

Draft Submittal

(Pink Paper)

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

SEQUOYAH APRIL/MAY 2007 EXAM

**EXAM NOS. 05000327/2007301
AND 05000328/2007301**

**APRIL 9 - 11, 2007 AND
MAY 9, 2007 (written)**

SEQUOYAH NUCLEAR PLANT JOB PERFORMANCE MEASURE

B.1.i JPM

Unit 2 Local Control of Charging Flow (2-FCV-62-93)

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Critical steps identified by CRITICAL STEP in **BOLD**.
2. Sequenced steps identified by an "s"
3. Any UNSAT requires comments
4. Insure operator performs the following required actions for **SELF-CHECKING**;
 - a. Identifies the correct unit, train, component, etc.
 - b. Reviews the intended action and expected response.
 - c. Compares the actual response to the expected response.

Validation Time: CR. _____ **Local** 9 minutes

Tools/Equipment/Procedures Needed:
2-SO-62-1, section 8.4

References:

	Reference	Title	Rev No.
1.	2-SO-62-1	CVCS	49

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READ TO OPERATOR

DIRECTIONS TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated for this JPM. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

1. Unit 2 is in Mode 1, 100% RTP
2. Pressurizer level is on program.
3. Normal letdown and charging are in service with 2A-A CCP running
4. Plant conditions require local control of 2-FCV-62-93 (charging) for maintenance on the normal controller.
5. All prerequisite actions are completed.

INITIATING CUES:

1. 2-HIC-62-93 charging flow controller is failing to properly control pressurizer level in automatic.
2. Troubleshooting has revealed that the flow modifier (2-FM-62-93B) must be replaced/repared.
3. You are the Unit 1 Aux Bldg AUO and are to establish local control of 2-FCV-62-93 using 2-SO-62-1, section 8.4.
4. Adjust charging flow as necessary to as determined by the control room operator.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 1.:</u> Operator receives a copy of the appropriate procedure.</p> <p><u>STANDARD:</u> Operator provided with a copy of 2-SO-62-1 section 8.4.</p> <p><u>COMMENTS:</u></p>	<p>Start Time_____</p>
<p><u>STEP 2.:</u> [1] OBTAIN permission from the SRO to locally control 2-FCV-62-93.</p> <p><u>Cue:</u> <i>SRO grants permission for local control.</i></p> <p><u>STANDARD:</u> Operator requests permission from SRO to operate 2-FCV-62-93 locally.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 3.:</u> [2] ESTABLISH communications between the local operator at panel 2-L-112A and the UO in the MCR operator.</p> <p><u>STANDARD:</u> Operator calls the MCR and establishes communications with the OATC.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 4.:</u> [3] ENSURE that a CCP is in service and that [2-FCV-62-98] and [2-FCV-62-99] are OPEN.</p> <p><u>Cue:</u> <i>2A-A CCP is running, status lights on M-6 indicate FCV-62-98 & 99 are open.</i></p> <p><u>STANDARD:</u> Operator request UO to verify pump on and valves open.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 5.: [4] MATCH the setpoint (red pen) and actual reading (black pen) using [2-HIC-62-93B].</p> <p>NOTE: Turning knob clockwise will raise setpoint. (Direction to turn during JPM depends on "as found" position of red pen in relation to black pen)</p> <p>Cue: <i>If operator turns knob in wrong direction, Cue that setpoint is decreasing. If turned in correct direction, Cue red and black pens are matched.</i></p> <p>STANDARD: Operator matches red with black pen on 2-HIC-62-93B by rotating "increase" knob. This step is critical to prevent change in setpoint when controller is swapped to manual.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 6.: [5] PLACE 2-HIC-62-93B in MANUAL.</p> <p>Cue: <i>2-HIC-62-93B is in the manual position.</i></p> <p>STANDARD: Operator rotates HIC-62-93B to the MANUAL position. This step is critical to establish manual control.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 7.: [6] VERIFY [2-XI-62-93] on panel 2-M-5 is illuminated.</p> <p>Cue: <i>UO informs operator that the light is ON.</i></p> <p>STANDARD: Communicates with the OATC to verify light is ON.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>



TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
SYSTEM OPERATING INSTRUCTION

2-SO-62-1

CHEMICAL AND VOLUME CONTROL SYSTEM

Revision 49

QUALITY RELATED

PREPARED/PROOFREAD BY: MARIE HANKINS

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: W. T. LEARY

EFFECTIVE DATE: 12/11/2006

LEVEL OF USE: **CONTINUOUS USE**

REVISION

DESCRIPTION: Revised Attachment 3 to change location of 2-VLV-62-714 in accordance with DCN D21689. Also changed the position of 4 ERCW valves from throttle to full OPEN in accordance with NB 061027 and ENG CALC MDQ000-067-200-095-01. Reworded note 1 of step 1 of section 8.5 as minor editorial change. Incorporated PCF 028. PCF-029 was deliberately not incorporated.

