

Draft Submittal

(Pink Paper)

MCGUIRE FEB 2005 EXAM 50-369 & 370/2005-301

**FEBRUARY 7 - 15, 2005
FEBRUARY 18, 2005 (written)**

1. Administrative Questions/JPMs
2. In-plant JPMs
3. Control Room JPMs (simulator JPMs)
4. Administrative Topics Outline ES-301-1
5. Control Room Systems and Facility Walk-Through
Test Outline ES-301-2

2005

NRC EXAM

JPMs

Facility: McGuire Date of Examination: _____
 Exam Level (circle one): RO / SRO-I / SRO-U Operating Test No.: _____

Control Room Systems[@] (8 for RO; 7 for SRO-I; 2 or 3 for SRO-U)

15
20
5
15
12
20
10
20

System / JPM Title	Type Code*	Safety Function
a. Respond to a Loss of Component Cooling (KC-234A)	N, S, A	SF-8
b. Respond to a Leak on operating ND System while at Mid Loop <i>ENB 235</i>	D, L, P	SF-4P
c. Intermediate Range Failure (ENB-235) (SROU)	N, S, A	SF-7
d. Align the Containment Spray system to Cold Leg Recirculation (NS-182A) (SROU)	D, S, PA	SF-5
e. Respond to Additional Dropped Rods While Retrieving a Dropped Control Rod (IRE 174IA)	D, S, A	SF-1
f. Establish Feedwater Flow to S/G's following a Runback (CF-237)	N, S	SF-4S
g. Align Normal Charging With NV Recirc Path Isolated (NV-146A)	D, S, A	SF-2
h. Start and Load 1A D/G then Separate From the Grid (DG-203) (SROU)	D, S	SF-6

In-Plant Systems[@] (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)

i. Control Steam Pressure Using SM PORVs (Unit 2)	E, B	SF-4S
j. Borate the Reactor Coolant System from the Auxiliary Shutdown Panel ASP-138 (SROU)	R, E, B	SF-1
k. Aligning Control Air from Backup Cylinders to F VI Compressor VI-110A (SROU)	E, A, P	SF-8

[@] All control room (and in-plant) systems must be different and serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1
(L)ow-Power	≥ 1 / ≥ 1 / ≥ 1
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Prepared By: Rob Billings

Reviewed By: _____

Approved By: Charles Sawyer

TASK: **Respond To a Loss of Component Cooling**

POSITION: **RO/SRO**

Operator's Name _____

Location: **Simulator**

Method: **Perform**

Estimated JPM Completion Time: 15 Minutes

Actual JPM Completion Time: Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____

Date / /

References: AP/1/A/5500/21

Loss of KC or KC System Leakage

JPM verified current with references by _____

Date / /

Rev. 00/11-18-04

FOR TRAINING PURPOSES ONLY

NOTES:

This JPM is designed to be performed as a **SIMULATION** or as a **WALKTHROUGH**. Cues found in shaded boxes should be given to the trainee for either setting.

INITIAL CONDITIONS

Unit one is in mode 1.

Both "B" Train KC pumps have tripped due to a failed slave relay in the load shed circuitry.

The SRO directs you to restore KC cooling by performing AP/1/A/5500/21.

JPM OVERALL STANDARD: "A" Train KC in service.

KA 008 A4.01 3.3/3.1

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	Check any KC pump - ON Performs the following: Isolate: * • Normal letdown • Excess Letdown • ND Letdown * Close all NM valves located on 1MC-8 (vertical board)	Operator determines from initial conditions and control boards no KC pumps are ON then proceeds to RNO. RO closes 1NV-35A. Cue: Switch rotated to close position, green light lit. N/A N/A RO closes all NM valves on 1MC-8. Cue: Close pushbuttons depressed on all NM valves. Green lights lit on all NM valves.		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2	Monitor Foldout Page	Same		
3	Secure any dilution in progress.	No dilutions in progress.		
4	Check ND – IN RHR MODE Go to step 7	NA		
5	Announce occurrence on the paging system.			
		Cue: Another operator will make the page.		
6	Check both train's KC Surge Tank level – STABLE OR GOING UP.	Same Cue: Both Surge tank levels are STABLE.		
7	Start Standby KC train: <ul style="list-style-type: none"> • Check standby KC Surge Tank level – GREATER THAN 2 FT. • Start Standby KC train PER one of the following: <ul style="list-style-type: none"> ○ To Start A Train, GO TO Enclosure 4. 	Same Cue: “A” Surge tank level indicates 8 feet. RO proceeds to Enclosure 4		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	(From Enclosure 4) Check 1KC-56A (KC to A ND HX) CLOSED	Same Cue: 1KC-56A green light lit		
9	Check 1KC-81B (KC to B ND HX) CLOSED	Same Cue: 1KC-81B green light lit		
10	Check 1B Train KC pumps - OFF	Same Cue: 1B1 and 1B2 KC Pumps - green lights lit		
*11	Select "CLOSED" on 1KC-54B (Train B Recirc Isol)	Same Cue: Switch rotated to close position, green light lit.		
12	Check 1A Train KC pumps - OFF	Same Cue: 1A1 and 1A2 KC Pumps - green lights lit		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
13	IF voiding of 1A train KC is suspected.....	No voiding is suspected, the operator should proceed to step 7.		
14	Close the following valves: * 1KC-50A * 1KC-1A 1KC-230A 1KC-3A	Same Cue: Pushbutton depressed, green light lit Cue: Pushbutton depressed, green light lit Cue: Green light lit Cue: Green light lit		
*15	Start 1A RN pump	Same Cue: Pushbutton depressed, red light lit		
16	Ensure 1RN-86A (A KC Hx Inlet Isol) opens	Same Cue: Red light lit		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*17	Place control switch for 1KC-51A (Train A Recirc Isol) in "AUTO"	Same Cue: Switch is placed to AUTO		
*18	Start 1A1 KC Pump	Same Cue: Pushbutton depressed, red light lit		
19	Check 1KC-6 (1A1 KC pump Discharge) LOCALLY THROTTLED IN STEP 6 * • Start 1A2 KC pump • <u>GO TO</u> Step 17	NO, operator goes to RNO Cue: Pushbutton depressed, red light lit Same		
20	Check ND pumps – ANY ON PRIOR TO ENTERING THIS PROCEDURE • <u>Go To</u> step 20	NO, operator proceeds to RNO. Same		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
21	<p>Check KC leak – HAS OCCURRED</p> <p>Perform the following:</p> <ul style="list-style-type: none"> • Limit KC pump flow to 4000 gpm per operating pump in the next step. • Open the following valves: <ul style="list-style-type: none"> * ○ 1KC-3A * ○ 1KC-230A • Close the following valves: <ul style="list-style-type: none"> * ○ 1KC-228B * ○ 1KC-18B • Open the following valves: <ul style="list-style-type: none"> * ○ 1KC-1A * ○ 1KC-50A • <u>GO TO</u> Step 25 	<p>NO, operator goes to RNO</p> <p>Operator monitors pump flow gauges during following alignments to ensure limits are not exceeded.</p> <p>Same</p> <p>Cue: Pushbuttons depressed, red lights lit</p> <p>Cue: Pushbuttons depressed, green lights lit</p> <p>Cue: Pushbuttons depressed, red lights lit</p> <p>Same</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
22	Check 1B ND pump - OFF	Same Cue: Green light lit		
23	Check 1KC-81B ((KC to B ND HX) CLOSED.	Same Cue: Green light lit		
24	Place control switch for 1KC-54B (Train B Recirc Isol) in the "CLOSE" position	Same Cue: Switch is in "CLOSE"		
25	Ensure 1KC-54B closes	Same Cue: Green light lit		
26	Stop 1B1 and 1B2 KC pumps	Same Cue: Green lights lit		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
27	Check KC flow – LESS THAN 4000 GPM PER OPERATING KC PUMP	Operator monitors pump flow gauge to ensure limits (8000 gpm with 2 pumps running) are not exceeded. Cue: "A" train KC flow gauge reads approximately 6500 gpm		
		<i>9,000 gpm</i>	<i>+throttle</i>	<i>1KC 149 156</i>
28	Check ND pumps – ANY ON PRIOR TO ENTERING THIS PROCEDURE GO TO Step 37.	No, operator goes to RNO.		
29	Check KC system leak – HAS OCCURRED GO TO Step 42 in the body of the procedure.	No, operator goes to RNO.		
30	Check any letdown path – IN SERVICE	Cue: ANOTHER OPERATOR WILL CONTINUE WITH THIS PROCEDURE.		

AP

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

Unit one is in mode 1.

Both "B" Train KC pumps have tripped due to a failed slave relay in the load shed circuitry.

The SRO directs you to restore KC cooling by performing AP/1/A/5500/21.



SIMULATOR OPERATOR GUIDELINES (KC-234A)

1. Snap 128
- 
- 

Prepared By Rob Billie

Reviewed By _____

Approved By Chris Sawyer

TASK: **Respond To Intermediate Range NI Failure**

POSITION: **RO**

Operator's Name _____

Location: **Simulator**

Method: **Perform**

Estimated JPM Completion Time: 5 Minutes

Actual JPM Completion Time: Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____

Date / /

References: AP/1/A/5500/16

Malfunction of Nuclear Instrumentation

JPM verified current with references by _____

Date / /

Rev. 00/11-24-04

FOR TRAINING PURPOSES ONLY

INITIAL CONDITIONS

Unit 1 is in the process of starting up after a refueling outage.

Power was holding at 10-8 amps for critical data when Intermediate Range N35 failed low.

The SRO directs you to remove N35 from service by completing AP/1/A/5500/16 (Malfunction of Nuclear Instrumentation), Case 2 (Intermediate Range Malfunction).

JPM OVERALL STANDARD: N35 is removed from service. When it is recognized the N36 has also failed the RO should trip the reactor per step one RNO.

NOTES: This JPM is designed to be performed as a **SIMULATION** or as a **WALKTHROUGH**. Cues found in shaded boxes should be given to the trainee for either setting.

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	Check one I/R channel - OPERABLE	Operator checks for IR Channel N-36 indications being normal. Cue: N36 is operable.		
2	Announce on the paging system	Same		
*3	Place failed channel "LEVEL TRIP" switch on I/R drawer to "BYPASS".	Operator places "LEVEL TRIP" switch on I/R drawer N35 to "BYPASS". Cue: Switch selected to "BYPASS".		
4	Check the following – LIT • "LEVEL TRIP BYPASS" indicating light on failed IR drawer. • "S/R or I/R TRIP BYPASS" alarm (1AD-2, E-2)	Same Cue: Lamp is lit Cue: Lamp is lit		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	<p>CONTINUED</p> <ul style="list-style-type: none"> • The failed channel's status light on 1SI-19 <ul style="list-style-type: none"> ○ "1/N-35A I/R CHANNEL 1 TRIP BYPASS" OR ○ "1/N-36A I/R CHANNEL 2 TRIP BYPASS" 	<p>Cue:</p> <p>Lamp is lit</p> <p>N/A</p>		
5	<p>Place operable I/R channel to record on NIS recorder.</p>	<p>Same</p> <p>Cue:</p> <p>Channel N36 selected on the NIS recorder.</p> <hr/> <p>At this time a failure of N36 will be inserted. The RO should soon recognize that all indications of reactor power have been lost. The operator should proceed back to step 1 then trip the reactor per step1 RNO.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6	<p>Check one I/R channel - OPERABLE</p> <p style="text-align: center;">(RNO)</p> <p>Perform the following: <u>IF</u> no indications on S/R of P/R, <u>THEN</u></p> <ul style="list-style-type: none"> * • Trip the reactor • <u>GO TO</u> EP/1/A/5000/E-0 (Reactor Trip or Safety Injection) 	<p>Operator determines that NO I/R channels are operable and proceeds to RNO.</p> <p>Cue:</p> <p>N35 indicates at bottom of the scale. N36 has drifted up to 10⁴ amps. All Power Range meters indicate 0%. S/R meters are at bottom of the scale.</p> <p>Same</p> <p>Cue:</p> <p>Trip switches rotated, green lamps lit</p> <p>The RO will perform the immediate actions of E-0.</p> <p>Cue:</p> <p>Another operator will continue with E-0.</p>		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

Unit 1 is in the process of starting up after a refueling outage.

Power was holding at 10-8 amps for critical data when Intermediate Range N35 failed low.

The SRO directs you to remove N35 from service by completing AP/1/A/5500/16 (Malfunction of Nuclear Instrumentation), Case 2 (Intermediate Range Malfunction).



SIMULATOR OPERATOR GUIDELINES (ENB-235)

1. Reset to Snap 129.
2. Insert trigger 1 at step 5.



Prepared By Rob Billing

Reviewed By _____

Approved By Chris Sawyer

TASK: **Respond To A Leak On The ND System While At Mid Loop**

POSITION: **RO**

Operator's Name _____

Location: **Simulator**

Method: **Perform**

Estimated JPM Completion Time: 30 Minutes

Actual JPM Completion Time: Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____ Date / /

References: AP/1/A/5500/19

Loss of ND or ND System Leakage

JPM verified current with references by _____

Date / /

Rev. 11/11-23-04

FOR TRAINING PURPOSES ONLY

INITIAL CONDITIONS

Unit one is in mode 5. The following conditions exist:

1A ND Pump has been secured due to a leak

1ND-35 is closed

B Train ND is available

A loss of ND has occurred due to a small leak. When NC level decreased to less than 4 inches the "A" ND pump was secured. The balance of plant operator has made up to greater than 20 inches and level is stable. AP/1/A/5500/19 (Loss of ND or ND System Leak) has been implemented and completed through step 13.

The SRO directs you to place 1B train of ND cooling in service PER AP/1/A/5500/19, starting with step 14.

JPM OVERALL STANDARD: B Train ND in service with Flow to NCS established.

NOTES:

This JPM is designed to be performed as a **SIMULATION** or as a **WALKTHROUGH**. Cues found in shaded boxes should be given to the trainee for either setting.

KA 000 025 G.6 3.7/3.6

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	<p>Check if immediate restart of ND is available as follows:</p> <p>NC subcooling based on core exit T/C's – GREATER THAN 0 DEGREES.</p> <p>NC level – STABLE OR GOING UP</p> <p>Suction flowpath for ND pump - ALIGNED</p> <p>Train of ND – IMMEDIATELY AVAILABLE TO RESTART</p> <p>Check if air entrainment – KNOWN TO HAVE OCCURRED</p> <p>GO TO step 14.d</p> <p>IF AT ANY TIME it appears that NC sub-cooling based on core exit T/Cs may be lost prior to restarting ND pump THEN GO TO step 15.</p> <p>Restart ND per enclosure 14 Startup of ND Pumps).</p>	<p>Operator determines from initial conditions B train ND is available</p> <p>Cue: Subcooling is 80° F</p> <p>Cue: NC level is stable</p> <p>Same</p> <p>Operator determines from initial conditions B train ND is available</p> <p>Operator proceeds to RNO</p> <p>Same</p> <p>Operator proceeds to Enclosure 14.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2	Check VI - AVAILABLE	RO determines that VI is available and continues Cue: VI System header pressure is 105 psig		
3	Check 1ND-35 (ND to FWST Isol) - CLOSED	Operator determines from initial conditions that 1ND-35 is already closed		
4	<p>Check if ND letdown valves should be closed:</p> <p>Check Pzr level – less than 96%</p> <ul style="list-style-type: none"> • Close 1NV-121 (ND Letdown Control) • 1ND-32 (A ND Hx to Letdown Hx) • 1ND-17 (B ND HX to Letdown Hx) <p>Go to step 5</p>	<p>Same</p> <p>Cue: Pzr. Level indicates 0%</p> <p>Cue: Needles at 0%</p> <p>Green light lit</p> <p>Green light lit</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
5	Check S/I – HAS OCCURRED GO TO Step 7	Same Cue: SI actuated stat light is dark Same		
6	Start desired ND pump PER one of the following: 1A ND Pump - GO TO Step 7 OR 1B ND Pump - GO TO Step 48	N/A Operator proceeds to step 48 to start B ND pump		
7	Dispatch 2 operators to perform the following on 1ND-9 (B ND Pump Discharge Isol) (aux bldg, 695 + 12, FF-54, room 500, ND Pump room 1B on north wall): Unlock valve Close valve Open valve 1 1/4 turns	Same Cue: An NLO has been dispatched and the valve has been positioned to 1 1/4 turns open		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	Dispatch operator to open breaker 1EMXB1-2C (1B ND Pump and 1B Hx Miniflow Stop Vlv 1ND-67B) (aux bldg, 733, GG-55-56)	Same Cue: Operator has been dispatched and reports that the breaker is open		
9	Check 1B RN pump - AVAILABLE	Same		
* 10	Start 1B RN pump	Same Cue: Pushbutton depressed, red light lit		
11	Start KC pumps as follows: <ul style="list-style-type: none"> select "Auto" on 1KC-54B (Train B Recirc Isol) 	Same Cue: Switch rotated clockwise		
*	<ul style="list-style-type: none"> Start 1B1 and 1B2 KC PUMPS 	Cue: Pushbuttons depressed, red lights lit		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
12	Ensure RN flow established to KC Hx in operation.	Same Cue: Flow meter indicates 4000 gpm		
13	Establish KC flow to 1B ND HX as follows: <ul style="list-style-type: none"> • Close 1KC-56A (KC to A ND HX) • <u>IF AT ANY TIME</u> adequate KC flow to 1B ND HX can not be established, <u>THEN</u> throttle closed the following valves as required: <ul style="list-style-type: none"> • 1KC-149 or • 1KC-156 • Throttle open 1KC-81B (KC to B ND Hx) to establish 2000 to 5000 gpm flow to 1B ND Hx while limiting each KC pump flow to 4000 gpm. 	Same Cue: Pushbutton depressed, green light lit N/A Cue: Pushbutton depressed, red and green lights lit, Flow at 3000 gpm		
14	* Check 1ND-35 (ND to FWST Isol) – CLOSED	Operator realizes valve is closed per JPM initial conditions.		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
15	<p>Check the following valves:</p> <p>1ND-1B (C NC Loops to ND Pumps)</p> <p>1ND-2AC (C NC Loops To ND Pumps)</p> <p>1ND-4B (B ND Pump Suct From FWST or NC)</p> <p>Go to step 59</p>	<p>Note: Operator uses OAC graphics to determine position of 1ND-1 and 1ND-2</p> <p>Cue: Red light lit on OAC</p> <p>Cue: Red light lit on OAC</p> <p>Cue: Red light lit</p>		
16	<p>Close the following:</p> <p>* 1ND-30A (Train A ND To Hot Leg Isol)</p> <p>1ND-34 (A & B ND Bypass)</p> <p>1ND-33 (A ND Hx Bypass)</p> <p>1ND-14(B ND Hx Outlet)</p> <p>1NI-183B (ND to B & C Hot Legs Isol).</p>	<p>Same</p> <p>Cue: Pushbutton depressed, lamp illuminated</p> <p>Cue: Manual loader at '0'</p> <p>Cue: Pushbutton depressed, lamp illuminated</p> <p>Cue: Manual loader at 0%</p> <p>Cue: Green light lit on OAC</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
17	<p>Open the following:</p> <p>1ND-18 (B ND Hx Bypass)</p> <p>1NI-178B (Train B ND To C & D CL)</p> <p>* 1ND-15B (Train B ND To Hot Leg Isol)</p>	<p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, lamp illuminated</p> <p>Cue:</p> <p>Pushbutton depressed, lamp illuminated</p> <p>Cue:</p> <p>Pushbutton depressed, lamp illuminated</p>		
18	<p>Check if either of the following are believed to have occurred:</p> <ul style="list-style-type: none"> • Air entrainment in ND system • Voiding of NC system <p><u>IF AT ANY TIME</u> NC level drops when ND pump is started, <u>THEN</u> makeup as required PER Enclosure 3 (NC System Makeup During Loss of ND)</p> <p><u>GO TO</u> step 64.</p>	<p>NO, operator proceeds to RNO.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
19	Check core exit T/C AVAILABLE	Same Cue: ICCM indicates CET readings		
20	Check subcooling based on core exit T/Cs – GREATER THAN 0 DEGREES	Same Cue: ICCM indicates CET readings 76 degrees subcooling.		
21	Check 1FW-27A (FWST Supply To ND) - CLOSED.	Same Cue: Green light lit		
22	Establish communications with operator at 1ND-9 (B ND Pump Discharge Isol)	RO will communicate with Simulator Runner to perform the next step Cue: Communications have been established with the NLO at valve 1ND-9		
23	Do not continue until 1ND-9 throttled 1 1/4 turns open.	Cue: 1ND-9 has been opened 1 1/4 turns.		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
24	Check NC level – GREATER THAN 10 INCHES.	Same Cue: Level indicates 15 inches		
25	Check 1ND-17 (B ND Hx to Letdown HX) - CLOSED	Same Cue: Green light lit		
* 26	Start 1B ND Pump	Same Cue: Pushbutton depressed, lamp illuminated		
27	When ND pump has been running 1 minute have operator <u>slowly</u> open, backseat and lock 1ND-9 (B ND Pump Discharge Isol).	RO will communicate with Simulator Runner to perform this step		
28	Check 1FW-27A (FWST Supply to ND)- CLOSED	Same Cue: Green light lit		
29	Check NC level – GREATER THAN 4 INCHES	Same Cue: Level indicates 15 inches		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
30	Do not continue until 1ND-9 is fully open.	Cue: NLO reports 1ND-9 is fully open.		
31	Throttle 1ND-34 (A & B ND Hx Bypass) to establish 1000 gpm to 2000 gpm.	Same Cue: Flow indicates 1800 gpm		
*32	Throttle the following as necessary to maintain stable NC system temperature: 1ND-14 (B ND Hx Outlet) 1ND-34 (A & B ND Hx Bypass)	Same Cue: Control knobs rotated clockwise/(counterclockwise) and NC System temperatures are stable	stop	*
33	Check NC temperature based on ND Pump discharge temperature – LESS THAN 200 DEGREES F	Same Cue: ND Pump discharge temperature reads 120 degrees F		
34	Reduce KC flow to 1B ND HX as required to control NC temperature	Same		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
35	If at any time cooldown is required then refer to Unit 1 Data Book Curve 1.6 b.	Same Cue: Stabilize temperature		
36	Check feed and bleed cooling - INITIATED GO TO step 82	Operator determines that feed and bleed has not been initiated and proceeds to RNO.		
37	Ensure ND flow greater than 1500 gpm	Operator throttles open 1ND-34 and/or 1ND-14 to obtain > 1500 gpm flow Cue: Flow indicates 1800 gpm		
38	Dispatch operator to reclose breaker 1EMXB1-2C (1B ND Pump and 1B Hx Mini flow Stop Vlv 1ND-67B)	Cue: Operator has been dispatched to reclose breaker.		
39	Ensure 1ND-67B (B ND Pump & B Hx Miniflow) remains closed	Same Cue: Green light is illuminated		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
40	<p>IF air entrainment may have occurred on the idle train, THEN</p> <p>Remove noncondensable gases from the idle ND Hx PER Enclosure 15 (Idle ND Train Hx Flush)</p> <p>Ensure idle train vented PER enclosure 2 (Venting of ND Pumps and Suction Piping)</p>	<p>Same</p> <p>Cue:</p> <p>The OSM is evaluating use of these enclosures.</p>		
41	<p>RETURN TO step in effect in body of this procedure</p>	<p>Cue:</p> <p>Another operator will continue in the procedure.</p>		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

