JPM- ANO-2-JPM-RO-NRC-A3

JOB PERFORMANCE MEASURE

UNIT: 2 **REV #:** ___ **DATE:** 14 July 2003

SYSTEM/DUTY AREA: A.3 Radiation Control

TASK: Utilization of Radiation Work Package to determine radiation equipment requirements for a job as well as ALARA concerns

JTA#:

KA VALUE RO: 2.9 **SRO:** 3.3 **KA REFERENCE:** 2.3.10

APPROVED FOR ADMINISTRATION TO: RO: X **SRO:** X

TASK LOCATION: INSIDE CR: OUTSIDE CR: X **BOTH:**

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):
PLANT SITE: SIMULATOR: Perform **Perform LAB:**

POSITION EVALUATED: RO: SRO:

ACTUAL TESTING ENVIRONMENT: SIMULATOR: PLANT SITE: LAB:

TESTING METHOD: SIMULATE: PERFORM:

APPROXIMATE COMPLETION TIME IN MINUTES: 15 minutes

REFERENCE (S):

EXAMINEE'S NAME: _____ **SSN:** _____ -_____ - _____

EVALUATOR'S NAME: _____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: UNSATISFACTORY:

PERFORMANCE CHECKLIST COMMENTS:

Start Time: Stop Time: Total Time:

SIGNED_____ **DATE:** _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

This JPM is to be conducted in conjunction with JPM B.2.b ANO-2-JPM-NRC-SFPSW Add water from Loop II SW to the Spent Fuel Pool.

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

Inform the examinee that the JPM shall begin as soon as the RCA control point is reached.
Provide the RWP to the examinee.

JPM INITIAL TASK CONDITIONS:

The following conditions exist:

1. Plant is DEFUELED and all cask loading operations are secured.

2. Power has been lost to both SFP cooling pumps and 2K11-K5 "FUEL POOL TEMP HI" is in alarm.

3. An operator is stationed at the spent fuel pool to monitor Spent Fuel Pool Level.

4. SFP purification is out of service for replacement of 2FP-10, SFP purification pump discharge.

5. Fuel Pool low level alarm is in and SFP level is lowering.

The SM/CRS directs, ''Align for makeup water addition to the SFP system from CVCS using OP 2104.006," Section 10.0 beginning with step 10.5"

TASK STANDARD: 2.3.10 Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

TASK PERFORMANCE AIDS: RWP, Dosimeter, protective clothing as necessary

SIMULATOR INITIAL CONDITIONS:

JOB PERFORMANCE MEASURE

INITIATING CUE:

The SM/CRS directs, "Align for makeup water addition to the SFP system from CVCS using OP 2104.006," Section 10.0 beginning with step 10.5"

Hand the examinee the RWP and survey for this JPM when he is ready to enter the RCA

CRITICAL ELEMENTS (C): 1, 2

PERFORMANCE CHECKLIST		**STANDARDS**	(Circle One)
1. (C)	Review RWP. Identify required dosimetry from the survey map. <u>POSITIVE CUE:</u> Dosimeter obtained	Examinee reviews the RWP and survey map to determine requirements. Identifies that the required dosimetry based on the provided survey is only a TLD.	N/A SAT UNSAT N/A SAT UNSAT
2. (C)	Obtain Electronic Alarming Dosimeter (EAD) from the rack outside the CAA entrance and activate it at the access turnstile using appropriate Radiation Work Permit number, and enters the CAA when access is granted. Determine the requirements for dosimetry, clothing, and respirators. POSITIVE CUE:	Examinee will obtain an EAD and insert the EAD into the activation slot, scan the bar code on his TLD, and follow the instructions on the screen. Entering RWP number and answering the questions on the computer fields of the access terminal. Once all fields have been entered appropriately, access is granted. Used RWP and survey provided to determine that protective clothing is required to be worn in this area.	N/A SAT UNSAT N/A SAT UNSAT
3.	Dons personal safety equipment as required inside the CAA	Hardhat, safety glasses, and earplugs worn where required in the CAA.	N/A SAT UNSAT
4. (C)	While in the CAA the examinee observes and adheres to all applicable postings and entry requirements.	While in the CAA the examinee observes and adheres to all applicable postings and entry requirements.	N/A SAT UNSAT
5.	Determines radiological status of area around valves to be operated to refill SFP.	Determines or knows that the area around valves to be operated to refill SFP is a contamination area.	N/A SAT UNSAT

6. (C)	Determines requirements for entry into the contaminated area around the SFP.	NO additional dosimetry, single PCs, and no pre-job brief.	N/A SAT UNSAT
7. (C)	When exiting the CAA the examinee enters the control point area and enters a PCM-1 monitor.	Examinee clears the PCM-1 monitor and exits.	N/A SAT UNSAT
8. (C)	If hand carried materials were taken into the CAA, they will be cleared through the tool contamination monitor (TCM)	Examinee places hand carried items in the TCM for counting	N/A SAT UNSAT
9.	After clearing the PCM-1 monitor, the examinee exits through the Portal Monitor	Examinee clears the Portal Monitor	N/A SAT UNSAT
10.	Examinee deactivates EAD at final exit of session	Examinee deactivates his EAD and returns it to the Health Physics rack.	

Terminating cue: Egress from CAA completed.

END

Status: Active **RADIOLOGICAL WORK PERMIT** Rev 0 Unit C RWP **2003-0005**

SECTION I	**RWP DESCRIPTION**	
START DATE: 01-Jan-2003	END DATE: 31-Dec-2003	RWP TYPE: General

DESCRIPTION:

Tours and Inspections

SYSTEM	COMPONENT	BLDG	LOCATION
NA	NA	A1	Non LHRA's
NA	NA	A2	Non LHRA's|
NA	NA	OSCA	Non LHRA's

JOB CONTACTS. Various
JOB CODE.....ROS-

ALARA CODE....C0008011
ALARA CAT.....Level II

SECTION II TASK LIST

TASK	STATUS	TASK DESCRIPTION	ESTIMATED	
			PR-HR	PER-REM
1	Active	Non Locked High Radiation Areas	116709.	0.617
		TOTALS	|116709.	0.617

SECTION III RWP REVIEWS AND APPROVAL

Originator	FULTZ MW	19-Dec-2002	Development	RASMUSSON DC	19-Dec-2002
ALARA Eval	RASMUSSON DC	19-dec-2002	HP Supv.	RASMUSSON DC	19-Dec-2002
Terminated	_____	_____	Completed	_____	_____
Withdrawn	_____	_____			

SECTION IV	**PROTECTIVE REQUIREMENTS BY TASK**	Rev 0	RWP **2003-0005**

TASK TASK DESCRIPTION (Task# 1)

1) **Non Locked High Radiation Areas**

RADIOLOGICAL CONDITIONS (Task# 1)

Component/Location	(mrem/Hr) Gen	Max	Dpm/100cm2		Yr/DANI#		
A1,A2 OSCA	1	200	<1K		Monthly pkg		
	1	80	<1K		Monthly pkg		

Dosimetry : Whole body TLD required, and Alarming Dosimeter.

SECTION IV	**PROTECTIVE REQUIREMENTS BY TASK** Rev 0	RWP **2003-0005**
TASK	**TASK DESCRIPTION** (Task# 1)	

---------- SPECIAL INSTRUCTIONS ----------

ALARA Actions:

1) Unless otherwise directed by RP supervision, Electronic Alarming Dosimeter (EAD) set points will be 5 mrem dose and 40 mrem/hr dose rate.

2) Utilize low dose areas whenever possible to minimize exposure.

Monitoring:

1) Notify the zone coverage RP or the on duty shift RP of areas to be entered and work to be performed.

2) Area posting/survey maps should be reviewed to ensure awareness of radiological conditions in your work area. This information can be obtain from one or more of the following:
A.) RWP - Radiological Conditions Section.
B.) Area Posting - Locale posting in the field.
C.) Status Board - At CA-2, Unit-1 elevation 404', Unit-2 elevations 354', 335' and 317' general areas.
D.) Surveys Maps - Posted outside cubicles. (Unit-1 only, 386' elevation and below).
E.) RWP File - Contact RP if file is desired.
F.) RP Personnel - Contact RP @ CA-1 (#5166), or use radios (on channel 2), located at CA-2 386' dress out area, 354' and 335' elevations near the elevators.

3) Periodically check Electronic Alarming Dosimeter (EAD). This check should be more frequent in areas where your ability to hear the alarm is diminished. If any EAD alarm is received secure work, exit area, and notify RP.

4) Initial/intermittent RP coverage is required for entry into High Radiation Areas unless the individual is "Category 3 Advanced Radworker" qualified and has the appropriate radiation survey meter at all times during the entry.
NOTE: An EAD is not an appropriate survey meter.

5) Prior to entering a "Radioactive Materials Area" outside Controlled Access, contact RP to ensure all personnel, equipment, and material is evaluated for appropriate monitoring upon exit.

Work Controls:

1) Ensure the proper surveys are performed prior to removing any items from the RCA.

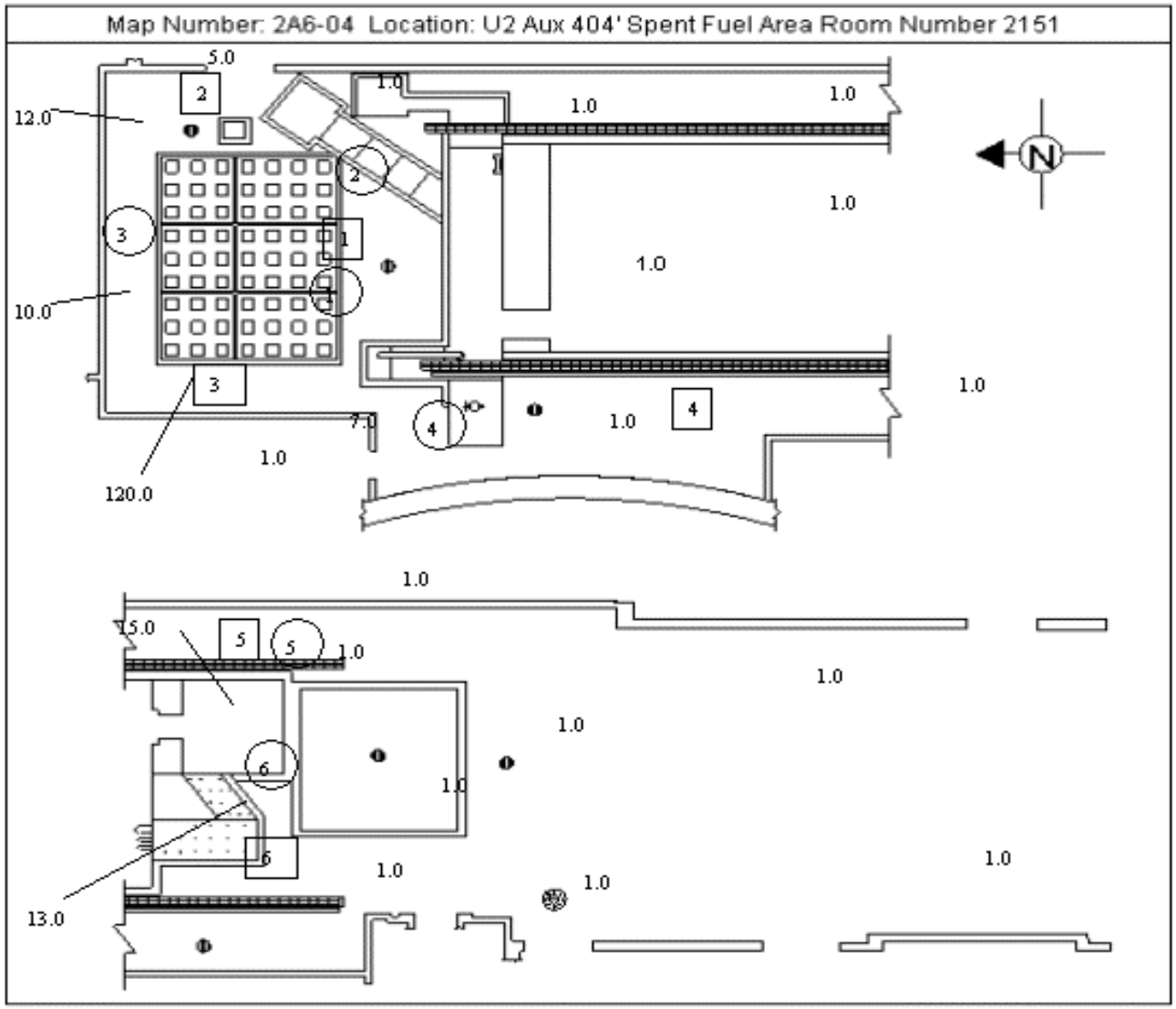
Respiratory:

|1) Based on historical and current data Airborne Activity is <30% DAC. Respiratory protection is not required unless otherwise posted.

Anti-C's:

1) Use Anti-C's appropriate for the area to be entered.

FOR TRAINING PURPOSES ONLY



SMEAR DATA (DPM/100cm2)	SURVEY DATA
1- 2000 2- 3000 3- 800 4- 1000 5- 200 6- 400	Unit: **2** Building: **RAB** Elevation: **404** Room: **2151** RxPwr: 100 Template: 2A2-24 Frequency: monthly Survey Date:07-01-2003 Survey Time: 21:10:00 Status: Complete RWP: 1 Task1 DAN#: 5-1-7 Surveyed By: Keith A. Murray Badge: 956 Reviewed By: James D. Looper Notes: Peer Check by BEK/837
L.A.S. Data (cpm/LAS) 1. 20 2. 30 3. 20 4. 20 5. 40 6. 35	
Alpha Data (DPM/100cm2)	**Instruments Used** Instrument: RAM-ION-RAM-049 Cal Due:08-31-2003 SrcCk Due: 07-04-2003 D/C & Bkg N/A N/A Instrument: RM-CHP-CR-106 Cal Due:07-30-2003 SrcCk Due:N/A D/C & Bkg 10 100
L.A.S. Alpha (cpm/LAS)	

All Radiation values are in mrem/hour unless otherwise noted
Smear results: < 1000 dpm/100cm2 or < 100 CCPM/LAS unless otherwise noted
O Smear location (100cm2)
- ❑ Large Area Smear (LAS) location

JOB PERFORMANCE MEASURE

UNIT: **2** REV #: **003** DATE: _____

SYSTEM/DUTY AREA: **Chemical and Volume Control System**

TASK: **Perform Emergency Boration (Alternate Success Path)**

JTA#: **ANO2-RO-EOPAOP-OFFNORM-193 (Perform Emergency Boration)**

KA VALUE RO: **3.9** SRO: **3.7** KA REFERENCE: **004 A4.07**

APPROVED FOR ADMINISTRATION TO: RO: **X** SRO: **X**

TASK LOCATION: INSIDE CR: **X** OUTSIDE CR: _____ BOTH: _____

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: _____ SIMULATOR: **Perform** LAB: _____

POSITION EVALUATED: RO: _____ SRO: _____

ACTUAL TESTING ENVIRONMENT: SIMULATOR: _____ PLANT SITE: _____ LAB: _____

TESTING METHOD: SIMULATE: _____ PERFORM: _____

APPROXIMATE COMPLETION TIME IN MINUTES: **7 Minutes**

REFERENCE (S): **OP 2203.032, OP 2103.015**

EXAMINEE'S NAME: _____ SSN: _____

EVALUATOR'S NAME: _____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: _____ UNSATISFACTORY: _____

PERFORMANCE CHECKLIST COMMENTS:

_____

_____

Start Time _____ Stop Time _____ Total Time _____

SIGNED: _____ DATE: _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS:

Mode 3, A Shutdown Margin is calculated following a reactor trip.

TASK STANDARD:

Greater than or equal to 40 gallons per minute boric acid solution being injected into the RCS using BAM Pumps via Emergency Borate Valve (2CV-4916-2). This is an alternate success path JPM.

TASK PERFORMANCE AIDS:

AOP 2203.032 Steps 2 through 6. Copy of RHOBAL Shutdown margin, OP 2103.015 Worksheet 4, showing SDM not met.

SIMULATOR SETUP:

A Mode 3 IC will be set up for this JPM. Use CASE file JPM01.

The elements of this file are:

Trigger 5 = 2CV-4873-1a = 75%. 2CV-4873-1a (VCT Outlet) malfunction set to 75%;

Then overrides 2HS-4873-2 are set to false and 2HS-4873-3 set to false to turn lights off.

This case file will simulate the VCT Outlet valve tripping its output breaker due to a motor fault as it tries to shut.

JOB PERFORMANCE MEASURE

INITIATING CUE:

The SM/CRS directs, "Review SDM calculation, OP 2103.015 worksheet 4 and perform actions as required."

CRITICAL ELEMENTS (C): 1, 5, 6

PERFORMANCE CHECKLIST			STANDARD	(Circle One)
(C)	1.	Review SDM calculation and recognize SDM is not met for current conditions.	Recognize that SDM is not met and that emergency boration is required.	N/A SAT UNSAT
EXAMINERS NOTE: **Examinee may review the instruction section of OP 2103.015 and then ask what method of emergency boration the CRS/SM recommends.** **EXAMINERS CUE:** **When asked which method of Emergency boration is recommended, give the following CUE:** **"Borate using the BAM Tank Gravity Feed valves per AOP 2203.032 starting with step 2."**				
	2.	Verify at least one Charging Pump (CCP) running with flow greater than 40 GPM. POSITIVE CUE: Red light(s) ON. Flow is greater than 40 gpm.	On Panel 2C09, verified CCP(s) running. Observed red light ON; green light OFF above at least one of the following handswitch(es): 2HS-4832-1, "A" CCP 2HS-4852-1, "C" CCP (red) 2HS-4853-2, "C" CCP (green) 2HS-4842-2, "B" CCP Observed flow greater than 40 gpm on Charging Header Flow (2FIS-4863).	N/A SAT UNSAT
	3.	Align Boric Acid Supply To CCP Suction. POSITIVE CUE: Red light(s) ON. NEGATIVE CUE: Green light(s) ON.	On Panel 2C09, opened BAMT Gravity Feed Valves 2CV-4920-1 and/or 2CV-4921-1 Observed red light ON and green light OFF above handswitch(es): • 2HS-4920-1 for 2CV-4920-1 • 2HS-4921-1 for 2CV-4921-1	N/A SAT UNSAT
EXAMINER'S NOTE: **In the following step the VCT Outlet Valve will NOT close requiring an alternate success path.**				

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARD	(Circle One)
	4.	Close Volume Control Tank (VCT) Outlet Valve (2CV-4873-1). POSITIVE CUE: Green light OFF. Red light OFF. NEGATIVE CUE: Red light ON.	On Panel 2C09, observed that 2CV-4873-1 did NOT go closed. Observed green light OFF; red light OFF above VCT Outlet Valve handswitch (2HS-4873-1).	N/A SAT UNSAT
(C)	5.	Start at least ONE BAM Pump. POSITIVE CUE: Red light ON. NEGATIVE CUE: Green light ON.	On Panel 2C09, start 2P39A **and/or** 2P39B. Observed RED light ON above the BAM pump started, 2HS-4919-2 (2P39A) or 2HS-4910-2 (2P39B).	N/A SAT UNSAT
(C)	6.	Open Emergency Borate From BAM Pumps Valve (2CV-4916-2). POSITIVE CUE: Red light ON. NEGATIVE CUE: Green light ON.	On Panel 2C09, opened 2CV-4916-2. Observed red light ON; green light OFF above Emergency Borate Valve, 2CV-4916-2.	N/A SAT UNSAT
	7.	Verify Boric Acid Makeup Flow Control Valve (2CV-4926) closed. POSITIVE CUE: Green light ON. NEGATIVE CUE: Red light ON.	On Panel 2C09, verified 2CV-4926 closed. Observed green light ON; red light OFF above Boric Acid Makeup Flow Controller (2FIC-4926).	N/A SAT UNSAT
	8.	Check Reactor Makeup Water Flow Control Valve (2CV-4927) or VCT Makeup Isol valve (2CV-4941) closed. POSITIVE CUE: Green light ON. NEGATIVE CUE: Red light ON.	On Panel 2C09, verified 2CV-4927 or 2CV-4941 closed. Observed green light ON; red light OFF above Reactor Makeup Water Flow Controller (2FIC-4927) or above 2CV-4941 handswitch.	N/A SAT UNSAT
	9.	Check Charging Header Flow (2FIS-4863) greater than 40 gpm. POSITIVE CUE: Flow is: 44 gpm (1 CCP) 88 gpm (2 CCP) 132 gpm (3 CCP)	On Panel 2C09 (upright portion), observed flow greater than 40 gpm on Charging Header Flow indicator (2FIS-4863).	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST	STANDARD	(Circle One)
END		

JOB PERFORMANCE MEASURE

EXAMINEE COPY

JPM INITIAL TASK CONDITIONS:

Mode 3. A Shutdown Margin is calculated following a reactor trip.

INITIATING CUE:

The SM/CRS directs, "Review SDM calculation, OP 2103.015 worksheet 4 and perform actions as required."

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE

Steps with (*) are continuous action steps.

1. Refer to 1903.010, Emergency Action Level Classification.

2. Verify at least ONE Charging pump running with flow greater than 40 gpm.

2. Perform the following:

A. IF in Mode 1 or 2, THEN perform the following:

1) Trip Reactor.

2) **GO TO** 2202.001, Standard Post Trip Actions.

B. IF in Mode 3, 4, 5, or 6, THEN perform the following:

1) Verify TCBs open.

2) **GO TO** Step 8.

INSTRUCTIONS	CONTINGENCY ACTIONS

3. Align Charging pump suction to at least ONE of the following sources:

A. Gravity Feed:

1) Open at least ONE BAM Tank Gravity Feed valve:

- 2CV-4920-1
- 2CV-4921-1

B. Boric Acid Makeup:

1) Start at least ONE BAM pump.

2) Open Emergency Borate From BAM Pumps valve (2CV-4916-2).

3) Verify Boric Acid Makeup Flow Control valve (2CV-4926) closed.

C. RWT to Charging pumps:

1) Open Charging Pump Suction Source From RWT valve (2CV-4950-2).

