James A. Fitzpatrick
JOB PERFORMANCE MEASURE

RO	17-1 NRC RO COO2	TASK TITLE: Perform Daily Checks Per ST-40D
APPL. TO	JPM NUMBER	

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 2.1.18 (3.6)

ESTIMATED COMPLETION TIME: 15 Minutes

SUBMITTED: ______________________ OPERATIONS REVIEW: ______________________

APPROVED: ______________________________

~~~~~~

CANDIDATE NAME: ______________________________ LOGIN ID:

JPM Completion Perform

Location: Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: _______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR:

____
SIGNATURE/PRINTED

RO	17-1 NRC RO COO2	TASK TITLE: Perform Daily Checks Per ST-40D
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. ST-40D, Daily Surveillance and Channel Check

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Provide the candidate with a working copy of the correct portions of ST-40D (attachment 1 steps 8.2.2, 8.2.6 through 8.2.13). Fill out the Sunday 0600-0900 values for steps 8.2.6 and 8.2.10 with normal values (1.74 and 1.79, respectively).
B. Ensure a complete copy of ST-40D is also available for the candidate to review if necessary.
C. Ensure the simulator is reset to an IC at power (IC-159).
D. Ensure Drywell-Torus D/P is approximately 1.64 psid (must be <1.7 psig).
E. Ensure SLC concentration is noted as approximately 11.5 weight percent enriched sodium pentaborate on the simulator's data sheet.

V. EVALUATOR NOTES

A. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, placekeeping and three-point communication.

VI. TASK CONDITIONS

- The plant is operating at approximately 90% power.
- Current time is 1900 on a Sunday.
- ST-40D, Daily Surveillance and Channel Check, is in progress.
- A field operator has reported the following SLC temperatures:
  - 11TIC-48: 60ºF
  - 11TIC-60: 59ºF

TASK TITLE: Perform Daily Checks Per ST-40D

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Complete the provided portions of ST-40D, Daily Surveillance and Channel Check. Your task is limited to Attachment 1 pages 45, 46, and 51 (of 63)."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of ST-40D	Obtains a controlled copy of ST-40D. **EVALUATOR:** Provide working copy.	SAT / UNSAT
2.	Records SLC data on ST-40D Attachment 1 Page 46.	Records SLC data per attached key.	SAT / UNSAT
3.	Evaluates SLC Volume – Concentration.	Determines SLC Volume – Concentration is satisfactory. **NOTE:** This should be indicated on ST-40D Attachment 1 Page 46 with a check mark in the associated block.	SAT / UNSAT
*4.	Evaluates SLC Tank Temperature.	Determines SLC Tank Temperature is unsatisfactory. **NOTE:** This should be indicated on ST-40D Attachment 1 Page 46 by the absence of a check mark in the associated block or an asterisk with a note in the remarks section.	**CRITICAL STEP** SAT / UNSAT

TASK TITLE: Perform Daily Checks Per ST-40D

	STEP	STANDARD	EVALUATION / COMMENT
*5.	Evaluates SLC Suction Temperature.	Determines SLC Suction Temperature is unsatisfactory. **NOTE:** This should be indicated on ST-40D Attachment 1 Page 46 by the absence of a check mark in the associated block or an asterisk with a note in the remarks section.	**CRITICAL STEP** SAT / UNSAT
6.	Records Containment and intake data on ST-40D Attachment 1 Page 51.	Records Containment and intake data per attached key.	SAT / UNSAT
*7.	Identifies Drywell-Torus differential pressure is out of specification.	Identifies Drywell-Torus differential pressure is out of specification. **NOTE:** This may be indicated on ST-40D Attachment 1 Page 51 with a red circle around the associated reading.	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: Readings taken for ST-40D Attachment 1 pages 45, 46, and 51 (of 63). Out-of-spec Drywell to Torus D/P identified. Out-of-spec SLC temperatures identified.

SIGN-OFF LOG SHEET

Step 8.2.2
DESCRIPTION: Sodium Pentaborate Volume & Temperature Verification
MODE/FREQUENCY: Modes 1,2/ Every 24 hours
REQUIREMENT: TECH SPEC - SR 3.1.7.1; SR 3.1.7.2; SR 3.1.7.3

INSTRUMENT/ LOCATION AND CHECK-OFF	TOL	RANGE	Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday	
				1800-2400		1800-2400		1800-2400		1800-2400		1800-2400		1800-2400		1800-2400
11LI-66 (percent level) 09-3	NA	NA		80-81												
11TIC-48 (temperature °F) 11TK-1 Temp. 25-19	NA	NA		60												
11TIC-60 (temperature °F) Suction Line Temp SLC PP Suct. Pipe	NA	NA		59												
Volume-Concentration Satisfactory (√)	NA	NA		Checked												
Tank Temperature-Satisfactory (√)	NA	NA		Unchecked												
Suction Temperature-Satisfactory (√)	NA	NA		Unchecked												

SIGN-OFF LOG SHEET

Step	PARAMETER/ INSTRUMENT	REQ'D		RANGE	Sunday		Monday		Tuesday		Wednesday		Thursday		Friday		Saturday	
		MODES/ (notes)	TECH SPECS		0600-0900	1800-2100	0600-0900	1800-2100	0600-0900	1800-2100	0600-0900	1800-2100	0600-0900	1800-2100	0600-0900	1800-2100	0600-0900	1800-2100
8.2.6	Drywell Pressure EPIC-A-3093 (16-1DPR-200 pt 1)	1,2,3	SR 3.6.1.4.1	≤ 1.95 psig	**1.74**	**1.64**												
8.2.10	Drywell-Torus Diff Press EPIC-A-3551 (16-1DPR-200 pt 3)	1 (2)	SR 3.6.2.4.1	≥ 1.7 psid	**1.79**	**1.64**												
8.2.7	Drywell Avg Temperature EPIC-A-3316 **(NOTE 1)**	1,2,3	SR 3.6.1.5.1	≤ 135°F		**109.4**												
8.2.8	Torus Water Temperature EPIC-A-3380 (16-1TR-131A or 131B)	1,2,3 (3)	SR 3.6.2.1.1	≤ 95°F ≤ 105°F ≤ 110°F		**79.0**												
8.2.9	Torus Water Level EPIC-A-3102 (23LI-201A or 201B)	1,2,3	SR 3.6.2.2.1	13.88 - 14.00 ft		**13.95**												
8.2.11	Secondary Containment Vacuum EPIC-A-3348 (01-125DPI-100A)	1,2,3	SR 3.6.4.1.1	≤ -0.25 in h20		**-0.76**												
8.2.12	ESW pump Screenwell Water Level EPIC-A-1094	1,2,3	SR 3.7.2.1	≥ 236.5 ft		**243.6**												
8.2.13	UHS water temperature EPIC-A-3358 (portable therm)	1,2,3	SR 3.7.2.2	≤ 85°F		**60.0**												

HANDOUT

- **The plant is operating at approximately 90% power.**
- **Current time is 1900 on a Sunday.**
- **ST-40D, Daily Surveillance and Channel Check, is in progress.**
- **A field operator has reported the following SLC temperatures:**
  - **11TIC-48: 60°F**
  - **11TIC-60: 59°F**

Complete the provided portions of ST-40D, Daily Surveillance and Channel Check.

Your task is limited to Attachment 1 pages 45, 46, and 51 (of 63).

STANDBY LIQUID CONTROL ANALYSIS DATA SHEET

11TK-1 Sparge Initiated: 1342 (Acceptable Time ≥30 min) 11TK-1 Sparge Secured: 1414

Visual Inspection of Tank Contents:

SAT (no foreign material present)

UNSAT (describe, including actions taken): _____

24 Month Offsite analysis: Latest Sample 12 / 29 / 17 Required Not Required
(to satisfy/exceed intent of Level 1 Acceptance Criteria of SR 3.1.7.11)

Plant: Entergy - James A FitzPatrick NPP Other:	Sampling Technician: Dave Costas
Sample Date: 2 / 2 / 18	Time: 1430

11TK-1 Liquid Level (h) 106 inches (Acceptable Level 95 to 126 in)

Tank USABLE Volume [(h-6)/0.0254] 3937 gal

Tank Solution Temp. (11TIC-48) 88 °F

sp gr at 60°F 1.0573 Hydrometer No. 11555G

Boron Concentration 20141.6 ppm (as determined from AM-02.05 Revision Number 3)

⇓COM2.3.1 (Level 2 Acceptance Criteria)

Weight percent sodium pentaborate 11.5 wt% Desired Concentration 10.5 to 12.5%

B-10 Atom percent 35.94 % Acceptable Level 1 Acceptance Criteria) ≥34.7% (to satisfy SR 3.1.7.11) 2/2/18 Date

⇓COM2.3.1	YES/NO
Sodium Pentaborate inside desired region per Attachment 1? (Level 2 Acceptance Criteria) (Lower Region 10.5%, Upper Region 12.5%)	X
Sodium Pentaborate concentration Inside Required Region per Attachment 1? (Level 1 acceptance criteria)	X
Sodium Pentaborate concentration Inside required region per Attachment 2? (Level 1 Acceptance Criteria)	X
IF NO to any question, **THEN:**	
NCO **AND** Shift Manager notified?	N/A
Chemistry Supervisor notified?	N/A
CR Initiated per subsection 7.8?	N/A

Costas / Costas / 2/5/18 Klein / Klein / 2/5/18

Technician Print/Sign Date Chemistry Supervisor Print/Sign Date

FORWARD TWO COPIES TO CONTROL ROOM FOR POSTING

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
OPERATIONS SURVEILLANCE TEST PROCEDURE

JET PUMP OPERABILITY TEST FOR TWO LOOP OPERATION (EPIC AVAILABLE)
ST-23C
REVISION 28

APPROVED BY: _____ DATE: _____
RESPONSIBLE PROCEDURE OWNER

EFFECTIVE DATE: _____

FIRST ISSUE ☐ FULL REVISION ☐ LIMITED REVISION ☒

CONTINUOUS USE	QUALITY RELATED
TECHNICAL	

REVISION SUMMARY SHEET

REV. NO.	CHANGED AND REASON FOR CHANGE
28	Changed steps 8.1.4 and 8.1.5 and Attachment 2 (Steps G and H) to take readings from the "A" and "B" recirc pump speeds via 02-184SI-16A1 and 02-184SI-16B1 at the 09-4 bench panel vice performing calculations using Recirc Pump Power for speed. This is due to the "A" Recirc pump power indication no longer being valid in EPIC due to instrument failure. (Temp Change DRN-14-00395) In Attachment 5, column 1 changed all numbers to whole numbers to maintain consistency throughout the attachment. (PCR 681) In step 9.2.1 removed the requirement to independently verify the calculations performed in steps 8.1.4 and 8.1.5 because these steps no longer direct performing a calculation. (PCR 989)
27	Updated Attachment 5 with baseline data collected following R20. (PCR dated 2/1/13)
26	Changed procedure level of use from Continuous to Reference. ST-23C does not meet the criteria of Continuous use per AP-02.04 Rev 40 or EN-AD-102 Rev 5. ST-23C is not infrequently performed or complex. Improper collection of data would not have immediate possible irreversible impact on safety, production or reliability. Deleted prerequisite that Recirculation pump speeds be within 5%. Replacing pumps (new vs old) or operation below 70% complicate meeting the 5% criteria. (Review comment). Revised Step 8.1.4 to calculate speed through formula due to normal EPIC point was unavailable. Incorporated this change permanently and extended to B Pump speed. Both 02-184SI-16A1 and 02-184SI-16B1 at panel 09-4 are available but less accurate and will be recorded on Attachment 2 only (TC dated 4/9/09). Corrected errors with original TC by removing second independent verification and replacing initial lines removed by TC. Corrected Section 9.1 numbering (TC dated 5/11/09).
25	Updated Attachments 3 and 4 following collection of

baseline data after RFO-18 (TC dated 1/3/07).

TABLE OF CONTENTS

1.0 **REQUIREMENTS**

1.1 **Frequency**

24 hours

1.2 **Technical Specifications**

1.2.1 **Surveillance Requirements**

- SR 3.4.1.2
- SR 3.4.2.1

1.2.2 **Limiting Conditions for Operation**

- LCO 3.4.1
- LCO 3.4.2

1.3 **Other**

None

1.4 **Commitments**

None

2.0 **PURPOSE**

2.1 Verify recirc loop jet pump flow mismatch is within allowable limits

2.2 Verify operability of Jet Pump Assemblies during two loop operation when EPIC is available.

3.0 REFERENCES

3.1 Performance References

None

3.2 Developmental References

3.2.1 GEK Volume II Section 16631

3.2.2 OP 27, Recirculation System

3.2.3 DER 96 0095 (ACTS 19429) Added Subsection 8.5 Reactor Engineering Data Collection

3.2.4 Attachments 3, 4 and 5 based on jet pump performance data collected from ST-23C during cycle 18.

Init

4.0 **PREREQUISITES**

4.1 SM has granted permission to perform this test. ____

4.2 Revision Number of this Working Copy is the same as the revision number listed in the Master Copy of the Index of Operations Surveillance Test Procedures. ____

4.3 Test personnel have read this procedure and are thoroughly familiar with its contents. ____

4.4 Start of test recorded. _____ ____
Date/Time

4.5 Start of test recorded in narrative log. ____

4.6 SM determines current status of reactor engineering data:

(_) Baselining data for new established pattern.

(_) Established pattern exists. ____

4.7 EPIC is available. ____

4.8 **IF** procedure will be performed **WHILE LESS THAN** 25% RTP,
THEN mark the following steps 'NA':

- 8.1.4 through 8.1.7
- 8.3 and 8.4

____

5.0 **TEST EQUIPMENT, SPECIAL TOOLS AND MATERIALS**

5.1 None

6.0 PRECAUTIONS AND LIMITATIONS

6.1 Precautions

None

6.2 Limitations

6.2.1 Test personnel shall immediately notify the CRS of any failure to meet Level 1 acceptance criteria.

6.2.2 Test personnel shall print name, sign initials, and enter date on Attachment 1 before performing Section 8 of this test.

6.2.3 When test personnel complete their assigned portion of this test, they shall enter hours worked on Attachment 1.

6.2.4 Once this test has been started, any additional test personnel shall read this procedure and become thoroughly familiar with its contents before performing any portion of this test.

6.2.5 Multiple working copies of this test may be used provided the following requirements are satisfied:

NOTE: The work site is defined as the location where work is controlled. The location of the work site is at the discretion of the SNO.

A. A working copy of this test shall be retained at the work site.

B. The work site working copy shall be the legal record for documenting this test.

C. Data from all steps performed away from the work site, including signatures, initials, and recorded values, is transcribed into the work site working copy following completion of the test.

7.0 **GENERAL TEST METHODS**

7.1 This test performs the following:

7.1.1 Verifies recirculation loop jet pump flow mismatch with both recirc loops in operation is within limits for above and below 70% core flow.

7.1.2 Verifies recirculation loop flow to recirc speed ratio is within limits of established patterns.

7.1.3 Verifies recirculation loop jet pump flow to recirc pump speed ratio is within limits of established patterns.

7.1.4 Verifies each jet pump differential pressure is within limits of established patterns.

7.2 Technical Specification Basis for SR 3.4.2.1 provides for base lining new established patterns and allows engineering judgment to be used to satisfy this surveillance while the new patterns are being developed.

7.3 This procedure may be used for post work testing and verification of operability for applicable equipment provided the following actions are performed:

7.3.1 The actions and requirements of Sections 1 through 6, 10, and 11 are satisfied.

7.3.2 The applicable portions of Sections 8 and 9 are performed.

7.3.3 Signoff for non-applicable portions of Sections 8 and 9 are marked "NA".

7.3.4 The reason for partial performance of this test is documented in Section 11.3.

Init

8.0 **PROCEDURE**

8.1 Record the following:

8.1.1	Total Core Flow	93.5 (% rated) EPIC-A-3330	TH
8.1.2	Loop A Jet Pump Flow	32.5 Mlbm/hr 02-3FI-92A	TH
8.1.3	Loop B Jet Pump Flow	39.0 Mlbm/hr 02-3FI-92B	TH
8.1.4	A Pump Speed (02-184SI-16A1 at panel 09-4)	81.5 %	TH
8.1.5	B Pump Speed (02-184SI-16B1 at panel 09-4)	82.4 %	TH
8.1.6	A Recirc Loop Flow	17.422 Mlbm/hr EPIC-A-3317	TH
8.1.7	B Recirc Loop Flow	16.602 Mlbm/hr EPIC-A-3318	
			TH

8.2 Calculate the absolute value of:

|(8.1.2) - (8.1.3)| = 6.5 Mlbm/hr TH

Init

NOTE: EPIC display ST-23C may be used to obtain all jet pump DPs.

8.3 Record the following on Attachment 5:

8.3.1 Average Loop PSID.

8.3.2 Diffuser to lower plenum differential pressure for each jet pump.

8.4 Record Reactor Engineering Data on Attachment 2. ____

8.5 **IF** baseline data is being collected to complete new "established patterns",
THEN Rx Engineering confirm there are no significant abnormalities which could indicate a jet pump failure.

_____/_____
Rx Engineering

Init

9.0 **RETURN TO NORMAL**

9.1 **System Restoration**

None

9.2 **Review and Signoff**

9.2.1 Calculation performed in Step 8.2 has been independently verified.

Independent verification _____/_____
Signature/Date

9.2.2 Test completed. _____
Date/Time ____

9.2.3 Test personnel have recorded hours worked on Attachment 1. ____

9.2.4 Man-Hours totaled and recorded on Attachment 1. ____

10.0 ACCEPTANCE CRITERIA

10.1 Level 1 Acceptance Criteria

10.1.1 For the Total Core flow recorded in Step 8.1, Recirculation loop jet pump flow mismatch from Step 8.2 meets one of the following:

- **LESS THAN OR EQUAL TO** 10% (7.7 Mlbm/hr) of rated core flow when operating at **LESS THAN** 70% of rated core flow
- **LESS THAN OR EQUAL TO** 5% (3.85 Mlbm/hr) of rated core flow when operating at **GREATER THAN OR EQUAL TO** 70% of rated core flow

10.1.2 **IF** base lining of new "established patterns" has been completed,
THEN at least one of the following criteria (A **OR** B) is satisfied for each operating recirculation loop:

A. Loop Flow vs Pump Speed vs Jet Pump Flow

- Loop A
  - For the Pump Speed recorded in Step 8.1.4 A Recirc loop flow from Step 8.1.6 is within ±5% of A Loop Predicted Flow on Attachment 3.
  - For the Pump Speed recorded in Step 8.1.4 A Recirc Loop JP flow from Step 8.1.2 is within ±5% of A Loop Predicted Flow on Attachment 4.
- Loop B
  - For the Pump Speed recorded in Step 8.1.5 B Recirc Loop flow from Step 8.1.7 is within ±5% of B Loop Predicted Flow on Attachment 3.
  - For the Pump Speed recorded in Step 8.1.5 B Recirc Loop JP flow from Step 8.1.3 is within ±5% of B Loop Predicted Flow on Attachment 4.

B. Jet Pump dP vs. Loop Jet Pump Average dP

- Loop A

  Each Loop A JP diffuser to lower plenum dP recorded on Attachment 5 is within ±20% of established patterns for the Average Loop PSID recorded on Attachment 5.

- Loop B

  Each Loop B JP diffuser to lower plenum dP recorded on Attachment 5 is within ±20% of established patterns for the Average Loop PSID recorded on Attachment 5.

10.1.3 **IF** baseline data is being collected to complete new "established patterns",
THEN engineering judgement of the flow data confirmed there are no significant abnormalities which could indicate a jet pump failure per Step 8.5.

10.2 **Level 2 Acceptance Criteria**

10.2.1 **IF** base lining of new "established patterns" has been completed,
THEN both of the following criteria (A **AND** B) is satisfied for each operating recirculation loop:

A. Loop Flow vs Pump Speed vs Jet Pump Flow

- Loop A
  - For the Pump Speed recorded in Step 8.1.4 A Recirc loop flow from Step 8.1.6 is within ±5% of A Loop Predicted Flow on Attachment 3.
  - For the Pump Speed recorded in Step 8.1.4 A Recirc Loop JP flow from Step 8.1.2 is within ±5% of A Loop Predicted Flow on Attachment 4.
- Loop B
  - For the Pump Speed recorded in Step 8.1.5 B Recirc Loop flow from Step 8.1.7 is within ±5% of B Loop Predicted Flow on Attachment 3.
  - For the Pump Speed recorded in Step 8.1.5 B Recirc Loop JP flow from Step 8.1.3 is within ±5% of B Loop Predicted Flow on Attachment 4.

B. Jet Pump dP vs. Loop Jet Pump Average dP

- Loop A

  Each Loop A JP diffuser to lower plenum dP recorded on Attachment 5 is within ±20% of established patterns for the Average Loop PSID recorded on Attachment 5.

- Loop B

  Each Loop B JP diffuser to lower plenum dP recorded on Attachment 5 is within ±20% of established patterns for the Average Loop PSID recorded on Attachment 5.

11.0 ACCEPTANCE VERIFICATION

11.1 Performer Review

11.1.1 Verify required data has been recorded and is within required tolerances. (_)

11.1.2 Verify required initials and signatures have been entered. (_)

11.1.3 **IF** Level 1 Acceptance Criteria was not met, **THEN** perform the following:

A. Sign off ST as unsatisfactory.

B. Immediately notify the CRS.

C. Initiate a CR. _____
CR number

D. If necessary, initiate a WR. _____
WR number

NOTE: A CR is required for instruments that exceed As Found tolerances for tracking purposes.

11.1.4 **IF** only Level 2 Acceptance Criteria was not met, **THEN** perform the following:

A. Sign off ST as satisfactory with corrective actions.

B. Initiate either a CR or a WR. _____
WR/CR number

11.1.5 Identify test results:

(_) Satisfactory

(_) Satisfactory with corrective actions

(_) Unsatisfactory

11.1.6 Record results in narrative log. (_)

11.1.7 Sign and record date and time.

_____ _____
Date/Time

11.2 **Management SRO Review**

11.2.1 Verify data is within required tolerances.

11.2.2 Verify data attachments, such as recorder printouts and calibration sheets are included as required.

11.2.3 Verify required initials and signatures have been entered.

11.2.4 Review test to determine if test results satisfy acceptance criteria:

(_) Satisfactory

(_) Satisfactory with corrective actions

(_) Unsatisfactory

11.2.5 **IF** Level 1 acceptance criteria is not satisfied, **THEN** immediately notify Operations Manager or alternate. Record name of person notified.

_____
Person Notified

11.2.6 Initiate required corrective and compensatory actions.

(_) Not required

(_) Required

11.2.7 Sign and record date and time.

_____ _____
Management SRO Date/Time

11.3 **Remarks**

12.0 **ATTACHMENTS**

1. TEST SIGNOFF LOG
2. ST 23C DATA FOR REACTOR ENGINEERING SUPPORT
3. PUMP SPEED vs. LOOP FLOW
4. PUMP SPEED vs. JET PUMP FLOW
5. LOOP AVERAGE dP vs. JET PUMP dP

ATTACHMENT 1 Page 1 of 1

TEST SIGNOFF LOG

PRINTED NAME	INITIALS	DATE	HOURS WORKED

Total Man-Hours _____

ATTACHMENT 2 Page 1 of 1

ST 23C DATA FOR REACTOR ENGINEERING SUPPORT

		Today / Now Date/Time	
A.	Recirc Loop A flow (EPIC-A-3317)	17.422	Mlbm/hr
B.	Recirc Loop B flow (EPIC-A-3318)	16.602	Mlbm/hr
C.	Rx Total Core Flow (EPIC-A-0414)	71.4	Mlbm/hr
D.	EPIC-A-6254, WTSUB	72.9	Mlbm/hr
E.	Recirc Pump A Speed (02-184SI-16A1 at panel 09-4)	81.5	%
F.	Recirc Pump B Speed (02-184SI-16B1 at panel 09-4)	82.4	%
G.	RWR Loop A Jet Pump Flow (02-3FI-92A at panel 09-4)	32.5	lbs/hr x 10^6
H.	RWR Loop B Jet Pump Flow (02-3FI-92B at panel 09-4)	39.0	lbs/hr x 10^6
I.	Double Tapped JP 1 Flow (02-3FI-87A at panel 09-4)	3.45	lbs/hr x 10^6
J.	Double Tapped JP 6 Flow (02-3FI-87C at panel 09-4)	3.3	lbs/hr x 10^6
K.	Double Tapped JP 11 Flow (02-3FI-87B at panel 09-4)	4.0	lbs/hr x 10^6
L.	Double Tapped JP 16 Flow (02-3FI-87D at panel 09-4)	4.1	lbs/hr x 10^6
M.	EPIC-A-3382 RECIRC LOOP A AVE JET PMP %PSID	31.01	%psid
N.	EPIC-A-3381 RECIRC LOOP B AVE JET PMP %PSID	48.71	%psid
O.	EPIC-A-405 RX CORE DIFF PRES	17.6	psid
P.	EPIC-A-3390 P6 10 MIN AVG CORE THERMAL POWER	2437.8	mwth

ATTACHMENT 3 Page 1 of 3

PUMP SPEED vs. LOOP FLOW

Pump Speed	A Loop Predicted Flow (Mlbm/hr)	-5%	+5%	B Loop Predicted Flow (Mlbm/hr)	-5%	+5%
4	0.70	0.67	0.74	0.87	0.83	0.91
5	0.90	0.85	0.94	1.06	1.01	1.11
6	1.10	1.04	1.15	1.25	1.19	1.31
7	1.29	1.23	1.36	1.44	1.36	1.51
8	1.49	1.41	1.56	1.62	1.54	1.71
9	1.68	1.60	1.77	1.81	1.72	1.90
10	1.88	1.78	1.97	2.00	1.90	2.10
11	2.07	1.97	2.18	2.19	2.08	2.30
12	2.27	2.16	2.38	2.38	2.26	2.50
13	2.47	2.34	2.59	2.56	2.44	2.69
14	2.66	2.53	2.80	2.75	2.62	2.89
15	2.86	2.72	3.00	2.94	2.79	3.09
16	3.05	2.90	3.21	3.13	2.97	3.29
17	3.25	3.09	3.41	3.32	3.15	3.48
18	3.45	3.27	3.62	3.51	3.33	3.68
19	3.64	3.46	3.82	3.69	3.51	3.88
20	3.84	3.65	4.03	3.88	3.69	4.08
21	4.03	3.83	4.24	4.07	3.87	4.27
22	4.23	4.02	4.44	4.26	4.05	4.47
23	4.43	4.20	4.65	4.45	4.22	4.67
24	4.62	4.39	4.85	4.64	4.40	4.87
25	4.82	4.58	5.06	4.82	4.58	5.06
26	5.01	4.76	5.26	5.01	4.76	5.26
27	5.21	4.95	5.47	5.20	4.94	5.46
28	5.41	5.13	5.68	5.39	5.12	5.66
29	5.60	5.32	5.88	5.58	5.30	5.85
30	5.80	5.51	6.09	5.76	5.48	6.05
31	5.99	5.69	6.29	5.95	5.65	6.25
32	6.19	5.88	6.50	6.14	5.83	6.45
33	6.38	6.07	6.70	6.33	6.01	6.65
34	6.58	6.25	6.91	6.52	6.19	6.84
35	6.78	6.44	7.12	6.71	6.37	7.04
36	6.97	6.62	7.32	6.89	6.55	7.24
37	7.17	6.81	7.53	7.08	6.73	7.44
38	7.36	7.00	7.73	7.27	6.91	7.63
39	7.56	7.18	7.94	7.46	7.09	7.83
40	7.76	7.37	8.14	7.65	7.26	8.03
41	7.95	7.55	8.35	7.83	7.44	8.23
42	8.15	7.74	8.55	8.02	7.62	8.42
43	8.34	7.93	8.76	8.21	7.80	8.62

ATTACHMENT 3 Page 2 of 3

PUMP SPEED vs. LOOP FLOW

Pump Speed	A Loop Predicted Flow (Mlbm/hr)	-5%	+5%	B Loop Predicted Flow (Mlbm/hr)	-5%	+5%
44	8.54	8.11	8.97	8.40	7.98	8.82
45	8.74	8.30	9.17	8.59	8.16	9.02
46	8.93	8.48	9.38	8.78	8.34	9.21
47	9.13	8.67	9.58	8.96	8.52	9.41
48	9.32	8.86	9.79	9.15	8.69	9.61
49	9.52	9.04	9.99	9.34	8.87	9.81
50	9.71	9.23	10.20	9.53	9.05	10.00
51	9.91	9.42	10.41	9.72	9.23	10.20
52	10.11	9.60	10.61	9.90	9.41	10.40
53	10.30	9.79	10.82	10.09	9.59	10.60
54	10.50	9.97	11.02	10.28	9.77	10.80
55	10.69	10.16	11.23	10.47	9.95	10.99
56	10.89	10.35	11.43	10.66	10.12	11.19
57	11.09	10.53	11.64	10.85	10.30	11.39
58	11.28	10.72	11.85	11.03	10.48	11.59
59	11.48	10.90	12.05	11.22	10.66	11.78
60	11.67	11.09	12.26	11.41	10.84	11.98
61	11.87	11.28	12.46	11.60	11.02	12.18
62	12.07	11.46	12.67	11.79	11.20	12.38
63	12.26	11.65	12.87	11.97	11.38	12.57
64	12.46	11.83	13.08	12.16	11.55	12.77
65	12.65	12.02	13.29	12.35	11.73	12.97
66	12.85	12.21	13.49	12.54	11.91	13.17
67	13.05	12.39	13.70	12.73	12.09	13.36
68	13.24	12.58	13.90	12.92	12.27	13.56
69	13.44	12.77	14.11	13.10	12.45	13.76
70	13.63	12.95	14.31	13.29	12.63	13.96
71	13.83	13.14	14.52	13.48	12.81	14.15
72	14.02	13.32	14.73	13.67	12.99	14.35
73	14.22	13.51	14.93	13.86	13.16	14.55
74	14.42	13.70	15.14	14.05	13.34	14.75
75	14.61	13.88	15.34	14.23	13.52	14.94
76	14.81	14.07	15.55	14.42	13.70	15.14
77	15.00	14.25	15.75	14.61	13.88	15.34
78	15.20	14.44	15.96	14.80	14.06	15.54
79	15.40	14.63	16.17	14.99	14.24	15.74
80	15.59	14.81	16.37	15.17	14.42	15.93
81	15.79	15.00	16.58	15.36	14.59	16.13
82	15.98	15.18	16.78	15.55	14.77	16.33
83	16.18	15.37	16.99	15.74	14.95	16.53
84	16.38	15.56	17.19	15.93	15.13	16.72

ATTACHMENT 3

PUMP SPEED vs. LOOP FLOW

Pump Speed	A Loop Predicted Flow (Mlbm/hr)	-5%	+5%	B Loop Predicted Flow (Mlbm/hr)	-5%	+5%
85	16.57	15.74	17.40	16.12	15.31	16.92
86	16.77	15.93	17.61	16.30	15.49	17.12
87	16.96	16.11	17.81	16.49	15.67	17.32
88	17.16	16.30	18.02	16.68	15.85	17.51
89	17.35	16.49	18.22	16.87	16.02	17.71
90	17.55	16.67	18.43	17.06	16.20	17.91
91	17.75	16.86	18.63	17.24	16.38	18.11
92	17.94	17.05	18.84	17.43	16.56	18.30
93	18.14	17.23	19.05	17.62	16.74	18.50
94	18.33	17.42	19.25	17.81	16.92	18.70
95	18.53	17.60	19.46	18.00	17.10	18.90
96	18.73	17.79	19.66	18.19	17.28	19.09
97	18.92	17.98	19.87	18.37	17.46	19.29
98	19.12	18.16	20.07	18.56	17.63	19.49
99	19.31	18.35	20.28	18.75	17.81	19.69
100	19.51	18.53	20.49	18.94	17.99	19.89
101	19.71	18.72	20.69	19.13	18.17	20.08
102	19.90	18.91	20.90	19.31	18.35	20.28
103	20.10	19.09	21.10	19.50	18.53	20.48
104	20.29	19.28	21.31	19.69	18.71	20.68
105	20.49	19.46	21.51	19.88	18.89	20.87

ATTACHMENT 4 Page 1 of 3

PUMP SPEED vs. JET PUMP FLOW

Pump Speed	A Loop JP Predicted Flow (Mlbm/hr	-5%	+5%	B Loop JP Predicted Flow (Mlbm/hr	-5%	+5%
4	3.81	3.62	4.00	5.99	5.69	6.29
5	4.20	3.99	4.41	6.36	6.04	6.67
6	4.60	4.37	4.83	6.72	6.38	7.05
7	4.99	4.74	5.24	7.08	6.72	7.43
8	5.39	5.12	5.66	7.44	7.07	7.81
9	5.79	5.50	6.07	7.80	7.41	8.19
10	6.18	5.87	6.49	8.16	7.75	8.57
11	6.58	6.25	6.90	8.52	8.10	8.95
12	6.97	6.62	7.32	8.89	8.44	9.33
13	7.37	7.00	7.74	9.25	8.78	9.71
14	7.76	7.37	8.15	9.61	9.13	10.09
15	8.16	7.75	8.57	9.97	9.47	10.47
16	8.55	8.13	8.98	10.33	9.81	10.85
17	8.95	8.50	9.40	10.69	10.16	11.23
18	9.34	8.88	9.81	11.05	10.50	11.61
19	9.74	9.25	10.23	11.41	10.84	11.99
20	10.13	9.63	10.64	11.78	11.19	12.37
21	10.53	10.00	11.06	12.14	11.53	12.74
22	10.93	10.38	11.47	12.50	11.87	13.12
23	11.32	10.75	11.89	12.86	12.22	13.50
24	11.72	11.13	12.30	13.22	12.56	13.88
25	12.11	11.51	12.72	13.58	12.90	14.26
26	12.51	11.88	13.13	13.94	13.25	14.64
27	12.90	12.26	13.55	14.31	13.59	15.02
28	13.30	12.63	13.96	14.67	13.93	15.40
29	13.69	13.01	14.38	15.03	14.28	15.78
30	14.09	13.38	14.79	15.39	14.62	16.16
31	14.48	13.76	15.21	15.75	14.96	16.54
32	14.88	14.14	15.62	16.11	15.31	16.92
33	15.27	14.51	16.04	16.47	15.65	17.30
34	15.67	14.89	16.45	16.84	15.99	17.68
35	16.07	15.26	16.87	17.20	16.34	18.06
36	16.46	15.64	17.28	17.56	16.68	18.44
37	16.86	16.01	17.7	17.92	17.02	18.82
38	17.25	16.39	18.11	18.28	17.37	19.20
39	17.65	16.76	18.53	18.64	17.71	19.58
40	18.04	17.14	18.94	19.00	18.05	19.95
41	18.44	17.52	19.36	19.37	18.40	20.33
42	18.83	17.89	19.78	19.73	18.74	20.71
43	19.23	18.27	20.19	20.09	19.08	21.09

ATTACHMENT 4 Page 2 of 3

PUMP SPEED vs. JET PUMP FLOW

Pump Speed	A Loop JP Predicted Flow (Mlbm/hr	-5%	+5%	B Loop JP Predicted Flow (Mlbm/hr	-5%	+5%
44	19.62	18.64	20.61	20.45	19.43	21.47
45	20.02	19.02	21.02	20.81	19.77	21.85
46	20.42	19.39	21.44	21.17	20.11	22.23
47	20.81	19.77	21.85	21.53	20.46	22.61
48	21.21	20.15	22.27	21.90	20.80	22.99
49	21.60	20.52	22.68	22.26	21.14	23.37
50	22.00	20.90	23.1	22.62	21.49	23.75
51	22.39	21.27	23.51	22.98	21.83	24.13
52	22.79	21.65	23.93	23.34	22.17	24.51
53	23.18	22.02	24.34	23.70	22.52	24.89
54	23.58	22.40	24.76	24.06	22.86	25.27
55	23.97	22.78	25.17	24.43	23.20	25.65
56	24.37	23.15	25.59	24.79	23.55	26.03
57	24.76	23.53	26	25.15	23.89	26.41
58	25.16	23.90	26.42	25.51	24.23	26.78
59	25.56	24.28	26.83	25.87	24.58	27.16
60	25.95	24.65	27.25	26.23	24.92	27.54
61	26.35	25.03	27.66	26.59	25.26	27.92
62	26.74	25.40	28.08	26.96	25.61	28.30
63	27.14	25.78	28.49	27.32	25.95	28.68
64	27.53	26.16	28.91	27.68	26.29	29.06
65	27.93	26.53	29.32	28.04	26.64	29.44
66	28.32	26.91	29.74	28.40	26.98	29.82
67	28.72	27.28	30.15	28.76	27.32	30.20
68	29.11	27.66	30.57	29.12	27.67	30.58
69	29.51	28.03	30.98	29.48	28.01	30.96
70	29.90	28.41	31.4	29.85	28.35	31.34
71	30.30	28.79	31.82	30.21	28.70	31.72
72	30.70	29.16	32.23	30.57	29.04	32.10
73	31.09	29.54	32.65	30.93	29.38	32.48
74	31.49	29.91	33.06	31.29	29.73	32.86
75	31.88	30.29	33.48	31.65	30.07	33.24
76	32.28	30.66	33.89	32.01	30.41	33.62
77	32.67	31.04	34.31	32.38	30.76	33.99
78	33.07	31.41	34.72	32.74	31.10	34.37
79	33.46	31.79	35.14	33.10	31.44	34.75
80	33.86	32.17	35.55	33.46	31.79	35.13
81	34.25	32.54	35.97	33.82	32.13	35.51
82	34.65	32.92	36.38	34.18	32.47	35.89
83	35.04	33.29	36.8	34.54	32.82	36.27

ATTACHMENT 4

PUMP SPEED vs. JET PUMP FLOW

Pump Speed	**A Loop JP Predicted Flow (Mlbm/hr**	**-5%**	**+5%**	**B Loop JP Predicted Flow (Mlbm/hr**	**-5%**	**+5%**
84	35.44	33.67	37.21	34.91	33.16	36.65
85	35.84	34.04	37.63	35.27	33.50	37.03
86	36.23	34.42	38.04	35.63	33.85	37.41
87	36.63	34.80	38.46	35.99	34.19	37.79
88	37.02	35.17	38.87	36.35	34.53	38.17
89	37.42	35.55	39.29	36.71	34.88	38.55
90	37.81	35.92	39.7	37.07	35.22	38.93
91	38.21	36.30	40.12	37.44	35.56	39.31
92	38.60	36.67	40.53	37.80	35.91	39.69
93	39.00	37.05	40.95	38.16	36.25	40.07
94	39.39	37.42	41.36	38.52	36.59	40.45
95	39.79	37.80	41.78	38.88	36.94	40.83
96	40.19	38.18	42.19	39.24	37.28	41.20
97	40.58	38.55	42.61	39.60	37.62	41.58
98	40.98	38.93	43.02	39.97	37.97	41.96
99	41.37	39.30	43.44	40.33	38.31	42.34
100	41.77	39.68	43.86	40.69	38.65	42.72
101	42.16	40.05	44.27	41.05	39.00	43.10
102	42.56	40.43	44.69	41.41	39.34	43.48
103	42.95	40.81	45.1	41.77	39.68	43.86
104	43.35	41.18	45.52	42.13	40.03	44.24
105	43.74	41.56	45.93	42.50	40.37	44.62

ATTACHMENT 5

LOOP AVERAGE dP vs. JET PUMP dP

LOOP A AVG % PSID	JP 1 -20%	JP 1 +20%	JP 2 -20%	JP 2 +20%	JP 3 -20%	JP 3 +20%	JP 4 -20%	JP 4 +20%	JP 5 -20%	JP 5 +20%
5	4.4	6.6	4.0	6.0	3.6	5.5	4.2	6.3	4.9	7.3
6	5.3	7.9	4.8	7.2	4.4	6.6	5.0	7.5	5.8	8.7
7	6.1	9.2	5.6	8.4	5.1	7.7	5.8	8.6	6.7	10.1
8	7.0	10.5	6.4	9.6	5.9	8.8	6.6	9.8	7.6	11.5
9	7.8	11.7	7.2	10.8	6.6	9.9	7.3	11.0	8.6	12.9
10	8.7	13.0	8.0	12.0	7.4	11.0	8.1	12.2	9.5	14.2
11	9.5	14.3	8.8	13.2	8.1	12.2	8.9	13.4	10.4	15.6
12	10.3	15.5	9.6	14.4	8.9	13.3	9.7	14.5	11.3	17.0
13	11.2	16.8	10.4	15.6	9.6	14.4	10.5	15.7	12.2	18.4
14	12.0	18.0	11.2	16.8	10.4	15.5	11.2	16.9	13.2	19.7
15	12.9	19.3	12.0	18.0	11.1	16.7	12.0	18.0	14.1	21.1
16	13.7	20.5	12.8	19.2	11.9	17.8	12.8	19.2	15.0	22.5
17	14.5	21.8	13.6	20.4	12.6	18.9	13.6	20.3	15.9	23.8
18	15.3	23.0	14.4	21.6	13.4	20.0	14.3	21.5	16.8	25.2
