR</u> | | |
| | | B.3 | Complete an evaluation as permitted by NRC RIS 2005-07 to institute required action(s). | Prior to terminating Required Action B.1 or B.2 |
| | | | | |

REMEDIAL ACTIONS (continued)

| CONDITION | | REQUIRED ACTION | | COMPLETION TIME |
|-----------|--|-----------------|--|---|
| C. | One or more DID*** required Fire Rated Assemblies is non- functional. | C.1 | Establish a once per shift fire watch on at least one side of the assembly. | 1 hour |
| | | <u>OR</u> | | |
| | | C.2 | Verify at least one side of the assembly has FUNCTIONAL fire detection instrumentation. | 1 hour |
| | | <u>OR</u> | | |
| | | C.3 | Complete an evaluation as permitted by NRC RIS 2005-07 to institute required action(s). | Prior to terminating Required Action C.1 |

*High Safety Significant (HSS) Fire Areas containing required Fire Rated Assemblies are defined in Table 16.9-5-3.

**Low Safety Significant (LSS) Fire Areas containing required Fire Rated Assemblies are defined as those areas with a boundary between redundant shutdown trains.

***Defense-in-Depth (DID) Fire Areas containing required Fire Rated Assemblies are defined as analysis compartment boundaries or PRA compartment boundaries that do not meet the HSS or LSS definitions.

TESTING REQUIREMENTS

| | TEST | FREQUENCY |
|-------------|---|--|
| TR 16.9-5-1 | Verify each HSS and LSS interior unlocked fire door is closed. | 24 hours |
| TR 16.9-5-2 | Verify each HSS and LSS locked closed fire door is closed. | 7 days |
| TR 16.9-5-3 | Perform an inspection and functional test of the release and closing mechanism and latches for each swinging fire door shown in Table 16.9-5-1. | 6 months |
| TR 16.9-5-4 | Perform a visual inspection of the exposed surfaces of each required Fire Rated Assembly. | 18 months |
| TR 16.9-5-5 | Any abnormal changes or degradation shall be identified and resolved via the corrective action program. Based on the investigation results, additional dampers may be selected for inspection. Samples will be grouped by unit, system, and train and shall be selected such that each damper is inspected every 15 years. Perform a visual inspection of fire dampers in each HSS and LSS required Fire Rated Assembly. | 18 months, in accordance with the predefined inspection schedule |
| | | (continued) |

TESTING REQUIREMENTS (continued)

| | TEST | | | | | | |
|-------------|--|--|--|--|--|--|--|
| TR 16.9-5-6 | Any abnormal changes or degradation shall be identified and resolved via the corrective action program. Based on the investigation results, additional Fire Rated Assemblies may be selected for inspection. Samples shall be selected such that each Fire Rated Assembly is inspected every 15 years. Perform a visual inspection of penetration seals in each HSS AND LSS required Fire Rated Assembly. | 18 months, in accordance with the predefined inspection schedule | | | | | |
| TR 16.9-5-7 | Perform an inspection and functional test of the automatic hold open, release and closing mechanism for each rolling fire door shown in Table 16.9-5-1. | 18 Months | | | | | |

Required Fire Doors

| DOOR | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|-----------------------|------|--------------|-----------|-----------|----------|-----------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| AX500F | AUX | 56, FF | 522+0 | 1/4 | DID | С |
| AX214A | AUX | 54-55, FF-GG | 543+0 | 1/4 | DID | С |
| AX214B | AUX | 58-59, FF-GG | 543+0 | 1/4 | DID | С |
| AX217D | AUX | 52-53, BB | 543+0 | 3/34 | LSS | В |
| AX217F ⁽¹⁾ | AUX | 51, AA-BB | 543+0 | 3/40 | LSS | В |
| AX217G | AUX | 52-53, BB | 543+0 | 3/32 | LSS | В |
| AX227D | AUX | 54-55, MM-NN | 543+0 | 4/22 | DID | С |
| AX227E | AUX | 59-60, MM-NN | 543+0 | 4/22 | DID | С |
| AX228A | AUX | 56-57, EE | 543+0 | 4/9 | DID | С |
| AX228B | AUX | 57-58, EE | 543+0 | 4/10 | DID | С |
| AX248 | AUX | 57-58, QQ | 543+0 | 4/ASB | LSS | В |
| AX260B | AUX | 61-62, BB-CC | 543+0 | 2/36 | LSS | В |
| AX260F ⁽¹⁾ | AUX | 62, AA-BB | 543+0 | 2/39 | LSS | В |
| AX260G | AUX | 61-62, BB-CC | 543+0 | 2/31 | LSS | В |
| AX260H | AUX | 61-62, BB-CC | 543+0 | 2/33 | LSS | В |
| T527#1 | AUX | 52-53, BB-CC | 543+0 | 3/37 | LSS | В |
| AX202 | AUX | 51, NN | 543+0 | 4/STAIR | DID | С |
| AX253A | AUX | 63, NN | 543+0 | 4/STAIR | DID | С |
| AX227A | AUX | 59, FF-GG | 543+0 | 4/STAIR | DID | С |
| AX260E | AUX | 52, CC | 543+0 | 3/STAIR | DID | С |
| AX516M | AUX | 62, CC | 543+0 | 2/STAIR | DID | С |
| AX354A | AUX | 55, DD-EE | 554+0 | 22/45 | LSS | В |
| AX354B | AUX | 59, DD-EE | 554+0 | 22/46 | LSS | В |
| AX418 | AUX | 57, BB | 554+0 | 9/10 | DID | С |
| AX419 | AUX | 57, DD-EE | 554+0 | 9/10 | DID | С |
| AX420A | AUX | 59, DD-EE | 554+0 | 9/46 | LSS | В |
| AX421A | AUX | 55, DD-EE | 554+0 | 10/45 | LSS | В |
| S102A | AUX | 53-54, AA | 554+0 | 10/SRV | LSS | В |
| AX302 | AUX | 41, CC-DD | 556+0 | 25/41 | DID | С |
| AX304 | AUX | 41, AA-BB | 556+0 | 26/42 | DID | С |
| AX306 | AUX | 73, DD-EE | 556+0 | 27/43 | DID | С |
| AX308 | AUX | 73, BB-CC | 556+0 | 28/44 | DID | С |
| AX348B | AUX | 54-55, MM-NN | 560+0 | 11/22 | DID | С |
| AX348C | AUX | 53-54, HH | 560+0 | 4/11 | DID | С |
| AX348D | AUX | 59-60, MM-NN | 560+0 | 11/22 | DID | С |
| AX348E | AUX | 60-61, HH | 560+0 | 4/11 | DID | С |
| AX352B | AUX | 53, CC-DD | 560+0 | 6/STAIR | HSS | А |
| AX352C | AUX | 53, CC-DD | 560+0 | 10/STAIR | DID | С |
| AX352D | AUX | 46-47, BB-CC | 560+0 | 6/RB1 | HSS | A |
| AX353 | AUX | 45, BB | 560+0 | 6/8 | HSS | A |
| AX353B | AUX | 45, AA-BB | 560+0 | 8/41 | LSS | В |
| AX353C | AUX | 45, AA-BB | 560+0 | 8/42 | DID | С |

Required Fire Doors

| DOOR | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|---------------|------|------------------|-----------|-----------|----------------------|-----------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| AX393B | AUX | 61, CC-DD | 560+0 | 9/STAIR | DID | С |
| AX393C | AUX | 61, CC-DD | 560+0 | 5/STAIR | DID | С |
| AX393D | AUX | 67-68, BB-CC | 560+0 | 5/RB2 | LSS | В |
| AX394 | AUX | 69, BB | 560+0 | 5/7 | DID | С |
| AX394B | AUX | 69, AA-BB | 560+0 | 7/43 | LSS | В |
| AX394C | AUX | 69, AA-BB | 560+0 | 7/44 | DID | С |
| AX395 | AUX | 61, AA-BB | 560+0 | 7/9 | LSS | В |
| AX396 | AUX | 53, AA-BB | 560+0 | 8/10 | LSS | В |
| AX415 | AUX | 45-46, CC-DD | 560+0 | 6/RB1 | HSS | A |
| AX416 | AUX | 68-69, CC-DD | 560+0 | 5/RB2 | LSS | В |
| AX417 | AUX | 57, QQ | 560+0 | 11/ASB | LSS | B |
| AX313D | AUX | <u>51, NN</u> | 560+0 | 11/STAIR | DID | <u> </u> |
| AX388B | AUX | 63, NN | 560+0 | 11/STAIR | DID | <u> </u> |
| AX348 | AUX | 59, FF-GG | 560+0 | 11/STAIR | DID | <u> </u> |
| <u>AX355A</u> | AUX | <u>53-54, FF</u> | 568+0 | 4/11 | | <u> </u> |
| AX355D | AUX | 60, FF | 568+0 | 4/11 | | <u> </u> |
| | | 60, FF | 508+0 | 11/STAIR | | |
| AX515 | | 54, BB | 574+0 | 17/45 | H35 | <u> </u> |
| AX310 | | 57 59 DD | 574+0 | 14/40 | | A |
| AX516K | | 57 AA BB | 574+0 | 16/17 | <u> </u> | A |
| ΔΧ517Δ | | 53-54 DD-FF | 574+0 | 22/45 | 185 | |
| AX517R | | 60-61 DD-EE | 574+0 | 22/46 | 1.55 | <u>B</u> |
| AX517C | | 57 DD-FE | 574+0 | 45/46 | | <u> </u> |
| AX517D | AUX | 57. DD-EE | 574+0 | 9/46 | LSS | <u>B</u> |
| AX517E | AUX | 56-57. DD-EE | 574+0 | 10/46 | LSS | B |
| AX518 | AUX | 60, BB | 574+0 | 16/46 | HSS | Α |
| S303 | SRV | 36-37, 1N | 574+0 | 45/SRV | DID | С |
| S303C | SRV | 36-37, V | 574+0 | 45/SRV | DID | С |
| S304A | AUX | 60, AA | 574+0 | 46/SRV | DID | С |
| AX500H | AUX | 54-55, MM-NN | 577+0 | 18/22 | DID | С |
| AX500K | AUX | 53-54, HH-GG | 577+0 | 4/18 | DID | С |
| AX500L | AUX | 59-60, MM-NN | 577+0 | 18/22 | DID | С |
| AX500N | AUX | 60-61, HH-GG | 577+0 | 4/18 | DID | С |
| AX513B | AUX | 53, CC-DD | 577+0 | 13/STAIR | HSS | A |
| AX514 | AUX | 45, BB | 577+0 | 13/15 | HSS | A |
| AX514B | AUX | 45-46, AA-BB | 577+0 | 6/13 | HSS | <u>A</u> |
| AX517 | AUX | 57, EE | 577+0 | 9/18 | | <u> </u> |
| AX525 | AUX | <u>55-56, QQ</u> | 577+0 | 18/ASB | LSS | <u> </u> |
| AX525B | AUX | 56, QQ | 5//+0 | 18/ASB | | <u> </u> |
| AX526D | | 58, QQ | 5//+0 | | LSS | <u> </u> |
| A314#3 | | | 577+0 | | <u>– 199</u> – 19 | <u> </u> |
| AX533U | | | 5//+0 | 40/51AIK | | |
| AX534 | AUX | 69, BB | 577+0 | 12/14 | HSS | A |

Required Fire Doors

| DOOR | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|-----------------------|-------|---------------------|-----------|-----------|----------|-----------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| AX534B | AUX | 68-69, AA-BB | 577+0 | 7/14 | HSS | Α |
| AX535A | AUX | 61, AA-BB | 577+0 | 14/46 | HSS | Α |
| AX536 | AUX | 53, AA-BB | 577+0 | 15/45 | HSS | А |
| AX656 | AUX | 53, CC-DD | 577+0 | 45/STAIR | DID | С |
| AX500P | AUX | 51, NN | 577+0 | 18/STAIR | DID | С |
| AX500S | AUX | 63, NN | 577+0 | 18/STAIR | DID | С |
| AX338A | AUX | 60, FF-GG | 577+0 | 18/STAIR | DID | С |
| AX602 | AUX | 52, UU-VV | 594+0 | 24/ASB | DID | С |
| AX627 | AUX | 62. UU-VV | 594+0 | 23/ASB | DID | С |
| AX630 | AUX | 58, QQ | 594+0 | 22/ASB | LSS | B |
| AX632 | AUX | 57, QQ | 594+0 | 22/ASB | LSS | В |
| AX635 | AUX | 60-61, QQ | 594+0 | 22/ASB | LSS | В |
| AX635E | AUX | 53-54, QQ | 594+0 | 22/ASB | LSS | В |
| AX635F | AUX | 53-54, QQ | 594+0 | 22/ASB | LSS | В |
| AX655 | AUX | 62-63, DD | 594+0 | 19/48 | LSS | В |
| AX656C | AUX | 61, CC-DD | 594+0 | 19/22 | LSS | В |
| AX657 | AUX | 60-61, CC | 594+0 | 19/22 | LSS | В |
| AX657A ⁽²⁾ | AUX | 54, BB | 594+0 | 21/35 | HSS | А |
| AX657B | AUX | 52-53, CC-DD | 594+0 | 20/22 | LSS | В |
| AX657E ⁽²⁾ | AUX | 53, BB | 594+0 | 21/35 | HSS | А |
| AX657F | AUX | 60, DD-EE | 594+0 | 21/22 | HSS | А |
| AX657G | AUX | 57-58, DD-EE | 594+0 | 21/22 | HSS | Α |
| AX657H | AUX | 54, DD-EE | 594+0 | 21/22 | HSS | Α |
| AX657J | AUX | 53, BB-CC | 594+0 | 20/21 | HSS | Α |
| AX658B | AUX | 51-52, DD | 594+0 | 20/49 | LSS | В |
| S400 | AUX | 55-56, AA | 594+0 | 21/SRV | HSS | Α |
| S406 | AUX | 58-59, AA | 594+0 | 21/SRV | HSS | Α |
| AX635G | AUX | 51, NN | 594+0 | 22/STAIR | DID | С |
| AX635H | AUX | 63, NN | 594+0 | 22/STAIR | DID | С |
| AX654A | AUX | 60, FF | 594+0 | 22/STAIR | DID | С |
| AX654B | AUX | 61, CC-DD | 594+0 | 19/STAIR | DID | С |
| AX665B | AUX | 53, CC-DD | 594+0 | 22/STAIR | DID | C |
| AX700B | AUX | 50-51, JJ-KK | 605+10 | 24/RB1 | LSS | B |
| AX700D | AUX | <u>63-64, KK</u> | 605+10 | 22/23 | LSS | B |
| AX701 | AUX | 50-51, JJ-KK | 605+10 | 22/RB1 | LSS | <u> </u> |
| AX/14B | AUX | 63-64, JJ-KK | 605+10 | 23/RB2 | LSS | B |
| AX/20 | AUX | <u>50-51, HH-JJ</u> | 605+10 | 22/RB1 | LSS | B |
| AX/21 | AUX | 63-64, HH-JJ | 605+10 | 22/RB2 | LSS | B |
| AX/14C | | 50-51, KK | 605+10 | 22/24 | | <u> </u> |
| AX/15A | | 63-64, JJ-KK | 605+10 | 22/KB2 | | <u> </u> |
| 5211\' | | 17, V | 0+800 | | | |
| 5212 | | 19, V | 560+0 | | | |
| 5210 | I B I | ∠ I,V | 0+000 | SKV/IBI | טוט | ل ل |

Required Fire Doors

| DOOR | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|---------------------|-------|-----------|-----------|-------------|----------|-----------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| S206 | TB1 | 22, V | 568+0 | SRV/TB1 | DID | С |
| S201 | TB1 | 33, V | 568+0 | SRV/TB1 | DID | С |
| SR3 ⁽³⁾ | TB1 | 30-31, V | 568+0 | SRV/TB1 | DID | С |
| S201A | TB1 | 27, V | 568+0 | SRV/TB1 | DID | С |
| T101 | TB1 | 31, 1K | 568+0 | TB1/U1 OTT | DID | С |
| S424 | TB1 | 24-25, V | 594+0 | SRV/TB1 | DID | С |
| S425 | TB1 | 23, V | 594+0 | SRV/TB1 | DID | С |
| S426 | TB1 | 22, V | 594+0 | SRV/TB1 | DID | С |
| SR21 ⁽³⁾ | TB1 | 24, V | 594+0 | SRV/TB1 | DID | С |
| S472 | TB1 | 27, V | 594+0 | SRV/TB1 | DID | С |
| S423 | TB1 | 29, V | 594+0 | SRV/TB1 | DID | С |
| S422 | TB1 | 29, V | 594+0 | SRV/TB1 | DID | С |
| SR7 ⁽³⁾ | TB1 | 29-30, V | 594+0 | SRV/TB1 | DID | С |
| S416 | TB1 | 32, V | 594+0 | SRV/TB1 | DID | С |
| S444 | TB1 | 15, V | 594+0 | SRV/TB1 | DID | С |
| TR4 ⁽³⁾ | TB1 | 15-16, V | 594+0 | SRV/TB1 | DID | С |
| T200A | TB1 | 32, 1J-1K | 594+0 | TB1/U1 MTOT | DID | С |
| S701 | TB1 | 22, 1L | 619+6 | SRV/TB1 | DID | С |
| S704 | TB1 | 33, 1L | 619+6 | SRV/TB1 | DID | С |
| S209 | TB2 | 20, P | 568+0 | SRV/TB2 | DID | С |
| S208 | TB2 | 22, P | 568+0 | SRV/TB2 | DID | С |
| SR2 ⁽³⁾ | TB2 | 32-33, P | 568+0 | SRV/TB2 | DID | С |
| S462 | TB2 | 32, P | 568+0 | SRV/TB2 | DID | С |
| SR4 ⁽³⁾ | TB2 | 30-31, P | 568+0 | SRV/TB2 | DID | С |
| S1102 | TB2 | 27, P | 568+0 | SRV/TB2 | DID | С |
| T151 | TB2 | 31, 2K | 568+0 | TB2/U2 OTT | DID | С |
| S423E | TB2 | 26, P-Q | 594+0 | SRV/TB2 | DID | С |
| S416A | TB2 | 32, P | 594+0 | SRV/TB2 | DID | С |
| SR8 ⁽³⁾ | TB2 | 29-30, P | 594+0 | SRV/TB2 | DID | С |
| S422A | TB2 | 29, P | 594+0 | SRV/TB2 | DID | С |
| S423A | TB2 | 29, P | 594+0 | SRV/TB2 | DID | С |
| S435 | TB2 | 24-25, P | 594+0 | SRV/TB2 | DID | С |
| S436 | TB2 | 23, P | 594+0 | SRV/TB2 | DID | С |
| S437 | TB2 | 22, P | 594+0 | SRV/TB2 | DID | С |
| SR22 ⁽³⁾ | TB2 | 24, P | 594+0 | SRV/TB2 | DID | С |
| S444A | TB2 | 15, P | 594+0 | SRV/TB2 | DID | С |
| SR16 ⁽³⁾ | TB2 | 15-16, P | 594+0 | SRV/TB2 | DID | С |
| S472A | TB2 | 27, P | 594+0 | SRV/TB2 | DID | С |
| T250A | TB2 | 32, 2J-2K | 594+0 | TB2/U2 MTOT | DID | С |
| S701A | TB2 | 22, 2L | 619+6 | SRV/TB2 | DID | С |
| S704A | TB2 | 33, 2L | 619+6 | SRV/TB2 | DID | С |
| AX662A | NSWPS | | 600+0 | 29/30 | LSS | В |

(1) These doors are not equipped with closing mechanisms or latches and are therefore exempt from TESTING REQUIREMENT 16.9-5-3.

(2) These doors are held open with a fusible link.

(3) Rolling Door.

Catawba Units 1 and 2

Required Fire Dampers

| DAMPER | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|-----------|------|---------------|-----------|-------------------|----------|-----------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| 1VA-FD001 | AUX | 53/GG-FF | 522+0 | 1/4 | DID | С |
| 1VA-FD002 | AUX | 53/GG-HH | 522+0 | 1/4 | DID | С |
| 1VA-FD003 | AUX | 55-56/GG-HH | 522+0 | 1/4 | DID | С |
| 1VA-FD004 | AUX | 55-56/GG-HH | 522+0 | 1/4 | DID | С |
| 1VA-FD005 | AUX | 54-55/GG-HH | 522+0 | 1/4 | DID | С |
| 1VA-FD006 | AUX | 54-55/GG-HH | 522+0 | 1/4 | DID | С |
| 1VA-FD007 | AUX | 53/GG-FF | 522+0 | 1/4 | DID | С |
| 1VA-FD008 | AUX | 53/GG-FF | 522+0 | 1/4 | DID | С |
| 1VA-FD009 | AUX | 53-54/FF-GG | 522+0 | 1/1 (ND PUMPS) | DID | С |
| 1VA-FD010 | AUX | 56-57/ GG-HH, | 522+0 | 1/4 | DID | С |
| 1VA-FD011 | AUX | 56-57/FF | 522+0 | 1/4 | DID | С |
| 1VA-FD012 | AUX | 51/NN-PP | 543+0 | 11/STAIR | DID | С |
| 1VA-FD013 | AUX | 54/MM | 543+0 | 4/22 | DID | С |
| 1VA-FD014 | AUX | 54/MM | 543+0 | 4/22 | DID | С |
| 1VA-FD015 | AUX | 54-55/MM-NN | 543+0 | 4/22 | DID | С |
| 1VA-FD016 | AUX | 54-55/MM-NN | 543+0 | 4/22 | DID | С |
| 1VA-FD017 | AUX | 54-55/MM-NN | 543+0 | 4/22 | DID | С |
| 1VA-FD020 | AUX | 55/JJ-KK | 543+0 | 4/4 (NV PUMPS) | DID | С |
| 1VA-FD033 | AUX | 51-52/AA-BB | 543+0 | 3/40 | LSS | В |
| 1VA-FD034 | AUX | 51-52/AA-BB | 543+0 | 3/40 | LSS | В |
| 1VA-FD035 | AUX | 52/AA-BB | 543+0 | 3/32 | LSS | В |
| 1VA-FD036 | AUX | 52-53/BB | 543+0 | 3/32 | LSS | В |
| 1VA-FD038 | AUX | 52-53/BB | 543+0 | 3/34 | LSS | В |
| 1VA-FD039 | AUX | 52-53/BB | 543+0 | 3/34 | LSS | В |
| 1VA-FD040 | AUX | 52-53/BB | 543+0 | 3/32 | LSS | В |
| 1VA-FD041 | AUX | 52-53/BB | 543+0 | 3/32 | LSS | В |
| 1VA-FD042 | AUX | 53/CC | 543+0 | 3/STAIR | DID | С |
| 1VA-FD043 | AUX | 53/CC-DD | 543+0 | 3/STAIR | DID | С |
| 1VA-FD045 | AUX | 52-53/DD | 560+0 | 3/6 | HSS | А |
| 1VA-FD046 | AUX | 52-53/CC-DD | 577+0 | 6/13 | HSS | А |
| 1VA-FD047 | AUX | 52-53/CC-DD | 577+0 | 6/13 | HSS | А |
| 1VA-FD048 | AUX | 54/MM-NN | 560+0 | 11/22 | DID | С |
| 1VA-FD049 | AUX | 54/MM | 560+0 | 11/22 | DID | С |
| 1VA-FD050 | AUX | 54-55/MM | 560+0 | 4/22 | DID | С |
| 1VA-FD051 | AUX | 54-55/MM | 560+0 | 4/22 | DID | С |
| 1VA-FD052 | AUX | 55/MM-NN | 560+0 | 11/22 | DID | С |
| 1VA-FD053 | AUX | 55/MM | 560+0 | 11/22 | DID | С |
| 1VA-FD054 | AUX | 53/GG-HH | 560+0 | 4/11 | DID | С |
| 1VA-FD055 | AUX | 53/GG-HH | 560+0 | 4/11 | DID | С |
| 1VA-FD056 | AUX | 53/KK | 560+0 | 4/11 | DID | С |
| 1VA-FD057 | AUX | 53/GG-HH | 560+0 | 4/11 | DID | С |