THIS PROCEDURE COULD IMPACT REACTIVITY

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Date _____

8.4 Local Manual Control of 2-FCV-62-93

- [1] **OBTAIN** permission from the Unit 2 US/SRO to locally control 2-FCV-62-93. _____
- [2] **ESTABLISH** communication between the local operator at panel 2-L-112A and the Unit operator. _____
- [3] **ENSURE** that a CCP is in service and that **[2-FCV-62-98]** and **[2-FCV-62-99]** are **OPEN**. _____

NOTE Charging flow abnormal Annunciator may actuate during transfer.

- [4] **MATCH** the setpoint (red pen) and the actual reading (black pen) using **[2-HIC-62-93B]**. _____
- [5] **PLACE [2-HIC-62-93B]** charging flow control in **MANUAL**. _____
- [6] **VERIFY [2-XI-62-93]** on panel 2-M-5 is illuminated. _____

NOTE Charging header flow can be monitored on 2-FI-62-93B on panel 2-L-112A.

- [7] **ADJUST** charging flow as directed by Unit operator. _____
- [8] **WHEN [2-HIC-62-93A]** is to be returned to service, **THEN**
 - [a] **ESTABLISH** communications between MCR and 2-L-112A panel. _____
 - [b] **RECORD** charging flow _____ gpm. _____
 - [c] **ADJUST [2-HIC-62-93A]** to ~ 15% open from the full closed position. _____
 - [d] **PLACE [2-HIC-62-93B]** charging header flow control on 2-L-112A to **AUTO**. _____

_____ 1st _____ IV _____

- [9] **ENSURE [2-XI-62-93]** on 2-M-5 is **not** illuminated. _____
- [10] **ADJUST [2-HIC-62-93A]** as necessary to control charging flow. _____

END OF TEXT

SEQUOYAH NUCLEAR PLANT JOB PERFORMANCE MEASURE

B.1.j JPM 2007 NRC Initial Exam

Respond to Loss of Control Air System

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Critical steps identified by CRITICAL STEP in **BOLD**.
2. Sequenced steps identified by an "s"
3. Any **UNSAT** requires comments
4. Insure operator performs the following actions for **SELF-CHECKING**;
 - a. Identifies the correct unit, train, component, etc.
 - b. Reviews the intended action and expected response.
 - c. Compares the actual response to the expected response.

Validation Time: CR. _____ Local 17 minutes

Tools/Equipment/Procedures Needed:

EA-32-2, section 4.1 and 4.2

References:

	Reference	Title	Rev No.
1.	EA-32-2	Establishing Control and Service Air	2

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READ TO OPERATOR

DIRECTIONS TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated for this JPM. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

1. Approximately 45 minutes ago both units experienced a loss of offsite power.
2. All D/Gs started and tied to the board as expected.
3. All shutdown boards are energized from the D/Gs at this time.
4. The Aux. Bldg. AUO is responding to the Aux. Air Compressors, but has been unable to get them started at this time.

INITIATING CUES:

1. You are the U1 Turb. Bldg AUO and the U1 CRO has directed you to go to the Control & Service Air compressors, **MANUALLY** start the compressors **AND** verify loading USING EA-32-2.
2. The operator has verified the 480V 1A2-A and 1B1-B shutdown boards are energized and that Compt 3D breaker is racked in and green light LIT, on both boards.
3. 0-FCV-67-205 & 208 are open.
4. When you have performed the procedure and pressure is trending to normal control range, notify the U1 CRO.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 1.:</u> Obtain a copy of the appropriate procedure and determine the applicable section.</p> <p><u>STANDARD:</u> The operator obtains a copy of EA-32-2 and determines that section 4.2 is the applicable section</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Start Time ___</p>
<p><u>STEP 2.:</u> [1] CHECK the following equipment power supplies available: Comp A; 1A2-A SD Bd Compt 3D Comp B; 1B1-B SD Bd Compt 3D</p> <p><u>Cue:</u> <i>Both breakers are racked in and green light LIT. (this was given in initiating cues)</i></p> <p><u>STANDARD:</u> Operator verifies power is available.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 3.:</u> [2] CHECK pressure in control air receivers No.1 and No.2.</p> <p><u>Cue:</u> <i>Air receiver pressures are 20 psig and decreasing.</i></p> <p><u>STANDARD:</u> Operator checks air receiver pressures to determine pressure.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 4: [3] ENSURE service air receiver isolation valve [0-PCV-33-4], CLOSED.</p> <p>Cue: <i>When operator locates 0-PCV-33-4 state limit switch actuator arm is touching the lower limit switch.</i></p> <p><i>If they look at the Handswitch; state: light is GREEN.</i></p> <p>STANDARD: The operator checks 0-PCV-33-4 and determines that it is closed.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 5: [4] ENSURE compressor trip signals RESET, as follows:</p> <p>a. DEPRESS [0-HS-32-25B] to reset air compressor trip signals.</p> <p>Cue: <i>0-HS-32-25B is depressed.</i></p> <p>STANDARD: Operator depresses 0-HS-32-25B to reset air comp trip signals. This step is critical to reset the compressor trips.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 6. b. CHECK air compressor A LOW OIL PRESSURE, HIGH OIL TEMPERATURE, and HIGH DISCHARGE AIR PRESSURE trip lights DARK.</p> <p>Cue: <i>Trip lights are dark.</i></p> <p>STANDARD: Operator checks comp A LOW OIL PRESSURE, HIGH OIL TEMPERATURE, and HIGH DISCHARGE AIR PRESSURE trip lights dark.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 7.: c. CHECK air compressor B LOW OIL PRESSURE, HIGH OIL TEMPERATURE, and HIGH DISCHARGE AIR PRESSURE trip lights DARK.</p> <p>Cue: <i>Trip lights are dark.</i></p> <p>STANDARD: Operator checks comp B LOW OIL PRESSURE, HIGH OIL TEMPERATURE, and HIGH DISCHARGE AIR PRESSURE trip lights dark.</p> <p>COMMENTS:</p>	<p>___ SAT ___ UNSAT</p> <p>Critical Step</p>
<p>STEP 8.: [5] PLACE Air Comp A AUTO/HAND switch, [0-HS-32-25D], in HAND.</p> <p>Cue: <i>0-HS-32-25D is in hand position.</i></p> <p>STANDARD: Operator places 0-HS-32-25D in HAND position. This step is critical to allow manual start of air compressor.</p> <p>COMMENTS:</p>	<p>___ SAT ___ UNSAT</p> <p>Critical Step</p>
<p>STEP 9.: [6] Place Air Comp B AUTO/HAND switch, [0-HS-32-26A], in HAND.</p> <p>Cue: <i>0-HS-32-26A is in hand position.</i></p> <p>STANDARD: Operator places 0-HS-32-26A in HAND position. This step is critical to allow manual start of air compressor.</p> <p>COMMENTS:</p>	<p>___ SAT ___ UNSAT</p> <p>Critical Step</p>
<p>STEP 10.: [7] PLACE [HS-32-25A] in Position 1(AB Position).</p> <p>Cue: <i>HS-32-25A is placed in position 1.</i></p> <p>STANDARD: Operator places HS-32-25A in position 1.</p> <p>COMMENTS:</p>	<p>___ SAT ___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 11.: [8] ENSURE [0-HS-32-25F] for compressor A in PULL TO START.</p> <p><u>Cue:</u> <i>0-HS-32-25F is in PULL TO START.</i></p> <p><u>STANDARD:</u> Operator places 0-HS-32-25F for comp A in PULL TO START position.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 12.: [9] DEPRESS [0-HS-32-25E] to start Air Compressor A.</p> <p><u>Cue:</u> <i>0-HS-32-25E is depressed and you hear a compressor start</i></p> <p><u>STANDARD:</u> Operator depresses 0-HS-32-25E to start comp A. This step is critical to manual start air compressor.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 13.: [10] PLACE [0-HS-32-43A] and [0-HS-32-43B] in ON to full load Air Compressor A.</p> <p><u>Cue:</u> <i>0-HS-32-43A and 0-HS-32-43B are in the ON position and comp A is fully loaded.</i></p> <p><u>STANDARD:</u> Operator places 0-HS-32-43A and 0-HS-32-43B in ON position to fully load comp A. This step is critical to manually load air compressor.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 14.: [11] ENSURE [0-HS-32-26D] for compressor B in PULL TO START.</p> <p><u>Cue:</u> <i>0-HS-32-26D is in PULL TO START.</i></p> <p><u>STANDARD:</u> Operator places 0-HS-32-26D for comp B in PULL TO START position.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 15.: [12] DEPRESS [0-HS-32-26B] to start compressor B.</p> <p><u>Cue:</u> <i>0-HS-32-26B is depressed and you hear a compressor start.</i></p> <p><u>STANDARD:</u> Operator depresses 0-HS-32-26B to start comp B. This step is critical to start of air compressor.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP *16.: [13] PLACE [0-HS-32-38A] and [0-HS-32-38B] in ON position to full load Air Compressor B.</p> <p><u>Cue:</u> <i>0-HS-32-38A and 0-HS-32-38B are in the ON position and comp B is fully loaded.</i></p> <p><u>STANDARD:</u> Operator places 0-HS-32-38A and 0-HS-32-38B in ON position to fully load comp B. This step is critical to manually load air compressor.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 17.: [14] CHECK operation of comps A and B:</p> <p>A. Comp A oil press on 0-PI-32-40 between 15 and 40 psig. B. Comp A cooling water flow indicated on 0-FG-32-44B. C. Comp B oil press on 0-PI-32-35 between 15 and 40 psig. D. Comp B cooling water flow indicated on 0-FG-32-24B.</p> <p><u>Cue:</u> <i>Oil pressure for both compressors is app. 35 psig Cooling water rotometer is turning on both compressors.</i></p> <p><u>STANDARD:</u> Operator checks oil pressure for both compressors and checks cooling water flow indicated for both compressors. [EPM-4 implies these four items must be done in sequence]</p> <p><u>COMMENTS:</u></p>	<p>___ SAT ___ UNSAT</p>
<p>STEP 18.: [15] MAINTAIN air pressure in control air receiver tanks between 80 and 100 psig.</p> <p><u>Cue:</u> <i>Air pressure is 90 psig and holding at this time.</i></p> <p><u>STANDARD:</u> Operator monitors and maintains air pressure in receiver tanks between 80 and 100 psig.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT ___ UNSAT</p>
<p>STEP 19.: Inform the U1 CRO that C & S air compressors A and B have been restarted and that air pressure is recovering at this time.</p> <p><u>STANDARD:</u> Operator informs the U1 CRO that C & S air compressor(s) A and B have been restarted and that air pressure is recovering at this time.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT ___ UNSAT</p> <p>Stop Time _____</p>