19	16.2	24.3	15.2	22.8	14.1	21.2	15.1	22.6	17.7	26.5
20	17.0	25.5	16.0	24.0	14.9	22.3	15.9	23.8	18.6	27.9
21	17.8	26.7	16.8	25.2	15.6	23.4	16.6	24.9	19.5	29.2
22	18.6	28.0	17.6	26.4	16.4	24.6	17.4	26.1	20.4	30.6
23	19.5	29.2	18.4	27.6	17.1	25.7	18.1	27.2	21.3	31.9
24	20.3	30.4	19.2	28.7	17.9	26.8	18.9	28.3	22.2	33.3
25	21.1	31.7	20.0	29.9	18.6	28.0	19.7	29.5	23.1	34.6
26	21.9	32.9	20.8	31.1	19.4	29.1	20.4	30.6	24.0	35.9
27	22.8	34.1	21.5	32.3	20.1	30.2	21.2	31.7	24.9	37.3
28	23.6	35.4	22.3	33.5	20.9	31.4	21.9	32.9	25.8	38.6
29	24.4	36.6	23.1	34.7	21.7	32.5	22.7	34.0	26.6	40.0
30	25.2	37.8	23.9	35.9	22.4	33.6	23.4	35.1	27.5	41.3
31	26.0	39.0	24.7	37.1	23.2	34.8	24.2	36.3	28.4	42.6
32	26.8	40.3	25.5	38.3	23.9	35.9	24.9	37.4	29.3	44.0
33	27.7	41.5	26.3	39.5	24.7	37.0	25.7	38.5	30.2	45.3
34	28.5	42.7	27.1	40.6	25.5	38.2	26.4	39.6	31.1	46.6
35	29.3	43.9	27.9	41.8	26.2	39.3	27.2	40.8	32.0	47.9
36	30.1	45.1	28.7	43.0	27.0	40.5	27.9	41.9	32.9	49.3
37	30.9	46.4	29.5	44.2	27.7	41.6	28.7	43.0	33.7	50.6
38	31.7	47.6	30.3	45.4	28.5	42.7	29.4	44.1	34.6	51.9
39	32.5	48.8	31.1	46.6	29.2	43.9	30.2	45.2	35.5	53.2
40	33.3	50.0	31.8	47.8	30.0	45.0	30.9	46.4	36.4	54.6
41	34.1	51.2	32.6	49.0	30.8	46.2	31.7	47.5	37.3	55.9
42	35.0	52.4	33.4	50.1	31.5	47.3	32.4	48.6	38.1	57.2
43	35.8	53.6	34.2	51.3	32.3	48.4	33.1	49.7	39.0	58.5
44	36.6	54.9	35.0	52.5	33.1	49.6	33.9	50.8	39.9	59.9
45	37.4	56.1	35.8	53.7	33.8	50.7	34.6	51.9	40.8	61.2
46	38.2	57.3	36.6	54.9	34.6	51.9	35.4	53.1	41.7	62.5
47	39.0	58.5	37.4	56.1	35.3	53.0	36.1	54.2	42.5	63.8
48	39.8	59.7	38.2	57.3	36.1	54.1	36.8	55.3	43.4	65.1
49	40.6	60.9	39.0	58.5	36.9	55.3	37.6	56.4	44.3	66.4
50	41.4	62.1	39.8	59.6	37.6	56.4	38.3	57.5	45.2	67.7
51	42.2	63.3	40.6	60.8	38.4	57.6	39.1	58.6	46.0	69.1
52	43.0	64.5	41.3	62.0	39.1	58.7	39.8	59.7	46.9	70.4
53	43.8	65.7	42.1	63.2	39.9	59.9	40.5	60.8	47.8	71.7
54	44.6	66.9	42.9	64.4	40.7	61.0	41.3	61.9	48.7	73.0
55	45.4	68.1	43.7	65.6	41.4	62.2	42.0	63.0	49.5	74.3
56	46.2	69.3	44.5	66.8	42.2	63.3	42.7	64.1	50.4	75.6
57	47.0	70.6	45.3	67.9	43.0	64.4	43.5	65.2	51.3	76.9
58	47.8	71.8	46.1	69.1	43.7	65.6	44.2	66.3	52.1	78.2
59	48.6	73.0	46.9	70.3	44.5	66.7	45.0	67.4	53.0	79.5
60	49.4	74.2	47.7	71.5	45.3	67.9	45.7	68.5	53.9	80.8

Record dp for Loop A average and each jet pump using EPIC-A data points

3382 AVG	942 JP-1	944 JP-2	946 JP-3	948 JP-4	950 JP-5
31.01	32.0	33.2	16.4	24.0	35.3

Init TH

ATTACHMENT 5

LOOP AVERAGE dP vs. JET PUMP dP

LOOP A AVG % PSID	JP 6 -20%	JP 6 +20%	JP 7 -20%	JP 7 +20%	JP 8 -20%	JP 8 +20%	JP 9 -20%	JP 9 +20%	JP 10 -20%	JP 10 +20%
5	4.6	7.0	4.1	6.2	3.8	5.7	3.6	5.5	3.9	5.8
6	5.6	8.3	4.9	7.4	4.5	6.8	4.4	6.6	4.6	7.0
7	6.5	9.7	5.7	8.6	5.3	7.9	5.1	7.7	5.4	8.1
8	7.4	11.0	6.5	9.8	6.0	9.1	5.9	8.8	6.2	9.3
9	8.3	12.4	7.3	11.0	6.8	10.2	6.6	9.9	7.0	10.5
10	9.2	13.7	8.1	12.2	7.6	11.3	7.4	11.0	7.8	11.7
11	10.1	15.1	8.9	13.4	8.3	12.5	8.1	12.2	8.6	12.9
12	10.9	16.4	9.7	14.6	9.1	13.6	8.9	13.3	9.4	14.1
13	11.8	17.8	10.5	15.7	9.8	14.7	9.6	14.4	10.2	15.3
14	12.7	19.1	11.3	16.9	10.6	15.8	10.3	15.5	11.0	16.5
15	13.6	20.4	12.1	18.1	11.3	17.0	11.1	16.6	11.8	17.7
16	14.5	21.7	12.9	19.3	12.0	18.1	11.8	17.8	12.6	18.9
17	15.4	23.1	13.6	20.5	12.8	19.2	12.6	18.9	13.4	20.1
18	16.3	24.4	14.4	21.6	13.5	20.3	13.3	20.0	14.2	21.3
19	17.2	25.7	15.2	22.8	14.3	21.4	14.1	21.2	15.0	22.5
20	18.0	27.1	16.0	24.0	15.0	22.6	14.9	22.3	15.8	23.8
21	18.9	28.4	16.8	25.2	15.8	23.7	15.6	23.4	16.6	25.0
22	19.8	29.7	17.6	26.3	16.5	24.8	16.4	24.5	17.5	26.2
23	20.7	31.0	18.3	27.5	17.3	25.9	17.1	25.7	18.3	27.4
24	21.6	32.3	19.1	28.7	18.0	27.1	17.9	26.8	19.1	28.6
25	22.4	33.7	19.9	29.8	18.8	28.2	18.6	27.9	19.9	29.8
26	23.3	35.0	20.7	31.0	19.5	29.3	19.4	29.1	20.7	31.0
27	24.2	36.3	21.5	32.2	20.3	30.4	20.1	30.2	21.5	32.3
28	25.1	37.6	22.2	33.3	21.0	31.5	20.9	31.3	22.3	33.5
29	25.9	38.9	23.0	34.5	21.8	32.7	21.6	32.5	23.1	34.7
30	26.8	40.2	23.8	35.7	22.5	33.8	22.4	33.6	23.9	35.9
31	27.7	41.5	24.6	36.8	23.3	34.9	23.2	34.7	24.8	37.1
32	28.6	42.8	25.3	38.0	24.0	36.0	23.9	35.9	25.6	38.4
33	29.4	44.1	26.1	39.2	24.8	37.1	24.7	37.0	26.4	39.6
34	30.3	45.5	26.9	40.3	25.5	38.3	25.4	38.1	27.2	40.8
35	31.2	46.8	27.7	41.5	26.2	39.4	26.2	39.3	28.0	42.0
36	32.0	48.1	28.4	42.6	27.0	40.5	26.9	40.4	28.8	43.3
37	32.9	49.4	29.2	43.8	27.7	41.6	27.7	41.5	29.7	44.5
38	33.8	50.7	30.0	45.0	28.5	42.7	28.5	42.7	30.5	45.7
39	34.7	52.0	30.7	46.1	29.2	43.8	29.2	43.8	31.3	46.9
40	35.5	53.3	31.5	47.3	30.0	45.0	30.0	45.0	32.1	48.2
41	36.4	54.6	32.3	48.4	30.7	46.1	30.7	46.1	32.9	49.4
42	37.3	55.9	33.1	49.6	31.5	47.2	31.5	47.2	33.8	50.6
43	38.1	57.2	33.8	50.7	32.2	48.3	32.3	48.4	34.6	51.9
44	39.0	58.5	34.6	51.9	33.0	49.4	33.0	49.5	35.4	53.1
45	39.9	59.8	35.4	53.0	33.7	50.6	33.8	50.7	36.2	54.3
46	40.7	61.1	36.1	54.2	34.4	51.7	34.5	51.8	37.0	55.5
47	41.6	62.4	36.9	55.3	35.2	52.8	35.3	52.9	37.9	56.8
48	42.5	63.7	37.7	56.5	35.9	53.9	36.1	54.1	38.7	58.0
49	43.3	65.0	38.4	57.7	36.7	55.0	36.8	55.2	39.5	59.2
50	44.2	66.3	39.2	58.8	37.4	56.1	37.6	56.4	40.3	60.5
51	45.1	67.6	40.0	60.0	38.2	57.3	38.3	57.5	41.1	61.7
52	45.9	68.9	40.7	61.1	38.9	58.4	39.1	58.6	42.0	62.9
53	46.8	70.2	41.5	62.3	39.7	59.5	39.9	59.8	42.8	64.2
54	47.6	71.5	42.3	63.4	40.4	60.6	40.6	60.9	43.6	65.4
55	48.5	72.8	43.0	64.5	41.1	61.7	41.4	62.1	44.4	66.7
56	49.4	74.1	43.8	65.7	41.9	62.8	42.1	63.2	45.3	67.9
57	50.2	75.3	44.6	66.8	42.6	64.0	42.9	64.4	46.1	69.1
58	51.1	76.6	45.3	68.0	43.4	65.1	43.7	65.5	46.9	70.4
59	52.0	77.9	46.1	69.1	44.1	66.2	44.4	66.7	47.7	71.6
60	52.8	79.2	46.9	70.3	44.9	67.3	45.2	67.8	48.6	72.8

Record dp for Loop A average and each jet pump using EPIC-A data points

3382 AVG	952 JP-6	954 JP-7	956 JP-8	958 JP-9	960 JP-10
31.01	30.3	35.1	34.8	34.0	35.0

Init TH

ATTACHMENT 5

LOOP AVERAGE dP vs. JET PUMP dP

LOOP B AVG % PSID	JP 11 -20%	JP 11 +20%	JP 12 -20%	JP 12 +20%	JP 13 -20%	JP 13 +20%	JP 14 -20%	JP 14 +20%	JP 15 -20%	JP 15 +20%
5	4.0	6.0	4.1	6.1	3.8	5.6	3.8	5.8	4.2	6.3
6	4.8	7.3	4.9	7.3	4.5	6.8	4.6	6.9	5.1	7.6
7	5.6	8.5	5.7	8.5	5.3	7.9	5.4	8.0	5.9	8.9
8	6.4	9.7	6.5	9.7	6.1	9.1	6.1	9.2	6.8	10.2
9	7.2	10.9	7.3	10.9	6.8	10.3	6.9	10.3	7.6	11.4
10	8.1	12.1	8.1	12.1	7.6	11.4	7.6	11.5	8.5	12.7
11	8.9	13.3	8.9	13.3	8.4	12.6	8.4	12.6	9.3	14.0
12	9.7	14.5	9.7	14.5	9.2	13.7	9.1	13.7	10.2	15.3
13	10.5	15.7	10.5	15.7	9.9	14.9	9.9	14.9	11.1	16.6
14	11.3	16.9	11.2	16.9	10.7	16.1	10.7	16.0	11.9	17.9
15	12.1	18.1	12.0	18.1	11.5	17.2	11.4	17.1	12.8	19.2
16	12.9	19.3	12.8	19.2	12.3	18.4	12.2	18.3	13.7	20.5
17	13.7	20.5	13.6	20.4	13.1	19.6	12.9	19.4	14.5	21.8
18	14.5	21.7	14.4	21.6	13.8	20.8	13.7	20.5	15.4	23.1
19	15.3	22.9	15.2	22.8	14.6	21.9	14.4	21.7	16.2	24.4
20	16.1	24.1	16.0	24.0	15.4	23.1	15.2	22.8	17.1	25.7
21	16.9	25.3	16.8	25.2	16.2	24.3	15.9	23.9	18.0	27.0
22	17.7	26.6	17.6	26.4	17.0	25.5	16.7	25.0	18.8	28.3
23	18.5	27.8	18.4	27.5	17.8	26.6	17.5	26.2	19.7	29.6
24	19.3	29.0	19.1	28.7	18.5	27.8	18.2	27.3	20.6	30.9
25	20.1	30.2	19.9	29.9	19.3	29.0	19.0	28.4	21.4	32.2
26	20.9	31.4	20.7	31.1	20.1	30.2	19.7	29.6	22.3	33.5
27	21.7	32.6	21.5	32.3	20.9	31.4	20.5	30.7	23.2	34.8
28	22.5	33.8	22.3	33.4	21.7	32.5	21.2	31.8	24.1	36.1
29	23.3	35.0	23.1	34.6	22.5	33.7	22.0	33.0	24.9	37.4
30	24.1	36.2	23.9	35.8	23.3	34.9	22.7	34.1	25.8	38.7
31	24.9	37.4	24.6	37.0	24.1	36.1	23.5	35.2	26.7	40.0
32	25.7	38.6	25.4	38.1	24.8	37.3	24.2	36.3	27.5	41.3
33	26.5	39.8	26.2	39.3	25.6	38.5	25.0	37.5	28.4	42.6
34	27.4	41.0	27.0	40.5	26.4	39.6	25.7	38.6	29.3	43.9
35	28.2	42.2	27.8	41.7	27.2	40.8	26.5	39.7	30.1	45.2
36	29.0	43.4	28.6	42.8	28.0	42.0	27.2	40.8	31.0	46.5
37	29.8	44.6	29.3	44.0	28.8	43.2	28.0	42.0	31.9	47.8
38	30.6	45.8	30.1	45.2	29.6	44.4	28.7	43.1	32.8	49.1
39	31.4	47.1	30.9	46.4	30.4	45.6	29.5	44.2	33.6	50.5
40	32.2	48.3	31.7	47.5	31.2	46.8	30.2	45.3	34.5	51.8
41	33.0	49.5	32.5	48.7	32.0	48.0	31.0	46.5	35.4	53.1
42	33.8	50.7	33.2	49.9	32.8	49.1	31.7	47.6	36.3	54.4
43	34.6	51.9	34.0	51.0	33.6	50.3	32.5	48.7	37.1	55.7
44	35.4	53.1	34.8	52.2	34.4	51.5	33.2	49.8	38.0	57.0
45	36.2	54.3	35.6	53.4	35.1	52.7	34.0	51.0	38.9	58.3
46	37.0	55.5	36.4	54.6	35.9	53.9	34.7	52.1	39.8	59.6
47	37.8	56.7	37.2	55.7	36.7	55.1	35.5	53.2	40.6	60.9
48	38.6	57.9	37.9	56.9	37.5	56.3	36.2	54.3	41.5	62.3
49	39.4	59.1	38.7	58.1	38.3	57.5	37.0	55.5	42.4	63.6
50	40.2	60.3	39.5	59.2	39.1	58.7	37.7	56.6	43.3	64.9
51	41.0	61.5	40.3	60.4	39.9	59.9	38.5	57.7	44.1	66.2
52	41.8	62.7	41.0	61.6	40.7	61.1	39.2	58.8	45.0	67.5
53	42.6	63.9	41.8	62.7	41.5	62.3	40.0	60.0	45.9	68.8
54	43.4	65.1	42.6	63.9	42.3	63.5	40.7	61.1	46.8	70.1
55	44.2	66.3	43.4	65.1	43.1	64.7	41.5	62.2	47.6	71.4
56	45.0	67.5	44.2	66.2	43.9	65.9	42.2	63.3	48.5	72.8
57	45.8	68.8	44.9	67.4	44.7	67.1	43.0	64.4	49.4	74.1
58	46.6	70.0	45.7	68.6	45.5	68.2	43.7	65.6	50.3	75.4
59	47.4	71.2	46.5	69.7	46.3	69.4	44.5	66.7	51.1	76.7
60	48.2	72.4	47.3	70.9	47.1	70.6	45.2	67.8	52.0	78.0

Record dp for Loop B average and each jet pump using EPIC-A data points

3381 AVG	943 JP-11	945 JP-12	947 JP-13	949 JP-14	951 JP-15
48.71	51.2	43.7	50.1	49.2	49.7

Init TH

ATTACHMENT 5

LOOP AVERAGE dP vs. JET PUMP dP

LOOP B AVG % PSID	JP 16 -20%	JP 16 +20%	JP 17 -20%	JP 17 +20%	JP 18 -20%	JP 18 +20%	JP 19 -20%	JP 19 +20%	JP 20 -20%	JP 20 +20%
5	4.2	6.3	4.2	6.3	3.9	5.8	3.9	5.8	4.3	6.4
6	5.0	7.6	5.0	7.5	4.6	7.0	4.7	7.0	5.1	7.6
7	5.9	8.8	5.8	8.7	5.4	8.1	5.5	8.2	5.9	8.9
8	6.7	10.1	6.6	9.9	6.2	9.3	6.2	9.4	6.7	10.1
9	7.5	11.3	7.4	11.1	6.9	10.4	7.0	10.6	7.5	11.3
10	8.4	12.6	8.2	12.3	7.7	11.6	7.8	11.8	8.3	12.5
11	9.2	13.8	9.0	13.5	8.5	12.7	8.6	13.0	9.1	13.7
12	10.0	15.1	9.8	14.7	9.2	13.9	9.4	14.2	10.0	14.9
13	10.9	16.3	10.6	15.9	10.0	15.0	10.2	15.4	10.8	16.1
14	11.7	17.6	11.4	17.0	10.8	16.2	11.0	16.6	11.6	17.3
15	12.6	18.8	12.2	18.2	11.5	17.3	11.9	17.8	12.4	18.5
16	13.4	20.1	12.9	19.4	12.3	18.4	12.7	19.0	13.2	19.7
17	14.2	21.3	13.7	20.6	13.1	19.6	13.5	20.2	14.0	20.9
18	15.1	22.6	14.5	21.8	13.8	20.7	14.3	21.4	14.8	22.1
19	15.9	23.8	15.3	22.9	14.6	21.9	15.1	22.6	15.5	23.3
20	16.7	25.1	16.1	24.1	15.4	23.0	15.9	23.8	16.3	24.5
21	17.6	26.3	16.8	25.3	16.1	24.2	16.7	25.1	17.1	25.7
22	18.4	27.6	17.6	26.4	16.9	25.3	17.5	26.3	17.9	26.9
23	19.2	28.8	18.4	27.6	17.7	26.5	18.3	27.5	18.7	28.1
24	20.1	30.1	19.2	28.8	18.4	27.6	19.1	28.7	19.5	29.2
25	20.9	31.3	20.0	29.9	19.2	28.8	20.0	29.9	20.3	30.4
26	21.7	32.6	20.7	31.1	19.9	29.9	20.8	31.2	21.1	31.6
27	22.6	33.8	21.5	32.2	20.7	31.1	21.6	32.4	21.9	32.8
28	23.4	35.1	22.3	33.4	21.5	32.2	22.4	33.6	22.6	34.0
29	24.2	36.3	23.0	34.6	22.2	33.3	23.2	34.8	23.4	35.1
30	25.1	37.6	23.8	35.7	23.0	34.5	24.0	36.0	24.2	36.3
31	25.9	38.8	24.6	36.9	23.8	35.6	24.9	37.3	25.0	37.5
32	26.7	40.1	25.4	38.0	24.5	36.8	25.7	38.5	25.8	38.7
33	27.5	41.3	26.1	39.2	25.3	37.9	26.5	39.7	26.6	39.8
34	28.4	42.6	26.9	40.3	26.0	39.1	27.3	41.0	27.3	41.0
35	29.2	43.8	27.7	41.5	26.8	40.2	28.1	42.2	28.1	42.2
36	30.0	45.1	28.4	42.6	27.6	41.4	28.9	43.4	28.9	43.3
37	30.9	46.3	29.2	43.8	28.3	42.5	29.8	44.6	29.7	44.5
38	31.7	47.6	30.0	44.9	29.1	43.6	30.6	45.9	30.4	45.7
39	32.5	48.8	30.7	46.1	29.9	44.8	31.4	47.1	31.2	46.8
40	33.4	50.1	31.5	47.2	30.6	45.9	32.2	48.3	32.0	48.0
41	34.2	51.3	32.2	48.4	31.4	47.1	33.0	49.6	32.8	49.2
42	35.0	52.5	33.0	49.5	32.1	48.2	33.9	50.8	33.6	50.3
43	35.9	53.8	33.8	50.7	32.9	49.3	34.7	52.0	34.3	51.5
44	36.7	55.0	34.5	51.8	33.7	50.5	35.5	53.3	35.1	52.7
45	37.5	56.3	35.3	52.9	34.4	51.6	36.3	54.5	35.9	53.8
46	38.4	57.5	36.1	54.1	35.2	52.8	37.2	55.7	36.6	55.0
47	39.2	58.8	36.8	55.2	35.9	53.9	38.0	57.0	37.4	56.1
48	40.0	60.0	37.6	56.4	36.7	55.1	38.8	58.2	38.2	57.3
49	40.9	61.3	38.3	57.5	37.5	56.2	39.6	59.5	39.0	58.4
50	41.7	62.5	39.1	58.6	38.2	57.3	40.5	60.7	39.7	59.6
51	42.5	63.8	39.9	59.8	39.0	58.5	41.3	61.9	40.5	60.8
52	43.3	65.0	40.6	60.9	39.7	59.6	42.1	63.2	41.3	61.9
53	44.2	66.3	41.4	62.1	40.5	60.8	42.9	64.4	42.0	63.1
54	45.0	67.5	42.1	63.2	41.3	61.9	43.8	65.6	42.8	64.2
55	45.8	68.8	42.9	64.3	42.0	63.0	44.6	66.9	43.6	65.4
56	46.7	70.0	43.6	65.5	42.8	64.2	45.4	68.1	44.4	66.5
57	47.5	71.2	44.4	66.6	43.6	65.3	46.2	69.4	45.1	67.7
58	48.3	72.5	45.2	67.7	44.3	66.5	47.1	70.6	45.9	68.8
59	49.2	73.7	45.9	68.9	45.1	67.6	47.9	71.8	46.7	70.0
60	50.0	75.0	46.7	70.0	45.8	68.7	48.7	73.1	47.4	71.1

Record dp for Loop B average and each jet pump using EPIC-A data points

3381 AVG	953 JP-16	955 JP-17	957 JP-18	959 JP-19	961 JP-20
48.71	51.1	46.1	51.8	48.2	46.4

Init TH

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

RO	NRC 17-1 RO EC	TASK TITLE: Perform ST-23C, Jet Pump Operability – Two Loop
APPL. TO	JPM NUMBER	

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 2.2.12 (3.7)

ESTIMATED COMPLETION TIME: 45 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________

JPM Completion Perform

Location: Classroom

DATE PERFORMED: ___________ TIME TO COMPLETE: _______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____________________

SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

RO	NRC 17-1 RO EC	TASK TITLE: Perform ST-23C, Jet Pump Operability – Two Loop
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. ST-23C, Jet Pump Operability Test for Two Loop Operation

III. TOOLS AND EQUIPMENT

A. Calculator

IV. SET UP REQUIREMENTS

A. Prepare a copy of ST-23C filled out up to step 8.1.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and not actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. ST-23C, Jet Pump Operability Test for Two Loop Operation (EPIC Available), is in progress.

B. The required data for completing ST-23C is included on the provided handout.

C. Baseline data collection is complete and an “established pattern” exists.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Perform ST-23C steps 8.1 through 8.4. Then assess the results against the Level 1 Acceptance Criteria of section 10.1.1 and 10.1.2 by completing the provided worksheet."

EVALUATOR: Provide the candidate with the attached handout, worksheet, and the prepared copy of ST-23C.

	STEP	STANDARD	EVALUATION / COMMENT
1.	Record data for ST-23C step 8.1.	Records data for ST-23C section 8.1 per the provided key. **EVALUATOR NOTE:** It is acceptable for all values to be rounded to the nearest whole number.	SAT / UNSAT
2.	Calculate the value for ST-23C step 8.2.	Calculates and records a value of 6.5 Mlbm/hr per the provided key.	SAT / UNSAT
3.	Record data for ST-23C step 8.3 on Attachment 5.	Records data for ST-23C step 8.3 on Attachment 5 per the provided key. **EVALUATOR NOTE:** It is acceptable for all values to be rounded to the nearest whole number.	SAT / UNSAT
4.	Record data for ST-23C step 8.4 on Attachment 2.	Record data for ST-23C step 8.4 on Attachment 2 per the provided key. **EVALUATOR NOTE:** It is acceptable for all values to be rounded to the nearest whole number.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*5.	Assess Level 1 Acceptance Criteria 10.1.1.	Determines Level 1 Acceptance Criteria 10.1.1 is UNSAT and provides brief description of why (see provided key). **EVALUATOR NOTE:** Level 1 Acceptance Criteria 10.1.1 is NOT met because total core flow is greater than 70% and Recirculation loop jet pump flow mismatch is greater than 3.85 Mlbm/hr (5%).	**CRITICAL STEP** SAT / UNSAT
*6.	Assess Level 1 Acceptance Criteria 10.1.2.	Determines Level 1 Acceptance Criteria 10.1.2 is UNSAT and provides brief description of why (see provided key). **EVALUATOR NOTE:** Level 1 Acceptance Criteria 10.1.2 is NOT met because both: • Loop A flows are greater than 5% from predicted on Attachments 3 and 4 AND • Jet Pump 3 and 4 dPs are greater than 20% below established values.	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Init

8.0 **PROCEDURE**

8.1 Record the following:

8.1.1 Total Core Flow ____93.5___ (% rated) EPIC-A-3330 __TH__

8.1.2 Loop A Jet Pump Flow ___32.5____ Mlbm/hr 02-3FI-92A __TH__

8.1.3 Loop B Jet Pump Flow ___39.0___ Mlbm/hr 02-3FI-92B __TH__

8.1.4 A Pump Speed (02-184SI-16A1 at panel 09-4) _____81.5____ % __TH__

8.1.5 B Pump Speed (02-184SI-16B1 at panel 09-4) ____82.4____ % __TH__

8.1.6 A Recirc Loop Flow ___17.422___ Mlbm/hr EPIC-A-3317 __TH__

8.1.7 B Recirc Loop Flow __16.602____ Mlbm/hr EPIC-A-3318

__TH__

8.2 Calculate the absolute value of:

|(8.1.2) - (8.1.3)| = _____6.5_____Mlbm/hr __TH__

ATTACHMENT 2

ST 23C DATA FOR REACTOR ENGINEERING SUPPORT

___Today / Now____
Date/Time

A.	Recirc Loop A flow (EPIC-A-3317)	17.422	Mlbm/hr
B.	Recirc Loop B flow (EPIC-A-3318)	16.602	Mlbm/hr
C.	Rx Total Core Flow (EPIC-A-0414)	71.4	Mlbm/hr
D.	EPIC-A-6254, WTSUB	72.9	Mlbm/hr
E.	Recirc Pump A Speed (02-184SI-16A1 at panel 09-4)	81.5	%
F.	Recirc Pump B Speed (02-184SI-16B1 at panel 09-4)	82.4	%
G.	RWR Loop A Jet Pump Flow (02-3FI-92A at panel 09-4)	32.5	lbs/hr x 10^6
H.	RWR Loop B Jet Pump Flow (02-3FI-92B at panel 09-4)	39.0	lbs/hr x 10^6
I.	Double Tapped JP 1 Flow (02-3FI-87A at panel 09-4)	3.45	lbs/hr x 10^6
J.	Double Tapped JP 6 Flow (02-3FI-87C at panel 09-4)	3.3	lbs/hr x 10^6
K.	Double Tapped JP 11 Flow (02-3FI-87B at panel 09-4)	4.0	lbs/hr x 10^6
L.	Double Tapped JP 16 Flow (02-3FI-87D at panel 09-4)	4.1	lbs/hr x 10^6
M.	EPIC-A-3382 RECIRC LOOP A AVE JET PMP %PSID	31.01	%psid
N.	EPIC-A-3381 RECIRC LOOP B AVE JET PMP %PSID	48.71	%psid
O.	EPIC-A-405 RX CORE DIFF PRES	17.6	psid
P.	EPIC-A-3390 P6 10 MIN AVG CORE THERMAL POWER	2437.8	mwth

57	47.0	70.6	45.3	67.9	43.0	64.4	43.5	65.2	51.3	76.9
58	47.8	71.8	46.1	69.1	43.7	65.6	44.2	66.3	52.1	78.2
59	48.6	73.0	46.9	70.3	44.5	66.7	45.0	67.4	53.0	79.5
60	49.4	74.2	47.7	71.5	45.3	67.9	45.7	68.5	53.9	80.8
Record dp for Loop A average and each jet pump using EPIC-A data points										
3382 AVG	**942 JP-1**		**944 JP-2**		**946 JP-3**		**948 JP-4**		**950 JP-5**	
31.01	32.0		33.2		16.4		24.0		35.3	

Init ____TH____

Rev. No. 28 Page 28 of 31

59	52.0	77.9	46.1	69.1	44.1	66.2	44.4	66.7	47.7	71.6
60	52.8	79.2	46.9	70.3	44.9	67.3	45.2	67.8	48.6	72.8
Record dp for Loop A average and each jet pump using EPIC-A data points										
3382 AVG	**952 JP-6**		**954 JP-7**		**956 JP-8**		**958 JP-9**		**960 JP-10**	
31.01	30.3		35.1		34.8		34.0		35.0	

Init ____TH____

Rev. No. 28 Page 29 of 31

59	47.4	71.2	46.5	69.7	46.3	69.4	44.5	66.7	51.1	76.7
60	48.2	72.4	47.3	70.9	47.1	70.6	45.2	67.8	52.0	78.0
Record dp for Loop B average and each jet pump using EPIC-A data points										
3381 AVG	**943 JP-11**		**945 JP-12**		**947 JP-13**		**949 JP-14**		**951 JP-15**	
48.71	51.2		43.7		50.1		49.2		49.7	

Init ____TH____

Rev. No. 28 Page 30 of 31

59	49.2	73.7	45.9	68.9	45.1	67.6	47.9	71.8	46.7	70.0
60	50.0	75.0	46.7	70.0	45.8	68.7	48.7	73.1	47.4	71.1
Record dp for Loop B average and each jet pump using EPIC-A data points										
3381 AVG	**953 JP-16**		**955 JP-17**		**957 JP-18**		**959 JP-19**		**961 JP-20**	
48.71	51.1		46.1		51.8		48.2		46.4	

Init ____TH____

Rev. No. 28 Page 31 of 31

Level 1 Acceptance Criteria	Status (circle one)	If UNSAT, describe why below
10.1.1	SAT UNSAT	**Recirculation loop jet pump flow mismatch exceeds 5% of rated core flow (3.85 Mlbm/hr).** **(or similar)**
10.1.2	SAT UNSAT	**Loop A and B flows are greater than 5% from predicted (Att. 3).** **Loop A and B jet pump flows are greater than 5% from predicted (Att. 4).** **Jet pump 3 and 4 dPs are greater than 20% below established values (Att 5).** **(or similar, such as "Loop A does not meet any of the required criteria in 10.1.2.")**

HANDOUT

- **ST-23C, Jet Pump Operability Test for Two Loop Operation (EPIC Available), is in progress.**
- **The required data for completing ST-23C is included on the provided handout.**
- **Baseline data collection is complete and an "established pattern" exists.**

Perform ST-23C section 8.0. Then assess the results against the Level 1 Acceptance Criteria of section 10.1.1 and 10.1.2 by completing the provided worksheet.

HANDOUT

Parameter	Instrument / EPIC Point	Value
Total Core Flow	EPIC-A-3330	93.5 % rated
Loop A Jet Pump Flow	02-3FI-92A	32.5 Mlbm/hr
Loop B Jet Pump Flow	02-3FI-92B	39.0 Mlbm/hr
A Pump Speed	02-184SI-16A1	81.5%
B Pump Speed	02-184SI-16B1	82.4%
A Recirc Loop Flow	EPIC-A-3317	17.422 Mlbm/hr
B Recirc Loop Flow	EPIC-A-3318	16.602 Mlbm/hr
Rx Total Core Flow	EPIC-A-0414	71.4 Mlbm/hr
WTSUB	EPIC-A-6254	72.9 Mlbm/hr
Double Tapped JP 1 Flow	02-3FI-87A	3.45 lbs/hr x 10^6
Double Tapped JP 6 Flow	02-3FI-87C	3.3 lbs/hr x 10^6
Double Tapped JP 11 Flow	02-3FI-87B	4.0 lbs/hr x 10^6
Double Tapped JP 16 Flow	02-3FI-87D	4.1 lbs/hr x 10^6
Recirc Loop A Ave Jet Pmp %PSID	EPIC-A-3382	31.01 % psid
Recirc Loop B Ave Jet Pmp %PSID	EPIC-A-3381	48.71 % psid
Rx Core Diff Press	EPIC-A-405	17.6 psid
P6 10 Min Avg Core Thermal Power	EPIC-A-3390	2437.8 MWth
Jet Pump 1 dP	EPIC-A-942	32.0 % psid
Jet Pump 2 dP	EPIC-A-944	33.2 % psid
Jet Pump 3 dP	EPIC-A-946	16.4 % psid
Jet Pump 4 dP	EPIC-A-948	24.0 % psid
Jet Pump 5 dP	EPIC-A-950	35.3 % psid
Jet Pump 6 dP	EPIC-A-952	30.3 % psid
Jet Pump 7 dP	EPIC-A-954	35.1 % psid
Jet Pump 8 dP	EPIC-A-956	34.8 % psid
Jet Pump 9 dP	EPIC-A-958	34.0 % psid
Jet Pump 10 dP	EPIC-A-960	35.0 % psid
Jet Pump 11 dP	EPIC-A-943	51.2 % psid
Jet Pump 12 dP	EPIC-A-945	43.7 % psid
Jet Pump 13 dP	EPIC-A-947	50.1 % psid
Jet Pump 14 dP	EPIC-A-949	49.2 % psid
Jet Pump 15 dP	EPIC-A-951	49.7 % psid
Jet Pump 16 dP	EPIC-A-953	51.1 % psid
Jet Pump 17 dP	EPIC-A-955	46.1 % psid
Jet Pump 18 dP	EPIC-A-957	51.8 % psid
Jet Pump 19 dP	EPIC-A-959	48.2 % psid
Jet Pump 20 dP	EPIC-A-961	46.4 % psid

WORKSHEET

Level 1 Acceptance Criteria	Status (circle one)	If UNSAT, describe why below
10.1.1	SAT UNSAT	
10.1.2	SAT UNSAT	

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

RO — APPL. TO

17-1 NRC RO RC — JPM NUMBER

TASK TITLE: Determine Release Rates

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 2.3.11 (3.8)

ESTIMATED COMPLETION TIME: 25 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________ LOGIN ID:

JPM Completion Perform

Location: Classroom

DATE PERFORMED: __________ TIME TO COMPLETE: ________ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR:

____
SIGNATURE/PRINTED

RO	17-1 NRC RO RC	TASK TITLE: Determine Release Rates
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. ARPs for Panel 09-3-2

III. TOOLS AND EQUIPMENT

A. Calculator

IV. SET UP REQUIREMENTS

A. Ensure sufficient copies of the references listed above are available for the number of candidates.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.
B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and not actually performed.
C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, placekeeping and three-point communication.

VI. TASK CONDITIONS

A. A plant transient has resulted in fuel damage.
B. Radiation releases are occurring through Service Water and Off-gas.
C. Annunciator 09-3-2-27, OFF GAS RAD MON HI, has alarmed.
D. Annunciator 09-3-2-38, OFF GAS RAD MON HI-HI, has NOT alarmed.
E. Annunciator 09-3-2-30, LIQUID PROCESS RAD MONITOR HI-HI, has NOT alarmed.
F. Current indications for RBCLC, Service Water, and Off-gas radiation monitoring are provided in the attached pictures.
G. Chemistry has determined release rates / radiation levels for RBCLC, Service Water, and Off-gas as follows:

Chemistry Calculations	
RBCLC	(300 – 14.1) x 2.23 E-7 = 6.37557 E-5 μCi/ml
Service Water	(800 – 2) x 22.8 E-7 = 1.81944 E-3 μCi/ml
Off-gas	(801 – 4) x 80.04 = 480.84 μCi/sec

H. Chemistry will determine if 10CFR, ODCM, Tech Spec, or TRM release rates are within limits.

TASK TITLE: Determine Release Rates

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate of the following:

"The CRS had directed you to:

- Verify the Chemistry data entries and calculations for release rates / activity levels for:
  - RBCLC (RM-352)
  - Service Water (RM-351)
  - Off-Gas (RM-150A/B)

- Determine if, based upon the given radiation monitor indications, the status of annunciators 09-3-2-27, 09-3-2-30, and 09-3-2-38 are appropriate."

	STEP	STANDARD	EVALUATION / COMMENT
*1.	Verify RBCLC activity.	Calculates RBCLC activity should be approximately 1.915238 E-4 μCi/ml (Acceptable range of 1.673975 E-4 to 2.156501 E-4). **EVALUATOR NOTE:** The Chemistry calculation utilized an incorrect rad monitor reading and K-factor. The correct calculation is (800 – 14.1) x 2.437 E-7 = 1.915238 E-4 μCi/ml. The acceptable range is based on a chart reading of 701 and 899.	**CRITICAL STEP** SAT / UNSAT

TASK TITLE: Determine Release Rates

	STEP	STANDARD	EVALUATION / COMMENT
*2.	Verify Service Water activity.	Calculates Service Water activity to be approximately 6.7944 E-5 μCi/ml (Acceptable range of 5.6544 E-5 to 7.9344 E-5). **EVALUATOR NOTE:** The Chemistry calculation utilized an incorrect rad monitor reading and incorrect decimal point for K factor. The correct calculation is (300 – 2) x 2.28 E-7 = 6.7944 E-5 μCi/ml. The acceptable range is based on a chart reading of 250 to 350.	**CRITICAL STEP** SAT / UNSAT
*3.	Verify Off-gas activity.	Determines the Chemistry calculation for Off-gas activity is incorrect. Correct value is 63791.88 μCi/ml. **EVALUATOR NOTE:** The Chemistry calculation performed a math error by not performing parenthesis operation first before multiplying.	**CRITICAL STEP** SAT / UNSAT

TASK TITLE: Determine Release Rates

	STEP	STANDARD	EVALUATION / COMMENT
4.	Determine status of alarms.	Determines that annunciator 09-3-2-27, OFF GAS RAD MON HI, is operating properly. Determines that annunciator 09-3-2-38, OFF GAS RAD MON HI-HI, is operating properly.	SAT / UNSAT
*5	Determine status of alarms.	Determines that annunciator 09-3-2-30, LIQUID PROCESS RAD MONITOR HI-HI, should have alarmed when Service Water activity exceeded 200 cps.	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: Release rates / activities are verified. Incorrect RBCLC and Service Water calculations are identified and correct values are calculated.

HANDOUT

- A plant transient has resulted in fuel damage.
- Radiation releases are occurring through Service Water and Off-gas.
- Annunciator 09-3-2-27, OFF GAS RAD MON HI, has alarmed.
- Annunciator 09-3-2-38, OFF GAS RAD MON HI-HI, has NOT alarmed.
- Annunciator 09-3-2-30, LIQUID PROCESS RAD MONITOR HI-HI, has NOT alarmed.
- Current indications for RBCLC, Service Water, and Off-gas radiation monitoring are provided in the attached pictures.
- Chemistry has determined release rates / radiation levels for RBCLC, Service Water, and Off-gas as follows:

Chemistry Calculations	
RBCLC	(300 – 14.1) x 2.23 E-7 = 6.37557 E-5 μCi/ml
Service Water	(800 – 2) x 22.8 E-7 = 1.81944 E-3 μCi/ml
Off-gas	(801 – 4) x 80.04 = 480.84 μCi/sec

- Chemistry will determine if 10CFR, ODCM, Tech Spec, or TRM release rates are within limits.

HANDOUT (cont.)

You are directed to:

- Verify the Chemistry data entries and calculations for release rates / activity levels for:
  - RBCLC (RM-352)
  - Service Water (RM-351)
  - Off-Gas (RM-150A/B)

- **IF** any calculation was performed incorrectly, **THEN** calculate the correct value based on the information provided.

- Determine if, based upon the given radiation monitor indications, the status of annunciators 09-3-2-27, 09-3-2-30, and 09-3-2-38 are appropriate.

POSTED ATTACHMENT
(Location: Panel 09-3 CR & Sim)
09-3-2 ANNUNCIATOR WINDOW CARD

1 CORE SPRAY HDR B PIPE BREAK DETECTOR ALARM	2 CORE SPRAY SYS B VLV OVERLOAD OR PWR LOSS	3 RHR B VLV OVERLOAD OR PWR LOSS	4 RHR HX A OR B DISCH COOL WTR TEMP HI	5 RHR PMP 10P-3B TRIP OR CNTRL PWR LOSS	6 RHR PMP 10P-3B OVERCURRENT	7 OFF GAS SMPL FLOW HI OR LO	8 STACK SMPL FLOW HI OR LO	9 OFF GAS RAD MON A DOWNSCALE OR INOP	10 OFF GAS TIMER INITIATED
11 CORE SPRAY SYS B HI PRESS VLV LEAKAGE	12 CORE SPRAY SYS B LOGIC PWR FAIL	13 RHR B INJ VLV OVERLOAD OR PWR LOSS	14 RHR HX A OR B INLET WTR TEMP HI	15 RHR PMP 10P-3D TRIP OR CNTRL PWR LOSS	16 RHR PMP 10P-3D OVERCURRENT	17 OFF GAS RAD MON B DOWNSCALE OR INOP	18 STACK RAD MON DOWNSCALE OR INOP	19 RX BLDG VENT RAD MON DOWNSCALE	20 LIQUID PROCESS RAD MON DOWNSCALE OR INOP
21 CORE SPRAY PMP 14P-1B TRIP OR CNTL PWR LOSS	22 CORE SPRAY SYS B LOGIC ACTUATED	23 RHR B LOGIC PWR FAIL	24	25 RHRSW PMP 10P-1B TRIP	26 RHRSW PMP 10P-1B OVERCURRENT	27 OFF GAS RAD MON HI	28 STACK RAD MON HI	29 RX BLDG VENT RAD MON HI	30 LIQUID PROCESS RAD MONITOR HI-HI
31 CORE SPRAY PMP 14P-1B OVERLOAD	32	33	34 RHR CROSS TIE VLV NOT CLOSED	35 RHRSW PMP 10P-1D TRIP	36 RHRSW PMP 10P-1D OVERCURRENT	37 RHR SYS B LOGIC ACTUATED	38 OFF GAS RAD MON HI-HI	39 STACK RAD MON HI-HI	40 RX BLDG VENT RAD MON HI-HI

HANDOUT

HANDOUT

COPY

OFF-GAS K-FACTOR DATA SHEET

NOTE: To calculate the current OFF-GAS release rate in µCi/sec:

$$\frac{\mu Ci}{sec} = \left[\text{SJAE Rad Monitor } (mR/hr) - \text{Bkgd } (mR/hr)\right] \times \text{K-Factor } \left(\frac{\mu Ci/sec}{mR/hr}\right)$$

ANALYSIS DATE	SJAE RAD MONITOR BKGD	K- Factor $\left(\frac{\mu Ci/sec}{mR/hr}\right)$
9/30/15	A: 4.0	80.04
	B: 4.0	

DATE COMPILED: 9/30/15

TECHNICIAN: J. Putnam / J. Putnam
Print/Sign

APPROVED FOR CONTROL ROOM POSTING: YES X NO ____

SUPERVISOR: Ashley A. Elder / Ashley A. Elder
Print/Sign

OFF-GAS RADIATION MONITOR LIMITS	
Data For Sept / 2015 (month/yr)	
NOMINAL STEADY STATE READING:	HIGH ALARM SETPOINT:
17RM-150A - 12.7 mR/hr	17RM-150A - 16.8 mR/hr
17RM-150B - 9.8 mR/hr	17RM-150B - 12.6 mR/hr
CONTACT CHEMISTRY LABORATORY FOR SAMPLING REQUIREMENTS UPON RECIEIPT OF HIGH ALARM	
EPIC ALARM 30 mR/hr	

Completed forms are quality records to be retained per EN-AD-103.

HANDOUT

LIQUID PROCESS MONITOR CAL DATA

COPY

TO CALCULATE ACTIVITY:

Activity (uCi/ml) = (Monitor Reading (cps) - BKG(cps)) X K-Factor (uCi/ml/cps)

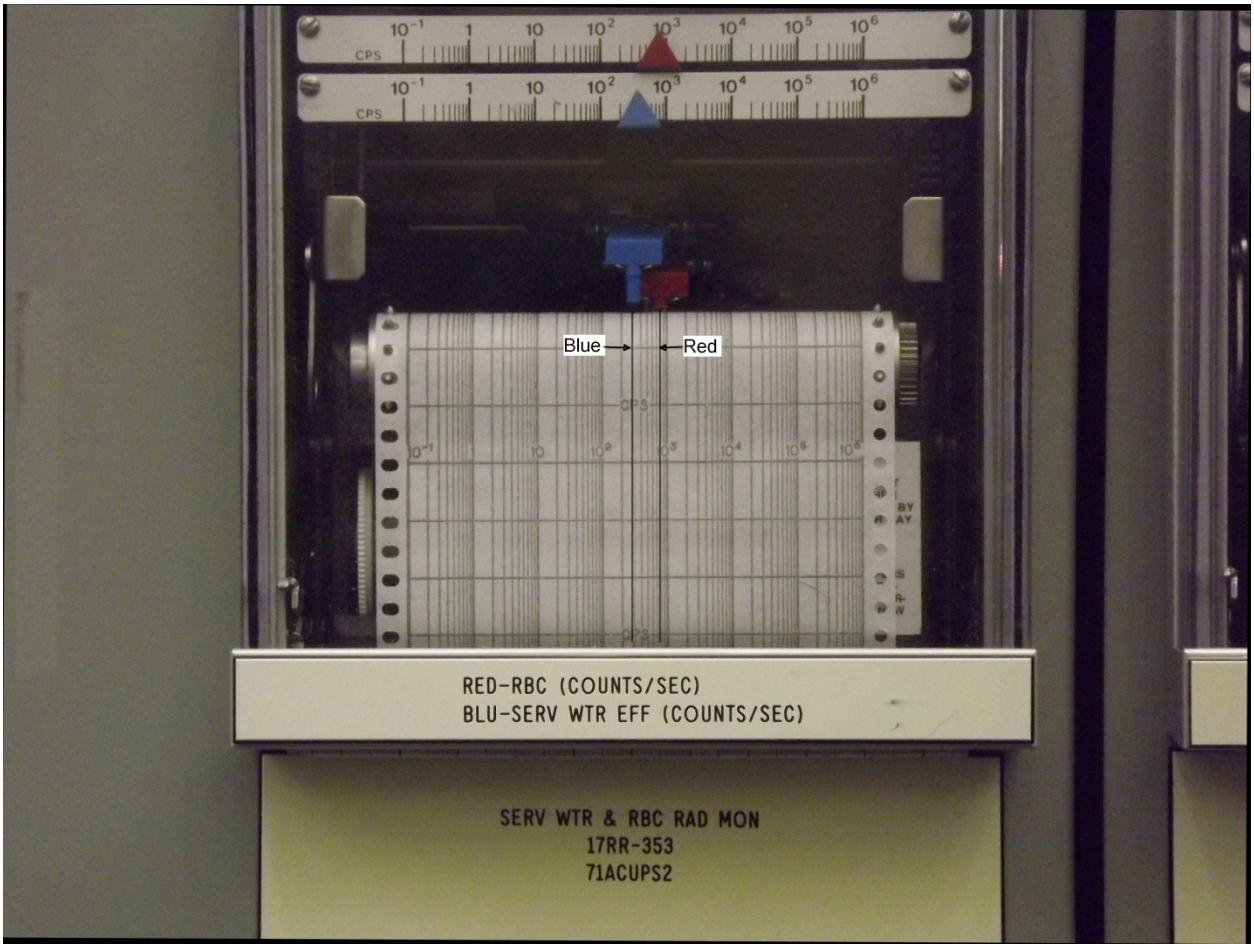
MONITOR ID	ID #	CAL DATE	BACKGROUND (BKG) cps	K FACTOR µCi/ml / cps
RADWASTE LIQUID	17RM-350	9-11-10	14	2.23E-7
NORMAL SERVICE WATER	17RM-351	9-17-15	2	2.28E-7
RBCLC	17RM-352	7-8-15	14.1	2.437E-7

CHEMISTRY TECHNICIAN: Kevin Dietrindorf
(Print/Sign)

APPROVED FOR POSTING:

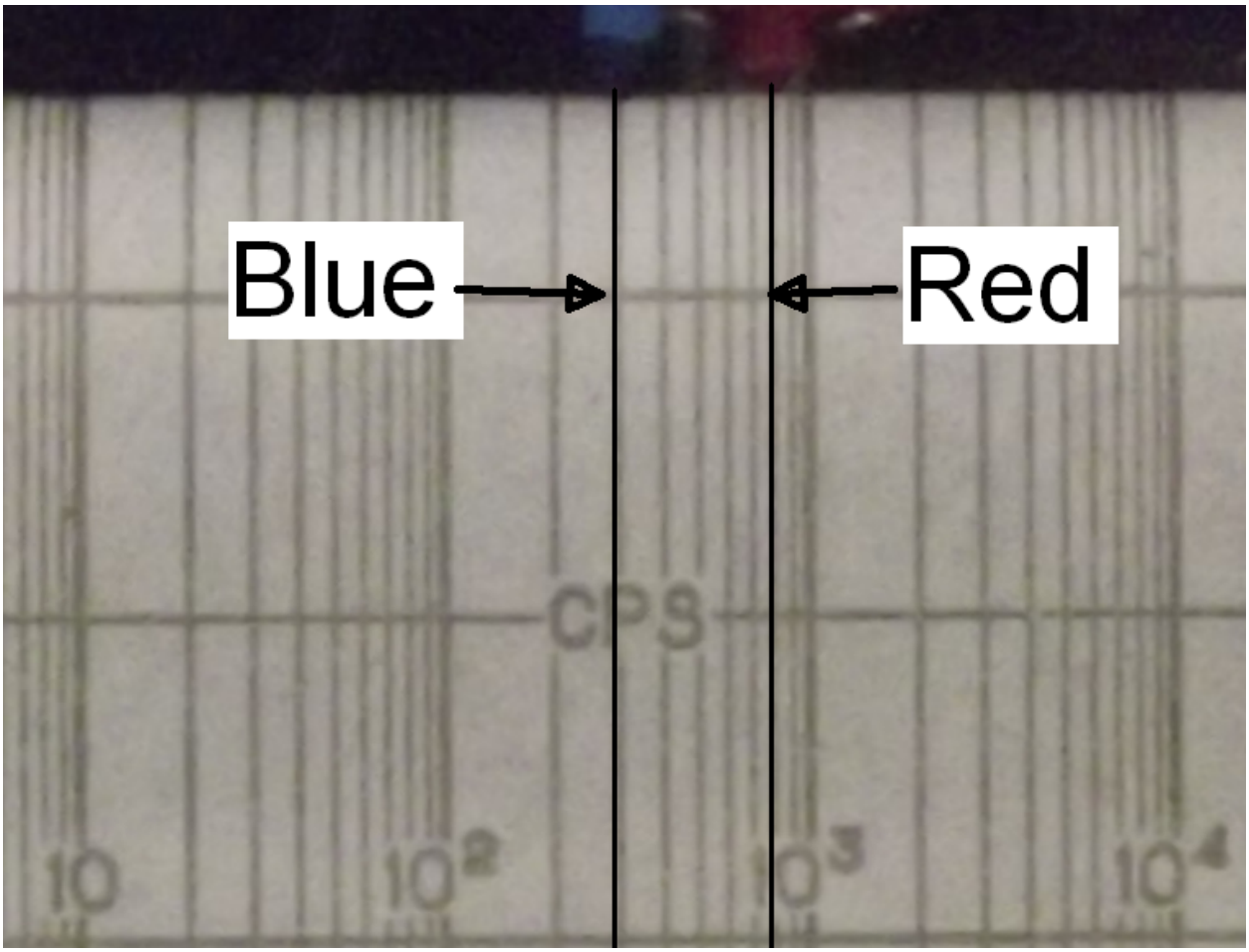
CHEMISTRY SUPERVISOR: Mark Riffle / [signature] 09/17/15
(Print/Sign) Date

HANDOUT


Blue
Red
RED-RBC (COUNTS/SEC)
BLU-SERV WTR EFF (COUNTS/SEC)
SERV WTR & RBC RAD MON
17RR-353
71ACUPS2

HANDOUT

Expanded View of Service Water and RBCLC Radiation Monitor



HANDOUT


LOG RAD MONITOR
MODE: OPERATE
MR/HR = 8.01 E 2
TRIPS =
HELP
DISPLAY OFF
ETC
CURSOR
DATA
OFF GAS RAD MON A
17RM-150A
COUNTS
PER SECOND
ONSCL
HI
HI-HI
INOP

HANDOUT


LOG RAD MONITOR
MODE: OPERATE
MR/HR = 8.01 E 2
TRIPS =
HELP
DISPLAY OFF
ETC
CURSOR
DATA
7 8 9 +
4 5 6 -
1 2 3 EXP
. 0 CE ENT
NUTAC
OFF GAS RAD MON B
17RM-150B
COUNTS
PER SECOND
DNSCL
HI
HI-HI

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

S/RO	17-1 NRC S/RO COO1	TASK TITLE:	Core Thermal Heat Balance Verification Using Turbine Steam Pressure
APPL. TO	JPM NUMBER		

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 2.1.19 (3.9/3.8)

ESTIMATED COMPLETION TIME: 12/20 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________ LOGIN ID:

JPM Completion Perform

Location: Classroom

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____________________
SIGNATURE/PRINTED

S/RO	17-1 NRC S/RO COO1	TASK TITLE:	Core Thermal Heat Balance Verification Using Turbine Steam Pressure
APPL. TO	JPM NUMBER		

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-65, Startup and Shutdown Procedure
B. RAP-7.3.03, Core Thermal Power Evaluation

III. TOOLS AND EQUIPMENT

A. Calculator
B. Steam Tables

IV. SET UP REQUIREMENTS

A. Provide a copy of RAP-7.3.03 ready to perform section 9.3 and Attachment 2.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.
B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and not actually performed.