REQUIRED FIRE DAMPERS

| NUMBER INTERFACE CRITERIA ACTION CONDITION 1VA-FD058 AUX 53-54/HH 560+0 4/11 DID C 1VA-FD059 AUX 54/GG-HH 560+0 4/11 DID C 1VA-FD060 AUX 55/FI/OQ 577+0 18/ASB LSS B 1VA-FD061 AUX 55/S6/QQ 577+0 18/ASB LSS B 1VA-FD063 AUX 55/MM-NN 577+0 18/22 DID C 1VA-FD064 AUX 55/MM-S77+0 18/22 DID C C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD068 AUX 53/4/HH 577+0 4/18 DID C 1VA-FD070 AUX 53/54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53/54/KK-LL 594+0 18/22 DID C 1VA-FD073 AUX 53/54/KK-LL 594+0 18/22 </th <th>DAMPER</th> <th>BLDG</th> <th>LOCATION</th> <th>ELEVATION</th> <th>FIRE AREA</th> <th>RISK</th> <th>REMEDIAL</th> | DAMPER | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|--|-----------|------|-------------|-----------|-----------|----------|-----------|
| CONDITION 1VA-FD058 AUX 53-54/HH 560+0 4/11 DID C 1VA-FD059 AUX 54/GG-HH 560+0 4/11 DID C 1VA-FD060 AUX 54/HH 560+0 4/11 DID C 1VA-FD061 AUX 55-56/QQ 577+0 18/ASB LSS B 1VA-FD062 AUX 55-56/QQ 577+0 18/ASB LSS B 1VA-FD064 AUX 55/MM-NN 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/HH 577+0 4/18 DID C 1VA-FD070 AUX 53/4/HH 577+0 4/18 DID C 1VA-FD071 AUX 53/4/H 577+0 4/18 DID C 1VA-FD072 AUX 53/HH 577+0 4/18 DID C 1VA-FD073 A | NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| 1VA-FD058 AUX 53-54/HH 560+0 4/11 DID C 1VA-FD060 AUX 54/GG-HH 560+0 4/11 DID C 1VA-FD061 AUX 55-60/Q 577+0 18/ASB LSS B 1VA-FD062 AUX 55-56/QQ 577+0 18/ASB LSS B 1VA-FD063 AUX 55/MM-NN 577+0 18/22 DID C 1VA-FD063 AUX 55/MM 577+0 18/22 DID C 1VA-FD065 AUX 54/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD067 AUX 54/HH 577+0 4/18 DID C 1VA-FD070 AUX 53/4/H 577+0 4/18 DID C 1VA-FD071 AUX 53/4/H 577+0 4/18 DID C 1VA-FD075 AUX 53/54/H 5 | | | | | | | CONDITION |
| 1VA-FD059 AUX 54/GG-HH 560+0 4/11 DID C 1VA-FD061 AUX 56-57/QQ 577+0 18/ASB LSS B 1VA-FD062 AUX 55-56/QQ 577+0 18/ASB LSS B 1VA-FD063 AUX 55/MM-NN 577+0 18/22 DID C 1VA-FD064 AUX 55/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 4/18 DID C 1VA-FD067 AUX 53/4/H 577+0 4/18 DID C 1VA-FD070 AUX 53/4/H 577+0 4/18 DID C 1VA-FD071 AUX 53/4/H 577+0 4/18 DID C 1VA-FD072 AUX 53/4/K-LL 594+0 18/22 DID C 1VA-FD074 AUX 53/6/CG-HH | 1VA-FD058 | AUX | 53-54/HH | 560+0 | 4/11 | DID | С |
| 1VA-FD060 AUX 54/HH 560-0 4/11 DID C 1VA-FD061 AUX 56-56/QQ 577+0 18/ASB LSS B 1VA-FD062 AUX 55-56/QQ 577+0 18/22 DID C 1VA-FD064 AUX 55/MM 577+0 18/22 DID C 1VA-FD064 AUX 55/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/HH 577+0 4/18 DID C 1VA-FD076 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD070 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD073 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/KK-LL | 1VA-FD059 | AUX | 54/GG-HH | 560+0 | 4/11 | DID | С |
| 1VA-FD061 AUX 56-57/QQ 577+0 18/ASB LSS B 1VA-FD063 AUX 55-56/QQ 577+0 18/ASB LSS B 1VA-FD064 AUX 55/MM-NN 577+0 18/22 DID C 1VA-FD064 AUX 55/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD068 AUX 54/HH 577+0 4/18 DID C 1VA-FD068 AUX 53/4/H 577+0 4/18 DID C 1VA-FD070 AUX 53/4/H 577+0 4/18 DID C 1VA-FD071 AUX 53/4/H 577+0 4/18 DID C 1VA-FD071 AUX 53/4/K-LL 594+0 18/22 DID C 1VA-FD076 AUX 53/54/K-LL 594+0 18/22 DID C 1VA-FD076 AUX 53/54/K-LL | 1VA-FD060 | AUX | 54/HH | 560+0 | 4/11 | DID | С |
| 1VA-FD062 AUX 55-56/QQ 577+0 18/ASB LSS B 1VA-FD063 AUX 55/MM 577+0 18/22 DID C 1VA-FD064 AUX 55/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 4/18 DID C 1VA-FD067 AUX 54/HH 577+0 4/18 DID C 1VA-FD069 AUX 53/4/HH 577+0 4/18 DID C 1VA-FD070 AUX 53/4/H 577+0 4/18 DID C 1VA-FD072 AUX 53/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/4/K-LL 594+0 18/22 DID C 1VA-FD076 AUX 53/54/K-LL 594+0 22/STAIR DID C 1VA-FD0778 AUX 53/54/K-LL | 1VA-FD061 | AUX | 56-57/QQ | 577+0 | 18/ASB | LSS | В |
| 1VA-FD063 AUX 55/MM-NN 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/HH 577+0 18/22 DID C 1VA-FD068 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD070 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53/SHH 577+0 4/18 DID C 1VA-FD071 AUX 53/SHH 577+0 4/18 DID C 1VA-FD074 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD075 AUX 53/SHK-LL 594+0 18/22 DID C 1VA-FD078 AUX 55-56/QQ <t< td=""><td>1VA-FD062</td><td>AUX</td><td>55-56/QQ</td><td>577+0</td><td>18/ASB</td><td>LSS</td><td>В</td></t<> | 1VA-FD062 | AUX | 55-56/QQ | 577+0 | 18/ASB | LSS | В |
| 1VA-FD064 AUX 55/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD067 AUX 54/HH 577+0 4/18 DID C 1VA-FD068 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD069 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD070 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/G-HH 577+0 4/18 DID C 1VA-FD074 AUX 53/G-HH 577+0 4/18 DID C 1VA-FD076 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/KK-LL 594+0 22/STAIR DID C 1VA-FD078 AUX 53-56/QQ | 1VA-FD063 | AUX | 55/MM-NN | 577+0 | 18/22 | DID | С |
| 1VA-FD065 AUX 54/MM 577+0 18/22 DID C 1VA-FD066 AUX 54/MM 577+0 18/22 DID C 1VA-FD067 AUX 54/HH 577+0 4/18 DID C 1VA-FD068 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD070 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/HH 577+0 4/18 DID C 1VA-FD074 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/KK-LL 594+0 22/STAIR DID C 1VA-FD078 AUX 53-54/CQ 594+0 22/ASB LSS B 1VA-FD088 AUX 53-54/FF-GG <td>1VA-FD064</td> <td>AUX</td> <td>55/MM</td> <td>577+0</td> <td>18/22</td> <td>DID</td> <td>С</td> | 1VA-FD064 | AUX | 55/MM | 577+0 | 18/22 | DID | С |
| 1VA-FD067 AUX 54/INH 577+0 18/22 DID C 1VA-FD068 AUX 53-54/IHI 577+0 4/18 DID C 1VA-FD069 AUX 53-54/IHI 577+0 4/18 DID C 1VA-FD070 AUX 53-54/IHI 577+0 4/18 DID C 1VA-FD071 AUX 53-54/IHI 577+0 4/18 DID C 1VA-FD072 AUX 53-54/IHI 577+0 4/18 DID C 1VA-FD073 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD074 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD075 AUX 53-54/IK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/IK-LL 594+0 22/ISTAIR DID C 1VA-FD173 AUX 53/CC-DD 594+0 22/ISTAIR DID C 1VA-FD133 AUX | 1VA-FD065 | AUX | 54/MM | 577+0 | 18/22 | DID | С |
| 1VA-FD067 AUX 53/54/HH 577+0 4/18 DID C 1VA-FD068 AUX 53/54/HH 577+0 4/18 DID C 1VA-FD070 AUX 53/54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53/54/HH 577+0 4/18 DID C 1VA-FD072 AUX 53/3/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/HH 577+0 4/18 DID C 1VA-FD074 AUX 53/3/HH 577+0 4/18 DID C 1VA-FD075 AUX 53/3/HK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD078 AUX 55-56/QQ 594+0 22/ASB LSS B 1VA-FD078 AUX 53-54/QQ 594+0 22/ASB LSS B 1VA-FD078 AUX 53/56/QQ <td>1VA-FD066</td> <td>AUX</td> <td>54/MM</td> <td>577+0</td> <td>18/22</td> <td>DID</td> <td>С</td> | 1VA-FD066 | AUX | 54/MM | 577+0 | 18/22 | DID | С |
| 1VA-FD068 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD070 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD072 AUX 53/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/HH 577+0 4/18 DID C 1VA-FD074 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/KK-LL 594+0 22/STAIR DID C 1VA-FD078 AUX 53-56/QQ 594+0 22/ASB LSS B 1VA-FD088 AUX 53-54/FD 5440 22/ASB LSS B 1VA-FD139 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD140 AUX 53/GG< | 1VA-FD067 | AUX | 54/HH | 577+0 | 4/18 | DID | С |
| 1VA-FD069 AUX 54/GG-HH 577+0 4/18 DID C 1VA-FD071 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD072 AUX 53/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD074 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD078 AUX 53-54/KK-LL 594+0 22/ASB LSS B 1VA-FD087 AUX 55-56/QQ 594+0 22/ASB LSS B 1VA-FD088 AUX 53-54/Q 594+0 22/ASB LSS B 1VA-FD139 AUX 51-52/DD 594+0 22/ISTAIR DID C 1VA-FD140 AUX 53/ | 1VA-FD068 | AUX | 53-54/HH | 577+0 | 4/18 | DID | С |
| 1VA-FD070 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD071 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD072 AUX 53/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/HH 577+0 4/18 DID C 1VA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD078 AUX 53-56/QQ 594+0 22/STAIR DID C 1VA-FD087 AUX 53-54/QQ 594+0 22/STAIR DID C 1VA-FD133 AUX 53/CC-DD 594+0 22/STAIR DID C 1VA-FD139 AUX 53-56/QQ 594+0 22/STAIR DID C 1VA-FD139 AUX 53/GG-60+0 4/11 DID C C 1VA-FD140 AUX 5 | 1VA-FD069 | AUX | 54/GG-HH | 577+0 | 4/18 | DID | С |
| 1VA-FD071 AUX 53-54/HH 577+0 4/18 DID C 1VA-FD072 AUX 53/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD074 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD077 AUX 53-54/KK-LL 594+0 22/STAIR DID C 1VA-FD078 AUX 53-56/QQ 594+0 22/ASB LSS B 1VA-FD133 AUX 53-54/FCG 560+0 2/STAIR DID C 1VA-FD139 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD141 AUX 53/GG 560+0 4/11 DID C 1VA-FD143 AUX <td< td=""><td>1VA-FD070</td><td>AUX</td><td>53-54/HH</td><td>577+0</td><td>4/18</td><td>DID</td><td>С</td></td<> | 1VA-FD070 | AUX | 53-54/HH | 577+0 | 4/18 | DID | С |
| 1VA-FD072 AUX 53/HH 577+0 4/18 DID C 1VA-FD073 AUX 53/HH 577+0 4/18 DID C 1VA-FD074 AUX 53/GG-HH 577+0 4/18 DID C 1VA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD076 AUX 53-54/KK-LL 594+0 22/STAIR DID C 1VA-FD078 AUX 55-56/QQ 594+0 22/ASB LSS B 1VA-FD087 AUX 53-54/KK-LL 594+0 22/ASB LSS B 1VA-FD087 AUX 53-54/QQ 594+0 22/ASB LSS B 1VA-FD133 AUX 53/CC-DD 594+0 22/STAIR DID C 1VA-FD139 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD141 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD143 AUX | 1VA-FD071 | AUX | 53-54/HH | 577+0 | 4/18 | DID | С |
| IVA-FD073 AUX 53/HH 577+0 4/18 DID C IVA-FD074 AUX 53/GG-HH 577+0 4/18 DID C IVA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C IVA-FD076 AUX 53-54/KK-LL 594+0 18/22 DID C IVA-FD078 AUX 55-56/QQ 594+0 22/STAIR DID C IVA-FD088 AUX 53-54/QQ 594+0 22/STAIR DID C IVA-FD133 AUX 53-54/CQ 594+0 22/STAIR DID C IVA-FD133 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD142 AUX 53/GG 560+0 4/11 DID C IVA-FD144 AUX 53/KK 560+0 4/11 DID C IVA-FD143 AUX | 1VA-FD072 | AUX | 53/HH | 577+0 | 4/18 | DID | С |
| IVA-FD074 AUX 53/GG-HH 577+0 4/18 DID C IVA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C IVA-FD076 AUX 53-54/KK-LL 594+0 22/STAIR DID C IVA-FD078 AUX 55-56/QQ 594+0 22/STAIR DID C IVA-FD087 AUX 53-54/QQ 594+0 22/ASB LSS B IVA-FD088 AUX 53-56/QQ 594+0 22/ASB LSS B IVA-FD133 AUX 53-54/FD 594+0 22/ASB LSS B IVA-FD133 AUX 53-54/FD 594+0 22/STAIR DID C IVA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD141 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD143 AUX 53/KK 560+0 1/11 DID C IVA-FD144 AUX | 1VA-FD073 | AUX | 53/HH | 577+0 | 4/18 | DID | С |
| IVA-FD075 AUX 53-54/KK-LL 594+0 18/22 DID C IVA-FD076 AUX 53-54/KK-LL 594+0 18/22 DID C IVA-FD078 AUX 57/NN 594+0 22/STAIR DID C IVA-FD087 AUX 55-56/QQ 594+0 22/ASB LSS B IVA-FD088 AUX 53-54/QQ 594+0 22/STAIR DID C IVA-FD133 AUX 53/CC-DD 594+0 22/STAIR DID C IVA-FD139 AUX 51-52/DD 543+0 3/4 DID C IVA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD141 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD142 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD144 AUX 53/JKK 560+0 1/118 DID C IVA-FD144 AUX < | 1VA-FD074 | AUX | 53/GG-HH | 577+0 | 4/18 | DID | С |
| 1VA-FD076 AUX 53-54/KK-LL 594+0 18/22 DID C 1VA-FD078 AUX 57/NN 594+0 22/STAIR DID C 1VA-FD087 AUX 55-56/QQ 594+0 22/ASB LSS B 1VA-FD088 AUX 53-54/QQ 594+0 22/ASB LSS B 1VA-FD133 AUX 53-54/FF-GG 560+0 22/STAIR DID C 1VA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD141 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD142 AUX 53/JJ-HH 560+0 4/11 DID C 1VA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C 1VA-FD144 AUX 53/KK 560+0 4/11 DID C 1VA-FD143 AUX 51/KK 560+0 1/1/18 DID C 1VA-FD144 AUX <td< td=""><td>1VA-FD075</td><td>AUX</td><td>53-54/KK-LL</td><td>594+0</td><td>18/22</td><td>DID</td><td>С</td></td<> | 1VA-FD075 | AUX | 53-54/KK-LL | 594+0 | 18/22 | DID | С |
| IVA-FD078 AUX 57/NN 594+0 22/STAIR DID C IVA-FD087 AUX 55-56/QQ 594+0 22/ASB LSS B IVA-FD088 AUX 53-54/QQ 594+0 22/ASB LSS B IVA-FD133 AUX 53/5C-DD 594+0 22/STAIR DID C IVA-FD139 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD141 AUX 53/GG 560+0 4/11 DID C IVA-FD142 AUX 53/GG 560+0 4/11 DID C IVA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD143 AUX 51/KK 560+0 4/11 DID C IVA-FD144 AUX 52/MM 560+0 11/18 DID C IVA-FD144 AUX 52/MM-NN | 1VA-FD076 | AUX | 53-54/KK-LL | 594+0 | 18/22 | DID | С |
| IVA-FD087 AUX 55-56/QQ 594+0 22/ASB LSS B IVA-FD088 AUX 53-54/QQ 594+0 22/ASB LSS B IVA-FD133 AUX 53-54/QQ 594+0 22/STAIR DID C IVA-FD139 AUX 51-52/DD 543+0 3/4 DID C IVA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD141 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD142 AUX 53/GG 560+0 4/11 DID C IVA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD144 AUX 53/KK 560+0 4/11 DID C IVA-FD144 AUX 53/JJ-HH 560+0 1/1/18 DID C IVA-FD144 AUX 51/KK 560+0 11/18 DID C IVA-FD147 AUX 52/MM | 1VA-FD078 | AUX | 57/NN | 594+0 | 22/STAIR | DID | С |
| IVA-FD088 AUX 53-54/QQ 594+0 22/ASB LSS B IVA-FD133 AUX 53/CC-DD 594+0 22/STAIR DID C IVA-FD139 AUX 51-52/DD 543+0 3/4 DID C IVA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD141 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD142 AUX 53/GG 560+0 4/11 DID C IVA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD144 AUX 53/KK 560+0 4/11 DID C IVA-FD144 AUX 51/KK 560+0 11/18 DID C IVA-FD147 AUX 52/MM-NN 560+0 3/6 HSS A IVA-FD148 AUX 52/MM-NN | 1VA-FD087 | AUX | 55-56/QQ | 594+0 | 22/ASB | LSS | В |
| IVA-FD133 AUX 53/CC-DD 594+0 22/STAIR DID C IVA-FD139 AUX 51-52/DD 543+0 3/4 DID C IVA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD141 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD142 AUX 53/GG 560+0 4/11 DID C IVA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD144 AUX 53/KK 560+0 4/11 DID C IVA-FD144 AUX 53/KK 560+0 4/11 DID C IVA-FD145 AUX 51/KK 560+0 11/18 DID C IVA-FD148 AUX 52/MM-NN 560+0 4/11 DID C IVA-FD149 AUX 52-53/DD 560+0 3/6 HSS A IVA-FD150 AUX 52-53/BB-CC | 1VA-FD088 | AUX | 53-54/QQ | 594+0 | 22/ASB | LSS | В |
| 1VA-FD139 AUX 51-52/DD 543+0 3/4 DID C 1VA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD141 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD142 AUX 53/GG 560+0 4/11 DID C 1VA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C 1VA-FD144 AUX 53/KK 560+0 4/11 DID C 1VA-FD144 AUX 53/KK 560+0 4/11 DID C 1VA-FD144 AUX 51/KK 560+0 11/18 DID C 1VA-FD145 AUX 51/KK 560+0 11/18 DID C 1VA-FD144 AUX 52/MM-NN 560+0 3/6 HSS A 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/BD-CC <t< td=""><td>1VA-FD133</td><td>AUX</td><td>53/CC-DD</td><td>594+0</td><td>22/STAIR</td><td>DID</td><td>С</td></t<> | 1VA-FD133 | AUX | 53/CC-DD | 594+0 | 22/STAIR | DID | С |
| IVA-FD140 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD141 AUX 53-54/FF-GG 560+0 4/11 DID C IVA-FD142 AUX 53/GG 560+0 4/11 DID C IVA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C IVA-FD144 AUX 53/KK 560+0 4/11 DID C IVA-FD144 AUX 53/KK 560+0 4/11 DID C IVA-FD144 AUX 53/KK 560+0 11/18 DID C IVA-FD146 AUX 51/KK 560+0 11/18 DID C IVA-FD147 AUX 52/MM-NN 560+0 11/18 DID C IVA-FD148 AUX 52/MM-NN 560+0 3/6 HSS A IVA-FD150 AUX 52-53/DD 560+0 3/6 HSS A IVA-FD1514 AUX 52-53/BE-CC | 1VA-FD139 | AUX | 51-52/DD | 543+0 | 3/4 | DID | С |
| 1VA-FD141 AUX 53-54/FF-GG 560+0 4/11 DID C 1VA-FD142 AUX 53/GG 560+0 4/11 DID C 1VA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C 1VA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C 1VA-FD144 AUX 53/KK 560+0 4/11 DID C 1VA-FD145 AUX 51/KK 560+0 11/18 DID C 1VA-FD146 AUX 51/KK 560+0 11/18 DID C 1VA-FD146 AUX 52/MM 560+0 11/18 DID C 1VA-FD147 AUX 52/MM-NN 560+0 4/11 DID C 1VA-FD148 AUX 52/MM-NN 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/DD 560+0 3/37 LSS B 1VA-FD1513 AUX 52-53/CC | 1VA-FD140 | AUX | 53-54/FF-GG | 560+0 | 4/11 | DID | С |
| 1VA-FD142 AUX 53/GG 560+0 4/11 DID C 1VA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C 1VA-FD144 AUX 53/KK 560+0 4/11 DID C 1VA-FD144 AUX 53/KK 560+0 11/18 DID C 1VA-FD145 AUX 51/KK 560+0 11/18 DID C 1VA-FD146 AUX 51/KK 560+0 11/18 DID C 1VA-FD147 AUX 52/MM 560+0 11/18 DID C 1VA-FD148 AUX 52/MM-NN 560+0 4/11 DID C 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/BG-CC 543+0 3/37 LSS B 1VA-FD154 AUX 53-54/GG-HH < | 1VA-FD141 | AUX | 53-54/FF-GG | 560+0 | 4/11 | DID | С |
| 1VA-FD143 AUX 53/JJ-HH 560+0 4/11 DID C 1VA-FD144 AUX 53/KK 560+0 4/11 DID C 1VA-FD145 AUX 51/KK 560+0 11/18 DID C 1VA-FD146 AUX 51/KK 560+0 11/18 DID C 1VA-FD146 AUX 51/KK 560+0 11/18 DID C 1VA-FD147 AUX 52/MM 560+0 11/18 DID C 1VA-FD148 AUX 52/MM-NN 560+0 4/11 DID C 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD152 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD154 AUX 53-54/GG-HH | 1VA-FD142 | AUX | 53/GG | 560+0 | 4/11 | DID | С |
| 1VA-FD144 AUX 53/KK 560+0 4/11 DID C 1VA-FD145 AUX 51/KK 560+0 11/18 DID C 1VA-FD146 AUX 51/KK 560+0 11/18 DID C 1VA-FD146 AUX 51/KK 560+0 11/18 DID C 1VA-FD147 AUX 52/MM 560+0 11/18 DID C 1VA-FD148 AUX 52/MM-NN 560+0 4/11 DID C 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD1512 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 50-51/AA-BB | 1VA-FD143 | AUX | 53/JJ-HH | 560+0 | 4/11 | DID | С |
| 1VA-FD145 AUX 51/KK 560+0 11/18 DID C 1VA-FD146 AUX 51/KK 560+0 11/18 DID C 1VA-FD147 AUX 52/MM 560+0 11/18 DID C 1VA-FD147 AUX 52/MM 560+0 11/18 DID C 1VA-FD148 AUX 52/MM-NN 560+0 4/11 DID C 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD1512 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/BC 543+0 3/37 LSS B 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 50-51/AA-BB </td <td>1VA-FD144</td> <td>AUX</td> <td>53/KK</td> <td>560+0</td> <td>4/11</td> <td>DID</td> <td>С</td> | 1VA-FD144 | AUX | 53/KK | 560+0 | 4/11 | DID | С |
| 1VA-FD146 AUX 51/KK 560+0 11/18 DID C 1VA-FD147 AUX 52/MM 560+0 11/18 DID C 1VA-FD148 AUX 52/MM-NN 560+0 4/11 DID C 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD152 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 49-50/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 50-51/AA- | 1VA-FD145 | AUX | 51/KK | 560+0 | 11/18 | DID | С |
| 1VA-FD147 AUX 52/MM 560+0 11/18 DID C 1VA-FD148 AUX 52/MM-NN 560+0 4/11 DID C 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD152 AUX 52-53/DD 560+0 3/37 LSS B 1VA-FD152 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 56/EE </td <td>1VA-FD146</td> <td>AUX</td> <td>51/KK</td> <td>560+0</td> <td>11/18</td> <td>DID</td> <td>С</td> | 1VA-FD146 | AUX | 51/KK | 560+0 | 11/18 | DID | С |
| 1VA-FD148 AUX 52/MM-NN 560+0 4/11 DID C 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD152 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/GG-HH 594+0 4/22 DID C 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 49-50/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX | 1VA-FD147 | AUX | 52/MM | 560+0 | 11/18 | DID | С |
| 1VA-FD149 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD150 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD152 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-5 | 1VA-FD148 | AUX | 52/MM-NN | 560+0 | 4/11 | DID | С |
| 1VA-FD150 AUX 52-53/DD 560+0 3/6 HSS A 1VA-FD152 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 49-50/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/G | 1VA-FD149 | AUX | 52-53/DD | 560+0 | 3/6 | HSS | А |
| 1VA-FD152 AUX 52-53/BB-CC 543+0 3/37 LSS B 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD153 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 49-50/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C | 1VA-FD150 | AUX | 52-53/DD | 560+0 | 3/6 | HSS | А |
| 1VA-FD153 AUX 52-53/CC 543+0 3/37 LSS B 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 49-50/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C 2VA-FD002 AUX 61/GG-FF 522+0 1/4 DID C | 1VA-FD152 | AUX | 52-53/BB-CC | 543+0 | 3/37 | LSS | В |
| 1VA-FD154 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 49-50/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C 2VA-FD002 AUX 61/GG-FF 522+0 1/4 DID C | 1VA-FD153 | AUX | 52-53/CC | 543+0 | 3/37 | LSS | В |
| 1VA-FD155 AUX 53-54/GG-HH 594+0 4/22 DID C 1VA-FD159 AUX 49-50/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C | 1VA-FD154 | AUX | 53-54/GG-HH | 594+0 | 4/22 | DID | С |
| 1VA-FD159 AUX 49-50/AA-BB 543+0 CO2 HSS A 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C 2VA-FD002 AUX 61/GG-FE 522+0 1/4 DID C | 1VA-FD155 | AUX | 53-54/GG-HH | 594+0 | 4/22 | DID | С |
| 1VA-FD160 AUX 50-51/AA-BB 543+0 CO2 HSS A 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C 2VA-FD002 AUX 61/GG-FE 522+0 1/4 DID C | 1VA-FD159 | AUX | 49-50/AA-BB | 543+0 | CO2 | HSS | A |
| 1VA-FD163 AUX 56/EE 543+0 10/45 LSS B 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C 2VA-FD002 AUX 61/GG-FF 522+0 1/4 DID C | 1VA-FD160 | AUX | 50-51/AA-BB | 543+0 | CO2 | HSS | A |
| 1VA-FD164 AUX 56-57/EE 543+0 4/10 DID C 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C 2VA-FD002 AUX 61/GG-FF 522+0 1/4 DID C | 1VA-FD163 | AUX | 56/EE | 543+0 | 10/45 | LSS | В |
| 2VA-FD001 AUX 61/GG-FF 522+0 1/4 DID C 2VA-FD002 AUX 61/GG-FF 522+0 1/4 DID C | 1VA-FD164 | AUX | 56-57/EE | 543+0 | 4/10 | DID | С |
| 2VA-FD002 AUX 61/GG-FE 522+0 1/4 DID C | 2VA-FD001 | AUX | 61/GG-FF | 522+0 | 1/4 | DID | С |
| | 2VA-FD002 | AUX | 61/GG-FF | 522+0 | 1/4 | DID | С |

