INITIAL SUBMITTAL

BROWNS FERRY 2000-301
50-259, 260, and 296/2000-301

JUNE 12 - 15, JUNE 27 - 29, AND
JUNE 30, 2000

INITIAL SUBMITTAL JPMS

✓ADMINISTRATIVE JPMs/QUESTIONS
✓ SIMULATOR JPMs
✓ IN-PLANT JPMs

Facility: __Browns Ferry________________ Date of Examination: __6/15-16/26-29

Examination Level (circle one): RO / SRO Operating Test Number: ____1____

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Plant Parameter Verification	RO- NRC JPM - 03, Evaluate Recombiner Performance.
		SRO-NRC JPM - 03, Evaluate Recombiner Performance
	Shift Staffing Requirements	RO - NRC-JPM-02 (NEW), Evaluate Overtime Eligibility
		SRO - NRC-JPM-02 (NEW), Evaluate Overtime Eligibility
A.2	Equipment Operability Requirements	RO-NRC - 04, Review of Core Spray MOV Operabiltiy Test
		SRO-NRC - 04, Review of Core Spray MOV Operabiltiy Test
A.3	Control of Radiation Releases	RO - Determine Stack Noble Gas Release Rate, **JPM #130**, KA 271000A4.05, 3.2/3.9, (Modified to have a problem with release. Also need to add tolerances in the JPM.)
		SRO - Determine Building Ventilation Noble Gas Release Rate, **JPM #131**, KA 272000A4.05, 2.3/2.7 (Modified to have a problem with release. Also need to add tolerances in the JPM.)
A.4	Emergency Plan	RO - 1. Emergency Class Levels. 2. Evaluation of reportable event. 3. Time frame for reporting. 4. Determination of reportable events.
		SRO - **JPM # 180**, Classify the Event Per the REP (Loss of All Power to 4 KV S/D Boards > 3 hours). The JPM needs to be adjusted to make the actual time requirements ie., State notification within 15 minutes, Step 1 requires ODS notified with in 5 minutes.

Developed for the Browns Ferry, June 2000, Initial Examination
Examination Report # 2000-301

U. S. Nuclear Regulatory Commission

Region II

A-1 Administrative Section RO

NRC-JPM-03

Title:

Evaluate Recombiner Performance

IAW

2-OI-66, Off-Gas System

Section 6.1

SAFETY CONSIDERATIONS:

NONE:

EVALUATOR NOTES:

1. The applicable procedure section will not be provided to the candidate.
2. If this is the first JPM of the JPM set, reat the JPM briefing contained in NUREG-1021, Appendix E, or similar to the candidate.

Read the following to the Candidate.

TASK CONDITIONS:

The plant is in the following condition: Obtain from facility to get proper terminology.

The XXX asks you to evaluate Recombiner 2As performance. XXXXXXXXXXXX

The HWC (Hydrogen Water Chemistry) System is shutdown.

Candidate Hand Out

STEP 1. Obtain a current copy of OI-66, Off-Gas System, Section 6.1 Recombiner Performance Evaluation.

Current Revision of OI-66 obtained and verified IAW ____ if applicable.

SAT/UNSAT*_____

STEP 2. (6.1.1.1) DETERMINE the in-service recombiner inlet temperature as indicated on RECOMBINER 2A(2B), INLET TEMP 2-TI-66-75A(B), Panel 2-9-53.

Determined the temperature of Recombiner, 2A(2B) INLET TEMP 2-TI-66-75A(B), Panel 2-9-53.

Critical Task SAT/UNSAT*_____

STEP 3. (6.1.1.2) DETERMINE the in-service recombiner operating (center) temperature as indicated on RECOMBINER 2A/2B TEMPERATURE recorder, 2-TRS-66-77, Panel 2-9-53.

Determined the in-service recombiner operating (center) temperature as indicated on RECOMBINER 2A/2B TEMPERATURE recorder, 2-TRS-66-77, Panel 2-9-53.

Critical Task SAT/UNSAT*_____

STEP 4. (6.1.1.3) CALCULATE the temperature difference (ΔT) between the values obtained in Steps 1 and 2.

Calculated the temperature difference (ΔT) between the values obtained in Steps 1 and 2.

Critical Task SAT/UNSAT*_____

STEP 5. (6.1.1.4) DETERMINE the reactor thermal power (MWt) from process computer.

Determined reactor thermal power (MWt) from process computer.

SAT/UNSAT*_____

STEP 6. (6.1.1.5) OBTAIN from Illustration 1 the ΔT value corresponding to the reactor power.

Obtained the ΔT value corresponding to the reactor power from Illustration 1.

SAT/UNSAT*_____

NOTE:

Illustration 1 is based on operating conditions with HWC shutdown. Additional curve(s) will be required to reflect normal operating conditions when the HWC system's nominal operating condition(s) is determined.

STEP 7. (6.1.1.6) VERIFY the calculated ΔT is greater than or equal to the value obtained from the table.

VERIFIED the calculated ΔT is greater than or equal to the value obtained from the table. The Candidate determines that the ΔT is ***NOT*** greater than or equal to the value obtained in Illustration 1.

Stop the performance of this task and inform the SRO that the acceptance criteria is NOT met.

CUE: Acknowledge report of ΔT not meeting the acceptance criteria. Tell the candidate to continue in the procedure.

SAT/UNSAT*_____

6.1 Recombiner Performance Evaluation (continued)

STEP 8. (6.1.2) IF the in-service recombiner performance is below the minimum allowable, THEN:

PERFORM the following:

(6.1.2.1) CHECK Off-Gas Preheater, Recombiner and SJAEs are in operation in accordance with Section 5.0.

CHECKS Off-Gas Preheater, Recombiner and SJAEs are in operation in accordance with Section 5.0.

CUE: Another Operator will check that the Preheater, Recombiner and SJAEs are in operation in accordance with Section 5.0.

. . . . .SAT/UNSAT*_____

STEP 9. (6.1.2.2) Closely MONITOR the OFFGAS HYDROGEN ANALYZER recorder, 2-H2R-66-96 on Panel 2-9-53.

MONITORS the OFFGAS HYDROGEN ANALYZER recorder, 2-H2R-66-96 on Panel 2-9-53.

DETERMINES that ***BOTH*** Hydrogen Analyzers are inoperable.

Critical Task SAT/UNSAT*_____

STEP 10. (6.1.2.3) IF both hydrogen analyzers are inoperable, THEN

REQUEST Chem Lab to obtain a grab sample to determine hydrogen concentration. REFER TO TRM 3.3.9.

Requests Chem lab to obtain a grab sample to determine hydrogen concentration.

Cue:	Chem Lab acknowledges to obtain a grab sample to determine hydrogen concentration. REFER TO TRM 3.3.9.

SAT/UNSAT*_____

STEP 11. (6.1.2.4) IF a malfunction of the SJAE is suspected, THEN

REFER TO Section 8.4 and TRANSFER SJAEs.

DETERMINES a malfunction of the SJAE is NOT suspected.

SAT/UNSAT*_____

STEP 12. (6.1.3) IF off-gas hydrogen rises above 1%, THEN

REFER TO 2-AOI-66-1.

DETERMINES Hydrogen did not rise above 1%.

Cue:	Chemistry reports hydrogen concentration is 0.35%

SAT/UNSAT*_____

STEP 13. (6.1.4) Only IF analysis or hydrogen analyzers show hydrogen concentration is below 4%, THEN

PLACE standby recombiner in operation. REFER TO Section 8.3.

DETERMINES that the standby recombiner need to be placed in operation. Reports this to the SRO.

CUE:	Another operator will place the standby recombiner in operation. This ends the JPM.

SAT/UNSAT*_____

RELATED TASKS:

K/A REFERENCE:

GEN 2.1.7, Ability to evaluate plant performance and make operational judgements based on operating characteristics / reactor behavior / and instrument interpretation.

REFERENCES:

OFF Gas System, OI-66, Revision 58

TOOLS AND EQUIPMENT:

Simulator

SAFETY FUNCTION (from NUREG 1123, Rev. 2.)

A-1 Conduct Of Operations

NEW JPM FOR BROWNS FERRY 2000 EXAMINATION. NRC JPM -03

Candidate Hand Out

Time required for Completion: 10 minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance: Simulate ✓Actual ___ Unit ___

Setting: Control Room__ Simulator ___ (Not applicable to In-Plant JPMS)

Time Critical: Yes ___ No ✓ Time Limit NA

Alternate Path: No._✓__ No __

EVALUATION

CANDIDATE's NAME:____

JPM: PASS ______ FAIL:______

Comments: ____

____

____

____

____

____

Examiners Name. ________________________________ Date:____________

TASK CONDITIONS:

The plant is in the following condition: Obtain from facility to get proper terminology.

The XXX asks you to evaluate Recombiner 2As performance. XXXXXXXXXXXX

The HWC (Hydrogen Water Chemistry) System is shutdown.

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

OPERATING INSTRUCTION

2-OI-66

OFF-GAS SYSTEM

REVISION 58

PREPARED BY: Michael K Teggins PHONE: 3728

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: DAVID M. OLIVE DATE: 12/08/99

EFFECTIVE DATE: 12/08/99

LEVEL OF USE: REFERENCE USE

VALIDATION DATE: 04/15/93

QUALITY-RELATED

REVISION LOG

Procedure Number: 2-OI-66 Revision Number: 58

Pages Affected: 10, 13, 58
Attachment 1, Page 5
Attachment 3, Page 4

Description of Change: IC -72 DESIGN CHANGE

DCN PIC 50208A (W18208A)

Page 10: Reworded Precaution 3.20 for clarity by placing the specific isolations defeated by the DCNs.

Page 13: Revised Precaution 3.39 by removing reference to the HWC System automatic shutdown from a FCV 66-28 valve closure. These feature has been removed by DCN PIC 50208A (W18208A). The precaution was also revised to include specific information concerning HWC System auto shutdown as a result of the SJAE discharge valves (FCV 66-14 and 66-18) being closed. Information concerning the effect this has on hydrogen concentrations in the Offgas System has also been added.

Reworded Precaution 3.42 to state the HWC System should be shutdown prior to swapping SJAE's.

Page 58: Added note 3 stating "The HWC system is shutdown prior to intentional swapping of SJAEs to prevent receipt of the automatic trip of the HWC system that will occur when both SJAE DISCHARGE VALVES 2-FCV-66-14 and 18 are closed".

Reworded Step 8.4.2.2 for clarity.

Attachment 1

Changed UNID 2-66-658 to 2-SHV-066-0658 to reflect current plant labeling. This addresses PCR 990411.

Attachment 3

Corrected discrepancy for breaker location.

Added the following breakers located on Panel 2-9-9, (Cab 5) Unit Nonpreferred.

- 522 OFFGAS SYSTEM NORMAL SUPPLY
- 524 RECOMBINER A OFFGAS SYSTEM
- 526 RECOMBINER B OFFGAS SYSTEM
- 529 OG SAMPLE PANEL HWC SYSTEM

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THIS REVISION AFFECTS SYSTEM STATUS CONTROL. CHECK 0-OI-57C ATTACHMENT 3B TO SEE IF BREAKERS 522, 524, 526, and 529 HAVE BEEN VERIFIED IN THEIR PROPER POSITIONS.

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TABLE OF CONTENTS (Continued)

ILLUSTRATIONS/ATTACHMENTS

1.0 PURPOSE

The purpose of this procedure is to provide instruction for operation of the Off-Gas (OG) System. Operation of the following subsystems and components are included: Steam Jet Air Ejector (SJAE)-Recombiner Trains, Glycol Cooler, Charcoal Adsorber, Mechanical (Condenser) Vacuum Pump, and Hydrogen Analyzers.

2.0 REFERENCES

2.1 Technical Specification

Section 5.5, Programs and Manuals

Section 5.5.8, Explosive Gas and Storage Tank Radioactivity Monitoring Program

Technical Requirements Manual

Section 3.7.2, Airborne Effluents

Section 3.3.9, Offgas Hydrogen Analyzer Instrumentation

2.2 Offsite Dose Calculation Manual

Section 1/2.2.2, Gaseous Effluents.

2.3 Final Safety Analysis Report

Section 9.5, Gaseous Radwaste System.

Section 10.23, Hydrogen Water Chemistry System

Section 13.0, Conduct of Operations.

2.4 Plant Instructions

2-AOI-47-3, Loss of Condenser Vacuum Abnormal.

2-AOI-66-1, Off-Gas H_2 High Abnormal.

2-AOI-66-2, Off-Gas Post-Treatment Radiation HI-HI-HI Abnormal.

2-OI-1, Main Steam System.

2-OI-2, Condensate System.

0-OI-2C, Demineralized Water System.

2-OI-4, Hydrogen Water Chemistry System.

0-OI-12, Auxiliary Boilers System.

2-OI-24, Raw Cooling Water System.

0-OI-25, Raw Service Water System.

2.4 Plant Instructions (Continued)

2-OI-30C, Turbine Building Ventilation System.

0-OI-32, Control Air System.

0-OI-33, Service Air System.

2-OI-37, Gland Seal Water System.

2-OI-47, Turbine Generator System.

2-OI-47C, Seal Steam System.

0-OI-57B, 480V/240V AC Electrical System.

0-OI-57C, 208V/120V AC Electrical System.

0-OI-57D, DC Electrical System.

1-, 2-, 3-OI-90, Radiation Monitoring System.

2-OI-99, Reactor Protection System.

2-GOI-100-1A, Unit Startup from Cold Shutdown to Power Operation and Return to Full Power From Power Reductions.

2-GOI-100-1B, Unit Startup From Cold Shutdown to Hot Standby.

2-GOI-100-1C, Unit Startup From Hot Standby to Power Operation.

2-GOI-100-12A, Unit Shutdown from Power Operation to Cold Shutdown and Reductions in Power During Power Operations.

2-ARP-9-7, Alarm Response Procedure.

2-SI-4.2.K-5(A) and (B), Off-Gas Hydrogen Analyzer A and B Calibration.

SSP-13.51, Tracking Limiting Conditions for Radioactive Liquid and Gaseous Effluent Monitoring Instrumentation.

2.5 Plant Drawings

15N711-1, 480V Auxiliary Power.

2912402, Piping & Instrument Diagram - Glycol Cooler.

2912463, Glycol Cooler.

2912471, Glycol Cooler.

45N602-7, Turbo-Generator Auxiliary.

2-47E610-1-4, Main Steam System.

2-47E610-2-1B, Condensate System.

2-47E610-4, Hydrogen Water Chemistry System

47W610-6 series, Heater Drains and Vents.

2-47E610-66 series, Off-Gas System.

45N614 series, 120V AC/250V DC Valves & Misc.

0-15E701-1, 480V Motor Control Center A.

0-15E701-2, 480V MCC B.

7-45E732-3, 480V Diesel Auxiliary Bd B.

0-45E736-1, 480V Control Bay Vent Bd A.

2-45E747-1, 480V Unit Board 2A.

2-45E747-2, 480V Unit Board 2B.

2-45E753-1, 480V Turbine MOV Bd 2A.

2-45E753-3, -4, 480V Turbine MOV Bd 2B.

2-45E753-5, -6, 480V Turbine MOV Bd 2C.

45N777 series, 480-V Unit Auxiliary Power.

2-47E801 series, Main Steam.

2-47E805 series, Heater Drains and Vents.

2-47E809 series, Off-Gas System.

2-47E808-5, Offgas Sample Panel Flow Diagram

2-47E815 series, Auxiliary Boiler System.

2.5 Plant Drawings

2-47E866-6, Recombiner Room & Off-Gas Dehumidification System.

2-105E2598 Offgas Monitor Panel elementary Diagram

2.6 Vendor Manuals

GEK-45765, Off-Gas System, BFN-CVM-0041, BFN-VTM-G080-9280.

ACME Freon Refrigeration Compressors (Chilled Water), Contract #91167, BFN-CVM-1139, BFN-VTM-A035-0010.

Air Correction Division (Gen. Instr. Catalytic Recombiners), Contract #90744, BFN-CVM-1146, BFN-VTM-CA28-0010.

Process Equipment Co. Instruction Manual (Moisture and Water Separators), Contract #90744, BFN-CVM-1600, BFN-VTM-P400-0010.

Foster Wheeler Operating Instructions (Precooler and SJAE), Contract #90744 and 91750, BFN-VTM-F175-0040.

MSA Research Corporation (HEPA Filters), Contract #90744 and 91750, BFN-CVM-0622.

Cosmodyne Glycol Coolers, BFN-VTM-C650-0010, Contract #'s 84698, 90744 and 91750.

GEK-105901 General Electric Offgas Monitor Panel

2.7 Miscellaneous Documents

GE SIL 150R2, Ignition Prevention for Recombiner/Charcoal Adsorber Off-Gas Systems.

GE SIL 497, Hydrogen Ignition in Off-Gas System.

INPO SOER 82-013, Intrusion of Resin, Lubricating Oils, and Organic Chemicals Into Reactor Coolant Water.

SEOPR 96-03-066-002 Off-Gas Condenser Level Controller System.

SEOPR 96-02-066-004, Isolating RCW to Off Gas Precooler.

BFPER960835 Recombiner Room Parallel Cooler Operation.

T. F. Van Natta, Jr. To J. D. Shaw, Use of Auxiliary Boiler Steam for Steam Jet Air Ejectors (SJAE) Above 10% Reactor Power, January 6, 1997.

EWR No. 96-0-066-006, Use of Auxiliary Boiler Steam for the Steam Jet Air Ejectors (SJAE), 1/9/97.

EWR No. 97-0-066-077, Operation of Unit 2 and/or 3 with Off-Gas Dehumidification Chiller out of service.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 [NER/C] Chemical contamination of the Off-Gas Building floor drains with glycol must be avoided since the substance can pass through the Radwaste System process and eventually be injected to the reactor via the Condensate System. [INPO SER 82-013]

3.2 The recombiner shall be warmed to greater than 240°F and purged with dry air prior to admitting process gas. Recombiner shall NOT be operated with inlet temperature less than 240°F.

3.3 Technical Specifications, Technical Requirements Manual, and the ODCM shall be referred to in the event an Off-Gas Post-Treatment Radiation Monitor, Off-Gas Hydrogen Analyzer, or Mechanical Vacuum Pump is made or found to be inoperable.

3.4 Seal air to Off-Gas System valves shall be maintained to prevent off-gas leakage through valve packing.

3.5 Glycol coolant refrigeration machine crankcase heaters should be on at least 2 hours before starting glycol unit.

3.6 The following stack dilution fan operational requirements should be observed:

- One Unit 2 Stack Dilution Fan is required to remain in operation to provide dilution air flow when Unit 2 Offgas System is required for unit operation. This requirement provides dilution flow to any potential hydrogen concentration in Offgas flow.

- The required flow for stack gas 0-FI-90-271 is 16,366 scfm. To preclude receiving erroneous alarms, optimum flow is 18,500. Either one or both Stack Gas Dilution Fans can be placed in service to satisfy these requirements. This may require 4 Stack Dilution fans (total for the plant) to be placed in service. This requirement provides minimum main stack flow for correct and accurate isokinetic radioactive release rate sampling and monitoring. Any two Stack Dilution Fans from separate Units and one Filter Cubicle Exhaust Fan as a minimum may meet this flow rate.

- When all SBGT Trains are secured and any evolution has the potential to discharge radioactive effluents through the main stack, one Unit 2 and one Unit 3 Stack Dilution Fan should remain in operation. This requirement provides clean air flow through the dilution cross-tie to SBGT ducts. This prevents the potential back flow of radioactive effluents through the SBGT duct work.

- [II/C] When notified by Rad Con of confirmed airborne radioactivity in the SBGT building, maximum blocking flow may be obtained by either removing unit 1 dilution fan from service and placing 2A, 2B, 3A, and 3B dilution fans in parallel service or throttling unit 2 and 3 stack dilution outlet (2-DMP-66-1101 and 3-DMP-66-1102). [BFPER 980030]

- Anytime all stack Dilution Fans are removed from service, a train of SGT must be placed in service. A Stack Dilution Fan or Standby Gas Treatment must be in operation when any potentially radioactive gas is being discharged out the stack. This will dilute potential hydrogen and prevent backflow into the Standby Gas Treatment System.

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

3.7 Following startup, while still at low power, recombiner performance and hydrogen concentration should be closely monitored.

3.8 Off-Gas System valves are potentially spark-producing when operated; therefore, when hydrogen concentration is suspected of being greater than 4%, NO action shall be taken that will change off-gas valve positions until after the unit is shut down.

3.9 The mechanical vacuum pumps shall NOT be used to purge the main condenser if hydrogen concentration is suspected of being present.

3.10 The mechanical vacuum pumps shall NOT be used when reactor power is greater than 5%.

3.11 Charcoal bed alignment during power operation shall NOT be changed. Any major change in off-gas flow will disturb bed equilibrium and result in a temporary (8 to 12 days) rise in stack discharge activity.

3.12 Charcoal bed prefilter and afterfilter differential pressure shall not exceed 10" H_2O. Switching to standby filters is recommended when filter differential pressure reaches 8" H_2O.

3.13 The Mechanical vacuum pumps will auto trip under any of the following conditions:

- Hotwell pressure is equal to or below -26" HG, or
- Hotwell pressure is equal to or below -22" HG, with reactor pressure greater than or equal to 600 psig (vacuum pumps suction valves also auto close), or
- Main Steam Line radiation is greater than or equal to 3 times normal background at full load (vacuum pumps suction valves also close), or
- Seal water pump trips, or
- Undervoltage.

3.14 During SJAE operation, steam supply pressure shall be maintained between 190 and 225 psig. Insufficient steam pressure will result in improper dilution of hydrogen. Excessive steam pressure causes water droplet carryover which reduces efficiency.

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

3.15 During power operation above 25% power, the discharge of the SJAEs must be routed through the charcoal adsorber.

3.16 Mechanical vacuum pumps will not start unless a seal water pump is running and hotwell pressure is above -26" Hg.

3.17 GE-SIL-150 recommends that off-gas process valves be fabricated with spark-proof material on closure contact points. Inspection of the SJAE discharge valves (2-FCV-66-14 & 18) proved that these valves were not fabricated correctly. Until the time that spark proof valves can be installed, it is GE's recommendation that manual swapping of SJAE should be done after verifying low levels of H_2 in the Off-Gas System. Automatic swapping of the SJAEs will be administratively controlled to prevent automatic valve operation during unverified H_2 levels.

3.18 The standby SJAE will still auto start when hotwell pressure rises to -25 inches Hg if auto isolation is NOT present and the following valves are aligned:

- HS-90-155 is in AUTO after RESET.
- HS for SJAE is in AUTO.
- HS for other SJAE is in OPEN.
- SJAE suction and outlet valve control switch in OPEN.

3.19 Off-Gas System auto isolation (closure of 2-FCV-66-28) will occur on any combination of HI-HI-HI, downscale, or inoperable trip simultaneously in both trip channels of the post-treatment Radiation Monitoring System after a five second time delay.

3.20 SJAE auto isolations on off gas holdup volume high temperature, high pressure, and low condenser vacuum have been removed by DCNs T34764A and T39736A.

3.21 After auto isolation, HS-90-155 must be placed to RESET and then AUTO to place system back in service when initiating conditions are corrected.

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

3.22 To place an individual SJAE in service (manually):

- Inlet and outlet condensate valves must be open and condensate pressure greater than or equal to 60 psig.

- Steam isolation valves to other SJAE must be closed.

- Steam pressure greater than or equal to 180 psig (170 psig on Aux. Steam) (30 second time delay).

3.23 Individual SJAE shutdown (PCV closure) is caused by:

- Condensate pressure less than 60 psig or inlet/outlet condensate valve fully closed.

- Other SJAE steam isolation valve not fully closed.

- Steam pressure less than or equal to 170 psig (160 psig Aux. Steam).

3.24 Air purging of an isolated SJAE is required prior to and during maintenance of the SJAE and associated piping in order to eliminate the buildup of combustible gases.

3.25 Pressure switch 2-PS-12-80A(B) allows operation of the SJAEs on auxiliary boiler steam by opening valves 2-FCV-66-14(18) SJAE discharge valve and 2-FCV-1-150(152) SJAE intercondenser drain valves when auxiliary steam pressure is 170 psig and rising. These valves will close at 160 psig lowering.

3.26 Placing handswitch 2-HS-1-150(152) to AUTO or OPEN will:

- Shut off auxiliary boiler steam to both SJAEs after a 60 second time delay.

- Close the main steam pressure control valves, 2-PCV-1-151(153) and 2-PCV-1-166(167) if at least 180 psig main steam supply pressure is not achieved within 30 seconds.

3.27 Once the SJAE is placed in service on main steam, if steam supply pressure to the SJAE falls below 170 psig for 5 seconds to either the 1st, 2nd, or 3rd stage, the following valves will close:

2-FCV-66-14(18), Off-Gas Outlet Valve from SJAE A(B).

2-FCV-1-150(152), SJAE A(B) Intercondenser Drain Valve.

2-PCV-1-166(167), Main Steam Pressure Control Valves.

2-PCV-1-151(153), Main Steam Pressure Control Valves.

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

3.28 Just prior to establishing condenser vacuum, the CON DEMIN TO FL DR, 2-43-1020 and the HOTWELL SAMPLE TO FL DR, 2-43-1019 should be closed to prevent loss of vacuum.

3.29 [NER/C] Low point drains are required to be maintained in the open position during startup to reduce the likelihood of recombiner quenching. [GE SIL 497]

3.30 [NER/C] At least one of the hydrogen monitors is required to be placed in the manual mode during any Off-Gas System transient to ensure continuous availability of monitoring. [GE SIL 497]

3.31 A hydrogen analyzer must be declared inoperable if no flow can be established or it fails to go through a calibration check within 4 hours.

3.32 Lowering recombiner temperature is a direct indication of moisture carryover. Therefore, recombiner temperature should be monitored during SJAE transfers.

3.33 Chemistry notification is required when any system changes are made that may affect the chilled water system volume (additions to or draining from, crossties between units, etc.).

3.34 [SEOPR] RCW may be isolated to the Off Gas Precooler for a maximum of 8 hours. During this time, SJAE suction pressures shall be closely monitored for the first 15 minutes that the RCW is isolated. If either SJAE suction pressure changes by greater than 1" hg, then RCW flow shall be restored to the Precooler. [96-02-0066-004]

3.35 (II/C)During routine plant evolutions, notify RADCON prior to making changes in the Off-Gas System which could cause a rise in area radiation levels. Confirmation RADCON has implemented appropriate radiological controls/barriers for the expected Off-Gas System alignment shall be obtained prior to performing the alignment. (BFPER961778)

3.36 The presence of any available oxygen in the effluent of the Off-gas recombiners indicates that sufficient oxygen is present for complete recombination of the hydrogen entering the recombiner. The Hydrogen Water Chemistry System should be adjusted to maintain oxygen at the effluent of the recombiner at 21 %, complete recombination of all hydrogen entering the recombiner does not require 21% oxygen to be present.

3.0 PRECAUTIONS AND LIMITATIONS (Continued)

3.37 Securing Hydrogen injection to the condensate system may result in a small net RISE or FALL in the amount of hydrogen leaving the reactor, depending upon the initial hydrogen injection rate. Performing an immediate shutdown of the Hydrogen Water Chemistry (HWC) system in response to a High Off-gas hydrogen concentration is not recommended unless a failure in the HWC system is found.

3.38 The net amount of hydrogen leaving the reactor when operating at certain hydrogen injection rates (without Noble Metal Coating Injection) in the Hydrogen Water Chemistry System may be less than the hydrogen released by the radiolysis reaction when not using HWC. A drop in recombiner temperatures could occur when the HWC system is in service at an injection rate just sufficient to minimize the radiolysis. Raising hydrogen injection rates to values above the rate which yields minimum radiolysis would cause recombiner temperatures to rise again due to additional hydrogen recombination.

3.39 Isolation of the Steam Jet Air Ejectors (both 2-FCV 66-14 and 66-18 closed), will result in the HWC System, if in service, having an automatic trip which immediately isolates both hydrogen and oxygen injection. This situation will result in rising hydrogen concentration in the Offgas System due to very little recombination taking place. The duration of this transient will depend on the injection rate and when the SJAE is placed back in service. The duration of this transient should be less than 15 minutes from the time Off Gas flow is re-established through the SJAE.
~~The Hydrogen Water Chemistry System immediately stops hydrogen and oxygen injection on indication of either closure of 2-FCV-66-28 OFFGAS ISOLATION VALVE or closure of both 2-FCV-66-14 and 18, SJAE DISCHARGE VALVEs. All other manual and automatic HWC shutdown signals result in immediate isolation of hydrogen injection followed by a programmed reduction to zero in the oxygen injection rate, in order to maintain the required oxygen concentration as the injected hydrogen progresses through the Feedwater / reactor / steam systems before reaching the Off-gas system.~~

3.40 An automatic shutdown of the HWC system occurs if the Off-gas oxygen concentration either exceeds 40% or falls below 5% oxygen.

3.41 No automatic shutdown of the HWC system occurs as a result of high hydrogen levels in the Off-gas system.

3.42 ~~Shutdown T~~The HWC system should be shutdown prior to intentional swapping of SJAEs to prevent receipt of the automatic shutdown of the HWC system that will occur when both SJAE DISCHARGE VALVES 2-FCV-66-14 and 18 are closed.

4.0 PRESTARTUP/STANDBY READINESS REQUIREMENTS

NOTE:

When Section 4.0 is required to be verified by subsequent sections, Section 4.0 shall be performed.

4.1 VERIFY the following related system requirements are satisfied:

4.1.1 The following panels are energized. REFER TO 0-OI-57B, 0-OI-57C, 0-OI-57D:

4.1.1.1 480V Turbine MOV Board 2A.

4.1.1.2 480V Turbine MOV Board 2B.

4.1.1.3 480V Turbine MOV Board 2C.

4.1.1.4 480V Unit Board 2A.

4.1.1.5 480V Unit Board 2B.

4.1.1.6 480V Diesel Auxiliary Board 2A.

4.1.1.7 480V Diesel Auxiliary Board 2B.

4.1.1.8 480V Control Bay Vent Board A.

4.1.1.9 480V Off-Gas MCC A.

4.1.1.10 480V Off-Gas Bldg MCC B.

4.1.1.11 Panel 2-9-9, Cabinet 2.

4.1.1.12 Panel 2-9-9, Cabinet 3.

4.1.1.13 Battery Board 2.

4.1.1.14 Panel 2-9-9, Cabinet 5

4.0 PRESTARTUP/STANDBY READINESS REQUIREMENTS (Continued)

4.1.2 The following system lineup checklists are current:

4.1.2.1 Attachment 1, Off-Gas System Valve Lineup Checklist, Unit 2.

4.1.2.2 Attachment 2, Off-Gas System Panel Lineup Checklist, Unit 2.

4.1.2.3 Attachment 3, Off-Gas System Electrical Lineup Checklist, Unit 2.

4.1.2.4 Attachment 4, Off-Gas System Instrument Inspection Checklist, Unit 2.

4.2 VERIFY the following support system requirements are satisfied:

4.2.1 The Radiation Monitoring System is in operation for the Stack Gas, Off-Gas, and Main Steam Line Radiation Monitors. REFER TO 2-OI-90.

4.2.2 The Condensate System is in operation to provide cooling to the Off-Gas condenser and the SJAE intercondensers. REFER TO 2-OI-2.

4.2.3 The Demineralized Water System is in service to supply demineralized water to the glycol tanks. REFER TO 0-OI-2C.

4.0 PRESTARTUP/STANDBY READINESS REQUIREMENTS (Continued)

4.2.4 The Control Air System is in operation to supply purge air to the recombiners, instrument air to the seal water level instruments, and seal air to the following Off-Gas System valves (associated flow indicators are in parentheses):

2-66-600 (2-FI-66-139)
2-FCV-66-72 (2-FI-66-72)
2-66-602 (2-FI-66-138)
2-LCV-66-94 (2-FI-66-94)
2-FCV-66-97 (2-FI-66-97)
2-LCV-66-93 (2-FI-66-93)
2-FCV-66-98 (2-FI-66-98
2-FCV-66-85 (2-FI-66-85
2-66-616 (2-FI-66-140)
2-FCV-66-91 (2-FI-66-91)
2-66-617 (2-FI-66-142)
2-FCV-66-78 (2-FI-66-78
2-FCV-66-122 (2-FI-66-122)
2-FCV-66-123 (2-FI-66-123)
2-66-628 (2-FI-66-141)
2-66-629 (2-FI-66-143)
2-FCV-66-113A (2-FI-66-113A)
2-FCV-66-113B (2-FI-66-113B)
2-FCV-66-117 (2-FI-66-117)
2-FCV-66-118 (2-FI-66-118)

REFER TO 2-OI-32.

4.2.5 The Auxiliary Boilers System is in operation to provide steam for initial system warm-up and purge. REFER TO 0-OI-12.

4.2.6 The Raw Service Water System is in service to provide cooling to the glycol refrigeration units. REFER TO 0-OI-25.

4.2.7 The Raw Cooling Water system is in service to provide cooling to the chilled water units. REFER TO 2-OI-24.

4.2.8 The Gland Seal Water System is in service for sealing water to main condenser seals and vacuum breakers. REFER TO 2-OI-37.

4.2.9 The Hydrogen Analyzers, Panel 2-LPNL 925-0588, are energized with heat trace in service for at least one hour prior to establishing flow through the sample panel. REFER TO 2-SI-4.2.K-5(A) and 2-SI-4.2.K-5(B) to declare the Hydrogen Analyzers operable.

5.0 STARTUP

NOTE:

The following sub-sections, 5.1 through 5.11, will normally be done sequentially, however, a sub-section may be skipped if that particular evolution has already been done or may be performed out of order at the direction of the Shift Manager/Unit Supervisor.

5.1 Establishing Off-Gas Stack Air Flow

5.1.1 VERIFY the following initial conditions are satisfied:

5.1.1.1 All Precautions and Limitations in Section 3.0 have been reviewed.

5.1.1.2 The Off-Gas System is in Prestartup/Standby Readiness in accordance with Section 4.0.

5.1.2 PLACE stack dilution fan(s) in service by performing the following:

NOTES:

(1) The following operations are performed at Control Room Panel 2-9-8 unless otherwise noted.

(2) A standby Stack Dilution Air Fan will auto start when flow at DILUTION AIR FANS FLOW LOW indicating switch, 2-FIS-66-33A(B), Panel 25-211, reaches 0.03" H_2O.

(3) The red and green indicating lights above Stack Dilution Fan control switches 2-HS-66-29A and 2-HS-66-31A indicate the position of the associated Stack Dilution Fan Discharge Damper.

(4) The required flow for stack gas 0-FI-90-271 is 16,366scfm. To preclude receiving erroneous alarms, optimum flow is 18,500. Either one or both Stack Gas Dilution Fans can be placed in service to satisfy these requirements. This may require 4 Stack Dilution fans (total for the plant) to be placed in service.

5.1.2.1 START the STACK DILUTION FAN 2A(B) using control switch, 2-HS-66-29A(31A), and VERIFY associated discharge damper red (open) indicating light(s) illuminate.

5.1.2.2 RESET ANN: STACK GAS DILUTION AIR FLOW LOW (2-XA-55-7A, Window 3) on Panel 2-9-7.

5.1 Establishing Off-Gas Stack Air Flow (Continued)

5.1.2.3 If desired to place a Stack Dilution Fan in standby, THEN

5.1.2.3.1 PLACE the STACK DILUTION FAN SEL control switch, 2-XS-66-29, to FAN B(FAN A) position.

5.1.2.3.2 PLACE standby STACK DILUTION FAN 2B(A) control switch, 2-HS-66-31A(29A), in AUTO.

5.1.3 PLACE stack filter cubicle exhaust fan in service by performing the following:

NOTE:

The following operations are performed at the Unit 1 Control Room Panel 9-8 unless otherwise noted.

5.1.3.1 START the STACK FLT CUBICLE EXH FAN A(B) using control switch, 1-HS-66-44A(46A), and VERIFY associated discharge damper red (open) indicating light illuminates.

5.1.3.2 RESET the STACK FILTER CUBICLE EXHAUST FLOW LOW annunciator (XA-55-7A, Window 8) on Unit 1 Panel 9-7.

5.2 Placing Mechanical Vacuum Pump in Service

****

CAUTIONS

(1) Mechanical vacuum pumps shall NOT be used to purge main condenser if hydrogen concentration is suspected of being present.

(2) Mechanical vacuum pumps shall NOT be used when reactor power is greater than or equal to 5%.

****

5.2.1 VERIFY CLOSED the COND DEMIN TO FL DR, 2-43-1020 (T-6G 557' EL) and HOTWELL SAMPLE TO FL DR, 2-43-1019 (T-9C 551' EL) to prevent loss of vacuum.

5.2.2 VERIFY Condensate System in service. REFER TO 2-OI-2.

5.2.3 VERIFY OPEN CNDR 2A1, 2A2, 2B1, 2B2, 2C1, AND 2C2 OFFGAS SHUTOFF VALVES.

5.2.4 VERIFY OPEN the following seal water valves (Vacuum Pump Room A(B), TS(7)-D, El 604'):

5.2.4.1 VAC PUMP A(B) SOV, 2-37-511(509).

5.2.4.2 VAC PUMP A(B) SOV, 2-37-512(510).

5.2.4.3 VAC PUMP A(B) SEP SOV, 2-37-508(507).

5.2.5 VERIFY Mech Vac Pump 2A(2B) water level in CNDR VAC PUMP SEP 2A (2B) CNDS LEVEL MECH VAC PUMP SEP A(B) CNDS LEVEL, 2-LG-066-0055, (0056)is approximately 1/2 full.

NOTE:

The following operations are performed at Control Room Panel 2-9-8 unless otherwise noted.

5.2.6 CHECK hotwell pressure as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, Panel 2-9-6, is above -26 inches Hg.

5.2 Placing Mechanical Vacuum Pump in Service (Continued)

5.2.7 OPEN the MECH VAC PUMP A(B) SUCTION VALVE, using 2-HS-66-36A(40A).

5.2.8 RUN the Seal Water Pump for approximately 30 seconds using MECH VAC PUMP A(B) SEAL WTR PUMP TEST, 2-HS-66-39C(43c) located in Mechanical Vacuum Pump room EL 604'.

5.2.9 START the MECH VACUUM PUMP A(B) using control switch, 2-HS-66-39A(43A).

NOTE:

The seal water pump will automatically start with its associated mechanical vacuum pump.

5.2.10 CLOSE the CONDENSER VACUUM BREAKERS using control switch, 2-HS-66-1A.

5.2.11 CHECK hotwell pressure is lowering as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, at Panel 2-9-6.

5.2.12 PREPARE the Offgas Analyzer Panel 2-LPNL-925-0588 for warm up by positioning the following valves on the panel as indicated:

- Fully OPEN OFFGAS TRAIN A BYPASS THROTTLE VLV 2-THV-066-1049
- Fully OPEN OFFGAS TRAIN B BYPASS THROTTLE VLV 2-THV-066-1050
- CLOSE OFFGAS TRAIN A SAMPLE FLOW CONTROL VLV 2-FCV-066-1047
- CLOSE OFFGAS TRAIN B SAMPLE FLOW CONTROL VLV 2-FCV-066-1048

5.3 Placing Glycol Cooling in Service

NOTES:

(1) The refrigeration machine crankcase heaters should be energized for at least 2 hours prior to starting the glycol unit.