C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, placekeeping and three-point communication.

VI. TASK CONDITIONS

A. A plant startup has just been completed.
B. Verification of Core Thermal Power is required.
C. The required plant data is given in the provided handouts.

*** - CRITICAL STEP**

TASK TITLE: Core Thermal Heat Balance Verification Using Turbine Steam Pressure

VII. INITIATING CUE

Inform the candidate, "Verify Core Thermal Power per RAP-7.3.03 Attachment 2."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain and review procedure.	Candidate obtains and reviews RAP-7.3.03. Candidate determines that the start point is Attachment 2. **EVALUATOR:** **Hand candidate a copy of RAP-7.3.03 ready to perform Section 9.3 and Attachment 2. Provide the EPIC screenshot and 3D Monicore case.**	SAT / UNSAT
*2.	Obtain and record Turbine first stage pressure from EPIC 1299.	Obtains a value of ~688.1 psig for EPIC point 1299 and records on Attachment 2.	**CRITICAL STEP** SAT / UNSAT
*3.	Calculate and record Reactor power calculated from Turbine first stage pressure.	Calculates ~103% power and records on Attachment 2.	**CRITICAL STEP** SAT / UNSAT
*4.	Obtain and record Reactor power calculated from heat balance.	Obtains a value of ~97.1% for Reactor power and records on Attachment 2.	**CRITICAL STEP** SAT / UNSAT
*5.	Determine if the two methods are within 5% of rated power of each other.	Determines the two methods differ by more than 5%.	**CRITICAL STEP** SAT / UNSAT
*6.	Determine need to initiate investigation.	Indicates that an investigation must be initiated. **NOTE:** This step may be satisfied by direct report, notification to Shift Manager, notification to Reactor Engineering, initiating a Incident Report, or similar.	**CRITICAL STEP** SAT / UNSAT

TASK TITLE: Core Thermal Heat Balance Verification Using Turbine Steam Pressure

	STEP	STANDARD	EVALUATION / COMMENT
7.	Determine need to notify General Manager Plant Operations.	Indicates that the General Manager Plant Operations must be notified if the difference cannot be explained. **NOTE:** This step may be satisfied by direct report, notification to Shift Manager, notification to Reactor Engineering, initiating a Condition Report, or similar.	SAT / UNSAT

EVALUATOR: Terminate the task at this point for RO candidates. For SRO candidates, provide the additional SRO Only Conditions and Cue, along with the SRO Only Worksheet.

Additional SRO Only Conditions:

Investigation has revealed the following:

- The 3D Monicore Core Thermal Power calculation is erroneous.
- Turbine first stage bowl pressure accurately reflects plant power level.
- Operation at the current power level has been ongoing for three hours.

Additional SRO Only Cue:

Complete the provided SRO Only Worksheet regarding requirements associated with the Licensed Power Level.

TASK TITLE: Core Thermal Heat Balance Verification Using Turbine Steam Pressure

	STEP	STANDARD	EVALUATION / COMMENT
*8.	**SRO ONLY** Determine requirements for 2 hour thermal power average	**SRO ONLY** Determines requirement for 2 hour thermal power average is: • If the 2 hour average exceeds RTP, take timely action to ensure that thermal power is less than or equal to RTP (or similar).	**CRITICAL STEP** SAT / UNSAT
*9.	**SRO ONLY** Determine requirement for average Reactor power level for each 12 hour shift	**SRO ONLY** Determines requirement for average Reactor power level for each 12 hour shift is: • The average reactor power level for each 12 hour shift shall not exceed Rated Thermal Power (or similar).	**CRITICAL STEP** SAT / UNSAT
*10.	**SRO ONLY** Determine the procedure that contains the specific guidance on both 2 hour and 12 hour thermal power averages.	**SRO ONLY** Determines RAP-7.3.16 contains the specific guidance on both 2 hour and 12 hour thermal power averages.	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point for SRO candidates.			

Task Standard: Core thermal heat balance determined to be out of tolerance in relation to Turbine steam pressure. For SRO candidates, procedural requirements of RAP-7.3.16, Plant Power Changes, for control of core thermal power determined.

SRO Only Key

1. Describe the specific requirement(s) regarding **2 hour thermal power average**, in accordance with plant procedure. **If the 2 hour average exceeds RTP, take timely action to ensure that thermal power is less than or equal to RTP (or similar).**
2. Describe the specific requirement(s) regarding the **average Reactor power level for each 12 hour shift**, in accordance with plant procedure. **The average reactor power level for each 12 hour shift shall not exceed Rated Thermal Power (or similar).**
3. Identify the plant procedure that contains the specific guidance on both of the questions above. **RAP-7.3.16**

SRO Only Key

HANDOUT

- **A plant startup has just been completed.**
- **Verification of Core Thermal Power is required.**
- **The required plant data is given in the provided handouts.**

Verify Core Thermal Power per RAP-7.3.03 Attachment 2.

HANDOUT

FITZPATRICK CY23

CORE POWER AND FLOW LOG

CASEID FMLS1180226075258

ENERGY BALANCE

POWER (MW)

ELECTRICAL	829.7	97.6%
CORE	2462.4	97.1%
FEED WATER	2450.3	
CR DRIVES	11.2	
CLEAN-UP	3.7	
RADIATIVE LOSS	1.1	
PUMPS	3.8	

FLOW (MLB/HR)

TOTAL CORE	63.96	83.1%
MEASURED	63.96	
SUBSTITUTE	63.18	
FEEDWATER	10.55	
CLEAN-UP	0.12	
RECIRC	29.83	
CR DRIVES	0.03	

PRESSURE (PSIa)

DOME	1054.26
DROP (MEAS)	17.26

ENTHALPY/SUBCOOLING (BTU/LB)

SUBC	24.11
FEEDWATER	398.37
RECIRC INLET	526.21
CLEAN-UP IN	515.62
CLEAN-UP OUT	409.20

LOAD LINE SUMMARY

CORE POWER	97.1%
CORE FLOW	83.1%
LOAD LINE	108.5%
FLOW BASIS	MEAS.
FLLLP	0.947

TEMPERATUER (Deg F)

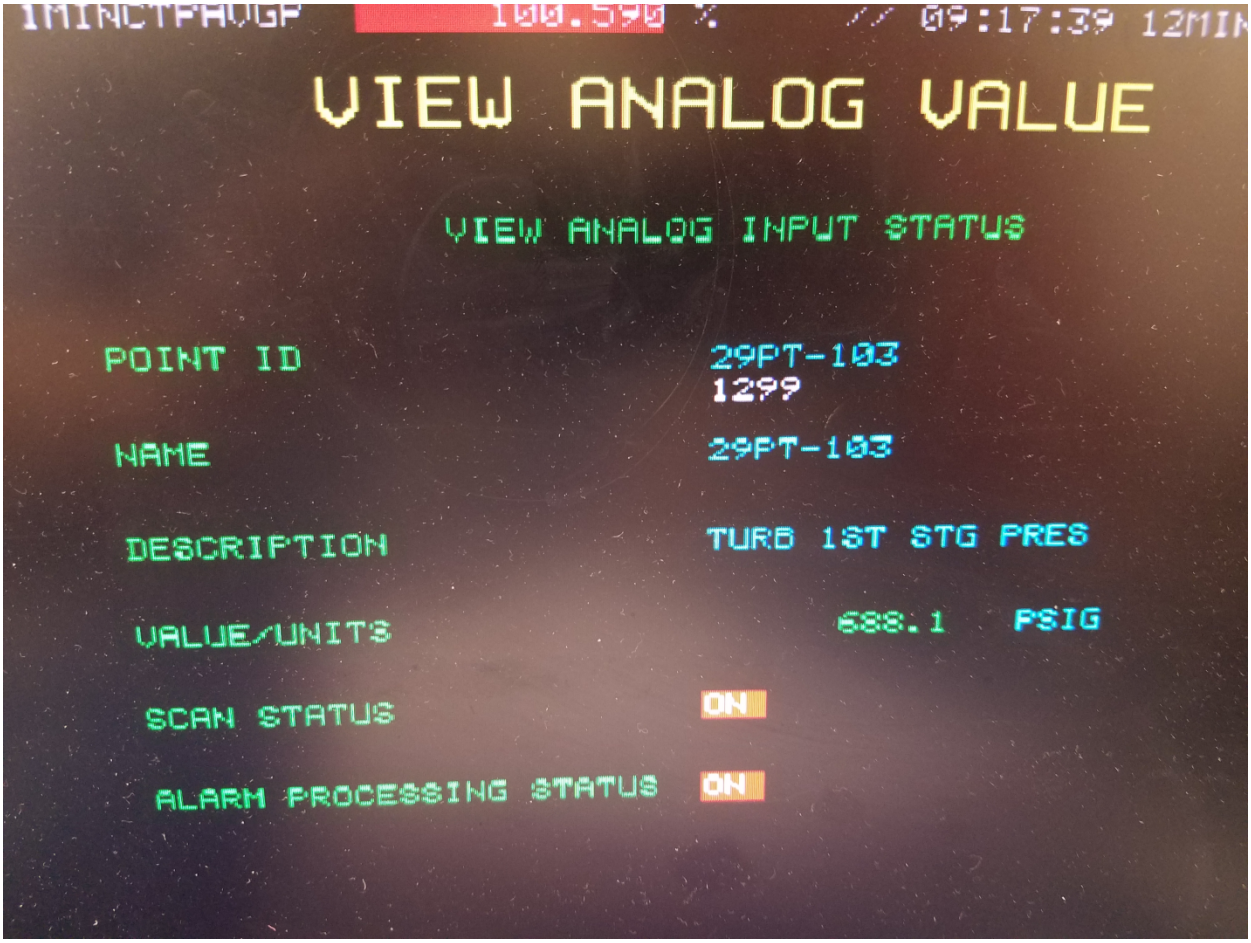
FEEDWATER	423.3
RECIRC IN	531.7
CLEAN UP IN	523.0
CLEAN UP OUT	431.3
CR DRIVES	95.0

APRM CALIBRATION

APRM ID	A	B	C	D	E	F
READING	96.7	95.7	97.3	96.7	96.4	97.5
AGAF	1.004	1.014	0.998	1.004	1.008	0.996
(APRM - %CTP)	-0.4	-1.3	0.2	-0.4	-0.7	0.4

FAILED SENSORS: NONE

HANDOUT


VIEW ANALOG VALUE
VIEW ANALOG INPUT STATUS
POINT ID
29PT-103
1299
NAME
29PT-103
DESCRIPTION
TURB 1ST STG PRES
VALUE/UNITS
688.1
PSIG
SCAN STATUS
ON
ALARM PROCESSING STATUS
ON

ADDITIONAL SRO ONLY HANDOUT

Investigation has revealed the following:

- **The 3D Monicore Core Thermal Power calculation is erroneous.**
- **Turbine first stage bowl pressure accurately reflects plant power level.**
- **Operation at the current power level has been ongoing for three hours.**

Complete the provided SRO Only Worksheet regarding requirements associated with the Licensed Power Level.

SRO Only Worksheet

1. Describe the specific requirement(s) regarding **2 hour thermal power average**, in accordance with plant procedure.
2. Describe the specific requirement(s) regarding the **average Reactor power level for each 12 hour shift**, in accordance with plant procedure.
3. Identify the plant procedure that contains the specific guidance on both of the questions above.

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

SRO	17-1 NRC SRO COO2	TASK TITLE:	Determine Reportability Requirements – Scram With Containment Isolation
APPL. TO	JPM NUMBER		

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 2.1.18 (3.8)

ESTIMATED COMPLETION TIME: 25 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________ LOGIN ID:

JPM Completion Perform

Location: Classroom

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR:

____
SIGNATURE/PRINTED

SRO	17-1 NRC SRO COO2	TASK TITLE:	Determine Reportability Requirements – Scram With Containment Isolation
APPL. TO	JPM NUMBER		

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. 10 CFR 50.72
B. NUREG 1022
C. LS-AA-1400

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Ensure sufficient copies of the referenced documents are available.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.
B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and not actually performed.
C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, placekeeping and three-point communication.

VI. TASK CONDITIONS

A. The plant was operating at 100% power with no equipment out of service.
B. A failure of the Feedwater Level Control System has occurred.
C. The plant was manually scrammed in anticipation of an automatic Reactor scram.
D. Reactor water level reached a low of 140 inches during the transient.
E. All systems operated as designed.
F. Reactor water level has been restored to the normal band.

TASK TITLE: Determine Reportability Requirements – Scram With Containment Isolation

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate of the following:

"List ALL the applicable 10 CFR 50.72 reportability requirements, the reason that they apply and the associated time limitations for reporting under that category. Record your findings on the sheet provided."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a applicable reference documents	Obtains a copy of applicable reference documents: • 10 CFR 50.72 • NUREG 1022 • LS-AA-1400 **EVALUATOR:** Ensure sufficient copies of these documents are available.	SAT / UNSAT
2.	Locate and identify applicability of 10 CFR 50.72(a)(1)	Determines no emergency classification is required **EVALUATOR NOTE:** This step may be evaluated by the absence of a one hour emergency report.	SAT / UNSAT
*3.	Locate and identify applicability of 10 CFR 50.72(b)(2)(iv)(B)	Identifies reportability per 10 CFR 50.72(b)(2)(iv)(B), for a valid RPS actuation while the Reactor is critical	**CRITICAL STEP** SAT / UNSAT
*4.	Determine notification time requirement for 10 CFR 50.72(b)(2)(iv)(B)	Determines 10 CFR 50.72(b)(2)(iv)(B) requires notification within 4 hours	**CRITICAL STEP** SAT / UNSAT

TASK TITLE: Determine Reportability Requirements – Scram With Containment Isolation

	STEP	STANDARD	EVALUATION / COMMENT
*5.	Locate and identify applicability of 10 CFR 50.72(b)(3)(iv)(A)	Identifies reportability per 10 CFR 50.72(b)(3)(iv)(A), for a valid actuation of containment isolation **EVALUATOR NOTE:** Candidate may alternately refer to 10CFR 50.72(b)(3)(iv)(B)(2) for this reportability requirement.	**CRITICAL STEP** SAT / UNSAT
*6.	Determine notification time requirement for 10 CFR 50.72(b)(3)(iv)(A)	Determines 10 CFR 50.72(b)(3)(iv)(A) requires notification within 8 hours **EVALUATOR NOTE:** Candidate may alternately refer to 10CFR 50.72(b)(3)(iv)(B)(2) for this reportability requirement. **EVALUATOR NOTE:** Candidate may report that the these notifications are due within 4 hours to coincide with the RPS actuation notification. This satisfies the requirement for notification within 8 hours.	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: NRC reportability requirements and associated time limits are determined.

HANDOUT

- **The plant was operating at 100% power with no equipment out of service.**
- **A failure of the Feedwater Level Control System has occurred.**
- **The plant was manually scrammed in anticipation of an automatic Reactor scram.**
- **Reactor water level reached a low of 140 inches during the transient.**
- **All systems operated as designed.**
- **Reactor water level has been restored to the normal band.**

List ALL the applicable 10 CFR 50.72 reportability requirements, the reason that they apply and the associated time limitations for reporting under that category. Record your findings on the sheet provided.

Attachment 1

EVALUATOR'S KEY

Identify ALL the applicable 10 CFR 50.72 reportability requirements, the reason that they apply and the associated time limitations for reporting under that category	
Reportability Requirement and Reason	Time Limit
10 CFR 50.72(b)(2)(iv)(B) Valid Reactor Protection System (RPS) actuation while the Reactor is critical	Within 4 hours
10 CFR 50.72(b)(3)(iv)(A) Valid actuation of any of the systems listed in paragraph (b)(3)(iv)(B) (isolations) **Note:** Candidate may alternately refer to 10CFR 50.72(b)(3)(iv)(B)(2) for this reportability requirement.	Within 8 hours **Note:** Candidate may report that this notification is due within 4 hours to coincide with the RPS actuation notification. This satisfies the requirement for notification within 8 hours.

EVALUATOR'S KEY

Attachment 2

JPM Scorecard for Candidate Use

Identify ALL the applicable 10 CFR 50.72 reportability requirements, the reason that they apply, and the associated time limitations for reporting under that category	
Reportability Requirement and Reason	Time Limit
	.

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

SRO	NRC 17-1 SRO EC	TASK TITLE: Review ST-23C, Jet Pump Operability – Two Loop
APPL. TO	JPM NUMBER	

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 2.2.12 (4.1)

ESTIMATED COMPLETION TIME: 20 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________

JPM Completion Perform

Location: Classroom

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____________________
SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

SRO	NRC 17-1 SRO EC	TASK TITLE: Review ST-23C, Jet Pump Operability – Two Loop
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. ST-23C, Jet Pump Operability Test for Two Loop Operation

III. TOOLS AND EQUIPMENT

A. Calculator

IV. SET UP REQUIREMENTS

A. Ensure a copy of the associated JPM handout is available for each candidate (ST-23C completed up to Management SRO Review – numbers based on failure of JP 4 at 100% power).

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. ST-23C, Jet Pump Operability Test for Two Loop Operation (EPIC Available), has been performed and is ready for the Management SRO Review.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Perform the Management SRO Review of ST-23C per section 11.2. Report your findings in the space below, including any required actions or restrictions (Tech Spec, TRM, ODCM, etc.), if applicable."

EVALUATOR: Provide the candidate with the attached handout and the prepared copy of ST-23C.

	STEP	STANDARD	EVALUATION / COMMENT
1.	Review data recorded in ST-23C.	Reviews data recorded in ST-23C.	SAT / UNSAT
*2.	Identify calculation error in step 8.2.	Identifies the calculation in step 8.2 should be recorded as 6.5 Mlbm/hr.	**CRITICAL STEP** SAT / UNSAT
*3.	Identify Level 1 Acceptance Criteria 10.1.1 is NOT met.	Identifies Level 1 Acceptance Criteria 10.1.1 is NOT met due to Recirculation loop jet pump flow mismatch. **EVALATOR NOTE:** Level 1 Acceptance Criteria 10.1.1 is NOT met because total core flow is greater than 70% and Recirculation loop jet pump flow mismatch is greater than 3.85 Mlbm/hr.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*4.	Identify Level 1 Acceptance Criteria 10.1.2 is NOT met.	Identifies Level 1 Acceptance Criteria 10.1.2 is NOT met. **EVALUATOR NOTE:** Level 1 Acceptance Criteria 10.1.2 is NOT met because both: • Loop flow is greater than 5% from predicted on Attachments 3 and 4 AND • Jet pump 3 and 4 dPs are greater than 20% below established values.	**CRITICAL STEP** SAT / UNSAT
5.	Identify required notification.	Identifies immediate notification of the Operations Manager or alternate is required.	SAT / UNSAT
*6.	Identify required corrective and compensatory actions.	Identifies Technical Specification LCO 3.4.1 Condition B must be entered (restore mismatch within 24 hours). Identifies Technical Specification LCO 3.4.2 Condition A must be entered (be in Mode 3 within 12 hours).	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

HANDOUT

- **ST-23C, Jet Pump Operability Test for Two Loop Operation (EPIC Available), has been performed and is ready for the Management SRO Review.**

Perform the Management SRO Review of ST-23C per section 11.2. Report your findings in the space below, including any required actions or restrictions (Tech Spec, TRM, ODCM, etc.), if applicable.

ENTERGY NUCLEAR OPERATIONS, INC.
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
OPERATIONS SURVEILLANCE TEST PROCEDURE

JET PUMP OPERABILITY TEST FOR TWO LOOP OPERATION (EPIC AVAILABLE)
ST-23C
REVISION 28

APPROVED BY: _____ DATE: _____
RESPONSIBLE PROCEDURE OWNER

EFFECTIVE DATE: _____

FIRST ISSUE ☐ FULL REVISION ☐ LIMITED REVISION ☒

CONTINUOUS USE	QUALITY RELATED
TECHNICAL	

REVISION SUMMARY SHEET

REV. NO.	CHANGED AND REASON FOR CHANGE
28	Changed steps 8.1.4 and 8.1.5 and Attachment 2 (Steps G and H) to take readings from the "A" and "B" recirc pump speeds via 02-184SI-16A1 and 02-184SI-16B1 at the 09-4 bench panel vice performing calculations using Recirc Pump Power for speed. This is due to the "A" Recirc pump power indication no longer being valid in EPIC due to instrument failure. (Temp Change DRN-14-00395) In Attachment 5, column 1 changed all numbers to whole numbers to maintain consistency throughout the attachment. (PCR 681) In step 9.2.1 removed the requirement to independently verify the calculations performed in steps 8.1.4 and 8.1.5 because these steps no longer direct performing a calculation. (PCR 989)
27	Updated Attachment 5 with baseline data collected following R20. (PCR dated 2/1/13)
26	Changed procedure level of use from Continuous to Reference. ST-23C does not meet the criteria of Continuous use per AP-02.04 Rev 40 or EN-AD-102 Rev 5. ST-23C is not infrequently performed or complex. Improper collection of data would not have immediate possible irreversible impact on safety, production or reliability. Deleted prerequisite that Recirculation pump speeds be within 5%. Replacing pumps (new vs old) or operation below 70% complicate meeting the 5% criteria. (Review comment). Revised Step 8.1.4 to calculate speed through formula due to normal EPIC point was unavailable. Incorporated this change permanently and extended to B Pump speed. Both 02-184SI-16A1 and 02-184SI-16B1 at panel 09-4 are available but less accurate and will be recorded on Attachment 2 only (TC dated 4/9/09). Corrected errors with original TC by removing second independent verification and replacing initial lines removed by TC. Corrected Section 9.1 numbering (TC dated

5/11/09).

25 Updated Attachments 3 and 4 following collection of baseline data after RFO-18 (TC dated 1/3/07).

TABLE OF CONTENTS

1.0 **REQUIREMENTS**

1.1 **Frequency**

24 hours

1.2 **Technical Specifications**

1.2.1 **Surveillance Requirements**

- SR 3.4.1.2
- SR 3.4.2.1

1.2.2 **Limiting Conditions for Operation**

- LCO 3.4.1
- LCO 3.4.2

1.3 **Other**

None

1.4 **Commitments**

None

2.0 **PURPOSE**

2.1 Verify recirc loop jet pump flow mismatch is within allowable limits

2.2 Verify operability of Jet Pump Assemblies during two loop operation when EPIC is available.

3.0 REFERENCES

3.1 Performance References

None

3.2 Developmental References

3.2.1 GEK Volume II Section 16631

3.2.2 OP 27, Recirculation System

3.2.3 DER 96 0095 (ACTS 19429) Added Subsection 8.5 Reactor Engineering Data Collection

3.2.4 Attachments 3, 4 and 5 based on jet pump performance data collected from ST-23C during cycle 18.

Init

4.0 **PREREQUISITES**

4.1 SM has granted permission to perform this test. *TH*

4.2 Revision Number of this Working Copy is the same as the revision number listed in the Master Copy of the Index of Operations Surveillance Test Procedures. *TH*

4.3 Test personnel have read this procedure and are thoroughly familiar with its contents. *TH*

4.4 Start of test recorded. *Today / 0700* *TH*
Date/Time

4.5 Start of test recorded in narrative log. *TH*

4.6 SM determines current status of reactor engineering data:

(_) Baselining data for new established pattern.

(_) Established pattern exists. *TH*

4.7 EPIC is available. *TH*

4.8 **IF** procedure will be performed **WHILE LESS THAN** 25% RTP,
THEN mark the following steps 'NA':

- 8.1.4 through 8.1.7
- 8.3 and 8.4

TH

5.0 **TEST EQUIPMENT, SPECIAL TOOLS AND MATERIALS**

5.1 None

6.0 PRECAUTIONS AND LIMITATIONS

6.1 Precautions

None

6.2 Limitations

6.2.1 Test personnel shall immediately notify the CRS of any failure to meet Level 1 acceptance criteria.

6.2.2 Test personnel shall print name, sign initials, and enter date on Attachment 1 before performing Section 8 of this test.

6.2.3 When test personnel complete their assigned portion of this test, they shall enter hours worked on Attachment 1.

6.2.4 Once this test has been started, any additional test personnel shall read this procedure and become thoroughly familiar with its contents before performing any portion of this test.

6.2.5 Multiple working copies of this test may be used provided the following requirements are satisfied:

NOTE: The work site is defined as the location where work is controlled. The location of the work site is at the discretion of the SNO.

A. A working copy of this test shall be retained at the work site.

B. The work site working copy shall be the legal record for documenting this test.

C. Data from all steps performed away from the work site, including signatures, initials, and recorded values, is transcribed into the work site working copy following completion of the test.

7.0 GENERAL TEST METHODS

7.1 This test performs the following:

7.1.1 Verifies recirculation loop jet pump flow mismatch with both recirc loops in operation is within limits for above and below 70% core flow.

7.1.2 Verifies recirculation loop flow to recirc speed ratio is within limits of established patterns.

7.1.3 Verifies recirculation loop jet pump flow to recirc pump speed ratio is within limits of established patterns.

7.1.4 Verifies each jet pump differential pressure is within limits of established patterns.

7.2 Technical Specification Basis for SR 3.4.2.1 provides for base lining new established patterns and allows engineering judgment to be used to satisfy this surveillance while the new patterns are being developed.

7.3 This procedure may be used for post work testing and verification of operability for applicable equipment provided the following actions are performed:

7.3.1 The actions and requirements of Sections 1 through 6, 10, and 11 are satisfied.

7.3.2 The applicable portions of Sections 8 and 9 are performed.

7.3.3 Signoff for non-applicable portions of Sections 8 and 9 are marked "NA".

7.3.4 The reason for partial performance of this test is documented in Section 11.3.

Init

8.0 **PROCEDURE**

8.1 Record the following:

8.1.1	Total Core Flow	93.5 (% rated) EPIC-A-3330		TH
8.1.2	Loop A Jet Pump Flow	32.5 Mlbm/hr 02-3FI-92A		TH
8.1.3	Loop B Jet Pump Flow	39.0 Mlbm/hr 02-3FI-92B		TH
8.1.4	A Pump Speed (02-184SI-16A1 at panel 09-4)	81.5 %		TH
8.1.5	B Pump Speed (02-184SI-16B1 at panel 09-4)	82.4 %		TH
8.1.6	A Recirc Loop Flow	17.422 Mlbm/hr EPIC-A-3317		TH
8.1.7	B Recirc Loop Flow	16.602 Mlbm/hr EPIC-A-3318		TH

8.2 Calculate the absolute value of:

|(8.1.2) - (8.1.3)| = 0.9 Mlbm/hr TH

Init

NOTE: EPIC display ST-23C may be used to obtain all jet pump DPs.

8.3 Record the following on Attachment 5:

8.3.1 Average Loop PSID.

8.3.2 Diffuser to lower plenum differential pressure for each jet pump.

8.4 Record Reactor Engineering Data on Attachment 2. *TH*

8.5 **IF** baseline data is being collected to complete new "established patterns",
THEN Rx Engineering confirm there are no significant abnormalities which could indicate a jet pump failure.

N/A /
Rx Engineering

Init

9.0 RETURN TO NORMAL

9.1 System Restoration

None

9.2 Review and Signoff

9.2.1 Calculation performed in Step 8.2 has been independently verified.

Independent verification ____*Dale Klein*____/ *Today*
Signature/Date

9.2.2 Test completed. ____*Today / 0900*_____
Date/Time *TH*

9.2.3 Test personnel have recorded hours worked on Attachment 1. *TH*

9.2.4 Man-Hours totaled and recorded on Attachment 1. *TH*

10.0 **ACCEPTANCE CRITERIA**

10.1 **Level 1 Acceptance Criteria**

10.1.1 For the Total Core flow recorded in Step 8.1, Recirculation loop jet pump flow mismatch from Step 8.2 meets one of the following:

- **LESS THAN OR EQUAL TO** 10% (7.7 Mlbm/hr) of rated core flow when operating at **LESS THAN** 70% of rated core flow

- **LESS THAN OR EQUAL TO** 5% (3.85 Mlbm/hr) of rated core flow when operating at **GREATER THAN OR EQUAL TO** 70% of rated core flow

10.1.2 **IF** base lining of new "established patterns" has been completed,
THEN at least one of the following criteria (A **OR** B) is satisfied for each operating recirculation loop:

A. <u>Loop Flow vs Pump Speed vs Jet Pump Flow</u>

- <u>Loop A</u>

  - For the Pump Speed recorded in Step 8.1.4 A Recirc loop flow from Step 8.1.6 is within ±5% of A Loop Predicted Flow on Attachment 3.

  - For the Pump Speed recorded in Step 8.1.4 A Recirc Loop JP flow from Step 8.1.2 is within ±5% of A Loop Predicted Flow on Attachment 4.

- <u>Loop B</u>

  - For the Pump Speed recorded in Step 8.1.5 B Recirc Loop flow from Step 8.1.7 is within ±5% of B Loop Predicted Flow on Attachment 3.

  - For the Pump Speed recorded in Step 8.1.5 B Recirc Loop JP flow from Step 8.1.3 is within ±5% of B Loop Predicted Flow on Attachment 4.

B. Jet Pump dP vs. Loop Jet Pump Average dP

- Loop A

  Each Loop A JP diffuser to lower plenum dP recorded on Attachment 5 is within ±20% of established patterns for the Average Loop PSID recorded on Attachment 5.

- Loop B

  Each Loop B JP diffuser to lower plenum dP recorded on Attachment 5 is within ±20% of established patterns for the Average Loop PSID recorded on Attachment 5.

10.1.3 **IF** baseline data is being collected to complete new "established patterns",
THEN engineering judgement of the flow data confirmed there are no significant abnormalities which could indicate a jet pump failure per Step 8.5.

10.2 **Level 2 Acceptance Criteria**

10.2.1 **IF** base lining of new "established patterns" has been completed,
THEN both of the following criteria (A **AND** B) is satisfied for each operating recirculation loop:

A. Loop Flow vs Pump Speed vs Jet Pump Flow

- Loop A

  - For the Pump Speed recorded in Step 8.1.4 A Recirc loop flow from Step 8.1.6 is within ±5% of A Loop Predicted Flow on Attachment 3.

  - For the Pump Speed recorded in Step 8.1.4 A Recirc Loop JP flow from Step 8.1.2 is within ±5% of A Loop Predicted Flow on Attachment 4.

- Loop B

  - For the Pump Speed recorded in Step 8.1.5 B Recirc Loop flow from Step 8.1.7 is within ±5% of B Loop Predicted Flow on Attachment 3.

  - For the Pump Speed recorded in Step 8.1.5 B Recirc Loop JP flow from Step 8.1.3 is within ±5% of B Loop Predicted Flow on Attachment 4.

B. Jet Pump dP vs. Loop Jet Pump Average dP

- Loop A

  Each Loop A JP diffuser to lower plenum dP recorded on Attachment 5 is within ±20% of established patterns for the Average Loop PSID recorded on Attachment 5.

- Loop B

Each Loop B JP diffuser to lower plenum dP recorded on Attachment 5 is within ±20% of established patterns for the Average Loop PSID recorded on Attachment 5.

11.0 ACCEPTANCE VERIFICATION

11.1 Performer Review

11.1.1 Verify required data has been recorded and is within required tolerances. (x)

11.1.2 Verify required initials and signatures have been entered. (x)

11.1.3 **IF** Level 1 Acceptance Criteria was not met, **THEN** perform the following:

A. Sign off ST as unsatisfactory.

B. Immediately notify the CRS.

C. Initiate a CR. ___N/A___
CR number

D. If necessary, initiate a WR. ___N/A___
WR number

NOTE: A CR is required for instruments that exceed As Found tolerances for tracking purposes.

11.1.4 **IF** only Level 2 Acceptance Criteria was not met, **THEN** perform the following:

A. Sign off ST as satisfactory with corrective actions.

B. Initiate either a CR or a WR. ___N/A___
WR/CR number

11.1.5 Identify test results:

(x) Satisfactory

(_) Satisfactory with corrective actions

(_) Unsatisfactory

11.1.6 Record results in narrative log. (x)

11.1.7 Sign and record date and time.

_____Tony Hall_____ Today / 0900
Date/Time

11.2 **Management SRO Review**

11.2.1 Verify data is within required tolerances.

11.2.2 Verify data attachments, such as recorder printouts and calibration sheets are included as required.

11.2.3 Verify required initials and signatures have been entered.

11.2.4 Review test to determine if test results satisfy acceptance criteria:

(_) Satisfactory

(_) Satisfactory with corrective actions

(_) Unsatisfactory

11.2.5 **IF** Level 1 acceptance criteria is not satisfied, **THEN** immediately notify Operations Manager or alternate. Record name of person notified.

_____
Person Notified

11.2.6 Initiate required corrective and compensatory actions.

(_) Not required

(_) Required

11.2.7 Sign and record date and time.

_____ _____
Management SRO Date/Time

11.3 **Remarks**

12.0 **ATTACHMENTS**

1. TEST SIGNOFF LOG
2. ST 23C DATA FOR REACTOR ENGINEERING SUPPORT
3. PUMP SPEED vs. LOOP FLOW
4. PUMP SPEED vs. JET PUMP FLOW
5. LOOP AVERAGE dP vs. JET PUMP dP

ATTACHMENT 1 Page 1 of 1

TEST SIGNOFF LOG

PRINTED NAME	INITIALS	DATE	HOURS WORKED
Tony Hall	*TH*	*Today*	*2*
Joe Smith	*JS*	*Today*	*1*
Dale Klein	*DK*	*Today*	*1*

Total Man-Hours 4

ATTACHMENT 2 Page 1 of 1

ST 23C DATA FOR REACTOR ENGINEERING SUPPORT

Today / 0730
Date/Time

A.	Recirc Loop A flow (EPIC-A-3317)	*17.422*	Mlbm/hr
B.	Recirc Loop B flow (EPIC-A-3318)	*16.602*	Mlbm/hr
C.	Rx Total Core Flow (EPIC-A-0414)	*71.4*	Mlbm/hr
D.	EPIC-A-6254, WTSUB	*72.9*	Mlbm/hr
E.	Recirc Pump A Speed (02-184SI-16A1 at panel 09-4)	*82.46*	%
F.	Recirc Pump B Speed (02-184SI-16B1 at panel 09-4)	*82.50*	%
G.	RWR Loop A Jet Pump Flow (02-3FI-92A at panel 09-4)	*32.5*	lbs/hr x 10^6
H.	RWR Loop B Jet Pump Flow (02-3FI-92B at panel 09-4)	*39.0*	lbs/hr x 10^6
I.	Double Tapped JP 1 Flow (02-3FI-87A at panel 09-4)	*3.45*	lbs/hr x 10^6
J.	Double Tapped JP 6 Flow (02-3FI-87C at panel 09-4)	*3.3*	lbs/hr x 10^6
K.	Double Tapped JP 11 Flow (02-3FI-87B at panel 09-4)	*4.0*	lbs/hr x 10^6
L.	Double Tapped JP 16 Flow (02-3FI-87D at panel 09-4)	*4.1*	lbs/hr x 10^6
M.	EPIC-A-3382 RECIRC LOOP A AVE JET PMP %PSID	*31.01*	%psid
N.	EPIC-A-3381 RECIRC LOOP B AVE JET PMP %PSID	*48.71*	%psid
O.	EPIC-A-405 RX CORE DIFF PRES	*17.6*	psid
P.	EPIC-A-3390 P6 10 MIN AVG CORE THERMAL POWER	*2437.8*	mwth

ATTACHMENT 3

PUMP SPEED vs. LOOP FLOW

Pump Speed	A Loop Predicted Flow (Mlbm/hr)	-5%	+5%	B Loop Predicted Flow (Mlbm/hr)	-5%	+5%
4	0.70	0.67	0.74	0.87	0.83	0.91
5	0.90	0.85	0.94	1.06	1.01	1.11
6	1.10	1.04	1.15	1.25	1.19	1.31
7	1.29	1.23	1.36	1.44	1.36	1.51
8	1.49	1.41	1.56	1.62	1.54	1.71
9	1.68	1.60	1.77	1.81	1.72	1.90
10	1.88	1.78	1.97	2.00	1.90	2.10
11	2.07	1.97	2.18	2.19	2.08	2.30
12	2.27	2.16	2.38	2.38	2.26	2.50
13	2.47	2.34	2.59	2.56	2.44	2.69
14	2.66	2.53	2.80	2.75	2.62	2.89
15	2.86	2.72	3.00	2.94	2.79	3.09
16	3.05	2.90	3.21	3.13	2.97	3.29
17	3.25	3.09	3.41	3.32	3.15	3.48
18	3.45	3.27	3.62	3.51	3.33	3.68
19	3.64	3.46	3.82	3.69	3.51	3.88
20	3.84	3.65	4.03	3.88	3.69	4.08
21	4.03	3.83	4.24	4.07	3.87	4.27
22	4.23	4.02	4.44	4.26	4.05	4.47
23	4.43	4.20	4.65	4.45	4.22	4.67
24	4.62	4.39	4.85	4.64	4.40	4.87
25	4.82	4.58	5.06	4.82	4.58	5.06
26	5.01	4.76	5.26	5.01	4.76	5.26
27	5.21	4.95	5.47	5.20	4.94	5.46
28	5.41	5.13	5.68	5.39	5.12	5.66
29	5.60	5.32	5.88	5.58	5.30	5.85
30	5.80	5.51	6.09	5.76	5.48	6.05
31	5.99	5.69	6.29	5.95	5.65	6.25
32	6.19	5.88	6.50	6.14	5.83	6.45
33	6.38	6.07	6.70	6.33	6.01	6.65
34	6.58	6.25	6.91	6.52	6.19	6.84
35	6.78	6.44	7.12	6.71	6.37	7.04
36	6.97	6.62	7.32	6.89	6.55	7.24
37	7.17	6.81	7.53	7.08	6.73	7.44