Unit one is in mode 5. The following conditions exist:

1A ND Pump has been secured due to a leak

1ND-35 is closed

B Train ND is available

A loss of ND has occurred due to a small leak. When NC level decreased to less than 4 inches the "A" ND pump was secured. The balance of plant operator has made up to greater than 20 inches and level is stable. AP/1/A/5500/19 (Loss of ND or ND System Leak) has been implemented and completed through step 13.

The SRO directs you to place 1B train of ND cooling in service PER AP/1/A/5500/19, starting with step 14.

SIMULATOR OPERATOR GUIDELINES (ND-103)

1. Snap 130 – **Add Thermal Margin to Status Board 60 minutes**
2. Slightly open FW27 to raise NCS level > 10 inches.
When NCS > 20 inches close FW27.
3. Stop B ND Pump
4. Freeze Simulator
5. During the JPM Performance
 - a. When dispatched as NLO to position ND9, 2 turns open insert LOA ND26 (B ND Pump Disch) select new value = .001.
 - b. When dispatched as NLO to de-energize ND67B, insert LOA ND17 (ND67B rackout) select one value = F (racked out).
 - c. When directed as NLO to throttle ND9 to establish 1000 - 1500 gpm Flow, insert LOA ND26 (B ND Pump Disch). select new value = .15, ramp time = 60 seconds.
 - d. When directed as NLO to fully open ND9, insert LOA ND26 (B ND Pump Disch), select new value = 1.0, ramp time = 60 seconds.
 - e. When directed as NLO to re-energized ND67B, insert LOA ND17 (ND67B rackout) select new value = T (racked in).

Prepared By: Rob Billings
Reviewed By: N/A
Approved By: SA Hyle

TASK: **Align the Containment Spray System to Cold Leg Recirculation**

POSITION: **RO/SRO**

Operator's Name _____

Location: **Simulator** Method: **Perform**

Estimated JPM Completion Time: 20 Minutes

Actual JPM Completion Time: _____ Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____ Date / /

References: EP/1/A/5000/ES-1.3 Transfer to Cold Leg Recirc

JPM verified current with references by _____

Date / /

Rev. 02/03-27-04

INITIAL CONDITIONS

You are the Unit 1 Balance of Plant (BOP) Operator. One hour ago, the Unit 1 reactor tripped due to a LOCA inside of containment.

EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirc) has been implemented and completed through step # 7. Containment pressure is approximately 4 psig. The "FWST Level Lo-Lo" Alarm has just been received.

The SRO instructs you to perform Steps 8 and 9 of EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirc).

JPM OVERALL STANDARD: Both NS pumps are stopped within 45 seconds of beginning step #1. 1B NS Pump is in operation with suction aligned to the Containment Sump and RN flow established to the 1B NS Hx. One train of ND is aligned to the Containment Aux Spray Header.

NOTES:

This JPM is designed to be performed as a **SIMULATION** or as a **WALKTHROUGH**. Cues found in shaded boxes should be given to the trainee for either setting.

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	<p>Check if NS should be aligned for recirc as follows:</p> <p>Check "FWST LEVEL LO-LO" alarm – LIT.</p>	Operator determines from JPM initial conditions or annunciator panel that the alarm is LIT.		
*2	Reset Containment Spray	<p>Operator resets both trains of Containment Spray</p> <p>Cue:</p> <p>Pushbuttons depressed and lights are illuminated</p>		
3	<ul style="list-style-type: none"> * • Stop 1A NS Pump * • Stop 1B NS Pump 	<p>Both NS pumps are stopped within 45 seconds of beginning step #1.</p> <p>Cue:</p> <p>Pushbutton depressed green light illuminated</p> <p>Cue:</p> <p>Pushbutton depressed green light illuminated</p> <p>Time critical stop time:</p> <p>-----</p>		
4	Check 1A NS Pump – AVAILABLE TO RUN.	Operator determines that the pump is available to run.		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
5	<p>Align A Train NS to containment sump as follows:</p> <ul style="list-style-type: none"> • Check 1NI-185A (RB Sump To Train A ND & NS) - OPEN • Close 1NS-20A (A NS Pump Suct From FWST) • Wait for 1NS-20A to close. • Open 1NS-18A (A NS Pump Suct From Cont Sump) <p><u>GO TO</u> Step 8.g</p>	<p>Same</p> <p>Cue:</p> <p>Red light is illuminated</p> <p>Same</p> <p>Cue:</p> <p>Pushbutton depressed</p> <p>Cue:</p> <p>Green light is illuminated</p> <p>Operator attempts to open valve, realizes it will not open, and then proceeds to RNO.</p> <p>Cue:</p> <p>Pushbutton depressed, <u>green</u> light is illuminated</p> <p>Same</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6	<p>Align B Train NS to containment sump as follows:</p> <ul style="list-style-type: none"> • Check 1NI-184B (RB Sump To Train B ND & NS) - OPEN * • Close 1NS-3B (B NS Pump Suct From FWST) • Wait for 1NS-3B to close. * • Open 1NS-1B (B NS Pump Suct From Cont Sump) • Check "NS SYS CPCS TRAIN B INHIBIT" status light (1SI-12) - DRK * • Start 1B NS Pump 	<p>Same</p> <p>Cue:</p> <p>Red light is illuminated</p> <p>Same</p> <p>Cue:</p> <p>Pushbutton depressed</p> <p>Cue:</p> <p>Green light is illuminated</p> <p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, Red light is illuminated</p> <p>Same</p> <p>Cue:</p> <p>Light is dark</p> <p>Same</p> <p>Cue:</p> <p>Pushbutton depressed Red light is illuminated</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6	<p>CONTINUED</p> <ul style="list-style-type: none"> * • Open 1RN-235B (B NS Hx Inlet Isol) * • Throttle open 1RN-238B (B NS Hx Outlet Isol) to establish 3100 GPM to 1B NS Hx. 	<p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, Red light is illuminated</p> <p>Operator throttles open valve to get 3100 GPM (+/- 400 GPM) RN flow to 1B NS Hx.</p> <p>Cue:</p> <p>Pushbutton depressed, red and green lights are illuminated, indicated flow increases to 3100 GPM</p>		
7	<p>Check both NS pumps – ON.</p>	<p>Operator determines that 1A NS pump is <u>not ON</u> and proceeds to RNO.</p> <p>Cue:</p> <p>Green light lit for 1A NS pump. Red light lit for 1B NS pump.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	<p>Perform the following:</p> <ul style="list-style-type: none"> • IF any NS pump is isolated from containment sump, THEN dispatch operator to pull control power fuses on affected NS pump to prevent it from starting with inadequate suction. • IF AT ANY TIME the idle NS pump(s) can be started, THEN ensure proper alignment PER Step 8.f or 8.g as required. 	<p>Same</p> <p>Cue: An operator has been dispatched to pull control power fuses on 1A NS pump.</p> <p>Operator reads step and continues to procedure step 9.</p>		
9	<p>Check if ND aux spray is required:</p> <ul style="list-style-type: none"> • Containment pressure – GREATER THAN 3 PSIG. 	<p>Operator checks Post Accident Containment pressure gages on Main control board and verifies Containment pressure is GREATER THAN 3 PSIG.</p> <p>Cue: Containment pressure gages indicate 4 PSIG.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	<p>Continued</p> <p>Check the following:</p> <ul style="list-style-type: none"> • Time after reactor trip – GREATER THAN 50 MINUTES • At least one of the following – ENERGIZED: <li style="padding-left: 40px;">1NI-173A (Train A ND To A & B CL) <li style="text-align: center;"><u>OR</u> <li style="padding-left: 40px;">1NI-178B (Train B ND To C & D CL) • Check if core cooling can be maintained with minimum S/I flow: <li style="padding-left: 40px;">At least one NV pump – ON <li style="padding-left: 40px;">At least one NI pump – ON 	<p>Operator determines from initial conditions that the Reactor tripped 60 minutes ago. Cue if needed.</p> <p>Cue:</p> <p>The Reactor tripped 60 minutes ago.</p> <p>Operator checks main control board indicating lights to see if at least one valve is energized.</p> <p>Cue:</p> <p>Red light illuminated.</p> <p>Cue:</p> <p>Red light illuminated.</p> <p>Same</p> <p>Cue:</p> <p>Red lights illuminated.</p> <p>Cue:</p> <p>Red lights illuminated.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	<p>Continued</p> <p>At least one of the following valves – OPEN</p> <p>1NI-9A (NC Cold Leg Inj From NV)</p> <p><u>OR</u></p> <p>1NI-10B (NC Cold Leg Inj From NV)</p> <ul style="list-style-type: none"> Establish ND aux spray from one train that is in Cold Leg Recirc mode: <p>For A train:</p> <p>* Close 1NI-173A (Train A ND To A & B CL)</p> <p>* Open 1NS-43A (A Train ND To NS Cont Outside Isol)</p> <p><u>OR</u></p>	<p>Operator checks at least one valve open.</p> <p>Cue:</p> <p>Red light illuminated.</p> <p>Cue:</p> <p>Red light illuminated.</p> <p><u>Note to evaluator:</u> It is Critical that <u>only one</u> train is aligned per the following steps. <u>Either</u> train can be used. N/A the steps for the unused train.</p> <p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, green light illuminated.</p> <p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, red light illuminated.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	<p>Continued</p> <p>For B train:</p> <p style="padding-left: 40px;">* Close 1NI-178B (Train B ND To C & D CL)</p> <p style="padding-left: 40px;">* Open 1NS-38B (B Train ND To NS Cont Outside Isol)</p>	<p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, green light illuminated.</p> <p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, red light illuminated.</p>		
10	<p>WHEN time allows, THEN place INFO tag on ND Pump control switch PER Enclosure 3 (ND Pump Restart Requirement If Aux Spray Is Open).</p>	<p>Cue:</p> <p>Another operator has been directed to place the info tag per Enclosure 3.</p>		
11	<p>WHEN containment pressure less than 1 PSIG, THEN stop ND aux spray PER Enclosure 4 (Securing ND Aux Containment Spray).</p>	<p>Cue:</p> <p>Another operator has been directed to monitor containment pressure and complete this procedure.</p>		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

You are the Unit 1 Balance of Plant (BOP) Operator. One hour ago, the Unit 1 reactor tripped due to a LOCA inside of containment.

EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirc) has been implemented and completed through step # 7. Containment pressure is approximately 4 psig. The "FWST Level Lo-Lo" Alarm has just been received.

The SRO instructs you to perform Steps 8 and 9 of EP/1/A/5000/ES-1.3 (Transfer To Cold Leg Recirc).

SIMULATOR OPERATOR GUIDELINES (NS-182A)

1. Reset to IC-39.
2. Insert Malfunction NC008A (Cold Leg LOCA) select loop = 1 (loop A).
3. Manually trip the Reactor, and stop all NCP's.
4. Close NV150 & 151.
5. Energize H2 Igniters.
6. Place RV pumps in MAN and OFF.
7. Reset CA Modulating valves and throttle CA flow to 50 gpm to each S/G.
8. Place the BOP panel switch to "SILENCE"
9. Insert OVR-NS014C (1A NS Pump Suction From CS Open PB) to "OFF".
10. Establish power to 1NI-173 and 1NI-178 by inserting the following LOA's:

LOA NI24 SET = RACKED IN
LOA NI25 SET = RACKED IN
11. When Lo Level in FWST Alarms, align for C/L Recirc by performing EP/ES-1.3 steps 1-7.
12. After alignment to C/L Recirc complete, allow FWST level to reach 33" (Lo-Lo Alarm)
13. Freeze simulator.

Note: Leave simulator frozen until ready to perform Step 1 of JPM

14. If NS Pump trips due to cavitation on low suction, reset EP153 Pump Motor overcurrent/cavitation 2 times.

TEMP SNAP # 126 (10-5-04)

Prepared By: Rob Billing
Reviewed By: N/A
Approved By: Alan Anton

TASK: **Respond to Additional Dropped Rods While Retrieving a Dropped Control Rod**

POSITION: **RO/SRO**

Operator's Name _____

Location: **Perform**

Method: **Simulator**

Estimated JPM Completion Time: 15 Minutes

Actual JPM Completion Time: _____ Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____ Date / /

References: AP/1/A/5500/14

Rod Control Malfunction

JPM verified current with references by _____

Date / /

Rev. 02/05-14-04

NOTES:

This JPM is designed to be performed as a **SIMULATION** or as a **WALKTHROUGH**. Cues found in shaded boxes should be given to the trainee for either setting.

INITIAL CONDITIONS

The unit is operating at 55% power with $T_{avg} = T_{REF}$. Control Rod M-4 in "D" Control Bank has dropped to the bottom of the core. The unit is conditioned for 100% power and the rod has been dropped 15 minutes. AP/1/A/5500/14, (Rod Control Malfunction) has been implemented and completed through step 13 of Enclosure 1, (Response to a Dropped Control Rod). IAE has repaired the cause of the dropped rod.

The SRO instructs you to continue with Step 14 of Enclosure 1, (Response to a Dropped Control Rod) of AP/1/A/5500/14 (Rod Control Malfunction).

JPM OVERALL STANDARD:

Operator begins retrieval of Rod M-4 in Control Bank 'D'. The operator manually trips the Reactor per AP/14 immediate actions within 30 seconds of recognizing greater than one rod is dropped.

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	<p>Record the following in the Reactor Operator Logbook:</p> <p>Record step counter readings for the affected rod group</p> <p>Check affected rod location - IN CONTROL BANK</p> <p>Dispatch IAE to obtain Bank Overlap Display in Logic Cabinet (Rod Control Cabinets approximately 5 ft from floor)</p> <p>Record bank overlap display.</p>	<p>Same</p> <p>Cue:</p> <p>Counter indicates 173 steps</p> <p>Operator determines from initial conditions that the affected rod is in a control bank</p> <p>Same</p> <p>Cue:</p> <p>IAE reports a Bank Overlap Counter reading of 475</p> <p>Operator records Bank Overlap Counter reading of 475.</p>		
*2	<p>Open coil disconnect switches on all lift coils in affected bank except for dropped rod</p>	<p>Operator opens all Control Bank "D" disconnects except M-4.</p> <p>Cue:</p> <p>All Control Bank "D" disconnect switches are in the up position, except for rod M-4</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*3	Transfer rod control from manual to affected bank using "CRD BANK SELECTOR"	Operator selects "CBD" Cue: Switch is rotated clockwise four positions		
4	<p>Check "ROD CONTROL URGENT FAILURE" alarm (1AD-2, A-10) – DARK</p> <p>Perform the following: Dispatch IAE to investigate alarm</p> <p>Do not continue until alarm reset</p> <p> </p> <p>Reset the "ROD CONTROL URGENT FAILURE" alarm (per the SRO's direction)</p>	<p>Operator observes alarm is LIT and proceeds to the <u>RNO</u>.</p> <p>Cue: Alarm is lit</p> <hr/> <p>Cue: IAE has repaired the cause of the alarm and requests you to reset the alarm using the Rod Control Alarm Reset pushbutton.</p> <hr/> <p>Cue: SRO directs you to reset the alarm per step 3, RNO b.</p> <hr/> <p>Operator resets the alarm AFTER receiving the cue.</p> <p>Cue: Pushbutton depressed, alarm has been reset</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
5	<p>Check DRPI indication for dropped rod:</p> <p>AT ZERO STEPS <u>OR</u> AT SIX STEPS</p>	<p>Operator determines DRPI indication for dropped rod indicates ZERO steps.</p> <p>Cue:</p> <p>DRPI indicates Rod M-4 is at ZERO STEPS.</p>		
6	<p><u>WHEN</u> "ROD CONTROL URGENT FAILURE" (1AD-2, A-10) alarm occurs in the next step, <u>THEN</u> acknowledge alarm and continue rod insertion in the "BANK SELECT" position.</p>	<p>Same</p>		
7	<p>Push rod control "IN" approximately 10 steps (on step counter) while ensuring all unaffected rods do not move</p>	<p>Same</p> <p>Cue:</p> <p>Unaffected rods are NOT moving</p> <p>Cue:</p> <p>"ROD CONTROL URGENT FAILURE" alarm is illuminated and acknowledge pushbutton has been depressed</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
8	Place affected rod group demand step counter to zero	Same Cue: Pushbutton depressed and rod group demand step counter reads zero		
9	Adjust boron concentration to maintain constant power level during rod withdrawal in next step	Cue: Another operator will adjust boron concentration as needed to maintain constant power level during rod withdrawal.		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
10	<p>Withdraw dropped rod to its recorded bank position</p> <p>Perform AP-14 immediate actions, Step #1, from memory:</p> <p>IF more than one rod dropped, THEN:</p> <p>* Trip reactor</p> <p>GO TO EP/1/A/5000/E-0 (Reactor Trip or Safety Injection).</p>	<p>Operator begins to withdraw rod M-4.</p> <p>Cue: Rod Control Lever placed in "Out" position and rod is being withdrawn.</p> <p>When rod M-4 is withdrawn to approx. 24 steps, the Simulator operator will drop group one of control bank A. Operator recognizes "more than one rod is dropped", manually trips the Reactor per AP/14 Immediate Actions within 30 seconds.</p> <p>Cue: Reactor is tripped. Note: Terminate the JPM once the Reactor is tripped.</p> <p>Cue: Another operator will continue in E-0.</p>		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

The unit is operating at 55% power with $T_{avg} = T_{REF}$. Control Rod M-4 in "D" Control Bank has dropped to the bottom of the core. The unit is conditioned for 100% power and the rod has been dropped 15 minutes. AP/1/A/5500/14, (Rod Control Malfunction) has been implemented and completed through step 13 of Enclosure 1, (Response to a Dropped Control Rod). IAE has repaired the cause of the dropped rod.

