

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.a

Raise Power to 10^{-3} %

Original Signatures on File

PREPARED/
REVISED BY:

Date/

VALIDATED BY:

*

Date/

APPROVED BY:

Date/

(Operations Training Manager)

CONCURRED:

**

Date/

(Operations Representative)

* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.

** Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).

NUCLEAR TRAINING
REVISION/USAGE LOG

REVISION NUMBER	DESCRIPTION OF REVISION	V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:

V - Specify if the JPM change will require another validation (Y or N).
See cover sheet for criteria.

SEQUOYAH NUCLEAR PLANT
RO/SRO
JOB PERFORMANCE MEASURE

Task:

Raise Reactor Power to 10^{13} %

JA/TA task # :

K/A Ratings:

Task Standard:

Reactor is tripped in response to uncontrolled rod withdrawal.

Evaluation Method : Simulator X In-Plant

Performer:

NAME

Start Time

Performance Rating : SAT UNSAT Performance Time

Finish Time

Evaluator:

SIGNATURE

DATE

COMMENTS

SPECIAL INSTRUCTIONS TO EVALUATOR:

- a. Reset the simulator to IC-91

Validation Time: CR. 21 mins Local _____

Tools/Equipment/Procedures Needed:

0-GO-2 Mark Up
0-SO-85-1 Mark Up
Counts Doubling table
1/M Plot

References:

	Reference	Title	Rev No.
A.	0-GO-2	Unit Startup from Hot Standby to Reactor Critical	26
B.	0-SO-85-1	Control Rod Drive System	32
C.	AOP-C.01	Rod Control System Malfunction	16

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READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. 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. A reactor startup is in progress in accordance with 0-GO-2, Reactor Startup. The following conditions exist:
 - All shutdown bank rods are fully withdrawn.
 - Control Bank "D" is at 127 steps.
 - The estimated critical position is 155 steps on Control Bank "D".
 - Most recent 1/M predicts 150 steps on Control Bank D
 - You are at the 6th doubling of source range counts.

INITIATING CUES:

The Unit Supervisor directs you to continue with the reactor startup and withdraw control rods to criticality in accordance with 0-GO-2, Unit Startup from Hot Standby to Reactor Critical, section 5.2, beginning at Step 55, and 0-SO-85-1 section 6.3, step 41. All precautions, limitations, prerequisites and preceding steps for performance of the task have been met or successfully performed.

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 1.: (55) If ICRR plot trend indicates acceptable ECC, Then initiate rod withdrawal using SO-85-1 to seventh doubling range (App. C) or criticality.</p> <p>STANDARD: Candidate determines that 7th doubling is approximately 2400 CPS on each SR channel. Determines that ICRR indicates acceptable ECC. Initiates rod withdrawal by placing IN-HOLD-OUT switch 1-HS-85-5111 to the OUT position.</p> <p>Evaluator Cue: If candidate reaches counts doubling prior to calling the reactor critical, cue the candidate to withdraw rods to criticality</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Start Time___</p> <p>Critical Step</p>
<p>Procedure note prior to step 56:</p> <p>Steps 5.3(56) through 5.3(58) may be repeated as necessary if rod motion is stopped prior to reaching doubling range or criticality.</p>	
<p>STEP 2.:(56) When any of the following conditions are met:</p> <ul style="list-style-type: none"> • SR count rate reaches or exceeds seventh doubling range determined in Appendix C or • Bank D rods reach fully withdrawn position or • Operators or Reactor Engineer determine that rod motion should be stopped <p>THEN STOP outward rod motion</p> <p>STANDARD: This step will NOT be applicable at this time</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>Note: Candidate may stop rod withdrawal when P-6 is received. When P-6 is received, action will be taken per procedure step 62 of 0-GO-2</p>	
<p>STEP 3.:(57) If Reactor is critical, then go to step 5.2(59) (NA Step 5.2(58).</p> <p>STANDARD: Candidate determines that the reactor is critical at this time and step 58 will be NA</p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 4.(59)</u> If any of the following conditions exist:</p> <ul style="list-style-type: none"> ▪ Critical conditions cannot be achieved within the +/- 750 pcm termination band or ▪ Critical conditions cannot be achieved within the +/- 1000 pcm allowable limits or, ▪ Critical conditions cannot be achieved above rod insertion limit or ▪ Reactor startup must be aborted for other reasons, <p>Then perform the following to abort reactor startup:</p> <ul style="list-style-type: none"> • STOP rod withdrawal • INITIATE insertion of control banks • PERFORM Appendix D, Actions if reactor startup must be aborted • DO NOT continue this section <p><u>STANDARD:</u> Candidate determines this step does NOT apply</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 5.(60)</u> If reactor is subcritical with rods at fully withdrawn position, then perform Appendix E Actions if reactor subcritical with rods fully withdrawn.</p> <p><u>STANDARD:</u> Candidate determines that this step is NA</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 6.(61)</u> If the reactor is critical with SUR less than 0.3 DPM, and Intermediate Range NIS <P-6 ($1E^{-4}$ %), then perform the following:</p> <ul style="list-style-type: none"> • If Bank D control Rods are BELOW the fully withdrawn position, then operate control rods to establish a positive SUR of approximately 0.3 DPM. <p><u>STANDARD:</u> Candidate evaluates IR SUR and if necessary, withdraws control bank D to establish a 0.3 DPM SUR</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>Procedure notes prior to step 62:</p> <p>1. Blocking the SRM trip with HS-92-5001 and HS-92-5002 will disable the detector outputs and remove the audio count rate signal</p> <p>2. Step 5.3(62) may be performed at time of criticality, if required. Source Range reactor trip must be BLOCKED before trip setpoint of 10^5 CPS</p>	

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 7.(62) When annunciator window XA-55-4A, window D-2 is lit, then</p> <ul style="list-style-type: none"> Record both Source Range readings Record both Intermediate Range readings Verify a minimum of 1 IRM channel greater than or equal to $1E^{-4}$ % RTP. Block source range reactor trip by momentarily placing HS-92-5001 and HS-92-5002 SRM TRIP RESET-BLOCK handswitches to BLOCK. Verify annunciator window XA-55-4A, C-1, is lit Select NR-45 to record 1 IR and 1 PR channel Adjust NR-45 chart speed as desired. <p>STANDARD: Acknowledge P-6 annunciator; Record SR and IR indications on MCB, and verify IR indication $> 1E^{-4}$ %.</p> <p>Places both switches in BLOCK, and observes annunciator XA-55-4A-C1</p> <p>Selects one IR and one PR indication on NR-45</p> <p>Cue: If the candidate reports that Source Range High Flux Trips have been blocked, acknowledge and provide direction to continue the control rod withdrawal</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 8.(63) Ensure PA announcement made to notify plant personnel when the reactor is critical.</p> <p>STANDARD: Announces criticality over the PA system</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>Note prior to step 64:</p> <p>When T-Avg is less than 551 degrees F and Tavg-Tref deviation alarm is lit, SR 4.1.1.4.b requires verifying lowest T-AVG greater than or equal to 541 degrees F at least once every 30 minutes.</p>	
<p>STEP 9.(64) If Tavg-Tref alarm (M-5A window C-6) is lit, and Tavg is less than 551 degrees F, Then perform 0-SI-SXX-068-127.0 to satisfy SR 4.1.1.4.b, Minimum Temperature for Criticality.</p> <p>STANDARD: Candidate verifies Tave is 547 degrees F.</p> <p>Cue: Another operator will perform the surveillance</p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
Booth Instructor: Insert malfunction when the candidate initiates the next rod withdrawal	
<p><u>STEP 10.(65)</u> If Bank D rods are below fully withdrawn position, then operate control rods to establish a positive SUR of approximately 0.5 DPM (not to exceed 1 DPM)</p> <p><u>STANDARD:</u> Initiates rod withdrawal by placing IN-HOLD-OUT switch 1-HS-85-5111 to the OUT position. Ensures SUR is < 1 DPM</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP 11.</u> Determines that Bank D Group 1 is stepping after releasing IN-HOLD-OUT switch</p> <p><u>STANDARD:</u> Candidate reports rod movement to SRO or attempts to insert Bank D rods. Determines rod movement does not stop</p> <p>Cue: <i>If candidate reports to SRO, acknowledge the report. Direct the candidate to recommend an action</i></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12.:</u> Trip the reactor in response to inappropriate continuous rod motion.</p> <p><u>STANDARD:</u> Candidate trips the reactor in response to inappropriate continuous rod motion.</p> <p>Note: Candidate may refer to AOP C.01 for tripping reactor</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

End of JPM

**CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)**

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

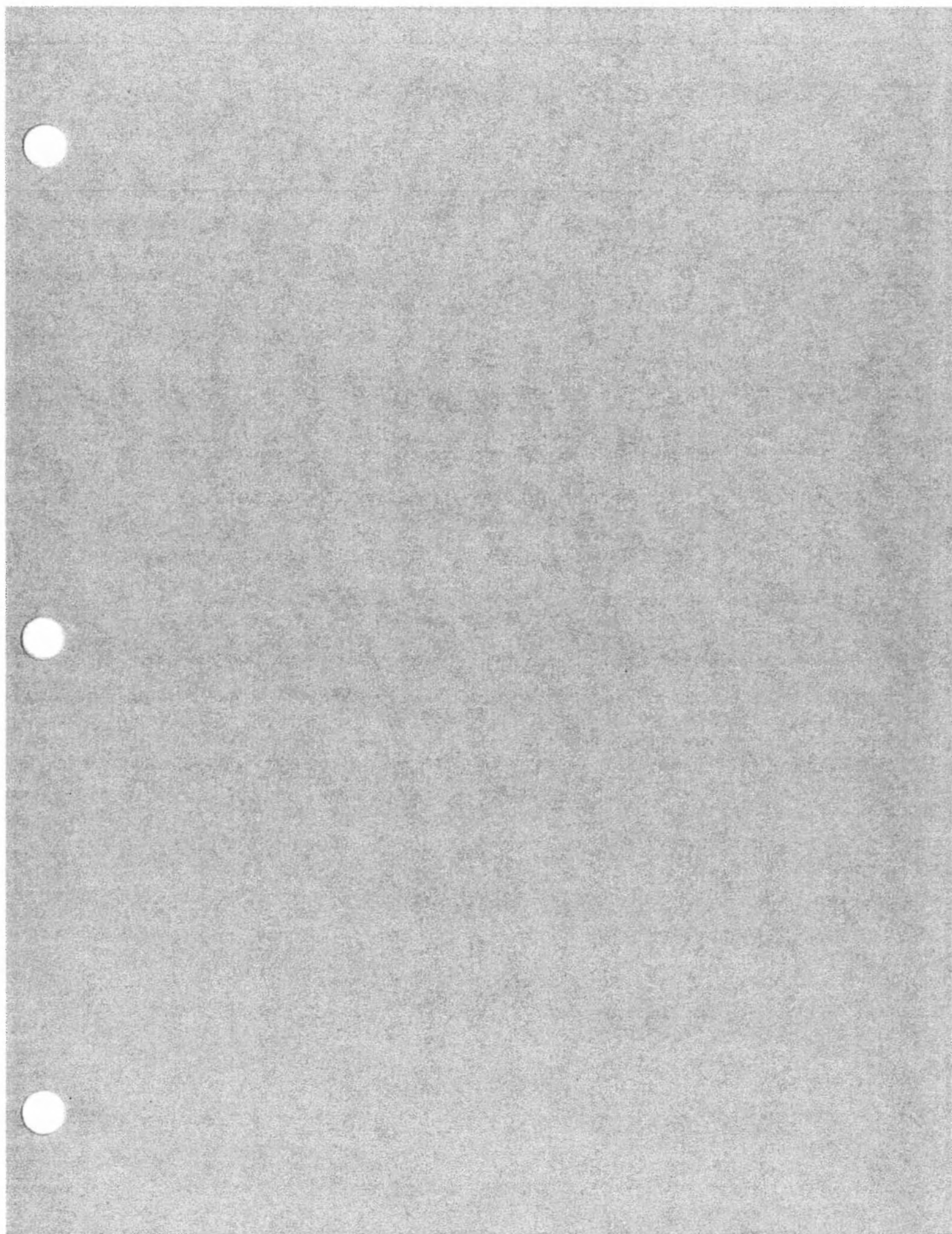
A reactor startup is in progress in accordance with 0-GO-2, Reactor Startup. The following conditions exist:

- All shutdown bank rods are fully withdrawn.
- Control Bank "D" is at 127 steps.
- The estimated critical position is 155 steps on Control Bank "D".
- Most recent 1/M predicts 150 steps on Control Bank D
- You are at the 6th doubling of source range counts.

INITIATING CUES:

The Unit Supervisor directs you to continue with the reactor startup and withdraw control rods to criticality in accordance with 0-GO-2, Unit Startup from Hot Standby to Reactor Critical, section 5.2, beginning at Step 55, and 0-SO-85-1 section 6.3, step 41.

All precautions, limitations, prerequisites and preceding steps for performance of the task have been met or successfully performed.



SQN Unit 0	UNIT STARTUP FROM HOT STANDBY TO REACTOR CRITICAL	0-GO-2 Rev. 0026 Page 79 of 85
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Appendix C
(Page 1 of 1)

DETERMING SOURCE RANGE COUNT RATE DOUBLING

1.0 Calculating Doubling Range

NOTES

- 1) Source range reading shall be allowed to stabilize for approximately 3 minutes after each reactivity change prior to determining new stable count rate.
- 2) The highest reading channel should be used when determining stable count rate. Digital indication on shutdown monitor [M-13] is preferred.
- 3) Doubling range is used to determine when rod motion should be stopped during approach to criticality. Criticality is expected in about 5 to 7 count rate doublings.
- 4) This appendix may be performed and IV'd by operators, STA, or Rx Engineers.

STABLE COUNT RATE (CR)	COUNT RATE DOUBLING RANGE		INITIALS	
	CR X 1.75 =	CR X 2.0 =	1st	IV
20	(Lower value not used for first doubling)	40	Q	2
40	70	80	Q	2
80	136	159	E	2
159	278	318	E	2
318	556	635	E	2
635	1111	1270	W	W
1270	2222	2540	W	W

End of Section

SQN 0	ESTIMATED CRITICAL CONDITIONS	0-SI-NUC-000-001.0 Rev 5 Page 35 of 42
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APPENDIX C

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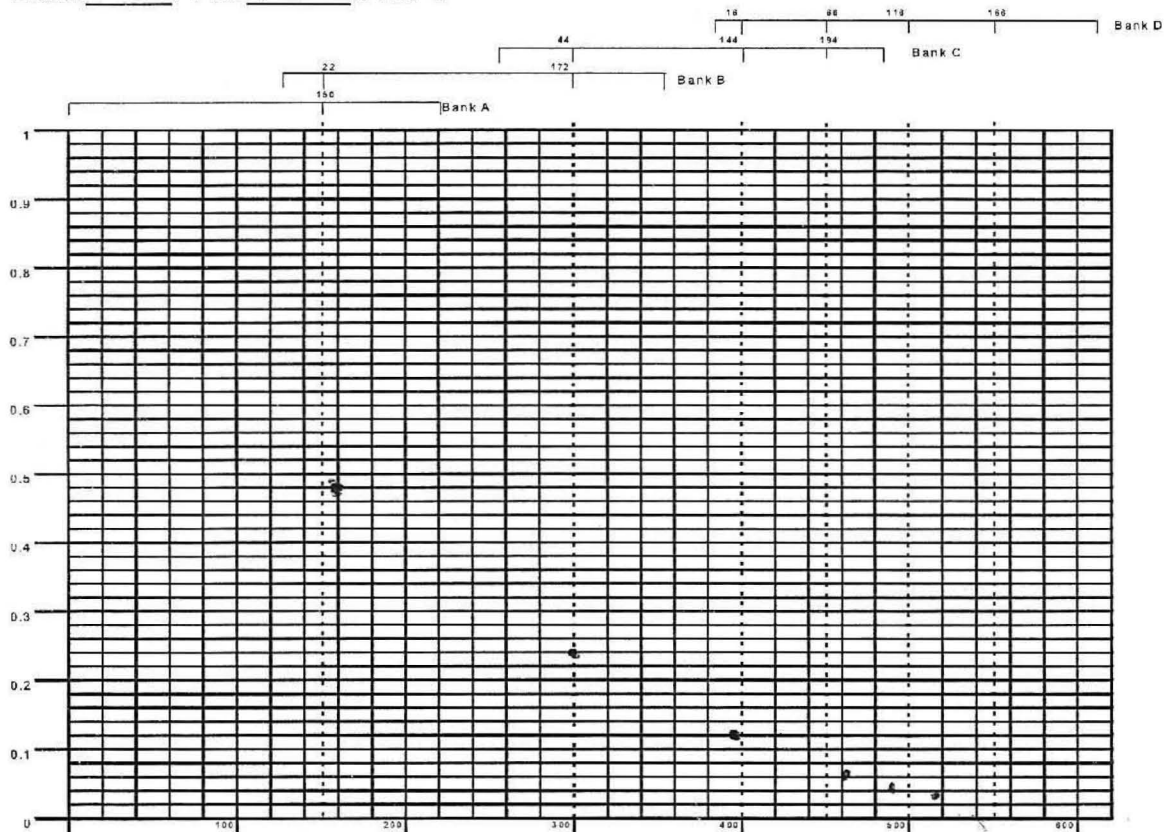
MONITORING THE APPROACH TO CRITICALITY

DATA SHEET C-1

ICRR DURING ROD WITHDRAWAL FOR CHANNEL N-32

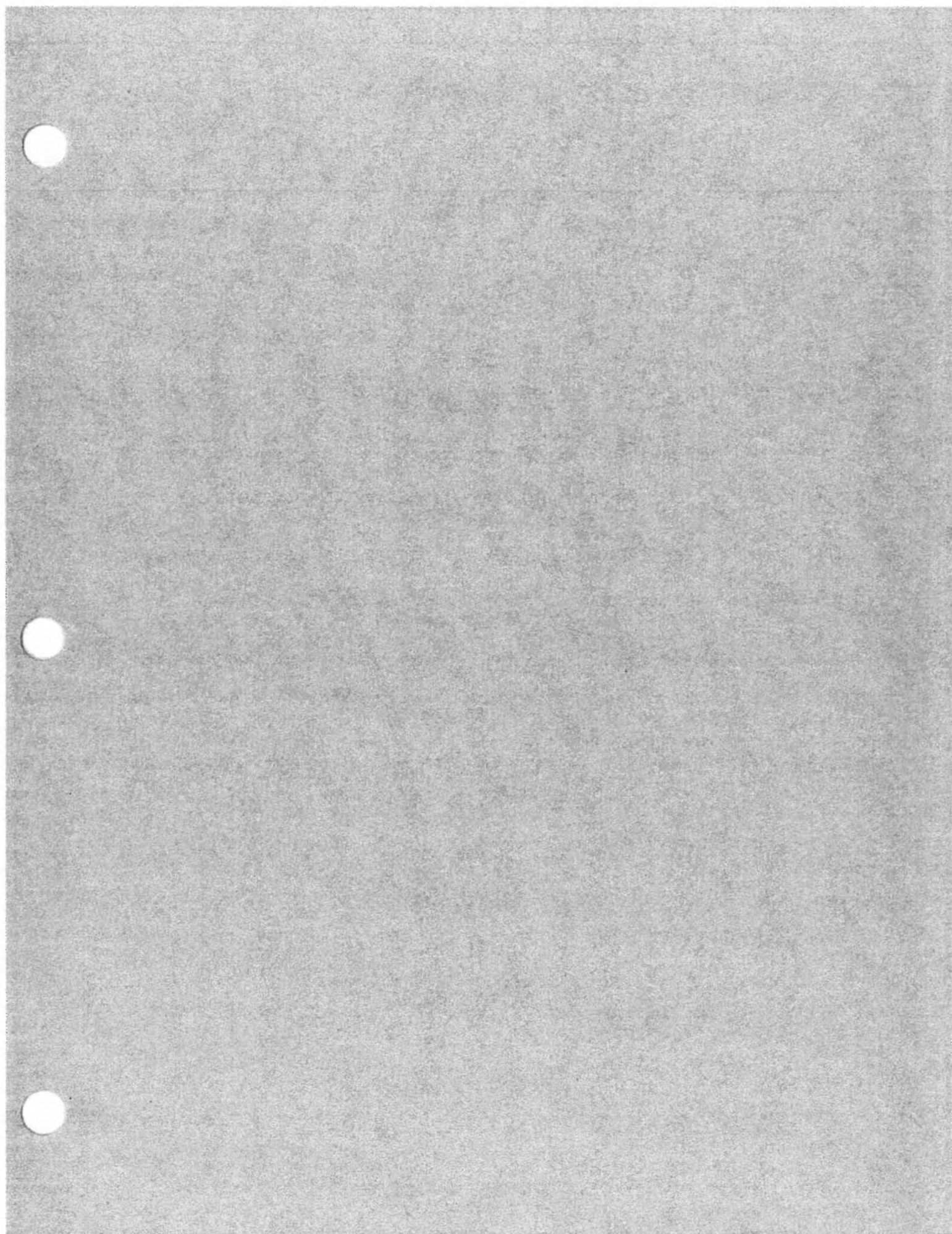
UNIT 1 CYCLE _____
ECC: _____ PPM 155 STEPS _____

DATE today



	COUNT	SECS	Cri	BANK	STEPS	ICRR	INITIALS
CR 0	19					1.00	~
CR 1	39					.48	~
CR 2	78					.24	~
CR 3	155					.12	~
CR 4	308					.06	~
CR 5	615					.03	~
CR 6	1270					.015	~
CR 7							
CR 8							
CR 9							

REVIEWED BY _____ DATE _____
REACTOR ENGR



SQN Unit 0	UNIT STARTUP FROM HOT STANDBY TO REACTOR CRITICAL	0-GO-2 Rev. 0026 Page 38 of 85
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STARTUP No. _____ **Unit** _____ **Date** _____

5.2 Reactor Startup after a refueling outage (continued)

[54] **IF** ICRR plot indicates criticality will fall outside
± 1000 pcm ECC termination band,
THEN

[54.1] **NOTIFY** SM and Duty Plant Manager. _____

[54.2] **EVALUATE** if ECC should be recalculated
prior to continuing startup. _____

[54.3] **IF** startup must be aborted, **THEN**
PERFORM Appendix D, Actions if Reactor Startup Must
Be Aborted. ☐

[55] **IF** ICRR plot trend indicates acceptable ECC,
THEN
INITIATE rod withdrawal **USING** 0-SO-85-1
to seventh doubling range (App. C) or criticality. ☐

NOTE

Steps 5.2[56] through 5.2[58] may be repeated as necessary if rod motion is stopped
prior to reaching doubling range or criticality.

[56] **WHEN** any of the following conditions are met:

- Source range count rate reaches or exceeds
seventh doubling range determined in Appendix C
OR
- Bank D rods reach fully withdrawn position
OR
- Operators or Rx Engineer determine that rod motion
should be stopped

THEN
STOP outward rod motion. ☐ ☐ ☐ ☐

[57] **IF** reactor is critical,
THEN
GO TO Step 5.2[59] (N/A Step 5.2[58]). _____

SQN Unit 0	UNIT STARTUP FROM HOT STANDBY TO REACTOR CRITICAL	0-GO-2 Rev. 0026 Page 39 of 85
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STARTUP No. _____ Unit _____ Date _____

5.2 Reactor Startup after a refueling outage (continued)

[58] **IF** ALL of the following conditions are met:

- rod motion was stopped prior to reaching doubling range or criticality
- Bank D rods are below fully withdrawn position
- Unit Supervisor concurrence is obtained to resume,

THEN

RESUME rod withdrawal **USING** 0-SO-85-1

to seventh doubling range or criticality (whichever comes first). ☐ ☐ ☐ ☐

[59] **IF** any of the following conditions exist:

- critical conditions cannot be achieved within the ± 1000 pcm allowable limits
OR
- critical conditions cannot be achieved above rod insertion limit
OR
- reactor startup must be aborted for other reasons,

THEN

PERFORM the following to abort reactor startup: **[C.11]**

[59.1] **STOP** rod withdrawal. _____

[59.2] **INITIATE** insertion of control banks. _____

[59.3] **PERFORM** Appendix D, Actions if Reactor Startup Must Be Aborted. ☐

[59.4] **DO NOT CONTINUE** this section.

SQN Unit 0	UNIT STARTUP FROM HOT STANDBY TO REACTOR CRITICAL	0-GO-2 Rev. 0026 Page 40 of 85
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STARTUP No. _____ Unit _____ Date _____

5.2 Reactor Startup after a refueling outage (continued)

[60] **IF** reactor is subcritical with Bank D rods
at fully withdrawn position,
THEN
PERFORM Appendix E, Actions if Reactor is Subcritical with
Rods Fully Withdrawn. □

[61] **IF** reactor is critical with SUR less than 0.3 DPM
AND intermediate range NIS is less than P-6 ($1 \times 10^{-4} \%$),
THEN
PERFORM the following:

[61.1] **IF** Bank D control rods are BELOW
fully withdrawn position,
THEN
OPERATE control rods to establish a positive SUR
of approximately 0.3 DPM. _____

[61.2] **IF** Bank D rods have reached fully withdrawn position
AND Rx Engineering concurs with RCS dilution,
THEN
PERFORM RCS dilution (as recommended by Rx Eng)
to establish positive SUR of approx. 0.3 DPM
USING 0-SO-62-7. _____

SQN Unit 0	UNIT STARTUP FROM HOT STANDBY TO REACTOR CRITICAL	0-GO-2 Rev. 0026 Page 41 of 85
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STARTUP No. _____ Unit _____ Date _____

5.2 Reactor Startup after a refueling outage (continued)

Start of Critical Step(s)

NOTES

- 1) Blocking the SRM reactor trip with **[HS-92-5001]** and **[HS-92-5002]** will disable the detector outputs and remove the audio count rate signal.
- 2) Step 5.2[62] may be performed at time of criticality, if required. Source range reactor trip must be BLOCKED before trip setpoints of 10^5 cps.

[62] **WHEN** annunciator XA-55-4A, window D-2

**P-6
INTERMEDIATE
RANGE
PERMISSIVE**

is LIT, THEN [C.2]

[62.1] **RECORD** both source range readings.

N-31 _____ CPS N-32 _____ CPS

Initials

[62.2] **RECORD** both intermediate range readings.

N-35 _____ %RTP N-36 _____ %RTP

Initials

[62.3] **VERIFY** a minimum of one IRM channel greater than or equal to 1×10^{-4} % RTP.

☐

[62.4] **BLOCK** source range reactor trip by momentarily placing **[HS-92-5001]** and **[HS-92-5002]** SRM TRIP RESET-BLOCK P-6 handswitches to BLOCK.

Initials

Date

Time

SQN Unit 0	UNIT STARTUP FROM HOT STANDBY TO REACTOR CRITICAL	0-GO-2 Rev. 0026 Page 42 of 85
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STARTUP No. _____ Unit _____ Date _____

5.2 Reactor Startup after a refueling outage (continued)

[62.5] **VERIFY** annunciator XA-55-4A, window C-1

**SOURCE RANGE
TRAINS A & B TRIP
BLOCK**

is LIT.

☐

End of Critical Step(s)

[62.6] **SELECT** NR 45 to record one intermediate range channel and one power range channel.

[62.7] **ADJUST** NR 45 chart speed as desired.
(N/A is no change needed.)

☐

[63] **ENSURE** PA announcement made to notify plant personnel when the reactor is critical.

☐

NOTE

When T-avg is less than 551°F and Tavg - Tref deviation alarm is lit, SR 4.1.1.4.b requires verifying lowest T-avg greater than or equal to 541°F at least once per 30 minutes.

[64] **IF** Tavg - Tref deviation alarm [M-5A window C-6] is LIT
AND T-avg is less than 551°F,
THEN
PERFORM 0-SI-SXX-068-127.0 to satisfy SR 4.1.1.4.b,
Minimum Temperature For Criticality.

SQN Unit 0	UNIT STARTUP FROM HOT STANDBY TO REACTOR CRITICAL	0-GO-2 Rev. 0026 Page 43 of 85
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STARTUP No. _____ Unit _____ Date _____

5.2 Reactor Startup after a refueling outage (continued)

[65] **RAISE** reactor power to approximately $1 \times 10^{-3}\%$:

[65.1] **IF** Bank D control rods are BELOW
fully withdrawn position,
THEN
OPERATE control rods to establish a positive SUR
of approximately 0.5 DPM (not to exceed 1 DPM). _____

[65.2] **IF** Bank D rods have reached fully withdrawn position
AND Rx Engineering concurs with RCS dilution,
THEN
PERFORM RCS dilution (as recommended by Rx Eng)
to establish positive SUR of approx. 0.5 DPM
USING 0-SO-62-7. _____

[65.3] **WHEN** intermediate range NIs indicate
approximately $1 \times 10^{-3}\%$,
THEN
PERFORM the following:

[65.3.1] **STABILIZE** reactor power using control rods. _____

[65.3.2] **RECORD** critical data indicated below.

Power Level: N-35 _____ %RTP N-36 _____ %RTP

Rod Position: _____ RCS Boron concentration _____
Bank Step ppm

Loop T_{AVG}: _____, _____, _____, _____,
1 2 3 4

Initials

Date

Time

[66] **MAINTAIN** reactor power stable with control banks
above low insertion limit **USING** rod movement or
boration/dilution to compensate for Xenon. ☐

SQN 1,2	CONTROL ROD DRIVE SYSTEM	0-SO-85-1 Rev 32 Page 51 of 77
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Unit _____

Date _____

6.3 Manual Operation of Rod Control System Below 15 Percent Power (Continued)

NOTE Three steps are added to the low insertion limit (120 steps @ zero power) until LEFM is available.