End of JPM



TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
EOI PROGRAM MANUAL
EMERGENCY ABNORMAL PROCEDURE

EA-32-2

ESTABLISHING CONTROL AND SERVICE AIR

Revision 2

QUALITY RELATED

PREPARED/PROOFREAD BY: CECIL DYER DATE: 9/17/97

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: ORIGINAL SIGNED BY O. D. HAYES DATE: 9/18/97

EFFECTIVE DATE: 9/30/97

VERIFICATION DATE: 9/17/97

VALIDATION DATE: N/A

REVISION

DESCRIPTION: Section 4.2 step 7 deleted C compressor from position-1, also step 16 deleted in accordance with DCN M12611A.

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4.0 OPERATOR ACTIONS

4.1 Section Applicability

1. **IF** starting and placing in service with system partially or fully depressurized,
THEN
GO TO Section 4.2.



2. **IF** aligning control and service air to supply auxiliary air,
THEN
GO TO Section 4.3.



3. **IF** loading air compressor(s) on hand control,
THEN
GO TO Section 4.4.



4. **RETURN TO** procedure and step in effect.



4.2 Startup With System Partially or Fully Depressurized

1. CHECK the following equipment power supplies AVAILABLE:

CONTROL AND SERVICE AIR COMPRESSOR	SUPPLIED BY 480 V SHUTDOWN BOARD	COMPARTMENT	AVAILABLE √
A	1A2-A	3D	<input type="checkbox"/>
B	1B1-B	3D	<input type="checkbox"/>

2. CHECK pressure in Control Air Receivers 1 and 2.

3. ENSURE service air receiver isolation valve **[0-PCV-33-4]** CLOSED.

4. ENSURE compressor trip signals RESET, as follows:

a. DEPRESS **[0-HS-32-25B]** to reset air compressor trip signals.

b. CHECK Air Compressor A trip lights DARK:

- Low OIL PRESSURE
- High OIL TEMPERATURE
- High DISCHARGE AIR PRESSURE.

c. CHECK Air Compressor B trip lights DARK:

- Low OIL PRESSURE
- High OIL TEMPERATURE
- High DISCHARGE AIR PRESSURE.

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4.2 Startup With System Partially or Fully Depressurized (Continued)

5. **PLACE** Air Compressor A AUTO/HAND switch **[0-HS-32-25D]** in HAND.

6. **PLACE** Air Compressor B AUTO/HAND switch **[0-HS-32-26A]** in HAND.

7. **PLACE** **[HS-32-25A]** in Position 1 (AB).

8. **ENSURE** **[0-HS-32-25F]** for Air Compressor A in PULL TO START.

9. **DEPRESS** **[0-HS-32-25E]** to start Air Compressor A.

10. **PLACE** **[0-HS-32-43A]** and **[0-HS-32-43B]** in ON to fully load Air Compressor A.

11. **ENSURE** **[0-HS-32-26D]** for Air Compressor B in PULL TO START.

12. **DEPRESS** **[0-HS-32-26B]** to start Air Compressor B.

13. **PLACE** **[0-HS-32-38A]** and **[0-HS-32-38B]** in ON to fully load Air Compressor B.