4. Close VCT Outlet valve (2CV-4873-1).

4. IF VCT Outlet valve does NOT close, THEN perform the following:

A. Start at least ONE BAM pump.

B. Open Emergency Borate From BAM Pumps valve (2CV-4916-2).

C. Verify Boric Acid Makeup Flow Control valve (2CV-4926) closed.

5. Check Reactor Makeup Water Flow Control valve (2CV-4927) closed.

5. IF 2CV-4927 NOT closed, THEN close VCT Make Up Isolation valve (2CV-4941-2).

INSTRUCTIONS	CONTINGENCY ACTIONS
6. Check Charging Header Flow indicator (2FIS-4863) greater than 40 gpm.	**6. GO TO Step 2.**
7. GO TO Step 15.	
8. Check RCS pressure less than 1265 psia.	**8. IF RCS pressure greater than 1265 psia, THEN reduce RCS pressure as follows:** A. Reset Low PZR Press Setpoints during pressure reduction. B. Commence RCS pressure reduction to less than 1265 psia as follows: 1) IF RCPs running, THEN use Normal PZR spray. 2) IF ALL RCPs stopped, THEN open PZR High Point Vent To Quench Tank valves: • 2SV-4636-1 • 2SV-4636-2 • 2SV-4669-1 C. Place ALL PZR Heaters in OFF. D. Maintain RCS MTS greater than 30°F.
9. Align ONE HPSI Train as follows: A. Verify RWT level greater than 7.5%. B. Verify associated RWT Outlet valve open: • 2CV-5630-1 • 2CV-5631-2 C. Start HPSI pump on recirc, refer to 2104.039, HPSI System Operation.	

1.0 PURPOSE

To provide a methodology for the calculation of critical configuration estimation and shutdown margin.

2.0 SCOPE

Procedure includes calculation methodology for determining critical Boron concentration, critical CEA position, shutdown margin (Modes 1, 2, 3, 4, 5 and 6), and Boron concentration required to maintain shutdown margin (Modes 3, 4, 5 and 6). The cycle specific data, curves and tables, needed to perform the calculations at any specified time during the cycle have been relocated to a Cycle specific Engineering Report (Plant Data Book).

Procedure satisfies Unit 2 Technical Specification surveillances 4.1.1.1.1.a, b, d & e and 4.1.1.2.a & b and ensures compliance with Limiting Condition for Operation 3.9.1.

3.0 DESCRIPTION

This procedure contains instructions and worksheets to perform reactivity balance calculations. Using the worksheets and cycle specific data provided in the current cycle’s Plant Data Book, operators can calculate estimated critical configurations, shutdown margin, and needed Boron additions and subtractions at power and during cool downs and heatups. Additional information to assist the operators during operation in Mode 1 is included.

4.0 REFERENCES

4.1 References Used In Procedure Preparation

- ANO-2 Tech Specs 3.1.1.1, 3.1.1.2, 3.1.3.6 and 3.9.1
- Plant Heat up (2102.002)
- Power Operation (2102.004)
- Plant Cool down (2102.010)
- Reactor Startup (2102.016)
- Soluble Poison Concentration Control (2103.004)
- CEDM Control System Operation (2105.009)
- Reactivity Anomaly Check Surveillance (2302.002)
- RHOBAL Updates for the Current Cycle of ANO-2
- ANO-2 Physics Data Book for the Current Cycle
- Core Operating Limits Report for the Current Cycle
- Reload Analysis Report for the Current Cycle
- CR-2-88-0355 items 3 and 5, Conservatism in SDM Calculations

4.2 References Used In Conjunction With This Procedure

- RHOBAL Updates for the Current Cycle of ANO-2
- ANO-2 Physics Data Book for the Current Cycle
- 1000.104, Condition Reporting and Corrective Actions
- 2102.002, Plant Heat up
- 2102.016, Reactor Startup
- 2302.002, Reactivity Anomaly Check Surveillance
- 2103.004, Soluble Poison Concentration Control
- ANO-2 Plant Data Book for the Current Cycle

4.3 NRC Commitments

- Step 5.7 and the projected block that can be checked on the worksheets of this procedure satisfy a commitment stated in 0CANO78012, Response to Inspection Report 80-10, Shutdown Margin Worksheet require specific notification to signify projected value, dated 7-29-80 (Commitment P11265).

5.0 LIMITS AND PRECAUTIONS

5.1 CEA worth figures A5A, A5B, A5C, B3, and Tables A5 and B3 of the Plant Data Book assume Groups and Banks other than those specified are fully withdrawn. Positions and associated worths for Groups 5 (figure/table A5), 6 and P are specified on the figures and tables.

5.2 The CEA group positions shall be maintained above the transient insertion limits of Technical Specification 3.1.3.6 during operation in modes 1 and 2. This ensures the shutdown margin required by Technical Specification 3.1.1.1 is maintained.

If the above requirement is not met, initiate and continue boration at $\geq$40 gpm of 2500 ppm boric acid solution or equivalent until the required shutdown margin is restored.

5.3 In modes 1, 2, 3, 4, and 5, a shutdown margin of -5.5%Δk/k (-6.0%Δk/k when <60 EFPD) or more negative shall be maintained at all times. If a calculation indicates that the appropriate margin is not in effect, measures should be initiated immediately to restore the margin by boration.

These shutdown margin requirements include a 0.5%Δk/k margin to allow for error in the curves and operating data enclosed in this procedure. An additional 0.5%Δk/k conservatism is added to the shutdown margin requirements above until after startup tests have shown good agreement with predictions. This extra conservatism may be removed following completion of startup physics tests for a cycle.

5.4 While shutdown (in modes 3, 4, and 5) CEA Shutdown Groups A and B should be fully withdrawn at all times if possible. If it is not possible to have Shutdown Groups A and B withdrawn, at least one boron dilution monitor and alarm should be operable. (Reference Cycle 11 Reload Analysis Report, Section 7.1.1.1)

5.5 While at refueling shutdown (<l40°F with the vessel head unbolted or removed), the boron concentration shall be maintained at all times to ensure that Keff $\leq$0.95. To accomplish this, and account for uncertainty, Keff is required to be $\leq$0.941 when <60 EFPD or Keff $\leq$0.945 when $\geq$60 EFPD. Also verify that the RCS (and refueling canal boron) concentration is greater than or equal to 2500 ppm. The more restrictive of these conditions must be met and is referred to as the refueling boron concentration in Worksheets 5 and 6. If the more restrictive of the above conditions is not in effect (i.e. the refueling boron concentration), measures shall be initiated immediately to restore the boron concentration to the required value.

5.6 Use the conservative data supplied in Table B4 (CEA worth less the worth of the worst stuck rod pair) for an inoperable CEA. For the purposes of shutdown margin calculations a CEA is considered inoperable only when it is untrippable and not fully inserted.

5.7 If shutdown margin worksheets are employed to project shutdown margin for other modes (such as during heat ups or cool downs), the "PROJECTED" block should be checked at the top of the worksheet to preclude confusing such projected values with actual values. Typically Worksheet 5 is to be used for such projected shutdown margin. (Commitment P11265)

5.8 A computer program, RHOBAL, exists to perform the calculations of all Worksheets in this procedure. Contact Reactor Engineering if assistance is needed in performing these worksheets.

5.9 Figures C1 through C5 of the Plant Data Book include additional boron to account for Sm buildup to the equilibrium Sm value at the beginning of a cycle.

5.10 When using Worksheets 4, 5, 6 and 8, and a CEA has been declared inoperable per TS, it is only necessary to assume that it is inoperable under the scope of these worksheets if it is untrippable and not fully inserted.

6.0 SETPOINTS

None

7.0 INSTRUCTIONS

7.1 General

7.1.1 The equation used for calculating a reactivity balance is:

$\rho(net) = \rho(fuel) + \rho(boron) + \rho(CEAs) + \rho(temp) + \rho(power) + \rho(xenon) + \rho(Net\ Sm)$

where it is understood that the values for ρ above are added algebraically (i.e. poisons are negative values).

7.1.2 When ρ(samarium) is called for in this procedure, the net samarium worth as defined by RHOBAL is the samarium worth which should be used.

7.1.3 The xenon reactivity worth is obtained from the RHOBAL computer program, which is accessible on the personal computers in the control room.

7.1.4 The samarium reactivity worth can be obtained from the RHOBAL computer program, which is accessible on the personal computers in the control room.

7.1.5 When running a Rhobal power history, power must be stable for a minimum of 72 hrs and burn up must be >30 EFPD prior to using the Equilibrium Concentrations initialization option. Otherwise, for > 30 EFPD, the power history must begin from the last time equilibrium conditions existed and the transient must be modeled in the program. For < 30 EFPD, the BOC conditions initialization option must be used and the entire power history from BOC must be modeled. As an alternative, the input concentrations option may be used and the concentrations from a previous power history starting from the above conditions would be the input.

7.1.6 Shutdown margin is the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming all control element assemblies are fully inserted except for the single assembly of highest reactivity worth which is assumed to be fully withdrawn.

7.1.7 Keff is defined as $100/(100-\rho)$ where ρ is a negative reactivity value when shutdown, in units of $\%\Delta k/k$.

7.1.8 When using values from figures or tables, either interpolate values between curves or data points, calculate the values if equations are provided, or use RHOBAL to determine the values.

7.1.9 Where worksheets call for a value from a figure, the table used to calculate the figure can be used to provide a more accurate value.

7.1.10 Select the appropriate worksheet from Step 7.2 or obtain the equivalent output from RHOBAL. Follow the instructions as given on the worksheet. Contact Reactor Engineering for assistance with reactivity problems which the Operations staff cannot expeditiously resolve.

JOB PERFORMANCE MEASURE

UNIT: **2** REV #: **000** DATE: _____

SYSTEM/DUTY AREA: **A. C. Electrical Distribution**

TASK: **Perform Synchronized Cross Connect of 480 VAC load-centers 2B1 and 2B2**

JTA#: **ANO2-RO-480VAC-NORM-15**

KA VALUE RO: **3.3** SRO: **3.1** KA REFERENCE: **062 A4.01**

APPROVED FOR ADMINISTRATION TO: RO: **X** SRO: **X**

TASK LOCATION: INSIDE CR: **X** OUTSIDE CR: _____ BOTH: _____

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: _____ SIMULATOR: **Perform** LAB: _____

POSITION EVALUATED: RO: _____ SRO: _____

ACTUAL TESTING ENVIRONMENT: SIMULATOR: _____ PLANT SITE: _____ LAB: _____

TESTING METHOD: SIMULATE: _____ PERFORM: _____

APPROXIMATE COMPLETION TIME IN MINUTES: **10 Minutes**

REFERENCE (S): **OP 2107.001**

EXAMINEE'S NAME: _____ SSN: _____

EVALUATOR'S NAME: _____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: _____ UNSATISFACTORY: _____

PERFORMANCE CHECKLIST COMMENTS:

_____

_____

Start Time _____ Stop Time _____ Total Time _____

SIGNED: _____ DATE: _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

JOB PERFORMANCE MEASURE

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS:

Non-Vital 4160VAC busses energized. 2B1 and 2B2 are energized.

TASK STANDARD:

Cross connect 480VAC non-vital busses 2B1 and 2B2 with 2B1 supplying and 2B2 feeder breaker open. Maintain 2B1 amperage less than 130 amps.

TASK PERFORMANCE AIDS:

OP 2107.001 Section 12.0.

SIMULATOR SETUP:

Any power level or mode.
All Non-Vital 4160VAC and 480VAC Busses energized.
Summed 2B1 and 2B2 bus currents are greater than 130 amps (REMOTE malfunctions 480CURR2B1 And 480CURR2B2).

JOB PERFORMANCE MEASURE

INITIATING CUE:

The SM/CRS directs, "Cross Connect 2B1 and 2B2 and open 2B2 feeder breaker from 2A2 using OP 2107.001 section 12.0."

CRITICAL ELEMENTS (C): 2, 3, 4, 6, 8

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
Examiner's note: **If the initial plant conditions are in Mode 3, 4 or 5, then the first step is N/A.**				
	1.	Check that Operations Manager approval obtained. EXAMINER'S CUE: "The Operations Manager has given permission to perform Cross Connect of 2B1 and 2B2."	Ask if Operations Manager has given approval to cross connect 2B1 and 2B2 at power.	N/A SAT UNSAT
Examiner's note: **The following two steps may be completed after cross-connecting the busses. The resolution on the meters is low at the low end.**				
(C)	2.	Determine combined load of 2B1 an 2B2.	On Panel 2C10, summed the current reading of 2B1 and 2B2. Observed that the summed load is greater than 130 amps.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	3.	Reduce loads on 2B1 and 2B2 so that combined loading is less than 130 amps when cross connected. EXAMINERS CUE: "AO has been directed to secure non-essential loads on 2B1 and 2B2 to reduce loading on 2B1 and 2B2 to less than 130 amps." **EXAMINERS NOTE:** **Direct operator in simulator instructor's station to reduce loading on 2B1 and 2B2 so that loading is less than 130 amps (use REMOTE malfunctions 480CURR2B1 and 480CURR2B2).**	Direct the AO or inform CRS of need to reduce non-essential loads on 2B1 and 2B2 so that combined loading is less than 130 amps.	N/A SAT UNSAT
(C)	4.	Synchroscope switch inserted in 2B1/2B2 cross-tie slot and placed in ON.	On Panel 2C10, Placed Synchroscope switch into 2B1/2B2 cross-tie slot and rotated clockwise to the ON position.	N/A SAT UNSAT
	5.	Observed that the Synchroscope is at the 12 o'clock position.	On Panel 2C10, Observed that the Synchroscope is at the 12 o'clock position with the Synchroscope switch in the ON position.	N/A SAT UNSAT
(C)	6.	Close the 2B1/2B2 Cross Tie breaker.	On panel 2C10, rotate the Cross Tie handswitch for 2B1/2B2 clockwise. Observed that the Green light turns OFF and the Red light turns ON above the Cross Tie handswitch.	N/A SAT UNSAT
	7.	Verify that the amperage indicated on 2B1 is less than 130 amps.	On panel 2C10, observe that the current is less than 130 amps on 2B1.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	8.	Open normal supply breaker on 2B2. AND Open Transformer feeder breaker from 2A2 to 2B2.	On Panel 2C10, rotate the normal feeder supply breaker on 2B2 counter clockwise to the open position. Observed that the RED light went OFF and the GREEN light went ON. On Panel 2C10, rotate the transformer feeder breaker on 2A2 to 2B2 counter clockwise to the open position. Observed that the RED light went OFF and the GREEN light went ON.	N/A SAT UNSAT
	9.	Turn sync switch to OFF.	On Panel 2C10, turn sync switch counter clockwise to the OFF position.	N/A SAT UNSAT
	9.	Notified AO to monitor 2B1 transformer during cross connected operation and maintain temperature less than 220°C. EXAMINER'S CUE: "AO has been notified to monitor 2B1 transformer and notify the control room if temperature exceeds 220°C during cross connected operations."	Notify AO to monitor 2B1 transformer during cross connected operation and maintain temperature less than 220°C.	N/A SAT UNSAT
END				

JOB PERFORMANCE MEASURE

EXAMINEE'S COPY

JPM INITIAL TASK CONDITIONS:

Non-Vital 4160VAC busses are energized. 2B1 and 2B2 are energized.

INITIATING CUE:

The SM/CRS directs, "Cross Connect 2B1 and 2B2 and open 2B2 feeder breaker from 2A2 using OP 2107.001 section 12.0."

12. CROSS CONNECTING 480V NON-ESF BUSES

CAUTION

- Time dependent over current relays exist on all 480V Load Center feeder breakers. They are set at 1600 amps (equates to 185 amps on 4160V AC side). Bus load should not exceed 173 amps (including 7% tolerance).
- Transformer continuous amperage rating at 4160V is 139 amps. Continuous operation > 139 amps will eventually degrade transformer. (130 amp limit based on 7% instrument error)

12.1. IF in Modes 1 OR 2,
AND cross connecting for non-emergency conditions,
THEN obtain Operations Manager concurrence.

12.2. IF BOTH buses energized,
AND combined load > 130 amps,
THEN adjust load as necessary to achieve < 130 amps combined load.

12.3. IF cross connecting to energize a de-energized bus,
THEN strip all loads from de-energized Load Center.

12.4. Place Synchroscope switch for appropriate Cross Tie breaker to ON.

12.5. IF cross connecting energized buses,
THEN check synchroscope at 12 o'clock position.

12.6. Close selected Cross Tie breaker.

12.7. IF desired to separate 480V bus from 4160V AC bus,
THEN open the following breakers:

12.7.1. Normal Supply breaker on 480V bus.

12.7.2. Transformer Feeder breaker on 2A1 OR 2A2.

12.8. Verify < 130 amps on supplying transformer.

12.9. Turn Sync switch to OFF.

12.10. IF EITHER Load center has been stripped,
THEN energize loads as directed by S/M.

12.11. Monitor supplying transformer to ensure temperature remains < 220°C while buses are cross-connected.

12.12. Maintain < 130 amps on supplying transformer while buses are cross-connected.

JOB PERFORMANCE MEASURE

UNIT: **2** REV #: **001** DATE: _____

SYSTEM/DUTY AREA: **Safety Injection System**

TASK: **Perform a high pressure fill of a SIT (SIT "A") (Alternate Success Path)**

JTA#: **ANO2-RO-ECCS-NORM-2 (Perform filling SIT's (RCS pressure >1500psia))**

KA VALUE RO: **3.3** SRO: **3.7** KA REFERENCE: **006 A2.03**

APPROVED FOR ADMINISTRATION TO: RO: **X** SRO: **X**

TASK LOCATION: INSIDE CR: **X** OUTSIDE CR: _____ BOTH: _____

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: _____ SIMULATOR: **Perform** LAB: _____

POSITION EVALUATED: RO: _____ SRO: _____

ACTUAL TESTING ENVIRONMENT: SIMULATOR: _____ PLANT SITE: _____ LAB: _____

TESTING METHOD: SIMULATE: _____ PERFORM: _____

APPROXIMATE COMPLETION TIME IN MINUTES: **10 Minutes**

REFERENCE (S): **OP 2104.001**

EXAMINEE'S NAME: _____ SSN: _____

EVALUATOR'S NAME: _____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: _____ UNSATISFACTORY: _____

PERFORMANCE CHECKLIST COMMENTS:

_____

_____

Start Time _____ Stop Time _____ Total Time _____

SIGNED: _____ DATE: _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS:

HPSI Pump (2P89A) is running on minimum recirculation and "A" SIT (2T2A) header from "A" train has been flushed

TASK STANDARD:

Safety Injection Tank (2T2A) level has been raised ~ 0.3% and fill is secured.

This is an ALTERNATE SUCCESS PATH JPM.

TASK PERFORMANCE AIDS:

OP 2104.001 Section 8.0.

SIMULATOR SETUP:

Setup override to de-energize the red and green lights for 2CV-5015-1 when the handswitch is taken to the open position and have the valve open 1%. Safety Injection Tank (2T2A) pressure is <608 psig. Safety Injection Tank (2T2A) level ~ 82.5%.

HPSI Pump (2P89A) is running on minimum recirculation.

RCS Pressure is > 1500 psia.

Run CASE file JPM04. It will do the following:

Set T4=sitfill (triggered when 2HS5015-1 red light energized).

T4 Set 2CV5015_a = 0.1

T4 Set 2HS-5015-1_G = FALSE (green light off)

T4 Set 2HS-5015-2_R = FALSE (red light off)

JOB PERFORMANCE MEASURE

INITIATING CUE:

The SM/CRS directs, "Raise Safety Injection Tank (2T2A) level 0.3% using OP 2104.001, beginning with step 8.3."

CRITICAL ELEMENTS (C): **1, 2, 4, 5, 6**

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	1.	Open SIT (2T2A) Drain Valve (2SV-5001-1). POSITIVE CUE: Red light ON. NEGATIVE CUE: Green light ON.	On Panel 2C17, placed handswitch for 2SV-5001-1 to OPEN. Observed red light ON above handswitch.	N/A SAT UNSAT
(C)	2.	Open SIT (2T2A) Check Valve Bypass (2SV-5004). POSITIVE CUE: Red light ON. NEGATIVE CUE: Green light ON.	On Panel 2C33, placed handswitch for 2SV-5004 to OPEN. Observed red light ON above handswitch.	N/A SAT UNSAT
	3.	Monitor SIT level and pressure during fill.	While filling SIT A, monitored level to ensure level maintained < 87.9%. While filling SIT A, monitored SIT pressure closely to ensure pressure maintained < 624 psig.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	4.	Throttle open HPSI Header 1 Injection to RCP A Discharge (2CV-5015-1). POSITIVE CUE: Both lights ON. NEGATIVE CUE: Only green light ON.	On Panel 2C17, throttled 2CV-5015-1 OPEN by placing handswitch to OPEN momentarily as required to establish an SIT fill rate. Observed red and green lights ON above handswitch. Observed SIT (2T2A) control board level instrument(s): 2LIS-5008 (2C17) 2LI-5010 (2C17) 2LIS-5009 (2C16) OR Observed SIT (2T2A) level on PMS, or SPDS computer point/trend display.	N/A SAT UNSAT
(C)	5.	Attempts to close HPSI Header 1 Injection to RCP A Discharge valve prior to exceeding 87.9%. NEGATIVE CUE: Red light ON.	On Panel 2C17, placed handswitch for 2CV-5015-1 to CLOSE. Recognized that 2CV-5015-1 would NOT close and both red and green lights are deenergized.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	6.	Stop the level increase in 2T2A SIT. POSITIVE CUE: 2P-89A is secured OR Closed SIT A Drain Valve (2SV-5001-1). POSITIVE CUE: 2SV-5001-1 green light is ON red light is OFF. OR Closed SIT A Check Valve Bypass (2SV-5004). POSITIVE CUE: 2SV-5004 green light is ON red light is OFF.	On panel 2C17, placed handswitch for A HPSI Pump (2P-89A) in stop Observed 2P89A stopped. OR On Panel 2C17 placed handswitch for SIT A Drain Valve (2SV-5001-1) to CLOSED. Observed green light ON above handswitch. OR On Panel 2C33, placed handswitch for SIT A Check Valve Bypass (2SV-5004) to CLOSED. Observed green light ON above handswitch.	N/A SAT UNSAT
	7.	Inform CRS of failure of 2CV-5015-1 to close. POSITIVE CUE: Acknowledge communication as CRS. Direct Examinee to secure from filling A SIT.	Informed CRS that 2CV-5015-1 failed to close.	N/A SAT UNSAT
	8.	Close SIT (2T2A) Drain Valve. (if not closed previously.) POSITIVE CUE: Green light ON.	On Panel 2C17, placed handswitch for SIT A Drain Valve (2SV-5001-1) to CLOSE. Observed green light ON above handswitch.	N/A SAT UNSAT
	9.	Close SIT (2T2A) Check Valve Bypass. (if not closed previously.) POSITIVE CUE: Green light ON.	On Panel 2C33, placed handswitch for SIT A Check Valve Bypass (2SV-5004) to CLOSE. Observed green light ON above handswitch.	N/A SAT UNSAT
END				

JOB PERFORMANCE MEASURE

EXAMINEE'S COPY

JPM INITIAL TASK CONDITIONS:

HPSI pump (2P89A) is running on minimum recirculation and "A" SIT (2T2A) header from "A" train has been flushed.