[39] WHEN Control Bank C is \approx 123 steps, **THEN**

ENSURE Window 7 (A-7), ROD CONTROL BANKS
LIMIT LOW alarm on panel **[XA-55-4B] CLEARS.** _____

[40] WHEN Control Bank C is withdrawn to 128 steps, **THEN**

ENSURE Control Bank D demand position counters
operational by performing the following: **[C.2]**

[a] BUMP [HS-85-5111], Rod Control Switch to withdraw
Control Bank D one-half step at a time, for one full step.

____ / ____
1st CV

[b] CHECK group demand position counters advance properly. ☐

[c] BUMP [HS-85-5111] to withdraw Control Bank D
one-half step at a time, for the second full step.

____ / ____
1st CV

[d] VERIFY group demand position counters advance properly. ☐

[e] IF group demand position counters do **NOT** advance properly,
THEN

A. **STOP** rod withdrawal. ☐

B. **INITIATE** WO to have counter repaired. ☐

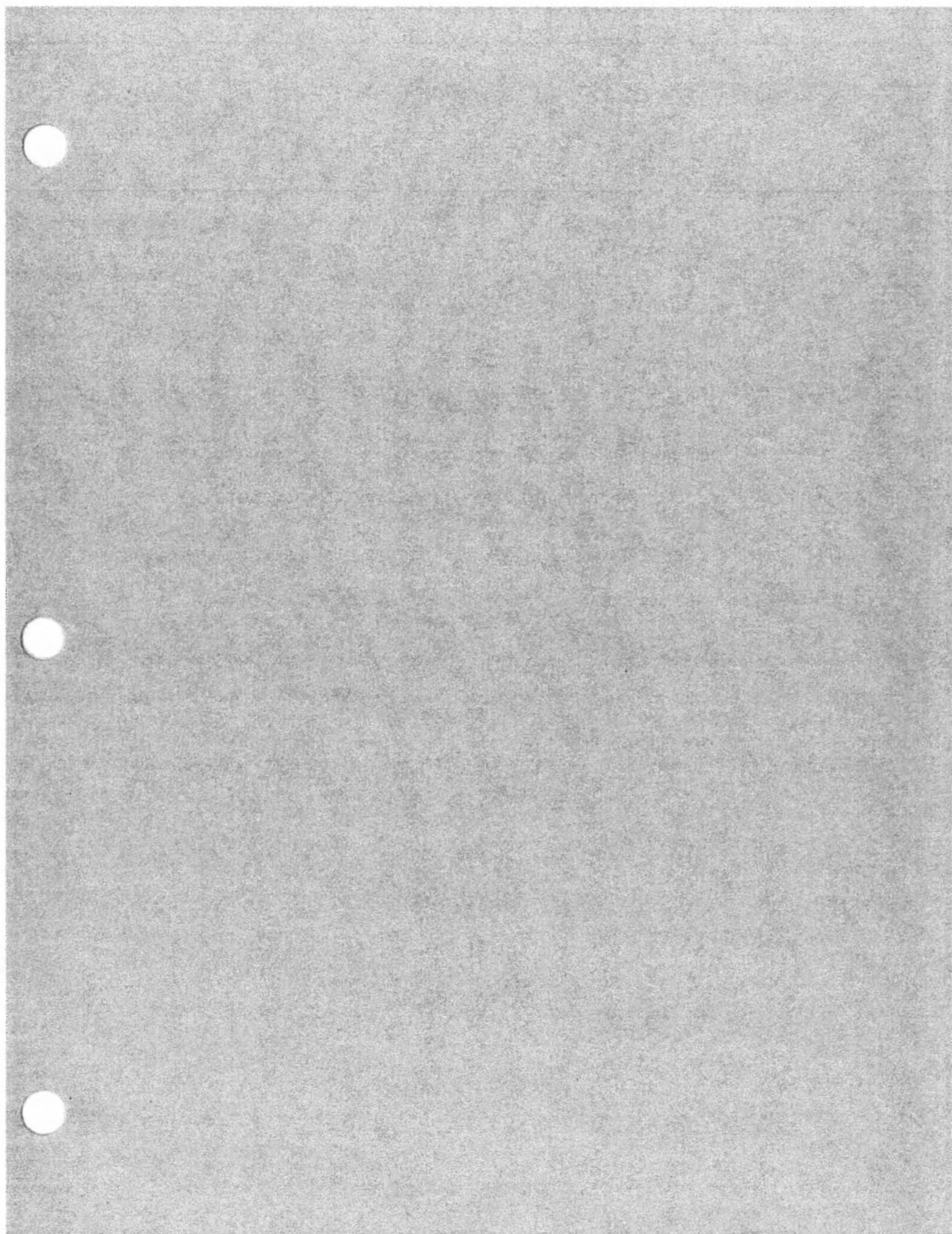
C. **WHEN** counter is repaired, **THEN**

1. **ENSURE** Control Bank D fully **INSERTED** and ☐

2. **RETURN** to beginning of this step. ☐

[41] CONTINUE withdrawal of Control Bank D using **[HS-85-5111]**
to next doubling or criticality. _____

End of Section 6.3



SQN	ROD CONTROL SYSTEM MALFUNCTIONS	AOP-C.01 Rev. 16
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.1 Continuous Rod Bank Movement

1. CHECK rod control:

- a. ENSURE rod control in MAN.
- b. CHECK rod motion STOPPED.
- b. TRIP the reactor, and
GO TO E-0, Reactor Trip or Safety
Injection.



CAUTION: — Control Rods should NOT be manually withdrawn during a plant transient.

2. CHECK for steam line or feedwater line break:

- a. CHECK for rising reactor power with dropping T-avg.
- a. GO TO Step 3.
- b. GO TO AOP-S.05, Steam Line or Feedwater Line Break/Leak.



SEQUOYAH NUCLEAR PLANT JOB PERFORMANCE MEASURE

B.1.b JPM 77-2AP

Perform D/G Load Test on 1B-B D/G
(with low oil press)

**PREPARED/
REVISED BY:** _____ **Date/** _____

VALIDATED BY: * _____ **Date/** _____

APPROVED BY: _____ **Date/** _____
(Operations Training Manager)

CONCURRED: ** _____ **Date/** _____
(Operations Representative)

* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.

** Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).

NUCLEAR TRAINING

REVISION/USAGE LOG

REVISION NUMBER	DESCRIPTION OF REVISION	V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:
7	Revised to reflect revision changes in SI-7B, changed critical steps for consistency with JPM 77-5AP reviewed/approved 4/20/99, corrected typos and incorporated comments from 1999 cycle 5 requal performances of JPM 77-2AP. Flow of the JPM is not affected.	N	10/14/99	All	SR TAYLOR
pen/ink	Deleted step 20 based on rev 20 of 0-AR-M26-B, Updated rev level	N	8/9/00	5,12	SR Taylor
pen/ink	SO-82 rev update only	N	8/17/00	4	SR Taylor
pen/ink	0-AR-M26-B rev chg only	N	8/28/00	4	SR Taylor
pen/ink	0-SI-OPS-082-007.B rev chg only	N	6/21/01	4	WR Ramsey
pen/ink	1-SI-OPS-082-007.B rev 25 Update minor changes related to stopwatch usage	N	09/07/01	ALL	WR Ramsey
8	Incorporated pen/ink changes; updated to recent revisions of references; no impact on JPM flow	N	8/20/02	All	J P Kearney
9	Revised remote functions used to conform to new simulator configuration	N	12/01/2003	4, 8, 10	JJ Tricoglou
10	Updated to current revisions and IC.	N	8/11/04	All	MG Croteau
11	Updated to current revisions. Minor format changes	N	01/31/07	All	RH Evans

V - Specify if the JPM change will require another validation (Y or N).
See cover sheet for criteria.

COMMENTS

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Sequenced steps identified by an "s"
2. Any UNSAT requires comments
3. Acknowledge any associated alarms.
4. Initialize Simulator to IC-16.
5. A Console operator will be required to enter overrides and play role of AUO on Radio.
6. **When operator starts step #18, insert IMF AN_OV_946 f:2.**
7. An extra simulator operator will be needed at step 5 for timing the D/G.
8. Ensure 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 13 minutes Local

Tools/Equipment/Procedures Needed:

- 1-SI-OPS-082-007.B, Through Section 6.1 and Appendix "C".
- "Signed off" copy of entire section 4.
- 0-AR-M26-B window B-4

References:

	Reference	Title	Rev No.
1.	1-SI-OPS-082-007.B	Electrical Power System Diesel Generator 1B-B	39
2.	0-AR-M26-B	Annunciator 0-XA-55-26B	27

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. 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. Both units are at 100% RTP.
2. All systems are OPERABLE, except for the 1B-B D/G, 0-GO-16 has been completed on all the A train equipment.
3. Maintenance has been completed on the 1B-B D/G and the clearance has been removed.
4. The D/G has been rolled and is in standby alignment using 0-SO-82-2.
5. The AUO at the D/G building has completed Appendix A of 1-SI-OPS-082-007.B and all parameters are within limits.
6. The U1 Control Room AUO has verified breaker 1934 is in the Disconnect position.
7. SI-166.36 is NOT required.
8. D/G-DAQ has been installed per Appendix J.
9. Applicable steps of Appendix J, Monitoring the D/G Starting Air System, completed.
10. Room fire protection is in service.
11. Section 4.0 of 1-SI-OPS-082-007.B is complete.

INITIATING CUES:

1. The U1 US/SRO has reviewed the completed work package for the 1B-B D/G, all that remains is to perform 1-SI-OPS-082-007.B for the PMT.
2. You are an extra unit operator and have been assigned to perform the operability run of D/G 1B-B per SI-OPS-082-007.B.
3. The PMT requires the AMBIENT MANUAL START method for testing.
4. Notify the US when the test is complete.

<p>STEP 1.: Operator obtains a copy of the appropriate procedure.</p> <p>NOTE: Initial conditions cover steps up to transition to App "C".</p> <p>STANDARD: Operator obtains a copy of 1-SI-OPS-082-007.B. Performance of task will start with Appendix C.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Start Time___</p>
<p>STEP 2.: [1] ENSURE [0-HS-82-48], 1B-B D/G mode selector switch in the UNIT position.</p> <p>STANDARD: 0-HS-82-48 in UNIT position on 0-M-26. Green light ON.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 3.: [2] Place [1-HS-57-74], D/G 1B-B Synchronize Switch in the SYN position.</p> <p>NOTE: 0-EI-82-35 and 0-XI-82-33 will indicate running voltage & frequency.</p> <p>STANDARD: 1-HS-57-74 in "SYN" position on 0-M-26. This step is critical to allow to allow D/G to be synchronized to the Shutdown Bd.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

<p>STEP 4. [3] PERFORM the following to initiate the D/G start signal:</p> <p>[a] IF the D/G-DAQ is to be used, THEN NOTIFY D/G-DAQ Operator to</p> <p style="padding-left: 40px;">START the D/G-DAQ</p> <p>NOTE: Operator should coordinate the start of the D/G-DAQ just prior to D/G start actuation.</p> <p>Cue Console operator Play role of D/G-DAQ operator: D/G-DAQ computer is running.</p> <p>STANDARD: Operator notifies the D/G-DAQ operator to start the D/G-DAQ.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 5.:</p> <p>[b] PROCEED with the countdown: 3,2,1, START.</p> <p>[c] DEPRESS [0-HS-82-46A], DG 1B-B Emergency Start Switch AND START stopwatch.</p> <p>[d] WHEN voltage >6800 volts AND frequency >58.8 Hz, THEN STOP stopwatch.</p> <p>NOTE: Role play as extra operator with stop watch and start watch when 0-HS-82-46A is depressed.</p> <p>STANDARD: 0-HS-82-46A momentarily depressed. Green light will go "out" and red light will come "on" above D/G mimic. [Not critical: D/G running alarm will ANN to indicate D/G > 40 rpm. Incoming voltage and frequency are verified on 0-EI-82-34 and 0-XI-82-32. Portions of this step is critical to start the D/G.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

<p>STEP 6.: [4] ENSURE [1-FCV-67-67], ERCW cooling water supply valve is OPEN.</p> <p>STANDARD: ERCW valve 1-FCV-67-67 is verified open.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>								
<p>STEP 7.: [5] RECORD the steady state values for the following:</p> <p>A. [0-EI-82-34], DG 1B-B incoming Voltage.</p> <p>B. [0-XI-82-32], DG 1B-B incoming Frequency.</p> <p>C. Time from Stopwatch(es):</p> <table border="0"> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>Seconds</td> <td>Stopwatch ID Number</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>Seconds</td> <td>Stopwatch ID Number</td> </tr> </table> <p>CUE: Time from stop watch. = 9.48 seconds</p> <p>STANDARD: Operator records parameters as directed and verifies acceptance criteria met. D/G voltage (as indicated on INC Voltage Gen 1B-B 0-EI-34) is ≥ 6800 but ≤ 7260 volts and frequency (as indicated on INC Freq Gen 1B-B 0-XI-82-32) is ≥ 58.8 Hz and ≤ 61.2 Hz</p> <p>COMMENTS:</p>	_____	_____	Seconds	Stopwatch ID Number	_____	_____	Seconds	Stopwatch ID Number	<p>___ SAT</p> <p>___ UNSAT</p>
_____	_____								
Seconds	Stopwatch ID Number								
_____	_____								
Seconds	Stopwatch ID Number								
<p>ACCEPTANCE CRITERIA: D/G 1B-B achieves steady state generator voltage of ≥ 6800 and ≤ 7260 volts and frequency of ≥ 58.8 Hz and ≤ 61.2 Hz.</p>									
<p>STEP 8.: [6] RECORD Voltage Regulator Control Current.</p> <p>Cue: Voltage Regulator Control Current is 1.8 dc amps.</p> <p>STANDARD: Operator records Voltage Regulator Control Current.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>								

ACCEPTANCE CRITERIA: Voltage Regulator Control Current between 1.0 – 2.5 dc amps. The Voltage regulator card must be functioning properly to consider DG operable.

<p>STEP 9.: [7] ENSURE D/G 1B-B [86 LOR] red light NOT ILLUMINATED, at D/G local relay panel.</p> <p>Cue: <i>Role Play as D/G operator - 86 LOR local red light is not illuminated.</i></p> <p>STANDARD Operator request D/G operator to verify red light on 86 LOR at D/G is not illuminated.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>NOTE Do not hold [86 LOR] in RESET position if it does not latch on the first attempt. Coil failure may result if relay is held in RESET position.</p>	
<p>STEP 10.: [8] RESET [86 LOR] Lockout Relay, on D/G local relay panel.</p> <p>NOTE: When the D/G AUO is requested to reset 86LOR, the Console operator should insert IRF EGR08 f:1 to reset 86LOR and then notify operator - 86 LOR is reset.</p> <p>STANDARD: 86 LOR is reset. This step is critical to allow paralleling the D/G to the Shutdown Bd.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 11.: [9] VERIFY [86LOR] is reset by amber light [0-XI-82-49] ILLUMINATED on 0-M-26.</p> <p>STANDARD: 86 LOR amber light on 0-M-26 is verified lit</p> <p>COMMENTS:</p>	

<p>STEP 12.: [10] IF the D/G-DAQ was used, THEN</p> <p>RECORD from the time required to achieve ≥ 6800 Volts and ≥ 58.8 HZ from the D/G-DAQ computer:</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">Seconds</p> <p>Cue: <i>Time was 9.5 seconds for D/G-DAQ.</i></p> <p>STANDARD: Operator ensures the DG accelerates to at least 900 rpm (58.8 - 61.2 Hz) and Voltage and frequency are within limit within the required 10 seconds. (Evaluator can sign for Tech Support)</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>ACCEPTANCE CRITERIA: D/G 1B-B start from ambient condition achieves in less than or equal to 10 seconds generator voltage ≥ 58.8 Hz.</p>	
<p>STEP 13.: [11] RECORD start as ambient in 0-SI-OPS-082-007.M.</p> <p>Cue: <i>Another operator will record start.</i></p> <p>STANDARD: Operator logs (addresses logging) the start in 0-SI-OPS-082-007.M.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 14.: [12] RETURN to Section 6.1, Step [9] of this instruction.</p> <p>STANDARD: Operator returns to the appropriate section and step of the procedure. (Exits Appendix C)</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>EVALUATOR NOTE: Following steps evaluate procedure section 6.1.</p> <p>STEP 15.: [9] PERFORM the following to wipe the Automatic Voltage Control Rheostat:</p> <p>[a] RECORD voltage from [0-EI-82-34]. _____</p> <p>[b] ENSURE [0-HS-82-42] DG 1A-A Voltage Regulator Switch in the PULL-P-AUTO position</p> <p>[c] DECREASE voltage to 6700 volts on [0-EI-82-34] USING [0-HS-82-42]</p> <p>[d] INCREASE voltage to 7300 volts on [0-EI-82-34] USING [0-HS-82-42]</p> <p>[e] RETURN voltage to value recorded in [9][e].</p> <p>STANDARD: Operator uses 0-HS-82-42 to decrease voltage to 6700 volts and increase voltage to 7300 volts, then return voltage to the value recorded in step [9][e].</p> <p>COMMENTS:</p>	
<p>STEP 16.: [10] PLACE [0-HS-82-48], Mode Selector Switch in PARALLEL position.</p> <p>STANDARD: 0-HS-82-48 rotated to the PARALLEL position. Red light "on" & green light "off". This step is critical to place speed droop circuit in service.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 17.: [11] ADJUST [0-HS-82-43], DG 1B-B Speed Control Switch to obtain a synchroscope indication of slowly rotating in [FAST] direction.</p> <p>STANDARD: Operator adjusts speed control hand switch 0-HS-82-43 such that synchroscope (XI-82-31) is moving slowly in the fast direction (slowly clockwise).</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

<p>STEP 18.: [12] ENSURE [0-HS-82-42], DG 1B-B Voltage Regulator Low-Raise Switch in the PULL-P-AUTO position, AND</p> <p>ADJUST to match incoming voltage with running voltage.</p> <p>STANDARD: Operator ensures HS-82-42 in PULL-P-AUTO and adjusts D/G voltage such that incoming voltage (EI-82-34) and running voltage (EI-82-35) are approximately equal. Only the bold portion of this standard is critical. This is critical to match voltage of the D/G with the voltage on the Shutdown Bd.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 19.: [13] WHEN the synchroscope DG 1B-B [0-SI-82-31] indicates 12 O'Clock position, THEN</p> <p>CLOSE breaker [1914] via [1-HS-57-73A], 1914 DG 1B-B to SD BD 1B-B, AND</p> <p>START stopwatch.</p> <p>NOTE: When operator begins discussing the step to close D/G Bkr, insert override IMF AN_OV_946 f:2.</p> <p>STANDARD: Operator discusses closing D/G 1B-B breaker 1914, but should stop due to annunciator.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 20.: Respond to annunciator panel 0-M-26B window B-4.</p> <p>STANDARD: Operator pulls AR 0-M26-B and consults page for window B-4 or TAKES PRUDENT ACTION TO EMERGENCY STOP D/G.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

EVALUATOR NOTE: The next Performance Step is from the ARP Corrective Actions.	
<p><u>STEP 21.:</u> [1] IF D/G running with no valid accident (blackout or SI) signal present, THEN, ENSURE D/G shutdown by depressing emergency stop pushbutton 0-HS-82-47A.</p> <p><u>STANDARD:</u> Operator depresses emergency stop button for Diesel Generator 1B-B. This step is critical to prevent damage to the D/G due to low lube oil pressure.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP 22.:</u> Inform US/SRO of Emergency stop of Diesel Generator 1B-B.</p> <p><u>Cue:</u> <i>US/SRO instructs operator to standby for further instructions.</i></p> <p><u>STANDARD:</u> Operator informs US/SRO of Emergency stop of Diesel Generator 1B-B.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Stop Time___</p>

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Both units are at 100% RTP.

All systems are OPERABLE, except for the 1B-B D/G, 0-GO-16 has been completed on all the A train equipment.

Maintenance has been completed on the 1B-B D/G and the clearance has been removed. The D/G has been rolled and is in standby alignment using 0-SO-82-2.

The AUO at the D/G building has completed Appendix A of 1-SI-OPS-082-007.B and all parameters are within limits.

The U1 Control Room AUO has verified breaker 1934 is in the Disconnect position. SI-166.36 is NOT required.

D/G-DAQ has been installed per Appendix J.

Applicable steps of Appendix J, Monitoring the D/G Starting Air System, completed. Room fire protection is in service.

Section 4.0 of 1-SI-OPS-082-007.B is complete.

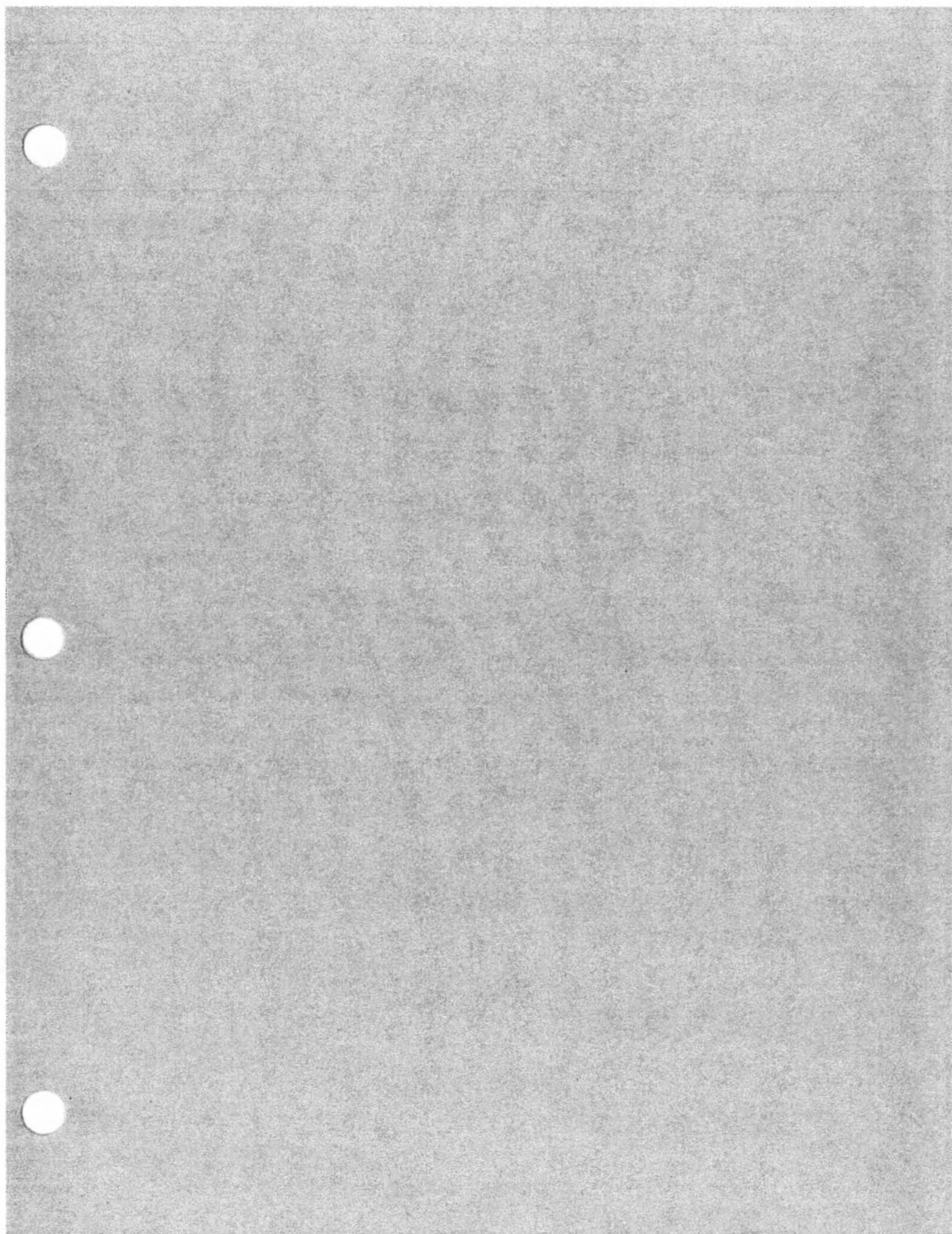
INITIATING CUES:

The U1 US/SRO has reviewed the completed work package for the 1B-B D/G, all that remains is to perform 1-SI-OPS-082-007.B for the PMT.

You are an extra unit operator and have been assigned to perform the operability run of D/G 1B-B per SI-OPS-082-007.B.

The PMT requires the AMBIENT MANUAL START method for testing.

Notify the US when the test is complete.



TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

ANNUNCIATOR RESPONSE

0-AR-M26-B

ANNUNCIATOR

0-XA-55-26B

Revision 27

QUALITY RELATED

PREPARED/PROOFREAD BY: DARRELL W. LUNSFORD

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: W. T. LEARY

EFFECTIVE DATE: 01/18/2007

LEVEL OF USE: **CONTINUOUS USE**

REVISION

DESCRIPTION: Window A-2, addressed probable cause of alarm as depressing the local panel PB per NB050676. Window C-6, added action to open alternate cooling supply per NB050748 (PER-85166). Window C-7, corrected referenced Tech Spec per TSC 04-01. Window D-1, corrected referenced procedure number per NB060835 (editorial). Changed from reference us to continuous use.

**ANNUNCIATOR
0-XA-55-26B**

	1	2	3	4	5	6	7	
A	DIESEL GEN 1B-B UNIT LOCKOUT AUTO START RDY FAILURE	DIESEL GEN 1B-B CONTROL POWER FAILURE	DIESEL GEN 1B-B MAINTENANCE POSITION	DIESEL GEN 1B-B FAIL TO START OR RUN	DIESEL GEN 1B-B RUNNING >40 RPM	SPARE	SPARE	A
B	DIESEL GEN 1B-B GOV ACTUATOR DIFFERENCE	DIESEL GEN 1B-B EXHAUST TEMP DIFFERENCE	DIESEL GEN 1B-B BATTERY TROUBLE	DIESEL GEN 1B-B LUBE OIL PRESS LOW ENGINE 1 OR 2	PS-18-66A/2 FULE OIL PRESS LOW ENG 1 OR 2	SPARE	6900 SD BD 1B-B OVERVOLTAGE	B
C	PS-82-192 DIESEL GEN 1B-B START AIR PRESS LOW ENG 1 OR 2	LS-18-63A/2 DAY TANK 1 OR 2 FUEL OIL LEVEL ABNORMAL	DIESEL GEN 1B-B OVERSPEED TRIP ENGINE 1 OR 2	DIESEL GEN 1B-B JACKET WATER TEMP HIGH-LOW ENGINE 1 OR 2	DIESEL GEN 1B-B WATER LEVEL OR PRESS ABN ENGINE 1 OR 2	480V PWR TRAIN 1B-B MCC UNDERVOLTAGE	6900V SD BD 1B-B FAILURE OR BUS UNDERVOLTAGE	C
D	DIESEL GEN 1B-B LUBE OIL LEVEL LOW ENGINE 1 OR 2	DIESEL GEN 1B-B CRANKCASE PRESS HIGH ENGINE 1 OR 2	DIESEL GEN 1B-B PROTECTIVE RELAY OPERATION	LS-18-40A DIESEL GEN 1B-B 7 DAY DSL OIL TANK LVL ABN	POWER TRAIN 1B 480v TRANS TEMP HIGH	480V SD BD 1B1-B FAILURE OR UNDERVOLTAGE	SPARE	D
E	DG RM 1B-B VENTILATION SYS TROUBLE	DIESEL GEN 1B-B HIGH TEMPERATURE	SPARE	480V BD RM 1B A/C SYS MALFUNCTION	6900V SD BD LOGIC PNL 1B-B LOAD STRIPPING RYLS OUT OF SYNC	480V SD BD 1B2-B FAILURE OR UNDERVOLTAGE	6900V SD BD 1B-B BKR 1914/ 1934 OVERLOAD	E
	1	2	3	4	5	6	7	

SQN

1 & 2

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Rev. 27

Source**Setpoint**

SER 946

0-PS-82-330 or 331 (Circulating oil pump) 20 psig
 0-PS-82-346 or 347 (Turbocharger supply) 10 psig
 0-PS-82-5029/2 or 5030/2 (Idle run)* 25 psig
 0-PS-82-5021/2 or 5022/2 (Running)* 40 psig

*Placed I/S 60 sec after D/G reaches 200 rpm.

**DIESEL GEN 1B-B
 LUBE OIL PRESS
 LOW
 ENGINE 1 OR 2**

**Probable
Causes**

1. Low lube oil level.
2. Strainer or filter dirty.
3. Oil temperature abnormal.
4. Worn oil pump or worn diesel bearings.
5. Soakback oil pump (AC Aux. Lube Oil Circ Pump) tripped.
6. Lube Oil Circulating Pump tripped.

**Corrective
Actions**

- [1] IF D/G running with no valid accident (blackout or SI) signal present, **THEN**
ENSURE D/G shutdown by depressing emergency stop pushbutton 0-HS-82-47A.
- [2] IF D/G in standby mode, **THEN**
ENSURE Lube Oil Circulating Pump and the AC soakback oil pump (AC Aux. Lube Oil Circ Pump) running.