The SRO instructs you to continue with Step 14 of Enclosure 1, (Response to a Dropped Control Rod) of AP/1/A/5500/14 (Rod Control Malfunction).

SIMULATOR OPERATIONAL GUIDELINES (IRE-174-IA)

1. Reset simulator to IC-15, 55% Power BOL
2. Place in RUN and allow time to stabilize
3. Insert MAL-IRE006M4, Dropped Rod M-4, value Stationary Gripper
4. Perform the actions of AP/1/A/5500/14 up through subsequent step 13 of Enclosure 1.
5. Stabilize the plant. Acknowledge all alarms (including DRPI).
6. Clear MAL- IRE006M4
7. Freeze the Simulator
8. Go to RUN after Initial Conditions have been read.

Insert MAL-IRE007A (Dropped Rod Group CBA-1) when Rod M-4 is pulled out to approximately 24 steps in JPM step #10.

OR

1. Reset to **TEMP SNAP # 127 (10-5-04)**.
2. Go to RUN, allow plant to stabilize, acknowledge alarms (including DRPI), then go to FREEZE.
3. Go to RUN after Initial Conditions have been read.
4. Activate TRIGGER # 1 when Rod M-4 is pulled out to approximately 24 steps in JPM step #10.

Prepared By: Rob Billy

Reviewed By: _____

Approved By: Charles Sawyer

TASK: **Recover from a FWPT Trip**

POSITION: **RO/SRO**

Operator's Name _____

Location: **Simulator**

Method: **Perform**

Estimated JPM Completion Time: 20 Minutes

Actual JPM Completion Time: _____ Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____

Date / /

References: AP/1/A/5500/003

Load Rejection

JPM verified current with references by _____

Date / /

Rev. 00/11-19-04

FOR TRAINING PURPOSES ONLY

NOTES: This JPM is designed to be performed as a **SIMULATION** or as a **WALKTHROUGH**. Cues found in shaded boxes should be given to the trainee for either setting.

INITIAL CONDITIONS

Unit 1 was at 100% power when the '1A' feedwater pump tripped due to an apparent failure of its control oil system. AP/1/A/5500/003 (Load Rejection) has been implemented and completed up through step 8. The BOP has been designated to continuously monitor reactor power.

The SRO instructs you to perform steps 9 through 22 of AP/1/A/5500/003 (Load Rejection).

JPM OVERALL STANDARD: '1A' CF pump is removed from service and feedwater is maintained by the '1B' CF pump.

KA 054 AA2.06 4.0/4.3

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	Check condenser dump valves – MODULATING OPEN	Operator checks condenser dump valve indications and sees several in mid position. Cue: Red and green lights lit for several dump valves		
2	Check load rejection – DUE TO LOSS OF CF PUMP.	Operator realizes 1A CF pump has tripped per initial conditions and proceeds.		
3	Control CF flow as follows: • Check “CF FLOW” – GREATER THAN OR EQUAL TO “SM FLOW” * • Place <u>running</u> CF pump in manual.	Operator checks MCB meters or OAC and determines that CF flow is greater than SM flow. Cue: CF flow is approximately 5% greater than SM flow on each S/G. Operator places “1B” CF Pump controller to “MAN” Cue: Pushbutton depressed, manual light lit		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
3	<p>CONTINUED</p> <ul style="list-style-type: none"> Check "CF HEADER PRESSURE" – AT LEAST 100 PSIG ABOVE "STEAM HEADER PRESSURE" <p>(RNO 11.C)</p> <p>Manually control CF pump speed as follows:</p> <ul style="list-style-type: none"> * Maintain "CF FLOW" 5-10% greater than "SM FLOW" until S/G levels are greater than or equal to program level. 	<p>Operator uses MCB indications or OAC to determine CF pressure-SM pressure (Differential Pressure). Delta Pee will be <u>less than 100 psid</u> so they will proceed to the RNO 11.C.</p> <p>Cue:</p> <p>CF header pressure is 1120 PSIG. SM Header pressure is 1050 PSIG.</p> <p>Operator increases output of "1B" CF pump until "CF FLOW" is 5-10% greater than "SM FLOW" and maintains until levels are greater than or equal to program level.</p> <p>Note: Maintaining flow exactly within limits is not critical. It is acceptable to have flow rates outside the <u>desired</u> limits as long as it creates no significant consequences.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
3 *	<p>CONTINUED</p> <ul style="list-style-type: none"> WHEN S/G levels are greater than or equal to program level (and CF control valves begin closing), THEN adjust CF pump speed to maintain "CF HEADER PRESSURE" 100-120 PSIG above "STEAM HEADER PRESSURE" Do not continue until "CF HEADER PRESSURE" is 100-120 PSIG above "STEAM HEADER PRESSURE". GO TO Step 11.e. Place <u>tripped</u> CF pump in manual. 	<p>Operator ensures S/G levels are at or above program level then adjusts "1B" CF pump to attain "CF HEADER PRESSURE" 100-120 PSIG above "STEAM HEADER PRESSURE"</p> <p>Cue:</p> <p>All S/G levels are 53% N/R and CF HEADER PRESSURE" is 110 PSIG above "STEAM HEADER PRESSURE"</p> <p>Cue:</p> <p>CF HEADER PRESSURE" is 110 PSIG above "STEAM HEADER PRESSURE"</p> <p>Same</p> <p>Operator places "1B" CF Pump controller to "MAN"</p> <p>Cue:</p> <p>Pushbutton depressed, manual light lit</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	<p>Check "IBP AIR FLOW TROUBLE" alarm (1AD-11, J-5) - DARK</p>	<p>Same</p> <p>Cue:</p> <p>Lamp is dark</p>		
5	<p>Check Pzr pressure control response.</p> <ul style="list-style-type: none"> • Ensure Pzr heaters are in auto. • Ensure Pzr spray control valves are in auto. • Check Pzr PORVs – CLOSED • Check Pzr spray control valves – CLOSED 	<p>Same</p> <p>Cue:</p> <p>Switches are in auto.</p> <p>Cue:</p> <p>Switches are in auto.</p> <p>Cue:</p> <p>Green lights lit on all Pzr PORV's.</p> <p>Cue:</p> <p>Green lights lit on all Pzr Spray Valves.</p>		
6	<p>Check turbine impulse pressure – LESS THAN 260 PSIG.</p> <p><u>IF AT ANY TIME</u> turbine impulse pressure drops to less than 260 PSIG, <u>THEN GO TO</u> Step 15.</p> <p><u>GO TO</u> Step 18.</p>	<p>Operator checks turbine impulse pressure and proceeds to the RNO.</p> <p>Cue:</p> <p>Turbine impulse pressure reads 400 PSIG.</p> <p>Same</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
7	<p>Check Main Generator</p> <p>Check Generator Breakers – EITHER GENERATOR BREAKER CLOSED.</p> <p>Check Generator - TIED TO GRID.</p> <p>Check generator power factor – 0.9 to 1.0 LAGGING</p> <p><u>GO TO</u> Step 19</p>	<p>Same</p> <p>Cue:</p> <p>Both red lights are lit.</p> <p>Cue:</p> <p>Both Generator Breakers – CLOSED.</p> <p>Cue:</p> <p>Power Factor reads .95 Lagging</p> <p>Same</p>		
8	<p>REFER TO RP/0/A/5700/000 Classification of Emergency.</p>	<p>EXAMINER CUE:</p> <p>The OSM will refer to RP/000</p>		
9	<p><u>WHEN</u> transient is over, <u>THEN:</u></p> <p>Check reactor power - GREATER THAN 40%.</p>	<p>Same</p> <p>Cue:</p> <p>NI's read 55 % power</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	<p>CONTINUED</p> <p>Check S/G "CF FLOW" - LESS THAN 15%.</p> <p>(RNO 20.b)</p> <p>Perform the following:</p> <p>IF AT ANY TIME, CF flow will be maintained less than 15%, THEN RETURN TO Step 20.c to swap CF flow to S/G CF Bypass control valves.</p> <p>GO TO Step 20.g</p> <p>Check either CF pump - RUNNING IN AUTO.</p> <p>(RNO 20.g)</p> <p>IF desired to place CF pump in auto, THEN perform the following:</p>	<p>Operator determines CF flow is <u>NOT</u> less than 15% and proceeds to the RNO 20.b.</p> <p>Cue:</p> <p>CF flow reads 55%</p> <p>Operator marks step and proceeds to next step.</p> <p>Same</p> <p>Operator determines <u>NO</u> CF pumps are in "AUTO" and proceeds to RNO 20.g.</p> <p>EXAMINER CUE:</p> <p>Automatic CF pump operation is desired.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	<p>CONTINUED</p> <p>Calculate approximate CF pump D/P as follows:</p> <ul style="list-style-type: none"> • Program d/P = % Power x 1.3 + 45 	<p>Same</p> <p>Cue:</p> <p>Power is 55%</p> <hr/> <p>1.3 x 55 = 71.5 plus <u>45.0</u> equals 116.5</p> <p>Note: Actual power level may vary. The calculation above is for reference only.</p> <hr/> <p>Operator adjusts output of "1B" CF pump controller until actual D/P is approximately equal to program D/P.</p> <p>Cue:</p> <p>Actual D/P reads 115 psig.</p> <hr/> <p>Operator places "1B" CF pump controller to "AUTO"</p> <p>Cue:</p> <p>Pushbutton depressed, AUTO light lit</p>		
*	<ul style="list-style-type: none"> • Ensure actual D/P is approximately equal to program D/P. 			
*	<ul style="list-style-type: none"> • Place CF pump in auto. 			

* DENOTES CRITICAL

STOP!

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
<p>9</p> <p>*</p> <p>*</p>	<p>CONTINUED</p> <p>Throttle closed 1CM-420.</p> <p>WHEN 1CM-420 is closed, THEN check load rejection signal reset. (OAC turn on code "CM")</p> <p>Reposition manual loader for 1CM-420 to 100% open.</p> <p>If thermal power is greater than 15%, THEN within 4 hours of reaching stable conditions, ensure each power range channel is within 2% of heat balance.</p> <p>Check Tave – GREATER THAN 561°F.</p>	<p>Same</p> <p>Cue:</p> <p>Loader rotated fully closed.</p> <p>Operator checks OAC.</p> <p>Cue:</p> <p>Load rejection signal shows "reset" on OAC.</p> <p>Same</p> <p>Cue:</p> <p>Loader rotated fully open.</p> <hr/> <p>Examiner Cue:</p> <p>Another operator will monitor and respond if needed.</p> <hr/> <p>Same</p> <p>Cue:</p> <p>Tave is 574 degrees F.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	<p>CONTINUED</p> <p>Check "CONTROL ROD BANK LO LO LIMIT" alarm – DARK</p> <p>(RNO 20.m)</p> <p>Perform the following:</p> <ul style="list-style-type: none"> • Ensure a shutdown margin calculation is complete within 45 minutes of runback PER OP/0/A/6100/006 (Reactivity Balance Calculation), Enclosure 4.4 (Shutdown Margin-Unit at Power Modes 1 and 2). • WHEN calculation complete..... <p>Check "CONTROL ROD BANK LO LIMIT" alarm – DARK</p> <p>(RNO 20.n.)</p> <p>Ensure the "CONTROL BANK LO LIMIT" alarm clears as Xenon builds in.</p>	<p>Operator observes lamp is NOT DARK and proceeds to RNO 20.m.</p> <hr/> <p>Examiner Cue:</p> <p>Unit 2 will perform the shutdown margin calculation.</p> <hr/> <p>Operator will flag the step and proceed to step 20.n.</p> <hr/> <p>Operator observes lamp is NOT DARK and proceeds to RNO 20.n.</p> <hr/> <p>Operator indicates they will monitor the alarm as Xenon builds in.</p>		
10	<p>Check load rejection – DUE TO LOSS OF CF PUMP.</p>	<p>Operator realizes 1A CF pump has tripped per initial conditions and proceeds.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
11	<p>Reset CF pump recirc valves as follows:</p> <ul style="list-style-type: none"> • Close recirc valve manual loader for CF pump that is tripped. <ul style="list-style-type: none"> * ○ 1CF-76 (A CF pump) <li style="text-align: center;">OR ○ 1CF-81 (B CF pump) • Depress "A or B CF PUMP RECIRC VALVE CLOSURE CIRCUIT RESET" pushbutton and ensure red "ACTIVE" light goes out and yellow "RESET" light is lit. • Slowly open recirc valve on tripped CF pump while monitoring suction pressure of running CF pump. 	<p>Same</p> <p>Operator closes manual loader for 1CF-76 (A CF pump).</p> <p>Cue:</p> <p>Loader rotated fully closed.</p> <p>N/A</p> <p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, "ACTIVE" light is out and yellow "RESET" light is lit.</p> <p>Same</p> <p>Cue:</p> <p>Loader slowly rotated fully open. Suction pressure on 1B CF pump has decreased some but is still adequate.</p>		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

Unit 1 was at 100% power when the '1A' feedwater pump tripped due to an apparent failure of its control oil system. AP/1/A/5500/003 (Load Rejection) has been implemented and completed up through step 8. The BOP has been designated to continuously monitor reactor power.

The SRO instructs you to perform steps 9 through 22 of AP/1/A/5500/003 (Load Rejection).



SIMULATOR OPERATIONAL GUIDELINES (CF-237A)

1. Reset to IC-125
2. Freeze the simulator.

Prepared By: Rob Billy

Reviewed By: _____

Approved By: Charles Sawyer

TASK: **Align Normal Charging With NV Recirc Path Isolated**

POSITION: **RO**

Operator's Name _____

Location: **Simulator**

Method: **Perform**

Estimated JPM Completion Time: 15 Minutes

Actual JPM Completion Time: _____ Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____

Date / /

References: EP/1/A/5000/E-0
EP/1/A/5000/G-1

Reactor Trip or Safety Injection
Generic Enclosures

JPM verified current with references by _____

Date / /

INITIAL CONDITIONS

You are the Unit 1 Balance of Plant Operator (BOP).

Unit 1 is operating at 100% power when a spurious Safety Injection occurs. EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection) has been implemented by the C/R SRO. SI Termination criteria has been satisfied per step 23. EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection) has been completed through step 26.

The SRO directs you to isolate the NV S/I flowpath by completing step 27 of EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).

JPM OVERALL STANDARD: The NV normal flowpath is aligned and 1NI-9A and 1NI-10A are closed. Charging flow is established greater than or equal to 60 gpm.

NOTES:

KA 004 020 A4.02 3.7/3.3

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	<p>Isolate NV S/I flowpath: Check NV pumps miniflow valves- OPEN:</p> <p>1NV-150B (NV Pumps Recirculation)</p> <p>1NV-151A (NV Pumps Recirculation)</p>	<p>Same</p> <p>Operator determines 1NV-151A is not OPEN and proceeds to RNO.</p> <p>Cue: Red light is lit</p> <p>Cue: GREEN light is lit</p>		
2	<p>Perform the following: Open valves</p>	<p>Same</p> <p>Cue: Pushbutton depressed, GREEN light is lit</p>		
3	<p><u>IF</u> both valves open, <u>THEN GO TO</u> Step 27.b.</p>	<p>Operator determines that 1NV-151A is closed and proceeds to RNO 27.a.3.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
4	<p><u>IF</u> either valve closed, <u>THEN:</u> Dispatch operator to open valve(s):</p> <p>1NV-150B (aux bldg, 716+8, HH-55, room 627, NV pump room 1A, west of pump motor)</p> <p>1NV-151A (aux bldg, 716+9, HH-55, room 627, NV pump room 1A, west of pump motor)</p>	<p>Operator dispatches an NLO to open 1NV-151A</p> <p>Cue: An NLO has been dispatched to open 1NV-151A</p>		
5	<p>Realign charging <u>PER</u> EP/1/A/5000/G-1 (Generic Enclosures), Enclosure 18 (Aligning Normal Charging With NV Recirc Path Isolated)</p>	<p>Same</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6	Close 1NV-241 (Seal Inj Flow Control)	Same Cue: Control knob rotated counterclockwise, needle indicates at 0%		
*7	Open the following: 1NV-244A (Charging Line Cont Outside Isol) 1NV-245B (Charging Line Cont Outside Isol)	Same Cue: Pushbutton depressed, red light is lit Cue: Pushbutton depressed, red light is lit		
8	Check NC pressure - LESS THAN 2000 PSIG	Operator proceeds to RNO. Cue: Meter indicates 2275 PSIG		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
*9	Throttle open 1NV-241 (Seal Inj Flow Control) to 50%	Same Cue: Control knob rotated clockwise, needle indicates at 50%		
10	Place 1NV-238 (Charging Line Flow Control) manual loader in "MAN"	Same Cue: "Manual" pushbutton depressed		
11	Place 1NV-238 (Charging Line Flow Control) manual loader at one of the following settings: IF NC pressure is greater than 1800 PSIG, THEN place 1NV-238 full open. OR	Operator fully opens 1NV-238. Cue: Pushbutton depressed and needle indicates 100%		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
11	<p>CONTINUED</p> <p>IF NC pressure is between 1800 PSIG and 1200 PSIG, THEN place 1NV-238 at 40% open.</p> <p>OR</p> <p>IF NC pressure is less than 1200 PSIG, THEN place 1NV-238 at 30% open.</p>	<p>N/A</p> <p>N/A</p>		
*12	<p>Close the following:</p> <p>1NI-9A (NC Cold Leg Inj From NV)</p> <p>1NI-10B (NC Cold Leg Inj From NV)</p>	<p>Same</p> <p>Cue: Pushbutton depressed, green light is lit</p> <p>Cue: Pushbutton depressed, green light is lit</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
13	Throttle 1NV-238 (Charging Line Flow Control) and 1NV-241 (Seal Inj Flow Control) to: <ul style="list-style-type: none"> • Establish 60 GPM charging flow. • Maintain seal injection flow 6-10 GPM. 	Operator should establish as close to 60 gpm as possible without going below 60 due to concerns with taking the PZR solid (no letdown is in service) <p>Cue: Meter indicates 60 GPM</p> <p>Cue: Meters indicate 8 GPM flow to each pump</p>		
14	Maintain charging flow between 60 GPM and 175 GPM.	<p>Cue: Charging flow meter reads 80 GPM.</p>		
15	<u>RETURN TO</u> procedure and step in effect	Same <p>Operator goes to E-0, step 27 , RNO 3.c</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
16	WHEN both 1NV-150B and 1NV-151A open, THEN charging flow may be throttled to less than 60 GPM	Cue: The NLO has not completed opening 1NV-151A yet		
17	GO TO Step 29	Cue: Another operator will complete the procedure		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

You are the Unit 1 Balance of Plant Operator (BOP).

Unit 1 is operating at 100% power when a spurious Safety Injection occurs. EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection) has been implemented by the C/R SRO. SI Termination criteria has been satisfied per step 23. EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection) has been completed through step 26.

The SRO directs you to isolate the NV S/I flowpath by completing step 27 of EP/1/A/5000/E-0 (Reactor Trip Or Safety Injection).

SIMULATOR OPERATOR GUIDELINES

1. **Reset to IC-131**, place Simulator to RUN and allow the plant to stabilize.
2. Manually initiate Safety Injection
3. Perform all actions of EP/1/A/5000/E-0 through step 26
4. Close 1NV-151A
5. Insert OVR S/C NV82C SET = OFF (prevents 1NV-151A from opening)
6. Verify 1NV-151A will not open.
6. Freeze Simulator

Prepared By: Rob Billy

Reviewed By: _____

Approved By: Chad Sawyer

TASK: **Start and Load 1B D/G from the C/R Then Separate From the Grid**

POSITION: **RO/SRO**

Operator's Name _____

Location: **Simulator/ Plant**

Method: **Perform/Walkthrough**

Estimated JPM Completion Time: 20 Minutes

Actual JPM Completion Time: _____ Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____

Date / /

References: OP/1/A/6350/002

Diesel Generator

JPM verified current with references by _____

Date / /

Rev. 02/11-21-04

INITIAL CONDITIONS

Unit 1 is at 100 % power. You are the Unit 1 Balance of Plant Operator. The WCC SRO has just been notified that the NORMAL SUPPLY breaker to 1ETB from 1ATD needs to be removed for inspection by IAE. The OSM has decided not to swap to the other train due to problems with the "A" RN pump. To facilitate this request, OP/1/A/6350/002, DIESEL GENERATOR, Enclosure 4.2 (1B D/G Startup) has been implemented and completed up to step 3.8.