INITIATING CUE:

The SM/CRS directs, "Raise Safety Injection Tank (2T2A) level 0.3% using OP 2104.001, beginning with step 8.3."

8.0 FILLING SITS (RCS PRESSURE ≥ 1500 PSIA

8.1 IF leakage is indicated past associated 2SI-15 check valve THEN GO TO Injection Header Flush and SIT Fill, Attachment C of this procedure to fill SIT(s).

8.2 Place HPSI pump (2P-89A/B/C) in service on minimum recirculation mode using applicable section of HPSI System Operation (2104.039).

NOTE

- Steps marked with an * are continuous action steps.
- SIT pressure will rapidly drop 2-5 psi when opening drain valve if SIT drain header has been depressurized.

*8.3 WHEN closing HPSI valves,
THEN maintain handswitch in close position for ~ 2 seconds after red light out.

*8.4 Closely monitor SIT parameters as SIT pressure will rise rapidly during fill operations.

8.5 IF filling A SIT,
THEN perform the following:

8.5.1 Verify open:

- SIT A Drain valve (2SV-5001-1)
- SIT A Check Valve Bypass (2SV-5004)

8.5.2 Throttle open selected HPSI Pump Injection MOV:

- HPSI Header 1 Injection to RCP A Discharge (2CV-5015-1)
- HPSI Header 2 Injection to RCP A Discharge (2CV-5016-2)

8.5.3 WHEN desired level reached,
THEN close the following:

A. HPSI valve opened in previous step

B. 2SV-5001-1

C. 2SV-5004

8.6 IF filling B SIT,
THEN perform the following:

8.6.1 Verify open:

- SIT B Drain valve (2SV-5021-1)
- SIT B Check Valve Bypass (2SV-5024)

8.6.2 Throttle open selected HPSI Pump Injection MOV:

- HPSI Header 1 Injection to RCP B Discharge (2CV-5035-1)
- HPSI Header 2 Injection to RCP B Discharge (2CV-5036-2)

8.6.3 WHEN desired level reached,
THEN close the following:

A. HPSI valve opened in previous step

B. 2SV-5021-1

C. 2SV-5024

8.7 IF filling C SIT,
THEN perform the following:

8.7.1 Verify open:

- SIT C Drain valve (2SV-5041-2)
- SIT C Check Valve Bypass (2SV-5044)

8.7.2 Throttle open selected HPSI Pump Injection MOV:

- HPSI Header 1 Injection to RCP C Discharge (2CV-5055-1)
- HPSI Header 2 Injection to RCP C Discharge (2CV-5056-2)

8.7.3 WHEN desired level reached,
THEN close the following:

A. HPSI valve opened in previous step

B. 2SV-5041-2

C. 2SV-5044

8.8 IF filling D SIT,
THEN perform the following:

8.8.1 Verify open:

- SIT D Drain valve (2SV-5061-2)
- SIT D Check Valve Bypass (2SV-5064)

8.8.2 Throttle open selected HPSI Pump Injection MOV:

- HPSI Header 1 Injection to RCP D Discharge (2CV-5075-1)
- HPSI Header 2 Injection to RCP D Discharge (2CV-5076-2)

8.8.3 WHEN desired level reached,
THEN close the following:

A. HPSI valve opened in previous step

B. 2SV-5061-2

C. 2SV-5064

8.9 WHEN all SIT filling operations are complete,
THEN secure HPSI pump using HPSI System Operation (2104.039).

JOB PERFORMANCE MEASURE

UNIT: 2 **REV #:** 6 **DATE:** **14 July 2003**

SYSTEM/DUTY AREA: **Abnormal/Emergency Operations**

TASK: **Secure Containment Spray (during recovery actions for SIAS)**

JTA#: **20265140101**

KA VALUE RO: **3.2** **SRO:** **3.7** **KA REFERENCE:** **026 020 A2.03**

APPROVED FOR ADMINISTRATION TO: **RO:** **X** **SRO:** **X**

TASK LOCATION: **INSIDE CR:** **X** **OUTSIDE CR:** **BOTH:**

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: **SIMULATOR:** **Perform** **LAB:**

POSITION EVALUATED: **RO:** ___ **SRO:** __

ACTUAL TESTING ENVIRONMENT: **SIMULATOR:** ____ **PLANT SITE:** ____ **LAB:**____

TESTING METHOD: **SIMULATE:** ___ **PERFORM:** ___

APPROXIMATE COMPLETION TIME IN MINUTES: **15 minutes**

REFERENCE (S): **EOP 2202.003**

EXAMINEE'S NAME: _____ **SSN:**_____ -_____ -_____

EVALUATOR'S NAME:_____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: **UNSATISFACTORY:**

PERFORMANCE CHECKLIST COMMENTS:

Start Time _____ **Stop Time**_____ **Total Time** _____

SIGNED_____ **DATE:** _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS: Post LOCA conditions exist. CSS termination criteria are satisfied.

EOP 2202.003 is completed through step 18.A.

TASK STANDARD: CSAS is reset and CSAS actuated components are secured.

TASK PERFORMANCE AIDS: EOP 2202.003 Section 1 - ENTRY Step 18

SIMULATOR SETUP: SIAS with containment spray actuated. Containment Temperature. < 140 ° F, Pressure < 22.5 psia, AND ALL CNTMT cooling fans running in emergency mode.

JOB PERFORMANCE MEASURE

INITIATING CUE:

The SS/CRS directs, "Reset CSAS and secure Containment Spray beginning with OP 2202.003 Section 1 - ENTRY step 18.B."

CRITICAL ELEMENTS (C): 1, 2, 3

PERFORMANCE CHECKLIST		**STANDARDS**	(Circle One)
EXAMINERS NOTE: The following step may be simulated for each of the other three trip paths.			
(C) 1.	Reset CSAS. POSITIVE CUE: All trip paths reset. Pretrip/trip indicators are reset. NEGATIVE CUE: One/all trip paths NOT reset.	On panel 2C23B, obtained key and placed it in trip path to be reset. Placed trip path to UNLK. Depressed CSAS pushbutton for trip path. Depressed CSAS lockout reset pushbutton. Reset pretrip/trip indicators after all CSAS trip paths are reset. OR On PPS inserts, reset pretrip/trip indicators after all CSAS trip paths are reset.	N/A SAT UNSAT
(C) 2.	Stop Containment Spray Pumps. POSITIVE CUE: Green lights ON. NEGATIVE CUE: Red light(s) ON.	On panels 2C16/17, Placed handswitches for Containment Spray Pumps (2P35A and 2P35B) in STOP. Observed green lights ON above handswitches.	N/A SAT UNSAT
(C) 3.	Close Containment Spray Header Isolation Valves. POSITIVE CUE: Green lights ON. NEGATIVE CUE: Red light(s) ON.	On panels 2C16/17, placed handswitches for Containment Spray Header Isolation valves (2CV-5612-1 and 2CV-5613-2) in CLOSE. Observed green lights ON above handswitches.	N/A SAT UNSAT
END			

JOB PERFORMANCE MEASURE

QUESTION 1: Reference: 026 000 K1.01 4.2/4.2

The "B" LPSI pump is running supplying shutdown cooling. Cntmt Spray Header Iso Valve (2CV-5612-1) is OPEN for testing. The CRS directs shifting shutdown cooling to the "A" LPSI pump through the "B" shutdown cooling heat exchanger. How will containment spray system components respond?

ANSWER: Reference: OP 2104.005 Rev. 33 PC-3

With no CSAS actuation, 2CV-5612-1 will close.

COMMENTS:

JOB PERFORMANCE MEASURE

QUESTION 2: Reference: 026 000 K4.02 3.1/3.6

While performing the 2P136A monthly test, the operator fails to close 2BS-11A. What affect will this have on completion of the monthly test?

ANSWER: Reference: OP 2104.005 Rev. 33 PC-3

NaOH Tank Outlet Valve (2CV-5657-1) will not open (from the control room) due to valve interlocks unless 2BS-11A is closed.

COMMENTS:

JOB PERFORMANCE MEASURE

EXAMINEE'S COPY

QUESTION 1:

The "B" LPSI pump is running supplying shutdown cooling. Cntmt Spray Header Iso Valve (2CV-5612-1) is OPEN for testing. The CRS directs shifting shutdown cooling to the "A" LPSI pump through the "B" shutdown cooling heat exchanger. How will containment spray system components respond?

JOB PERFORMANCE MEASURE

EXAMINEE'S COPY

QUESTION 2:

While performing the 2P136A monthly test, the operator fails to close 2BS-11A. What affect will this have on completion of the monthly test?

JOB PERFORMANCE MEASURE

JPM INITIAL TASK CONDITIONS:

Post LOCA conditions exist. CSS termination criteria are satisfied. EOP 2202.003 is completed through step 18.A.

INITIATING CUE:

The SS/CRS directs, "Reset CSAS and secure Containment Spray beginning with OP 2202.003 Section 1 - ENTRY step 18.B."

JOB PERFORMANCE MEASURE

SYSTEM/DUTY AREA: Abnormal/Emergency Operations

TASK: Restore SDC Flow following an instrument failure – inadvertent Auto-Closure Initiation (ACI)

JTA#: Respond to Loss of SDC, ANO2 RO EOPAOP OFF NORM 20355190401

KA VALUE RO: 3.5 **SRO:** 3.7 **KA REFERENCE:** 005 A2.02

APPROVED FOR ADMINISTRATION TO: RO: X **SRO:** X

TASK LOCATION: INSIDE CR: X **OUTSIDE CR:** _____ **BOTH:**

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: _____ **SIMULATOR:** Perform **LAB:**_____

POSITION EVALUATED: RO: _____ **SRO:** _____

ACTUAL TESTING ENVIRONMENT: SIMULATOR: _____ **PLANT SITE:** _____ **LAB:** _____

TESTING METHOD: SIMULATE: _____ **PERFORM:** _____

APPROXIMATE COMPLETION TIME IN MINUTES: 15 minutes

REFERENCE (S): EOP 2203.029

EXAMINEE'S NAME: _____ **SSN:** _____

EVALUATOR'S NAME: _____ **DATE** _____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: _____ **UNSATISFACTORY:** _____

PERFORMANCE CHECKLIST COMMENTS:

_____

_____

_____

_____

_____ **Start Time** _____ **Stop Time** _____ **Total Time**

SIGNED_____ **DATE:** _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS:

AOP 2203.029 has been entered due to 2PI-4623-2 failing "High". SDC pump secured, fuse for 2PS-4623-2 removed, and Loss of SDC AOP, 2203.029, completed up to step 13.C

TASK STANDARD: SDC restored per Loss of SDC AOP, 2203.029.

TASK PERFORMANCE AIDS: Loss of SDC AOP, 2203.029

SIMULATOR SETUP:

Mode 5, SDC aligned for the "A" LPSI Pump through the "A" SDC Heat Exchanger.
2P-60 A & B secured, All LPSI Injection MOVs are OPEN, and 2CV-5086-2 is CLOSED.
ACI actuation clear due to de-energizing 2PS-4623-2 by fuse removal.

JOB PERFORMANCE MEASURE

INITIATING CUE:

The SM/CRS directs, "The fuse has been removed for 2PI-4623-2, Restore Shutdown Cooling Flow I.A.W. AOP 2203.029 beginning with step 13.C."

CRITICAL ELEMENTS (C): 2, 5, 6, 8, 9

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	1.	Verify SDC RCS isolation valves open. **POSITIVE CUE:** Red lights ON; green lights OFF.	On panels 2C16 and 2C17, checked indications for: - 2CV-5038-1 - 2CV-5084-1 - 2CV-5086-2 Observed 2CV-5086-2 closed by green light ON, red light OFF above handswitch.	N/A SAT UNSAT
(C)	2.	Determine that 2CV-5086-2 is shut due to the Auto-Closure Initiation (ACI) and Open 2CV-5086-2. **POSITIVE CUE:** Red light ON; green light OFF	On panel 2C16, placed handswitch for 2CV-5086-2 to "OPEN". Observed red light ON; green light OFF above handswitch.	N/A SAT UNSAT
	4.	Check SDC pump running.	On 2C17, determined That no SDC pumps are running. Observed 2C-16 and 2C-17 that 2P-60 A & B were secured. Observed green light ON; red light OFF above handswitches.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	5.	Close ALL LPSI Injection MOVs. POSITIVE CUE: Green lights ON; red lights OFF.	On 2C16 & 17, placed handswitches for Safety Injection MOVs to "CLOSE". 2CV-5017-1 2CV-5037-1 2CV-5057-2 2CV-5077-2 Observed green light ON; red light OFF above Handswitch for all valves.	N/A SAT UNSAT
(C)	6.	B. Open ONE LPSI Injection MOV 10%.	On 2C-16 or 17, throttled open 1 LPSI Injection MOV 10%. 2CV-5017-1 2CV-5037-1 2CV-5057-2 2CV-5077-2 Operated 1 LPSI Injection MOV Handswitch until position indicator shows ~ 10%. Observed green and red light ON and position indicator at 10% above handswitch.	N/A SAT UNSAT
	7.	Verify RCS level adequate; refer to Attachment A, RCS Level.	Referred to Attachment "A" and verified RCS Level adequate for SDC Pump restart.	N/A SAT UNSAT
NOTE: If 2CV-5091 is not in Automatic, the candidate may have to transverse from 2C-16 & 17 back to 2C-04 multiple times to control flow. 2CV-5091 should be monitored to ensure that it has control of flow when placed in automatic.				
(C)	8.	D. Start SDC pump; refer to 2104.004, Shutdown Cooling System.	On 2C17 placed handswitch for 2P-60A to "START". Observed red light ON; green light OFF above handswitch.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	9.	Raise SDC flow to greater than 2400 gpm by opening LPSI Injection MOVs.	On 2C-16 & 17 placed hand-switches for Safety Injection MOVs to "OPEN) as necessary to achieve > 2400 gpm flow. 2FIC-5091 indicates > 2400 gpm.	N/A SAT UNSAT
	10.	Control RCS cool down rate within TS limits; refer to 2202.010, Standard Attachments, Attachment 8, RCS Cool down Table.	On 2C04 adjusted 2HIC-5093, SDC Temperature Controller as necessary.	N/A SAT UNSAT
END				

JOB PERFORMANCE MEASURE

EXAMINEE'S COPY

JPM INITIAL TASK CONDITIONS:

Loss of Shutdown Cooling AOP, 2203.029, has been entered due to 2PS-4623-2 failing "High". The resulting ACI caused 2CV-5086-2 to close. The "A" SDC pump was secured and AOP completed up to step 13.C.

INITIATING CUE:

The SM/CRS directs, "The fuse has been removed for 2PI-4623-2, Restore Shutdown Cooling Flow I.A.W. AOP 2203.029 beginning with step 13.C."

JPM- ANO-2-JPM-RO-EFW

JOB PERFORMANCE MEASURE

UNIT: 2 **REV #:** 7 **DATE:** 14 July 2003

SYSTEM/DUTY AREA: Heat removal from core, EFW system
TASK: Local/manual start of Turbine driven EFW pump
JTA#: 20015130101
KA VALUE **RO:** 3.5 **SRO:** 3.9 **KA REFERENCE:** 001 A4.10

APPROVED FOR ADMINISTRATION TO: RO: X **SRO:** X

TASK LOCATION: INSIDE CR: X **OUTSIDE CR:** **BOTH:**

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):
PLANT SITE: **SIMULATOR:** Perform **Perform LAB:**

POSITION EVALUATED: **RO:** **SRO:**

ACTUAL TESTING ENVIRONMENT: **SIMULATOR:** **PLANT SITE:** **LAB:**

TESTING METHOD: SIMULATE: **PERFORM:**

APPROXIMATE COMPLETION TIME IN MINUTES: 20 minutes

REFERENCE (S): Procedure **2106.006 EMERGENCY FEEDWATER SYSTEM OPERATIONS**

EXAMINEE'S NAME: _____ **SSN:** _____ - _____ -_____.

EVALUATOR'S NAME: _____.

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: **UNSATISFACTORY:**

PERFORMANCE CHECKLIST COMMENTS:

Start Time: _____ **Stop Time:** _____ **Total Time:** _____.

SIGNED_____ **DATE:** _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

Initial Conditions: The plant has suffered a loss of all feed water. It is necessary to perform a local start of the EFW pump to restore feed water flow to the Steam generators.

JOB PERFORMANCE MEASURE
INITIATING CUE:
The SS/CRS directs, "Perform a local manual startup of 2P-7A EFW pump using Procedure 2106.006. Attachments A and C of Procedure 2106.006 have been completed"

CRITICAL ELEMENTS (C): 1e,1f, 5, 6, 10, 12

7.1 Align system using Attachment A and Attachment C of this procedure.

		PERFORMANCE CHECKLIST	STANDARDS	(Circle One)
1.		Verify 2P-7A aligned using Section 7.0 of this procedure	Performs checks IAW section 7.0 (steps a through I)	
	a.	Verify Condensate Suction valve 2CV-0795-2 open	Condensate Suction valve 2CV-0795-2 open	N/A SAT UNSAT
	b.	Verify EFW Discharge valve 2CV-1037-1 open	EFW Discharge valve 2CV-1037-1 open	N/A SAT UNSAT
	c.	Verify Service Water Suction valve 2CV-0711-2 closed	Service Water Suction valve 2CV-0711-2 closed	N/A SAT UNSAT
	d.	Verify EFW Discharge valve 2CV-1026-2 closed	EFW Discharge valve 2CV-1026-2 closed	N/A SAT UNSAT
	e. (C)	Verify 2P-7A Speed controller (2HIC-0336-2) set at 100%.	2P-7A Speed controller (2HIC-0336-2) set at 100%.	N/A SAT UNSAT
	f. (C)	Verify EFW pump (2P-7A AND 2P-7B) bearing oil levels within 1/4 inch of line on Oil Level indicating plate.	EFW pump (2P-7A AND 2P-7B) bearing oil levels within 1/4 inch of line on Oil Level indicating plate.	N/A SAT UNSAT
	g.	Check EFW pump Turbine (2K-3) inboard bearing oil level between low and high marks on 2LI-0315.	EFW pump Turbine (2K-3) inboard bearing oil level between low and high marks on 2LI-0315.	N/A SAT UNSAT
	h.	Check 2P-7B motor oil $\geq$ 1/4 full in bulls-eye sight glass. (pump is operable with any oil in sightglass).	2P-7B motor oil $\geq$ 1/4 full in bulls-eye sight glass.	N/A SAT UNSAT
	i.	IF oil is needed for 2K-3 or 2P-7B motor, THEN submit MAI	Examinee states that MAI is not needed.	N/A SAT UNSAT
This completes the system alignment				
2.		Notify Chemistry to perform the following: • Take required EFW samples. (CR-ANO-2-1999-0324) • Sample Main Steam as needed to accommodate effluent release calculations. (CR-ANO-2-1999-0324	Chemistry notified.	N/A SAT UNSAT

3.	3 IF plant power < 10%, AND use of SU/BD DI Cond Return Header as suction source desired, AND FW Htr 2E7A Cond Inlet Temp (T0606) is ≤ 140°F, THEN verify open EFW Suction (2EFW-0706).	Checks plant power and contacts control to determine if use of SU/BD DI Cond Return Header as suction source desired. Cue: Use of use of SU/BD DI Cond Return Header as suction source is not desired.	N/A SAT UNSAT
4.	IF in Mode 1, 2 or 3, THEN enter Tech Spec 3.7.1.2.		N/A SAT UNSAT
5. (C)	Close 2P-7A Trip Throttle valve.	2P-7A Trip Throttle valve closed	N/A SAT UNSAT
6. (C)	Open Steam Supply valve (2CV-0340-2).	Steam Supply valve (2CV-0340-2) opened.	N/A SAT UNSAT
7.	Record time 2CV-0340-2 opened in Control Room log.	Time 2CV-0340-2 opened recorded in Control Room log	N/A SAT UNSAT
8.	Check Turbine Bearing Cooling Water Supply valve (2SV-0317-2) opens	Turbine Bearing Cooling Water Supply valve (2SV-0317-2) checked open.	N/A SAT UNSAT
9.	Slowly open 2P-7A Trip Throttle valve to obtain desired RPM or discharge pressure.	2P-7A Trip Throttle valve opened. Desired RPM or discharge pressure obtained.	N/A SAT UNSAT
CAUTION 2P-7A will trip on over speed between 4420 and 4520 RPM. Examiner: Venting of the control oil system is desired, examinee should perform the following:			
10. (C)	Adjust 2P-7A Speed controller (2HIC-0336-2) to 50%.	2P-7A Speed controller (2HIC-0336-2) adjusted to 50%.	N/A SAT UNSAT
11.	Throttle closed 2P-7A Trip Throttle valve until governor valve is fully extended (full open)	2P-7A Trip Throttle valve throttled closed until governor valve is fully extended (full open)	N/A SAT UNSAT
12. (C)	Slowly open Trip Throttle valve until governor valve fully retracts	Trip Throttle valve opened slowly until governor valve is fully retracted	N/A SAT UNSAT
13.	Repeat above steps as desired to fully vent control oil system	Repeat above as necessary until system properly vented.	N/A SAT UNSAT
14.	WHEN venting operations are complete, THEN return 2HIC-0336-2 to 100% while maintaining desired RPM or discharge pressure using Trip Throttle valve.	2HIC-0336-2 returned to 100% with desired RPM or discharge pressure maintained using Trip Throttle valve.	N/A SAT UNSAT
15.	JPM completed		

TS 3.7.1.2

EMERGENCY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 Two emergency feed water pumps and associated flow paths shall be OPERABLE with:
a. One motor driven pump capable of being powered from an OPERABLE emergency bus, and
b. One turbine driven pump capable of being powered from an OPERABLE steam supply system.
APPLICABILITY: MODES 1, 2, and 3
ACTION:
With one emergency feed water pump inoperable, restore the inoperable pump to OPERABLE status within 72 hours or be in HOT SHUTDOWN within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.7.1.2 Each emergency feed water pump shall be demonstrated OPERABLE:
a. At least once per 31 days by:
1. Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.
b. In accordance with the Inservice Testing Program by:
1. Verifying the developed head of each EFW pump at the flow test point is greater than or equal to the required developed head.
This surveillance requirement is not required to be performed for the turbine driven EFW pump until 24 hours after exceeding 700 psia in the steam generators.
c. At least once per 18 months by:
1. Verifying that each automatic valve in the flow path actuates to its correct position on MSIS or EFAS test signals.
2. Verifying that the motor driven pump starts automatically upon receipt of an EFAS test signal.
3. Verifying that the turbine driven pump steam supply MOV opens automatically upon receipt of an EFAS test signal.
d. By verifying proper alignment of the required EFW flow paths by verifying flow from the condensate storage tank to each steam generator. This SR is required to be verified prior to entering MODE 2 whenever plant has been in MODES 4, 5, 6, or defueled for > 30 days.