(2) The following operations are performed at Panel 25-96 in the Off-Gas Building unless otherwise noted.

5.3.1 VERIFY compressor oil level is mid-range in sightglass.

5.3.2 RESET low oil pressure and low discharge pressure trips.

5.3.3 VERIFY ANN: GLYCOL STORAGE TANK LEVEL LOW (2-XA-55-53, Window 26) is reset.

5.3.4 VERIFY the POWER toggle switch is ON.

5.3.5 START the GLYCOL TANK AGITATOR using control switch, 2-HS-66-99.

5.3.6 PLACE the SENSOR SELECT toggle switch to position B(A) to select RTD at Glycol Tank.

5.3.7 START the GLYCOL PUMP A(B) using control switch, 2-HS-66-104B(105B), and OBSERVE GLYCOL PUMP DISCHARGE PRESSURE, 2-PI-66-103A, rises to approximately 30 psig.

5.3.8 PLACE standby GLYCOL PUMP B(A) control switch, 2-HS-66-105B(104B), in AUTO.

5.3 Placing Glycol Cooling in Service (Continued)

5.3.9 PLACE the REFRIGERATION UNIT 2A(2B) control switch 2-HS-66-102A(C) in AUTO on Panel 2-9-53.

5.3.10 START the REFRIGERATION MACHINE A(B) using control switch, 2-HS-66-102B(D).

5.3.11 ADJUST Raw Service Water from Refrigeration Unit A(B), 2-FCV-66-102A(B) as necessary to maintain Compressor Discharge Pressure from 130 to 160 psig (Off-Gas Bldg. 538' EL).

5.3.12 PLACE standby REFRIGERATION MACHINE B(A) control switch, 2-HS-66-102D(B), in AUTO.

NOTES:

(1) If glycol coolant temperature is greater than 36°F, the standby refrigeration machine will start when placed in AUTO.

(2) Every 24 hours, system timers automatically switch the operation from the operating machine to the standby refrigeration machine.

5.3.13 RESET ANN: CHARCOAL BED REFRIGERATION MACHINE INOP (2-XA-55-53, Window 5).

5.3.14 OBSERVE the GLYCOL STORAGE TANK TEMPERATURE, 2-TRS-66-100, Panel 2-9-53, stabilizes at approximately 34°F.

5.3.15 STOP the GLYCOL TANK AGITATOR with control switch, 2-HS-66-99.

5.4 Placing Chilled Water System in Service

NOTE:

The following operation is performed locally at Turbine Building El. 586', T10-B unless otherwise specified.

****

CAUTION

Do not operate heaters without oil in the crankcase. The crankcase heating elements must be submerged or they can overheat.

****

NOTE:

Chemistry should be contacted any time system changes are made that may affect system volume (additions to or draining from, crossties between units, etc.).

5.4.1 VERIFY compressor oil level is mid-range in sightglass.

5.4.2 VERIFY local OFF-GAS DEHUMIDIFICATION WATER CHILLER disconnect switch is closed to provide power to the crankcase heaters.

NOTE:

If time permits, and the compressor is cold to the touch, allow four hours heat-up time prior to placing the OG CHILLER inservice.

5.4.3 VERIFY OG CHLR EXP TANK LEVEL, 2-LG-066-0061 from 1/2 to 3/4 and OG CHLR CHW PMP B SUCT PRESS, 2-PI-066-0062, at approximately 12 psig.

5.4.4 PERFORM the following to establish the correct level in the chilled water expansion tank.

5.4.4.1 CLOSE 2-PCV-2-264 OUTLET SOV, 2-SHV-002-1357.

5.4.4.2 THROTTLE OPEN OG CHLR CHW PUMP B SUCTION STNR DR, 2-DRV-066-544 and slowly DRAIN the chilled water expansion tank.

5.4 Placing Chilled Water System in Service (Continued)

5.4.4.3 WHEN Chilled water Pump B suction pressure reaches atmospheric, THEN

OPEN OG CHLR CHW EXPANSION TANK VENT, 2-VTV-066-0542

5.4.4.4 WHEN Chilled Water Expansion Tank is drained THEN

CLOSE the following valves:

- OG CHLR CHW PUMP B SUCTION STNR DR, 2-DRV-066-0544.
- OG CHLR CHW EXPANSION TANK VENT, 2-VTV-066-0542.

5.4.4.5 OPEN 2-PCV-2-264 OUTLET SOV, 2-SHV-002-1357.

NOTE:

When adding water, level will continue to rise after the vent valve is cycled until pump suction pressure equalizes. Level changes should be made in small increments.

5.4.4.6 IF level stabilizes too low, THEN

OPEN OG CHLR CHW EXPANSION TANK VENT, 2-VTV-066-542 to raise tank level AND CLOSE at desired level.

5.4.5 VERIFY the OFFGAS CHILLER POWER CONTROL toggle switch, 2-HS-066-0936A, is in ON position.

5.4.6 RESET low temperature and low pressure trips using OFFGAS CHILLER MOTOR RESET, 2-HS-066-0936B.

5.4.7 START the OG CHILLER CHW PUMP B using local STOP-START pushbutton, 2-HS-066-0059, and OBSERVE the OG CHLR CHW PMP DISCH PRESS, 2-PI-066-0063, rises to approximately 40 psig.

5.4.8 VERIFY compressor motor running.

5.4.9 CHECK the OG CHLR EXP TANK LEVEL, 2-LG-066-0061, and REPEAT Step 5.4.3 if water level has dropped.

5.4 <u>Placing Chilled Water System in Service (Continued)</u>

<u>NOTES</u>:

1) The 2A Room Cooler is normally used if the 2A Recombiner is in service and the 2B Room Cooler is normally used if the 2B Recombiner is in service. If conditions necessitate, 2A Room Cooler may be run with 2B Recombiner in service and 2B Room Cooler may be run with 2A Recombiner in service.

2) If conditions in the Recombiner Room (temperature) necessitate the use of both Recombiner Room Cooling Coils, then at Unit Supervisor discretion, both room coolers can be run at the same time by performing section 8.19.

5.4.10 PERFORM the following at JB-4432 (Turbine Bldg, El. 586', T6-B):

5.4.10.1 START the RECOMBINER ROOM CLG COIL FAN 2A(2B) using control switch, 2-HS-066-0131A(B).

5.4.10.2 PLACE the RECOMBINER ROOM CLG COIL 2B(2A) control switch, 2-HS-066-0131B(A), in STANDBY.

5.5 Restoring Off-Gas Treatment Building Sump Loop Seal

5.5.1 IF the Off-Gas System has been shutdown in excess of 30 days, THEN

VERIFY the Off-Gas Treatment Building Sump loop seal is filled by performing the following in the Off-Gas Building EL 538':

5.5.1.1 CONNECT a hose between COOLER CNDR B SHELL SIDE FLUSH Valve 2-66-611 and any Demineralized Water Service Connection.

5.5.1.2 OPEN 2-66-611.

5.5.1.3 OPEN the Demineralized Water Service Connection Valve for 1 to 2 minutes THEN

CLOSE the Demineralized Water Service Connection Valve.

5.5.1.4 CLOSE 2-66-611 and REMOVE hose.

5.6 Dry Air Purge and Recombiner Warm-up

NOTES:

1) Recombiner warm-up from cold condition may require in excess of 4 hours.

2) The following operations are performed at Control Room Panel 2-9-53 unless otherwise noted.

3) Opening the Unit 2 Off-Gas System Isolation Valve, 2-66-28, while establishing dry air purge can result in perturbations in the Unit 3 Off-Gas System. Unit 3 should be made aware of this during the performance of Step 5.6.3.

4) The performance of this section to establish dry air purge can have the following effects on the Off-Gas System:

- Rising Off-Gas System flow.
- Lowering Off-Gas Pretreatment radiation.
- Rising Off-Gas Post Treatment sample flow

5.6.1 VERIFY the OFFGAS TREATMENT SELECT handswitch, 2-XS-66-113 is in BYPASS.

5.6.2 OPEN the OFFGAS SYSTEM ISOLATION VALVE using 2-HS-66-28.

5.6.3 NOTIFY Unit 3 that Unit 2 is opening Off-Gas System Isolation Valve 2-FCV-66-28. REFER TO Note 3.

5.6.4 VERIFY OPEN both Recombiner Discharge Valves:

5.6.4.1 RECOMBINER 2A DISCHARGE VALVE using 2-HS-66-78A

5.6.4.2 RECOMBINER 2B DISCHARGE VALVE using 2-HS-66-91A

5.6.5 IF operation with a standby cooler condenser is desired, THEN

CLOSE the following valves for the cooler condenser selected for standby:

- MOISTURE SEP 2B(2A) OUTLET VALVE, using 2-HS-66-123(122).

- COOLER CNDR 2B(2A) INLET VALVE, using 2-HS-66-98(97).

5.6.6 For the in service Cooler Condenser(s), OPEN the CLR CNDR/MSR 2A(2B) DRAIN VALVE using 2-HS-66-106(107).

5.6 Dry Air Purge and Recombiner Warm-up (Continued)

5.6.7 VERIFY OPEN the following valves for the prefilter to be placed in service (charcoal adsorber prefilter vault - EL 556'):

5.6.7.1 PREFILTER A(B) INLET, 2-66-616(617)

5.6.7.2 PREFILTER A(B) OUTLET, 2-66-628(629)

5.6.8 VERIFY the OFFGAS REHEATER OUTLET TEMP CONTROL switch, 2-TC-66-109, is in AUTO and set at 77°F.

5.6.9 VERIFY the following temperature control switches are ON:

5.6.9.1 RECOMBINER 2A TEMP CONT, 2-HS-66-76.

5.6.9.2 RECOMBINER 2B TEMP CONT, 2-HS-66-90.

5.6.10 VERIFY OPEN the following valves at Panel 25-252 (located El. 604 T6-C Line):

5.6.10.1 STEAM TO PREHEATER A DRAIN VALVE, using 2-HS-12-76A.

5.6.10.2 STEAM TO PREHEATER B DRAIN VALVE, using 2-HS-12-76B.

5.6.11 VERIFY the following Panel 25-95 controllers are in AUTO and set as indicated:

5.6.11.1 CONDENSER DRAIN VALVE, 2-LIC-66-93 (50%).

5.6.11.2 CONDENSER DRAIN VALVE, 2-LIC-66-94 (70%)

5.6.12 OPEN the UNITS 1 & 2 SJAE STM valve, 0-12-662 (Turbine Bldg. EL 565' north of Aux. Boiler A in overhead).

5.6.13 Slowly THROTTLE OPEN by jogging the following valves (control pushbuttons are inside Recombiner Room):

5.6.13.1 AUX STEAM TO OFF-GAS PREHEATER A, 2-HS-12-74A.

5.6.13.2 AUX STEAM TO OFF-GAS PREHEATER B, 2-HS-12-75A.

5.6 Dry Air Purge and Recombiner Warm-up (Continued)

5.6.14 CHECK auxiliary steam supply pressure at following instruments is between 150 and 250 psig (on wall outside Recombiner Room):

5.6.14.1 STEAM TO OFF-GAS PREHEATER A, 2-PIC-1-175A.

5.6.14.2 STEAM TO OFF-GAS PREHEATER B, 2-PIC-1-175B.

5.6.15 OPEN the RECOMBINER 2A AIR PURGE VALVE, using 2-HS-66-87.

5.6.16 OPEN the RECOMBINER 2B AIR PURGE VALVE, using 2-HS-66-86.

5.6.17 OPEN FSV-66-87 BYPASS valve, 2-33-1132 (TB 586' outside SJAE rooms).

5.6.18 OPEN FSV-66-86 BYPASS valve, 2-33-1133 (TB El. 586' outside SJAE rooms).

5.6.19 VENT the condensate side of the Off-Gas Condenser as follows:

5.6.19.1 OPEN OG CNDR TUBE SIDE VENT, 2-66-568 (Recombiner Room T-7C El. 586').

5.6.19.2 WHEN approximately 1 minute has elapsed, THEN

CLOSE 2-66-568.

5.6 Air Purge and Recombiner Warm-up (Continued)

NOTE:

The minimum temperature requirement of 240°F is not required when not processing a nuclear stream.

5.6.20 WHEN the average temperature for each recombiner is greater than 240°F as indicated on RECOMBINER TEMPERATURE recorder, 2-TRS-66-77, THEN

CLOSE the Recombiner Air Purge Valves:

5.6.20.1 RECOMBINER 2A AIR PURGE VALVE using 2-HS-66-87.

5.6.20.2 RECOMBINER 2B AIR PURGE VALVE using 2-HS-66-86.

5.6.20.3 FSV-66-87 BYPASS valve, 2-33-1132.

5.6.20.4 FSV-66-86 BYPASS valve, 2-33-1133.

5.6.21 CLOSE the discharge valve of the Recombiner to be placed in standby, RECOMBINER 2B(2A) DISCHARGE VALVE using 2-HS-66-91A(78A).

5.6.22 CLOSE the following Recombiner drain valves from Panel 25-252:

5.6.22.1 RECOMBINER A DRAIN VALVE using 2-HS-66-73.

5.6.22.2 RECOMBINER B DRAIN VALVE using 2-HS-66-88.

5.6.7

5.7 Steam Warming of Off-Gas System from SJAEs

NOTES:

(1) The following steps could affect condenser vacuum.

(2) The minimum temperature requirement of 240°F is not required when not processing a nuclear stream.

5.7.1 VERIFY the Recombiners have been warmed to greater than 240°F and one is aligned for service with the other in standby.

5.7.1.1 REFER TO Section 5.6.

5.7.2 OPEN the Preheater Inlet Valves at Panel 9-53:

5.7.2.1 PREHEATER 2A INLET VALVE using 2-HS-66-72A.

5.7.2.2 PREHEATER 2B INLET VALVE using 2-HS-66-85A.

5.7.3 VERIFY the following valves are open at Panel 9-6:

5.7.3.1 SJAE 2A CONDENSATE INLET VALVE, using 2-HS-2-36A.

5.7.3.2 SJAE 2B CONDENSATE INLET VALVE, using 2-HS-2-31A.

5.7.3.3 SJAE 2A CONDENSATE OUTLET VALVE, using 2-HS-2-41A.

5.7.3.4 SJAE 2B CONDENSATE OUTLET VALVE, using 2-HS-2-35A.

5.7.4 VERIFY the CNDS FROM SJAE A(B) pressure, 2-PI-2-40(34), is greater than 60 psig at Panel 25-105.

5.7.5 SLOWLY OPEN the UNITS 1 & 2 SJAE STM valve, 0-12-662 (Turbine Bldg, El 565' north of Aux. Boiler A in overhead).

5.7.6 PLACE the SJAE 2A(2B) OG OUTLET VALVE to OPEN/AUTO using 2-HS-66-14(18), at Panel 2-9-8.

5.7.7 CHECK 2-HS-1-150 AND 2-HS-1-152 in CLOSE on Panel 2-9-7.

5.7 Steam Warming of Off-Gas System from SJAEs (Continued)

NOTES:

(1) Pushbutton 2-HS-12-3A will simultaneously operate valves 2-FCV-12-3 and 70 which supply auxiliary steam to SJAE A. Likewise, 2-HS-12-5A will operate 2-FCV-12-5 and 72 which supply auxiliary steam to SJAE B. This admits auxiliary steam to all three stages of the SJAEs. Controls are on JB 3524 (El 586', T6-C).

(2) With Auxiliary Boiler Steam Pressure at 2-PS-12-80A(B) greater than 170 psig, when valves 2-FCV-12-3 and 70 (2-FCV-12-5 and 72) are full open the SJAE A(B) intercondenser drain valve 2-FCV-1-150 (2-FCV-1-152) will open. This will result in a rise in condenser pressure.

5.7.8 Slowly JOG OPEN AUX STM TO SJAE A(B) 1ST, 2ND, & 3RD STG, using pushbutton 2-HS-12-3A(5A) at JB 3524 T6-C El. 586' as follows:

5.7.8.1 DEPRESS the OPEN pushbutton for 2-HS-12-3A(5A) AND

5.7.8.2 WHEN open AND closed indicating lights illuminate, THEN

DEPRESS the STOP pushbutton for 2-HS-12-3A(5A).

5.7.8.3 Alternately DEPRESS the OPEN and STOP pushbutton in 2 to 3 second intervals until the valve is fully OPEN.

****

CAUTION

If FCV-66-14(18) does not start opening at approximately 170 psig, the loop seal is in jeopardy of being lost.

****

5.7.9 CHECK auxiliary steam supply pressure at STEAM TO SJAE A(B) STAGE I & II, 2-PI-1-150(152), on Panel 25-105, is between 175 and 250 psig.

5.7 Steam Warming of Off-Gas System from SJAEs (Continued)

NOTE:

The requirements of steps 5.7.10 and 5.7.11 are NOT APPLICABLE WHEN NOT processing a nuclear stream.

5.7.10 VERIFY Recombiner temperatures stabilize greater than 275°F as indicated on RECOMBINER 2A/2B TEMPERATURE recorder 2-TRS-66-77 at Panel 9-53.

5.7.11 VERIFY the following annunciators are reset:

5.7.11.1 OFF-GAS RECOMBINER A INLET TEMP LOW (2-XA-55-53, Window 1).

5.7.11.2 OFF-GAS RECOMBINER B INLET TEMP LOW (2-XA-55-53, Window 11).

5.7.11.3 OFF-GAS RECOMBINER TEMP ABNORMAL (2-XA-55-53, Window 21).

5.8 Placing SJAEs in Service with Auxiliary Boiler Steam

NOTE:

Completion of placing SJAEs in service on Auxiliary Boiler steam may continue when directed by 2-GOI-100-1A.

****

CAUTION

A Hydrogen Analyzer must be operable per TRM 3.7.2 when steam jet air ejectors are in service.

****

5.8.1 VERIFY steam warming of Off-Gas System has been completed. REFER TO Section 5.7.

5.8.2 VERIFY the CNDS FROM SJAE A(B) pressure, 2-PI-2-40(34), is greater than 60 psig at Panel 25-105.

5.8.3 VERIFY hotwell pressure, as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, Panel 2-9-6, is below -20 inches Hg.

5.8.4 OPEN both SJAE INLET VALVES, using the following at Panel 2-9-8.

5.8.4.1 SJAE 2A INLET VALVE, 2-HS-66-11.

5.8.4.2 SJAE 2B INLET VALVE, 2-HS-66-15.

5.8.5 VERIFY hotwell pressure is lowering, as indicated on the HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, on Panel 2-9-6.

5.8.6 PERFORM the following Hydrogen Analyzer checks:

5.8.6.1 Have IM personnel ADJUST sample and bypass flow and pressure to their nominal values after SJAE startup. (See 8.1.1 for nominal values)

5.8.6.2 Confirm that NORMAL OPG MODE status lights 2-IL-66-1135 and 1151 are energized and no abnormal condition status lights or alarms are energized for the Hydrogen Analyzers on the 9-53 and at panel 2-LPNL-925-0588.

5.8 Placing SJAEs in Service with Auxiliary Boiler Steam (Continued)

NOTE:

If Auxiliary Boiler Steam pressure drops to less than or equal to 160 psig the SJAE will shutdown automatically (valves 2-FCV-66-14(18) and 2-FCV-1-150(152) will close).

The following signals will automatically trip the mechanical vacuum pump and close the mechanical vacuum pump suction valve:

- Hotwell pressure below -27" Hg.
- Hotwell pressure below -22" Hg and reactor pressure greater than 600 psig.

5.8.7 PLACE the MECH VACUUM PUMP 2A(2B) control switch, 2-HS-66-39A(43A), at Panel 2-9-8, in STOP.

5.8.8 PLACE the MECH VAC PUMP 2A(B) SUCTION VALVE control switch, 2-HS-66-36A(40A), Panel 2-9-8, in CLOSE.

5.8.9 CLOSE the following seal water valves at Vacuum Pump Room A(B), T5(7)-D, El 604'.

5.8.9.1 VAC PUMP A(B) SOV, 2-37-511(509).

5.8.9.2 VAC PUMP A(B) SOV, 2-37-512(510).

5.8.9.3 VAC PUMP A(B) SEP SOV, 2-37-508(507).

5.8.10 VERIFY that the in service SJAE maintains condenser vacuum by observing the HOTWELL PRESS AND TEMP recorder, 2-XR-2-2 on Panel 2-9-6.

5.9 Transfer of SJAEs from Aux Boiler Steam to Main Steam

5.9.1 WHEN directed by 2-GOI-100-1A to transfer SJAEs from Auxiliary Steam to Main Steam, THEN

PERFORM Steps 5.9.2 through 5.9.12.

5.9.2 VERIFY the following pressure controllers are set at 200 psi and the associated hand loader is set as follows on Panel 25-105:

5.9.2.1 STEAM TO SJAE A(B) STAGE I & II, 2-PC-1-150(152)-12 psig.

5.9.2.2 STEAM TO SJAE A(B) STAGE III, 2-PC-1-166(167)-8 psig.

5.9.3 VERIFY OPEN (steam trap bypass valve) MAIN STEAM TO SJAE 2A(2B) DRAIN VLV, using 2-HS-6-113A(114A) at Panel 2-9-7.

5.9.4 PLACE the STEAM TO SJAE 2A(2B) handswitch, 2-HS-1-155A(156A) in OPEN at Panel 2-9-7 (this will open valves 2-FCV-1-155 and 172 (2-FCV-1-156 and 173)).

NOTE: The following step will:

- Shut off auxiliary boiler steam to both SJAEs after a 60 second time delay.
- Close the main steam pressure control valves, 2-PCV-1-151(153) and 2-PCV-1-166(167), if at least 180 psig main steam supply pressure is not achieved within 30 seconds.

5.9.5 PLACE the SJAE 2A(2B) PRESSURE CONTROLLER handswitch, 2-HS-1-150(152), in OPEN at Panel 2-9-7.

5.9 Transfer of SJAEs from Aux Boiler Steam to Main Steam (Continued)

NOTE:

The 30 second timer may expire before 180 psig Main Steam pressure is sensed; therefore, it may be necessary to reset the logic sequence by placing 2-HS-1-150(152) to CLOSE and back to OPEN in order to achieve valve operation as described in Steps 5.9.6 and 5.9.7.

5.9.6 VERIFY the following red, open indicating lights have illuminated at Panel 2-9-7:

5.9.6.1 STEAM TO SJAE 2A(2B) STAGES 1, 2, AND 3, 2-ZI-1-151/166(153/167).

5.9.6.2 SJAE 2A(2B) INTMD CONDENSER DRAIN, 2-ZI-1-150(152).

5.9.7 VERIFY the following valves are closed at JB 3524(El 586, T6-C).

5.9.7.1 AUX STM TO SJAE A 1st and 2nd stage 2-FCV-12-3.

5.9.7.2 AUX STM TO SJAE A 3rd stage 2-FCV-12-70.

5.9.7.3 AUX STM TO SJAE B 1st and 2nd stage 2-FCV-12-5.

5.9.7.4 AUX STM TO SJAE B 3rd stage 2-FCV-12-72.

5.9.8 VERIFY the following CLOSE pushbuttons are depressed at JB 3524 El. 586 T6-C:

5.9.8.1 AUX STM TO SJAE A 1ST, 2ND & 3RD STG, 2-HS-12-3A.

5.9.8.2 AUX STM TO SJAE B 1ST, 2ND & 3RD STG, 2-HS-12-5A.

5.9.9 CHECK main steam supply pressure at STEAM TO SJAE A(B) STAGE I & II, 2-PI-1-150(152), Panel 25-105, is being maintained between 190 and 225 psig.

5.9.10 CLOSE the following steam trap bypass valves at Panel 2-9-7:

5.9.10.1 MAIN STEAM TO SJAE 2A DRAIN VLV, using 2-HS-6-113A.

5.9.10.2 MAIN STEAM TO SJAE 2B DRAIN VLV, using 2-HS-6-114A.

5.9 Transfer of SJAEs from Aux Boiler Steam to Main Steam (Continued)

5.9.11 VERIFY hotwell pressure as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, Panel 2-9-6, is being maintained below -25 inches Hg.

5.9.12 [GE/R] PLACE the SJAE B(A) PRESS CONTROLLER handswitch, 2-HS-1-152(150), in CLOSE at Panel 2-9-7 for the SJAE selected for Standby operation. [GE-SIL-150]

5.9.13 IF the Preheaters have been transferred from Aux Boiler steam to main steam, THEN

CLOSE UNITS 1 & 2 SJAE STM valve, 0-12-662 (Turbine Bldg. 565', North of Aux. Boiler in overhead.

NOTE:

Section 8.4 may be referred to if operation of the standby SJAE is required.

5.10 Transfer of Preheaters from Aux Boiler Steam to Main Steam

5.10.1 WHEN directed by 2-GOI-100-1A to transfer preheaters from Auxiliary Steam to Main Steam, THEN

PERFORM Steps 5.10.2 through 5.10.8.

5.10.2 VERIFY OPEN the STEAM TO PREHEATER DRAIN VALVEs using 2-HS-1-177A AND 2-HS-1-177B at Panel 25-252 (T-6C EL 604').

5.10.3 VERIFY OPEN the STEAM TO PREHEATER DRAIN VALVEs using 2-HS-1-178A AND 2-HS-1-178B (in Recombiner Rooms El-586).

5.10.4 OPEN the following valves using the pushbutton controls at T-7 B line, elevation 586:

5.10.4.1 STEAM TO OFF-GAS PREHEATER A, using 2-HS-1-176C.

5.10.4.2 STEAM TO OFF-GAS PREHEATER B, using 2-HS-1-176D.

5.10.5 CLOSE the following valves using the pushbutton controls at T-7 B line, elevation 586:

5.10.5.1 AUX STEAM TO OFF-GAS PREHEATER A, using 2-HS-12-74B.

5.10.5.2 AUX STEAM TO OFF-GAS PREHEATER B, using 2-HS-12-75B.

5.10.6 CLOSE the following valves at Panel 25-252 (T-6C EL 604'):

5.10.6.1 STEAM TO PREHEATER A DRAIN VALVE, using 2-HS-12-76A.

5.10.6.2 STEAM TO PREHEATER B DRAIN VALVE, using 2-HS-12-76B.

5.10.7 CHECK Main Steam supply pressure at following indications is between 240 and 260 psig (wall outside Recombiner Room).

5.10.7.1 STEAM TO OFF-GAS PREHEATER A, 2-PIC-1-175A.

5.10.7.2 STEAM TO OFF-GAS PREHEATER B, 2-PIC-1-175B.

5.10.8 IF the SJAEs have been transferred from Aux Boiler steam to main steam, THEN

CLOSE the UNITS 1 & 2 SJAE STM valve, 0-12-662, (Turbine Bldg, El 565' north of Aux. Boiler A in overhead).

5.10 Transfer of Preheaters from Aux Boiler Steam to Main Steam (Continued)

5.10.9 VERIFY Recombiner temperatures stabilize greater than 275°F as indicated on RECOMBINER 2A/2B TEMPERATURE recorder 2-TRS-66-77 at Panel 2-9-53, and hydrogen concentrations are stable as indicated by OFF-GAS HYDROGEN ANALYZER recorder 2-H2R-66-94 at Panel 2-9-53.

5.10.10 VERIFY the following annunciators are reset:

5.10.10.1 OFF-GAS RECOMBINER A INLET TEMP LOW (2-XA-55-53, window 1).

5.10.10.2 OFF GAS RECOMBINER B INLET TEMP LOW (2-XA-55-53, window 11).

5.10.10.3 OFF GAS RECOMBINER TEMP ABNORMAL (2-XA-55-53, window 21).

5.11 Aligning Charcoal Filters for Parallel Flow

NOTE:

The charcoal beds can be aligned for either parallel or series flow, but normally parallel flow is preferred. Performing the following steps at Panel 9-53 will align the charcoal beds for parallel flow. If series alignment is preferred, Section 8.10 shall be performed in lieu of the following steps.

****

CAUTION

The charcoal adsorbers must be aligned in the treatment mode prior to reaching 25% power.

****

5.11.1 PLACE the OFFGAS TREATMENT SELECT handswitch, 2-XS-66-113, in TREAT.

5.11.2 OPEN the CHARCOAL ADSORBER TRAIN 2 INLET VALVE, using 2-HS-66-117.

5.11.3 OPEN the CHARCOAL ADSORBER TRAIN 1 DISCH VALVE, using 2-HS-66-118.

5.11.4 CLOSE the CHARCOAL ADSORBER TRAINS SERIES VLV, using 2-HS-66-116.

5.11.5 VERIFY dewpoint temperature on OFFGAS REHEATER TEMPERATURE recorder, 2-TRS-66-108, indicates 45°F or less (Blue Pen).

****

CAUTION

A Reheater Inlet Dewpoint Temperature above 48°F may cause wetting of the charcoal beds.

****

5.11.6 IF the Off-Gas System is intended to be operated with charcoal beds in parallel with the charcoal beds on another (shutdown) unit, THEN

COMPLETE Section 8.11.

6.0 SYSTEM OPERATIONS

6.1 Recombiner Performance Evaluation

NOTE:

1) The production of hydrogen and oxygen in the reactor is dependent upon reactor power level and upon the amount of hydrogen injected by the Hydrogen Water Chemistry system, if in service. Since the recombination of hydrogen and oxygen is exothermic, the operating temperature of the recombiner is also dependent upon power level and the status of the HWC system.

2) Following startup, while still at low power, recombiner performance and hydrogen concentration should be closely monitored.

6.1.1 PERFORM a recombiner performance evaluation as follows:

6.1.1.1 DETERMINE the in-service recombiner inlet temperature as indicated on RECOMBINER 2A(2B), INLET TEMP 2-TI-66-75A(B), Panel 2-9-53.

6.1.1.2 DETERMINE the in-service recombiner operating (center) temperature as indicated on RECOMBINER 2A/2B TEMPERATURE recorder, 2-TRS-66-77, Panel 2-9-53.

6.1.1.3 CALCULATE the temperature difference (ΔT) between the values obtained in Steps 1 and 2.

6.1.1.4 DETERMINE the reactor thermal power (MWt) from process computer.

6.1.1.5 OBTAIN from Illustration 1 the ΔT value corresponding to the reactor power.

NOTE:

Illustration 1 is based on operating conditions with HWC shutdown. Additional curve(s) will be required to reflect normal operating conditions when the HWC system's nominal operating condition(s) is determined.

6.1.1.6 VERIFY the calculated ΔT is greater than or equal to the value obtained from the table.

6.1 Recombiner Performance Evaluation (continued)

6.1.2 IF the in-service recombiner performance is below the minimum allowable, THEN

PERFORM the following:

6.1.2.1 CHECK Off-Gas Preheater, Recombiner and SJAEs are in operation in accordance with Section 5.0.

6.1.2.2 Closely MONITOR the OFFGAS HYDROGEN ANALYZER recorder, 2-H2R-66-96 on Panel 2-9-53.

6.1.2.3 IF both hydrogen analyzers are inoperable, THEN

REQUEST Chem Lab to obtain a grab sample to determine hydrogen concentration. REFER TO TRM 3.3.9.

6.1.2.4 IF a malfunction of the SJAE is suspected, THEN

REFER TO Section 8.4 and TRANSFER SJAEs.

6.1.3 IF off-gas hydrogen rises above 1%, THEN

REFER TO 2-AOI-66-1.

6.1.4 Only IF analysis or hydrogen analyzers show hydrogen concentration is below 4%, THEN

PLACE standby recombiner in operation. REFER TO Section 8.3.

6.2 Monthly Seal Air Flow Checks During Normal Operation

NOTES:

(1) An adequate sealing air flow must be maintained to the OFF-GAS SYSTEM valves. This will assist the system's optimum efficiency and OFF-GAS integrity.

(2) Rotometer inlet valves are to be kept full open. These valves are not to be adjusted in an attempt to control seal air flow.

6.2.1 CHECK seal air flow to the OFF-GAS SYSTEM valves using Attachment 5, 2-OI-66.

6.2.2 IF seal flow should exceed the setpoint range (0-0.6 ccps), THEN

NOTIFY the UO/Unit Supervisor and INITIATE a Work Request.

7.0 <u>SHUTDOWN</u>

7.1 <u>Shutting Down the Off-Gas System</u>

7.1.1 REVIEW all Precautions and Limitations in Section 3.0.

7.1.2 VERIFY the following initial conditions are met:

7.1.2.1 Off-Gas System is in operation in accordance with Section 5.0.

7.1.2.2 Reactor shutdown in accordance with <u>2-GOI-100-12A</u> has commenced.

****

CAUTION

Mechanical vacuum pumps shall <u>NOT</u> be used to purge main condenser if hydrogen concentration is suspected of being present.

****

7.1.3 To purge the main condenser of airborne activity, PERFORM the following:

7.1.3.1 VERIFY an SJAE and sealing steam system in service on Auxiliary Boiler steam.

7.1.3.2 THROTTLE OPEN CONDENSER VAC BREAKERS 1A AND 1B using 2-HS-66-1A at Panel 2-9-8 to maintain hotwell pressure below -6" HG as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, Panel 2-9-6.

7.1.3.3 After a minimum of 30 minutes, CLOSE CONDENSER VAC BREAKERS 1A AND 1B, 2-HS-66-1A.

7.1 Shutting Down the Off-Gas System (Continued)

NOTES:

(1) The following operations are performed at Control Room Panel 2-9-53 unless otherwise noted.

(2) The following steps shall be performed when directed by 2-GOI-100-12A.

7.1.4 IF on Auxiliary Boiler Steam, THEN

CLOSE AUX STM TO SJAE A(B) 1st, 2nd & 3rd STG by depressing 2-HS-12-3A(5A) (El. 586, T6-C).

7.1.5 PLACE the following control switches in CLOSE at Panel 2-9-7:

7.1.5.1 STEAM TO SJAE 2A(2B), 2-HS-1-155A (156A).

7.1.5.2 SJAE A PRESS CONTROLLER, 2-HS-1-150.

7.1.5.3 SJAE B PRESS CONTROLLER, 2-HS-1-152.

7.1.6 PLACE SJAE 2A(2B) INLET VALVE control switch, 2-HS-66-11(15) in CLOSE at Panel 2-9-8.

7.1.7 PLACE SJAE 2A(2B) OG OUTLET VALVE control switch, 2-HS-66-14(18) in CLOSE at Panel 2-9-8.

NOTE:

The Mechanical Vacuum Pump will trip when condenser vacuum is greater than 27" Hg, or when condenser vacuum is greater than 22" Hg with reactor pressure greater than 600 psig.

7.1.8 IF condenser vacuum is to be maintained, THEN

PERFORM the following whenever hotwell pressure, on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, Panel 2-9-6, rises above -27" Hg:

7.1.8.1 VERIFY seal water is aligned to the Vacuum Pumps. REFER TO section 5.2.

7.1.8.2 OPEN the MECH VAC PUMP 2A(2B) SUCTION VALVE, using 2-HS-66-36A(40A) at Panel 2-9-8.

7.1.8.3 START the MECH VACUUM PUMP 2A(2B) using control switch, 2-HS-66-39A(43A) at Panel 2-9-8.

7.1 Shutting Down the Off-Gas System (Continued)

7.1.9 PLACE the following temperature control switches in OFF:

7.1.9.1 RECOMBINER 2A TEMP CONT, 2-HS-66-76.

7.1.9.2 RECOMBINER 2B TEMP CONT, 2-HS-66-90.

7.1.10 CLOSE the STEAM TO OFF-GAS PREHEATER A valve, using 2-HS-1-176A, in recombiner room.

7.1.11 CLOSE the STEAM TO OFF-GAS PREHEATER B valve, using 2-HS-1-176B, in recombiner room.

7.1.12 VERIFY OPEN the RECOMBINER A AIR PURGE VALVE, 2-FSV-66-87.

7.1.13 VERIFY OPEN the RECOMBINER B AIR PURGE VALVE, 2-FSV-66-86.

7.1.14 IF on Aux Boiler Steam, THEN

CLOSE AUX STEAM TO OFF-GAS PREHEATER A(B), using 2-HS-12-74A(75A), in recombiner room.

NOTE:

The air purge will cool down the Off-Gas System and will purge/dilute any residual hydrogen. Purging should continue for a minimum of two hours. If maintenance is to be performed on the Off-Gas System, purging should continue for six hours or until hydrogen analysis shows less than 2% by volume.

7.1.15 WHEN it is no longer required to maintain condenser vacuum, THEN

PERFORM the following:

7.1.15.1 STOP the MECH VACUUM PUMP 2A(2B) using control switch, 2-HS-66-39A(43A) at Panel 2-9-8.

7.1.15.2 CLOSE the Mech Vac Pump seal water valve(s) in the Mech. vacuum Pump Room:

- VAC PUMP A(B) SOV, 2-37-511(509).
- VAC PUMP A(B) SOV, 2-37-512(510).
- VAC PUMP A(B) SEP SOV, 2-37-508(507).

7.1 Shutting Down the Off-Gas System (Continued)

7.1.15.3 CLOSE the MECH VAC PUMP A(B) SUCTION VALVE, using 2-HS-66-36A(40A) at Panel 2-9-8.

7.1.15.4 OPEN the CONDENSER VAC BREAKERS 1A AND 1B using control switch, 2-HS-66-1A, at Panel 2-9-8.

7.1.15.5 VERIFY hotwell pressure is rising as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, at Panel 2-9-6.

7.1.15.6 PLACE OFFGAS TRAIN A AUTO CHANNEL CHECK / BYPASS handswitch 2-HS-066-1007 and OFFGAS TRAIN B AUTO CHANNEL CHECK / BYPASS handswitch 2-HS-066-1008 at 2-LPNL-925-0588 in BYPASS to stop the automatic hydrogen analyzer calibration checks.