REQUIRED FIRE DAMPERS

| DAMPER | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|------------|------|--------------|-----------|---------------|----------|-------------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| 2VA-FD003 | AUX | 60-61/FF-GG | 522+0 | 1/1 (ND | DID | С |
| | | 61/CC EE | 522±0 | <u>PUMPS)</u> | חוח | <u> </u> |
| 2VA-1 D004 | | | 522+0 | 1/4 | | C |
| 2VA-FD005 | | | 522+0 | 1/4 | | C |
| 2VA-FD000 | | 59-00/GG-HH | 522+0 | 1/4 | | |
| 2VA-FD007 | | 59-00/GG-HH | 522+0 | 1/4 | | |
| 2VA-FD008 | | 58-59/GG-HH | 522+0 | 1/4 | | |
| 2VA-FD009 | | 58-59/GG-HH | 522+0 | 1/4 | | |
| 2VA-FD010 | AUX | 57-58/GG-HH | 522+0 | 1/4 | | |
| 2VA-FD011 | AUX | 57-58/FF | 522+0 | 1/4 | | <u> </u> |
| 2VA-FD012 | AUX | 59-60/MIM-NN | 543+0 | 4/22 | | <u> </u> |
| 2VA-FD013 | AUX | 59/MM | 543+0 | 4/22 | | <u> </u> |
| 2VA-FD014 | AUX | 59/MM | 543+0 | 4/22 | DID | <u> </u> |
| 2VA-FD015 | AUX | 59-60/MM-NN | 543+0 | 4/22 | DID | C |
| 2VA-FD020 | AUX | 63/NN | 534+0 | 4/STAIR | DID | С |
| 2VA-FD023 | AUX | 59/JJ-KK | 543+0 | 4/4 (NV | DID | С |
| | | 04.00/22 | | PUMPS) | | |
| 2VA-FD036 | AUX | 61-62/DD | 560+0 | 2/5 | LSS | B |
| 2VA-FD037 | AUX | 61-62/CC-DD | 577+0 | 5/12 | HSS | A |
| 2VA-FD038 | AUX | 61-62/CC-DD | 577+0 | 5/12 | HSS | A |
| 2VA-FD040 | AUX | 62-63/AA-BB | 543+0 | 2/39 | LSS | В |
| 2VA-FD041 | AUX | 62-63/AA-BB | 543+0 | 2/39 | LSS | В |
| 2VA-FD042 | AUX | 62/AA-BB | 543+0 | 2/31 | LSS | В |
| 2VA-FD043 | AUX | 61-62/BB | 543+0 | 2/31 | LSS | В |
| 2VA-FD045 | AUX | 61/CC | 543+0 | 2/STAIR | DID | С |
| 2VA-FD046 | AUX | 61/CC-DD | 543+0 | 2/STAIR | DID | С |
| 2VA-FD048 | AUX | 61-62/BB | 543+0 | 2/33 | LSS | В |
| 2VA-FD049 | AUX | 61-62/BB | 543+0 | 2/33 | LSS | В |
| 2VA-FD050 | AUX | 61-62/BB | 543+0 | 2/31 | LSS | В |
| 2VA-FD051 | AUX | 61-62/BB | 543+0 | 2/31 | LSS | В |
| 2VA-FD053 | AUX | 60/MM | 560+0 | 11/22 | DID | С |
| 2VA-FD054 | AUX | 59/MM-NN | 560+0 | 11/22 | DID | С |
| 2VA-FD056 | AUX | 60/MM-NN | 560+0 | 11/22 | DID | С |
| 2VA-FD057 | AUX | 59-60/MM | 560+0 | 11/22 | DID | С |
| 2VA-FD058 | AUX | 59-60/MM | 560+0 | 4/22 | DID | С |
| 2VA-FD059 | AUX | 60-61/HH | 560+0 | 4/11 | DID | С |
| 2VA-FD060 | AUX | 61/HH-JJ | 560+0 | 4/11 | DID | С |
| 2VA-FD061 | AUX | 60-61/GG-HH | 560+0 | 4/11 | DID | С |
| 2VA-FD062 | AUX | 61/GG-HH | 560+0 | 4/11 | DID | С |
| 2VA-FD063 | AUX | 61/GG-HH | 560+0 | 4/11 | DID | С |
| 2VA-FD064 | AUX | 60-61/GG-HH | 560+0 | 4/11 | DID | С |
| 2VA-FD065 | AUX | 61/HH | 560+0 | 4/11 | DID | С |
| 2VA-FD069 | AUX | 58-59/QQ | 577+0 | 18/ASB | LSS | В |
| 2VA-FD070 | AUX | 59-60/QQ | 577+0 | 18/ASB | LSS | В |
| 2VA-FD071 | AUX | 59-60/MM-NN | 577+0 | 18/22 | DID | С |
| 2VA-FD072 | AUX | 59-60/MM | 577+0 | 18/22 | DID | С |
| | | | | | | (continued) |

Catawba Units 1 and 2

Revision 10

REQUIRED FIRE DAMPERS

| DAMPER | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|------------|------|-------------|------------------------|-----------|----------|-------------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| 2VA-FD073 | AUX | 60/MM | 577+0 | 18/22 | DID | С |
| 2VA-FD074 | AUX | 60/MM | 577+0 | 18/22 | DID | С |
| 2VA-FD075 | AUX | 60/HH | 577+0 | 4/22 | DID | С |
| 2VA-FD076 | AUX | 60/HH | 577+0 | 4/22 | DID | С |
| 2VA-FD077 | AUX | 60-61/HH | 577+0 | 4/22 | DID | С |
| 2VA-FD078 | AUX | 60-61/HH | 577+0 | 4/22 | DID | С |
| 2VA-FD079 | AUX | 61/HH | 577+0 | 4/22 | DID | С |
| 2VA-FD080 | AUX | 61/GG-HH | 577+0 | 4/22 | DID | С |
| 2VA-FD081 | AUX | 61/HH | 577+0 | 4/22 | DID | С |
| 2VA-FD083 | AUX | 63/NN | 594+0 | 22/STAIR | DID | С |
| 2VA-FD086 | AUX | 60/FF | 594+0 | 22/STAIR | DID | С |
| 2VA-FD087 | AUX | 59-60/QQ | 594+0 | 22/ASB | LSS | В |
| 2VA-FD088 | AUX | 60-61/QQ | 594+0 | 22/ASB | LSS | В |
| 2VA-FD093 | AUX | 58-59/QQ | 594+0 | 22/ASB | LSS | В |
| 2VA-FD097 | AUX | 61/CC-DD | 594+0 | 22/STAIR | DID | С |
| 2VA-FD108A | AUX | 57-59/QQ | 611+0 | 22/ASB | LSS | В |
| 2VA-FD108B | AUX | 57-59/QQ | 611+0 | 22/ASB | LSS | В |
| 2VA-FD114 | AUX | 59-60/KK-LL | 594+0 | 18/22 | DID | С |
| 2VA-FD115 | AUX | 59-60/KK-LL | 594+0 | 18/22 | DID | С |
| 2VA-FD137 | AUX | 60-61/FF-GG | 560+0 | 4/18 | DID | С |
| 2VA-FD138 | AUX | 60-61/FF-GG | 560+0 | 4/18 | DID | С |
| 2VA-FD139 | AUX | 61/GG | 560+0 | 4/11 | DID | С |
| 2VA-FD141 | AUX | 62-63/DD | 543+0 | 2/4 | DID | С |
| 2VA-FD142 | AUX | 60-61/KK | 560+0 | 4/11 | DID | С |
| 2VA-FD143 | AUX | 62-63/KK | 560+0 | 4/18 | DID | С |
| 2VA-FD144 | AUX | 63/KK | 560+0 | 4/18 | DID | С |
| 2VA-FD145 | AUX | 61-62/MM-NN | 560+0 | 4/11 | DID | С |
| 2VA-FD146 | AUX | 61-62/DD | 560+0 | 2/5 | LSS | В |
| 2VA-FD147 | AUX | 61-62/DD | 560+0 | 2/5 | LSS | В |
| 2VA-FD151 | AUX | 61-62/BB-CC | 543+0 | 2/36 | LSS | В |
| 2VA-FD152 | AUX | 61-62/CC | 543+0 | 2/36 | LSS | В |
| 2VA-FD153 | AUX | 60-61/GG-HH | 594+0 | 4/22 | DID | С |
| 2VA-FD154 | AUX | 60-61/GG-HH | 594+0 | 4/22 | DID | С |
| 2VA-FD157 | AUX | 63-64/AA-BB | 543+0 | CO2 | HSS | Α |
| 2VA-FD158 | AUX | 64-65/AA-BB | 543+0 | CO2 | HSS | Α |
| 2VA-FD160 | AUX | 57-58/QQ | 543+0 | 4/ASB | LSS | В |
| 2VA-FD161 | AUX | 57-58/QQ | 543+0 | 4/ASB | LSS | В |
| 2VA-FD163 | AUX | 58/EE | 543+0 | 9/46 | LSS | В |
| 2VA-FD164 | AUX | 57-58/EE | 543+0 | 4/9 | DID | С |
| 0BRS-FD001 | AUX | 54-55/DD-EE | 554+0 | 10/22 | DID | С |
| 0BRS-FD010 | AUX | 57/DD-EE | 554+0 | 9/10 | DID | С |
| 0BRS-FD019 | AUX | 59/DD-EE | 554+0 | 9/22 | DID | С |
| 0BRX- | | | EE 4 + 0 | 10/00 | חוח | C |
| FD001A | AUX | 34-33/DD-EE | 554+0 | 10/22 | | U U |
| 0BRX- | | | 55/+0 | 10/22 | חיח | C |
| FD001B | AUA | 04-00/DD-EE | 004+0 | 10/22 | | 0 |
| | | | | | | (continued) |

REQUIRED FIRE DAMPERS

| 0BRX- FD001C AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001D AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001F AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001F AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001G AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001H AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001H AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX-FD002 AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX-FD010 AUX 57/AA-BB 554+0 9/10 DID C 0BRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C 0BRX-FD013 AUX 60/DD-EE 554+0 9/22 DID C 0BRX-FD0 | DAMPER NUMBER | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK CRITERIA | REMEDIAL ACTION CONDITION |
|--|------------------|------|-------------|-----------|-----------|------------------|---------------------------------|
| 0BRX- FD001D AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001E AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001F AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001G AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001H AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX-FD002 AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX-FD003 AUX 57/AA-BB 554+0 9/10 DID C 0BRX-FD010 AUX 57/AA-BB 554+0 9/10 DID C 0BRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C 0BRX-FD012 AUX 60/DD-EE 554+0 9/22 DID C 0BRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022A | 0BRX- FD001C | AUX | 54-55/DD-EE | 554+0 | 10/22 | DID | С |
| 0BRX- FD001E AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001F AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001G AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001H AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX-FD002 AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX-FD003 AUX 57/AA-BB 554+0 9/10 DID C 0BRX-FD010 AUX 57/AA-BB 554+0 9/10 DID C 0BRX-FD011 AUX 57/RD-CC DD 554+0 9/10 DID C 0BRX-FD012 AUX 57/CC-DD 554+0 9/10 DID C 0BRX-FD014 AUX 67/DD-EE 554+0 9/12 DID C 0BRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022A | 0BRX- FD001D | AUX | 54-55/DD-EE | 554+0 | 10/22 | DID | С |
| 0BRX- FD001F AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001G AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001H AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX- FD001H AUX 54-55/DD-EE 554+0 10/22 DID C 0BRX-FD002 AUX 57/AA-BB 554+0 9/10 DID C 0BRX-FD010 AUX 57/AA-BB 554+0 9/10 DID C 0BRX-FD011 AUX 57/CC-DD 554+0 9/10 DID C 0BRX-FD012 AUX 57/CC-DD 554+0 9/10 DID C 0BRX-FD014 AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022A AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022C AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022C | 0BRX- FD001E | AUX | 54-55/DD-EE | 554+0 | 10/22 | DID | С |
| OBRX- FD001G AUX 54-55/DD-EE 554+0 10/22 DID C OBRX- FD001H AUX 54-55/DD-EE 554+0 10/22 DID C OBRX-FD002 AUX 54-55/DD-EE 554+0 10/22 DID C OBRX-FD009 AUX 57/AA-BB 554+0 9/10 DID C OBRX-FD011 AUX 57/BB-CC 554+0 9/10 DID C OBRX-FD012 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/DD-EE 554+0 9/22 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX- AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX- F | 0BRX- FD001F | AUX | 54-55/DD-EE | 554+0 | 10/22 | DID | С |
| OBRX- FD001H AUX AUX 54-55/DD-EE 554+0 10/22 DID C OBRX-FD002 AUX 54-55/DD-EE 554+0 10/22 DID C OBRX-FD010 AUX 57/AA-BB 554+0 9/10 DID C OBRX-FD011 AUX 57/RB-CC 554+0 9/10 DID C OBRX-FD012 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DD 554+0 9/22 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022B AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022D AUX | 0BRX- FD001G | AUX | 54-55/DD-EE | 554+0 | 10/22 | DID | С |
| OBRX-FD002 AUX 54-55/DD-EE 554+0 10/22 DID C OBRX-FD019 AUX 57/AA-BB 554+0 9/10 DID C OBRX-FD010 AUX 57/AA-BB 554+0 9/10 DID C OBRX-FD011 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DD 554+0 9/12 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX- AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX- | 0BRX- FD001H | AUX | 54-55/DD-EE | 554+0 | 10/22 | DID | С |
| OBRX-FD009 AUX 57/AA-BB 554+0 9/10 DID C OBRX-FD011 AUX 57/AA-BB 554+0 9/10 DID C OBRX-FD011 AUX 57/BB-CC 554+0 9/10 DID C OBRX-FD012 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DE 554+0 9/10 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX- G0/BR 60/DD-EE 554+0 9/22 DID C OBRX- AUX 60/DD-EE 554+0 9/22 DID C OBRX- G0/BD-EE 554+0 9/22 DID C C OBRX- G0/DD-EE 554+0 9/22 DID C C OBRX- FD022E AUX 60/DD-EE | 0BRX-FD002 | AUX | 54-55/DD-EE | 554+0 | 10/22 | DID | С |
| OBRX-FD010 AUX 57/AA-BB 554+0 9/10 DID C OBRX-FD011 AUX 57/BB-CC 554+0 9/10 DID C OBRX-FD012 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DE 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DE 554+0 9/22 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX- AUX 60/DD-EE 554+0 9/22 DID C OBRX- AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD0 | 0BRX-FD009 | AUX | 57/AA-BB | 554+0 | 9/10 | DID | С |
| OBRX-FD011 AUX 57/BB-CC 554+0 9/10 DID C OBRX-FD012 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DE 554+0 9/10 DID C OBRX-FD014 AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022B AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022G AUX <t< td=""><td>0BRX-FD010</td><td>AUX</td><td>57/AA-BB</td><td>554+0</td><td>9/10</td><td>DID</td><td>С</td></t<> | 0BRX-FD010 | AUX | 57/AA-BB | 554+0 | 9/10 | DID | С |
| OBRX-FD012 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022B AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022G AUX <t< td=""><td>0BRX-FD011</td><td>AUX</td><td>57/BB-CC</td><td>554+0</td><td>9/10</td><td>DID</td><td>С</td></t<> | 0BRX-FD011 | AUX | 57/BB-CC | 554+0 | 9/10 | DID | С |
| OBRX-FD013 AUX 57/CC-DD 554+0 9/10 DID C OBRX-FD014 AUX 57/DD-EE 554+0 9/10 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022B AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX | 0BRX-FD012 | AUX | 57/CC-DD | 554+0 | 9/10 | DID | С |
| OBRX-FD014 AUX 57/DD-EE 554+0 9/10 DID C OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022B AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022F AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD023 AUX | 0BRX-FD013 | AUX | 57/CC-DD | 554+0 | 9/10 | DID | С |
| OBRX-FD021 AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022A AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022B AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022C AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022F AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022F AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022B AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD002A AUX< | 0BRX-FD014 | AUX | 57/DD-EE | 554+0 | 9/10 | DID | С |
| OBRX- FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022B AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD002A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005A <t< td=""><td>0BRX-FD021</td><td>AUX</td><td>60/DD-EE</td><td>554+0</td><td>9/22</td><td>DID</td><td>С</td></t<> | 0BRX-FD021 | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| OBRX- FD022B AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022F AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD002A AUX 57/BB-CC 554+0 9/10 DID C OBRX-FD023 AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005A | 0BRX- FD022A | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| OBRX- FD022C AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022F AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022A AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD023 AUX 57/BB-CC 554+0 9/10 DID C 0BRX- FD005A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54/AA 594+0 21/35 HSS A 1CRA-FD008 AUX | 0BRX- FD022B | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| OBRX- FD022D AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022F AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C 0BRX-FD023 AUX 57/BB-CC 554+0 9/10 DID C 1CRA- FD005A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD010 AUX <td>0BRX- FD022C</td> <td>AUX</td> <td>60/DD-EE</td> <td>554+0</td> <td>9/22</td> <td>DID</td> <td>С</td> | 0BRX- FD022C | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| OBRX- FD022E AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022F AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022H AUX 60/DD-EE 554+0 9/10 DID C 0BRX-FD023 AUX 57/BB-CC 554+0 9/10 DID C 1CRA- FD005A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54/AA 594+0 21/35 HSS A 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD010 AUX | 0BRX- FD022D | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| OBRX- FD022F AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C OBRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C OBRX-FD023 AUX 57/BB-CC 554+0 9/10 DID C 1CRA- FD005A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/35 HSS A 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD010 AUX 53-54/CC -DD 594+0 21/35 HSS A 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR DID C 1CRA-FD011 | 0BRX- FD022E | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| 0BRX- FD022G AUX 60/DD-EE 554+0 9/22 DID C 0BRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C 0BRX-FD023 AUX 57/BB-CC 554+0 9/10 DID C 1CRA- FD005A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/35 HSS A 1CRA- FD005B AUX 54/AA 594+0 21/35 HSS A 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD010 AUX 53-54/CC -DD 594+0 21/35 HSS A 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR DID C 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 | 0BRX- FD022F | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| 0BRX- FD022H AUX 60/DD-EE 554+0 9/22 DID C 0BRX-FD023 AUX 57/BB-CC 554+0 9/10 DID C 1CRA- FD005A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA-FD008 AUX 54-55/DD-EE 594+0 21/35 HSS A 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD009 AUX 53-54/CC-DD 594+0 21/35 HSS A 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR DID C 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 0BRX- FD022G | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| OBRX-FD023 AUX 57/BB-CC 554+0 9/10 DID C 1CRA- FD005A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD009 AUX 53-54/CC-DD 594+0 22/STAIR DID C 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR HSS A 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 0BRX- FD022H | AUX | 60/DD-EE | 554+0 | 9/22 | DID | С |
| 1CRA- FD005A AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD009 AUX 53-54/CC-DD 594+0 22/STAIR DID C 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR HSS A 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 0BRX-FD023 | AUX | 57/BB-CC | 554+0 | 9/10 | DID | С |
| 1CRA- FD005B AUX 54-55/DD-EE 594+0 21/22 HSS A 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD009 AUX 53-54/CC-DD 594+0 22/STAIR DID C 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR HSS A 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 1CRA- FD005A | AUX | 54-55/DD-EE | 594+0 | 21/22 | HSS | А |
| 1CRA-FD008 AUX 54/AA 594+0 21/35 HSS A 1CRA-FD009 AUX 53-54/CC-DD 594+0 22/STAIR DID C 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR HSS A 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR HSS A 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 1CRA- FD005B | AUX | 54-55/DD-EE | 594+0 | 21/22 | HSS | А |
| 1CRA-FD009 AUX 53-54/CC-DD 594+0 22/STAIR DID C 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR HSS A 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 1CRA-FD008 | AUX | 54/AA | 594+0 | 21/35 | HSS | A |
| 1CRA-FD010 AUX 53-54/CC 594+0 21/STAIR HSS A 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 1CRA-FD009 | AUX | 53-54/CC-DD | 594+0 | 22/STAIR | DID | С |
| 1CRA-FD011 AUX 53/AA-BB 594+0 20/35 DID C 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 1CRA-FD010 | AUX | 53-54/CC | 594+0 | 21/STAIR | HSS | Α |
| 1CRA-FD012 AUX 53/BB-CC 594+0 20/21 HSS A | 1CRA-FD011 | AUX | 53/AA-BB | 594+0 | 20/35 | DID | С |
| | 1CRA-FD012 | AUX | 53/BB-CC | 594+0 | 20/21 | HSS | А |