38	7.36	7.00	7.73	7.27	6.91	7.63
39	7.56	7.18	7.94	7.46	7.09	7.83
40	7.76	7.37	8.14	7.65	7.26	8.03
41	7.95	7.55	8.35	7.83	7.44	8.23
42	8.15	7.74	8.55	8.02	7.62	8.42
43	8.34	7.93	8.76	8.21	7.80	8.62

ATTACHMENT 3

PUMP SPEED vs. LOOP FLOW

Pump Speed	A Loop Predicted Flow (Mlbm/hr)	-5%	+5%	B Loop Predicted Flow (Mlbm/hr)	-5%	+5%
44	8.54	8.11	8.97	8.40	7.98	8.82
45	8.74	8.30	9.17	8.59	8.16	9.02
46	8.93	8.48	9.38	8.78	8.34	9.21
47	9.13	8.67	9.58	8.96	8.52	9.41
48	9.32	8.86	9.79	9.15	8.69	9.61
49	9.52	9.04	9.99	9.34	8.87	9.81
50	9.71	9.23	10.20	9.53	9.05	10.00
51	9.91	9.42	10.41	9.72	9.23	10.20
52	10.11	9.60	10.61	9.90	9.41	10.40
53	10.30	9.79	10.82	10.09	9.59	10.60
54	10.50	9.97	11.02	10.28	9.77	10.80
55	10.69	10.16	11.23	10.47	9.95	10.99
56	10.89	10.35	11.43	10.66	10.12	11.19
57	11.09	10.53	11.64	10.85	10.30	11.39
58	11.28	10.72	11.85	11.03	10.48	11.59
59	11.48	10.90	12.05	11.22	10.66	11.78
60	11.67	11.09	12.26	11.41	10.84	11.98
61	11.87	11.28	12.46	11.60	11.02	12.18
62	12.07	11.46	12.67	11.79	11.20	12.38
63	12.26	11.65	12.87	11.97	11.38	12.57
64	12.46	11.83	13.08	12.16	11.55	12.77
65	12.65	12.02	13.29	12.35	11.73	12.97
66	12.85	12.21	13.49	12.54	11.91	13.17
67	13.05	12.39	13.70	12.73	12.09	13.36
68	13.24	12.58	13.90	12.92	12.27	13.56
69	13.44	12.77	14.11	13.10	12.45	13.76
70	13.63	12.95	14.31	13.29	12.63	13.96
71	13.83	13.14	14.52	13.48	12.81	14.15
72	14.02	13.32	14.73	13.67	12.99	14.35
73	14.22	13.51	14.93	13.86	13.16	14.55
74	14.42	13.70	15.14	14.05	13.34	14.75
75	14.61	13.88	15.34	14.23	13.52	14.94
76	14.81	14.07	15.55	14.42	13.70	15.14
77	15.00	14.25	15.75	14.61	13.88	15.34
78	15.20	14.44	15.96	14.80	14.06	15.54
79	15.40	14.63	16.17	14.99	14.24	15.74
80	15.59	14.81	16.37	15.17	14.42	15.93
81	15.79	15.00	16.58	15.36	14.59	16.13
82	15.98	15.18	16.78	15.55	14.77	16.33
83	16.18	15.37	16.99	15.74	14.95	16.53
84	16.38	15.56	17.19	15.93	15.13	16.72

ATTACHMENT 3

PUMP SPEED vs. LOOP FLOW

Pump Speed	A Loop Predicted Flow (Mlbm/hr)	-5%	+5%	B Loop Predicted Flow (Mlbm/hr)	-5%	+5%
85	16.57	15.74	17.40	16.12	15.31	16.92
86	16.77	15.93	17.61	16.30	15.49	17.12
87	16.96	16.11	17.81	16.49	15.67	17.32
88	17.16	16.30	18.02	16.68	15.85	17.51
89	17.35	16.49	18.22	16.87	16.02	17.71
90	17.55	16.67	18.43	17.06	16.20	17.91
91	17.75	16.86	18.63	17.24	16.38	18.11
92	17.94	17.05	18.84	17.43	16.56	18.30
93	18.14	17.23	19.05	17.62	16.74	18.50
94	18.33	17.42	19.25	17.81	16.92	18.70
95	18.53	17.60	19.46	18.00	17.10	18.90
96	18.73	17.79	19.66	18.19	17.28	19.09
97	18.92	17.98	19.87	18.37	17.46	19.29
98	19.12	18.16	20.07	18.56	17.63	19.49
99	19.31	18.35	20.28	18.75	17.81	19.69
100	19.51	18.53	20.49	18.94	17.99	19.89
101	19.71	18.72	20.69	19.13	18.17	20.08
102	19.90	18.91	20.90	19.31	18.35	20.28
103	20.10	19.09	21.10	19.50	18.53	20.48
104	20.29	19.28	21.31	19.69	18.71	20.68
105	20.49	19.46	21.51	19.88	18.89	20.87

ATTACHMENT 4 Page 1 of 3

PUMP SPEED vs. JET PUMP FLOW

Pump Speed	A Loop JP Predicted Flow (Mlbm/hr	-5%	+5%	B Loop JP Predicted Flow (Mlbm/hr	-5%	+5%
4	3.81	3.62	4.00	5.99	5.69	6.29
5	4.20	3.99	4.41	6.36	6.04	6.67
6	4.60	4.37	4.83	6.72	6.38	7.05
7	4.99	4.74	5.24	7.08	6.72	7.43
8	5.39	5.12	5.66	7.44	7.07	7.81
9	5.79	5.50	6.07	7.80	7.41	8.19
10	6.18	5.87	6.49	8.16	7.75	8.57
11	6.58	6.25	6.90	8.52	8.10	8.95
12	6.97	6.62	7.32	8.89	8.44	9.33
13	7.37	7.00	7.74	9.25	8.78	9.71
14	7.76	7.37	8.15	9.61	9.13	10.09
15	8.16	7.75	8.57	9.97	9.47	10.47
16	8.55	8.13	8.98	10.33	9.81	10.85
17	8.95	8.50	9.40	10.69	10.16	11.23
18	9.34	8.88	9.81	11.05	10.50	11.61
19	9.74	9.25	10.23	11.41	10.84	11.99
20	10.13	9.63	10.64	11.78	11.19	12.37
21	10.53	10.00	11.06	12.14	11.53	12.74
22	10.93	10.38	11.47	12.50	11.87	13.12
23	11.32	10.75	11.89	12.86	12.22	13.50
24	11.72	11.13	12.30	13.22	12.56	13.88
25	12.11	11.51	12.72	13.58	12.90	14.26
26	12.51	11.88	13.13	13.94	13.25	14.64
27	12.90	12.26	13.55	14.31	13.59	15.02
28	13.30	12.63	13.96	14.67	13.93	15.40
29	13.69	13.01	14.38	15.03	14.28	15.78
30	14.09	13.38	14.79	15.39	14.62	16.16
31	14.48	13.76	15.21	15.75	14.96	16.54
32	14.88	14.14	15.62	16.11	15.31	16.92
33	15.27	14.51	16.04	16.47	15.65	17.30
34	15.67	14.89	16.45	16.84	15.99	17.68
35	16.07	15.26	16.87	17.20	16.34	18.06
36	16.46	15.64	17.28	17.56	16.68	18.44
37	16.86	16.01	17.7	17.92	17.02	18.82
38	17.25	16.39	18.11	18.28	17.37	19.20
39	17.65	16.76	18.53	18.64	17.71	19.58
40	18.04	17.14	18.94	19.00	18.05	19.95
41	18.44	17.52	19.36	19.37	18.40	20.33
42	18.83	17.89	19.78	19.73	18.74	20.71
43	19.23	18.27	20.19	20.09	19.08	21.09

ATTACHMENT 4 Page 2 of 3

PUMP SPEED vs. JET PUMP FLOW

Pump Speed	A Loop JP Predicted Flow (Mlbm/hr	-5%	+5%	B Loop JP Predicted Flow (Mlbm/hr	-5%	+5%
44	19.62	18.64	20.61	20.45	19.43	21.47
45	20.02	19.02	21.02	20.81	19.77	21.85
46	20.42	19.39	21.44	21.17	20.11	22.23
47	20.81	19.77	21.85	21.53	20.46	22.61
48	21.21	20.15	22.27	21.90	20.80	22.99
49	21.60	20.52	22.68	22.26	21.14	23.37
50	22.00	20.90	23.1	22.62	21.49	23.75
51	22.39	21.27	23.51	22.98	21.83	24.13
52	22.79	21.65	23.93	23.34	22.17	24.51
53	23.18	22.02	24.34	23.70	22.52	24.89
54	23.58	22.40	24.76	24.06	22.86	25.27
55	23.97	22.78	25.17	24.43	23.20	25.65
56	24.37	23.15	25.59	24.79	23.55	26.03
57	24.76	23.53	26	25.15	23.89	26.41
58	25.16	23.90	26.42	25.51	24.23	26.78
59	25.56	24.28	26.83	25.87	24.58	27.16
60	25.95	24.65	27.25	26.23	24.92	27.54
61	26.35	25.03	27.66	26.59	25.26	27.92
62	26.74	25.40	28.08	26.96	25.61	28.30
63	27.14	25.78	28.49	27.32	25.95	28.68
64	27.53	26.16	28.91	27.68	26.29	29.06
65	27.93	26.53	29.32	28.04	26.64	29.44
66	28.32	26.91	29.74	28.40	26.98	29.82
67	28.72	27.28	30.15	28.76	27.32	30.20
68	29.11	27.66	30.57	29.12	27.67	30.58
69	29.51	28.03	30.98	29.48	28.01	30.96
70	29.90	28.41	31.4	29.85	28.35	31.34
71	30.30	28.79	31.82	30.21	28.70	31.72
72	30.70	29.16	32.23	30.57	29.04	32.10
73	31.09	29.54	32.65	30.93	29.38	32.48
74	31.49	29.91	33.06	31.29	29.73	32.86
75	31.88	30.29	33.48	31.65	30.07	33.24
76	32.28	30.66	33.89	32.01	30.41	33.62
77	32.67	31.04	34.31	32.38	30.76	33.99
78	33.07	31.41	34.72	32.74	31.10	34.37
79	33.46	31.79	35.14	33.10	31.44	34.75
80	33.86	32.17	35.55	33.46	31.79	35.13
81	34.25	32.54	35.97	33.82	32.13	35.51
82	34.65	32.92	36.38	34.18	32.47	35.89
83	35.04	33.29	36.8	34.54	32.82	36.27

ATTACHMENT 4 Page 3 of 3

PUMP SPEED vs. JET PUMP FLOW

Pump Speed	A Loop JP Predicted Flow (Mlbm/hr	-5%	+5%	B Loop JP Predicted Flow (Mlbm/hr	-5%	+5%
84	35.44	33.67	37.21	34.91	33.16	36.65
85	35.84	34.04	37.63	35.27	33.50	37.03
86	36.23	34.42	38.04	35.63	33.85	37.41
87	36.63	34.80	38.46	35.99	34.19	37.79
88	37.02	35.17	38.87	36.35	34.53	38.17
89	37.42	35.55	39.29	36.71	34.88	38.55
90	37.81	35.92	39.7	37.07	35.22	38.93
91	38.21	36.30	40.12	37.44	35.56	39.31
92	38.60	36.67	40.53	37.80	35.91	39.69
93	39.00	37.05	40.95	38.16	36.25	40.07
94	39.39	37.42	41.36	38.52	36.59	40.45
95	39.79	37.80	41.78	38.88	36.94	40.83
96	40.19	38.18	42.19	39.24	37.28	41.20
97	40.58	38.55	42.61	39.60	37.62	41.58
98	40.98	38.93	43.02	39.97	37.97	41.96
99	41.37	39.30	43.44	40.33	38.31	42.34
100	41.77	39.68	43.86	40.69	38.65	42.72
101	42.16	40.05	44.27	41.05	39.00	43.10
102	42.56	40.43	44.69	41.41	39.34	43.48
103	42.95	40.81	45.1	41.77	39.68	43.86
104	43.35	41.18	45.52	42.13	40.03	44.24
105	43.74	41.56	45.93	42.50	40.37	44.62

ATTACHMENT 5

LOOP AVERAGE dP vs. JET PUMP dP

LOOP A AVG % PSID	JP 1 -20%	JP 1 +20%	JP 2 -20%	JP 2 +20%	JP 3 -20%	JP 3 +20%	JP 4 -20%	JP 4 +20%	JP 5 -20%	JP 5 +20%
5	4.4	6.6	4.0	6.0	3.6	5.5	4.2	6.3	4.9	7.3
6	5.3	7.9	4.8	7.2	4.4	6.6	5.0	7.5	5.8	8.7
7	6.1	9.2	5.6	8.4	5.1	7.7	5.8	8.6	6.7	10.1
8	7.0	10.5	6.4	9.6	5.9	8.8	6.6	9.8	7.6	11.5
9	7.8	11.7	7.2	10.8	6.6	9.9	7.3	11.0	8.6	12.9
10	8.7	13.0	8.0	12.0	7.4	11.0	8.1	12.2	9.5	14.2
11	9.5	14.3	8.8	13.2	8.1	12.2	8.9	13.4	10.4	15.6
12	10.3	15.5	9.6	14.4	8.9	13.3	9.7	14.5	11.3	17.0
13	11.2	16.8	10.4	15.6	9.6	14.4	10.5	15.7	12.2	18.4
14	12.0	18.0	11.2	16.8	10.4	15.5	11.2	16.9	13.2	19.7
15	12.9	19.3	12.0	18.0	11.1	16.7	12.0	18.0	14.1	21.1
16	13.7	20.5	12.8	19.2	11.9	17.8	12.8	19.2	15.0	22.5
17	14.5	21.8	13.6	20.4	12.6	18.9	13.6	20.3	15.9	23.8
18	15.3	23.0	14.4	21.6	13.4	20.0	14.3	21.5	16.8	25.2
19	16.2	24.3	15.2	22.8	14.1	21.2	15.1	22.6	17.7	26.5
20	17.0	25.5	16.0	24.0	14.9	22.3	15.9	23.8	18.6	27.9
21	17.8	26.7	16.8	25.2	15.6	23.4	16.6	24.9	19.5	29.2
22	18.6	28.0	17.6	26.4	16.4	24.6	17.4	26.1	20.4	30.6
23	19.5	29.2	18.4	27.6	17.1	25.7	18.1	27.2	21.3	31.9
24	20.3	30.4	19.2	28.7	17.9	26.8	18.9	28.3	22.2	33.3
25	21.1	31.7	20.0	29.9	18.6	28.0	19.7	29.5	23.1	34.6
26	21.9	32.9	20.8	31.1	19.4	29.1	20.4	30.6	24.0	35.9
27	22.8	34.1	21.5	32.3	20.1	30.2	21.2	31.7	24.9	37.3
28	23.6	35.4	22.3	33.5	20.9	31.4	21.9	32.9	25.8	38.6
29	24.4	36.6	23.1	34.7	21.7	32.5	22.7	34.0	26.6	40.0
30	25.2	37.8	23.9	35.9	22.4	33.6	23.4	35.1	27.5	41.3
31	26.0	39.0	24.7	37.1	23.2	34.8	24.2	36.3	28.4	42.6
32	26.8	40.3	25.5	38.3	23.9	35.9	24.9	37.4	29.3	44.0
33	27.7	41.5	26.3	39.5	24.7	37.0	25.7	38.5	30.2	45.3
34	28.5	42.7	27.1	40.6	25.5	38.2	26.4	39.6	31.1	46.6
35	29.3	43.9	27.9	41.8	26.2	39.3	27.2	40.8	32.0	47.9
36	30.1	45.1	28.7	43.0	27.0	40.5	27.9	41.9	32.9	49.3
37	30.9	46.4	29.5	44.2	27.7	41.6	28.7	43.0	33.7	50.6
38	31.7	47.6	30.3	45.4	28.5	42.7	29.4	44.1	34.6	51.9
39	32.5	48.8	31.1	46.6	29.2	43.9	30.2	45.2	35.5	53.2
40	33.3	50.0	31.8	47.8	30.0	45.0	30.9	46.4	36.4	54.6
41	34.1	51.2	32.6	49.0	30.8	46.2	31.7	47.5	37.3	55.9
42	35.0	52.4	33.4	50.1	31.5	47.3	32.4	48.6	38.1	57.2
43	35.8	53.6	34.2	51.3	32.3	48.4	33.1	49.7	39.0	58.5
44	36.6	54.9	35.0	52.5	33.1	49.6	33.9	50.8	39.9	59.9
45	37.4	56.1	35.8	53.7	33.8	50.7	34.6	51.9	40.8	61.2
46	38.2	57.3	36.6	54.9	34.6	51.9	35.4	53.1	41.7	62.5
47	39.0	58.5	37.4	56.1	35.3	53.0	36.1	54.2	42.5	63.8
48	39.8	59.7	38.2	57.3	36.1	54.1	36.8	55.3	43.4	65.1
49	40.6	60.9	39.0	58.5	36.9	55.3	37.6	56.4	44.3	66.4
50	41.4	62.1	39.8	59.6	37.6	56.4	38.3	57.5	45.2	67.7
51	42.2	63.3	40.6	60.8	38.4	57.6	39.1	58.6	46.0	69.1
52	43.0	64.5	41.3	62.0	39.1	58.7	39.8	59.7	46.9	70.4
53	43.8	65.7	42.1	63.2	39.9	59.9	40.5	60.8	47.8	71.7
54	44.6	66.9	42.9	64.4	40.7	61.0	41.3	61.9	48.7	73.0
55	45.4	68.1	43.7	65.6	41.4	62.2	42.0	63.0	49.5	74.3
56	46.2	69.3	44.5	66.8	42.2	63.3	42.7	64.1	50.4	75.6
57	47.0	70.6	45.3	67.9	43.0	64.4	43.5	65.2	51.3	76.9
58	47.8	71.8	46.1	69.1	43.7	65.6	44.2	66.3	52.1	78.2
59	48.6	73.0	46.9	70.3	44.5	66.7	45.0	67.4	53.0	79.5
60	49.4	74.2	47.7	71.5	45.3	67.9	45.7	68.5	53.9	80.8

Record dp for Loop A average and each jet pump using EPIC-A data points

3382 AVG	942 JP-1	944 JP-2	946 JP-3	948 JP-4	950 JP-5
31.01	*32.0*	*33.2*	*16.4*	*24.0*	*35.3*

Init *TH*

ATTACHMENT 5

LOOP AVERAGE dP vs. JET PUMP dP

LOOP A AVG % PSID	JP 6 -20%	JP 6 +20%	JP 7 -20%	JP 7 +20%	JP 8 -20%	JP 8 +20%	JP 9 -20%	JP 9 +20%	JP 10 -20%	JP 10 +20%
5	4.6	7.0	4.1	6.2	3.8	5.7	3.6	5.5	3.9	5.8
6	5.6	8.3	4.9	7.4	4.5	6.8	4.4	6.6	4.6	7.0
7	6.5	9.7	5.7	8.6	5.3	7.9	5.1	7.7	5.4	8.1
8	7.4	11.0	6.5	9.8	6.0	9.1	5.9	8.8	6.2	9.3
9	8.3	12.4	7.3	11.0	6.8	10.2	6.6	9.9	7.0	10.5
10	9.2	13.7	8.1	12.2	7.6	11.3	7.4	11.0	7.8	11.7
11	10.1	15.1	8.9	13.4	8.3	12.5	8.1	12.2	8.6	12.9
12	10.9	16.4	9.7	14.6	9.1	13.6	8.9	13.3	9.4	14.1
13	11.8	17.8	10.5	15.7	9.8	14.7	9.6	14.4	10.2	15.3
14	12.7	19.1	11.3	16.9	10.6	15.8	10.3	15.5	11.0	16.5
15	13.6	20.4	12.1	18.1	11.3	17.0	11.1	16.6	11.8	17.7
16	14.5	21.7	12.9	19.3	12.0	18.1	11.8	17.8	12.6	18.9
17	15.4	23.1	13.6	20.5	12.8	19.2	12.6	18.9	13.4	20.1
18	16.3	24.4	14.4	21.6	13.5	20.3	13.3	20.0	14.2	21.3
19	17.2	25.7	15.2	22.8	14.3	21.4	14.1	21.2	15.0	22.5
20	18.0	27.1	16.0	24.0	15.0	22.6	14.9	22.3	15.8	23.8
21	18.9	28.4	16.8	25.2	15.8	23.7	15.6	23.4	16.6	25.0
22	19.8	29.7	17.6	26.3	16.5	24.8	16.4	24.5	17.5	26.2
23	20.7	31.0	18.3	27.5	17.3	25.9	17.1	25.7	18.3	27.4
24	21.6	32.3	19.1	28.7	18.0	27.1	17.9	26.8	19.1	28.6
25	22.4	33.7	19.9	29.8	18.8	28.2	18.6	27.9	19.9	29.8
26	23.3	35.0	20.7	31.0	19.5	29.3	19.4	29.1	20.7	31.0
27	24.2	36.3	21.5	32.2	20.3	30.4	20.1	30.2	21.5	32.3
28	25.1	37.6	22.2	33.3	21.0	31.5	20.9	31.3	22.3	33.5
29	25.9	38.9	23.0	34.5	21.8	32.7	21.6	32.5	23.1	34.7
30	26.8	40.2	23.8	35.7	22.5	33.8	22.4	33.6	23.9	35.9
31	27.7	41.5	24.6	36.8	23.3	34.9	23.2	34.7	24.8	37.1
32	28.6	42.8	25.3	38.0	24.0	36.0	23.9	35.9	25.6	38.4
33	29.4	44.1	26.1	39.2	24.8	37.1	24.7	37.0	26.4	39.6
34	30.3	45.5	26.9	40.3	25.5	38.3	25.4	38.1	27.2	40.8
35	31.2	46.8	27.7	41.5	26.2	39.4	26.2	39.3	28.0	42.0
36	32.0	48.1	28.4	42.6	27.0	40.5	26.9	40.4	28.8	43.3
37	32.9	49.4	29.2	43.8	27.7	41.6	27.7	41.5	29.7	44.5
38	33.8	50.7	30.0	45.0	28.5	42.7	28.5	42.7	30.5	45.7
39	34.7	52.0	30.7	46.1	29.2	43.8	29.2	43.8	31.3	46.9
40	35.5	53.3	31.5	47.3	30.0	45.0	30.0	45.0	32.1	48.2
41	36.4	54.6	32.3	48.4	30.7	46.1	30.7	46.1	32.9	49.4
42	37.3	55.9	33.1	49.6	31.5	47.2	31.5	47.2	33.8	50.6
43	38.1	57.2	33.8	50.7	32.2	48.3	32.3	48.4	34.6	51.9
44	39.0	58.5	34.6	51.9	33.0	49.4	33.0	49.5	35.4	53.1
45	39.9	59.8	35.4	53.0	33.7	50.6	33.8	50.7	36.2	54.3
46	40.7	61.1	36.1	54.2	34.4	51.7	34.5	51.8	37.0	55.5
47	41.6	62.4	36.9	55.3	35.2	52.8	35.3	52.9	37.9	56.8
48	42.5	63.7	37.7	56.5	35.9	53.9	36.1	54.1	38.7	58.0
49	43.3	65.0	38.4	57.7	36.7	55.0	36.8	55.2	39.5	59.2
50	44.2	66.3	39.2	58.8	37.4	56.1	37.6	56.4	40.3	60.5
51	45.1	67.6	40.0	60.0	38.2	57.3	38.3	57.5	41.1	61.7
52	45.9	68.9	40.7	61.1	38.9	58.4	39.1	58.6	42.0	62.9
53	46.8	70.2	41.5	62.3	39.7	59.5	39.9	59.8	42.8	64.2
54	47.6	71.5	42.3	63.4	40.4	60.6	40.6	60.9	43.6	65.4
55	48.5	72.8	43.0	64.5	41.1	61.7	41.4	62.1	44.4	66.7
56	49.4	74.1	43.8	65.7	41.9	62.8	42.1	63.2	45.3	67.9
57	50.2	75.3	44.6	66.8	42.6	64.0	42.9	64.4	46.1	69.1
58	51.1	76.6	45.3	68.0	43.4	65.1	43.7	65.5	46.9	70.4
59	52.0	77.9	46.1	69.1	44.1	66.2	44.4	66.7	47.7	71.6
60	52.8	79.2	46.9	70.3	44.9	67.3	45.2	67.8	48.6	72.8

Record dp for Loop A average and each jet pump using EPIC-A data points

3382 AVG	952 JP-6	954 JP-7	956 JP-8	958 JP-9	960 JP-10
31.01	*30.3*	*35.1*	*34.8*	*34.0*	*35.0*

Init ___*TH*___

ATTACHMENT 5

LOOP AVERAGE dP vs. JET PUMP dP

LOOP B AVG % PSID	JP 11 -20%	JP 11 +20%	JP 12 -20%	JP 12 +20%	JP 13 -20%	JP 13 +20%	JP 14 -20%	JP 14 +20%	JP 15 -20%	JP 15 +20%
5	4.0	6.0	4.1	6.1	3.8	5.6	3.8	5.8	4.2	6.3
6	4.8	7.3	4.9	7.3	4.5	6.8	4.6	6.9	5.1	7.6
7	5.6	8.5	5.7	8.5	5.3	7.9	5.4	8.0	5.9	8.9
8	6.4	9.7	6.5	9.7	6.1	9.1	6.1	9.2	6.8	10.2
9	7.2	10.9	7.3	10.9	6.8	10.3	6.9	10.3	7.6	11.4
10	8.1	12.1	8.1	12.1	7.6	11.4	7.6	11.5	8.5	12.7
11	8.9	13.3	8.9	13.3	8.4	12.6	8.4	12.6	9.3	14.0
12	9.7	14.5	9.7	14.5	9.2	13.7	9.1	13.7	10.2	15.3
13	10.5	15.7	10.5	15.7	9.9	14.9	9.9	14.9	11.1	16.6
14	11.3	16.9	11.2	16.9	10.7	16.1	10.7	16.0	11.9	17.9
15	12.1	18.1	12.0	18.1	11.5	17.2	11.4	17.1	12.8	19.2
16	12.9	19.3	12.8	19.2	12.3	18.4	12.2	18.3	13.7	20.5
17	13.7	20.5	13.6	20.4	13.1	19.6	12.9	19.4	14.5	21.8
18	14.5	21.7	14.4	21.6	13.8	20.8	13.7	20.5	15.4	23.1
19	15.3	22.9	15.2	22.8	14.6	21.9	14.4	21.7	16.2	24.4
20	16.1	24.1	16.0	24.0	15.4	23.1	15.2	22.8	17.1	25.7
21	16.9	25.3	16.8	25.2	16.2	24.3	15.9	23.9	18.0	27.0
22	17.7	26.6	17.6	26.4	17.0	25.5	16.7	25.0	18.8	28.3
23	18.5	27.8	18.4	27.5	17.8	26.6	17.5	26.2	19.7	29.6
24	19.3	29.0	19.1	28.7	18.5	27.8	18.2	27.3	20.6	30.9
25	20.1	30.2	19.9	29.9	19.3	29.0	19.0	28.4	21.4	32.2
26	20.9	31.4	20.7	31.1	20.1	30.2	19.7	29.6	22.3	33.5
27	21.7	32.6	21.5	32.3	20.9	31.4	20.5	30.7	23.2	34.8
28	22.5	33.8	22.3	33.4	21.7	32.5	21.2	31.8	24.1	36.1
29	23.3	35.0	23.1	34.6	22.5	33.7	22.0	33.0	24.9	37.4
30	24.1	36.2	23.9	35.8	23.3	34.9	22.7	34.1	25.8	38.7
31	24.9	37.4	24.6	37.0	24.1	36.1	23.5	35.2	26.7	40.0
32	25.7	38.6	25.4	38.1	24.8	37.3	24.2	36.3	27.5	41.3
33	26.5	39.8	26.2	39.3	25.6	38.5	25.0	37.5	28.4	42.6
34	27.4	41.0	27.0	40.5	26.4	39.6	25.7	38.6	29.3	43.9
35	28.2	42.2	27.8	41.7	27.2	40.8	26.5	39.7	30.1	45.2
36	29.0	43.4	28.6	42.8	28.0	42.0	27.2	40.8	31.0	46.5
37	29.8	44.6	29.3	44.0	28.8	43.2	28.0	42.0	31.9	47.8
38	30.6	45.8	30.1	45.2	29.6	44.4	28.7	43.1	32.8	49.1
39	31.4	47.1	30.9	46.4	30.4	45.6	29.5	44.2	33.6	50.5
40	32.2	48.3	31.7	47.5	31.2	46.8	30.2	45.3	34.5	51.8
41	33.0	49.5	32.5	48.7	32.0	48.0	31.0	46.5	35.4	53.1
42	33.8	50.7	33.2	49.9	32.8	49.1	31.7	47.6	36.3	54.4
43	34.6	51.9	34.0	51.0	33.6	50.3	32.5	48.7	37.1	55.7
44	35.4	53.1	34.8	52.2	34.4	51.5	33.2	49.8	38.0	57.0
45	36.2	54.3	35.6	53.4	35.1	52.7	34.0	51.0	38.9	58.3
46	37.0	55.5	36.4	54.6	35.9	53.9	34.7	52.1	39.8	59.6
47	37.8	56.7	37.2	55.7	36.7	55.1	35.5	53.2	40.6	60.9
48	38.6	57.9	37.9	56.9	37.5	56.3	36.2	54.3	41.5	62.3
49	39.4	59.1	38.7	58.1	38.3	57.5	37.0	55.5	42.4	63.6
50	40.2	60.3	39.5	59.2	39.1	58.7	37.7	56.6	43.3	64.9
51	41.0	61.5	40.3	60.4	39.9	59.9	38.5	57.7	44.1	66.2
52	41.8	62.7	41.0	61.6	40.7	61.1	39.2	58.8	45.0	67.5
53	42.6	63.9	41.8	62.7	41.5	62.3	40.0	60.0	45.9	68.8
54	43.4	65.1	42.6	63.9	42.3	63.5	40.7	61.1	46.8	70.1
55	44.2	66.3	43.4	65.1	43.1	64.7	41.5	62.2	47.6	71.4
56	45.0	67.5	44.2	66.2	43.9	65.9	42.2	63.3	48.5	72.8
57	45.8	68.8	44.9	67.4	44.7	67.1	43.0	64.4	49.4	74.1
58	46.6	70.0	45.7	68.6	45.5	68.2	43.7	65.6	50.3	75.4
59	47.4	71.2	46.5	69.7	46.3	69.4	44.5	66.7	51.1	76.7
60	48.2	72.4	47.3	70.9	47.1	70.6	45.2	67.8	52.0	78.0

Record dp for Loop B average and each jet pump using EPIC-A data points

3381 AVG	943 JP-11	945 JP-12	947 JP-13	949 JP-14	951 JP-15
48.71	*51.2*	*43.7*	*50.1*	*49.2*	*49.7*

Init *TH*

ATTACHMENT 5

LOOP AVERAGE dP vs. JET PUMP dP

LOOP B AVG % PSID	JP 16 -20%	JP 16 +20%	JP 17 -20%	JP 17 +20%	JP 18 -20%	JP 18 +20%	JP 19 -20%	JP 19 +20%	JP 20 -20%	JP 20 +20%
5	4.2	6.3	4.2	6.3	3.9	5.8	3.9	5.8	4.3	6.4
6	5.0	7.6	5.0	7.5	4.6	7.0	4.7	7.0	5.1	7.6
7	5.9	8.8	5.8	8.7	5.4	8.1	5.5	8.2	5.9	8.9
8	6.7	10.1	6.6	9.9	6.2	9.3	6.2	9.4	6.7	10.1
9	7.5	11.3	7.4	11.1	6.9	10.4	7.0	10.6	7.5	11.3
10	8.4	12.6	8.2	12.3	7.7	11.6	7.8	11.8	8.3	12.5
11	9.2	13.8	9.0	13.5	8.5	12.7	8.6	13.0	9.1	13.7
12	10.0	15.1	9.8	14.7	9.2	13.9	9.4	14.2	10.0	14.9
13	10.9	16.3	10.6	15.9	10.0	15.0	10.2	15.4	10.8	16.1
14	11.7	17.6	11.4	17.0	10.8	16.2	11.0	16.6	11.6	17.3
15	12.6	18.8	12.2	18.2	11.5	17.3	11.9	17.8	12.4	18.5
16	13.4	20.1	12.9	19.4	12.3	18.4	12.7	19.0	13.2	19.7
17	14.2	21.3	13.7	20.6	13.1	19.6	13.5	20.2	14.0	20.9
18	15.1	22.6	14.5	21.8	13.8	20.7	14.3	21.4	14.8	22.1
19	15.9	23.8	15.3	22.9	14.6	21.9	15.1	22.6	15.5	23.3
20	16.7	25.1	16.1	24.1	15.4	23.0	15.9	23.8	16.3	24.5
21	17.6	26.3	16.8	25.3	16.1	24.2	16.7	25.1	17.1	25.7
22	18.4	27.6	17.6	26.4	16.9	25.3	17.5	26.3	17.9	26.9
23	19.2	28.8	18.4	27.6	17.7	26.5	18.3	27.5	18.7	28.1
24	20.1	30.1	19.2	28.8	18.4	27.6	19.1	28.7	19.5	29.2
25	20.9	31.3	20.0	29.9	19.2	28.8	20.0	29.9	20.3	30.4
26	21.7	32.6	20.7	31.1	19.9	29.9	20.8	31.2	21.1	31.6
27	22.6	33.8	21.5	32.2	20.7	31.1	21.6	32.4	21.9	32.8
28	23.4	35.1	22.3	33.4	21.5	32.2	22.4	33.6	22.6	34.0
29	24.2	36.3	23.0	34.6	22.2	33.3	23.2	34.8	23.4	35.1
30	25.1	37.6	23.8	35.7	23.0	34.5	24.0	36.0	24.2	36.3
31	25.9	38.8	24.6	36.9	23.8	35.6	24.9	37.3	25.0	37.5
32	26.7	40.1	25.4	38.0	24.5	36.8	25.7	38.5	25.8	38.7
33	27.5	41.3	26.1	39.2	25.3	37.9	26.5	39.7	26.6	39.8
34	28.4	42.6	26.9	40.3	26.0	39.1	27.3	41.0	27.3	41.0
35	29.2	43.8	27.7	41.5	26.8	40.2	28.1	42.2	28.1	42.2
36	30.0	45.1	28.4	42.6	27.6	41.4	28.9	43.4	28.9	43.3
37	30.9	46.3	29.2	43.8	28.3	42.5	29.8	44.6	29.7	44.5
38	31.7	47.6	30.0	44.9	29.1	43.6	30.6	45.9	30.4	45.7
39	32.5	48.8	30.7	46.1	29.9	44.8	31.4	47.1	31.2	46.8
40	33.4	50.1	31.5	47.2	30.6	45.9	32.2	48.3	32.0	48.0
41	34.2	51.3	32.2	48.4	31.4	47.1	33.0	49.6	32.8	49.2
42	35.0	52.5	33.0	49.5	32.1	48.2	33.9	50.8	33.6	50.3
43	35.9	53.8	33.8	50.7	32.9	49.3	34.7	52.0	34.3	51.5
44	36.7	55.0	34.5	51.8	33.7	50.5	35.5	53.3	35.1	52.7
45	37.5	56.3	35.3	52.9	34.4	51.6	36.3	54.5	35.9	53.8
46	38.4	57.5	36.1	54.1	35.2	52.8	37.2	55.7	36.6	55.0
47	39.2	58.8	36.8	55.2	35.9	53.9	38.0	57.0	37.4	56.1
48	40.0	60.0	37.6	56.4	36.7	55.1	38.8	58.2	38.2	57.3
49	40.9	61.3	38.3	57.5	37.5	56.2	39.6	59.5	39.0	58.4
50	41.7	62.5	39.1	58.6	38.2	57.3	40.5	60.7	39.7	59.6
51	42.5	63.8	39.9	59.8	39.0	58.5	41.3	61.9	40.5	60.8
52	43.3	65.0	40.6	60.9	39.7	59.6	42.1	63.2	41.3	61.9
53	44.2	66.3	41.4	62.1	40.5	60.8	42.9	64.4	42.0	63.1
54	45.0	67.5	42.1	63.2	41.3	61.9	43.8	65.6	42.8	64.2
55	45.8	68.8	42.9	64.3	42.0	63.0	44.6	66.9	43.6	65.4
56	46.7	70.0	43.6	65.5	42.8	64.2	45.4	68.1	44.4	66.5
57	47.5	71.2	44.4	66.6	43.6	65.3	46.2	69.4	45.1	67.7
58	48.3	72.5	45.2	67.7	44.3	66.5	47.1	70.6	45.9	68.8
59	49.2	73.7	45.9	68.9	45.1	67.6	47.9	71.8	46.7	70.0
60	50.0	75.0	46.7	70.0	45.8	68.7	48.7	73.1	47.4	71.1

Record dp for Loop B average and each jet pump using EPIC-A data points

3381 AVG	953 JP-16	955 JP-17	957 JP-18	959 JP-19	961 JP-20
48.71	*51.1*	*46.1*	*51.8*	*48.2*	*46.4*

Init *TH*

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

SRO	17-1 NRC SRO EP	TASK TITLE:	Determine Protective Action Recommendations (Time Critical)
APPL. TO	JPM NUMBER		

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 2.4.44 (4.4)

ESTIMATED COMPLETION TIME: 30 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________ LOGIN ID:

JPM Completion Perform

Location: Classroom

DATE PERFORMED: __________ TIME TO COMPLETE: ________ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR:

____
SIGNATURE/PRINTED

SRO	17-1 NRC SRO EP	TASK TITLE:	Determine Protective Action Recommendations (Time Critical)
APPL. TO	JPM NUMBER		

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. EAP-4C

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Ensure sufficient copies of the referenced documents are available.

V. EVALUATOR NOTES

A. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, placekeeping and three-point communication.

VI. TASK CONDITIONS

A. The plant was initially operating at 100% power when an accident occurred.
B. The Shift Manager has just declared a General Emergency (AG1.1) due to Stack high range radiation.
C. NO Protective Action Recommendations (PARs) have yet been made.
D. EPIC is unavailable.
E. Primary Containment remains intact.
F. The release is expected to be in progress for greater than 1 hour.
G. The following meteorological conditions exist now:
- 200' elevation wind speed is 12 mph from 90°.
- 30' elevation wind speed is 12 mph from 90°.
- Stability class is E.

TASK TITLE: Determine Protective Action Recommendations (Time Critical)

VII. INITIATING CUE

Provide the candidate with the Handout and Worksheet. Inform the candidate of the following:

"Complete the provided worksheet to determine the need for Protective Action Recommendations (PARs). This is a time critical JPM. Your time clock starts once you acknowledge this task."

*** - CRITICAL STEP**

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain applicable reference documents	Obtains a copy of applicable reference documents, as needed: • IAP-1 • IAP-2 • EAP-4C • EAP-4.1 **EVALUATOR:** Ensure sufficient copies of these documents are available.	SAT / UNSAT
*2.	Determine if PARs are required.	Determines that PARs are required.	**CRITICAL STEP** SAT / UNSAT
*3.	Determine the required PARs.	Determines the following PARs are required to be evacuated: 1,2,3,6,26,27 JPM start time: _____ Time this step complete: _____	**CRITICAL STEP** SAT / UNSAT

TASK TITLE: Determine Protective Action Recommendations (Time Critical)

	STEP	STANDARD	EVALUATION / COMMENT
		Time difference: _____ (must be ≤15 min)	
EVALUATOR: Continue the JPM by providing the candidate with Handout #2 and Worksheet #2. **INITIATING CUE:** Inform the candidate, "New meteorological conditions exist as shown below. The General Emergency remains in progress. Complete the provided worksheet to determine the need for changes to Protective Action Recommendations (PARs). This is a time critical JPM. Your time clock starts once you acknowledge this task." **New meteorological conditions** ○ 200' elevation wind speed is 12 mph from 275°. ○ 30' elevation wind speed is 12 mph from 275°. ○ Stability class is E.			
*4.	Determine if changes to PARs are required.	Determines that changes to PARs are required.	**CRITICAL STEP** SAT / UNSAT
*5.	Determine the required PARs.	Determines the following PARs are required to be evacuated: 1,2,3,4,6,26,27 JPM step 4 start time: _____ Time this step complete: _____ Time difference: _____ (must be ≤15 min)	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

SRO 17-1 NRC SRO EP

TASK TITLE: Determine Protective Action Recommendations (Time Critical)

Task Standard: Protective Action Recommendations determined for initial and subsequent meteorological conditions.

EVALUATOR'S KEY

WORKSHEET

1. Are Protective Action Recommendations required? (circle one)

   Yes No

2. If Yes, is sheltering required or is evacuation required? (circle one)

   Sheltering Evacuation

3. If Yes, which ERPAs require sheltering or evacuation?
   (circle only those that apply)

   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

   17 18 19 20 21 22 23 24 25 26 27 28 29

EVALUATOR'S KEY

EVALUATOR'S KEY

WORKSHEET #2

1. Are any changes to the Protective Action Recommendations required? (circle one)

   Yes No

2. If Yes, is sheltering required or is evacuation required? (circle one)

   Sheltering Evacuation

3. If Yes, which ERPAs require sheltering or evacuation? (circle only those that apply)

   1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

   17 18 19 20 21 22 23 24 25 26 27 28 29

EVALUATOR'S KEY

HANDOUT

Initial Conditions:

- The plant was initially operating at 100% power when an accident occurred.
- The Shift Manager has just declared a General Emergency (AG1.1) due to Stack high range radiation.
- NO Protective Action Recommendations (PARs) have yet been made.
- Primary Containment remains intact.
- EPIC is unavailable.
- The release is expected to be in progress for greater than 1 hour.
- The following meteorological conditions exist now:
  - 200' elevation wind speed is 12 mph from 90°.
  - 30' elevation wind speed is 12 mph from 90°.
  - Stability class is E.

Initiating Cue:

Complete the provided worksheet to determine the need for Protective Action Recommendations (PARs).

This is a time critical JPM. Your time clock starts once you acknowledge this task.

WORKSHEET

1. Are Protective Action Recommendations required? (circle one)

Yes No

2. If Yes, is sheltering required or is evacuation required? (circle one)

Sheltering Evacuation

3. If Yes, which ERPAs require sheltering or evacuation?
(circle only those that apply)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

17 18 19 20 21 22 23 24 25 26 27 28 29

HANDOUT #2

Initiating Cue:

New meteorological conditions exist as shown below.

The General Emergency remains in progress.

Complete the provided worksheet to determine the need for changes to Protective Action Recommendations (PARs).

This is a time critical JPM. Your time clock starts once you acknowledge this task.

New meteorological conditions

- 200' elevation wind speed is 12 mph from 275°.
- 30' elevation wind speed is 12 mph from 275°.
- Stability class is E.

WORKSHEET #2

1. Are any changes to the Protective Action Recommendations required? (circle one)

Yes No

2. If Yes, is sheltering required or is evacuation required? (circle one)

Sheltering Evacuation

3. If Yes, which ERPAs require sheltering or evacuation? (circle only those that apply)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

17 18 19 20 21 22 23 24 25 26 27 28 29

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

SRO	17-1 NRC SRO RC	TASK TITLE:	Determine Actions for Inoperable Stack Radiation Monitor
APPL. TO	JPM NUMBER		

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 2.3.11 (4.3)

ESTIMATED COMPLETION TIME: 25 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________ LOGIN ID:

JPM Completion Perform

Location: Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR:

____
SIGNATURE/PRINTED

SRO	17-1 NRC SRO RC	TASK TITLE:	Determine Actions for Inoperable Stack Radiation Monitor
APPL. TO	JPM NUMBER		

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. ARP-09-3-2-18
B. OP-31
C. ODCM

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Ensure sufficient copies of the referenced documents (ARP, OP and ODCM) are available.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.
B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and not actually performed.
C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, placekeeping and three-point communication.

VI. TASK CONDITIONS

- The plant is operating at 100% power.
- Annunciator 09-3-2-18, STACK RAD MON DOWNSCALE OR INOP, has alarmed.
- Stack gas radiation monitor 17RM-050A and 17RM-050B indicate downscale.

TASK TITLE: Determine Actions for Inoperable Stack Radiation Monitor

VII. INITIATING CUE

Inform the candidate of the following:

"(Operator's name), determine the appropriate actions and compensatory measures in response to 17RM-050A and B indicating downscale. Record your findings on the provided attachment."

EXAMINER NOTE: Provide Attachment 2.

*** - CRITICAL STEP**

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a applicable reference documents	Obtains a copy of applicable reference documents: • ARP 09-3-2-18 • OP-31 (optional) • ODCM **EVALUATOR:** Ensure sufficient copies of these documents are available.	SAT / UNSAT
*2.	Reviews plant conditions and determine actions per ARP.	• Obtain assistance from I&C and Radiation Protection • Obtain assistance from Chemistry to perform a source check	SAT / UNSAT

TASK TITLE: Determine Actions for Inoperable Stack Radiation Monitor

	STEP	STANDARD	EVALUATION / COMMENT
*3.	Reviews plant conditions and determine actions per ODCM 3.0 Gaseous Effluents (3.1.1.c.1.a. Main stack exhaust)	Grab samples shall be collected at least once per 12 hours and analyzed within 24 hours of collection or auxiliary samplers are used.	**CRITICAL STEP** SAT / UNSAT
*4.	Reviews plant conditions and determine actions per ODCM.	Return at least one instrument to operable status within 30 days or provide an explanation in the next Radioactive Release Report as to why the inoperability was not corrected within 30 days.	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

HANDOUT

- **The plant is operating at 100% power.**
- **Annunciator 09-3-2-18, STACK RAD MON DOWNSCALE OR INOP, has alarmed.**
- **Stack gas radiation monitor 17RM-50A and 17RM-50B indicate downscale.**

Determine the appropriate actions and compensatory measures in response to 17RM-050A and B indicating downscale.

Record your findings on the provided attachment.

Attachment 1

ANSWER KEY

Determine the appropriate actions in response to these conditions.		
Action	Required By (Document)	
Obtain assistance from I&C and Radiation Protection	ARP	SAT \ UNSAT
Obtain assistance from Chemistry to perform a source check	ARP	SAT \ UNSAT
Grab samples shall be collected at least once per 12 hours and analyzed within 24 hours of collection or auxiliary samplers are used.	**ODCM**	**CRITICAL STEP** SAT \ UNSAT
Return at least one instrument to operable status within 30 days or provide an explanation in the next Radioactive Release Report as to why the inoperability was not corrected within 30 days.	**ODCM**	**CRITICAL STEP** SAT \ UNSAT

Attachment 2

JPM Scorecard For Applicant Use

Determine the appropriate actions in response to these conditions.	
Action	Required By (Document)

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

S/RO	NRC 17-1 A	TASK TITLE:	Perform Actions For Fire In Plant (Alt Path); RWR System
APPL. TO	JPM NUMBER		

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 202001 A4.01 (3.7/3.7)

ESTIMATED COMPLETION TIME: 10 Minutes

SUBMITTED: ____________________________ OPERATIONS REVIEW: ____________________________

APPROVED: ____