The C/R SRO directs you to complete the procedure by performing a normal start from the Control Room and subsequently separating from the Duke Grid. An NLO has a copy of the procedure and is in the 1B D/G room to monitor the equipment during startup.

JPM OVERALL STANDARD: Power to 4160V Bus 1ETB is being supplied from 1B D/G with Normal supply breaker from 1ATD open.

NOTES: This JPM is designed to be performed as a **SIMULATION** or as a **WALKTHROUGH**. Cues found in shaded boxes should be given to the trainee for either setting.

Examiner shall provide a copy of the procedure with all applicable steps through step 3.7 signed off.

KA 064000 A4.01 4.0/4.3

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	Place Control Room "1B D/G Mode Select" to positions where D/G will be started: <ul style="list-style-type: none"> • "LOCAL" to allow D/G to start from local panel. • "C/R" to start D/G from Control Room 	Same N/A Cue: Switch rotated to "C/R " position.		
2	IF desired to "Slow Start" D/G, perform the following.....	Based on the JPM initial conditions, the operator chooses to perform a normal start from the C/R. Give the following cue if needed: Cue: A "Slow Start" is not desired.		
3	IF performing start other than "Slow Start", perform one of the following: <ul style="list-style-type: none"> • Depress "START" on "1B Diesel Generator" <p style="text-align: center;">OR</p>	The operator chooses to perform a normal start from the C/R. Cue: Pushbutton depressed, red and green lights lit for 10 seconds. Red light lit, green light is dark.		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
3	<p>Continued</p> <ul style="list-style-type: none"> • Manually pull and then release plunger on front of relay "CD(SAB)" located lower left inside 1B Sequencer Control Cabinet (1DGLSB) <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Start D/G per PT/1/A/4350/055 B (1B D/G Slave Start Test) <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Start D/G per PT/1/A/4350/004 B (D/G 1B Load Sequencer Test) 	<p>N/A</p> <p>N/A</p> <p>N/A</p>		
4	<p>IF D/G started by pulling plunger on front of relay "CD(SAB)", check 95% speed light lit on front of 1B Sequencer Control Cabinet (1DGLSB).</p>	<p>Operator N/A's the step and continues.</p>		
5	<p>Record the following:</p> <p>D/G start time/date: _____</p> <p>Local panel start time _____</p>	<p>Operator records actual time, date and local panel start time.</p> <p>Cue: Time/date is current time and date.</p> <p>Cue: The NLO reports local panel start time is 9.5 seconds.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
6	Check governor oil level visible in sightglass while engine is idling.	<p>This step is checked locally. Operator simulates communicating with the NLO at the D/G.</p> <p>Cue:</p> <p>The NLO reports oil is visible in the sightglass.</p>		
7	<p>IF D/G idles more than 7 minutes, check the following: (may NOT be visible from floor at no load)</p> <p>Oil splashing on turbocharger intake side bearing sightglass</p> <p>Oil splashing on turbocharger exhaust side bearing sightglass</p>	<p>This step is checked locally. Operator simulates communicating with the NLO at the D/G.</p> <p>Note: Operator may N/A this step if D/G idles less than seven minutes</p> <p>Cue:</p> <p>The NLO reports oil is splashing on both sight glasses.</p>		
8	Check 1KDPG5050 (Jacket Water Pressure) greater than 24 psig.	<p>This step is checked locally. Operator simulates communicating with the NLO at the D/G.</p> <p>Cue:</p> <p>The NLO reports Jacket Water pressure is 36 psig.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	Check 1LDP5130 (Lube Oil Pressure) greater than 36 psig.	<p>This step is checked locally. Operator simulates communicating with the NLO at the D/G.</p> <p>Cue:</p> <p>The NLO reports lube oil pressure is 48 psig.</p>		
10	Place "Before & After Lube Oil Pump" in "AUTO".	<p>This step is performed locally. Operator simulates communicating with the NLO at the D/G.</p> <p>Cue:</p> <p>The NLO reports the Before and After Lube Oil pump has been placed in Auto.</p>		
11	<p>IF 1LD-113B (Lube Oil Filter Bypass Valve) indicates "OPEN", notify SWM immediately.</p> <hr/> <p>Person Contacted _____</p> <p>_____/_____ Date Time</p>	<p>This step is checked locally. Operator simulates communicating with the NLO at the D/G.</p> <p>Cue:</p> <p>The NLO reports 1LD-113B is closed.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
12	<p>WHEN D/G running AND Fuel Oil Booster Pump "OFF", check 1FDPG5010 (Fuel Oil Pressure) greater than 32 psig.</p>	<p>This step is checked locally. Operator simulates communicating with the NLO at the D/G</p>		
		<p>Cue: The NLO reports that Fuel Oil Pressure is 44 psig.</p>		
13	<p>Check the following on OAC (Turn-on Code RNESS1B):</p> <p>1RN-171B (1B KD Hx Supply Isol) indicates "OPEN"</p> <p>RN flow indicated through D/G Heat Exchanger</p>	<p>Operator checks OAC and/or control board indications.</p> <p>Cue: Red light lit.</p> <p>Cue: Meter reads 1500 gpm.</p>		
14	<p>Check the following:</p> <p>Steady-state D/G Volts 3740 - 4580V</p> <p>Steady-state D/G Frequency 58.8 - 61.2 Hz</p>	<p>Same</p> <p>Cue: Meter reads 4100 volts.</p> <p>Cue: Meter reads 60 hertz.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
15	<p>IF requested by Engineering or Maintenance for specific D/G voltage and frequency, perform the following:</p> <ul style="list-style-type: none"> • Adjust D/G voltage using "1B D/G Voltage Adjust" • Adjust D/G frequency using "1B D/G Gov Control" 	<p>Operator receives the following cue and continues to the next step.</p> <p>Cue: No specific adjustments have been requested.</p>		
16	<p>IF D/G is to remain unloaded, exit this enclosure.</p>	<p>Operator N/A's the step and continues.</p>		
17	<p>Ensure frequency 60 Hz using "1B D/G Gov Control".</p>	<p>Same</p> <p>Cue: Meter reads 60 hertz</p>		
18	<p>Check "Line Volts" 3960 - 4360 V.</p>	<p>Same</p> <p>Cue: Meter reads 4100 volts.</p>		
19	<p>Adjust D/G voltage 50 - 100 V higher than line voltage using "1B D/G Volt Adjust".</p>	<p>Operator adjusts D/G voltage 50-100 volts higher than line volts.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
20	IF OAC is available, check point M1D3356 (1B D/G Droop Permissive) indicates "COMPLETE".	Same Cue: OAC point indicates "COMPLETE".		
* 21	Place "1B D/G Sync Switch" to "ON".	Same Cue: Switch rotated clockwise.		
* 22	Using "1B D/G Gov Control", adjust D/G speed to allow synchroscope to move slowly in "FAST" (clockwise) direction.	Same Cue: Pushbutton depressed, synchroscope moving slowly in "FAST" (clockwise) direction		
* 23	WHEN synchroscope pointer within 3 minutes before 12 o'clock position, firmly depress and promptly release "CLOSE" for "1ETB Emergency Breaker".	Same Cue: Synchroscope at 3 minutes before 12 o'clock, pushbutton depressed, red light lit.		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
<p>24</p> <p>*</p>	<p>Perform the following concurrently:</p> <ul style="list-style-type: none"> Quickly raise D/G load to 1000 KW using "1B D/G Gov Control" Maintain power factor 0.90 - 0.92 lagging using "1B D/G Voltage Adjust" 	<p>Same</p> <p>Cue: Pushbutton depressed, KW meter increasing, Meter reads 1000 KW, Pushbutton released.</p> <p>Cue: Handle rotated counter clockwise, Power Factor at 0.9 lagging, handle released.</p>		
<p>25</p>	<p>Place "1B D/G Sync Switch" to "OFF".</p>	<p>Same</p> <p>Cue: Switch rotated counter clockwise.</p>		
<p>26</p>	<p>Check the following: (may NOT be visible from floor at low load)</p> <p>Oil splashing on turbocharger intake side bearing sightglass</p> <p>Oil splashing on turbocharger exhaust side bearing sightglass</p>	<p>This step is checked locally. Operator simulates communicating with the NLO at the D/G.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Cue: The NLO reports oil is splashing on both sightglasses</p> </div>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
27	<p>IF 1LD-113B (Lube Oil Filter Bypass Valve) indicates "OPEN"</p> <p style="text-align: center;">OR</p> <p>1LDPG5370 (1B D/G Lube Oil Filter D/P) greater than 12 psid, notify SWM immediately.</p>	<p>This step is checked locally. Operator simulates communicating with the NLO at the D/G.</p> <p>Cue:</p> <p>The NLO reports 1LD-113B is closed and filter D/P is 4 psid.</p>		
28	Operate D/G at 1000 KW for 5 minutes.	<p>Same</p> <p>Cue:</p> <p>Five minutes have elapsed.</p>		
29	<p>IF desired to operate D/G carrying 1ETB separated from Duke grid, perform the following:</p> <ul style="list-style-type: none"> • Log Off Site Power in TSAIL. 	<p>Operator increases D/G load until 1ATD amp meter reads <u>approximately</u> "0" amps, or Zero KW on OAC, then opens 1ETB Normal Supply breaker.</p> <p>Cue:</p> <p>The C/R SRO has logged OFF Site Power in TSAIL</p>	Summary	

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
29	<p>Continued</p> <p>IF 1ETB aligned to normal supply (1ATD), perform the following:</p> <ul style="list-style-type: none"> • Maintain power factor 0.90-0.92 lagging using "1B D/G Voltage Adjust" during load adjustment. * • Transfer load to 1B D/G using "1B D/G Gov Control" to obtain either of the following: <ul style="list-style-type: none"> • Zero amps on 1ATD ammeter on 1MC-11 • Zero KW on OAC point M1A0930 * • Open "1ETB Normal Breaker". • IF 1ETB aligned to standby supply (SATB), open "1ETB Standby Breaker". * • Ensure D/G voltage 4160 V using "1B D/G Voltage Adjust". 	<p>Cue:</p> <p>Voltage adjust handle rotated CW/CCW, Power factor reads 0.90 lagging</p> <p>Cue:</p> <p>Pushbutton depressed, amp meter decreasing, Meter reads "0" amps, Pushbutton released.</p> <p>Cue:</p> <p>Pushbutton depressed, Green light lit.</p> <p>N/A</p> <p>Cue:</p> <p>Handle rotated clockwise/CCW, Meter reads 4160 volts.</p>		

* DENOTES CRITICAL



STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
29 *	<p>Continued</p> <ul style="list-style-type: none"> • Ensure frequency 60 Hz using "1B D/G Gov Control". 	<p>Cue:</p> <p>"Lower" pushbutton depressed, Frequency reads 60 hertz.</p>		
30	<p>IF desired to operate D/G carrying 1ETB paralleled with Duke grid, perform the following....</p>	<p>Operator N/A's the step and continues.</p>		
31	<p>Perform the following every 4 hours of D/G operation: Check:</p> <ul style="list-style-type: none"> • Crankcase Oil Level visible in sight glass • Turbocharger oil levels • Governor actuator oil level • Pedestal Bearing Oil Level visible in sight glass • Oil Filer D/P < 12 	<p>RO will instruct NLO at D/G to check local items:</p> <p>Cue:</p> <p>The NLO has been notified.</p>		
32	<p>Notify Maintenance to lubricate starting air distributors every 12 hours.</p>	<p>Cue:</p> <p>Maintenance has been notified.</p>		
33	<p>Ensure all D/G starts logged in D/G Logbook.</p>	<p>Same</p> <p>Cue:</p> <p>Another Operator will complete the logbook entries.</p>		

STOP TIME _____

* DENOTES CRITICAL



SIMULATOR OPERATIONAL GUIDELINES (DG-198)

1. Reset Simulator to IC-39.
 2. Go to RUN.
- 
- 

INITIAL CONDITIONS

Unit 1 is at 100 % power. You are the Unit 1 Balance of Plant Operator. The WCC SRO has just been notified that the NORMAL SUPPLY breaker to 1ETB from 1ATD needs to be removed for inspection by IAE. The OSM has decided not to swap to the other train due to problems with the "A" RN pump. To facilitate this request, OP/1/A/6350/002, DIESEL GENERATOR, Enclosure 4.2 (1B D/G Startup) has been implemented and completed up to step 3.8.

The C/R SRO directs you to complete the procedure by performing a normal start from the Control Room and subsequently separating from the Duke Grid. An NLO has a copy of the procedure and is in the 1B D/G room to monitor the equipment during startup.

Duke Power Company
McGuire Nuclear Station

Procedure No.

OP/ 1/A/6350/002

Revision No.

099

Diesel Generator

Electronic Reference No.

MC00474X

Continuous Use

PERFORMANCE

***** UNCONTROLLED FOR PRINT *****

(ISSUED) - PDF Format

Revision History (significant issues, limited to one page)

- Rev 099 10/13/04
- Engineering calculation MCC-1210.04-00-0082, Instrument Loop Uncertainty for D/G Starting Air Receiver Tank Pressure determined minimum indicated VG Tank pressure is 218 psig (TS value of 210 psig + 8 psig instrument error). This affects VG values within procedure.
 - Enc. 4.3, 4.4, 4.11 and 4.12. added steps (and a note of explanation) to place B&A Lube Oil Pump in RUN during D/G coast down. Then placed pump in AUTO once D/G has stopped.
 - Enc. 4.5 and 4.6, added new Step 2.2 to notify Diesel Crew that the Startup Checklist is being performed. This allows the Diesel Crew to be present and take readings.
- Rev 098 04/13/04 Changed 1FD-149 to Locked Closed instead of Closed.
- Rev 097 03/03/04
- MGMM-13296 installed more accurate D/G Voltage and Line Voltage instruments. Enc. 4.1 Step 3.26 and Enc. 4.2 Step 3.26 have been modified to a new value range of 50 - 100V due to having more accurate voltage readings.
 - MGMM-14014 provides indication on the OAC that the "Droop Permissive" conditions are met prior to paralleling the D/G, and that the D/G is in "Droop Mode" once paralleled. Enc. 4.1 Step 3.27 and Enc. 4.2 Step 3.27 have been added to check the "Droop Permissive" indicates "COMPLETE" along with an explanatory caution.
 - Changed ITS references to TS.
 - Edited per Writer's Manual, and other changes to match counterpart procedures.
- Rev 096 02/24/04 Changed Fuel Oil Day Tank Level "from greater than 27.5 inches (120 gallons)" to "greater than 37 inches (160 gallons)" due to available volume to meet or exceed the 1/2 hour time period mentioned in the FSAR and Tech Spec, PIP 04-035.

Diesel Generator

1. Purpose

Define operation of the D/Gs.

2. Limits and Precautions

- 2.1 Operation of D/G at a reduced speed should be minimized. Due to possible damage to Exciter-Regulator and Generator Field, operation at speeds lower than normal must be assessed by System Engineer or IAE personnel and covered by applicable procedures.
- 2.2 Maximum differential temperature between cylinders is 200°F with D/G loaded greater than 1000 KW.
- 2.3 Maximum turbocharger speed is 15,000 rpm.
- 2.4 A minimum run time of 1 minute is required after any D/G start to ensure burnout of any excess fuel admitted to cylinders during start.
- 2.5 **IF** D/G is idled for greater than 30 minutes, D/G should be loaded to at least 3000 KW and run for one hour or greater to clean injector tips.
- 2.6 **IF** a sudden loss of crankcase vacuum is indicated, together with an unusual knock or sudden decrease in speed, stop engine with normal stop switch to ensure circulation of LD and KD for at least 20 minutes. Engine covers must remain in place during this cooling period, since engine vapors may ignite.
- 2.7 Allow D/G to come to a complete stop before re-starting.
- 2.8 To stop D/G following an auto start, the local control panel must be used.
- 2.9 Any spill in D/G room will be cleaned up per RP/0/A/5700/022 (Spill/Incident Response Procedure).

3. Procedure

See Section 4.

4. Enclosures

- 4.1 1A D/G Startup
- 4.2 1B D/G Startup
- 4.3 1A D/G Shutdown
- 4.4 1B D/G Shutdown
- 4.5 1A D/G Startup Checklist
- 4.6 1B D/G Startup Checklist
- 4.7 1A D/G Valve Checklist
- 4.8 1B D/G Valve Checklist
- 4.9 1A D/G Cylinders Fluid Check
- 4.10 1B D/G Cylinders Fluid Check
- 4.11 1A D/G Hot Bearing Deflection Measurements
- 4.12 1B D/G Hot Bearing Deflection Measurements

End of Body

1. Limits and Precautions

- 1.1 Operation of D/G at a reduced speed should be minimized. Due to possible damage to Exciter-Regulator and Generator Field, operation at speeds lower than normal must be assessed by System Engineer or IAE personnel and covered by applicable procedures.
- 1.2 Maximum differential temperature between cylinders is 200°F with D/G loaded greater than 1000 KW.
- 1.3 Maximum turbocharger speed is 15,000 rpm.
- 1.4 A minimum run time of 1 minute is required after any D/G start to ensure burnout of any excess fuel admitted to cylinders during start.
- 1.5 **IF** D/G is idled for greater than 30 minutes, D/G should be loaded to at least 3000 KW and run for one hour or greater to clean injector tips.
- 1.6 **IF** a sudden loss of crankcase vacuum is indicated, together with an unusual knock or sudden decrease in speed, stop engine with normal stop switch to ensure circulation of LD and KD for at least 20 minutes. Engine covers must remain in place during this cooling period, since engine vapors may ignite.
- 1.7 Allow D/G to come to a complete stop before re-starting.
- 1.8 Any spill in D/G room will be cleaned up per RP/0/A/5700/022 (Spill/Incident Response Procedure).

2. Initial Conditions

- ___ 2.1 Electrical Distribution Lineup has been completed per OP/0/A/6350/001 (Normal Power Checklist).
- ___ 2.2 Control Room has been informed that a startup of D/G is being performed.
- ___ 2.3 RN System in operation per OP/1/A/6400/006 (Nuclear Service Water System) and available to supply D/G Cooling Water Heat Exchanger.
- ___ 2.4 D/G battery charger in operation per OP/1/A/6350/006 (125 VDC Diesel Auxiliary Power).
- ___ 2.5 D/G Room Ventilation System in "AUTO".

3. Procedure

3.1 Evaluate all outstanding R&Rs that may impact performance of this procedure.

 3.2 **IF** D/G to carry 1ETB separate from grid, evaluate potential loss of 1ETB for other than
SRO auto start. (Auto start disables manual mode trips)

 3.3 **IF** B Train is operating train, evaluate swapping operating trains or delaying D/G run
SRO due to potential D/G fault causing loss of operating train. {PIP 99-3803 }

NOTE: **IF** multiple D/G starts are being performed, Enclosure 4.6 (1B D/G Startup Checklist) should only be performed once.

 3.4 **IF** time allows before D/G start, perform Enclosure 4.6 (1B D/G Startup Checklist).

3.5 Check all "Auto/Run" switches on Local Control Panel in "AUTO".

 3.6 Place "Before & After Lube Oil Pump" in "RUN".

3.7 Check 1LDP5130 (Lube Oil Pressure) stable.

3.8 Place Control Room "1B D/G Mode Select" to applicable position:

 • "LOCAL" to operate D/G from local panel

OR

 • "C/R" to operate D/G from Control Room

 3.9 **IF** desired to "Slow Start" D/G, perform the following:

 3.9.1 Declare 1B D/G inoperable.

SRO

 3.9.2 Notify Control Room to perform PT/1/A/4350/025 (Essential Auxiliary Power System Power Source Verification) within one hour of declaring D/G inoperable.

 3.9.3 Rotate "Load Limit" control knob on Woodward Governor Actuator counter
DV clockwise to "SLOW START" position.

 3.9.4 Depress "START" on "1B Diesel Generator".

 3.9.5 **WHEN** D/G has started, rotate "Load Limit" on Woodward Governor
DV Actuator fully clockwise (MAX FUEL).

 3.9.6 Evaluate operability of 1B D/G.

SRO

3.9.7 Go to Step 3.12.

NOTE: Key #172 is needed to access Sequencer Cabinet.

___ 3.10 **IF** performing start other than "Slow Start", perform one of the following:

- ___ • Depress "START" on "1B Diesel Generator"
- OR

CAUTION: **IF** relay plunger is pulled more than once **OR** held more than 3 seconds, a load shed of 1ETB will result.