REQUIRED FIRE DAMPERS

| DAMPER | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|-----------------|---------|-------------|-----------|-----------|----------|-----------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| 1CRA-FD013 | AUX | 52/CC-DD | 594+0 | 20/22 | LSS | В |
| 1CRA-FD016 | AUX | 54-55/DD-EE | 574+0 | 22/45 | LSS | В |
| 1CRA-FD017 | AUX | 54-55/DD | 574+0 | 17/45 | HSS | А |
| 1CRA-FD018 | AUX | 54-55/DD | 574+0 | 17/45 | HSS | А |
| 1CRA-FD019 | AUX | 54/AA-BB | 574+0 | 17/45 | HSS | А |
| 1CRA-FD020 | AUX | 57/CC-DD | 574+0 | 16/17 | HSS | А |
| 1CRA-FD021 | AUX | 53-54/DD-EE | 574+0 | 22/45 | LSS | В |
| 1CRA-FD022 | AUX | 55-56/DD | 574+0 | 17/45 | HSS | Α |
| 1CRA-FD023 | AUX | 56-57/DD | 574+0 | 17/45 | HSS | А |
| 1CRA- | | | 57410 | 45/46 | סוס | 0 |
| FD024A | AUX | 57/DD-EE | 574+0 | 40/40 | טוט | C |
| 1CRA- | | | 574+0 | 15/16 | חוח | C |
| FD024B | AUX | STIDD-EE | 574+0 | 45/40 | טוט | C |
| 1CRA- | ΔΗΥ | 54-55/DD-EE | 574+0 | 22/45 | 1991 | В |
| FD025A | AUA | 34-33/DD-LL | 57410 | 22/45 | 200 | U |
| 1CRA- | ΔΠΧ | 54-55/DD-FF | 574+0 | 22/45 | 221 | в |
| FD025B | AUA | 04-00/DD-LL | 514:0 | 22/45 | 200 | D |
| 1CRA-FD026 | AUX | 54-55/EE | 577+0 | 18/22 | DID | С |
| 1CRA-FD028 | AUX | 53-54/EE | 577+0 | 18/22 | DID | С |
| 1CRA-FD029 | AUX | 54-55/EE | 568+0 | 11/22 | DID | С |
| 1CRA-FD030 | AUX | 54-55/EE | 568+0 | 11/22 | DID | С |
| 1CRA-FD039 | AUX | 57/EE-FF | 577+0 | 18/18 (KC | DID | С |
| 1CR-ED001 | ΔΠΧ | 55-56/DD-EE | 50/+0 | 21/22 | нее | Δ |
| 1CR-ED002 | | 55-56/DD-EE | 594+0 | 21/22 | 22H | Δ |
| 1CR-ED003 | | 54/ΔΔ_RR | 594+0 | 21/35 | <u> </u> | Δ |
| 1CR-FD004 | | 53-54/BB | 594+0 | 21/35 | <u> </u> | Δ |
| 1CR-FD005 | | 53-54/BB | 594+0 | 21/35 | HSS | Δ |
| 1CR-FD007 | | 51/CC-DD | 594+0 | 13/20 | HSS | Α |
| 2CRA- | | | | 10/20 | 1100 | |
| FD005A | AUX | 59-60/DD-EE | 594+0 | 21/22 | HSS | A |
| 2CRA- | A L D / | | = 0 4 0 | 0.1/0.0 | | • |
| FD005B | AUX | 59-60/DD-EE | 594+0 | 21/22 | HSS | A |
| 2CRA-FD008 | AUX | 60/AA-BB | 594+0 | 19/21 | HSS | А |
| 2CRA-FD009 | AUX | 60-61/CC | 594+0 | 19/22 | LSS | В |
| 2CRA-FD012 | AUX | 61/CC-DD | 594+0 | 19/22 | LSS | В |
| 2CRA-FD015 | AUX | 59-60/DD-EE | 574+0 | 22/46 | LSS | В |
| 2CRA-FD016 | AUX | 59-60/DD | 574+0 | 16/46 | HSS | А |
| 2CRA-FD017 | AUX | 59-60/DD | 574+0 | 16/46 | HSS | А |
| 2CRA-FD018 | AUX | 60/AA-BB | 574+0 | 16/46 | HSS | А |
| 2CRA-FD019 | AUX | 58-59/DD | 574+0 | 16/46 | HSS | Α |
| 2CRA-FD020 | AUX | 57-58/DD | 574+0 | 16/46 | HSS | Α |
| 2CRA-FD021 | AUX | 60-61/DD-EE | 574+0 | 22/46 | LSS | В |
| 2CRA- FD022A | AUX | 59-60/DD-EE | 574+0 | 22/46 | LSS | В |

REQUIRED FIRE DAMPERS

| DAMPER | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|------------|------|-------------|-----------|-----------|----------|-----------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| 2CRA- | ΔΠΧ | 59-60/DD-FF | 574+0 | 22/46 | 1.88 | В |
| FD022B | AUA | 33-00/DD-EE | 574.0 | 22/40 | 200 | D |
| 2CRA-FD023 | AUX | 59-60/EE | 577+0 | 18/22 | DID | С |
| 2CRA-FD025 | AUX | 60-61/EE | 577+0 | 18/22 | DID | С |
| 2CRA-FD026 | AUX | 59-60/EE | 568+0 | 11/22 | DID | С |
| 2CRA-FD027 | AUX | 59-60/EE | 568+0 | 11/22 | DID | С |
| 2CR-FD001 | AUX | 58-59/DD-EE | 594+0 | 21/22 | HSS | Α |
| 2CR-FD002 | AUX | 58-59/DD | 594+0 | 21/22 | HSS | Α |
| 2CR-FD003 | AUX | 63-64/CC | 594+0 | 12/19 | HSS | А |
| 1VF-FD001A | AUX | 51, NN-PP | 605+10 | 22/24 | LSS | В |
| 1VF-FD001B | AUX | 51, NN-PP | 605+10 | 22/24 | LSS | В |
| 1VF-FD002A | AUX | 50-51/NN-PP | 631+6 | 24/38 | DID | С |
| 1VF-FD002B | AUX | 50-51/NN-PP | 631+6 | 24/38 | DID | С |
| 1VF-FD004 | AUX | 49/PP-QQ | 631+6 | 24/38 | DID | С |
| 1VF-FD005 | AUX | 49-50/PP-QQ | 631+6 | 24/38 | DID | С |
| 1VF-FD006 | AUX | 50-51 | 631+6 | 24/38 | DID | С |
| 1VF-FD007 | AUX | 50-51/KK-LL | 605+10 | 22/24 | LSS | В |
| 1VF-FD010 | AUX | 50-51/KK | 605+10 | 22/24 | LSS | В |
| 1VF-FD011 | AUX | 50-51/JJ-KK | 631+6 | 22/38 | LSS | В |
| 1VF-FD013 | AUX | 50-51/JJ-KK | 616+10 | 22/24 | LSS | В |
| 1VF-FD014 | AUX | 50-51/JJ-KK | 616+10 | 22/24 | LSS | В |
| 2VF-FD001A | AUX | 63. NN-PP | 605+10 | 22/23 | LSS | В |
| 2VF-FD001B | AUX | 63, NN-PP | 605+10 | 22/23 | LSS | В |
| 2VF-FD002A | AUX | 63-64/NN-PP | 631+6 | 23/47 | DID | С |
| 2VF-FD002B | AUX | 63-64/NN-PP | 631+6 | 23/47 | DID | С |
| 2VF-FD004 | AUX | 65/PP-QQ | 631+6 | 23/47 | DID | С |
| 2VF-FD005 | AUX | 64-65/PP-QQ | 631+6 | 23/47 | DID | С |
| 2VF-FD006 | AUX | 63-64/PP-QQ | 631+6 | 23/47 | DID | С |
| 2VF-FD007 | AUX | 63-64/KK-LL | 605+10 | 22/23 | LSS | B |
| 2VF-FD010 | AUX | 63-64/KK | 605+10 | 22/23 | LSS | В |
| 2VF-FD011 | AUX | 64-64/JJ-KK | 631+6 | 22/47 | LSS | В |
| 2VF-FD013 | AUX | 63-64/JJ-KK | 616+10 | 22/23 | LSS | В |
| 2VF-FD014 | AUX | 63-64/JJ-KK | 616+10 | 22/23 | LSS | В |
| 1TB-FD001 | TB1 | 18-19/V | 594+0 | TB1/SRV | DID | С |
| 1TB-FD002 | TB1 | 18-19/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD003 | TB1 | 18-19/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD004 | TB1 | 18-19/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD005 | TB1 | 18-19/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD006 | TB1 | 18-19/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD007 | TB1 | 21-22/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD008 | TB1 | 21-22/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD009 | TB1 | 21-22/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD010 | TB1 | 21-22/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD011 | TB1 | 21-22/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD012 | TB1 | 21-22/V | 594+0 | TB1/SRV | DID | C |
| 1TB-FD032 | TB1 | 18-19/V | 594+0 | TB1/SRV | DID | C |

Catawba Units 1 and 2

(continued)

Revision 10
Table 16.9-5-2

REQUIRED FIRE DAMPERS

| DAMPER | BLDG | LOCATION | ELEVATION | FIRE AREA | RISK | REMEDIAL |
|-----------|------|-------------|-----------|-----------|----------|-----------|
| NUMBER | | | | INTERFACE | CRITERIA | ACTION |
| | | | | | | CONDITION |
| 1TB-FD038 | TB1 | 16-17/V | 594+0 | TB1/SRV | DID | С |
| 1TB-FD039 | TB1 | 16-17/V | 594+0 | TB1/SRV | DID | С |
| 1TB-FD040 | TB1 | 16/V | 594+0 | TB1/SRV | DID | С |
| 1TB-FD043 | TB1 | 30-31/1J-1K | 568+0 | TB1/OTT | DID | С |
| 1TB-FD044 | TB1 | 32/1J-1K | 594+0 | TB1/MTOT | DID | С |
| 1TB-FD045 | TB1 | 30/1J-1K | 594+0 | TB1/MTOT | DID | С |
| 1TB-FD046 | TB1 | 32/1K-1L | 568+0 | TB1/OTT | DID | С |
| 2TB-FD013 | TB2 | 21-22/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD014 | TB2 | 21-22/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD015 | TB2 | 21-22/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD016 | TB2 | 21-22/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD017 | TB2 | 21-22/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD018 | TB2 | 21-22/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD019 | TB2 | 18-19/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD020 | TB2 | 18-19/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD021 | TB2 | 18-19/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD022 | TB2 | 18-19/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD023 | TB2 | 18-19/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD024 | TB2 | 18-19/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD031 | TB2 | 32/2K-2L | 568+0 | TB2/OTT | DID | С |
| 2TB-FD032 | TB2 | 18/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD036 | TB2 | 16-17/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD038 | TB2 | 17-18/P | 594+0 | TB2/SRV | DID | С |
| 2TB-FD039 | TB2 | 32/2J-2K | 594+0 | TB2/MTOT | DID | С |
| 2TB-FD040 | TB2 | 30/2J-2K | 594+0 | TB2/MTOT | DID | C |
| 2TB-FD041 | TB2 | 30-31/2J/2K | 568+0 | TB2/OTT | DID | С |

Table 16.9-5-3

HIGH SAFETY SIGNIFICANT (HSS) FIRE AREAS*

| FIRE AREA | BLDG | ELEVATION | DESCRIPTION |
|-----------|------|-----------|---|
| 6 | AUX | 560+0 | Unit 1 Electrical Pen Room El 560 |
| 12 | AUX | 577+0 | Unit 2 Electrical Pen Room El 577 |
| 13 | AUX | 577+0 | Unit 1 Electrical Pen Room El 577 |
| 14 | AUX | 577+0 | Unit 2 4160V Essential Swgr Room (2ETA) |
| 15 | AUX | 577+0 | Unit 1 4160V Essential Swgr Room (1ETA) |
| 16 | AUX | 574+0 | Unit 2 Cable Room EI 574 |
| 17 | AUX | 574+0 | Unit 1 Cable Room EI 574 |
| 21 | AUX | 594+0 | Main Control Room El 594 |

*High Safety Significant (HSS) Fire Areas are defined as the areas with HSS fire barrier features in accordance with the Catawba NFPA 805 Monitoring Program.

Table 16.9-5-4

| | | ASSURED |
|------|---|----------------|
| FIRE | | SHUTDOWN |
| AREA | FIRE AREA DESCRIPTIONS | TRAIN / METHOD |
| 1 | ND & NS Pump Room EI 522 (Common) | SSS |
| 2 | Unit 2 CA Pump Room El 543 | SSS |
| 3 | Unit 1 CA Pump Room El 543 | SSS |
| 4 | Aux Bldg. Gen Area & NV Pump Room El 543 (Common) | SSS |
| 5 | Unit 2 Electrical Pen Room El 560 | Α |
| 6 | Unit 1 Electrical Pen Room El 560 | Α |
| 7 | Unit 2 4160V Essential SWGR Room El 560 | А |
| 8 | Unit 1 4160V Essential SWGR Room El 560 | Α |
| 9 | Unit 2 Battery Room El 554 | SSS |
| 10 | Unit 1 Battery Room El 554 | SSS |
| 11 | Aux Bldg. Gen Area & U1 KC Pump Room El 560 (Common) | SSS |
| 12 | Unit 2 Electrical Pen Room El 577 | В |
| 13 | Unit 1 Electrical Pen Room El 577 | В |
| 14 | Unit 2 4160V Essential SWGR Room El 577 | В |
| 15 | Unit 1 4160V Essential SWGR Room El 577 | В |
| 16 | Unit 2 Cable Room El 574 | SSS |
| 17 | Unit 1 Cable Room El 574 | SSS |
| 18 | Aux Bldg. Gen Area & U2 KC Pump Room El 577 (Common) | SSS |
| 19 | Unit 2 Electrical Pen Room El 594 | А |
| 20 | Unit 1 Electrical Pen Room El 594 | А |
| 21 | Control Room El 594 (Common) | SSS |
| 22 | Aux Bldg. Gen Area El 594 (Common) | SSS |
| 23 | Unit 2 Fuel Storage Area El 605 | А |
| 24 | Unit 1 Fuel Storage Area El 605 | Α |
| 25 | Diesel Generator Bldg. 1A El 556 | В |
| 25A | Diesel Generator Bldg. 1A Stairwell | В |
| 26 | Diesel Generator Bldg. 1B El 556 | А |
| 26B | Diesel Generator Bldg. 1B Stairwell | Α |
| 27 | Diesel Generator Bldg. 2A El 556 | В |
| 27A | Diesel Generator Bldg. 2A Stairwell | В |
| 28 | Diesel Generator Bldg. 2B El 556 | А |
| 28B | Diesel Generator Bldg. 2B Stairwell | Α |
| 29 | Train A RN Pump Structure El 600 (Common) | В |
| 30 | Train B RN Pump Structure El 600 (Common) | Α |
| 31 | Unit 2 Train A Aux Shutdown Panel El 543 | В |
| 32 | Unit 1 Train A Aux Shutdown Panel El 543 | В |
| 33 | Unit 2 Train B Aux Shutdown Panel El 543 | Α |
| 34 | Unit 1 Train B Aux Shutdown Panel El 543 | А |
| 35 | Control Room Tagout Area El 594 | A or B |
| 36 | Unit 2 Turbine Driven CA Pump Control Panel Room El 543 | В |
| 37 | Unit 1 Turbine Driven CA Pump Control Panel Room El 543 | В |
| 38 | Unit 1 Fuel Storage Area HVAC Room El 631 | A or B |
| | | (continued) |

FIRE AREAS AND SHUTDOWN TRAIN / METHOD

(continued)

| | | ASSURED |
|--------|---|----------------|
| FIRE | | SHUTDOWN |
| AREA | FIRE AREA DESCRIPTIONS | TRAIN / METHOD |
| 39 | Unit 2 Turbine Driven CA Pump Pit El 543 | В |
| 40 | Unit 1 Turbine Driven CA Pump Pit El 543 | В |
| 41 | DG1A Sequencer Tunnel El 556 | В |
| 42 | DG1B Sequencer Tunnel El 556 | А |
| 43 | DG2A Sequencer Tunnel El 556 | В |
| 44 | DG2B Sequencer Tunnel El 556 | A |
| 45 | Unit 1 Cable Room Corridor El 574 | В |
| 46 | Unit 2 Cable Room Corridor El 574 | В |
| 47 | Unit 2 Fuel Storage Area HVAC Room El 631 | A or B |
| 48 | Unit 2 Interior Doghouse | A and B |
| 49 | Unit 1 Interior Doghouse | A and B |
| 50 | Unit 2 Exterior Doghouse | A and B |
| 51 | Unit 1 Exterior Doghouse | A and B |
| ASB | Auxiliary Service Building | A or B |
| RB1 | Unit 1 Reactor Building | A and B |
| RB2 | Unit 2 Reactor Building | A and B |
| SRV | Service Building | В |
| SSF | Standby Shutdown Facility | A or B |
| STAIR* | Stairway | See Note |
| TB1 | Unit 1 Turbine Building | A or B |
| TB2 | Unit 2 Turbine Building | A or B |
| YRD** | Yard Area | A or B |

FIRE AREAS AND SHUTDOWN TRAIN / METHOD

* IF the barrier in a stairway is adjacent to a HSS Fire Area (see Table 16.9-5-3), enter CONDITION A; otherwise enter CONDITION C.

** Exterior walls that interface with the YRD do not require entry into a CONDITION statement and therefore do not have a REQUIRED ACTION.

A = A TRAIN B = B TRAIN SSS = STANDBY SHUTDOWN SYSTEM BASES The functional integrity of the Fire Rated Assemblies and associated sealing devices ensures that fires will be confined or adequately retarded so as not to spread between fire areas/compartments.

The fire barriers and associated penetration seals are passive elements in the facility fire protection program and are subject to periodic inspections.

Risk-informed insights from the Fire PRA process can apply to compensatory actions. The safety significance of the fire area can provide relief for required compensatory actions. In addition, the presence of functional fire detection can reduce the required compensatory actions. Functional fire detection in the area provides early warning of a fire for fire brigade response. Fire detection can provide a compensatory action equivalent to or better than fire watch.

Fire barrier penetration seals, including cable/pipe penetration seals, fire doors, and fire dampers, are considered FUNCTIONAL when the visually observed condition indicates no abnormal change in appearance or abnormal degradation. An evaluation is performed to determine the cause of any identified fire barrier penetration seal abnormal change in appearance or abnormal degradation and the effect of this change on the ability of the fire barrier penetration seal to perform its function. Based on this evaluation additional inspections may be performed.

During periods of time when a barrier is not FUNCTIONAL, either:

- (1) Perform the recommended fire watch in accordance with the criteria in the remedial actions, or
- (2) a licensee may choose to implement a different required action or a combination of actions (e.g., additional administrative controls, operator briefings, temporary procedures, interim shutdown strategies, operator manual actions, temporary fire barriers, temporary detection or suppression systems). Such a change must be made to the approved Fire Protection Plan (FPP). However, the licensee must complete a documented evaluation of the impact of the proposed required actions would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire. Any change to the FPP must maintain compliance with the General Design Criteria and 10 CFR 50.48(a).

The evaluation of the required action should incorporate risk insights regarding the location, quantity, and type of combustible material in the fire area; the presence of ignition sources and their likelihood of occurrence; the automatic fire suppression and the fire detection capability in the fire area; the manual fire suppression capability in the fire area; and the human error probability where applicable.

BASES (continued)

The expectation is to promptly complete the corrective action at the first available opportunity and eliminate the reliance on the required action.

This SLC is part of the Catawba Fire Protection Program and therefore subject to the provisions of Section 2.C.(5) of the Catawba Renewed Facility Operating Licenses.

REFERENCES 1. Catawba UFSAR, Section 9.5.1.

- 2. Catawba Nuclear Station 10 CFR 50.48(c) Fire Protection Safety Evaluation (SE).
- 3. Catawba Plant Design Basis Specification for Fire Protection, CNS-1465.00-00-0006, as revised.
- 4. Catawba UFSAR, Section 18.2.8.
- 5. Catawba License Renewal Commitments, CNS-1274.00-00-0016, Section 4.12.2.
- 6. NRC Regulatory Issue Summary 2005-07, Compensatory Measures to Satisfy the Fire Protection Program Requirements, April 19, 2005.
- Catawba Renewed Facility Operating License Conditions 2.C.(5).
- 8. CNC-1435.00-00-0084, Catawba NFPA 805 Monitoring Program.
- 9. CNC-1435.00-00-0044, Fire Protection Nuclear Safety Capability Assessment.
- 10. CN-1209.10 series drawings.
- 11. CN-1105 series drawings.



| | 4 | | | ۲. |) | | 6 | | | 7 | | | 8 | | | | 9 | | | 10 | | | 11 | | |
|-----------------|------|--|--------------|--------------------------------|----------|--------------------------|--|------------------------|--------------------------|--|--|---|--|-------------------|---------------------------------------|-------------------|---------------------------------------|------------------|-----------------------------------|--------------|---|-----------------|-----------------------|-------------|--------------------|
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 68 | $(\overline{c},\overline{c},\overline{c})$ | | 61 | | 62 | (5 1) | GØ | Fg | 68 | $\overline{(57)}$ | 56 | (55) | 61 | 53 | ۲ | | $\overline{51}$ | | | $\left(\begin{array}{c} 1 \end{array} \right)$ | (AG) | $\overrightarrow{15}$ | | $\left(12\right)$ |
| 5 20- | Ø 2Ø | | 6 6 20 | -0 2 | 0-0 20 | 1-0 20 | | -0 20 | -0 20- | -Ø 2Ø- | -0 20- | -Ø 2Ø- | | | | | 20-0 | 20-6 | 20-0 20-0 | 15- | 6 20-6 | | | | 7-3 |
|] | | 4-6 | 5 | | | | | | | | | | | | | | | | 4-6- | | | | 11-Ø- | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | 23 | 3 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | IRE AREA | | | | | | | | | | | | | |
| | | | | | | | | | STAIR 300A 300B | | • • • • • • • • • • • • • • | | | | | | | | | | | | | | |
| | | | | | | 307] | 3 | 25 | 301 | FIRE | 410 | • 4 14 | | 3 | 14 | | 316 | | | | | | | | |
| | | | | | | | | | | | <u>411</u> <u>412</u> | |] | | | _ | STAIRS | | | | | | | | |
| | | | | <u>Ø3A</u> | | HOSE F2Ø3 ∟″⊗″ | | 303B -STAIRS | -FIRE ARE | A 22 | FIRE HOSE | 416 | 310B | FIRE ARE | A 22 31 | | 3 10A IRE HOSE 1RF 269 | | | | | | | | |
| | | | | | | 425] | 30 | | | | 1RF22 | | | | 133 | | <u>317</u> 434 | | | | | | | | |
| | F | IRE AREA | | | | 126] | 442 | 444 | | 41 SE | CTION A-A (TYPICAL) | 450 | | 453 | 454 | | 435) | | | | <u>AREA 18</u> | | | | |
| | | | | | | 4 <u>28</u> | 449 | | | 46 460 462 | 300 | 455 | | 458 | 459 | | | | 319 | | | | | | |
| | | | | | FI HC | RE ISE 2 13 | | | | | FIRE HOSI 1RF243 | | | ••••• | | | FIRE HOSE 1RF263 | | | | | | | | STAIRS |
| | 1 | | | | | FIRE AREA 4 | | <u>300C</u> | 6" CURB | RE AREA 1 | | NENT ING S | 6" • • • • • • • • • • • • • • • • • • • | | | | RE 4 | | | | | | | | |
| | | | | | | | ст — — — — — — — — — — — — — — — — — — — | E FI | RE 2 SE 239 | | | | FI HO | RE 300 SE 25 1 | | UCT IAFT 17 | | | | | | | | | |
| | | | | | | AF | FIRE REA 18 \ 324 | | | | с мs 20 (330) | ₩ ₩ | | | - 331 - 332 | | | | | | | | | | |
| | | | | | | | | <u> </u> | 22 CABLE SHAFT | FIRE AREA 46 | 3+0 | FIRE REA 45 | 334 CABLE - DI SHAFT SH | JCT E | [333] | | | | | | | | | لا ـ . ا | |
| | | | JNIT 2 | | | F ARE | IRE A 22 | 340 | B 3404 | | | 35 | ZA 350 | | | RE 22 | | | | <u>NIT 1</u> | | | | | |
| 1 | | | | | | STAIRS 360A | | | | а <u>340</u> |] | | | 51] | | ᡔᢧᡎᡜ᠂ | STAIRS | | | | | | | | |
| | E | | FI, FI | RE T | FIRE | | AL STAIR | 3424 RS 343 | | | | | | 52A 53 s | TAIRS ELEO PENE | CTRICAL TRATIO | 8 370 N | FIRF | FIRE | | | ₩ | | | |
| HUS 1RF9 | | -MCC 2EMXL | | SE 485 CC - 2. MXD 2. | | | 3 CO2 | TAIRS | =] <u>G</u>] | | | | 354] | | 00 * F CO2 X RS 3 | ROOM 2 | 2.5 GAL A WATER- FIRE & HOSE | AREA 6 | HUSE 1RF 489 MCC – 1EMXD | | - MCC 1EMXL | HUSE 1RF 997 | 8 | | |
| | | | | WITCHGEAN | | DSE 54 486 | | CO2 (MIN) (MIN) 346 | | ====\$ | 34 1RF2 | 187 (==================================== | | |) ⊗ 5″ | | □ 1RF 488 | SWI ⁻ | CHGEAR ROO | | | |) 2.5 GAL WATER | | |
| | | 2EL XF TRANSI | | vgr. FIRE AR | EA 7 | | | | | | | | | | | |] | Swgr. | I AREA 8 | | CENTE CENTE 1ELXF TRANSF | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | Ι | I | I | I | I | I | | | | | | | | | | | |