NOTE

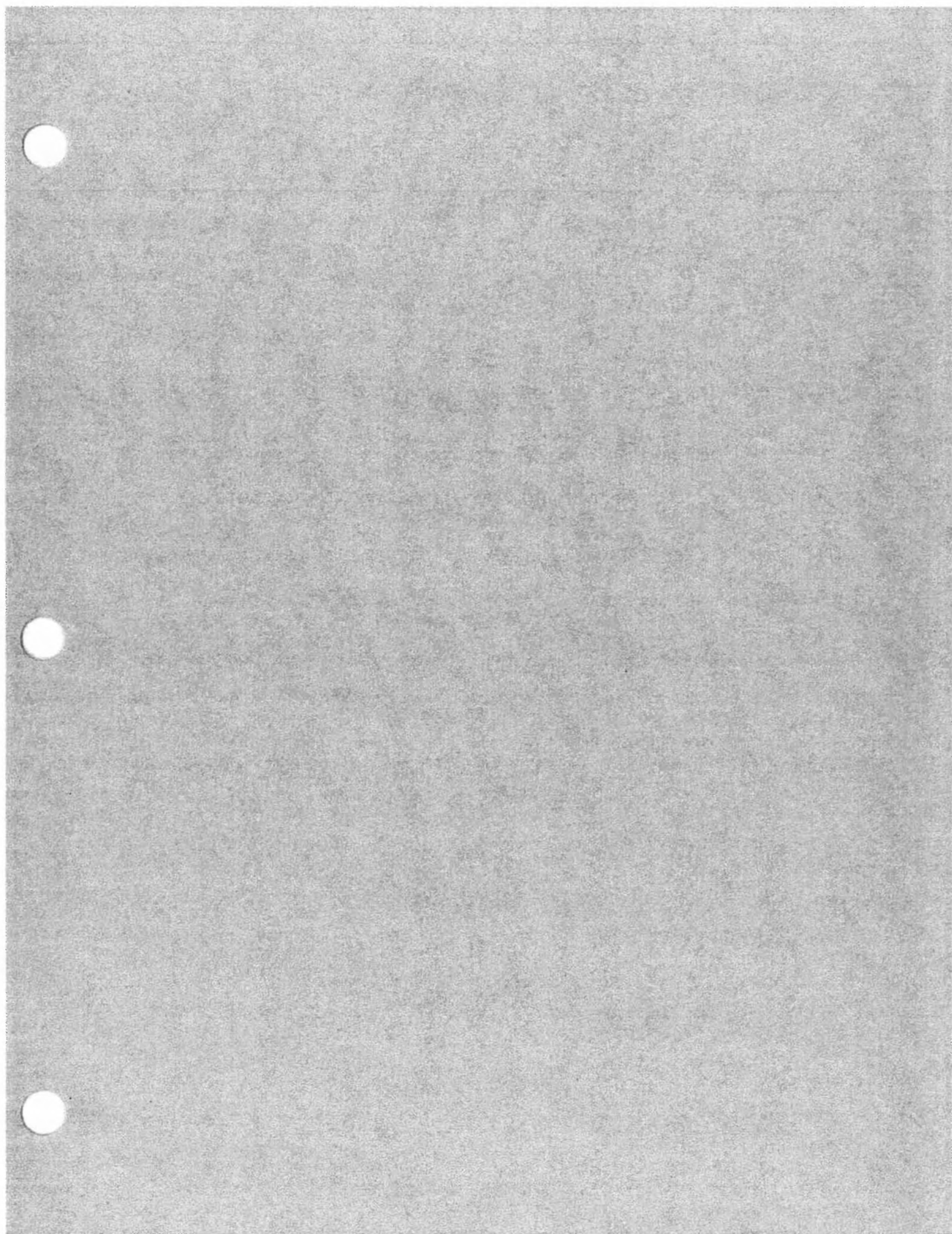
Provided special restrictions are implemented an INOP Lube Oil Circulating pump (6 gpm) does not INOP the D/G. Restrictions are checking oil temperature $\geq 85^{\circ}\text{F}$ and the engine must have been prelubricated within the last 48 hours (using Lube Oil Circ pump). D/G is INOP if either of these restrictions are not met.

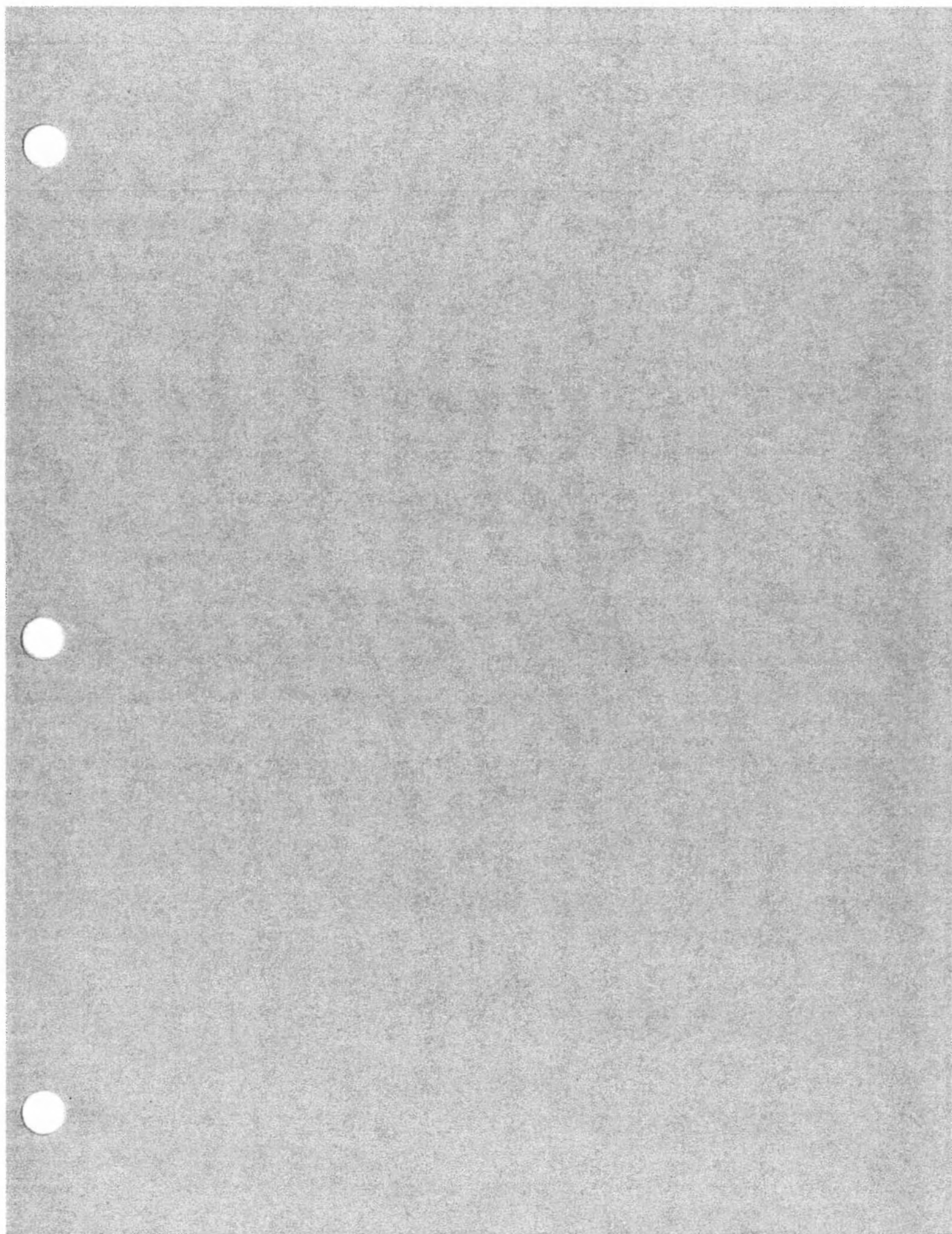
- [3] IF Lube Oil Circulating Pump (6 gpm) is inoperable with the D/G in Standby, **THEN**
 [a] **MONITOR** the following at 30 minute frequency:
 1. Engine lube oil temperature $\geq 85^{\circ}\text{F}$. Use a contact pyrometer on suction/supply line of 3 gpm Soakback (Aux) Lube Oil circulating pump in close proximity to exit of crankcase sump.
 2. Soakback pump in service.
 [b] **RESTORE** Lube Oil Circ pump to service (in <48 hours to maintain DG operable).
- [4] IF the soakback oil pumps (AC Aux. Lube Oil Circ Pump and DC Lube Oil Circulation Pump) (3 gpm) inoperable, **THEN**
DECLARE 1B-B D/G inoperable.
- [5] IF D/G running due to emergency start, **THEN**
EVALUATE emergency stop of D/G.
- [6] **EVALUATE** Plant Technical Specification Requirements LCO 3.8.1.1 and 3.8.1.2.

References

45N767-1, 45N767-6, 45N767-9, 45N767-10, 45B655-26B

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1 & 2		Rev. 27





TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

SURVEILLANCE INSTRUCTION

1-SI-OPS-082-007.B

ELECTRICAL POWER SYSTEM DIESEL GENERATOR 1B-B

Revision 39

QUALITY RELATED

PREPARED/PROOFREAD BY: JENNIFER WILSON

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: W. T. LEARY

EFFECTIVE DATE: 11/15/06

LEVEL OF USE: **CONTINUOUS USE**

REVISION

DESCRIPTION: Removed references to Tech Spec 3.3.2.1 due to relocation to TS 3.3.3.11 per TSC 04-01. This is a minor editorial change. Also provided guidance for operability of Diesels when the Turbocharger Inlet Temperature thermocouple is not operable. Reference PER 111005. Also added guidance to Appendix I to ensure over voltage relay reset and D/G Exciter Relay Panel Overvoltage red light out as part of standby readiness checks. Reference RT 060879. These are intent changes.

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1.0 INTRODUCTION

1.1 Purpose

This Instruction provides the steps necessary to demonstrate OPERABILITY of 1B-B Diesel Generator in accordance with frequency and requirements of Technical Specification Surveillance Requirements. **[C.2]**

This instruction also performs monthly inspections in accordance with manufacturers recommendations.

1.2 Scope

1.2.1 Operability Test to be Performed

The surveillance test to be performed in a 31 day interval staggered test basis involves the following verifications: **[C.2]**

- A. The fuel level adequate in the engine-mounted day tanks.
- B. The fuel level adequate in the 7-day tank.
- C. The fuel transfer pump starts and transfers fuel from the storage system to the engine mounted fuel tanks.
- D. The Diesel Generator (D/G) is started by one of the following signals with startup on each signal verified at least once per 124 days.
 1. Manual
 2. Simulated Loss of Offsite Power
 3. SI (ESF) Actuation Test Signal
- E. D/G starts from ambient conditions and achieves in less than or equal to 10 seconds voltage and frequency of ≥ 6800 volts and ≥ 58.8 Hz and achieves a steady state voltage of ≥ 6800 and ≤ 7260 volts and frequency of ≥ 58.8 and ≤ 61.2 Hz. All other D/G starts for the purpose of this surveillance testing, may be preceded by an engine idle start and gradual acceleration to synchronous speed.

SQN 1	ELECTRICAL POWER SYSTEM DIESEL GENERATOR 1B-B	1-SI-OPS-082-007.B Rev: 39 Page 5 of 78
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1.2.1 Operability Test to be Performed (Continued)

NOTE

In accordance with Reg. Guide 1.9, the load requirement of between 3.96 MW and 4.4 MW may be reduced to ≥ 2.2 MW when both units are in MODE 5 or 6. All four D/Gs must be within test frequency between 3.96 and 4.4 MW prior to either unit entering MODE 4.

- F. The generator is synchronized, loaded between 3.96 and 4.4 MW ≤ 60 seconds and operates for ≥ 60 minutes once per 184 days. All other loading for the purpose of this surveillance testing may be gradual to ≥ 3.96 MW and maintained at ≤ 4.4 MW for ≥ 60 minutes.
- G. The D/G is realigned to provide standby power to associated Shutdown Board upon completion of the testing.

1.2.2 Requirements Fulfilled

This Instruction fulfills the following Technical Specification (TS) Surveillance Requirements (SR):

- A. SR 4.8.1.1.2.a.1 through 4.8.1.1.2.a.6 (for D/G tested).
- B. SR 4.8.1.2 (Partial for D/G tested).

1.2.3 Mode

- A. Applicable Modes - All
- B. Performance Modes - All

1.3 Frequency/Conditions

- A. This test must be performed on a periodic basis at least once per 31 days.
- B. This test may be performed as a Post-Maintenance-Test (PMT) to prove operability of the D/G upon work completion.

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2.0 REFERENCES

2.1 Performance References

- A. System Instructions
 - 1. 0-SO-82 (Series) *Diesel Generators*
- B. Other Surveillance Instructions
 - 1. 0-SI-OPS-082-007.M, Diesel Generator Surveillance Frequency
 - 2. SI-102 (Series), Diesel Generator Inspections
- C. Maintenance Instructions
 - 1. 0-MI-EDG-082-001.0, *Installation and Removal of the D/G Data Acquisition (DAQ) System*

2.2 Developmental References

- A. TVA Drawings
 - 1. 45N765-1 through 5
 - 2. 45N767-1 through 5
- B. Technical Specifications
 - 1. Surveillance Requirement 4.8.1.1.2.a
 - 2. Surveillance Requirement 4.8.1.2
- C. Regulatory Guide 1.108
- D. Regulatory Guide 1.9
- E. FSAR Section 8.0, *Electrical Power*
- F. SI-7, *Electrical Power System: Diesel Generators*
- G. Technical Standard 04.06.07.14.03
- H. RIMS L44 870227 811 (provided background data needed to generate Attachments A, B, and C capability curves).
- I. SSP-13.3, Appendix B, Air Pollution Control
- J. P318-0020, tab 61 Vendor manual
- K. Recommended Shutdown Limits for SQN DG's signed by Engine Systems Inc. (ESI) dated 10-21-97 (VM change 5584)

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3.0 PRECAUTIONS AND LIMITATIONS

- A. Operating the Diesel engines without air box drains (crankcase vents) open could damage the engines.
- B. Operating the Diesel engine with high jacket water temperature (> 205°F) could damage the engine.
- C. Operating the Diesel engine with < 20 psi lube oil pressure could damage the engine.
- D. Operating the generator system at speeds \leq 850 rpm for extended periods of time with exciter regulator in operation could cause damage to the exciter-regulator field.
- E. Fire protection system shall be available for 1B-B D/G room.
- F. In the event of a crankcase high pressure trip, the diesel generator should not be restarted until a thorough checkout has been performed by Maintenance. Diesel engine should be allowed to cool for two hours prior to opening the top deck cover or handhole, to prevent the possibility of an explosion from hot oil vapors.
- G. The prestart rolling requirements of 0-SO-82 series must be observed (unless waived by SM) to check for water in the cylinders. If prestart rolling requirements are waived, no personnel are required in the DG room upon DG start as an ambient start must be performed and the required DG start readings can be obtained in the MCR (panel 0-M-26B).
- H. In accordance with FSAR 8.3-11 more than one D/G will not be operated in parallel with its 6.9 kV unit board at the same time.
- I. Care should be used when changing lamps on the diesel generator local control panel. A short circuit in a lamp socket has the potential for rendering the diesel generator inoperable.
- J. Diesel engine exhaust stack should be monitored within five minutes after startup. If the equipment is still emitting black smoke, a malfunction or misadjustment is indicated and the equipment should be readjusted or shutdown for repairs as applicable. If black smoke persists and equipment cannot be shutdown, Site Environmental shall be notified. Black smoke is defined for this precaution as smoke significantly darker than is normal from previous experience.
- K. Placing 43T(L) switch in test position will make the associated D/G inoperable (LCO 3.8.1.1 or 3.8.1.2).

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3.0 PRECAUTIONS AND LIMITATIONS (Cont.)

- L. Breaker position disagreement /overcurrent white light for the Normal, Alternate, and Emergency supply breakers on the 6900V Shutdown Boards, may illuminate momentarily as the breaker closes.
- M. When the diesel generator is in operation in parallel mode, power switching activities (large motor starts, capacitor switching, CSST tap changer operation, generator synchronizing activities, etc.) may result in actuation of the phase imbalance or overcurrent relay.
- N. Chemistry should be notified to adjust ERCW flow calculations prior to initiating ERCW flow to a DG Heat Exchanger.
- O. The following annunciators may be expected as a result of starting a D/G, and should clear momentarily if not valid (unless otherwise stated):

1B-B LOCAL PANEL (Lights)

- A-1 Green light not illuminated (numerous reasons as stated in AR)
- A-8 Engine Running (engine above 40 rpm)
- C-2 Low Jacket Water Temp (pump pulls some water for makeup from expansion tank which is not heated)
- C-3 Field Ground Relay (64X) Operation (leakage current when field flash/excitation occurs)
- C-5 Low Jacket Water Temp (see C-2)
- E-2 Low Jacket Water (only if level in expansion tank is substantially below run full mark)
- E-5 Low Jacket Water (see E-2)
- G-1 Low Start Air Pressure Tank (depends on initial tank pressure)
- G-4 Low Start Air Pressure Tank (see G-1)
- BB-1 Overvoltage (59 relay operates when field flash occurs - generator output voltage does not drop below relay reset until D/G excitation is removed below 550 rpm - to extinguish light requires manual reset per the AR after excitation is removed)

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3.0 PRECAUTIONS AND LIMITATIONS (Cont.)

NOTE The associated local alarm must be reset prior to resetting UCR alarm.

0-M-26B (0-XA-55-26B Windows)

- A-5 D/G 1B-B Running > 40 rpm
- C-1 D/G 1B-B Start Air Pressure Low Eng 1 or 2
- C-4 D/G 1B-B Jacket Water Temp High-Low Eng 1 or 2
- C-5 D/G 1B-B Water Level or Pressure Abn Eng 1 or 2
- D-3 D/G 1B-B Protective Relay Operation

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Date_____

4.0 PREREQUISITE ACTIONS

NOTE Throughout this Instruction where an **IF/THEN** statement exists, the step should be **N/A** if condition does not exist.

4.1 Preliminary Actions

- [1] **ENSURE** Instruction to be used is a copy of the effective version. _____
- [2] **ENSURE** Precautions and Limitations, Section 3.0, has been reviewed. _____
- [3] **IF** diesel generator has been inop (tagged) for maintenance, **THEN**

ENSURE diesel generator is in standby mode in accordance with 0-SO-82-2. **[C.3]** _____
- [4] **COORDINATE** performance of this test with D/G Outage Coordinator, assigned per D/G outage schedule supplied by Daily Scheduling. (N/A if not assigned.) _____
- [5] **VERIFY** necessary portions of all outage work/test items are complete before running operability test. Coordinate with D/G Outage Coordinator or Daily Scheduling. _____
- [6] **VERIFY** necessary personnel are stationed at D/G building to complete any remaining (running) requirements of other Surveillance Instructions in progress via D/G Outage Coordinator, as applicable. _____
- [7] **IF** performing Ambient Start, **AND** use of the D/G-DAQ is desired for start timing, **THEN**

ASSIGN Electrical Maintenance/Engineering responsibility for operating the D/G-DAQ, **AND**

NOTIFY responsible group to

COMPLETE applicable portions of 0-MI-EDG-082-001.0, Installation and Removal of the D/G Data Acquisition (DAQ) System. _____

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Date_____

4.2 Measuring and Test Equipment, Parts, and Supplies

NOTE If performing an ambient start, AND if using the D/G DAQ for start timing, a stopwatch must be used as a backup. If the DAQ is NOT being used, two stopwatches must be used.

- [1] IF performing an ambient start, **OR**
timing of DG loading required, **THEN**

OBTAIN stopwatch(es). ☐

- [2] IF performing Ambient Start **AND** use of the D/G-DAQ is desired
for start timing, **THEN**

REFERENCE 0-MI-EDG-082-001.0, Installation and
Removal of the D/G Data Acquisition (DAQ) System, for
listing of required M&TE. ☐

- [3] IF an Engine Cylinder Thermocouple is known or suspected
to be inoperable, **THEN**

OBTAIN a pyrometer for surface temperature
measurement from M&TE. ☐

4.3 Field Preparations

- [1] **ENSURE** prestart rolling requirements of 0-SO-82-2
have been met, **OR** ☐

OBTAIN waiver from SM.
Prestart rolling waived for this performance
(N/A if not waived.)

SM Signature

- [2] IF SM waived prestart rolling requirements, **THEN**

NOTIFY the Control Room Operator that the D/G room
1B-B is to be cleared of **ALL** personnel prior to startup
of the diesel

AND the DG start readings will be obtained from the MCR
(panel 0-M-26B). _____

- [3] **ENSURE** Fire protection system is available for D/G Room
1B-B. _____

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Date _____

4.3 Field Preparations (Continued)

- [4] IF** diesel exhaust fumes accumulate in D/G Bldg corridor during Diesel Generator operation, **THEN**
CLOSE [0-FCO-30-467] DG Bldg Corridor Air Intake Damper **USING [0-HS-30-467]** (1B-B DG Exhaust Fan Room, north wall).

4.4 Approvals and Notifications

- [1] OBTAIN** Senior Reactor Operators (SRO) approval from both units prior to beginning this surveillance.

_____	/	/
Unit 1 SRO	Date	Time
_____	/	/
Unit 2 SRO	Date	Time

- [2] IF** Start method requires an "SI Actuation Test Signal", **THEN**

ENSURE Unit 1 Train "B" SSPS is in service.

NOTE If an ambient start is required to satisfy PMT requirements, this start can be used to fulfill periodic ambient or non-ambient start requirements.

- [3] PERFORM ONE** of the following four substeps (N/A the other three):

- [a] IF** performance of this instruction is to satisfy a PMT **AND** Periodic testing requirements, **THEN**

PERFORM Section 6.1 for Ambient Start

OR

PERFORM Section 6.2 for Non-Ambient Start,
AND
ENSURE periodic testing requirements in substep **[c]** met.

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Date _____

4.4 Approvals and Notifications (Cont.)

- [b] IF performance of this instruction is to satisfy a
PMT ONLY, THEN

PERFORM Section 6.1 for Ambient Start

OR

PERFORM Section 6.2 for Non-Ambient Start. _____

- [c] IF the calendar date is January or July, and this
is the first performance during the month,

THEN

PERFORM Section 6.1, Ambient Start
Performance. _____

- [d] IF the calendar date is February, March, April,
May, June, August, September, October,
November, or December,

OR

IF the calendar date is January or July, and this
is NOT the first performance of the month,

THEN

PERFORM Section 6.2, Non-Ambient
Performance. _____

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Date _____

5.0 ACCEPTANCE CRITERIA

- A. The D/G is synchronized, then loaded to between 3.96 and 4.4 MW in less than or equal to 60 seconds. Load requirements may be reduced to ≥ 2.2 MW with both units in mode 5 or 6.
- B. Fuel Oil Transfer Pumps start and transfer fuel from the D/G 7-Day tank to the engine Day Tank.
- C. The fuel oil in the D/G Day Tank is verified ≥ 250 gallons and the fuel oil level in the 7-Day tanks is verified ≥ 4.7 feet.
- D. The Diesel generator (D/G) is started by one of the following signals with startup on each signal verified at least once per 124 days.
 1. Manual
 2. Simulated Loss of Offsite Power
 3. SI (ESF) Actuation Test Signal
- E. D/G starts from ambient conditions and achieves in less than or equal to 10 seconds voltage and frequency of ≥ 6800 volts and ≥ 58.8 Hz and achieves a steady state voltage of ≥ 6800 and ≤ 7260 volts and frequency of ≥ 58.8 and ≤ 61.2 Hz. All other D/G starts for the purpose of this surveillance testing, may be preceded by an engine idle start and gradual acceleration to synchronous speed.
- F. If specific acceptance criteria stated in the instruction steps are not met, notify the SM as soon as practical after observation of the noncompliance.

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Date_____

6.1 Ambient Start Performance (Continued)

CAUTION If performing this instruction for a PMT **AND** to fulfill periodic testing requirements, the required periodic start method must be used.

NOTE Steps [6], [7] and [8] choose the start method and direct the performer to the appropriate appendix.

[6] IF any of the following conditions exist:

A. Calendar date is January or July,

OR

B. Performance is a Post-Maintenance-Test (PMT) that requires an ambient manual start, **THEN**

PERFORM Appendix C, Ambient Manual Start Method. _____

[7] IF Performance is a Post-Maintenance-Test (PMT), **AND** an Ambient Simulated Loss of Offsite Power start is required, **THEN**

PERFORM Appendix D, Ambient Simulated Loss of Offsite Power Start Method. _____

[8] IF Performance is a Post-Maintenance-Test (PMT), **AND** an Ambient SI Actuation Test Signal start is required, **THEN**

PERFORM Appendix E, Ambient SI Actuation Test Signal Start Method. _____

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Date _____

6.1 Ambient Start Performance (Continued)

[9] PERFORM the following to wipe the Automatic Voltage Control Rheostat:

[a] RECORD voltage from **[0-EI-82-34]**. _____

[b] ENSURE [0-HS-82-42], DG 1A-A Voltage Regulator Switch in the PULL-P-AUTO position. _____

[c] DECREASE voltage to 6700 volts on **[0-EI-82-34]** USING **[0-HS-82-42]**. _____

[d] INCREASE voltage to 7300 volts on **[0-EI-82-34]** USING **[0-HS-82-42]**. _____

[e] RETURN voltage to value recorded in **[9][a]**. _____

[10] PLACE [0-HS-82-48], DG 1B-B Mode Selector Switch in the **PARALLEL** position. _____

[11] ADJUST [0-HS-82-43], DG 1B-B Speed Control Switch to obtain a synchroscope indication of slowly rotating in the **[FAST]** direction. _____

NOTE 1 With Ambient Start being performed, the generator must be loaded between 3.96 and 4.4 MW immediately after breaker 1914 is closed.

NOTE 2 During steps **[14]** and **[15]** the Load vs. VAR limits of Attachment 1 must be observed when loading the Diesel Generator. The load requirement of 3.96 to 4.4 MW may be reduced to ≥ 2.2 MW if both units are in MODE 5 and/or 6.

NOTE 3 When closing the Diesel Generator Output Breaker at the 12 o'clock position, consideration should be given to the speed of rotation of the synchroscope needle and the response time it takes to close the breaker.

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Date _____

6.1 Ambient Start Performance (Continued)

NOTE 4 The following table provides an approximation of expected values at various DG loading plateaus. These values shall be monitored to provide alternative M-26 indications thus ensuring proper diesel generator loading. The values given are calculated approximations and may vary due to system variables. (e.g. If amps are 370 and Mvar have been adjusted to 2.0 Mvar then MW should be approx. 4.0.)

MW (0-EI-82-40A)	Mv (0-EI-82-41A)	Amps (0-EI-82-39B)
0.5 MW	0.5 Mvar	60 Amps
1.0 MW	0.75 Mvar	100 Amps
2.0 MW	1.0 Mvar	185 Amps
3.0 MW	1.0 Mvar	260 Amps
4.0 MW	1.5 Mvar	350 Amps
4.0 MW	2.0 Mvar	370 Amps
4.2 MW	1.5 Mvar	370 Amps
4.2 MW	2.0 Mvar	385 Amps
4.4 MW	1.5 Mvar	385 Amps
4.4 MW	2.0 Mvar	400 Amps
4.8 MW*	1.5 Mvar	415 Amps
4.8 MW*	2.0 Mvar	430 Amps

* 2 Hr rating limitations apply

NOTE 5 CSST A LTC X, Tap Position Indication on 0-ECB-5 should be observed prior to and during paralleling to the 6.9 kv Shutdown Board. Tap changer operation during this time can cause a D/G voltage change.

[12] ENSURE [0-HS-82-42], DG 1B-B Voltage Regulator Switch in PULL-P-AUTO position, AND

ADJUST to match incoming voltage with running voltage. _____

*******CRITICAL STEP*******

[13] WHEN the Synchroscope DG 1B-B **[0-XI-82-31]** indicates 12 O'Clock position, **THEN**
CLOSE breaker **[1914]** via **[1-HS-57-73A]**, 1914 DG 1B-B to SD BD 1B-B, **AND**

START stopwatch. _____

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Date _____

6.1 Ambient Start Performance (Continued)

NOTE Steps [14] and [15] must be completed within 60 seconds.

[14] IMMEDIATELY LOAD D/G 1B-B to ≥ 1.0 MW by performing the following:

- [a] PLACE [0-HS-82-43], DG 1B-B Speed Control**
Switch in **RAISE** and obtain ≥ 1.0 MW on
[0-EI-82-40A] DG 1B-B Megawatts. ☐
- [b] ADJUST [0-HS-82-42], DG 1B-B Voltage Regulator**
Switch to 0.75 MVARs Outgoing as indicated on
[0-EI-82-41A], DG 1B-B Megavars. ☐
- [c] ENSURE DG indications (MW, Mvars, and Amps)**
match the expected indications of Table in NOTE 4. ☐
- [d] IF DG indications not as expected, THEN NOTIFY US.** ☐

CAUTION Care must be taken to not exceed 4.84MW (2-hour rating).

NOTE 1 Adjustment of MVARs may be performed simultaneously with DG loading to ensure MVARs are maintained within limits.

NOTE 2 Table in Note 4 (prior to step [12]) should be referred to ensure proper indications during loading of DG.

[15] IMMEDIATELY LOAD D/G 1B-B to ≥ 3.96 and ≤ 4.4 MW (≥ 2.2 MW if both units in modes 5 or 6) by performing the following:

- [a] PLACE [0-HS-82-43], DG 1B-B Speed Control**
Switch in **RAISE** and obtain ≥ 3.96 and ≤ 4.4 MW in
 ≤ 60 seconds on **[0-EI-82-40A] DG 1B-B Megawatts.** ☐
- [b] ADJUST [0-HS-82-42], DG 1B-B Voltage Regulator**
Switch to ≥ 0.75 and ≤ 2.37 MVARs Outgoing as
indicated on **[0-EI-82-41A] DG 1B-B Megavars.** ☐
- [c] STOP stopwatch.** ☐

[16] RECORD the following:

A. Loading time

Seconds

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Date_____

6.1 Ambient Start Performance (Continued)

B. Load achieved **[0-EI-82-40A]**. _____
MW

C. Time load achieved. _____
Time

ACCEPTANCE CRITERIA: The D/G is synchronized, then loaded to ≥ 3.96
and ≤ 4.4 MW in less than or equal to 60 seconds.