~~~~~~

CANDIDATE NAME: ____ LOGIN ID:

JPM Completion	☐	Simulated	☒	Performed
Location:	☐	Plant	☒	Simulator

DATE PERFORMED: ____________ TIME TO COMPLETE: ________ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR:

____
SIGNATURE/PRINTED

S/RO	NRC 17-1 A	TASK TITLE:	Perform Actions For Fire In Plant (Alt Path); RWR System
APPL. TO	JPM NUMBER		

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. AOP-28, Operation During Plant Fires

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Reset the simulator to a power-operating IC. (IC-156)
B. Insert malfunction FP02:Z01, Smoke – Zone 1 – RB 227 West Crescent on Trigger 3.
C. Insert malfunction HP06, HPCI Steam Line Break, Final=5%, on Trigger 3.
D. Insert annunciator 09-3-3-38, HPCI Aux Oil Pmp Overload Or Control Pwr Loss, on Trigger 3.
E. Override RWR pump B control switch trip and pull to lock contacts OFF (RR ZDI2AS1B in NASTR), on Trigger 3.
F. When ready to initiate JPM, insert Trigger 3.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.
B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.
C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, placekeeping and three-point communication.

VI. TASK CONDITIONS

A. The plant is operating in Mode 1.
B. A serious fire is in progress in the West Crescent area.
C. The fire has caused a spurious isolation of HPCI and loss of control power to the HPCI Aux Oil pump.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Perform the immediate actions for Attachment 2 of AOP-28, Operation During Plant Fires."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of AOP-28	Obtains a controlled copy of AOP-28 and selects Attachment 2. **EVALUATOR:** Provide working copy.	SAT / UNSAT
2.	IF RPV isolation is desired, THEN ensure closed the following valves to isolate the RPV…	Determines RPV isolation is NOT desired. **EVALUATOR:** If candidate asks about need for RPV isolation, report that RPV isolation is **NOT** currently desired.	SAT / UNSAT
*3.	Manually scram reactor and execute AOP-1 concurrently.	At panel 09-05: • Depresses MANUAL SCRAM A and MANUAL SCRAM B pushbuttons. • Places RX MODE switch in SHUTDOWN. **EVALUATOR CUE:** Tell candidate that another operator will complete the rest of AOP-1.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
4.	Ensure RWR Pumps 02-2P-1A and 02-2P-1B are shut down as follows: a. Ensure both RWR pumps are at LESS THAN OR EQUAL TO minimum speed.	Runs RWR pump A to minimum speed by rotating RWR MG A SPEED CNTRL knob counterclockwise. Runs RWR pump B to minimum speed by rotating RWR MG B SPEED CNTRL knob counterclockwise.	SAT / UNSAT
*5.	b. Ensure both RWR pumps are tripped at Panel 09-4.	Trips RWR pump A by rotating control switch counterclockwise to TRIP and Pull-to-Lock. **Alternate Path begins here:** Attempts to trip RWR pump B by rotating control switch counterclockwise to TRIP and Pull-to-Lock.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*6.	c. IF an RWR pump fails to trip from Panel 09-4, THEN trip AND place in Pull-To-Lock the following 4 KV bus feeder breakers at Panel 09-8: • 02-2P-1A NSS TO BUS 10100 BKR 10102 AND RSS TO BUS 10100 BKR 10112 • 02-2P-1B NSS TO BUS 10200 BKR 10202 AND RSS TO BUS 10200 BKR 10212	Determines RWR pump B failed to trip. Rotates NSS TO BUS 10200 BKR 10202 control switch counterclockwise and places in Pull-to-Lock. *** Rotates RSS TO BUS 10200 BKR 10212 control switch counterclockwise and places in Pull-to-Lock.**	**CRITICAL STEP** SAT / UNSAT **NOTE:** Only tripping of the one breaker is critical. Placing the control switch in Pull-to-Lock is NOT critical. The 10100 bus breakers are also likely to be opened based on procedure wording.
7.	IF an RWR pump fails to trip from Panels 09-4 and 09-8, THEN depress mechanical TRIP pushbutton on the following 4 KV breakers…	Determines both RWR pumps have tripped.	SAT / UNSAT
*8.	**NOTE:** JPM steps *8 & *9 may be completed in either order or concurrently. Attempt to isolate RWR Pump 02-2P-1A as follows: a. Close RWR PMP A DISCH 02MOV-53A. b. Close 02-2RWR-39A (RWR pump A seal purge upstr isol valve). c. Close RWR PMP A SUCT 02MOV-43A.	Closes RWR PMP A DISCH 02MOV-53A by rotating control switch counterclockwise to CLOSE. Dispatches operator to close 02-2RWR-39A (RWR pump A seal purge upstr isol valve). **EVALUATOR ROLE PLAY:** When requested, report that 02-2RWR-39A is closed. Closes RWR PMP A SUCT 02MOV-43A by rotating control switch counterclockwise to CLOSE.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*9.	Attempt to isolate RWR Pump 02-2P-1B as follows: a. Close RWR PMP B DISCH 02MOV-53B. b. Close 02-2RWR-39B (RWR pump B seal purge upstr isol valve). c. Close RWR PMP B SUCT 02MOV-43B.	Closes RWR PMP B DISCH 02MOV-53B by rotating control switch counterclockwise to CLOSE. Dispatches operator to close 02-2RWR-39B (RWR pump B seal purge upstr isol valve). **EVALUATOR ROLE PLAY:** When requested, report that 02-2RWR-39B is closed. Closes RWR PMP B SUCT 02MOV-43B by rotating control switch counterclockwise to CLOSE.	**CRITICAL STEP** SAT / UNSAT
*10.	Place the following keylock switches in BYPASS at panel 09-3: • 10MOV-16B AUTO CONTROL BYPASS 10A-S21B • 10MOV-25B AUTO CONTROL BYPASS 10A-S22B • 10MOV-27B AUTO CONTROL BYPASS 10A-S23B	Rotates 10MOV-16B AUTO CONTROL BYPASS 10A-S21B keylock switch clockwise to BYPASS. Rotates 10MOV-25B AUTO CONTROL BYPASS 10A-S22B keylock switch clockwise to BYPASS. Rotates 10MOV-27B AUTO CONTROL BYPASS 10A-S23B keylock switch clockwise to BYPASS.	**CRITICAL STEP** SAT / UNSAT
11.	Ensure open MIN FLOW VLV 10MOV-16B.	Observes MIN FLOW VLV 10MOV-16B green light off, red light on.	SAT / UNSAT
12.	Refer to Section 2.0 for guidance on instrument and component usage.	Refers to Section 2.0	SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: The Rx is scrammed, both RWR pumps are tripped and isolated, and RHR keylock switches are in BYPASS.

HANDOUT

Initial Conditions:

- **The plant is operating in Mode 1.**
- **A serious fire is in progress in the West Crescent area.**
- **The fire has caused a spurious isolation of HPCI and loss of control power to the HPCI Aux Oil pump.**

Initiating Cue

Perform the immediate actions for Attachment 2 of AOP-28, Operation During Plant Fires.

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

S/RO	NRC 17-1 B	TASK TITLE: Transfer Feedwater Level Control to Master-Auto
APPL. TO	JPM NUMBER	

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 259001 A4.01 (3.6/3.5)

ESTIMATED COMPLETION TIME: 20 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________

JPM Completion ☐ Simulated ☒ Performed

Location: ☐ Plant ☒ Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____________________

SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

S/RO	NRC 17-1 B	TASK TITLE: Transfer Feedwater Level Control to Master-Auto
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-2A, Feedwater System

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Plant in a startup condition near 5% power (IC-157).

B. Ensure Feedwater pump A is operating and pump B is secured.

C. Ensure 34MOV-100A and 34MOV-100B are closed.

D. Ensure Reactor water level is being maintained in the green band and controlled with 34FCV-137 in MAN and full open and other Feedwater controllers in MAN.

E. Place FDWTR screen on EPIC slave 1 monitor.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. A plant startup is in progress.

B. Reactor power is approximately 5%.

C. Feedwater pump A is running and Feedwater pump B is secured.

D. FDWTR STARTUP VLV (34FCV-137) 06FIC-130 is full open and in MAN.

E. RFP A FLOW CNTRL 06-84A is in MAN.

S/RO	NRC 17-1 B	TASK TITLE: Transfer Feedwater Level Control to Master-Auto
APPL. TO	JPM NUMBER	

F. RX WTR LVL CNTRL 06LC-83 is in MAN.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Transfer RFP A FLOW CNTRL 06-84A to master-manual and then master-auto per OP-2A Section D.2. The procedure is in progress up to step D.2.27."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of OP-2A.	Obtains a controlled copy of OP-2A. **Evaluator Note:** The candidate may make adjustments to Feedwater controllers throughout the JPM that are not scripted in order to maintain Reactor water level in band.	SAT / UNSAT
2.	Select the correct section to perform the task.	Selects Section D.2 of OP-2A. Proceeds to Step D.2.27.	SAT / UNSAT
3.	WHEN RFPT A speed is GREATER THAN 2000 rpm, perform the following at the Shift Manager's discretion to transfer RFP A FLOW CNTRL 06-84A to master-manual: Line up RX WTR LVL CNTRL 06LC-83 as follows: Verify controller is in MAN.	Observes RX WTR LVL CNTRL 06LC-83 is in MAN.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
4.	Ensure setpoint is BETWEEN 55 AND 65% (197 and 203 inches).	Ensures RX WTR LVL CNTRL 06LC-83 setpoint is between 55 AND 65% (197 and 203 inches).	SAT / UNSAT
5.	Adjust RX WTR LVL CNTRL 06LC-83 manual control knob to balance RFP A FLOW CNTRL 06-84A.	Rotates 06LC-83 manual control knob to balance RFP A FLOW CNTRL 06-84A, as necessary.	SAT / UNSAT / NA
*6.	Place RFP A FLOW CNTRL 06-84A in BAL.	Places RFP A FLOW CNTRL 06-84A in BAL.	**CRITICAL STEP** SAT / UNSAT
7.	Control RFPT A speed by adjusting RX WTR LVL CNTRL 06LC-83 manual control knob.	Controls RFPT A speed by adjusting RX WTR LVL CNTRL 06LC-83 manual control knob, as necessary.	SAT / UNSAT / NA
8.	Transfer RFP A FLOW CNTRL 06-84A to master auto as follows: IF 34FCV-137 is in automatic (BAL), THEN place FDWTR STARTUP VLV (34FCV-137) 06FIC-130 in manual as follows…	Determines 34FCV-137 is NOT in automatic (BAL) and moves to next step.	SAT / UNSAT / NA

	STEP	STANDARD	EVALUATION / COMMENT
9.	Place RX WTR LVL CNTRL 06LC-83 in automatic (BAL) as follows: Balance controller by adjusting SP ADJUST knob.	Balances RX WTR LVL CNTRL 06LC-83 by adjusting SP ADJUST knob as necessary.	SAT / UNSAT
*10.	Place controller in BAL.	Places RX WTR LVL CNTRL 06LC-83 in BAL.	**CRITICAL STEP** SAT / UNSAT
11.	Adjust RX WTR LVL CNTRL 06LC-83 setpoint to BETWEEN 55 AND 65% (197 and 203 inches).	Adjusts RX WTR LVL CNTRL 06LC-83 setpoint, as necessary	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*12.	Verify RX WTR LVL CNTRL 06LC-83 is controlling level at setpoint.	Observes RX WTR LVL CNTRL 06LC-83 is controlling level at setpoint. * Maintains Reactor water level within a band of 177-222.5" throughout the evolution. **EVALUATOR NOTE:** This step is used to designate that a critical aspect of the entire JPM is to maintain Reactor water level within a band of 177-222.5". Many of the other steps are partially critical, in that if the candidate makes a significant enough of an error, a Reactor water level transient will occur. If a scram is received on low Reactor water level or a Feedwater pump trip occurs on high Reactor water level, at any point in the JPM, that is considered grounds for failing this critical step.	**CRITICAL STEP** SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: RFP A FLOW CNTRL 06-84A is transferred to master-manual and then master-auto per OP-2A Section D.2. Reactor water level is maintained within a band of 177-222.5" throughout the evolution.

HANDOUT

- **A plant startup is in progress.**
- **Reactor power is approximately 5%.**
- **Feedwater pump A is running and Feedwater pump B is secured.**
- **FDWTR STARTUP VLV (34FCV-137) 06FIC-130 is full open and in MAN.**
- **RFP A FLOW CNTRL 06-84A is in MAN.**
- **RX WTR LVL CNTRL 06LC-83 is in MAN**

Transfer RFP A FLOW CNTRL 06-84A to master-manual and then master-auto per OP-2A Section D.2. The procedure is in progress up to step D.2.27.

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

RO	NRC 17-1 C	TASK TITLE:	Roll Main Turbine, Low Bearing Oil Pressure (Alternate Path)
APPL. TO	JPM NUMBER		

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 241000 A4.11 (3.1/3.1)

ESTIMATED COMPLETION TIME: 10 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________

JPM Completion ☐ Simulated ☒ Performed

Location: ☐ Plant ☒ Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____________________
SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

RO	NRC 17-1 C	TASK TITLE:	Roll Main Turbine, Low Bearing Oil Pressure (Alternate Path)
APPL. TO	JPM NUMBER		

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-9, Main Turbine

B. ARP 09-5-2-07, MAIN TURB BRG OIL LO PRESS TRIP

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Reset the simulator to IC-158.

B. Place EPIC TGO screen up on Slave 2.

Place malfunction TU03, Main Turbine Bearing Oil Low Pressure, Final=100, Delay=2 sec, Ramp=17 sec on Trigger 1.

C. Preset malfunction TC11, Main Turbine Auto Trip Failure, on Trigger 1.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. A plant startup is in progress.

B. The Main Turbine is ready to be rolled per OP-9 (Main Turbine).

C. An operator is stationed on the turbine deck.

D. Another operator will assist while performing OP-9 step D.8.6.e (verifying Turbine trip indications).

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Roll the Main Turbine per OP-9 section D.8."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of OP-9.	Obtains a controlled copy of OP-9.	SAT / UNSAT
2.	Select the correct section to perform the task.	Selects Section D.8.	SAT / UNSAT
3.	CAUTIONS: Operating the Main Turbine at low speed could result in large rotor bows being generated by rubbing with no indication of high vibration being evident from Turbine Supervisory Instrumentation. If rotor bowing caused by rubbing is allowed to occur, damage to buckets, covers, and possibly a permanently bowed rotor could occur. Operating the Main Turbine at a steady-state speed LESS THAN 800 rpm for GREATER THAN 5 minutes could cause rotor bowing due to rubbing.	Candidate reads CAUTIONS.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
4.	Station an operator on turbine deck.	Recalls an operator is stationed on turbine deck per Initiating Cue.	SAT / UNSAT
5.	Verify open ISV-1, 2, 3, and 4.	Verifies ISV1, 2, 3, 4 are open by observing position indicators.	SAT / UNSAT
*6.	Depress 100 (RPM) pushbutton.	100 (RPM) pushbutton depressed.	**CRITICAL STEP** SAT / UNSAT
7.	Verify the following valves open: • TSV-1, 2, 3, and 4 • IV-1, 2, 3, and 4	Verifies TSV1, 2, 3, 4 are open by observing position indicators. Verifies IV1, 2, 3, 4 are open by observing position indicators.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*8.	Immediately perform main turbine trip test as follows: a) Depress both TRIP pushbuttons. b) Verify closed the following valves: • TSV-1, 2, 3, and 4 • TCV-1, 2, 3, and 4 • ISV-1, 2, 3, and 4 • IV-1, 2, 3, and 4	 * Depresses both TRIP pushbuttons Verifies closed the following valves by observing position indicators: • TSV-1, 2, 3, and 4 • TCV-1, 2, 3, and 4 • ISV-1, 2, 3, and 4 • IV-1, 2, 3, and 4	 **CRITICAL STEP** SAT / UNSAT SAT / UNSAT
9.	Immediately reset main turbine trip as follows: a. Verify main turbine trip condition annunciators at annunciator window section 09-5-2 are clear. b. Ensure ALL VALVES CLOSED pushbutton backlight is on. c. Verify VACUUM NORMAL light is on.	 Observes main turbine trip condition annunciators at annunciator window section 09-5-2 are clear. **EVALUATOR NOTE:** Annunciator 09-5-2-9 will be in alarm until the Turbine trip is reset. Observes ALL VALVES CLOSED pushbutton backlight is on. Observes VACUUM NORMAL light is on.	 SAT / UNSAT SAT / UNSAT SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
10.	NOTE: TRIP RESET pushbutton will be held depressed until Step D.8.6f.	Reads NOTE.	SAT / UNSAT
*11.	Depress and hold TRIP RESET pushbutton.	Depresses and holds TRIP RESET pushbutton until Step D.8.6.f.	**CRITICAL STEP** SAT / UNSAT
12.	Verify the following: • RESETTING light is on • ISV-1, 2, 3, and 4 open • The following valves remain closed: – TSV-1, 2, 3, and 4 – TCV-1, 2, 3, and 4 – IV-1, 2, 3, and 4 • RESET light is on at RESET pushbutton • RESET light is on at MECHANICAL TRIP section • RESET light is on at CNDSR VAC TRIP STATUS section • TRIPPED light is off at MECHANICAL TRIP section • TRIPPED light is off at CNDSR VAC TRIP STATUS section • Annunciator 09-5-2-9 MAIN TURB TRIP clears	**Evaluator Cue:** Inform candidate that ALL items in this verification step are satisfactory.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*13	Release TRIP RESET pushbutton.	Releases the TRIP RESET pushbutton **after** confirmation of above Evaluator Cue.	**CRITICAL STEP** SAT / UNSAT
*14	Depresses MEDIUM STARTUP RATE pushbutton.	Depresses the MEDIUM STARTUP RATE pushbutton. **Evaluator Cue:** Another Operator will monitor parameters listed in Step D.8.7. **Evaluator Cue:** Step D.8.8 has been completed SAT.	**CRITICAL STEP** SAT / UNSAT

*15	Roll Main Turbine as follows: a. Verify open ISV 1, 2, 3, and 4. **b. Depress 100 (RPM) pushbutton.** c. Verify the following valves open: • TSV 1, 2, 3, and 4 • IV 1, 2, 3, and 4 d. Verify servo current meter indicator needle moves for turbine control valves TCV-1, TCV-2 and TCV-3. e. Verify TURB TURN GEAR 94TTG-3 is disengaged. f. Place control switch for TURB TURN GEAR 94TTG-3 to TRIP, spring return to normal. g. Verify TURB TURN GEAR 94TTG-3 is stopped. h. Begin walkdown of main turbine; listen for rubbing or unusual noise.	a. Observes ISV 1, 2, 3, and 4 are open. **b. Depresses the 100 RPM pushbutton.** **<u>Booth Operator:</u>** Once this step is performed, insert Trigger 1 to initiate the bearing oil low pressure condition and alternate path. c. Observes TSV 1,2,3,4 and IV 1,2,3,4 are open. d. Observes meter needles for TCV-1,2,3 move. e. Observes 94TTG-3 is disengaged (right most red light ON only). f. Places control switch 94TTG-3 in Trip. g. Verifies 94TTG-3 has stopped. **Evaluator Cue:** 94TTG-3 has stopped. **Evaluator Cue:** Walkdown has commenced.	SAT / UNSAT **CRITICAL STEP**

Alternate Path begins here			
16	Recognize / report annunciator 09-5-2-07, MAIN TURB BRG OIL LO PRESS TRIP.	Recognizes / reports annunciator 09-5-2-07, MAIN TURB BRG OIL LO PRESS TRIP. **Evaluator Cue:** If candidate asks for direction on how to proceed, request their recommendation and then direct them to carry out their recommendation.	SAT / UNSAT
17	Recognize / report failure of Main Turbine to trip.	Recognizes / reports failure of Main Turbine to trip. **Evaluator Cue:** If candidate asks for direction on how to proceed, request their recommendation and then direct them to carry out their recommendation.	SAT / UNSAT
*18	Depress Main Turbine trip pushbuttons.	Depresses Main Turbine trip pushbuttons.	SAT / UNSAT **CRITICAL STEP**
EVALUATOR: Terminate the task at this point.			

Task Standard: The Main Turbine has been rolled. Low bearing oil pressure is recognized and the Main Turbine is tripped.

HANDOUT

Initial Conditions:

- **A plant startup is in progress.**
- **The Main Turbine is ready to be rolled per OP-9 (Main Turbine).**
- **An operator is stationed on the turbine deck.**
- **Another operator will assist while performing OP-9 step D.8.6.e (verifying Turbine trip indications).**

Initiating Cue:

Roll the Main Turbine per OP-9 section D.8.

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

S/RO	17-1 NRC D	TASK TITLE:	Perform Control Rod Operability Test, CRD Pump Trips (Alt Path)
APPL. TO	JPM NUMBER		

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 201001 A2.01 (3.2/3.3)

ESTIMATED COMPLETION TIME: 15 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ______________________________

~~~~~~

CANDIDATE NAME: ______________________________

JPM Completion ☐ Simulated ☒ Performed

Location: ☐ Plant ☒ Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ______________________________

SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

S/RO	17-1 NRC D	TASK TITLE:	Perform Control Rod Operability Test, CRD Pump Trips (Alt Path)
APPL. TO	JPM NUMBER		

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. ST-20C, Control Rod Operability For Fully Withdrawn Control Rods

B. AOP-69, Control Rod Drive Pump Trouble

III. TOOLS AND EQUIPMENT

A. Provide a copy of ST-20C marked up to step 8.1.

B. Provide a copy of a control rod scan computer printout marked “Beginning of ST-20C”.

IV. SET UP REQUIREMENTS

A. Reset the simulator to an IC with Reactor power above 25% (IC-159).

B. Ensure control rods 18-51 and 22-51 are at position 48.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. The plant is operating in Mode 1.

B. Control rod operability testing is required to be performed.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Perform ST-20C, Control Rod Operability For Fully Withdrawn Control Rods. The procedure has been completed up to step 8.1. Complete the test for control rods 18-51 and 22-51 and then stop."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of ST-20C.	Obtains a controlled copy of ST-20C from evaluator.	SAT / UNSAT
2.	Select the correct section to perform the task.	Selects Section 8.1.	SAT / UNSAT
3.	IF control rod inserts two notches during test, THEN perform the following…	Acknowledges step.	SAT / UNSAT
4.	IF control rod inserts GREATER THAN two notches during test, THEN perform the following…	Acknowledges step.	SAT / UNSAT
*5.	Select control rod on ROD SEL matrix.	Selects control rod 18-51 by depressing pushbutton on ROD SEL matrix. **EVALUATOR NOTE:** This JPM is written for the candidate to perform testing of control rod 18-51 first. If the candidate performs testing of control rod 22-51 first, this is acceptable.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
6.	Verify correct control rod is selected by observing BOTH of the following: • Select pushbutton for control rod is backlit brighter than pushbuttons for other control rods in same group • Control rod indicating light is on (light with control rod coordinates on FULL CORE DISPLAY)	Observes control rod 18-51 select pushbutton is backlit brighter than pushbuttons for other control rods in same group. Observes control rod 18-51 indicating light on the FULL CORE DISPLAY is lit.	SAT / UNSAT
7.	Ensure normal operating values are established for the following Control Rod Drive Hydraulic System parameters per Section E of OP-25.	Observes normal CRD operating values. **EVALUATOR NOTE:** The candidate may either recognize normal CRD operating values or reference OP-25. Normal CRD operating values include system flow of 59-61 gpm, cooling water flow of 59-61 gpm, and drive water differential pressure of 260-270 psid.	SAT / UNSAT
8.	IF control rod fails to move with drive water differential pressure at 260 to 270 psid while performing Step 8.1.7, THEN perform the following…	Acknowledges step.	SAT / UNSAT
*9.	Insert control rod one notch using ROD MOVEMENT CNTRL switch.	Inserts control rod 18-51 one notch by rotating ROD MOVEMENT CNTRL switch counterclockwise to ROD IN and then releasing.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
10.	Verify control rod settles in position 46 before ROD SETTLE light goes off.	Observes control rod 18-51 settles at position 46.	SAT / UNSAT
11.	Ensure normal operating values are established for the following Control Rod Drive Hydraulic System parameters per Section E of OP-25.	Observes normal CRD operating values. **EVALUATOR NOTE:** The candidate may either recognize normal CRD operating values or reference OP-25. Normal CRD operating values include system flow of 59-61 gpm, cooling water flow of 59-61 gpm, and drive water differential pressure of 260-270 psid.	SAT / UNSAT
12.	IF control rod fails to move with drive water differential pressure at 260 to 270 psid while performing Step 8.1.13, THEN perform the following…	Acknowledges step.	SAT / UNSAT
13.	If annunciator 09-5-2-4 ROD OVERTRAVEL alarms during coupling integrity and withdraw stall flow rate test, THEN perform the following…	Acknowledges step.	SAT / UNSAT
14.	IF control rod inserts GREATER THAN one notch during coupling integrity and withdraw stall flow rate test, THEN perform the following…	Acknowledges step.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*15.	Perform coupling integrity and withdraw stall flow rate test as follows: Place and hold ROD EMERG IN NOTCH OVERRIDE control switch in OVERRIDE.	Rotates ROD EMERG IN NOTCH OVERRIDE control switch clockwise to OVERRIDE and holds.	**CRITICAL STEP** SAT / UNSAT
*16.	Place and hold ROD MOVEMENT CNTRL control switch in OUT NOTCH.	Rotates ROD MOVEMENT CNTRL switch clockwise to OUT NOTCH and holds.	**CRITICAL STEP** SAT / UNSAT
17.	Verify the following for the selected control rod: • Rod withdraws • Four rod display indicates 48. • Red FULL OUT light is on at FULL CORE DISPLAY.	Observes control rod 18-51 withdraws. Observes control rod 18-51 stops at position 48. Observes control rod 18-51 red FULL OUT light is lit on the FULL CORE DISPLAY.	SAT / UNSAT
18.	Verify annunciator 09-5-2-4 ROD OVERTRAVEL is clear.	Observes annunciator 09-5-2-4, ROD OVERTRAVEL, is clear.	SAT / UNSAT
19.	WHEN flow rate indication is stable on DRV WTR FLOW 03FI-305, note withdraw stall flow rate.	Observes stable value on DRV WTR FLOW 03FI-305.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*20.	Release the following control switches: • ROD MOVEMENT CNTRL • ROD EMERG IN NOTCH OVERRIDE	Releases the following control switches: • ROD MOVEMENT CNTRL • ROD EMERG IN NOTCH OVERRIDE	**CRITICAL STEP** SAT / UNSAT
21.	Record withdraw stall flow rate from Step 8.1.13E on Attachment 2.	Records withdraw stall flow rate for control rod 18-51 on Attachment 2.	SAT / UNSAT
22.	IF control rod moved more than one notch, OR any other abnormality occurred during control rod testing, THEN record the following in Subsection 11.3, as applicable…	Acknowledges step.	SAT / UNSAT
23.	Initial the tested control rod number on the rod scan computer printout marked "Beginning Of ST-20C".	Initials control rod 18-51 on the rod scan computer printout. **EVALUATOR NOTE:** This completes testing of control rod 18-51. The steps below are for the testing of control rod 22-51. The conditional steps that do not apply have been left out for simplicity, however they all still apply as written in previous steps.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*24.	Select control rod on ROD SEL matrix.	Selects control rod 22-51 by depressing pushbutton on ROD SEL matrix. **EVALUATOR NOTE:** CRD pump A will trip 2 seconds after control rod 22-51 is selected. This initiates the alternate path.	**CRITICAL STEP** SAT / UNSAT
		Alternate Path begins here	
25.	Recognize / report trip of CRD pump A (annunciator 09-5-1-49).	Recognizes / reports trip of CRD pump A (annunciator 09-5-1-49). **EVALUATOR CUE:** If candidate asks for direction, tell them to make a recommendation and then carry out that recommendation.	SAT / UNSAT
26.	Enter AOP-69.	Enters AOP-69.	SAT / UNSAT
27.	Monitor ACCUM alarm lights on full core display at panel 09-5, and execute ARP-09-5-1-43 as appropriate.	Observes ACCUM alarm lights on full core display are not in alarm.	SAT / UNSAT
28.	IF the operating CRD Pump tripped on low suction pressure…	Determines CRD pump A did not trip on low suction pressure (annunciator 09-5-1-29 clear).	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
29.	IF a full reactor scram condition does not exist (RPS is reset), THEN perform the following: Ensure CRD FLOW CNTRL 03FIC-301 is in MAN.	Places CRD FLOW CNTRL 03FIC-301 in MAN. **EVALUATOR NOTE:** Steps that place CRD FLOW CNTRL 03FIC-301 in MAN are deemed non-critical because the system will adequately respond to the start of CRD pump B with the controller still in AUTO. The candidate should follow the procedure and place CRD FLOW CNTRL 03FIC-301 in MAN, but failure to do so should be graded as a competency issue, not a critical step failure.	SAT / UNSAT
30.	Rotate manual control knob on CRD FLOW CNTRL 03FIC-301 fully counterclockwise.	Rotates manual control knob on CRD FLOW CNTRL 03FIC-301 fully counterclockwise	SAT / UNSAT
31.	Verify in-service CRD flow control valve (03FCV-19A or B) is closed.	Observes in-service CRD flow control is closed.	SAT / UNSAT
*32.	Attempt to start one CRD pump (CRD PMP 03P-16A or CRD PMP 03P-16B). If the first pump fails to start, attempt to start the other.	Places CRD PMP 03P-16B control switch in START.	**CRITICAL STEP** SAT / UNSAT
33.	Slowly adjust manual control knob on CRD FLOW CNTRL 03FIC-301 to establish 59 to 61 gpm on 03FI-310 or 03FIC-301.	Slowly adjusts manual control knob on CRD FLOW CNTRL 03FIC-301 to establish 59 to 61 gpm on 03FI-310 or 03FIC-301.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
34.	Place CRD FLOW CNTRL 03FIC-301 in automatic as follows: Balance controller by adjusting setpoint tape.	Balances CRD FLOW CNTRL 03FIC-301 by adjusting setpoint tape.	SAT / UNSAT
35.	Place controller in AUTO.	Places CRD FLOW CNTRL 03FIC-301 in AUTO. **EVALUATOR NOTE:** This step is critical if the candidate earlier placed CRD FLOW CNTRL 03FIC-301 in MAN.	**CRITICAL STEP** SAT / UNSAT
36.	Adjust setpoint to BETWEEN 59 and 61 gpm.	Adjusts CRD FLOW CNTRL 03FIC-301 setpoint to BETWEEN 59 and 61 gpm. **EVALUATOR NOTE:** This step is critical if the candidate's earlier actions resulted in the setpoint being out of band.	**CRITICAL STEP** SAT / UNSAT
37.	Verify CRD indications at panel 09-5 are normal per Section E of OP-25.	Observes normal CRD operating values. **EVALUATOR NOTE:** The candidate may either recognize normal CRD operating values or reference OP-25. Normal CRD operating values include system flow of 59-61 gpm, cooling water flow of 59-61 gpm, and drive water differential pressure of 260-270 psid.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
38.	Ensure the control switch for the Out of Service CRD Pump(s) is Green Flagged.	Places the CRD PMP 03P-16A control switch in STOP. **EVALUATOR NOTE:** This is the end of the alternate path. Inform that candidate that ST-20C will be put on hold and their task is complete.	SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: Control rods 18-51 is tested and returned to position 48. CRD pump B is in service with CRD FLOW CNTRL 03FIC-301 in AUTO.

HANDOUT

- **The plant is operating in Mode 1.**
- **Control rod operability testing is required to be performed.**

Perform ST-20C, Control Rod Operability For Fully Withdrawn Control Rods.

The procedure has been completed up to step 8.1.

Complete the test for control rods 18-51 and 22-51 and then stop.

Beginning of ST-20C

PLANT NAME: FITZPATRICK CY23

CONTROL ROD POSITIONS