NOTES

2. FIRE EXTINGUISHER INSTALLED IN CHEMISTRY SUPERVISOR'S OFFICE AT EL.568+0.

EL.560+0

Ь

EL.568+0

SECTION A-A (TYP.) NOT TO SCALE

4

5

1. FOR OTHER NOTES, SEE CN-1209-10.01.



1Ø

| 17-3 | V JC KE | |
|---------|--|--------------------|
| | A.ZO NE | , I |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | SS 10 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | N KK |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | 35 |
| | | |
| A.2S KE | LEG. CERTFULL SIZE | E ONLY |
| | QA CONDITIO | DN 3 |
| | DUKE ENERGY Catawba nuclear station | r I UNITS 1 & 2 |

| 1 1 | 12 | 13 | | 14 |
|---------------------------|---|----------------------------|------------------------|--|
| | | | | |
| | ×. | | | |
| (45) (44) (43) (42) | | | | |
| | | | | |
| | | A.2S | KEY | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | SS |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | KK KK |
| | | | | |
| | | | | |
| | | | | |
| | | | | GG |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | 20-E |
| | | | | |
| -997 | | | | R B B B B B B B B B B B B B B B B B B B |
| -2.5 GAL WATER | | | | |
| | | | | |
| | | | | 36 |
| | | | | |
| | | | | |
| | | | | |
| A.2 | S KEY | | | |
| | | LEG. CERTFUL | l size only |] |
| | | QA COND | ITION 3 | |
| | C r | DUKE E Atawba nuclear s | ENERGY TATION UNITS | 1 & 2 |
| | | FIRE PROTECT | ION EQUIPMENT | - |
| | | AUXILIARY Elevati | BUILUING ON 560+0 | |
| REV PER EC 405994 | | | | RFV |
| 11 REVISIONS | 20 ⁷ - 1 " DWG . 12 | NU. LN-1209- 13 | -10.12 | 14 |







|) (5 | 5 (5 | 4 5 | 3 (5 | 2 (5 | 1) (5 | 50 (49 20-0 4-6 |)(| 48 | 47 (4 | 6 (4 | 5 4 4 | 4 | 3)(42 | |
|------|------|-----|------|------|-------|-----------------------|----|--------|-------|------|-------|---|----------------|--|
| | | | | | | | | | | | | | | |
| | | | | | | | |]] | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

9 | 10 | 11 |

| 8 | |
|---|---|
| | |
| | LEGEND |
| | LOW SAFETY SIGNIFICANT & HIGH SAFETY SIGNIFICANT (LSS/HSS) BARRIERS |
| | DEFENSE-IN-DEPTH (DID) BARRIERS |
| | |

| 12 | | 13 | | 14 | |
|-----------|---|--------------------|--------------------|-----------|------|
| | | | | | |
| | | | | | L |
| | | | | | |
| | | | | | |
| 3 | | | | | К |
| | | | | | |
| | | | | | |
| | | | | | |
| | | X X W W | | | |
| | 19-0 19-0 | | | | _ |
| | | | | | |
| |) | UU | | | I |
| | | $\overline{(TT)}$ | | | |
| | 50-0 | <u> </u> | | | |
| | | RR | | | F |
| | | | | | |
| | | PP) | | | _ |
| | 50-0 | NN) | | | |
| | 50-0 | | | | C |
| | 50-0 | | | | |
| | | (LL) | | | |
| | | KK | | | F |
| | | JJ | | | |
| | 50-10-10-10-10-10-10-10-10-10-10-10-10-10 | (HH) | | | |
| | 50-0 | GG | | | |
| | | | | | |
| | 50-0 | | | | |
| <u> </u> | | (EE) | | | |
| | | | | | |
| | | CC | | | |
| | | BB | | | |
| | 50-0 | AA) | | | |
| | 6-4 | 37 | | | |
| NOTE | E: DWG CN-1201-4 | NOTES 29 & 3 | 2 FOR RINCK 14 | ALL JOINT | |
| SEAL | LANT INSTALLATION | N. | , en deuer M | | |
| | LEG | . CERTFUL | L SIZE ONL | Y | E |
| | QA | A COND | | 3 | |
| | CATAWBA | NUCLEAR S | TATION UNI | TS 1 & 2 | |
| | | FIRE BOUN FLOOR | DARY WALLS Plan | | |
| | F | INISHED FL | . EL. 522+ | - 10 | REV. |
| 1"=2 | טאט. NO. | LIN-1105- | | | 8 |

| | 1 2 | 3 | | | 4 | | |
|---|---|--------------|------|--|-----------------------------|-------|-------------------|
| L | | | | | | | |
| | | (73) Ø-3- | 72 7 | $\frac{1}{1-0} \left(\begin{array}{c} 70 \\ 18-6 \end{array} \right)$ | <u>69</u> (6 <u>20-0</u> | 8)(67 | ') ((15 4 |
| K | | | | | | | |
| J | | | | | | | |
| | | | | | | | |
| Ι | | | | | | | |
| | | | | | | | |
| H | | | | | | | |
| G | | | | | | | |
| | | | | | | | |
| F | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| D | | | | | | | |
| | | | | | | | |
| С | LEGEND | | | | | | |
| В | SYMBOL DESCRIPTION FIRE AREA BOUNDARY WALL DELUGE SYSTEM | | | | | | |
| | SPRINKLER SYSTEM | | | | | | |
| А | FIRE EXTINGUISHER (15 LB CO2 UNLESS OTHERWISE NOTED) | | | | | | |
| | ERN: CNØØØ1LG | | | | | | |

4

С



REVISIONS 1Ø

11

12

13

| 10.10 | rev. | |
|--|------------------------|---|
| | | L |
| | | K |
| | | J |
| | | I |
| | | |
| | | H |
| | | G |
| | | F |
| | | |
| | | E |
| | | |
| | | D |
| | | |
| 3 | | С |
| N-1209-10.01. | | |
| $T \cap N $ | | В |
| MPANY ON UNITS 1&2 | | |
| EQUIPMENT DING 2+Ø HA SMITH DATE 6-1Ø- DE ROBERTS DATE 6-1Ø- GR HEDRICKS DATE 6-25- | 8 1 81 81 | A |
| 10 | REV. | |

13

12

1 1

14



| | LEGEND |
|------------------|---|
| | LOW SAFETY SIGN HIGH SAFETY SIGN (LSS/HSS) BARRIER |
| | DEFENSE-IN-DEPT (DID) BARRIERS |
| A-AX-100- W-6 | FLOOR ELEVATION BUILDING ROOM NUMBER OPENING NUMBER ROOM SURFACE F=FLOOR W=WALL |

| BUILD | ION CODES | | |
|-------|----------------|------|----------|
| CODE | FL. ELEV | CODE | FL. ELEV |
| A | 522+Ø | J | 577+Ø |
| В | 533+Ø | К | 594+Ø |
| С | 543+Ø | L | 605+10 |
| D | 554 <i>+</i> Ø | М | 609+0 |
| E | 556+Ø | Ν | 610+0 |
| F | 560+0 | 0 | 619+6 |
| G | 568+Ø | Р | 631+6 |
| Н | 574+Ø | | |



| 12 | | 13 | | 14 | |
|----------------------------|----------------------------|---------------------------|-----------------------|----------|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | - |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | - |
| | | | | | |
| | | | | | |
| | | | | <u> </u> | |
| | | | | | |
| | | | | | - |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | MM | |
| | | | | 2 Q - [| |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | GG | |
| | | | | | |
| | | | | | |
| | | | | EE) | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | <u> </u> | ?ТН— | | |
| 9-10.01. | | | | | |
| | | | | | |
| | LEG. | CERTFULL | SIZE ONLY | | |
| | QA | CONDI | FION 3 | | |
| | | DUKE ENE | RGY | 1 Q. 7 | |
| | CHIHMRA NI | JULCHK SIA | IUN UNIIS | | |
| | F I RE Al | PROTECTION JXILIARY BU | N EQUIPMEN JILDING | | |
| | | LLEVATION | 543+Ø | | |
| SCALE - | | | 7 1 1 | RE | V |
| <u> 20′ - 1"</u> UV 12 | יט. ואט. <u>ר</u> ך | N−⊥∠∅∀−⊥ 13 | | 14 | 6 |





| | | 4 | | | | | 5 | | | | | | 6 | | | | | | | 7 | | | | | | 8 | | | | | | 9 | | | | | | 10 | | | | | | 11 | | | | |
|---|-------------------------------|--------|---------|--------|---|------------------------------|-----------|-------------------------------------|----------------------------------|------------------------------------|-------------------------|-------------|----|----------------------------------|------------------|--|---|---|--|--------------------------------------|----------------------|---|-------------------|---|---------------------------|--------------------------------------|-----------|--|---------|---------------------|-----------------|--|-----------------------------------|--------------------|---------------------------|------------------------|--|----|-------------------------|------------------|-------------------------|---------------------|-----------------------------|------------|---|-------------------|---|---|
| | 2) | | 67) | (E.F | | | | 6 | $\overline{\mathcal{A}}$ | Æ | $\overline{\mathbf{A}}$ | Œ | 1 | ((| | (1 | 59 | | (5,5 | | 6 | 7 | 6 | | 6 | | (5) | 1) | 6 | | | \sum | 6 | 1) | 6 | $\overline{\gamma}$ | 191 | 48 | (4 | | (4 | | (4 | 5 | | $\overline{(43)}$ | $\left(\begin{array}{c} 4 \end{array} \right)$ |) |
| | 20-1 | 20-0 | | -6 | 2 | | 20 | | 9 20 | | 2Ø | -Ø | 20 | × 2-0 | | () | | 20- | Ø | 2Ø- | | /) 2Ø | | 20 | | 20 | | 9 20- | | 20 | | 2Ø | | 2Ø | | 2Ø- | | 15 | 5-6 | 20 | | 20 | | <u>18-</u> | | | 7-3 | |
| 3 | | | 4 - | -6- | | | | | | | | | | | | | | | | 2. | | | | | | | | | | | | | | | | 4 | 6 | | | | | | | 11- | 2 | | | |
| | | | | | | | |] | | | | | | | | | | | | | | | FIRF | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | STAIRS | | | 3 | 07 | | | | 305 | | | | TAIRS 200A 200B | | FIRI HOS 1RF2 | ELEV E E 19 | 1 SEE 1 31 1 4 11 1 4 12 1 4 13 | | 4416B 415 415 414 315 | | | | 31 | 4 | | | 310 STA 310 | IRS | | | | | | | | | | | | | | | |
| | | FIRE | | | | | | 42 | | HOSE 203– 25 26 28 | | 449 445 423 | | 444 [422] | 303B IRS (| F HÅF HÅF HÅF HÅF HÅF HÅF HÅF HÅF HÅF HÅ | | AREA 304 42 42 44 44 44 44 53 4 | 22 22 20 1 20 1 20 1 20 1 20 1 20 1 1 20 1 1 20 1 1 20 1 1 1 1 1 1 1 1 1 1 1 1 1 | | SE ECTIO (TYPI | | | 31 (430) (430) (450) (451) (455) (456) (456) (456) (456) | | ØB DU SHA 187 457 473 | | AREA 315 423 435 | | 459 454 433 | | IRE 1RF2 317 43 | HOSE 269 7 34 35 • | | | 9 | | | E ARE | EA 18 | 8 | | | | | | | |
| | | | | | | | | | FIF HOS 1RF2 | RE AREA | | | | 3000 | | FIRE HOSE RF23 STAIR [322A | 9 3 7 7 7 7 7 7 7 7 7 7 7 7 7 | RB RB I I I I I I | | REA MC ROC | | | | | | FI IRF | RE 251 | 300D | 331 | — DUC SHA | | FI HO HO RE 4 | RE-L SE 263 E | | | | | | | | | | | | | | TAIRS | |
| | | | | | | | | | | | | | | | | 322 GT (AFT) 340B | | | FIF AREA | EL.56 RE 46 | 320 58+0 | | FIR FIR REA | E 45 | 334 - CABL SHAF | | | | 332 | FIRE FIRE | 2 | | | | | | | | 1 | | | | | | | | | |
| | ⊗s″ FIRE HOSE ∑1RF99 | | | | | FIRE HOSE RF 485 | 2.5 WA | FIRE FIRE AREA GAL- TER | SI 360 5 5 FII HO | AIRS 60A ELI PEN | | CAL TION | | IRS 3# STAIF 1Ø# CO2 | | 41 12A 43 43 43 43 43 43 43 43 43 43 | | 42 | | FIRE EA FIRE HOSE 1RF 48 | 9 84 | BATI RO ARE ARE | | | 352] 354] | | 51 | ST 10 CC STAIRS 10# CO2 | AIRS | ELEC PENET R(| TRICAL RATIO | STAIR 370 370 370 37 37 37 37 37 37 37 37 37 37 37 37 37 | AL AF RE SE 488 | FIRE REA Sea | | FIRE HOSE IRF 48 | 39 ,;;; , , , , , , , , , , , , , , , , , | | | -M 1E | | F IF HOS 1RFS | ,∞ RE SE 997 ,∞ | | | | | |
| | | CENTER | TRANSF. | CENTER | | SWITCH -2ETB SWGR. | | ROOM | 1RF | 486 | | | | (MIN | | 46 | | | | | | | ب ۲ ۲ | | | 3 | | | 85° | | | | | -1ET SWGI | WITCH B R. RE AF | SEAR F | | | 1ELXB LOAD CENTER | 1EL XF TRANSF | 1ELXD LOAD CENTER | | | WAT | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

NOTES

2. FIRE EXTINGUISHER INSTALLED IN CHEMISTRY SUPERVISOR'S OFFICE AT EL.568+0.

EL.560+0

Ь

EL.568+0

SECTION A-A (TYP.) Not to scale

4

5

1. FOR OTHER NOTES, SEE CN-1209-10.01.



1Ø

| 11 | 12 | 13 | 14 | + |
|--|--------------------------------|---|-------------------|------------------|
| | | | | |
| \sim \sim \sim \sim | | | | L |
| $\begin{array}{cccccccccccccccccccccccccccccccccccc$ | | | | |
| | | | | \vdash |
| | | | | |
| | | | | K |
| | | | | |
| | | | | |
| | | | | |
| | | | | J |
| | | | | |
| | | | | |
| | | | | |
| | | | SS) | I |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | G |
| | | | | |
| | | | | |
| STAIRS | | | | |
| | | | | F |
| | | | | |
| | | | | |
| | | | | |
| | | | | E |
| | | | | |
| | | | | |
| FIRE * | | | | |
| HOSE 1RF 997 | | | BB | D |
| 2.5 GAL WATER | | | | |
| | | | | $\left \right $ |
| 0 | | | 36 | |
| | | | (35) | C |
| | | | | |
| | | | | |
| ⊤ | | | | R |
| | | ηλ <u>σονισττον</u> ι | <u>- '</u> 」 つ | |
| | | JH CUNULLUN Duke energy | <u>ح</u> | ┥ |
| | CATAW | BA NUCLEAR STATION UNI | TS 1 & 2 | _ |
| | | FIRE PRUIECTION EQUIPN AUXILIARY BUILDING ELEVATION 560+0 | ήen i | A |
| 23 REV PER EC 405994 | | | | |
| NO. REVISIONS | SCALE 20'-1" DWG. NO. 12 | CN-1209-10.12 13 | 14 | <u>}</u> |



| BUILDING FLOOR ELEVATION CODES | | | | | | | |
|--------------------------------|---------|------|----------------|--|--|--|--|
| CODE | FL ELEV | CODE | | | | | |
| A | 522+Ø | J | 577+Ø | | | | |
| В | 533+Ø | K | 594 <i>+</i> Ø | | | | |
| С | 543+Ø | L | 605+10 | | | | |
| D | 554+0 | М | 609+0 | | | | |
| E | 556+0 | N | 610+0 | | | | |
| F | 560+0 | 0 | 619+6 | | | | |
| G | 568+Ø | P | 631+6 | | | | |
| Η | 574+Ø | | | | | | |
| | | | · | | | | |

| SAFETY SIGNIFICANT & SAFETY SIGNIFICANT | | | | | | |
|--|---|-----|-----|------------|---------|-----|
| HSS) BARRIERS | | | | | | |
| NSE-IN-DEPTH Barriers | | | | | | |
| R ELEVATION CODE | | | | | | |
| NUMBER | | | | | | |
| NG NUMBER | | | | | | |
| SURFACE | | | 12 | REV PER EC | 410919 | |
|)OR | | | 11 | REV PER EC | 4Ø5994 | |
| _ L | | | NO. | | REVISIO | INS |
| R | 9 | 1 1 | | 1 1 | | |

| 12 | 13 14 | |
|-------------------------|---|------------|
| | | |
| | | L |
| | | |
|)(41) | | _ |
| ▶< | | |
| | | К |
| | | |
| | | _ |
| | | |
| | | J |
| | | |
| | | - |
| | | |
| | | I |
| | | |
| | | - |
| | | |
| | | Н |
| | | |
| | | - |
| | | |
| | | G |
| | | |
| KK | | |
| | | |
| | | F |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | С |
| | | |
| | | |
| | | |
| | | В |
| | NA CONDITION 3 | |
| | | |
| | ADOUITEOTUDA | |
| | FIRE BOUNDARY WALLS PLAN AT EL 577+Ø | A |
| | | |
| SCALE 1" = 20' 12 | DWG. NO. CN-1105-09 13 14 | REV. 12 |



| | | | | | CA |
|-----|------------|-----------|----|-------------------|------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 2Ø | REV PER EC | 405994 | | | |
| 19 | REV PER EC | 405994 | | | |
| NO. | | REVISIONS | 5 | SCALE 20′ – 1″ | DWG. |
| | 1 1 | | 12 | 2 | |

| | 13 | | 14 | |
|--------------------|---|---------------------------|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | К |
| | | | | |
| | | | | |
| | | | | |
| | | | | J |
| | | | | |
| | | | | |
| | | | | Τ |
| | | | SS SS | |
| | | | RR RR | |
| | | | | |
| | | | R R R R R R R R R R R R R R R R R R R | н |
| | | | | |
| | | | 20-0 0-0 | |
| | | | | |
| | | | | G |
| | | | | |
| | | | | |
| | | | | |
| | | | | F |
| | | | Q Q Q Q Q Q | |
| | | | | |
| | | | | E |
| | | | | |
| | | | | |
| | | | | |
| | | | | D |
| | | | 20-0 | |
| | | | (AA) (37) | |
| | | | 36 | |
| | | | | С |
| | | | | |
| | | | | |
| | | | 1 | D |
| LEG. CE | RTFULL SI | ZE ONLY | | |
| UA (| JUNDITI | UN 3 | | |
| ATAWBA NUC | LEAR STATIC |)n units | 1 & 2 | |
| FIRE P Aux F | ROTECTION E (ILIARY BUIL (LEVATION 53 | QUIPMENT _DING 77+Ø | | A |
| L | | ~ | | |
| NO. CN- | -1209-10. 13 | 13 | 14 | |
| | | | | |



| 13 | | 14 | |
|---|--------------------------|-----|------------|
| | | | |
| | | | |
| | | | |
| | | | К |
| | | | |
| | | | J |
| | | | |
| | | | I |
| | | | |
| | | | |
| | | | H |
| | | | |
| | | | G |
| | | | |
| | | | F |
| | | | |
| | | | E |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | С |
| | | | |
| G. CERTFULL SI | ZE ONLY | | В |
| A CONDITI | ON 3 By In units 1 | & 2 | |
| ARCHITECTUF FIRE BOUNDARY PLAN AT EL 59 | RAL WALLS 94+Ø | | A |
| CN-1105-10 | | | REV. 24 |



| | LEGEND |
|-------------|--|
| SYMBOL | DESCRIPTION |
| | FIRE AREA Boundary Wall |
| | DELUGE SYSTEM |
| | SPRINKLER SYSTEM |
| | CO2 SYSTEM |
| v | FIRE HOSE RACK |
| \otimes r | FIRE EXTINGUISHER (15 LB CO2 UNLESS OTHERWISE NOTED) |