NOTE Appendix B Table 1 Running Condition Checklist provides DG operating parameters and limits which must be monitored at all times when the DG is running. DG System Inspections (Table 2) may be performed at any point after DG full load is attained. DG Running Condition data (Table 1) should be taken approximately 45 minutes after DG full load is attained.

[17] NOTIFY Diesel Generator Building assigned AUO to
PERFORM Appendix B, **AND**

PROVIDE D/G Building AUO time D/G achieved final load.
(Step [16]) _____

[18] MAINTAIN load at predetermined test value for ≥ 60
minutes by adjusting **[0-HS-82-43]**, DG 1B-B Speed
Control Switch, as needed. _____

[19] ENSURE at-load time requirement met as follows:

[a] RECORD time test load achieved. _____
Time

[b] RECORD finish time. _____
Time

[c] SUBTRACT [a] from [b] AND

RECORD results. _____ ☐
Min

ACCEPTANCE CRITERIA: D/G 1B-B operated with a load of ≥ 3.96 and ≤ 4.4 MW for
 ≥ 60 minutes. Load requirement may be reduced to ≥ 2.2 MW
with both units in mode 5 or 6.

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Date _____

6.1 Ambient Start Performance (Continued)

[20] **ENSURE** Appendix B complete before continuing. ☐

CAUTION **Overshooting load drop will result in a reverse power condition.**

NOTE Adjustment of Mvars may be performed simultaneously with DG unloading to ensure Mvars are maintained within limits.

[21] **UNLOAD** D/G 1B-B via **[0-HS-82-43]**, DG 1B-B Speed Control Switch, to ≤ 0.5 MW while observing **[0-EI-82-40A]**, DG 1B-B Megawatts. ☐

[22] **REDUCE** reactive load to near zero via **[0-HS-82-42]**, DG 1B-B Voltage Regulator Switch. ☐

[23] **IF** 1-SI-TFT-082-102.B, Functional Test of D/G 1B-B Protective Relays, is to be performed, **THEN**

COORDINATE with TPS personnel **AND**

PERFORM 1-SI-TFT-082-102.B. _____

[24] **OPEN** breaker **[1914]**, D/G 1B-B to SD BD 1B-B breaker. _____

[25] **ENSURE** D/G voltage is ≥ 6800 and ≤ 7260 volts on **[0-EI-82-34]**, **AND** ☐

ENSURE D/G frequency is ≥ 58.8 and ≤ 61.2 Hz on **[0-XI-82-32]**. ☐

NOTE The D/G will accelerate toward rated speed for 2 seconds upon initiation of the following step before decelerating back to idle speed.

[26] **PLACE** **[0-HS-82-44]**, D/G 1B-B Control Start-Stop Switch in **STOP** position momentarily. _____

[27] **PLACE** **[0-HS-82-48]**, D/G 1B-B Mode Selector Switch in the **UNIT** position. _____

[28] **NOTIFY** AUO assigned to DG to obtain engine crankcase oil levels at idle speed condition per Appendix B. _____

[29] **PLACE** **[1-HS-57-74]**, Synchronize Switch in the **OFF** position. _____

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Date_____

6.1 Ambient Start Performance (Continued)

- [30] **NOTIFY** Radiochemical Laboratory of need to sample engine-mounted fuel tanks (day tanks) for condensate in accordance with Technical Standard 04.06.07.14.03 and TS SR 4.8.1.1.2.b.

NOTE Steps [31], [32] and [33] need to verified after 1B-B D/G is no longer running.

- [31] **VERIFY** 0-LI-18-61/2 \geq 250 gals, Diesel Generator Day Tank 1 Level (local on tank).

Gals

- [32] **VERIFY** 0-LI-18-76/2 \geq 250 gals, Diesel Generator Day Tank 1 Level (local on tank).

Gals

- [33] **ENSURE** 0-LI-18-40 \geq 4.7 ft level of fuel oil in 7-Day Tank (local at west end of D/G).

Ft

- [34] **PERFORM** Appendix I, Verification of Diesel Generator Return to Standby Readiness.

- [35] **ENSURE** the following **RECORDED** in 0-SI-OPS-082-007.M:

- A. D/G start. ☐
- B. Method used. ☐
- C. Date of ambient start and due date for next required ambient start. ☐
- D. Return-to-service time, if test method caused inoperability of D/G (NA otherwise). ☐

ACCEPTANCE CRITERIA:

Each step [21] through [34] was completed satisfactorily and the D/G response was as prescribed.

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Date_____

6.2 Non-Ambient Performance

NOTE Deviation from the scheduled start method or start type may result in exceeding a surveillance interval requirement of either 124 or 184 days respectively. SRO approval is required for deviation from schedule.

[1] DISPATCH an AUO to D/G building for duration of test. _____

[2] DIRECT D/G building AUO to perform Appendix A, D/G Pre-Run Condition Checkout. _____

[3] IF breaker **[1934]** is installed in its Shutdown Board compartment, **THEN**

ENSURE breaker **[1934]** is in the **DISCONNECT** position. _____

[4] ENSURE Appendix A completed with all parameters within acceptable ranges. _____

CAUTION If performing this instruction for a PMT **AND** to fulfill periodic testing requirements, the required periodic start method must be used.

NOTE Steps **[5]**, **[6]** and **[7]** choose the start method and direct the performer to the appropriate appendix.

[5] IF any of the following conditions exist:

- A. Calendar date is January, March, May, July, September, or November,
- B. Performance is a Post-Maintenance-Test (PMT) only,
- C. Performance is for increased frequency requirement,
- D. Calendar date is February, April, June, August, October, or December, **and** this is **NOT** the first performance of the month, **THEN**

PERFORM Appendix F, Non-Ambient Manual Start Method. **[C.3]** (Refer to current 0-SI-OPS-082-007.M for last performance date.) _____

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Date _____

6.2 Non-Ambient Performance (Continued)

- [6] IF the calendar date is February, June, October, **and** this is the first performance during the month, **THEN**

PERFORM Appendix G, Non-Ambient Simulated Loss of Offsite Power Start Method. **[C.3]** (Refer to current 0-SI-OPS-082-007.M for last performance date.) _____

- [7] IF the calendar date is April, August, December, **and** this is the first performance during the month, **THEN**

PERFORM Appendix H, Non-Ambient SI Actuation Test Signal Start Method. **[C.3]** (Refer to current 0-SI-OPS-082-007.M for last performance date.) _____

- [8] **PERFORM** the following to wipe the Automatic Voltage Control Rheostat:

[a] **RECORD** voltage from **[0-EI-82-34]**. _____

[b] **ENSURE** **[0-HS-82-42]**, DG 1A-A Voltage Regulator Switch in the PULL-P-AUTO position. _____

[c] **DECREASE** voltage to 6700 volts on **[0-EI-82-34]** USING **[0-HS-82-42]**. _____

[d] **INCREASE** voltage to 7300 volts on **[0-EI-82-34]** USING **[0-HS-82-42]**. _____

[e] **RETURN** voltage to value recorded in **[8][a]**. _____

- [9] **PLACE** **[0-HS-82-48]**, DG 1B-B Mode Selector Switch, in the **PARALLEL** position. _____

- [10] **ADJUST** **[0-HS-82-43]**, DG 1B-B Speed control Switch to obtain a synchroscope indication of slowly rotating in the **[FAST]** direction. _____

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Date_____

6.2 Non-Ambient Performance (Continued)

NOTE 1 During steps **[13]** through **[19]** the Load vs. VAR limits of Attachment 1 must be observed when loading the Diesel Generator. The load requirement of 3.96 MW to 4.4 MW may be reduced to ≥ 2.2 MW if both units are in MODE 5 and/or 6.

NOTE 2 When closing the Diesel Generator Output Breaker at the 12 o'clock position consideration should be given to the speed of rotation of the synchroscope needle and the response time it takes to close the breaker.

NOTE 3 The following table provides an approximation of expected values at various DG loading plateaus. These values shall be monitored to provide alternative M-26 indications thus ensuring proper diesel generator loading. The values given are calculated approximations and may vary due to system variables. (e.g. If amps are 370 and Mvar have been adjusted to 2.0 Mvar then MW should be approx 4.0.)

MW (0-EI-82-40A)	Mv (0-EI-82-41A)	Amps (0-EI-82-39B)
0.5 MW	0.5 Mvar	60 Amps
1.0 MW	0.75 Mvar	100 Amps
2.0 MW	1.0 Mvar	185 Amps
3.0 MW	1.0 Mvar	260 Amps
4.0 MW	1.5 Mvar	350 Amps
4.0 MW	2.0 Mvar	370 Amps
4.2 MW	1.5 Mvar	370 Amps
4.2 MW	2.0 Mvar	385 Amps
4.4 MW	1.5 Mvar	385 Amps
4.4 MW	2.0 Mvar	400 Amps
4.8 MW*	1.5 Mvar	415 Amps
4.8 MW*	2.0 Mvar	430 Amps

* 2 Hr rating limitations apply

NOTE 4 CSST A LTC X, Tap Position Indication on 0-ECB-5 should be observed prior to and during paralleling to the 6.9 kv Shutdown Board. Tap changer operation during this time can cause a D/G voltage change.

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6.2 Non-Ambient Performance (Continued)

[11] ENSURE [0-HS-82-42], DG 1B-B Voltage Regulator Switch
in the **PULL-P-AUTO** position, **AND**

ADJUST to match incoming voltage with running voltage. _____

*******CRITICAL STEP*******

[12] WHEN the Synchroscope DG 1B-B **[0-XI-82-31]** indicates
12 O'Clock position, **THEN**
CLOSE breaker **[1914]** via **[1-HS-57-73A]**, 1914 DG
1B-B to SD BD 1B-B. _____

CAUTION Care must be taken to not exceed 4.84 MW (2-hour rating).

NOTE Adjustment of Mvars may be performed simultaneously with
DG loading to ensure MVARs are maintained within limits.

[13] LOAD D/G 1B-B to 1.0 MW by performing the following:

[a] PLACE [0-HS-82-43], DG Speed Control Switch
in **RAISE** position and obtain 1.0 MW on
[0-EI-82-40A], DG Megawatts. ☐

[b] ADJUST [0-HS-82-42], DG Voltage Regulator
Switch to obtain .75 MVARs Outgoing, as indicated
on **[0-EI-82-41A]**, DG Megavars. ☐

[c] RECORD time 1.0 MW achieved: _____ ☐
Time

[d] ENSURE DG indications (MW, Mvars and Amps) match
the expected indications of Table in NOTE 3. ☐

[e] IF DG indications not as expected **THEN NOTIFY US.** ☐

[14] MAINTAIN 1.0MW for 5 minutes, THEN

INCREASE load to 2.2 MW as in **[13]** above. _____

[15] RECORD time 2.2 MW achieved _____ ☐
Time

[16] IF 3.96 to 4.4 MW test load required and 5 minutes have
elapsed, **THEN**

INCREASE load between 3.96 and
4.4 MW as in step **[13]**. _____

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Date _____

6.2 Non-Ambient Performance (Continued)

[17] RECORD the following:

A. Final load _____ **[0-EI-82-40A]**
MW

B. Time final load achieved _____
Time

NOTE

Appendix B Table 1 Running Condition Checklist provides DG operating parameters and limits which must be monitored when the DG is running. DG System Inspections (Table 2) may be performed at any point after DG full load is attained. DG Running Condition data (Table 1) should be taken approximately 45 minutes after DG full load is attained.

[18] NOTIFY Diesel Generator Building assigned AUO to perform Appendix B, **AND**

PROVIDE D/G Building AUO time D/G achieved final load.
(Step [17]) _____

[19] MAINTAIN load at predetermined test value for ≥ 60 minutes by adjusting **[0-HS-82-43]**, DG 1B-B Speed Control Switch as needed. _____

[20] ENSURE at-load time requirement met as follows:

[a] RECORD time test load achieved. _____
Time

[b] RECORD finish time. . _____
Time

[c] SUBTRACT [a] from [b] AND

[d] RECORD results. . _____
Min



ACCEPTANCE CRITERIA:

D/G 1B-B operated with a load of ≥ 3.96 and ≤ 4.4 MW for ≥ 60 minutes. Load requirement may be reduced to ≥ 2.2 MW with both units in mode 5 or 6.

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Date _____

6.2 Non-Ambient Performance (Continued)

[21] **ENSURE** Appendix B complete before continuing. ☐

CAUTION **Overshooting load drop will result in a reverse power condition.**

NOTE Adjustment of Mvars may be performed simultaneously with DG unloading to ensure MVARs are maintained within limits.

[22] **UNLOAD** D/G 1B-B via **[0-HS-82-43]**, DG 1B-B Speed Control Switch, to ≤ 0.5 MW while observing **[0-EI-82-40A]**, DG 1B-B Megawatts. _____

[23] **REDUCE** reactive load to near zero via **[0-HS-82-42]**, DG 1B-B Voltage Regulator Switch. _____

[24] **IF** 1-SI-TFT-082-102.B, Functional Test of D/G 1B-B Protective Relays, is to be performed, **THEN**

COORDINATE with TPS personnel **AND**
PERFORM 1-SI-TFT-082-102.B. _____

[25] **OPEN** breaker **[1914]**, D/G 1B-B to SD BD 1B-B breaker. _____

[26] **ENSURE** D/G voltage is ≥ 6800 and ≤ 7260 volts on **[0-EI-82-34]**, **AND** ☐

ENSURE D/G frequency is ≥ 58.8 and ≤ 61.2 Hz on **[0-XI-82-32]**. ☐

NOTE The D/G will operate at rated speed for 2 seconds upon initiation of the following step before decelerating back to idle speed.

[27] **PLACE** **[0-HS-82-44]**, D/G 1B-B Control Start-Stop Switch in the **STOP** position momentarily. _____

[28] **NOTIFY** AUO assigned to DG to obtain engine crankcase levels at idle condition per Appendix B. _____

[29] **PLACE** **[0-HS-82-48]**, D/G 1B-B Mode Selector Switch in the **UNIT** position. _____

[30] **PLACE** **[1-HS-57-74]**, Synchronize Switch in the **OFF** position. _____

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6.2 Non-Ambient Performance (Continued)

- [31] NOTIFY** Radiochemical Laboratory of need to sample engine-mounted fuel tanks (day tanks) for condensate in accordance with Technical Standard 04.06.07.14.03 and TS SR 4.8.1.1.2.b. _____

NOTE Steps [32], [33] and [34] need to be verified after 1B-B D/G is no longer running.

- [32] VERIFY [0-LI-18-61/2] \geq 250 gals, Diesel Generator Day Tank 1 Level (local on tank).** _____
Gals

- [33] VERIFY [0-LI-18-76/2] \geq 250 gals, Diesel Generator Day Tank 2 Level (local on tank).** _____
Gals

- [34] ENSURE [0-LI-18-40] \geq 4.7 ft level of fuel oil in 7-Day Tank (local at west end of D/G).** _____
Ft

- [35] PERFORM** Appendix I, Verification of Diesel Generator Return to Standby Readiness. _____

- [36] ENSURE** the following **RECORDED** in 0-SI-OPS-082-007.M:

- A. D/G start. ☐
- B. Method used. ☐
- C. Date of ambient start and due date for next required ambient start. ☐
- D. Return-to-service time, if test method caused inoperability of D/G (NA otherwise). ☐

ACCEPTANCE CRITERIA:

Each step [22] through [35] was completed satisfactorily and the D/G response was as prescribed.

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Date _____

7.0 POST PERFORMANCE ACTIVITIES

- [1] IF DG-DAQ** computer was installed for timing DG voltage and frequency, **THEN**

ENSURE 0-MI-EDG-082-001.0, *Installation and Removal of the D/G Data Acquisition (DAQ) System*, included with package.

- [2] DELIVER** SI package to Unit SRO for review and approval.

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APPENDIX A

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1B-B DIESEL GENERATOR PRE-RUN CONDITION CHECKOUT

NOTE This Appendix is to be performed just prior to running the diesel generator for operability test. The D/G should already be in Standby Mode in accordance with 0-SO-82-2 and prestart manual rolling completed as required

TABLE 1

NO.	PARAMETER OBSERVED	LIMITS	INSTR UNID	UNITS	Readings	
					1B1	1B2
1	Engine Circulating Lube Oil Pressure [C.1] (on control panel)	≥ 5 psig	0-PI-82-5016/2 0-PI-82-5015/2	psig	_____psig	_____psig
2	Engine Lube Oil Crankcase Level, Dip Stick	> Low < Full	Dipstick	√	<input type="checkbox"/>	<input type="checkbox"/>
3	Overvoltage Alarm	Not Illuminated (NOTE 4)	D/G 1B-B Local Pnl Light BB-1	√	<input type="checkbox"/>	
4	Engine Jacket Water Temperature	> 100° F < 125° F (NOTE 3)	0-TI-82-5006/2 0-TI-82-5003/2	°F	_____°F	_____°F
5	Engine Lube Oil Temperature	> 80°F, <125°F (NOTE 3)	0-TI-82-5010/2 0-TI-82-5008/2	°F	_____°F	_____°F
6	Engine Cooling Water Expansion Tank Level	> Min Shutdown ≤ Max Shutdown	0-LI-82-5004/2 0-LI-82-5001/2	√	<input type="checkbox"/>	<input type="checkbox"/>
7	Engine Woodward Governor Oil Level	NOTE 1	N/A	√	<input type="checkbox"/>	<input type="checkbox"/>
8	Engine Circulating Lube Oil Pressure to Turbocharger [C.1]	≥ 10 psig	0-PI-82-346 0-PI-82-347	psig	_____psig	_____psig
9	Generator Bearing Oil Levels	NOTE 2	NA	√	<input type="checkbox"/>	<input type="checkbox"/>
10	Engine Day Tank Fuel Oil Level	≥ 250 gal	0-LI-18-61/2 0-LI-18-76/2	gals	_____gals	_____gals
Performers Initials					_____	

NOTE 1 Single line style sight glasses: Oil level above indicator line. Two line style sight glasses: Oil level above lower indicator line.

NOTE 2 Any observable oil level present in sightglass. √ indicates oil level is acceptable

NOTE 3 Limits for Non-Ambient performance are identified in Appendix A Table 2 Step [4].

NOTE 4 IF light illuminated, RESET 59 relay by pushing up on target reset rod (bottom left corner of 59 relay)

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TABLE 1 (Continued)					Readings	
NO.	PARAMETER OBSERVED	LIMITS	INSTR UNID	UNITS	1B1	1B2
11	7-Day Fuel Oil Tank Level	≥ 4.7 Ft	0-LI-18-40	Ft	____ ft	____ ft
12	Air Intake Oil Bath (muffler and exhaust room)	NOTE 2	NA	√	<input type="checkbox"/>	<input type="checkbox"/>
Performers Initials					_____	

NOTE 2 Any observable oil level present in sightglass. √ indicates oil level is acceptable

START AIR SYSTEM CHECKS					
13	Engine 1B1(A) Starting Air Receiver Pressure	≥ 250 psig	0-PI-82-190	psig	____ psig
14	Engine 1B1(B) Starting Air Receiver Pressure	≥ 182.5 psig ≤ 200 psig ⁽¹⁾	0-PI-82-200	psig	____ psig
15	Engine 1B2(A) Starting Air Receiver Pressure	≥ 250 psig	0-PI-82-191	psig	____ psig
16	Engine 1B2(B) Starting Air Receiver Pressure	≥ 182.5 psig ≤ 200 psig ⁽¹⁾	0-PI-82-201	psig	____ psig
Performers Initials					_____

⁽¹⁾ IF pressure less than 182.5 psig, THEN INITIATE WO to connect M&TE gauge to verify actual pressure is >150 psig. IF pressure greater than 200 psig, THEN REQUEST maintenance to determine whether the associated PCV or the indicator is out of calibration and recalibrate as appropriate.

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TABLE 2

[1] CONTACT UO to **DETERMINE** start method for the D/G:

AMBIENT ☐

NON-AMBIENT ☐

[2] IF start method is Non-Ambient, **THEN**

CHECK DG Engine Priming pump by performing the following:

[a] DEPRESS AND HOLD [HS-82-59] Fuel Priming Pump to start both priming pumps. ☐

[b] VERIFY Fuel Oil pressure increases to ≥ 20 psig on 0-PI-18-69/2 or 0-PI-18-84/2, **AND** ☐

RECORD Maximum Output Pressure achieved:

0-PI-18-69/2 _____ 0-PI-18-84/2 _____

[c] RELEASE [HS-82-59] DG Priming Pumps ☐

ACCEPTANCE CRITERIA: Fuel Oil Priming Pumps start and pressure increases to ≥ 20 psig.

[3] CHECK Starting Air Compressors and Receivers by performing the following:

NOTE Air compressor oil levels must be taken when air compressor is not running.

[a] IF start method is Non-Ambient, **THEN**

1. STOP Air Compressors by placing handswitches to **OFF** position.

Handswitch	Component	Position	√
HS-82-210	Air Compressor No. 1	OFF	<input type="checkbox"/>
HS-82-211	Air Compressor No. 2	OFF	<input type="checkbox"/>

2. CHECK Air Compressor Oil Levels:

Engine No. 1 compressor oil level between low and full on dipstick ☐

Engine No. 2 compressor oil level between low and full on dipstick ☐

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TABLE 2

NOTE

Substeps [3] through [5] may be performed on one compressor at a time if desired.

- 3. START** Air Compressors by placing handswitches to **MANUAL** position:

Handswitch	Component	Position	√
HS-82-210	Air Compressor No. 1	MANUAL	<input type="checkbox"/>
HS-82-211	Air Compressor No. 2	MANUAL	<input type="checkbox"/>

- 4. CHECK** Air Compressor Oil pressure:

Engine No. 1 compressor oil pressure on

1-PI-82-210/1B1 \geq 20 psig

☐

Engine No. 2 compressor oil pressure on

1-PI-82-211/1B2 \geq 20 psig

☐

- 5. PLACE** Air Compressors in **AUTO**:

Handswitch	Component	Position	Initial	IV
HS-82-210	Air Compressor No. 1	AUTO	<input type="checkbox"/>	<input type="checkbox"/>
HS-82-211	Air Compressor No. 2	AUTO	<input type="checkbox"/>	<input type="checkbox"/>

- [b] INSPECT** Starting Air system for leaks/degradation to ensure no detrimental leaks present. (SNOOP may be utilized in performing inspection)

☐

- [c] BLOWDOWN** Air Receiver Tanks and Air Compressor unloader sensing line for both engines until free of excessive water utilizing the following valves:

ENGINE 1B1	√	ENGINE 1B2	√
0-82-510-1B1	<input type="checkbox"/>	0-82-536-1B2	<input type="checkbox"/>
0-82-509-1B1	<input type="checkbox"/>	0-82-537-1B2	<input type="checkbox"/>
0-82-557-1B1	<input type="checkbox"/>	0-82-557-1B2	<input type="checkbox"/>

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TABLE 2

[4] ENSURE the Acceptance Criteria conditions listed below are met for the applicable method of DG start.

AMBIENT START PERFORMANCE All parameters in Table 1 are within prescribed limits

OR

NON-AMBIENT START PERFORMANCE All parameters in Table 1 are within prescribed limits except as follows:

Check 3: Jacket water temperature maximum may be as high as 175°F on prescribed indicators.

Check 4: Oil temperature maximum may be as high as 195°F on prescribed indicators.

[5] ENSURE the following have been performed prior to start of DG:

CAUTION Care should be used when changing lamps on the diesel generator local control panel. A short circuit in a lamp socket has the potential for rendering the diesel generator inoperable.

[a] PERFORM LAMP TEST on D/G local control panel
AND

REPLACE any burned out lamps.

[b] IF [0-TR-82-5036/2A] 1B-B Generator Stator Winding Temperature Recorder is operable, **THEN**

ENSURE recorder is **IN SERVICE**. **[C.4]**

[c] IF [0-TR-82-5036/2B] 1B-B Generator Bearing Temperature Recorder is operable, **THEN**

ENSURE recorder is **IN SERVICE**. **[C.4]**

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TABLE 2

- [d] IF [0-TR-82-5036/2A] or [0-TR-82-5036/2B]**
 Stator Winding or Generator Bearing RTD
 Temp Recorder is NOT operable, **THEN**
- [1] ENSURE** MIG installs M&TE to provide means to
 monitor temperatures for 1B-B D/G. _____
- [2] CONTINUOUSLY MONITOR** bearing and stator
 temperatures. _____
- [3] REPORT** to the MCR if any bearing temperatures
 exceed 80°C or stator temperatures exceed 125°C. _____

NOTE

If dial settings in step **[6]** are not correct, Systems Engineering should be contacted for evaluation. Operators should not adjust dial settings.

[6] VERIFY correct Woodward governor dial settings for the following:

Parameter	ENGINE 1B1	✓	ENGINE 1B2	✓
Speed	18.89-19.39	<input type="checkbox"/>	19.83-20.33	<input type="checkbox"/>
Load Limit	2 Increments before Max Fuel	<input type="checkbox"/>	2 Increments before Max Fuel	<input type="checkbox"/>

[7] RECORD Woodward Governor Speed Droop Dial Settings for both engines:

Engine 1B1 _____ Engine 1B2 _____

[8] NOTIFY Unit operator that checkout is complete. _____

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TABLE 1(Cont.)

PARAMETER OBSERVED	NORMAL RANGE	OPERABLE LIMIT	SHUTDOWN LIMIT	UNID <u>1B1</u> 1B2	UNITS	READINGS (45 mins after full load attained)	
						1B1	1B2
Lube Oil Temperature to Engine	155° - 195°F	> 150 < 200	N/A	0-TI-82-5010/2 0-TI-82-5008/2	°F		
Water Jacket Temperature to Cooler	N/A	N/A	N/A	0-TI-82-5005/2 0-TI-82-5002/2	°F		
Jacket Water Expansion Tank Level	Between High & Lo Run Marks	> Low < High	N/A	0-LI-82-5004/2 0-LI-82-5001/2	(√)		
Day Tank Fuel Level	~300 to ~500 Gals	≥ 250	N/A	0-LI-18-61/2 0-LI-18-76/2	Gal		
Heat Exchanger ERCW Flow	~650 gpm – ~1320 gpm	≥ 350 gpm	N/A	1-FI-67-74 1-FI-67-280	gpm		

IDLE RUN DATA						
						READINGS
Lube Oil Crankcase Oil Level @ idle speed	Note 1	NA	NA	dipstick	(√)	
Performers initials						

Note 1 Oil level to be obtained during idle condition after running at full loaded conditions. If level is @ 4" mark or lower THEN initiate WO to add oil.

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TABLE 1(Cont.)

NOTE DG Running Condition data (Table 1) should be taken approximately 45 minutes after DG full load is attained.

[1] **LOG** Current MW Load from **[0-EI-82-40A]** immediately prior to taking readings. _____ MW

[2] **LOG** current Voltage Regulator Control Current (Located inside Panel 1) immediately prior to taking readings. _____ Amps

DIESEL GENERATOR EXHAUST TEMPERATURES						
Parameter Observed	Normal Range	Oper Limit	SD Limit	UNID	Readings	
					Engine 1B1	Engine 1B2
Engine Cylinder Temperatures	850°F-1050°F	< 1100°F	> 1300°F	0-TI-82-5011/2		
NOTE An indication of $\geq 1500^{\circ}\text{F}$ is indicative of an open TC circuit.				TC #1		
				TC #2		
				TC #3		
				TC #4		
				TC #5		
				TC #6		
				TC #7		
				TC #8		
				TC #9		
				TC #10		
				TC #11		
				TC #12		
				TC #13		
				TC #14		
				TC #15		
				TC #16		
Engine Exhaust Temperature	800°F-1000°F	< 1050°F	> 1200°F	0-TI-82-5011/2		
				TC #17		

Instructions for Inoperable Engine Cylinder Temperatures:

IF an Inoperable TC exists **THEN**

(1) Obtain surface temp measuring device from MTE (i.e. contact or infra-red type pyrometer).

NOTE When taking manual temperatures for comparison, the exhaust manifold surface temperature must be taken near the TC boss to attempt to avoid influences from irregular surface conditions.

(2) Obtain surface temperature of the cylinder with failed TC and record temperature in parenthesis in "readings" blank

(3) Obtain surface temperature of a cylinder adjacent or as near as possible to the cylinder with failed TC and record temperature in parenthesis in the "readings" blank. (This blank should contain both good TC reading and surface reading)

(4) **IF** surface readings are comparable **THEN** cylinder with inop TC may be considered to be within normal range.

IF cylinder with inop TC is $\geq 200^{\circ}\text{F}$ higher **THEN** consider cylinder temperature as exceeding SD limit.

(5) **IF** TC 17 is inoperable **THEN** a contact or infrared pyrometer should be used to obtain the surface temperature at the inlet of both turbochargers in close proximity to the TC connection nipple. Compare the two temperatures to ensure balanced engine loading. The difference should be no more than 100°F .

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TABLE 1(Cont.)

DIESEL GENERATOR STATOR TEMPERATURES					
Parameter Observed	Normal Range	Oper Limit	SD Limit	UNID	Readings
Stator Temperatures	NA	NA	> 145°C	0-TR-82-5036/2A	
A phase				Pt #1 (Red)	
A phase				Pt #2 (Green)	
B phase				Pt #3 (Blue)	
B phase				Pt #4 (Violet)	
C phase				Pt #5 (Orange)	
C phase				Pt #6 (Cyan)	
DIESEL GENERATOR BEARING TEMPERATURES					
Bearing Temperatures	NA	< 80°C	> 90°C	0-TR-82-5036/2B	
Bearing No. 1				Pt #1 (Red)	
Bearing No. 1				Pt #2 (Green)	
Bearing No. 1				Pt #3 (Blue)	
Bearing No. 2				Pt #4 (Violet)	
Bearing No. 2				Pt #5 (Orange)	
Bearing No. 2				Pt #6 (Cyan)	
Performers Initials					

Acceptance Criteria: All data within minimum/maximum limit(s) as specified on this table.