7.1.16 REFER TO 2-OI-47 and SHUT DOWN turbine seal steam and steam packing exhauster.

7.1.17 WHEN purging is no longer required, THEN

PERFORM the following:

7.1.17.1 CLOSE the RECOMBINER 2A AIR PURGE VALVE, using 2-HS-66-87.

7.1.17.2 CLOSE the RECOMBINER 2B AIR PURGE VALVE, using 2-HS-66-86.

7.1.17.3 CLOSE the PREHEATER 2A INLET VALVE, using 2-HS-66-72A.

7.1.17.4 CLOSE the PREHEATER 2B INLET VALVE, using 2-HS-66-85A.

7.1.18 CHECK the following annunciators are reset:

7.1.18.1 OG POST TRTMT RADIATION HIGH (2-XA-55-4C, Window 33).

7.1.18.2 OG POST TRTMT RADIATION HIGH HIGH (2-XA-55-4C, Window 34).

7.1.19 PLACE the OFFGAS TREATMENT SELECT handswitch, 2-XS-66-113 in BYPASS.

7.1 Shutting Down the Off-Gas System (Continued)

7.1.20 CLOSE the OFFGAS SYSTEM ISOLATION VALVE, using 2-HS-66-28.

7.1.21 IF shutdown of Glycol Cooling System is desired, THEN

PERFORM the following to shut down the Glycol Cooling System (Off-Gas Building, El 538'):

7.1.21.1 PLACE standby REFRIGERATION MACHINE B(A) control switch, 2-HS-66-102D(B), Panel 25-96, in STOP.

7.1.21.2 STOP the REFRIGERATION MACHINE A(B) using control switch, 2-HS-66-102B(D), at Panel 25-96.

7.1.21.3 PLACE standby GLYCOL PUMP B(A) control switch, 2-HS-66-105B(104B), Panel 25-96, in STOP.

7.1.21.4 STOP the GLYCOL PUMP A(B) using control switch, 2-HS-66-104B(105), at Panel 25-96.

7.1.22 IF shutdown of Chilled Water System is desired, THEN

PERFORM the following to shut down the Chilled Water System:

7.1.22.1 PLACE standby RECOMB ROOM COOLING COIL FAN B control switch, 2-HS-66-131B, in STOP at JB-4432 (T6-B, El 586').

7.1.22.2 STOP the RECOMB ROOM COOLING COIL FAN A using control switch, 2-HS-66-131A (T6-B, El 586').

7.1.22.3 STOP the CHW PUMP B using pushbutton control, 2-HS-66-59 (T10-B, El 586').

7.1.22.4 IF maintenance is to be performed on the system, THEN

OPEN local disconnect switch to remove power from the crankcase heaters.

7.1.23 PERFORM the following to shut down the stack filter cubicle exhaust fans at Unit 1 Panel 9-8:

7.1.23.1 VERIFY that Units 1 and 3 Off-Gas Systems are shut down. REFER TO BF-OI-66 and 3-OI-66.

7.1.23.2 STOP the STACK FLT EXH CUBICLE FAN A(B) using control switch, 1-HS-66-44A(46A), and CHECK associated damper green (closed) indicating light illuminates.

7.1 Shutting Down the Off-Gas System (Continued)

7.1.24 PERFORM the following to shut down the Stack Dilution Fans:

****

CAUTION

A Stack Dilution Fan or Standby Gas Treatment must be in operation when any potentially radioactive gas is being discharged out the stack. This will dilute potential hydrogen and prevent backflow into the Standby Gas Treatment System.

****

NOTE:

The required flow for stack gas 0-FI-90-271 is 16,366scfm. To preclude receiving erroneous alarms, optimum flow is 18,500. If these requirements are to be met, ensure at least 3 other fans are in service. This may require 4 Stack Dilution fans (total for the plant) to be placed in service.

7.1.24.1 VERIFY either of the following:

- Units 1 and 3 Off-Gas Systems are shut down. REFER TO BF-OI-66 and 3-OI-66.
- Standby Gas Treatment is in service. (REFER TO 0-OI-65)

7.1.24.2 VERIFY Unit 2 Steam Packing Exhauster is shut down. REFER TO 2-OI-47C.

7.1.24.3 PLACE the STACK DILUTION FAN SEL control switch, 2-XS-66-29, Panel 2-9-8, in OFF.

7.1.24.4 PLACE the STACK DILUTION FAN 2A(2B), 2-HS-66-29A(31A), Panel 2-9-8, in STOP.

7.1.25 IF NOT required for monitoring during maintenance, THEN

REQUEST Instrument & Control Section shut down the Hydrogen Analyzers using 2-SI-4.2.K-5(A) and (B).

8.0 INFREQUENT OPERATIONS

8.1 Hydrogen Analyzer Trouble-Shooting

NOTES:

1. Alarms for the following parameters for each of the hydrogen analyzers are on Panel 2-LPNL-925-588, T6-C, El 604':

   - HI SAMPLE PRESSURE TRAIN A (TRAIN B) (5 psig)
   - LOW SAMPLE PRESSURE TRAIN A (TRAIN B) (10" Hg vacuum)
   - LOW SAMPLE FLOW TRAIN A (TRAIN B) (1/2 SCFH)
   - CHANNEL FAULT TRAIN A (TRAIN B)

   The corresponding indicating lights for Hydrogen Analyzer A(B) on Panel 2-9-53 are labeled as follows:

   - 2-IL-66-1139(1142) HIGH SAMPLE PRESSURE .
   - 2-IL-66-1140(1141) LOW SAMPLE PRESSURE
   - 2-IL-66-1143(1145) LOW SAMPLE FLOW
   - 2-IL-66-1147(1149) CHANNEL FAULT

   Any of the above alarms will cause the OFF-GAS MONITOR PANEL TROUBLE alarm, 2-XA-55-589, window 7 and the H2 WATER CHEMISTRY ABNORMAL alarm, 2-XA-55-53, window 10. These common alarms will also occur if a heat trace failure is detected in the Off-gas Monitor Panel 2-LPNL-925-0588. Refer to 2-ARP-25-588 for additional alarm information.

2. Status light indication for TRAIN A / TRAIN B is:

   NORMAL OPG MODE 2-IL-66-1135 / 1151 is normally energized. Energized if OFF-GAS SAMPLE MODE SELECT SW 2-HS-66-1111 is in the NORMAL position and OFF-GAS TRAIN A(B) FUNCTIONAL TEST / OP SW is in the OPERATE position

   CALIBRATION MODE 2-Il-66-1136 / 1152 is normally de-energized. Energized if OFF-GAS SAMPLE MODE SELECT SW 2-HS-66-1111 is in the Train A(B) position, OFF-GAS TRAIN A(B) FUNCTIONAL TEST / OP SW 2-HS-66-1115(1116)is in the TEST position, or an automatic channel check is in progress for that hydrogen analyzer

   AUTO CHAN CHECK MODE 2-IL-66-1137(1153) is normally energized. Energized if OFF-GAS TRAIN A(B) AUTO CHANNEL CHECK/BYPASS SWITCH 2-HS-66-1007(1008)is in the AUTO position

   MANUAL CHAN CHECK MODE 2-IL-66-1138(1154) is normally de-energized. Energized if OFF-GAS TRAIN A(B) AUTO CHANNEL CHECK/BYPASS SWITCH 2-HS-66-1007(1008) is in the BYPASS position

8.1 Hydrogen Analyzer Trouble-Shooting (continued)

PURGE MODE 2-IL-66-1148(1150) is normally de-energized. Energized if a sample train is selected with OFFGAS SAMPLE MODE SELECT SW 2-HS-066-1111, OFFGAS TRAIN A(B) CAL GAS SELECT SW 2-HS-066-1110A(1110B) is in the NITROGEN position or the OFF-GAS NITROGEN PURGE SUPPLY SOLENOID VLV 2-FSV-66-1003(1004) is open during an automatic channel check

3. The following operations are performed at Panel 2-LPNL-925-0588 unless otherwise noted.

4. In the following steps if initial checks and adjustments fail to restore proper operation, the I&C section should be contacted REFER to 2-SI-4.2.K-5(A) and (B).

5. The adjustment of sample flow, bypass flow and sample pressure interact and iterative adjustment of the following parameters may be necessary to clear a sample flow or pressure alarm

8.1.1 To ESTABLISH correct sample conditions:

8.1.1.1 VERIFY sample gas flow is approximately 1 SCFH as indicated on OFFGAS TRAIN A(B) SAMPLE FLOW INDICATING SWITCH 2-FIS-066-1021(1022). ADJUST sample flow using OFFGAS TRAIN A(B) SAMPLE FLOW CONTROL VLV 2-FCV-066-1047(1048)

8.1.1.2 VERIFY bypass gas flow is approximately 1 SCFH as indicated on OFFGAS TRAIN A(B) BYPASS FLOW INDICATOR 2-FI-066-1023(1024). ADJUST bypass flow using OFFGAS TRAIN A(B) BYPASS THROTTLE VLV 2-THV-066-1049(1050).

8.1.1.3 The sample supply pressure as indicated on OFF-GAS TRAIN A(B) INLET SAMPLE PRESSURE 2-PI-066-1011(1012) should indicate between 0.5 and 2 psig and the pressure as indicated on the OFFGAS SAMPLE OUTLET PRESSURE gauge 2-PI-066-1013 should be >25″ Hg vacuum if the plant Off-gas system is operating at normal conditions. ADJUST the sample pressure regulator OFFGAS TRAIN A(B) SAMPLE PRESS REGULATOR 2-PCV-066-1014(1015) and establish a sample pressure of 0 psig as indicated on OFFGAS TRAIN A(B) SAMPLE PRESSURE TRANSMITTER 2-PIT-066-1009(1010). Turning the adjusting screw (under the tamper proof cap) clockwise (CW) will increase the sample pressure; counter clockwise (CCW) will reduce the sample pressure.

8.1 Hydrogen Analyzer Trouble-Shooting (continued)

8.1.2 CHANNEL FAULT 2-IL-66-1147(1149) will energize in addition to CHANNEL FAULT TRAIN A(B) 2-XA-55-588, window 7(23), OFF-GAS MONITOR PANEL TROUBLE 2-XA-55-589, window 7, and H2 WATER CHEMISTRY ABNORMAL 2-XA-55-53, window 10 if a channel check is performed and the monitor under test fails to indicate the required cal gas concentration indication of 1% +/- 0.25% or the analyzer output is outside of it's normal range.

8.1.3 Operation of the sample panel heat trace equipment should maintain the sample tubing surface temperature inside the sample cabinet at 110 - 125 °f. The temperature can be verified by manually monitoring the tubing temperature of thermocouples OFFGAS TRAIN A(B) HEAT TRACE TEMP ELEMENT 2-TE-066-1029(1039). This can be accomplished by using a hand held monitor plugged into Genius block K302 or by monitoring the PLC input % AI09(A) and % AI10(B). The readout is 0-10,000 engineering units (EU), which equals 0-200°F.

8.2 Purging Off-Gas System

NOTES:

(1) This section is to be used to purge the condenser and off-gas piping prior to performing any maintenance on the Off-Gas System. Purging of small piping such as loop seals, relief lines, or moisture separators is not included. They shall be given special consideration if they are affected by maintenance activities.

(2) All actions are performed from Panel 2-9-53 unless stated otherwise.

8.2.1 REVIEW all Precautions and Limitations in Section 3.0.

8.2.2 VERIFY the following initial conditions are satisfied:

- Service Air System is in operation to supply purge air. REFER TO 0-OI-33.
- Stack dilution fans are in operation. REFER TO Section 5.1.
- OG POST TRTMT RAD MONITOR HI-HI-HI/INOP (2-XA-55-4C, Window 35) annunciator is reset.
- Off-Gas H_2 Analyzer is in service. REFER TO 2-SI-4.2.K-5(A) and (B).

8.2.3 VERIFY CLOSED the SJAE 2A INLET VALVE, 2-FCV-66-11, Panel 2-9-8.

8.2.4 VERIFY CLOSED the SJAE 2B INLET VALVE, 2-FCV-66-15, Panel 2-9-8.

8.2.5 VERIFY OPEN the OFFGAS SYSTEM ISOLATION VALVE, 2-FCV-66-28.

8.2.6 VERIFY OPEN the PREHEATER 2A INLET VALVE, 2-FCV-66-72.

8.2.7 VERIFY OPEN the PREHEATER 2B INLET VALVE, 2-FCV-66-85.

8.2.8 OPEN the RECOMBINER 2A AIR PURGE VALVE, using 2-HS-66-87.

8.2 Purging Off-Gas System (Continued)

8.2.9 OPEN the RECOMBINER 2B AIR PURGE VALVE, using 2-HS-66-86.

8.2.10 PURGE the Off-Gas System for a minimum of six hours.

8.2.11 REQUEST Chem Lab obtain a grab sample to verify hydrogen less than 2% (by volume).

8.2.12 CLOSE the RECOMBINER 2A AIR PURGE VALVE, using 2-HS-66-87.

8.2.13 CLOSE the RECOMBINER 2B AIR PURGE VALVE, using 2-HS-66-86.

8.2.14 CLOSE the OFFGAS SYSTEM ISOLATION VALVE, using 2-HS-66-28.

8.3 Placing Standby Recombiner in Operation

****

CAUTION

Off-Gas System valves are potentially spark-producing when operated; therefore, when hydrogen concentration is suspected of being greater than 4%, do NOT take any action that will change off-gas valve positions until after the unit is shut down.

****

8.3.1 REVIEW all Precautions and Limitations in Section 3.0.

8.3.2 VERIFY the following initial conditions have been met:

8.3.2.1 Off-Gas System hydrogen concentration is below 4% (by volume).

8.3.2.2 Standby recombiner temperature, as indicated on RECOMBINER 2A/2B TEMPERATURE recorder, 2-TRS-66-77, on Panel 2-9-53, is ≥275°F.

NOTE:

The following operations are performed at Panel 9-53 unless otherwise noted.

8.3.3 VERIFY ON the RECOMBINER 2B(2A) TEMP CONT handswitch, 2-HS-66-90(76).

8.3.4 VERIFY CLOSED the RECOMBINER B(A) DRAIN VALVE, 2-FSV-66-88(73) at Panel 25-252.

8.3.5 VERIFY OPEN the following valves at Panel 25-95:

8.3.5.1 PREHEATER INLET DRAIN TO MAIN CONDENSER, 2-FCV-66-79.

8.3.5.2 PREHEATER DRAIN TO MAIN CONDENSER, 2-FCV-66-81.

8.3.5.3 PREHEATER INLET DRAIN TO MAIN CONDENSER, 2-FCV-66-80.

8.3.5.4 PREHEATER DRAIN TO MAIN CONDENSER, 2-FCV-66-82.

8.3 Placing Standby Recombiner in Operation (Continued)

8.3.6 VERIFY OPEN the PREHEATER 2B(2A) INLET VALVE, 2-FCV-66-85(72).

8.3.7 OPEN the RECOMBINER 2B(2A) DISCHARGE VALVE using 2-HS-66-91A(78A).

8.3.8 VERIFY CLOSED the RECOMBINER 2A(2B) AIR PURGE VALVE, using 2-HS-66-87(86).

8.3.9 CLOSE the RECOMBINER 2A(2B) DISCHARGE VALVE using 2-HS-66-78A(91A).

8.3.10 MONITOR hotwell pressure as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, Panel 2-9-6.

8.3.11 WHEN recombiner temperatures stabilize greater than 275°F, THEN

COMPLETE a recombiner performance evaluation, REFER TO Section 6.1.

8.4 Placing Standby SJAE in Operation

NOTES:

1. Auto swapping of SJAE is administratively prohibited per GE-SIL-150. See Precaution and Limitation 3.17.
2. Panel 25-105 located in Unit 2 Turbine Bldg. El 586' T6-C.
3. The HWC system is shutdown prior to intentional swapping of SJAEs to prevent receipt of the automatic trip of the HWC system that will occur when both SJAE DISCHARGE VALVES 2-FCV-66-14 and 18 are closed.

8.4.1 REVIEW all Precautions and Limitations in Section 3.0.

8.4.2 VERIFY the following initial conditions have been met:

8.4.2.1 Off-Gas System hydrogen concentration is less than 4% (by volume).

8.4.2.2 IF HWC System is in service, THEN

SHUTDOWN~~A normal shutdown of~~ ~~the~~ HWC S~~s~~ystem~~-~~. REFER TO~~has been completed in accordance~~ 2-OI-4~~with 2-OI-~~.4 ~~HWC System.~~
(otherwise N/A~~N/A if HWC System was not in service~~)

8.4.2.3 SJAEs are in operation. REFER TO Section 5.9.

8.4.3 At Panel 2-9-6, VERIFY OPEN the following valves:

8.4.3.1 SJAE 2B(2A) CNDS INLET VALVE, using 2-HS-2-31A(36A).

8.4.3.2 SJAE 2B(2A) CNDS OUTLET VALVE, using 2-HS-2-35A(41A).

8.4.4 At Panel 25-105, VERIFY CONDENSATE FROM SJAE B(A) pressure, 2-PI-2-34(40), is greater than 60 psig.

8.4.5 At Panel 25-105, VERIFY manual/hand loader output pressure and pressure controller setpoints are adjusted as follows:

8.4.5.1 Setpoint for STEAM TO SJAE B(A) STAGE I & II, 2-PC-1-152(150) set for approximately 225 psig (dial located inside controller housing).

8.4.5.2 Manual/Hand loader for STEAM TO SJAE B(A) STAGE I & II, 2-PC-1-152(150) set for approximately 6 psig.

8.4.5.3 Setpoint for STEAM TO SJAE B(A) STAGE III, 2-PC-1-167(166) set for approximately 225 psig (dial located inside controller housing).

8.4.5.4 Manual/hand loader for STEAM TO SJAE B(A) STAGE III, 2-PC-1-167(166), set for approximately 6 psig.

8.4 Placing Standby SJAE in Operation (Continued)

8.4.6 At Panel 25-105, VERIFY both SJAE dilution steam pressure modifiers are adjusted to approximately mid-position (located at the rear of panel).

8.4.6.1 SJAE B(A) STG I & II PRESSURE, 2-XM-1-152(150).

8.4.6.2 SJAE B(A) STAGE III PRESSURE, 2-XM-1-167(166).

8.4.7 At Panel 2-9-8, VERIFY OPEN both SJAE Inlet Valves using the following:

8.4.7.1 SJAE 2A INLET VALVE, 2-HS-66-11.

8.4.7.2 SJAE 2B INLET VALVE, 2-HS-66-15.

8.4.8 At Panel 2-9-8, PLACE in OPEN/AUTO the SJAE 2B(2A) OG OUTLET VALVE using, 2-HS-66-18(14).

8.4.9 At Panel 2-9-7, PLACE the STEAM TO SJAE 2A(2B) handswitch, 2-HS-1-155A(156A), in CLOSE.

8.4.10 At Panel 2-9-7, PLACE the SJAE 2A(2B) PRESS CONTROLLER handswitch, 2-HS-1-150(152), in CLOSE.

8.4.11 At Panel 2-9-8, PLACE the SJAE 2A(2B) OG OUTLET VALVE using 2-HS-66-14(18) in CLOSE.

8.4.12 At Panel 2-9-7, PLACE the STEAM TO SJAE 2B(2A) handswitch, 2-HS-1-156A(155A), in OPEN.

8.4.13 At Panel 2-9-7, PLACE the STEAM TO SJAE 2B(2A)PRESS CONTROLLER handswitch, 2-HS-1-152(150), in OPEN.

NOTE:

It may be necessary to return 2-HS-1-152(150) to CLOSE position, then back to OPEN in order to open the SJAE steam supply valves. This will reset the logic sequence.

8.4.14 On Panel 25-105, ADJUST manual/hand loaders until dilution steam pressure is indicating approximately 190 to 220 psig on the following indications:

8.4.14.1 STEAM TO SJAE B(A) STAGE I & II, 2-PI-1-152(150).

8.4.14.2 STEAM TO SJAE B(A) STAGE III, 2-PI-1-167(166).

8.4 <u>Placing Standby SJAE in Operation</u> (Continued)

8.4.15 At Panel 25-105, ADJUST the SJAE dilution steam pressure modifiers as necessary to obtain stable steam pressure indication on the following instruments(modifiers are located at the rear of the panel):

8.4.15.1 SJAE B(A) STG I & II PRESSURE, 2-XM-1-152(150).

8.4.15.2 SJAE B(A) STAGE III PRESSURE, 2-XM-1-167(166).

8.4.16 At Panel 25-105, TRANSFER SJAE Stage I and II pressure control from the manual/hand loader to the pressure controller by performing the following:

8.4.16.1 ADJUST setpoint for STEAM TO SJAE B(A) STAGE I & II, 2-PC-1-152(150) set for approximately 200 psig (dial located inside controller housing).

8.4.16.2 SLOWLY RAISE manual/hand loader for STEAM TO SJAE B(A) STAGE I & II, 2-PC-1-152(150) setting to approximately 12 psig.

8.4.16.3 VERIFY stable SJAE dilution steam pressure is maintained on STEAM TO SJAE B(A) STAGE I & II, 2-PI-1-152(150).

8.4.17 At Panel 25-105, TRANSFER SJAE Stage III pressure control from the manual/hand loader to the pressure controller by performing the following:

8.4.17.1 ADJUST setpoint for STEAM TO SJAE B(A) STAGE III, 2-PC-1-167(166) set for approximately 200 psig (dial located inside controller housing).

8.4.17.2 SLOWLY RAISE manual/hand loader for STEAM TO SJAAE B(A) STAGE III, 2-PC-1-167(166) setting to approximately 10 PSIG.

8.4.17.3 VERIFY stable SJAE dilution steam pressure is maintained on STEAM TO SJAE B(A) STAGE III, 2-PI-1-167(166).

8.4.18 On Panel 2-9-6, MONITOR hotwell pressure as indicated on HOTWELL TEMP AND PRESS recorder, 2-XR-2-2.

8.4.19 After stable SJAE operation has been confirmed, the HWC system may be placed back in service at the direction of the Unit Supervisor. REFER to 2-OI-4 HWC System (N/A if HWC System is unavailable)

8.5 Placing Standby Cooler Condenser in Operation

8.5.1 REVIEW all Precautions and Limitations in Section 3.0.

8.5.2 VERIFY the following conditions have been met:

8.5.2.1 Off-Gas System hydrogen concentration is less than 4% (by volume).

8.5.2.2 Cooler condensers are aligned. REFER TO Section 5.3.

NOTE:

(1) The following operations are performed at Control Room Panel 2-9-53 unless otherwise noted.

(2) To remove a Cooler Condenser from service proceed to step 8.5.4

8.5.3 Placing the standby cooler in operation

8.5.3.1 OPEN the CLR CNDR/MSR 2B(2A) DRAIN VALVE, using 2-HS-66-107(106).

8.5.3.2 OPEN the COOLER CNDR 2B(2A) INLET VALVE, using 2-HS-66-98(97).

8.5.3.3 OPEN the MOISTURE SEP 2B(2A) OUTLET VALVE, using 2-HS-66-123(122).

8.5.4 WHEN it is desired to remove an in service cooler condenser, THEN

8.5.4.1 CLOSE the CLR CNDR/MSR 2A(2B) DRAIN VALVE, using 2-HS-66-106(107).

8.5.4.2 CLOSE the COOLER CNDR 2A(2B) INLET VALVE, using 2-HS-66-97(98).

8.5.4.3 CLOSE the MOISTURE SEP 2A(2B) OUTLET VALVE, using 2-HS-66-122(123).

8.6 Standby Stack Dilution Fan Operation

8.6.1 REVIEW all Precautions and Limitations in Section 3.0.

NOTE:

The following steps are performed at Panel 2-9-8.

8.6.2 VERIFY Stack Dilution Air Fan(s) are in service. REFER TO Section 5.1.

8.6.3 PLACE the STACK DILUTION FAN SEL control switch, 2-XS-66-29, in OFF.

8.6.4 PLACE standby STACK DILUTION FAN 2B(2A) control switch, 2-HS-66-31A(29A), in START.

8.6.5 If desired to operate only one stack dilution fan, THEN

8.6.5.1 PLACE the operating (or possibly tripped) STACK DILUTION FAN 2A(2B) control switch, 2-HS-66-29A(31A), in STOP.

8.6.5.2 PLACE the STACK DILUTION FAN SEL control switch, 2-XS-66-29, in FAN A (FAN B)[representative of the nonoperating fan].

8.6.5.3 PLACE the STACK DILUTION FAN 2A(2B) control switch, 2-HS-66-29A(31A), in AUTO.

8.7 Placing Standby Prefilters in Operations

8.7.1 VERIFY the following initial condition has been met:

8.7.1.1 All Precautions and Limitations in Section 3.0 have been reviewed.

NOTE:

The following steps are performed in the Charcoal Adsorber Prefilter Vault, Off-Gas Building, El 556' unless otherwise noted.

8.7.2 OPEN standby PREFILTER B(A) INLET, 2-66-617(616).

8.7.3 OPEN standby PREFILTER B(A) OUTLET, 2-66-629(628).

8.7.4 CLOSE in-service PREFILTER A(B) INLET, 2-66-616(617).

8.7.5 CLOSE in-service PREFILTER A(B) OUTLET, 2-66-628(629).

8.7.6 CHECK differential pressure at PREFILTER DIFF PRESS, 2-PDIS-66-112, Panel 2-9-53 is less than or equal to 8" H_2O.

8.8 Placing Standby Afterfilters in Operation

8.8.1 REVIEW all Precautions and Limitations in Section 3.0.

NOTE:

The following steps are performed in the Stack Enclosure, El 568' unless otherwise noted.

8.8.2 OPEN standby AFTER FILTER B(A) INLET, 2-66-516(515).

8.8.3 OPEN standby AFTER FILTER B(A) OUTLET, 2-66-518(517).

8.8.4 CHECK OPEN the OG AFTERFILTER 2B(2A) VESS DR VLV, 2-FCV-66-26(25), at Panel 2-9-8.

8.8.5 CHECK OPEN the OG AFTERFILTER 2B(2A) ANNULUS DR VLV, 2-FCV-66-27(24), at Panel 2-9-8.

8.8.6 CLOSE in-service AFTERFILTER A(B) INLET, 2-66-515(516).

8.8.7 CLOSE in-service AFTERFILTER A(B) OUTLET, 2-66-517(518).

8.8.8 CHECK differential pressure at AFTERFILTER DIFF PRESS, 2-PDIS-66-51, is less than or equal to 8" H_2O.

8.9 Placing Standby Filter Cubicle Exhaust Fan in Operation

8.9.1 REVIEW all Precautions and Limitations in Section 3.0.

8.9.2 START standby STACK FLT EXH CUBICLE FAN B(A), 1-HS-66-46A(44A), Unit 1 Panel 9-8, and VERIFY associated discharge damper red (open) indicating light illuminates.

8.9.3 STOP in-service STACK FLT EXH CUBICLE FAN A(B), 1-HS-66-44A(46A), Unit 1 Panel 9-8, and VERIFY associated discharge damper red (open) indicating light extinguishes.

8.10 Aligning Charcoal Beds in Series

****

CAUTIONS

Charcoal bed alignment during power operation shall NOT be changed. Any major change in off-gas flow disturbs bed equilibrium and will result in a temporary (8 to 12 days) rise in stack discharge activity.

The charcoal adsorbers must be aligned in the treatment mode prior to reaching 25% power.

****

8.10.1 VERIFY the following initial conditions are met:

8.10.1.1 All Precautions and Limitations in Section 3.0 have been reviewed.

8.10.1.2 The Off-Gas System is in Prestartup/Standby Readiness or system startup is in progress. REFER TO Section 4.0 or Section 5.0 respectively.

8.10.1.3 OFFGAS TREATMENT SELECT handswitch, 2-XS-66-113, is in BYPASS on Panel 2-9-53.

8.10 Aligning Charcoal Beds in Series (Continued)

NOTE:

The following steps are performed at Panel 2-9-53.

8.10.2 OPEN the CHARCOAL ADSORBER TRAINS SERIES VLV, using 2-HS-66-116.

8.10.3 CLOSE the CHARCOAL ADSORBER TRAIN 2 INLET VALVE, using 2-HS-66-117.

8.10.4 CLOSE the CHARCOAL ADSORBER TRAIN 1 DISCH VLV, using 2-HS-66-118.

8.10.5 VERIFY dewpoint temperature on OFFGAS REHEATER TEMPERATURE recorder, TRS-66-108, indicates 45°F or less (Blue Pen).

8.10.6 PLACE the OFFGAS TREATMENT SELECT handswitch, 2-XS-66-113, in TREAT.

8.10.7 IF the Off-Gas System is intended to be operated with charcoal beds in parallel with charcoal beds on another (shutdown) unit, THEN

COMPLETE Section 8.11.

8.11 Placing Charcoal Beds in Parallel with Another Unit

NOTE:

In order to reduce total off-gas activity, the unit may be started up with off-gas flow directed, in parallel configuration, through an adjoining unit's charcoal beds (if the adjoining unit is shut down).

****

CAUTION

The charcoal adsorbers must be aligned in the treatment mode prior to reaching 25% power.

****

8.11.1 VERIFY the following initial conditions have been met:

8.11.1.1 All Precautions and Limitations in Section 3.0 have been reviewed.

8.11.1.2 The Off-Gas System is in operation. REFER TO Section 5.0.

8.11.1.3 The unit (Unit 1 or 3) selected for parallel charcoal bed operation is shut down.

8.11.1.4 The Post-Treatment Radiation Monitoring System is in service in accordance with 1-, 2-, 3-OI-90 for the unit selected for parallel operation.

8.11.1.5 The ADSORBER (OFFGAS TREATMENT SELECT) handswitch, 1-HS(XS)-66-113, Unit 1(3) Panel 9-53, is in BYPASS.

8.11.1.6 The following components for the selected unit are in service. REFER TO BF-OI-66 and 3-OI-66.

- Cooler Condensers
- Glycol Cooler
- Reheater
- Prefilters
- Charcoal Adsorbers
- Afterfilters

8.11 Placing Charcoal Beds in Parallel with Another Unit (Continued)

NOTE:
The following steps are performed in the applicable Valve Room in the Off-Gas Building, El 556', unless otherwise noted.

8.11.2 CLOSE the COOLER CONDENSERS COMMON INLET SHUTOFF, 1-66-600 (CLR CNDR COMMON INLET SHUTOFF, 3-SHV-066-0600).

8.11.3 OPEN the OFF-GAS BYPASS MANIFOLD U-1 ISOL, 1-66-602 (OG BYPASS MANIFOLD U-3 ISOL, 3-SHV-066-0602).

8.11.4 OPEN the OFF-GAS BYPASS MANIFOLD U-2 ISOL, 2-66-602.

8.11.5 OPEN the OFF-GAS SYSTEM ISOLATION VALVE, using 1(3)-HS-66-28, at the Unit 1(3) Panel 9-53.

8.11.6 VERIFY dewpoint temperature on OFFGAS REHEATER TEMPERATURE recorder, 2-TRS-66-108, Unit 2 Panel 9-53, indicates 45°F or less (Blue Pen).

8.11.7 PLACE the ADSORBER (OFFGAS TREATMENT SELECT) handswitch, 1(3)-HS(XS)-66-113, Unit 1(3) Panel 9-53, in TREAT.

8.12 Swapping SJAEs and Preheaters from MS to Aux Boiler Steam

8.12.1 Check the following initial conditions are satisfied:

8.12.1.1 All Precautions and Limitations in Section 3.0 have been reviewed.

8.12.1.2 SJAE and/or preheaters are in service using main steam.

8.12.1.3 Swapping to Aux Boiler Steam has been directed by Shift Manager or 2-GOI-100-12A.

8.12.1.4 Auxiliary Boiler(s) in service per 0-OI-12 and boiler pressure greater than or equal to 170 psig.

8.12.2 VERIFY OPEN the UNITS 1 & 2 SJAE STM valve, 0-12-662 (TB EL 565' north of Aux. Boiler A in overhead).

8.12.3 CHECK Auxiliary Steam Supply pressure at 2-PI-1-150 and 152 on Panel 25-105, is between 175 and 250 psig.

****

CAUTION

The following step will terminate steam flow to the SJAEs until the Auxiliary Boiler Steam supply valves are opened. Close coordination between personnel operating Auxiliary Boiler valves and Unit Operator is required.

****

8.12.4 PLACE both of the following to CLOSE at Panel 2-9-7.

8.12.4.1 SJAE 2A PRESSURE CONTROLLER, 2-HS-1-150.

8.12.4.2 SJAE 2B PRESSURE CONTROLLER, 2-HS-1-152.

8.12.5 For the SJAE to be returned to service DEPRESS the open pushbutton for AUX STM TO SJAE A(B) 1st, 2nd & 3rd STG, 2-HS-12-3A(5A) until valve is fully open at JB 3524 El. 586' T6-C.

8.12 Swapping SJAEs and Preheaters from MS to Aux Boiler Steam (Continued)

8.12.6 CHECK Auxiliary Steam Supply pressure at 2-PI-1-150 and/or 152 on Panel 25-105, is between 175 and 250 psig.

8.12.7 PLACE both of the following to CLOSE at Panel 2-9-7.

8.12.7.1 STEAM TO SJAE 2A, 2-HS-1-155A.

8.12.7.2 STEAM to SJAE 2B, 2-HS-1-156A.

8.12.8 SWAP steam to the preheaters by performing the following in the recombiner room:

8.12.8.1 OPEN AUX STEAM TO OFF-GAS PREHEATER A, using 2-HS-12-74A.

8.12.8.2 OPEN AUX STEAM TO OFF-GAS PREHEATER B, using 2-HS-12-75A.

8.12.8.3 CLOSE STEAM TO OFF-GAS PREHEATER A, 2-HS-1-176A.

8.12.8.4 CLOSE STEAM TO OFF-GAS PREHEATER B, 2-HS-1-176B.

8.13 Establishing or Re-Establishing SJAE Loop Seal

8.13.1 If desired to ESTABLISH or Re-ESTABLISH SJAE Loop Seal, THEN

PERFORM the following:

8.13.1.1 VERIFY CLOSED SJAE LOOP SEAL DR valve 2-6-828.

8.13.1.2 CLOSE SJAE LOOP SEAL OUTLET valve 2-6-829.

8.13.1.3 WHEN level in loop seal reaches normal level, THEN

OPEN SJAE LOOP SEAL OUTLET valve 2-6-829.

8.14 SJAE Return to Service Following Isolation

NOTE: The Automatic Isolations for Holdup Volume High Temperature and Pressure (240 degrees/10 psig respectively), as well as Hotwell High Pressure (-6" Hg) have been deleted per DCNs T37764A, T39736A.

8.14.1 VERIFY Off-Gas System hydrogen concentration is less than 4% (by volume).

8.14.2 RESET the OG OUTLET/DRAIN ISOLATION VLVS using 2-HS-90-155 on Panel 2-9-8.

8.14.3 VERIFY OPEN the following valves.

8.14.3.1 SJAE 2A INLET VALVE, 2-HS-66-11, Panel 2-9-8.

8.14.3.2 SJAE 2B INLET VALVE, 2-HS-66-15, Panel 2-9-8.

8.14.4 IDENTIFY and CORRECT the cause of the PCV valve closure. Potential causes are:

8.14.4.1 Condensate pressure from SJAE A(B) less than 60 psig, 2-PI-2-34(40), Panel 25-105.

8.14.4.2 SJAE 2A(2B) CONDENSATE INLET VALVE closed at 2-HS-2-31A(36), Panel 2-9-6.

8.14.4.3 SJAE 2A(2B) CONDENSATE OUTLET VALVE closed at 2-HS-2-35A(41A), Panel 2-9-6.

8.14.4.4 STEAM TO SJAE 2B(2A) open at 2-HS-1-156A(155A), Panel 2-9-7.

8.14.4.5 STEAM TO SJAE A(B) STAGE I & II, 2-PI-1-150(152), Panel 25-105 is less than 170 psig.

8.14.5 VERIFY the following valves open at Panel 2-9-7 when the initiating condition is corrected.

8.14.5.1 STEAM TO SJAE A(B), 2-FCV-1-155/172 (156/173).

8.14.5.2 STEAM TO SJAE A(B), 2-PCV-1-151/166 (153/167).

8.14.5.3 SJAE A(B) INTMD CONDENSER DRAIN 2-FCV-1-150(152).

8.14.6 MONITOR hotwell pressure as indicated on HOTWELL PRESS AND TEMP recorder, 2-XR-2-2, Panel 2-9-6.

8.14.7 After stable SJAE operation has been confirmed, REFER to 2-OI-4 HWC System for shutdown and restart guidance if the HWC system had previously been in service. (otherwise N/A)

8.15 <u>Using U-3 Off-Gas Chiller to Supply Chilled Water to U-2</u>

****

CAUTION

This section shall only be performed when Units 1 and 3 Off-Gas Systems are out of service and with Shift Manager concurrence.

****

<u>NOTE</u>:

Chemistry should be contacted any time system changes are made that may affect the chilled water system volume (additions to or draining from, crossties between units, etc.).

8.15.1 VERIFY U-3 Chiller available for service.

8.15.2 VERIFY CLOSED the following valves:

- U-1 & 2 CHW RETURN CROSSTIE 0-66-664.
- U-1 & 2 CHW SUPPLY CROSSTIE 0-66-661.
- DEHUMIDIFICATION COIL CHW OUTLET 3-SHV-066-0656.
- DEHUMIDIFICATION COIL CHW INLET 3-SHV-066-0655.
- RECOMB RM CLG COIL 3A CHW INLET 3-SHV-066-0657.
- RECOMB RM CLG COIL 3A CHW OUTLET 3-SHV-066-0658.
- RECOMB RM CLG COIL 3B CHW INLET 3-SHV-066-0659.
- RECOMB RM CLG COIL 3B CHW OUTLET 3-SHV-066-0660.

8.15 Using U-3 Off-Gas Chiller to Supply Chilled Water to U-2 (Continued)

8.15.3 VERIFY OPEN the following valves:

- U-2 & 3 CHW SUPPLY CROSSTIE 0-66-662.
- U-2 & 3 CHW RETURN CROSSTIE 0-66-663.
- OG CHLR C CHW INLET, 3-SHV-066-0652.
- OG CHLR C CHW OUTLET, 3-SHV-066-0653.
- OG CHLR CHW PUMP C SUCTION, 3-SHV-066-0543.
- OG CHLR CHW PUMP C DISCHARGE, 3-SHV-066-0546.

8.15.4 IF desired to operate U-2 Off-Gas Chiller in parallel with U-3 Off-Gas Chiller, THEN

GO TO step 8.15.8.

8.15.5 STOP U-2 Off-Gas Chiller by placing CONTROL POWER, 2-HS-66-936A in OFF.

8.15.6 STOP U-2 Off-Gas Chilled Water Pump using local Stop-Start pushbutton CHW PUMP B, 2-HS-66-59.

8.15.7 CLOSE PCV 2-264 INLET SOV, 2-2-1356 to isolate the U-2 Off-gas Chilled Water Expansion Tank.

****

CAUTION

Operating Chilled Water Circulation Pump B and Chilled Water Circulation Pump C at reduced flow rates may cause pump temperatures to rise.

****

8.15.8 START U-3 Off-Gas Chilled Water Pump using local Stop-Start pushbutton OG CHILLER CHW PUMP C, 3-HS-066-0059.

8.15.9 RESET low temperature and low pressure trips using OFFGAS CHILLER MOTOR RESET, 3-HS-066-0936B.

8.15.10 START U-3 Off-Gas Chiller by placing OFFGAS CHILLER POWER CONTROL, 3-HS-066-0936A in ON.

8.15 Using U-3 Off-Gas Chiller to Supply Chilled Water to U-2 (Continued)

8.15.11 IF Chilled Water Circulation Pumps B and C are operating at reduced flow, THEN

MONITOR the pumps for elevated temperatures.

****

CAUTION

Throttling 2-66-546, CHW PUMP B DISCHARGE, may cause Chilled Water Circulation Pump C breaker amps to rise (480V TMOV Bd 2B Compt 9D2).