| VETS LINE METER STOLENESS CHL LINE METER STOLENESS VETS LINE METER STOLENES VETS LINE METER STOLENESS VETS LINE METER STOLENESS VETS | .2 | 13 14 | |
|--|----|--|-------------|
| SELS LICE OF A REPORT OF A DESTRUCTION AND SELECTION COTINGE REPORT OF A DESTRUCTION ADD SELECTION ADD | | | |
| VITS LITE CHER PRESSURE CHEREFORM VITS LITE PRESSURE CHEREFORM VITS LITE PRESSURE CHEREFORM VITS LITE PRESSURE CHEREFORM VITS LITE PRESSURE CHEREFORM VITS LITE PRESSURE CHEREFORM VITS LITE PRESSURE CHEREFORM VITE | | | |
| VITE L FOR CHEEK NOTES, SEE CN-233-18.5L VITE L FOR CHEEK NOTES, SEE CN-233-18.5L L FOR CHEEK NOTES, SEE CN-233-18.5L L FOR CHEEK NOTES, SEE CN-233-18.5L | | | |
| NTE LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET CAMPA NUE - SCIENTING 15 15 2 LEC CHI,LE, S.24 UNET | | | |
| NUTS L. REC DIFFE HOLES, RECONDUCTION BUILTS IN A 2 NUTS L. REC DIFFE HOLES, RECONDUCTS IN A 2 NUTS L. REC RECONDUCTS IN A 2 NUTS L. REC RECONDUCTS I | | | - |
| AND AND AND AND AND AND AND AND | | | |
| NUE MUE MUE MUE MUE MUE MUE MUE M | | | |
| EXEMPLE LIFE DIFERENCE LIFE DIFERENCE DIF | | | |
| VIEW | | | |
| Image: Second | | | - |
| VILLE VILE VILE VILLE VILE | | | |
| NUES LEG. DEFT. FULL DIZE DALY | | | A |
| NOTES 1. FOR OTHER NOTES, SEE CH-1223-10.0.1 I. FOR OTHER NOTES, SEE CH-1223-10.0.1 | | |) |
| LEG. CERT. HULL STAL UNLY COTIVER VOTES, SEE DE-1223-18-21. LEG. CERT. HULL STAL UNLY COTIVER VOTES VOTES, SEE DE-1223-18-21. LEG. CERT. HULL STAL UNLY COTIVER VOTES | | |) |
| NULS 1. FOR DIMES NOTES, SEE CH-200-10.01. SULS 1. FOR DIMES NOTES, SEE CH-200-10.01. LCC. CERT, FPULL ST.42, ONLY CATIONER NUTES, SEE CH-200-10.01. CATIONER NU | | | / |
| NTEE C. TOUGHER STEEL STEEL OR MAN C. TOUGHER STEEL STEEL STEEL STEEL STEEL C. TOUGHER STEEL STEEL STEEL STEEL STEEL C. TOUGHER STEEL | | |) |
| LUCE CLER NOTES, SEE CH-1229-16.61. | | | |
| MITES LEG. CERTPULL SIZE OVL* CALADDA NUCLEAR S ATTON UNI S 1 & 2 LEG. CERTPULL SIZE OVL* CALADDA NUCLEAR S ATTON UNI S 1 & 2 LEG. CERTPULL SIZE OVL* CALADDA NUCLEAR S ATTON UNI S 1 & 2 LEG. CERTPULL SIZE OVL* | | <u> </u> |) |
| VITES 1. TOR OTHER NOTES, SEE IN 1239 18.01. LEG. CERT, -TULL SIZE ONLY OA CONDITION 3 DUKE ENERGY CATAMBA NUCLEAP STATION UNITS I & 2 FURE PROTECTION EDUIPMENT OUXILINEY EVILLOING | | |) |
| WITS 1. FUR OTHER NOTES, SEE ON-TECHNOLOGIA WITS 1. FUR OTHER NOTES, SEE ON-TECHNOLOGIA DAGE ENERGY CALAMER STATION UNITS 1 & 2 | | |) |
| NULLS 1. FOR OTHER NUTES, SEE CH-1239-18.01. THUS, CLEB JLL SCAL CNLY OA CONDITION 3 DUKE ENERGY CHANDA NULLEAR STATION JULIS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| NJIES LES. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAVEA NUCLEAR STATION UNITS 1 & 2 FURE PROTECTION EQUIPPENT AUXILIARY DUILDING | | |) |
| NOTES 1. TORISTIER NOTES, SEE EN-229-20,01. IES. CERT. FULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAMBA NUCLEAR STATION UNITS 1 & 2 TIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| NTEC LEG. CERTFULL SIZE ONLY CATAWDA NUCLEAR STATION JULTO 1 & 2 FIRE PROTECTION EQUIPYENT AUXIL LARY HULLING FIRE PROTECTION EQUIPYENT AUXIL LARY HULLING | | |) |
| NOTES 1. FOR OTHER NOTES, SEE CH-1205- 0.21. LES, CERTFULL SIZE ONLY CC CA AVBA NUCCEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILITARY BUILDING | | |) |
| NUISS LEG. CERTFULL SIZE ONLY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIATY BUILDING | | | , |
| NOIES LEC. CERT. FULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWDA INCLEAR STATION JULIS 1 & 2 FIRE PROTECTION EGUIPMENT AUXILIARY BULLUINS | | |) |
| NULES 1. FOR OTHER NOTES, SEE CN-1209-13.21. LED. CERTFULL SIZE DNLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| NOTES 1. FOR OTHER NOTES, SEE CN-1229-12.61. I. FOR OTHER NOTES, SEE CN-1229-12.61. | | |) |
| NOTES 1. FOR OTHER NOTES. SEE CN-1209-18.81. LIG. CERTFULL SIZE ONLY QA CONDITION 3 OUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | |) |
| NOTES 1. FOR OTHER NOTES, SEE CN-1225-18.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERgy CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | / |
| NOTES 1. FOR OTHER NOTES, SEE CN-1289-18.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERgy CATAWDA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | |) |
| NOTES 1. FOR OTHER NOTES, SEE CN-1289-18.21. | | | |
| NOTES 1. FOR OTHER NOTES, SEE CN-1289-10.01. LEG. CERTFULL SIZE ONLY OA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EDUIPMENT AUXILIARY BUILDING | | |) |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-18.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | |) |
| NOTES I. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | / |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | |) |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| NOTES 1. FOR OTHER NOTES. SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | |) - |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | |) |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY OA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | |) |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING DUKE ENERGY | | BB |) |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY OA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | |) |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| NOTES 1. FOR OTHER NOTES, SEE CN-1209-10.01. LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | NOTES | |
| LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING ELEVATION FOR 12 | | 1. FOR OTHER NOTES, SEE CN-1209-10.01. | |
| LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| LEG. CERTFULL SIZE ONLY QA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| GA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | | |
| OA CONDITION 3 DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | LEU. LEKIFULL SIZE UNLY | |
| DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | | QA CONDITION 3 | |
| FIRE PROTECTION EQUIPMENT AUXILIARY BUILDING | _ | DUKE ENERGY CATAWBA NUCLEAR STATION UNITS 1 & 2 | |
| AUXILIARY BUILDING | _ | FIRE PROTECTION FOUTPMENT | |
| | _ | AUXILIARY BUILDING | |
| | _ | | |
| $\frac{1}{2\alpha'-1} DWG. NO. (N-12\alpha) - 1\alpha 1\alpha \qquad \frac{1}{1-2}$ | | G.NO. (N-12/19-1/1 14 | REV. 1 7 |

| LEGEND | | | | |
|-----------------------------------|--|--|--|--|
| SYMBOL | DESCRIPTION | | | |
| | FIRE AREA Boundary Wall | | | |
| | DELUGE SYSTEM | | | |
| | SPRINKLER SYSTEM | | | |
| | CO2 SYSTEM | | | |
| ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | FIRE HOSE RACK | | | |
| \bigotimes r | FIRE EXTINGUISHER (15 LB CO2 UNLESS OTHERWISE NOTED) | | | |
| | | | | |

| 12 | | 13 | | 14 | |
|-----|--------|------------------------|------------------------|------------|--|
| | | | | | |
| | | | | | |
| (4) |)) | 39 | 38) | | |
| 2-0 | 36-0 | 32-0 | j | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | RR | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 5 | | | | | |
| | | | | | |
| | | | | GG | |
| | | | | | |
| | | | | | |
| | | ; | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | BB) | |
| | | | | 20-0-4-0 | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | _ | | IORTH | | |
| | | | | | |
| | I F | EG. CERTFI | JLL SIZE N | NLY | |
| | | | | ر ا ا | |
| | | IH UUNU Duke | ENERGY | | |
| | CATAWB | A NUCLEAR | STATION UI | NITS 1 & 2 | |
| _ | F | IRE PROTEC AUXILIAR | TION EQUI Y BUILDIN | PMENT G | |
| 1 | ⊢_ | EVALIUNS 6 | שט + IN % ו | 0IJ+6 | |

JPM A.3R

RO

EVALUATION SHEET

| Task: Deterr | nine Radiation Protec | tion Requ | irements for an activ | /ity | | |
|-----------------------|--|--|--|----------------------|-----------------------------|---------------------|
| Alternate Path: | N/A | | | | | |
| Facility JPM #: | 2005 Admin JPM F | R03/SRO4 | Modified | | | |
| Safety Function: | N/A | | | | | |
| <u>K/A</u> G 2.3.7 | Ability to comply abnormal condi | y with radi tions. | ation work permit re | quireme | ents during n | ormal or |
| Importance: | 3.5 / 3.6 <u>CFR:</u> | 41.12 / | 45.10 | | | |
| Preferred Evaluat | tion Location: | | Preferred Evalua | ation M | ethod: | |
| Simulator | Classroom | <u>(</u> | Perform | X | Simulate | |
| <u>References</u> : | Radiation Work Pe | ermit # 502 | 1 Task 1, Room 10 | 5 (ND P | ump 1A) Su | rvey Map |
| <u>Task Standard:</u> | Correctly determin additional time allo exceeding 80% of | e that tota wed at Lo RWP dose | l dose received for t w Exposure Waiting e limits. | he job is Area is | s 13 mR and s 42 minutes | maximum prior to |
| Validation Time: | 10 minutes | | Time Critical: | Ye | es N | lo <u>X</u> |
| Applicant: NAME | | _ Docke | t # | Tin Tin | ne Start: ne Finish: | |
| Performance Rati | ing: | | | Pe | rformance T | ime |
| SAT UNSAT | - | | | | | |
| | | | | | | |
| Examiner: | NAME | | SIG | NATURE | / E | DATE |
| COMMENTS | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 has entered AP/1/A/5500/019 (Loss of Residual Heat Removal)
- The CRS has dispatched an AO to 1A ND pump room to vent the 1A ND pump casing when directed.
- The AO has staged himself to minimize dose while waiting.
- The following is the timeline for the venting evolution:

0730 – AO enters 1A ND Pump Room.

- 0800 AO is directed to vent using 1ND-88 (1A ND Pump Seal Water Hx Inlet Vent).
- 0812 Venting is complete. AO returns to the LEWA to await further instruction.

INITIATING CUES:

Based on the above time line, RWP # 5021, and Survey Maps provided and discounting any dose received during transit:

1. State the amount of dose that has been received thus far.

Amount of dose received - _____ mR

2. Following completion of venting activity, calculate how much longer the AO can remain in the room until required to exit (based on exceeding 80% of RWP allowable dose).

Allowable time in room following venting activity – ______.

EXAMINER NOTE: Each applicant should receive a copy of RWP # 5021 (Task 1) and the Room Survey for rooms 105 and 110.

START TIME: _____

| | STEP / STANDARD | SAT / UNSAT | |
|---|--|------------------|--|
| STEP 1 | Determine dose received for the venting evolution: | CRITICAL STEP | |
| | (LEWA) where they wait for 30 minutes (.5 hours) | | |
| | LEWA dose: 10 mR/hr X .5 hr = 5 mR | | |
| | Venting time is 12 minutes (.2 hours) | | |
| | Area dose: 40 mR/hr X .2 hr = 8 mR | | |
| | Total amount of dose received = 5 mR + 8 mR = <u>13 mR</u> | | |
| <u>STANDA</u> | <u>RD</u> : | SAT | |
| Applicant determines the total amount of dose received for the evolution to be 13 mR. | | UNSAT | |
| This step this JPM | is critical to meet the task requirements and standard for to determine the total amount of dose received. | | |
| | | | |
| | | | |

| | STEP / STANDARD | SAT / UNSAT |
|------------------------------------|--|------------------|
| STEP 2 | Determine allowable time in room following venting activity. The RWP limits total exposure to 25 mR | CRITICAL STEP |
| | 25 mR x 80% = 20 mR total allowable dose | |
| | 20 mR – 13 mR (dose following venting) = 7 mR (remaining) | |
| | 7 mR ÷ 10 mR/hr = 0.7 hr (42 minutes) | |
| <u>STANDAI</u> | <u>RD</u> : | |
| Applicant until 0854 | determines they can remain in the room another 42 minutes, or | SAT |
| This step this JPM without e | UNSAT | |
| | ITS: | |
| | END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Unit 1 has entered AP/1/A/5500/019 (Loss of Residual Heat Removal)
- The CRS has dispatched an AO to 1A ND pump room to vent the 1A ND pump casing when directed.
- The AO has staged himself to minimize dose while waiting.
- The following is the timeline for the venting evolution:

0730 – AO enters 1A ND Pump Room.

- 0800 AO is directed to vent using 1ND-88 (1A ND Pump Seal Water Hx Inlet Vent).
- 0812 Venting is complete. AO returns to the LEWA to await further instruction.

INITIATING CUES:

Based on the above time line, RWP # 5021, and Survey Maps provided and discounting any dose received during transit:

1. State the amount of dose that has been received thus far.

Amount of dose received - _____ mR

2. Following completion of venting activity, calculate how much longer the AO can remain in the room until required to exit (based on exceeding 80% of RWP allowable dose).

Allowable time in room following venting activity – ______.

INFORMATION

USE ONLY

Catawba Nuclear Station Radiation Work Permit

INFORMATION USE ONLY

AUX BUILDING ENTRY INTO PENTRATION ROOMS HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

RWP # 5021

Rev: 11

Task #1

AUX BUILDING ENTRY INTO PENTRATION ROOMS, HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

ED Alarm Set Points:

Dose Alarm: 25 mrem

Dose Rate Alarm: 50 mrem/hr

RWP Requirements

Dress Category/Work Description

• Dress Category "F" 1. Complete protection of skin and clothing is NOT required. 2. Radioactive material is handled and/or transported AND the potential for loose surface contamination >1000 dpm/100cm2 exists AND durability of surgical gloves is sufficient.

• E Dress Category "G" Entry into dry contaminated areas <25,000 dpm/100cm2 with NO climbing or physical / strenuous work. NO brushing, grinding, lapping, etc. is allowed.

• Dress Category "H" Entry into dry contaminated areas <25,000 dpm/100cm2 with NO climbing or physical / strenuous work. NO brushing, grinding, lapping, etc. is allowed.

• Dress Category "I" Work in dry contaminated areas <50,000 dpm/100cm2 with a risk of puncturing or tearing gloves or beta dose concerns to the hands. Work may involve brushing, grinding, lapping, etc. (1) (3) (4)

• Dress Category "N" Wet work, hot particle controls are required or work in highly contaminated areas. Work may involve brushing, grinding, lapping, etc. (1)

· Dress Category "Z" Special dress. See Additional Instructions.

· Modesty garments, top & bottom, are required under protective clothing where personal outer clothing is not worn

• (1) Cloth coverall are acceptable for use when allowed by RP. Gloves and booties must be secured (e.g. taped, elastic cuff) when wearing cloth coveralls

• (2) IF double SOP is not used when wearing double PCs, remove the outer layers at the source

• (3) Skull caps may be substituted for a hood when approved by RP and NO hands on work is to be performed.

• (4) For activities requiring crawling, kneeling, etc., review need for additional barrier to prevent contamination events, e.g., additional protective clothing, knee pads, use of floor covering, etc.

Protective Clothing

F - Lab coat, glove liners, rubber gloves OR surgical gloves, booties and shoe covers

G - Hood, coveralls, glove liners and rubber gloves, booties, and shoe covers over personal clothing (NO modesty clothing required).

H - Hood, coveralls, glove liners and rubber gloves, booties and shoe covers, NO personal outer clothing.

· I - Hood, coveralls, glove liners, 2 pair rubber gloves, booties and shoe covers, no personal outer clothing.

N - Hood, coveralls, water resistant/water proof suit, glove liners, 2 pair rubber gloves, booties, 2 pair shoe covers, no personal outer clothing.

• Z - Special dress

Contamination Control

· Wipe down AND bag all tools and equipment prior to removal from a contaminated area as directed by RP

Utilize facial protection (e.g. face shield, hood sock, power visor) as directed by RP

· Install catch containments OR drain rigs to prevent spills if draining components

· If installing a drain rig, use hose clamps to secure hose OR tubing connections

If installing a drain rig, secure hose OR tubing to floor drain

• Wear disposable (plastic) booties inside of orex booties for work in wet conditions

· Change outer rubber gloves often when handling highly contaminated material as directed by RP

INFORMATION

USE ONLY

Catawba Nuclear Station Radiation Work Permit

INFORMATION USE ONLY

AUX BUILDING ENTRY INTO PENTRATION ROOMS HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

RWP # 5021

Rev: 11

Task # 1

AUX BUILDING ENTRY INTO PENTRATION ROOMS, HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

ED Alarm Set Points:

Dose Alarm: 25 mrem

Dose Rate Alarm: 50 mrem/hr

RWP Requirements

Use surgical gloves in lieu of rubber gloves for the manipulation of small or specialty items as directed by RP

RP Job Coverage

Start of Job, Intermittent or No Coverage In Radiation Areas or Less

RP Coverage Required To Transport Material > 5 mrem/hr at 30 cm

Pre-job briefing required

• Continuous RP Coverage for aggressive work in Alpha Level III areas or Alpha Level II areas with beta-gamma to alpha ratios less than 3000:1 or where conditions could change

Dosimetry Requirements

• Monitor ED periodically while inside the RCA/RCZ (once or twice per hour in low dose rate areas). Monitor more frequently in higher dose rate areas, for example every 10 to 15 minutes.

• If dress requirements prevent the monitoring of ED, and RP is not remotely monitoring (via teledose & communications), place ED external to the outmost layer of protective clothing for monitoring

Respiratory Protection

• If weighted DAC-Hours are expected to result in greater than or equal to 4 DAC-Hours per person, perform a TEDE/ALARA evaluation

Full Face Particulate (Additional Hood Required) IF warranted by TEDE ALARA Evaluation OR directed by RP

Personal (lapel) air samplers required for Alpha Level III areas or Alpha Level II areas with beta-gamma to alpha ratios of less than 3000:1

RP Hold Points

Breaching Contaminated System

RP Survey Required Prior to Handling Debris or Foreign Material

RP survey required after removal of items from contaminated systems. Decon may be necessary (as directed by RP)

Notify RP prior to reaching OR entry into the overhead (8 feet and above)

Accumulated Dose Higher than Expected

Notify RP Prior to Start of Work

• A change in Alpha Level (AL I to AL II or AL III; AL II to AL III) requires additional planning for alpha considerations

Stop Work Criteria

Dose Alarm

Unexpected dose rate alarm

Airborne conditions higher than expected

• Actual dose rates are higher than the expected levels written on this RWP task

• Actual contamination levels are higher than the expected levels written on this RWP task

INFORMATION

USE ONLY

Catawba Nuclear Station Radiation Work Permit

INFORMATION USE ONLY

AUX BUILDING ENTRY INTO PENTRATION ROOMS HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM VENTING ON ECCS SYSTEMS

RWP # 5021

Rev: 11

Task # 1 AUX BUILDING ENTRY INTO PENTRATION ROOMS, HEAT EXCHANGER ROOMS AND PUMP ROOMS TO PERFORM

VENTING ON ECCS SYSTEMS

ED Alarm Set Points:

Dose Alarm: 25 mrem

Dose Rate Alarm: 50 mrem/hr

RWP Requirements

Unexpected wet conditions

Work scope changes

• If monitoring of the ED indicates that the dose alarm set point will be exceeded prior to completing the job, leave the area and contact RP. Do not wait to receive an alarm before exiting the area

· Failure of OR sweat soaked protective clothing

Expected Radiological Conditions

Expected radiological conditions: General Area Dose Rates: <0.1 mrem/hr - 50 mrem/hr High Contact Dose Rates: <0.1 mrem/hr - 1000 mrem/hr

Contamination Levels: < 1000 dpm/100cm2- 100,000 dpm/100cm2

Additional Instructions

Electronic Dosimeter rate alarms are established based on general area dose rates. If personnel are positioned in close proximity to primary piping and equipment they may anticipate receiving a dose rate alarm.

Z Dress - Orex Coveralls only. This is for use in clean areas only due to potential for contamination from wearing a fall harness.

JPM A.3S

SRO

EVALUATION SHEET

| | = • / · | | | | |
|-----------------------|---|--|--------------------------------------|--------------------------------|--|
| Task: Calcula | ate Total RL Discharge F | low | | | |
| Alternate Path: | N/A | | | | |
| Facility JPM #: | WL-001 Modified | | | | |
| Safety Function: | N/A | | | | |
| <u>K/A</u> 2.3.11 | Ability to control rac | liation releases. | | | |
| Importance: | 3.8 / 4.3 <u>CFR:</u> 4 | 1.11 / 43.4 / 45.10 | | | |
| Preferred Evaluat | ion Location: | Preferred Evaluation | tion Method: | | |
| Simulator | ClassroomX | Perform | X Simula | ate | |
| References: | PT/0/A/4250/011 (RL 1 | Cemperature and Discharge | e Flow Determi | nation) | |
| <u>Task Standard:</u> | Total RL Discharge Flo acceptable range) and for LWR #2019025 app | ow calculated to be 44,112 determination that sufficie proval. | gpm (43,933 to nt dilution flow o | 9 44,383 gpm does NOT exist | |
| Validation Time: | 25 minutes | Time Critical: | Yes | No | |
| Applicant: NAME | | Docket # | Time Start: Time Finish | n: | |
| Performance Rati | ng: | | Performanc | e Time | |
| SAT UNSAT | | | | | |
| Examiner: | | | | 1 | |
| | NAME | SIGN | ATURE | | |
| COMMENTS | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- The RL discharge header flow instrumentation is inoperable.
- An LWR package has been delivered to the control room for approval.

INITIATING CUES:

- You are directed to calculate and record the total RL discharge flow per Enclosure 13.2 (Total Discharge Flow Calculation Sheet) of PT/0/A/4250/011 and determine whether sufficient dilution flow exists to approve the LWR.
- The following plant indications are noted:

| Unit 1 Power | NO Mode | | | |
|--|----------------|--|--|--|
| Unit 2 Power | 100% | | | |
| 0RLP5030 (RL Discharge Pressure) | 68 psig | | | |
| 0RNP7380 (Lake Elevation) | 567 feet | | | |
| C1P5856 (RN Calculate Total Flow) | Out of service | | | |
| C1P5854 (RN Train A Calculated Total Flow) | 13560 gpm | | | |
| C1P5855 (RN Train B Calculated Total Flow) | 5450 gpm | | | |
| C2P5853 (Unit 2 Cooling Tower Evaporation) | 11500 gpm | | | |
| | | | | |
| RL Pumps A and B are in service | | | | |
| RN discharge is aligned to RL discharge header | | | | |
| OAC Databook is not available | | | | |

Total RL Discharge Flow (Step 1.5): _____ gpm

Sufficient dilution flow for LWR #2019025 approval? (YES/NO) _____ EXAMINER NOTE:

After reading cue, provide applicant with a copy of PT/0/A/4250/011 Enclosures 13.2 and 13.7 and copy of LWR #2019025.