```
51

47
  L
43

39                  12              12
  L
35

31          10              08              10
  L
27

23          10              08              10
  L
19

15                  12              12
  L
11

07
  L
03    L       L       L       L       L       L
   02  06  10  14  18  22  26  30  34  38  42  46  50
```

S = SUBSTITUTE VALUE
L = LPRM
-99 = MISSING CONTROL ROD POSITION

CONTROL ROD DENSITY 5.72%
SEQUENCE B-2

LOAD LINE SUMMARY

CORE POWER	89.26%
CORE FLOW	87.07%
LOAD LINE	106.72%
FLLLP	0.937

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

S/RO APPL. TO	17-1 NRC E JPM NUMBER	TASK TITLE: Perform the EDG Load Test, EDG Ground Overload (Alt Path)

REV: _____ DATE: ________ NRC K/A SYSTEM NUMBER: 2640000 A4.04 3.7/3.7

ESTIMATED COMPLETION TIME: 20 Minutes

SUBMITTED: ____________________ OPERATION REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________

JPM Completion: ( ) Simulated ( ) Performed

Location: ( ) Plant ( ) Simulator

DATE PERFORMED: ____________________ TIME TO COMPLETE: ____ Minutes

PERFORMANCE EVALUATION: ( ) Satisfactory ( ) Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ________________________________
SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE
REQUIRED TASK INFORMATION

S/RO	17-1 NRC E	TASK TITLE: Perform the EDG Load Test, EDG Ground Overload (Alt Path)
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. ST-9BB, EDG B & D FULL LOAD TEST AND ESW PUMP OPERABILITY TEST

III. TOOLS AND EQUIPMENT

A. Synchronizing Switch

IV. SET UP REQUIREMENTS

A. Initialize the simulator to IC-156.
B. Obtain a controlled copy of ST-9BB, EDG B & D FULL LOAD TEST AND ESW PUMP OPERABILITY TEST. Initial as complete Section 4.0, 5.0 and Steps 8.1 through and including Steps 8.7.
C. Place annunciator “EDG D GRD OVERLOAD”, 09-8-4-32, on Trigger 1 (to be activated automatically when EDG D load is >1000 KW).

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.

VI. TASK CONDITIONS

A. EDG B and D load testing is in progress with ST-9BB, EDG B & D FULL LOAD TEST AND ESW PUMP OPERABILITY TEST complete through Step 8.7.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Perform ST-9BB, EDG B & D FULL LOAD TEST AND ESW PUMP OPERABILITY TEST, steps 8.8 through 8.28 for EDG B & D."

NOTE: All controls and indications located on panel 09-8 unless otherwise stated.

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of procedure ST-9BB, EDG B & D FULL LOAD TEST AND ESW PUMP OPERABILITY TEST	Obtains a controlled copy of ST-9BB	SAT / UNSAT
2.	Reviews the precautions	Reviews the precautions, making note of any that are applicable	SAT / UNSAT
3.	Select the correct section to perform the task.	Selects Section 8 of ST-9BB	SAT / UNSAT
4.	Verify the following annunciators are clear: • 09-4-11 EDG B ENG TROUBLE OR SHUTDOWN • 09-8-4-14 EDG D ENG TROUBLE OR SHUTDOWN	Verifies 09-8-4-11 and 09-8-4-14 alarms are clear	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
5.	**IF** both of the following conditions exist: • Outside ambient temperature is **GREATER THAN** 88 deg F on 17WR-I01K, CHAN **A,** digital indication at panel 17EMRP. *AND* • Screenwell intake temperature is **GREATER THAN** 78 deg F on EPIC-A-1503 or EPIC-A-1504 *THEN …..*	Request reading of outside air temperature on 17WR-I01K, CHAN A, digital indication at panel 17EMRP. **EVALUATOR:** When asked for outside air temperature, inform the candidate that it is 60 deg F.	SAT / UNSAT
6.	Station 3 operators with stopwatches to monitor/record times for: • Frequency • Voltage • Steady State Voltage and Frequency	Request Station operators with stopwatches to monitor/record: • Frequency • Voltage • Steady State Voltage and Frequency **EVALUATOR:** When requested, inform candidate that the 3 operators are stationed with stop watches.	SAT / UNSAT
7.	IF EDG System B is required to be operable, THEN EDG System B is declared inoperable.	Informs CRS \ SM that EDG System B is inoperable.	SAT / UNSAT
*8.	Simultaneously place the EDG B & D control switches to START and start all 3 stopwatches.	Simultaneously places the EDG B & D control switches in START. **EVALUATOR NOTE:** The candidate will be given stop watch times in the next step and is not responsible for operating a stopwatch.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
9.	Record stopwatch times for: • Frequency • Voltage • Steady State Voltage and Frequency	Requests for and records stopwatch times. **EVALUATOR:** When requested, inform candidate that the stopwatch times are: • Frequency – 6 secs • Voltage – 6 secs • Steady State Voltage and Frequency – 7 secs	SAT / UNSAT
10.	Record EDG B/D frequency and voltage.	For both B & D EDGs, records frequency and voltage.	SAT / UNSAT
11.	Verify the following: • EDG B & D TIE BKR 10604 is closed • ESW pump 46P-2B is running	Verifies the following by observing the control switch red indicating light is on and the green light is off: • EDG B & D TIE BKR 10604 is closed • ESW pump 46P-2B is running	SAT / UNSAT
*12.	Trip tie Breaker 10604 and allow switch to spring return to AUTO position and record the time.	Places the control switch for Breaker 10604, EDG B & D TIE BKR, to TRIP, allow switch to spring return to AUTO	**CRITICAL STEP** SAT / UNSAT
		Records time the control switch for Breaker 10604, EDG B & D TIE BKR, is placed to TRIP	SAT / UNSAT
13.	Record EDG B/D frequency	For both B & D EDGs, records frequency.	SAT / UNSAT
14.	Verify EPIC-D-732 closed and open on alarm typer.	Verifies EPIC-D-732 closed and open on alarm typer.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*15.	Place EDG B and D governor mode switches in the droop position	Places the EDG GOV MODE toggle switches for EDGs B & D to DROOP	**CRITICAL STEP** SAT / UNSAT
16.	IF an EDG functions improperly while paralleled with 10600 bus, THEN perform the following: • Trip associated EDG load breaker. • Shut down malfunctioning EDG per Section G of OP-22 (Single EDG Shutdown from Control Room).	Reads the actions for an improperly functioning EDG. **EVALUATOR NOTE:** This step is to be used by the operator to trip the associated load breaker towards the end of this procedure.	SAT / UNSAT
17.	WHILE performing Steps 8.27 and 8.28, do not operate the T 4 or T-2 load tap changer.	Reads \ acknowledges tap changer requirement.	SAT / UNSAT
*18.	Place EDG B LOAD BKR SNCH SW in ON	Places the EDG B LOAD BKR SYNCH SW to ON	**CRITICAL STEP** SAT / UNSAT
19.	Adjust EDG B VOLT REG to match INCOMING and RUNNING voltages	Matches INCOMING (EDG) and RUNNING (bus 10600) voltages with EDG B VOLT REG adjustments	SAT / UNSAT
*20.	Adjust EDG B GOV to rotate synchroscope slowly in the FAST direction (clockwise)	Adjusts EDG B GOV to rotate synchroscope slowly in fast direction	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*21.	When EDG B and the 10600 BUS are in phase (synchroscope at 12 o'clock) close EDG B LOAD BKR 10602	Places the control switch 10602, EDG B LOAD BKR, to CLOSE when synchroscope is at approximately 12:00	**CRITICAL STEP** SAT / UNSAT
22.	Adjust EDG B GOV to raise EDG B load to between 100 and 300 kW	Places the EDG B GOV switch to RAISE and loads EDG B to between 100 and 300 kW	SAT / UNSAT
23.	Place EDG B LOAD BKR SYNCH SW in OFF and remove synch switch handle.	Places the EDG B LOAD BKR SYNCH SW to OFF and removes synch switch handle.	SAT / UNSAT
24.	If EDG B is the second diesel paralleled, THEN balance EDG B and D using voltage regulator(s) to establish LESS THAN 100 KVAR difference between EDG B and EDG D.	Determines EDG B is NOT the second diesel being paralleled, therefore step is n\a.	SAT / UNSAT
25.	Adjust EDG B GOV to raise EDG B load to ≥ 2340 KW and ≤ 2600 kW over 3 to 5 minutes in approximately 800 kW increments	Adjusts EDG B GOV to raise EDG B load to ≥ 2340 KW and ≤ 2600 kW over 3 to 5 minutes in 800 kW increments. **EVALUATOR**: State,"3 minutes have passed", after each load adjustment.	SAT / UNSAT
*26.	Place EDG D LOAD BKR SYNCH SW in ON	Places the EDG D LOAD BKR SYNCH SW to ON	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
27.	Adjust EDG D VOLT REG to match INCOMING and RUNNING voltage	Matches INCOMING (EDG) and RUNNING (Bus 10600) voltages with EDG D VOLT REG adjustments	SAT / UNSAT
*28.	Adjust EDG D GOV to rotate synchroscope slowly in the FAST direction (clockwise)	Adjusts EDG D GOV to rotate synchroscope slowly in fast direction	**CRITICAL STEP** SAT / UNSAT
*29.	When EDG D and the 10600 Bus are in phase (synchroscope at 12 O'clock) close EDG LOAD BKR 10612	Places the control switch for 10612, EDG D LOAD BKR, to CLOSE when synchroscope is at approximately 12:00	**CRITICAL STEP** SAT / UNSAT
30.	Adjust EDG D GOV to raise EDG D load to between 100 and 300 kW	Places the EDG D GOV switch to RAISE and loads EDG D to between 100 and 300 kW	SAT / UNSAT
31.	Place EDG D LOAD BKR SYNCH SW in OFF and remove synch switch handle.	Places the EDG D LOAD BKR SYNCH SW to OFF and removes synch switch handle.	SAT / UNSAT
32.	If EDG D is the second diesel paralleled, THEN balance EDG B and D using voltage regulator(s) to establish LESS THAN 100 KVAR difference between EDG B and EDG D.	Balance EDG B & D using voltage regulator(s) to establish less than 100 kVAR difference between them.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
33.	Adjust EDG D GOV to raise EDG D load to 2600 kW over 3 to 5 minutes in approximately 800 kW increments	Adjusts EDG D GOV to raise EDG D load to 2600 kW over 3 to 5 minutes in 800 kW increments **SIMULATOR OPERATOR**: After the candidate raises KW loading to >1000, Trigger 1 automatically activates.	SAT / UNSAT
		Alternate Path begins here	
*34.	Acknowledges EDG D GRD OVERLOAD annunciator 09-8-4-32.	Trips EDG D load breaker by placing the control switch for 10612, EDG D LOAD BKR, to TRIP **EVALUATOR NOTE:** The candidate may unload EDG D before tripping the breaker. Alternately, the candidate may place the EDG Control Switch to STOP, which both secures the EDG and trips the load breaker. This also satisfies the critical step.	**CRITICAL STEP** SAT / UNSAT
<u>EVALUATOR</u>: Terminate the task at this point			

Task standard: EDG B and D started and loaded per ST-9BB. Then, EDG D load breaker tripped in response to ground overload indications.

HANDOUT

EDG B and D load testing is in progress with ST-9BB, EDG B & D FULL LOAD TEST AND ESW PUMP OPERABILITY TEST complete through Step 8.7.

Perform ST-9BB, EDG B & D FULL LOAD TEST AND ESW PUMP OPERABILITY TEST, steps 8.8 through 8.28 for EDG B & D.

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

RO	NRC 17-1 F	TASK TITLE: Supply ESW to Ventilation Loads
APPL. TO	JPM NUMBER	

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 400000 A4.01 (3.1/3.0)

ESTIMATED COMPLETION TIME: 10 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________

JPM Completion ☐ Simulated ☒ Performed

Location: ☐ Plant ☒ Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____________________
SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

RO	NRC 17-1 F	TASK TITLE: Supply ESW to Ventilation Loads
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-21, Emergency Service Water (ESW)

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Reset the simulator to IC-158.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. The plant is operating at power.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Supply ESW A to ventilation loads per OP-21 section D.3. The procedure is in progress up to step D.3.3."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of OP-21.	Obtains a controlled copy of OP-21.	SAT / UNSAT
2.	Select the correct section to perform the task.	Selects Section D.3. Proceeds to step D.3.3	SAT / UNSAT
3.	Verify closed ESW SYS A INJ VLV 46MOV-101A.	Observes 46MOV-101A green light on, red light off.	SAT / UNSAT
4.	Verify 46ESW-10A (CRD pump A cooler ESW loop A supply isol valve) is locked closed.	Directs operator to verify 46ESW-10A (CRD pump A cooler ESW loop A supply isol valve) is locked closed. **Evaluator Cue:** 46ESW-10A is locked closed.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
5.	IF time will permit venting ESW Loop A to ensure piping is full, THEN vent ESW Loop A to a floor drain or suitable container through the following valves: • 46ESW-1010A (emergency service water loop A outer vent valve) located in West Cable Tunnel, 260' elevation • 46ESW-1012A (emergency service water loop A outer vent valve) located in Fan Room, Admin Bldg, 300' elevation • 46ESW-1011A (emergency service water loop A outer vent valve) located in Chiller Room, Admin Bldg, 300' elevation IF air is vented from ESW Loop A, THEN notify Shift Manager.	Directs operator to vent ESW Loop A. **Evaluator Cue:** ESW Loop A has been vented. No air flow was observed.	SAT / UNSAT
6.	Ensure open ESW SYS A TEST VLV 46MOV-102A.	Observes 46MOV-102A green light off, red light on.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*7.	Ensure ESW PMP A 46P-2A is running.	Starts ESW PMP A 46P-2A by rotating control switch clockwise to START.	**CRITICAL STEP** SAT / UNSAT
*8.	Open ESW SYS A INJ VLV 46MOV-101A.	Opens ESW SYS A INJ VLV 46MOV-101A by depressing OPEN pushbutton.	**CRITICAL STEP** SAT / UNSAT
*9.	Close ESW SYS A TEST VLV 46MOV-102A.	Closes ESW SYS A TEST VLV 46MOV-102A by depressing CLOSE pushbutton.	**CRITICAL STEP** SAT / UNSAT
10.	Monitor ESW Loop A flow rate on EPIC-A-710 or on EPIC display ESW.	Utilizes plant computer to monitor ESW Loop A flow rate (on EPIC-A-710 or on EPIC display ESW).	SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: ESW Loop A has been started and aligned to supply ventilation loads per OP-21 section D.3.

HANDOUT

Initial Conditions:

- **The plant is operating at power.**

Initiating Cue:

Supply ESW A to ventilation loads per OP-21 section D.3. The procedure is in progress up to step D.3.3.

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

S/RO	NRC 17-1 G	TASK TITLE: Isolate Control Room and Relay Room Ventilation
APPL. TO	JPM NUMBER	

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 290003 A4.01 (3.2/3.2)

ESTIMATED COMPLETION TIME: 10 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________

JPM Completion ☐ Simulated ☒ Performed

Location: ☐ Plant ☒ Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____________________

SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

S/RO	NRC 17-1 G	TASK TITLE: Isolate Control Room and Relay Room Ventilation
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-55B, Control Room Ventilation and Cooling

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Initialize the simulator to IC-157.

B. Control Room Ventilation Train ‘A’ in service.

C. Relay Room Ventilation Train ‘B’ in service.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and not actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. An accident at Nine Mile Point has resulted in rising radiation levels in the Control Room ventilation air supply header.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Isolate Control Room and Relay Room ventilation per OP-55B section G.1."

NOTE: All actions performed at Panel 09-75

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of OP-55B, Control Room Ventilation and Cooling.	Obtains a controlled copy of OP-55B.	SAT / UNSAT
2.	Select the correct section to perform the task.	Selects Section G.1 of OP-55B, Control Room Ventilation Isolation.	SAT / UNSAT
*3.	Place Control Room Ventilation ISOL & PURGE CNTRL switch in ISOL.	Places Control Room Ventilation ISOL & PURGE CNTRL switch in ISOL.	**CRITICAL STEP** SAT / UNSAT
4.	Verify closed the following dampers and valves: • EXH 70MOD-109 • INLET 70MOD-105 • EXH ISOL 70MOV-107 • INLET ISOL 70MOV-108	Observes red light off, green light on for the following: • EXH 70MOD-109 • INLET 70MOD-105 • EXH ISOL 70MOV-107 • INLET ISOL 70MOV-108	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
5.	Verify open the following dampers: • RECIRC A 70MOD-110A • RECIRC B 70MOD-110B	Observes red light on, green light off for the following: • RECIRC A 70MOD-110A • RECIRC B 70MOD-110B	SAT / UNSAT
6.	Verify one of the following control room emergency air supply fans is running with its discharge damper open: <u>Supply Fan</u> FRESH AIR SUPP 70FN-6A FRESH AIR SUPP 70FN-6B <u>Discharge Damper</u> DISCH 70MOD-112A DISCH 70MOD-112B	Observes red light on, green light off for FRESH AIR SUPP SUPP 70FN-6A Observes red light on, green light off for DISCH 70MOD-112A	SAT / UNSAT
7.	Close 70DMPR-105 (control room vent supply isol 70MOD-105 manual bypass damper) (located near 70MOV-108).	Direct field operator to close 70DMPR-105. **<u>Evaluator Cue:</u>** 70DMPR-105 is closed.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
8.	Ensure closed all access doors to Control Room.	Acknowledges cue. **Evaluator Cue:** All access doors to the Control Room are closed.	SAT / UNSAT
9.	IF differential pressure is LESS THAN +0.125 inches water gauge on CNTRL RM DIFF PRESS 70DPI-063, THEN ensure Office Area Ventilation is in normal operation or shutdown per OP-59B.	Observes CNTRL RM DIFF PRESS 70DPI-063 indicates greater than +0.125 inches water gauge.	SAT / UNSAT
10.	WHILE control room ventilation is operating in isolate mode, perform the following: a. Record control room dP in the narrative log once per shift. b. Notify system engineer if LESS THAN +0.2 inches water gauge.	Acknowledges step. **Evaluator Cue:** Another operator will record Control Room dP in the narrative log.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
11.	Hang copy (6 total) of Attachment 5 on the following sets of doors (one copy facing outside on outer fire door, other facing inside on inner vestibule door): 76FDR-300-13 MAIN CONTROL ROOM FIRE DOOR and associated inner vestibule door 76FDR-300-10 MAIN CONTROL ROOM CORRIDOR FIRE DOOR and associated inner vestibule door 76FDR-300-26 CONTROL ROOM ACCESS DOOR FROM NEW ADMIN/SUPPORT FACILITY and associated inner vestibule door	Acknowledges step. **Evaluator Cue:** Another operator has hung the required signs.	SAT / UNSAT
*12.	IF Control Room Ventilation is being isolated as a result of high radiation in the air supply header, OR by direction of AOP-39 OR AOP-40, THEN isolate Relay Room Ventilation as follows: Place the following Relay Room Ventilation control switches in ISOL: • ISOL & PURGE CNTRL A • ISOL & PURGE CNTRL B	Places ISOL & PURGE CNTRL A in ISOL.	**CRITICAL STEP** SAT / UNSAT
		Places ISOL & PURGE CNTRL B in ISOL.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
13.	Verify closed the following dampers and valves: • EXH ISOL 70MOV-105 • INLET ISOL 70MOV-106 • RR VENT DAMPER 70MOD-115	Observes red light off, green light on for the following: • EXH ISOL 70MOV-105 • INLET ISOL 70MOV-106 • RR VENT DAMPER 70MOD-115	SAT / UNSAT
14.	IF either 70MOV-105 or 70MOV-106 failed to close…	Determines step is N/A and moves on in procedure.	SAT / UNSAT
15.	IF RR VENT DAMPER 70MOD-115 is not closed…	Determines step is N/A and moves on in procedure.	SAT / UNSAT
16.	Verify open the following dampers: • RECIRC A 70MOD-104A • RECIRC B 70MOD-104B	Observes red light on, green light off for the following: • RECIRC A 70MOD-104A • RECIRC B 70MOD-104B	SAT / UNSAT
17.	Ensure closed all access doors to Relay Room.	Acknowledges cue. **Evaluator Cue:** All access doors to the Relay Room are closed.	SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: Control Room and Relay Room ventilation are isolated per OP-55B section G.1.

HANDOUT

- **An accident at Nine Mile Point has resulted in rising radiation levels in the Control Room ventilation air supply header.**

Isolate Control Room and Relay Room ventilation per OP-55B section G.1.

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

S/RO	17-1 NRC H	TASK TITLE: Lower Torus Water Level
APPL. TO	JPM NUMBER	

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 223001 A2.11 (3.6/3.8)

ESTIMATED COMPLETION TIME: 10 Minutes

SUBMITTED: ____________________________ OPERATIONS REVIEW: ____________________________

APPROVED: ____

~~~~~~

CANDIDATE NAME: ____

JPM Completion ☐ Simulated ☒ Performed

Location: ☐ Plant ☒ Simulator

DATE PERFORMED: ____________ TIME TO COMPLETE: ________ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____

SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

S/RO	17-1 NRC H	TASK TITLE: Lower Torus Water Level
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-13B, RHR – Containment Control

III. TOOLS AND EQUIPMENT

A. None.

IV. SET UP REQUIREMENTS

A. Reset the simulator to IC-159.

B. Raise Torus level to at least 13.95'

C. Check closed 10RHR-274

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and not actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. Torus water level is high and must be drained via the RHR System.

B. The RHR pump suction pressure is adequate for pump operation.

C. Radwaste is lined up to receive drains to Waste Collector Tank.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "Lower Torus water level to approximately 13.90’ per OP-13B Section G.1”.

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of procedure OP-13B, RHR - CONTAINMENT CONTROL	Obtains a controlled copy of procedure OP-13B.	SAT / UNSAT
2.	Select the correct section to perform the task.	Selects Section G.1. (Pumping Torus Water to Reactor Building Equipment Drain Discharge Header with RHR Loop A)	SAT / UNSAT
3.	IF water is to be pumped to a radwaste storage tank, THEN direct radwaste operator to perform the following: a. Ensure lineup from reactor building equipment drain discharge header to the desired radwaste storage tank is correct. b. Ensure sufficient radwaste storage tank volume is available.	Contacts Radwaste operator and verifies conditions are met for receiving water. **Evaluator Cue:** Inform Candidate conditions are met to receive water from the Torus.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
4.	Open RHR pump discharge drain valve: RHR Pump — Drain Valve 10P-3A — 10RHR-250A 10P-3C — 10RHR-250C	Directs operator to the West Crescent area to open 10-RHR-250A(C) and report back. (ALARA area) **Booth Operator:** Act as the operator and, access remote function RH08 and open the valve. **Inform the Candidate:** "10-RHR-250A or 10-RHR-250C is OPEN".	SAT / UNSAT
5.	CAUTION Starting an RHR pump in an RHR loop that is not full could result in severe water hammer and equipment damage. RHR loop piping shall be full prior to manually starting an RHR pump in that loop.	Acknowledges CAUTION. **Evaluator Note:** The candidate may observe the absence of keepful alarms based on this caution.	SAT / UNSAT
*6.	Ensure one of the following RHR pumps is running: • RHR PMP 10P-3A • RHR PMP 10P-3C	Starts either 10P-3A or 3C.	**CRITICAL STEP** SAT / UNSAT
7.	NOTE: 10MOV-34A may be throttled when 10MOV-39A has dual position indication.	Acknowledges NOTE.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*8.	Ensure open RHR TEST TORUS CLG & SPRAY 10MOV-39A.	Opens RHR TEST TORUS CLG & SPRAY 10MOV-39A.	**CRITICAL STEP** SAT / UNSAT
*9.	Throttle RHR TEST & TORUS CLG 10MOV-34A to establish desired RHR Loop A flow.	Throttles open 10MOV-34A by placing the control switch to OPEN position until the desired flow rate is achieved and observes the following: • 10MOV-34A red- light ON and green- light ON **EVALUATOR- NOTE -not part of critical task:** Candidate should minimize pump flow less than 6500 gpm for one pump (13,000 gpm for two pumps) to prevent high vibration.	**CRITICAL STEP** SAT / UNSAT
10.	IF RHR Loop A condensate transfer keep-full is in service, AND RHR Loop A pressure is LESS THAN condensate transfer pressure, THEN close 10RHR-274 (RHR loop A containment spray keep-full cond xfer connection valve).	Determines step is N/A.	SAT / UNSAT
*11.	Open RHR DISCH TO RADW 10MOV-67.	Opens RHR DISCH TO RADW 10MOV-67.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*12.	Throttle RHR DISCH TO RADW 10MOV-57 to control flow to reactor building equipment drain discharge header.	Throttles open RHR DISCH TO RADW 10MOV-57 to control flow to reactor building equipment drain discharge header.	**CRITICAL STEP** SAT / UNSAT
13.	WHILE pumping torus water, monitor torus water level using multiple indications.	Monitors Torus water level by using any of the following: 1) EPIC - TORUS 2) 23LR-202A/B on panel 09-3 3) 23LI-202A/B on panel 09-3 4) LEVEL TLC (Soft keyboard) 5) SPDS screens with torus level indicated	SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: Torus water level is lowering to RB Equipment Drain Discharge Header via RHR.

HANDOUT

- **Torus water level is high and must be drained via the RHR System.**
- **The RHR pump suction pressure is adequate for pump operation.**
- **Radwaste is lined up to receive drains to Waste Collector Tank.**

Lower Torus water level to approximately 13.90’ per OP-13B Section G.1.

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

S/RO	17-1 NRC I	TASK TITLE:	Restore H_2O_2 Monitors Following Isolation (Alt Path)
APPL. TO	JPM NUMBER		

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 223002 A2.09 3.6/3.7

ESTIMATED COMPLETION TIME: 10 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ______________________________

~~~~~~

CANDIDATE NAME: ______________________________ LOGIN ID:

JPM Completion ☒ Simulated ☐ Performed

Location: ☒ Plant ☐ Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ______________________________

SIGNATURE/PRINTED

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-37, Containment Atmosphere Dilution System.

B. EP-2, Isolation/Interlock Overrides.

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Obtain SM permission prior to performing this task.

B. Obtain a controlled copy of EP-2 Isolation/Interlock Overrides.

C. Obtain a controlled copy of OP-37, Reinitializing Hydrogen/Oxygen Monitor Panel.

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, placekeeping and three-point communication.

VI. TASK CONDITIONS

A. A Primary Containment isolation has occurred due to High Drywell Pressure (2.7 psig).

B. The cause of the isolation has been determined.

C. The Shift Manager directs restoration of H_2/O_2 monitors.

VII. INITIATING CUE

Inform the candidate, "Override the High Drywell Pressure Isolation per Section 5.25 of EP-2 and then reinitialize 27PCX-101A per section D.2 of OP-37."

*** - CRITICAL STEP**

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of EP-2, ISOLATION/INTERLOCK OVERRIDES.	Obtains a controlled copy of EP-2. **EVALUATOR:** Provide working copy of EP-2.	SAT \ UNSAT
*2.	Place EMERG MANUAL OVERRIDE SYSTEM A keylock switch in OVER/RI at panel 27MAP. (PA2-35 key)	At Panel 27MAP, places EMERG MANUAL OVERRIDE SYSTEM A switch in OVER/RI. **EVALUATOR CUE:** Inform candidate keylock switch is in override.	**CRITICAL STEP** SAT \ UNSAT
*3.	Place EMER MANUAL OVERRIDE SYSTEM B keylock switch in OVER/RI at panel 27MAP.	At Panel 27MAP, places EMERG MANUAL OVERRIDE SYSTEM B switch in OVER/RI. **EVALUATOR CUE:** Inform candidate keylock switch is in override.	**CRITICAL STEP** SAT \ UNSAT
4.	Reinitialize hydrogen/oxygen monitor panel per Section D of OP-37.	Exits EP-2 and enters OP-37. **EVALUATOR:** Provide working copy of OP-37.	SAT \ UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
5.	Ensure LOCAL POWER switch is in OFF.	Observes LOCAL power switch in OFF.	SAT \ UNSAT
EVALUATOR: Inform the Candidate all valves referenced in Section D.2.2 are found with their green light on, red light off.			
*6.	Ensure open one set of the following valve pairs: • SAMPLE GAS SUPP POOL SAMP VALVE 27SOV-119E1 • SAMPLE GAS SUPP POOL SAMP VALVE 27SOV-119E2	**<u>EVALUATOR NOTE \ CUE:</u>** If Candidate asks which Sample Path to use: inform Candidate to use "**normal path**". (The normal path is the Supp Pool 27SOV-119E1/E2) Attempts to open one of the following pairs of valve by placing control switches to OPEN: • SAMPLE GAS SUPP POOL SAMP VALVE 27SOV-119E1 • SAMPLE GAS SUPP POOL SAMP VALVE 27SOV-119E2 **EVALUATOR CUE:** When the candidate moves the first control switch to open, state the red light is on, green light off. **Alternate Path begins here:** When the **second valve** (of the pair) control switch is placed to open, state the **red light is off** and the **green light remains on.**	**CRITICAL STEP** SAT \ UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
6a.	Note: Candidate may re-close first valve previously opened.	**EVALUATOR CUE:** When the first valve previously opened is taken to close, state the **green light is on, the red light is off.**	SAT \ UNSAT
*7.	Ensure open one set of the following valve pairs: • SAMPLE GAS DRYW MID SAMP VALVE 27SOV-120E1/E2	**EVALUATOR CUE:** If Candidate asks which Sample Path to use: inform Candidate to use "**DW mid path**". Attempts to open a different pair of the following valves by placing control switches to OPEN: • SAMPLE GAS DRYW MID SAMP VALVE 27SOV-120E1 • SAMPLE GAS DRYW MID SAMP VALVE 27SOV-120E2 **EVALUATOR CUE:** For each valve in the second pair, when the candidate indicates the control switch is moved to open, then inform the candidate that the red light came on the green light is off.	**CRITICAL STEP** SAT \ UNSAT
*8.	Ensure open the following valves at MAP: • SAMPLE GAS RETURN SAMP VALVE 27SOV-124E1 • SAMPLE GAS RETURN SAMP VALVE 27SOV-124E2	Places the control switch to the OPEN position for: • SAMPLE GAS RETURN SAMP VALVE 27SOV-124E1 • SAMPLE GAS RETURN SAMP VALVE 27SOV-124E2 **EVALUATOR CUE:** For each valve, when the candidate indicates the control switch is moved to open inform the candidate that the red light is on, the green light is off.	**CRITICAL STEP** SAT \ UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*9.	Ensure PUMP switch is in RUN.	Places PUMP switch in RUN. **EVALUATOR CUE:** Inform the candidate it is in RUN.	**CRITICAL STEP** SAT \ UNSAT
*10.	Ensure POWER keylock switch is in ON.	Places POWER keylock switch in ON. **EVALUATOR CUE:** Inform the candidate the keylock switch is in ON.	**CRITICAL STEP** SAT \ UNSAT
*11.	Depress 6.	Depresses 6 on 27PCX-101A keypad. **EVALUATOR CUE:** When indicates 6 would be depressed, then inform the candidate “6 has been depressed and ‘ENTER ACCESS CODE’ appears on CRT screen”.	**CRITICAL STEP** SAT \ UNSAT
*12.	When “ENTER ACCESS CODE” appears on CRT screen, perform the following: a) Depress 8. b) Depress 2. c) Depress ENTER.	Depresses 8, then 2, and then Enter key on 27PCX-101A keypad. **EVALUATOR CUE:** When the candidate indicates 8, 2 and Enter keys would be depressed, then state the “monitor” display appears on CRT screen.	**CRITICAL STEP** SAT \ UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*13.	WHEN monitor display appears on CRT screen, perform the following: a) Depress 1. b) Depress ESC.	Depresses 1 and then ESC key on 27PCX-101A keypad. **EVALUATOR CUE:** When the candidate states they would depress 1 then ESC, inform the candidate that the 27PCX-101 graphic display is now visible.	**CRITICAL STEP** SAT \ UNSAT
14.	Verify the following on 27PCX-101A display: • SV-1 is open • SV-6 is open • Flow indication for P1 (red light on)	Observes the following: • SV-1 open • SV-6 open • P1 running **EVALUATOR CUE:** If asked, inform the candidate SV-1 and SV-6 indicate open and P1 red light is on.	SAT \ UNSAT
		<u>EVALUATOR</u>: Terminate the task at this point.	

Task standard: High Drywell Pressure Isolation is overridden per Section 5.25 of EP-2. 27PCX-101A re-initialized and aligned to Drywell per section D.2 of OP-37.

HANDOUT

- **A Primary Containment isolation has occurred due to High Drywell Pressure (2.7 psig).**
- **The cause of the isolation has been determined.**
- **The Shift Manager directs restoration of H_2/O_2 monitors.**

Override the High Drywell Pressure Isolation per Section 5.25 of EP-2 and then reinitialize 27PCX-101A per section D.2 of OP-37.

James A. Fitzpatrick
JOB PERFORMANCE MEASURE

S/RO	17-1 NRC J	TASK TITLE: Supply Fire Protection Water to EDGs B & D
APPL. TO	JPM NUMBER	

REV: ______ DATE: ___________ NRC K/A SYSTEM NUMBER: 286000 K1.09 (3.2/3.3)

ESTIMATED COMPLETION TIME: 15 Minutes

SUBMITTED: ____________________ OPERATIONS REVIEW: ____________________

APPROVED: ____________________

~~~~~~

CANDIDATE NAME: ____________________

JPM Completion ☒ Simulated ☐ Performed

Location: ☒ Plant ☐ Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ____________________
SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

S/RO	17-1 NRC J	TASK TITLE: Supply Fire Protection Water to EDGs B & D
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-22, Diesel Generator Emergency Power

III. TOOLS AND EQUIPMENT

A. Equipment located in cabinet 76CAB-1 on West wall of North Emergency Service Water Room.

IV. SET UP REQUIREMENTS

A. Provide a working copy of OP-22, including Section G.24

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and not actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. The plant has sustained a loss of off-site power.

B. The A and C EDGs have failed to start.

C. Upon initiation of the B and D EDGs, the B ESW System failed due to a fault in the supply breaker to the B ESW pump.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "The CRS has directed you to supply cooling water to EDGs B and D from the Fire Protection System per OP-22 section G.24."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of OP-22.	The candidate determines where to obtain a controlled copy of OP-22. (Control Room, Merlin) **EVALUATOR:** Provide candidate a current copy of OP-22.	SAT / UNSAT
2.	Select the correct section to perform the task.	The candidate selects Section G.24 of OP-22.	SAT / UNSAT
3.	BEFORE cross connecting safety systems, review system status to ensure failure of one system will not result in common-cause failure.	Reviews procedure step regarding cross-connecting safety systems. **EVALUATOR CUE:** If asked, inform the candidate that the review is complete and a single failure of one system will NOT result in common-cause failure.	SAT / UNSAT
4.	Verify ESW Pump 46P-2B is not available.	Determines ESW pump 46P-2B is not available based on initial conditions.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
5.	**CAUTION** Fire Protection Pumps 76P-1, 76P-2, and 76P-4 are designed to operate with screenwell forebay water level GREATER THAN or equal to 239 feet, 6 inches.	Review procedure caution. **EVALUATOR CUE:** If asked for forebay level, state that forebay level is normal.	SAT / UNSAT
6.	Ensure AT LEAST one of the following pumps is running: • ELEC FIRE PMP 76P-2 • DIESEL FIRE PMP 76P-1 • DIESEL FIRE PMP 76P-4	Ensures AT LEAST one of the following pumps is running: • ELEC FIRE PMP 76P-2 • DIESEL FIRE PMP 76P-1 • DIESEL FIRE PMP 76P-4 **EVALUATOR CUE:** Candidate may visually ensure one pump is running by using local indications or by contacting the Control Room. If necessary, respond to Control Room communication and report to the candidate that Diesel Fire Pumps P1 and P4 are running.	SAT / UNSAT
7.	Verify closed AT LEAST one of the following valves: • 46ESW-2A (ESW loop A supply to EDG cross-tie isol valve) • 46ESW-2B (ESW loop B supply to EDG cross-tie isol valve)	Verifies closed AT LEAST one of the following valves by simulating rotating valve handwheel clockwise: • 46ESW-2A • 46ESW-2B **EVALUATOR CUE:** The indicated handwheel does not rotate.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*8.	Line up cross-tie between fire protection and ESW as follows: NOTE: Locking devices (red detents) must be depressed in order to remove caps. Remove caps from the following valves: • 46ESW-2000 (ESW/FPS cross-tie isol valve)	Simulates removing cap from 46ESW-2000 by pushing red detent. **EVALUATOR CUE:** The indicated cap is removed.	**CRITICAL STEP** SAT / UNSAT
*9.	• 76FPS-2000 (FPS/ESW cross-tie isol valve)	Simulates removing cap from 76FPS-2000 by pushing red detent. **EVALUATOR CUE:** The indicated cap is removed.	**CRITICAL STEP** SAT / UNSAT
*10.	Connect short length of hose (stored in cabinet 76CAB-1 on west wall of north emergency service water room) between the following valves: • 46ESW-2000	Simulates connecting hose to 46ESW-2000.	**CRITICAL STEP** SAT / UNSAT
*11.	• 76FPS-2000	Simulates connecting hose to 76FPS-2000.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*12.	Unlock and open 76FPS-2000.	Simulates unlocking and then opening 76FPS-2000 by rotating handwheel counterclockwise. **EVALUATOR CUE:** The indicated valve handwheel has rotated fully counterclockwise.	**CRITICAL STEP** SAT / UNSAT
*13.	Unlock and open 46ESW-2000.	Simulates unlocking and then opening 46ESW-2000 by rotating handwheel counterclockwise. **EVALUATOR CUE:** The indicated valve handwheel has rotated fully counterclockwise.	**CRITICAL STEP** SAT / UNSAT
*14.	Line up ESW motor-operated valves as follows: NOTE: If the ESW lockout matrix is activated, operation of 46MOV-101B will be blocked. IF the ESW lockout matrix is activated, THEN perform the following: Open circuit breaker 71MCC-262-OD1 (46MOV-101B ESW loop B supply header isol valve).	**EVALUATOR CUE:** If asked about ESW lockout matrix, inform the Candidate that the ESW lockout matrix is activated. Indicates need to open circuit breaker 71MCC-262-OD1. **EVALUATOR CUE:** Inform the Candidate that circuit breaker 71MCC-262-OD1 has been opened by another operator.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*15.	Declutch and manually close 46MOV-101B (emergency service water loop B supply header isol valve).	Simulates de-clutching and then closing 46MOV-101B by rotating handwheel fully clockwise. **EVALUTOR CUE:** When the de-clutch mechanism is pulled downward and the handwheel is turned clockwise, inform the Candidate that the handwheel has been turned in the indicated direction and stopped.	**CRITICAL STEP** SAT / UNSAT
16.	Ensure closed the following valves: • ESW SYS B INJ VLV 46MOV-101B	Observes 46MOV-101B is closed. **EVALUATOR CUE:** 46MOV-101B is closed.	SAT / UNSAT
17.	• ESW SYS B TEST VLV 46MOV-102B	Observes 46MOV-102B is closed. **EVALUATOR CUE:** 46MOV-102B is closed.	SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: Cooling water has been supplied to EDGs B and D from the Fire Protection System per OP-22 section G.24

HANDOUT

- **The plant has sustained a loss of off-site power.**
- **The A and C EDGs have failed to start.**
- **Upon initiation of the B and D EDGs, the B ESW System failed due to a fault in the supply breaker to the B ESW pump.**

The CRS has directed you to supply cooling water to EDGs B and D from the Fire Protection System per OP-22 section G.24.

James A. Fitzpatrick

JOB PERFORMANCE MEASURE

S/RO	17-1 NRC K	TASK TITLE: Electrically Disarm a CRD HCU
APPL. TO	JPM NUMBER	

REV: ______ DATE: __________ NRC K/A SYSTEM NUMBER: 201003 A2.02 (3.7/3.8)

ESTIMATED COMPLETION TIME: 15 Minutes

SUBMITTED: ______________________ OPERATIONS REVIEW: ______________________

APPROVED: ______________________

~~~~~~

CANDIDATE NAME: ______________________

JPM Completion ☒ Simulated ☐ Performed

Location: ☒ Plant ☐ Simulator

DATE PERFORMED: __________ TIME TO COMPLETE: ______ Minutes

PERFORMANCE EVALUATION: ☐ Satisfactory ☐ Unsatisfactory

~~~~~~

COMMENTS: (MANDATORY FOR UNSATISFACTORY PERFORMANCE)

EVALUATOR: ______________________

SIGNATURE/PRINTED

JOB PERFORMANCE MEASURE

REQUIRED TASK INFORMATION

S/RO	17-1 NRC K	TASK TITLE: Electrically Disarm a CRD HCU
APPL. TO	JPM NUMBER	

I. SAFETY CONSIDERATIONS

A. None

II. REFERENCES

A. OP-25, Control Rod Drive Hydraulic System

III. TOOLS AND EQUIPMENT

A. None

IV. SET UP REQUIREMENTS

A. Provide a working copy of OP-25

V. EVALUATOR NOTES

A. The candidate should, at a minimum, observe the change in equipment status light indication when equipment is operated.

B. If simulating this task, then inform the candidate that the conditions of each step need only be properly identified and <u>not</u> actually performed.

C. The candidate should demonstrate proper use of HU tools such as procedure use, self checking, place keeping and three-point communication.

VI. TASK CONDITIONS

A. The plant is operating at 100% power.

B. Control rod 22-19 was fully withdrawn, but would not couple.

C. The rod has been fully inserted and its HCU is being valved out per OP-25 Section G.1.

D. The rod must be electrically disarmed.

*** - CRITICAL STEP**

VII. INITIATING CUE

Inform the candidate, "The CRS has directed you to electrically disarm control rod 22-19 per OP-25 Section G.21."

	STEP	STANDARD	EVALUATION / COMMENT
1.	Obtain a controlled copy of OP-25.	The candidate determines where to obtain a controlled copy of OP-25. (Control Room, Merlin) **EVALUATOR:** Provide candidate a current copy of OP-25.	SAT / UNSAT
2.	Review precautions and selects correct section.	Reviews precautions and selects section G.21.	SAT / UNSAT
3.	Notify Control Room that CRD 22-19 will be electrically disarmed.	Notifies Control Room that CRD 22-19 will be electrically disarmed. **EVALUATOR CUE:** Acknowledge communication.	SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
*4.	Unplug amphenol connector from each of the following solenoid operated valves at HCU 22-19 and control per AP-12.06. • 03SOV-120(*) (withdraw settle solenoid operated valve)	Simulates unplugging amphenol connector from 03SOV-120 at HCU 22-19. **EVALUATOR CUE:** The indicated connector has been unplugged.	**CRITICAL STEP** SAT / UNSAT
*5.	• 03SOV-121(*) (insert exhaust water solenoid operated valve)	Simulates unplugging amphenol connector from 03SOV-121 at HCU 22-19. **EVALUATOR CUE:** The indicated connector has been unplugged.	**CRITICAL STEP** SAT / UNSAT
*6.	• 03SOV-122(*) (withdraw drive water solenoid operated valve)	Simulates unplugging amphenol connector from 03SOV-122 at HCU 22-19. **EVALUATOR CUE:** The indicated connector has been unplugged.	**CRITICAL STEP** SAT / UNSAT
*7.	• 03SOV-123(*) (insert drive water solenoid operated valve)	Simulates unplugging amphenol connector from 03SOV-123 at HCU 22-19. **EVALUATOR CUE:** The indicated connector has been unplugged.	**CRITICAL STEP** SAT / UNSAT

	STEP	STANDARD	EVALUATION / COMMENT
8.	Notify Control Room that CRD 22-19 has been electrically disarmed.	Notifies Control Room that CRD 22-19 has been electrically disarmed. **EVALUATOR CUE:** Acknowledge communication.	SAT / UNSAT
EVALUATOR: Terminate the task at this point.			

Task Standard: CRD 22-19 has been electrically disarmed per OP-25 Section G.21.

HANDOUT

- **The plant is operating at 100% power.**
- **Control rod 22-19 was fully withdrawn, but would not couple.**
- **The rod has been fully inserted and its HCU is being valved out per OP-25 Section G.1.**
- **The rod must be electrically disarmed.**

The CRS has directed you to electrically disarm control rod 22-19 per OP-25 Section G.21.

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LOI 17-1 NRC EXAMINATION SCENARIO 1

TITLE: **LOI 17-1 NRC EXAMINATION SCENARIO 1**

SCENARIO NUMBER: **NRC 1**

PATH: **STAND ALONE**

Validation: _____ Training: _____ Operations: _____

	CANDIDATES
CRS	
ATC	
BOP	

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
10/25/17	New	New Scenario	T. Hooper	D. Kelly

A. TITLE: LOI 17-1 NRC EXAMINATION SCENARIO 1

B. SCENARIO SETUP:

1. IC-151

2. Special Instructions:

   a. The Plant is operating at approximately 80% power.
   b. SRV 'A' is inoperable (yellow tag on SRV 'A' switch).
   c. Have OP-65 marked up for power reduction.
   d. Have OP-4 marked up to step F.2.1.

3. Preset Conditions:

   a. Preset, M:NM14:A, APRM channel A failure, Final=63.7855
   b. Preset, M:AD07:A, Rx press relieve vlv(2E-RV2-71A) failed closed
   c. TRIGGER 1, M:PC05:J, Drywell pressure xmtr 05PT-12A failure, Final =10
   d. TRIGGER 2, M:HP05, HPCI inadvertent initiation
   e. TRIGGER 3, M:MC01, Main Condenser air in leakage, Initial=25, Final=40, Ramp=8:00
   f. Preset, M:RP01AB, RPS Automatic Scram Failure B Side Only
   g. Preset, M:RP01BB, RPS Manual Scram Failure B Side Only
   h. Preset, M:RP09, ARI Fails to Actuate
   i. TRIGGER 16, M:SL01:A, Standby Liquid Control pump A trip, Delay=30
   j. TRIGGER 17, M:SL01:B, Standby Liquid Control pump B trip, Delay=30
   k. Preset, M:RR13:A, ATWS System Fails to Initiate
   l. Preset, M:RR13:B, ATWS System Fails to Initiate
   m. TRIGGER 4, M:EG01, Main Generator Trip
   n. TRIGGER 5, M:TC04:A Turbine Bypass Valve Failure, 0%
   o. TRIGGER 5, M:TC04:B Turbine Bypass Valve Failure, 0%
   p. TRIGGER 20, R:IA07, Scram Air Hdr Man Iso Vlv, CLOSE
   q. TRIGGER 20, M:IA01, Loss of Air Pressure to Scram Air Header, 100%, Ramp=30 seconds
   r. TRIGGER 19, R:RH40:A, Relay 10A-K45A Timer Grayboot, REMOVED
   s. TRIGGER 19, R:RH40:B, Relay 10A-K45B Timer Grayboot, REMOVED
   t. Preset, O:AD ZLO217A(1), SRV A green light, Final=OFF
   u. Preset, O:HP ZDI23AS19, HPCI turbine trip pushbutton, Final=NORMAL
   v. Event Trigger 1, Event: None, Command: mmf pc05:j (0 3) 0
   w. Event Trigger 4, Event: ycx07nmaprmaf<42, Command: None
   x. Event Trigger 5, Event: ycx07nmaprmaf<24, Command: None
   y. Event Trigger 16, Event: zdi11s1(2)==1, Command: dmf sl01:b
   z. Event Trigger 17, Event: zdi11s1(1)==1, Command: dmf sl01:a
   aa. Event Trigger 30, Event: zdi5as1(1)==1, Command: imf mc01 18

4. Consumable Forms and Procedures:
   - AOP-1, AOP-31, AOP-32, AOP-77

C. SCENARIO SUMMARY:

The scenario will begin with the plant operating at approximately 80% power. SRV A is inoperable and Circulating Water pump A operation is degraded. The crew will begin by lowering power with recirculation flow and control rods to 63-65%. During the power reduction, it will become evident that APRM A has failed as-is. The crew will bypass APRM A per OP-16. Once the power reduction is complete, the crew will secure Circulating Water pump A per OP-4.

Drywell pressure transmitter 05PT-12A will fail momentarily high, then low. This will cause a half scram on RPS A. The crew will reset the half scram. The SRO will determine the Technical Specification impact.

HPCI will inadvertently initiate. The crew will take action to trip HPCI per AOP-77. The first method (pushbutton) will fail, so the crew will take alternate actions to trip HPCI. The SRO will determine the Technical Specification impact of the resulting HPCI inoperability.

Elevated Main Condenser air in-leakage will occur. Main Condenser vacuum will degrade. The crew will enter AOP-31 and eventually insert a manual Reactor scram.

RPS B will fail to process the scram and ARI will also fail to insert control rods. The crew will enter EOP-2 and EOP-3. The ATWS system will fail to automatically trip the Recirculation pumps when required. The crew will lower Recirculation flow to minimum and then trip the Recirculation pumps. The crew will terminate and prevent injection except CRD, SLC, and RCIC. The crew will inject boron using SLC. The first pump started will trip after a time delay. The second pump started will operate properly. The Main Turbine will be available until power lowers to approximately 40%, when a spurious turbine trip occurs. As power lowers, two Turbine Bypass Valves will fail closed, challenging Reactor pressure control and Primary Containment control. The crew will be able to manually insert control rods. Either pulling RPS fuses or venting the scram air header will result in all rods inserting.

The scenario will be terminated when control rods are being inserted or are all inserted and Reactor water level is controlled above 0”.

Shift Turnover
The Plant is operating at approximately 80% power. SRV A is inoperable due to a circuit failure. Circulating Water pump A operation is degraded due to excessive seal leakage. When you take the shift: 1. Lower Reactor power to 63-65% using Recirc and control rods per the provided RMI. 2. Then, secure Circulating Water pump A per OP-4 section F. The procedure is in progress up to step F.2.1. • Waste Sample Tank discharge to the canal is NOT in progress. • Chlorine pump stroke setting has been reduced to the value appropriate for 2 circulating water pumps, per Attachment 3 of OP 7A. • Chlorination of condenser waterboxes is secured per OP 7A.

Critical Tasks/Standards
Critical Task #1: Given a failure to scram with Reactor power above 2.5%, the crew will lower Reactor power by one or more of the following methods, in accordance with EOP-3: • Terminating and preventing all RPV injection except SLC, RCIC, and CRD • Tripping Recirculation pumps • Injecting boron Critical Task #2: Given a failure to scram, the crew will initiate Control Rod insertion, in accordance with EOP-3.