****

8.15.12 IF U-2 Off-Gas Chiller is in service parallel with U-3 Off-Gas Chiller, THEN

8.15.12.1 THROTTLE 2-66-546, CHW PUMP B DISCHARGE, until 2-FI-66-64, CHW PUMP B FLOW and 3-FI-066-0064, OG CHLR CHW PUMP C FLOW indicate approximately the same flow.

8.15.12.2 NOTIFY Electrical Maintenance to MONITOR breaker while 2-66-546, CHW PUMP B DISCHARGE is being throttled and frequently thereafter to insure Chilled Water Circulation Pump B breaker does not trip due to high amps or thermal overload.

8.16 <u>Restoring U-3 Off-Gas Chiller Lineup from U-2 to U-3</u>

8.16.1 WHEN U-3 Off-Gas Chiller is no longer needed to support U-2, THEN

OPEN the following valves:

- DEHUMIDIFICATION COIL CHW OUTLET, 3-SHV-066-0656.
- DEHUMIDIFICATION COIL CHW INLET, 3-SHV-066-0655.
- RECOMB RM CLG COIL 3A CHW INLET, 3-SHV-066-0657.
- RECOMB RM CLG COIL 3A CHW OUTLET, 3-SHV-066-0658.
- RECOMB RM CLG COIL 3B CHW INLET, 3-SHV-066-0659.
- RECOMB RM CLG COIL 3B CHW OUTLET, 3-SHV-066-0660.

8.16.2 IF 2-66-546, CHW PUMP B DISCHARGE was throttled in step 8.15.11, THEN

OPEN 2-66-546 CHW PUMP B DISCHARGE.

8.16.3 CLOSE the following valves:

- U-2 & 3 CHW SUPPLY CROSSTIE, 0-66-662.
- U-2 & 3 CHW RETURN CROSSTIE, 0-66-663.

8.16.4 If U-3 Off-Gas Chilled Water system is no longer required, THEN

PERFORM the following:

- STOP the U-3 Off-Gas Chiller by placing OFFGAS CHILLER POWER CONTROL, 3-HS-066-0936A in OFF.
- STOP the U-3 Off-Gas Chilled Water Pump using local Stop-Start pushbutton OG CHILLER CHW PUMP C, 3-HS-066-0059.

8.16.5 IF Required, THEN

OPEN PCV 2-264 INLET SOV, 2-2-1356 to re-align the U-2 Off-Gas Chilled Water Expansion Tank.

8.16.6 IF required, THEN

START the Unit 2 Off-Gas Chiller. REFER TO Section 5.4.

8.17 Using the Purge Air System for Dilution Air Flow

NOTE:

The following steps are performed at Panel 2-9-53.

8.17.1 REVIEW Precautions and Limitations in Section 3.0.

8.17.2 OPEN the in-service Recombiner air purge valve using RECOMBINER 2A(2B) AIR PURGE VALVE 2-HS-66-87(86).

8.17.3 VERIFY Off-Gas flow rises, using 2-FR-66-111, Green Pen, OG FLOW TO 6-HOUR HOLDUP VOLUME, Panel 2-9-53.

8.17.4 If additional dilution flow is required, THEN

OPEN the Purge Air valve to the Standby Recombiner using RECOMBINER 2A(2B) AIR PURGE VALVE 2-HS-66-87(86).

8.17.5 RECORD Recombiner Purge Valve(s) opened in step 8.17.2 and/or step 8.17.4 in NOMS Narrative Log and Reactor Operator Turnover Log.

8.17.6 VERIFY OG HOLDUP LINE INLET FLOW LOW (Window 4, 2-XA-55-53) annunciator is NOT in alarm.

NOTE:

Limiting Off-Gas flow to the Hold Up Volume to less than 18 SCFM prevents reaching the limit of 18.5 SCFM as specified in the FSAR.

8.17.7 With one or both Recombiner Air Purge Valves are open, Off Gas flow to the Holdup Volume shall be verified to be less than 18 SCFM. This will be performed during board walkdowns completed every two hours as specified in 0-GOI-300-1 Reactor Operator Turnover(Attachment 4).

8.17.8 IF Off-Gas flow to the Holdup Volume approaches 18 SCFM, THEN, PLACE or VERIFY the following handswitches in CLOSE:
- RECOMBINER 2A AIR PURGE VALVE, 2-HS-66-87.
- RECOMBINER 2B AIR PURGE VALVE, 2-HS-66-86.

8.17.9 WHEN the Purge Air System is no longer required, THEN

CLOSE the RECOMBINER 2A(2B) AIR PURGE VALVE(S) using 2-HS-66-87(86).

8.17.10 RECORD Air Purge Valves closed in step 8.17.8 or 8.17.9 in NOMS Narrative Log.

8.18 <u>System Operation With Malfunctioning Off-Gas Condenser Drain Valve Controller 2-LIC-66-93 and 2-LIC-66-94</u>

8.18.1 VERIFY OG CONDENSER A or B DRAIN LVL HIGH/LOW 2-LA-66-93 or 94 is in alarm.

8.18.2 VERIFY the following system parameters are normal:

- Off-Gas system hydrogen concentration using the OFF GAS HYDROGEN ANALYZER, 2-H2R-66-96 at Panel 2-9-53.
- Off-Gas system 6 Hour Holdup Volume pressure using 6 HOUR HOLD UP VOLUME PRESS, 2-PIS-66-21A-D at Panel 25-38.

<u>NOTE</u>

When 2-TIS-66-22A, and 2-TIS-22B are set to 230°F the Off-Gas Alarm will not occur until Holdup Volume Temperature reaches 230°F. Hydrogen levels in the system, and Holdup Volume pressure may rise prior to receiving the High Temperature Alarm. Therefore, OFF GAS HOLDUP VOLUME PRESSURE and OFF GAS HYDROGEN CONCENTRATION must be continuously monitored.

8.18.3 Set 6 HOUR HOLDUP VOLUME TEMP, 2-TIS-66-22A and 2-TIS-66-22B setpoint to 240° at Panel 25-38.

8.18.4 Continuously MONITOR Off-Gas Hydrogen concentration using the OFF GAS HYDROGEN ANALYZER 2-H2R-66-96 at Panel 2-9-53.

8.18.4.1 IF Off-Gas hydrogen concentration reaches 1%, THEN

NOTIFY the Shift Manager, and REFER to <u>2-AOI-66-1</u>.

8.18.5 Continuously MONITOR 6 HOUR HOLD UP VOLUME PRESS, 2-PIS-66-21A-D at Panel 25-38.

8.18.5.1 IF Off-Gas 6 Hour Hold Up Volume pressure rises to 1.5 psig, THEN

NOTIFY the Shift Manager.

8.18 System Operation With Malfunctioning Off-Gas Condenser Drain Valve Controller 2-LIC-66-93 and 2-LIC-66-94 (Continued)

8.18.6 WHEN the Off-Gas Condenser Drain Valves are functioning normally, THEN˙

- VERIFY Off-Gas Holdup Volume Temperature is less than 160°F using the 6 HOUR HOLD UP VOLUME TEMP, 2-TIS-66-22A and 2-TIS-66-22B at Panel 25-38.

- VERIFY Off-Gas System hydrogen concentration is less than 1% using the OFF GAS HYDROGEN ANALYZER, 2-H2R-66-96 at Panel 2-9-53.

- VERIFY Off-Gas System Holdup Volume pressure is normal using 6 HOUR HOLD UP VOLUME PRESS, 2-PIS-66-21A-D at Panel 25-38.

8.18.7 Set 6 HOUR HOLDUP VOLUME TEMP, 2-TIS-66-22A and 2-TIS-66-22B setpoint to 240°F at Panel 25-38.

8.19 Dual Recombiner Room Cooling Coil Operation

8.19.1 OBTAIN Unit Supervisor approval to perform this section.

8.19.2 VERIFY Chill Water System and one Recombiner Room Cooling Coil in service. REFER TO Section 5.4.

NOTES:

(1) The placement of jumpers in Sections 8.19.3 or 8.19.4 shall be recorded on Illustration 2 and in the NOMS Narrative Log.
(2) TVA print 0-45E777-19 can be referred to for jumper placement.
(3) Jumpers are to be placed at wire termination points located in the terminal panel adjacent to the breaker compartment.
(4) Perform either Step 8.19.3 OR 8.19.4 depending on which Recombiner Room Cooling Coil is in service.

8.19.3 IF Recombiner Room Cooling Coil 2A is in service, THEN

PERFORM the following steps to place both Recombiner Room Cooling Coils in service:

8.19.3.1 At 480V TURBINE MOV BD 2B, PLACE in OFF, OFF GAS RECOMBINER RM COOLER FAN 2B Compartment 10A.

8.19.3.2 At 480V TURBINE MOV BD 2B Compartment 10A, PLACE jumper from wire 10A4 to 10A7.

8.19.3.3 At 480V TURBINE MOV BD 2B, PLACE in ON, OFF GAS RECOMBINER RM COOLER FAN 2B Compartment 10A.

8.19.3.4 START the RECOMBINER ROOM CLG COIL 2B using control switch 2-HS-066-0131B at JB-4432(El 586', T6-B outside of Recombiner Room).

8.19.3.5 STOP the RECOMBINER ROOM CLG COIL 2A using control switch 2-HS-066-0131A at JB-4432.

8.19.3.6 At 480V TURBINE MOV BD 2A, PLACE in OFF, OFF GAS RECOMBINER RM COOLER FAN 2A Compartment 16A.

8.19.3.7 At 480V TURBINE MOV BD 2A Compartment 16A, PLACE jumper from wire 16A4 to 16A7.

8.19.3.8 At 480V TURBINE MOV BD 2A, PLACE in ON, OFF GAS RECOMBINER RM COOLER FAN 2A Compartment 16A.

8.19.3.9 START the RECOMBINER ROOM CLG 2A using control switch 2-HS-066-0131A at JB-4432.

8.19 Dual Recombiner Room Cooling Coil Operation (Continued)

8.19.3.10 RECORD jumper placements in steps 8.19.3.2 and 8.19.3.7 on Illustration 2 and in NOMS Narrative Log.

8.19.3.11 GO TO STEP 8.19.5.

8.19.4 IF Recombiner Room Cooling Coil 2B is in service, THEN

PERFORM the following steps to place both Recombiner Room Cooling Coils in service:

8.19.4.1 At 480V TURBINE MOV BD 2A, PLACE in OFF OFF GAS RECOMBINER RM COOLER FAN 2A Compartment 16A.

8.19.4.2 At 480V TURBINE MOV BD 2A Compartment 16A, PLACE jumper from wire 16A4 to 16A7.

8.19.4.3 At 480V TURBINE MOV BD 2A, PLACE in ON, OFF GAS RECOMBINER RM COOLER FAN 2A Compartment 16A.

8.19.4.4 START the RECOMBINER ROOM CLG COIL 2A using control switch 2-HS-066-0131A at JB-4432 (El 586′ T6-B outside of Recombiner Room).

8.19.4.5 STOP the RECOMBINER ROOM CLG COIL 2B using control switch 2-HS-066-0131B at JB-4432.

8.19.4.6 At 480V TURBINE MOV BD 2B, PLACE in OFF OFF GAS RECOMBINER ROOM COOLER FAN 2B Compartment 10A.

8.19.4.7 At 480V TURBINE MOV BD 2B Compartment 10A, PLACE jumper from wire 10A4 to 10A7.

8.19.4.8 At 480V TURBINE MOV BD 2B, PLACE in ON, OFF GAS RECOMBINER RM COOLER FAN 2B Compartment 10A.

8.19.4.9 START the RECOMBINER ROOM CLG COIL 2B using control switch 2-HS-066-0131B at JB-4432.

8.19.4.10 RECORD jumper placements in steps 8.19.4.2 and 8.19.4.7 on Illustration 2 and in NOMS Narrative Log.

8.19 Dual Recombiner Room Cooling Coil Operation (Continued)

NOTES:

(1) Chiller Water Loop Flow instrument used in Step 8.19.5 is located in the discharge of the Chill Water Pump.
(2) The Chill Water inlet shutoff valves used in Step 8.19.6 are located in the Turbine Building breezeway.

8.19.5 VERIFY CHILLER WATER LOOP FLOW, 2-FI-066-0064 at approximately 50 to 55 gpm.

8.19.6 IF flow requirement in Step 8.19.5 is not satisfied, THEN

THROTTLE as necessary the following valves to achieve approximately 50 to 55 gpm flow.

- RECOMB ROOM CLG COIL A CHW INLET SHUTOFF, 2-66-657.
- RECOMB RM CLG COIL 2B CHW INLET SHUTOFF, 2-66-659.

8.19.7 INFORM Chemistry of current Recombiner Room Cooling Coil lineup.

8.19.8 WHEN return to one Recombiner Room Cooling Coil operation is desired, THEN

CONTINUE with the procedure.

NOTES:

(1) The removal of jumpers in Sections 8.19.9 or 8.19.10 shall be recorded on Illustration 2 and in NOMS Narrative Log.
(2) Jumpers are located at wire termination points located in the terminal panel adjacent to the breaker compartment.
(3) Perform either Step 8.19.9 or 8.19.10, depending on which Recombiner Room Cooling Coil is to remain in service.

8.19.9 If Recombiner Room Cooling Coil 2A is to remain in service, THEN

PERFORM the following steps to return lineup to Recombiner Room Cooling Coil 2A in service with 2B Cooling Coil in standby:

8.19.9.1 STOP the RECOMBINER ROOM CLG COIL 2A using control switch 2-HS-066-0131A at JB-4432(El 586' T6-B outside of Recombiner Room).

8.19 Dual Recombiner Room Cooling Coil Operation (Continued)

8.19.9.2 At 480V TURBINE MOV BD 2A, PLACE in OFF, OFF GAS RECOMBINER RM COOLER FAN 2A Compartment 16A.

8.19.9.3 At 480V TURBINE MOV BD 2A Compartment 16A, REMOVE jumper from wire 16A4 to 16A7.

8.19.9.4 At 480V TURBINE MOV BD 2A, PLACE in ON, OFF GAS RECOMBINER RM COOLER FAN 2A Compartment 16A.

8.19.9.5 PLACE in standby the RECOMBINER ROOM CLG 2A using control switch 2-HS-066-0131A at JB-4432

8.19.9.6 STOP the RECOMBINER ROOM CLG COIL 2B using control switch 2-HS-066-0131B at JB-4432.

8.19.9.7 VERIFY RECOMBINER ROOM CLG COIL 2A starts and PLACE in START control switch 2-HS-066-0131A at JB-4432.

8.19.9.8 At 480V TURBINE MOV BD 2B, PLACE in OFF, OFF GAS RECOMBINER ROOM COOLER FAN 2B Compartment 10A.

8.19.9.9 At 480V TURBINE MOV BD 2B Compartment 10, REMOVE jumper from wire 10A4 to 10A7.

8.19.9.10 At 480V TURBINE MOV BD 2B, PLACE in ON, OFF GAS RECOMBINER RM COOLER FAN 2B Compartment 10A.

8.19.9.11 PLACE in standby the RECOMBINER ROOM CLG COIL 2B using control switch 2-HS-066-0131B at JB-4432.

8.19.9.12 RECORD jumper removals in steps 8.19.9.3 and 8.19.9.9 on Illustration 2 and in NOMS Narrative Log.

8.19.9.13 GO TO Step 8.19.11.

8.19 Dual Recombiner Room Cooling Coil Operation (Continued)

8.19.10 If Recombiner Room Cooling Coil 2B is to remain in service, THEN

PERFORM the following steps to return lineup to Recombiner Room Cooling Coil 2B in service with 2A Cooling Coil in standby:

8.19.10.1 STOP the RECOMBINER ROOM CLG COIL 2B using control switch 2-HS-066-0131B at JB-4432.

8.19.10.2 At 480V TURBINE MOV BD 2B, PLACE in OFF, OFF GAS RECOMBINER ROOM COOLER FAN 2B Compartment 10A.

8.19.10.3 At 480V TURBINE MOV BD 2B Compartment 10, REMOVE jumper from wire 10A4 to 10A7.

8.19.10.4 At 480V TURBINE MOV BD 2B, PLACE in ON, OFF GAS RECOMBINER RM COOLER FAN 2B Compartment 10A.

8.19.10.5 PLACE in standby the RECOMBINER ROOM CLG COIL 2B using control switch 2-HS-066-0131B at JB-4432.

8.19.10.6 STOP the RECOMBINER ROOM CLG COIL 2A using control switch 2-HS-066-0131A at JB-4432

8.19.10.7 VERIFY RECOMBINER ROOM CLG COIL 2B starts and PLACE in START control switch 2-HS-066-0131B at JB-4432.

8.19.10.8 At 480V TURBINE MOV BD 2A, PLACE in OFF, OFF GAS RECOMBINER RM COOLER FAN 2A Compartment 16A.

8.19.10.9 At 480V TURBINE MOV BD 2A Compartment 16A, REMOVE jumper from wire 16A4 to 16A7.

8.19.10.10 At 480V TURBINE MOV BD 2A, PLACE in ON OFF GAS RECOMBINER RM COOLER FAN 2A Compartment 16A.

8.19.10.11 PLACE in standby the RECOMBINER ROOM CLG 2A using control switch 2-HS-066-0131A at JB-4432(El 586′ T6-B, outside of Recombiner Room).

8.19.10.12 RECORD jumper removals in steps 8.19.10.3 and 8.19.10.9 on Illustration 2 and in NOMS Narrative Log.

8.19 Dual Recombiner Room Cooling Coil Operation (Continued)

NOTE:
(1) The Chill Water inlet shutoff valves used in Step 8.19.11 are located in the Turbine Building breezeway.

8.19.11 OPEN the following valves:

- RECOMB ROOM CLG COIL A CHW INLET SHUTOFF, 2-66-657.
- RECOMB ROOM CLG COIL B CHW INLET SHUTOFF, 2-66-659.

8.19.12 INFORM Chemistry of the current Recombiner Room Cooling Coil lineup.

8.20 Placing Standby Recombiner Room Cooling Coil in Operation

NOTES:

1) The Recombiner Room Cooling Coil control switches are located on Junction Box JB-4432, Turbine Bldg. El 586′ T6-B, outside of the Recombiner Room.

2) Steps 8.20.2 and 8.20.3 should be performed in a timely manner.

8.20.1 REVIEW all Precautions and Limitations in Section 3.0.

8.20.2 STOP and PLACE in STANDBY the in service RECOMBINER ROOM CLG COIL 2A(2B) control switch, 2-HS-066-0131A(B).

8.20.3 VERIFY running or START the other RECOMBINER ROOM CLG COIL 2B(2A) by placing control switch 2-HS-066-0131B(A) to on.

8.20.4 NOTIFY Chemistry that Recombiner Room Cooling Coils have been swapped.

8.21 Placing Alternate Glycol Chiller in Service

NOTES:

(1) Glycol coolant refrigeration machine crankcase heaters should be on at least 2 hours before starting glycol unit.

(2) The following actions are performed at Panel 25-96 in the Off-Gas building.

8.21.1 START the standby glycol chiller using REFRIGERATION MACHINE B(A), 2-HS-66-102D(B).

8.21.2 STOP the normal glycol chiller using REFRIGERATION MACHINE A(B), 2-HS-66-102B(D).

8.21.3 PLACE the glycol chiller removed from service in AUTO using REFRIGERATION MACHINE A(B), 2-HS-66-102B(D).

8.21.4 NOTIFY the Unit 2 Operator to reset annunciator CHARCOAL BED REFRIGERATION MACHINES INOP(2-XA-55-53, Window 5).

8.22 Unit 2 Operation Without Off-Gas Chiller

****

CAUTIONS

(1) Continued operation without the off-gas chiller will result in elevated Recombiner Room, off-gas hold up volume temperatures and rising drainage from six hour hold up volume drain 2-FCV-66-23 to radwaste.
(2) Minimize the time that a chiller is inoperable to minimize the temperature rise in the off-gas recombiner room and avoid any potential corrosion of the six hour hold up volume piping.

****

8.22.1 STOP Unit 2 off-gas chiller by placing OFF-GAS CHILLER POWER CONTROL, 2-HS-66-936A, in OFF.

8.22.2 STOP Unit 2 off-gas chiller CHW pump using local STOP-START pushbutton, OG CHILLER CHW PUMP B 2-HS-066-0059.

8.22.3 CLOSE PCV 2-264 INLET SOV, 2-SHV-002-1356, to isolate the Unit 2 off-gas chilled water expansion tank.

NOTE

It is desired, in this condition, to leave the Recombiner Room cooler in service.

8.22.4 MONITOR Recombiner Room and off-gas hold up volume temperature to VERIFY unit stability.

8.22.4.1 IF Recombiner Room Temperature exceeds 140°F, THEN

CONTACT Tech Support to install a temporary temperature monitoring device (Biddle) and LOG temperatures twice per shift in NOMS Narrative Log to verify stable room temperatures.

8.22.4.2 IF Recombiner Room Temperature exceeds 160°F, THEN it is recommended to PERFORM Section 8.23, Dual Unit Operation with a shared off-gas chiller and NOTIFY BOP System Supervisor and System Engineering Supervisor for additional actions.

8.22.5 WHEN re-start of Unit 2 off-gas chiller is desired, THEN

PERFORM Section 5.4, Placing Chilled Water System in Service.

8.23 Dual Unit Operation With a Shared Off-Gas Chiller

NOTE:

This section should only be performed with Shift Manager's approval. It is recommended by Engineering to be performed when Unit 2 off-gas chiller has tripped or has been removed from service and Recombiner Room temperature exceeds 160°F.

****

CAUTION

Dual unit operation with a shared off-gas chiller may jeopardize both units. Thoughtful consideration and the operating status (OPEN WR/WO which impact the operating chiller) of the existing off-gas chiller must be given prior to implementation.

****

8.23.1 VERIFY STOPPED Unit 2 off-gas chiller by PLACING CONTROL POWER 2-HS-66-936A in OFF.

8.23.2 STOP Unit 2 Off-gas Chilled Water Pump using local STOP-START pushbutton CHW Pump B, 2-HS-66-59.

8.23.3 CLOSE PCV 2-264 INLET SOV, 2-2-1356 to isolate the Unit 2 Off-gas Chilled Water Expansion Tank.

8.23.4 VERIFY CLOSED the following valves:

- Units 1 and 2 CHW RETURN CROSSTIE, 0-66-664
- Units 1 and 2 CHW SUPPLY CROSSTIE, 0-66-661

8.23.5 OPEN the following valves:

- Units 2 and 3 CHW SUPPLY CROSSTIE, 0-66-662
- Units 2 and 3 CHW RETURN CROSSTIE, 0-66-663

8.23.6 MONITOR Unit 2 off-gas chiller for proper and stable loading.

8.23.6.1 IF the inservice Off-Gas Chiller is over-loaded, THEN

CLOSE the following valves for the Recombiner Room Cooler and/or Off-Gas Dehumidifier, as necessary, and establish a caution order on the isolated valves.

8.23 Dual Unit Operation With a Shared Off-Gas Chiller (Continued)

UNIT 3 LOADS/VALVES

- DEHUMIDIFCATION COIL CHW OUTLET, 3-SHV-066-0656
- DEHUMIDIFCATION COIL CHW INLET, 3-SHV-066-0655
- RECOMB RM CLG COIL 3A CHW INLET, 3-SHV-066-0657
- RECOMB RM CLG COIL 3A CHW OUTLET, 3-SHV-066-0658
- RECOMB RM CLG COIL 3B CHW INLET, 3-SHV-066-0659
- RECOMB RM CLG COIL 3B CHW OUTLET, 3-SHV-066-0660

UNIT 2 LOADS/VALVES

- DEHUMIDIFCATION COIL CHW OUTLET, 2-66-656
- DEHUMIDIFCATION COIL CHW INLET, 2-66-655
- RECOMB RM CLG COIL A CHW INLET SHUTOFF, 2-66-657
- RECOMB RM CLG COIL A CHW OUTLET SHUTOFF, 2-66-658
- RECOMB RM CLG COIL B CHW INLET SHUTOFF, 2-66-659
- RECOMB RM CLG COIL B CHW OUTLET SHUTOFF, 2-66-660

8.23.7 WHEN RE-START of Unit 2 off-gas chiller is desired, THEN

PERFORM Section 5.4, Placing Chilled Water System Inservice.

8.23.8 CLOSE the following valves:

- Units 2 and 3 CHW SUPPLY CROSSTIE, 0-66-662
- Units 2 and 3 CHW RETURN CROSSTIE, 0-66-663

8.23.9 CLOSE valves which were opened and RELEASE caution orders established in Step 8.23.6.1

8.23.10 MONITOR off-gas chiller for stable loading and VERIFY Recombiner Room and off-gas hold up volume temperature return to normal.

8.24 SJAE Isolation Prevention

NOTES:
(1) Jumpers may be installed to bypass the Low Steam Pressure Isolation while placing a steam jet inservice. If after approximately 10 minutes system parameters have not stabilized to where the jet will not remain in service with the jumpers removed, then place the other steam jet in service. It is not permissible to operate continuously with the jumpers installed.
(2) Perform only the sections required to place the desired steam jet in service.
(3) It will be necessary to open JB 1636 on Panel 25-105 to install or remove jumpers.
(4) Document jumper installation and removal on Illustration 3.

8.24.1 OBTAIN Unit Supervisor permission to defeat SJAE Low Steam Pressure Isolation.

8.24.2 IF it is desired to disable the 2A SJAE Low Steam Pressure Isolation, THEN:

8.24.2.1 INSTALL jumper at terminal point OGA 38(neutral).

8.24.2.2 INSTALL other end of jumper at terminal point OGA 34(signal).

8.24.2.3 RECORD jumper placement on Illustration 3 and in Narrative Log.

8.24.3 IF it is desired to disable the 2B SJAE Low Steam Pressure Isolation, THEN:

8.24.3.1 INSTALL jumper at terminal point OGB 38(neutral).

8.24.3.2 INSTALL other end of jumper at terminal point OGB 34(signal).

8.24.3.3 RECORD jumper placement on Illustration 3 and in Narrative Log.

8.24.4 IF it is desired to enable the 2A SJAE Isolation, THEN:

8.24.4.1 REMOVE jumper at terminal point OGA 34(signal).

8.24.4.2 REMOVE other end of jumper at terminal point OGA 38(neutral).

8.24.4.3 RECORD jumper removal on Illustration 3 and in Narrative Log.

8.24.5 IF it is desired to enable the 2B SJAE Isolation, THEN:

8.24.5.1 REMOVE jumper at terminal point OGB 34(signal).

8.24.5.2 REMOVE other end of jumper at terminal point OGB 38(neutral).

8.24.5.3 RECORD jumper removal on Illustration 3 and in Narrative Log.

END OF TEXT

Recombiner Performance Evaluation - ΔT to Reactor Power(1)

MWt	ΔT	MWt	ΔT	MWt	ΔT	MWt	ΔT
0.0	0.0	410.0	28.7	820.0	57.4	1230.0	86.1
10.0	0.7	420.0	29.4	830.0	58.1	1240.0	86.8
20.0	1.4	430.0	30.1	840.0	58.8	1250.0	87.5
30.0	2.1	440.0	30.8	850.0	59.5	1260.0	88.2
40.0	2.8	450.0	31.5	860.0	60.2	1270.0	88.9
50.0	3.5	460.0	32.2	870.0	60.9	1280.0	89.6
60.0	4.2	470.0	32.9	880.0	61.6	1290.0	90.3
70.0	4.9	480.0	33.6	890.0	62.3	1300.0	91.0
80.0	5.6	490.0	34.3	900.0	63.0	1310.0	91.7
90.0	6.3	500.0	35.0	910.0	63.7	1320.0	92.4
100.0	7.0	510.0	35.7	920.0	64.4	1330.0	93.1
110.0	7.7	520.0	36.4	930.0	65.1	1340.0	93.8
120.0	8.4	530.0	37.1	940.0	65.8	1350.0	94.5
130.0	9.1	540.0	37.8	950.0	66.5	1360.0	95.2
140.0	9.8	550.0	38.5	960.0	67.2	1370.0	95.9
150.0	10.5	560.0	39.2	970.0	67.9	1380.0	96.6
160.0	11.2	570.0	39.9	980.0	68.6	1390.0	97.3
170.0	11.9	580.0	40.6	990.0	69.3	1400.0	98.0
180.0	12.6	590.0	41.3	1000.0	70.0	1410.0	98.7
190.0	13.3	600.0	42.0	1010.0	70.7	1420.0	99.4
200.0	14.0	610.0	42.7	1020.0	71.4	1430.0	100.1
210.0	14.7	620.0	43.4	1030.0	72.1	1440.0	100.8
220.0	15.4	630.0	44.1	1040.0	72.8	1450.0	101.5
230.0	16.1	640.0	44.8	1050.0	73.5	1460.0	102.2
240.0	16.8	650.0	45.5	1060.0	74.2	1470.0	102.9
250.0	17.5	660.0	46.2	1070.0	74.9	1480.0	103.6
260.0	18.2	670.0	46.9	1080.0	75.6	1490.0	104.3
270.0	18.9	680.0	47.6	1090.0	76.3	1500.0	105.0
280.0	19.6	690.0	48.3	1100.0	77.0	1510.0	105.7
290.0	20.3	700.0	49.0	1110.0	77.7	1520.0	106.4
300.0	21.0	710.0	49.7	1120.0	78.4	1530.0	107.1
310.0	21.7	720.0	50.4	1130.0	79.1	1540.0	107.8
320.0	22.4	730.0	51.1	1140.0	79.8	1550.0	108.5
330.0	23.1	740.0	51.8	1150.0	80.5	1560.0	109.2
340.0	23.8	750.0	52.5	1160.0	81.2	1570.0	109.9
350.0	24.5	760.0	53.2	1170.0	81.9	1580.0	110.6
360.0	25.2	770.0	53.9	1180.0	82.6	1590.0	111.3
370.0	25.9	780.0	54.6	1190.0	83.3	1600.0	112.0
380.0	26.6	790.0	55.3	1200.0	84.0	1610.0	112.7
390.0	27.3	800.0	56.0	1210.0	84.7	1620.0	113.4
400.0	28.0	810.0	56.7	1220.0	85.4	1630.0	114.1

(1) Hydrogen Water Chemistry Out of Service

Recombiner Performance Evaluation - ΔT to Reactor Power (1)

MWt	ΔT	MWt	ΔT	MWt	ΔT	MWt	ΔT
1640.0	114.8	2090.0	146.3	2530.0	177.1	2970.0	207.9
1650.0	115.5	2100.0	147.0	2540.0	177.8	2980.0	208.6
1660.0	116.2	2110.0	147.7	2550.0	178.5	2990.0	209.3
1670.0	116.9	2120.0	148.4	2560.0	179.2	3000.0	210.0
1680.0	117.6	2130.0	149.1	2570.0	179.9	3010.0	210.7
1690.0	118.3	2140.0	149.8	2580.0	180.6	3020.0	211.4
1700.0	119.0	2150.0	150.5	2590.0	181.3	3030.0	212.1
1710.0	119.7	2160.0	151.2	2600.0	182.0	3040.0	212.8
1720.0	120.4	2170.0	151.9	2610.0	182.7	3050.0	213.5
1730.0	121.1	2180.0	152.6	2620.0	183.4	3060.0	214.2
1740.0	121.8	2190.0	153.3	2630.0	184.1	3070.0	214.9
1750.0	122.5	2200.0	154.0	2640.0	184.8	3080.0	215.6
1760.0	123.2	2210.0	154.7	2650.0	185.5	3090.0	216.3
1770.0	123.9	2220.0	155.4	2660.0	186.2	3100.0	217.0
1780.0	124.6	2230.0	156.1	2670.0	186.9	3110.0	217.7
1790.0	125.3	2240.0	156.8	2680.0	187.6	3120.0	218.4
1800.0	126.0	2250.0	157.5	2690.0	188.3	3130.0	219.1
1810.0	126.7	2260.0	158.2	2700.0	189.0	3140.0	219.8
1820.0	127.4	2270.0	158.9	2710.0	189.7	3150.0	220.5
1830.0	128.1	2280.0	159.6	2720.0	190.4	3160.0	221.2
1840.0	128.8	2290.0	160.3	2730.0	191.1	3170.0	221.9
1850.0	129.5	2300.0	161.0	2740.0	191.8	3180.0	222.6
1860.0	130.2	2310.0	161.7	2750.0	192.5	3190.0	223.3
1870.0	130.9	2320.0	162.4	2760.0	193.2	3200.0	224.0
1880.0	131.6	2330.0	163.1	2770.0	193.9	3210.0	224.7
1890.0	132.3	2340.0	163.8	2780.0	194.6	3220.0	225.4
1900.0	133.0	2350.0	164.5	2790.0	195.3	3230.0	226.1
1910.0	133.7	2360.0	165.2	2800.0	196.0	3240.0	226.8
1920.0	134.4	2370.0	165.9	2810.0	196.7	3250.0	227.5
1930.0	135.1	2380.0	166.6	2820.0	197.4	3260.0	228.1
1940.0	135.8	2390.0	167.3	2830.0	198.1	3270.0	228.9
1950.0	136.5	2400.0	168.0	2840.0	198.8	3280.0	229.6
1960.0	137.2	2410.0	168.7	2850.0	199.5	3290.0	230.3
1970.0	137.9	2420.0	169.4	2860.0	200.2	3300.0	231.0
1980.0	138.6	2430.0	170.1	2870.0	200.9	3310.0	231.7
1990.0	139.3	2440.0	170.8	2880.0	201.6	3320.0	232.4
2000.0	140.0	2450.0	171.5	2890.0	202.3	3330.0	233.1
2010.0	140.7	2460.0	172.2	2900.0	203.0	3340.0	233.8
2020.0	141.4	2470.0	172.9	2910.0	203.7	3350.0	234.5
2030.0	142.1	2480.0	173.6	2920.0	204.4	3360.0	235.2
2040.0	142.8	2490.0	174.3	2930.0	205.1	3370.0	235.9
2050.0	143.5	2500.0	175.0	2940.0	205.8	3380.0	236.6
2060.0	144.2	2510.0	175.7	2950.0	206.5	3390.0	237.3
2070.0	144.9	2520.0	176.4	2960.0	207.2	3400.0	238.0
2080.0	145.6						

(1) Hydrogen Water Chemistry Out of Service

Recombiner Performance Evaluation - ΔT to Reactor Power (1)

MWt	ΔT
3410.0	238.7
3420.0	239.4
3430.0	240.1
3440.0	240.8
3450.0	241.5
3460.0	242.2
3470.0	242.9
3480.0	243.6
3490.0	244.3
3500.0	245.0
3510.0	245.7
3520.0	246.4
3530.0	247.1
3540.0	247.8
3550.0	248.5
3560.0	249.2
3570.0	249.9
3580.0	250.6
3590.0	251.3
3600.0	252.0
3610.0	252.7
3620.0	253.4
3630.0	254.1
3640.0	254.8

(1) Hydrogen Water Chemistry Out of Service

Unit 2 Jumper Placement
For Dual Recombiner Room
Cooling Coil Operation

NOTE:

After jumpers are installed in accordance with Section 8.19 and the steps below, the signed copy of this illustration is placed in the Unit 2 Daily Configuration Log. When the system is restored to normal, in accordance with Section 8.19 and the steps below, this Illustration is removed from the Daily Configuration Log and sent to the Operations Superintendent.

Section 8.19 Jumpers Installed/Removed

RECOMBINER ROOM COOLING COIL 2A:
480V Turbine Building MOV Bd 2A, Compartment 16A

8.19.3.7 or 8.19.4.2 — Jumper Installed

____
1st

____
2nd

8.19.9.3 or 8.19.10.9 — Jumper Removed

____
1st

____
2nd

____
Date

RECOMBINER ROOM COOLING COIL 2B:
480V Turbine Building MOV Bd 2B, Compartment 10A

8.19.3.2 or 8.19.4.7 — Jumper Installed

____
1st

____
2nd

8.19.9.9 or 8.19.10.3 — Jumper Removed

____
1st

____
2nd

____
Date

Responsible Organization: Operations

Retention Period: NONE

Unit 2 Jumper Placement
For SJAE Isolation Prevention

NOTE:

Tools and jumpers may be obtained from the Operations black box located at T-6 E-line EL. 586′, in Heater Alley. When the system is restored to normal, in accordance with Section 8.24 and the steps below, this Illustration is forwarded to the Operations Superintendent.

SJAE 2A:

JB 1636 located on PANEL 25-105

STEP 8.24.2 Jumper Installed

________ 1st

________ 2nd

________ Date

STEP 8.24.4 Jumper Removed

________ 1st

________ 2nd

________ Date

SJAE 2B:

JB 1636 located on PANEL 25-105

STEP 8.24.3 Jumper Installed

________ 1st

________ 2nd

________ Date

STEP 8.24.5 Jumper Removed

________ 1st

________ 2nd

________ Date

Responsible Organization: Operations Retention Period: NONE

Developed for the Browns Ferry, June 2000, Initial Examination
Examination Report # 2000-301

U. S. Nuclear Regulatory Commission

Region II

A-1 Administrative Section

NRC-JPM-02

Title:

Evaluate Overtime Eligibility

SAFETY CONSIDERATIONS:

NONE:

EVALUATOR NOTES:

1. The applicable procedure section will not be provided to the candidate.
2. If this is the first JPM of the JPM set, reat the JPM briefing contained in NUREG-1021, Appendix E, or similar to the candidate.

Read the following to the Candidate.

TASK CONDITIONS:

1. A startup is planned for the following shift. One Reactor Operator must be held over two hours for startup.
2. The following is the work history (excluding shift turnover time) of the available reactor operators on shift. A break of at least 8 hours occurred between all work periods. All operators began their shift at the same time each day.

TASK CONDITIONS:

1. A startup is planned for the following shift. One Reactor Operator must be held over two hours for startup.

2. The following is the work history (excluding shift turnover time) of the available reactor operators on shift. A break of at least 8 hours occurred between all work periods. All operators began their shift at the same time each day.

DAY	1	2	3	4	5	6	7	8 (Today)
Operator #1	0	0	12	12	12	8	14	10
Operator #2	0	0	12	12	12	12	8	14
Operator #3	0	0	12	12	12	8	8	15
Operator #4	0	8	12	10	10	8	10	12
Operator #5	0	4	12	10	10	14	10	12

INITIATING CUE:

Evaluate the work history for all 5 operators. Determine which operator(s), if any, can be held over for two hours without prior overtime approval, and determine which operators CANNOT be held over for two hours without prior overtime approval.

PERFORMANCE CHECKLIST

NOTE: Sequence is assumed unless denoted in the Comments.

STEP 1. Obtain a current copy of Technical Specifications/SSP - 1.5, Overtime Restrictions (Regulatory)

Current Revision of TS/SSP 1.5 obtained and verified IAW ____ if applicable.

SAT/UNSAT*_____

STEP 2. Determine Operator #1 would exceed 24 hours in a 48 hour period.