START TIME: _____

| STEP / STANDARD | SAT / UNSAT |
|---|----------------|
| STEP 11.1Obtain Total RL Supply (A) as follows:1.1.1 IF 0RLP5030 (Conventional LP Service Wtr Press) is NOT available contact engineering for optional indications and elevation corrections. | SAT |
| <u>STANDARD</u> : | UNSAT |
| Applicant determines per initiating cue that this step is not applicable. | |
| COMMENTS: | |

| | UNSAT |
|--|------------------|
| STEP 2 1.1.2 Perform the following calculations to obtain Total Discharge Head: | CRITICAL STEP |
| PL Disch Pressure – 0PL D5030 + 3.0 psi | |
| RL Disch Pressure = 0 RLP 3030 + 5.9 psi | |
| RL Disch Pressure = $68 + 3.9 \text{ psi} = 71.9 \text{ psig}$ | |
| Lake Elevation = 567 ORNP7380 (Lake Wylie Level) or obtained from hydro central per Step 1.1.4.2 of Enclosure 13.1 or Step 1.1.2.2 of Enclosure 13.8. (71.9 psig x 2.311 ft/psig) + (571.75 - 567 ft) = 170.9 ft RL Disch Pressure Lake Elev Total Disch Head (Acceptable Range 170.75 - 171) | SAT |
| STANDARD: | UNSAT |
| Applicant Calculates Total Discharge Head of 170.9 feet. (170.75 -171 Acceptable) | |
| Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard. | |
| COMMENTS: | |
| | |
| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| STEP 3 1.1.3 Using Total Discharge Head from Step 1.1.2 obtain the RL Pump Flow value using <u>one</u> of the following: | CRITICAL STEP |
| • Eliciosule 13.7 | |
| OR | |
| OAC Databook in "Secondary Systems Databook Calcs" using "RL Total Discharge Head vs. RL Pump Flow Rate". | |
| STANDARD: | |
| Applicant determines that Enclosure 13.7 should be used to determine RL pump flow value since the OAC Databook is not available per the initiating cue. Applicant determines RL pump flow to be 30,178 gpm. (30,040 – 30,386 gpm Acceptable) | SAT UNSAT |
| Evenings Note: This step is critical to be able to correctly calculate | |
| Total RL Discharge Flow to meet the JPM standard. | |
| COMMENTS: | |
| | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|---|------------------|
| <u>STEP 4</u> 1.1.4 Once RL Pump Flow value is obtained, calculate Total RL Supply based on number of RL pumps in operation: | CRITICAL STEP |
| $\frac{30178}{\text{RL Pump Flow Value}} X \frac{2}{\text{\# of pumps in operation}} = \frac{60356}{\text{Total RL Supply}} gpm (A)$ (Acceptable Range 60080 - 60772) | |
| STANDARD: | |
| Applicant calculates Total RL Supply to be 60,356 gpm. (60,080 – 60,772 gpm Acceptable) | SAT |
| Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard. | UNSAT |
| COMMENTS: | |
| | |
| | |

| STEP 5 1.1.5 Enter Total RL Supply (A) value in Step 1.4. | |
|---|-------|
| STANDARD: | |
| Applicant records value for (A) in Step 1.4. | SAT |
| COMMENTS: | UNSAT |
| | |
| | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|---|----------------|
| STEP 6 1.2 IF RN discharge is aligned to the RL discharge header, obtain Total RN Flow (B) as follows: | |
| 1.2.1 <u>IF</u> OAC point C1P5856 (RN Calculated Total Flow) is available, perform the following: | |
| STANDARD: | SAT |
| Applicant determines per initiating cue that OAC point C1P5856 is not available and that this step is not applicable. | UNSAT |
| COMMENTS: | |

| <u>STEP 7</u> 1.2.2 <u>IF</u> Flo are | OAC points C1P5854 (RN Train A Calculated Total ow) <u>AND</u> C1P5855 (RN Train B Calculated Total Flow) e available, perform the following to obtain total RN flow: | |
|---|---|--------------|
| 1.2.2.1 | Record the value of C1P5854 (RN Train A Calculated Total Flow) below: C1P5854 13,560 gpm (RN Pump Train A Flow) | |
| 1.2.2.2 | Record the value of C1P5855 (RN Train B Calculated Total Flow) below: C1P5855 <u>5,450</u> gpm (RN Pump Train B Flow) | SAT UNSAT |
| STANDARD: | | |
| Applicant records va given in the initiating | alues for RN trains A and B calculated flow from values g cue. | |
| COMMENTS: | | |
| | | |

| STEP / STANDARD | SAT / UNSAT |
|--|----------------|
| <u>STEP 8</u> 1.2.3 <u>IF either</u> C1P5854 (RN Train A Calculated Total Flow) <u>OR</u> C1P5855 (RN Train B Calculated Total Flow) is <u>NOT</u> available, perform the following to obtain total RN flow: | |
| STANDARD: | SAT |
| Applicant determines that this step is not applicable. | UNSAT |
| <u>COMMENTS:</u> | |

| STEP 9 1.2.4 Perform the following calculations to obtain Total RN Flow: Perform the following calculations to obtain Total RN Flow: | CRITICAL STEP |
|---|------------------|
| $\frac{13,360}{\text{PN Pump Train A Flow + PN Pump Train P Flow = Total PN Flow} = \frac{19,010}{\text{gpm (B)}}$ | |
| Kin Pump Train A Plow + Kin Pump Train B Plow = Total Kin Plow | |
| STANDARD: | |
| Applicant calculates Total RN Flow (B) to be 19,010 gpm. | SAT |
| Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard. | UNSAT |
| COMMENTS: | |
| | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|--|----------------|
| STEP 10 1.2.5 Enter Total RN Flow (B) in Step 1.4. | |
| STANDARD: | SAT |
| Applicant records value in Step 1.4. | 3A1 |
| COMMENTS: | UNSAT |
| | |

| NOTE: Normal Cooling Tower evaporation loss @ 100% power is 9,000 to 14,000 gpm/unit. | |
|--|-------|
| STEP 11 1.3 Obtain Total Cooling Tower Evaporation (C) as follows: | |
| 1.3.1 IF a Unit 1 NC Pump is <u>NOT</u> inservice <u>AND</u> Unit 1 is in Mode 5, 6, or No Mode, enter 0 for Unit 1 Cooling Tower Evaporation in Step 1.3.3. | SAT |
| STANDARD: | UNSAT |
| Applicant determines per initiating cue that Unit 1 is in No Mode and enters 0 for Unit 1 evaporation in Step 1.3.3. | |
| COMMENTS: | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|--|----------------|
| <u>STEP 12</u> 1.3.2 IF a Unit 2 NC Pump is <u>NOT</u> inservice <u>AND</u> Unit 2 is in Mode 5, 6, or No Mode, enter 0 for Unit 2 Cooling Tower Evaporation in Step 1.3.3. | |
| STANDARD: | SAT |
| Applicant determines that this step is not applicable. | UNSAT |
| COMMENTS: | |
| | |

| STEP 13 1.3.3 Calculate Cooling Tower Total Evaporation as follows: Calculate Cooling Tower Total Evaporation as follows: | CRITICAL STEP |
|---|------------------|
| 0 + 11,500 = 11,500 gpm (C) Unit 1 Cooling Tower Evaporation + Unit 2 Cooling Tower Evaporation = Total Evaporation (C1P5853 or Step 1.3.1) (C2P5853 or Step 1.3.2) | |
| Applicant calculates Total Evaporation (C) to be 11,500 gpm. Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard. | SAT UNSAT |
| <u>COMMENTS:</u> | |

| STEP / STANDARD | SAT / UNSAT |
|---|----------------|
| STEP 14 1.3.4 Enter Total Evaporation (C) in Step 1.4. | |
| STANDARD: | |
| Applicant enters value for Total Evaporation (C) in Step 1.4. | SAT |
| COMMENTS: | UNSAT |
| | |
| | |

| STEP 15 1.4 Perform the following to obtain Calculated Total RL Disch Flow: | CRITICAL STEP |
|--|------------------|
| $\frac{60,356}{\text{Total RL Supply (A) + Total RN Flow (B) - Total Evaporation (C)} = \frac{67,866}{\text{Calculated Total RL Disch Flow}} gpm (Acceptable Range 67,590 - 68,282)$ | |
| STANDARD: | |
| Applicant calculates the Calculated Total RL Disch Flow to be 67,866 gpm. (67,590 – 68,282 gpm Acceptable) | SAT |
| | SAT |
| Examiner Note: This step is critical to be able to correctly calculate Total RL Discharge Flow to meet the JPM standard. | UNSAT |
| COMMENTS: | |
| | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| NOTE: Due to problems with current RL instrumentation (PIP C-10-4540) and discrepancies between calculated and OAC RL flow (PIP C-12-1399), a safety factor is applied to the Calculated Total RL Disch Flow of Step 1.4 to ensure conservative Total RL Disch Flow | CRITICAL STEP |
| rates are used for dilution purposes. This is a temporary conservative action for use till RL discharge flow instrumentation problems are resolved. | |
| STEP 16 1.5 Apply dilution safety factor to obtain Total RL Discharge Flow from the Calculated Total RL Discharge Flow from Step 1.4 as follows: | |
| 67,866Y 0.65 = 44,112gpmCalculated Total RL Disch FlowTotal RL Disch Flow (Acceptable Range 43,933 - 44,383)Step 1.4 | |
| STANDARD: | SAT |
| Applicant calculates Total RL Disch Flow to be 44,112 gpm. (43,933 – 44,383 gpm Acceptable) | UNSAT |
| Examiner Note: This step is critical to correctly determine Total RL Discharge Flow to meet the JPM standard. | |
| COMMENTS: | |
| | |
| | |

| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| STEP 17 Determine whether LWR #2019025 should be approved. | CRITICAL STEP |
| STANDARD: | |
| Applicant determines that the RL Low Flow Interlock would be set for 45,000 gpm and that sufficient dilution flow does NOT exist to approve the LWR. | |
| Examiner Note: This step is critical to correctly determine that Total RL Flow is less than the RL Low Flow Interlock Setpoint and that sufficient dilution flow does NOT exist to approve the LWR. | SAT UNSAT |
| COMMENTS: | |
| END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- The RL discharge header flow instrumentation is inoperable.
- An LWR package has been delivered to the control room for approval.

INITIATING CUES:

- You are directed to calculate and record the total RL discharge flow per Enclosure 13.2 (Total Discharge Flow Calculation Sheet) of PT/0/A/4250/011 and determine whether sufficient dilution flow exists to approve the LWR.
- The following plant indications are noted:

| Unit 1 Power | NO Mode |
|--|----------------|
| Unit 2 Power | 100% |
| 0RLP5030 (RL Discharge Pressure) | 68 psig |
| 0RNP7380 (Lake Elevation) | 567 feet |
| C1P5856 (RN Calculate Total Flow) | Out of service |
| C1P5854 (RN Train A Calculated Total Flow) | 13560 gpm |
| C1P5855 (RN Train B Calculated Total Flow) | 5450 gpm |
| C2P5853 (Unit 2 Cooling Tower Evaporation) | 11500 gpm |
| | |
| RL Pumps A and B are in service | |
| RN discharge is aligned to RL discharge header | |
| OAC Databook is not available | |

Total RL Discharge Flow (Step 1.5): _____ gpm

Sufficient dilution flow for LWR #2019025 approval? (YES/NO)

KEY

| | Procedure No. |
|-------------|--------------------------|
| | Revision No. |
| | |
| | |
| | Electronic Reference No. |
| PERFORMANCE | |
| | |
| | |





Enclosure 13.2

Total Discharge Flow Calculation Sheet

PT/**0**/A/4250/011 Page 1 of 3

1. Procedure

- 1.1 Obtain Total RL Supply (A) as follows:
- <u>N/A</u> 1.1.1 <u>**IF** 0RLP5030 (Conventional LP Service Wtr Press) is <u>NOT</u> available contact engineering for optional indications and elevation corrections.</u>

| Engineer contacted: _ | | |
|-----------------------|--|--|
|-----------------------|--|--|

- **NOTE:** Engineering specified optional indications and elevation corrections may be substituted for 0RLP5030 (Conventional LP Service Wtr Press) and the 3.9 psi elevation correction of following step to obtain Total Discharge Head.
 - 1.1.2 Perform the following calculations to obtain Total Discharge Head:

RL Disch Pressure = 0RLP5030 + 3.9 psi

- RL Disch Pressure = 68 + 3.9 psi = 71.9 psig
- Lake Elevation = <u>567</u> ORNP7380 (Lake Wylie Level) or obtained from hydro central per Step 1.1.4.2 of Enclosure 13.1 or Step 1.1.2.2 of Enclosure 13.8.
- $(\underbrace{71.9}_{\text{RL Disch Pressure}} \text{psig x } 2.311 \text{ ft/psig}) + (571.75 \underbrace{567}_{\text{Lake Elev}} \text{ft}) = \underbrace{170.9}_{\text{ft}} \text{ft}$ $(\underbrace{\text{Lake Elev}}_{\text{(Acceptable Range 170.75 171)}} \text{ft})$
- 1.1.3 Using Total Discharge Head from Step 1.1.2 obtain the RL Pump Flow value using <u>one</u> of the following:
 - Enclosure 13.7 (RL Pumps Head / Capacity Table)
 OR
 - OAC Databook in "Secondary Systems Databook Calcs" using "RL Total Discharge Head vs. RL Pump Flow Rate".
- 1.1.4 Once RL Pump Flow value is obtained, calculate Total RL Supply based on number of RL pumps in operation:

| | 30178 | X | 2 | = | 60356 | _gpm (A) |
|-------|-----------------------|---------|---------------|--------|--------------|----------------|
| | RL Pump Flow Value | # of p | oumps in oper | ration | Total RL Sup | ply |
| | | | | (Acce | ptable Range | 60080 - 60772) |
| 1.1.5 | Enter Total RL Supply | (A) val | ue in Step 1 | .4. | | |



PT/**0**/A/4250/011

Total Discharge Flow Calculation Sheet Page 2 of 3

- 1.2 **IF** RN discharge is aligned to the RL discharge header, obtain Total RN Flow (B) as follows:
 - <u>N/A</u> 1.2.1 <u>IF</u> OAC point C1P5856 (RN Calculated Total Flow) is available, perform the following:
 - □ 1.2.1.1 Record the current value of C1P5856 (RN Calculated Total Flow) C1P5856 _____ gpm
 - \Box 1.2.1.2 Enter above value as Total RN Flow (B) in Step 1.4.
 - □ 1.2.1.3 N/A Step 1.2.2 thru Step 1.2.5.
 - 1.2.2 **IF** OAC points C1P5854 (RN Train A Calculated Total Flow) <u>AND</u> C1P5855 (RN Train B Calculated Total Flow) are available, perform the following to obtain total RN flow:
 - _____ 1.2.2.1 Record the value of C1P5854 (RN Train A Calculated Total Flow) below:

C1P5854 <u>13,560</u> gpm (RN Pump Train A Flow)

1.2.2.2 Record the value of C1P5855 (RN Train B Calculated Total Flow) below:

C1P5855 <u>5,450</u> gpm (RN Pump Train B Flow)

- <u>N/A</u> 1.2.3 <u>IF either</u> C1P5854 (RN Train A Calculated Total Flow) <u>OR</u> C1P5855 (RN Train B Calculated Total Flow) is <u>NOT</u> available, perform the following to obtain total RN flow:
 - _____ 1.2.3.1 Calculate RN Pump Train A flow:

| | _ + _ | | _ = | | g | pm |
|----------|-------|----------|-----|---------|-------|--------|
| 1RNP7520 | + | 2RNP7520 | = | RN Pump | Train | A flow |

1.2.3.2 Calculate RN Pump Train B flow:

+ _____ = _____ gpm 1RNP7510 + 2RNP7510 = RN Pump Train B flow

1.2.4 Perform the following calculations to obtain Total RN Flow:

 $\underline{13,560} + \underline{5,450} = \underline{19,010} \text{ gpm (B)}$

RN Pump Train A Flow + RN Pump Train B Flow = Total RN Flow

1.2.5 Enter Total RN Flow (B) in Step 1.4.

KEY

KEY

Enclosure 13.2

PT/**0**/A/4250/011 Page 3 of 3

| | | Total Discharge Flow (| Calculation Sheet | Page 3 of 3 | 3 |
|------------|--|--|---|--|---|
| NOTE: | Normal | Cooling Tower evaporation loss @ | ⁰ 100% power is 9,00 | 00 to 14,000 g | pm/unit. |
| 1.3 | Obtain | Total Cooling Tower Evaporation | (C) as follows: | | |
| | _ 1.3.1 | IF a Unit 1 NC Pump is NOT is No Mode, enter 0 for Unit 1 Co | nservice <u>AND</u> Unit a oling Tower Evapor | 1 is in Mode 5 ation in Step 1 | , 6, or 1.3.3. |
| <u>N/A</u> | _ 1.3.2 | IF a Unit 2 NC Pump is NOT is No Mode, enter 0 for Unit 2 Co | nservice <u>AND</u> Unit 2 oling Tower Evapor | 2 is in Mode 5 ation in Step 1 | , 6, or 1.3.3. |
| | 1.3.3 | Calculate Cooling Tower Total | Evaporation as follo | ws: | |
| | | + | 11,500 | = | <u>11.500 gpm (C)</u> |
| | | Unit 1 Cooling Tower Evaporation + U (C1P5853 or Step 1.3.1) | Unit 2 Cooling Tower Ev (C2P5853 or Step | aporation = $Total $ (1.3.2) | l Evaporation |
| | 1.3.4 | Enter Total Evaporation (C) in | Step 1.4. | | |
| 1.4 | Perform | the following to obtain Calculated | d Total RL Disch Flo | ow: | |
| | 6(Total RI | 0,356 + <u>19,010</u> L Supply (A) + Total RN Flow (B) - Tota | $\frac{11,500}{11,500} = $ | 67,866 | _gpm .L Disch Flow inge 67,590 - 68,282) |
| NOTE: | Due to p between Calculat rates are RL disch | oroblems with current RL instrument calculated and OAC RL flow (PIF ed Total RL Disch Flow of Step 1. used for dilution purposes. This is harge flow instrumentation problem | ntation (PIP C-10-45 P C-12-1399), a safet 4 to ensure conserva s a temporary conser ns are resolved. | 540) and discre y factor is app tive Total RL vative action | epancies lied to the Disch Flow for use till |
| 1.5 | Apply of Total R | lilution safety factor to obtain Tota L Discharge Flow from Step 1.4 as | l RL Discharge Flow s follows: | v from the Cal | culated |
| | | 67,866 X 0.65 = | 44,112 | gpm | |
| | Calculat Step 1.4 | ed Total RL Disch Flow | Total RL Disch Flo | W (Acceptable | Range 43,933 - 44,383 |
| Calculated | l By | | | | |
| | • | Operator/Initials | Date/Time | | |
| Verified B | у | Operator/Initials | Date/Time | | |
| | | operator/initials | Date, Time | | |
| | | | | | |

NE I

KEY

Enclosure 13.7

RL Pumps Head / Capacity Table

PT/**0**/A/4250/011 Page 1 of 1

| Head | Flow | Head | Flow | Head | Flow | Head | Flow |
|------|-------|--------|--------------------|--------|-------|------|-------|
| 100 | 57192 | 146 | 46803 | 175.50 | 24110 | 200 | 15185 |
| 101 | 56997 | 147 | 46524 | 175.75 | 23824 | 201 | 14965 |
| 102 | 56800 | 148 | 46238 | 176.00 | 23544 | 202 | 14737 |
| 103 | 56602 | 149 | 45942 | 176.25 | 23271 | 203 | 14499 |
| 104 | 56403 | 150 | 45636 | 176.50 | 23005 | 204 | 14252 |
| 105 | 56202 | 151 | 45318 | 176.75 | 22747 | 205 | 13997 |
| 106 | 55999 | 152 | 44984 | 177.00 | 22496 | 206 | 13733 |
| 107 | 55795 | 153 | 44633 | 177.25 | 22252 | 207 | 13460 |
| 108 | 55590 | 154 | 44262 | 177.50 | 22016 | 208 | 13180 |
| 109 | 55383 | 155 | 43867 | 177.75 | 21787 | 209 | 12891 |
| 110 | 55175 | 156 | 43444 | 178.00 | 21566 | 210 | 12595 |
| 111 | 54966 | 157 | 42987 | 178.25 | 21352 | 211 | 12292 |
| 112 | 54755 | 158 | 42493 | 178.50 | 21146 | 212 | 11982 |
| 113 | 54543 | 159 | 41954 | 178.75 | 20947 | 213 | 11665 |
| 114 | 54330 | 160 | 41365 | 179.00 | 20756 | 214 | 11342 |
| 115 | 54116 | 161 | 40717 | 179.25 | 20571 | 215 | 11012 |
| 116 | 53900 | 162 | 40004 | 179.50 | 20394 | 216 | 10677 |
| 117 | 53683 | 163 | 39219 | 179.75 | 20224 | 217 | 10335 |
| 118 | 53465 | 164 | 38354 | 180.00 | 20061 | 218 | 9988 |
| 119 | 53246 | 165 | 37405 | 180.25 | 19904 | 219 | 9635 |
| 120 | 53025 | 166 | 36368 | 180.50 | 19754 | 220 | 9277 |
| 121 | 52804 | 167 | 35244 | 180.75 | 19611 | 221 | 8914 |
| 122 | 52581 | 168 | 34036 | 181.00 | 19473 | 222 | 8546 |
| 123 | 52357 | 169 | 32755 | 181.25 | 19341 | 223 | 8174 |
| 124 | 52132 | 170.00 | 31416 | 181.50 | 19215 | 224 | 7796 |
| 125 | 51906 | 170.25 | 31074 | 181.75 | 19095 | 225 | 7414 |
| 126 | 51679 | 170.50 | 30731 | 182.00 | 18980 | 226 | 7028 |
| 127 | 51451 | 170.75 | <mark>30386</mark> | 182.25 | 18870 | 227 | 6638 |
| 128 | 51222 | 171.00 | 30040 | 182.50 | 18764 | 228 | 6243 |
| 129 | 50991 | 171.25 | 29693 | 183 | 18568 | 229 | 5845 |
| 130 | 50760 | 171.50 | 29345 | 184 | 18224 | 230 | 5443 |
| 131 | 50527 | 171.75 | 28998 | 185 | 17935 | 231 | 5036 |
| 132 | 50293 | 172.00 | 28652 | 186 | 17689 | 232 | 4627 |
| 133 | 50058 | 172.25 | 28306 | 187 | 17475 | 233 | 4213 |
| 134 | 49821 | 172.50 | 27962 | 188 | 17286 | 234 | 3796 |
| 135 | 49583 | 172.75 | 27620 | 189 | 17112 | 235 | 3376 |
| 136 | 49343 | 173.00 | 27281 | 190 | 16949 | 236 | 2952 |
| 137 | 49102 | 173.25 | 26944 | 191 | 16791 | 237 | 2525 |
| 138 | 48859 | 173.50 | 26611 | 192 | 16635 | 238 | 2095 |
| 139 | 48613 | 173.75 | 26281 | 193 | 16476 | 239 | 1662 |
| 140 | 48365 | 174.00 | 25955 | 194 | 16314 | 240 | 1226 |
| 141 | 48114 | 174.25 | 25634 | 195 | 16146 | 241 | 786 |
| 142 | 47860 | 174.50 | 25318 | 196 | 15971 | 242 | 344 |
| 143 | 47603 | 174.75 | 25008 | 197 | 15788 | | |
| 144 | 47341 | 175.00 | 24703 | 198 | 15596 | | |
| 145 | 47075 | 175.25 | 24403 | 199 | 15395 | | |



Total Discharge Flow Calculation Sheet

1. Procedure

- 1.1 Obtain Total RL Supply (A) as follows:
- 1.1.1 **IF** 0RLP5030 (Conventional LP Service Wtr Press) is **NOT** available contact engineering for optional indications and elevation corrections.

| Engineer contacted: | |
|---------------------|--|
|---------------------|--|

- **NOTE:** Engineering specified optional indications and elevation corrections may be substituted for 0RLP5030 (Conventional LP Service Wtr Press) and the 3.9 psi elevation correction of following step to obtain Total Discharge Head.
 - 1.1.2 Perform the following calculations to obtain Total Discharge Head:

- RL Disch Pressure = $_$ + 3.9 psi = $_$ psig
- Lake Elevation = _____ 0RNP7380 (Lake Wylie Level) or obtained from hydro central per Step 1.1.4.2 of Enclosure 13.1 or Step 1.1.2.2 of Enclosure 13.8.
- $f_{\text{RL Disch Pressure}} psig x 2.311 \text{ ft/psig} + (571.75 ft) = ft$ ft Lake Elev Total Disch Head
- 1.1.3 Using Total Discharge Head from Step 1.1.2 obtain the RL Pump Flow value using <u>one</u> of the following:
 - Enclosure 13.7 (RL Pumps Head / Capacity Table) OR
 - □ OAC Databook in "Secondary Systems Databook Calcs" using "RL Total Discharge Head vs. RL Pump Flow Rate".
- 1.1.4 Once RL Pump Flow value is obtained, calculate Total RL Supply based on number of RL pumps in operation:

$$\frac{1}{RL Pump Flow Value} X = gpm (A)$$

$$\# of pumps in operation Total RL Supply$$

1.1.5 Enter Total RL Supply (A) value in Step 1.4.

Total Discharge Flow Calculation Sheet Page 2 of 3

- 1.2 **IF** RN discharge is aligned to the RL discharge header, obtain Total RN Flow (B) as follows:
 - 1.2.1 **IF** OAC point C1P5856 (RN Calculated Total Flow) is available, perform the following:
 - □ 1.2.1.1 Record the current value of C1P5856 (RN Calculated Total Flow) C1P5856 _____ gpm
 - \Box 1.2.1.2 Enter above value as Total RN Flow (B) in Step 1.4.
 - □ 1.2.1.3 N/A Step 1.2.2 thru Step 1.2.5.
 - 1.2.2 **IF** OAC points C1P5854 (RN Train A Calculated Total Flow) <u>AND</u> C1P5855 (RN Train B Calculated Total Flow) are available, perform the following to obtain total RN flow:
 - _____ 1.2.2.1 Record the value of C1P5854 (RN Train A Calculated Total Flow) below:

C1P5854 _____ gpm (RN Pump Train A Flow)

1.2.2.2 Record the value of C1P5855 (RN Train B Calculated Total Flow) below:

C1P5855 _____ gpm (RN Pump Train B Flow)

- 1.2.3 <u>IF either</u> C1P5854 (RN Train A Calculated Total Flow) <u>OR</u> C1P5855 (RN Train B Calculated Total Flow) is <u>NOT</u> available, perform the following to obtain total RN flow:
 - _____ 1.2.3.1 Calculate RN Pump Train A flow:

+ _____ = _____ gpm 1RNP7520 + 2RNP7520 = RN Pump Train A flow

1.2.3.2 Calculate RN Pump Train B flow:

 $+ \underline{\qquad} = \underline{\qquad} gpm$ 1RNP7510 + 2RNP7510 = RN Pump Train B flow

1.2.4 Perform the following calculations to obtain Total RN Flow:

RN Pump Train A Flow + RN Pump Train B Flow = Total RN Flow

_____ 1.2.5 Enter Total RN Flow (B) in Step 1.4.

| | Enclosure 13.2 | PT/ 0 /A/4250/011 |
|----------|---|--------------------------|
| | Total Discharge Flow Calculation Sheet | Page 3 of 3 |
| Normal | Cooling Tower evaporation loss @ 100% power is 9,00 | 00 to 14,000 gpm/unit. |
| Obtain ' | Total Cooling Tower Evaporation (C) as follows: | |
| 1.3.1 | IF a Unit 1 NC Pump is NOT inservice AND Unit 1 | l is in Mode 5, 6, or |
| | No Mode, enter 0 for Unit 1 Cooling Tower Evaporation | ation in Step 1.3.3. |

- 1.3.2 **IF** a Unit 2 NC Pump is **NOT** inservice **AND** Unit 2 is in Mode 5, 6, or No Mode, enter 0 for Unit 2 Cooling Tower Evaporation in Step 1.3.3.
- 1.3.3 Calculate Cooling Tower Total Evaporation as follows:

______+ ____ = _____gpm (C) Unit 1 Cooling Tower Evaporation + Unit 2 Cooling Tower Evaporation = Total Evaporation (C1P5853 or Step 1.3.1) (C2P5853 or Step 1.3.2)

1.3.4 Enter Total Evaporation (C) in Step 1.4.

NOTE:

1.3

_ 1.4 Perform the following to obtain Calculated Total RL Disch Flow:

_____ + ____ - ___ = ____ gpm Total RL Supply (A) + Total RN Flow (B) - Total Evaporation (C) = Calculated Total RL Disch Flow

NOTE: Due to problems with current RL instrumentation (PIP C-10-4540) and discrepancies between calculated and OAC RL flow (PIP C-12-1399), a safety factor is applied to the Calculated Total RL Disch Flow of Step 1.4 to ensure conservative Total RL Disch Flow rates are used for dilution purposes. This is a temporary conservative action for use till RL discharge flow instrumentation problems are resolved.