JOB PERFORMANCE MEASURE

UNIT: 2 **REV #:** 4 **DATE:** .

SYSTEM/DUTY AREA: Abnormal/Emergency Operations

TASK: Restore component cooling water to reactor coolant pumps (Alternate Success Path)

JTA#: 20085180401

KA VALUE RO: 3.3 SRO: 3.1 KA REFERENCE: 008 A4.01

APPROVED FOR ADMINISTRATION TO: RO: X SRO: X

TASK LOCATION: INSIDE CR: X OUTSIDE CR: BOTH:

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: SIMULATOR: Perform LAB: .

POSITION EVALUATED: RO: SRO: .

ACTUAL TESTING ENVIRONMENT: SIMULATOR: PLANT SITE: LAB: .

TESTING METHOD: SIMULATE: PERFORM: .

APPROXIMATE COMPLETION TIME IN MINUTES: 15 minutes

REFERENCE(S): EOP 2202.010

EXAMINEE'S NAME: SSN: - - .

EVALUATOR'S NAME: .

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: UNSATISFACTORY: .

PERFORMANCE CHECKLIST COMMENTS:

.

.

Start Time **Stop Time** **Total Time**

SIGNED **DATE:**

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS: 2A1, 2A2, are re-energized from SU#2 following a degraded power situation. 2202.010 ATT. 29 steps up to 1.n have been completed. Power to CCW pumps has been restored.

TASK STANDARD: Controlled bled off isolated to VCT and CBO relief valve isolated.

TASK PERFORMANCE AIDS: EOP 2202.010 Attachment 21

SIMULATOR INITIAL CONDITIONS: Set up CCW valves per EOP 2202.010 Attachment 29 "STARTUP XFM# 2 USAGE" perform actions through step 1.n. Close RCP CCW RETURN valve, 2CV-5255-1, 2CV-5254-2 and 2CV-5236-1. NO SIAS actuation.

Run case file JPM07 This will do the following:

Set T4 = ccwrcp (this will trigger T4 when 2CV 5255 red light is energized).

When 2CV 5255-1 is taken to open position, it will trip the breaker

T4=2HS-5255-1 R false (override)

T4=2HS-5255-1 G false (override)

T4=2CV5255-1 a = 0.0% (component malfunction)

JOB PERFORMANCE MEASURE

INITIATING CUE:

The SM/CRS directs, "Restore CCW to the RCP's using EOP 2202.010 Attachment 21."

CRITICAL ELEMENTS (C): 3, 4, 5 , 6, 7, 11, 12

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	1.	Verify RCP bleedoff to VCT valves open. POSITIVE CUE: For 2CV-4846-1 red light ON and For 2CV-4847-2 red light ON.	On panel 2C16 verified 2CV-4847-2 red light on; control switch in OPEN. On panel 2C17, verified 2CV-4846-1 red light on; control switch in OPEN.	N/A SAT UNSAT
	2.	Verify RCP Bleedoff Relief Isolation to Quench Tank open. POSITIVE CUE: For 2CV-4856 red light ON	On panel 2C09, verified 2CV-4856 red light on; keyswitch in LOCKED OPEN.	N/A SAT UNSAT
(C)	3.	Determine RCP Seal temperature and status of Loop II CCW pump. POSITIVE CUE: RCP seal temperatures are > 180°F and one CCW pump is running on Loop II.	On panel 2C14 or on PMS computer, determined RCP seal temperatures. On 2C14, observed running indication for one Loop II CCW pump and Loop II flow.	N/A SAT UNSAT
(C)	4.	Verify RCP CCW Return valve (2CV-5255-1) CLOSED. POSITIVE CUE: Green light ON.	On panel 2C17, verified 2CV-5255-1 closed. Observed green light ON; red light OFF above handswitch.	N/A SAT UNSAT
(C)	5.	Open RCP CCW Supply valve (2CV-5236-1). POSITIVE CUE: Red light ON.	On panel 2C17, placed handswitch for 2CV-5236-1 in “OPEN”. Observed green light OFF; red light ON.	N/A SAT UNSAT
(C)	6.	Open RCP CCW Return valve (2CV-5254-2). POSITIVE CUE: Red light ON.	On panel 2C16, placed handswitch for 2CV-5254-2 in "OPEN". Observed green light OFF; red light ON.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

EXAMINER'S NOTE: When 2CV-5255-1 is taken to OPEN, the breaker will trip and cannot be reset. The valve will be stuck closed.				
(C)	7.	Modulate RCP CCW Return valve (2CV-5255-1) OPEN. POSITIVE CUES: Red and green lights OFF. If WCO sent to the valve; 2CV-5255-1 cannot be opened. If AO sent to the breaker, 2B53-G4; the breaker for 2CV-5255-1 cannot be reset.	On panel 2C17, took handswitch for 2CV-5255-1 to "OPEN" for one (1) second then released. Observed red and green lights OFF. EXAMINEE may ask to dispatch a NLO to the valve and or breaker.	N/A SAT UNSAT
EXAMINER'S NOTE: The examinee may elect to monitor RCP seal cooldown before making the decision that CCW cannot be restored. This monitoring of RCP seal cooldown may take 10 minutes to validate that 2CV-5255-1 did not open. The examinee should go to step 4 of Attachment 21.				
	8.	Verify ALL RCP's secured. POSITIVE CUE: Green light ON and Red light OFF for 2P32 A, B, C, D.	On panel 2C04, observed 2P32A, B, C, and D RCP handswitches in STOP or PTL. Observed handswitch is green flagged; green light ON and red light OFF.	N/A SAT UNSAT
	9.	Close 2CV-5254-2. POSITIVE CUE: Green light ON.	On panel 2C16, placed handswitch for 2CV-5254-2 to "CLOSE" Observed green light ON; red light OFF.	N/A SAT UNSAT
	10.	Close 2CV-5236-1. POSITIVE CUE: Green light ON.	On panel 2C17, placed handswitch for 2CV-5236-1 to "CLOSE" Observed green light ON; red light OFF.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

(C)	11.	Close RCP bleedoff to VCT valves. POSITIVE CUE: For 2CV-4846-1 green light ON and For 2CV-4847-2 green light ON.	On panel 2C17, placed handswitch for 2CV-4846-1 to "CLOSE." On panel 2C16, placed handswitch for 2CV-4847-2 to "CLOSE." For each valve, observed green light ON; red light OFF.	N/A SAT UNSAT
(C)	12.	Close RCP bleedoff relief isolation to quench tank valve (2CV-4856). POSITIVE CUE: Green light ON.	On panel 2C09, placed handswitch for 2CV-4856 to "CLOSE" Observed green light ON; red light OFF.	N/A SAT UNSAT
END				

EXAMINEE'S COPY

JPM INITIAL TASK CONDITIONS:

2A1, 2A2, are re-energized from SU#2 following a degraded power situation.
2202.010 ATT. 29 steps up to 1.n have been completed.
Power to CCW pumps has been restored.

INITIATING CUE:

The SM/CRS directs, "Restore CCW to the RCP's using EOP 2202.010 Attachment 21."

2 REV #: **000** DATE: _____

SYSTEM/DUTY AREA: **AC Electrical Distribution**

TASK: **Perform A Startup Of 2Y2224, Swing Inverter For 2RS4 (Alternate Success Path)**

JTA#: **ANO2AO120ACNORM5**

KA VALUE RO: **3.4** SRO: **3.9** KA REFERENCE: **062 A2.01**

APPROVED FOR ADMINISTRATION TO: RO: **X** SRO: **X**

TASK LOCATION: INSIDE CR: _____ OUTSIDE CR: **X** BOTH: _____

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: **Simulate** SIMULATOR: _____ LAB: _____

POSITION EVALUATED: RO: _____ SRO: _____

ACTUAL TESTING ENVIRONMENT: SIMULATOR: _____ PLANT SITE: _____ LAB: _____

TESTING METHOD: SIMULATE: _____ PERFORM: _____

APPROXIMATE COMPLETION TIME IN MINUTES: **20 Minutes**

REFERENCE (S): **2107.003 and 2107.001 supplement 4.**

EXAMINEE'S NAME: _____ SSN: _____

EVALUATOR'S NAME: _____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: _____ UNSATISFACTORY: _____

PERFORMANCE CHECKLIST COMMENTS:

_____

_____

Start Time _____ Stop Time _____ Total Time _____

SIGNED: _____ DATE: _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS:

The following conditions exist:

1. Unit is in Mode 1.

2. 2Y2224 is shut down.

3. 2RS4 is being supplied by Inverter 2Y24 Normal Source.

TASK STANDARD:

1. 2Y2224 Alternate Source is supplying 120VAC Vital Bus 2RS4 in accordance with OP 2107.003, Attachment J, Section 1.

2. Procedure was halted when examinee was prompted of the Low Inverter Voltage Alarm.

3. Examinee did not place 2Y2224 on normal source with low inverter voltage.

TASK PERFORMANCE AIDS:

2107.003 Attachment J, Section 1

2107.001 Supplement 4, Table 11

SIMULATOR SETUP:

NONE

INITIATING CUE:

The SM/CRS directs you to, "Place 2Y2224 in service with the inverter supplying 2RS4 and shutdown 2Y24 using 2107.003, Attachment J Section 1 and 2107.001 Supp. 4 Table 11."

CRITICAL ELEMENTS (C): 9, 12, 13, 20, 27, 30, 31

START TIME: _____

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	1.	Verify Battery INPUT breaker (B1) OPEN POSITIVE CUE: B1 handle is in the DOWN position	At 2Y2224, verified B1 OPEN Observed B1 handle in the DOWN position	N/A SAT UNSAT
	2.	Verify INVERTER OUTPUT BREAKER (B2) OPEN POSITIVE CUE: B2 handle is in the DOWN position	At 2Y2224, verified B2 OPEN. Observing B2 handle in the DOWN position	N/A SAT UNSAT
	3.	Verify ALTERNATE SOURCE INPUT breaker (B800) OPEN POSITIVE CUE: B800 handle is in the DOWN position	At 2Y2224, verified B800 OPEN Observed B800 handle in the DOWN position	N/A SAT UNSAT
	4.	Verify MANUAL BYPASS SWITCH (2HS9601) in ALTERNATE SOURCE POSITION POSITIVE CUE: MANUAL BYPASS SWITCH (2HS9601) in ALTERNATE SOURCE POSITION	At 2Y2224, observed MANUAL BYPASS SWITCH (2HS9601) in ALTERNATE SOURCE POSITION	N/A SAT UNSAT

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	5.	Verify Manual OUTPUT TRANSFER SWITCH (2HS-9504) at top of panel in 2Y2224 to 2RS4 position. POSITIVE CUE: Manual OUTPUT TRANSFER SWITCH (2HS-9504) at top of panel is in 2Y2224 to 2RS4 position.	At 2Y2224, verified Manual OUTPUT TRANSFER SWITCH (2HS-9504) at top of panel in 2Y2224 to 2RS4 position.	N/A SAT UNSAT
	6.	Check 2Y2224 To 2RS4 light on. POSITIVE CUE: 2Y2224 To 2RS4 light on	At 2Y2224, observed 2Y2224 To 2RS4 light on	N/A SAT UNSAT
	7.	Check 2D12 battery bank connected to 2D02 bus. POSITIVE CUE: The 2D12 NOT AVAILABLE alarm is not in.	Called the Control Room to verify the 2D12 NOT AVAILABLE alarm is not in.	N/A SAT UNSAT
	8.	Check the in-service battery charger (2D32A/2D32B) on float. POSITIVE CUE: 1. The float lamp for the in-service battery charger is lit. OR The in-service battery charger DC voltage is ~130 VDC. 2. Battery charger has been on float for 72 hours.	Checked the float lamp illuminated for the in-service battery charger. OR Checked the in-service battery charger DC voltage ~130 VDC. AND Contacted the Control room to verify that battery changer has been on float for greater than 24 hours.	N/A SAT UNSAT

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	9.	Close Battery INPUT breaker (B1) POSITIVE CUE: Battery Input breaker (B1) is in the UP position.	At 2Y2224, closed B1 by moving its handle in UP direction Observed B1 operating handle remained in the UP position	N/A SAT UNSAT
	10.	Check 2Y2224 125 VDC INVERTER INPUT (V1) reading ~125 VDC POSITIVE CUE: 2Y2224 125 VDC INVERTER INPUT (V1) reading ~125 VDC	At 2Y2224 checked 2Y2224 125 VDC INVERTER INPUT (V1) reading ~125 VDC	N/A SAT UNSAT
Instructor Note: **Procedure step 1.2.11 will be NA due to voltage being indicated in step 1.2.10.**				
	11.	Wait 60 seconds POSITIVE CUE: 60 seconds has elapsed	At 2Y2224, verified 60 seconds elapsed	N/A SAT UNSAT
(C)	12.	Close 2Y2224 INVERTER OUTPUT breaker (B2) POSITIVE CUE: 2Y2224 INVERTER OUTPUT breaker (B2) handle is in the UP position.	At 2Y2224, closed 2Y2224 INVERTER OUTPUT breaker (B2) by raising its handle in UP direction	N/A SAT UNSAT
(C)	13.	Close 2Y2224 ALTERNATE SOURCE INPUT breaker (B800) POSITIVE CUE: 2Y2224 ALTERNATE SOURCE INPUT breaker (B800) handle is in the UP position	At 2Y2224, closed 2Y2224 ALTERNATE SOURCE INPUT breaker (B800) by raising its handle in the UP direction	N/A SAT UNSAT

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	14.	Check 2Y2224 120 VAC ALTERNATE SOURCE Volt Meter (V3) reading ~120 VAC. POSITIVE CUE: 2Y2224 120 VAC ALTERNATE SOURCE Volt Meter (V3) reads ~120 VAC.	At 2Y2224, observed 2Y2224 120 VAC ALTERNATE SOURCE Volt Meter (V3) reading ~120 VAC.	N/A SAT UNSAT
Instructor Note: **Procedure step 1.2.16 will be NA due to voltage being indicated in step 1.2.15.**				
	15.	Verify 2Y2224 ALTERNATE SOURCE Supplying Load light is on. POSITIVE CUE: Amber 2Y2224 ALTERNATE SOURCE Supplying Load light is on.	At 2Y2224, verified amber 2Y2224 ALTERNATE SOURCE Supplying Load light is on.	N/A SAT UNSAT
	16.	Check 2Y2224 120 VAC OUTPUT Volt Meter (V2) reading ~120 VAC. POSITIVE CUE: 2Y2224 120 VAC OUTPUT Volt Meter (V2) reading ~120 VAC.	At 2Y2224, observed 2Y2224 120 VAC OUTPUT Volt Meter (V2) reading ~120 VAC.	N/A SAT UNSAT
	17.	Check 2Y2224 OUTPUT FREQUENCY Meter (E1) reading ~60 Hertz. POSITIVE CUE: 2Y2224 OUTPUT FREQUENCY Meter (E1) reading ~60 Hertz.	At 2Y2224, observed 2Y2224 OUTPUT FREQUENCY Meter (E1) reading ~60 Hertz.	N/A SAT UNSAT
Instructor Note: ♦ **Examinee is now switching to another inverter, 2Y24** ♦ **Examinee will transfer this inverter to Alternate Source**				

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	18.	Check 2Y24 INVERTER IN SYNC light is on. POSITIVE CUE: The green 2Y24 INVERTER IN SYNC light is on.	AT 2Y24 observed the green 2Y24 INVERTER IN SYNC light is on.	N/A SAT UNSAT
Instructor Note: **Procedure step 1.3.2 will be NA due to Inverter In Syc lamp being lit in step 1.3.1.**				
	19.	Enter 24 hour administrative time clock per Supplement 4 of Electrical System Operations (2107.001) for operation with 2RS4 panel powered from alternate source. POSITIVE CUE: Acknowledge 24 hour administrative time clock per Supplement 4 of Electrical System Operations	Operator overtly demonstrates the acknowledgement of the 24 hour administrative time clock per Supplement 4 of Electrical System Operations (2107.001) for operation with 2RS4 panel powered from alternate source.	N/A SAT UNSAT
(C)	20.	Depress 2Y24 ALTERNATE SOURCE TO LOAD pushbutton (2PB-9402). POSITIVE CUE: 2Y24 ALTERNATE SOURCE TO LOAD pushbutton (2PB-9402) is depressed.	At 2Y24, depressed 2Y24 ALTERNATE SOURCE TO LOAD pushbutton (2PB-9402).	N/A SAT UNSAT
	21.	Check 2Y24 ALTERNATE SOURCE SUPPLYING LOAD light comes ON. POSITIVE CUE: The amber 2Y24 ALTERNATE SOURCE SUPPLYING LOAD light comes ON.	At 2Y24, observed the amber 2Y24 ALTERNATE SOURCE SUPPLYING LOAD light comes ON.	N/A SAT UNSAT

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	22.	Check 2Y24 INVERTER SUPPLYING LOAD light is OFF. POSITIVE CUE: The green 2Y24 INVERTER SUPPLYING LOAD light is OFF.	At 2Y24, observed the green 2Y24 INVERTER SUPPLYING LOAD light is OFF	N/A SAT UNSAT
	23.	Place the 2Y24 MANUAL BYPASS SWITCH (2HS-9801) in the ALTERNATE SOURCE position. POSITIVE CUE: The 2Y24 MANUAL BYPASS SWITCH (2HS-9801) is in the ALTERNATE SOURCE position.	At 2Y24, rotated the 2Y24 MANUAL BYPASS SWITCH (2HS-9801) to the ALTERNATE SOURCE position.	N/A SAT UNSAT
	24.	Check 2Y24 120 VAC OUTPUT Volt Meter (V2) reading ~120 VAC. POSITIVE CUE: 2Y24 120 VAC OUTPUT Volt Meter (V2) reading ~120 VAC.	At 2Y24, observed 2Y24 120 VAC OUTPUT Volt Meter (V2) reading ~120 VAC.	N/A SAT UNSAT
	25.	Check 2Y24 OUTPUT FREQUENCY Meter (E1) reading ~60 Hertz. POSITIVE CUE: 2Y24 OUTPUT FREQUENCY Meter (E1) reading ~60 Hertz.	At 2Y24, observed 2Y24 OUTPUT FREQUENCY Meter (E1) reading ~60 Hertz.	N/A SAT UNSAT

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	26.	Verify the STATIC SWITCH TRANSFERRED alarm is IN alarm. POSITIVE CUE: The STATIC SWITCH TRANSFERRED alarm is IN alarm on 2Y2224.	At 2Y2224, verify the STATIC SWITCH TRANSFERRED alarm is IN alarm.	N/A SAT UNSAT
(C)	27.	At 2Y24, place manual 2RS4 TRANSFER SWITCH (2HS-9602) at top of panel in the 2Y2224 To 2RS4 position. POSITIVE CUE: Manual 2RS4 TRANSFER SWITCH (2HS-9602) at top of panel is in the 2Y2224 To 2RS4 position.	At 2Y24, rotated the Manual 2RS4 TRANSFER SWITCH (2HS-9602) at top of panel to the 2Y2224 To 2RS4 position.	N/A SAT UNSAT
	28.	Check the 2Y2224 To 2RS4 light comes on. POSITIVE CUE: The 2Y2224 To 2RS4 light is on.	At 2Y24, observed the 2Y2224 To 2RS4 light comes on.	N/A SAT UNSAT
Instructor Note: ♦ **Examinee is now switching to another inverter, 2Y2224.** ♦ **Examinee will take steps to transfer this inverter to NORMAL SOURCE.**				
	29.	Check 2Y2224 INVERTER IN SYNC light is on. POSITIVE CUE: The green 2Y2224 INVERTER IN SYNC light is on.	AT 2Y2224 observed the green 2Y2224 INVERTER IN SYNC light is on.	N/A SAT UNSAT
Instructor Note: **Procedure step 1.4.2 will be NA due to INVERTER IN SYNC lamp being lit in step 1.4.1.**				

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	30.	Place the Inverter 2Y2224 MANUAL BYPASS SWITCH (2HS-9601) in the NORMAL SOURCE position. POSITIVE CUE: The Inverter 2Y2224 MANUAL BYPASS SWITCH (2HS-9601) in the NORMAL SOURCE position.	At 2Y2224, rotated the Inverter 2Y2224 MANUAL BYPASS SWITCH (2HS-9601) in the NORMAL SOURCE position.	N/A SAT UNSAT
Instructor Note: **The following step is the alternate success path step. The examinee shall not transfer the inverter to the INVERTER SUPPLYING LOAD with the LOW INVERTER VOLTAGE alarm present. The examinee will stop the evolution and contact the control room for guidance.**				
(C)	31.	Check all alarms clear except the STATIC SWITCH TRANSFER (ST/SW) alarm. NEGATIVE CUE: The following alarms are in: • LOW INVERTER VOLTAGE • STATIC SWITCH TRANSFER (ST/SW) WHEN the examinee notifies the control room, THEN give the following cue: "Stop and report to the control room for a brief."	Examinee notified the control room of the abnormal indication.	N/A SAT UNSAT
END				

STOP TIME: _____

EXAMINEE'S COPY

JPM INITIAL TASK CONDITIONS:

1. **2Y2224 is shut down.**
2. **2RS4 is being supplied by Inverter 2Y24 Normal Source.**

INITIATING CUE:

The SM/CRS directs, "Place 2Y2224 in service supplying 2RS4 and shutdown 2Y24 using OP 2107.003, Attachment J Section 1 and OP 2107.001 Supp. 4 Table 11."

ATTACHMENT J

INVERTER 2Y24 OPERATION

This Attachment is used to transfer 2RS4 power supply between 2Y24 and 2Y2224 with instructions to startup and shutdown the inverters. When transferring 2RS4 power both inverters MUST be on ALTERNATE SOURCE. GO TO the appropriate section for instructions on performing the task desired.