Determined that Operator #1 would exceed 24 hours in a 48 hour period. (Day 7 and 8 already have 24 hours, if worked 2 more hours it would be 26 hours in a 48 hour period.)

Critical Step .....SAT/UNSAT*_____

STEP 3. Determine Operator #2 would not exceed any overtime restrictions.

Determined Operator #2 would not exceed any overtime restrictions.

SAT/UNSAT*_____

STEP 4. Determine Operator #3 would exceed 16 hours strait.

Determined Operator #3 would exceed 16 hours strait.

Critical Step .....SAT/UNSAT*_____

STEP 5. Determine Operator #4 would not exceed any overtime restrictions.

Determined Operator #4 would not exceed any overtime restrictions.

SAT/UNSAT*_____

STEP 6. Determine Operator #5 would exceed 72 hours in a 7 day period.

Determined Operator #5 would exceed 72 hours in a 7 day period.

Critical Step .....SAT/UNSAT*_____

TERMINATING CUE:	When the candidate has evaluated overtime restrictions, this JPM is complete.

* Comments required for any step evaluated as unsat.

RELATED TASKS:

Conduct shift turnover and relief

K/A REFERENCE:

GEN 2.1.5

REFERENCES:

TS 5.2.2, SSP - 1.5, Overtime Restrictions (Regulatory)

TOOLS AND EQUIPMENT:

None

SAFETY FUNCTION (from NUREG 1123, Rev. 2.)

A-1 Conduct Of Operations

NEW JPM FOR BROWNS FERRY 2000 EXAMINATION.

Time required for Completion: 10 minutes (approximate).

APPLICABLE METHOD OF TESTING

Performance:	Simulate ✓	Actual ___	Unit ___
Setting:	Control Room ✓	Simulator ___ (Not applicable to In-Plant JPMS)	
Time Critical:	Yes ___	No ✓	Time Limit NA
Alternate Path:	No.___	No ✓	

EVALUATION

CANDIDATE's NAME:______________________________

JPM: PASS _____ FAIL:______

Comments: ______________________________

Examiners Name. ______________________ Date:__________

Candidate's Handout

Candidate's Name ________________

TASK CONDITIONS:

1. A startup is planned for the following shift. One Reactor Operator must be held over two hours for startup.

2. The following is the work history (excluding shift turnover time) of the available reactor operators on shift. A break of at least 8 hours occurred between all work periods. All operators began their shift at the same time each day.

DAY	1	2	3	4	5	6	7	8 (Today)
Operator #1	0	0	12	12	12	8	14	10
Operator #2	0	0	12	12	12	12	8	14
Operator #3	0	0	12	12	12	8	8	15
Operator #4	0	8	12	10	10	8	10	12
Operator #5	0	4	12	10	10	14	10	12

INITIATING CUE:

Evaluate the work history for all 5 operators. Determine which operator(s), if any, can be held over for two hours without prior overtime approval, and determine which operators CANNOT be held over for two hours without prior overtime approval.

Developed for the Browns Ferry, June 2000, Initial Examination
Examination Report # 2000-301

U. S. Nuclear Regulatory Commission

Region II

A-1 Administrative Section SRO

NRC-JPM-04

Title:

Review of Core Spray MOV Operabiltiy Test

IAW

0-SR-3.6.1.3.5 (CS II), Core Spray MOV Operability Test

Developed for the Browns Ferry, June 2000, Initial Examination
Examination Report # 2000-301

Read the Following to the Candidate

Initial Conditions:

1. Unit 2 is in MODE 1.

2. 2-SR-3.6.1.3.5 (CS II), "Core Spray MOV Operability Test," has just been completed.

Initiating Cues:

Review the procedure and determine the acceptability of the test.

Candidate Hand Out

Candidate's Name ______________

START TIME __________

STEP 1. Obtain the completed copy of 2-SR-3.6.1.3.5(CSII), "Core Spray MOV Operability Test."

Candidate receives completed SR.

SAT/UNSAT*_____

STEP 2. The candidate reviews the procedure.

The candidate REVIEWS 2-SR-3.6.1.3.5(CSII), "Core Spray MOV Operability Test."

SAT/UNSAT*_____

STEP 3. The candidate evaluates the CLOSING stroke time data for 2-FCV-75-51.

(7.6.2) Closing stroke time for 2-FCV-75-51 recorded.

The candidate evaluates and determines that step 7.6.2 is Satisfactory.

SAT/UNSAT*_____

STEP 4. The candidate evaluates the OPEN stroke time for 2-FCV-75-53.

(7.6.3) Open stroke time for 2-FCV-75-53.

(7.6.3.1) Stroke time recorded and less than maximum value.

The candidate evaluates and determines that steps 7.6.3 and 7.6.3.1 are completed satisfactorily and meet the acceptance criteria.

SAT/UNSAT*_____

Candidate's Name ____________

STEP 5. (7.6.4) The candidate evaluates step 7.6.4 and determines the step was signed off properly.

The candidate determined that the annunciator did not come in and that step 7.6.4 was signed off properly.

SAT/UNSAT*_____

STEP 6. The candidate evaluates the CLOSE stroke time data for 2-FCV75-53.

(7.6.5) CLOSE 2-FCV-75-52 stroke time recorded and less than maximum value.

The candidate determined that the CLOSE stroke time was within limits and was properly recorded.

SAT/UNSAT*_____

STEP 7. (7.6.6) The candidate evaluates acceptance criteria. The candidate evaluates that steps 7.6.6.1 and 7.6.6.2 do not have to be performed.

The candidate determined that stoke times in 7.6.3 and 7.6.5 are less than maximum values listed.

The candidate also determines that the valves do not need to be re-stroked and steps 7.6.6.1 and 7.6.6.2 need to be N/Aed.

SAT/UNSAT*_____

Candidate's Name ______________

STEP 8. The candidate evaluates the OPEN Stroke time for 2-FCV-75-51.

(7.6.7) Open stroke time testing for. 2-FCV-75-51.

The candidate Evaluates the OPEN stroke time data for 2-FCV-75-51 and Determined that the valve data is UNSATISFACTORY in the OPEN direction. The valve must be declared INOP or retested.

The candidate Determined that the person performing the SR did not perform steps 7.6.8 thru 7.6.8.1 & 7.6.8.2. As should have been required since the open time was out of specification.

The candidate Determined that Attachment 3 should have been filled out for valve 2-FCV-75-51.

The Candidate should report this information to the UO and the US.

CUE: US acknowledges this finding, continue with the review.

Critical Step SAT/UNSAT*_____

STEP 9. (7.6.9) If the CS System Loop II was declared inoperable ONLY because of 2-FCV-75-51 closure, THEN

EXIT CS System LCO and RECORD time; otherwise, N/A.

The candidate determines that this closure was correct. DO WE HAVE TO STATE THAT THIS SYSTEM IS STILL INOP BECAUSE OF THE VALVE NOT STROKING TIME PROPERLY. SHOULD THE SYSTEM STILL BE INOP??????

SAT/UNSAT*_____

Candidate's Name ______________

STEP 10. (7.7) The candidate evaluates the CLOSE stroke time for 2.-FCV-75.37.

The candidate should determine the CLOSE stroke time is greater than the maximum closure time.

The candidate determined the CLOSE stroke time exceeds the maximum closure time and that the performer incorrectly signed this step without retest.

CUE: US acknowledges this finding, continue with the review.

Critical Step SAT/UNSAT*_____

STEP 11. (7.7.2) The candidate evaluates the OPEN stroke time for 2.-FCV-75.37.

The candidate should determine the OPEN stroke time is outside the band for normal operations.

CUE: US acknowledges this finding, continue with the review.

Critical Step SAT/UNSAT*_____

STEP 12. (7.7.3) The candidate evaluates that valve, 2.-FCV-75.37 has to be re-stroked in accordance with steps 7.7.3.1 and 7.7.3.2.

The candidate determined that Attachments 2 and 3 were filled out properly for valve 2.-FCV-75.37 and that the re-stroke times were Satisfactory.

SAT/UNSAT*_____

STEP 13. (7.8 thru 7.12) The candidate evaluates the completed steps.

The candidate evaluated steps 7.8-7.12 and determined they were completed and documented satisfactorily.

SAT/UNSAT*_____

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

SURVEILLANCE PROCEDURE

2-SR-3.6.1.3.5(CS II)

CORE SPRAY MOV OPERABILITY TEST

REVISION 3

QUALITY RELATED

PREPARED BY: BOB KERSTETTER

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: RUSSELL W. GILBERT

EFFECTIVE DATE: 12/14/98

VALIDATION DATE: 06/21/93

LEVEL OF USE: **CONTINUOUS USE**

PAGES AFFECTED: 5, 8

REVISION DESCRIPTION: NIC-05, PER CORRECTIVE ACTION

- **BFPER 98-012643-000**, Added P & L 3.8 and Note on page 8 to inform operators to REFER TO Illustration 1.

1.0 INTRODUCTION

1.1 Purpose

This surveillance procedure verifies the opening and/or closing time of certain power operated, automatic Core Spray Primary Containment Isolation Valves (PCIVs) is within the limit required by Technical Specification (TS) 5.5.6.

This SR is not required to satisfy SR 3.6.1.3.5 because none of the valves tested in this SR are required to be tested by SR 3.6.1.3.5 (see discussion in TS Bases).

1.2 Scope

This procedure in conjunction with SRs/SIs listed as being ASME type in 2-SR-1 will fully implement the ASME Section XI program of Technical Specification 5.5.6 and 0-TI-362.

1.3 Frequency

Once per 92 days in Accordance With The Inservice Testing Program.

1.4 Applicability

MODES 1, 2, and 3

2.0 REFERENCES

2.1 BFN Unit 2 Technical Specifications

Section 5.5.6, Inservice Testing Program

2.2 BFN Updated FSAR

Section 4.12, Inservice Inspection and Testing

Section 5.2, Primary Containment System

Section 6.4.3, Core Spray System Description.

Section 7.4, Core Standby Cooling System Control and Instrumentation.

2.3 Plant Instructions

2-OI-75, Core Spray System Operating Instruction.

2-SI-3.2.1, ASME Section XI Valve Performance.

0-TI-362, Inservice Testing of Pumps and Valves.

SSP-8.1, Conduct of Testing.

SSP-12.6, Verification Program.

2.4 Plant Drawings

2-47E814 Sheet 1, Core Spray System Flow Diagram.

2-45E779 Sheets 10 and 18, 480V Shutdown Auxiliary Power Schematic Diagram.

0-730E930 Sheets 10-19, Core Spray Elementary Diagram.

2-47E611-75 Sheets 1-3, Core Spray Logic Diagram.

2.5 Other Documents

ECN P3118 Safety Evaluation (B22 880830 516).

3.0 PRECAUTIONS AND LIMITATIONS

3.1 If maintenance other than what is provided in this SR becomes necessary, a work request (WR) should be generated.

3.2 The stroke time for all motor-operated/air operated valves shall be measured to the nearest tenth of a second. Stroke time is defined as the period from initial switch movement to panel indication of completed valve travel.

3.3 If during performance of this procedure it becomes necessary to change test equipment, the identification number and calibration date for the new test equipment, along with the step numbers for which it was used, shall be noted in the post-test remarks section of the Surveillance Procedure Review Form.

3.4 Test deficiencies shall be dispositioned in accordance with SSP-8.1, Conduct of Testing.

3.5 The CORE SPRAY SYS II DISCH PRESS HIGH 2-PA-75-52 (2-XA-55-3F, Window 30) annunciator may alarm when 2-FCV-75-51 is closed and 2-FCV-75-53 is opened in the following steps. The 2-PS-75-52 instrument loop which actuates the annunciator can spuriously function in this valve alignment. Specifically, the small piping volume between 2-FCV-75-53 and 2-FCV-75-51 is easily pressurized if even very small leakage (e.g., less than LLRT acceptance value) past 2-FCV-75-54 is present. The pressurization of this piping volume is an expected condition and is not indicative of 2-FCV-75-54 valve failure by itself. If the alarm should occur, Technical Support will evaluate, during its ASME Section XI review, the need for additional testing of 2-FCV-75-54 if excessive leakage is suspected based on the valve's maintenance and operating history.

3.6 The pressurization of the piping volume between 2-FCV-75-53 and 2-FCV-75-51 will cause a small pressure transient in the CS Loop II discharge piping when the outboard injection valve 2-FCV-75-51 initially begins to open and the pressure is relieved. Check valves may be heard lightly backseating in the NE Corner Room Elevation 519' and a slight amount of pipe movement in the vicinity of the injection valves may be noted. Additionally, if any air has become entrapped in the instrument lines which provide the process connection for flow switch 2-FS-75-49, spurious operation of the flow switch and minimum flow valve 2-FCV-75-37 may result. If spurious operation of the minimum flow valve should occur, a WR should be generated to backfill the affected instrument lines.

3.7 The BFN Generic Letter (GL) 89-10 Program has excluded 2-FCV-75-51 from its program maintenance requirements. However, this valve is stroked to the closed position by this SR in order to satisfy ASME Section XI IST Program requirements. Consequently, administrative actions must be taken to ensure that the CS System is declared inoperable and a limiting condition for operation (LCO) entered while this valve is in the closed position. The necessary administrative controls are contained within this SR to ensure that the appropriate Technical Specification reviews occur prior to placing this valve in the closed position.

3.8 REFER TO Illustration 1, Process for Stroke Timing Valves per OM -10 Code. Valves that exceed the maximum allowed stroke time shall not be restroked and must be declared inoperable.

Date 6/27/00

INITIALS

4.0 PREREQUISITES

4.1 This copy of 2-SR-3.6.1.3.5(CS II) is verified the most current. ___

4.2 CS System Loop II is available for testing. ___

4.3 Qualified personnel listed below are available to perform this SR:

UO 1 ___

5.0 SPECIAL TOOLS AND EQUIPMENT RECOMMENDED

5.1 Recommended Tools

None.

5.2 Recommended Measuring And Test Equipment (M&TE)

Digital stopwatch with an accuracy of ≤ 0.1 second measured over a 30 second period.

6.0 ACCEPTANCE CRITERIA

6.1 Responses which fail to meet acceptance criteria stated in this section shall constitute unsatisfactory SR results and require immediate notification of the Unit Supervisor at the time of failure. Any valve with a closing or opening time exceeding its maximum value shall be declared inoperable immediately.

Conformance with the following acceptance criteria satisfies the requirements of TS 5.5.6 and shall be demonstrated as required by this procedure:

6.1.1 2-FCV-75-37 opening time is ≤ 15.0 seconds, and closing time is ≤ 15.0 seconds.

6.1.2 2-FCV-75-51 opening time is ≤ 30.0 seconds.

6.1.3 2-FCV-75-53 opening time is ≤ 30.0 seconds, and closing time is ≤ 30.0 seconds.

6.2 Steps which verify acceptance criteria are designated by (AC) next to the initial blank.

Date 6/27/00

INITIALS

7.0 PROCEDURE STEPS

NOTE:

All valve manipulations and verifications are performed at Panel 2-9-3 unless otherwise noted.

7.1 **CHECK** that following initial conditions have been met:

7.1.1 All precautions and limitations in Section 3.0 have been reviewed. RAB

7.1.2 All prerequisites listed in Section 4.0 are satisfied. RAB

7.2 **OBTAIN** permission from the Unit Supervisor to perform this SR. FHB US

7.3 [NRC/C] **NOTIFY** Unit Operator (UO) prior to start of this SR. [RPT 82-16, LER 259/8232] RAB

7.4 **RECORD** date and time started, reason for test, and plant conditions on Attachment 1, Surveillance Procedure Review Form. RAB

7.5 **RECORD** stopwatch identification number below:
ID No: ____________ RAB

Date 6/27/00

INITIALS

7.0 PROCEDURE STEPS (Continued)

NOTE: Steps 7.6 and 7.7 may be performed in any order.

7.6 **PERFORM** CS System Loop II discharge valve operability testing as follows:

7.6.1 **VERIFY** CS System Loop II may be removed from operable service, **DECLARE** CS System Loop II inoperable, and **RECORD** Time.

TIME 1329 ____ RAB

NOTES:

1) Consult Step 3.7 for additional information regarding CS System inoperability declaration when 2-FCV-75-51 is closed.

2) REFER TO Illustration 1, Process for Stroke Timing Valves per OM -10 Code.

7.6.2 **CLOSE** CORE SPRAY SYS II OUTBD INJECT VALVE 2-FCV-75-51 using handswitch 2-HS-75-51A and **RECORD** stroke time below:

2-FCV-75-51 Closing Time (Seconds)		
Normal	Measured	Maximum
NA	30.1	NA

____ RAB

7.6.3 **OPEN** CORE SPRAY SYS II INBD INJECT VALVE 2-FCV-75-53 using handswitch 2-HS-75-53A and **RECORD** stroke time below:

2-FCV-75-53 Opening Time (Seconds)		
Normal	Measured	Maximum
23.8 - 30.0	29.8	30.0

____ RAB

7.6.3.1 **VERIFY** the stroke time recorded in Step 7.6.3 is less than or equal to the maximum value listed. ____ RAB (AC)

Date 6/27/00

INITIALS

7.0 PROCEDURE STEPS (Continued)

7.6.4 **IF** CORE SPRAY SYS II DISCH PRESS HIGH 2-PA-75-52 (2-XA-55-3F, Window 30) annunciator is in alarm, **THEN**

INITIAL step; otherwise, **N/A**. N/A

7.6.5 **CLOSE** CORE SPRAY SYS II INBD INJECT VALVE 2-FCV-75-53 using handswitch 2-HS-75-53A and **RECORD** stroke time below:

2-FCV-75-53 Closure Time (Seconds)		
Normal	Measured	Maximum
23.8 - 30.0	25.8	30.0

MOB

7.6.5.1 **VERIFY** that the stroke time recorded in Step 7.6.5 is less than or equal to the maximum value listed. MOB (AC)

7.6.6 **IF** both of the stroke times measured in step 7.6.3 and7.6.5 are less than or equal to the maximum values listed and either time is outside the normal range, **THEN**

PERFORM steps 7.6.6.1 and 7.6.6.2 (**N/A** this step through 7.6.6.2 otherwise). MOB

7.6.6.1 **RESTROKE** 2-FCV-75-53 in the affected direction (OPEN or CLOSED), with the final position being CLOSED and **RECORD** the stroke time on Attachment 3. N/A

7.6.6.2 **VERIFY** the restroke times recorded on Attachment 3 are less than or equal to the maximum values listed. N/A (AC)

Date 6/27/00

INITIALS

7.0 PROCEDURE STEPS (Continued)

7.6.7 **OPEN** CORE SPRAY SYS II OUTBD INJECT VALVE 2-FCV-75-51 using handswitch 2-HS-75-51A and **RECORD** stroke time below:

2-FCV-75-51 Opening Time (Seconds)		
Normal	Measured	Maximum
23.8 - 30.0	23.6	30.0

[initials]

7.6.7.1 **VERIFY** the stroke time recorded in Step 7.6.7 is less than or equal to the maximum value listed. [initials] (AC)

7.6.8 **IF** the stroke time measured in step 7.6.7 is less than or equal to the maximum value listed and outside the normal range, **THEN**

PERFORM steps 7.6.8.1 and 7.6.8.2 (**N/A** this step through 7.6.8.2 otherwise). N/A

7.6.8.1 **CLOSE** the valve and **RESTROKE** 3-FCV-75-51 in the open direction and **RECORD** the stroke time on Attachment 3. N/A

7.6.8.2 **VERIFY** the restroke time recorded on Attachment 3 is less than or equal to the maximum value listed. N/A (AC)

7.6.9 **IF** the CS System Loop II was declared inoperable ONLY because of 2-FCV-75-51 closure, **THEN**

EXIT CS System LCO and **RECORD** Time; otherwise, **N/A**.

Time 1420 [initials]

Date 6/27/00

INITIALS

7.0 PROCEDURE STEPS (Continued)

7.7 **PERFORM** CS System Loop II minimum flow valve operability test as follows:

7.7.1 **CLOSE** CORE SPRAY SYS II MIN FLOW VALVE 2-FCV-75-37 by using handswitch 2-HS-75-37A and **RECORD** stroke time below:

2-FCV-75-37 Closure Time (Seconds)		
Normal	Measured	Maximum
10.2 - 13.8	15.1	15.0

ASB

7.7.1.1 **VERIFY** the stroke time recorded in Step 7.7.1 is less than or equal to the maximum value listed. ASB (AC)

7.7.2 **OPEN** CORE SPRAY SYS II MIN FLOW VALVE 2-FCV-75-37 by releasing handswitch 2-HS-75-37A and **RECORD** stroke time below:

2-FCV-75-37 Opening Time (Seconds)		
Normal	Measured	Maximum
10.2 - 13.8	14.8	15.0

ASB

7.7.2.1 **VERIFY** the stroke time recorded in Step 7.7.2 is less than or equal to the maximum value listed. ASB (AC)

7.7.3 **IF** both of the stroke times measured in step 7.7.1 and 7.7.2 are less than or equal to the maximum values listed and either time is outside the normal range, **THEN**

PERFORM steps 7.7.3.1 and 7.7.3.2 (**N/A** this step through 7.7.3.2 otherwise). ASB

Date 6/27/00

INITIALS

7.0 PROCEDURE STEPS (Continued)

7.7.3.1 **RESTROKE** 2-FCV-75-37 in the affected direction (open or closed) with the final position being open and **RECORD** the stroke time on Attachment 3. ________

7.7.3.2 **VERIFY** the restroke times recorded on Attachment 3 are less than or equal to the maximum values listed. ________ (AC)

NOTES:

(1) The independent verifications of the following step may be performed in any order.

(2) If a deficiency(s) is identified during performance of the independent verifications in the following step, the independent verifier shall stop and notify the Unit Supervisor immediately for further instructions prior to correcting the deficient condition(s).

7.8 **PERFORM** following independent verifications to ensure that CS Loop II has been returned to its pretest configuration:

7.8.1 **VERIFY** CORE SPRAY SYS II MIN FLOW VALVE 2-FCV-75-37 is OPEN by noting that red indicating light is illuminated and green indicating light is extinguished above 2-HS-75-37A. EVL IV

7.8.2 **VERIFY** CORE SPRAY SYS II OUTBD INJECT VALVE 2-FCV-75-51 is OPEN by noting that red indicating light is illuminated and green indicating light is extinguished above 2-HS-75-51A. EVL IV

Date______________

INITIALS

7.0 PROCEDURE STEPS (Continued)

7.8.3 **VERIFY** CORE SPRAY SYS II INBD INJECT VALVE 2-FCV-75-53 is CLOSED by noting that red indicating light is extinguished and green indicating light is illuminated above 2-HS-75-53A. ______ IV

7.9 **COMPLETE** Attachment 1, Surveillance Procedure Review Form, to Unit Supervisor review. ______

7.10 **IF** any valve required restroking during this SR (i.e., restroke times were recorded on Attachment 3), **THEN**

PROVIDE a copy of Attachment 3 to the Duty System Engineer (pager 10-291) to deliver to the ASME Section XI IST program owner. Otherwise, **N/A** this step. ______

7.11 **NOTIFY** UO that this SR is complete. ______

7.12 **NOTIFY** Unit Supervisor that this SR is complete. ______

8.0 ILLUSTRATIONS/ATTACHMENTS

8.1 Attachment 1, Surveillance Procedure Review Form.

8.2 Attachment 2, ASME Section XI Inservice Testing Review Form.

8.3 Attachment 3, ASME Section XI Restroke Time Record Form

8.4 Illustration 1, Process for Stroke Timing Valves Per OM-10 Code.

END OF TEXT

ATTACHMENT 1
(Page 1 of 1)

SURVEILLANCE PROCEDURE REVIEW FORM

REASON FOR TEST:
✓ Scheduled Surveillance
___ System Inoperable (Explain in Remarks)
___ Maintenance (WR/WO No.________)
___ Other (Explain in Remarks)

DATE/TIME STARTED 6/27/00
DATE/TIME COMPLETED 1327
PLANT CONDITIONS 100%

PRE-TEST REMARKS:

PERFORMED BY:

Initials	Name (Print)	Name (Signature)
RSB	RICHARD S. BALDWIN (Test Dir/Lead Perf)	Richard S Baldwin
	(Test Dir/Lead Perf)	
EXL	EDWIN LEA	Edwin Lea

Delays or Problems (If yes, explain in POST-TEST REMARKS)? ___ Yes ✓ No
Acceptance Criteria Satisfied? ✓ Yes ___ No
If the above answer is no, the Unit Supervisor shall determine if an LCO exists.
LCO ___ Yes ___ No

UNIT SUPERVISOR________________ Date________
==========
INDEPENDENT QUALIFIED REVIEWER________________ Date________
==========
SCHEDULING COORDINATOR________________ Date________
==========
POST-TEST REMARKS:

ATTACHMENT 2
(Page 1 of 1)

ASME SECTION XI INSERVICE TESTING REVIEW FORM

Valves Tested	Not Acceptable	Fully Acceptable	N/A or Not Tested
2-FCV-75-37	[✓]	[ ]	[ ]
2-FCV-75-51	[ ]	[✓]	[ ]
2-FCV-75-53	[ ]	[✓]	[ ]

NOTE:

Any valve having a stroke time exceeding its maximum value shall be declared inoperable. Any valve having a stroke time outside of its normal stroke time range shall be restroked immediately. If the restroke time is also outside the normal range, then the recorded stroke times shall be evaluated by engineering within 96 hours of the completion of this SR for acceptability.

Date Received: ____________________

ASME SECTION XI REVIEWER (Components) ____________________ DATE __________

ASME Section XI Data entered in SI(s) 2-SI-3.2.1

ANII REVIEWER - ____________________ DATE __________

REMARKS: ____________________

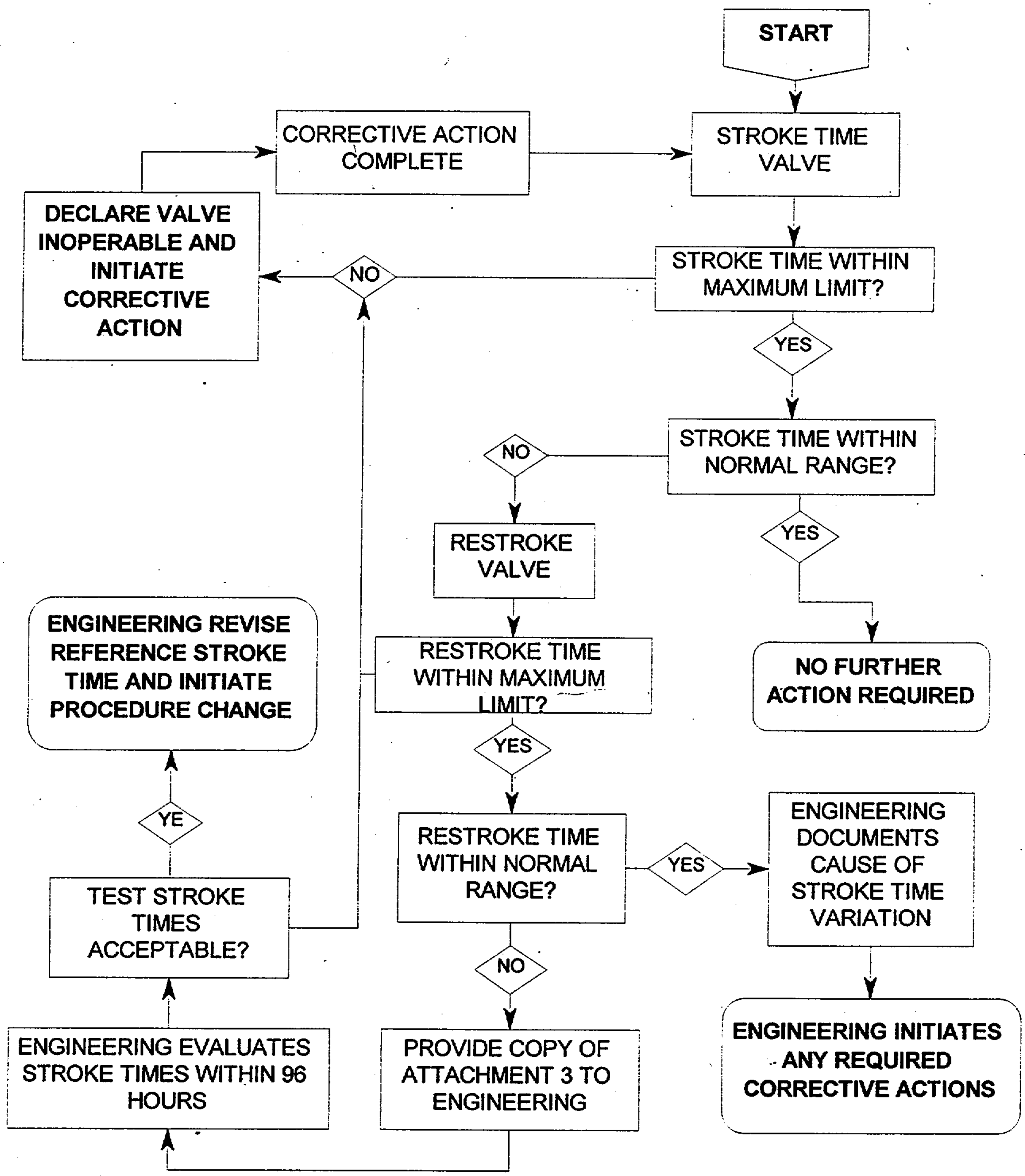
ATTACHMENT 3
(Page 1 of 1)

ASME SECTION XI RESTROKE TIME RECORD FORM

VALVE UNID	NORMAL STROKE TIME (SEC)	MEASURED STROKE TIME (SEC)	MAXIMUM STROKE TIME (SEC)
2-FCV-75-37 (OPEN)	10.2 - 13.8	14.9	15.0
2-FCV-75-37 (CLOSE)	10.2 - 13.8	14.0	15.0
2-FCV-75-51 (OPEN)	23.8 - 30.0		30.0
2-FCV-75-53 (OPEN)	23.8 - 30.0		30.0
2-FCV-75-53 (CLOSE)	23.8 - 30.0		30.0

ILLUSTRATION 1

PROCESS FOR STROKE TIMING VALVES PER OM-10 CODE



BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 131

TITLE: DETERMINE BUILDING VENTILATION NOBLE GAS RELEASE RATE

TASK NUMBER: U-090-SU-02

SUBMITTED BY: ______________________ DATE: ________

VALIDATED BY: ______________________ DATE: ________

APPROVED: ______________________ DATE: ________
TRAINING

PLANT CONCURRENCE: ______________________ DATE: ________
OPERATIONS

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
2	10/4/94	ALL	GENERAL REVISION

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________ SS# ______________
RO ________ SRO ________ DATE: ______________

JPM NUMBER: 131

TASK NUMBER: U-090-SU-02

TASK TITLE: PERFORM AIRBORNE EFFLUENT RELEASE RATE SI

K/A NUMBER: 272000A4.05 K/A RATING: RO 2.3 SRO: 3.7

****

TASK STANDARD: CALCULATE TOTAL BUILDING RADIOACTIVE RELEASE RARE AS DIRECTED BY 0-SI-4.8.B.1.a.1

LOCATION OF PERFORMANCE: SIMULATOR ___ PLANT ___ CONTROL ROOM X

REFERENCES/PROCEDURES NEEDED: 0-SI-4.8.B.1.a.1, REV 26

VALIDATION TIME: CONTROL ROOM: 40:00 LOCAL: ________

MAX. TIME ALLOWED: ______ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM ______ LOCAL ____

COMMENTS: ____

Additional comment sheets attached? YES _____ NO _____

RESULTS: SATISFACTORY ________
UNSATISFACTORY ________

SIGNATURE: ______________________________
DATE: __________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. Ensure that you observe electrical safety precautions when working near energized equipment. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task and when you have completed the assigned task.

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task and when you have completed the assigned task.

****

INITIAL CONDITIONS: You are the Log AUO. Unit 2 is operating at power. Units 1 and 3 are defueled. The surveillance instruction to calculate the building ventilation noble gas release rate (once per shift) is due. The fan status has been determined.

INITIATING CUES: Calculate the building ventilation noble gas release rate per 0-SI-4.8.B.1.a.1. Begin at Step 7.7 and continue through Step 7.8.7.

START TIME____________

NOTE:

Due to variations in required performance frequency and to minimize impact on personnel, Steps 7.7 and 7.8, 7.9 through 7.13 can be completed independently. If the stack flow instrumentation (0-FI-90-271) is inoperable or out of service, Attachment 7 must be completed before Step 7.9 can be completed.

7.7 Fan Status Determination

****

Performance Step: Critical___ Not Critical X

7.7.1 RM-90-249

7.7.1.1 Once per shift: RECORD on Attachment 3 the operating status of each ventilation fan monitored by this CAM. The status shall be indicated with "X" in the appropriate ON/OFF column.

7.7.1.2 Once per day (second shift): If all fans serviced by this CAM are off and the monitor is out of service, VERIFY the exhausts' fan control switches are tagged out of service and VERIFY the fan dampers are closed.

Standard:

None. Fan status supplied with JPM.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical X

7.7.2 RM-90-250

Once per shift: CHECK the status of each fan contributing flow to the ventilation path monitored by the RM-90-250 CAM. USE an "A" or "B" to denote which fan is operating. INDICATE the fan status by using the "O" column for all fans off (if applicable), the "S" column for fans on slow or the "F" column for fans on fast.

Standard:

None. Fan status supplied with JPM.

SAT___UNSAT___N/A___ COMMENTS:_______________________________________

****

Performance Step: Critical___ Not Critical X

7.7.3RM-90-251

7.7.3.1 Once per shift: RECORD on Attachment 3 the operating status of each ventilation fan monitored by this CAM. The status shall be indicated with "X" in the appropriate ON/OFF column.

7.7.3.2 Once per day (second shift): If all fans serviced by this CAM are off and the monitor is out of service, ENSURE the exhaust fan control switches are tagged out of service and VERIFY the fan dampers are closed.

Standard:

None. Fan status supplied with JPM.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical X

7.7.40-RM-90-252 (Unit 1 Only)

Once each shift: RECORD the operating status of fans monitored by this CAM with an "X" in the appropriate column of Attachment 3. USE column "0" for all fans off, column "1" for one fan on or column "2" for two fans on.

Standard:

None. Fan status supplied with JPM.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical_X_

7.7.5 Stack Dilution Fan

Once each shift: RECORDED the operating status of the Unit 2 and 3 stack dilution fans with an "X" in the appropriate column of Attachment 3. USE column "0" for all fans off, column "1" for one fan on or column "2" for two fans on.

Standard:

None. Fan status supplied with JPM.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

****

Performance Step: Critical___ Not Critical_X_

7.7.6 If any of the indicated fans (stack dilution or CAM) are operating and the corresponding monitor is declared inoperable, CONTACT the Chemical Laboratory and ENSURE that compensatory sampling in accordance with 0-SI-4.8.B.1.a.2 is being conducted.

7.7.7 At the completion of third shift on Saturday, TOTAL the number of shifts each column of Attachment 3 was marked. RECORD the totals at the bottom of Attachment 3.

Standard:

None

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

****

Performance Step: Critical X Not Critical__

7.8 DETERMINE the building ventilation noble gas release rate once per shift by completing the following steps:

7.8.1 For each monitor listed on Attachment 4, COMPLETE one of the following four steps:

7.8.1.1 From the CONTINUOUS AIR MONITORING SYSTEM OPERATOR CONSOLE, 0-CONS-90-361A OR 0-CONS-90-362A, Panel 1-9-44, OBTAIN the noble gas release rate by entering the keystrokes shown below. RECORD the noble gas release rate (μCi/sec) in the appropriate columns of Attachment 4 for each operable building ventilation radiation monitor. If the release is negative, record 0.00.

Keystrokes:

[DATA], 3-Digit CAM Code, [-], [1], [ENTER], [PRINT], [FILE], [ENTER]

CAM	Code	CAM	Code
0-RM-90-252	001	2-RM-90-251	006
1-RM-90-249	002	3-RM-90-251	007
2-RM-90-249	003	3-RM-90-250	008
3-RM-90-249	004	1-RM-90-250	009
1-RM-90-251	005	2-RM-90-250	010

Standard:

OBTAINED noble gas release rate from the Continuous Air Monitoring System Operator Console and **RECORDED** on Attachment 4.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

7.8.1.2 If the operator consoles 0-CONS-90-361A or 0-CONS-90-362A are not available and the CAMs are operating, OBTAIN the release rate data from the local display on each CAM by selecting channel 1 with the CAM thumbwheel. If the release rate is negative, record 0.00.

Note:

If 0-SI-4.8.B.1.a.2 is in effect for the CAMs, the Chemical Laboratory will report on a shiftly basis the release rate in μCi/sec. The reported release rate will assume maximum flow rate and will yield a conservative (high) release value.

7.8.1.3 For out of service and/or inoperable CAMs with ventilation system in service, CONTACT the Chemical Laboratory and ENSURE that manual sampling is being accomplished in accordance with 0-SI-4.8.B.1.a.2. RECORD on Attachment 4 the release rate for each inoperable CAM as reported by the Chemical Laboratory.

7.8.1.4 If the ventilation system for a CAM is totally isolated (i.e., no environmental releases occurring), RECORD a noble gas release rate of 0.00 Uci/sec on Attachment 4.

****

Performance Step : Critical X Not Critical__

7.8.2 For each monitor, USE Attachments 3 and 5 and DETERMINE the release factor based on fan status. RECORD the release factors in the appropriate columns on Attachment 4.

Standard:

DETERMINED correct release factor based on fan status and **RECORDED** on Attachment 4.

SAT___ UNSAT___ N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical X Not Critical__

7.8.3 MULTIPLY the release rate by the release factor and RECORD the answer under the column labeled "Actual Rate" on Attachment 4.

Standard:

MULTIPLIED release rate by the release factor and **RECORDED** on Attachment 4.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical X

7.8.4 For each unit, SUM the actual rates for the RM-90-249, RM-90-250 and RM-90-251 monitors. RECORD the unit total release rates in the appropriate columns on Page 4 of Attachment 4.

Standard:

SUMMED the actual rates and **RECORDED** the unit total release rate on Page 4 of Attachment 4.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical X Not Critical__

7.8.5 SUM the three unit total release rates and the 0-RM-90-252 actual rate. RECORD the building ventilation release rate on Page 4 of Attachment 4.

Standard:

SUMMED the three unit total release rates and the 90-252 actual rate and **RECORDED** on Attachment 4.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

NOTE:

For reporting purposes, the release fraction should only be recorded to three decimal places. For examples:

1. A release fraction of 0.12345 should be recorded as 0.123.
2. A release fraction of 0.000012 should be recorded as 0.000.

****

Performance Step : Critical X Not Critical__

7.8.6 DETERMINE the building ventilation release fraction by dividing the total building ventilation release rate by 1.50 E+05 (or 150,000) µCi/sec. RECORD the fraction on both Attachment 2 and Attachment 4.