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TABLE 2
System Inspections During DG Run

NOTE This table may be performed at any time after the DG attains a full loaded condition.

[1] ENSURE Vibration data COLLECTED for DG bearing (to be provided to Predictive Maintenance Section) _____

[2] CHECK Fuel Oil Transfer Pumps by performing the following:

[a] RECORD Engine Day Tank Levels Engine 1B1 _____
gals
Engine 1B2 _____
gals

[b] START Fuel Transfer Pump #1 from D/G local control panel with **[HS-18-55/2]** AND
VERIFY level increase in Engine Day Tanks. Day Tank 1B1 ☐
Day Tank 1B2 ☐

[c] ENSURE **[HS-18-55/2]** is in **AUTO** position. _____
1st IV

[d] START Fuel Transfer Pump #2 from D/G local control panel with **[HS-18-54/2]** AND
VERIFY level increase in Engine Day Tanks. Day Tank 1B1 ☐
Day Tank 1B2 ☐

[e] ENSURE **[HS-18-54/2]** is in **AUTO** position. _____
1st IV

ACCEPTANCE CRITERIA Fuel Transfer Pump starts, transferring oil from the 7-day Tank AND both Engine Day Tank levels increase with DG operating at full loaded condition.

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**TABLE 2(Cont.)
System Inspections During DG Run**

- [3] CHECK** Airbox vent path not obstructed by verifying that air flow is present downstream of the following valves: (check at drain trough for airflow or if drain is not observable then check if downstream piping is hot to touch. A ✓ indicates airflow observed or piping is hot thus indicating airflow.)

ENGINE 1B1	✓	ENGINE 1B2	✓
1-DRV-82-1B1*	<input type="checkbox"/>	1-DRV-82-1B2*	<input type="checkbox"/>

*Valves are maintained open at all times.

ACCEPTANCE CRITERIA: Air flow present downstream of valves.

- [4] INSPECT** the following DG subsystems for significant leakage or signs of degradation. IF any signs of leakage or degradation **THEN** Initiate WR AND Notify US. (A ✓ indicates acceptable conditions)

System	Components	(✓)
Engine Cooling System	Flexible couplings Temperature Regulating Valve Immersion Heaters, Engine water pumps and pump seals Water Expansion Tank, gauge glass and piping Water connections, valves and plugs on engine.	<input type="checkbox"/>
Fuel Oil System	Fuel Transfer pumps, piping connections, and pumps seals Filters Engine driven pump and piping Day tank connections Fuel transfer system and piping connections Priming Pumps and piping connections.	<input type="checkbox"/>
Lubricating Oil System	Filters and piping connections Circulating pump and strainer Connections to the lube oil cooler Turbocharger filter and oil lines	<input type="checkbox"/>
Air intake & Exhaust System	Air Intake and Exhaust System for leaks and degradation	<input type="checkbox"/>
Start air system	Start air system piping, components and connections	<input type="checkbox"/>
Cylinder leakage	Inspect for signs of packing leaks around cylinder test plugs. Feel for air leakage around plugs during operation of DG.	<input type="checkbox"/>
Performers Initials		<input type="text"/>

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AMBIENT MANUAL START METHOD

NOTE All steps in this Appendix refer to 1B-B Diesel Generator (D/G) and are performed from Main Control Room Panel 0-M-26B unless otherwise specifically noted.

**[1] ENSURE [0-HS-82-48], D/G 1B-B Mode Selector Switch in the
UNIT position.** _____

**[2] PLACE [1-HS-57-74], D/G 1B-B Synchronize Switch in the
SYN position.** _____

NOTE 1 Close communication and coordination with field personnel is required to accomplish the following step. Parts **[a]**, **[b]**, and **[c]** are to be performed with the D/G-DAQ (if used) started just prior to the D/G start actuation.

NOTE 2 A stopwatch must be used as a backup to the D/G DAQ. If there is any timing discrepancy between the two, the DAQ should take precedence due to its superior accuracy.

NOTE 3 If the D/G DAQ is not used, two stopwatches must be used to time the D/G start.

NOTE 4 To ensure consistency and accuracy when timing DG starts the following guidelines are provided:

- 1 -Start stopwatch when emergency start handswitch is depressed (manual start).
- 2 -Monitor voltage until the meter indicates >6800 volts (voltage stabilizes before frequency).
- 3 -Monitor frequency until meter indicates >58.8 Hz
STOP the watch.

[3] PERFORM the following to initiate the D/G start signal:

**[a] IF the D/G-DAQ is to be used, THEN
NOTIFY D/G-DAQ Operator to
START D/G-DAQ.** _____

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[b] **PROCEED** with the countdown: 3, 2, 1, **START**. _____

[c] **DEPRESS [0-HS-82-46A]**, DG 1B-B Emergency Start Switch, **AND** **START** stopwatch. _____

[d] **WHEN** voltage > 6800 volts **AND** frequency > 58.8 Hz, **THEN** **STOP** stopwatch. _____

*******CRITICAL STEP*******

[4] **ENSURE [1-FCV-67-67]**, ERCW cooling water supply valve is **OPEN**. _____

[5] **RECORD** steady state values for following:

A. **[0-EI-82-34]**, DG 1B-B Incoming Voltage _____

Reading

B. **[0-XI-82-32]**, DG 1B-B Incoming Frequency. _____

Reading

C. Time from Stopwatch(es):

Seconds

Stopwatch ID Number

Seconds

Stopwatch ID Number

ACCEPTANCE CRITERIA: D/G 1B-B achieves steady state generator voltage of ≥ 6800 and ≤ 7260 volts and frequency of ≥ 58.8 Hz and ≤ 61.2 Hz.

NOTE Voltage Regulator Current Ammeter is in panel 1 of exciter cabinet.

[6] **RECORD** Voltage Regulator Control Current _____

Reading

ACCEPTANCE CRITERIA: Voltage Regulator Control Current between 1.0 - 2.5 dc amps. The Voltage regulator card must be functioning properly to consider DG operable.

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- [7] ENSURE** D/G 1B-B **[86LOR]** red light NOT ILLUMINATED, at
D/G local relay panel. _____

NOTE Do not hold **[86LOR]** in RESET position if it does not latch on the first attempt. Coil failure may result if relay is held in RESET position.

- [8] RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel. _____

- [9] VERIFY** **[86LOR]** is reset by amber light **[0-XI-82-49]**
ILLUMINATED on 0-M-26B. _____

- [10] IF** the D/G-DAQ was used, **THEN**

RECORD the time required to achieve ≥ 6800 volts and ≥ 58.8
Hz. from D/G-DAQ computer:

Seconds

DG-DAQ Operator

ACCEPTANCE CRITERIA: D/G 1B-B start from ambient condition achieves in less
than or equal to 10 seconds generator voltage ≥ 6800
volts and ≥ 58.8 Hz.

- [11] RECORD** start as ambient in 0-SI-OPS-082-007.M. _____

- [12] RETURN** to Section 6.1 Step **[9]** of this Instruction. ☐

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AMBIENT SIMULATED LOSS OF OFFSITE POWER START METHOD

NOTE All steps in this Appendix Refer to 1B-B Diesel Generator (D/G) and are performed from Main Control Room Panel 0-M-26B unless otherwise specifically noted.

[1] ENSURE [0-HS-82-48], D/G 1B-B Mode Selector Switch is in the **UNIT** position. _____

[2] PLACE [1-HS-57-74], D/G 1B-B Synchronize Switch in the **SYN** position. _____

[3] REMOVE [CES1BY] fuses in Auxiliary Relay Room rack 1-R-76, to prevent startup of other D/Gs:

A. 1-FU1-500-R076K21 ☐

B. 1-FU1-500-R076K22 ☐

1st CV

[4] VERIFY the following:

A. NORMAL white light left of **[43T(L)]** is **NOT** illuminated. ☐

B. TEST white light right of **[43T(L)]** is **NOT** illuminated. ☐

C. ES1BY amber light by switch **[43DT]** is illuminated. ☐

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CAUTION **Placing 43MT(X) in TEST renders loss of voltage relays inoperable (TS LCO 3.3.3.11 and 3.8.1.1 or 3.8.1.2).**

NOTE Handswitch **[43MT]** in the TEST position will prevent load shedding of the Shutdown Board. These handswitches are located in the 6.9kV SD Bd. Logic Panel 1B-B.

[5] PLACE [43MT(X)] master test switch in the TEST position AND

VERIFY adjoining UVX white lights (eleven) are illuminated. ☐

[6] PLACE [43MT(Y)] master test switch in the TEST position AND

VERIFY adjoining UVY white lights (eleven) are illuminated. ☐

[7] IF any of the eleven UVX or UVY white lights are NOT illuminated in steps [5] and [6], THEN

DO NOT continue with this instruction until the Unit SRO has been notified, problem evaluated, and corrective actions completed.

Unit SRO

[8] PERFORM the following:

[a] ENSURE communications has been established between the control room operator at 0-M-26B, AUO at the DG, and operations personnel at the applicable Shutdown Board and DG-DAQ operator (if used). ☐

[b] NOTIFY AUO at the DG Local Panel that the red light above **[86LOR]** at D/G local panel should illuminate during the simulated undervoltage condition (TEST pushbuttons are depressed) and when the TEST buttons on the undervoltage relays are released the red light above **[86LOR]** will **NOT** be illuminated. ☐

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- [c] **NOTIFY** operations personnel at the 6.9kV Shutdown Board that the undervoltage relays are located on the 6.9kV SD Bds., panel 7, and labeled as **[27TS1A]**, **[27TS1B]**, and **[27TS1C]**. A 2 out of 3 logic for undervoltage requires the undervoltage relay TEST pushbutton of 2 relays to be actuated together for greater than 1.25 seconds.

☐

- [9] **NOTIFY** Operations personnel to **REMOVE** covers from 27TS1A, 27TS1B, and 27TS1C relays.

☐

- [10] **ENSURE** all personnel involved with the performance of this instruction **REVIEW** step [11] prior initiating the simulated undervoltage condition.

☐

NOTE 1 Close communication and coordination with field personnel is required to accomplish the following step.

NOTE 2 A stopwatch must be used as a backup to the D/G DAQ. If there is any timing discrepancy between the two, the DAQ should take precedence due to its superior accuracy.

NOTE 3 If the D/G DAQ is not used, two stopwatches must be used to time the D/G start.

NOTE 4 To ensure consistency and accuracy when timing DG starts the following guidelines are provided:

- 1 -Start stopwatch when amber light (Emergency Start lockout) goes out on 0-M-26.
- 2 -Monitor voltage until the meter indicates >6800 volts (voltage stabilizes before frequency).
- 3 -Monitor frequency until meter indicates >58.8 Hz
STOP the watch.

- [11] **INITIATE** the simulated undervoltage condition by performing the following:

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NOTE

Operations personnel at the Shutdown Board will initiate the starting sequence.

[a] IF the D/G DAQ is to be used, THEN

NOTIFY DG-DAQ operator to START DG-DAQ. ☐

[b] PROCEED with the countdown: 3, 2, 1, START. ☐

[c] WHEN START is communicated by the personnel at the Shutdown Board, THEN

NOTE

The following four steps must be performed at the same time.

6.9kV Shutdown Board 1B-B, Compartment 7

1. PRESS AND HOLD TEST pushbuttons on any two of the three undervoltage relays **[27TS1A]**, **[27TS1B]**, and/or **[27TS1C]**.

UNTIL completion of step [12].

1st

CV

Diesel Generator Local Panel

2. VERIFY red light above **[86LOR]** illuminated. ☐

3. START stopwatch(es) per note [4]
STOP stopwatch(es) per note [4], AND
RECORD the following:

Time required to achieve $\geq 58.8\text{Hz}$ and ≥ 6800 volts:

Time (seconds)

Time (seconds)

Stopwatch ID

Stopwatch ID

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4. IF the D/G-DAQ was used, THEN,

RECORD the following from the DG-DAQ computer:

Time required to achieve ≥ 58.8 Hz and
 ≥ 6800 volts:

	Seconds	DG-DAQ Operator
<u>ACCEPTANCE CRITERIA:</u>	D/G 1B-B start from ambient condition achieves in less than or equal to 10 seconds generator voltage ≥ 6800 volts and ≥ 58.8 Hz.	

1B-B Shutdown Bd Logic Relay Panel

[12] **VERIFY** the following:

- A. Red targets on undervoltage relays. ☐
- B. All eight UVX amber lights go out. ☐
- C. All eight UVE amber lights go out. ☐
- D. ES1BY amber light goes out. ☐

[13] **RELEASE** the TEST pushbuttons. ☐

Main Control Room 0-M-26B Panel

*****CRITICAL STEP*****

[14] **ENSURE** [1-FCV-67-67], ERCW cooling water supply valve is **OPEN**. _____

[15] **RECORD** the steady state values for the following:

- A. [0-EI-82-34], DG 1B-B Incoming Voltage

Reading
- B. [0-XI-82-32], DG 1B-B Incoming Frequency.

Reading

ACCEPTANCE CRITERIA: D/G 1B-B achieves steady state generator voltage of ≥ 6800 and ≤ 7260 volts and frequency of ≥ 58.8 and ≤ 61.2 Hz.

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6.9kV Shutdown Board Area

[16] **RESET** the targets on the undervoltage relays. ☐

[17] **REPLACE** covers on undervoltage relays. ☐

[18] **VERIFY** ES1BY amber light is illuminated. ☐

[19] **VERIFY** UVX group test lights illuminated in 6.9kV SD Bd.
Logic Panel 1B-B:

43TA	<input type="checkbox"/>	43TD	<input type="checkbox"/>	43TG	<input type="checkbox"/>
43TB	<input type="checkbox"/>	43TE	<input type="checkbox"/>	43TK	<input type="checkbox"/>
43TC	<input type="checkbox"/>	43TF	<input type="checkbox"/>		

[20] **PLACE** 43MT(X) master test switch in the **NORMAL** position
AND

VERIFY adjoining UVX white lights (eleven) are **NOT**
illuminated.

1st CV

[21] **VERIFY** UYV group test lights illuminated in 6.9kV SD Bd.
Logic Panel 1B-B:

43TA	<input type="checkbox"/>	43TD	<input type="checkbox"/>	43TG	<input type="checkbox"/>
43TB	<input type="checkbox"/>	43TE	<input type="checkbox"/>	43TK	<input type="checkbox"/>
43TC	<input type="checkbox"/>	43TF	<input type="checkbox"/>		

[22] **PLACE** 43MT(Y) master test switch in the **NORMAL**
position **AND**

VERIFY adjoining UYV white lights (eleven) are **NOT**
illuminated.

1st CV

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Diesel Generator Local Panel

NOTE Voltage Regulator Current Ammeter is in panel 1 of exciter cabinet.

[23] **RECORD** Voltage Regulator Control Current _____
Reading

ACCEPTANCE CRITERIA: Voltage Regulator Control Current between 1.0 - 2.5 dc amps. The voltage regulator card must be functioning properly to consider DG operable.

[24] **VERIFY** red light above **[86LOR]** is **NOT** illuminated. ☐

NOTE Do not hold **[86LOR]** in reset position if it does not latch on the first attempt. Coil failure may result if relay is held in **RESET** position.

[25] **RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel. _____

Main Control Room 0-M-26B Panel

[26] **VERIFY** applicable annunciators for the DG being tested are **RESET**. ☐

[27] **REINSTALL** **[CES1BY]** fuses removed for test in Auxiliary Instrument Room, Rack 1-R-76 **AND**

A. 1-FU1-500-R076K21 ☐

B. 1-FU1-500-R076K22 ☐

1st CV

[28] **NOTIFY** Control Room operator when **[CES1BY]** fuses have been installed. ☐

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1B-B Shutdown Bd Logic Relay Panel

[29] VERIFY the following:

- A. NORMAL white light left of **[43T(L)]** is illuminated. ☐
- B. TEST white light right of **[43T(L)]** is **NOT** illuminated. ☐
- C. ES1BY amber light by switch **[43DT]** is illuminated. ☐

[30] IF all acceptance criteria have been met, **THEN**

EVALUATE exiting the LCO actions which were previously entered.

Unit 1 SRO	/	/	
Date			Time
Unit 2 SRO	/	/	
Date			Time

[31] RECORD start as Ambient Start in 0-SI-OPS-082-007.M. _____

[32] RETURN TO Section 6.1 Step **[9]**. _____

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AMBIENT SI ACTUATION TEST SIGNAL START METHOD

CAUTION

During the performance of this appendix, slave relay K609B will be energized, resulting in the following equipment alignment considerations:

- A. Reactor building floor and equipment drain sump pump 1B will trip or not start as normal. It may be necessary to rotate to 1A pump if water entering sump warrants.
- B. Component Cooling Water Pump 1B-B will not come back on if blackout sequence is started during test.
- C. 1-FCV-63-67 cold leg accumulator isolation valve will open if power is available to valve.

[1] ENSURE [0-HS-82-48], D/G 1B-B Mode Selector Switch is in the **UNIT** position. _____

[2] PLACE [1-HS-57-74], D/G 1B-B Synchronize Switch in the **SYN** position. _____

NOTE 1 Normal white light will go **DARK** and Test white light will **ILLUMINATE** when 43T(L) is placed in **TEST** position.

NOTE 2 Placing 43T(L) switch in test position will make the associated D/G inoperable (LCO 3.8.1.1 or 3.8.1.2).

[3] PLACE [43T(L)] test switch, 1B-B SD Bd Logic Relay Panel in **TEST** position to prevent other 3 D/Gs from starting on this SI signal.

1st

IV

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- NOTE 1** Red light above **[86LOR]** at D/G local panel should illuminate while Safety Injection condition is simulated. AUO assigned should observe. Light will only be on while **[K609B]** relay is engaged.
- NOTE 2** Close communication and coordination with field personnel is required to accomplish the following step. Parts **[a]**, **[b]**, and **[c]** are to be performed such that the D/G-DAQ is started just prior to the D/G start actuation (if used).
- NOTE 3** A stopwatch must be used as a backup to the D/G DAQ. If there is any timing discrepancy between the two, the DAQ should take precedence due to its superior accuracy.
- NOTE 4** If the D/G DAQ is not used, two stopwatches must be used to time the D/G start.
- NOTE 5** To ensure consistency and accuracy when timing DG starts the following guidelines are provided:
- 1 -Start stopwatch when amber light (Emergency Start lockout) goes out on O-M-26.
 - 2 -Monitor voltage until the meter indicates > 6800 volts (voltage stabilizes before frequency).
 - 3 -Monitor frequency until meter indicates > 58.8 Hz
STOP the watch.
- NOTE 6** Actuating the K609 relay will result in "Safeguards Test Rack Train B in Test" (1-XA-55-6A, window E-7) annunciation, which will clear when the relay is reset.

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[4] PERFORM the following to initiate the D/G start signal:

[a] IF the D/G-DAQ is to be used, **THEN**

NOTIFY D/G Operator to

START D/G-DAQ computer. _____

[b] PROCEED with the countdown: 3, 2, 1 **START**. _____

NOTE Step **[4][c]** and step **[5]** must be performed at the same time.

*****CRITICAL STEP*****

[c] PERFORM the following GO TEST to pickup K609B relay:

[1] ROTATE AND DEPRESS Test Switch

[S828], in B Train Safeguards Test Cabinet, 1-R-53, CB el 685 Auxiliary Instrument Room. _____

1st CV

[2] RELEASE [S828]. _____

[3] PLACE [S821], Reset Test switch, in **RESET** position, **AND**

RELEASE [S821], Reset Test Switch. _____

[4] VERIFY [K609], RESET by observation of the relay. (K609 is located in 1-R-51, the cabinet west of 1-R-53) _____

1st CV

[5] START stopwatch(es) per note **[5]**,
STOP stopwatch(es) per note **[5]**, **AND**
RECORD the following:

Time required to achieve ≥ 58.8 Hz and ≥ 6800 volts:

Time (seconds)

Stopwatch ID

Time (seconds)

Stopwatch ID

[6] IF the D/G-DAQ was used, **THEN**,

RECORD the following from the D/G-DAQ computer:

Time required to achieve ≥ 6800 volts and ≥ 58.8 Hz.

Seconds

DG-DAQ Operator

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*****CRITICAL STEP*****

- [7] **ENSURE [1-FCV-67-67]**, ERCW cooling water supply valve is **OPEN**. _____

ACCEPTANCE CRITERIA: D/G 1B-B start from ambient condition achieves in less than or equal to 10 seconds generator voltage ≥ 6800 volts and ≥ 58.8 Hz.

- [8] **RECORD** the steady state values for the following:

A. **[0-EI-82-34]**, DG 1B-B Incoming Voltage _____

Reading

B. **[0-XI-82-32]**, DG 1B-B Incoming Frequency. _____

Reading

ACCEPTANCE CRITERIA: D/G 1B-B achieves steady state generator voltage of ≥ 6800 and ≤ 7260 volts and frequency of ≥ 58.8 and ≤ 61.2 Hz.

- [9] **VERIFY [ES1BY]** amber light is **ILLUMINATED** in 1B-B 6.9kV SD Board Logic Relay Panel. _____

- [10] **PLACE [43T(L)]**, Test Switch, in **NORMAL** position, in 1B-B 6.9kV SD Board Logic Relay Panel, **AND**

NOTIFY control room operator. _____

NOTE Voltage Regulator Current Ammeter is in panel 1 of exciter cabinet.

- [11] **RECORD** Voltage Regulator Control Current. _____

Reading

ACCEPTANCE CRITERIA: Voltage Regulator Control Current between 1.0 - 2.5 dc amps. The voltage regulator card must be functioning properly to consider DG operable.

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[12] ENSURE D/G 1B-B **[86LOR]** red light is **NOT ILLUMINATED**,
at D/G local relay panel. _____

NOTE Do not hold **[86LOR]** in **RESET** position if it does not latch on the first attempt. Coil failure may result if relay is held in **RESET** position.

[13] RESET **[86LOR]**, Lockout Relay, on D/G local relay panel. _____

[14] RECORD start as Ambient Start in 0-SI-OPS-082-007.M. _____

[15] RETURN to Section 6.1 Step **[9]**. _____

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NON-AMBIENT MANUAL START METHOD

NOTE All steps in this Appendix refer to 1B-B Diesel Generator (D/G) and are performed from Main Control Room Panel 0-M-26B unless otherwise specifically noted.

- [1] **ENSURE [0-HS-82-48]**, DG 1B-B Mode Selector Switch is in the **UNIT** position. _____
- [2] **PLACE [1-HS-57-74]**, DG 1B-B Synchronize Switch in the **SYN** position. _____
- [3] **PLACE [0-HS-82-48]**, DG 1B-B Mode Selector Switch in the **PULL-TO-LOCAL** position. _____
- [4] **DEPRESS [0-HS-82-52]**, Trip To Local Generator 1B-B, pushbutton to place D/G controls in **LOCAL** (D/G local control panel). _____

NOTE Idle start should bring the D/G to approximately 400 rpm. The idle speed should be maintained for > 5 minutes but not to exceed 10 minutes; therefore, be prepared to release idle start when 5 minute warmup period is complete.

- [5] **DEPRESS [0-HS-82-55]**, Idle Start Generator 1B-B Pushbutton on D/G local control panel. _____

*****CRITICAL STEP*****

- [6] **ENSURE [1-FCV-67-67]**, ERCW cooling water valve **OPEN** locally in D/G 1B-B room. _____
- [7] **VERIFY [TACHOMETER]**, Local Speed Indicator stabilizes at approximately 400 rpm. _____

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CAUTION When the engine is idle started and running at idle speed, a normal stop initiation will cause the D/G to accelerate toward rated speed for 2 seconds before decelerating back to idle speed for 10 minutes.

[8] **ENSURE [LRX1B]**, Lockout Control Relay **RESET** to restore control to Main Control Room panel, (D/G local relay panel). _____

[9] **PLACE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch in the **UNIT** position, (0-M-26B, push in). _____

NOTE When DG passes through 550 rpm (SS-3) 64X relay may cause momentary annunciation of Protective Relay Operation (Window D-3)

[10] **WHEN** D/G 1B-B has idled for ≥ 5 minutes, **THEN**

DEPRESS [0-HS-82-46A], D/G 1B-B Emergency Start Switch on 0-M-26B panel. _____

[11] **VERIFY [TACHOMETER]**, D/G speed, stabilizes at ~ 900 rpm (D/G local control panel). _____

[12] **VERIFY** voltage ≥ 6800 and ≤ 7260 volts and frequency ≥ 58.8 and ≤ 61.2 Hz. _____

A. **[0-EI-82-34]**, D/G 1B-B Incoming Voltage.
Reading _____ volts

B. **[0-XI-82-32]**, D/G 1B-B Incoming Frequency.
Reading _____ Hz _____

ACCEPTANCE CRITERIA: D/G 1B-B stabilizes at a voltage ≥ 6800 and ≤ 7260 volts and frequency stabilizes at ≥ 58.8 and ≤ 61.2 Hz.

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[13] RECORD Voltage Regulator Control Current _____

Reading

ACCEPTANCE CRITERIA:

Voltage Regulator Control Current between 1.0 - 2.5 dc amps.
The voltage regulator card must be functioning properly to
consider DG operable.

[14] ENSURE D/G 1B-B **[86LOR]** red light NOT ILLUMINATED, at
D/G local relay panel. _____

NOTE

Do not hold **[86LOR]** in RESET position if it does not latch
on the first attempt. Coil failure may result if relay is held in
RESET position.

[15] RESET **[86LOR]**, Lockout Relay, on D/G local relay panel. _____

[16] VERIFY **[86LOR]** is RESET by amber light **[0-XI-82-49]**
ILLUMINATED on 0-M-26B. _____

[17] RETURN to Section 6.2 step **[8]** of this Instruction. _____

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NON-AMBIENT SIMULATED LOSS OF OFFSITE POWER START METHOD

- [1] REMOVE [CES1BY] fuses in Auxiliary Relay Room rack
1-R-76, to prevent startup of other D/Gs.**

- A. 1-FU1-500-R076K21 ☐
- B. 1-FU1-500-R076K22 ☐

1st CV

- [2] VERIFY the following:**

- A. NORMAL white light left of **[43T(L)]** is **NOT** illuminated. ☐
- B. TEST white light right of **[43T(L)]** is **NOT** illuminated. ☐
- C. ES1BY amber light by switch **[43DT]** is illuminated. ☐

CAUTION **Placing 43MT(X) in TEST renders loss of voltage relays inoperable
(TS LCO 3.3.3.11 and 3.8.1.1 or 3.8.1.2).**

NOTE **[43MT]** handswitch in the TEST position will prevent load shedding of the
Shutdown Board. These handswitches are located in the 6.9kV SD Bd.
Logic Panel 1B-B.

- [3] PLACE [43MT(X)] master test switch in the TEST position AND
VERIFY adjoining UVX white lights (eleven) are illuminated.** ☐
- [4] PLACE [43MT(Y)] master test switch in the TEST position AND
VERIFY adjoining UVE white lights (eleven) are illuminated.** ☐

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- [5] IF any of the eleven UVX or UYV white lights are **NOT** illuminated in steps [3] and [4], **THEN**

DO NOT continue with this instruction until the Unit SRO has been notified, problem evaluated, and corrective actions completed.

Unit SRO

- [6] **PLACE [1-HS-57-74]**, D/G 1B-B Synchronize Switch in the **SYN** position on 0-M-26B. ☐
- [7] **PLACE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch in the **PULL-TO-LOCAL** position on 0-M-26B. ☐
- [8] **DEPRESS [0-HS-82-52]**, Trip-To-Local pushbutton on D/G 1B-B local control panel to place D/G controls in **LOCAL**. ☐

NOTE Idle start should bring the D/G to approximately 400 rpm. The idle speed should be maintained for ≥ 5 minutes but not to exceed 10 minutes; therefore, be prepared to initiate auto start when 5 minute warmup period is complete.

- [9] **DEPRESS [0-HS-82-55]**, Idle Start Gen 1B-B pushbutton on the D/G local control panel. ☐

*****CRITICAL STEP*****

- [10] **VERIFY [1-FCV-67-67] OPENS** to provide cooling water to heat exchanger (locally in D/G room). _____
- [11] **VERIFY [TACHOMETER]**, Local Speed Indicator stabilizes at approximately 400 rpm. _____

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CAUTION

When the engine is idle started and running at idle speed, a normal stop initiation will cause the D/G to accelerate toward rated speed for 2 seconds before decelerating back to idle speed for 10 minutes.

- [12] ENSURE **[LRX1B]**, Lockout Control Relay RESET on D/G local relay panel. ☐

- [13] PLACE **[0-HS-82-48]**, D/G 1B-B Mode Selector Switch, in the UNIT position, on 0-M-26B in Main Control Room. _____

- [14] NOTIFY AUO at the DG Local Panel that the red light above **[86LOR]** at D/G local panel should illuminate during the simulated undervoltage condition (TEST pushbuttons are depressed) and when the TEST buttons on the undervoltage relays are released the red light above **[86LOR]** will NOT be illuminated. ☐

- [15] NOTIFY operations personnel at the 6.9kV Shutdown Board that the undervoltage relays are located on the 6.9kV SD Bd., panel 7, and labeled as **[27TS1A]**, **[27TS1B]**, and **[27TS1C]**. A 2 out of 3 logic for undervoltage requires the undervoltage relay TEST pushbutton of 2 relays to be actuated together for greater than 1.25 seconds. ☐

- [16] NOTIFY operations personnel at the 6.9 kV Shutdown Board to REMOVE covers from 27TS1A, 27TS1B, and 27TS1C relays. ☐

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- NOTE 1** Close communication and coordination with field personnel is required to accomplish the following step.
- NOTE 2** Operations personnel at the Shutdown Board will initiate the starting sequence.
- NOTE 3** A 2 out of 3 logic for undervoltage requires the undervoltage relay TEST pushbutton of 2 relays to be actuated together for greater than 1.25 seconds.