- ___ • Manually pull and then release plunger on front of relay "CD(SAB)" located lower left inside 1B Sequencer Control Cabinet (1DGLSB)

OR

- ___ • Start D/G per PT/1/A/4350/055 B (1B D/G Slave Start Test)

OR

- ___ • Start D/G per PT/1/A/4350/004 B (1B D/G Periodic and Load Sequencer Test)

___ 3.11 **IF** D/G started by pulling plunger on front of relay "CD(SAB)", check 95% speed light lit on front of 1B Sequencer Control Cabinet (1DGLSB).

3.12 Record the following:

- D/G start time/date: _____
- Local panel start time: _____

NOTE: Governor sightglass oil level will vary during D/G operation. Level should be checked after D/G load is adjusted.

3.13 Check Governor oil visible in sightglass.

___ 3.14 **IF** D/G idles more than seven minutes, check the following:

- Oil splashing on turbocharger intake side bearing sightglass
- Oil splashing on turbocharger exhaust side bearing sightglass

3.15 Check 1KDPG5050 (Jacket Water Pressure) greater than 24 psig.

3.16 Check 1LDP5130 (Lube Oil Pressure) greater than 36 psig.

___ 3.17 Place "Before & After Lube Oil Pump" in "AUTO".

- _____ 3.18 **IF** 1LD-113B (Lube Oil Filter Bypass Valve) indicates "OPEN", notify WCC SRO immediately.
- _____ 3.19 **WHEN** D/G running **AND** Fuel Oil Booster Pump "OFF", check 1FDPG5010 (Fuel Oil Pressure) greater than 32 psig.
- 3.20 Check the following on OAC (Turn-on Code RNESS1B):
- 1RN-171B (1B KD HX Supply Isol) indicates "OPEN"
 - RN flow indicated through D/G Heat Exchanger
- 3.21 Check the following:
- Steady-state D/G Volts 3740 - 4580 V
 - Steady-state D/G Frequency 58.8 - 61.2 Hz
- _____ 3.22 **IF** requested by Engineering or Maintenance for specific D/G voltage and frequency, perform the following:
- _____ • Adjust D/G voltage using "1B D/G Voltage Adjust"
 - _____ • Adjust D/G frequency using "1B D/G Gov Control"
- _____ 3.23 **IF** D/G is to remain unloaded, exit this enclosure.
- _____ 3.24 Ensure frequency 60 Hz using "1B D/G Gov Control".
- 3.25 Check "Line Volts" 3960 - 4360 V.
- _____ 3.26 Adjust D/G voltage 50 – 100V higher than line voltage using "1B D/G Voltage Adjust".

CAUTION: Failure of the Droop Permissive could result in erratic D/G operation while paralleled to the bus.

- _____ 3.27 **IF** OAC is available, check OAC Point M1D3356 (1B D/G Droop Permissive) indicates "COMPLETE".
- _____ 3.28 Place "1B D/G Sync Switch" to "ON".

NOTE: Synchroscope should travel no faster than one revolution in 20 seconds.

- _____ 3.29 Using "1B D/G Gov Control", adjust D/G speed to allow synchroscope to move slowly in "FAST" (clockwise) direction.

Enclosure 4.2
1B D/G Startup

OP/1/A/6350/002
Page 5 of 8

- NOTE:**
- D/G load should be raised quickly after closing breaker to prevent reverse power condition.
 - Steps 3.30 - 3.31 may be completed and then signed off as time allows.

- _____ 3.30 **WHEN** synchroscope pointer is within three minutes before 12 o'clock position, firmly depress and promptly release "CLOSE" for "1ETB Emergency Breaker".
- 3.31 Perform the following concurrently:
- _____ • Quickly raise D/G load to 1000 KW using "1B D/G Gov Control"
 - _____ • Maintain power factor 0.90 - 0.92 lagging using "1B D/G Voltage Adjust"
- _____ 3.32 Place "1B D/G Sync Switch" to "OFF".
- _____ 3.33 Check the following:
- Oil splashing on turbocharger intake side bearing sightglass
 - Oil splashing on turbocharger exhaust side bearing sightglass
- _____ 3.34 **IF** 1LD-113B (Lube Oil Filter Bypass Valve) indicates "OPEN" **OR** 1LDPG5370 (1B D/G Lube Oil Filter D/P) greater than 12 psid, notify WCC SRO immediately.
- 3.35 Operate D/G at 1000 KW for 5 minutes.

Unit 1

Enclosure 4.2
1B D/G Startup

OP/1/A/6350/002
Page 6 of 8

- _____ 3.36 **IF** desired to operate D/G carrying 1ETB separated from Duke grid, perform the following:
- _____ 3.36.1 Log Off Site Power in TSAIL.
- _____ SRO 3.36.2 **IF** 1ETB aligned to normal supply (1ATD), perform the following:
- _____ 3.36.2.1 Maintain power factor 0.90 - 0.92 lagging using "1B D/G Voltage Control" during load adjustment.
- _____ 3.36.2.2 Transfer load to 1B D/G using "1B D/G Gov Control" to obtain either of the following:
- Zero amps on 1ATD ammeter on 1MC-11
 - Zero KW on OAC Point M1A0930
- _____ 3.36.2.3 Open "1ETB Normal Breaker".
- _____ 3.36.3 **IF** 1ETB aligned to standby supply (SATB), perform the following:
- _____ 3.36.3.1 Maintain power factor 0.90 - 0.92 lagging using "1B D/G Voltage Control" during load adjustment.
- _____ 3.36.3.2 Transfer load to 1B D/G using "1B D/G Gov Control" to obtain either of the following:
- Zero amps on SATB ammeter on 1MC-11
 - Zero KW on OAC Point M1A0865
- _____ 3.36.3.3 Open "1ETB Standby Breaker".
- _____ 3.36.4 Ensure D/G voltage 4160 V using "1B D/G Voltage Adjust".
- _____ 3.36.5 Ensure frequency 60 Hz using "1B D/G Gov Control".

3.37 **IF** desired to operate D/G carrying 1ETB paralleled with Duke grid, perform the following:

NOTE: D/G loading different from procedure may be performed as directed by System Engineer.

3.37.1 Raise D/G load to 2000 - 2100 KW as follows:

- Raise D/G load to 2000 - 2100 KW using "1B D/G Gov Control"
- Maintain power factor 0.90 - 0.92 lagging using "1B D/G Voltage Adjust"

3.37.2 **WHEN** D/G has operated at 2000 - 2100 KW for 10 minutes, perform the following:

- Raise D/G load to 3000 - 3100 KW using "1B D/G Gov Control"
- Maintain power factor 0.90 - 0.92 lagging using "1B D/G Voltage Adjust"

NOTE: The following step is performed to ensure proper firing pressures in order to minimize potential head gasket failure. {PIP-2-M98-4084}

3.37.3 Check Linkshaft Position Indicator (located right bank below turbocharger) between 10 degrees A.B.C. and 20 degrees B.B.C.

3.37.3.1 **IF** Linkshaft Position Indicator indicates outside above limits, notify System Engineer for evaluation.

_____/_____
Person Contacted Date Time

3.37.4 **WHEN** D/G has operated at 3000 - 3100 KW for 10 minutes, perform the following:

- Raise D/G load to 3800 KW using "1B D/G Gov Control"
- Maintain power factor 0.90 - 0.92 lagging using "1B D/G Voltage Adjust"

Enclosure 4.2

OP/1/A/6350/002

1B D/G Startup

Page 8 of 8

3.38 Perform the following every 4 hours of D/G operation:

3.38.1 Check:

- Crankcase Oil Level visible in sightglass
- Turbocharger Oil Levels (Exhaust and Intake Sides) in bull's eye with visible splashing on sightglass
- Governor actuator oil level within 1/8th inch of black line
- Pedestal Bearing oil level visible in sightglass
- 1LDPG5370 (1B D/G Lube Oil Filter D/P) indicating less than 12 psid

_____ 3.38.2 **IF** any parameter outside indicated range, notify WCC SRO for corrective action.

_____ 3.39 Notify Maintenance to lubricate starting air distributors every 12 hours.

_____/_____
Person Contacted Date Time

_____ 3.40 Ensure all D/G starts logged in D/G Logbook.

End of Enclosure

Prepared By Rob Billing
Reviewed By Gary Groat
Approved By L M Pope

TASK: **Control Steam Pressure Locally using SM PORV's**

POSITION: **NLO**

Operator's Name _____

Location: **Plant**

Method: **Walkthrough**

Estimated JPM Completion Time: 10 Minutes

Actual JPM Completion Time: Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____ Date / /

References: AP/1/A/5500/17

Loss of Control Room

JPM verified current with references by _____

Date / /

Rev. 10/10-29-01

INITIAL CONDITIONS

A Loss of Control Room has occurred at McGuire and AP/1/A/5500/17 (Loss of Control Room) has been implemented. The procedure is complete through subsequent action step 17. When Steam Generator pressure is checked in step 17, the RO discovers pressure to be 1185 PSIG and reports this to the SRO. The SRO desires to reduce pressure below the Safety Valve lift setpoint of 1170 PSIG.

The SRO dispatches you to locally control Steam Generator Pressure with the SM PORV's per AP/1/A/5500/17 (Loss of Control Room) Enclosure 7 (Manual Operation of PORVs).

JPM OVERALL STANDARD: 1SV-1 and 1SV-19 each 10% open and being controlled from the Unit 1 exterior doghouse

NOTES:

KA 041020 A4.08 3.0/3.1

TASK:MO-3018

START TIME _____

{PRIVATE STEPS}	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	Establish communication from doghouses to SRO at Aux Shutdown Panel.	<p>Operator states that they would use Plant Phone or Radio to establish communication with SRO at Unit 1 Aux Shutdown Panel.</p> <p>Cue:</p> <p>You are in communication with the SRO at the Aux Shutdown Panel</p>		

* DENOTES CRITICAL

{PRIVATE STEPS}	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2	<p>Operate valves 1SV-19 (A SM PORV) and 1SV-1 (D SM PORV) (exterior doghouse) using manual loaders as follows:</p> <p>Ensure the following controller knobs are in the full counterclockwise position:</p> <p>Manual loader 1SMML5521 (1A SM PORV (1SV-19) Local Manual Loader)</p> <p>Manual loader 1SMML5491 (1D SM PORV (1SV-1) Local Manual Loader)</p> <p>Ensure the following valves are open:</p> <p>A-1 (1A S/G LOCAL MANUAL LOADER INPUT ISOL)</p>	<p>1SV-19 and 1SV-1 controller knobs turned completely counterclockwise</p> <p>Same</p> <p>Cue: Control knob rotated counterclockwise</p> <p>Same</p> <p>Cue: Control knob rotated counterclockwise</p> <p>Same</p> <p>Cue: Knob rotated counterclockwise</p>		

* DENOTES CRITICAL

{PRIVATE STEPS}	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2	<p>CONTINUED</p> <p>D-1 (1D S/G LOCAL MANUAL LOADER INPUT ISOL)</p> <p>Close the following valves:</p> <p>* A-2 (1A S/G C/R MANUAL LOADER OUTPUT ISOL)</p> <p>* D-2 (1D S/G C/R MANUAL LOADER OUTPUT ISOL)</p> <p>Open the following valves:</p> <p>* A-3 (1A S/G LOCAL MANUAL LOADER OUTPUT ISOL)</p> <p>* D-3 (1D S/G LOCAL MANUAL LOADER OUTPUT ISOL)</p>	<p>Cue:</p> <p>Knob rotated counterclockwise</p> <p>Same</p> <p>Cue:</p> <p>Knob rotated clockwise</p> <p>Cue:</p> <p>Knob rotated clockwise</p> <p>Same</p> <p>Cue:</p> <p>Knob rotated counterclockwise</p> <p>Cue:</p> <p>Knob rotated counterclockwise</p>		

* DENOTES CRITICAL

{PRIVATE STEPS}	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
2 * *	<p>CONTINUED</p> <p>Adjust "1A SM PORV (1SV-19) LOCAL MANUAL LOADER" as directed by SRO</p> <p>Adjust "1D SM PORV (1SV-1) LOCAL MANUAL LOADER" as directed by SRO</p>	<p>Operator adjusts 1SV-19 to 10% open</p> <p>Cue: SRO requests that you adjust the manual loader to 10% open</p> <p>Cue: Control knob rotated clockwise and needle is at 10%</p> <p>Operator adjusts 1SV-1 to 10% open</p> <p>Cue: SRO requests that you adjust the manual loader to 10% open</p> <p>Cue: Control knob rotated clockwise and needle is at 10%</p>		
3	<p>Operate the following PER instruction tag near valves:</p> <p>1SV-13 (B S/G PORV)</p> <p>1SV-7 (C S/G PORV)</p>	<p>Cue:</p> <p>The SRO at the Auxiliary Shutdown Panel states that steam pressure is under control and no further local PORV operation is required</p>		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

A Loss of Control Room has occurred at McGuire and AP/1/A/5500/17 (Loss of Control Room) has been implemented. The procedure is complete through subsequent action step 17. When Steam Generator pressure is checked in step 17, the RO discovers pressure to be 1185 PSIG and reports this to the SRO. The SRO desires to reduce pressure below the Safety Valve lift setpoint of 1170 PSIG.

The SRO dispatches you to locally control Steam Generator Pressure with the SM PORV's per AP/1/A/5500/17 (Loss of Control Room) Enclosure 7 (Manual Operation of PORVs).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. Establish communication from doghouses to SRO at Aux Shutdown Panel.

NOTE A Main Steam Isolation signal or loss of VI will prevent operation of PORVs from manual loaders.

2. Operate valves 1SV-19 (A SM PORV) and 1SV-1 (D SM PORV) (exterior doghouse) using manual loaders as follows:

Operate the following PER instruction tag near valves:

- a. Ensure the following controller knobs are in the full counter clockwise position:
- • Manual loader 1SMML5521 (1A SM PORV (1SV-19) Local Manual Loader)
 - • Manual loader 1SMML5491 (1D SM PORV (1SV-1) Local Manual loader).
- b. Ensure the following valves are open:
- • A-1 (1A S/G Local Manual Loader Input Isol)
 - • D-1 (1D S/G Local Manual Loader Input Isol).
- c. Close the following valves:
- • A-2 (1A S/G C/R Manual Loader Output Isol)
 - • D-2 (1D S/G C/R Manual Loader Output Isol).
- d. Open the following valves:
- • A-3 (1A S/G Local Manual Loader Output Isol)
 - • D-3 (1D S/G Local Manual Loader Output Isol).

- • 1SV-19 (A SM PORV)
- • 1SV-1 (D SM PORV).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. (Continued)

- e. Adjust "1A SM PORV (1SV-19) LOCAL MANUAL LOADER" as directed by SRO.
- f. Adjust "1D SM PORV (1SV-1) LOCAL MANUAL LOADER" as directed by SRO.

3. Operate the following PER instruction tag near valves:

- • 1SV-13 (B SM PORV)
- • 1SV-7ABC (C SM PORV).

Prepared By: Rob Billing

Reviewed By: _____

Approved By: Chare Sawyer

TASK: **Borate Unit 2 Reactor Coolant System from the Auxiliary Shutdown Panel**

POSITION: **RO/SRO**

Operator's Name _____

Location: **Plant** Method: **Walkthrough**

Estimated JPM Completion Time: 10 Minutes

Actual JPM Completion Time: _____ Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____ Date / /

References: AP/2/A/5500/17 Loss of Control Room
 OP/2/A/6100/22 Unit 2 Data Book

JPM verified current with references by _____

Date / /

Rev. 03/11-21-04

INITIAL CONDITIONS

- Toxic fumes have forced the evacuation of the Control Room.
- AP/2/A/5500/17 (Loss of Control Room) has been implemented and completed through Step 20b. Plant control has been transferred to the Aux. Shutdown Panel.
- Unit 2 is now in Mode 3 at full temperature and pressure.
- 2A NV Pump is in operation and current NCS boron concentration is 1430 ppm.
- Control Rod positions cannot be determined in step 20.c of the procedure.

The SRO instructs you to emergency borate the NC System per AP/2/A/5500/17 (Loss of Control Room) step 20.c RNO.

JPM OVERALL STANDARD: Required volume of boric acid to increase NC System concentration to 2000 ppm is determined from Data Book and boric acid flow is initiated from the Auxiliary Shutdown Panel.

NOTES: Evaluator shall provide a copy of applicable section of AP/17 upon request. Evaluator shall provide a copy of the applicable Data Book tables to the examinee once the remote Data Book (in the CA pump room) is located. In this scenario, the ASP door would already be unlocked and open. However, in order to access the ASP controls for this JPM, key # 172 is needed. There is a key # 172 at the panel in a locked breakglass station. The keys an operator normally carries should unlock the breakglass station. If the operator does not have the proper key to unlock the breakglass station, they will have to return to the WCC and obtain one. The Evaluator may choose to have the examinee check out key # 172 from the WCC prior to JPM administration, in order to preclude delays.

Notify the Control Room at x4263 each time prior to opening and after reclosing the ASP door.

* Calculation to determine amount of Boric acid required to Borate to 2000 PPM from 1430 PPM is as follows:

1430 to 1700 = 3348 gal
1700 to 1900 = 2592 gal
1900 to 2000 = 1334 gal
Total = 7274 gallons

7274 gals = approximately 73 minutes
100 GPM

* **Note:** Operator may refer to Data Book Table 5.2 to evaluate the Correction factor (K). Since the unit is at full temperature and pressure, the Correction factor (K) is 1.0 and will not impact the calculation. Reference to table 5.2 is therefore not critical to the successful completion of this JPM.

KA 004 A2.14 3.8/3.9

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	<p>Perform the following:</p> <p>Determine the amount NC System must be borated:</p> <p><u>IF</u> two or more rods not fully inserted, <u>THEN</u> emergency borate 2100 gallons for each rod not fully inserted</p> <p><u>OR</u></p> <p><u>IF</u> rod positions can not be determined, <u>THEN</u> emergency borate to 2000 PPM.</p>	<p>Operator determines from initial conditions that rod position cannot be determined</p> <p>N/A</p> <p>Operator prepares to borate the NC System based on not being able to determine rod position</p>		
*				

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	<p>CONTINUED</p> <p>Borate as follows:</p> <ul style="list-style-type: none"> * Determine amount of boric acid to add from Data Book 	<p>Operator uses Data Book pages provided to determine the amount of acid needed, based on initial conditions (1430 PPM), to be (7274 gal ± 10 gal)</p> <p>Note: One calculation flowpath is shown below. Operator could use a different flowpath resulting in a slightly different answer. Give credit for answer within +/- 10 gallons.</p> <p>1430 to 1700 = 3348 gal 1700 to 1900 = 2592 gal 1900 to 2000 = 1334 gal Total = 7274 gallons</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT																
1	CONTINUED	<p>Note to Examiner: Ensure CR is called at x4263 before ASP door is opened.</p> <p>Operator will use key # 172 (per note on page 2 of this JPM) to open ASP door. All control switches have been placed in the local position as a result of previous procedure steps. The following components are aligned as indicated:</p> <table border="0"> <tr><td>2NV-241</td><td>70% open</td></tr> <tr><td>2NV-238</td><td>80% open</td></tr> <tr><td>2NV-13</td><td>Open</td></tr> <tr><td>2NV-16</td><td>Closed</td></tr> <tr><td>2A BA Pump</td><td>ON</td></tr> <tr><td>2B BA Pump</td><td>OFF</td></tr> <tr><td>2A NV Pump</td><td>ON</td></tr> <tr><td>2B NV Pump</td><td>OFF</td></tr> </table> <p>Same</p> <p>Cue: Pushbutton depressed, red light is lit</p>	2NV-241	70% open	2NV-238	80% open	2NV-13	Open	2NV-16	Closed	2A BA Pump	ON	2B BA Pump	OFF	2A NV Pump	ON	2B NV Pump	OFF		
2NV-241	70% open																			
2NV-238	80% open																			
2NV-13	Open																			
2NV-16	Closed																			
2A BA Pump	ON																			
2B BA Pump	OFF																			
2A NV Pump	ON																			
2B NV Pump	OFF																			
*	<ul style="list-style-type: none"> Open 2NV-265B (Boric Acid To NV Pumps) 	Same																		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
<p>1</p> <p style="text-align: right;">*</p>	<p>CONTINUED</p> <p>Start either BA Transfer pump</p> <p>Determine emergency boration flow from local gauge or assume 30 GPM emergency boration</p> <p>WHEN desired amount of boric acid is added, THEN:</p>	<p>Operator starts a pump or verifies one pump is running</p> <p>Cue: Pushbutton depressed, red light is lit <u>OR</u> Red light is lit.</p> <p>Cue: An NLO reports Emergency Boration flow is 100 GPM</p> <p>Note: The critical part of the following step is for the Operator to correctly determine the amount of time required to add boric acid. An answer of greater than 73 minutes is acceptable. Total = 7274 gallons = approximately 73 minutes at 100 GPM</p> <p>Cue: _____ Minutes (calculated time) have elapsed.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	<p>CONTINUED</p> <p>Ensure only one BA transfer pump is running</p>	<p>Operator stops one BA Transfer pump if two are running. Cue as appropriate based on number of pumps running</p> <p>Cue:</p> <p>2A BA pump red light is lit, 2B BA pump red light is lit</p> <p>Pushbutton depressed, green light is lit</p> <p style="text-align: center;"><u>OR</u></p> <p>2A BA pump red light is lit, 2B BA pump green light is lit</p>		
*	Close 2NV-265B	<p>Same</p> <p>Cue:</p> <p>Pushbutton depressed, green light is lit</p>		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

- Toxic fumes have forced the evacuation of the Control Room.
- AP/2/A/5500/17 (Loss of Control Room) has been implemented and completed through Step 20b. Plant control has been transferred to the Aux. Shutdown Panel.
- Unit 2 is now in Mode 3 at full temperature and pressure.
- 2A NV Pump is in operation and current NCS boron concentration is 1430 ppm.
- Control Rod positions cannot be determined in step 20.c of the procedure.