1.0 SHIFTING 2RS4 POWER FROM 2Y24 TO 2Y2224
2.0 SHIFTING 2RS4 POWER FROM 2Y2224 TO 2Y24
3.0 SHIFTING 2RS4 POWER FROM 2Y24 NORMAL SOURCE TO 2Y24 ALTERNATE SOURCE AND SHUTDOWN OF INVERTER, IF DESIRED
4.0 SHIFTING 2RS4 POWER FROM 2Y24 ALTERNATE SOURCE TO 2Y24 NORMAL SOURCE
5.0 STARTUP OF 2Y24 INVERTER SECTION WITH 2RS4 SUPPLIED FROM 2Y24 ALTERNATE SOURCE AND SHIFTING 2RS4 TO 2Y24 NORMAL SOURCE
6.0 2Y24 STARTUP WITH 2RS4 DE-ENERGIZED

CAUTION

- After startup of a de-energized inverter, "STATIC SWITCH TRANSFERRED" is only expected RIS Unit alarm. DO NOT transfer load to this inverter unless all other RIS Unit alarms are clear.
- After startup of a de-energized inverter, "INVERTER OUTPUT OVERVOLTAGE" alarm may briefly occur. This condition may exist for a few minutes to an hour depending on room temperature conditions. All load transfers SHALL be halted until this condition clears. (CR-ANO-2-2002-1138).

1.0 SHIFTING 2RS4 POWER FROM 2Y24 TO 2Y2224

1.1 IF 2Y2224 is NOT shutdown,
THEN perform the following to align to ALTERNATE SOURCE:

1.1.1 Check 2Y2224 INVERTER IN SYNC light is on.

1.1.2 IF INVERTER IN SYNC light is NOT on,
THEN contact Electrical Maintenance for assistance.

1.1.3 Depress 2Y2224 ALT SOURCE TO LOAD pushbutton (2PB-9504).

1.1.4 Check 2Y2224 ALT SOURCE SUPPLYING LOAD light on.

1.1.5 Check 2Y2224 INVERTER SUPPLYING LOAD light out.

1.1.6 Verify 2Y2224 MANUAL BYPASS SWITCH (2HS-9601) in ALTERNATE SOURCE position.

1.1.7 Check 2Y2224 120 VAC OUTPUT voltage (V2) indicates ~ 120 volts.

1.1.8 Check 2Y2224 OUTPUT FREQUENCY (E1) is ~ 60 Hz.

1.1.9 Verify OUTPUT TRANSFER SWITCH (2HS-9504) at top of panel placed in 2Y2224 TO 2RS4 position.

1.1.10 Check 2Y2224 TO 2RS4 light comes on.

1.2 IF Swing Inverter 2Y2224 is shutdown,
THEN start up 2Y2224 on ALTERNATE SOURCE as follows:

1.2.1 Verify 2Y2224 125 VDC INPUT breaker (B1) open.

1.2.2 Verify 2Y2224 120 VAC INVERTER OUTPUT breaker (B2) open.

1.2.3 Verify 2Y2224 ALT SOURCE INPUT breaker (B800) open.

1.2.4 Verify 2Y2224 MANUAL BYPASS SWITCH (2HS-9601) in ALTERNATE SOURCE position.

1.2.5 Verify OUTPUT TRANSFER SWITCH (2HS-9504) at top of panel in 2Y2224 TO 2RS4 position.

1.2.6 Check 2Y2224 TO 2RS4 light on.

CAUTION
Energizing off-line inverter, while battery bank is disconnected from the DC bus or in-service battery charger is on equalize, will blow fuses on the on-line inverters.

1.2.7 Check 2D12 battery bank connected to 2D02 bus.

1.2.8 Check in-service battery charger (2D32A/B) as follows:

- Check battery charger on float.
- Check battery charger has been on float > 24 hours.

1.2.9 Close 2Y2224 125 VDC INPUT breaker (B1).

1.2.10 Check 2Y2224 125 VDC INVERTER INPUT (V1) reading ~ 125 volts.

1.2.11 IF no voltage indicated,
THEN verify 2Y2224 DC supply feeder (2D0231) closed AND “Fuse Blown” light NOT lit.

1.2.12 Wait 60 seconds for inverter to stabilize.

1.2.13 Close 2Y2224 120 VAC INVERTER OUTPUT breaker (B2).

1.2.14 Close 2Y2224 ALTERNATE SOURCE INPUT breaker (B800).

1.2.15 Check 2Y2224 120 VAC ALT SOURCE (V3) reading ~ 120 volts.

1.2.16 IF no voltage indicated,
THEN verify 2Y2224 ALTERNATE SOURCE Supply (2B61-N4) closed.

1.2.17 Verify 2Y2224 ALT SOURCE SUPPLYING LOAD light is on.

1.2.18 Check 2Y2224 120 VAC OUTPUT (V2) indicates ~ 120 volts.

1.2.19 Check 2Y2224 OUTPUT FREQUENCY (E1) is ~ 60 Hz.

1.3 IF 2RS4 is supplied from 2Y24 NORMAL SOURCE,
THEN transfer 2RS4 to 2Y24 ALTERNATE SOURCE
AND THEN to 2Y2224 ALTERNATE SOURCE as follows:

1.3.1 Check 2Y24 INVERTER IN SYNC light is on.

1.3.2 IF INVERTER IN SYNC light is NOT on,
THEN contact Electrical Maintenance for assistance.

1.3.3 IF in Mode 1-4,
THEN enter 24-hour administrative time clock per Supplement 4 of Electrical System Operations (2107.001) for operation with 2RS4 panel powered from ALTERNATE SOURCE.

1.3.4 Depress 2Y24 ALT SOURCE TO LOAD pushbutton (2PB-9402).

1.3.5 Check 2Y24 ALT SOURCE SUPPLYING LOAD light comes on.

1.3.6 Check 2Y24 INVERTER SUPPLYING LOAD light goes out.

1.3.7 Place 2Y24 MANUAL BYPASS SWITCH (2HS-9801) in ALTERNATE SOURCE position.

1.3.8 Check 2Y24 120 VAC OUTPUT voltage indicates ~ 120 volts.

1.3.9 Check 2Y24 OUTPUT FREQUENCY (E1) is ~ 60 Hz.

1.3.10 WHEN ONLY “STATIC SWITCH TRANSFERRED” is in alarm on 2Y2224,
THEN continue performance of this section.
(CR-ANO-2-2002-1138)

1.3.11 At 2Y24, place 2RS4 TRANSFER SWITCH (2HS-9602) at top of panel in the 2Y2224 TO 2RS4 position.

1.3.12 At 2Y24, check 2Y2224 TO 2RS4 light comes on.

1.4 IF desired to shift 2RS4 loads to 2Y2224 NORMAL SOURCE, THEN perform the following:

1.4.1 Check 2Y2224 INVERTER IN SYNC light is on.

1.4.2 IF INVERTER IN SYNC light is NOT on, THEN contact Electrical Maintenance for assistance.

1.4.3 Place Inverter 2Y2224 MANUAL BYPASS SWITCH (2HS-9601) in NORMAL SOURCE position.

1.4.4 Check all alarms clear except ST/SW Transfer.

1.4.5 Depress 2Y2224 INVERTER TO LOAD pushbutton (2PB-9502).

1.4.6 Check 2Y2224 INVERTER SUPPLYING LOAD light comes on.

1.4.7 Check 2Y2224 ALT SOURCE SUPPLYING LOAD light goes out.

1.4.8 Reset 2Y2224 local alarm panel.

1.4.9 Check 2RS4 INVERTER TROUBLE (2K01-G11) is cleared.

1.4.10 Verify 2RS4 operable by performing the necessary portions of Supplement 4 of 2107.001.

1.4.11 IF applicable, THEN exit 24-hour administrative time clock per Supplement 4 of 2107.001 for operation with 2RS4 panel powered from ALTERNATE SOURCE.

1.5 IF desired to shutdown 2Y24, THEN perform the following:

1.5.1 Open 2Y24 ALT SOURCE INPUT breaker (B800).

1.5.2 Open 2Y24 120 VAC INVERTER OUTPUT breaker (B2).

1.5.3 Open 2Y24 125 VDC INPUT breaker (B1).

SUPPLEMENT 4

TABLE 10, 2RS2 SUPPLY INVERTER **2Y22** OR **2Y2224** (Circle one)

TEST QUANTITY	MEASURED VALUE	ACCEPTABLE NORMAL RANGE	IS DATA WITHIN ACCEPTABLE NORMAL RANGE?	
125 VDC Input Breaker (B1)	√( ) if closed	Closed	YES NO	
120 VAC Inverter Output (B2)	√( ) if closed	Closed	YES NO	
Manual Bypass switch	√( ) if in Normal Source	Normal Source	YES NO	
Inverter Supplying Load	√( ) if Light On	Light On (1)	YES NO	
120 VAC Output	V	> 117V < 126V	YES NO	(2)
Inverter output voltage E2RS2 OR E2RS2RS4 (SPDS)	V	> 105V < 137.5V	YES NO	(3)
Alt Source Status Z2Y22B OR Z2Y2224 (SPDS)	√( ) if in Normal	Normal	YES NO	

TABLE 11, 2RS4 SUPPLY INVERTER **2Y24** OR **2Y2224** (Circle one)

TEST QUANTITY	MEASURED VALUE	ACCEPTABLE NORMAL RANGE	IS DATA WITHIN ACCEPTABLE NORMAL RANGE?	
125 VDC Input Breaker (B1)	√( ) if closed	Closed	YES NO	
120 VAC Inverter Output (B2)	√( ) if closed	Closed	YES NO	
Manual Bypass switch	√( ) if in Normal Source	Normal Source	YES NO	
Inverter Supplying Load	√( ) if Light On	Light On (1)	YES NO	
120 VAC Output	V	> 117V < 126V	YES NO	(2)
Inverter output voltage E2RS4 OR E2RS2RS4 (SPDS)	V	> 105V < 137.5V	YES NO	(3)
Alt Source Status Z2Y24B OR Z2Y2224 (SPDS)	√( ) if in Normal	Normal	YES NO	

(1) Alternate indications such as remote annunciator (2K01 - "2RSX INVERTER TROUBLE" NOT in alarm) OR local indication ("2YXX ALT SOURCE SUPPLYING LOAD" light out) may be used to verify Inverter supplying load.

(2) Voltage band defines RS Bus operability for steps 3.4.1/3.4.2 of this section (ULD-2-SYS-20, CR-ANO-2-2001-01134).

(3) Voltage band defines DC Input voltage (ULD-2-SYS-03).

JOB PERFORMANCE MEASURE

UNIT: **2** REV #: **001** DATE: _____

SYSTEM/DUTY AREA: **Spent Fuel Pool Cooling System**

TASK: **Add water to the Spent Fuel Pool (Alternate Success Path)**

JTA#: **ANO2WCOSFPEMER1**

KA VALUE RO: **3.1** SRO: **3.5** KA REFERENCE: **033 A2.03**

APPROVED FOR ADMINISTRATION TO: RO: **X** SRO: **X**

TASK LOCATION: INSIDE CR: _____ OUTSIDE CR: **X** BOTH: _____

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: **Simulate** SIMULATOR: _____ LAB: _____

POSITION EVALUATED: RO: _____ SRO: _____

ACTUAL TESTING ENVIRONMENT: SIMULATOR: _____ PLANT SITE: _____ LAB: _____

TESTING METHOD: SIMULATE: _____ PERFORM: _____

APPROXIMATE COMPLETION TIME IN MINUTES: **20 Minutes**

REFERENCE (S): **OP 2104.006**

EXAMINEE'S NAME: _____ SSN: _____

EVALUATOR'S NAME: _____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: _____ UNSATISFACTORY: _____

PERFORMANCE CHECKLIST COMMENTS:

_____

_____

Start Time _____ Stop Time _____ Total Time _____

SIGNED: _____ DATE: _____

SIGNATURE INDICATES THIS JPM HAS BEEN COMPARED TO ITS APPLICABLE PROCEDURE BY A QUALIFIED INDIVIDUAL (NOT THE EXAMINEE) AND IS CURRENT WITH THAT REVISION.

JOB PERFORMANCE MEASURE

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS:

The following conditions exist:

1. **Plant is in DEFUELED and all cask loading operations are secured.**
2. **Power has been lost to both SFP cooling pumps and 2K11-K5 “FUEL POOL TEMP HI” is in alarm.**
3. **An operator is stationed at the spent fuel pool to monitor Spent Fuel Pool Level.**
4. **SFP purification is out of service for replacement of 2FP-10, SFP purification pump discharge.**
5. **Fuel Pool low level alarm is in and SFP level is lowering.**

TASK STANDARD:

Emergency Spent Fuel Pool Makeup from Loop 2 Service Water has been initiated.

TASK PERFORMANCE AIDS:

OP 2104.006 Section 10 and 14

SIMULATOR SETUP:

NONE

JOB PERFORMANCE MEASURE

INITIATING CUE:

The SM/CRS directs, "Align for makeup water addition to the SFP system from CVCS using OP 2104.006," Section 10.0 beginning with step 10.5"

CRITICAL ELEMENTS (C): 2, 3, 4, 5, 6, 8, 9, 11, 13

START TIME: _____

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	1.	Verified Spent Fuel Pool Purification Pump (2P66) secured. POSITIVE CUE: Green light ON, red light OFF. NEGATIVE CUE: Red light ON, green light OFF.	Locally verified 2P66 handswitch (2HS-5411) in STOP and observed green light ON, red light OFF.	N/A SAT UNSAT
TRANSITION NOTE: **Go to elevation 354' RAB, just north of the elevator, to the SFP valve gallery.**				
(C)	2.	Verify RWT to Fuel Pool Isolation valve (2FP-46) closed. POSITIVE CUE: 2FP-32 stem inserted fully and valve is closed. NEGATIVE CUE: 2FP-32 stem withdrawn fully and valve is open.	Verified 2FP-46 Closed by observing stem fully inserted into the valve and rotating handwheel counterclockwise.	N/A SAT UNSAT
(C)	3.	Verify Borated MU or RWT to 2P-66 (2FP-32) closed. POSITIVE CUE: 2FP-32 stem is fully inserted. NEGATIVE CUE: 2FP-32 stem withdrawn fully.	Verified 2FP-32 CLOSED by observing valve stem fully inserted into the valve and rotating handwheel counterclockwise.	N/A SAT UNSAT
TRANSITION NOTE: **Go to elevation 354' RAB VCT valve gallery.**				

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	4.	Close Makeup to Charging Pump Suction (2CVC-83). POSITIVE CUE: Resistance to operation indicated; valve position indicator aligned to CLOSE. NEGATIVE CUE: Valve position indicator in OPEN; or in an intermediate position.	Closed 2CVC-83 by pulling on right-hand side of chain (from the chain operator). Observed valve closed position indication on valve reach rod actuator.	N/A SAT UNSAT
(C)	5.	Verify Manual Makeup to VCT (2CVC-68) closed. POSITIVE CUE: Resistance to operation indicated; valve position indicator aligned to CLOSE. NEGATIVE CUE: Valve position indicator in OPEN; or in an intermediate position.	Attempted to rotate reach rod handwheel CW noting resistance to motion. Observed valve closed position indication on valve reach rod actuator.	N/A SAT UNSAT
TRANSITION NOTE: **Go to elevation 354' RAB spent fuel pool valve gallery just off elevator.** **Examiner's NOTE:** **This is the ALTERNATE SUCCESS PATH CUE step. 2CVC-66 will not open and therefore CVCS system cannot be used to makeup to the SPF. A prompt will be given from the control room to use Loop 2 service water as makeup source.**				
(C)	6.	Open MU to SF Pool (2CVC-66). CUE: Valve stem full-in and valve will not move.	Attempted to open 2CVC-66 by rotating handwheel CCW.	N/A SAT UNSAT

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	7.	Notify control room of inability to open 2CVC-66. CUE: Control room acknowledges that 2CVC-66 will not open and that section 14 of OP 2104.006, Fuel Pool Systems, should be used to add Loop 2 service water to the SFP starting with step 14.1.	Notified the Control room of inability to open 2CVC-66.	N/A SAT UNSAT
EXAMINER's NOTE: **Purification pump was previously identified as secured in initial conditions (Procedure step 14.1.1).**				
(C)	8.	Close SW Header 2 Telltale Drain (2SW-1211). POSITIVE CUE: 2SW-1211 has stem inserted into hand wheel.	Closed 2SW-1211 by turning hand wheel Clockwise. Observed valve stem fully inserted into the valve.	N/A SAT UNSAT
TRANSITION NOTE: **Go to elevation 335' RAB just off elevator. Valve is chain operated and is located about 20' in overhead in middle of North / South corridor.**				
(C)	9.	Open SW Header 2 Emergency Feed Isolation valve (2SW-67). POSITIVE CUE: 2SW-67 chain will not rotate any more and valve is fully open. NEGATIVE CUE: 2SW-67 is closed.	Opened 2SW-67 by turning chain Counterclockwise until chain stopped rotating.	N/A SAT UNSAT
TRANSITION NOTE: **Go to elevation 354' RAB spent fuel pool valve gallery just off elevator.** **EXAMINER'S NOTE:** **When asked for Category E key, simulate giving examinee key from the control room for valve 2SW 56.**				

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
	10.	Ensure position of 2SW-56 is logged in Category "E" Log. POSITIVE CUE: Valve position is logged in CAT 'E' log.	Logged position of 2SW-56 by: Using a plant telephone, Gaitronics, OR radio; contacted Control Room and directed entry in Category "E" Log. OR Ensured Category "E" log entry made upon completion of evolution.	N/A SAT UNSAT
(C)	11.	Open SW Header 2 Emergency Feed Isolation valve (2SW-56). POSITIVE CUE: 2SW-56 valve stem is fully extended and valve is open. NEGATIVE CUE: 2SW-56 valve stem is inserted and valve is closed	Unlocked locking device on 2SW-56 using category 'E' valve key. Opened 2SW-56 by turning handwheel CCW. Observed valve stem fully withdrawn out of the valve.	N/A SAT UNSAT
	12.	Verify Operator in SFP to monitor level and is in communication with Operator at SW Header 2 Emergency Feed Isolation to SF Pool (2SW-62) POSITIVE CUE: Operator in SFP responds to radio communications.	Verified that an Operator was stationed to monitor SFP level and is in communication with Operator at SW Header 2 Emergency Feed Isolation to SF Pool (2SW-62)	N/A SAT UNSAT
EXAMINERS NOTE: **- Final valve position is at discretion of examinee to ensure level is raised/maintained.**				

JOB PERFORMANCE MEASURE

PERFORMANCE CHECKLIST			STANDARDS	(Circle One)
(C)	13.	Throttles open SW Header 2 Emergency Feed Isolation valve to SF Pool (2SW-62). POSITIVE CUE: Operator stationed at SFP reports level rising slowly. NEGATIVE CUE: Operator reports NO change in SFP level.	Throttled open 2SW-62 by turning handwheel CCW. Observed valve stem withdrawn out of the valve commensurate with valves throttling.	N/A SAT UNSAT
END				

STOP TIME:_____

JOB PERFORMANCE MEASURE

EXAMINEE'S COPY

JPM INITIAL TASK CONDITIONS:

1. **Plant is in DEFUELED and all cask loading operations are secured.**
2. **Power has been lost to both SFP cooling pumps.**
3. **An operator is stationed at the spent fuel pool to monitor Spent Fuel Pool Level.**
4. **SFP purification is out of service for replacement of 2FP-10, SFP purification pump discharge.**
5. **Fuel Pool low level alarm is in and SFP level is lowering.**

INITIATING CUE:

The SM/CRS directs, "Align for makeup water addition to the SFP system from CVCS using OP 2104.006, Section 10.0 beginning with step 10.5"

- When SFP level > 401’7”, water may spill over through pipe chase to 335’ elevation due to starting/stopping SFP Cooling/Purification pumps.
- SFP volume ~ 500 gal/inch.
- SFP/Tilt Pit volume ~ 600 gal/inch (Tilt Pit gate not sealed/not installed).
- SFP/CLP volume ~ 560 gal/inch (CLP gate not sealed/not installed).
- SFP/Tilt Pit/CLP volume ~ 660 gal/inch (Tilt Pit AND CLP gates not sealed/not installed).
- SFP, Tilt Pit and Refueling Canal volume ~ 1650 gal/inch.
- Coordinate with Dry Fuel personnel when making up during Dry Fuel Operations. **{4.3.2}**
- Steps marked with an * are continuous action steps.

10.1 IF Cask Loading Operations are in progress,
THEN notify DFS Management of intent to add to SFP.

10.2 Calculate amount of boric acid or water needed to achieve desired fuel pool level and concentration using appropriate attachment or Boron 2 Program.

10.3 Verify Chemical Addition portion of CVCS available.

10.4 Verify VCT Makeup Valve (2CV-4941-2) closed.

10.5 IF Purification NOT in service
OR is aligned to RWT,
THEN verify the following:

10.5.1 Fuel Pool Purification Pump (2P-66) off.

10.5.2 RWT to Fuel Pool Isol (2FP-46) closed.

10.5.3 Borated MU or RWT to 2P-66 (2FP-32) closed.

10.6 Verify the following valves closed:

- Manual Makeup to Charging Pump Suction (2CVC-83)
- Manual Makeup to VCT (2CVC-68)

10.7 Verify the following valves open:

- MU to SF Pool (2CVC-66)
- Borated MU to Fuel Pool (2CVC-67)
- Borated MU, RWT, SW to Fuel Pool (2FP-31)

10.8 Station an Operator to monitor SFP level in communication with Control Room.

*10.9 Monitor Reactor Power during makeup to Fuel Pool in case 2CV-4941-2, 2CVC-68, or 2CVC-83 has seat leakage.

10.10 Add calculated amounts of boric acid and water from CVCS by using the Boric Acid MU System in MANUAL as follows:

10.10.1 IF water is to be added,
THEN perform the following:

A. Verify either RMW pump (2P-109A OR 2P-109B) running.

B. Set RMW Flow controller (2FIC-4927) to desired flow.

C. IF NO Boric Acid to be added,
THEN verify Boric Acid MU Flow Controller (2FIC-4926) in MANUAL with OUTPUT DEMAND < zero.