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4.2 Startup With System Partially or Fully Depressurized (Continued)

14. **CHECK** operation of Air Compressors A and B:

- a. Air Compressor A oil pressure between 15 and 40 psig on **[0-PI-32-40]**
- b. Air Compressor A cooling water flow INDICATED on **[0-FG-32-44B]**
- c. Air Compressor B oil pressure between 15 and 40 psig on **[0-PI-32-35]**
- d. Air Compressor B cooling water flow INDICATED on **[0-FG-32-24B]**.

15. **MAINTAIN** air pressure in receiver tanks between 80 psig and 100 psig.

16. **GO TO** Section 4.1, step in effect.



END OF SECTION

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4.3 Aligning Control and Service Air to Supply Auxiliary Air

NOTE **[FCV-32-82]** and **[FCV-32-85]** isolate auxiliary air from control air between 66.5 psig and 71.5 psig.

1. **ALIGN** control and service air to supply Train A auxiliary air as follows: [Aux Bldg, elev 734, Panel 0-L-321]
 - a. **NOTIFY** Unit SRO Auxiliary Control Air Compressor A-A being placed in standby.
 - b. **ENSURE** Train A control air supply **[0-FCV-32-82]** OPEN.
 - c. **PLACE** AUTO/OFF/HAND handswitch **[0-HS-32-60B]** in AUTO.
 - d. **ENSURE** safe stop pushbutton **[0-HS-32-60E]** PULLED OUT.

2. **ALIGN** control and service air to supply Train B auxiliary air as follows: [Aux Bldg, elev 734, Panel 0-L-322]
 - a. **NOTIFY** Unit SRO Auxiliary Control Air Compressor B-B being placed in standby.
 - b. **ENSURE** Train B control air supply **[0-FCV-32-85]** OPEN.
 - c. **PLACE** AUTO/OFF/HAND handswitch **[0-HS-32-86B]** in AUTO.
 - d. **ENSURE** safe stop pushbutton **[0-HS-32-86E]** PULLED OUT.

3. **GO TO** Section 4.1, step in effect.



END OF SECTION

4.4 Loading Air Compressors on Hand Control

1. **LOAD** desired control and service air compressor(s) on hand control as follows:

a. **PLACE** hand loading panel switch [**HS-32-125**] in OFF.
(disables auto sequence relay)

b. **PLACE** half load handswitch in ON:

COMPRESSOR	HALF LOAD HANDSWITCH	ON √
A	HS-32-43A	<input type="checkbox"/>
B	HS-32-38A	<input type="checkbox"/>

c. **PLACE** full load handswitch in ON:

COMPRESSOR	FULL LOAD HANDSWITCH	ON √
A	HS-32-43B	<input type="checkbox"/>
B	HS-32-38B	<input type="checkbox"/>

d. **CONTROL** loading to maintain desired air pressure between 80 and 100 psig.

2. **GO TO** Section 4.1, step in effect.



END OF TEXT

SQN 1, 2	ESTABLISHING CONTROL AND SERVICE AIR	EA-32-2 Rev. 2 Page 9 of 9
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5.0 REFERENCES

5.1 Drawings

- A. 45N749-2, 480 V Shutdown Board 1A2-A Single Line.
- B. 45N779-6, 480 V Shutdown Board Auxiliary Power Schematic.

SEQUOYAH NUCLEAR PLANT JOB PERFORMANCE MEASURE

B.1.k JPM 2007 NRC Initial Exam

Control S/G PORVs from the Aux. Control Room

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Critical steps identified by CRITICAL STEP in **BOLD**.
2. Sequenced steps identified by an "s"
3. Any **UNSAT** requires comments
4. **SM approval will be required to enter the "Trip Hazard Zone" in the Vital Battery Rm and Vital Inverter area.**

Validation Time: CR. _____ Local 15 minutes

Tools/Equipment/Procedures Needed:
AOP-C.04, section 2.2

References:

	Reference	Title	Rev No.
A.	AOP-C.04	Control Room Inaccessibility	13

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READ TO OPERATOR

DIRECTIONS TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All steps shall be simulated for this JPM. **WHEN ENTERING A UNIT TRIP HAZARD ZONE, ENSURE YOU DO NOT TOUCH ANY SWITCHES WITHIN THAT ZONE.** I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

1. There has been a fire in the spreader room, Unit 1 has been tripped, the main control room has been abandoned per AOP-C.04, "Control Room Inaccessibility".
2. Unit 1 is currently being maintained in HOT STANDBY from the Aux. Control Room.
3. All controls have been placed in auxiliary mode.
4. S/G pressures are at 1005 psig and That is ~ 547°F and stable.
5. The source range monitor in the Aux. C.R. is in service.
6. The RCS has been borated to the COLD SHUTDOWN, Xenon-free condition.