[17] WHEN D/G 1B-B has idled for ≥ 5 minutes, THEN

INITIATE the simulated undervoltage condition by performing the following:

[a] PROCEED with the countdown: 3, 2, 1, START.



[b] WHEN START is communicated by the personnel at the Shutdown Board, **THEN**

NOTE The following four substeps must be performed at the same time.

6.9kV Shutdown Board 1B-B, Compartment 7

- PRESS AND HOLD** TEST pushbuttons on any two of the three undervoltage relays **[27TS1A]**, **[27TS1B]**, and/or **[27TS1C]**

UNTIL completion of step **[18]**.

1st

CV

Diesel Generator Local Panel

- VERIFY** red light above **[86LOR]** illuminated.



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Main Control Room 0-M-26B Panel

3. **VERIFY** D/G 1B-B Incoming Voltage,
[0-EI-82-34], is ≥ 6800 and ≤ 7260 volts.

Volts

4. **VERIFY** D/G 1B-B Incoming Frequency,
[0-XI-82-32], is ≥ 58.8 and ≤ 61.2 Hz.

Hz

ACCEPTANCE CRITERIA: D/G 1B-B stabilizes at a voltage ≥ 6800 and ≤ 7260 volts
and frequency stabilizes at ≥ 58.8 and ≤ 61.2 Hz.

1B-B Shutdown Bd Logic Relay Panel

- [18] **VERIFY** the following:

- A. Red targets on undervoltage relays. ☐
- B. All eight UVX amber lights go out. ☐
- C. All eight UVY amber lights go out. ☐
- D. ES1BY amber light goes out. ☐

- [19] **RELEASE** the TEST pushbuttons. ☐

- [20] **RESET** the targets on the undervoltage relays. ☐

- [21] **REPLACE** covers on undervoltage relays. ☐

- [22] **VERIFY** ES1BY amber light is illuminated. ☐

- [23] **VERIFY** UVX group test lights illuminated in 6.9kV SD Bd.

Logic Panel 1B-B:

43TA	<input type="checkbox"/>	43TD	<input type="checkbox"/>	43TG	<input type="checkbox"/>
43TB	<input type="checkbox"/>	43TE	<input type="checkbox"/>	43TK	<input type="checkbox"/>
43TC	<input type="checkbox"/>	43TF	<input type="checkbox"/>		

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- [24] PLACE [43MT(X)] master test switch in the NORMAL position
AND**

VERIFY adjoining UVX white lights (eleven) are
NOT illuminated.

1st CV

- [25] VERIFY** UVY group test lights illuminated in 6.9kV SD Bd.
Logic Panel 1B-B:

43TA	<input type="checkbox"/>	43TD	<input type="checkbox"/>	43TG	<input type="checkbox"/>
43TB	<input type="checkbox"/>	43TE	<input type="checkbox"/>	43TK	<input type="checkbox"/>
43TC	<input type="checkbox"/>	43TF	<input type="checkbox"/>		

- [26] PLACE [43MT(Y)] master test switch in the NORMAL position
AND**

VERIFY adjoining UVY white lights (eleven) are
NOT illuminated.

1st CV

Diesel Generator Local Panel

NOTE Voltage Regulator Current Ammeter is in panel 1 of exciter cabinet.

- [27] RECORD** Voltage Regulator Control Current

Reading

ACCEPTANCE CRITERIA:

Voltage Regulator Control Current between 1.0-2.5 dc amps.
The voltage regulator card must be functioning properly to
consider DG operable.

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[28] VERIFY red light above **[86LOR]** is **NOT** illuminated. ☐

NOTE

Do not hold **[86LOR]** in **RESET** position if it does not latch on the first attempt. Coil failure may result if relay is held in **RESET** position.

[29] RESET **[86LOR]**, Lockout Relay, on D/G local relay panel. ☐

Main Control Room 0-M-26B Panel

[30] VERIFY applicable D/G annunciators **RESET**. ☐

[31] REINSTALL **[CES1BY]** fuses removed for test in Auxiliary Instrument Room, Rack 1-R-76:

A. 1-FU1-500-R076K21

B. 1-FU1-500-R076K22

1st CV

[32] NOTIFY Control Room Operator when **[CES1BY]** fuses have been installed. ☐

1B-B Shutdown Bd Logic Relay Panel

[33] VERIFY the following:

A. NORMAL white light left of **[43T(L)]** is illuminated. ☐

B. TEST white light right of **[43T(L)]** is **NOT** illuminated. ☐

C. ES1BY amber light by switch **[43DT]** is illuminated. ☐

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[34] IF all acceptance criteria have been met, **THEN**

EVALUATE exiting the LCO actions which were previously entered.

_____	/	/
Unit 1 SRO	Date	Time
_____	/	/
Unit 2 SRO	Date	Time

[35] RETURN TO Section 6.2 Step **[8]** of this Instruction.

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NON-AMBIENT SI ACTUATION TEST SIGNAL START METHOD

CAUTION During the performance of this appendix, slave relay K609B will be energized, resulting in the following equipment alignment considerations:

- A. Reactor building floor and equipment drain sump pump 1B will trip or not start as normal. It may be necessary to rotate to 1A pump if water entering sump warrants.
- B. Component Cooling Water Pump 1B-B will not come back on if blackout sequence is started during test.
- C. 1-FCV-63-67 cold leg accumulator isolation valve will open if power is available to valve.

NOTE 1 Normal white light will go **DARK** and Test white light will **ILLUMINATE** when 43T(L) is placed in **TEST** position.

NOTE 2 Placing 43T(L) switch in test position will make the associated D/G inoperable (LCO 3.8.1.1 or 3.8.1.2).

- [1] **PLACE [43T(L)]**, Test Switch, in 1B-B SD Bd Logic Relay Panel in the **TEST** position to prevent other 3 D/Gs from starting on this SI signal.

1st IV

- [2] **PLACE [1-HS-57-74]**, D/G 1B-B Synchronize Switch in the **SYN** position on 0-M-26B.

- [3] **ENSURE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch, is in the **PULL-TO-LOCAL** position on 0-M-26B.

- [4] **DEPRESS [0-HS-82-52]**, Trip-To-Local pushbutton Gen 1B-B to place D/G controls in **LOCAL** operation.

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NOTE

Idle start should bring the D/G to approximately 400 rpm. The idle speed should be maintained for ≥ 5 minutes but not to exceed 10 minutes; therefore, be prepared to initiate auto start when 5 minute warmup period is complete.

- [5] **DEPRESS [0-HS-82-55]**, Idle Start Gen 1B-B pushbutton on the D/G local control panel. _____

*****CRITICAL STEP*****

- [6] **ENSURE [1-FCV-67-67] OPENS** to provide cooling water to heat exchanger (locally in D/G room). _____
- [7] **VERIFY [TACHOMETER]**, Local Speed Indicator stabilizes at approximately 400 rpm. _____

CAUTION

When the engine is idle started and running at idle speed, a normal stop initiation will cause the D/G to accelerate toward rated speed for 2 seconds before decelerating back to idle speed for 10 minutes.

- [8] **ENSURE [LRX1B]**, Lockout Control Relay RESET on D/G local relay panel. _____
- [9] **PLACE [0-HS-82-48]**, D/G 1B-B Mode Selector Switch, in the **UNIT** position, on 0-M-26B in Main Control Room. _____

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NOTE 1 Red light above **[86LOR]** at D/G local panel should illuminate while relay **[K609]** is picked up. AUO should observe. Light will only be on until **[K609]** is reset.

NOTE 2 Actuating the K609 relay will result in "Safeguards Test Rack Train B in Test" (1-XA-55-6A window E-7) annunciation, which will clear when the relay is reset.

*****CRITICAL STEP*****

[10] WHEN D/G 1B-B has idled for ≥ 5 minutes, THEN

PERFORM the following **GO TEST** to pickup K609B relay:

[a] ROTATE and DEPRESS test switch **[S828]**, in B Train Safeguards Test Cabinet, 1-R-53, CB el 685 Auxiliary Instrument Room.

1st CV

[b] RELEASE [S828].

[c] PLACE [S821], Reset Test Switch, in RESET position, AND

RELEASE [S821], Reset Test Switch.

[d] VERIFY [K609], RESET by observation of the relay. (K609 is located in 1-R-51, the cabinet west of 1-R-53)

1st IV

[11] VERIFY D/G 1B-B Incoming Voltage [0-EI-82-34]
 ≥ 6800 and ≤ 7260 volts (0-M-26B).

Volts

[12] VERIFY D/G 1B-B Incoming Frequency [0-XI-82-32]
 ≥ 58.8 and ≤ 61.2 Hz (0-M-26B).

Hz

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ACCEPTANCE CRITERIA:

Non-Ambient Start

D/G 1B-B stabilizes at a voltage ≥ 6800 and ≤ 7260 volts
and frequency stabilizes at ≥ 58.8 and ≤ 61.2 Hz.

[13] **VERIFY** **[ES1BY]** amber light is **ILLUMINATED** in
1B-B 6.9kV SD Board Logic Relay Panel. _____

[14] **PLACE** **[43T(L)]** test switch, in **NORMAL** position, in 1B-B
6.9kV SD Board Logic Relay Panel and **NOTIFY** control
room operator. _____

NOTE

Voltage Regulator Current Ammeter is in panel 1 of exciter
cabinet.

[15] **RECORD** Voltage Regulator Control Current Reading: _____

Reading

ACCEPTANCE CRITERIA:

Voltage Regulator Control Current between 1.0 - 2.5 dc amps.
The voltage regulator card must be functioning properly to
consider DG operable.

[16] **ENSURE** D/G 1B-B **[86LOR]** red light **NOT ILLUMINATED**, at
D/G local relay panel. _____

NOTE

Do not hold **[86LOR]** in **RESET** position if it does not latch on
the first attempt. Coil failure may result if relay is held in **RESET** position.

[17] **RESET** **[86LOR]**, Lockout Relay, on D/G local relay panel. _____

[18] **RETURN** to Section 6.2 Step [8] of this Instruction. _____

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VERIFICATION OF DIESEL GENERATOR RETURN TO STANDBY READINESS

480V Diesel Aux Bd

- [1] **PLACE [1-HS-30-465C]** Diesel Gen 1B-B Muffler Room Exhaust Fan in **STOP** position. ☐

- [2] **ENSURE [1-HS-30-465C]** Diesel Gen 1B-B Muffler Room Exhaust Fan is in **P-AUTO** position (1B1-B, Compt 6D).

_____/_____
1st IV

- [3] **ENSURE** one of the following Diesel Gen 1B-B Room Exhaust Fans in **P-AUTO** position: (**N/A** fan NOT selected)

1-HS-30-449C	1B Exhaust Fan	1B1-B, Compt. 6A	P-AUTO	_____/_____ 1st IV
1-HS-30-453C	2B Exhaust Fan	1B2-B, Compt. 6D	P-AUTO	_____/_____ 1st IV

- [4] **ENSURE** Diesel Gen 1B-B Room Exhaust Fan not selected in step [3] in **PULL-TO-STANDBY** position: (**N/A** other fan)

1-HS-30-449C	1B Exhaust Fan	1B1-B, Compt. 6A	PULL-TO-STANDBY	_____/_____ 1st IV
1-HS-30-453C	2B Exhaust Fan	1B2-B, Compt. 6D	PULL-TO-STANDBY	_____/_____ 1st IV

- [5] **ENSURE [1-HS-30-317]** Gen and Elec Pnl 1B-B Vent Fan switch in **AUTO** position (1B1-B, Compt 4A).

_____/_____
1st IV

Exhaust Rm

NOTE The following local fan room exhaust fan handswitches will not stop fans if room temperature is above thermostat setpoint.

- [6] **PRESS [1-HS-30-449B]** Diesel Gen 1B-B Room Exhaust Fan 1-B STOP pushbutton. ☐

- [7] **PRESS [1-HS-30-453B]** Diesel Gen 1B-B Room Exhaust Fan 2-B STOP pushbutton. ☐

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Exhaust Rm (continued)

- [8] **ENSURE [0-HS-30-467]** DG Bldg Corridor Air Intake Damper in **OPEN** position (1B-B DG Exhaust Fan Room, north wall).

1st IV

Local D/G Control Panel

- [9] **ENSURE [0-HS-82-53]** Maint-Auto Switch Gen 1B-B in **AUTO** position.

1st IV

Local Exciter Panel

- [10] **ENSURE [0-HS-82-217]** Voltage Regulator switch in **AUTO** position.

1st IV

- [11] **ENSURE [0-HS-82-198]** Diesel Gen 1B-B Local Mode switch in **OFF** position.

1st IV

- [12] **ENSURE** Loss Of Field Cutout Switch in **ON** position.

1st IV

- [13] **ENSURE** Diesel Generator Fault Shutdown relay **RESET** by **DEPRESSING [0-HS-82-58]**.

1st IV

- [14] **ENSURE** Overvoltage 59 Relay **RESET** and Overvoltage light (BB-1) **DARK** by **PUSHING UP** on relay target reset rod (bottom left corner of relay).

1st IV

Local Relay Board

- [15] **ENSURE [86LOR]** relay is **RESET**.

- [16] **ENSURE [LRX1B]** is **RESET**.

1st IV

- [17] **ENSURE [86 GA]** is **RESET**.

1st IV

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2A-A D/G Rm

[18] CHECK [0-XR-52-77], Seismic Event Monitor.

[19] IF [0-XR-52-77], Seismic Monitor is actuated
(Event Indicator RED light lit or flashing), **THEN**
NOTIFY the Maintenance Instrument Group (MIG) to
reset the monitor in accordance with SI-657.

Panel 0-M-26

[20] ENSURE [1-HS-57-74] DG 1B-B Synchronize switch in **OFF**
position.

1st / IV

[21] ENSURE [0-HS-82-48] DG 1B-B Mode Selector switch in
PUSH IN UNIT position.

1st / IV

[22] ENSURE [1-HS-57-73A] 1914 DG 1B-B To Sd Bd
1B-B switch in **A-AUTO** position.

1st / IV

[23] CHECK annunciation panel **[0-XA-55-26B]** **CLEAR** of
alarms, **OR**

EVALUATE any alarms present for operability concern as
required.



[24] CHECK [0-XI-82-49] Emerg Start Lockout Relay
ILLUMINATED.

1st / IV

[25] ENSURE [1-FCV-67-67] ERCW Cooling Water Valve is
CLOSED AND

[1-HS-67-67A] is in **AUTO** position.

1st / IV

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SOURCE NOTES

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REQUIREMENTS STATEMENT	SOURCE DOCUMENT	IMPLEMENTING STATEMENT
Commitment made to provide continuous prelubrication of the engine or to perform prior to all test starts. SQN has a continuous lubrication system for parts of the engine and the turbocharger and prelube checks are made prior to any manual or routine Diesel Starts.	NER 830137005 INPO SOER 83-001	[C.1]
Commitment made to consider manufacturer's recommendations in procedures governing test frequency, loading, and duration. SQN T/S stipulates test frequency, load, and duration for the D/Gs.	NER 830137006 INPO SOER 83-001	[C.2]
Commitment made that procedures should state initial conditions, steps to be followed for each type of test normally performed, and actions required to restore the unit to standby conditions for automatic start.	NER 830137008 INPO SOER 83-001	[C.3]
Commitment made to include steps to ensure that the generator bearing and stator temperature recorder is in service prior to start.	AFI SQA 900I071002	[C.4]
Procedures that do not contain appropriate verification requirements will be revised. (This item is not annotated within the procedure, since the entire procedure must meet the verification program requirements.)	NCO 970071001	[C.5]

SEQUOYAH NUCLEAR PLANT JOB PERFORMANCE MEASURE

B.1.c JPM 153/SIM

Emergency Mode Control Room Isolation due to High Rad

Original Signatures on File

**PREPARED/
REVISED BY:**

Date/

VALIDATED BY:

*

Date/

APPROVED BY:

Date/

(Operations Training Manager)

CONCURRED:

**

Date/

(Operations Representative)

* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.

** Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).

NUCLEAR TRAINING
REVISION/USAGE LOG

REVISION NUMBER	DESCRIPTION OF REVISION	V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:
0	New JPM	y	10/15/98	All	JP Kearney
pen/ink	0-AR-M12-B Rev change only	N	9/16/99	4	SR Taylor
pen/ink	0-SO-30-2 Rev change only	N	9/20/99	4	SR Taylor
pen/ink	0-AR-M6-C Rev change only	N	9/22/99	4	SR Taylor
pen/ink	0-SO-30-2 Rev changes only	N	12/10/01	4	L. Pauley
1	Incorporated pen/ink changes; removed 1-AR-M6-C and 0-AR-M12-B from references since they do not affect JPM steps; no impact on JPM flow	N	8/22/02	4	J P Kearney
2	Updated to current simulator commands, revision, and IC. Needs to be run on simulator.	Y	8/26/04	All	MG Croteau
3	Updated to latest procedure revision. Minor format changes	N	2/1/07	All	R. H. Evans

V - Specify if the JPM change will require another validation (Y or N).
See cover sheet for criteria.

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Sequenced steps identified by an "s"
2. Any **UNSAT** requires comments
3. Initialize Simulator in **IC-96**.
4. **NOTE: This JPM requires support from the Console Operator at several steps.**
5. **Ensure B Train Control Building A/C AHU and Electrical Board Room A/C AHU are in service [M-10].**
6. **Ensure 0-HS-311-105A and 0-HS-311-106A (Control Bldg fresh air inlet) are placed in A-Auto [M-10].**
7. **NOTE:** This JPM has been pre-shot in IC-96. Should IC-96 be erased or fail to perform as expected then use the following set-up instructions.
8. Initialize the simulator in IC-16:
9. Load the following malfunctions and overrides.
Initiate malfunction CH07A, failure of Train A Control Room Isolation
Initiate malfunction CH07B, failure of Train B Control Room Isolation
Initiate malfunction RM90125 to 10500 to set RM-90-125, Control Room Radmonitor, to a high rad condition.
Initiate malfunction RM90126 to 10500 to set RM-90-126, Control Room Radmonitor, to a high rad condition.
Override AN_OV_1255 to ON to set Control Room Isolation Train A alarm
Override AN_OV_1262 to ON to set Control Room Isolation Train B alarm
Override ZLOXX559A_10 to OFF
Override ZLOXX559A_9 to ON
Override ZLOXX559B_32 to OFF
Override ZLOXX559B_31 to ON
Override ZLOXX559A_44 to OFF
Override ZLOXX559A_43 to ON
Override ZLOXX559B_20 to OFF
Override ZLOXX559B_19 to ON
Override AN_OV_771 to ON (MCR intake monitor 125 hi rad)
Override AN_OV_776 to ON (MCR intake monitor 126 hi rad)
6. Acknowledge all alarms.
7. Ensure 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. 15 mins **Local** _____

Tools/Equipment/Procedures Needed:
0-SO-30-2 section 8.1

References:

	Reference	Title	Rev No.
1.	0-SO-30-2	Control Room Isolation	13

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. 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:

Both units are in MODE 1.
All systems are aligned in automatic control.
A valid high rad signal occurred on 0-RM-90-125 and 0-RM-90-126.

INITIATING CUES:

The Unit 1 US/SRO has directed you to respond to the valid high rad alarms and perform any necessary actions.

When all necessary actions have been completed notify the Unit 1 US/SRO.

Job Performance Checklist:

STEP/STANDARD		SAT/UNSAT
<p><u>STEP 1.:</u> Acknowledge Control Room Ventilation Isolation alarm.</p> <p><u>STANDARD:</u> Operator verifies Control Room Ventilation Isolation alarm acknowledged. Pulls AR-M6-C windows E-5 and E-6. Determines the need to perform the actions of 0-SO-30-2.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Start Time___</p>	
<p><u>STEP 2.:</u> Obtain proper procedure.</p> <p><u>STANDARD:</u> 0-SO-30-2 Section 8.1 identified as appropriate procedure.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>	
<p><u>STEP* 3.:</u> [1] ACKNOWLEDGE Control Room Ventilation Isolation alarm.</p> <p><u>STANDARD:</u> CRI alarm acknowledged.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>	
<p><u>STEP 4.:</u> [2] IF CRI is from a valid SIS or High Radiation signal, THEN</p> <p>NOTIFY RADCON to monitor Control Building el. 732 work areas for habitability.</p> <p>Note: Initial conditions stated alarm was valid.</p> <p><u>STANDARD:</u> Operator notifies the Radiochemical Laboratory to take air samples and determine if the MCR must be evacuated.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>	

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 5.: [3] ENSURE either Control Building A/C AHU RUNNING and associated AHU inlet OPEN.</p> <p>STANDARD: Operator verifies that B Train Control Building A/C AHU is running and 0-FCO-311-23 is open</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 6.: [4] IF Control Building A/C AHUs stopped, THEN...</p> <p>STANDARD: Operator NAs this step.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 7.: [5] ENSURE either Electrical Board Room Chiller RUNNING and associated AHU inlet OPEN.</p> <p>STANDARD: Operator verifies that B Train Electrical Board Room A/C AHU is running and 0-FCO-311-28 is open</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 8.: [6] ENSURE either Control Building Emergency Air Cleanup fan RUNNING and associated fan inlet OPEN.</p> <p>STANDARD: Operator verifies:</p> <p>0-HS-311-10A, Fan B, running and verify RED light LIT and verify RED light LIT for 0-FCO-311-11, Fan B Inlet.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 9.: [7] ENSURE at least one Emergency Air Pressurizing Fan RUNNING and associated fan inlet OPEN.</p> <p>STANDARD: Operator starts ONE of the following Emergency Air Pressurizing fans and verifies its inlet open:</p> <p>Place 0-HS-311-108A, Fan A, to Start and verify RED light LIT and verify RED light LIT for 0-FCO-311-108, Fan A Inlet.</p> <p>OR</p> <p>Place 0-HS-311-109A, Fan B, to Start and verify RED light LIT and verify RED light LIT for 0-FCO-311-109, Fan B Inlet. This step is critical to maintain positive pressure in the control room.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 10.: [8] ENSURE MCR and Spreading Room Fresh Air Fans STOPPED.</p> <p>STANDARD: Operator verifies the following Spreading Room Supply and Exhaust Fans are stopped by the fan's GREEN light LIT OR places the handswitch to the STOP position and verify the GREEN light LIT:</p> <p>Spreading Room Supply Fan, 0-HS-311-36A</p> <p>Spreading Room Exhaust Fan A, 0-HS-311-79A [NOT critical, fan is already off]</p> <p>Spreading Room Exhaust Fan B, 0-HS-311-80A.</p> <p>This step is critical to maintain clean air to the control building.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT												
<p>NOTE During Train testing the dampers that are not applicable to the Train being tested can be N/A.</p>													
<p>STEP 11.: [9] ENSURE MCR and Spreading Room Fresh Air Dampers CLOSED:</p> <table border="0"> <tr> <td>0-FCV-311-105A</td><td>MCR fresh air</td></tr> <tr> <td>0-FCV-311-106A</td><td>MCR fresh air</td></tr> <tr> <td>0-FCV-311-105B</td><td>Spreading room fresh air</td></tr> <tr> <td>0-FCV-311-106B</td><td>Spreading room fresh air</td></tr> <tr> <td>0-FCV-311-79</td><td>Spreading Room Exhaust Fan A outlet</td></tr> <tr> <td>0-FCV-311-80</td><td>Spreading Room Exhaust Fan B outlet</td></tr> </table> <p>NOTE: The next two dampers in the procedure step are covered in the subsequent JPM step.</p> <p>STANDARD: Operator closes the following dampers:</p> <p>Places 0-HS-311-105A to CLOSE to close 0-FCV-311-105A and - 105B and verify GREEN lights LIT [critical step]</p> <p>Places 0-HS-311-106A to CLOSE to close 0-FCV-311-106A and - 106B and verify GREEN lights LIT [critical step]</p> <p>Verifies 0-FCV-311-105B CLOSED by GREEN light LIT Verifies 0-FCV-311-106B CLOSED by GREEN light LIT Verifies 0-FCV-311-79 CLOSED by GREEN light LIT Verifies 0-FCV-311-80 CLOSED by GREEN light LIT</p> <p>COMMENTS:</p>	0-FCV-311-105A	MCR fresh air	0-FCV-311-106A	MCR fresh air	0-FCV-311-105B	Spreading room fresh air	0-FCV-311-106B	Spreading room fresh air	0-FCV-311-79	Spreading Room Exhaust Fan A outlet	0-FCV-311-80	Spreading Room Exhaust Fan B outlet	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
0-FCV-311-105A	MCR fresh air												
0-FCV-311-106A	MCR fresh air												
0-FCV-311-105B	Spreading room fresh air												
0-FCV-311-106B	Spreading room fresh air												
0-FCV-311-79	Spreading Room Exhaust Fan A outlet												
0-FCV-311-80	Spreading Room Exhaust Fan B outlet												

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>EVALUATOR NOTE Step 12 is part of procedure step 9.</p> <p>STEP 12.: ENSURE the Spreading Room Fresh Air Dampers CLOSED:</p> <p>0-FCV-311-17 Spreading Room supply discharge 0-FCV-311-102 Spreading Room supply discharge</p> <p>NOTE: Spreading room supply discharge dampers 0-FCO-311-17 & 102 have control room indications only, personnel will have to be dispatched locally to close these dampers.</p> <p>NOTE: Console operator inserts the following to close 0-FCO-311-17. Override ZLOXX559A_10 to ON Override ZLOXX559A_9 to OFF Console operator inserts the following to close 0-FCO-311-102. Override ZLOXX559B_32 to ON Override ZLOXX559B_31 to OFF</p> <p>Cue: Role play as an AUO when requested to locally close the dampers.</p> <p>STANDARD: Operator dispatches personnel locally to close them:</p> <p>Requests SM/SRO to dispatch personnel or dispatches personnel to CLOSE 0-FCV-311-17 & 0-FCV-311-102 locally.</p> <p>This step is critical to maintain clean air to the control room.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 13: [10] ENSURE Locker Room Exhaust Fan STOPPED.</p> <p>STANDARD: Operator places 0-HS-311-81A to the PTL position and verifies the GREEN light LIT.</p> <p>This step is critical to maintain clean air to the control room.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 14.: [11] ENSURE Locker Room Exhaust Dampers CLOSED:</p> <p>0-FCO-311-103, Toilet and Locker Room Exhaust Fan Discharge 0-FCO-311-104, Toilet and Locker Room Exhaust Fan Discharge</p> <p>Note: These dampers have control room indications only, personnel will have to be dispatched locally to close these dampers.</p> <p>Note: Console operator inserts the following to close 0-FCO-311-103. Override ZLOXX559A_44 to ON Override ZLOXX559A_43 to OFF Console operator inserts the following to close 0-FCO-311-104. Override ZLOXX559B_20 to ON Override ZLOXX559B_19 to OFF</p> <p>Cue: Role play as an AUO when requested to locally close the dampers.</p> <p>STANDARD: Operator requests SM/SRO to dispatch personnel or dispatches personnel requests SM/SRO to locally close 0-FCO-311-103 and 0-FCV-311-104.</p> <p>This step is critical to maintain clean air to the control room.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>NOTE Battery Room Exhaust Fans are started and stopped, via their respective breakers on the 480V C&A Vent Boards.</p>	
<p>STEP 15.: [12] IF one Electrical Board Room AHU in service, THEN ENSURE one of the following Battery Room Exhaust Fans are RUNNING.</p> <p>[a] Battery Room Exhaust Fan A. [C&A Vent Board 1A1-A / 12A] [b] Battery Room Exhaust Fan B. [C&A Vent Board 1B1-B / 11E] [c] Battery Room Exhaust Fan C. [C&A Vent Board 2B1-B / 11E]</p> <p>STANDARD: Operator verifies one of the following Battery Room Exhaust Fans are running by RED light LIT or places one of the handswitches to START and verifies RED light LIT:</p> <p>0-HS-311-33A, Battery Room Exhaust Fan A 0-HS-311-34A, Battery Room Exhaust Fan B 0-HS-311-35A, Battery Room Exhaust Fan C</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 16.: [13] IF Electrical Board Room AHUs stopped, THEN PERFORM the following:</p> <p>STANDARD: Operator N/As the step because one Electrical Board Room AHU is running.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 17.: [14] IF Battery Room Exhaust Fans off and either Electrical Board Room AHU running, THEN</p> <p>CLOSE damper, [31A-157] (Located above Auxiliary Instrument Room Access Door).</p> <p>STANDARD: Operator N/As the step because one Battery Room Exhaust Fan is running.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 18.: [15] ENSURE Shutdown Board Room Pressurizing Fans A and B STOPPED.</p> <p>STANDARD: Operator places the following fans handswitches to the STOP position and verifies the GREEN light is LIT for each fan:</p> <p>0-HS-313-383A, 1A-A Pressurizing Fan 0-HS-313-384A, 1B-B Pressurizing Fan 0-HS-313-391A, 2A-A Pressurizing Fan 0-HS-313-392A, 2B-B Pressurizing Fan</p> <p>This step is critical to maintain clean air to the shutdown Bd Room.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p>STEP 19.: [16] IF it is desired to align the Train A Control Room Emergency Ventilation System (CREVS) P-AUTO (standby mode operation), THEN PERFORM the following.</p> <p><u>Cue:</u> <i>Direct the operator that Train A CREVS is not to be placed in standby at this time.</i></p> <p><u>STANDARD:</u> Operator N/As this step.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 20.: [17] IF it is desired to align the Train B Control Room Emergency Ventilation System (CREVS) to P-AUTO (standby mode operation), THEN PERFORM the following.</p> <p><u>Cue:</u> <i>Direct the operator that Train B CREVS is not to be placed in standby at this time.</i></p> <p><u>STANDARD:</u> Operator N/As this step.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 21.: [18] IF paint or solvents were used on Control Building el 732 or the Control Building roof within the 24 hours prior to CREVS startup, THEN</p> <p>NOTIFY Systems Engineering to evaluate affect on CREVS charcoal filters and to ensure compliance with Tech Spec 4.7.7.c.</p> <p><u>Cue:</u> <i>Paint or solvents have not been used in the last 24 hours.</i></p> <p><u>STANDARD:</u> Operator N/As this step and notifies the US/SRO that Emergency Mode Control Room Isolation has been completed.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Stop Time___</p>

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

Both units are in MODE 1.