10.10.2 IF Boric Acid is to be added,
THEN perform the following:

A. Select desired BAM Pump (2P-39A OR 2P-39B) for start using BAM Pump Select Switch (2HS-4911-2).

B. Start desired BAM Pump (2P-39A OR 2P-39B).

C. Open associated Recirc (2CV-4903-2 OR 2CV-4915-2).

D. Set Boric Acid MU Flow Controller (2FIC-4926) to desired flow rate.

E. IF NO water to be added,
THEN verify RMW Flow Controller (2FIC-4927) in MANUAL with OUTPUT DEMAND < zero.

10.10.3 Reset Flow totalizers (2FQI-4926 AND 2FQI-4927) to zero.

10.10.4 Place MU Mode Selector switch (2HS-4928) to MANUAL.

10.10.5 Verify 2CV-4926 AND 2CV-4927 respond properly.

10.11 WHEN the calculated amounts of boric acid and water have been added,
THEN perform the following:

10.11.1 Reposition MU Mode Selector Switch (2HS-4928) as desired.

10.11.2 Verify 2CV-4927 closed.

10.11.3 Verify 2CV-4926 closed.

10.11.4 Verify BAM Pumps secured.

10.11.5 Verify BAM Pump Recirc Valves closed.

10.11.6 Close Borated MU, RWT, SW to Fuel Pool (2FP-31).

10.11.7 Close Borated MU to Fuel Pool (2CVC-67).

10.11.8 Close MU to SF Pool (2CVC-66).

10.11.9 Return 2FIC-4927 AND 2FIC-4926 to desired settings.

10.12 Reposition the following as desired:

- 2CV-4941-2
- 2CVC-68
- 2CVC-83

10.13 IF makeup for other than normal evaporation,
THEN request Chemistry to sample SFP.

10.14 Align Purification System as desired using appropriate section of this procedure.

14.0 EMERGENCY FUEL POOL MAKEUP FROM SERVICE WATER

14.1 IF desired to use Loop 2 SW to makeup to Fuel Pool, THEN perform the following:

14.1.1 IF SFP is aligned for Purification, THEN secure Fuel Pool Purification Pump (2P-66) to prevent rapid depletion of Fuel Pool Demineralizer (2T-5).

14.1.2 Close SW Hdr 2 Telltale Drain (2SW-1211).

14.1.3 Open SW Hdr 2 Emerg Feed Isol to Fuel Pool (2SW-67).

14.1.4 Perform the following:

A. Record unlocking of SW Hdr 2 Emerg Feed Isol (2SW-56) in Cat E log.

B. Unlock and open 2SW-56.

14.1.5 Station an Operator to monitor SFP level in communication with Operator at SW Hdr 2 Emerg Feed Isol to SFP (2SW-62).

14.1.6 Throttle 2SW-62 as necessary to maintain Fuel Pool level.

14.1.7 WHEN Service Water makeup no longer required, THEN secure as follows:

A. Close 2SW-62.

B. Close and lock 2SW-56.

C. Close 2SW-67.

D. Open 2SW-1211.

E. Independently verify 2SW-56 locked closed.

JOB PERFORMANCE MEASURE

JPM-#- A2JPM-RO-PRHAS REV. 02

SYSTEM/DUTY AREA: Emergency & Abnormal Operations

TASK: Perform local operation of proportional heaters

JTA # : ANO2-RO-EOPAOP-OFFNORM-126

KA VALUE **RO:** 4.1 **SRO:** 4.2 **KA REFERENCE:** 068 AA1.07

APPROVED FOR ADMINISTRATION TO: **RO:** X **SRO:** X

TASK LOCATION: **INSIDE CR:** **OUTSIDE CR:** **X** **BOTH:**

SUGGESTED TESTING ENVIRONMENT AND METHOD (PERFORM OR SIMULATE):

PLANT SITE: Simulate **SIMULATOR:** **LAB:**

POSITION EVALUATED: RO: SRO:

ACTUAL TESTING ENVIRONMENT: SIMULATOR: PLANT SITE: LAB:

TESTING METHOD: **SIMULATE:** **PERFORM:**

APPROXIMATE COMPLETION TIME IN MINUTES: 15 minutes

REFERENCE (S): AOP 2203.014 Rev. 014-07-0, Alternate Shutdown

EXAMINEE'S NAME: _____ **SSN:** _____ - _____ - _____

EVALUATOR'S NAME: _____ **DATE:** _____

THE EXAMINEE'S PERFORMANCE WAS EVALUATED AGAINST THE STANDARDS CONTAINED IN THIS JPM AND IS DETERMINED TO BE:

SATISFACTORY: **UNSATISFACTORY:**

PERFORMANCE CHECKLIST COMMENTS:

Start Time: _____ Stop Time: _____ Total Time: _____

Signature indicates this JPM has been compared to its applicable procedure by a qualified individual (not the examinee) and is current with that revision.

SIGNED: _____ **DATE:** _____

JOB PERFORMANCE MEASURE

JPM-#- A2JPM-RO-PRHAS REV. 02

THE EXAMINER SHALL REVIEW THE FOLLOWING WITH THE EXAMINEE:

The examiner shall review the "Briefing Checklist - System Walkthrough" portion of OP 1064.023 Attachment 6 with the examinee.

JPM INITIAL TASK CONDITIONS: The following conditions exist.

1. A fire has occurred in the Control Room rendering the Control Room uninhabitable.

2. RCS pressure is 1840 psia.

3. Pressurizer Level is 44%

TASK STANDARD: Proportional heater control has been established locally at 2C117 and 2C118 and the heaters have been energized.

TASK PERFORMANCE AIDS: AOP 2203.014, Alternate Shutdown, Attachment G.

JOB PERFORMANCE MEASURE

JPM-#- A2JPM-RO-PRHAS REV. 02

INITIATING CUE:

The SM directs, “Energize pressurizer proportional heaters locally and raise pressurizer pressure to 2250 psia using AOP 2203.014, Attachment G.

CRITICAL ELEMENTS (C): 3, 4, 5, 6, 7

JOB PERFORMANCE MEASURE

JPM-#- A2JPM-RO-PRHAS REV. 02

START TIME:

PERFORMANCE CHECKLIST		STANDARDS	(Circle One)
TRANSITION NOTE: Go to the lower south electrical penetration room.			
1.	Verify "PZR PROP HTR CONT SW" (2HS-4640B) position. POSITIVE CUE: 2HS-4640B indicates OFF.	On panel 2C117, verified 2HS-4640B in OFF. OR Placed 2HS-4640B in OFF.	N/A SAT UNSAT
2.	Verify "PZR PROP HTR CONT SW" (2HS-4641B) position. POSITIVE CUE: 2HS-4641B indicates OFF.	On panel 2C118, verified 2HS-4641B in OFF. OR Placed 2HS-4641B in OFF.	N/A SAT UNSAT
(C) 3.	Place "PZR PROP HTR SEL SW" (2HS-4640A) in EMERG. POSITIVE CUE: 2HS-4640A indicates EMERG. NEGATIVE CUE: 2HS-4640A indicates NORM.	On panel 2C117, verified key inserted in key switch. Placed 2HS-4640A in EMERG.	N/A SAT UNSAT
(C) 4.	Place "PZR PROP HTR SEL SW" (2HS-4641A) in EMERG. POSITIVE CUE: 2HS-4641A indicates EMERG. NEGATIVE CUE: 2HS-4641A indicates NORM.	On panel 2C118, verified key inserted in key switch. Placed 2HS-4641A in EMERG.	N/A SAT UNSAT
TRANSITION NOTE: Go to Load Center 2B5.			

JOB PERFORMANCE MEASURE

JPM-#- A2JPM-RO-PRHAS REV. 02

PERFORMANCE CHECKLIST		STANDARDS	(Circle One)
	Close breaker 2B523 "PRESSURIZER PROPORTIONAL HEATER 2SCR-1". POSITIVE CUE: Breaker 2B523 red flag showing.	On load center 2B5, depressed breaker 2B523 "close" push button. **OR** On load center 2B5, raised the mechanical close lever for breaker 2B523.	N/A SAT UNSAT
Note To Examiner: **1. The following breaker (2B623) is simulated to be open and will not close electrically.** **2. This will require using the mechanical close lever.**			
(C) 6.	Close breaker 2B623 "PRESSURIZER PROPORTIONAL HEATER 2SCR-2". POSITIVE CUE: If the mechanical close lever is used, the Breaker 2B623 red flag showing. NEGATIVE CUE: If the electrical pushbutton is used, the Breaker 2B623 green flag showing.	On load center 2B6, raised the mechanical close lever for breaker 2B623.	N/A SAT UNSAT
TRANSITION NOTE: Go to the lower south electrical penetration room.			
(C) 7.	Energize all proportional heaters. POSITIVE CUE: 2HS-4640 and 2HS 4641 are in “ON”. NEGATIVE CUE: 2HS-4640 and/or 2HS 4641 are in “OFF”.	On panel 2C117, placed "PZR PROP HTR CONT SW" (2HS-4640B) in ON. On panel 2C118, placed "PZR PROP HTR CONT SW" (2HS-4641B) in ON.	N/A SAT UNSAT
END **STOP TIME:**_____			

JOB PERFORMANCE MEASURE

JPM-#- A2JPM-RO-PRHAS REV. 02

EXAMINEE'S COPY

JPM INITIAL TASK CONDITIONS: The following conditions exist.

- A fire has occurred in the Control Room rendering the Control Room uninhabitable.
- RCS pressure is 1840 psia.
- Pressurizer Level is 44%

INITIATING CUE:

The SM directs, "Energize pressurizer proportional heaters locally and raise pressurizer pressure to 2250 psia using AOP 2203.014, Attachment G.

Facility: ANO-2	Scenario No.: 1	Op-Test No.: 2003-1 Page 1
Examiners:		Operators:

Initial Conditions:

100% MOL, All ESF systems in standby. Green Train Maintenance Week. 'B' Vacuum pump tagged out for maintenance.

Turnover:

100%. 250 EFPD. 'B' Vacuum pump tagged out for maintenance. Green Train Maintenance Week. EOOS indicates 'Minimal Risk.'

Event No.	Malf. No.	Event Type*	Event Description
1	XRCCHAPCNT	I (CBOR)	Control Channel "A" Pressurizer Pressure fails HIGH.
2	XSPUPFAIL	C (CBOR)	Loss of Safety Parameter Display System (SPDS) Update
3	XFW2TE0361	I (CBOT)	Common MFP lube oil supply temperature transmitter, 2TE-0361, fails LOW (fails 2TIC-5283 closed).
4	RCP2P32BLOW RCP2P32BMID	R (CBOR) N (ALL)	RCP 2P32B Lower and Middle Seal failures; Requiring a plant shutdown.
5	RCP2P32BUPP	C (CBOR)	RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP.
6	RCSLOCATCB	M (ALL)	Loss of Coolant Accident after Reactor trip due to vapor seal leakage.
7	HPI2P89AFAL	C (CBOT)	'A' HPSI pump fails to auto start due to faulty ESF relay.
8	416_2A406	C (CBOT)	'B' HPSI pump fails to start due to breaker fault.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO #1 NARRATIVE

Simulator session begins with the plant at 100% power and steady state. 'B' vacuum pump is tagged out for maintenance.

The in-service Pressurizer (PZR) control channel pressure instrument will fail high. Alarms on Pressurizer Control Channel 1 pressure HI and Pressure HI HI will come in. This will result in BOTH PZR spray valves opening, the backup heaters to deenergize, the proportional heaters to go to minimum fire and actual PZR pressure to drop. AOP 2203.028, PZR Systems Malfunctions, will be entered and actions directed by the CRS. The CBOR may take both PZR spray valves to manual and close them. The CBOR may take the Backup heaters to ON to raise PZR pressure. The CBOR will verify that the other pressure control channel is reading correctly and select the channel 2 for control using 2HS-4626. The CBOT will place SDBCS Master Controller in AUTO local and adjust setpoint to 1000 psia

About two minutes into scenario, the SPDS computer will fail to update. The CBOR will report that the SPDS is not updating. This will remain failed the rest of the scenario. Primarily the CBOR will be forced into using redundant indications since one of the SPDS CRT's is on 2C03 and the CBOR relies heavily on it for indications. The CBOT also will be forced to use redundant indications as one of the SPDS CRT is located on the upper part of 2C16. The CRS will notify maintenance and log the time SPDS is lost. This is a 1-hour reportable event if SPDS cannot be restored (10CFR50.72).

Five minutes into the scenario, 2TE0361 fails low. This will result in CCW isolation to the common MFP lube oil cooler. Temperature alarms will come in on supply temperature at 135°F. The CRS will refer to ACA2203.012C that will direct obtaining local lube oil temperatures from the AO. The CBOT will monitor MFP lube oil temperatures on 2TRS 0325 chart recorder located on 2C11. The CBOT will recognize that 2TIC-5283, MFP Lube Oil Temp. Controller on 2C04 has zero output due to the temperature feed failing low. The CBOT will take manual control of 2TIC-5283 to lower and control MFP lube oil temp using the PMS MFP screen and the AO to watch MFP lube oil temperature.

Approximately 15 minutes into the scenario, two seals on 'B' RCP will fail. Annunciator 2K11-G3, RCP Bleedoff flow HI/LO will alarm. The CBOT will verify using PMS and RCP chart recorder on 2C14 that the lower and middle seals have failed. The CRS will enter the RCP emergencies AOP, 2203.025 and direct the board operator actions. The crew will perform a power reduction such that the plant will be off line in one hour. The CBOR will borate the RCS and reduce turbine load to maintain Tave-Tref within 2°F. The CBOT will make preparations to remove secondary plant equipment out of service as power is reduced.

SCENARIO #1 NARRATIVE

When the lead examiner is ready, the third seal will fail on 'B' RCP. When the crew recognizes the failure the CRS will direct a manual Reactor trip and securing of 'B' RCP. The Crew will complete SPTA's when the reactor is tripped.
On the Reactor trip, the vapor seal on 'B' RCP will fail resulting in a 400 gpm LOCA ramped over 5 minutes. The crew will manually actuate SIAS and CCAS when pressure is observed to be trending towards the trip setpoint of 1650 psia. The CBOR will secure one RCP in each loop when RCS pressure reaches 1400 psia. When SIAS is manually actuated, the 'A' HPSI pump will fail to automatically start. The CBOT will recognize the 'A' HPSI pump not starting (annunciator will alarm) and manually start the pump (with direction from the CRS). Also when SIAS is manually actuated, the 'B' HPSI pump will fail due to a breaker fault (annunciator will alarm). The CBOT will place 'B' HPSI pump in PTL and start 'C' HPSI pump.

After SPTA's are complete, the CRS will diagnose a LOCA and enter the LOCA EOP 2202.003. The CRS will direct the CBOR to cooldown the RCS. The CBOR will cooldown the RCS using the SDBCS bypass valves to the condenser and plot and record the cooldown using standard attachments 1 and 8. When HPSI termination criteria is met, the crew will secure one HPSI pump and throttle the opposite loop HPSI injection MOV's to maintain PZR level. The scenario may be terminated at the lead examiner's discretion.

Simulator Instructions for Scenario 1

Reset to 100% power MOL IC.

Triggers T1, T3, T4, T5 set to false.

Conditional trigger T2 set to reactor trip.

Place Green train maintenance week sign in simulator.

Place Minimal Risk sign in simulator.

Align 'C' HPSI to Green Train and in PTL.

PZR Pressure control hand-switch 2HS-4626 in Channel A.

'B' Vacuum pump tagged out. Handswitch on 2C01 in PTL. Overide for Green light (2HS-0696-4) set to FALSE. Override for handswitch in PTL (2HS-0696) set to TRUE. Override for Seal Water Pump Green light (2CI-P31B) FALSE.

Event No.	Malf. No.	Value/ Ramp Time	Event Description
1	XRCCHAPCNT Trigger=T1	2500	Control Channel "A" Pressurizer Pressure fails HIGH.
2	XSPUPFAIL Trigger = T1	Insert 2 min TD	Loss of Safety Parameter Display System (SPDS) Update
3	XFW2TE0361 Trigger = T3	0	Common MFP Lube Oil Supply Temperature Transmitter, 2TE-0361, fails LOW (fails 2TIC-5283 closed).
4	RCP2P32BLOW RCP2P32BMID Trigger = T4	100 3 min TD	RCP 2P32B Lower and Middle Seal failures: Requiring a plant shutdown.
5	RCP2P32BUPP Trigger = T5	100	RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP.
6	RCSLOCATCB Trigger = T2	400 gpm 5 min Ramp	Loss of Coolant Accident after Reactor trip due to vapor seal leakage.
7	HPI2P89AFAL	True	'A' HPSI pump fails to auto start due to faulty ESF relay.
8	416_2A406 2HS-5079-2_w	Locked OPEN True	'B' HPSI pump fails due to breaker fault.

Op-Test No.: 1 Scenario No.: 1 Event No.: 1 Page 5 of 16

Event Description: Control Channel “A” Pressurizer Pressure fails HIGH..

Time	Position	Applicant's Actions or Behavior
	CBOR	Announce annunciator 2K10-E6 Pressurizer Pressure Control Channel 1 Pressure HI / LO. Report both Pressurizer spray valves open and actual pressurizer pressure dropping.
	CRS	Refer to PZR Systems Malfunctions AOP 2203.028 and direct board operators actions. Refer to **TS 3.2.8** if pressure not 2025 to 2275 psia.
	CBOR	Compare channels and determine Channel 1 failed low. Control backup heaters manually to maintain pressure > 2100 psia. Place PZR Pressure Channel Select switch (2HS-4626) to channel 2. Verify PZR spray valves closed. Restore backup heaters to automatic control.
	CBOT	Place SDBCS Master controller in AUTO local and adjust setpoint to 1000 psia.

Termination Criteria: PZR Pressure Control selected to Channel 2 in auto control or at examiner's discretion.

Op-Test No.: 1 Scenario No.: 1 Event No.: 2 Page 6 of 16

Event Description: Loss of the Safety Parameter Display (SPDS) Update.

Time	Position	Applicant's Actions or Behavior
	CBOR	Announce the loss of the SPDS computer to the CRS
	CRS	Logs the failure of the SPDS.
	CRS	Direct the CBOR/CBOT to use the other means of monitoring plant parameters.
	CBOR CBOT	Monitors the plant and provides information from other panel indications.
	CRS	Inform SM: ♦ To Contact maintenance (CSG), ♦ That it is a 1-hour reportable occurrence if it cannot be restarted within 1 hour. (10CFR50.72(b) (1) (v) and ANO procedure 2105.014, SPDS.

Termination criteria: SPDS is logged out of service, maintenance is contacted (CSG) and SM informed of loss of SPDS or at the examiner's discretion (NOTE: this condition will remain throughout the rest of the scenario).

Op-Test No.: 1 Scenario No.: 3 Event No.: 3 Page 7 of 16

Event Description: Common MFP Lube Oil Supply Temperature Transmitter, 2TE-0361, fails LOW (fails 2TIC-5283 closed).

Time	Position	Applicant's Actions or Behavior
	CBOT	Announce annunciators: 2K03-E8/E11 Turbine bearing Metal Temperature High. 2K03-D8/D11 Turbine Bearing Oil Temperature High.
	CRS	Implement Annunciator Corrective Action AOP 2203.012C.
NOTE: When contacted by control room as AO, report that local MFP bearing temperatures to 'A' MFP (2TI2611A) and 'B' MFP (2TI2611B) are trending up are reading the value obtained from instructor's area qume (IEW CCT2E22).		
	CBOT	Report that 2TE-0374('A' MFP) and 2TE-0371('B' MFP) are > 135°F and trending up. Also Report that bearing metal temperatures are also trending up.
	CBOT	Report that MFP Lube Oil TEMP Controller (2TIC-5283) has zero output. Take manual control of controller and control MFP lube oil temperature < 135°F.
	CBOT	Report that PMS point T0361 has failed low. (P&ID M-2216 sh2, E7 & M-2234 sh 1, G-2)
Termination Criteria: When MFP Lube Oil controller is in manual and controlling MFP lube oil temperature or at examiner's discretion.		

Op-Test No.: 1 Scenario No.: 1 Event No.: 4 Page 8 of 16 Event Description: RCP 2P32B Lower and Middle Seal failures requiring a plant shutdown.		
Time	Position	Applicant's Actions or Behavior
	CBOR	Announce alarm 2K11-G3 RCP BLEEDOFF FLOW HI/LO. Report lower seal failure on “B” RCP.
	CRS	Refer to **RCP Emergencies AOP 2203.025** and direct board operator actions.
	CBOR CBOT	Monitor RCP seals for further degradation. Report middle seal failure on “B” RCP.
	CRS	Setup contingency to trip reactor and RCP if upper seal fails. **Refer to OP 2102.004 Power Operations** and commence a plant shutdown. Notify NLOs, Management, Dispatcher, Chemist, and Nuclear Eng.
	CBOR	Commence boration ~ 20 gpm. Maintain ASI –0.20 to +0.20 with Group 6 or P CEAs.
	CBOT	Reduce main turbine load to maintain Tave within 2° F of Tref.
Termination criteria: Plant shutdown in progress or at examiner’s discretion.		

Op-Test No.: 1 Scenario No.: 1 Event No. 5, 6 , 7 & 8 Page 9 of 16

Event Description: RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP; Loss of Coolant Accident after Reactor trip due to vapor seal leakage; 'A' HPSI pump fails to auto start due to faulty ESF relay; 'B' HPSI pump fails due to breaker fault.

Time	Position	Applicant's Actions or Behavior
	CBOR	Announce Upper Seal failure on "B" RCP (third seal). Manually trip reactor. Secure 'B' RCP and place associated spray valve in MANUAL and closed.
	CRS	**Implement Standard Post Trip Actions, 2202.001** Notify operators to monitor Exhibit 7 CBO Reactor Trip Checklist, track safety functions, and direct board operator actions.
	CBOR	**Check reactivity control:** Reactor power decreasing. All CEAs inserted.
	CBOT	**Check maintenance of vital auxiliaries:** Main turbine tripped. Generator output and exciter breakers open. Both 4160v and 6900 v non-vital buses energized. Both 4160v and 480v vital AC bus energized. Both 125v vital DC bus energized.
	CBOR	**Check inventory control:** PZR level 10 to 80%. Trend from setpoint. RCS MTS > 30°F

Continue to next page

Op-Test No.: 1 Scenario No.: 1 Event No. 5, 6 , 7 & 8 Page 10 of 16

Event Description: RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP; Loss of Coolant Accident after Reactor trip due to vapor seal leakage; 'A' HPSI pump fails to auto start due to faulty ESF relay; 'B' HPSI pump fails due to breaker fault.

Time	Position	Applicant's Actions or Behavior
CT	CBOR	**Check RCS pressure control:** RCS pressure 1800 to 2250 psia. Trend from setpoint Verify SIAS when pressure less than 1650 psia. Trip one RCP in each loop when pressure less than 1400 psia. (may not be done until LOCA procedure) Place spray valve for secured RCP in manual closed. **Secure ALL RCPs if NPSH requirements violated.**
	CBOR	**Check core heat removal by forced circulation:** RCP status Loop Δ T less than 10° F. RCS MTS 30° F or greater. Component cooling water aligned to RCPs. Service water not aligned to CCW.
	CBOT	**Restore SW to CCW using Exhibit 5.**
	CBOT or CBOR	**Check RCS Heat Removal:** Report SG levels. MFW in RTO (Reactor Trip Override). Report feedwater line intact. Report SG pressures.
	CBOR	Report RCS Tc 540 to 555°F.