INITIATING CUES:

1. It has been determined to cool the plant down to Cold Shutdown due to extensive damage in the spreader room.
2. You are the Unit 1 OATC and the US directs you to initiate cooldown at ~50°F/Hr, **using all 4 S/Gs**, in accordance with AOP-C.04, Section 2.2, step 9.
3. Notify US when cooldown established.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 1:</u> Obtain a copy of the appropriate procedure.</p> <p><u>STANDARD:</u> Operator obtains a copy of AOP-C.04, Section 2.2 and refers to step 9.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Start Time ___</p>
<p><u>STEP 2:</u> [9] INITIATE RCS cooldown to approximately 450°F.</p> <p><u>STANDARD:</u> N/A, this will be satisfied in JPM step 7 after PORVs adjusted.</p> <p><u>COMMENTS:</u></p> <p><u>NOTE:</u> JPM Steps 3 through 6 give specifics for each S/Gs PORV; the steps do not have to be performed in any particular sequence.</p> <p><u>NOTE:</u> Operator may elect to control S/G PORVs in manual to establish a steady cooldown rate.</p>	
<p>EVALUATOR NOTE Steps 3 through 6 are part of procedure step 9.a.</p>	
<p><u>STEP 3:</u> a. ADJUST S/G atmospheric relief valve controllers [L-10] to begin dumping steam.</p> <p>Lower pressure setpoint on PIC-1-6C or PLACE PIC-1-6C in manual and slowly increase demand to open valve slightly (less than 20% demand). (SG-1 Atmo Relief)</p> <p><u>Cue:</u> <i>If operator Rotates thumbwheel up, state that setpoint is increasing, output decreasing</i></p> <p><u>Cue:</u> <i>IF operator Rotates thumbwheel down State:</i> <i>1. Controller output has increased.</i> <i>2. Indicated S/G Pressure currently 940 psig.</i></p> <p><u>Cue:</u> <i>IF operator goes to manual and increases demand:</i> <i>1. Controller output has increased.</i> <i>2. Indicated S/G Pressure currently 940 psig.</i></p> <p><u>STANDARD:</u> Operator controls 1-PIC-1-6C until setpoint is below actual pressure and output increases or PORV is manually opened a slight amount. This step is critical to open the atmospheric relief valve.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 4: Lower pressure setpoint on PIC-1-13C or PLACE PIC-1-13C in manual and slowly increase demand to open valve slightly (less than 20% demand). (SG-2 Atmo Relief)</p> <p><u>Cue:</u> <i>If operator Rotates thumbwheel up, state that setpoint is increasing, output decreasing</i></p> <p><u>Cue:</u> <i>IF operator Rotates thumbwheel down State:</i> 1. Controller output has increased. 2. Indicated S/G Pressure currently 960 psig.</p> <p><u>Cue:</u> <i>IF operator goes to manual and increases demand:</i> 1. Controller output has increased. 2. Indicated S/G Pressure currently 960 psig.</p> <p>STANDARD: Operator controls 1-PIC-1-13C until setpoint is below actual pressure and output increases or PORV is manually opened a slight amount. This step is critical to open the atmospheric relief valve.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 5: Lower pressure setpoint on PIC-1-24C or PLACE PIC-1-24C in manual and slowly increase demand to open valve slightly (less than 20% demand). (SG-3 Atmo Relief)</p> <p><u>Cue:</u> <i>If operator Rotates thumbwheel up, state that setpoint is increasing, output decreasing</i></p> <p><u>Cue:</u> <i>IF operator Rotates thumbwheel down State:</i> 1. Controller output has increased. 2. Indicated S/G Pressure currently 940 psig.</p> <p><u>Cue:</u> <i>IF operator goes to manual and increases demand:</i> 1. Controller output has increased. 2. Indicated S/G Pressure currently 940 psig.</p> <p>STANDARD: Operator controls 1-PIC-1-24C until setpoint is below actual pressure and output increases or PORV is manually opened a slight amount. This step is critical to open the atmospheric relief valve.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
<p>STEP 6: Lower pressure setpoint on PIC-1-31C or PLACE PIC-1-31C in manual and slowly increase demand to open valve slightly (less than 20% demand). (SG-4 Atmo Relief)</p> <p>Cue: <i>If operator Rotates thumbwheel up, state that setpoint is increasing, output decreasing</i></p> <p>Cue: <i>IF operator Rotates thumbwheel down State:</i> 1. Controller output has increased. 2. Indicated S/G Pressure currently 980 psig.</p> <p>Cue: <i>IF operator goes to manual and increases demand:</i> 1. Controller output has increased. 2. Indicated S/G Pressure currently 980 psig.</p> <p>STANDARD: Operator controls 1-PIC-1-31C until setpoint is below actual pressure and output increases or PORV is manually opened a slight amount. This step is critical to open the atmospheric relief valve.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>	
<p>STEP 7: b. MONITOR cooldown rate USING Appendix O.</p> <p>Cue: <i>Inform operator RCS has cooled from 547 °F to 536 °F in the last 15 minutes.</i></p> <p>STANDARD: Operator refers to Appendix O and MONITORS RCS temperature USING loop 1 or 2 hot leg indicators 1-TI-68-1C or -24C for running RCPs to determine cooldown rate of ~50°F/hr. (Operator may use temperature gradients on the S/G pressure scales 1-PI-1-1C or 8C for T_{sat}) This step is critical to establish cooldown rate.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>	
<p>STEP 8: Inform the U1 US a cooldown rate of ~ 44°F/hr has been established.</p> <p>STANDARD: Operator informs the U1 US a cooldown rate of ~ 44°F/hr has been established.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Stop Time___</p>	



TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

AOI PROGRAM MANUAL

ABNORMAL OPERATING PROCEDURES

AOP-C.04

SHUTDOWN FROM AUXILIARY CONTROL ROOM

Revision 13

QUALITY RELATED

PREPARED/PROOFREAD BY: D. A. PORTER

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: W. T. Leary

EFFECTIVE DATE: 01/23/07

REVISION

DESCRIPTION: Revised to add interim actions for PER 118222 (potential for CCP auto start prior to aligning suction valves). Added step to reset D/G lockout relay (PER 118278)

**ANY INTENT CHANGE TO THIS PROCEDURE WHICH IS
NOT DIRECTLY RELATED TO A DCN REQUIRES EVALUATION
OF FIRE PROTECTION LICENSE CONDITION USING FPDP-3.**

SQN	SHUTDOWN FROM AUXILIARY CONTROL ROOM	AOP-C.04 Rev. 13
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1.0 PURPOSE

This procedure provides actions necessary for Control Room abandonment, plant cooldown from the Auxiliary Control Room, and return to Main Control Room operation. This AOP may be used to transfer control to ACR on one unit or both units.

This procedure is relied upon for Appendix R Safe Shutdown for Control Building fires.

Appendix A and B contain staffing requirements for dual unit or single unit MCR abandonment.

SQN	SHUTDOWN FROM AUXILIARY CONTROL ROOM	AOP-C.04 Rev. 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.0 OPERATOR ACTIONS

CAUTION **A major fire in spreading room could result in collapse of the MCR floor. If entering this AOP for a spreading room fire, both units should abandon the MCR.**

NOTE Transferring controls on only one unit will impact control of common systems (ERCW, D/G, and Train B CCS) for the opposite unit.

1. **DETERMINE** required actions:

IF...	GO TO SECTION	PAGE
Abandoning the Main Control Room	2.1	4
Performing Plant Cooldown from Auxiliary Control Room	2.2	25
Returning to Main Control Room operation	2.3	40

END OF SECTION

THIS WAS NOT PROVIDED WITH DRAFT SUBMITTAL, I PRINTED IT FROM THE REFERENCE MATERIAL THAT THEY PROVIDED WITH SUBMITTAL.

SQN	SHUTDOWN FROM AUXILIARY CONTROL ROOM	AOP-C.04 Rev. 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.2 Plant Cooldown from Auxiliary Control Room

NOTE TSC should be consulted prior to initiating cooldown.

1. **ENSURE** necessary repairs to support cooldown have been completed.

CAUTION Restarting RCPs could result in positive reactivity addition if RCS loops contain water with lower boron concentration or temperature.

2. **DETERMINE** if RCPs can be restarted:

- a. **CHECK** off-site power AVAILABLE.

- a. **NOTIFY** TSC to evaluate natural circulation cooldown **USING** ES-0.2, Natural Circulation Cooldown.

GO TO Step 3.



- b. **NOTIFY** TSC to evaluate RCP restart.

- c. **VERIFY** RCP start conditions and **START** at least one RCP **USING** Appendix P.

- c. **IF NO** RCP can be started, **THEN** **NOTIFY** TSC to evaluate natural circulation cooldown **USING** ES-0.2, Natural Circulation Cooldown.

3. **MAINTAIN** RCS pressure **USING** allowable pressure-temperature curves of TI-28, Figure A.11.1.

SQN	SHUTDOWN FROM AUXILIARY CONTROL ROOM	AOP-C.04 Rev. 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.2 Plant Cooldown from Auxiliary Control Room (cont'd)

NOTE Boration of the RCS to cold shutdown, xenon free conditions may be performed under the following step.

4. **CHECK** shutdown margin adequate for cooldown to 450°F
USING 0-SI-NUC-000-038.0.