Standard:

DIVIDED total building ventilation release rate (from Step 7.8.5) by 1.50 E+05 and **RECORDED** result in Attachments 2 and 4.

SAT____UNSAT____N/A____ COMMENTS:__________________________

____

****

Performance Step :   Critical___ Not Critical X

7.8.7 VERIFY the acceptance criteria as given in Step 6.2.1 has been met. The building ventilation release fraction must be less than or equal to 0.90. If the acceptance criteria has failed, immediately CONTACT the Shift Operation Supervisor. (AC)

Standard:

VERIFIED acceptance criteria of building ventilation release fraction $\leq$ 0.90.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

END OF TASK

STOP TIME____________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 130

TITLE: DETERMINE STACK NOBLE GAS RELEASE RATE

TASK NUMBER: U-090-SU-02

SUBMITTED BY: ______________________ DATE: __________

VALIDATED BY: ______________________ DATE: __________

APPROVED: ______________________ DATE: __________
TRAINING

PLANT CONCURRENCE: ______________________ DATE: __________
OPERATIONS

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
2	10/4/94	ALL	GENERAL REVISION
3	5/2/96	2,3,7	PROCEDURE UPDATE, ADDED WRGERMS DATA TO STEP 7.9.4.2 AND ADDED STEP 7.9.4.3

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________ SS# ______________________

RO ________ SRO ________ DATE: ______________

JPM NUMBER: 130

TASK NUMBER: U-090-SU-02

TASK TITLE: PERFORM AIRBORNE EFFLUENT RELEASE RATE SI

K/A NUMBER: 271000A4.05 K/A RATING: RO 3.2 SRO: 3.9

****

TASK STANDARD:

LOCATION OF PERFORMANCE: SIMULATOR ___ PLANT ___ CONTROL ROOM X

REFERENCES/PROCEDURES NEEDED: 0-SI-4.8.B.1.a.1, REV 30

VALIDATION TIME: CONTROL ROOM: ________ LOCAL: ________

MAX. TIME ALLOWED: _______ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM 8:00 LOCAL ___

COMMENTS: ____
____
____
____

Additional comment sheets attached? YES _____ NO _____

RESULTS: SATISFACTORY _______ UNSATISFACTORY _______

SIGNATURE: ______________________ DATE: ______________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. Ensure that you observe electrical safety precautions when working near energized equipment. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task and when you have completed the assigned task.

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task and when you have completed the assigned task.

****

INITIAL CONDITIONS: You are the Log AUO. Unit 2 is operating at power. Units 1 and 3 are defueled. 0-SI-4.8.B.1.a.1, Airborne Effluent Release Rate, is in progress.

INITIATING CUES: Determine the elevated (stack) noble gas release rate and release fraction per 0-SI-4.8.B.1.a.1. Alternative sampling is <u>NOT</u> necessary.

START TIME___________

****

Performance Step: Critical X Not Critical___

7.9 DETERMINE the elevated (stack) noble gas release rates once per shift by completing the following steps:

7.9.1 RECORD the highest noble gas count rates (counts per second, cps) for the 0-RM-90-147 and 0-RM-90-148 monitors in the appropriate columns of Attachment 6 in accordance with one of the following steps:

7.9.1.1 If both the 0-RR-90-147 and at least one of the radiation monitors are operable, OBTAIN the necessary information from 0-RR-90-147 on Panel 9-2. If applicable, RECORD "OOS" in the appropriate column of Attachment 6 if one of the monitors is out of service.

7.9.1.2 If 0-RR-90-147 is inoperable and at least one of the radiation monitors is operable, OBTAIN the necessary data from the 0-RM-90-147B and/or 0-RM-90-148B monitors located on Panel 1-9-10. If applicable, RECORD "OOS"in the appropriate column of Attachment 6 if one of the monitors is out of service.

7.9.1.3 If both monitors are inoperable, CONTACT the Chemical Laboratory and ENSURE that manual sampling has been initiated in accordance with 0-SI-4.8.B.1.a.2. RECORD "OOS" in the appropriate columns of Attachment 6.

Standard:

RECORDED highest noble gas count rate for 0-RM-90-147 and 0-RM-90-148 on Attachment 6.

SAT___UNSAT___N/A___ COMMENTS:_______________________________

Note:

If 0-SI-4.8.B.1.a.2 is in effect for the stack monitors, the Chemical Laboratory will report on a shiftly basis the stack release rate in mCi/sec. The reported release rate will assume a maximum flow rate and will yield a conservative (high) release value. In this case, Steps 7.9.2 through 7.9.5 are not applicable.

CUE: 0-SI-4.8.B.1.a.2 IS NOT IN EFFECT.

Performance Step: Critical X Not Critical__

7.9.2 SUBTRACT the current background reading from each of the gross count rates. If this results in a count rate less than or equal to 0.5 cps (minimum detectable count rate), RECORD a net count rate of 0.5 cps in the appropriate columns of Attachment 6. Otherwise, RECORD the actual count rate.

CUE: BACKGROUND READINGS ARE 4.5 CPS AND 8.5 CPS.

Standard:

RECORDED result on Attachment 6.

SAT___UNSAT___N/A___ COMMENTS:________________________________

****

Performance Step: Critical___ Not Critical X

7.9.3 If the gross count rate is less than one-half of the current background for four consecutive shift, REQUEST the Chemical Laboratory to recheck the background per Attachment 11. Otherwise, PROCEED to Step 7.9.4.

Standard:

PROCEEDED to Step 7.9.4.

SAT___ UNSAT___ N/A___ COMMENTS:_______________________________________

____

****

Performance Step: Critical X Not Critical__

7.9.4 DETERMINE the stack flow rate and RECORD in the appropriate column of Attachment 6.

7.9.4.1 If 0-FI-90-271 on Panel 1-9-53 is operable, RECORD the stack flow in standard cubic feet per minute (scfm).

7.9.4.2 If 0-FI-90-271 on Panel 1-9-53 is inoperable, the flow can be determined from 0-FI-90-348 on Panel 25-412 in the WRGERMS building. If 0-FI-90-348 is used for the flow, MAKE a note in the remarks log that 0-FI-90-348 was used.

7.9.4.3 If 0-FI-90-271 on Panel 1-9-53 is inoperable and 0-FI-90-348 is not used, ESTIMATE the stack flow every four hours using Attachment 7. RECORD the total stack flow in scfm on Attachment 7. RECORD on Attachment 6 the most current value of the 4 hour observations from Attachment 7.

Standard:

DETERMINED stack flow rate from 0-FI-90-271 and **RECORDED** on Attachment 6.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical X Not Critical __

7.9.5 DETERMINE the stack release rate by using the net count rate and total stack flow in accordance with the following equation. When there are two net count rate reading, USE the highest net count rate.

$$\underset{(scfm)}{\text{Total Stack Flow}} \times \underset{(cps)}{\text{Net Count Rate}} \times 1.23\text{ E-03 } \frac{mCi/sec}{cps\text{-}scfm}$$

7.9.6 RECORD in the appropriate column of Attachment 6 either the release rate calculated in Step 7.9.5 or as reported by the Chemical Laboratory for an inoperable monitor.

Standard:

CALCULATED stack release rate using the equation and **RECORDED** result on Attachment 6

SAT___UNSAT___N/A___ COMMENTS:___________________________________

____

NOTE:

Alternative sampling for the WRGERM monitor is satisfied by taking readings from the normal stack release monitors, 0-RM-90-147 an/or 0-RM-90-148, when operable or by manual sampling in accordance with 0-SI-4.8.B.1.a.2 when the normal stack monitors are inoperable. This alternate sampling succession satisfies the requirement for a preplanned alternate method as required in Note 8 of Unit 2 Technical Specification Table 3.2.F.

7.9.7 Wide Range Gaseous Effluent Radiation Monitor (WRGERM), 0-RM-90-306, Panel 2-9-10.

7.9.7.1 If the monitor is inoperable, RECORD "INOP" in the appropriate column of Attachment 6 and CONTINUE with Step 7.9.8. Otherwise, CONTINUE with Step 7.9.7.2.

****

Performance Step : Critical___ Not Critical X

7.9.7.2 ENSURE 0-RM-90-306 is in the Sample Mode.

Standard:

VERIFIED 0-RM-90-306 in the Sample Mode.

SAT____UNSAT____N/A____ COMMENTS:________________________

____

****

Performance Step : Critical X Not Critical__

7.9.7.3 RECORD the noble gas release rate in mCi/sec in the appropriate column of Attachment 6. Record results to two decimal places (e.g. 2.95E 00). If the release rate is negative, record 0.00.

Standard:

RECORDED the noble gas release rate obtained from 0-RM-90-306 in Attachment 6.

SAT____UNSAT____N/A____ COMMENTS:________________________

____

7.9.8 If the WRGERM monitor is inoperable for a period greater than one day, CONTACT the Chemical Technical Support Supervisor. If the monitor remains inoperable for a period of seven days, a special report must be submitted to the NRC in accordance with Unit 2 Technical Specification 6.9.2.10.

7.9.9 If all release streams to the stack are isolated, USE a release rate factor of 0.00. Otherwise, USE 1.00. RECORD the release rate factor in the appropriate column of Attachment 6.

****

Performance Step : Critical X Not Critical__

7.9.10 CALCULATE the actual release rate by multiplying the highest release rate (0-RM-90-147/148 or 0-RM-90-306) by the release factor. RECORD the information in the Actual Release Rate column on Attachment 6.

Standard:

CALCULATED actual release rate and **RECORDED** result on Attachment 6.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

NOTE:

For reporting purposes, the release fractions should only be recorded to three decimal places. For example, a release fraction of 0.12345 should be recorded only as 0.123.

****

Performance Step : Critical X Not Critical__

7.9.11 CALCULATE the stack release fraction by dividing the actual release rate by 1.44 E+07 (or 14,400,000) mCi/sec. RECORD this information on both Attachment 2 and Attachment 6.

Standard:

CALCULATED stack release fraction and **RECORDED** result on Attachments 2 AND 6.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

****

Performance Step : Critical___ Not Critical X

7.9.12 VERIFY the acceptance criteria as given in Step 6.2.2 has been met. The stack release fraction must be less than or equal to 0.10. If the acceptance criteria has failed, immediately CONTACT the Shift Operations Supervisor. (AC)

Standard:

VERIFIED stack release fraction $\leq$ 0.10.

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

END OF TASK

STOP TIME:_________

Examiners COPY

RO A.4

Question #1: No Reference allowed.

List in order of severity the Emergency Classification Levels.

Answer:

General Emergency
Site Area Emergency
Alert
Unusual Event

Reference: SPP - 3.5, Regulatory Reporting Requirements p. 33

KA 2.4.29, Knowledge of the Emergency plan. 2.6/4.0

Question # 2: No Reference allowed.

Who is (are) responsible for evaluating if a event is reportable?

Answer:

SM or STA

Reference: OPL171.092, Regulatory Reporting Requirements, Lesson plan.

KA 2.4.29, Knowledge of the Emergency plan. 2.6/4.0

Question # 3:

When does the one or four hour time frame for reporting an event begin?

Answer:

When the SM becomes aware of/or should have been made aware of the existing condition.

Reference: OPL171.092, Regulatory Reporting Requirements, Lesson plan

KA 2.4.29, Knowledge of the Emergency plan. 2.6/4.0

Question # 4:

Determine from the following examples if the area identified should or should not be a reportable event:

a. HPCI system isolates during the performance of a surveillance.

b. Single low water level instrument failure.

c. Loss of power or air to a fail-safe component that causes the component to go to the required position.

d. HPCI removed from service during scheduled maintenance.

Answer:

a. Reportable
b. Not reportable
c. Not reportable
d. Not reportable

Reference: OPL171.092, Regulatory Reporting Requirements, Lesson plan

Candidate Handout

Candidate's Name ____________

RO A.4

Question #1: No Reference allowed.

List in order of severity the Emergency Classification Levels.

Question # 2: No Reference allowed.

Who is (are) responsible for evaluating if a event is reportable?

Question # 3:

When does the one or four hour time frame for reporting an event begin?

Question # 4:

Determine from the following examples if the area identified should or should not be a reportable event:

a. HPCI system isolates during the performance of a surveillance.

b. Single low water level instrument failure

c. Loss of power or air to a fail-safe component that causes the component to go to the required position.

d. HPCI removed from service during scheduled maintenance.

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 180

TITLE: CLASSIFY THE EVENT PER THE REP (LOSS OF ALL PWR TO 4KV S/D BDS >3 HOURS)

TASK NUMBER: S-000-EM-21

Good term. cue

First line of init. cue is redundant and teaching. Why not time critical? Doesn't State need to be notified in 15 min? Step 1 requires ODS notif. w/in 5 min.

SUBMITTED BY: Russell R. Eden DATE: 11/08/99

VALIDATED BY: N/A DATE: 11/08/99

APPROVED: [signature] TRAINING DATE: 11/8/99

PLANT CONCURRENCE: J R Stacy OPERATIONS DATE: 11.9.99

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
0	6/03/96	ALL	INITIAL ISSUE
1	8/29/96	2,4,5,7-15	CHANGED SOS TO SM, ASOS TO US, DELETED CUE ON NOTIFYING STATE DIRECTLY.
2	12/10/96	2,3,7,10,14	PROCEDURE REVISION
3	09/11/97	ALL	FORMAT AND PROCEDURE REVISION
4	12/10/97	4	ADDED WIND SPEED & DIRECTION
5	10/28/98	3,5,7,11,12 ,14,15	PROCEDURE REVISION AND GENERAL UPDATE
6	11/02/99	2,3,5,17	PROCEDURE REVISION
7	11/08/99	2,3	PROCEDURE REVISION ON 11/03/99

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ____________________ SS# ____________________

RO ________ SRO X ________ DATE: ____________________

JPM NUMBER: 180

TASK NUMBER: S-000-EM-21 (SRO ONLY)

TASK TITLE: CLASSIFY THE EVENT PER THE REP (LOSS OF ALL PWR TO ALL UNIT SPECIFIC 4KV S/D BDS >3 HOURS)

K/A NUMBER: 2.4.38 K/A RATING: RO 2.2 SRO: 4.0

****

TASK STANDARD: THE EVENT IS CLASSIFIED AS A GENERAL EMERGENCY BASED ON LOSS OF ALL POWER TO UNIT SPECIFIC 4KV SHUTDOWN BDS ON ANY UNIT FOR >3 HOURS

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: EPIP 1, REV 28; EPIP 5, REV 27; EPIP 8, REV 10

VALIDATION TIME: CONTROL ROOM: 23:00 LOCAL: N/A

MAX. TIME ALLOWED: ________ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM ______ LOCAL N/A

COMMENTS: ____

Additional comment sheets attached? YES ______ NO ______

RESULTS: **SATISFACTORY** ________ **UNSATISFACTORY** ________

SIGNATURE: ____________________ **DATE:** ____________________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

INITIAL CONDITIONS: You are the SHIFT MANAGER. Unit 2 was MODE 2 at 2% power when a severe storm caused damage to the switchyard with loss of ALL OFFSITE POWER at 1300 hours. Also, an unisolable rupture occurred in the EECW system for Unit 1/2 Diesels and cannot be repaired for 4 hours. All Unit 1/2 Diesels are lost due to the loss of cooling water. Unit 1/2 shutdown boards cannot be crosstied to Unit 3. EOI-1 has been entered and all rods inserted on the scram; SBGT C is operating and no elevated radiological stack release is predicted.

INITIATING CUES: The UNIT SUPERVISOR has informed you of the EECW line rupture causing loss of all Unit 1/2 Diesels and an estimated time of repair being 4 hours. Using the following parameters provided to you by the Control Room operating crew, **Classify** the event and carry out all your actions (All notifications will be done on the Simulator).

Reactor Level	+40 inches on Normal Range, controlled by RCIC
Reactor Pressure	950 controlled by SRV's (MSIV's isolated)
DW Pressure	1.38 psig
DW Temperature	145 °F
DW Radiation	RR-90-256 reading normal prior to isolation
Torus Temperature	91 °F
PSC Pressure	1.0 psig
Torus Level	-2 inches
Wind Speed 5 mph	Wind Direction/North

NOTE: Unit 2 conditions are fairly stable.
No abnormal radiological releases offsite.

START TIME: ______________

****

Performance Step : Critical X Not Critical ____

Refers to EPIP 1 to classify emergency event.

Standard:

SHIFT MANAGER/SED refers to EPIP 1, Section 5, Loss of AC Power and declares a GENERAL EMERGENCY (5.1-G) based on Loss of voltage to ALL unit specific 4KV Shutdown Boards from Table 5.1 **AND** restoration of at least one 4KV Shutdown Board is **NOT** likely within three hours.

SAT____UNSAT____N/A____ COMMENTS:__________________________

____

****

Performance Step : Critical X Not Critical ____

Implements EPIP-5 GENERAL EMERGENCY.

Standard:

SHIFT MANAGER/SED recognizes/implements a GENERAL EMERGENCY per EPIP-5.

SAT____UNSAT____N/A____ COMMENTS:__________________________

____

3.0 INSTRUCTIONS

NOTE: **IF ALL EMERGENCY CENTERS ARE STAFFED STEPS 3.1 THRU 3.2 DO NOT APPLY. (N/A STEPS IF NOT APPLICABLE)**

CUE: EMERGENCY CENTERS ARE NOT STAFFED AT THIS TIME.

3.1 **Notification of the Operations Duty Specialist (ODS) & Emergency Responders**

NOTE: The ODS **should** be notified within 5 minutes after the emergency event is declared.

****

Performance Step : Critical X Not Critical ____

3.1.1 **Complete** Attachment A (Notification Information).

Standard:

ATTACHMENT A is complete with EAL Designator 5.1-G GENERAL EMERGENCY status. **(EXCEPT PROTECTIVE ACTION RECOMMENDATION WHICH WILL BE PERFORMED IN STEP 3.6)** EOI-1 has been entered and all rods inserted on the scram. Loss of ALL OFFSITE power and EECW piping rupture causing loss to Unit 1/2 Diesel Generators--estimated time of repair for leak is 4 hours. Unable to crosstie 4KV Shutdown Boards with Unit 3. Reactor level +40 inches on Normal Range controlled by RCIC (MSIV's are isolated). Reactor pressure 950 controlled by SRV's, DW pressure 1.38 psig, DW temperature 145 °F, Torus temperature 91 °F, Torus level -2 inches, Torus pressure 1.0 psig. Wind speed is 5 MPH and direction is North. Unit 2 conditions are fairly stable with no abnormal radiological releases offsite. **(INFORMATION GIVEN IN INITIAL CONDITIONS & INITIATING CUES EXCEPT EAL DESIGNATOR) NOTE: THIS IS GENERIC INFORMATION FOR DESCRIPTION OF EVENT--ALL THIS EXACT INFORMATION IS NOT REQUIRED FOR ACCEPTANCE UNDER BRIEF DESCRIPTION OF EVENT.**

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical X Not Critical____

3.1.2 **Direct** the Unit 1, Unit Operator to make notifications from Attachment B (Unit 1, Unit Operator Notification)

Standard:

Unit 1 Operator is directed to make notifications per Attachment B.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

****

Performance Step : Critical X Not Critical____

3.1.3 **Notify** the ODS and **Provide** the information from Attachment A.

Note: Utilize the direct ring-down ODS phone when making this notification or as applicable dial direct.

ODS Telephone Numbers
5-751-1700, 2495

If the ODS cannot be reached within 10 minutes, **Then** contact the following and Provide the information from Attachment A:

1. **Limestone County: 9-232-0111**
2. **Morgan County: 9-1-256-353-2515**
3. **Lawrence County: 9-1-256-974-7641**
4. **Lauderdale County: 9-1-256-760-9117**
5. **State of Alabama Rad Health Duty Officer:**

Day Shift 8 a.m. - 5 p.m.
9-1-334-206-5391
Holidays-Weekends-Offshifts
9-1-334-242-4378

Standard:

NOTIFIES the ODS and **provides** the information from Attachment A.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

****

Performance Step : Critical___ Not Critical_X_

3.1.4 **Fax** a copy of Attachment A to the ODS for confirmation of information or the state if contacted directly.

ODS Fax: 5-751-8620

AL Rad Health 9-1-334-206-5387

CUE: THE FAX TO ODS WILL BE SIMULATED.

Standard:

SIMULATE faxing a copy of Attachment A to the ODS.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

3.1.5 **Receive** confirmation call from the ODS (to verify notification of the State of Alabama), (**N/A** this step if the State was contacted directly).

CUE: REQUEST SIMULATOR CONSOLE OPERATOR TO CALL AND CONFIRM THAT ODS HAS NOTIFIED THE STATE OF ALABAMA.

3.2 **NOTIFICATION OF SITE PERSONNEL**

****

Performance Step : Critical___ Not Critical X

3.2.1 **Make** the following P.A. announcement:

THIS IS (NAME), SHIFT MANAGER.
A GENERAL EMERGENCY HAS BEEN DECLARED ON UNIT 2 . I HAVE ASSUMED THE DUTIES OF SITE EMERGENCY DIRECTOR. REPORT TO YOUR ASSIGNED EMERGENCY RESPONSE FACILITY AT THIS TIME!

Standard:

P. A. Announcement was made giving name, SHIFT MANAGER'S Position, GENERAL EMERGENCY status on Unit 2, and informing crew that the SHIFT MANAGER has the duties of SED and directing crew to report to their assigned Emergency Response Facility.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

****

Performance Step : Critical____ Not Critical_X_

3.3 **ACCOUNTABILITY AND EVACUATION OF NON-EMERGENCY RESPONDERS**

Note: Prior to sounding the Evacuation Alarm notify Nuclear Security. If the TSC is staffed notify the TSC Security Manager. If the TSC is not staffed or the TSC Security Manager position has not been filled then call 3629 or 7830.

CUE: THE TSC IS NOT STAFFED AT THIS TIME. THE TSC SECURITY MANAGER POSITION HAS NOT BEEN FILLED.

Standard:

Prior to sounding the **Evacuation Alarm** the SHIFT MANAGER/SED notifies Nuclear Security by dialing 3629 or 7830.

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical X Not Critical ___

3.3.1 **Activate** the Accountability Alarm, if not previously sounded. (Reference EPIP-8) **(N/A STEP IF NOT APPLICABLE)**

Standard:

SHIFT MANAGER/SED **ACTIVATES** the Site Assembly and Accountability by sounding the 3-minute undulating siren utilizing **OPERATOR AID 0-CNTL-244-6378** on Unit 2 Simulator.

SAT____ UNSAT____ N/A____ COMMENTS:________________________________

____

CUE: INFORM THE SHIFT MANAGER/SED THAT ACCOUNTABILITY IS COMPLETE

****

Performance Step : Critical X Not Critical____

3.3.2 **When** accountability is complete, **Conduct** evacuation of non-emergency responders by activating the Evacuation Alarm, if not previously sounded. **(N/A STEP IF NOT APPLICABLE)**

Standard:

SHIFT MANAGER/SED **ACTIVATES** the EVACUATION ALARM by sounding the Site Evacuation Alarm (3-Minute steady siren) utilizing the **OPERATOR AID 0-CNTL-244-6378** on Unit 2 Simulator.

SAT____ UNSAT____ N/A____ COMMENTS:____________________

****

Performance Step : Critical___ Not Critical X

3.4 **DOSE ASSESSMENT**

3.4.1 Evaluate the need for offsite dose assessment. **(N/A STEP IF NOT APPLICABLE)**

3.4.1.1 **When** offsite dose assessment is required **Obtain** the information from the CECC when operational.

3.4.1.2 If the CECC is not operational, **Contact** the TSC, when staffed or the RADCON Shift Supervisor and **Request** the implementation of EPIP 14, for manual dose assessment.

CUE: INFORM SHIFT MANAGER/SED THAT CECC AND TSC IS NOT STAFFED AT THIS TIME.

Standard:

IF SHIFT MANAGER/SED elects to perform offsite dose assessment, then he/she contacts RADCON SHIFT SUPERISOR and request implementation of EPIP-14 for manual dose assessment . (**OTHERWISE, N/A)**

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical X Not Critical___

3.5 **NOTIFICATION OF THE NRC**

3.5.1 **Notify** the **NRC** immediately or within 1 hour and if requested by the NRC maintain an open and continuous communications channel.

Note: **Utilize** the Emergency Notification System **(ENS)** when making this notification. Dial the first number listed on the sticker affixed to the **ENS** telephone, using all 10 digits. **IF** the number is busy, **THEN** select in order, the alternate numbers until a connection is achieved.

Note: **IF** the ENS phones are out-of-service, **THEN** dial direct utilizing the TVA phone system by dialing 9-1-the number listed on the ENS telephones. No access codes are required.

Standard:

PERFORMER notified NRC on the Simulator by calling the console operator and requesting NRC. Informing NRC that the SHIFT MANAGER/SED has declared a GENERAL EMERGENCY.

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical X Not Critical ___

3.6 **PROTECTIVE ACTION RECOMMENDATION**

3.6.1 **IF** the CECC is **not staffed**, **Then** make a Protective Action Recommendation (PAR) using Attachment C. (This PAR shall be made only by the SED.) **(N/A STEP IF NOT APPLICABLE)**

CUE: THE CECC IS NOT STAFFED AND NO OFFSITE DOSE ASSESSMENTS ARE AVAILABLE AT THIS TIME.

Standard:

SHIFT MANAGER/SED refers to EPIP-5, Attachment C, and declares a RECOMMENDATION 4 based on lack of information, no offsite dose assessment information available.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical___ Not Critical_X_

3.7 **EMERGENCY RESPONSE TEAM NOTIFICATIONS**

3.7.1 **IF** the following emergency centers are staffed, **THEN** notify the following of the current emergency classification and plant conditions. **(N/A STEP IF NOT APPLICABLE)**

* CECC
* TSC
* OSC
* CONTROL ROOMS
* PLANT PA ANNOUNCEMENT

CUE: THE EMERGENCY CENTERS ARE NOT STAFFED AT THIS TIME.

Standard:

SHIFT MANAGER/SED addresses Step 3.7.1 and N/A's Step due to Emergency Centers not manned and the plant site personnel were notified in Step 3.2.1.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

3.8 **PERIODIC EVALUATION OF THE EVENT**

3.8.1 Continue to **Evaluate** the event using EPIP-1 as conditions warrant.

Note: Conditions that warrant this evaluation are as a minimum when other EAL conditions exist indicating the current emergency classification or significant changes in plant conditions have occurred.

CUE: THE EMERGENCY CENTERS ARE STAFFED AND THE PLANT MANAGER (SITE EMERGENCY DIRECTOR) IS HERE TO RELIEVE YOU—

THAT WILL BE ALL FOR NOW

END OF TASK

STOP TIME:__________

Facility: ___Browns Ferry _______________ Date of Examination: _6/15-16/26-29
Exam Level (circle one): RO / SRO(I) / SRO(U) Operating Test No.: ___1____

B.1 Control Room Systems

	System / JPM Title	Type Code*	Safety Function
a.	Respond to Drywell Pressure and/or Temperature High or Excessive Leakage into Drywell **JPM # 126F**. KA 223001A4.07, 4.2/4.1 . 3 critical steps.(RO&SROI)	D,S,A	5
b.	Line up Alternate RPV Injection System - - RHR Crosstie - in accordance with EOI Appendix 7C, JPM # 28, KA 203000A2.16, 4.4/4.5 **(ALL)**	D,S	2
c.	Place the Standby SJAE in Operation, **JPM #116F**, KA 271000A4.09, 3.3/3.2 (RO&SROI)	D,S,A	9
d.	Respond to SLC Squib Valve Loss of Continuity, JPM # 82, KA 211000A4.03, 4.1/4.1 (RO&SROI)	D,S	1
e.	Line up Control of SRVs and MSIVs at 25-32, **JPM #78**, KA 239002, 4.4/4.4 (RO&SROI)	D,S	3
f.	Tie D/G to 4 kV shutdown board at Panel 9-23, **JPM #104(NRC Alternate Path)**, KA 26400A2.05, 3.6/3.6. At step 8.1.11 the DG kvar load will increase uncontrollably. The operator will have to trip the DG manually. Need to determine what will require this to be done. Will this action take place because of the Illustration 2 requirement or precautions and limits? **(ALL)**	M,A,S	6
g.	Recover from a loss of Shutdown Cooling, **NRC-1, Alternate Path**, KA 205000A4.01, 3.7/3.7 **(ALL)**	N,A,S	4

B.2 Facility Walk-Through

a.	Manually SLOW Start "A" Diesel Generator Locally, **JPM #106**, KA 264000G2.1.30, 3.9/3.4 **(ALL)**	D,	6
b.	EOI Appendix 1A - Removal and Replacement of RPS Scram Solenoid Fuses, **JPM # 311** KA 212000A2.20, 4.1/4.2 **(ALL)**	D,R	7
c.	Place PSC System in Service, **JPM #101**, KA 209001K1.03, 2.9/3.0 Is there an equivalent for Unit 3???(RO&SROI)	D	4

* Type Codes: (D)irect from bank, (M)odified from bank, (N)ew, (A)lternate path, (C)ontrol room, (S)imulator, (L)ow-Power, (R)CA

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 126F

TITLE: RESPOND TO DRYWELL PRESSURE AND/OR TEMPERATURE HIGH OR EXCESSIVE LEAKAGE INTO DRYWELL

TASK NUMBER: U-064-AB-01

OK

SUBMITTED BY: Russell R Eder DATE: 9/22/99

VALIDATED BY: JR Starr DATE: 11.3.99

APPROVED: [signature] DATE: 10/4/99
TRAINING

PLANT CONCURRENCE: JR Starr DATE: 11.3.99
OPERATIONS

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
0	9/22/99	ALL	NEW JPM

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________ SS# ________________

RO ______ SRO ______ DATE: ________________

JPM NUMBER: 126F

TASK NUMBER: U-064-AB-01

TASK TITLE: RESPOND TO DRYWELL PRESSURE AND/OR TEMPERATURE HIGH OR EXCESSIVE LEAKAGE INTO DRYWELL

K/A NUMBER: 223001A4.07 K/A RATING: RO 4.2 SRO: 4.1

****

TASK STANDARD: PERFORM SUBSEQUENT OPERATOR ACTION REQUIRED TO REDUCE DRYWELL PRESSURE AS DIRECTED BY 2-AOI-64-1

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 2-AOI-64-1, REV 18

VALIDATION TIME: CONTROL ROOM: 4:00 LOCAL: ______

MAX. TIME ALLOWED: ______ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM ____ LOCAL ____

COMMENTS: ____

Additional comment sheets attached? YES ____ NO ____

RESULTS: **SATISFACTORY** ______ **UNSATISFACTORY**

SIGNATURE: ______________________ **DATE:** ________________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEP: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

PERFORMER shall demonstrate the use of TOUCH STAAR during this JPM.

PERFORMER shall demonstrate the use of 3-way communication.

****

INITIAL CONDITIONS: You are an Operator. Unit 2 is experiencing increased drywell pressure due to a small leak inside the drywell. 2-XA-55-3B, Window 26, DRYWELL TO SUPPRESSION CHAMBER DP ABNORMAL, is in alarm.

INITIATING CUES: ________________(NAME)________________, vent the drywell in accordance with 2-AOI-64-1.

START TIME___________

****

Performance Step: Critical___ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required Abnormal Operating Instruction.

Standard:

IDENTIFIED OR OBTAINED copy of 2-AOI-64-1.

SAT___UNSAT___N/A___ COMMENTS:_________________________________

____

4.2 Subsequent Actions

4.2.1 If any EOI entry condition is met, THEN

ENTER appropriate EOI(s).

4.2.2 High Drywell Pressure:

4.2.2.1 CHECK Drywell pressure using multiple indications.

4.2.2.2 ALIGN and START additional Drywell coolers and fans as necessary. REFER to 2-OI-64.

****

CAUTION

Stack release rates exceeding 1.4 X 10^7 µci/sec, or a SI-4.8.B.1.a.1 release fraction above one will result in ODCM release being exceeded.

****

****

Performance Step : Critical_X_ Not Critical____

4.2.2.3 VENT Drywell as follows:

4.2.2.3.1 CLOSE SUPPR CHBR INBD ISOLATION VLV 2-FCV-64-34 (Panel 2-9-3)

Standard:

PLACED 2-FCV-64-34 in the CLOSE position and **VERIFIED** illuminated GREEN valve position indicating lamp above associated hand switch.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

****

Performance Step : Critical___ Not Critical_X__

4.2.2.3.2 VERIFY OPEN, DRYWELL INBD ISOLATION VLV, 2-FCV-64-31, (Panel 2-9-3).

Standard:

VERIFIED illuminated RED valve position indicating lamps above associated hand switch.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

****

Performance Step : Critical___ Not Critical_X__

4.2.2.3.3 VERIFY 2-FIC-84-20 is in AUTO and SET at 100 scfm (Panel 2-9-55).

Standard:

VERIFIED 2-FIC-84-20 in AUTO and set for 100 scfm.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

****

Performance Step : Critical_X_ Not Critical____

4.2.2.3.4 START STGTS TRAIN C (Panel 2-9-25).

Standard:

At Panel 2-9-25, **DISCOVERED** that 0-HS-65-69A/2 for C SBGT was tagged, and requested Unit 1 Operator to START SBGT A OR B in step 2.2.2.3.5.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

4.2.2.3.5 REQUEST Unit 1 Operator to START Standby Gas Treatment Fans A or B, if required.

****

CAUTION

If 2-FCV-84-20 closes after 2-HS-64-35 is opened, the reason for valve closure must be cleared and 2-HS-64-35 must be returned to OPEN in order for 2-FCV-84-20 to re-open.

****

****

Performance Step : Critical X Not Critical ____

4.2.2.3.6 PLACE 2-FCV-84-20 CONTROL DW/SUPPR CHBR VENT, 2-HS-64-35, in OPEN (Panel 2-9-3).

Standard:

PLACED 2-HS-64-35 in the OPEN position.

SAT____ UNSAT____ N/A____ COMMENTS:____________________________

____

CUE: [WHEN STEP 4.2.2.3.6 COMPLETED] THE UNIT SUPERVISOR DIRECTS DRYWELL VENTING TO BE CONTINUED UNTIL DIRECTED TO SECURE THE VENTING OPERATION. STACK RELEASE RATES ARE WELL WITHIN LIMITS.

****

Performance Step: Critical ___ Not Critical X

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCH STAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT_____ UNSAT______ N/A ______ COMMENTS:____________________________

____

____

____

****

Performance Step: Critical____ Not Critical_X_

PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION (Standard is subjective and instructor must evaluate the need for additional training on 3-WAY COMMUNICATION to maintain plant standards.

SAT_____ UNSAT______ N/A ______ COMMENTS:______________________________

END OF TASK

STOP TIME:_________

COPY

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 28

TITLE: EOI APPENDIX 7C - ALTERNATE RPV INJECTION SYSTEM LINEUP - RHR CROSSTIES

TASK NUMBER: U-000-EM-38

Why isn't step "k" critical?
What is term. cue?

SUBMITTED BY: Russell R. Eder DATE: 8/27/98

VALIDATED BY: MA DATE: 8/27/98

APPROVED: [signature] DATE: 9/2/98
TRAINING

PLANT CONCURRENCE: [signature] DATE: 9/2/98
OPERATIONS

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
3	12/6/94	1,2,3,4	REVISE TO NEW FORMAT
4	11/8/95	ALL	REVISED BASE PROCEDURE
5	8/27/98	ALL	NEW PROCEDURE REV., FORMAT, ADD 3-WAY COMM., TOUCH STAAR, DELETE PLANT NOTE.

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________ SS# ______________

RO ________ SRO ________ DATE: ______________

JPM NUMBER: 28

TASK NUMBER: U-000-EM-38

TASK TITLE: LINE UP ALTERNATE RPV INJECTION SYSTEM - RHR CROSSTIE - IN ACCORDANCE WITH EOI APPENDIX 7C

K/A NUMBER: 203000A2.16 K/A RATING: RO 4.4 SRO: 4.5

****

TASK STANDARD: SIMULATE AND PERFORM ACTIONS/MANIPULATIONS REQUIRED TO ALIGN UNIT 1 RHR LOOP II TO UNIT 2 RHR LOOP I FOR UNIT 2 RPV INJECTION

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM __

REFERENCES/PROCEDURES NEEDED: 2-EOI APPENDIX 7C, REV 6

VALIDATION TIME: CONTROL ROOM: 12:00 LOCAL: ________

MAX. TIME ALLOWED: _______ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: _________ CONTROL ROOM _____ LOCAL _____

COMMENTS: ____

Additional comment sheets attached? YES _____ NO _____

RESULTS: **SATISFACTORY** _______ **UNSATISFACTORY** _______

SIGNATURE: ______________________ **DATE:** ______________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEPS: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

PERFORMER shall demonstrate the use of TOUCH STAAR during this JPM.

PERFORMER shall demonstrate the use of 3-WAY COMMUNICATION during this JPM.

****

INITIAL CONDITIONS: You are an Operator. The Unit 2 reactor has scrammed and due to several malfunctions you are unable to maintain RPV level >12 inches. EOI-1 has been entered and followed to RC/L-8.

INITIATING CUES: The Unit Supervisor directs you to perform EOI Appendix 7C, ALTERNATE RPV INJECTION SYSTEM LINEUP - RHR CROSSTIES, using RHR crossties to inject water into the RPV.

START TIME________

****

Performance Step: Critical___ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required procedure.

Standard:

IDENTIFIED OR OBTAINED copy of EOI APPENDIX 7C.

SAT___UNSAT___N/A___ COMMENTS:_________________________________

____

1. IF......RHR crosstie to Unit 1 CANNOT be performed
THEN....**CONTINUE** at Step 2.

****

Performance Step : Critical___ Not Critical_X_

a. **NOTIFY** Unit 1 operators that Unit 1 RHR pumps will be crosstied to Unit 2 as directed by the EOIs.

Standard:

NOTIFIED Unit 1 Operators that Unit 1 RHR pumps will be crosstied to Unit 2 as directed by the 2-EOI Appendix-7C.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

CUE: [WHEN NOTIFIED] ACKNOWLEDGE THAT UNIT 1 RHR PUMPS WILL BE CROSSTIED TO UNIT 2.

****

Performance Step: Critical X Not Critical__

b. **DISPATCH** personnel to Unit 1 Auxiliary Instrument Room to perform the following:

1). **REFER** TO Attachment 1 and OBTAIN tools and equipment from EOI Equipment Storage Box.

2) **REFER** TO Attachment 2 and BOOT the following relay contacts on Unit 1, Panel 1-9-33, Front:

- 1-RLY-074-10A-K19B, contact 1-2.
- 1-RLY-074-10A-K22B, contact 1-2.

3) **NOTIFY** Unit 2 Operator that 1B and 1D RHR Pump Suction Valve interlocks have been defeated.

Standard:

DISPATCHED personnel by phone or radio to UNIT 1 auxiliary instrument room to perform step 1.b of Appendix 7C.