____ 1.5 Apply dilution safety factor to obtain Total RL Discharge Flow from the Calculated Total RL Discharge Flow from Step 1.4 as follows:

| | X 0.65 = | | _ gpm |
|-------------|--|---------------------|-------|
| | Calculated Total RL Disch Flow Step 1.4 | Total RL Disch Flow | |
| Calculated | By Operator/Initials | Date/Time | |
| Verified By | , | | |
| 5 | Operator/Initials | Date/Time | |

Enclosure 13.7

RL Pumps Head / Capacity Table

PT/**0**/A/4250/011 Page 1 of 1

| Head | Flow | Head | Flow | Head | Flow | Head | Flow |
|------|-------|--------|-------|--------|-------|------|-------|
| 100 | 57192 | 146 | 46803 | 175.50 | 24110 | 200 | 15185 |
| 101 | 56997 | 147 | 46524 | 175.75 | 23824 | 201 | 14965 |
| 102 | 56800 | 148 | 46238 | 176.00 | 23544 | 202 | 14737 |
| 103 | 56602 | 149 | 45942 | 176.25 | 23271 | 203 | 14499 |
| 104 | 56403 | 150 | 45636 | 176.50 | 23005 | 204 | 14252 |
| 105 | 56202 | 151 | 45318 | 176.75 | 22747 | 205 | 13997 |
| 106 | 55999 | 152 | 44984 | 177.00 | 22496 | 206 | 13733 |
| 107 | 55795 | 153 | 44633 | 177.25 | 22252 | 207 | 13460 |
| 108 | 55590 | 154 | 44262 | 177.50 | 22016 | 208 | 13180 |
| 109 | 55383 | 155 | 43867 | 177.75 | 21787 | 209 | 12891 |
| 110 | 55175 | 156 | 43444 | 178.00 | 21566 | 210 | 12595 |
| 111 | 54966 | 157 | 42987 | 178.25 | 21352 | 211 | 12292 |
| 112 | 54755 | 158 | 42493 | 178.50 | 21146 | 212 | 11982 |
| 113 | 54543 | 159 | 41954 | 178.75 | 20947 | 213 | 11665 |
| 114 | 54330 | 160 | 41365 | 179.00 | 20756 | 214 | 11342 |
| 115 | 54116 | 161 | 40717 | 179.25 | 20571 | 215 | 11012 |
| 116 | 53900 | 162 | 40004 | 179.50 | 20394 | 216 | 10677 |
| 117 | 53683 | 163 | 39219 | 179.75 | 20224 | 217 | 10335 |
| 118 | 53465 | 164 | 38354 | 180.00 | 20061 | 218 | 9988 |
| 119 | 53246 | 165 | 37405 | 180.25 | 19904 | 219 | 9635 |
| 120 | 53025 | 166 | 36368 | 180.50 | 19754 | 220 | 9277 |
| 121 | 52804 | 167 | 35244 | 180.75 | 19611 | 221 | 8914 |
| 122 | 52581 | 168 | 34036 | 181.00 | 19473 | 222 | 8546 |
| 123 | 52357 | 169 | 32755 | 181.25 | 19341 | 223 | 8174 |
| 124 | 52132 | 170.00 | 31416 | 181.50 | 19215 | 224 | 7796 |
| 125 | 51906 | 170.25 | 31074 | 181.75 | 19095 | 225 | 7414 |
| 126 | 51679 | 170.50 | 30731 | 182.00 | 18980 | 226 | 7028 |
| 127 | 51451 | 170.75 | 30386 | 182.25 | 18870 | 227 | 6638 |
| 128 | 51222 | 171.00 | 30040 | 182.50 | 18764 | 228 | 6243 |
| 129 | 50991 | 171.25 | 29693 | 183 | 18568 | 229 | 5845 |
| 130 | 50760 | 171.50 | 29345 | 184 | 18224 | 230 | 5443 |
| 131 | 50527 | 171.75 | 28998 | 185 | 17935 | 231 | 5036 |
| 132 | 50293 | 172.00 | 28652 | 186 | 17689 | 232 | 4627 |
| 133 | 50058 | 172.25 | 28306 | 187 | 17475 | 233 | 4213 |
| 134 | 49821 | 172.50 | 27962 | 188 | 17286 | 234 | 3796 |
| 135 | 49583 | 172.75 | 27620 | 189 | 17112 | 235 | 3376 |
| 136 | 49343 | 173.00 | 27281 | 190 | 16949 | 236 | 2952 |
| 137 | 49102 | 173.25 | 26944 | 191 | 16791 | 237 | 2525 |
| 138 | 48859 | 173.50 | 26611 | 192 | 16635 | 238 | 2095 |
| 139 | 48613 | 1/3./5 | 26281 | 193 | 164/6 | 239 | 1002 |
| 140 | 48365 | 1/4.00 | 25955 | 194 | 16314 | 240 | 1226 |
| 141 | 48114 | 1/4.25 | 25034 | 195 | 10140 | 241 | /80 |
| 142 | 47860 | 1/4.50 | 25318 | 196 | 15700 | 242 | 344 |
| 145 | 47003 | 1/4./5 | 25008 | 19/ | 15/88 | | |
| 144 | 4/341 | 1/5.00 | 24703 | 198 | 15396 | | |
| 145 | 47075 | 175.25 | 24403 | 199 | 15395 | | |

CANBERRA

LIQUID WASTE RELEASE PERMIT REPORT

LWR Number: 2019025 Release ID: 1 Waste Monitor Tank "A" Release Mode: 2 Batch Status: P Pre-Release Comments:

| | Undiluted | | EC | |
|---------|-----------|----------|----------|--|
| Nuclide | uCi/ml | EC | Ratio | |
| | | | | |
| CS-137 | 5.00E-06 | 1.00E-06 | 5.00E+00 | |
| | | | | |
| Gamma | 5.00E-06 | | | |
| | | | | |
| Н-З | 7.50E-01 | 1.00E-03 | 7.50E+02 | |
| | | | | |
| Beta | 7.50E-01 | | | |
| | | | | |
| | | | | |
| Total | 7.50E-01 | | 7.55E+02 | |
| | | | | |

LIQUID WASTE RELEASE PERMIT REPORT

LWR Number: 2019025

| === RL/RN PUMP DATA ================================== |
|--|
| RL pumps assigned to release 1.00 |
| RN pumps assigned to release 1.00 |
| Minimum RL flow interlock setpoint for radionuclides (gpm) 4.50E+04 |
| === RECOMMENDED RELEASE RATE ==================================== |
| Allowable release rate (gpm) 3.70E+02 |
| Recommended release rate (gpm) 1.00E+02 |
| Release rate margin (%) 270.47 |
| SETPOINT DATA |
| EME491 In Service 188 |
| EMPRYSE Background (cpm) |
| Cs-137 Equivalence (uCi/ml) 5.00E-06 |
| Expected CPM 2.75E+03 |
| 50 % of Expected CPM 1.37E+03 |
| Trip 1 setpoint (cpm) 2.47E+04 |
| Trip 2 setpoint (cpm) 3.30E+04 |
| === SPECIAL INSTRUCTIONS FOR RELEASE =================================== |
| * RL flow interlock must be greater than or equal to 4 50E+04 gpm * |
| 0 EMF 49 FUNCTIONAL |
| |
| |
| |
| |
| |

 Performed by:
 Date:

 Verified by:

Date/Time: 09/01/2019 08:41 bnk7339D: Retdas

Page - 2

CANBERRA

| LWR Number: | 201 | 9025 | | | |
|---------------|-----|----------|--------|------|-----|
| Release ID: | 1 | Waste Mc | onitor | Tank | "A" |
| Release Mode: | 2 | Batch | | | |

| CRS AUTHORIZING RELEASE | DATE/TIME |
|--|---|
| COMPLETE PRIOR TO RELEASE: | COMPLETE FOLLOWING RELEASE: |
| O)EMF49L Source Checked & Operable | (0) EMF Recorder Stamped |
| <pre>O)EMF49L Setpoints Set (Low Range)</pre> | (O)Date/Time First Trip |
| TRIP 1 cpm TRIP 2 cpm | |
| O)(I.V.)Independent Verification | (O)Date/Time Second Trip/ |
| 0)EMF Recorder Stamped | (O)Date/Time Release Secured |
| 0)Ensure number of RL Pumps Operating is at least 1.00 | ,, |
| O)Ensure number of RN Pumps Operating is at least 1.00 | (O) Tark Lough & |
| 0)RL Flowrategpm | (0) Flush per Procedure |
| 0)RL Flowrate Interlock set @ gpm For Appropriate Headers | (0)Flush secured |
| D)Reset LWR Integrator | (O)EMF Reading after Flush: |
| O)1WL124 Flowrate set @gpm | cpm |
| D)Date/Time Release Started | (O) Volume Releasedgal (O)Reset LWR Integrator |
| O)OWLP6160 channel check (| 0) (0/Reset EMF49L Setpoints |
| (OPS Contact) | EMF Reading (cpm)After Flush: |
| <pre>D) Date/Time Release Secured /</pre> | cpm X 3 =cpm (Trip2) |
|)Date/Time First Restart | Trip 2 X 0.7 =cpm (Trip1) |
|) Date/Time Second Restart | (O)Highest EMF Reading During Release:cpm |
| OMPLETION OF RELEASE ACKNOWLEDGED. | (O)RL Flowrate Interlock Set @ Zero (O) |
| RS ת | DATE/TIME / |
| P SHIFT REVIEW | DATE/TIME / |
| nsure all signoffs are legible. Print na | me where indicated on next page. |
| ate/Time: 09/01/2019 08:41 bnk7339D: R | etdas Page - 3 |

RETDAS v3.5.1 <DPCCNS Rev.4.0>

CANBERRA

LWR Number: 2019025 Release ID: 1 Waste Monitor Tank "A" Release Mode: 2 Batch

| + Print Name + | Initials | Print Name | Initials |
|-----------------------|----------|------------|----------|
| | | | |
| | | | |
| | | | |
| + | · | | |

Date/Time: 09/01/2019 08:41 bnk7339D: Retdas

Page - 4

JPM A.4

SRO

EVALUATION SHEET

| ′A EW ′A Knowledge of SRO 4.5 <u>CFR:</u> 4 <u>Location:</u> | responsibilities in emerge 1.10 / 43.5 / 45.11 | ncy plan implementation. | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| EW ′A Knowledge of SRO 4.5 <u>CFR:</u> 4 <u>_ocation:</u> | responsibilities in emerge 1.10 / 43.5 / 45.11 | ncy plan implementation. | | | | | | | |
| /A Knowledge of SRO 4.5 <u>CFR:</u> 4 <u>_ocation:</u> | responsibilities in emerge 1.10 / 43.5 / 45.11 | ncy plan implementation. | | | | | | | |
| Knowledge of SRO 4.5 <u>CFR:</u> 4 <u>-ocation:</u> | responsibilities in emerger | ncy plan implementation. | | | | | | | |
| 4.5 <u>CFR:</u> 4 Location: | 1.10 / 43.5 / 45.11 | | | | | | | | |
| Location: | Duefermed Evelve | | | | | | | | |
| | Preferred Evalua | Preferred Evaluation Location: Preferred Evaluation Method: | | | | | | | |
| Classroom X | Perform | X Simulate | | | | | | | |
| ⊃/0/A/5000/001 (Clas El Rev 6 EAL Wallch P/0/A/5000/006 A (N com) | ssification of Emergency) art otifications to States and C | Counties from the Control | | | | | | | |
| sing NEI Rev 6 EAL /ent as a Site Area E e Emergency Notifica inutes. | Wallchart and RP/0/A/5000 mergency (HS6.1) in <u><</u> 15 ation Form, in accordance | D/001, applicant classifies the minutes, and then completes with supplied KEY, in <u><</u> 15 | | | | | | | |
| minutes | Time Critical: | Yes <u>X</u> No | | | | | | | |
| | Docket # | Time Start: Time Finish: <u>Time Critical 1 (<15 min):</u> Time Start: Time Finish: <u>Time Critical 2 (<15 min):</u> Time Start: Time Finish: Performance Time | | | | | | | |
| NAME ======== | SIGN ==================================== | IATURE DATE | | | | | | | |
| | COMMENTS | | | | | | | | |
| | PlotA/5000/001 (Classific Rev 6 EAL Wallch 2/0/A/5000/006 A (Nom) sing NEI Rev 6 EAL ent as a Site Area E emergency Notificanutes. minutes Minutes NAME | -/0/A/S000/001 (Classification of Emergency) El Rev 6 EAL Wallchart >/0/A/5000/006 A (Notifications to States and Com) sing NEI Rev 6 EAL Wallchart and RP/0/A/5000 ent as a Site Area Emergency (HS6.1) in ≤ 15 > Emergency Notification Form, in accordance nutes. minutes Time Critical: Docket # Docket # NAME SIGN COMMENTS SIGN | | | | | | | |

-

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Both Units are at 100% RTP.
- Radiography is in progress in the Unit 1 CA Pump Room.
- Subsequently
 - 0800: A fork lift performing material handling in the Unit 1 yard between the Containment and Turbine Building overturns rupturing its fuel tank.
 - 0801: Propane gas enters the Unit 1 VC/YC intake.
 - 0802: Control Room evacuation is initiated in accordance with AP/1(2)/A/5500/017 (Loss of Control Room).
 - 0808 Radiography in the Unit 1 CA Pump Room is hindering access to the Unit 1 ASP. The SM directs operators to transition to the SSF in order to establish safe shutdown conditions.
 - 0813: Unit 2 control is established at the Unit 2 Aux Shutdown Panels.
 - $\circ~$ 0824: Unit 1 control is established at the SSF.

INITIATING CUES:

- You are the Emergency Coordinator.
- Classify this event per RP/0/A/5000/001 (Emergency Classification).
- Emergency Coordinator Judgment is NOT to be used when making this classification.
- Fill out the Emergency Notification Form per RP/0/A/5000/006 A (Notifications to the States And Counties From the Control Room).
- This JPM is time critical.

EXAMINER NOTE:

After reading cue, provide applicant with a copy of RP/0/A/5000/001, RP/0/A/5000/006 A, and NEI Rev 6 EAL wallcharts.

| | SAT / |
|-----------------|-------|
| STEP / STANDARD | UNSAT |

START TIME: _____

| STEP / STANDARD | SAT / UNSAT |
|---|------------------|
| Time Critical 1 Start: STEP 1: Classify the Event: | CRITICAL STEP |
| Unit 2 is in an Alert (HA6.1) due to the event which resulted in plant control being transferred from the Control Room to the ASP. | |
| Unit 1 is in an Site Area Emergency (HS6.1) due to transfer of control from the Control Room AND the inability to reestablish control within 15 minutes. | |
| Since Unit 1 is in a higher classification than Unit 2, the emergency classification for the site will be an Site Area Emergency (HS6.1). | |
| STANDARD: | SVI |
| Applicant determines from NEI Rev 6 EAL Wallchart, that Catawba is in a Site Area Emergency HS6.1. | UNSAT |
| Time Critical 1 Finish: | |
| Examiner Note: This step is critical to determine the proper Emergency Action Level prior to notification of the States and Counties. This time critical must be complete in < 15 minutes. | |

| STEP / STANDARD | SAT / UNSAT |
|--|------------------|
| | |
| Time Critical 2 Start: STEP 2: Fill out Emergency Notification Form: | CRITICAL STEP |
| <u>STANDARD</u> : | |
| Applicant properly fills out the emergency notification form (in accordance with provided KEY) within 15 minutes. | |
| Time Critical 2 Finish: | |
| Examiner Note: This step is critical to ensure timely and accurate notification of the States and Counties. This time critical must be complete in < 15 minutes. | SAT UNSAT |
| COMMENTS: | |
| | |
| END OF TASK | |

STOP TIME _____

APPLICANT CUE SHEET

(RETURN TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

- Both Units are at 100% RTP.
- Radiography is in progress in the Unit 1 CA Pump Room.
- Subsequently
 - 0800: A fork lift performing material handling in the Unit 1 yard between the Containment and Turbine Building overturns rupturing its fuel tank.
 - 0801: Propane gas enters the Unit 1 VC/YC intake.
 - 0802: Control Room evacuation is initiated in accordance with AP/1(2)/A/5500/017 (Loss of Control Room).
 - 0808 Radiography in the Unit 1 CA Pump Room is hindering access to the Unit 1 ASP. The SM directs operators to transition to the SSF in order to establish safe shutdown conditions.
 - 0813: Unit 2 control is established at the Unit 2 Aux Shutdown Panels.
 - 0824: Unit 1 control is established at the SSF.

INITIATING CUES:

- You are the Emergency Coordinator.
- Classify this event per RP/0/A/5000/001 (Emergency Classification).
- Emergency Coordinator Judgment is NOT to be used when making this classification.
- Fill out the Emergency Notification Form per RP/0/A/5000/006 A (Notifications to the States And Counties From the Control Room).
- This JPM is time critical.

| Declared EAL: | |
|---------------|--|
| | |

Declaration Time: _____

Items marked with a * indicate critical tasks

JPM A.4 KEY

JPM A.1-2 KEY

NUCLEAR POWER PLANT EMERGENCY NOTIFICATION FORM

| MESSAGE #1 | Confirmation Pho | one #: AUTHEN | ITICATION CODE #: | | |
|--|---|--|--------------------------------------|--|--|
| Lines 1 – 6 are required for IN | ITIAL Notifications | | | | |
| 1. EVENT: D DRILL | ACTUAL DECLAF | RATION D TERMINATION (ONL | Y Lines 1, 2, & 4 required) | | |
| 2. AFFECTED SITE: | | | | | |
| Catawba | | | | | |
| 3.*EMERGENCY CLASSIFIC | ATION | | | | |
| UNUSUAL EVENT | ALERT | SITE AREA EMERGENCY | GENERAL EMERGENCY | | |
| 4.* EAL # | * Declaration | Date:/ / Time: | | | |
| | Terminatior | n Date://Time: | (mark "N/A" for EAL # & Description) | | |
| EAL DESCRIPTION: | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 5.★RELEASE TO THE ENVIR | ONMENT (caused | by the emergency): | | | |
| 6.* PROTECTIVE ACTION RE | COMMENDATIO | NS: | | | |
| | | | | | |
| EVACUATE: | | | | | |
| □ SHELTER: | | | | | |
| CONSIDER THE USE | OF KI (POTASSIU | IM IODIDE) IN ACCORDANCE WITH O | RO PLANS AND POLICIES | | |
| OTHER: | | | | | |
| Lines 7-11 are NOT required for | or INITIAL notificat | tions. Lines 7-11 may be provided sepa | arately for follow-up notifications. | | |
| 7. PROGNOSIS: Upgrade in | classification or | PAR change is likely before the next | follow-up notification 🛛 Yes 🛛 No | | |
| 8. SITE UNIT(S) STATUS: | | | | | |
| AFFECTED UNIT | | | | | |
| YES Unit 1 | l% Po | ower Shutdown: Date// | Time | | |
| □ YES Unit 2 | 2% Pe | ower Shutdown: Date//_ | Time | | |
| 9. METEOROLOGICAL DAT | A : | | | | |
| Wind direction from: | degrees V | Vind Speed: mph Precip | itation: inches | | |
| Stability Class: | | | | | |
| Lines 10 - 11 are completed for follow-up notifications, IF Line 5 IS OCCURRING or HAS OCCURRED is selected | | | | | |
| 10. AIRBORNE RELEASE C | | | ELEVATED | | |
| MAGNITUDE UNITS: | | D μCl/sec | | | |
| | iodines | | | | |
| 11. DOSE PROJECTION: Pro | ojection period: | Hours Estimated Rele | ase DurationHours | | |
| Performed: | DISTANCE | TEDE (mrem) | Thyroid CDE (mrem) | | |
| Date / / | Site Boundary | | | | |
| nme: | 2 Miles | | | | |
| | 5 Miles | | | | |
| | 10 Miles | | | | |
| 12. REMARKS (As Applicable): | | | | | |
| | | | | | |
| | | | | | |
| | erator Name | | | | |
| | | | | | |
| 14. NUTIFIED BT: | | | | | |
| 15. RECEIVED BY (ORO use | 15. RECEIVED BY (ORO use only): DateTime | | | | |

GOVERNMENT AGENCIES NOTIFIED

Record the name, date, time, and agencies notified as applicable.

| 1. | | | York County WP/EOC |
|-------------|--------|--------|----------------------------|
| | (name) | | 9.1.802/220.1110 |
| - | (date) | (time) | 9-1-803/329-1110 |
| | | | |
| 2 | | | Mecklenburg County WP/EOC |
| | (name) | | 9-704/336-2441 (WP) |
| _ | | | 9-704/432-4120 (EOC) |
| | (date) | (time) | |
| | | | |
| 3 | | | Gaston County WP/EOC |
| | (name) | | |
| _ | | | 9-704/866-3300 |
| | (date) | (time) | |
| Л | | | North Carolina EOC/WP |
| | (name) | | 9-1-919/733-3300 (Primary) |
| | | | 9-1-800/858-0368 (Alt) |
| - | (date) | (time) | 5 1 000/050 0500 (/ iii.) |
| | | | |
| 5 | | | North Carolina Alt. WP |
| J | (name) | | 9-1-828/466-5500 |
| | | | 9-1-828/466-5501 |
| - | (date) | (time) | 5 1 626/400 5501 |
| | | | |
| 6 | (2222) | | North Carolina Alt. EUC |
| | (name) | | 9-1-919//33-3300 (Primary) |
| - | (1-+-) | (1: | 9-1-800-858-0368 (Alt.) |
| | (date) | (time) | |
| 7. | | | South Carolina WP |
| /. <u>-</u> | (name) | | 9-1-803/737-8500 (Primary) |
| | | | 9-1-800/811-8045 (Alt.) |
| - | (date) | (time) | |
| | | | |
| 8 | | | South Carolina Alt. WP |
| 0. | (name) | | |
| | | | 9-1-803/896-9621 |
| - | (date) | (time) | |
| | | | |
| 9. | | | South Carolina EOC |
| ÷. | (name) | | 9-1-803/737-8500 (Primarv) |
| | | | 9-1-803-737-8724 (Alt.) |
| - | (date) | (time) | |