BORATE RCS to achieve adequate shutdown margin for 450°F:

- a. **IF** RWST is boration source,
THEN
BORATE RCS **USING** Appendix G, RCS Boration From RWST.
- b. **IF** Boric Acid Tanks are boration source,
THEN
BORATE RCS **USING** Appendix H, RCS Boration From BAT.

5. **MONITOR** source range channel. [L-10]

- NOTES**
- Automatic VCT makeup is NOT available.
 - Approximately 30,000 gal will be required for makeup during cooldown. Makeup volume may be monitored locally at RWST using Appendix Y. Also, makeup may be estimated using charging flow and elapsed time.

6. **ENSURE** CCP suction aligned to RWST
USING Appendix G.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.2 Plant Cooldown from Auxiliary Control Room (cont'd)

NOTE Slowly raising pressurizer level to approximately 60% at the start of cooldown allows for contraction during cooldown. As level is raised, pressurizer heaters should be energized to maintain uniform pressurizer temperature.

7. MAINTAIN pressurizer level:

a. **ADJUST** HIC-62-93C and HIC-62-56C as necessary to maintain the following:

- Pzr level between 25% and 60% [L-10]
- Total seal injection flow at least 24 gpm. [FI-62-93C]

a. **IF** non-essential air NOT available, **THEN CONTROL** seal injection flow locally **USING** Appendix T.

IF pressurizer level less than 25% and dropping, **THEN PERFORM** the following:

- 1) **RAISE** seal injection flow.
- 2) **REDUCE** or **STOP** excess letdown flow.
- 3) **SLOW** or **SUSPEND** cooldown **UNTIL** level is restored.

b. **OPERATE** pressurizer heaters A-A and B-B **USING**:

- HS-68-341AC, [6.9 kV Shutdown Bd A-A, Compt. 20]
- HS-68-341DC [6.9 kV Shutdown Bd B-B, Compt 20].

SQN	SHUTDOWN FROM AUXILIARY CONTROL ROOM	AOP-C.04 Rev. 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.2 Plant Cooldown from Auxiliary Control Room (cont'd)

CAUTION If SSPS is energized and automatic SI signal is NOT blocked, reducing S/G pressure to less than 600 psig (rate compensated) or reducing RCS pressure to less than 1870 psig may result in SI actuation. ESF components will not be impacted by SI signal if transfer switches have been placed in AUX position, with the exception of D/Gs (which will automatically start).

8. IF SSPS system is energized,
THEN
EVALUATE performing the following:

- **NOTIFY** IM to block following SI signals
USING 0-PI-IXX-099-002.0, Auto S.I.
Block and Block of Source Range
Channel Cutoff:
 - Low pressurizer pressure SI
 - Low steamline pressure SI

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.2 Plant Cooldown from Auxiliary Control Room (cont'd)

CAUTION The maximum cooldown rate for the RCS should not exceed 100°F in any one hour period. (TS 3.4.9.1)

NOTE Plant cooldown should be performed using a continuous rate as much as possible rather than steps. S/G atmospheric relief valve controllers may be placed in manual to provide a more constant steam flow.

9. **INITIATE** RCS cooldown to approximately 450°F:

a. **ADJUST** S/G atmospheric relief valve controllers [L-10] to begin dumping steam.

a. **OPERATE** S/G #1 and 4 atmospheric relief valves locally:

1) **DISPATCH** personnel to perform Appendix K, Local Control of S/G Atmospheric Reliefs.

2) **PLACE** S/G #1 and 4 atmospheric relief valve controllers in **MANUAL** and **ADJUST** controller output to zero.

b. **MONITOR** cooldown rate **USING** Appendix O.

SQN	SHUTDOWN FROM AUXILIARY CONTROL ROOM	AOP-C.04 Rev. 13
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.2 Plant Cooldown from Auxiliary Control Room (cont'd)

NOTE Maximum allowable pressurizer cooldown rate is 200°F/hr.

10. INITIATE RCS depressurization:

a. **CONTROL** pressurizer heaters
USING the following:

- HS-68-341AC, Backup Heater Group A-A [6.9 kV Shutdown Bd A-A, Compt. 20]
- HS-68-341DC, Backup Heater Group B-B [6.9 kV Shutdown Bd B-B, Compt 20]

b. **CONTROL** RCS pressure with pressurizer PORV.

b. **IF** PORV CANNOT be closed,
THEN
CLOSE associated block valve:

- FCV-68-332, Block valve for 68-340A [Rx MOV Bd 1B1-B (2B1-B), Compt 12E]
- FCV-68-333, Block valve for 68-334A [Unit 1: Rx. MOV Bd 1A1-A, Compt 9D]
[Unit 2: Rx MOV Bd 2A1-A, Compt 9E]

c. **MAINTAIN** RCS pressure and temperature within acceptable region of cooldown curve **USING** TI-28 Figure A.11.1.