Continue to next page

Op-Test No.: 1 Scenario No.: 1 Event No. 5, 6 , 7 & 8 Page 11 of 16
Event Description: RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP; Loss of Coolant Accident after Reactor trip due to vapor seal leakage; 'A' HPSI pump fails to auto start due to faulty ESF relay; 'B' HPSI pump fails due to breaker fault.

Time	Position	Applicant's Actions or Behavior
	CBOR	**Check CNTMT parameters:** Temperature less than 140° F and trending up. Pressure less than 16 psia and trending up. CNTMT Spray Pumps secured. Status of radiation alarms: CAMS (2K10-B6) In alarm Area radiation (2K11-B10) in alarm. Process liquid (2K11-C10) Report trends on radiation monitors increasing. Status of SEC SYS RADIATION HI (2K11-A10) Report trends on secondary system radiation monitors stable.
	CRS	Notify SM to perform the following: SE report to control room. Announce reactor trip on plant page. Refer to Tech Specs and EALs. **Tech Specs 3.0.3, 3.6.3.1 and in Alert Emergency Class**
	CRS	Direct CBOs to acknowledge all control room annunciators and announce all significant alarms. **Diagnose Loss of Coolant Accident EOP 2202.003.**
	CRS	Implement Loss of Coolant ORP, open place keeping page, and direct board operators' actions.
	CRS	Perform crew brief and review floating steps.
	CRS	Contact chemistry to sample SG for activity

Continue to next page

Op-Test No.: 1 Scenario No.: 1 Event No. 5, 6 , 7 & 8 Page 12 of 16

Event Description: RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP; Loss of Coolant Accident after Reactor trip due to vapor seal leakage; 'A' HPSI pump fails to auto start due to faulty ESF relay; 'B' HPSI pump fails due to breaker fault.

Time	Position	Applicant's Actions or Behavior
	CBOR	Verify SIAS and CCAS actuated on PPS inserts.
	CBOT	Verify CCW aligned to RCPs **(Floating Step)**
CT	CBOR	Check RCS pressure greater than 1400 psia. **(Floating Step)** • Secure one RCP in loop 2 (if not done in SPTA's). • Secure ALL RCPs if MTS <30°F.
	CBOT	Restore ESF/Non-ESF systems: **(Floating step)** • Verify at least one SW pump running in each loop. • Verify DG SW outlet valves open. • Verify SW suction aligned to Lake. • Check 4160v Non-vital buses energized from offsite power. • Check 4160v Vital buses energized from offsite power. • Start SW pumps as needed to maintain header pressure. • Restore SW to ACW per Exhibit 5. • Maintain SW header greater than 85 psig.

Continue to next page

Op-Test No.: 1 Scenario No.: 1 Event No. 5, 6 , 7 & 8 Page 13 of 16

Event Description: RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP; Loss of Coolant Accident after Reactor trip due to vapor seal leakage; 'A' HPSI pump fails to auto start due to faulty ESF relay; 'B' HPSI pump fails due to breaker fault.

Time	Position	Applicant's Actions or Behavior
CT	CBOT	Verify HPSI flow to RCS: Report A HPSI pump failure to auto start and manually start. Report B HPSI Pump breaker trip. Manually start 'C' HPSI pump (Only one HPSI pump is required to be started).
	CBOT	Verify all CNTMT Cooling Fans running in emergency mode.
	CBOT	Verify SG levels greater than 22.2%. **(Floating Step)**
	CBOT	Align Feedwater: • Check EFW pump 2P7B running. • Secure EFW pump 2P7A. • Verify AFW pump 2P75 secured. • Secure running MFW pump and close ALL FW blocks.
	CBOT	Verify CCW surge tank constant and CCW radiation monitor trend stable.
	CBOR	Check LOCA is limited to containment. • Containment sump level going up. • Containment temperature, humidity and pressure are going up. • Auxiliary Building radiation levels steady. • Auxiliary building sump is less than 53%. • Waste tanks 2T20 A/B levels are steady.

Continue to next page

Op-Test No.: 1 Scenario No.: 1 Event No. 5, 6 , 7 & 8 Page 14 of 16 Event Description: RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP; Loss of Coolant Accident after Reactor trip due to vapor seal leakage; 'A' HPSI pump fails to auto start due to faulty ESF relay; 'B' HPSI pump fails due to breaker fault.		
Time	Position	Applicant's Actions or Behavior
	CBOR	Check CNTMT Isolation parameters. **(Floating Step)** CNTMT pressure exceeds 18.3 psia. CNTMT RADIATION HI alarm 2K10-A6 in alarm. Actuate CIAS and commence Attachment 5. Verify ONE Penetration Room Ventilation Fan Running.
	CBOR	Check CNTMT pressure trend not exceeded 23.3 psia. **(Floating Step)** • Verify CSAS actuated on PPS inserts. • Stop ALL RCPs, place spray valves in manual closed. • Verify spray pumps running with greater than 1875 gpm each.
	CBOT	Terminate CNTMT Spray if conditions met.
	CBOT	Start both Hydrogen Analyzers per 2104.044.
	CBOT	Verify All available miscellaneous CNTMT ventilation running: • CNTMT Bldg. Recirc fans (2VSF-31A-D) • Reactor Cavity fans (2VSF-34A&B) • Three CEDM Shroud Cooling fans (2VSF-35s)
Continue to next page		

Op-Test No.: 1 Scenario No.: 1 Event No. 5, 6 , 7 & 8 Page 15 of 16

Event Description: RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP; Loss of Coolant Accident after Reactor trip due to vapor seal leakage; 'A' HPSI pump fails to auto start due to faulty ESF relay; 'B' HPSI pump fails due to breaker fault.

Time	Position	Applicant's Actions or Behavior
	CBOT	Check ALL AC and vital DC buses energized. **(Floating Step)**
	CBOR	Check IA pressure greater than 65 psig. **(Floating Step)**
	CRS	Check **LOCA not isolated and proceed to Section 3**
	CBOR	Perform controlled cooldown to 275°F. **(Float Step)** • Reset low PZR pressure and low SG pressure setpoints. • Record and plot cooldown on Attachments 1 and 8. Initiate cooldown using SDBCS bypass valves.
	CBOT	Check Condensate pump in service.
	CBOT	Maintain SG levels 45 to 90%. Check CST level greater than 82%
	CBOR	Restore PZR level. **(Floating Step)** Maintain 29% to 80%
	CBOR	Verify Natural Circulation if RCPs secured: • Loop ΔT less than 50° F. • Thot and Tcold constant or lowering. • RCS MTS 30° F or greater. • ΔT between Thot and average CETs less than 10° F.

Continue to next page

Op-Test No.: 1 Scenario No.: 1 Event No. 5, 6 , 7 & 8 Page 16 of 16

Event Description: RCP 2P32B Upper Seal Failure requiring manual Reactor trip and securing of 'B' RCP; Loss of Coolant Accident after Reactor trip due to vapor seal leakage; 'A' HPSI pump fails to auto start due to faulty ESF relay; 'B' HPSI pump fails due to breaker fault.

Time	Position	Applicant's Actions or Behavior
	CRS	Check that RCP restart criteria is NOT met.
	CBOR	Check RCS void free: • PZR level stable using aux spray. • RVLMS LVL 01 indicates WET. • Upper head thermocouples indicate subcooled.
	CBOR	Maintain RCS P-T limits and RCP NPSH per Attachment 1. Check uncontrolled RCS cooldown below 500° F Tcold has not occurred.
CT	CBOT CBOR	Override HPSI when termination criteria met: **(Floating Step)** • RCS MTS 30° F or greater. • PZR level greater than 29% and controlled. • RVLMS LVL 03 or higher indicates WET. • At least one SG available – Level 10 to 90% with FW available OR level being restored with FW flow greater than 485 gpm. Throttle HPSI flow OR place HPSI pump in PTL as needed to control RCS pressure, inventory, and heat removal.

Termination criteria: Cooldown in progress with HPSI throttled or at examiner's discretion.

Facility: ANO-2	Scenario No.: 2 (New)	Op-Test No.: 2003-1
		Page 1 of 13

Examiners:		Operators:

Initial Conditions:
70% and decreasing. Down Power commenced from 100% due to Rod Drop (CEA # 46). Azimuthal Tilt in Alarm and continuing power decrease.

Turnover:
Continue power decrease to 50% due to Azimuthal Tilt Alarm. Azimuthal Tilt has not cleared with the Power Reduction. CEA 46 dropped to bottom ~ 80 minutes ago and has been re-aligned with other CEA's in Group 6. Entered AOP 2203.003, CEA Malfunctions. Green Train Maintenance week. EOOS indicates 'Minimal Risk.'

Event No.	Malf. No.	Event Type*	Event Description
1 CUED	XSG2LT11311	I (CBOT)	Steam Generator "B" Safety Channel Level Fails LOW.
2 T=0	POWER REDUCTION	N (ALL) R (CBOR)	Continue Power REDUCTION
3 T+10 From T1	XCVLDNHXOU	I (CBOR)	Letdown Heat Exchanger Outlet Temperature Transmitter fails LOW
4 T=0	CEA48STUCK Value = 80%	C(CBOR)	Degraded Rod Motion for CEA 48 on Controlling CEA Bank. This requires individual CEA adjustment to align the CEA with the CEA bank.
5 CUED	EHLEAK (NEW)	M(ALL)	Leak in Electro Hydraulic System resulting in Loss of EH Pressure to Main Turbine and MFPs resulting in Manual/Automatic Reactor Trip.
6 RX TRIP	MS1002 (Set to 0#)	M (ALL)	Main Steam Safety Valve OPENS and Fails to CLOSE on "A" Steam Generator resulting in an ESD outside Containment
7 EFAS	ESF1025 2CV10382_A	C (CBOT)	'B' EFW isolation valves to 'A' SG fail to close, one automatically and one with valve failure. This results in continued EFW Feed to Affected Steam Generator.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO #2 NARRATIVE

Simulator session begins with the plant at 70% power and a power reduction in progress. Annunciator 2K10-B2, TECH SPEC AZ TILT EXCEEDED and 2K10-C2, CPC AZ TILT EXCEEDED are in alarm. Direction from Reactor Engineering has been given to continue reducing power to less than 50% in the next 30 minutes (40 minutes is the Tech Spec required time). The crew will enter OP 2102.004, Power Operations procedure, step 11.16, Power Reduction. The CBOR will start a power reduction by RCS boration and lowering turbine load on the turbine load potentiometer to maintain Tave-Tref within 2°F.

During the down power,Axial Shape Index (ASI) will become more negative; to maintain ASI within .01 of Equilibrium Shape Index (ESI), Group 6 CEA's will need to be inserted. As Group 6 CEAs are inserted, CEA 48 will lag behind the other four CEA's in the group. Annunciators 2K04-J5 CEAC #1 DEVIATION and 2K04-J6, CEAC#2 Deviation (5") may alarm. PMS CEA Annunciator 2K10-D1, CEA Minor Deviation (3") or 2K10-C1, CEA Major Deviation (6") may also alarm. Manual Individual CEDMCS operation will be needed to align CEA 48 with the rest of the group.

When Reactivity manipulation completed and on lead examiner's cue, 2LT-1131-1, safety channel for 'B' Steam Generator (SG) Level, will fail low. This will trip one of the four PPS trip channels for low SG level trip. Alarms for RPS Channel Trip/Pre-trip and Channel 'A' Operator Insert (2C03) trip and pre-trip lights will be lit. The CRS will refer to the ACA 2203.012D and Tech Specs 3.3.1.1, 3.3.2.1 and 3.3.3.5 for guidance. The CBOT will place Channel 'A' PPS in bypass for Point 8, LOW SG B Lvl, Point 10, HI SG B Lvl, and Point 20, SG B ?P for maintenance and trouble shooting. The crew will have one hour to place these points in bypass before exceeding the Tech Spec LCO.

Approximately 10 minutes after SG Level transmitter fails low, the Letdown Heat Exchanger temperature transmitter, 2TIC-4815, fails low. This will cause the temperature controller to close and actual Letdown temperature to go up. With no operator action, the Letdown Radiation Monitor will be isolated, the Letdown Demineralizer will be bypassed and the VCT temperature will rise. Annunciator 2K11-C1, Letdown HX 2E29 Outlet Temp Hi will alarm. CRS will refer to ACA for 2K11-C1 and direct actions. CBOR will evaluate 2HIC-4815 and report that demand out of HIC is zero and temperature indicated is zero. CBOR or CBOT will look at PMS computer point T4805 and report that letdown temperature is above alarm set point. CBOR will place 2HIC-4815 in manual and control CCW flow from the Letdown Heat Exchanger to maintain letdown temperature less than 140°F. CRS will contact the WCO and ask flow on 2FIS-5261, CCW flow out of Letdown Heat Exchanger. If letdown temperature exceeded 145°F, letdown flow through the letdown radiation monitor must be manually restored.

SCENARIO #2 NARRATIVE (Continued)

When cued by the lead examiner, an EH leak will start down stream of isolation valve 2EH-1A (on EH Pump Skid) on the common header. EH pressure will degrade to ~1300psig over the next 3 minutes. Annunciator 2K02-A9, LOW EH Pressure, will alarm and the standby EH pump will automatically start. EH pressure will rise and then lower again as the leak worsens. Annunciator 2K02-C10, EH Tank Low Level will alarm about 5 minutes after the start of the malfunction. The Main Turbine Generator will automatically trip at 1100 psig EH pressure. The Main Feed Pumps will automatically trip at 400 psig EH pressure. The crew will secure the EH pumps and the CRS will enter SPTA's.

Post reactor trip the Main Steam Safety Valve (2PSV-1002) on 'A' SG will fail open resulting in an Excess Steam Demand (ESD) outside containment. Also, post EFAS, Emergency Feed Actuation Signal, 2CV-1038-2, 'B' EFW Pump to 'A' SG will mechanically fail to close and 2CV-1025-1, 'B' EFW Pump to 'A' SG will fail to close due to a stuck relay. This will result in severe overcooling of the RCS, if not corrected. The CBOT will override 2CV-1025-1 and close.

Simulator Instructions for Scenario 2

Reset simulator to MOL 70% power IC normal system lineup.

Group 6 is inserted for ASI control.

Markup OP 2102.004, Power Operations up to step 11.16 for power reduction.

Place Green train maintenance week sign in simulator.

2K10-B2, Tech Spec AZ Tilt Exceeded alarm in.

2K10-C2, CPC AZ Tilt Exceeded alarm in.

Triggers T1, T3, and T4 are set to False.

Conditional Trigger T2 is set to Reactor trip.

Conditional Trigger T5 is set to EFAS-1.

Event No.	Malf. No.	Value/ Ramp Time	Event Description
1	XSG2LT11311 Trigger T1	0	Steam Generator “B” Safety Channel Level Fails LOW.
2	POWER REDUCTION		Continue Power REDUCTION
3	XCVLDNHXOU Trigger T3	50°F	Letdown Heat Exchanger Outlet Temperature Transmitter fails LOW
4	CEA48STUCK	80%	Degraded Rod Motion for CEA 48 on Controlling CEA Bank. This requires individual CEA adjustment to align the CEA with the CEA bank.
5	EHLEAK Trigger T4	TRUE	Leak in Electro Hydraulic System resulting in Loss of EH Pressure to Main Turbine and MFPs resulting in Manual/Automatic Reactor Trip.
6	MS1002 Trigger T2	0 Ramp = 20 min.	Main Steam Safety Valve OPENS and Fails to CLOSE on “A” Steam Generator resulting in an ESD outside Containment
7	ESF1025 2CV10382_A 2HS-1038-2_R Trigger T5	TRUE 1.0 FALSE TD 20 sec.	‘B’ EFW isolation valves to ‘A’ SG fail to close. 2CV-1025-1 fails to automatically CLOSE. 2CV-1038-2 fails to CLOSE due to valve failure. This results in continued EFW Feed to AFFECTED Steam Generator.

Op-Test No.: 1 Scenario No.: 2 Event No.: 1 Page 5 of 15

Event Description: Steam Generator "B" Safety Channel Level Fails LOW.

Time	Position	Applicant's Actions or Behavior
	CBOR	Announce annunciators: 2K04-A4, CH A RPS/ESF/PRETRIP/TRIP 2K04-B3, PPS Channel TRIP 2K12-K7, DEFAS Trouble
	CRS	Implement Annunciator Corrective Action AOP 2203.012D.
	CBOR	Report B SG level low pretrip/trip on 'A' PPS insert.
	CBOT	Compare all four channels and report 2LI-1131-1 indicates zero.
	CRS	Inform SM to refer to Tech Spec **3.3.1.1 and 3.3.2.1** and TRM **3.3.1.1.**
	CBOT	Place the following points in bypass on PPS Channel A: LOW SG B Lvl (Point 8) HI SG B Lvl (Point 10) SG B ΔP (Point 20)
	CBOR	Verify annunciator 2K04-C3, PPS CHANNEL BYPASSED alarms. Verify correct channels in bypass.
	CRS	Contact Maintenance/Work Week Manager.

Termination criteria: Affected points are placed in bypass or at examiner's discretion.

Op-Test No.: 1 Scenario No.: 2 Event No.: 2 Page 6 of 13

Event Description: Continue Power REDUCTION

Time	Position	Applicant's Actions or Behavior
	ALL	Crew will conduct brief for power decrease.
	CRS	Implement normal operating procedure 2102.004, Power Operations, Section 11.0. (Step11.16) Direct CBOR to borate to lower RCS temperature and adjust turbine load using load set potentiometer.
	CBOR	Commence RCS boration using OP 2104.003, Chemical Addition, Exhibit 3, Normal Boration At Power. Verify Boric Acid Makeup Controller in Auto at desired flow rate. Verify selected Boric Acid Pump in Normal-After-Stop. Verify Mode Selector Switch (2HS-4928) in BORATE. Verify 2CV-4830, Charging Pump Suction from Boric Acid, opens. Verify selected Boric Acid Pump running. Open associated Boric Acid Pump Recirc valve. Depress red push button on Boric Acid Makeup Batch Controller, 2FIQS-4926 and verify it is set for proper quantity. Verify 2FIC-4926 indicates proper flow rate. Monitor Tave and ASI. Obtain PEER check.
	CBOR	Adjust turbine load to maintain reference temperature and RCS average temperature within two degrees. Obtain PEER check.
	CBOR	Maintain ASI within 0.05 of power dependant ESI by withdrawing CEA's. Obtain PEER check and CRS permission to withdraw CEA's.

Termination criteria: Reactivity manipulation observed or at examiner's discretion.

Op-Test No.: 1 Scenario No.: 2 Event No.: 3 Page 7 of 11

Event Description: Letdown Heat Exchanger Outlet Temperature Transmitter fails LOW.

Time	Position	Applicant's Actions or Behavior
	CBOR	Announce Annunciator 2K12-C1, Letdown HX 2E29 Outlet Temp HI Verify temperature 2TIS-4815 is reading zero.
	CRS	Refer to ACA for 2K12-C1 and direct Board Operator actions.
	CBOR or CBOT	Verify Computer point T4805 and 2C09 TIS-4805 are reading greater than 140°F.
	CBOR	Verify normal letdown flow.
NOTE: When contacted as WCO, Report CCW flow rate based on approximate demand of 2TIC 4815. (Until manual control is initiated the flow rate is zero, the maximum flow rate is 1200 gpm.)		
	CRS	Contact WCO to verify CCW flow through Letdown Heat Exchanger using 2FIS-5261.
	CBOT	Report CCW Loop II temperature from 2C14.
	CBOR	Report that 2TIC-4815 is not controlling CCW flow in Automatic and take manual control of 2TIC-4815 and raise CCW flow through the Letdown Heat Exchanger to maintain Letdown temperature less than 140°F.
	CBOR	If Letdown temperature went above 145°F, then verify: • That the Letdown To Ion Exchanger valve, 2CV-4803, is in bypass • That the Letdown To Radmonitor valve, 2CV-4804, is closed.
	CBOR	When Letdown temperature drops below 140°F, then verify: • That the Letdown To Ion Exchanger valve, 2CV-4803, is NOT in bypass • Take the Letdown to Radmonitor valve, 2CV-4804, closed then open.
	CRS	Contact Maintenance / Work Week Manager.
Termination criteria: Letdown Heat Exchanger temperature controller, 2TIC-4815 is in manual and controlling Letdown temperature less than 140°F.		

Op-Test No.: 1 Scenario No.: 2 Event No.: 4 Page 8 of 13

Event Description: Degraded Rod Motion for CEA 48 on Controlling CEA Bank.

Time	Position	Applicant's Actions or Behavior
	CBOR	Announce CEA 48 position indication deviating from rest of bank: • CEAC 1 or 2 indication • Announce Annunciator 2K04-J5, CEAC #1 Deviation and 2K04-J6, CEAC#2 Deviation alarms. Report 5" deviation. • Announce PMS CEA Annunciator 2K10-D1, CEA Minor Deviation. Report 3" deviation. • Announce Annunciator 2K10-C1, CEA Major Deviation alarm. Report 6" deviation.
	CRS	Direct Manual Individual CEDMCS operation to align CEA 48 with the rest of the group.
	CBOR	Align CEA 48 with rest of group by Manual Individual operation of CEDMCS and insert CEA 48 until it is aligned with the other four CEA's in Group 6. Obtain PEER Check.

NOTE: This evolution may occur more than once during the scenario. It is dependant on the magnitude of power reduction.

Termination Criteria: Event may be terminated when CEA 48 is aligned with the rest of the CEA's in Group 6 or at the discretion of the lead examiner.

Op-Test No.: 1 Scenario No.: 2 Event No.: 5 Page 9 of 13

Event Description: Leak in Electro Hydraulic System resulting in Loss of EH Pressure to Main Turbine and MFPs resulting in Manual/Automatic Reactor Trip.