All systems are aligned in automatic control.

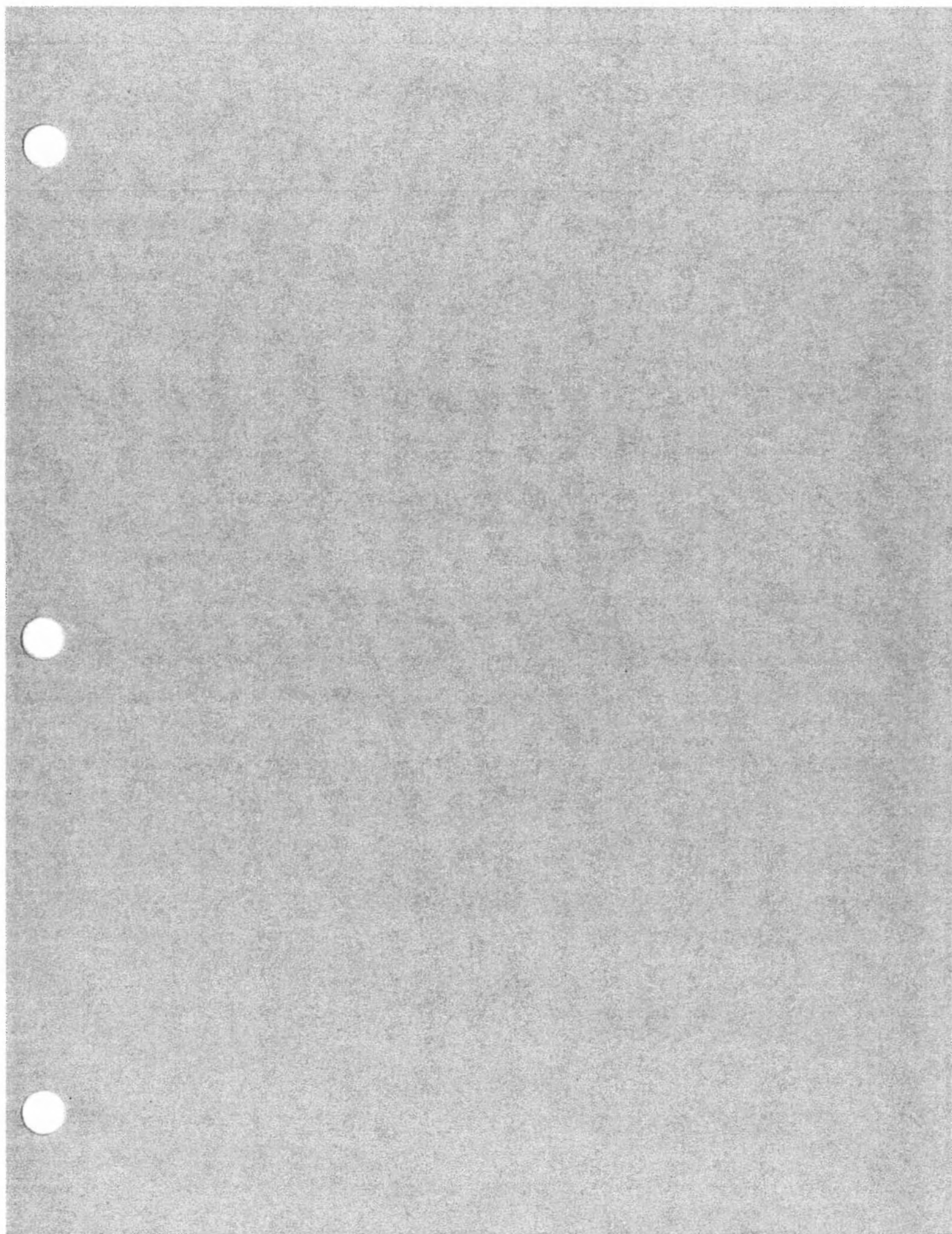
A valid high rad signal occurred on 0-RM-90-125 and 0-RM-90-126.

INITIATING CUES:

INITIATING CUES:

The Unit 1 US/SRO has directed you to respond to the valid high rad alarms and perform any necessary actions.

When all necessary actions have been completed notify the Unit 1 US/SRO.



CVCS-HEAT TRACE-UHI
1-XA-55-6C

	1	2	3	4	5	6	7	
A	TS-62-239 A/B BORIC ACID TANK A TEMP HIGH-LOW	FS-62-139A/B REACTOR COOLANT MAKE UP B.A. FLOW DEVIATION	LS-62-129A/B VOLUME CONTROL TANK LEVEL HI-LOW	TS-62-78 LTDN HX OUTLET TO DEMIN TEMP HIGH	CONTAINMENT ISOLATION PHASE B TRAIN A	CONTAINMENT ISOLATION PHASE B TRAIN B	RCS MID LOOP LEVEL LOW	A
B	TIT-62-243 BORIC ACID TANK C TEMP HIGH-LOW	FS-62-142A/B REACTOR COOLANT MAKE UP DEMIN WATER FLOW DEVN	TS-62-131 VOLUME CONTROL TANK TEMP HIGH	FS-62-82 LOW PRESS LTDN FLOW HIGH PRESSURE HIGH	CONTAINMENT ISOLATION PHASE A TRAIN A	CONTAINMENT ISOLATION PHASE A TRAIN B	RCS MID LOOP LEVEL HIGH	B
C	LS-62-238A/B BORIC ACID TANK A LEVEL HI-LOW	AUTO MAKE-UP START SIGNAL BLOCKED	PS-62-122A/B VOLUME CONTROL TANK PRESS HI-LOW	TS-62-75 LOW PRESSURE LETDOWN RELIEF TEMP HIGH	CONTAINMENT VENTILATION ISOLATION TRAIN A	CONTAINMENT VENTILATION ISOLATION TRAIN B	BORIC ACID SYSTEM AREA TEMPERATURE LOW	C
D	LS-62-242A/B BORIC ACID TANK C LEVEL HI-LOW	SPARE	FS-62-93A/B CHARGING LINE FLOW ABNORMAL	TS-62-71 REGENERATIVE HX LETDOWN LINE TEMP HIGH	AUX BUILDING ISOLATION TRAIN A	AUX BUILDING ISOLATION TRAIN B	SI/CNTMT SPRAY FREEZE PROTECTION SYS TEMP HI/LO	D
E	SPARE	SPARE	LS-63-104 CONTAINMENT SUMP FULL	LS-63-176 CNTMT LEVEL HI RHR RECIRC	CONTROL ROOM ISOLATION TRAIN A	CONTROL ROOM ISOLATION TRAIN B	FCV-74-1/2 TROUBLE OR RHR PRESS HI	E
	1	2	3	4	5	6	7	

Source

SER 1255
 TS 31A-5A High Temp
 TS 31A-6A High Temp

RE-90-125 Radiation
 K-608 Relay Operation (U-1 or U-2)

Setpoint

N/A

**CONTROL ROOM
 ISOLATION
 TRAIN A**

Probable Causes

1. Manual from HS-31A-7A on 1-M-6 or 2-M-6.
2. Hi temp (> 200°F) in air inlet duct to control building pressurization fans A-A or B-B.
3. Safety Injection signal from U-1 or U-2.
4. Indicating noble gas > setpoint in duct from control building pressurization fan A-A.

Corrective Actions

- [1] **ENSURE** Control Room Isolation:
REFER TO Section 8.1 of 0-SO-30-2, Emergency Mode Control Room Isolation. **[C.4]**
- [2] **DETERMINE** cause of alarm.
- [3] **EVALUATE** EPIP-1, Emergency Plan Classification Matrix.
- [4] **WHEN** Control Room ventilation can be returned to normal operation, **THEN**
REFER TO Section 8.2 of 0-SO-30-2, Recovery From Control Room Isolation.

References

45N631-2, 45B655-06C-0, 47W611-31-1, 47W611-31-2, 47W866-4

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Source**Setpoint**

SER 1262
 TS 31A-5B High Temp
 TS 31A-6B High Temp

N/A

**CONTROL ROOM
 ISOLATION
 TRAIN B**

RE-90-126 Radiation
 K-608 Relay Operation (U-1 or U-2)

Probable Causes

1. Manual from HS-31A-38A on 1-M-6 or 2-M-6.
2. Hi temp (> 200°F) in air inlet duct to control building pressurization fans A-A or B-B.
3. Safety Injection signal from U-1 or U-2.
4. Indicating noble gas > setpoint in duct from control building pressurization fan B-B.

Corrective Actions

- [1] **ENSURE** Control Room Isolation:
REFER TO Section 8.1 of 0-SO-30-2, Emergency Mode Control Room Isolation. **[C.4]**
- [2] **DETERMINE** cause of alarm.
- [3] **EVALUATE** EPIP-1, Emergency Plan Classification Matrix.
- [4] **WHEN** Control Room ventilation can be returned to normal operation, **THEN**
REFER TO Section 8.2 of 0-SO-30-2, Recovery From Control Room Isolation.

References

45N631-2, 45B655-06C-0, 47W611-31-1, 47W611-31-2, 47W866-4

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TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT
SYSTEM OPERATING INSTRUCTION

0-SO-30-2

CONTROL ROOM ISOLATION

Revision 13

QUALITY RELATED

PREPARED/PROOFREAD BY: W. T. LEARY

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: TONEY WHITTEN

EFFECTIVE DATE: 01/05/06

LEVEL OF USE: **CONTINUOUS USE**

REVISION

DESCRIPTION: Revised to relocate direction to perform Section 8.2 from Section 8.1. This provides for verification of required automatic actions in Section 8.1 regardless of the source or validity of the initiating signal.

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1.0 INTRODUCTION

1.1 Purpose

To provide instructions for the verification and recovery from control room isolations.

1.2 Scope

- A. Emergency Mode Control Room Isolation.
- B. Recovery from Control Room Isolation

2.0 REFERENCES

2.1 Performance References

None

2.2 Developmental References

- A. 0-SO-30-1, *Control Building Heating, Air Conditioning, and Ventilation*
- B. SSP-12.6, *Equipment Status Verification And Checking Program*
- C. FSAR 6.4
- D. Technical Specifications 3.7.7
- E. TVA Drawings
 - 1. 47W611-31-1 thru 6
 - 2. 47W865-3,7
 - 3. 47W866-4
 - 4. 47W867-1 thru 4

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Date_____

3.0 PRECAUTIONS AND LIMITATIONS

- A. Replacing HEPA and charcoal filters will be necessary if their differential pressure reaches 3" H₂O.

4.0 PREREQUISITE ACTIONS

NOTE Throughout this Instruction where an **IF/THEN** statement exists, the step should be **N/A** if condition does not exist.

- [1] **ENSURE** Instruction to be used is a copy of the effective version.

- [2] **ENSURE** Precautions and Limitations Section 3.0, has been reviewed.

- [3] **IF** ventilation alignment changes are made which could impact door closure, **THEN**
NOTIFY Fire Operations.

- [4] **ENSURE** each performer documents their name and initials:

Print Name	Initials

- [5] **INDICATE** below which performance section of this Instruction will be used and the reason for its performance.

☐ 8.0 INFREQUENT OPERATION

REASON: _____

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Date_____

5.0 STARTUP/STANDBY READINESS

None

6.0 NORMAL OPERATION

None

7.0 SHUTDOWN

None

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Date _____

8.0 INFREQUENT OPERATION

8.1 Emergency Mode Control Room Isolation

[1] **ACKNOWLEDGE** Control Room Ventilation Isolation alarm. _____

[2] **IF** CRI is from a valid SIS or High Radiation signal, **THEN**

NOTIFY RADCON to monitor Control Building el. 732 work areas for habitability impact. _____

[3] **ENSURE** either Control Building A/C AHU **RUNNING** and associated AHU inlet **OPEN**:

CONTROL BLDG A/C AHU	RUNNING √	AHU INLET	OPEN √
A	<input type="checkbox"/>	0-FCO-311-20	<input type="checkbox"/>
B	<input type="checkbox"/>	0-FCO-311-23	<input type="checkbox"/>

[4] **IF** Control Building A/C AHUs stopped, **THEN**

DISPATCH personnel to:

[a] **OPEN** Mechanical equipment room door C-39. ☐

[b] **OPEN** MCR door C-48 or C-56. ☐

[5] **ENSURE** either Electrical Board Room Chiller **RUNNING** and associated AHU inlet **OPEN**:

ELECTRICAL BOARD ROOM A/C AHU	RUNNING √	AHU INLET	OPEN √
A	<input type="checkbox"/>	0-FCO-311-27	<input type="checkbox"/>
B	<input type="checkbox"/>	0-FCO-311-28	<input type="checkbox"/>

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Date _____

8.1 Emergency Mode Control Room Isolation (Continued)

- [6] **ENSURE** either Control Building Emergency Air Cleanup fan **RUNNING** and associated fan inlet **OPEN**:

CONTROL BLDG EMERGENCY AIR CLEANUP FAN	RUNNING √	FAN INLET	OPEN √
A	<input type="checkbox"/>	0-FCO-311-9	<input type="checkbox"/>
B	<input type="checkbox"/>	0-FCO-311-11	<input type="checkbox"/>

- [7] **ENSURE** at least one Emergency Air Pressurizing Fan **RUNNING** and associated fan inlet **OPEN**:

CONTROL BLDG EMERGENCY PRESSURIZING FAN	RUNNING √	FAN INLET	OPEN √
A	<input type="checkbox"/>	0-FCO-311-108	<input type="checkbox"/>
B	<input type="checkbox"/>	0-FCO-311-109	<input type="checkbox"/>

- [8] **ENSURE** MCR and Spreading Room Fresh Air Fans **STOPPED**:

- [a] Spreading Room Supply Fan. ☐
- [b] Spreading Room Exhaust Fan A. ☐
- [c] Spreading Room Exhaust Fan B. ☐

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 8 of 20
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Date _____

8.1 Emergency Mode Control Room Isolation (Continued)

NOTE During Train testing the dampers that are not applicable to the Train being tested can be N/A.

[9] ENSURE MCR and Spreading Room Fresh Air Dampers **CLOSED**:

DAMPER	CRI TRAIN	DESCRIPTION	CLOSED √
0-FCV-311-105A	A	MCR fresh air	<input type="checkbox"/>
0-FCV-311-106A	B	MCR fresh air	<input type="checkbox"/>
0-FCV-311-105B	A	Spreading room fresh air	<input type="checkbox"/>
0-FCV-311-106B	B	Spreading room fresh air	<input type="checkbox"/>
0-FCO-311-79	A/B	Spreading Room Exhaust Fan A outlet	<input type="checkbox"/>
0-FCO-311-80	A/B	Spreading Room Exhaust Fan B outlet	<input type="checkbox"/>
0-FCO-311-17	A	Spreading room supply discharge	<input type="checkbox"/>
0-FCO-311-102	B	Spreading room supply discharge	<input type="checkbox"/>

[10] ENSURE Locker Room Exhaust Fan **STOPPED**.

☐

NOTE During Train testing the dampers that are not applicable to the Train being tested can be N/A.

[11] ENSURE Locker Room Exhaust Dampers **CLOSED**:

DAMPER	CRI TRAIN	DESCRIPTION	CLOSED √
0-FCO-311-103	A	TOILET AND LOCKER ROOM EXHAUST FAN DISCHARGE	<input type="checkbox"/>
0-FCO-311-104	B	TOILET AND LOCKER ROOM EXHAUST FAN DISCHARGE	<input type="checkbox"/>

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Date _____

8.1 Emergency Mode Control Room Isolation (Continued)

NOTE Battery Room Exhaust Fans are started and stopped, via their respective breakers on the 480V C&A Vent Boards.

[12] IF one Electrical Board Room AHU in service, **THEN ENSURE** one of the following Battery Room Exhaust Fans **RUNNING**:

- [a] Battery Room Exhaust Fan A. [C&A Vent Board 1A1-A / 12A] ☐
- [b] Battery Room Exhaust Fan B. [C&A Vent Board 1B1-B / 11E] ☐
- [c] Battery Room Exhaust Fan C. [C&A Vent Board 2B1-B / 11E] ☐

NOTE All Battery Room Exhaust Fans may be out of service no greater than 11 days. If the TSC is manned, it will assume responsibility for tracking and initiating corrective action. If the TSC is NOT manned, the MCR will retain this responsibility.

[13] IF all Electrical Board Room AHUs stopped, **THEN PERFORM** the following:

- [a] **ENSURE** all battery room exhaust fans stopped. ☐
- [b] **RECORD** present time _____. ☐
- [c] IF TSC is manned, **THEN NOTIFY** TSC to track and initiate corrective action. ☐

[14] IF Battery Room Exhaust Fans off and either Electrical Board Room AHU running, **THEN**

CLOSE damper **[31A-157]** (Located above Auxiliary Instrument Room Access Door). ☐

[15] **ENSURE** Shutdown Board Room Pressurizing Fans A and B are **STOPPED**:

FAN	DESCRIPTION	STOPPED √
1A-A	Pressurizing Fan	<input type="checkbox"/>
1B-B	Pressurizing Fan	<input type="checkbox"/>
2A-A	Pressurizing Fan	<input type="checkbox"/>
2B-B	Pressurizing Fan	<input type="checkbox"/>

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 10 of 20
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Date _____

8.1 Emergency Mode Control Room Isolation (Continued)

CAUTION Placing a train of CREVS in P-Auto (standby mode) will prevent automatic start on an accident signal. Refer to Tech Spec LCO 3.7.7.

NOTE: One train of CREVS may be stopped and placed in standby to protect the charcoal bed filter for that train.

NOTE: Control Building Emergency Pressurization Fan A takes suction through the normal suction flowpath (north end of Control Bldg). If smoke and/or radiation is still entering the MCR after CRI is actuated, then stopping Emergency Press Fan A may prevent further smoke and/or radiation intake.

- [16] IF it is desired to align the Train A Control Room Emergency Ventilation System (CREVS) to P-Auto (standby mode) operation, **THEN**

PERFORM the following:

- [a] **PLACE** CREVS fan handswitches to the **P-AUTO** position (hand switches in **Pull Out** position):

- [1] **[0-HS-311-108A]**, Control Building Emergency Pressurization Fan A _____
- [2] **[0-HS-311-8A]**, Control Building Emergency Air Cleanup Fan A. _____

- [b] **PLACE** the CREVS fan handswitches to the **STOP** position:

- [1] **[0-HS-311-108A]**, Control Building Emergency Pressurization Fan A. _____
- [2] **[0-HS-311-8A]**, Control Building Emergency Air Cleanup Fan A. _____

- [c] **VERIFY** the applicable fan inlet dampers are **CLOSED**:

- [1] **[0-FCO-311-108]**, Control Building Emergency Pressurization Fan A Inlet damper. _____
- [2] **[0-FCO-311-9]**, Control Building Emergency Air Cleanup Fan A Inlet damper. _____

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 11 of 20
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Date _____

8.1 Emergency Mode Control Room Isolation (Continued)

CAUTION Placing a train of CREVS in P-Auto (standby mode) will prevent automatic start on an accident signal. Refer to Tech Spec LCO 3.7.7.

NOTE: One train of CREVS may be stopped and placed in P-Auto (standby) to protect the charcoal bed filter for that train.

NOTE: Control Building Emergency Pressurization Fan B takes suction through the emergency suction flowpath (south end of Control Building). If smoke and/or radiation is entering the MCR after CRI is actuated, then stopping Emergency Press Fan B may prevent further smoke and or radiation intake.

[17] **IF** it is desired to align the Train B Control Room Emergency Ventilation System (CREVS) to P-AUTO (standby mode operation), **THEN**

PERFORM the following:

[a] **PLACE** CREVS fan handswitches to the **P-AUTO** position (hand switches in **Pull Out** position):

[1] **[0-HS-311-109A]** Control Building Emergency Pressurization Fan B

[2] **[0-HS-311-10A]** Control Building Emergency Air Cleanup Fan B.

[b] **PLACE** the CREVS fan handswitches to the **STOP** position:

[1] **[0-HS-311-109A]** Control Building Emergency Pressurization Fan B.

[2] **[0-HS-311-10A]** Control Building Emergency Air Cleanup Fan B.

[c] **VERIFY** the applicable fan inlet dampers are **CLOSED**:

[1] **[0-FCO-311-109]** Control Building Emergency Pressurization Fan B Inlet damper.

[2] **[0-FCO-311-11]** Control Building Emergency Air Cleanup Fan B Inlet damper.

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 12 of 20
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Date_____

8.1 Emergency Mode Control Room Isolation (Continued)

- [18] **IF** paint or solvents were used on Control Building el 732 or the Control Building roof within the 24 hours prior to CREVS startup, **THEN**

NOTIFY Systems Engineering to evaluate affect on CREVS charcoal filters and to ensure compliance with Tech Spec 4.7.7.c.

- [19] **WHEN** recovery from Control Room Isolation is desired, **THEN**

PERFORM Section 8.2, Recovery from Control Room Isolation.

END OF TEXT

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 13 of 20
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Date_____

8.2 Recovery From Control Room Isolation

- [1] **OBTAIN** permission from the Shift Manager to perform the Recovery From Control Room Isolation. _____

NOTE The following handswitch alignment prevents all four fans from starting and possibly over pressurizing the Shutdown Board Rooms when the Control Room Isolation (CRI) is reset.

- [2] **ENSURE** two of the following handswitches (one per Unit) are in the **P-AUTO** position and the other two handswitches (one per Unit), are in the **OFF** position:

DESCRIPTION	HANDSWITCH	P-AUTO (√)	OFF (√)	INITIALS
SD BD RM A PRESS FAN 1A-A	0-HS-313-383A			_____
SD BD RM A PRESS FAN 1B-B	0-HS-313-384A			_____
SD BD RM B PRESS FAN 2A-A	0-HS-313-391A			_____
SD BD RM B PRESS FAN 2B-B	0-HS-313-392A			_____

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0		

Date _____

8.2 Recovery from Control Room Isolation (Continued)

- [4] **RESET** the Control Room Ventilation Isolation signal with one pair of the following Unit's handswitches (N/A handswitches not used):

[a] **[1-HS-31A-7A]**, Control Bldg. Isol. Train A. _____

[b] **[1-HS-31A-38A]**, Control Bldg. Isol. Train B. _____

OR

[c] **[2-HS-31A-7A]**, Control Bldg. Isol. Train A. _____

[d] **[2-HS-31A-38A]**, Control Bldg. Isol. Train B. _____

- [5] **VERIFY** the Control Room Ventilation Isolation signal has been reset by the following annunciator windows on panel 1, 2-XA-55-6C not lit:

[a] Control Room Isolation Train A (Window E-5). _____

[b] Control Room Isolation Train B (Window E-6). _____

NOTE Manual operation of the Main Control Room and Spreading Room Fresh Air Dampers will be required when their applicable handswitches are not in the **A-AUTO** position.

- [6] **VERIFY** the following automatic operations occur:

EQUIPMENT IDENTIFICATION	POSITION	INITIALS
Main Control Room Fresh Air Damper 0-FCV-311-105A	OPEN	_____
Main Control Room Fresh Air Damper 0-FCV-311-106A	OPEN	_____
Spreading Room Fresh Air Damper 0-FCV-311-105B	OPEN	_____
Spreading Room Fresh Air Damper 0-FCV-311-106B	OPEN	_____
T & L Rm Exh Fan Disch 0-FCO-311-103	OPEN	_____
T & L Rm Exh Fan Disch 0-FCO-311-104	OPEN	_____
Spreading Room Supply Fan Discharge Damper 0-FCO-311-102	OPEN	_____
Spreading Room Supply Fan Discharge Damper 0-FCO-311-17	OPEN	_____

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 15 of 20
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Date _____

8.2 Recovery from Control Room Isolation (Continued)

- [7] **ENSURE** the Control Building Emergency Pressurizing Fan A has been **STOPPED AND**

[0-HS-311-108A], Control Building Emergency Press Fan A, is in the **A-AUTO** position. _____

- [8] **VERIFY [0-FCO-311-108]**, Control Building Emergency Press Fan A Inlet, is **CLOSED**. _____

- [9] **ENSURE** the Control Building Emergency Pressurizing Fan B has been **STOPPED AND**

[0-HS-311-109A], Control Building Emergency Press Fan B, is in the **A-AUTO** position. _____

- [10] **VERIFY [0-FCO-311-109]**, Control Building Emergency Press Fan B Inlet, is **CLOSED**. _____

- [11] **ENSURE** the Control Building Emergency Air Cleanup Fan A has been **STOPPED AND**

[0-HS-311-8A], Control Building Emergency Air Cleanup Fan A, is in the **A-AUTO** position. _____

- [12] **VERIFY [0-FCO-311-9]**, Control Building Emergency Air Cleanup Fan A Inlet, is **CLOSED**. _____

- [13] **ENSURE** the Control Building Emergency Air Cleanup Fan B has been **STOPPED AND**

[0-HS-311-10A], Control Building Emergency Air Cleanup Fan B, is in the **A-AUTO** position. _____

- [14] **VERIFY [0-FCO-311-11]**, Control Building Emergency Air Cleanup Fan B Inlet, is **CLOSED**. _____

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Date _____

8.2 Recovery from Control Room Isolation (Continued)

[15] **PLACE** one of the Spreading Room Exhaust Fans in service by performing the following:

[a] **START** fan using its applicable handswitch
(N/A fan not started):

[1] **[0-HS-311-79A]**, Spreading Room
Exhaust Fan A. _____

[2] **[0-HS-311-80A]**, Spreading Room
Exhaust Fan B. _____

[b] **VERIFY** the applicable fan's discharge damper
OPENS (N/A damper for fan not started):

[1] **[0-FCO-311-79]**, Spreading Room
Exhaust Fan A Out. _____

[2] **[0-FCO-311-80]**, Spreading Room
Exhaust Fan B Out. _____

[16] **ENSURE** both of the Spreading Room Exhaust Fan
handswitches are in the **A-AUTO** position:

[a] **[0-HS-311-79A]**, Spreading Room Exhaust Fan A. _____

[b] **[0-HS-311-80A]**, Spreading Room Exhaust Fan B. _____

CAUTION The Spreading Room Exhaust Fan should have been operating
for at least 20 seconds to prevent Spreading Room Supply Fan
trip out on low flow.

[17] **PLACE** **[0-HS-311-36A]**, Spreading Room Supply Fan, in
START AND

RETURN to **A-AUTO**. _____

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 17 of 20
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Date _____

8.2 Recovery from Control Room Isolation (Continued)

[18] **ENSURE** Locker Room Exhaust Fan running, **AND**

[0-HS-311-81A] in **A-AUTO**. _____

NOTE

The following selected fans may start when initially placed in the **P-AUTO** position, but should be **STOPPED** and returned back to **P-AUTO**.

[19] **VERIFY** the two Shutdown Board Room Fans that were selected in step [2] for **P-AUTO** are running, **THEN** **PLACE** the other two Shutdown Board Room Fans handswitches, which were in the **OFF** position in step [2], to the **P-AUTO** position:

DESCRIPTION	HANDSWITCH	RUNNING (√)	P-AUTO (√)	INITIALS
SD BD RM A PRESS FAN 1A-A	0-HS-313-383A			_____
SD BD RM A PRESS FAN 1B-B	0-HS-313-384A			_____
SD BD RM B PRESS FAN 2A-A	0-HS-313-391A			_____
SD BD RM B PRESS FAN 2B-B	0-HS-313-392A			_____

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 18 of 20
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Date _____

8.2 Recovery from Control Room Isolation (Continued)

[20] **INDEPENDENTLY VERIFY** following handswitch positions:

DESCRIPTION	HANDSWITCH	POSITION	INITIALS
SD BD RM A PRESS FAN 1A-A	0-HS-313-383A	P-AUTO	_____
SD BD RM A PRESS FAN 1B-B	0-HS-313-384A	P-AUTO	_____
SD BD RM B PRESS FAN 2A-A	0-HS-313-391A	P-AUTO	_____
SD BD RM B PRESS FAN 2B-B	0-HS-313-392A	P-AUTO	_____
Locker Room Exhaust Fan	0-HS-311-81A	A-AUTO	_____
Spreading Room Supply Fan	0-HS-311-36A	A-AUTO	_____
Spreading Room Exhaust Fan A	0-HS-311-79A	A-AUTO	_____
Spreading Room Exhaust Fan B	0-HS-311-80A	A-AUTO	_____
Cntl Bldg Emerg Air Clean Up Fan A	0-HS-311-8A	A-AUTO	_____
Cntl Bldg Emerg Air Clean Up Fan B	0-HS-311-10A	A-AUTO	_____
Cntl Bldg Emerg Press Fan A	0-HS-311-108A	A-AUTO	_____
Cntl Bldg Emerg Press Fan B	0-HS-311-109A	A-AUTO	_____

[21] IF self contained breathing apparatus were used, **THEN**
NOTIFY RADCON of need for replacements. _____

[22] IF paint or solvents were used on Control Building el 732
or the Control Building roof within the 24 hours prior to
CREVS startup, **THEN**
NOTIFY Tech Support to evaluate affect on CREVS
charcoal filters and to ensure compliance with
Tech Spec 4.7.7.c. _____

END OF TEXT

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 19 of 20
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9.0 RECORDS

Completed copies of all sections shall be transmitted to the Operations Superintendent 's Secretary.