The SRO instructs you to emergency borate the NC System per AP/2/A/5500/17 (Loss of Control Room) step 20.c RNO.

UNIT 2

A. Purpose

To describe the steps to be taken to achieve and maintain Hot Standby in the event of a control room evacuation, except if a plant fire has damaged plant controls required to safely shutdown the plant or a security event in a vital area has the potential to damage controls required to safely shutdown the plant.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

B. Symptoms

- Any condition that renders the control room uninhabitable, unless a fire has damaged plant controls required to safely shutdown the plant or a security event in a vital area has the potential to damage controls required to safely shutdown the plant.

C. Operator Actions

___ 1. **IF AT ANY TIME a plant fire has damaged controls required to safely shutdown the unit OR a security event in a vital area has the potential to damage controls required to safely shutdown the unit, THEN GO TO AP/2/A/5500/24 (Loss Of Plant Control Due To Fire Or Sabotage) (Located in control room and SSF).**

___ 2. **IF time allows prior to leaving the control room, THEN:**

- ___ • Stop any power increases in progress.
- ___ • Secure any boron dilutions in progress.
- ___ • Take Unit 2 Emergency Keys from black box of keys located on Unit 1 BOP desk.
- ___ • Announce occurrence on page.

___ 3. **Notify station management to initiate actions to restore control room habitability.**

___ 4. **Check VI System - AVAILABLE.**

___ **REFER TO AP/2/A/5500/22 (Loss Of VI).**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE Keys to access Aux Shutdown Panel and CA Panels may be obtained from breakglass station at panels or from box taken in Step 2 (key #172).

5. **Dispatch operators to local operating locations as follows:**

- ___ a. One SRO to the Aux Shutdown panel to align valves **PER** Enclosure 1 (Aux Shutdown Panel Alignment).
- b. One RO to perform the following:
 - 1) **IF** boron dilution is known to still be in progress, **THEN** locally stop Unit 2 Reactor Makeup Water pumps at the "REACTOR MAKEUP WATER PUMPS CONTROL PANEL" (Aux Bldg 716, FW Pump area) as follows:
 - ___ a) Select "LOCAL" for the running Reactor Makeup Water pump.
 - ___ b) Select "STOP" for the running Reactor Makeup Water pump.
 - ___ 2) Go to the TD CA and MD CA pump local control panels and take control of CA **PER** Enclosure 2 (CA Pump Control).

CAUTION The operator at the reactor trip breakers shall not trip the reactor until directed to do so by the SRO at the Aux Shutdown panel.

- ___ c. One operator (an RO if available) to Unit 2 reactor trip breakers and standby.
- ___ c. **IF** the reactor trip breakers are inaccessible, **THEN** dispatch operator to 2LXF and 2LXG, and standby.

CAUTION The operator at the main turbine shall not trip the turbine until directed to do so by the SRO at the Aux Shutdown panel.

- ___ d. One operator to Unit 2 main turbine front standard and standby.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

6. **Establish communications PER
Enclosure 3 (Communications) with the
following:**

- a. SRO at the Aux Shutdown panel.
- b. RO at the TD CA and MD CA pump control panels.
- c. Operator at the reactor trip breakers.
- d. Operator at the main turbine front standard.

c. Operator at 2LXF and 2LXG.

7. **REFER TO RP/0/A/5700/000
(Classification of Emergency).**

8. **Check control room habitability -
RESTORED.**

Perform the following:

a. Do not continue until the following are met:

- Step 5 - COMPLETE
- Step 6 - COMPLETE
- Enclosure 1 (Aux Shutdown Panel Alignment) - COMPLETE
- Enclosure 2 (CA Pump Control) - COMPLETE THROUGH STEP 3.

b. **GO TO** Step 10.

9. **GO TO Enclosure 8 (Re-Manning
Control Room Alignment).**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE OAC terminals are located in the TSC and OAC room.

10. **The SRO directs as follows:**

___ a. Check operator - STANDING BY AT
UNIT 2 REACTOR TRIP BREAKERS.

a. **IF** reactor trip breakers inaccessible,
THEN perform the following:

___ 1) Notify operator at Unit 2 main
turbine to trip turbine.

___ 2) **WHEN** turbine tripped, **THEN** notify
operator at 2LXF and 2LXG to:

a) Trip MG sets by opening:

___ • 2LXF-1A (2A Control Rod
Drive MG Set Motor)

___ • 2LXG-1D (2B Control Rod
Drive MG Set Motor).

___ b) Proceed to OAC terminal to
monitor plant parameters as
directed by SRO at Aux
Shutdown panel.

___ 3) **GO TO** Step 10.c.

b. Notify operator at Unit 2 reactor trip
breakers to:

___ 1) Trip reactor.

___ 2) Proceed to OAC terminal to monitor
plant parameters as directed by
SRO at Aux Shutdown panel.

UNIT 2

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10. (Continued)

c. Notify operator at Unit 2 main turbine to:

___ 1) Check all throttle valves - CLOSED.

___ 1) Trip main turbine.

___ 2) Trip both Unit 2 CF pumps.

3) Close the following valves:

___ • 2SP-1 (SM To CF Pump 2A Isol)
(Unit 2 turbine bldg, 760+14,
2H-26, east of CF pump 2A)

___ • 2SP-2 (SM To CF Pump 2B Isol)
(Unit 2 turbine bldg, 760+14,
2H-26, east of CF pump 2A).

d. Notify operator at CA panels to:

___ 1) Ensure MD CA pumps have started.

___ 2) Control CA flow **PER** Enclosure 2
(CA Pump Control).

___ 11. **IF AT ANY TIME the Aux Shutdown panel controls are not responding properly, AND unit cannot be safely shutdown, THEN GO TO AP/2/A/5500/24 (Loss Of Plant Control Due To Fire Or Sabotage) (Located in control room and SSF).**

UNIT 2

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 12. **Check NC Cold Leg temperature -
STABLE OR TRENDING TO 557°F.**

**IF NC Cold Leg temperature is less than
557°F AND going down, THEN:**

a. Control CA flow as follows:

___ 1) Maintain total CA flow greater than
450 GPM until at least one S/G WR
level is greater than 55%.

___ 2) **WHEN** W/R level is greater than
55% in at least one S/G, **THEN**
throttle CA flow to:

___ • Minimize cooldown

___ • Maintain at least one S/G W/R
level greater than 55%.

___ b. Dispatch operator to observe operation
of Unit 2 S/G SM PORVs (from outside
of doghouses).

___ c. **IF** SM PORV stuck open, **THEN**
dispatch operator to isolate.

___ d. **IF** cooldown continues, **THEN** dispatch
operator to close S/G MSIVs **PER**
Enclosure 4 (Manual Closure Of
Main Steam Isolation Valves).

e. **IF** cooldown continues, **THEN** dispatch
operator to fail the following valves
closed:

___ • 2SM-83 (A SM Line Drain Isol) (Unit 2
exterior doghouse, 750+7, GG-69, 4
ft from outer wall)

___ • 2SM-89 (B SM Line Drain Isol) (Unit 2
interior doghouse, 750+6, FF-59, in
corner against outer wall)

___ • 2SM-95 (C SM Line Drain Isol) (Unit 2
interior doghouse, 750+4, FF-59, in
corner against outer wall)

___ • 2SM-101 (D SM Line Drain Isol) (Unit
2 exterior doghouse, 750+7, GG-58,
northeast of GG-58).

UNIT 2

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13. **Control charging flow as follows:**

___ a. Have operator at OAC monitor Unit 2 NC pump seal injection flow.

___ a. Dispatch operator to monitor Unit 2 NC pump seal injection flow (aux bldg, 716, LL-61, in hallway to mechanical penetration room, 1 foot above floor).

b. Control 2NV-241 (Seal Inj Flow Control) and 2NV-238 (Charging Line Flow Control) to maintain:

___ b. **IF** Pzr level is less than 25%, **THEN** start second NV pump.

___ • NC pumps seal injection flow - GREATER THAN 6 GPM

___ • Pzr level - AT 25%

___ • Regenerative HX letdown temperature - LESS THAN 380°F.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

__ 14. **Check letdown - IN SERVICE.**

Establish excess letdown as follows:

a. Dispatch operator to open:

- __ • 2KC-305B (Excess L/D Hx Sup Hdr Cont Otsd Isol) (aux bldg, 716+12, CC-61, room 601, 9 ft north of CA Pump 2B, 1 ft from reactor bldg wall)
- __ • 2KC-315B (Excess L/D Hx Ret Hdr Cont Otsd Isol) (aux bldg, 716+15, CC-61, room 601, 6 ft north of CA Pump 2B, 1 ft from reactor building wall).

NOTE Opening and then closing 2NV-26 (Excess L/D Hx Outlet Cntrl) will reduce the possibility of water hammer by ensuring that the excess letdown line is filled with water.

- __ b. Open 2NV-26 (Excess L/D Hx Outlet Cntrl).
- __ c. Wait 2 minutes **THEN** close 2NV-26 (Excess L/D Hx Outlet Cntrl).
- d. **WHEN** dispatched operator opens 2KC-305B and 2KC-315B, **THEN** open the following valves:
 - __ • 2NV-24B (C NC Loop To Exs L/D Hx Isol)
 - __ • 2NV-25B (C NC Loop To Exs L/D Hx Isol).
- __ e. Slowly open 2NV-26 (Excess L/D Hx Outlet Cntrl) to maintain "EXCESS L/D HX TEMP" less than 200°F as indicated on OAC (M2A0716).
- __ f. Notify Chemistry that Unit 2 excess letdown is in service.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION While in "LOCAL", 2A and 2B Pzr Heater Groups will not cycle to maintain Pzr pressure and will not trip on low Pzr level.

___ 15. Check Pzr pressure - AT 2235 PSIG.

Control Pzr pressure using the following as required:

- ___ • **IF** Pzr level is greater than 20%, **THEN** Pzr heaters may be used.
- ___ • **IF** normal letdown in service, **THEN** NV Aux Spray may be used **PER** Enclosure 5 (Aligning NV Aux Spray).
- ___ • Pzr PORVs.

___ 16. **WHEN** time and manpower allow, **THEN** maintain Unit 2 CA suction sources **PER** Enclosure 6 (Maintaining CA Suction Sources).

___ 17. Check S/G pressures - LESS THAN 1125 PSIG.

___ **IF** SM safeties lifting **AND** it is desired to reduce pressure below safety setpoint (1170 PSIG), **THEN** dispatch operator to control pressure with Unit 2 S/G SM PORVs **PER** Enclosure 7 (Manual Operation of PORVs).

UNIT 2

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

18. **Dispatch operator to start at least one Aux Electric Boiler as follows:**

a. Ensure the following valves are open:

- ___ • 1AS-74 (Unit 1 and Unit 2 AS Hdr Crosstie) (service bldg, 739+12, room 202, R-27, over B RL Pump)
- ___ • 2AS-74 (Unit 2 AS Hdr Isol) (service bldg, 739+14, room 202, S-27, above RL strainer).

b. Start Aux Electric Boiler(s) **PER** OP/1/B/6250/007 B (Auxiliary Electric Boilers):

- ___ • Enclosure 4.1 (Auxiliary Electric Boiler A Startup/Shutdown)
- ___ • Enclosure 4.2 (Auxiliary Electric Boiler B Startup/Shutdown).

___ c. **WHEN** at least one Aux Electric Boilers is in service, **THEN** dispatch operator to close 2AS-72 (SM To AS Control Outlet Isol) (Unit 2 turbine bldg, 739+10, 2E-34, right of Diesel Generator Lube Oil Tank).

19. **Check VCT Makeup capability:**

a. Have operator at Unit 2 OAC:

- ___ 1) Monitor VCT level.
- ___ 2) Notify SRO at aux shutdown panel if:
 - ___ • VCT level goes below 35%
 - OR
 - ___ • VCT level exceeds 80%.

a. Dispatch operator to Unit 2 local VCT gauge (aux bldg, 733, north hallway, 8 ft south of NN-60) to:

- ___ 1) Monitor VCT level.
- ___ 2) Notify SRO at aux shutdown panel if:
 - ___ • VCT level goes below 35%
 - OR
 - ___ • VCT level exceeds 80%.

UNIT 2

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19. (Continued)

b. **IF AT ANY TIME** VCT level is less than 35%, **THEN** dispatch operator to:

1) Open one of the following valves:

- • 2NV-221A (NV Pumps Suct From FWST) (aux bldg, 716+1, JJ-60, on wall north of BW pumps)

OR

- • 2NV-222B (NV Pumps Suct From FWST) (aux bldg, 716+8' JJ-60, on wall north of BW pumps).

2) Close one of the following valves:

- • 2NV-141A (VCT Outlet Isol) (aux bldg, 733+4, JJ-62, outside VCT room)

OR

- • 2NV-142B (VCT Outlet Isol) (aux bldg, 733+4, JJ-62, outside VCT room).

UNIT 2

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

19. (Continued)

c. **IF AT ANY TIME** VCT level exceeds 80%, **THEN** dispatch operator to shift Unit 2 NV pumps suction to VCT as follows:

1) Open the following valves:

- • 2NV-141A (VCT Outlet Isol) (aux bldg, 733+4, JJ-62, outside VCT room)
- • 2NV-142B (VCT Outlet Isol) (aux bldg, 733+4, JJ-62, outside VCT room).

2) Close the following valves:

- • 2NV-221A (NV Pumps Suct From FWST) (aux bldg, 716+1, JJ-60, on wall north of BW pumps)
- • 2NV-222B (NV Pumps Suct From FWST) (aux bldg, 716+8' JJ-60, on wall north of BW pumps).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

20. **Maintain shutdown margin greater than 1.3% Delta k/k:**

- a. Have Chemistry obtain Unit 2 boron concentration sample every hour until TSC directs them otherwise.

NOTE Automatic VCT makeup will continue at boron concentration set prior to evacuating the Control Room.

- ___ 1) **WHEN** boron sample results available, **THEN** check boron concentration - STABLE OR GOING UP.

- 1) **IF** boron dilution in effect, **THEN** borate as necessary to maintain boron concentration.
- ___ a) Open 2NV-265B (Boric Acid To NV Pumps).
- ___ b) Start either boric acid transfer pump.
- ___ c) Determine emergency boration flow from local gauge or assume 30 GPM emergency boration flow.
- d) **WHEN** desired amount of boric acid is added, **THEN**:
- ___ (1) Ensure only one boric acid transfer pump is running.
- ___ (2) Close 2NV-265B.

UNIT 2

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

20. (Continued)

___ b. Check NC Cold Leg temperature -
GREATER THAN 509°F.

b. Perform the following:

___ 1) **IF** NC Cold Leg temperature less
than 509°F prior to event, **THEN**
GO TO Step 20.d.

2) Borate as follows:

___ a) Open 2NV-265B (Boric Acid To
NV Pumps).

___ b) Start either boric acid transfer
pump.

c) **WHEN** all NC T-Colds are
above 509°F, **THEN**:

___ (1) Ensure only one boric acid
transfer pump is running.

___ (2) Close 2NV-265B.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

20. (Continued)

- c. Have operator at Unit 2 OAC check all rods fully inserted using OAC (turn on code "RODS").

c. Perform the following:

- 1) Determine the amount NC System must be borated:

- • **IF** two or more rods not fully inserted, **THEN** emergency borate 2100 gallons for each rod not fully inserted.

OR

- • **IF** rod positions can not be determined, **THEN** emergency borate to 2000 PPM.

- 2) Borate as follows:

- a) Determine amount of boric acid to add from Data Book.
- b) Open 2NV-265B (Boric Acid To NV Pumps).
- c) Start either boric acid transfer pump.
- d) Determine emergency boration flow from local gauge or assume 30 GPM emergency boration.
- e) **WHEN** desired amount of boric acid is added, **THEN**:
- (1) Ensure only one boric acid transfer pump is running.
- (2) Close 2NV-265B.

UNIT 2

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

20. (Continued)

___ d. Periodically check wide range
"NEUTRON FLUX TRN B SR" -
STABLE OR GOING DOWN.

d. Borate to 2000 PPM as follows:

- ___ 1) Open 2NV-265B (Boric Acid To NV Pumps).
- ___ 2) Start either boric acid transfer pump.
- ___ 3) Determine emergency boration flow from local gauge or assume 30 GPM emergency boration.
- ___ 4) Determine amount of boric acid to add to reach 2000 PPM from Data Book.
- ___ 5) **WHEN** desired amount of boric acid is added, **THEN**:
 - ___ a) Ensure only one boric acid transfer pump is running.
 - ___ b) Close 2NV-265B.

___ 21. **WHEN TSC is staffed, THEN request guidance on maintaining Unit 2 shutdown margin greater than 1.3% Delta k/k as xenon decays.**

22. **Dispatch operator to perform the following on Unit 2 main turbine:**

- ___ a. Verify Oil Lift pump starts at 600 RPM.
- ___ b. Ensure turning gear on.

___ a. Contact IAE to start Unit 2 Oil Lift pump.

___ 23. **Check Control Room habitability - RESTORED.**

Perform the following:

- ___ a. **IF** cooldown is desired, **THEN GO TO OP/2/A/6100/004** (Shutdown Outside The Control Room From Hot Standby To Cold Shutdown).
- ___ b. Consult the TSC for further guidance.

Prepared By: Rob Billings
Reviewed By: John H. Sells
Approved By: Walter Carter

TASK: **Aligning Nitrogen To Supply Control Air to D, E and F VI Compressors**

POSITION: **NLO**

Operator's Name _____

Location: **Plant** Method: **Walkthrough**

Estimated JPM Completion Time: 15 Minutes

Actual JPM Completion Time: _____ Minutes

The JPM Operator's performance was evaluated against the standards of this JPM and is determined to be:

SATISFACTORY/UNSATISFACTORY (circle one)

Evaluator's Signature _____ Date / /

References: AP/1/A/5500/22 Loss of VI

JPM verified current with references by _____

Date / /

Rev. 15/03-18-04

INITIAL CONDITIONS

You are the Unit 1 Service Building Rounds person.

A flexible coupling rupture on the Instrument Air System Header has caused all Instrument Air Compressors previously in service to trip. AP/1/A/5500/22 (Loss of VI) has been implemented. The C/R SRO has dispatched you to locally check the Air Compressors. You discover that D, E, and F Compressors have all tripped off and report this to the Control Room. The C/R SRO checks Instrument Air header pressure and discovers that pressure is less than 20 PSIG. A, B, and C VI Compressors are all out of service for a major modification.

The C/R SRO directs you to perform AP/1/A/5500/22 (Loss of VI), Enclosure 6 (Starting D, E, and F VI Compressors With Low Control Air).

JPM OVERALL STANDARD: Nitrogen from backup cylinders is aligned to D, E, and F VI compressors with pressure set between 90-100 psig.

NOTES:

Several valves that need to be operated during this JPM require the use of a ladder. If asked, cue the operator that they may assume ladders are available; however, they should not climb during performance of the JPM.