Time	Position	Applicant's Actions or Behavior
	CBOT	Report Annunciators 2K02-A9, EH Header Press LO and 2K02-B9, EH Pump 2P14A/B Auto Start are in alarm and report that Standby EH Pump 2P14B automatically started.
	CRS	Refer to ACA for 2K02-A9 and direct actions.
	CBOT	Report EH pressure is less than 1300 psig and lowering.
NOTE: When contacted by CRS, report that EH fluid is spraying into EH pit area from a break on the common EH discharge header down stream of isolation valve 2EH-1A and is a large leak.		
	CRS	Direct AO to investigate EH system.
	CBOT	Report Annunciator 2K02-C10, EH Tank 2T38 Level Hi/LO is in alarm.
	CRS	Refer to ACA for Annunciator 2K02-C10, EH Tank 2T38 Level Hi/LO and direct actions.
	CBOT	Monitor EH pressure and report that pressure is approaching Main Turbine Generator (MTG) trip set point and recommend manually tripping the plant.
	CBOT	Report that the MTG is tripped.
	CRS	Direct CBOR to manual trip the reactor.
	CBOR	Manually trip the reactor.
	CBOT	Place both EH pumps in PTL. Manually trip the MFP's or report that they have tripped on low EH pressure.
Termination Criteria: Event may be terminated when the reactor is tripped.		

Op-Test No.: 1 Scenario No.: 2 Event No.: 6 and 7 Page 10 of 13

Event Description: On reactor trip one MSSV on 'A' SG, 2PSV-1002, will stick open. On EFAS actuation, the 'B' EFW isolation valves to 'A' SG, 2CV-1038-2 and 2CV-1025-1 will not close. Implement SPTA's and diagnose event.

Time	Position	Applicant's Actions or Behavior
	CREW	Announce reactor trip.
	CRS	**Implement 2202.001, Standard Post Trip Actions,** track safety functions, and direct board operator actions.
	CRS	Direct crew to use Exhibit 7, CBO Reactor Trip Checklist, track safety functions, and that the CRS has control of annunciator horn during moment of silence.
	CRS	Directs crew to take control of annunciator horns and implement SPTA's.
	CBOR	**Check reactivity control:** Report reactor power lowering. Report all CEA's are inserted.
	CBOT	**Check maintenance of vital auxiliaries:** Report main turbine tripped. Report generator output and exciter breakers open. Report both 4160vac and 6900vac non-vital buses energized form S/U #3. Report both 4160v and 480v vital AC bus energized from S/U #3. Report both 125v vital DC bus energized.
	CBOR	**Check inventory control:** Report PZR level 10 to 80%. Report PZR level NOT trending to setpoint. Report RCS MTS greater than 30 °F

Event 6&7 Continued.

Op-Test No.: 1 Scenario No.: 1 Event No.: 6 & 7 Page 11 of 13

Event Description: On reactor trip one MSSV on 'A' SG, 2PSV-1002, will stick open. On EFAS actuation, the 'B' EFW isolation valves to 'A' SG, 2CV-1038-2 and 2CV-1025-1 will not close. Implement SPTA's and diagnose and mitigate event.

Time	Position	Applicant's Actions or Behavior
	CBOR	**Check RCS pressure control:** Report RCS pressure 1800 to 2250 psia. May be lower than 1800 due to the RCS cooldown.
	CBOR	**Check core heat removal by forced circulation:** Report RCP's are running. Report CCW is aligned to RCP's. Report SW is aligned to CCW.
	CBOT	**Check RCS Heat Removal:** Report SG levels are lowering. Report all condensate pumps are secured. Report both MFW pumps are secured. Manually actuate EFAS, if not already actuated. Report that a SG safety valve is open and depressurizing the SG. **Manually actuate MSIS or announce that MSIS has been automatically actuated.** CRS can direct the CBOT to setup to maintain post SG lowdown RCS temperature using upstream ADV on 'B' SG.
	CBOR	Report RCS Tc 540 to 555°F and slowly lowering.
CT	CBOT	Close 2CV-1025-1 by overriding EFAS actuation or secure 2P7B, Motor Driven EFWP to secure feeding the AFFECTED SG.

Event 6&7 Continued.

Op-Test No.: 1 Scenario No.: 2 Event No.: 6 & 7 Page 12 of 13

Event Description: On reactor trip, one MSSV on 'A' SG, 2PSV-1002, will stick open. On EFAS actuation, the 'B' EFW isolation valves to 'A' SG, 2CV-1038-2 and 2CV-1025-1 will not close. Implement SPTA's and diagnose event.

Time	Position	Applicant's Actions or Behavior
	CBOR	**Check CNTMT parameters:** Report temperature less than 140° F. Report pressure less than 16 psia. Report containment spray pumps secured. Report status of radiation alarms: CAMS (2K10-B6) not in alarm Area radiation (2K11-B10) not in alarm Process liquid (2K11-C10) not in alarm Report stable trends on radiation monitors. Report SEC SYS RADIATION HI (2K11-A10) not in alarm. Report stable trends on secondary system radiation monitors.
	CRS	Notify SE to report to control room. Announce reactor trip on plant page. Notify SM to refer to Tech Specs and EALs. **(3.7.1.2 EFW valve failure and NUE – 3.1, Uncontrolled depressurization of secondary that results in MSIS actuation)**
	CRS	Direct CBOs to acknowledge all control room annunciators and announce all significant alarms. Notify crew of status of Safety functions. Diagnose EXCESS STEAM DEMAND event on 'A' SG. Conduct crew brief.

Event 6 & 7 Continued.

Op-Test No.: 1 Scenario No.: 2 Event No.: 6 & 7 Page 13 of 13

Event Description: On reactor trip, one MSSV on 'A' SG, 2PSV-1002, will stick open. On EFAS actuation, the 'B' EFW isolation valves to 'A' SG, 2CV-1038-2 and 2CV-1025-1 will not close. Implement SPTA's and diagnose event.

Time	Position	Applicant's Actions or Behavior
	CRS	Implement EXCESS STEAM DEMAND Event EOP 2202.006. Direct board operators in performing the below actions.
	CBOR	Verify one RCP in each loop if RCS pressure drops less than 1400 psia and associated spray valve in manual and closed.
CT	CBOT	Maintain Post SG Blowdown RCS temperature and pressure less than 200°F margin to saturation by steaming the 'B' SG using the Upstream Atmospheric Dump Valve.
CT	CBOR	Maintain Post SG Blowdown RCS temperature and pressure less than 200°F margin to saturation by controlling RCS pressure using Normal Spray or Auxiliary Spray.
	CBOR CBOT	Maintain PZR level by overriding HPSI.

Event Termination: RCS temperature is maintained using Upstream ADV on 'B' SG and RCS pressure is maintained using Normal or Auxiliary Spray or at the discretion of the lead examiner.

Facility: ANO-2 Scenario No.: 3 Op-Test No.: 2003-1

Examiners:		Operators:

Initial Conditions:

100% MOL; Thunderstorm Watch for Pope and Conway counties.

Turnover::

National Weather service has issued a Thunderstorm Watch for Pope and Conway Counties until 8:00 pm today. AOP 2203.008, Natural Emergencies, Section 3, Tornado, steps 1 and 2 have been completed. Call 890-4987 for weather updates.

Event No.	Malf. No.	Event Type*	Event Description
1	500BRK5106 500BRK5110	N (ALL) R (CBOR)	Mabelvale 500KV line failure. Site must reduce load to 1250MW total net generation. Unit One will reduce turbine load to 350MW. Unit 2 will reduce turbine load to 900 MW in 15 minutes.
2 CUED	XRCCHAPLVL	I (CBOR)	'A' Pressurizer Level Control Channel fails LOW.
3 10 Min after event 2	CVC2P36BFAL	C (CBOR)	'B' CCP breaker trip.
4 CUED	RCSPZSTMLK RPSRXAUTO RPSRXMAN RPSDSSAUTO RPSDSSMAN	M (ALL)	PZR Steam Space leak. RPS/DSS fail to manually and automatically trip. Open feeder breakers to MG sets.
5 TRIP	CEA52STUCK	C (CBOR)	Stuck CEA # 52 on Reactor trip.
6 EFAS	MFWPMPATRP 2CV-0332 EFW2P7BESF	C (CBOT)	'A' MFP trip. 'A' EFW pump over speed trip on startup. 'B' EFW pump fails to auto start.
7 CUED	416_2A306	C (CBOT)	'A' HPSI trip after verification.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO #3 NARRATIVE

When crew takes the watch, the Systems Dispatcher will call the Control Room and report that the 500 KV line to Mabelvale has failed and the ANO site output must be reduced to less than 1250 MW within 15 minutes. Unit 2 must reduce load to 900 MW gross output within 15 minutes. The CRS will enter Attachment 'H' of OP 2102.004, Power Operations, and direct the CBOR to borate and reduce turbine load to maintain Tave –Tref within 2°F.

After the CBOR has completed the required reactivity manipulation, the in-service Pressurizer (PZR) Control Channel Level instrument will fail low. Alarms on Control Channel 1 Level LO and Level LO LO will come in. This will result in Letdown going to minimum flow, the two backup CCP's will automatically start, all PZR heaters will de-energize and actual PZR level will go up. AOP 2203.018, PZR Systems Malfunctions, will be entered and actions directed by the CRS. The CBOR will take the Letdown Flow Controller to manual and control PZR level. The CBOR will also verify that the other level control channel is reading correctly and select that channel for control and place the PZR Low Level Cutoff switch to the unaffected channel. When the auto and manual signals are matched, the CBOR will place the Letdown Flow Controller to automatic. The CRS will determine that TS 3.3.3.5 and 3.3.3.6 are applicable.

Approximately 10 minutes after the PZR Level Control Channel fails low, 'B' CCP breaker will trip. The CRS will enter the Loss Of Charging AOP. The crew will determine that the CCP breaker tripped and start a backup CCP. Letdown may isolate on high Regen Heat Exchanger temperature, depending on the promptness of starting the Backup CCP. If letdown isolated, then, letdown will be restored using 2104.002, CVCS.

When Charging and Letdown have been restored, a PZR Steam Space leak in excess of PZR heaters capacity to maintain pressure will begin. PZR pressure will drop rapidly and the crew will manually trip the reactor. Both the RPS and DSS manual and auto pushbuttons will fail to actuate a reactor trip. The CRS will direct the CBOT to open the feeder breakers to the MG sets, 2B712 and 2B812. CRS will identify 3.0.3 applicability due to the failure of all manual trip pushbuttons. When the reactor is tripped, one CEA will fail to insert requiring the CBOR to perform Exhibit 1, Emergency Boration. The CRS will enter Standard Post Trip Actions and determine safety function status and diagnose a LOCA. During SPTA's the crew will verify SIAS, CCAS actuations. The Crew will secure ALL RCP's when Margin to Saturation conditions are reached. When RCS Heat removal safety function is evaluated, EFW will be manually actuated due to the trip of 'A' MFP. Upon EFAS

actuation ‘A’ EFW pump will overspeed trip and ‘B’ EFW pump will fail to auto start. The CBOT will manually start ‘B’ EFW pump.

SCENARIO #3 NARRATIVE (continued)

After SIAS has been verified to be operating correctly, ‘A’ HPSI pump will trip. The CBOT will place the handswitch for ‘A’ HPSI in PTL and manually start ‘B’ HPSI pump. The crew will complete the entry section for LOCA procedure and determine that the LOCA is an unisolated event and the CRS will implement Section 3 of the LOCA procedure. The crew will start an RCS cooldown to SDC.

Simulator Instructions for Scenario 3

Reset simulator to MOL 100% power IC.
Align swing pumps (HPSI and SW) to the Red train, except for Charging.
Markup AOP 2203.008, Natural Emergencies Section 3, Tornado steps 1 & 2.
Ensure that AACG is secured and annunciators clear.
'B' CCP is selected as lead pump.
Place MINIMAL RISK and Green Train Maintenance Week signs on 2C100.
T1, T3, T4, T5, T7 set to false.
T2 set to RXTRP; T6 set to EFAS 1.

Event No.	Malf. No.	Value/ Ramp Time	Event Description
1	500BKR5106 500BKR5110 Trigger = T1	TRUE	Mabelvale distribution line failure.
2	XRCCHAPLVL Trigger = T3	0	'A' Pressurizer Level Control Channel fails LOW.
3	CVC2P36BFAL Trigger = T4	TRUE	'B' CCP breaker trip.
4	RCSPZSTMLK Trigger = T5 RPSRXAUTO RPSRXMAN RPSDSSAUTO RPSDSSMAN TRUE	50 Ramp = 5 min.	PZR Steam Space Leak RPS/DSS fail to manually and automatically trip. Open feeder breakers to MG sets.
5	CEA52STUCK	0	Stuck CEA 52 on Reactor trip.
6	MFWPMPATRP Trigger T2 2CV-0332 EFW2P7BESF Trigger T6	TRUE 0 TRUE	'A' MFP trip. 'A' EFW pump over speed trip on startup. 'B' EFW pump fails to auto start.
7	416_2A306	LCK-	'A' HPSI pump trips after verification and entry into

	Trigger = T7	OP	LOCA EOP.

Op-Test No.: 1 Scenario No.: 3 Event No.: 1 Page 6 of 152

Event Description: Mabelvale distribution line failure.

Time	Position	Applicant's Actions or Behavior
Simulator operator's cue: When directed by lead examiner; call the CRS as the System Dispatcher with the following direction: "The 500KV line to Mabelvale has been damaged and ANO's net generation must be reduced to 1250KW within the next 15 minutes. Unit One will reduce load to 350 MW and Unit Two will reduce load to 900 MW gross output."		
	ALL	Crew will conduct brief for RAPID power reduction to net Unit 2 Generation of 900 MW.
	CRS	Implement normal operating procedure 2102.004, Power Operations Section 11.0, Power Reduction and refer to Attachment 'H' for rapid power reduction.
	CBOR	Commence RCS Boration using OP 2104.003, Chemical Addition, Exhibit 3, Normal Boration At Power. Verify Boric Acid Makeup Controller in Auto at desired flow rate. Verify selected Boric Acid Pump in Normal-After-Stop. Verify Mode Selector Switch (2HS-4928) in BORATE. Verify 2CV-4830, Charging Pump Suction from Boric Acid, opens. Verify selected Boric Acid Pump running. Open associated Boric Acid Pump Recirc valve. Depress red push button on Boric Acid Makeup Batch Controller, 2FIQS-4926 and verify it is set for proper quantity. Verify 2FIC-4926 indicates proper flow rate. Monitor Tave and ASI. Obtain PEER checks.
	CBOR	Adjust turbine load to maintain reference temperature and RCS average temperature within two degrees. Obtain PEER checks.
	CBOR	Maintain ASI within 0.05 of power dependant ESI by inserting CEA's. Obtain PEER checks and CRS permission to withdraw CEA's.
Termination criteria: ~150 MW reduction and Reactivity manipulation observed or at		

examiner's discretion.

Op-Test No.: 1 Scenario No.: 3 Event No.: 2 Page 8 of 152 Event Description: 'A' Pressurizer Level Control Channel fails LOW.		
	CBOR	Announce alarms 2K10-G6 CNTRL CH 1 LEVEL LO. 2K10-F6 CNTRL CH 1 LEVEL LO LO. Report 2LI-4627-2 and 2LR-4625 indicate normal. Report backup Charging Pumps started.
	CRS	Refer to **PZR Systems Malfunctions AOP 2203.028** and direct board operators actions.
	CBOR	Determine PZR Level Channel A failed. Place Letdown Flow Controller (2HIC-4817) in MANUAL. Place PZR Level Channel Select switch (2HS-4628) to Channel B. Place PZR Low Low Level Cutoff select switch (2HS-4642) to Channel B. Verify PZR heaters and Normal Spray maintaining RCS pressure 2025 to 2275 psia. The CBOR will take the Letdown Flow Controller to AUTO when AUTO and MANUAL signals match.
	CRS	Inform SM to refer to TS 3.3.3.6 Post Accident Instrumentation.
Termination criteria: Unaffected PZR Level Channel selected and Letdown in automatic or at examiner's discretion.		

Op-Test No.: 1 Scenario No.: 3 Event No.: 3 Page 9 of 152

Event Description: 2P36B, 'B' CCP breaker trip.

Time	Position	Applicant's Actions or Behavior
	CBOR	Announce annunciator 2K12-B3 CHARGING HEADER FLOW LO Verify that Charging flow indicates zero.
	CRS	Implement Loss of Charging AOP 2203.036 and direct board operator actions.
	CBOR	Verify suction and discharge flow path. Verify Charging Header Isolation valve 2CV-4840-2 OPEN. Verify that 'B' CCP Breaker is tripped (RED and GREEN Lights out)
	CBOR	Start Backup CCP. Verify proper operation of CCP (Flow, Pressure and Temperature)
	CRS	Contact WCO to locally check 'B' CCP for gas binding.
Simulator Operator Cue: **When contacted to check for gas binding, report that 'B' CCP venting complete and no gas was observed.**		
	CBOR	Restores Letdown System to operation using OP 2104.002, Chemical and Volume Control, Section 9.2 Restoring Letdown After Temporary Isolation (if isolated on high Regenerative HX Outlet Temperature previously).

Termination criteria: CVCS restored to operation, or at examiners discretion.

Op-Test No.: 1 Scenario No.: 3 Event No.: 4 Page 10 of 152

Event Description: Pressurizer Steam Space Leak and failure of RPS and DSS to Automatically or Manually actuate.

Time	Position	Applicant's Actions or Behavior
	CBOR	Announce the following: • PZR pressure dropping rapidly. • ALL PZR heaters are energized. • Containment temperature and pressure are rising.
	CRS	Verify that leak is from the PZR and not a Main Steam Line Break by comparing Tave, Steam/Feed Flows, PZR Pressure and PZR Level. Direct CBO's to manually trip the reactor.
	CBOR	Attempt Manual Reactor Trip pushbuttons on 2C03, Attempt Manual DSS pushbutton on 2C03, Attempt Manual Reactor trip pushbuttons on 2C14.
C	CBOT	Open Breakers 2B712 and 2B812 and reclose after 10 seconds.
	CRS	Direct board operators to verify Safety Functions using Exhibit 7.
	CRS	Identify 3.0.3 applicability.

Termination criteria: Reactor tripped or at discretion of Lead Examiner.

Op-Test No.: 1 Scenario No.: 3 Event No.: 4, 5, 6 and 7 Page 11 of 152

Event Description: Pressurizer Steam Space Leak (post trip), Stuck CEA 52, 'A' & 'B' EFW pump failures, 'A' HPSI pump failure.

Time	Position	Applicant's Actions or Behavior
	CRS	**Implement SPTA's and direct contingency actions.**
	CBOR	**Check reactivity control:** Reactor power decreasing. Identify CEA 52 stuck out. Emergency Boration in progress (SIAS will actuate/ CBOR will verify 40 gpm Charging Flow and BAM pumps started and Emergency Borate valve is open)
	CBOT	**Check maintenance of vital auxiliaries:** Main turbine tripped. Generator output and exciter breakers open. All 4160v and 6900 v Non-Vital busses energized. ALL 4160v and 480v vital AC bus energized. All 125v vital DC bus energized.
	CBOR	**Check inventory control:** PZR level 16 to 80%. Trend from setpoint. Report SIAS actuated or manually actuate and verify all PZR heaters off when PZR level less than 29%.
C	CBOR	**Check RCS pressure control:** RCS pressure 1800 to 2300 psia. Trend from setpoint Secure Two RCP's when RCS pressure is less than 1400 psia or ALL RCP's when MTS is lost. Place spray valve for secured RCPs in manual closed. Verify SIAS when pressure less than 1650 psia.

Termination criteria: RCP's secured, RCS Cooldown in progress, EFW pump started or at lead examiner's discretion. (continued on next page)

Op-Test No.: 1 Scenario No.: 3 Event No.: 4, 5, 6 and 7 Page 13 of 152

Event Description: Pressurizer Steam Space Leak (post trip), Stuck CEA 52, 'A' & 'B' EFW pump failures, 'A' HPSI pump failure.

Time	Position	Applicant's Actions or Behavior
	CBOR	**Check core heat removal by forced circulation:** Two RCP 's running (if all are secured no further actions are taken) Loop Δ T less than 10° F. RCS MTS 30° F or greater. Service Water Pump suction aligned to Lake. Component Cooling Water aligned to RCPs.
	CBOT	Restore SW to ACW per Exhibit 5. (NOTE: This action requires several minutes) Check SIAS actuated. Maintain SW pressure greater than 85 psig. (If all RCPs are secured, above actions are not taken until LOCA procedure)
	CBOT	**Check RCS Heat Removal:** Report SG levels and method of feed. Manually actuate EFW. Announce 'A' EFW pump overspeed trip. Manually start 'B' EFW pump. Report feedwater line intact. Report SG pressures.
	CBOR	RCS Tcold 540 to 555° F.

Termination criteria: RCP's secured, RCS Cooldown in progress, EFW pump started or at lead examiner's discretion. (continued)

Op-Test No.: 1 Scenario No.: 3 Event No.: 4, 5, 6 and 7 Page 14 of 152

Event Description: Pressurizer Steam Space Leak (post trip), Stuck CEA 52, 'A' & 'B' EFW pump failures, 'A' HPSI pump failure.

Time	Position	Applicant's Actions or Behavior
	CBOR	**Check CNTMT parameters:** Temperature trending up. Pressure trending up. Status of radiation alarms: CAMS (2K10-B6) in alarm Area radiation (2K11-B10) in alarm Process liquid (2K11-C10) Secondary Sys Radiation Hi (2K11-A10) NOT in alarm.
	CBOR	Check CCAS, and SIAS actuated on PPS inserts. Verify one Emergency Penetration Room Vent fan running. CNTMT coolers in Emergency Mode.
	CRS	Notify SM to perform the following: SE report to control room. Announce reactor trip on plant page. Refer to Tech Specs and EALs.
	CRS	Direct CBOs to acknowledge all control room annunciators and announce all significant alarms. Diagnose Loss of Coolant Accident.
	CRS	Implement Loss of Coolant Accident procedure and open place keeping page. Direct board operators in performing the following actions.
	ALL	Perform crew brief and review floating steps.

Termination criteria: RCP's secured, RCS Cooldown in progress, EFW pump started or at lead examiner's discretion. (continued)

Op-Test No.: 1 Scenario No.: 3 Event No.: 4, 5, 6 and 7 Page 15 of 152

Event Description: Pressurizer Steam Space Leak (post trip), Stuck CEA 52, 'A' & 'B' EFW pump failures, 'A' HPSI pump failure.

Time	Position	Applicant's Actions or Behavior
	CRS	Direct actions in LOCA procedure.
	CBOT	Restore CCW to RCP's (Att.21), SW to CCW (ATT.5) and SW to ACW (ATT. 5)
	CBOR	Verify HPSI and LPSI flow adequate.
	CBOT	Verify Containment Cooling is operating in Emergency Mode.
	CBOT	Verify one Penetration Room Exhaust Fan running.
	CBOT	Start Hydrogen Analyzers.
	CBOR	Start RCS cooldown.

Termination criteria: RCP's secured, RCS Cooldown in progress, EFW pump started or at lead examiner's discretion.