EVENT NO.	EVENT SEQUENCE	
1.	Lower Reactor Power with Recirculation Flow and Control Rods	(Reactivity: ATC, SRO)
2.	APRM Fails As-Is	(Instrument: ATC, SRO)
3.	Secure Circulating Water Pump A	(Normal: BOP, SRO)
4.	Drywell Pressure Transmitter Fails High, then Low	(Instrument: ATC, SRO)
5.	HPCI Inadvertently Initiates, Trip Pushbutton Fails to Work	(Instrument: BOP, SRO)
6.	Loss of Main Condenser Vacuum	(Component: All)
7.	Failure of RPS and ARI to Actuate	(Major: All)
8.	First SLC Pump Trips, Recirculation Pumps Fail to Automatically Trip	(Component: ATC, SRO)
9	Main Generator Trip and Two Turbine Bypass Valves Fails Closed	(Component: BOP, SRO)

D. TERMINATION CUES:

- Control rods are being inserted or are all inserted.
- Reactor water level is being controlled above 0”.

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	• Walkdown the control panels and assume the watch	
Event 1 Lower Reactor Power with Recirculation Flow and Control Rods	SRO	• Direct Reactor power lowered to 63-65% per RMI • Provide oversight for reactivity manipulation	SAT / UNSAT / NA
Note: The next event will be self-revealing during the power reduction.	ATC	• Lower Recirculation flow alternately with RWR MG A(B) SPEED CNTRL to obtain 43-45 Mlbm/hr • Insert control rods in the second CRAM group • Monitor APRMs, CTP, Recirc flow, Reactor water level	SAT / UNSAT / NA
Note: The second CRAM group contains the following control rods: • 26-43 • 42-23 • 26-11 • 18-39	BOP	• Assist ATC with peer checks and plant monitoring	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Event 2 APRM Fails As-Is	ATC	• Recognize / report APRM A is not lowering during the power reduction • Recognize / report annunciators 09-5-2-2, Rod Withdrawal Block, and 09-5-2-44, APRM Upscale, if power is lowered enough prior to bypassing APRM A	SAT / UNSAT / NA
	SRO	• Acknowledge report • Direct execution of ARPs (if annunciators received) • Determine Technical Specification Table 3.3.1.1-1 Functions 2b, c, and d are met with APRM A out of service • Determine TRM Table T3.3.B-1 Functions 1a, b, and c are met with APRM A out of service • Directs bypassing APRM A per OP-16	SAT / UNSAT / NA

	ATC	• Bypass APRM A per OP-16 Section E.16:
		  ○ Place APRM BYP switch in A
		  ○ Verify APRM A is bypassed using one or both of the following:
		  ▪ APRM A BYPASS indicating light is on
		  ▪ APRM A EPIC alarm indicates bypassed
		  ○ Verify the other two APRM channels associated with the same APRM BYP switch are in service using one or both of the following:
		  ▪ APRM BYPASS indicating lights are off for the other two APRMs
		  ▪ No EPIC bypassed alarms for the other two APRMs
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Event 3 Secure Circulating Water Pump A	SRO	• Direct securing Circulating Water Pump A per OP-4	SAT / UNSAT / NA
	BOP	• Acknowledge direction • Secure Circulating Water pump A per OP-4, starting at step F.2.1: ○ Ensure reactor power is LESS THAN 65% ○ Determine Waste Sample Tank discharge to the canal is not in progress ○ Determine chlorine pump stroke setting has been reduced to the value appropriate for 2 circulating water pumps, per Attachment 3 of OP-7A ○ Determine chlorination of condenser waterboxes is secured per OP-7A ○ IF Circulating Water Pump A is running, THEN shut down Circulating Water Pump A 36P-1A as follows: ○ Stop CIRC WTR PMP A 36P-1A ○ Verify closed CIRC WTR PMP DISCH VLV 36MOV-100A	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Event 4 **On Lead Examiner Cue: ACTIVATE TRIGGER 1** Drywell Pressure Transmitter Fails High, then Low	ATC	• Recognize / report ½ scram RPS 'A' side • Recognize / report annunciators: ○ 09-5-1-21, RPS HI DW PRESS TRIP ○ 09-5-1-3, RPS A AUTO SCRAM ○ EPIC alarm 1217, 05PT-12A Hi-Hi	SAT / UNSAT / NA
Role Play: If asked as management whether to reset half scram or leave in, direct resetting half scram.	SRO	• Acknowledge reports • Direct ARP response • Determine Technical Specification 3.3.1.1 Condition A is applicable (place channel in trip condition within 12 hours) • Determine Technical Specification 3.3.6.1 Condition A is applicable (place channel in trip condition within 12 hours) • Determine Technical Specification 3.3.6.2 Condition A is applicable (place channel in trip condition within 12 hours) • Direct resetting half scram	SAT / UNSAT / NA
Role Play: If dispatched to investigate Relay Room, wait 1 minute and report MTU for 05PT-12A indicates downscale.	ATC	• Reset half scram per ARP 09-5-1-3: • Place RX SCRAM RESET switch to GROUP 2 & 3, then to GROUP 1 & 4, spring return to NORM • Verify RPS A SCRAM GROUPS 1, 2, 3, and 4 lights are on	SAT / UNSAT / NA
Role Play: If dispatched to investigate Instrument Rack, wait 1 minute and report nothing abnormal for 05PT-12A.	BOP	• Assist analyzing cause of ½ scram • Utilize ARP and\or EPIC to determine 05PT-12A failed • May observe Alarm typer printout of DW pressure spiked to 10 psig	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
<u>Event 5</u> **On Lead Examiner Cue: ACTIVATE TRIGGER 2** HPCI Inadvertently Initiates, Trip Pushbutton Fails to Work	ALL	• Recognize / report spurious HPCI initiation • Recognize / report Reactor power rise, if applicable • Recognize / report Reactor water level rise, if applicable	SAT / UNSAT / NA
	SRO	• Acknowledge report • Enter AOP-77 (Inadvertent Initiation of ECCS or RCIC) • Verify HPCI injection not required • Direct trip of HPCI • May enter AOP-32 (Unexplained/Unanticipated Reactivity Change) • Declare HPCI inoperable • Determine Technical Specification 3.5.1 Condition C requires restoring HPCI to operable within 14 days • Declare the secured train of Standby Gas Treatment inoperable • Determine Technical Specification 3.6.4.3 Condition A requires restoring Standby Gas Treatment to operable within 7 days	SAT / UNSAT / NA
Role Play: If dispatched to investigate HPCI, wait two minutes, then report there is no obvious reason why HPCI started and there is no observable damage to the system.	BOP	• Execute AOP-77 • Observe Reactor water level and Drywell pressure indications to verify HPCI injection not required • Attempt to trip HPCI using pushbutton • Recognize / report failure of HPCI trip pushbutton to work • May lower HPCI flow rate to 0 • Take keylock switch 23A-S2A, 23MOV-16 AUTO CONTROL BYPASS, to BYPASS	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
		• Close OUTBD STM SUPP VLV 23MOV-16 • Close STM LINE WARMING ISOL VLV 23MOV-60 • AFTER turbine comes to a complete stop, place AUX OIL PMP 23P-150 control switch in PULL-TO-LOCK • Secure one train of Standby Gas • For the running Standby Gas train, open 01-125MOV-11(12) • May execute AOP-32 (Unexplained/Unanticipated Reactivity Change) ○ Determine HPCI initiation was only cause of reactivity change	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
<u>Event 6</u> **On Lead Examiner Cue: ACTIVATE TRIGGER 3** Loss of Main Condenser vacuum	BOP / ATC	• Recognize / report annunciator 09-3-1-28 Offgas Recombiner Trouble • Recognize / report lowering Main Condenser vacuum	SAT / UNSAT / NA
Note: A typical benchmark for directing a Reactor scram is a vacuum of 24.0" Hg.	SRO	• Acknowledge reports • Enter AOP-31 (Loss of Condenser Vacuum) • Direct power reduction per RAP-7.3.16 to maintain Main Condenser vacuum within Normal Operating Region, as time permits • Direct Reactor scram	SAT / UNSAT / NA
Role Play: If dispatched to investigate Recombiner trouble alarm, wait 2 minutes, then report that the alarm is caused by high Recombiner flow.	BOP	• Execute AOP-31 • Monitor Main Condenser vacuum • Trip Recombiner, if not yet automatically tripped • Trip H_2 addition • Close 20LCV-958 • Attempt to determine cause of vacuum degradation • Coordinate with ATC to insert 3rd group of CRAM rods, as time permits	SAT / UNSAT / NA
Note: Once a Reactor scram is attempted, a failure to scram will occur. This is scripted in the next event.	ATC	• Insert CRAM rods, as time permits • Depress manual Scram pushbuttons • Place Mode Switch to Shutdown	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
<u>Events 7, 8, & 9</u> Failure of RPS and ARI to Actuate, First SLC Pump Delayed Trip; Recirculation Pumps Fail to Automatically Trip, Main Generator Trip, Two Turbine Bypass Valves Fail Closed	ATC	• Recognize / report failure to scram • Manually initiate ARI	SAT / UNSAT / NA
Critical Task #1		**Given a failure to scram with Reactor power above 2.5%, the crew will lower Reactor power by one or more of the following methods, in accordance with EOP-3:** • **Terminating and preventing all RPV injection except SLC, RCIC, and CRD** • **Tripping Recirculation pumps** • **Injecting boron**	**Pass / Fail**
Critical Task #1 Standard:		**Terminate and prevent all injection except SLC, RCIC and CRD per EP-5** **And/or** **Trip Recirculation pumps** **And/or** **Inject boron**	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Critical Task #2		**Given a failure to scram, the crew will initiate Control Rod insertion, in accordance with EOP-3.**	**Pass / Fail**
Critical Task #2 Standard:		**Perform EP-3 Backup Control Rod Insertion Actions to insert control rods.**	
Note: Malfunctions will: ○ Trip the Main Generator when Reactor power lowers to approximately 42% ○ Fail closed two Turbine Bypass Valves when Reactor power lowers to approximately 24%	SRO	• Acknowledge report • Enter EOP-2 (RPV Control) on Reactor power above 2.5% or unknown when a scram is required • Determine the Reactor will NOT remain shutdown under all conditions without boron • Exit EOP-2 • Enter EOP-3 (Failure to Scram) • **Direct EP-3 Failure to Scram Actions** • Direct bypassing MSIV low RPV water level isolation interlocks per EP-2 • **Direct terminate and prevent all injection except SLC, RCIC and CRD per EP-5** • Direct RPV water level controlled between -19” and 110” with only Group 1 Water Level Control Systems (Condensate/Feedwater, CRD, HPCI, RCIC, LPCI) • Direct Reactor pressure controlled 800-1000 psig with Turbine Bypass Valves and SRVs, as required • May direct lowering Reactor pressure to allow injection with Condensate Booster pumps	SAT / UNSAT / NA **Critical Tasks #1 and #2** **Critical Task #1**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	ATC	• Perform EP-3 Failure to Scram Actions ○ Ensure Rx Mode Switch in SHUTDOWN ○ Ensure ARI initiated ○ Run Recirc flow to minimum ○ Determine Rx power greater than 2.5% ○ **Ensure Recirc pumps tripped** ○ Override ADS ○ Place ADS LOGIC OVERRIDE & RESET LOGIC A 2E-S2A in OVERRIDE ○ Place ADS LOGIC OVERRIDE & RESET LOGIC B 2E-S2B in OVERRIDE ○ Verify annunciator 09-4-1-27 ADS OVERRIDE SW IN OVERRIDE is in alarm ○ Verify white ADS LOGIC OVERRIDDEN 2E-DS10 light is on ○ Obtain CRS concurrence to inject SLC ○ Inject SLC ○ Verify white SQUIB VLVS READY lights are on ○ Note level on TK LVL 11LI-66 ○ Place SLC pup keylock switch in START SYS-A or START SYS-B ○ Verify red SLC pump running light is on ○ Verify SLC pump discharge pressure on DISCH PRESS 11PI-65 is greater than or equal to RPV pressure ○ Verify the following: ○ CLN UP SUCT 12MOV-18 is closed ○ CLN UP RETURN ISOL VALVE 12MOV-69 is closed	SAT / UNSAT / NA **Critical Task #1**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	ATC cont.	• Recognize / report trip of first SLC pump started • Start second SLC pump • Insert IRMs and SRMs • Range IRMs as necessary	SAT / UNSAT / NA

Booth Operator:
When directed to install MSIV low water level jumpers, wait 2 minutes and **run** MSIVLEVEL.cae.
	BOP	• Direct NPO to bypass MSIV low RPV water level isolation interlocks per EP-2 Section 5.1
		• Control Reactor pressure on SRVs, as required
		• **Terminate and prevent all injection except SLC, RCIC, and CRD per EP-5**
		  ○ Feedwater
		  ○ If RFP A is running:
		  ○ Ensure RFP A FLOW CNTRL 06-84A is in MAN
		  ○ Lower RFP A FLOW CNTRL 06-84A to minimum
		  ○ Ensure open RFP A MIN FLOW 34FCV-135A
		  ○ If RFP B is running:
		  ○ Ensure RFP B FLOW CNTRL 06-84B is in MAN
		  ○ Lower RFP BFLOW CNTRL 06-84B to minimum
		  ○ Ensure open RFP B MIN FLOW 34FCV-135B
		  ○ Ensure closed:
		  ○ RFP A DISCH 34MOV-100A
		  ○ RFP B DISCH 34MOV-100B
		  ○ Ensure FDWTR STARTUP VLV 34FCV-137 in MANUAL
		  ○ Ensure closed FDWTR STARTUP VLV 34FCV-137
			SAT / UNSAT / NA
			
			Critical Task #1

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	BOP cont.	○ Core Spray Loop A ○ Place 14MOV-11A AUTO ACTUATION BYPASS SW 14A-S16A switch in bypass ○ Verify white 14MOV-11A AUTO ACTUATION BYPASS LT 14A-DS35A light is on ○ Ensure closed OUTBD INJ VLV 14MOV-11A ○ Ensure PMP 14P-1A is stopped ○ Core Spray Loop B ○ Place 14MOV-11B AUTO ACTUATION BYPASS SW 14A-S16B switch in bypass ○ Verify white 14MOV-11B AUTO ACTUATION BYPASS LT 14A-DS35B light is on ○ Ensure closed OUTBD INJ VLV 14MOV-11B ○ Ensure PMP 14P-1B is stopped	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Booth Operator: If requested to disconnect RHR timers, wait 2 minutes, then **activate Trigger 19** and report task completion.	BOP cont.	○ RHR Loop A ○ Place 10MOV-27A AUTO CONTROL BYPASS 10A-S23A ○ Verify white light above 10MOV-27A AUTO CONTROL BYPASS 10A-S23A is on ○ Ensure closed LPCI OUTBD INJ VLV 10MOV-27A ○ Ensure RHR Loop A pumps which are not required to be running are stopped ○ RHR Loop B ○ Place 10MOV-27B AUTO CONTROL BYPASS 10A-S23B ○ Verify white light above 10MOV-27B AUTO CONTROL BYPASS 10A-S23B is on ○ Ensure closed LPCI OUTBD INJ VLV 10MOV-27B ○ Ensure RHR Loop B pumps which are not required to be running are stopped • Report RPV water level is less than 110” to CRS	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	BOP cont.	• Control RPV water level between -19” and 110” with only Group 1 Water Level Control Systems (Condensate/Feedwater, CRD, HPCI, RCIC, LPCI) o Condensate/Feedwater o If any Reactor feed pump is running: o Ensure feedwater pump discharge pressure is less than RPV pressure by adjusting reactor feed pump speed o Lineup injection flow path by performing on or both of the following: o Adjusting FDWTR STARTUP VLV 34FCV-137 o Ensure open or throttled open Reactor feed pump discharge valve for running pump (34MOV-100A or B) o Control feed flow to RPV by performing any of the following: o Adjust RFP speed o Adjust FDWTR STARTUP VLV 34FCV-137 o Close feed pump discharge valves o If both Reactor feed pumps are shutdown, and feedwater discharge header pressure is greater than RPV pressure, then control feed flow to RPV by performing one or both of the following: o Throttling FDWTR STARTUP VLV 34FCV-137 o Throttling one or both of the following valves, only if APRMs are on scale: o RFP A DISCH 34MOV-100A o RFP B DISCH 34MOV-100B	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
Note: HPCI was secured earlier in the scenario due to inadvertent start, but could be restarted if need for injection.	BOP cont.	○ HPCI ○ Preparation for injection: ○ Ensure SGT is running per OP-20 ○ Ensure open one of the following valves: ○ HPCI GLAND SEAL SUCT 01-125MOV-13A ○ HPCI GLAND SEAL SUCT 01-125MOV-13B ○ Ensure HPCI FLOW CNTRL 23FIC-108-1 setpoint is adjusted to minimum ○ Ensure HPCI FLOW CNTRL 23FIC-108-1 is in AUTO ○ Injection with initiation signal: ○ Depress INITIATION SIG/MAN TURB TRIP RESET 23A-S17 pushbutton ○ Verify annunciator 09-3-3-28 HPCI TURB TRIP SOLENOID ENERGIZED is clear ○ Verify HPCI auto-initiation ○ Control HPCI turbine speed in manual or automatic ○ Periodically verify HPCI turbine speed is greater than 2100 rpm ○ Injection without initiation signal: ○ Depress INITIATION SIG/MAN TURB TRIP RESET 23A-S17 pushbutton ○ Verify annunciator 09-3-3-28 HPCI TURB TRIP SOLENOID ENERGIZED is clear ○ Ensure open OUTBD STM SUPP VLV 23MOV-16 ○ Ensure GLAND SEAL CNDSR BLOWER 23P-140 is running	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	BOP cont.	○ HPCI cont. ○ Injection without initiation signal cont. ○ Ensure open TURB STM SUPP VLV 23MOV-14 ○ Ensure AUX OIL PMP 23P-150 is running ○ Open INJ VLV 23MOV-19 ○ Ensure closed the following valves: ○ STM LINE DRAIN TO RADW 23AOV-42 ○ STM LINE DRAIN TO RADW 23AOV-43 ○ TEST VLV TO CST 23MOV-21 ○ HPCI & RCIC TEST VLV TO CST 23MOV-24 ○ Control HPCI turbine speed in manual or automatic ○ Periodically verify HPCI turbine speed is greater than 2100 rpm	SAT / UNSAT / NA
Booth Operator: If requested to pull RPS fuses, wait 30 seconds and for lead examiner concurrence, then **run EP3_SCRAMFUSES_OUT_B .cae** and report task completion. If directed to vent Scram Air Header, wait 2 minutes and for lead examiner concurrence, then **activate Trigger 20** and report task completion.	ATC	• **Perform EP-3 Backup Control Rod Insertion Actions** ○ May de-energize scram solenoids per Subsection 5.2 ○ Determine fuses to be pulled based on lit RPS Scram Group lights ○ Pull fuses 5A-F18B, 5A-F18F, 5A-F18D, and 5A-F18H ○ May direct NPO to vent scram air header per Subsection 5.3 • Report all control rods are inserted	SAT / UNSAT / NA **Critical Task #2**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS / EVALUATION
	SRO	• Acknowledge report • Exit EOP-3 • Enter EOP-2 • Direct Reactor water level restored and maintained 177-222.5”	SAT / UNSAT / NA
	BOP	• Begin restoring Reactor water level 177-222.5”	SAT / UNSAT / NA

Termination Criteria:

- Control rods are being inserted or are all inserted.
- Reactor water level is being controlled above 0”.

Shift Turnover

The Plant is operating at approximately 80% power.

SRV A is inoperable due to a circuit failure.

Circulating Water pump A operation is degraded due to excessive seal leakage.

When you take the shift:

1. Lower Reactor power to 63-65% using Recirc and control rods per the provided RMI.
2. Then, secure Circulating Water pump A per OP-4 section F. The procedure is in progress up to step F.2.1.

    - Waste Sample Tank discharge to the canal is NOT in progress.
    - Chlorine pump stroke setting has been reduced to the value appropriate for 2 circulating water pumps, per Attachment 3 of OP 7A.
    - Chlorination of condenser waterboxes is secured per OP 7A.

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Reduction Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Lower Recirc flow to 43-45 Mlbm/hr	-	-	-	RWR	NA	-	
	2	Insert 2nd CRAM group	See CRAM group	See CRAM group	See CRAM group	See CRAM group	NA	See CRAM group	

Prepared By: Joe Allen
(RxEng)

SM Approval: Dave Roe
(Shift Manager)

Reviewed By: Bob Jones
(RxEng or SRO)

Stamps

CONTROL ROOM OPERATOR

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Reduction
Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Lower Recirc flow to 43-45 Mlbm/hr	-	-	-	RWR	NA	-	
	2	Insert 2nd CRAM group	See CRAM group	See CRAM group	See CRAM group	See CRAM group	NA	See CRAM group	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

INDEPENDENT VERIFIER

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Reduction Today

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Lower Recirc flow to 43-45 Mlbm/hr	-	-	-	RWR	NA	-	
	2	Insert 2nd CRAM group	See CRAM group	See CRAM group	See CRAM group	See CRAM group	NA	See CRAM group	

Prepared By: Joe Allen
(RxEng)

SM Approval: Dave Roe
(Shift Manager)

Reviewed By: Bob Jones
(RxEng or SRO)

Stamps

CRS

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LOI 17-1 NRC EXAMINATION SCENARIO 2

TITLE: **LOI 17-1 NRC EXAMINATION SCENARIO 2**

SCENARIO NUMBER: **NRC 2**

PATH: **STAND ALONE**

Validation: _____ Training: _____ Operations: _____

	CANDIDATES
CRS	
ATC	
BOP	

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
10/26/17	New	New Scenario	T. Hooper	D. Kelly

A. TITLE: LOI 17-1 NRC EXAMINATION SCENARIO 2

B. SCENARIO SETUP:

1. IC-152

2. Special Instructions:

    a. The Plant is operating at approximately 58% power.
    b. SRV A is inoperable.
    c. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance.

3. Preset Conditions:

    a. Preset, M:AD07:A, Rx press relief vlv (2E-RV2-71A) fails closed
    b. Trigger 1, M:RR22:B, Rx Vessel Scram Level Transmitter, 100%
    c. Trigger 2, M:SW01:A, Loss of RBCLC Flow to Recirculation A
    d. Trigger 3, M:FW25:A, Condensate Booster Pump 33-P9A trip
    e. Trigger 3, M:FW25:B, Condensate Booster Pump 33-P9B trip
    f. Trigger 3, M:FW25:C, Condensate Booster Pump 33-P9C trip, Delay=1:30
    g. Preset, M:RP01A, Reactor Protection System Automatic Scram Failure
    h. Preset, M:RP01B, Reactor Protection System Manual Scram Failure
    i. Preset, M:RP09, ARI Fails to Actuate
    j. Preset, M:RC02, RCIC System Failure to Auto Start
    k. Preset, M:HP01, HPCI Failure to Auto Start
    l. Preset, M:CU10, RWCU 12MOV-18 Auto Isolation Failure
    m. Preset, M:CU12, RWCU 12MOV-15 Auto Isolation Failure
    n. Preset, M:CU11, RWCU 12MOV-15 Fails As-Is
    o. Trigger 4, M:CU07, RWCU Pipe Break Between IVs, Initial=3, Ramp=10:00, Final=25
    p. Preset, O:AD ZLO271A(1), SRV A green light, Final=off
    q. Preset, O:TC ZDIPNIBVOJI, Bypass Valve Opening Jack open pushbutton, Final=normal
    r. Event Trigger 16, Event: zdi1csari, Command: dmf rp09

4. Consumable Forms and Procedures:
    - AOP-1, AOP-8

C. SCENARIO SUMMARY:

The scenario will begin with the plant operating at approximately 58% power. SRV A is inoperable. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance. The crew will begin by starting Condensate pump A and Condensate Booster pump A per OP-3 section D.8. Next, the crew will secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1. Then, the crew will perform a control rod pattern adjustment per the provided RMI, which will move four control rods from position 10 to 12 and two control rods from position 08 to 04.

Reactor water level transmitter, 02-3LT-101B, will fail upscale. This transmitter is one of the inputs to the RPS scram function. With the transmitter failed high, the SRO will determine that it cannot perform its scram function, declare that function inoperable, and determine the Technical Specification impact.

All RBCLC flow to Recirculation pump A will isolate. This will cause multiple high temperature alarms. If left unmitigated, this will cause degradation of both Recirculation pump A seals and loss of coolant into the Drywell. The crew will secure Recirculation pump A. If damage has occurred to both pump seals, the crew will also isolate Recirculation pump A to stop the loss of coolant. The crew will execute AOP-8 due to the reduction in core flow. The SRO will determine the Technical Specification impact.

Condensate Booster pump A will trip and Condensate Booster pump B will fail to start. Condensate Booster pump C will also trip after a 90 second time delay. The crew will enter AOP-1 and insert a manual Reactor scram. On the scram attempt, the RPS pushbuttons and Mode Switch will fail to work. The crew will insert control rods by initiating ARI. The crew will enter EOP-2 and stabilize the plant. HPCI and RCIC will fail to automatically start. With all Condensate Booster and Feedwater pumps unavailable for injection, the crew will be able to manually start HPCI and/or RCIC to restore Reactor water level.

RWCU will develop a steam leak. This will cause high area temperatures in the Reactor Building. RWCU will fail to automatically isolate. The crew will be able to close 12MOV-18, however 12MOV-15 will fail to close, preventing isolation of the steam leak. The crew will execute EOP-5. As Reactor Building area temperatures approach max safe levels, the crew will attempt to anticipate Emergency Depressurization by rapidly lowering Reactor pressure with Turbine Bypass Valves. The Bypass Opening Jack will fail to open Turbine Bypass Valves. The crew may open Turbine Bypass Valves by adjusting the pressure regulator setpoint, but this will limit how quickly Reactor pressure can be lowered. Once two max safe temperatures are exceeded, the crew will perform an Emergency Depressurization.

The scenario will be terminated when all control rods are inserted, the Emergency RPV Depressurization is in progress, and Reactor water level is controlled above 0”.

Shift Turnover
The plant is operating at approximately 58% power. SRV A is inoperable due to a circuit failure. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance. When you take the shift: 1. Start Condensate pump A and Condensate Booster pump A per OP-3 section D.8. 2. Secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1. 3. Perform a control rod pattern adjustment per the provided RMI.

Critical Tasks/Standards
Critical Task #1: Given the plant operating at power with a loss of Feedwater injection and failure of RPS to scram the Reactor, the crew will manually initiate ARI, in accordance with AOP-1 and/or EOP-3. Critical Task #2: Given an un-isolable primary system discharging into Secondary Containment and two areas exceeding Maximum Safe Temperatures, the crew will perform an emergency RPV depressurization, in accordance with EOP-5.

EVENT NO.	EVENT SEQUENCE	
1.	Swap Condensate and Condensate Booster Pumps	(Normal: BOP, SRO)
2.	Perform Control Rod Pattern Adjustment	(Reactivity: ATC, SRO)
3.	RPS Level Transmitter Fails High	(Instrument: SRO)
4.	Loss of RBCLC Flow to RRP Pump A	(Component: BOP, SRO)
5.	Condensate Booster Pump A Trip, Condensate Booster Pump B Fails to Start; Delayed Trip of Condensate Booster Pump C	(Component: ATC, SRO)
6.	RPS Fails to Scram, ARI Fails to Automatically Initiate	(Instrument: ATC, SRO)
7.	HPCI and RCIC Fail to Start Automatically	(Instrument: BOP, SRO)
8.	RWCU Steam Leak into Reactor Building; RWCU Fails to Isolate Automatically and Manually	(Major: All)
9.	Bypass Opening Jack Motor Fails	(Instrument: ATC, SRO)

D. TERMINATION CUES:

- All control rods are inserted
- Emergency RPV Depressurization is in progress
- Reactor water level is controlled above 0”

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	• Walkdown the control panels and assume the watch	
Event 1 Swap Condensate and Condensate Booster Pumps	SRO	• Perform Crew Brief • Direct BOP to start Condensate pump A and Condensate Booster pump A per OP-3 section D.8 • Direct BOP to secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1	SAT / UNSAT / NA
Note: The Condensate Booster pump control switch must be held in START position until pump starts.	BOP	• Start Condensate pump A and Condensate Booster pump A per OP-3 section D.8: ○ Observe pump motor amps for running Condensate pumps ○ Start Condensate pump A ○ Verify load is being shared between the Condensate pumps that are running as indicated by pump motor amps ○ Verify all white lights for RPS A and RPS B power source selectors are on at panel 09-16 ○ Observe running Condensate Booster pump motor amps ○ Start Condensate Booster pump A ○ Verify running Condensate Booster pumps are sharing the load as indicated by motor amps	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: If directed to make Hydrogen Injection System lineup changes, wait 3 minutes and report task completion. **Role Play:** If contacted as Radwaste, acknowledge changes in Condensate lineup.	BOP cont.	○ Verify all white lights for RPS A and RPS B power source selectors are on at panel 09-16 ○ IF the Hydrogen Injection System is in service, THEN line up hydrogen to the Condensate Booster pump just started per OP-89A Section D, Placing Additional Hydrogen Injection Trains In Service • Secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1: • Place and hold pump control switch for Condensate Booster pump B in STOP • WHEN Condensate Booster discharge header pressure stabilizes, allow pump control switch to return to normal • Place and hold pump control switch for Condensate pump B in STOP • WHEN Condensate discharge header pressure stabilizes, allow pump control switch to return to normal • Line up hydrogen injection for the Condensate Booster pump removed from service per Section G of OP-89A, Operation or Changing Condensate Booster Pumps in Service	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 2</u> Perform Control Rod Pattern Adjustment	SRO	• Direct ATC to perform control rod pattern adjustment per RMI • Provide oversight of reactivity manipulation	SAT / UNSAT / NA

Note:
The first four control rods in the pattern adjustment are 10-31, 42-31, 42-23, 10-23. These control rods are being moved from position 10 to 12.
	ATC	• While withdrawing control rods, monitor the following:
		  ○ Nuclear instrumentation
		  ○ Control rod position indication
		• Ensure ROD SEL PWR switch is in ON
		• Ensure control rod to be moved is selected by depressing rod select pushbutton on ROD SEL matrix, if necessary
		• Verify the following:
		  ○ Select pushbutton is brightly backlit
		  ○ Control rod indicating light is on
		  ○ ROD OUT PERM light is on
		• Place ROD MOVEMENT CNTRL switch to OUT NOTCH, spring return to OFF
		• Verify control rod latches in the expected even numbered position before ROD SETTLE light goes off
		• Verify ROD SETTLE light is off
		• Repeat as necessary
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Note:
The last two control rods in the pattern adjustment are 26-31 and 26-23. These control rods are being moved from position 08 to 04.
		• While inserting control rods, monitor the following:
		  ○ Nuclear instrumentation
		  ○ Control rod position indication
		• Ensure ROD SEL PWR switch is in ON
		• Ensure control rod to be moved is selected by depressing rod select pushbutton on ROD SEL matrix, if necessary
		• Verify the following:
		  ○ Select pushbutton is brightly backlit
		  ○ Control rod indicating light is on
		  ○ Annunciator 09-5-2-1 RWM ROD BLOCK RPIS INOP is clear
		• Place ROD MOVEMENT CNTRL switch to IN, spring return to OFF
		• Verify control rod latches in the expected even numbered position before ROD SETTLE light goes off
		• Verify ROD SETTLE light is off
		• Repeat as necessary	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 3</u> **On Lead Examiner Cue: ACTIVATE TRIGGER 1** RPS Level Transmitter Fails High	ATC / BOP	• Recognize / report annunciator 09-5-2-60, ATTS RPS DIV B1 OR B2 GROSS FAIL OR TU INOP	SAT / UNSAT / NA
	SRO	• Acknowledge reports • Direct ARP response • May reference OP-27A Attachment 7 • Determine an input for the low Reactor water level RPS, PCIS, and SCIS functions is inoperable • Determine Technical Specification Table 3.3.1.1-1 Function 4 is not met • Determine Technical Specification 3.3.1.1 Condition A requires placing the channel or associated trip system in trip within 12 hours • Determine Technical Specification Table 3.3.6.1-1 Functions 2.a, 2.g, 5.e, 6.b, and 7.a are not met • Determine Technical Specification 3.3.6.1 Condition A requires placing the channel in trip within 12 hours • Determine Technical Specification Table 3.3.6.2-1 Function 1 is not met • Determine Technical Specification 3.3.6.2 Condition A requires placing the channel in trip within 12 hours	SAT / UNSAT / NA

Role Play:
If dispatched to investigate, wait 2 minutes, then report that narrow range level MTU 02-3MTU-201B has failed upscale (225”) with the gross fail light lit.
	ATC / BOP	• Execute ARP 09-5-2-60:
		  ○ Dispatch operator to check red gross fail lights on panel 09-92 and 94 panel MTUs
		  ○ Dispatch operator to check position of calibration unit, select switches and test switches at panel 09-92 and 94
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Event 4 **On Lead Examiner Cue: ACTIVATE TRIGGER 2** Loss of RBCLC Flow to Recirculation Pump A	BOP / ATC	• Recognize / report EPIC low flow alarm • Recognize / report multiple annunciators, including: ○ 09-4-2-17, RWR A SEAL CLR FLOW LO ○ 09-4-2-27, RWR PMP A MTR WINDING CLR FLOW LO ○ 09-4-3-33, RWR PMP A OR B TEMP HI	SAT / UNSAT / NA
	SRO	• Acknowledge reports • Direct ARP execution • Direction shutdown of Recirculation pump A per OP-27 • Enter AOP-8 (Unexpected Change in Core Flow) • Determine TRO 3.3.B Condition C entry is required (1 hour to establish single loop limits for APRM flow biased rod block) • Determine Technical Specification 3.4.1 Condition B entry is required (24 hours)	SAT / UNSAT / NA
Note: Some indication for 15FIS-102A is available on EPIC screen RWRA1. **Role Play:** If dispatched to check RBC flow rate to RWR pump A wait 2 minutes, then report that there is no RBC flow to RWR pump A.	BOP	• Execute ARP 09-4-2-17, as time permits: ○ Monitor seal cavity temps on 02TR-031 (points 8 & 9) ○ If seal cavity temp increases to 250°F, then shutdown A RWR pump per Section G of OP-27 ○ Ensure open 15AOV-132A and 15AOV-133A ○ Verify RBC flow rate >300 gpm on 15FIS-102A ○ Monitor DW leakage for signs of seal leakage	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: If dispatched to close 02-2RWR-39A, wait 2 minutes, then report task completion.		• Execute ARP 09-4-2-27, as time permits: ○ Monitor temps on 02-2TR-31 ○ Verify RBC flow rate >300 gpm on 15FIS-102A ○ If RBC flow cannot be restored and RWR pump and motor temps are rising, then shut down RWR loop A per OP-27 Section G ○ Monitor DW sump levels • Execute ARP 09-4-3-33, as time permits: ○ Check 02-2TR-31 ○ Check RBC temp ○ Check RBC lineup and verify at least 300 gpm on 15-FIS-102A ○ Monitor computer and annunciators for problem ○ Monitor DW leakage for possible leak in RBC system ○ If any RWR motor bearing exceeds 220°F, then shut down RWR pump per Section G of OP-27	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Note: It is expected to move to the next event before the crew addresses Recirculation loop temperature and SLO scram/rod block setpoint issues.	BOP cont.	• Secure Recirculation pump A per OP-27: ○ Close RWR PMP A DISCH 02MOV-53A ○ Verify RWR PMP 02-2P-1A is tripped ○ Place RWR PMP 02-2P-1A control switch in PULL TO LOCK ○ Verify open RWR MG A GEN FIELD BKR ○ IF loop A isolation is required, THEN ensure closed the following valves (not expected): ▪ RWR PMP A DISCH 02MOV-53A ▪ RWR PMP A SUCT 02MOV-43A ▪ 02-2RWR-39A (RWR pump A seal purge upstr isol valve) • Coordinate with ATC to execute AOP-8, as time permits • Monitor for thermal-hydraulic instability • Ensure RPV water level returns to normal and stabilizes • Determine operating point on Power-Flow Map • Demand a 3D Monicore Official Program and review margin to thermal limits	SAT / UNSAT / NA
	ATC	• Monitor Reactor power • Monitor for thermal-hydraulic instability • Monitor Feedwater response	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Events 5, 6, & 7</u> **On Lead Examiner Cue: ACTIVATE TRIGGER 3** Condensate Booster Pump A Trip, Condensate Booster Pump B Fails to Start; Delayed Trip of Condensate Booster Pump C; RPS Fails to Scram, ARI Fails to Automatically Initiate; HPCI and RCIC Fail to Start Automatically	ATC / BOP	• Recognize / report annunciators: ○ 09-6-3-2, COND BSTR PMP 33P-9A OVERLOAD OR TRIP ○ 09-6-3-11, COND BSTR PMP 33P-9B OVERLOAD OR TRIP ○ 09-6-3-22, COND BSTR PMP 33P-9C OVERLOAD OR TRIP (90 seconds later) • Recognize / report trip of Condensate Booster pump A • Recognize / report Condensate Booster pump B fails to start • Recognize / report trip of Condensate Booster pump C (90 seconds later) • Recognize / report failure to scram using Mode Switch and RPS pushbuttons • Recognize / report failure of HPCI and RCIC to start automatically	SAT / UNSAT / NA
Critical Task #1 **Critical Task #1 Standard:**		**Given the plant operating at power with a loss of Feedwater injection and failure of RPS to scram the Reactor, the crew will manually initiate ARI, in accordance with AOP-1 and/or EOP-3.** **Manually initiate ARI.**	**Pass / Fail**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SRO	• Acknowledge reports • Direct ARP response • Acknowledge report of Condensate Booster pump C trip • **Direct manual Reactor scram** • Acknowledge control rods insert with ARI • Enter AOP-1, Reactor Scram • Enter EOP-2, RPV Control • Direct Reactor pressure controlled 800 to 1000 psig using TBVs • Direct Reactor water level controlled 180 to 220 inches using HPCI and/or RCIC • Acknowledge failure of HPCI and RCIC to automatically start • May direct Reactor cooldown < 100°F/hr	SAT / UNSAT / NA **Critical Task #1**

Note:
ARPs 09-6-3-11(22) are similar for the other two Condensate Booster pumps.
 	
Role Play:
If dispatched to investigate trip of Condensate Booster pumps, wait 2 minutes and then report breaker tripped on overcurrent, but no abnormal indications at the pump.
	BOP	• As time permits, performs ARP 09-6-3-2:
		  ○ Evaluate entry into AOP-41 Feedwater Malfunction
		  ○ IF Condensate Booster Pump 33P-9A trips, THEN ensure reactor power is within capacity of in-service condensate booster pump(s)
		  ○ IF any relay flag shows or 86 device is tripped on Breaker 71-10350, THEN perform the following:
		  ○ Place COND BSTR PMP 33P-9A in PULL TO LOCK
		  ○ Do not reset relay flags or 86 devices until Electrical Maintenance investigates
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ATC	• Depress manual Scram pushbuttons • Place Mode Switch to Shutdown • **Initiate ARI** • Report all control rods have inserted • Enter AOP-1 • Fully insert IRMs and SRMs • Observe Reactor power downscale on APRMs • Observe SDIV vent and drain valves closed • Transfer APRM/IRM recorders to IRMs • Down-range IRMs • Monitor Reactor pressure control on the Turbine Bypass Valves	SAT / UNSAT / NA **Critical Task #1**

	BOP	• Enter AOP-1
		• Control RPV water level between 180 and 220” using any of the following methods:
		  ○ Operate HPCI per OP-15:
		  ○ Ensure open 23MOV-16
		  ○ Ensure running 23P-140
		  ○ Ensure open 23MOV-14
		  ○ Perform the following steps without unnecessary delay:
		  ○ If 09-3-3-28 is in then depress 23A-S17
		  ○ Ensure running 23P-150
		  ○ Ensure open 23MOV-19
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	BOP cont.	○ Operate RCIC per OP-19: ○ Verify Annunciator 09-4-0-32 RCIC LOGIC RX LVL HI is clear ○ Verify CST SUCT VLV 13MOV-18 open ○ Start VAC PMP 13P-3 ○ Open OIL CLR WTR SUPP 13MOV-132 ○ Perform the following without unnecessary delay: ○ Open TURB STM SUPP VLV 13MOV-131 ○ Open INJ VLV 13MOV-21 ○ Adjust RCIC FLOW CNTRL 13FIC-91 to desired flow rate	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Events 8 & 9</u> **On Lead Examiner Cue:** **ACTIVATE TRIGGER 4** RWCU Steam Leak into Reactor Building; RWCU Fails to Isolate Automatically and Manually; BOJM Fails	ATC / BOP	• Recognize / report EPIC high area temperature alarms • Recognize / report multiple annunciators • Recognize / report RWCU failed to isolate	SAT / UNSAT / NA
Critical Task #2 **Critical Task #2 Standard:**		**Given an un-isolable primary system discharging into Secondary Containment and two areas exceeding Maximum Safe Temperatures, the crew will perform an emergency RPV depressurization, in accordance with EOP-5.** **Open at least 5 SRVs.**	**Pass / Fail**
<u>Note:</u> The SRO will likely anticipate Emergency Depressurization by ordering a rapid depressurization with Turbine Bypass Valves. The normal cooldown rate of 100ºF/hr may be violated since area temperatures are approaching Max Safe Values.	SRO	• Acknowledge reports • Enter EOP-5, Secondary Containment Control, on high area temperatures • Direct isolation of RWCU • Direct area/building evacuation • Acknowledge manual RWCU isolation failure • May direct rapid Reactor depressurization using TBVs • Acknowledge failure of Bypass Opening Jack to open TBVs • Recognize / acknowledge two area temperature above Max Safe Value • Enter Emergency Depressurization leg of EOP-2 • **Direct all ADS valves and one additional SRV open**	SAT / UNSAT / NA **Critical Task #2**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Note:
The crew may attempt to isolate RWCU by closing 12MOV-15 and 12MOV-18 before referencing an ARP or OP as a backup to a failed automatic action (EN-OP-115) or based on guidance in EOP-5.
	BOP	• Attempt to isolate RWCU
		  ○ Close 12MOV-18
		  ○ Attempt to close 12MOV-15
		  ○ Recognize / report 12MOV-15 failed to close
		• Announce Reactor Building Evacuation
			SAT / UNSAT / NA

Role Play: If dispatched to investigate high temperature, wait 2 minutes, then report you see steam coming from the RWCU area and cannot access the area.	ATC / BOP	• Update crew on RB area temperatures • May attempt to open Turbine Bypass Valves to initiate cooldown or rapidly depressurize RPV in anticipation of Emergency Depressurization • Recognize / report failure of Bypass Opening Jack to open TBVs • May lower pressure regulator setpoint to initiate cooldown • Report two area temperatures above Max Safe Value • **Open all ADS valves and one additional SRV**	SAT / UNSAT / NA **Critical Task #2**

Termination Criteria:

- All control rods are inserted
- Emergency RPV Depressurization is in progress
- Reactor water level is controlled above 0”

Shift Turnover
The plant is operating at approximately 58% power. SRV A is inoperable due to a circuit failure. Condensate pump A and Condensate Booster pump A are ready to start following breaker maintenance. When you take the shift: 1. Start Condensate pump A and Condensate Booster pump A per OP-3 section D.8. 2. Secure Condensate Booster pump B and Condensate pump B per OP-3 section F.1. 3. Perform a control rod pattern adjustment per the provided RMI.