KA: APE065 AK3.08 3.7/3.9

TASK: MO-5012

START TIME _____

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
1	<p>Check VI pressure as read on 0MVIPT5090 (VI Supply to Unit 2 Hdr Press) (Unit 2 TB, 739, column 2N-32) – LESS THAN 70 PSIG.</p>	<p>Same</p> <p>Cue:</p> <p>Gage is indicating 15 PSIG.</p>		
2	<p>Check KR in service as follows:</p> <ul style="list-style-type: none"> • Any KR pump - RUNNING • KR pump discharge pressure - GREATER THAN 50 PSIG. 	<p>Operator checks local KR pump indications.</p> <p>Cue:</p> <p>B and C KR pumps are running</p> <p>Cue:</p> <p>Both gauges read 75 psig.</p>		
3	<p>Check D, E, and F VI compressors - ALL OFF</p>	<p>Operator determines from initial conditions that D, E and F VI compressors are off.</p>		
4	<p>Check VB compressor - RUNNING</p>	<p>Operator receives cue, then proceeds to <u>RNO</u>.</p> <p>Cue:</p> <p>Both Breathing Air Compressors are tagged out for maintenance</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
5	<p>Perform the following:</p> <p>Depress "START" on both VB compressors</p> <p>IF both VB compressors still off, <u>THEN GO TO</u> Step 19.</p>	<p>Operator receives cue, determines VB Compressors are not available and proceeds to RNO step 4.b.</p> <p>Cue:</p> <p>Both Breathing Air Compressors are tagged out for maintenance.</p> <p>Operator proceeds to step 19.</p>		
6	<p>Check D, E, and F VI compressors - ALL OFF</p>	<p>Operator determines from initial conditions that D, E and F VI compressors are off.</p>		
7	<p>Observe notes prior to Step 25 and <u>GO TO</u> Step 25.</p>	<p>Same</p>		
8	<p>Dispatch maintenance personnel or another operator to bring two additional 225 cubic feet nitrogen cylinders to service bldg, 739, column U-30 in case extra cylinders are needed.</p>	<p>Cue:</p> <p>Maintenance has been dispatched.</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	<p>Align nitrogen cylinders (located in service bldg, 739, column U-30) to supply control air to D, E, and F VI compressors as follows:</p>			
*	<p>Close "F VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of F VI compressor microcontroller panel).</p>	<p>Same Cue: Handle rotated 90⁰ clockwise</p>		
*	<p>Close 1VI-837 (Alternate VI Control Air Supply to D/E/F VI Compressors) (service bldg, 739, above F VI Compressor).</p>	<p>Same Cue: Handwheel rotated clockwise</p>		
*	<p>Close "D VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of D VI compressor microcontroller panel).</p>	<p>Same Cue: Handle rotated 90⁰ clockwise</p>		
*	<p>Close "E VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of E VI compressor microcontroller panel).</p>	<p>Same Cue: Handle rotated 90⁰ clockwise</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9	<p>CONTINUED</p> <p>Unlock and close 1VI-842 (Normal VI Control Air Supply to VI Compressors D, E, and F) (service bldg, 739, U-30, west side of column).</p> <p>Open 1VI-843 (VI Backup Compressed Nitrogen Cylinders Isol) (service bldg, 739, U-30, west side of column).</p> <p>Ensure pressure regulating knob on 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) (service bldg, 739, at column U-30) turned fully counterclockwise.</p> <p>Open isolation valve on top of each nitrogen cylinder.</p> <p>Open:</p> <ul style="list-style-type: none"> • 1VI-572 (VI Nitrogen Cylinder Isolation) (service bldg, 739, at column U-30) • 1VI-573 (VI Nitrogen Cylinder Isolation) (service bldg, 739, at column U-30). 	<p>Same</p> <p>Cue:</p> <p>Lock removed, handwheel rotated clockwise</p> <p>Same</p> <p>Cue:</p> <p>Handwheel rotated counterclockwise</p> <p>Same</p> <p>Cue:</p> <p>Regulator is turned fully counterclockwise.</p> <p>Cue:</p> <p>Handwheels rotated counterclockwise</p> <p>Cue:</p> <p>Handle rotated 90⁰ counterclockwise</p> <p>Cue:</p> <p>Handle rotated 90⁰ counterclockwise</p>		

* DENOTES CRITICAL

STEPS	ELEMENTS	STANDARD	S/U	COMMENTS REQUIRED FOR UNSAT
9 *	<p>CONTINUED</p> <p>Turn regulating knob on 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) (service bldg, 739, at column U-30) clockwise to obtain 90-100 PSIG outlet pressure.</p> <p>Periodically ensure 1VI-574 is maintaining 90-100 PSIG outlet pressure.</p>	<p>Same</p> <p>Cue:</p> <p>Knob turned clockwise, outlet pressure reads 98 psig.</p> <p>Operator explains that they will monitor and adjust regulator as needed to maintain 90-100 psig.</p>		
10	<p>Check D VI compressor - AVAILABLE FOR RESTART</p>	<p>Same</p> <p>Cue:</p> <p>D VI compressor is available for restart</p>		
11	<p>Start D VI compressor as follows.....</p>	<p>Operator receives cue, then terminates JPM.</p> <p>Cue:</p> <p>The SRO has directed another operator to start the D VI Compressor and complete this Enclosure.</p>		

STOP TIME _____

* DENOTES CRITICAL

INITIAL CONDITIONS

You are the Unit 1 Service Building Rounds person.

A flexible coupling rupture on the Instrument Air System Header has caused all Instrument Air Compressors previously in service to trip. AP/1/A/5500/22 (Loss of VI) has been implemented. The C/R SRO has dispatched you to locally check the Air Compressors. You discover that D, E, and F Compressors have all tripped off and report this to the Control Room. The C/R SRO checks Instrument Air header pressure and discovers that pressure is less than 20 PSIG. A, B, and C VI Compressors are all out of service for a major modification.

The C/R SRO directs you to perform AP/1/A/5500/22 (Loss of VI), Enclosure 6 (Starting D, E, and F VI Compressors With Low Control Air).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

1. Check VI pressure as read on 0MVIPT5090 (VI Supply to Unit 2 Hdr Press) (Unit 2 TB, 739, column 2N-32) - LESS THAN 70 PSIG.

Perform the following:

- a. IF any compressor (D, E, or F) off, THEN GO TO Enclosure 2 (Startup of D, E and F VI Compressors).
- b. Exit this enclosure.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

2. Check KR in service as follows:

- ___ • Any KR pump - RUNNING
- ___ • KR pump discharge pressure - GREATER THAN 50 PSIG.

Perform the following:

- ___ a. Check at least 4 ft in sight glass on side of KR Storage Tank.
- ___ b. **IF** KR Storage Tank level less than 4 ft, **THEN** cycle one of the following to maintain level greater than 4 ft:
 - ___ • 1KR-16 (KR Storage Tank YM Makeup Isol) (at KR Storage Tank)
- OR
- ___ • 1KR-97 (KR Storage Tank Makeup From CM Isol) (at KR Storage Tank).
- ___ c. **IF** KR pump running, **THEN** vent pump and system as necessary.
- ___ d. **IF** all KR pumps are off, **THEN**:
 - ___ 1) Select KR pump to be started.
 - ___ 2) Ensure selected pump is vented.
 - ___ 3) Throttle selected pump's discharge valve one quarter turn open:
 - ___ • A pump: 1KR-7 (Recirculated Cooling Water Pump A Disch Isol)
 - ___ • B pump: 1KR-8 (Recirculated Cooling Water Pump B Disch Isol)
 - ___ • C pump: 1KR-9 (Recirculated Cooling Water Pump C Disch Isol).
 - ___ 4) Have Control Room start selected pump.
 - ___ 5) Slowly open KR pump discharge valve.
 - ___ 6) **IF** available, **THEN** have Control Room start second pump.
- ___ e. **WHEN** time allows, **THEN REFER TO** OP/0/B/6400/004 (Recirculating Cooling Water System), Enclosure 4.1 (KR System Startup and Normal Operation).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 3. Check D, E, and F VI compressors - ALL OFF.

Perform the following:

NOTE D, E, and F VI compressors may not fully load with low control air pressure.

a. Ensure all available compressors are running:

___ • A, B, and C VI compressors **PER** Enclosure 3 (Startup of A, B, and C VI Compressors)

___ • G and H VI compressors **PER** Enclosure 4 (Diesel VI Compressor Operation).

___ b. **IF** VI pressure cannot be restored greater than 70 PSIG, **THEN** observe note prior to Step 4 and **GO TO** Step 4.

c. **IF** VI pressure can be restored greater 70 PSIG, **THEN** perform the following:

___ 1) Do not continue until VI pressure is greater than 70 PSIG.

___ 2) **IF** any compressor (D, E, or F) off, **THEN GO TO** Enclosure 2 (Startup of D, E and F VI Compressors).

___ 3) Exit this enclosure.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE Steps 4 through 18 align VB to the control air header for D, E, and F VI compressors to ensure proper operation.

___ 4. Check VB compressor - RUNNING.

Perform the following:

- ___ a. Depress "START" on both VB compressors.
- ___ b. **IF** both VB compressors still off, **THEN GO TO** Step 19.

___ 5. Check VB pressure (gauge on receiver tank) - GREATER THAN 70 PSIG.

Perform the following:

- a. **IF** VB pressure going up, **THEN** perform the following:
 - ___ 1) Do not continue until VB pressure is greater than 70 PSIG.
 - ___ 2) **GO TO** Step 6.
- ___ b. **IF** VB pressure greater than 70 PSIG cannot be established, **THEN GO TO** Step 19.

___ 6. Check 1VB-162 (A & B VB Compressors Discharge Isol) (service bldg, 739+10, Q-30, 6 ft from F VI Compressor panel) - OPEN.

Perform the following:

- ___ a. Open 1VB-162.
- ___ b. Do not continue until VB pressure is greater than 70 PSIG.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. **Align VB to supply control air to VI compressors as follows:**

___ a. Check D, E, and F VI compressors - ALL OFF.

a. Perform the following:

1) Open:

- ___ • 1VB-264 (VB to VI Comps Ctrl Air) (service bldg, 739+7, U-28, above 2EMF-31)
- ___ • 1VB-265 (E VI Compressor Backup Control Air Isol) (service bldg, 739+13, U-28, south of E VI Compressor)
- ___ • 1VB-266 (F VI Compressor Backup Control Air Isol) (service bldg, 739+7, above F VI Compressor).

___ 2) Close 1VI-837 (Alternate VI Control Air Supply to D/E/F VI Compressors) (service bldg, 739, above F VI Compressor).

___ 3) Unlock and close 1VI-842 (Normal VI Control Air Supply to VI Compressors D, E, and F) (service bldg, 739, U-30, west side of column).

___ 4) Do not continue until VB pressure (gauge on receiver tank) is greater than 70 PSIG.

___ 5) GO TO Step 8.

___ b. Close 1VI-837 (Alternate VI Control Air Supply to D/E/F VI Compressors) (service bldg, 739, above F VI Compressor).

___ c. Unlock and close 1VI-842 (Normal VI Control Air Supply to VI Compressors D, E, and F) (service bldg, 739, U-30, west side of column).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

7. (Continued)

- d. Open 1VB-264 (VB to VI Comps Ctrl Air) (service bldg, 739+7, U-28, above 2EMF-31).
- e. Open 1VB-265 (E VI Compressor Backup Control Air Isol) (service bldg, 739+13, U-28, south of E VI Compressor).
- f. Open 1VB-266 (F VI Compressor Backup Control Air Isol) (service bldg, 739+7, above F VI Compressor).

8. Check status of D VI compressor as follows:

- a. Check D VI compressor - OFF.

a. Perform the following:

- 1) IF compressor microcontroller panel indicates "SURGE UNLOAD", THEN reset the compressor as follows:

- a) Depress "RESET" pushbutton.
- b) Depress "LOAD" pushbutton.

- 2) GO TO Step 10.

- b. Check D VI compressor - AVAILABLE TO START.

- b. GO TO Step 10.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9. Start D VI compressor as follows:

- a. Check 1VI-839 (VI Supply to D VI Compressor Control Panel Hdr Isol) (service bldg, 739, next to D VI Compressor) - OPEN.
- b. Ensure "CONTROL POWER" switch in "ON".
- c. Ensure "EMERGENCY STOP" fully extended.
- d. Depress "RESET" pushbutton.
- e. Check compressor indicating - "READY".

- a. Open 1VI-839.

- e. Perform the following:

- 1) Check event log page in "INFO" folder to determine problem.
- 2) Do not start D VI compressor until problem with compressor has been resolved.
- 3) GO TO Step 10.

- f. Open the following to drain condensation:

- 1VI-448 (D VI Compressor Condensate Drn) (service bldg, at D VI compressor)
- 1VI-449 (D VI Compressor Condensate Drn) (service bldg, at D VI compressor)

- g. Do not continue until condensation drained from compressor.

- h. WHEN condensation drained, THEN throttle the following valves to 1/4 open:

- 1VI-448
- 1VI-449.

- i. Depress "UNLOAD" pushbutton.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

9. (Continued)

- ___ j. Depress "START" pushbutton.
 - ___ k. Wait approximately 30 seconds for compressor to reach operating speed.
 - ___ l. Check compressor indicating - "UNLOADED".
 - ___ m. Determine system pressure setpoint for D VI compressor as follows:
 - ___ • IF this is the first compressor started, THEN use "105 PSIG" for setpoint in next step.
 - ___ • IF this is the second compressor started, THEN use "100 PSIG" for setpoint in next step.
 - ___ • IF this is the third compressor started, THEN use "95 PSIG" for setpoint in next step.
 - ___ n. Enter pressure setpoint determined in Step 9.m into microcontroller per instructions on local placard.
 - ___ o. Depress "LOAD" pushbutton.
 - ___ p. Throttle the following drain valves to discharge all condensate and small amount of air:
 - ___ • 1VI-448 (D VI Compressor Condensate Drn)
 - ___ • 1VI-449 (D VI Compressor Condensate Drn)
- ___ l. IF compressor has tripped, THEN GO TO Step 10.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

10. Check status of E VI compressor as follows:

a. Check E VI compressor - OFF.

a. Perform the following:

1) **IF** compressor microcontroller panel indicates "SURGE UNLOAD", **THEN** reset the compressor as follows:

a) Depress "RESET" pushbutton.

b) Depress "LOAD" pushbutton.

2) GO TO Step 12.

b. Check E VI compressor - AVAILABLE TO START.

b. GO TO Step 12.

11. Start E VI compressor as follows:

a. Check 1VI-838 (VI Supply to E VI Compressor Control Panel Hdr Isol) (service bldg, 739+5, U-29, beside E VI Compressor Panel) - OPEN.

a. Open 1VI-838.

b. Ensure "CONTROL POWER" switch in "ON".

c. Ensure "EMERGENCY STOP" fully extended.

d. Depress "RESET" pushbutton.

e. Check compressor indicating - "READY".

e. Perform the following:

1) Check event log page in "INFO" folder to determine problem.

2) Do not start E VI compressor until problem with compressor has been resolved.

3) GO TO Step 12.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

11. (Continued)

- f. Open the following to drain condensation:
- ___ • 1VI-803 (E VI Compressor Condensate Drn) (service bldg, at E VI compressor)
 - ___ • 1VI-804 (E VI Compressor Condensate Drn) (service bldg, at E VI compressor).
- ___ g. Do not continue until condensation drained from compressor.
- h. WHEN condensation drained, THEN throttle the following valves to 1/4 open:
- ___ • 1VI-803
 - ___ • 1VI-804.
- ___ i. Depress "UNLOAD" pushbutton.
- ___ j. Depress "START" pushbutton.
- ___ k. Wait approximately 30 seconds for compressor to reach operating speed.
- ___ l. Check compressor indicating - "UNLOADED".
- ___ l. IF compressor has tripped, THEN GO TO Step 12.
- m. Determine system pressure setpoint for E VI compressor as follows:
- ___ • IF this is the first compressor started, THEN use "105 PSIG" for setpoint in next step.
 - ___ • IF this is the second compressor started, THEN use "100 PSIG" for setpoint in next step.
 - ___ • IF this is the third compressor started, THEN use "95 PSIG" for setpoint in next step.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

11. (Continued)

- ___ n. Enter pressure setpoint determined in Step 11.m into microcontroller per instructions on local placard.
- ___ o. Depress "LOAD" pushbutton.
- p. Throttle the following drain valves to discharge all condensate and small amount of air:
 - ___ • 1VI-803 (E VI Compressor Condensate Drn)
 - ___ • 1VI-804 (E VI Compressor Condensate Drn).

12. Check status of F VI compressor as follows:

- ___ a. Check F VI compressor - OFF.

- a. Perform the following:

- 1) **IF** compressor microcontroller panel indicates "SURGE UNLOAD", **THEN** reset the compressor as follows:

- ___ a) Depress "RESET" pushbutton.

- ___ b) Depress "LOAD" pushbutton.

- ___ 2) GO TO Step 14.

- ___ b. Check F VI compressor - AVAILABLE TO START.

- ___ b. GO TO Step 14.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13. Start F VI compressor as follows:

a. Check 1VI-841 (VI Supply to F VI Compressor Control Panel Hdr Isol) (service bldg, 739+1, on F VI Compressor skid next to control panel 1 ft from floor) - OPEN.

b. Ensure "CONTROL POWER" switch in "ON".

c. Ensure "EMERGENCY STOP" fully extended.

d. Depress "RESET" pushbutton.

e. Check compressor indicating - "READY".

f. Open the following to drain condensation:

• 1VI-808 (F VI Compressor Condensate Drn) (service bldg, at F VI compressor)

• 1VI-809 (F VI Compressor Condensate Drn) (service bldg, at F VI compressor)

g. Do not continue until condensation drained from compressor.

h. WHEN condensation drained, THEN throttle the following valves to 1/4 open:

• 1VI-808

• 1VI-809.

i. Depress "UNLOAD" pushbutton.

j. Depress "START" pushbutton.

a. Open 1VI-841.

e. Perform the following:

1) Check event log page in "INFO" folder to determine problem.

2) GO TO Step 14.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

13. (Continued)

- k. Wait approximately 30 seconds for compressor to reach operating speed.
 - l. Check compressor indicating - "UNLOADED".
 - m. Determine system pressure setpoint for F VI compressor as follows:
 - IF this is the first compressor started, THEN use "105 PSIG" for setpoint in next step.
 - IF this is the second compressor started, THEN use "100 PSIG" for setpoint in next step.
 - IF this is the third compressor started, THEN use "95 PSIG" for setpoint in next step.
 - n. Enter pressure setpoint determined in Step 13.m into microcontroller per instructions on local placard.
 - o. Depress "LOAD" pushbutton.
 - p. Throttle the following drain valves to discharge all condensate and small amount of air:
 - 1VI-808 (F VI Compressor Condensate Drn)
 - 1VI-809 (F VI Compressor Condensate Drn).
- l. IF compressor has tripped, THEN GO TO Step 14.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 14. Check VI pressure as read on
0MVIPT5090 (VI Supply to Unit 2 Hdr
Press) (Unit 2 TB, 739, column 2N-32) -
GREATER THAN 70 PSIG.

Perform the following:

- ___ a. IF AT ANY TIME it appears that running compressors will not be able to raise VI header pressure above 70 PSIG, THEN perform Step 16.
- ___ b. Observe caution prior to Step 17 and GO TO Step 17.

___ 15. Observe caution prior to Step 17 and GO TO Step 17.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

16. **IF AT ANY TIME** it appears that running compressors will not be able to raise VI header pressure above 70 PSIG, **THEN** perform the following:

- ___ a. **IF** loss of power to F VI compressor has occurred, **THEN** align to energized power source **PER** OP/0/A/6450/005 (Instrument Air System), Enclosure 4.5 (F VI Compressor Operation) (satellite file located beside lube oil station door).

- b. Start additional compressors as required:
 - ___ • D VI compressor **PER** Step 9
 - ___ • E VI compressor **PER** Step 11
 - ___ • F VI compressor **PER** Step 13
 - ___ • A, B, and C VI compressors **PER** Enclosure 3 (Startup of A, B, and C VI Compressors)
 - ___ • G and H VI compressors **PER** Enclosure 4 (Diesel VI Compressor Operation).

- ___ c. **IF** running compressors still not able to raise VI header pressure above 70 PSIG, **THEN** contact station management to evaluate isolating VI to turbine bldg headers **PER** Enclosure 16 (Isolation of Unit 1 and Unit 2 Turbine Bldg VI Headers).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION Realigning control air in next step must be done slowly to avoid compressor trip.