SAT____UNSAT____N/A____ COMMENTS:____________________________

CUE: [WHEN NOTIFIED]ACKNOWLEDGE THAT 1B AND 1D RHR PUMP SUCTION VALVE INTERLOCKS HAVE BEEN DEFEATED IN ACCORDANCE WITH 2-EOI APPENDIX-7C, STEP 1.b.

- What part of this step is critical
for this in the plant?

****

Performance Step: Critical X Not Critical ___

c. **DISPATCH** personnel to **CLOSE** the following breakers:

- 1-BRK-074-0098, RHR PUMP B SUCTION CROSSTIE VALVE FCV-74-98 (M010-180), (480V RMOV MOV Board 1B, Compartment 1C).

- 1-BRK-074-0099, RHR PUMP D SUCTION XTIE VLV FCV-74-99 (480V RMOV MOV Board 2B, Compartment 17E).

Standard:

DISPATCHED personnel to close the above listed breakers.

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

CUE: NOTIFICATION HAS BEEN RECEIVED THAT THE BREAKERS FOR 1-FCV-74-98 AND 1-FCV-74-99 HAVE BEEN CLOSED.

****

Performance Step: Critical X Not Critical __

d. **NOTIFY** Unit 1 Operator to perform the following on Unit 1, Panel 1-9-3:

1) **CLOSE** the following valves:

- FCV-74-24, RHR PUMP B SUPP POOL SUCTION VALVE
- FCV-74-35, RHR PUMP D SUPP POOL SUCTION VALVE.

2) **PLACE** HS-74-149, RHR SYSTEM-II MIN FLOW BYPASS, switch in BYPASS.

3) **VERIFY CLOSED** FCV-74-30, RHR SYSTEM II MINIMUM FLOW VALVE.

4) **OPEN** FCV-74-98, UNITS 1-2 SUCTION CROSSTIE.

5) **OPEN** FCV-74-99 UNITS 1-2 SUCTION CROSSTIE.

6) **OPEN** FCV-74-101, UNIT 1-2 DISCHARGE CROSSTIE.

7) **VERIFY CLOSED** the following valves:

- FCV-74-67 RHR SYSTEM II INBD RECIRC LOOP VALVE
- FCV-74-74 RHR SYS II CONTAINMENT SPRAY OUTBD VALVE
- FCV-74-75 RHR SYS II CONTAINMENT SPRAY INBD VALVE
- FCV-74-71 RHR SYSTEM II SUPPRESSION POOL VALVE.

8) **CHECK** 1-PI-74-65, RHR SYSTEM II PRESS, indicates above 45 psig.

9) **VERIFY** at least one RHRSW pump operating on each EECW header.

10) **START** an RHRSW pump to supply the desired RHR Heat Exchanger(s).

11) **SLOWLY THROTTLE** FCV-23-46 or 52, RHR HEAT EXCHANGER B(D) COOL WATER OUTLET VLV, to obtain between 1350 and 4500 gpm flow through the desired RHR heat exchanger.

12) **NOTIFY** Unit 2 Operator when complete.

Standard:

DIRECTED Unit 1 Operator by phone to PERFORM the above listed as directed by 2-EOI Appendix-7C, Step 1.d.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

CUE: [SIMULATOR OPERATOR] INSERT AND RH02A OPEN AND REPORT STEP 1.d. COMPLETE.

****

Performance Step: Critical X Not Critical__

e. **PLACE** 2-HS-74-148, RHR SYSTEM I MIN FLOW INHIBIT, switch in INHIBIT on Unit 2, Panel 2-9-3.

Standard:

PLACED 2-HS-74-148, Panel 2-9-3, in the INHIBIT position.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step: Critical___ Not Critical X

f. **VERIFY CLOSED** FCV-74-7, RHR SYSTEM I MIN FLOW VALVE.

Standard:

VERIFIED illuminated GREEN valve position indicating lamp above 2-HS-74-7A, Panel 2-9-3.

SAT____UNSAT____N/A____ COMMENTS:______________________________

****

Performance Step : Critical___ Not Critical X

g. **VERIFY CLOSED** FCV-74-53. RHR SYSTEM I LPCI INBD INJECT VALVE.

Standard:

VERIFIED illuminated GREEN valve position indicating lamp above 2-HS-74-53A.

SAT____UNSAT____N/A____ COMMENTS:______________________________

****

Performance Step : Critical___ Not Critical X

h. **CLOSE** FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE.

Standard:

PLACED 2-HS-74-52A in the CLOSE position and **VERIFIED** illuminated GREEN valve position indicating lamp above associated control switch.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

****

Performance Step: Critical___ Not Critical X

i. **DISPATCH** personnel to rack out the following Unit 2 RHR Pump breakers:

- 2-BKR-074-005, RESIDUAL HEAT REMOVAL PUMP 2A, 4KV SD BD A, COMPARTMENT 19.
- 2-BKR-074-0016, RESIDUAL HEAT REMOVAL PUMP 2C, 4KV SD BD B, Compartment 17.

Standard:

DISPATCHED personnel by phone or radio to rack out the above listed breakers.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

CUE: [SIMULATOR OPERATOR] INSERT BAT JPM28 AND REPORT RHR PUMP 2A AND 2C BREAKERS RACKED OUT (STEP 6).

****

Performance Step: Critical X Not Critical ___

j. **OPEN** the following valves on Unit 2, Panel 2-9-3:

- 2-FCV-74-96, RHR PUMP 2A SUCT U-1 XTIE

Standard:

PLACED 2-HS-74-96A, Panel 2-9-3, in the OPEN position and **VERIFIED** illuminated RED valve position indicating lamp above associated control switch.

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

****

Performance Step: Critical X Not Critical ___

- 2-FCV-74-97, RHR PUMP 2C SUCT U-1 XTIE.

Standard:

PLACED 2-HS-74-97A, Panel 2-9-3, in the OPEN position and **VERIFIED** illuminated RED valve position indicating lamp above associated control switch.

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

****

Performance Step: Critical X Not Critical ___

- 2-FCV-74-100, RHR SYS I U-1 DISCH XTIE.

Standard:

PLACED 2-HS-74-100A, Panel 2-9-3, in the OPEN position and **VERIFIED** illuminated RED valve position indicating lamp above associated control switch.

SAT____ UNSAT____ N/A____ COMMENTS: ____________________________

____

****

Performance Step: Critical ___ Not Critical X

k. **CHECK** 2-PI-74-51, RHR SYS I DISCH PRESS, indicates above 4~~8~~5 psig.

Standard:

VERIFIED 2-PI-74-51 indicating pressure greater than 4~~8~~5 psig.

SAT____ UNSAT____ N/A____ COMMENTS: ____________________________

____

****

Performance Step: Critical X Not Critical___

1. **NOTIFY** Unit 1 Operator to start RHR Pump (1B or 1D) for the RHR heat exchanger aligned in Step 1.d.10).

Standard:

DIRECTED Unit 1 Operator by phone to START 1B or 1D RHR pump.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

CUE: [SIMULATOR OPERATOR] INSERT MRF RH01 START AND REPORT 1B RHR PUMP RUNNING.

****

Performance Step: Critical X Not Critical___

m. **OPEN** 2-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE.

Standard:

PLACED 2-HS-74-53A, Panel 2-9-3, in the OPEN position and **VERIFIED** illuminated RED valve position indicating lamp above associated control switch.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

****

Performance Step: Critical X Not Critical___

n. **THROTTLE OPEN** 2-FCV-74-52, RHR SYS I LPCI OUTBD INJECT VALVE, to control injection flow below 5000 gpm.

Standard:

PLACED 2-HS-74-52A in the OPEN position and HELD open as required to establish ~5000 GPM Loop I flow as indicated on 2-FI-74-50, Panel 2-9-3.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step: Critical___ Not Critical X

o. **NOTIFY** Chemistry that RHRSW has been aligned to in-service RHR Heat Exchangers.

Standard:

NOTIFIED Chemistry section by phone that RHRSW has been aligned to 1B RHR heat exchanger.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step: Critical___ Not Critical_X_

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCH STAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT_____ UNSAT______ N/A ______ COMMENTS:________________________

____

____

____

****

Performance Step: Critical___ Not Critical_X_

PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION (Standard is subjective and instructor must evaluate the need for additional training on 3-WAY COMMUNICATION to maintain plant standards).

SAT_____ UNSAT______ N/A ______ COMMENTS:________________________

____

____

END OF TASK

STOP TIME __________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 116F

TITLE: PLACING STANDBY STEAM JET AIR EJECTOR IN OPERATION

TASK NUMBER: U-066-NO-07

on
What is term. cue?

SUBMITTED BY: ______ DATE: 10/25/99

VALIDATED BY: ______ DATE: 11.3.99

APPROVED: ______ TRAINING DATE: 10/25/99

PLANT CONCURRENCE: ______ OPERATIONS DATE: 11.3.99

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
0	10/10/99	ALL	NEW JPM

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________ SS# __________ ______

RO ______ SRO ______ DATE: ______________

JPM NUMBER: 116F

TASK NUMBER: U-066-NO-07

TASK TITLE: PLACE THE STANDBY SJAE IN OPERATION

K/A NUMBER: 271000A4.09 K/A RATING: RO 3.3 SRO: 3.2

****

TASK STANDARD: PERFORM CONTROL ROOM MANIPULATIONS REQUIRED TO PLACE THE STANDBY STEAM JET AIR EJECTOR IN OPERATION DURING POWER OPERATION

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 2-OI-66, REV 57

VALIDATION TIME: CONTROL ROOM: 7:00 LOCAL: ______

MAX. TIME ALLOWED: ______ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ______ CONTROL ROOM ____ LOCAL ____

COMMENTS: ____

Additional comment sheets attached? YES ____ NO ____

RESULTS: SATISFACTORY ______ UNSATISFACTORY ______

SIGNATURE: ______________________ DATE: ______________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEPS: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

PERFORMER shall demonstrate the use of TOUCH STAAR during this JPM.

PERFORMER shall demonstrate the use of 3-WAY COMMUNICATION during this JPM.

****

INITIAL CONDITIONS: You are an Operator. Unit 2 is at 100% power. 2A steam jet air ejector is in service in accordance with Section 5.9 of 2-OI-66. 2A steam jet air ejector is to be removed from service for maintenance and 2B steam jet air ejector is to be placed into operation. HWC is shutdown per 2-OI-4.

INITIATING CUES: ______(NAME)______, remove 2A steam jet air ejector from service and place 2B steam jet air ejector into operation.

START TIME________

****

Performance Step: Critical___ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required procedure.

Standard:

IDENTIFIED OR OBTAINED copy of 2-OI-66.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

8.4 Placing Standby SJAE in Operation

NOTES:

1. Auto swapping of SJAE is administratively prohibited per GE-SIL-150. See Precautions and Limitations 3.17.
2. Panel 25-105 located in Unit 2 Turbine Bldg. EL 586' T6-C

****

Performance Step : Critical___ Not Critical X

8.4.1 REVIEW all Precaution and Limitations in Section 3.0.

Standard:

REVIEWED all Precautions and Limitations in Section 3.0.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

****

Performance Step : Critical___ Not Critical X

8.4.2 VERIFY the following initial conditions have been met:

8.4.2.1 Off-Gas System hydrogen concentration is less than 4% (by volume).

Standard:

VERIFIED hydrogen concentration less than 4% by any of the following methods:

- No high off gas hydrogen alarms on annunciator panel 2-XA-55-53
- Offgas Hydrogen Analyzer recorder 2-H2R-66-96, Panel 2-9-53, indicates less than 4% hydrogen (A & B analyzers)
- H2 Analyzer Conc Hi, 2-IL-66-96A and 2-IL-66-96B, Panel 2-9-53, status indicating amber lamps EXTINGUISHED

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical___ Not Critical X

8.4.2.2 A normal shutdown of the HWC system has been completed in accordance with 2-OI-4 HWC System. (N/A if HWC System was not in service)

Standard:

None

SAT____UNSAT____N/A X COMMENTS: Given in initial conditions.

****

Performance Step : Critical___ Not Critical X

8.4.2.3 SJAEs are in operation. REFER TO Section 5.9.

Standard:

None

SAT____ UNSAT____ N/A X COMMENTS: Given in initial conditions.

****

Performance Step : Critical___ Not Critical X

8.4.3 At Panel 2-9-6, VERIFY OPEN the following valves:

8.4.3.1 SJAE 2B(2A) CNDS INLET VALVE, using 2-HS-2-31A(36A).

8.4.3.2 SJAE 2B(2A) CNDS OUTLET VALVE, using 2-HS-2-35A(41A).

Standard:

At Panel 2-9-6, **VERIFIED** illuminated RED valve position indicating lamps above 2-HS-2-31A and 2-HS-2-35A.

SAT____ UNSAT____ N/A____ COMMENTS:________________________

****

Performance Step : Critical___ Not Critical_X_

8.4.4 At Panel 25-105, VERIFY CONDENSATE FROM SJAE B(A) pressure, 2-PI-2-34(40), is greater than 60 psig.

Standard:

DISPATCHED/CALLED Turbine Building AUO to determine reading from 2-PI-2-34, CONDENSATE FROM SJAE B, Panel 25-105.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

CUE: [WHEN DISPATACHED/CALLED] 2-PI-2-34, CONDENSATE FROM SJAE B, INDICATES 90 PSIG.

****

Performance Step : Critical___ Not Critical X

8.4.5 At Panel 25-105, VERIFY manual/hand loader output pressure and pressure controller setpoints are adjusted as follows:

8.4.5.1 Setpoint for STEAM TO SJAE B(A) STAGE I & II, 2-PC-1-153(150) set for approximately 225 psig (dial located inside controller housing).

8.4.5.2 Manual/Hand loader for STEAM TO SJAE B(A) STAGE I & II, 2-PC-1-152(150) set for approximately 6 psig.

8.4.5.3 Setpoint for STEAM TO SJAE B(A) STAGE III, 2-PC-1-167(166) set for approximately 225 psig (dial located inside controller housing).

8.4.5.4 Manual/hand loader for STEAM TO SJAE B(A) STAGE III, 2-PC-1-167, set for approximately 6 psig.

CUE: [WHEN DISPATCHED/CALLED], THE SETPOINT FOR STEAM TO SJAE B STAGES I AND II, 2-PC-1-152 IS SET FOR 225 PSIG. (INSIDE CONTROLLER HOUSING).

MANUAL HAND LOADER FOR SJAE B STAGE I AND II IS SET AT 6 PSIG.

SETPOINT FOR STEAM TO SJAE B, STAGE III, 2-PC-1-167 IS SET FOR 225 PSIG. (INSIDE CONTROLLER HOUSING)

MANUAL HAND LOADER FOR STEAM TO SJAE B, STAGE III, 2-PC-1-167 IS SET FOR 6 PSIG.

Standard:

DISPATCH US to perform/verify steps 8.4.5.1 through 8.4.5.4.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical____ Not Critical X

8.4.6 At Panel 25-105, VERIFY both SJAE dilution steam pressure modifiers are adjusted to approximately mid-position (located at the rear of panel).

8.4.6.1 SJAE B(A) STG I & II PRESSURE, 2-XM-1-152(150).

8.4.6.2 SJAE B(A) STAGE III PRESSURE, 2-XM-1-167(166).

CUE: [WHEN DISPATCHED/CALLED], BOTH SJAE DILUTION STEAM PRESSURE MODIFIERS ARE ADJUSTED TO MID-POSITION.

Standard:

DISPATCHED US to verify both SJAE dilution steam pressure modifiers are in mid-position.

SAT____ UNSAT____ N/A____ COMMENTS:____________________

****

Performance Step : Critical____ Not Critical X

8.4.7 At Panel 2-9-8, VERIFY OPEN both SJAE Inlet Valves using the following:

8.4.7.1 SJAE 2A INLET VALVE, 2-HS-66-11.

8.4.7.2 SJAE 2B INLET VALVE, 2-HS-66-15.

Standard:

VERIFIED/PLACED 2-HS-66-11 and 15 in the OPEN position.

SAT____ UNSAT____ N/A____ COMMENTS:____________________

****

Performance Step : Critical X Not Critical____

8.4.8 At Panel 2-9-8, PLACE in OPEN/AUTO the SJAE 2B(2A) OG OUTLET VALVE using, 2-HS-66-18(14).

Standard:

VERIFIED/PLACED 2-HS-66-18 in the OPEN/AUTO position.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

****

Performance Step : Critical X Not Critical____

8.4.9 At Panel 2-9-7, PLACE the STEAM TO SJAE 2A(2B) handswitch, 2-HS-1-155A(156A) in CLOSE.

Standard:

PLACED 2-HS-1-155A in the CLOSE position.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

****

Performance Step : Critical X Not Critical____

8.4.10 At Panel 2-9-7, PLACE the SJAE 2A(2B) PRESS CONTROLLER handswitch, 2-HS-1-150(152), in CLOSE.

Standard:

PLACED 2-HS-1-150 in the CLOSE position.

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

****

Performance Step : Critical___ Not Critical X

8.4.11 At Panel 2-9-8, PLACE the SJAE 2A(2B) OG OUTLET VALVE using 2-HS-66-14(18) in CLOSE.

Standard:

PLACED 2-HS-66-14 IN CLOSE position.

SAT___ UNSAT___ N/A___ COMMENTS:___

****

Performance Step : Critical X Not Critical___

8.4.12 At Panel 2-9-7, PLACE the SJAE TO SJAE 2B(2A) handswitch, 2-HS-1-156A(155A) in OPEN.

Standard:

PLACED 2-HS-1-156A in OPEN position.

SAT___ UNSAT___ N/A___ COMMENTS:___

****

Performance Step : Critical X Not Critical ___

8.4.13 At Panel 2-9-7, PLACE the STEAM TO SJAE 2B(2A) PRESS CONTROLLER handswitch, 2-HS-1-152(150), in OPEN.

Standard:

PLACED 2-HS-1-152 in the **OPEN** position **AND RECOGNIZED THAT SJAE B DID NOT GO INTO SERVICE—NOTIFIED US.**

SAT___ UNSAT___ N/A___ COMMENTS:______________________

CUE: When failure of 2B jet recognized, STATE as US "Place 2A jet back in service.....continue at step 8.4.8".

********************************** ********

Performance Step :

8.4.8 At P ... E 2B(2A)

Standard:

SAT___

The note after step 8.4.13 states you may have to cycle this. Will the candidates do this?

****

****

Performance Step : Critical____ Not Critical X

8.4.9 At Panel 2-9-7, PLACE the STEAM TO SJAE 2A(2B) handswitch, 2-HS-1-155A(156A), in CLOSE.

Standard:

PLACED 2-HS-1-156A to CLOSE.

SAT____ UNSAT____ N/A____ COMMENTS:________________________

****

Performance Step : Critical____ Not Critical X

8.4.10 At Panel 2-9-7, PLACE the SJAE 2A(2B) PRESS CONTROLLER handswitch, 2-HS-1-150(152), in CLOSE.

Standard:

PLACED 2-HS-1-152 to CLOSE.

SAT____ UNSAT____ N/A____ COMMENTS:________________________

****

Performance Step : Critical____ Not Critical X

8.4.11 At Panel 2-9-8, PLACE the SJAE 2A(2B) OG OUTLET VALVE using 2-HS-66-14(18) in CLOSE.

Standard:

PLACED 2-HS-66-18 in CLOSE.

SAT____ UNSAT____ N/A____ COMMENTS:________________________

****

Performance Step : Critical X Not Critical____

8.4.12 At Panel 2-9-7, PLACE the STEAM TO SJAE 2B(2A) handswitch, 2-HS-1-156A(155A), in OPEN.

Standard:

PLACED 2-HS-1-155A in OPEN.

SAT____UNSAT____N/A____ COMMENTS:________________________________

****

Performance Step : Critical X Not Critical____

8.4.13 At Panel 2-9-7, PLACE the STEAM TO SJAE 2BA(2A) PRESS CONTROLLER handswitch, 2-HS-1-152(150), in OPEN.

Standard:

PLACED 2-HS-1-150 in OPEN.

SAT____UNSAT____N/A____ COMMENTS:________________________________

NOTE:

It may be necessary to return 2-HS-1-152(150) to CLOSE position, then back to OPEN in order to open the SJAE steam supply valves. This will reset the logic sequence.

****

Performance Step : Critical____ Not Critical X

8.4.14 Dispatch operator to **locally perform** step 8.4.14 through 8.4.17.

CUE: [WHEN DISPATCHED/CALLED], INFORM OPERATOR THAT LOCAL STEPS 8.4.14 THROUGH 8.4.17 HAVE BEEN COMPLETE.

Standard:

DISPATCHED Operator to perform steps 8.4.14 through 8.4.17 locally.

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical___ Not Critical X

8.4.18 On Panel 2-9-6, MONITOR hotwell pressure as indicated on HOTWELL TEMP AND PRESS recorder, 2-XR-2-2.

Standard:

VERIFIED stable hotwell pressure and temperature indications on 2-XR-2-2.

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

CUE: FOR STEP 8.4.19: INFORM OPERATOR THAT HWC IS TAGGED OUT AND UNAVAILABLE FOR SERVICE.

****

Performance Step: Critical____ Not Critical X

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCH STAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT____ UNSAT_____ N/A_____ COMMENTS:______________________________

____

____

****

Performance Step: Critical______ Not Critical X

PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION (Standard is subjective and instructor must evaluate the need for additional training on 3-WAY COMMUNICATION to maintain plant standards).

SAT______ UNSAT________ N/A______ COMMENTS____________________________

____

____

END OF TASK

STOP TIME:________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 82

TITLE: RESPOND TO SLC SQUIB VALVE LOSS OF CONTINUITY

TASK NUMBER: U-063-AL-04

Why not give alarm in real time and have operator respond? Term. cue?

SUBMITTED BY: Russell R Eddie DATE: 11/02/99

VALIDATED BY: NA DATE: 11/02/99

APPROVED: [signature] TRAINING DATE: 11/3/99

PLANT CONCURRENCE: [signature] OPERATIONS DATE: 11.3.99

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
2	12/8/94	1,2,3,4	REVISE TO NEW FORMAT
3	11/11/96	ALL	PROCEDURE UPGRADE, ADDED NON-CRITICAL STEP ON TOUCH STAAR, CHANGED ASOS TO US.
4	08/04/97	ALL	FORMAT DOCUMENT, ADD NON-CRITICAL STEP ON 3-WAY COMM.
5	09/1/97	5,7	CHANGED STEP 1 AND 3 CRIT STEP TO NON-CRIT, CHANGED CUE FOR US TO PERFORM T. SPEC.
6	09/1/98	3,4,5,7	PROCEDURE REVISION
7	11/02/99	2,3,7	PROCEDURE REVISION

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________ SS# ______________

RO ________ SRO ________ DATE: ______________

JPM NUMBER: 82

TASK NUMBER: U-063-AL-04

TASK TITLE: RESPOND TO SLC SQUIB VALVE CONTINUITY LOSS

K/A NUMBER: 211000A4.03 K/A RATING: RO 4.1 SRO: 4.1

****

TASK STANDARD: PERFORM OPERATION NECESSARY TO RESPOND TO LOSS OF SLC SQUIB VALVE CONTINUITY AS DIRECTED BY ARP 2-XA-55-5B-20.

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM __

REFERENCES/PROCEDURES NEEDED: ARP 2-XA-55-5B-20, REV 0010

VALIDATION TIME: CONTROL ROOM: 3:30 LOCAL: ________

MAX. TIME ALLOWED: _______ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: _________ CONTROL ROOM _____ LOCAL _____

COMMENTS: ____

____

Additional comment sheets attached? YES _____ NO ____

RESULTS: **SATISFACTORY** _______ **UNSATISFACTORY** ______

SIGNATURE: ______________________ **DATE:** ______________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEP: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

PERFORMER shall demonstrate the use of TOUCH STAAR during this JPM.

PERFORMER shall demonstrate the use 3-WAY COMMUNICATION during this JPM.

****

INITIAL CONDITIONS: You are a Unit 2 Operator. Unit 2 is at 100% power. ~~SLC SQUIB VALVE CONTINUITY LOST 2-XA-55-5B, Window 20, is in alarm.~~

INITIATING CUES: ~~The UNIT SUPERVISOR directs~~ are you to respond to ~~the alarm.~~ plant conditions.

START TIME__________

****

Performance Step: Critical___ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required ARP.

Standard:

IDENTIFIED OR OBTAINED copy of ARP 2-XA-55-5B-20

SAT___UNSAT___N/A___ COMMENTS:____________________

____

****

Performance Step: Critical___Not Critical X

1. If SLC has been initiated, THEN

   REFER to 2-EOI-1 or 2-AOI-79-2.

Standard:

IDENTIFIED SLC not initiated by multiple indications (switch position flow light not on, pump green lights on, no other associated alarms).

SAT___UNSAT___N/A___ COMMENTS:____________________

____

****

Performance Step: Critical X Not Critical___

2. If SLC has NOT been initiated, THEN

PERFORM the following:

a. CHECK blue indicating lights on Panel 2-9-5 to determine which valve ignition circuit failed.

Standard:

CHECKED blue indicating lights on 9-5. **IDENTIFIED** left hand light out.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step : Critical X Not Critical___

b. CHECK sensor and ammeter in back of Panel 2-9-5.

Standard:

CHECKED sensor and amp meter in back of 2-9-5.

CUE: XM-63-8A READING 0 MA

SAT____UNSAT____N/A____ COMMENTS:____________________________

____

****

Performance Step: Critical___ Not Critical_X_

c. DISPATCH personnel to SLC tank, RB El 639', to check squib valve equipment area.

Standard:

DISPATCHED personnel to SLC tank area.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

CUE: THE UNIT SUPERVISOR WILL ADDRESS ANY TECHNICAL SPECIFICATION REQUIREMENTS.

****

Performance Step: Critical___Not Critical__X_

3. REFER to Tech Spec 3.1.7.

Standard:

REFERRED to Tech Spec Sect. 3.1.7. **DETERMINED** 7 day LCO. (LCO determination critical for SRO only)

SAT___UNSAT___N/A_X__ COMMENTS:____NONE____________________

____

****

Performance Step: Critical___ Not Critical X

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCH STAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT_____ UNSAT______ N/A ______ COMMENTS: ________________________

____

____

****

Performance Step: Critical____Not Critical X

PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION (Standard is subjective and instructor must evaluate the need for additional training on 3-WAY COMMUNICATION to maintain plant standards.

SAT_____ UNSAT______ N/A ______ COMMENTS: ________________________

____

____

END OF TASK

STOP TIME_______

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 78

TITLE: LINE UP CONTROL OF SRVs AND MSIVs AT 25-32

TASK NUMBER: U-000-AB-05

Simple. Why not req. control after swap?

SUBMITTED BY: Russell R. Eder DATE: 11/08/99

VALIDATED BY: N/A DATE: 11/08/99

APPROVED: [signature] DATE: 11/8/99
TRAINING

PLANT CONCURRENCE: [signature] DATE: 11.9.99
OPERATIONS

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
2	12/8/94	1,2,3,4	REVISE TO NEW FORMAT
3	8/4/96	ALL	PROCEDURE UPGRADE, ADDED CRITICAL STEP ON TOUCH STAAR, AND CHANGED COMM. STD.
4	11/08/99	ALL	PROCEDURE CHANGE, CHANGED MGT. EXPECT. TO PLANT WORK EXPECT., ADDED NON-CRIT. STEP 3-WAY COMM.

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________ SS# ______________________

RO ________ SRO ________ DATE: ______________________

JPM NUMBER: 78

TASK NUMBER: U-000-AB-05

TASK TITLE: RESPOND TO CONTROL ROOM ABANDONMENT

K/A NUMBER: 295016AA1.07 K/A RATING: RO 4.2 SRO: 4.3

****

TASK STANDARD: PERFORM OPERATION NECESSARY TO LINE UP CONTROL OF SRVs AND MSIVs AT PANEL 2-25-32 AS DIRECTED BY 2-AOI-100-2.

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 2-AOI-100-2, REV 45

VALIDATION TIME: CONTROL ROOM: 8:00 LOCAL: ________

MAX. TIME ALLOWED: ________ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM ______ LOCAL ____

COMMENTS: ____

Additional comment sheets attached? YES _____ NO ____

RESULTS: SATISFACTORY ________ UNSATISFACTORY _____

SIGNATURE: ______________________ DATE: ______________________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEPS: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

PERFORMER shall demonstrate the use of TOUCH STAAR during this JPM.

PERFORMER shall demonstrate the use of 3-WAY COMMUNICATION during this JPM.

****

INITIAL CONDITIONS: You are an Operator. Unit 2 Control Room is being abandoned and IMMEDIATE OPERATOR ACTIONS have been completed. You are to proceed to Panel 2-25-32.

INITIATING CUES: The Unit Supervisor directs you to continue with 2-AOI-100-2 at Step 4.2.2.

START TIME__________

****

Performance Step: Critical___ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required AOI.

Standard:

IDENTIFIED OR OBTAINED copy of 2-AOI-100-2

SAT____UNSAT____N/A____ COMMENTS:___________________________

____

****

4.2 Unit 2 Subsequent Actions

4.2.1 IF ALL control rods were NOT fully inserted AND RPS failed to deenergize, THEN

DIRECT an operator to Unit 2 Auxiliary Instrument Room to perform Attachment 11.

****

CAUTION

Failure to place control switch in desired position prior to transferring to the emergency position may result in inadvertent actuation of the component.

[NER/C] Operation from Panel 2-25-32 bypasses logic and interlocks normally associated with the components. [GE SIL 326.S1]

****

NOTES:

(1) The following transfers Reactor Pressure Control to Panel 2-25-32 to allow for pressure control while completing the Panel Checklist.

(2) Attachment 9, Alarm Response Procedure Panel 2-25-32, provides for any alarms associated with this instruction.

****

Performance Step: Critical___ Not Critical X

4.2.2 At Panel 2-25-32, PLACE the following MSRV control switches in CLOSE/AUTO:

Switch No.	Description
2-HS-1-22C	MN STM LINE B RELIEF VALVE
2-HS-1-5C	MN STM LINE A RELIEF VALVE
2-HS-1-30C	MN STM LINE C RELIEF VALVE
2-HS-1-34C	MN STM LINE C RELIEF VALVE

Standard:

VERIFIED 2-HS-1-22C, 2-HS-1-5C, 2-HS-1-30C and 2-HS-1-34C control switches in the CLOSE/AUTO position.

SAT___ UNSAT___ N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical X Not Critical__

4.2.3 At Panel 2-25-32, PLACE the following MSRV disconnect switches in DISCT.

Switch No.	Description
2-XS-1-18	MAIN STM LINE B RELIEF VALVE DISCT
2-XS-1-4	MAIN STM LINE A RELIEF VALVE DISCT
2-XS-1-42	MAIN STM LINE D RELIEF VALVE DISCT
2-XS-1-23	MAIN STM LINE B RELIEF VALVE DISCT
2-XS-1-41	MAIN STM LINE D RELIEF VALVE DISCT
2-XS-1-180	MAIN STM LINE D RELIEF VALVE DISCT

Standard:

PLACED the listed six (6) disconnect switches in DISCT.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step : Critical X Not Critical__

4.2.4 At Panel 2-25-32, PLACE the following MSRV transfer switches in EMERG:

2-XS-1-22	MAIN STM LINE B RELIEF VALVE XFR
2-XS-1-5	MAIN STM LINE A RELIEF VALVE XFR
2-XS-1-30	MAIN STM LINE C RELIEF VALVE XFR
2-XS-1-34	MAIN STM LINE C RELIEF VALVE XFR

Standard:

PLACED the listed four (4) transfer switches in EMERG.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

NOTE:

Use of the following sequence when opening MSRVs should distribute heat evenly in the Suppression Pool.

****

Performance Step: Critical___ Not Critical X

4.2.5 At Panel 2-25-32, MAINTAIN Reactor Pressure between 800 to 1000 psig using the following sequence:

4.2.5.1 2-HS-1-22C, MN STM LINE B RELIEF VALVE

4.2.5.2 2-HS-1-5C, MN STM LINE A RELIEF VALVE

4.2.5.3 2-HS-1-30C, MN STM LINE C RELIEF VALVE

4.2.5.4 2-HS-1-34C, MN STM LINE C RELIEF VALVE

Standard:

MAINTAINS reactor pressure 800 to 1000 psig using sequential opening of the above listed four (4) MSRVs.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

CAUTION

Failure to place control switch in desired position prior to transferring to emergency position may result in inadvertent actuation of the component.

****

Performance Step: Critical X Not Critical__

4.2.6 At Panel 2-25-32, CLOSE MSIVs using the following switch sequence:

4.2.6.1 PLACE control switch in CLOSE.

4.2.6.2 PLACE transfer switch in EMERG.

MSIV	Control Switch	Req'd Position	Transfer Switch	Req'd Position
A INBOARD	HS-1-14C	CLOSE	2-XS-1-14	EMERG
B INBOARD	HS-1-26C	CLOSE	2-XS-1-26	EMERG
C INBOARD	HS-1-37C	CLOSE	2-XS-1-37	EMERG
D INBOARD	HS-1-51C	CLOSE	2-XS-1-51	EMERG
A OUTBOARD	HS-1-15C	CLOSE	2-XS-1-15	EMERG
B OUTBOARD	HS-1-27C	CLOSE	2-XS-1-27	EMERG
C OUTBOARD	HS-1-38C	CLOSE	2-XS-1-38	EMERG
D OUTBOARD	HS-1-52C	CLOSE	2-XS-1-52	EMERG

Standard:

VERIFIED the listed eight (8) control switches in the CLOSE position and then **PLACED** the listed eight (8) transfer switches in the EMERG positions.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

CUE: THIS ENDS THE JPM.

****

Performance Step: Critical X Not Critical ____

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCH STAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT____ UNSAT_____ N/A_____ COMMENTS: ______________________________

****

Performance Step: Critical ____ Not Critical X

PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION (Standard is subjective and instructor must evaluate the need for additional training on 3-WAY COMMUNICATION to maintain plant standards).

SAT______ UNSAT_______ N/A______ COMMENTS ______________________________

END OF TASK

STOP TIME

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 104

TITLE: TIE D/G TO 4kV SHUTDOWN BOARD AT PANEL 9-23

TASK NUMBER: U-082-NO-07

SUBMITTED BY: ______________________ DATE: ________

VALIDATED BY: ______________________ DATE: ________

APPROVED: ______________________ DATE: ________
TRAINING

PLANT CONCURREN (f) Make this an alternate path
→ at step 8.1.12 - in KVAR

* Examination
and Plant C
is there a requirement to trip
this.

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
3	10/4/94	ALL	GENERAL REVISION
4	11/8/94	11	Step 8.1.7 not critical
5	10/23/95	ALL	PROCEDURE CHANGE
6	5/2/96	3,8	PROCEDURE UPDATE, MINOR VERBAL CHANGE
7	10/24/96	4, 16, 17	ADDED NON-CRIT. STEP ON TOUCH STAAR, CHANGED ASOS TO US, SOS TO SM.
8	12/06/96	2,9,14,15,16	PROCEDURE UPDATE, MINOR VERBAL CHANGES
9	10/14/97	ALL	FORMAT, PROCEDURE UPDATE, CHANGED MGT EXPECT. TO PLANT WORK EXPECTATIONS, ADDED 3-WAY COMM.
10	09/02/98	2	PROCEDURE REVISION
11	01/04/99	3	PROCEDURE REVISION
12	11/04/99	2,9,10,14,16	PROCEDURE REVISION

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ______________________ SS# ______________

RO ________ SRO ________ DATE: ______________

JPM NUMBER: 104

TASK NUMBER: U-082-NO-07

TASK TITLE: PERFORM PARALLEL WITH SYSTEM OPERATION AT PANEL 9-23

K/A NUMBER: 264000A2.05 K/A RATING: RO 3.6 SRO: 3.6

****

TASK STANDARD: PERFORM OPERATIONS NECESSARY TO PARALLEL A DIESEL GENERATOR WITH OFFSITE POWER AT PANEL 9-23 AS DIRECTED BY 0-OI-82.

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ___ CONTROL ROOM __

REFERENCES/PROCEDURES NEEDED: 0-OI-82, REV. 68

VALIDATION TIME: CONTROL ROOM: 14:00 LOCAL: ________

MAX. TIME ALLOWED: ______ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM _____ LOCAL _____

COMMENTS: ____

Additional comment sheets attached? YES _____ NO ____

RESULTS: SATISFACTORY ______ UNSATISFACTORY ______

SIGNATURE: ____________________ DATE: ______________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEPS: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

PERFORMER shall demonstrate the use of TOUCH STAAR during this JPM.

PERFORMER shall demonstrate the use of 3-WAY COMMUNICATION during this JPM.

****

INITIAL CONDITIONS: You are a Unit Operator. Unit 2 is operating at 100% power. Diesel Generator 'A' is running for special testing in accordance with Section 5.0. of 0-OI-82. The Operations Superintendent's permission has been received for performing the test.

INITIATING CUES: The UNIT SUPERVISOR directs you to parallel Diesel Generator 'A' with the system as directed by 0-OI-82. The diesel generator is to be loaded to 2600 $\pm$ 50 Kw. (Procedure reference given to student).

START TIME__________

****

Performance Step: Critical___ Not Critical_X__

WHEN REQUESTED BY EXAMINER identify/obtain copy of required procedure.

Standard:

IDENTIFIED OR OBTAINED copy of 0-OI-82.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

8.1 Parallel with System Operation at Panel 9-23

****

Performance Step: Critical___ Not Critical X

8.1.1 VERIFY the following initial conditions:

8.1.1.1 All Precautions and Limitations in Section 3.0 have been reviewed.

8.1.1.2 Diesel Generator A (B, C, D) is operating in accordance with Section 5.0.

8.1.1.3 4-Kv Shutdown Board A (B, C, D) is being supplied power from an offsite power source.

Standard:

REVIEWED Precautions and Limitations. **VERIFIED** DG A operating by alarm/red light illuminated on START switch. **VERIFIED** normal supply breaker to 4kV Shutdown Board closed by red light illuminated on breaker control switch.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical X Not Critical____

8.1.2 PLACE the associated Diesel Generator breaker synchronizing switch to ON:

Diesel	Instrument Name	Instrument No.	Panel
A	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7
B	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
C	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

Standard:

PLACED 0-25-211-A/22A SYNC switch in the ON position.

SAT___UNSAT___N/A___ COMMENTS:___________________________________

____

****

Performance Step: Critical___ Not Critical_X__

8.1.3 VERIFY that 4-Kv Shutdown Board A (B, C, D) voltage is 3950 to 4400 VOLTS and NOT undergoing abnormal voltage transients.

Standard:

VERIFIED 4kV Shutdown Bd A voltage 3950-4400 volts and stable.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical_X_

8.1.4 VERIFY SYSTEM SYNC FREQUENCY is between 59 to 61 Hertz and NOT undergoing abnormal frequency transients.

Standard:

VERIFIED SYSTEM SYNC FREQUENCY 59-61 Hz and stable.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

CAUTION

Diesel generators shall NOT be paralleled with an unstable offsite source or during inclement weather (e.g., lightning, heavy winds).