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Rod Sequence Exchange
Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	10-31	10	12	Notch	NA	-	
	2	Withdraw	42-31	10	12	Notch	NA	-	
	3	Withdraw	42-23	10	12	Notch	NA	-	
	4	Withdraw	10-23	10	12	Notch	NA	-	
	5	Insert	26-31	08	04	Notch	NA	-	
	6	Insert	26-23	08	04	Notch	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

CONTROL ROOM OPERATOR

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Rod Sequence Exchange
Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	10-31	10	12	Notch	NA	-	
	2	Withdraw	42-31	10	12	Notch	NA	-	
	3	Withdraw	42-23	10	12	Notch	NA	-	
	4	Withdraw	10-23	10	12	Notch	NA	-	
	5	Insert	26-31	08	04	Notch	NA	-	
	6	Insert	26-23	08	04	Notch	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

INDEPENDENT VERIFIER

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Rod Sequence Exchange
Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	10-31	10	12	Notch	NA	-	
	2	Withdraw	42-31	10	12	Notch	NA	-	
	3	Withdraw	42-23	10	12	Notch	NA	-	
	4	Withdraw	10-23	10	12	Notch	NA	-	
	5	Insert	26-31	08	04	Notch	NA	-	
	6	Insert	26-23	08	04	Notch	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

CRS

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LOI 17-1 NRC EXAMINATION SCENARIO 3

TITLE: **LOI 17-1 NRC EXAMINATION SCENARIO 3**

SCENARIO NUMBER: **NRC 3**

PATH: **STAND ALONE**

Validation: _____ Training: _____ Operations: _____

	CANDIDATES
CRS	
ATC	
BOP	

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
10/30/17	New	New Scenario	T. Hooper	D. Kelly

A. TITLE: LOI 17-1 NRC EXAMINATION SCENARIO 3

B. SCENARIO SETUP:

1. IC-153

2. Special Instructions:

    a. The Plant is operating at approximately 85% power.
    b. SRV A is inoperable.
    c. RHR loop A is operating in the Torus Cooling lineup.
    d. Have ST-23B filled out to support control rod withdrawals.
    e. Ensure CRD B is running (A in Standby)

3. Preset Conditions:

    a. Preset, M:AD07:A Rx press relief vlv (2E-RV2-71A) failed closed
    b. Preset, M:RD11:26:11, Control Rod (26-11) Uncoupled
    c. Trigger 2, M:ED18:A, 4.16KV Bus 10500 Failure
    d. Trigger 3, M:MS02:A, MSL A steam leak inside Primary Containment, Ramp: 90 sec, Final: 2.5
    e. Trigger 4, M:RR15:A, Coolant A leak inside Primary Containment, Delay 7 min, Ramp: 10 min, Final: 32
    f. Trigger 4, M:ED44, Loss of 115KV system, Delay=3 min
    g. Trigger 4, M:HP02, HPCI Turbine Trip, Delay=10 min
    h. Trigger 1, R:RH35, 10-MOV-39A, RHR A Test Cooling and Spray breaker, Final=open
    i. Trigger 16, R:DG23:A, EDG-A Local Maintenance Switch, Final=maint
    j. Trigger 17, R:DG23:C, EDG-C Local Maintenance Switch, Final=maint
    k. Preset, O:AD ZLO271A(1), SRV A green light, Final=off
    l. Event Trigger 1, Event: zlo10as14a(2)==0, Command: None
    m. Event Trigger 4, Event: (zlo5ads8a == 0) && (zlo5ads8b == 0), Command: None

4. Consumable Forms and Procedures:
    - AOP-1, AOP-18, AOP-25, AOP-59, AOP-72, ST-23B

C. SCENARIO SUMMARY:

The scenario will begin at approximately 85% power with SRV A inoperable. RHR loop A is operating in the Torus Cooling lineup. The crew will begin by securing the Torus Cooling lineup per OP-13B. As the lineup is being secured, the breaker will trip for Torus Cooling and Spray Valve (10MOV-39A). The SRO will determine the Technical Specification impact of this failure.

The crew will raise Reactor power using a combination of Recirculation flow and control rods. They will begin by moving control rods 26-43 and 26-11 from position 24 to 48. When control rod 26-11 is at position 48, it will become apparent that the control rod is uncoupled. The crew will execute AOP-25 to re-couple the control rod and continue with the power ascension.

An electrical fault on the 4160 VAC 10500 bus will occur. The crew will execute AOP-18 (Loss of 10500 Bus) and AOP-59 (Loss of RPS Bus A). This will significantly impact the availability of Core Spray and RHR for the remainder of the scenario. The SRO will address Technical Specifications.

After the plant is stabilized, a steam leak inside the Drywell develops. The crew will insert a manual Reactor scram due to rising Drywell pressure.

Approximately 3 minutes after the scram, all 115KV offsite power is lost. This further degrades the availability of equipment. The crew will execute AOP-72. The crew will control Reactor water level with HPCI and/or RCIC due to the loss of all Condensate and Feedwater.

Approximately 7 minutes after the scram, the steam leak will degrade further into a significant loss of coolant accident. Rising inventory losses will require additional injection to the Reactor. Degrading Containment parameters will require Torus and then Drywell sprays.

Approximately 10 minutes after the scram HPCI will trip. The crew will maximize other injection systems (RCIC, SLC), but will be unable to keep up with lowering Reactor water level. The crew will execute the Alternate Level Control leg of EOP-2 to attempt to maintain Reactor water level above the Top of Active Fuel (zero inches).

Due to lowering Reactor water level and insufficient high pressure injection sources, the crew will perform an Emergency Depressurization to allow low pressure injection sources to restore and\or maintain Reactor water level >0 inches.

The scenario will be terminated when all control rods are inserted, Emergency Depressurization is in progress, and Reactor water level is being controlled above 0 inches.

Shift Turnover
The Plant is operating at approximately 85% power. SRV A is inoperable due to a circuit failure. RHR loop A is operating in the Torus Cooling lineup. When you take the shift: 1. Secure Torus Cooling per OP-13B. 2. Raise Reactor power using control rods and Recirculation flow per the provided RMI.

Critical Tasks/Standards
Critical Task #1: **Given a coolant leak inside the Containment, the crew will spray the Drywell, in accordance with EOP-4.**
Critical Task #2: **Given a coolant leak, a loss of high pressure injection system and the inability to restore and maintain Reactor water level above the Top of Active Fuel (TAF), the crew will initiate actions for an Emergency RPV Depressurization, in accordance with EOP-2.**

EVENT NO.	EVENT SEQUENCE	
1.	Secure Torus Cooling	(Normal: BOP, SRO)
2.	Torus Cooling and Spray Valve (10MOV-39A) Power Loss	(Component: SRO)
3.	Raise Reactor Power with Control Rods and Recirculation Flow	(Reactivity: ATC, SRO)
4.	Uncoupled Control Rod	(Component: ATC, SRO)
5.	Electrical Fault on 10500 Bus	(Component: BOP, SRO)
6.	Steam Leak in Drywell	(Component: All)
7.	Loss of Offsite Power	(Component: All)
8.	Loss of Coolant Accident	(Major: All)
9.	HPCI Trips	(Component: All)

D. TERMINATION CUES:

- All control rods are inserted
- Emergency Depressurization is in progress
- Reactor water level is being controlled above 0”

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	• Walkdown the control panels and assume the watch	
<u>Events 1 & 2</u> **Secure Torus Cooling; Torus Cooling and Spray Valve (10MOV-39A) Power Loss**	SRO	• Perform Crew Brief • Direct BOP to secure Torus Cooling per OP-13B sections F.1 and F.7 • Acknowledge report of 10MOV-39A breaker trip • Ensure ARP execution • Declare RHR loop A inoperable for Containment Spray and Torus Cooling • Determine Technical Specification 3.6.1.9 and 3.6.2.3 Condition A requires restoring to operable status within 7 days • Determine Technical Specification 3.6.1.3 Condition A requires verifying the valve closed within 4 hours	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Note:
Trigger 1 automatically initiates when 10MOV-39A green light turns on to initiate event 2.
 	
Role Play:
If dispatched to investigate 10MOV-39A, wait 2 minutes, then report that the supply breaker (71MCC-153-OD1) is tripped.
	BOP	• Close RHR TEST & TORUS CLG 10MOV-34A
		• IF RHR Loop A flow is LESS THAN 1500 gpm, THEN ensure open MIN FLOW VLV 10MOV-16A
		• IF RHR Loop A operation is not required, THEN shut down RHR Loop A per Subsection F.7
		• Ensure one of the RHR Loop A keep-full systems is in service as follows:
		  o RHR KEEP-FULL PMP 10P-2A is running, OR
		  o 10RHR-274 (RHR loop A reactor head spray keep-full cond xfer connection valve) is throttled open
		• Ensure closed the following valves:
		  o RHR TEST & TORUS CLG 10MOV-34A
		  o TORUS SPRAY INBD VLV 10MOV-38A
		  o DW SPRAY INBD VLV 10MOV-31A
		• Ensure the following RHR pumps are stopped:
		  o RHR PMP 10P-3A
		  o RHR PMP 10P-3A
		• Ensure closed the following valves:
		  o RHR TEST TORUS CLG & SPRAY 10MOV-39A
		  o DW SPRAY OUTBD VLV 10MOV-26A
		• Recognize \ report Annunciator 09-3-1-03 (RHR A VLV OVERLOAD OR PWR LOSS)
		• Report 10MOV-39A indicating lights off
		• Dispatch operator to investigate
		• Continue securing valve lineup
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

		• Ensure open MIN FLOW VLV 10MOV-16A
		• Ensure open HX A BYP VLV 10MOV-66A
		• IF RHRSW Loop A operation is not required, THEN shut down RHRSW Loop A as follows:
		  ○ Close RHRSW DISCH VLV FROM HX A 10MOV-89A
		  ○ Ensure the following RHRSW pumps are stopped:
		  ▪ RHRSW PMP 10P-1A
		  ▪ RHRSW PMP 10P-1C	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Events 3 & 4</u> **Raise Reactor Power with Control Rods and Recirculation Flow; Uncoupled Control Rod**	SRO	• Direct ATC to withdraw control rods per provided instructions • Provide oversight of reactivity manipulation • Acknowledge control rod 26-11 is uncoupled • Enter AOP-25, Uncoupled Control Rod • Direct recoupling the control rod per AOP-25 • Acknowledge control rod 26-11 is coupled • Direct ATC to raise Reactor power to 95% with Recirculation flow	SAT / UNSAT / NA

<u>Note:</u>
Control rods 26-43 and 26-11 are to be moved from position 24 to 48. Once at position 48, it will be discovered that control rod 26-11 is uncoupled.
	ATC	• While withdrawing control rods, monitor the following:
		  • Nuclear instrumentation
		  • Control rod position indication
		• Ensure ROD SEL PWR switch is in ON
		• Ensure control rod to be moved is selected by depressing rod select pushbutton on ROD SEL matrix, if necessary
		• Verify the following:
		  • Select pushbutton is brightly backlit
		  • Control rod indicating light is on
		  • ROD OUT PERM light is on
		  • IF control rod is to be withdrawn to position 48, THEN perform ST-23B to withdraw and perform coupling integrity test:
		• Place and hold ROD EMERG IN NOTCH OVERRIDE control switch in OVERRIDE
		• Place and hold the ROD MOVEMENT CNTRL control switch in OUT NOTCH
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Booth Operator:
When control rod 26-11 is inserted to position 44, then **delete malfunction RD11:26:11**.
 	
Note:
It is recommended to move on to the next event after a few Recirc flow manipulations have been observed.
		• Verify the following for the selected control rod:
		  • Four rod display indicates 48
		  • Red FULL OUT light is on at FULL CORE DISPLAY
		• Verify annunciator 09-5-2-4 ROD OVERTRAVEL is clear
		• Release the following control switches:
		  • ROD MOVEMENT CNTRL
		  • ROD EMERG IN NOTCH OVERRIDE
		• Document results of coupling integrity test on Attachment 2
		• Repeat for control rod 26-11
		• Recognize / report control rod 26-11 is uncoupled
		• Re-couple control rod 26-11 per AOP-25:
		  • Insert the control rod to position 44
		  • Withdraw control rod to position 48 using notch withdrawal
		  • Perform control rod coupling integrity test per ST-23B
		• Recognize / report control rod 26-11 is coupled
		• Report completion of control rod withdrawals
		• Raise Reactor power to 95% using Recirculation flow:
		  ○ Raise Recirc flow alternately with RWR MG A(B) SPEED CNTRL
		  ○ Monitor APRMs, CTP, Recirc flow, Reactor water level	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 5</u> **Electrical Fault on 10500 Bus** (on Lead Examiner Cue: ACTIVATE TRIGGER 2)	ALL	• Recognize / report loss of Bus 10500 • Recognize / report start of EDGs A and C • Recognize / report half scram	SAT / UNSAT / NA
	SRO	• Acknowledge reports • Enter AOP-18 (Loss of 10500 Bus) • Enter AOP-59 (Loss RPS A) • Determine Technical Specification 3.8.7 Condition A requires restoring Bus 10500 within 8 hours	SAT / UNSAT / NA

Role Play:
If dispatched to investigate Bus 10500, wait two minutes, then report that the normal supply breaker (10514) is tripped and appears to have some damage to the cubicle door (no smoke, no fire).
 	
Role Play:
As NPO when dispatched to 93ECP-A(C), use REMOTE **Triggers 16 and 17** to place EDG A (C) control switch to MAINT, report completed.
	BOP	• Execute AOP-18
		• Dispatch NPO to EDGs
		• Start DW Cooling Fan 68FN-2D
		• Shutdown EDG A and C:
		  ○ Ensure EDG A LOAD BKR 10502 (512) is tripped and placed in PULL TO LOCK
		  ○ Ensure EDG A & C TIE BKR 10504 is tripped
		  ○ Place EDG A (C) CONTROL SWITCH in MAINT at panel 93ECP-A(C)
		  ○ Place EDG A(C) CNTRL control switch to STOP at panel 09-8
		• Executes AOP-59 (Loss of RPS Bus A Power)
		• Verify SBGT B start per OP-20
		  ○ Verify the following:
		  ▪ White light for AIR HTR 01-125E-5B is on
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: if dispatched to restore RPS power, report preparations \ briefs will begin.		▪ Red light for AIR HTR 01-125E-5B is on ▪ BELOW EL 369' SUCT 01-125MOV-12 is open ▪ TRAIN B CLG VLV 01-125MOV-100B is closed ▪ TRAIN B INLET 01-125MOV-14B is open ▪ FN DISCH 01-125MOV-15B is open ▪ TRAIN A FN 01-125FN-1B is running ○ If SGT Train A is shutdown, then verify flow rate on SGT FLOW 01-125FI-106A: ▪ RB un-isolated – Approximately 6000 scfm ▪ RB isolated – Approximately 5600 to 5800 scfm	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 6</u> **Steam Leak in Drywell** (on Lead Examiner Cue: ACTIVATE TRIGGER 3)	ALL	• Recognize / report rising Drywell pressure and temperature • Recognize / report EPIC alarm 358, DW Cam Hi Rad	SAT / UNSAT / NA
	SRO	• Acknowledge reports • As time permits, may direct rapid Reactor power reduction in anticipation of Reactor scram • Direct Reactor scram • Enter AOP-1 (Reactor Scram) • Enter AOP-39 (Loss of Coolant) • Enter EOP-2 (RPV Control) on low Reactor water level and high Drywell pressure (as they occur) • Enter EOP-4 (Primary Containment Control) on high Drywell pressure and high Drywell temperature (as they occur) • Direct Reactor water level controlled 180-220” using Feedwater and Condensate • Direct Reactor pressure controlled 800-1000# using Turbine Bypass Valves • Direct Control Room and Relay Room Ventilation isolated per OP-55B Section G within 30 minutes • Direct TSC filtered ventilation started per Section D of OP-59B within 60 minutes • May direct Core Spray and RHR injection prevented per EP-5	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	ATC	• If directed, rapidly lower Reactor power with Recirculation flow and/or CRAM rods • Enter AOP-1 • Depress MANUAL SCRAM A and MANUAL SCRAM B pushbuttons • Place RX MODE switch in SHUTDOWN • Fully insert IRMs and SRMs • Observe Reactor power lowering • Ensure closed SDIV vent and drain valves • Ensure Main Turbine is tripped • Verify 4KV loads (10300 Bus) transfer to reserve power • May begin Reactor depressurization	SAT / UNSAT / NA
	BOP	• Enter AOP-1 • Control Reactor water level 180-220” using Feedwater and Condensate	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 7</u> **Loss of Offsite Power** **<u>Note:</u>** This event is automatically initiates approximately 3 minutes after the scram.	ALL	• Recognize / report loss of offsite power • Recognize / report loss of Buses 10100, 10200, 10300, and 10400	SAT / UNSAT / NA
	SRO	• Enter AOP-72 (115 KV Grid Loss, Instability, or Degradation), as time permits • Direct Reactor water level controlled 180-220" using HPCI, RCIC, CRD and/or SLC • Update crew on status of available equipment • May direct closing MSIVs	SAT / UNSAT / NA

	BOP	• Control Reactor water level 180-220" using HPCI, RCIC, CRD and/or SLC
		• If needed to manually start HPCI, then per OP-15:
		  ○ Ensure reset RPV high level light
		  ○ Ensure desired suction path open
		  ○ Ensure open 23MOV-16
		  ○ Ensure running 23P-140
		  ○ Perform the following steps without unnecessary delay:
		  ○ If 09-3-3-28 is in, then depress 23A-S17
		  ○ Ensure running 23P-150
		  ○ Ensure open 23MOV-19
		  ○ Adjust thumbwheel for desired flow	

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
		• If needed to manually start RCIC, then per OP-19: ○ Verify Annunciator 09-4-0-32 RCIC LOGIC RX LVL HI is clear ○ Verify CST SUCT VLV 13MOV-18 open ○ Start VAC PMP 13P-3 ○ Open OIL CLR WTR SUPP 13MOV-132 ○ Perform the following without unnecessary delay: ○ Open TURB STM SUPP VLV 13MOV-131 ○ Open INJ VLV 13MOV-21 ○ Adjust RCIC FLOW CNTRL 13FIC-91 to desired flow rate	

<u>Events 7 & 8</u> **Loss of Coolant Accident; HPCI Trips** **Note:** The loss of coolant accident automatically initiates ~7 minutes after the Reactor scram. The HPCI trip automatically initiates ~10 minutes after the Reactor scram.	All	• Recognize / report rising Drywell pressure and lowering Reactor water level • Recognize / report trip of HPCI (~3 min later)	SAT / UNSAT / NA
Critical Task #1 **Critical Task #1 Standard:**	**Given a coolant leak inside the Containment, the crew will spray the Drywell, in accordance with EOP-4.** **Spray the Drywell.**		**Pass / Fail**
Critical Task #2 **Critical Task #2 Standard:**	**Given a coolant leak, a loss of high pressure injection systems, and the inability to restore and maintain Reactor water level above the Top of Active Fuel (TAF), the crew will initiate actions for an Emergency RPV Depressurization in accordance with EOP-2.** **Open at least 5 SRVs.**		**Pass / Fail**

	SRO	• Acknowledge reports • Re-enter EOP-2 (RPV Control) on low Reactor water level, as necessary • When Primary Containment pressure exceeds 2.7 psig and before Torus pressure exceeds 15 psig, direct initiation of Torus Spray • **When Torus pressure exceeds 15 psig, direct Drywell spray** • Determine Reactor water level cannot be maintained above 0” • Enter Alternate RPV Level Control leg of EOP-2 • Direct override of ADS • Direct SLC injection, if not done previously • **When Reactor water level reaches 0”, enter Emergency RPV Depressurization leg of EOP-2** • Direct opening all ADS valves • Direct opening one additional SRV • Direct Reactor water level restored and maintained 180-220” using Core Spray and/or LPCI • As time allows, directs re-start of Drywell spray	SAT / UNSAT / NA **Critical Task #1** **Critical Task #2**
	ATC / BOP	• Recognize / report trip of HPCI • Attempt to control Reactor water level 180-220” using RCIC, CRD, and/or SLC • Recognize / report inability to maintain Reactor water level with available injection systems	SAT / UNSAT / NA

	ATC / BOP	• Initiate Torus spray:
		  ▪ Place SPRAY CNTRL 10A-S17B switch to MANUAL, spring return to normal
		  ▪ Verify white SPRAY PERM 10A-DS67B light is on
		  ▪ Ensure available RHR pumps in RHR Loop B are running (recognize/report failure to automatically start)
		  ▪ Open RHR TEST TORUS CLG & SPRAY 10MOV-39B
		  ▪ Throttle TORUS SPRAY INBD VLV 10MOV-38B to establish desired torus spray flow rate
		  ▪ WHEN RHR Loop B flow is GREATER THAN 1500 gpm, ensure closed MIN FLOW VLV 10MOV-16B
		  ▪ Throttle RHR TEST & TORUS CLG 10MOV-34B to divert excess flow to the torus to maintain > 6,500 gpm RHR Loop B flow with one RHR pump operating or > 13,000 gpm RHR Loop B flow with two RHR pumps operating
		• Establish RHRSW flow and temperature control:
		• Loop B:
		  ▪ Establish RHRSW flow and temperature control:
		  ▪ Start one of the RHRSW pumps
		  ▪ Throttle RHRSW DISCH VLV FROM HX B 10MOV-89B to establish 2500 to 4000 gpm
		  ▪ Start the second RHRSW pump if desired
		  ▪ Throttle RHRSW DISCH VLV FROM HX B 10MOV-89B to establish 2500 to 4000 gpm per RHRSW pump
		• IF drywell or torus sprays are in service, THEN establish 4000 gpm per RHRSW pump
		• Close HX B BYP VLV 10MOV-66B
			SAT / UNSAT / NA

	ATC / BOP	• Ensure Recirc pumps tripped
		• Ensure Drywell Cooling fans tripped
		• **Initiate Drywell spray:**
		• Place SPRAY CNTRL 10A-S17B switch to MANUAL, spring return to normal
		  ▪ Verify white SPRAY PERM 10A-DS67B light is on
		  ▪ Ensure available RHR pumps in RHR Loop B are running
		  ▪ Open DW SPRAY OUTBD VLV 10MOV-26B
		  ▪ Throttle DW SPRAY INBD VLV 10MOV-31B to establish desired drywell spray flow rate
		• Override ADS:
		  ▪ Place ADS LOGIC OVERRIDE & RESET LOGIC A 2E-S2A in OVERRIDE
		  ▪ Place ADS LOGIC OVERRIDE & RESET LOGIC B 2E-S2B in OVERRIDE
		  ▪ Verify annunciator 09-4-1-27 ADS OVERRIDE SW IN OVERRIDE is in alarm
		  ▪ Verify white ADS LOGIC OVERRIDDEN 2E-DS10 light is on
		• Initiate SLC injection, if not done previously
		• Verify isolations per AOP-15
		• As time permits, execute AOP-39 (Loss of Coolant)
			SAT / UNSAT / NA
			
			Critical Task #1

	ATC / BOP	• **Open all ADS valves and one additional SRV** • Restore and maintain Reactor water level 180-220” using available injection systems • Control LPCI injection by throttling 10MOV-27A(B) • Control CS injection by throttling 14MOV-12B • Secure RHR pumps if needed	SAT / UNSAT / NA **Critical Task #2**

Termination Criteria:

All control rods are inserted, Emergency Depressurization is in progress and Reactor water level is being controlled above 0 inches.

Shift Turnover

The Plant is operating at approximately 85% power.

SRV A is inoperable due to a circuit failure.

RHR loop A is operating in the Torus Cooling lineup.

When you take the shift:

1. Secure Torus Cooling per OP-13B.
2. Raise Reactor power using control rods and Recirculation flow per the provided RMI.

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Ascension Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	26-43	24	48	Continuous	Yes	-	
	2	Withdraw	26-11	24	48	Continuous	Yes	-	
	3	Raise **power** to 95% RTP	-	-	-	RWR	NA	-	

Prepared By: *Joe Allen*
(RxEng)

SM Approval: *Dave Roe*
(Shift Manager)

Reviewed By: *Bob Jones*
(RxEng or SRO)

Stamps

CONTROL ROOM OPERATOR

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Ascension
Today

Page 1 of 1

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	26-43	24	48	Continuous	Yes	-	
	2	Withdraw	26-11	24	48	Continuous	Yes	-	
	3	Raise **power** to 95% RTP	-	-	-	RWR	NA	-	

Prepared By: _Joe Allen_
(RxEng)

SM Approval: _Dave Roe_
(Shift Manager)

Reviewed By: _Bob Jones_
(RxEng or SRO)

Stamps

INDEPENDENT VERIFIER

Reactivity/monitoring Steps – (site specific RWR control sheet format is to be used)

Power Ascension Today

Init	Step	Action	Rod	From Notch	To Notch	Method	Cplg Chk	RSCS Grp	Notes
	1	Withdraw	26-43	24	48	Continuous	Yes	-	
	2	Withdraw	26-11	24	48	Continuous	Yes	-	
	3	Raise **power** to 95% RTP	-	-	-	RWR	NA	-	

Prepared By: *Joe Allen*
(RxEng)

SM Approval: *Dave Roe*
(Shift Manager)

Reviewed By: *Bob Jones*
(RxEng or SRO)

Stamps

CRS

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

LOI 17-1 NRC EXAMINATION SCENARIO 4

TITLE: **LOI 17-1 NRC EXAMINATION SCENARIO 4**

SCENARIO NUMBER: **NRC 4**

PATH: **STAND ALONE**

Validation: _____ Training: _____ Operations: _____

	CANDIDATES
CRS	
ATC	
BOP	

RECORD OF CHANGES

DATE	SOURCE OF CHANGE	BRIEF DESCRIPTION OF CHANGE	INITIATOR	REVIEWED
7/14/15	LOI 16-1 NRC Exam	New Scenario	T. Hooper	D. Kelly
10/25/17	LOI 17-1 NRC Exam	Updated	T. Hooper	D. Kelly

A. TITLE: LOI 17-1 NRC EXAMINATION SCENARIO 4

B. SCENARIO SETUP:

1. IC-154

2. Special Instructions:

   a. The Plant is operating at approximately 94% power.
   b. SRV 'A' is inoperable (yellow tag on SRV 'A' switch).
   c. Crew will start RBCLC pump A and secure B per OP-40 G.1.
   d. Raise power with RWR.

3. Preset Conditions:

   a. Preset, M:AD07:A, Rx press relief vlv fails closed
   b. Trigger 1, M:SL04:A, Standby liquid squib valve fails
   c. Trigger 2, M:AD06:C, Rx press relief valve fails
   d. Trigger 3, M:FW05:A, Rx feedwtr pmp A high vibration
   e. Trigger 16, M:FW01:A, Rx feedwtr pmp A trip
   f. Trigger 4, M:RX01, Fuel cladding failure, Ramp: 2 min, Final: 10
   g. Trigger 5, M:MS05, Steam leak outside primary cont, Ramp: 10 min, Final: 40
   h. Preset, M:MS08B:C, MSIV 80C fails open
   i. Preset, M:MS08B:G, MSIV 86C fails open
   j. Preset, M:RP12:A, PCIS group 1 inboard msiv isolation failure
   k. Preset, M:RP12:B, PCIS group 1 outboard msiv isolation failure
   l. Trigger 25, R:AD07:C, C SRV isolation switch at RSP, Final: Local
   m. Trigger 26, R:AD02:C, C SRV fuse pull out, Final: Out
   n. Preset, R:HV13, Remove Relays K1 & K3 from 17RIS, Final: Remove
   o. Trigger 5, O:FW ZDI684B, FW controller B, Final: Manual
   p. Trigger 5, O:FW ZAI684B(1), FW controller B-man, Final: 0
   q. Preset, O:AD ZLO217A(1), SRV A green light, Final=OFF
   r. Event Trigger 5, Event: (zlo5ads8a == 0) && (zlo5ads8b == 0), Command: imf rx01 100 15:00
   s. Event Trigger 16, Event: fwvrfpt(1)>8, Command: none

4. Consumable Forms and Procedures:
   - AOP-1

C. SCENARIO SUMMARY:

The scenario will begin at approximately 94% power with SRV 'A' inoperable. The crew will begin the shift by swapping RBCLC pumps per OP-40.

After the RBCLC pumps are swapped, the crew will raise Reactor power using Recirculation flow.

Once Reactor power has been raised, Standby Liquid Control Squib valve 'A' will lose continuity in its initiation circuit. The SRO will address Technical Specifications (TS).

After the TS LCO has been determined, Safety Relief valve 'C' will inadvertently open. The crew will execute AOP-36 (Stuck Open Relief Valve). Actions taken will be successful in closing the SRV and once again the SRO will address TSs.

Feedwater Pump 'A' will then experience high pump vibrations. Efforts to mitigate the pump vibrations will be unsuccessful and the Feedwater pump will trip.

The Feedwater transient will result in fuel clad damage and radiation levels in the Turbine Building will begin to rise. The crew will enter AOP-3 (High Activity in Reactor Coolant or Off-gas) and attempt to minimize the rise in radiation levels.

The SRO will determine a Reactor scram is warranted and direct a manual scram to be inserted. EOP-2 (RPV Control) and EOP-6 (Radioactive Release Control) will be entered. Turbine Building ventilation radiation levels will approach the General Emergency level, therefore the crew will perform an Emergency RPV Depressurization.

The scenario will be terminated when all control rods are inserted, an Emergency RPV Depressurization is in progress, and RPV level is controlled above zero inches.

Shift Turnover
The Plant is operating at approximately 94% power. SRV A is inoperable due to a circuit failure. When you take the shift: 1. Swap RBCLC pump lineup; start pump ‘A’ then secure pump ‘B’ per OP-40 section G.1. 2. Raise Reactor power to 98% with Recirculation flow. 3. Maintain Reactor at 98% for 1 hour. 4. Raise Reactor power to 100% with Recirculation flow.

Critical Tasks/Standards	
Critical Task #1:	**Given a fuel failure, the crew will scram the Reactor, in accordance with AOP-3.**
Critical Task #2:	**Given an un-isolable primary system discharging outside of primary and secondary containments and off-site radioactivity release rates approaching the General Emergency level, the crew will perform an emergency RPV depressurization, in accordance with EOP-6.**

EVENT NO.	EVENT SEQUENCE	
1.	Swap RBCLC Pumps	(Normal: BOP, SRO)
2.	Raise Reactor Power with Recirculation Flow	(Reactivity: ATC, SRO)
3.	SLC Squib Valve Continuity Loss	(Component: SRO)
4.	SRV Inadvertently Opens	(Component : BOP, SRO)
5.	Feedwater Pump Vibration and Delayed Pump Trip	(Component: ALL)
6.	Fuel Failure	(Component: ALL)
7.	Main Steam Leak in Turbine Building; One Main Steam Line Fails to Isolate; Turbine Building Ventilation Fails to Isolate	(Major: ALL)
8.	MSIVs Fail to Automatically Isolate	(Instrument: BOP, SRO)
9.	Master Feedwater Level Controller Fails Low	(Instrument: ATC, SRO)

D. TERMINATION CUES:

- All control rods are inserted
- Emergency RPV Depressurization is in progress
- RPV level is controlled above zero inches.

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Simulator in RUN Recorder and Alarm Power ON Simulator Checklist Complete			
Provide Turnover (Attach. 1)			
After the shift turnover, allow no more than five minutes for panel walkdown	All	• Walkdown the control panels and assume the watch	
<u>Event 1</u> **Swap RBCLC Pumps** (OP-40)	SRO	• Perform Crew Brief • Direct OP-40 section G.1 performed to swap RBCLC pumps (start 15RBC-2A then secure 15RBC-2B).	SAT / UNSAT / NA
Role Play: If dispatched to perform any pump checks, immediately report that the requested pump checks are SAT.	BOP	• Start the standby RBCLC pump (15RBC-2A). • Verify RBCLC pump motor current is less than maximum normal amps. • Place and hold control switch for the RBCLC pump to be shutdown (15RBC-2B) in STOP until RBCLC System discharge header pressure is stable at greater than 75 psig, then release control switch. • Verify RBCLC pump motor current for the running RBCLC pumps is less than maximum normal amps. • IF sidestream filter is in service, then throttle 15RBC-304 (RBCLC magnetite F-300 outlet isol valve) as necessary to establish filter flowrate approximately 50 gpm.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 2</u> **Raise Reactor Power with Recirculation Flow**	SRO	• Direct ATC to raise power to 98% with Recirc flow • Provide oversight for reactivity manipulation	SAT / UNSAT / NA
	ATC	• Raise Recirc flow alternately with RWR MG A(B) SPEED CNTRL • Monitor APRMs, CTP, Recirc flow, Reactor water level, Core Map	SAT / UNSAT / NA
<u>Event 3</u> **SLC squib valve continuity loss** (on Lead Examiner Cue: ACTIVATE TRIGGER 1)	BOP \ ATC	• Recognize / report annunciator 09-3-3-30, SLC SQUIB VLV CONTINUITY LOSS	SAT / UNSAT / NA
	SRO	• Acknowledge report • Declare one SLC subsystem inoperable • Determine Technical Specification 3.1.7 Condition A requires restoring the SLC subsystem to operable within 7 days	SAT / UNSAT / NA
Role Play: If dispatched to investigate SLC issue, wait 2 minutes and then report that you do not see any obvious problems.	BOP	• Executes ARP 09-3-3-30: • Determine which valve has lost continuity by checking milliamp meters in back of Panel 09-3.	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

<u>Event 4</u>
SRV C Inadvertently Opens
(on Lead Examiner Cue: ACTIVATE TRIGGER 2)
	BOP \ ATC	• Recognize / report annunciators:
		  ○ 09-4-1-16, SRV Leaking
		  ○ 09-4-2-6, SRV Sonic Mon Alarm Hi
		• Recognize / report SRV C open
			SAT / UNSAT / NA

	SRO	• Acknowledge report • Enter AOP-36, Stuck Open Relief Valve • If Torus water temperature exceeds 95ºF or Torus water level exceeds 14.0 feet, enter EOP-4, Primary Containment Control • May enter AOP-32 (Unplanned Power Change) • Direct initiation of Torus Cooling • Determine SRV C is inoperable and is an ADS valve per Technical Specification 3.5.1 • Enter TS LCO 3.5.1.E (14 day LCO for ADS) • Enter TS 3.6.2.4.A (8 hour LCO for DW/Torus D/P)	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Role Play: When directed to place SRV C isolation switch in LOCAL, wait 2 minutes, insert Trigger 25, wait approximately 15 seconds, then report task completion. **Role Play:** When directed to remove SRV C fuses, wait 1 minute, insert Trigger 26, then report task completion. **Role Play:** When directed to place SRV C isolation switch in REMOTE, wait 1 minute, re-insert remote **AD07:C** in **REMOTE**, wait approximately 15 seconds, then report task completion.	BOP	• Execute AOP-36 ○ Identify open SRV ○ Determine annunciator 09-4-2-37 is NOT in alarm ○ Determine annunciator 09-4-3-3 is NOT in alarm ○ Cycle SRV C control switch at panel 09-4 ○ Direct Operator to place SRV C isolation switch in LOCAL at panel 25ASP-5 ○ Determine SRV C closed ○ Direct Operator to remove the four control power fuses for SRV C at panel 09-45 ○ Direct Operator to place SRV C isolation switch in REMOTE at panel 25ASP-5 ○ Monitor Torus water temperature	SAT / UNSAT / NA
Role Play: If Torus vent directed, wait 2 minutes, start a SBGT fan in the simulator, then run applicable caep OP37_TORUSVENT…cae.	BOP cont.	• May direct Torus vent • Initiate Torus Cooling per OP-13B posted attachment: ○ Ensure at least one of the RHR pumps is running ○ Open RHR TEST TORUS CLG & SPRAY 10MOV-39A(B) ○ Throttle RHR TEST & TORUS CLG 10MOV-34A(B) to establish desired/flow ○ WHEN RHR Loop A(B) flow is GREATER THAN 1500 gpm, ensure closed MIN FLOW VLV 10MOV-16A(B) ○ Establish RHRSW flow and temperature control	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	BOP cont.	• Initiate RHRSW per OP-13C posted attachment: • Establish RHRSW flow and temperature control: ○ Start one of the RHRSW pumps ○ Throttle RHRSW DISCH VLV FROM HX A(B) 10MOV-89A(B) to establish 2500 to 4000 gpm ○ Start the second RHRSW pump if desired ○ Throttle RHRSW DISCH VLV FROM HX A(B) 10MOV-89A(B) to establish 5000 to 8000 gpm per RHRSW pump ○ Close HX A(B) BYP VLV 10MOV-66A(B)	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
<u>Event 5</u> **Feedwater Pump Vibration and Delayed Pump Trip** (on Lead Examiner Cue: ACTIVATE TRIGGER 3)	ATC / BOP	• Recognize / report EPIC alarms • Recognize / report annunciator 09-6-4-11, RFPT A VIB HI • Recognize / report rising Feedwater pump A vibrations	SAT / UNSAT / NA
Note: The ARP directs tripping Feedwater pump A if vibration reaches 6 mils. There is no automatic trip on vibration, however the pump will spuriously trip in this scenario if vibration reaches ~8 mils.	SRO	• Acknowledge report • Direct ARP response • May direct emergency power reduction with Recirculation flow (43-45 Mlbm/hr) and/or CRAM rods • Direct trip of Feedwater pump A • Enter AOP-41 (Feedwater Malfunction) • May enter AOP-8 (Unexpected Change in Core Flow)	SAT / UNSAT / NA

Note:
Recirculation pumps will likely runback to the 44% limiter due to only one Feedwater pump operating and Reactor water level lowering to 196.5”.
 	
Role Play:
If dispatched to investigate, wait 2 minutes, then report that Feedwater pump A is vibrating, but there is no obvious cause.
	BOP	• Execute ARP 09-6-4-11
		  ○ Monitor vibration level and trend
		  ○ When vibration approaches/exceeds 6 mils, trip Feedwater pump A
		• Coordinate with ATC to lower Reactor power with Recirculation flow, as required / directed
			SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Note: Following the trip of Feedwater pump A, Reactor power will likely stabilize between 65-70% power. The crew may decide to lower Reactor power further by inserting CRAM rods, since during a startup the second Feedwater pump is started prior to exceeding 55% power. **Role Play:** If the crew is not taking action to lower Reactor power by inserting CRAM rods, when crew informs Ops Management or Reactor Engineering of event, direct crew to lower Reactor power to 50% using RAP-7.3.16.	ATC	• Coordinate with BOP to lower Reactor power with CRAM rods, as required / directed • Monitor for thermal-hydraulic instabilities (THI) ○ May select control rod(s) to monitor LPRMs • Monitor Turbine vibrations	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Critical Task #1		**Given a fuel failure, the crew will scram the Reactor, in accordance with AOP-3.**	**Pass / Fail**
Critical Task #2		**Given an un-isolable primary system discharging outside of primary and secondary containments and off-site radioactivity release rates approaching the General Emergency level, the crew will perform an emergency RPV depressurization, in accordance with EOP-6.**	**Pass / Fail**
Event 6 **Fuel failure** (on Lead Examiner cue, insert Trigger 4)	BOP \ ATC	• Recognize / report annunciators: ○ 09-3-2-27, OFF GAS RAD MON HI ○ 09-3-2-10, OFF GAS TIMER INITIATED ○ 09-3-2-38, OFF GAS RAD MON HI-HI • Recognize / report rising Offgas and Main Steam Line rad monitors • Recognize / report Turbine Building and Reactor Building radiation monitor alarms	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
	SRO	• Acknowledge reports • Enter AOP-3 (High Activity in Reactor Coolant or Off-gas) • Enter EOP-5 (Secondary Containment Control) • Direct power reduction • Provide oversight for power reduction • Direct evacuation of affected areas • **Direct Reactor scram** • Enter AOP-1 (Reactor Scram) • Enter EOP-2 (RPV Control) on low RPV water level • Direct RPV water level restored and maintained 180-220" using Feedwater, CRD, HPCI, and/or RCIC • Direct RPV pressure controlled 800-1000 psig using Turbine Bypass Valves and/or SRVs • May direct closure of MSIVs • Enter AOP-15 (Isolation Verification and Recovery)	SAT / UNSAT / NA **Critical Task #1**

	ATC	• Insert CRAM rods
		• May continue inserting control rods per shutdown sequence
		• **Depress manual Scram pushbuttons**
		• Place Mode Switch to Shutdown
		• Report all control rods have inserted
		• Enter AOP-1
		  ○ Fully insert IRMs and SRMs
		  ○ Observe Reactor power downscale on APRMs
		  ○ Observe SDIV vent and drain valves closed
		  ○ Ensure Main Turbine is tripped
		  ○ Verify 4 KV loads transfer to reserve power
		  ○ Transfer APRM/IRM recorders to IRMs
		  ○ Down-range IRMs
			SAT / UNSAT / NA
			
			Critical Task #1

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION

Event 9
Master Feedwater level controller fails low
 	
Note:
Condensate Booster pumps will be capable of injection to the Reactor once Reactor pressure is reduced to approximately 700 psig.
	BOP	• Execute AOP-3
		• Direct Chemistry to sample reactor coolant and off-gas
		• Direct Radiation Protection to survey for changing radiation levels throughout the plant
		• Make evacuation announcement
		• Enter AOP-1
		• Attempt to control Reactor water level 180-220" using Feedwater
		• Recognize / report inability to inject with high pressure Feedwater pumps
		  ○ Operate RCIC per OP-19 Section D
		  ○ Operate HPCI per OP-15 Section D
		• Verify Group 2 isolation per AOP-15
		• Close MSIVs, as directed (may attempt using slow close PBs)
		• May control pressure on SRVs, as directed
			SAT / UNSAT / NA

Event 7 **Main Steam Leak in Turbine Building; One Main Steam Line Fails to Isolate; Turbine Building Ventilation Fails to Isolate** **Event 8** **MSIVs Fail to Automatically Isolate** **Booth Operator:** Ensure **Trigger 5** automatically activates when the Reactor is scrammed.	BOP / ATC	• Recognize / report high steam tunnel temperatures • Recognize / report partial MSIV isolation • Recognize / report failure of Main Steam Line C to isolate • Recognize / report rising radiation levels	SAT / UNSAT / NA

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Note: Turbine Building Exhaust radiation monitors are used in the following EALs: UE – Low range ≥5E4 cpm Alert – Low range ≥9.9E5 cpm SAE – High range ≥1.2 mR/hr* GE – High range ≥12 mR/hr* *with low range upscale **Role Play:** If dispatched to investigate conditions in the Turbine Building, wait 2 minutes, then report that there is a lot of steam in the ***Turbine Building*** and you had to exit the building. **Role Play:** If dispatched to investigate conditions in the Reactor Building, wait 2 minutes, then report that ***Reactor Building*** conditions are normal except for elevated radiation levels.	SRO	• Enter AOP-40, Main Steam Line Break, as time permits • Enter EOP-6, Radioactivity Release Control, on Turbine Building Exhaust radiation levels above the emergency plan Alert level • Monitor Reactor Building radiation levels and Turbine Building Exhaust radiation levels • Determine Turbine Building Exhaust radiation levels are approaching the threshold requiring a General Emergency • Enter EOP-2 Contingency Leg, Emergency RPV Depressurization • Determine Torus water level is above 5.5 feet • **Direct open all 7 ADS valves** • Determine < 7 ADS valves can be opened • Direct additional SRVs be opened for a total of 7 open SRVs • Wait until shutdown cooling RPV pressure interlock clears	SAT / UNSAT / NA **Critical Task #2**

INSTRUCTOR ACTIVITY	POSITION	OPERATOR ACTIONS/STANDARD	COMMENTS/EVALUATION
Evaluator Note: Depending on Crew actions, RX01 (fuel failure malf) may need to be increased to “drive” TB rad values up. **Role Play:** If dispatched as RP to survey Turbine Building, wait 2 minutes, then report radiation levels matching current status of ARMs. **Role Play:** If dispatched to investigate Feedwater pump control, wait 2 minutes, then report that you have found no indications why Feedwater pump control has failed.	BOP	• **Attempt to open all 7 ADS valves** • Report that not all ADS valves can be opened • Open additional SRV(s) until 7 are open • Report 7 SRVs are open • Control Reactor water level 180-220”	SAT / UNSAT / NA **Critical Task #2**

Termination Criteria:

All control rods are inserted, an Emergency RPV Depressurization is in progress and RPV level is controlled above zero inches.

Shift Turnover
The Plant is operating at approximately 94% power. SRV A is inoperable due to a circuit failure. When you take the shift: 1. Swap RBCLC pump lineup; start pump ‘A’ then secure pump ‘B’ per OP-40 section G.1. 2. Raise Reactor power to 98% with Recirculation flow. 3. Maintain Reactor at 98% for 1 hour. 4. Raise Reactor power to 100% with Recirculation flow.