17. **WHEN** VI pressure is greater than 70 PSIG, as read on 0MVIPT5090 (VI Supply to Unit 2 Hdr Press) (Unit 2 TB, 739, column 2N-32), **THEN** realign VI compressors D, E, and F control air to VI header as follows:

- ___ a. Allow VI header pressure to return as close as possible to VB pressure, prior to continuing in this enclosure.
- ___ b. Very slowly open and lock 1VI-842 (Normal VI Control Air Supply to VI Compressors D, E, and F) (service bldg, 739, U-30, west side of column).
- ___ c. Very slowly open 1VI-837 (Alternate VI Control Air Supply to D/E/F VI Compressors) (service bldg, 739, above F VI Compressor).
- ___ d. Very slowly close 1VB-266 (F VI Compressor Backup Control Air Isol) (service bldg, 739+7, above F VI Compressor).
- ___ e. Very slowly close 1VB-265 (E VI Compressor Backup Control Air Isol) (service bldg, 739+13, U-28, south of E VI Compressor).
- ___ f. Very slowly close 1VB-264 (VB to VI Comps Ctrl Air) (service bldg, 739+7, U-28, above 2EMF-31).

___ 18. **Exit this enclosure.**

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 19. Check D, E, and F compressors - ALL OFF.

___ Observe note prior to Step 21 and GO TO Step 21.

___ 20. Observe notes prior to Step 25 and GO TO Step 25.

NOTE

- The local readout of VI compressor flow rate (instruments 0VIFT6500, 0VIFT6510, 0VIFT6520) must be multiplied by 10 to obtain the actual compressor flow rate in the next step.
- If VI compressor flowrate is less than 200 SCFM, the compressor is considered unloaded.

___ 21. Using local VI compressor discharge flow instruments (service bldg, 739, column U29), check any VI compressor discharge flow rate - GREATER THAN 200 SCFM.

Perform the following:

- a. Stop D, E, and F VI compressors by performing the following on each running compressor:
 - ___ 1) Depress "UNLOAD" pushbutton.
 - ___ 2) Depress "STOP" pushbutton.
- ___ b. Observe notes prior to Step 25 and GO TO Step 25 to restart VI compressors with nitrogen aligned to control air header.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

NOTE D, E, and F VI compressors respond to low control air pressure as follows:

- VI compressor inlet and bypass valves require control air to operate. As control air pressure drops below 70 PSIG, these valves begin moving toward their fail safe position, causing compressor output to go down. If control air pressure continues to drop, these valves eventually reach their fail safe position, and the compressor will be fully unloaded.
- Compressor "surge" is another possible outcome of low control air pressure. If the VI compressor inlet valve fails closed faster than the bypass valve fails open, a reversal of flow through the compressor may occur, resulting in "surge". If surge occurs, the compressor will automatically unload, and control air must be restored to re-load the compressor.
- If control air pressure drops low enough, the compressor will trip on low seal air pressure.

22. **Contact station management to evaluate the following actions as necessary to restore VI:**

a. Continue efforts to start available VI compressors:

- ___ • A, B, and C VI compressors PER Enclosure 3 (Startup of A, B, and C VI Compressors)
- ___ • G and H VI compressors PER Enclosure 4 (Diesel VI Compressor Operation).

___ b. Continue efforts to isolate VI leaks.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

22. (Continued)

NOTE If VI pressure is stable, isolating headers may reduce load enough for running compressors to raise VI system pressure to normal.

- ___ c. Evaluate isolating Unit 1 and/or Unit 2 Turbine Bldg VI headers as necessary to raise VI pressure above 70 PSIG PER Enclosure 16 (Isolation of Unit 1 and Unit 2 Turbine Bldg VI Headers).

NOTE If VI pressure is going down, it may be necessary to align nitrogen to the VI compressor control air header in order to restore full VI compressor capacity. Aligning nitrogen however, requires first stopping D, E, and F, VI compressors due to the limited amount of nitrogen available.

- d. Evaluate aligning nitrogen to control air header as follows:

1) Stop D, E, and F VI compressors by performing the following on each running compressor:

- ___ a) Depress "UNLOAD" pushbutton.
___ b) Depress "STOP" pushbutton.

___ 2) Observe notes prior to Step 25 and GO TO Step 25 to restart VI compressors with nitrogen aligned to control air header.

___ 23. Do not continue until VI pressure is greater than 70 PSIG.

___ 24. Exit this enclosure.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- NOTE**
- Subsequent steps use nitrogen cylinders as control air for VI compressors.
 - Two nitrogen cylinders are installed in the service bldg, 739, column U-30.

___ 25. **Dispatch maintenance personnel or another operator to bring two additional 225 cubic feet nitrogen cylinders to service bldg, 739, column U-30 in case extra cylinders are needed.**

26. **Align nitrogen cylinders (located in service bldg, 739, column U-30) to supply control air to D, E, and F VI compressors as follows:**

- ___ a. Close "F VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of F VI compressor microcontroller panel).
- ___ b. Close 1VI-837 (Alternate VI Control Air Supply to D/E/F VI Compressors) (service bldg, 739, above F VI Compressor).
- ___ c. Close "D VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of D VI compressor microcontroller panel).
- ___ d. Close "E VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of E VI compressor microcontroller panel).
- ___ e. Unlock and close 1VI-842 (Normal VI Control Air Supply to VI Compressors D, E, and F) (service bldg, 739, U-30, west side of column).
- ___ f. Open 1VI-843 (VI Backup Compressed Nitrogen Cylinders Isol) (service bldg, 739, U-30, west side of column).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

26. (Continued)

- ___ g. Ensure pressure regulating knob on 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) (service bldg, 739, at column U-30) turned fully counterclockwise.
- ___ h. Open isolation valve on top of each nitrogen cylinder.
- i. Open:
 - ___ • 1VI-572 (VI Nitrogen Cylinder Isolation) (service bldg, 739, at column U-30)
 - ___ • 1VI-573 (VI Nitrogen Cylinder Isolation) (service bldg, 739, at column U-30).
- ___ j. Turn regulating knob on 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) (service bldg, 739, at column U-30) clockwise to obtain 90-100 PSIG outlet pressure.

CAUTION Compressor trip may occur if 1VI-574 outlet pressure goes below 70 PSIG.

- ___ k. Periodically ensure 1VI-574 is maintaining 90-100 PSIG outlet pressure.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 27. Check D VI compressor - AVAILABLE TO START.

___ GO TO Step 29.

28. Start D VI compressor as follows:

___ a. Check 1VI-839 (VI Supply to D VI Compressor Control Panel Hdr Isol) (service bldg, 739, next to D VI Compressor) - OPEN.

___ a. Open 1VI-839.

___ b. Ensure "CONTROL POWER" switch in "ON".

___ c. Ensure "EMERGENCY STOP" fully extended.

___ d. Depress "RESET" pushbutton.

___ e. Check compressor indicating - "READY".

e. Perform the following:

___ 1) Check event log page in "INFO" folder to determine problem.

___ 2) Do not start D VI compressor until problem with compressor has been resolved.

___ 3) GO TO Step 29.

f. Open the following to drain condensation:

___ • 1VI-448 (D VI Compressor Condensate Drn) (service bldg, at D VI compressor)

___ • 1VI-449 (D VI Compressor Condensate Drn) (service bldg, at D VI compressor)

___ g. Do not continue until condensation drained from compressor.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

28. (Continued)

h. WHEN condensation drained, THEN
throttle the following valves to 1/4 open:

___ • 1VI-448

___ • 1VI-449.

___ i. Depress "UNLOAD" pushbutton.

___ j. Depress "START" pushbutton.

___ k. Wait approximately 30 seconds for
compressor to reach operating speed.

___ l. Check compressor indicating -
"UNLOADED".

___ l. IF compressor has tripped, THEN GO
TO Step 29.

m. Determine system pressure setpoint for
D VI compressor as follows:

___ • IF this is the first compressor started,
THEN use "105 PSIG" for setpoint in
next step.

___ • IF this is the second compressor
started, THEN use "100 PSIG" for
setpoint in next step.

___ • IF this is the third compressor started,
THEN use "95 PSIG" for setpoint in
next step.

___ n. Enter pressure setpoint determined in
Step 28.m into microcontroller per
instructions on local placard.

___ o. Depress "LOAD" pushbutton.

p. Throttle the following drain valves to
discharge all condensate and small
amount of air:

___ • 1VI-448 (D VI Compressor
Condensate Drn)

___ • 1VI-449 (D VI Compressor
Condensate Drn).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 29. Check E VI compressor - AVAILABLE TO START.

___ GO TO Step 31.

30. Start E VI compressor as follows:

___ a. Check 1VI-838 (VI Supply to E VI Compressor Control Panel Hdr Isol) (service bldg, 739+5, U-29, beside E VI Compressor Panel) - OPEN.

___ a. Open 1VI-838.

___ b. Ensure "CONTROL POWER" switch in "ON".

___ c. Ensure "EMERGENCY STOP" fully extended.

___ d. Depress "RESET" pushbutton.

___ e. Check compressor indicating - "READY".

e. Perform the following:

___ 1) Check event log page in "INFO" folder to determine problem.

___ 2) Do not start E VI compressor until problem with compressor has been resolved.

___ 3) GO TO Step 31.

f. Open the following to drain condensation:

___ • 1VI-803 (E VI Compressor Condensate Drn) (service bldg, at E VI compressor)

___ • 1VI-804 (E VI Compressor Condensate Drn) (service bldg, at E VI compressor).

___ g. Do not continue until condensation drained from compressor.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

30. (Continued)

h. WHEN condensation drained, THEN throttle the following valves to 1/4 open:

___ • 1VI-803

___ • 1VI-804.

___ i. Depress "UNLOAD" pushbutton.

___ j. Depress "START" pushbutton.

___ k. Wait approximately 30 seconds for compressor to reach operating speed.

___ l. Check compressor indicating - "UNLOADED".

___ l. IF compressor has tripped, THEN GO TO Step 31.

m. Determine system pressure setpoint for E VI compressor as follows:

___ • IF this is the first compressor started, THEN use "105 PSIG" for setpoint in next step.

___ • IF this is the second compressor started, THEN use "100 PSIG" for setpoint in next step.

___ • IF this is the third compressor started, THEN use "95 PSIG" for setpoint in next step.

___ n. Enter pressure setpoint determined in Step 30.m into microcontroller per instructions on local placard.

___ o. Depress "LOAD" pushbutton.

p. Throttle the following drain valves to discharge all condensate and small amount of air:

___ • 1VI-803 (E VI Compressor Condensate Drn)

___ • 1VI-804 (E VI Compressor Condensate Drn).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

___ 31. Check F VI compressor - AVAILABLE TO START.

___ GO TO Step 33.

32. Start F VI compressor as follows:

___ a. Check 1VI-841 (VI Supply to F VI Compressor Control Panel Hdr Isol) (service bldg, 739+1, on F VI Compressor skid next to control panel 1 ft from floor) - OPEN.

___ a. Open 1VI-841.

___ b. Ensure "CONTROL POWER" switch in "ON".

___ c. Ensure "EMERGENCY STOP" fully extended.

___ d. Depress "RESET" pushbutton.

___ e. Check compressor indicating - "READY".

e. Perform the following:

___ 1) Check event log page in "INFO" folder to determine problem.

___ 2) GO TO Step 33.

f. Open the following to drain condensation:

___ • 1VI-808 (F VI Compressor Condensate Drn) (service bldg, at F VI compressor)

___ • 1VI-809 (F VI Compressor Condensate Drn) (service bldg, at F VI compressor)

___ g. Do not continue until condensation drained from compressor.

h. WHEN condensation drained, THEN throttle the following valves to 1/4 open:

___ • 1VI-808

___ • 1VI-809.

___ i. Depress "UNLOAD" pushbutton.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

32. (Continued)

__ j. Depress "START" pushbutton.

__ k. Wait approximately 30 seconds for compressor to reach operating speed.

__ l. Check compressor indicating - "UNLOADED".

__ l. IF compressor has tripped, THEN GO TO Step 33.

m. Determine system pressure setpoint for F VI compressor as follows:

__ • IF this is the first compressor started, THEN use "105 PSIG" for setpoint in next step.

__ • IF this is the second compressor started, THEN use "100 PSIG" for setpoint in next step.

__ • IF this is the third compressor started, THEN use "95 PSIG" for setpoint in next step.

__ n. Enter pressure setpoint determined in Step 32.m into microcontroller per instructions on local placard.

__ o. Depress "LOAD" pushbutton.

p. Throttle the following drain valves to discharge all condensate and small amount of air:

__ • 1VI-808 (F VI Compressor Condensate Drn)

__ • 1VI-809 (F VI Compressor Condensate Drn).

__ 33. Check VI pressure as read on 0MVIPT5090 (VI Supply to Unit 2 Hdr Press) (Unit 2 TB, 739, column 2N-32) - GREATER THAN 70 PSIG.

__ Observe caution prior to Step 35 and GO TO Step 35.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- 34. Observe cautions prior to Step 40 and GO TO Step 40.

CAUTION Control air will be isolated to non-running compressors in the next step to conserve nitrogen. While control air is isolated, the associated compressor must remain off.

35. Isolate control air to compressors that are off to conserve nitrogen:
- • **IF** D VI compressor is off, **THEN** close 1VI-839 (VI Supply to D VI Compressor Control Panel Hdr Isol) (service bldg, 739, next to D VI Compressor).
 - • **IF** E VI compressor is off, **THEN** close 1VI-838 (VI Supply to E VI Compressor Control Panel Hdr Isol) (service bldg, 739+5, U-29, beside E VI Compressor Panel).
 - • **IF** F VI compressor is off, **THEN** close 1VI-841 (VI Supply to F VI Compressor Control Panel Hdr Isol) (service bldg, 739+1, on F VI Compressor skid next to control panel 1 ft from floor).

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

CAUTION

- Control air must be realigned to the VI header prior to depleting nitrogen cylinders.
- Compressor trip may occur if 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) outlet pressure goes below 70 PSIG.

NOTE

Two nitrogen cylinders can supply control air to all three compressors for approximately 50 minutes. If necessary, nitrogen cylinders can be replaced to gain additional time.

36. Continuously monitor the following parameters and perform actions as directed:

- • **WHEN** VI Pressure is greater than 70 PSIG, as read on 0MVIPT5090 (VI Supply to Unit 2 Hdr Press) (Unit 2 TB, 739, column 2N-32), **THEN** observe cautions prior to Step 40 and **GO TO** Step 40 to realign control air back to normal.
- • **IF AT ANY TIME** nitrogen cylinder pressure as read on inlet pressure gauge of 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) (service bldg, 739, at column U-30) goes below 500 PSIG, **THEN** replace both nitrogen cylinders **PER** Step 38.
- • **IF AT ANY TIME** control air header pressure as read on outlet pressure gauge of 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) (service bldg, 739, at column U-30) is outside control band of 90 - 100 PSIG, **THEN** adjust 1VI-574.
- • **IF AT ANY TIME** it appears that running compressors will not be able to raise VI header pressure above 70 PSIG, **THEN** perform Step 39.

37. Do not continue until directed by step above.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

38. **IF AT ANY TIME** nitrogen cylinder pressure as read on inlet pressure gauge of 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) (service bldg, 739, at column U-30) goes below 500 PSIG, **THEN** replace both nitrogen cylinders one at a time as follows:

- ___ a. Ensure one nitrogen cylinder remains in service at all times during cylinder replacement.
- ___ b. Ensure 1VI-574 is maintaining 90-100 PSIG outlet pressure during cylinder replacement.
- ___ c. Isolate one empty nitrogen cylinder as follows:
 - ___ 1) Slowly close isolation valve on top of empty nitrogen cylinder while ensuring 1VI-574 is maintaining 90-100 PSIG outlet pressure.
 - ___ 2) Close header isolation valve for nitrogen cylinder isolated in step above:
 - ___ • 1VI-572 (VI Nitrogen Cylinder Isolation) (service bldg, 739, at column U-30)
- ___ OR
 - ___ • 1VI-573 (VI Nitrogen Cylinder Isolation) (service bldg, 739, at column U-30).
- ___ d. Unhook flexhose from isolated nitrogen cylinder.
- ___ e. Attach flexhose to full cylinder.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

38. (Continued)

f. Open header isolation valve for cylinder that was replaced:

- ___ • 1VI-572 (VI Nitrogen Cylinder Isolation)

OR

- ___ • 1VI-573 (VI Nitrogen Cylinder Isolation).

___ g. Slowly open isolation valve on top of full nitrogen cylinder while ensuring 1VI-574 is maintaining 90-100 PSIG outlet pressure.

___ h. IF other cylinder needs replacing, THEN RETURN TO Step 38.a to replace second bottle.

___ i. Observe note and cautions prior to Step 36 and RETURN TO Step 36.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

39. **IF AT ANY TIME** it appears that running compressors will not be able to raise VI header pressure above 70 PSIG, **THEN** perform the following:
- ___ a. **IF** loss of power to F VI compressor has occurred, **THEN** align to energized power source **PER** OP/0/A/6450/005 (Instrument Air System), Enclosure 4.5 (F VI Compressor Operation) (satellite file located beside lube oil station door).
 - ___ b. Start additional compressors as required:
 - ___ • D VI compressor **PER** Step 28
 - ___ • E VI compressor **PER** Step 30
 - ___ • F VI compressor **PER** Step 32
 - ___ • A, B, and C VI compressors **PER** Enclosure 3 (Startup of A, B, and C VI Compressors)
 - ___ • G and H VI compressors **PER** Enclosure 4 (Diesel VI Compressor Operation).
 - ___ c. **IF** running compressors still not able to raise VI header pressure above 70 PSIG, **THEN** contact station management to evaluate isolating VI to turbine bldg headers **PER** Enclosure 16 (Isolation of Unit 1 and Unit 2 Turbine Bldg VI Headers).
 - ___ d. Observe note and cautions prior to Step 36 and **RETURN TO** Step 36.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

- CAUTION**
- Control air must be realigned to VI header prior to depleting nitrogen cylinders.
 - Realigning control air in next step must be done slowly to avoid compressor trip.

40. **WHEN** VI Pressure is greater than 70 PSIG, as read on 0MVIPT5090 (VI Supply to Unit 2 Hdr Press) (Unit 2 TB, 739, column 2N-32), **THEN** realign control air to VI header as follows:
- ___ a. **IF** nitrogen cylinders have sufficient pressure still available, **THEN** allow VI header pressure to return as close as possible to 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) outlet pressure, prior to continuing.
 - ___ b. Very slowly open and lock 1VI-842 (Normal VI Control Air Supply to VI Compressors D, E, and F) (service bldg, 739, U-30, west side of column).
 - ___ c. Very slowly open 1VI-837 (Alternate VI Control Air Supply to D/E/F VI Compressors) (service bldg, 739, above F VI Compressor).
 - ___ d. Very slowly close 1VI-843 (VI Backup Compressed Nitrogen Cylinders Isol) (service bldg, 739, U-30, west side of column).
 - ___ e. Turn regulating knob on 1VI-574 (VI Nitrogen Cylinder Pressure Regulator) (service bldg, 739, at column U-30) fully counterclockwise.

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

40. (Continued)

f. Close the following valves:

- ___ • 1VI-572 (VI Nitrogen Cylinder Isolation) (service bldg, 739, at column U-30)
- ___ • 1VI-573 (VI Nitrogen Cylinder Isolation) (service bldg, 739, at column U-30)
- ___ • Isolation valve on each nitrogen cylinder.

g. Check the following valves - OPEN: ___ g. Very slowly open valve(s).

- ___ • 1VI-839 (VI Supply to D VI Compressor Control Panel Hdr Isol) (service bldg, 739, next to D VI Compressor)
- ___ • 1VI-838 (VI Supply to E VI Compressor Control Panel Hdr Isol) (service bldg, 739+5, U-29, beside E VI Compressor Panel)
- ___ • 1VI-841 (VI Supply to F VI Compressor Control Panel Hdr Isol) (service bldg, 739+1, on F VI Compressor skid next to control panel 1 ft from floor)

h. Very slowly open the following:

- ___ • "D VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of D VI compressor microcontroller panel)
- ___ • "E VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of E VI compressor microcontroller panel)
- ___ • "F VI COMPRESSOR VORTEX COOLER ISOLATION" valve (located on top of F VI compressor microcontroller panel)

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

40. (Continued)

- ___ i. Notify maintenance to connect two full 225 cubic feet nitrogen cylinders via flexhose to backup header.

___ 41. Exit this enclosure.