SQN 0	CONTROL ROOM ISOLATION	0-SO-30-2 Rev: 13 Page 20 of 20
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SOURCE NOTES

REQUIREMENTS STATEMENT	SOURCE DOCUMENT	IMPLEMENTING STATEMENT
Procedures that do not contain appropriate verification requirements will be revised. (This item is not annotated within the procedure, since the entire procedure must meet the verification program requirements)	NCO970071001	C.1

SEQUOYAH NUCLEAR PLANT JOB PERFORMANCE MEASURE

B.1.d JPM 013AP1/SIM

Transfer to Hot Leg Recirculation

Original Signatures on File

**PREPARED/
REVISED BY:**

Date/

VALIDATED BY:

*

Date/

APPROVED BY:

Date/

(Operations Training Manager)

CONCURRED:

**

Date/

(Operations Representative)

* Validation not required for minor enhancements, procedure Rev changes that do not affect the JPM, or individual step changes that do not affect the flow of the JPM.

** Operations Concurrence required for new JPMs and changes that affect the flow of the JPM (if not driven by a procedure revision).

NUCLEAR TRAINING					
REVISION/USAGE LOG					
REVISION NUMBER	DESCRIPTION OF REVISION	V	DATE	PAGES AFFECTED	PREPARED/ REVISED BY:
0	Transfer from Word Perfect	N	1994	All	HJ Birch
1	Add cover sheep and Incorporate Rev B minor changes. Chgd performance time to based on validation.	Y	9/12/95	All	HJ Birch
pen/ink	Chg intiat cue to since time of event to match ES-1.3. Comment from student.	N	1/25/96	4	HJ Birch
pen/ink	Chg due to procedure revision and chg recirc criteria from 12 hr to 5.5 hr	N	03/19/02	4	WR Ramsey
2	Incorporated pen/ink changes	N	8/22/02	4	J P Kearney
3	Updated to current revision of EOP.	N	9/22/03	All	MG Croteau
4	Corrected IC. Corrected typos. 5 vice 5.5 hours.	N	8/2/04	All	MG Croteau
5	Corrected IC. Revised JPM to conform to latest revision of ES-1.4.	Y	9/30/2005	All	JJ Tricoglou

V - Specify if the JPM change will require another Validation (Y or N).
See cover sheet for criteria.

SEQUOYAH NUCLEAR PLANT
RO/SRO
JOB PERFORMANCE MEASURE

Task:

Transfer to Hot Leg Recirculation

JATA Task # : 0000790501 (RO)

K/A Ratings:

194001 A1.02 (4.1/3.9)

194001 A1.13 (4.3/4.1)

000011 EA1.11 (4.2/4.2)

000011 EA1.13 (4.1/4.2)

006020 A4.01 (3.7/3.6)

000011 EA1.05 (4.3/3.9)

006020 A4.02 (3.9/3.8)

Task Standard:

Successful realignment of RHR to cold leg injection and BOTH trains of safety injection to the hot leg recirculation flow path. (RHR hot leg injection valve fails to open)

Evaluation Method : Simulator X In-Plant

Performer: _____
NAME

Start Time _____

Performance Rating : SAT _____ UNSAT _____ Performance Time _____

Finish Time _____

Evaluator: _____ / _____
SIGNATURE DATE

COMMENTS

SPECIAL INSTRUCTIONS TO EVALUATOR:

1. Critical steps identified by an asterisk (*)
2. Sequenced steps identified by an "s"
3. Any UNSAT requires comments
4. Initialize the simulator in **IC-93**.
5. NOTE: This JPM has been pre-shot in **IC # 93**. Should **IC # 93** be erased or fail to perform as expected then use the following set-up instructions:
 - a. Initialize the simulator to sump recirc IC - 24(if available) then, after automatic containment sump swapover is initiated, perform required alignment of ECCS to Containment Sump per ES-1.3. Include the following remote functions:
 - i. **IRF RH14 f:1**
 - ii. **IRF SIR06 f:0**
 - iii. **IOR ZDIHS63172A f:0 (Fails [FCV-63-172] CLOSED)**
 - b. If sump recirc IC is not available then initialize to IC 16 and complete the following setup:
 - i. Insert - **IMF TH01A f:10** (10% LOCA on Loop #1 Hot Leg), and Trip RCPs.
 - ii. After automatic containment sump swapover is initiated, perform required alignment of ECCS to Containment Sump per ES-1.3.
 - iii. Place operating power on FCV-63-1 (remote function **IRF RHR14 f:1**)
 - iv. When RWST level decreases to 8% realign Containment Spray Pump suction to Cntmt Sump per ES-1.3.
 - v. Place operating power on FCV-63-22 (remote function **IRF SIR06 f:0**).
 - vi. Insert override **IOR ZDIHS63172A f:0 (Fails [FCV-63-172] CLOSED)**
 - vii. Acknowledge and clear ALL alarms.
 - viii. Freeze simulator after realignment of Cntmt Spray suction to Cntmt Sump.
 - c. To keep out nuisance alarms: insert overrides on following alarms
 - i. **IMF AN_OV_304 f:3** (Containment Moisture High)
 - ii. **IMF AN_OV_420 f:3** (Saturation Monitor)
 - iii. **IMF AN_OV_96 f:3** (Turbine Zero Speed)
 - d. Ensure operator performs the following required actions for **SELF-CHECKING**;
 - i. Reviews the intended action and expected response.
 - ii. Compares the actual response to the expected response.

Validation Time: CR. 13 mins **Local** _____

Tools/Equipment/Procedures Needed:

ES-1.4 "Transfer to Hot Leg Recirculation"

References:

	Reference	Title	Rev No.
1.	ES-1.4	Transfer to Hot Leg Recirculation	5

READ TO OPERATOR

Directions to Trainee:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM. I will provide initiating cues and reports on other actions when directed by you. 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. All ECCS components and Containment Spray pumps are aligned and taking suction from Containment sump per ES-1.3.
2. RCS pressure is less than 180 psig. RHR spray is not in service.
3. Both RHR pumps are in service.
4. 5 hours have elapsed since the time of the event

INITIATING CUES:

1. You are the Unit 1 OATC and are to transfer to Hot Leg Recirculation per ES-1.4.
2. When you have completed ES-1.4 notify the US/SRO.

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 ES-1.4 and implements the actions to align to hot leg recirculation.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Start Time___</p>
<p><u>STEP 2:</u> [1] DETERMINE if RHR spray should be isolated:</p> <p><u>STANDARD:</u> Operator verifies [FCV-72-40] and 41 are closed and goes to step 2.</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 3:</u> [2] CHECK RHR Pump A-A Running.</p> <p><u>STANDARD:</u> Operator verifies "A-A" RHR pump running by RED lights on HS (may also check pump amps)</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP *4:</u> [3] ALIGN RHR Train A for hot leg recirculation:</p> <p>[a] CLOSE RHR Train "A" cold leg isolation valve FCV-63-93.</p> <p><u>STANDARD:</u> Operator closes FCV-63-93 and verifies CLOSED as indicated by green position indicating light ON. This step is critical to isolate cold leg injection prior to opening the hot leg recirculation flow path.</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>EVALUATOR NOTE Steps 5, 6 and 7 are part of procedure step 3.</p>	
<p><u>STEP 5:</u> [b] ENSURE RHR Train "B" discharge crosstie valve FCV-74-35 CLOSED.</p> <p><u>STANDARD:</u> Operator ensures RHR Train "B" discharge crosstie valve CLOSED, FCV-74-35, as indicated by green indicating light ON.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD

SAT/UNSAT

<p>STEP *6: [c] OPEN RHR Train "A" discharge crosstie valve FCV-74-33.</p> <p>STANDARD: Operator opens FCV-74-33 and verifies OPEN as indicated by red position indicating light ON. This step is critical to isolate A train RHR from B train RHR.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP *7: [d] OPEN FCV-63-172, RHR HL injection valve.</p> <p>NOTE: FCV-63-172 fails to open. Operator must perform RNO and realign both RHR trains to cold legs.</p> <p>STANDARD: RHR HL injection FCV-63-172 CLOSED as indicated by green position indicating light remaining ON. Operator performs RNO. This step is critical to align A train RHR to the hot leg recirculation flow path.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>EVALUATOR NOTE Steps 8, 9, 10 and 11 are part of procedure step 3 RNO.</p>	
<p>STEP 8: 1) ENSURE RHR hot leg injection valve FCV-63-172 CLOSED.</p> <p>STANDARD: Operator ensures RHR hot leg injection valve FCV-63-172 CLOSED, as indicated by green indicating light ON.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD

SAT/UNSAT

<p><u>STEP *9:</u> 2) ENSURE RHR Train A discharge crosstie valve FCV-74-33 CLOSED.</p> <p><u>STANDARD:</u> Operator closes FCV-74-33, as indicated by green indicating light ON. This step is critical to return flow path to cold leg recirculation.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP *10:</u> 3) ENSURE RHR Train A cold leg isolation valve FCV-63-93 OPEN.</p> <p><u>STANDARD:</u> Operator opens FCV-63-93, as indicated by red indicating light ON. This step is critical to return flow path to cold leg recirculation.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP 11:</u> 4) IF RHR hot leg injection valve FCV-63-172 is NOT capable of opening from the MCR, THEN GO TO Step 11.</p> <p><u>STANDARD:</u> Operator transitions to step 11.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 12:</u> [11] CHECK SI pump A-A Running.</p> <p><u>STANDARD:</u> Operator checks "A-A" SI pump running by RED lights on HS (may also check pump amps).</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD

SAT/UNSAT

<p><u>STEP *13:</u> [12] ALIGN SI pump A-A for hot leg recirculation:</p> <p>a. ENSURE SI Pump "A-A" STOPPED.</p> <p><u>STANDARD:</u> Operator stops SI Pump "A-A" as indicated by green indicating light ON (HS-63-10A). This step is critical to prevent pump damage during the transfer to hot leg recirculation.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP *14:</u> b. CLOSE SI Train "A" crosstie valve FCV-63-152.</p> <p><u>STANDARD:</u> Operator closes Train "A" crosstie FCV-63-152 as indicated by green position indicating light ON. This step is critical to isolate the cold leg recirculation flow path.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP *15:</u> c. WHEN FCV-63-152 Closed, THEN PERFORM the following:</p> <p>1) OPEN SI Train "A" HL injection valve FCV-63-156.</p> <p><u>STANDARD:</u> Operator opens Train "A" HL injection FCV-63-156 as indicated by red position indicating light ON. This step is critical to align flow path to hot leg recirculation.</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 *16: 2) START SI pump "A-A".</p> <p>STANDARD: SI Pump "A-A" is started as indicated by red indicating light ON (HS-63-10A). This step is critical to establish flow to hot leg recirculation.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p>STEP 17: [13] VERIFY SI Train A discharge flow on FI-63-151.</p> <p>STANDARD: Operator verifies Train A flow established as indicated on FI-63-151.</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP 18: [14] CHECK SI pump B-B Running.</p> <p>STANDARD: Operator checks "B-B" SI pump running by RED lights on HS (may also check pump amps).</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p>STEP *19: [15] ALIGN SI pump B-B for hot leg recirculation:</p> <p> a. STOP SI Pump "B-B".</p> <p>STANDARD: Operator stops SI Pump "B-B" as indicated by green indicating light ON (HS-63-15A).). This step is critical to prevent pump damage during the transfer to hot leg recirculation.</p> <p>COMMENTS:</p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD

SAT/UNSAT

<p><u>STEP *20:</u> b. CLOSE SI Train "B" crosstie valve FCV-63-153,</p> <p><u>STANDARD:</u> Operator closes Train "B" crosstie FCV-63-153, and verifies closed as indicated by green position indicating light ON. This step is critical to isolate the cold leg recirculation flow path.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP *21:</u> c. WHEN FCV-63-153 closed, THEN PERFORM the following:</p> <p> 1) OPEN SI Train "B" HL injection valve FCV-63-157.</p> <p><u>STANDARD:</u> Operator opens Train "B" HL Injection FCV-63-157, and verifies open as indicated by red position indicating light ON. This step is critical to align flow path to hot leg recirculation.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>
<p><u>STEP *22:</u> 2) START SI Pump "B-B".</p> <p><u>STANDARD:</u> Operator starts SI Pump "B-B" ON as indicated by red indicating light ON (HS-63-15A). This step is critical to establish flow to hot leg recirculation.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p> <p>Critical Step</p>

Job Performance Checklist:

STEP/STANDARD	SAT/UNSAT
<p><u>STEP 23:</u> [16] CHECK SI Train B discharge flow on FI-63-20.</p> <p><u>STANDARD:</u> Operator verifies Train "B" HL flow established as indicated on FI-63-20.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 24:</u> [17] ISOLATE SI pump flow to cold legs:</p> <p>a. CHECK BOTH SI pumps ALIGNED for hot leg recirculation.</p> <p><u>STANDARD:</u> Operator verifies that both SI pumps were properly aligned in the previous steps.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 25:</u> b. CHECK power AVAILABLE to FCV-63-22.</p> <p><u>NOTE:</u> IRF SIR06 f:0 will place power on FCV-63-22.</p> <p><u>Cue:</u> <i>Power is on FCV-63-22</i></p> <p><u>STANDARD:</u> Operator asks SRO if power is restored to FCV-63-22.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>
<p><u>STEP 26:</u> c. CLOSE SI pump CL injection valve FCV-63-22.</p> <p><u>STANDARD:</u> FCV-63-22 CLOSED as indicated by green position indicating light ON.</p> <p><u>COMMENTS:</u></p>	<p>___ SAT</p> <p>___ UNSAT</p>

Job Performance Checklist:

STEP/STANDARD

SAT/UNSAT

<u>STEP 27:</u> Inform the US/SRO when Hot Leg Recirculation has been established.	<input type="checkbox"/> SAT
	<input type="checkbox"/> UNSAT
<u>STANDARD:</u> Operator verifies Hot leg Recirc alignment and informs the US/SRO.	Stop Time_____
<u>COMMENTS:</u>	

END OF JPM

CANDIDATE CUE SHEET
(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

DIRECTION TO TRAINEE:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Ensure you indicate to me when you understand your assigned task. To indicate that you have completed your assigned task return the handout sheet I provided you.

INITIAL CONDITIONS:

All ECCS components and Containment Spray pumps are aligned and taking suction from Containment sump per ES-1.3.

RCS pressure is less than 180 psig. RHR spray is not in service.

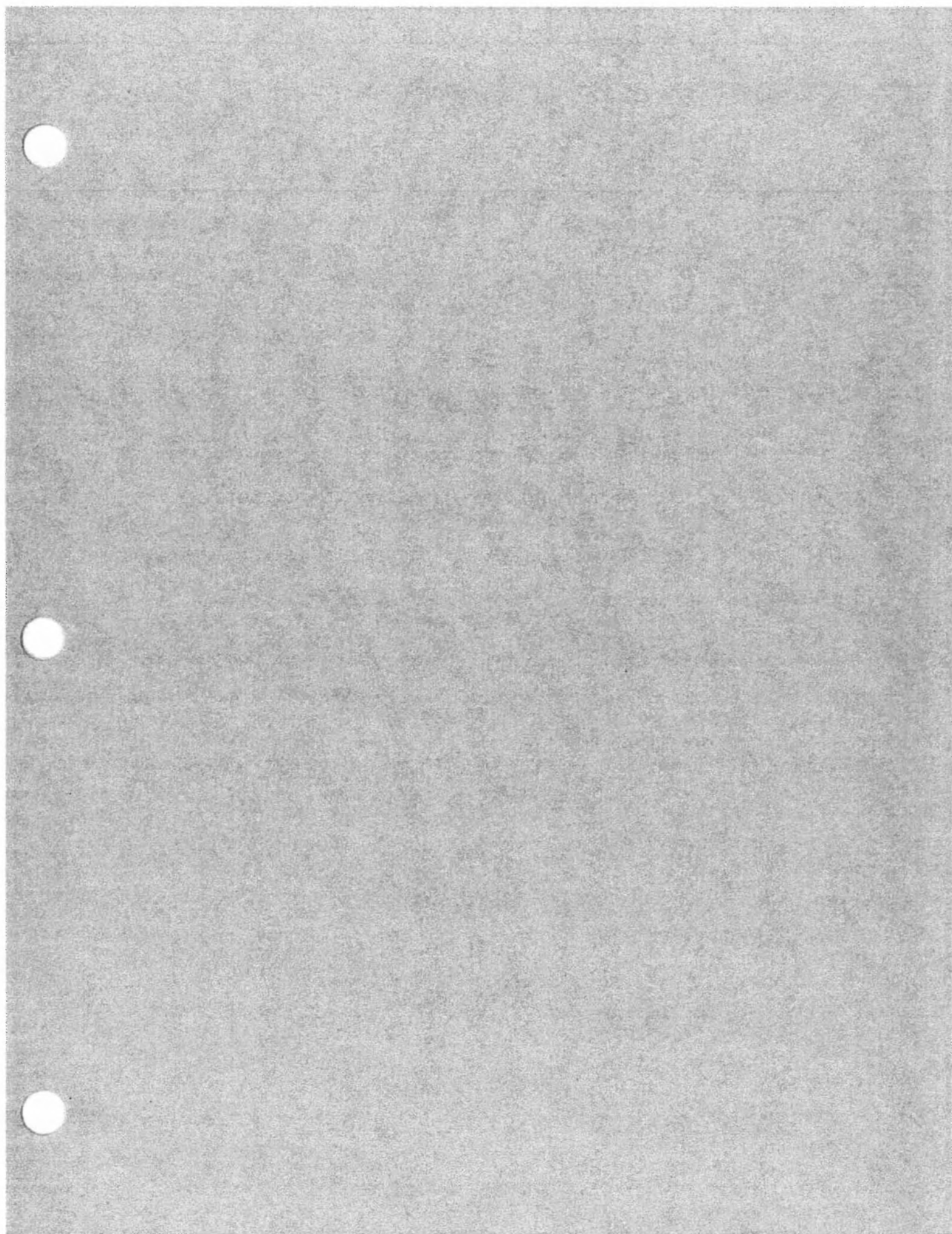
Both RHR pumps are in service.

5 hours have elapsed since the time of the event.

INITIATING CUES:

You are the Unit 1 OATC and are to transfer to Hot Leg Recirculation per ES-1.4.

When you have completed ES-1.4 notify the US/SRO.



TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT

EOI PROGRAM MANUAL

EMERGENCY SUBPROCEDURE

ES-1.4

TRANSFER TO HOT LEG RECIRCULATION

Revision 5

QUALITY RELATED

PREPARED/PROOFREAD BY: D. A. PORTER

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: W. T. LEARY

EFFECTIVE DATE: 08/01/2005

REVISION

DESCRIPTION: Revised to improve contingency actions for valve failures (PER 75660).

This procedure contains a Handout Page (2 copies).

SQN	TRANSFER TO HOT LEG RECIRCULATION	ES-1.4 Rev. 5
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HANDOUT

Page 1 of 1

STEP	ACTION
12.c.	WHEN FCV-63-152 closed, THEN PERFORM the following:
	1) OPEN SI Train A hot leg injection FCV-63-156.
	2) START SI pump A-A.
15.c.	WHEN FCV-63-153 closed, THEN PERFORM the following:
	1) OPEN SI Train B hot leg injection FCV-63-157.
	2) START SI pump B-B.
17.b. RNO	(if both SI pumps aligned for hot leg recirculation) WHEN power available to FCV-63-22, THEN CLOSE SI pump cold leg injection valve FCV-63-22.

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HANDOUT

Page 1 of 1

STEP	ACTION
12.c.	WHEN FCV-63-152 closed, THEN PERFORM the following:
	1) OPEN SI Train A hot leg injection FCV-63-156.
	2) START SI pump A-A.
15.c.	WHEN FCV-63-153 closed, THEN PERFORM the following:
	1) OPEN SI Train B hot leg injection FCV-63-157.
	2) START SI pump B-B.
17.b. RNO	(if both SI pumps aligned for hot leg recirculation) WHEN power available to FCV-63-22, THEN CLOSE SI pump cold leg injection valve FCV-63-22.

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1.0 PURPOSE

This procedure provides the necessary instructions for transferring the Safety Injection System to hot leg recirculation.

2.0 SYMPTOMS AND ENTRY CONDITIONS

2.1 ENTRY CONDITIONS

- E-1 Loss of Reactor or Secondary Coolant:
 - 5 hours after event initiation.

- ES-1.2 Post LOCA Cooldown and Depressurization:
 - when TSC determines hot leg recirculation is required

- ES-1.3 Transfer to RHR Containment Sump
 - when TSC determines hot leg recirculation is required

3.0 OPERATOR ACTIONS

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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1. **DETERMINE** if RHR spray should be isolated:

a. **CHECK** RHR spray IN SERVICE:

- Train A RHR spray valve FCV-72-40 OPEN

OR

- Train B RHR spray valve FCV-72-41 OPEN.

b. **CHECK** containment pressure less than 4 psig.

a. **GO TO** Step 2.



b. **IF** Train B RHR spray valve FCV-72-41 is open,
THEN
GO TO Step 2.



IF Train A RHR spray valve FCV-72-40 is open,
THEN
GO TO Step 7.



c. **ENSURE** RHR spray valves **CLOSED**:

- Train A RHR spray valve FCV-72-40
- Train B RHR spray valve FCV-72-41.

c. **CLOSE** valves locally.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2. **CHECK** RHR pump A-A RUNNING.

IF Train B RHR spray valve
FCV-72-41 is closed,
THEN
GO TO Step 8.



IF Train B RHR spray valve
FCV-72-41 is open,
THEN
GO TO Step 11.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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3. **ALIGN** RHR Train A for hot leg recirculation:

- a. **CLOSE** RHR Train A cold leg isolation valve FCV-63-93.
- b. **ENSURE** RHR Train B discharge crosstie valve FCV-74-35 **CLOSED**.
- c. **OPEN** RHR Train A discharge crosstie valve FCV-74-33.
- d. **OPEN** RHR hot leg injection valve FCV-63-172.

PERFORM the following:

- 1) **ENSURE** RHR hot leg injection valve FCV-63-172 **CLOSED**.
- 2) **ENSURE** RHR Train A discharge crosstie valve FCV-74-33 **CLOSED**.
- 3) **ENSURE** RHR Train A cold leg isolation valve FCV-63-93 **OPEN**.
- 4) **IF** FCV-63-172 is **NOT** capable of opening from MCR,
THEN
GO TO Step 11.



- 5) **IF** Train B RHR spray valve FCV-72-41 is open,
THEN
GO TO Step 11.



- 6) **IF** Train B RHR spray valve FCV-72-41 is closed,
THEN
GO TO Step 7.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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4. **VERIFY** RHR hot leg injection flow on FI-63-173.

IF RCS pressure is less than 300 psig
AND NO RHR flow to hot legs is indicated,
THEN

PERFORM the following:

- a. **VERIFY** valves aligned as specified in Step 3.
- b. **EVALUATE** MCR indications:
 - RHR pump A-A amps
 - FCV-74-12 RHR Pump A-A miniflow valve position.
- c. **NOTIFY** TSC to investigate cause **WHILE** continuing in this procedure.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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5. **ENSURE** RHR Train B cold leg isolation valve FCV-63-94 CLOSED.

IF FCV-63-94 CANNOT be closed from MCR,
THEN
PERFORM the following:

- a. **VERIFY** RHR pump A-A RUNNING and aligned for hot leg recirculation as specified in Step 3.
- b. **VERIFY** the following valves OPEN:
 - FCV-63-8, RHR pump to CCP suction
 - FCV-63-6 or FCV-63-7, RHR pump discharge to SI pump suction
- c. **IF** substeps a and b are met,
THEN
PERFORM the following:
 - 1) **ENSURE** only one CCP RUNNING. (Train A preferred)
 - 2) **ENSURE** idle CCP placed in PULL TO LOCK.
 - 3) **ENSURE** only one SI pump RUNNING. (Train A preferred)
 - 4) **ENSURE** idle SI pump placed in PULL TO LOCK.
 - 5) **ENSURE** RHR pump B-B STOPPED and **PLACE** in PULL TO LOCK.

6. **GO TO** Step 11.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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7. **CHECK** RHR pump B-B RUNNING.

GO TO Step 11.



8. **ALIGN** RHR Train B for hot leg recirculation:

PERFORM the following:

- a. **CLOSE** FCV-63-94, RHR Train B cold leg isolation valve.
- b. **ENSURE** RHR Train A discharge crosstie valve FCV-74-33 CLOSED.
- c. **OPEN** RHR Train B discharge crosstie valve FCV-74-35.
- d. **OPEN** FCV-63-172, RHR hot leg injection valve.

1) **ENSURE** FCV-63-172, RHR hot leg injection valve CLOSED.

2) **ENSURE** RHR Train B discharge crosstie valve FCV-74-35 CLOSED.

3) **ENSURE** RHR Train B cold leg isolation valve FCV-63-94 OPEN.

4) **GO TO** Step 11.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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9. **VERIFY** RHR hot leg injection flow on FI-63-173.

IF RCS pressure is less than 300 psig
AND NO RHR flow to hot legs is indicated,
THEN
PERFORM the following:

- a. **VERIFY** valves aligned as specified in Step 8.
- b. **EVALUATE** MCR indications:
 - RHR pump B-B amps
 - FCV-74-24 RHR Pump B-B miniflow valve position.
- c. **NOTIFY** TSC to investigate cause **WHILE** continuing in this procedure.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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10. **ENSURE** RHR Train A cold leg isolation valve FCV-63-93 CLOSED.

IF FCV-63-93 CANNOT be closed from MCR,

THEN

PERFORM the following:

- a. **VERIFY** RHR pump B-B RUNNING and aligned for hot leg recirculation as specified in Step 8.
- b. **VERIFY** the following valves OPEN:
 - FCV-63-11, RHR discharge to SI pump suction
 - FCV-63-6 or FCV-63-7, RHR pump discharge to SI pump suction.
- c. **IF** substeps a and b are met, **THEN** **PERFORM** the following:
 - 1) **ENSURE** only one CCP RUNNING. (Train B preferred)
 - 2) **ENSURE** idle CCP placed in PULL TO LOCK.
 - 3) **ENSURE** only one SI pump RUNNING. (Train B preferred)
 - 4) **ENSURE** idle SI pump placed in PULL TO LOCK.
 - 5) **ENSURE** RHR pump A-A STOPPED and **PLACE** in PULL TO LOCK.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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11. **CHECK** SI pump A-A RUNNING .

GO TO Step 14.



12. **ALIGN** SI pump A-A for hot leg recirculation:

a. **ENSURE** SI pump A-A STOPPED.

b. **CLOSE** SI Train A crosstie FCV-63-152.

c. **WHEN** FCV-63-152 closed,
THEN
PERFORM the following:

1) **OPEN** SI Train A hot leg injection FCV-63-156.

2) **START** SI pump A-A.

IF SI pump A-A CANNOT be aligned for hot leg recirc,
THEN
PERFORM the following:

1) **ENSURE** SI pump A-A STOPPED.

2) **ENSURE** SI Train A hot leg injection FCV-63-156 CLOSED.

3) **ENSURE** SI Train A crosstie FCV-63-152 OPEN.

4) **START** SI pump A-A.


5) **IF** any of the following conditions met:

- SI pump B-B RUNNING
OR
- SI pump B-B is stopped
AND is available for hot leg recirc

THEN
GO TO Step 15.



6) **IF** SI pump B-B is NOT available,
THEN
GO TO Step 18.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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13 **VERIFY** SI Train A discharge flow on FI-63-151.

PERFORM the following:

- a. **VERIFY** valves aligned as specified in Step 12.
- b. **EVALUATE** SI pump A-A amps.
- c. **NOTIFY** TSC to investigate cause **WHILE** continuing in this procedure.

14. **CHECK** SI pump B-B RUNNING.

GO TO Step 18.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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15. **ALIGN** SI pump B-B for hot leg recirculation:

- a. **STOP** SI pump B-B.
- b. **CLOSE** SI Train B crosstie FCV-63-153.
- c. **WHEN** FCV-63-153 closed,
THEN
PERFORM the following:
 - 1) **OPEN** SI Train B hot leg injection FCV-63-157.
 - 2) **START** SI pump B-B.

IF SI pump B-B CANNOT be aligned for hot leg recirc,
THEN
PERFORM the following:

- 1) **ENSURE** SI pump B-B STOPPED.
- 2) **ENSURE** SI Train B hot leg injection FCV-63-157 CLOSED.
- 3) **ENSURE** SI Train B crosstie FCV-63-153 OPEN.
- 4) **IF NO** SI pump is running,
THEN
START SI pump B-B.
- 5) **IF** SI pump A-A is stopped
AND is available for hot leg recirc,
THEN
GO TO Step 12.



- 6) **IF NO** SI pump can be aligned for hot leg recirc,
THEN
GO TO Step 18.



- 7) **GO TO** Step 17.



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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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16. **VERIFY** SI Train B discharge flow on FI-63-20.

PERFORM the following:

- a. **VERIFY** valves aligned as specified in Step 15.
- b. **EVALUATE** SI pump B-B amps.
- c. **NOTIFY** TSC to investigate cause **WHILE** continuing in this procedure.