****

Performance Step: Critical___ Not Critical X

8.1.5 If 4-Kv Shutdown Board A (B, C, D) is experiencing abnormal voltage/ frequency transients, THEN

PERFORM the following:

8.1.5.1 PLACE the associated Diesel Generator breaker synchronizing switch to OFF:

Diesel	Instrument Name	Instrument No.	Panel
A	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7
B	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
C	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

8.1.5.2 TRANSFER the 4-Kv shutdown board to a stable offsite source in accordance with 0-OI-57A.

8.1.5.3 WHEN the 4-Kv shutdown board has been transferred to a stable offsite power source, THEN

PLACE the Diesel Generator synchronizing switch to ON.

Standard:

None - Satisfied by steps 3 and 4.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

NOTE:

Only one Unit 1 and 2 Diesel Generator at a time shall be operated in parallel with system.

****

Performance Step: Critical X Not Critical____

8.1.6 PULL and PLACE the associated Diesel Generator mode selector switch in PARALLEL WITH SYSTEM:

Diesel	Handswitch Name	Handswitch No.	Panel
A	DG A MODE SELECT	0-HS-82-A/5A	0-9-23-7
B	DG B MODE SELECT	0-HS-82-B/5A	0-9-23-7
C	DG C MODE SELECT	0-HS-82-C/5A	0-9-23-8
D	DG D MODE SELECT	0-HS-82-D/5A	0-9-23-8

****

CAUTION

Failure of the PARALLEL WITH SYSTEM light to illuminate in the following step could indicate that the DG is still in SINGLE UNIT operation and result in overload when the DG output breaker is closed.

****

Standard:

PULLED UP on 0-HS-82-A/5A and **PLACED** in PARALLEL WITH SYSTEM.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical X

8.1.7 RELEASE the Diesel Generator mode selector switch and OBSERVE PARALLEL WITH SYSTEM light illuminated.

Standard:

RELEASED the Operation Mode Selector switch and **VERIFIED** RED Parallel with System light illuminated.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step : Critical X Not Critical____

8.1.8 ADJUST diesel generator frequency using the associated Diesel Generator governor control switch to obtain a synchroscope needle rotation of one revolution every 15 to 20 seconds in the FAST direction.

Diesel	Instrument Name	Instrument No.	Panel
A	DG A GOVERNOR CONTROL	0-HS-82-A/3A	0-9-23-7
B	DG B GOVERNOR CONTROL	0-HS-82-B/3A	0-9-23-7
C	DG C GOVERNOR CONTROL	0-HS-82-C/3A	0-9-23-8
D	DG D GOVERNOR CONTROL	0-HS-82-D/3A	0-9-23-8

Standard:

ADJUSTED frequency using 0-HS-82-A/3A to obtain one revolution every 15-20 seconds in the clockwise direction.

SAT____UNSAT____N/A____ COMMENTS:__________________________

____

****

Performance Step : Critical X Not Critical____

8.1.9 USE the associated Diesel Generator voltage regulator control switch to match Diesel Generator and System voltages:

Diesel	Instrument Name	Instrument	Panel
A	DG A VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-A/2A 0-EI-82-AB 0-EI-211-AB	0-9-23-7
B	DG B VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-B/2A 0-EI-82-AB 0-EI-211-AB	0-9-23-7
C	DG C VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-C/2A 0-EI-82-CD 0-EI-211-CD	0-9-23-8
D	DG D VOLT REGULATOR CONT GEN SYNC REF VOLTAGE SYSTEM SYNC REF VOLTAGE	0-HS-82-D/2A 0-EI-82-CD 0-EI-211-CD	0-9-23-8

Standard:

ADJUSTED 0-HS-82-A/2A to match 0-EI-82-AB and 0-EI-211-AB readings.

SAT____UNSAT____N/A____ COMMENTS:________________________________

____

****

Performance Step : Critical X Not Critical____

8.1.10 When the synchroscope needle is approximately 2 minutes on the left hand side of the 12 o'clock position, THEN

PLACE the associated Diesel Generator breaker handswitch to CLOSE:

Diesel	Handswitch Name	Handswitch No.	Panel
A	DG A BKR 1818	0-HS-211-A/22A	0-9-23-7
B	DG B BKR 1822	0-HS-211-B/4A	0-9-23-7
C	DG C BKR 1812	0-HS-211-C/4A	0-9-23-8
D	DG D BKR 1816	0-HS-211-D/20A	0-9-23-8

Standard:

WHEN synchroscope needle approximately 2 minutes to left of 12 O'clock position, **PLACED** 0-HS-211-A/22A in the CLOSE position.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical_X__

8.1.11 PLACE the associated Diesel Generator breaker synchronizing switch to OFF:

Diesel	Instrument Name	Instrument No.	Panel
A	DG A BKR 1818 SYNC	0-25-211-A/22A	0-9-23-7
B	DG B BKR 1822 SYNC	0-25-211-B/4A	0-9-23-7
C	DG C BKR 1812 SYNC	0-25-211-C/4A	0-9-23-8
D	DG D BKR 1816 SYNC	0-25-211-D/20A	0-9-23-8

Standard:

PLACED 0-25-211-A/22A in the OFF position.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

NOTE:

Lagging VARS should be maintained when adjusting kW load (rising or lowering). This may require kW load adjustment to be stopped periodically to allow for adjusting kVAR load. Once desired kW load is achieved, Illustration 1 should be referred to for determination of kVAR loading required to obtain a power factor (pf) of 0.8 lagging. Diesel generator kVAR load should then be adjusted to obtain a 0.8 pf lagging. If system conditions will not permit the kVAR loading required to obtain a 0.8 pf lagging, kVAR load should be adjusted to the maximum kVAR lagging the system will allow.

****

Performance Step: Critical X Not Critical____

8.1.12 USE the associated Diesel Generator's governor control switch and voltage regulator control switch to obtain desired kW and kVAR load:

Diesel	Instrument Name	Instrument No.	Panel
A	DG A GOVERNOR CONTROL DG A VOLT REGULATOR CONT	0-HS-82-A/3A 0-HS-82-A/2A	0-9-23-7
B	DG B GOVERNOR CONTROL DG B VOLT REGULATOR CONT	0-HS-82-B/3A 0-HS-82-B/2A	0-9-23-7
C	DG C GOVERNOR CONTROL DG C VOLT REGULATOR CONT	0-HS-82-C/3A 0-HS-82-C/2A	0-9-23-8
D	DG D GOVERNOR CONTROL DG C VOLT REGULATOR CONT	0-HS-82-D/3A 0-HS-82-D/2A	0-9-23-8

Standard:

ADJUSTED 0-HS-82-A/3A to obtain 2600 ±50 Kw.
DETERMINED KVAR loading to be 1950 ± 50 from ILLUSTRATION 1.
ADJUSTED 0-HS-82-A/2A to obtain 1950 ±50 KVAR.

SAT___UNSAT___N/A___ COMMENTS:___________________________________

At this point have a failure of the ckt and have KVARs ↑ uncontrollably this way the candidate will have to trip the D/G!

Q

****

Performance Step: Critical___ Not Critical X

8.1.13 RECORD time/date loaded on Illustration 2.

CUE: ANOTHER OPERATOR WILL RECORD DATA ON ILLUSTRATION 2.

Standard:

N/A due to another operator will record data on Illustration 2.

SAT___UNSAT___N/A X COMMENTS:________________________________

8.1.14 MONITOR the offsite source that is paralleled with the diesel generator.

8.1.15 IF abnormal voltage or frequency transients are experienced, THEN

PERFORM the following:

8.1.15.1 **REFER TO** Section 8.2 and SEPARATE the 4-kV board from offsite power.

8.1.15.2 **REFER TO** 0-OI-57A and TRANSFER the 4-kV shutdown bus to a stable offsite source.

8.1.16 WHEN Parallel with System operation is no longer desired, THEN

UNLOAD the diesel generator as follows:

CUE: THE SHIFT MANAGER DIRECTS SOMEONE ELSE TO UNLOAD THE D/G. THAT WILL BE ALL FOR NOW.

****

Performance Step: Critical___ Not Critical_X__

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCHSTAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT_____ UNSAT______ N/A ______ COMMENTS:______________________

****

Performance Step: Critical_____Not Critical_X____

PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION (Standard is subjective and instructor must evaluate the need for additional training on 3-WAY COMMUNICATION to maintain plant standards).

SAT______UNSAT_______N/A______COMMENTS____________________________

END OF TASK

STOP TIME________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: NRC-1

TITLE: Loss of Shutdown Cooling.

TASK NUMBER:

SUBMITTED BY: Richard S. Baldwin DATE: 4/24/00

VALIDATED BY: ______________ DATE: ________

APPROVED: ______________ DATE: ________
TRAINING

PLANT CONCURRENCE: ______________ DATE: ________
OPERATIONS

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR:_______________________________ SS#____________________

RO __________ SRO __________ DATE:____________________

JPM NUMBER: NRC-1

TASK NUMBER:

TASK TITLE: Loss of Shutdown Cooling.

K/A NUMBER: 205000A4.01 K/A RATING: RO 3.7 SRO: 3.7

****
*

TASK STANDARD:

LOCATION OF PERFORMANCE: SIMULATOR X PLANT ____ CONTROL ROOM __

REFERENCES/PROCEDURES NEEDED:

VALIDATION TIME: CONTROL ROOM: __________ LOCAL: __________

MAX. TIME ALLOWED: ________ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: __________ CONTROL ROOM ______ LOCAL ____

COMMENTS: ____

____

____

____

____

Additional comment sheets attached? YES _____ NO _____

RESULTS: SATISFACTORY ________ UNSATISFACTORY ______

EXAMINER SIGNATURE:___________________ DATE: __________

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. Ensure that you observe electrical safety precautions when working near energized equipment. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task and when you have completed the assigned task.

****

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEPS: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

PERFORMER shall demonstrate the use of TOUCH STAAR during this JPM.

PERFORMER shall demonstrate the use of 3-WAY COMMUNICATION during this JPM.

****

INITIAL CONDITIONS: Plant Conditions that would allow Shutdown cooling to be placed in service. A plant Shutdown for refueling. (Train 1 of the RHR system pump will not start when called for it) The running pump will not restart. Will have to go to Unit 1 RHR cross connection.

INITIATING CUES: Continue with plant cooldown on RHR train II.

****

Performance Step: Critical___ Not Critical_x__

4.2.5 IF Shutdown Cooling isolates on low RPV water level or high Drywell press (GROUP 2 ISOL) AND RPV water level needs restoring using LPCI, THEN

PERFORM the following before reaching -122 inches RPV water level:

4.2.5.1 VERIFY CLOSED the following valves on a Group 2 isolation:

- RHR SHUTDOWN COOLING SUCT OUTBD ISOL VLV, 2-FCV-74-47.
- RHR SHUTDOWN COOLING SUCT INBD ISOL VLV, 2-FCV-74-48.
- RHR SYS I LPCI INBD INJECT VALVE, 2-FCV-74-53.
- RHR SYS II LPCI INBD INJECT VALVE, 2-FCV-74-67.

4.2.5.2 DEPRESS RHR SYS I(II) SD CLG INBD INJECT ISOL RESET, 2-XS-74-126 and 2-XS-74-132 AND VERIFY 2-IL-74-126 and 2-IL-74-132 extinguished.

4.2.5.3 IF the RHR loop that was in shutdown cooling is needed for RPV water level makeup, THEN

PERFORM the following:

4.2.5.3.1 CLOSE RHR PUMP 2A(2B) and 2C(2D) SD COOLING SUCT VLVs, 2-FCV-74-2(25) and 2-FCV-74-13(36).

Standard:

SAT___UNSAT___N/A___ COMMENTS:___________________________________

____

****

****

Performance Step: Critical___ Not Critical___

CAUTION

[NER] Failure to have RHR SHUTDOWN COOLING SHUT OUTBD and INBD ISOL VLVs, 2-FCV-74-47 and 2-FCV-74-48, closed may result in inadvertent draining of the reactor vessel through the RHR PUMP 2A(2B) and 2C(2D) SUPPR POOL SUCT VLVs, 2-FCV-74-1(24) and 2-FCV-74-12(35). [INPO SOER 87-002]

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical___

4.2.5.3.2OPEN RHR PUMP 2A(2B) and 2C(2D) SUPPR POOL SUCT VLVs, 2-FCV-74-1(24) and 2-FCV-74-12(35).

4.2.5.3.3 PLACE RHR SYSTEM I(II) MIN FLOW INHIBIT switch, 2-HS-74-148(149), in NORM.

4.2.5.3.4 VERIFY RHR SYSTEM I(II) MIN FLOW VALVE, 2-FCV-74-7(30), opens.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical___

4.2.6 IF Primary Containment Integrity is required, THEN

VERIFY RHR system discharge piping pressure is being maintained >48 psig. REFER TO 2-OI-74, Section 8.1.

Standard:

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical___

NOTES:

(1) With the Reactor in Cold Shutdown Condition (Mode 4 or Mode 5), reactor coolant stratification may be indicated by one of the following:

- Reactor pressure above 0 psig with any reactor coolant temperature indication reading at or below 212°F.
- Differential temperatures of 50°F or greater between either RX VESSEL BOTTOM HEAD (FLANGE DR LINE) 2-TE-56-29 (8) temperatures and RX VESSEL FW NOZZLE N4B END (N4B INBD)(N4B END)(N4D INBD) 2-TE-56-13(14)(15)(16) temperatures from the REACTOR VESSEL METAL TEMPERATURE recorder, 2-TR-56-4.
- With recirculation pumps and shutdown cooling out of service, a Feedwater sparger temperature of 200°F or greater on any RX VESSEL FW NOZZLE (N4B END (N4B INBD)(N4D END)(N4D INBD) 2-TE-56-13(14)(15)(16) temperatures from the REACTOR VESSEL METAL TEMPERATURE recorder, 2-TR-56-4.

2) [NER/C] For purposes of thermal stratification monitoring, the bottom head drain line is more representative as long as there is flow in the line. [GE SIL 251 and 430

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

****

Performance Step: Critical___ Not Critical___

4.2.7 PLOT heatup/cooldown rate as necessary. REFER TO 2-SI-4.6.A.1 (2-SR-3.4.9.1(A)).

4.2.8 DIRECT the STA to ESTIMATE the following times at least once per shift until a method of decay heat removal is restored:

4.2.8.1 DETERMINE the time since shutdown.

4.2.8.2 DETERMINE the current RPV heat-up rate from 2-SI-4.6.A.1 (2-SR-3.4.9.1(A)), or, if reactor coolant stratification is suspected, use Illustration 1. If additional information is required to determine the heat-up rates, contact Reactor Engineer.

4.2.8.3 DETERMINE the reactor coolant temperature or use the last valid reactor coolant temperature available.

4.2.8.4 ESTIMATE the time for reactor coolant temperature to reach 212°F, using data obtained in Steps 4.2.8.1 through 4.2.8.3.

4.2.8.5 IF the Reactor Vessel head is removed and the cavity is flooded with the fuel pool gates installed,

THEN ESTIMATE the time for reactor coolant temperature to reach 125°F and 150°F using a plot of the actual heatup rate or Illustration 1.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

****

Performance Step: Critical___ Not Critical___

4.2.9 IF the loss of Shutdown Cooling is due to inadequate RHRSW flow, THEN

START the standby RHRSW pump for the appropriate header. REFER TO 0-OI-23.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical___

4.2.10 IF the loss of Shutdown Cooling is due to Group 2 PCIS isolation, WHEN conditions which permit resetting Group 2 PCIS isolation are met, THEN

PERFORM the following:

4.2.10.1 RESET Group 2 isolation by momentarily PLACING PCIS DIV I RESET, 2-HS-64-16A-S32, and PCIS DIV II RESET, 2-HS-16A-S33, in reset.

4.2.10.2 Momentarily DEPRESS RHR SYS I(II) SD CLG INBD INJECT ISOL RESET, 2-XS-74-126 and 2-XS-74-132. VERIFY 2-IL-74-126 and 2-IL-74-132 extinguished.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical_-_

4.2.11 IF the loss of Shutdown Cooling is due to Group 2 PCIS AND the isolation signal fails to reset or remain reset due to invalid and/or sporadic signals, THEN

PERFORM the following:

4.2.11.1 VERIFY primary containment integrity is NOT required.

****

CAUTION

Defeating of PCIS group 2 isolation logic for Shutdown Cooling is ONLY to be used for an isolation due to a verified false or spurious signal OR an instrument failure. Allowance for defeating these interlocks is not permitted for isolations due to an actual low water level condition.

****

4.2.11.2 OBTAIN Shift Manager permission to defeat the Group 2 PCIS isolation logic for Shutdown Cooling.

4.2.11.3 DEFEAT RHR Group 2 PCIS isolation logic. REFER TO Illustration 2.

****

CAUTION

Group 2 PCIS isolation logic must be operable any time primary containment integrity is required in order to meet requirements of Technical Specifications (ITS 3.3.6.1).

****

4.2.11.4 IF conditions change such that primary containment integrity must be reestablished, THEN

Immediately RESTORE Group 2 PCIS Isolation Logic. REFER TO Illustration 2.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

****

Performance Step: Critical___ Not Critical_‗_

4.2.12 INCREASE RWCU flow rate to maximum AND maximize RWCU blowdown as required to maintain reactor coolant temperatures less than 200°F on all indications.
REFER TO 2-OI-69.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical_‗_

CAUTION
Accurate coolant temperatures will not be available if all forced circulation is lost.

4.2.13 [NER/C] IF forced circulation has been lost AND vessel cavity is less than 80 inches, THEN

PERFORM the following:

4.2.13.1 RAISE RPV water level to 80 inches as indicated on RX WTR LEVEL FLOOD-UP, 2-LI-3-55.

4.2.13.2 MAINTAIN RPV water level between +70 inches to +90 inches as indicated on RX WTR LEVEL FLOOD-UP, 2-LI-3-55.

4.2.13.3 INCREASE monitoring frequency of reactor coolant temperature and pressure, using multiple indications.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

****

Performance Step: Critical___ Not Critical_✓_

4.2.14 RETURN the affected loop of RHR to Shutdown Cooling.
REFER TO 2-OI-74.

4.2.14.1 IF the affected loop of RHR cannot be placed back in Shutdown Cooling, THEN

PLACE the alternate loop of RHR in Shutdown Cooling. REFER TO 2-OI-74.

4.2.14.2 IF no Unit 2 RHR loop can be placed in Shutdown Cooling, THEN

OBTAIN Shift Manager approval and PLACE Unit 1 RHR loop in service, CROSS-TIED with Unit 2, for Shutdown Cooling. REFER to 2-OI-74.

4.2.14.3 IF no RHR loops can be placed in service, THEN

VERIFY a Recirculation Pump in service.
REFER TO 2-OI-68.

Standard:

At this point need to be able to NOT restart the tripped pump and then have the alternate pump also not start. Will have to eventually go to OI-74 procedure to cross connect unit 1 RHR with Unit 2.

SAT___UNSAT___N/A___ COMMENTS:______________________________

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Performance Step: Critical___ Not Critical___

4.2.15 IF the Reactor is in a Cold Shutdown Condition (Mode 4 or Mode 5) AND the reactor vessel head studs are tensioned or head tensioning is in progress, THEN

PERFORM 2-SI-4.6.A.5 (2-SR-3.4.9.5-7), RPV Temperature Monitoring with Head Tensioned.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:______________________________

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****

Performance Step: Critical___ Not Critical___

4.2.16 PERFORM the following prior to exceeding 212•F moderator temperature:

4.2.16.1 VERIFY Main Condenser vacuum is available. REFER TO 2-OI-66.

4.2.16.2 CLOSE Inboard OR Outboard MSIVs on each main steam line.

4.2.16.3 ESTABLISH Reactor vessel vent path by verifying the following valves are opened:

- 2-FCV-1-55.
- 2-FCV-1-56.
- 2-FCV-1-57.
- 2-FCV-1-58.

4.2.16.4 THROTTLE OPEN 2-FCV-1-59 and MAINTAIN the Reactor depressurized.

4.2.16.5 VERIFY all moderator temperature monitoring points indicate less than 212°F.

4.2.16.6 IF Group 2 PCIS logic has been defeated, THEN

RESTORE logic to operable status prior to exceeding 212°F moderator temperature. REFER to Illustration 2.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:_______________

____

****

Performance Step: Critical___ Not Critical___

4.2.17 IF Step 4.2.16 will not maintain the Reactor depressurized, THEN

PERFORM the following:

4.2.17.1 VERIFY Reactor vessel makeup from condensate system is available. REFER TO 2-OI-2.

4.2.17.2 VERIFY Main Condenser vacuum is available.
REFER TO 2-OI-66.

4.2.17.3 OPEN BOTH Inboard and Outboard MSIVs on at least one main steam line. REFER TO 2-OI-1.

4.2.17.4 OPEN Bypass valves as necessary to maintain the Reactor depressurized and moderator temperature less than 212°F.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:_______________

____

****

Performance Step: Critical___ Not Critical_-_

4.2.18 IF the Cold Shutdown Condition (Mode 4 or Mode 5) cannot be maintained, THEN

PERFORM the following:

4.2.18.1 VERIFY the Main Condenser vacuum is available. REFER TO 2-OI-66.

4.2.18.2 VERIFY CLOSED RPV HEAD VENT INBD(OUTBD) VALVES, 2-FCV-3-98(99).

4.2.18.3 PERFORM the required actions for systems and components required with the reactor in other than a Cold Shutdown Condition (Mode 4 or Mode 5) by the following:

- Technical Specifications (Improved Technical Specifications)
- 2-SI-1(2-SR-1)
- 2-GOI-100-1A

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical_-_

4.2.19 IF the Reactor is in a Hot Shutdown Condition (Mode 3), THEN

PERFORM the following:

4.2.19.1 IF the Reactor is to be maintained in a Hot Shutdown condition (Mode 3) (reactor coolant temperature above 212°F), THEN

REFER TO 2-GOI-100-12A.

4.2.19.2 EVALUATE the ability to achieve AND maintain the Reactor in a Cold Shutdown condition (Mode 4 or Mode 5) (reactor coolant temperature at or below 212°F).

4.2.19.3 IF the Reactor is to be depressurized, AND The Main Condenser is available, THEN

DEPRESSURIZE using one or more of the following systems:

- Turbine Bypass Valves.
- RFPT Drains.
- HPCI Steam Line Drains.
- RCIC Steam Line Drains.

NOTE:
Use of Non-ADS SRVs, if available is preferred to complete the next step.

4.2.19.4 IF the Reactor is to be depressurized AND the Main Condenser is NOT available AND RPV Pressure is above 50 psig, THEN

DEPRESSURIZE using the Suppression Pool as follows:

4.2.19.4.1 OPEN SRVs as required.

4.2.19.4.2 INITIATE 2-SI-4.7.A.1.a (2-SR-3.6.2.1.1), Suppression Chamber Water Check.

4.2.19.4.3 INITIATE Suppression Pool Cooling. REFER TO 2-OI-74.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:____________________________________

____

****

Performance Step: Critical___ Not Critical___

4.2.20 IF the Reactor Vessel Head is removed AND the Reactor Cavity is flooded, THEN

4.2.20.1 NOTIFY RADCON to closely MONITOR airborne radiation levels on the Refuel Floor due to higher water temperature.

4.2.20.2 VERIFY Refuel Floor ventilation fans are in FAST speed.

4.2.20.3 IF Reactor Well temperature and/or Reactor Vessel temperature increases to above 150°F, THEN

CONSIDER Evacuating the Refuel Floor.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

****

Performance Step: Critical___ Not Critical___

4.2.21 IF Fuel Pool gates are removed, THEN

PERFORM the following:

4.2.21.1 MAINTAIN Fuel Pool temperature below 125°F by operating the Fuel Pool Cooling System at maximum capacity. REFER TO 2-OI-78.

4.2.21.2 VERIFY Reactor Well Cooling is in service.
REFER TO 2-OI-78.

4.2.21.3 IF necessary to remove additional decay heat, THEN

INITIATE RHR Supplemental Fuel Pool Cooling.
REFER TO 2-OI-74.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:________________________________

****
Performance Step: Critical___ Not Critical___

#. Text from procedure or action required.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:______________________________

****
Performance Step: Critical___ Not Critical___

#. Text from procedure or action required.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:______________________________

****
Performance Step: Critical___ Not Critical___

#. Text from procedure or action required.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:______________________________

****
Performance Step: Critical___ Not Critical___

#. ***Text from procedure or action required.***

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:___

****
Performance Step: Critical___ Not Critical___

#. ***Text from procedure or action required.***

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:___

****
Performance Step: Critical___ Not Critical___

#. ***Text from procedure or action required.***

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:___

****
Performance Step: Critical___ Not Critical___

#. Text from procedure or action required.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:___

****
Performance Step: Critical___ Not Critical___

#. Text from procedure or action required.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:___

****
Performance Step: Critical___ Not Critical___

#. Text from procedure or action required.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:____

____

****

Performance Step: Critical___ Not Critical___

#. Text from procedure or action required.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:____

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****

Performance Step: Critical___ Not Critical___

#. Text from procedure or action required.

Standard:

Describe acceptable performance method.

SAT___UNSAT___N/A___ COMMENTS:____

____

****

Performance Step: Critical___ Not Critical X

PERFORMER demonstrated the use of 3-WAY COMMUNICATION and Touch Staar during the performance of this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION and Touch-Staar during the performance of this JPM to ensure proper understanding of directives given and ensure proper component manipulations. If UNSAT, note in comments section of JPM.

SAT_____ UNSAT______ N/A ______ COMMENTS:________________________

____

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TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

ABNORMAL OPERATING INSTRUCTION

2-AOI-74-1

LOSS OF SHUTDOWN COOLING

REVISION 21

PREPARED BY: Michael D. Campbell PHONE: 7350

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: GILBERT LITTLE DATE: 02/05/98

EFFECTIVE DATE: 02/23/98

LEVEL OF USE: REFERENCE USE

VALIDATION DATE: 03/27/93

QUALITY-RELATED

REVISION LOG

Procedure Number: 2-AOI-74-1 Revision Number: 21

Pages Affected: all

Description of Change: IC-22 -ISTS

A review of CTS, ITS Submittal, and the TRM was completed to support this procedure change which adds ITS / TRM references / requirements, as denoted by parentheses. At this time there are no changes to CTS required to support this procedure change. CTS requirements / references will be replaced by the ITS / TRM requirements/references when final NRC approval of the submittal is given. When final NRC approval of the submittal is given, no ITS / TRM changes will be required to support the procedure change removing CTS references / requirements. Other minor editorial changes have been made to correct editorial errors such as spelling errors and incorrectly numbered steps.

Page 4: Simplified direction of Step 4.2.8.5 as follows: ESTIMATE the time for reactor coolant temperature to reach 125°F and 150°F using a plot of the actual heatup rate or Illustration 1.

Illustration 2 has been restructured to incorporate some notes as procedure steps. This has been done because some notes were evaluated to be action steps.

1.0 PURPOSE

This instruction provides the symptoms and operator actions for a Loss of Shutdown Cooling.

2.0 SYMPTOMS

- RHR Pump Trip while in Shutdown Cooling Mode:
  - RHR SYS I PUMP A(C) TRIPPED, various conditions [2-XA-55-3D, Window 13(14)]
  - RHR SYS II PUMP B(D) TRIPPED, various conditions [2-XA-55-3E, Window 13(14)]

- Low RHR Shutdown Cooling Flow while in Shutdown Cooling Mode:
  - RHR SD CLG FLOW LOW at 3700 GPM (2-XA-55-3D, Window 11)

- Automatic isolation (PCIS Group II or 100 psig) or manual isolation of RHR System while in Shutdown Cooling Mode:
  - RHR SYS I/II DISCH OR SD CLG HDR PRESS HIGH at 100 psi (2-XA-55-3E, Window 32).
  - 2-FCV-74-47, RHR SHUTDOWN COOLING SUCT OUTBD ISOL VLV CLOSED.
  - 2-FCV-74-48, RHR SHUTDOWN COOLING SUCT INBD ISOL VLV CLOSED.
  - 2-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE CLOSED.
  - 2-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE CLOSED.

- Loss of RHRSW while in Shutdown Cooling Mode:
  - RHRSW HDR PRESS LOW at 50 psi decreasing (2-XA-55-3E, Window 31)

- High RHR cooling water temperature while in Shutdown Cooling Mode:
  - RHR/FPC HX OUTLET TEMP HIGH at 125°F (2-XA-55-3E, Window 18)

- Indication of pressure on RPV or increasing Reactor coolant temperature while in a Cold Shutdown condition (Mode 4 or Mode 5).

- Indication of RPV water level below +11.2 inches or Drywell pressure above 2.45 psig.

3.0 AUTOMATIC ACTIONS

None.

4.0 OPERATOR ACTIONS

4.1 Immediate Actions

None.

4.2 Subsequent Actions

****

CAUTION

Reactor vessel stratification may occur until Shutdown Cooling is restored or a Reactor Recirculation Pump is placed in service.

****

4.2.1 IF any EOI entry condition is met, THEN

ENTER the appropriate EOI(s).

4.2.2 NOTIFY the Shift Manager.

4.2.3 IF Refueling is in progress, THEN

NOTIFY the Refueling Floor SRO.

4.2.4 REVIEW EPIP-1, Emergency Plan Classification Logic, for entry conditions.

4.2 Subsequent Actions (continued)

4.2.5 IF Shutdown Cooling isolates on low RPV water level or high Drywell press (GROUP 2 ISOL) AND RPV water level needs restoring using LPCI, THEN

PERFORM the following before reaching -122 inches RPV water level:

4.2.5.1 VERIFY CLOSED the following valves on a Group 2 isolation:

- RHR SHUTDOWN COOLING SUCT OUTBD ISOL VLV, 2-FCV-74-47.
- RHR SHUTDOWN COOLING SUCT INBD ISOL VLV, 2-FCV-74-48.
- RHR SYS I LPCI INBD INJECT VALVE, 2-FCV-74-53.
- RHR SYS II LPCI INBD INJECT VALVE, 2-FCV-74-67.

4.2.5.2 DEPRESS RHR SYS I(II) SD CLG INBD INJECT ISOL RESET, 2-XS-74-126 and 2-XS-74-132 AND VERIFY 2-IL-74-126 and 2-IL-74-132 extinguished.

4.2.5.3 IF the RHR loop that was in shutdown cooling is needed for RPV water level makeup, THEN

PERFORM the following:

4.2.5.3.1 CLOSE RHR PUMP 2A(2B) and 2C(2D) SD COOLING SUCT VLVs, 2-FCV-74-2(25) and 2-FCV-74-13(36).

****

CAUTION

[NER] Failure to have RHR SHUTDOWN COOLING SHUT OUTBD and INBD ISOL VLVs, 2-FCV-74-47 and 2-FCV-74-48, closed may result in inadvertent draining of the reactor vessel through the RHR PUMP 2A(2B) and 2C(2D) SUPPR POOL SUCT VLVs, 2-FCV-74-1(24) and 2-FCV-74-12(35). [INPO SOER 87-002]

****

4.2.5.3.2 OPEN RHR PUMP 2A(2B) and 2C(2D) SUPPR POOL SUCT VLVs, 2-FCV-74-1(24) and 2-FCV-74-12(35).

4.2.5.3.3 PLACE RHR SYSTEM I(II) MIN FLOW INHIBIT switch, 2-HS-74-148(149), in NORM.

4.2.5.3.4 VERIFY RHR SYSTEM I(II) MIN FLOW VALVE, 2-FCV-74-7(30), opens.

4.2.6 IF Primary Containment Integrity is required, THEN

VERIFY RHR system discharge piping pressure is being maintained >48 psig. REFER TO 2-OI-74, Section 8.1.

4.2 Subsequent Actions (continued)

NOTES:

(1) With the Reactor in Cold Shutdown Condition (Mode 4 or Mode 5), reactor coolant stratification may be indicated by one of the following:

- Reactor pressure above 0 psig with any reactor coolant temperature indication reading at or below 212°F.
- Differential temperatures of 50°F or greater between either RX VESSEL BOTTOM HEAD (FLANGE DR LINE) 2-TE-56-29 (8) temperatures and RX VESSEL FW NOZZLE N4B END (N4B INBD)(N4B END)(N4D INBD) 2-TE-56-13(14)(15)(16) temperatures from the REACTOR VESSEL METAL TEMPERATURE recorder, 2-TR-56-4.
- With recirculation pumps and shutdown cooling out of service, a Feedwater sparger temperature of 200°F or greater on any RX VESSEL FW NOZZLE (N4B END (N4B INBD)(N4D END)(N4D INBD) 2-TE-56-13(14)(15)(16) temperatures from the REACTOR VESSEL METAL TEMPERATURE recorder, 2-TR-56-4.

(2) [NER/C] For purposes of thermal stratification monitoring, the bottom head drain line is more representative as long as there is flow in the line. [GE SIL 251 and 430]

4.2.7 PLOT heatup/cooldown rate as necessary. REFER TO 2-SI-4.6.A.1 (2-SR-3.4.9.1(A)).

4.2.8 DIRECT the STA to ESTIMATE the following times at least once per shift until a method of decay heat removal is restored:

4.2.8.1 DETERMINE the time since shutdown.

4.2.8.2 DETERMINE the current RPV heat-up rate from 2-SI-4.6.A.1 (2-SR-3.4.9.1(A)), or, if reactor coolant stratification is suspected, use Illustration 1. If additional information is required to determine the heat-up rates, contact Reactor Engineer.

4.2.8.3 DETERMINE the reactor coolant temperature or use the last valid reactor coolant temperature available.

4.2.8.4 ESTIMATE the time for reactor coolant temperature to reach 212°F, using data obtained in Steps 4.2.8.1 through 4.2.8.3.

4.2.8.5 IF the Reactor Vessel head is removed and the cavity is flooded with the fuel pool gates installed,

THEN ESTIMATE the time for reactor coolant temperature to reach ~~the following~~

~~temperatures~~125°F and 150°F using a plot of the actual heatup rate or Illustration 1~~÷~~.
~~⊟125°F~~

~~150°F~~

4.2 Subsequent Actions (continued)

4.2.9 IF the loss of Shutdown Cooling is due to inadequate RHRSW flow, THEN

START the standby RHRSW pump for the appropriate header. REFER TO 0-OI-23.

4.2.10 IF the loss of Shutdown Cooling is due to Group 2 PCIS isolation, WHEN conditions which permit resetting Group 2 PCIS isolation are met, THEN

PERFORM the following:

4.2.10.1 RESET Group 2 isolation by momentarily PLACING PCIS DIV I RESET, 2-HS-64-16A-S32, and PCIS DIV II RESET, 2-HS-16A-S33, in reset.

4.2.10.2 Momentarily DEPRESS RHR SYS I(II) SD CLG INBD INJECT ISOL RESET, 2-XS-74-126 and 2-XS-74-132. VERIFY 2-IL-74-126 and 2-IL-74-132 extinguished.

4.2.11 IF the loss of Shutdown Cooling is due to Group 2 PCIS AND the isolation signal fails to reset or remain reset due to invalid and/or sporadic signals, THEN

PERFORM the following:

4.2.11.1 VERIFY primary containment integrity is NOT required.

****

CAUTION

Defeating of PCIS group 2 isolation logic for Shutdown Cooling is ONLY to be used for an isolation due to a verified false or spurious signal OR an instrument failure. Allowance for defeating these interlocks is not permitted for isolations due to an actual low water level condition.

****

4.2.11.2 OBTAIN Shift Manager permission to defeat the Group 2 PCIS isolation logic for Shutdown Cooling.

4.2.11.3 DEFEAT RHR Group 2 PCIS isolation logic. REFER TO Illustration 2.

****

CAUTION

Group 2 PCIS isolation logic must be operable any time primary containment integrity is required in order to meet requirements of Technical Specifications~~.~~
(ITS 3.3.6.1~~-~~).

****

4.2.11.4 IF conditions change such that primary containment integrity must be reestablished, THEN

Immediately RESTORE Group 2 PCIS Isolation Logic. REFER TO Illustration 2.

4.2 Subsequent Actions (continued)

4.2.12 INCREASE RWCU flow rate to maximum AND maximize RWCU blowdown as required to maintain reactor coolant temperatures less than 200°F on all indications. REFER TO 2-OI-69.

****

CAUTION

Accurate coolant temperatures will not be available if all forced circulation is lost.

****

4.2.13 [NER/C] IF forced circulation has been lost AND vessel cavity is less than 80 inches, THEN

PERFORM the following:

4.2.13.1 RAISE RPV water level to 80 inches as indicated on RX WTR LEVEL FLOOD-UP, 2-LI-3-55.

4.2.13.2 MAINTAIN RPV water level between +70 inches to +90 inches as indicated on RX WTR LEVEL FLOOD-UP, 2-LI-3-55.

4.2.13.3 INCREASE monitoring frequency of reactor coolant temperature and pressure, using multiple indications.

4.2.14 RETURN the affected loop of RHR to Shutdown Cooling. REFER TO 2-OI-74.

4.2.14.1 IF the affected loop of RHR cannot be placed back in Shutdown Cooling, THEN

PLACE the alternate loop of RHR in Shutdown Cooling. REFER TO 2-OI-74.

4.2.14.2 IF no Unit 2 RHR loop can be placed in Shutdown Cooling, THEN

OBTAIN Shift Manager approval and PLACE Unit 1 RHR loop in service, CROSS-TIED with Unit 2, for Shutdown Cooling. REFER to 2-OI-74.

4.2.14.3 IF no RHR loops can be placed in service, THEN

VERIFY a Recirculation Pump in service. REFER TO 2-OI-68.

4.2 Subsequent Actions (continued)

4.2.15 IF the Reactor is in a Cold Shutdown Condition (Mode 4 or Mode 5) AND the reactor vessel head studs are tensioned or head tensioning is in progress, THEN

PERFORM 2-SI-4.6.A.5 (2-SR-3.4.9.5-7), RPV Temperature Monitoring with Head Tensioned.

4.2.16 PERFORM the following prior to exceeding 212•F moderator temperature:

4.2.16.1 VERIFY Main Condenser vacuum is available. REFER TO 2-OI-66.

4.2.16.2 CLOSE Inboard OR Outboard MSIVs on each main steam line.

4.2.16.3 ESTABLISH Reactor vessel vent path by verifying the following valves are opened:

- 2-FCV-1-55.
- 2-FCV-1-56.
- 2-FCV-1-57.
- 2-FCV-1-58.

4.2.16.4 THROTTLE OPEN 2-FCV-1-59 and MAINTAIN the Reactor depressurized.

4.2.16.5 VERIFY all moderator temperature monitoring points indicate less than 212°F.

4.2.16.6 IF Group 2 PCIS logic has been defeated, THEN

RESTORE logic to operable status prior to exceeding 212°F moderator temperature. REFER to Illustration 2.

4.2 Subsequent Actions (continued)

4.2.17 IF Step 4.2.16 will not maintain the Reactor depressurized, THEN

PERFORM the following:

4.2.17.1 VERIFY Reactor vessel makeup from condensate system is available. REFER TO 2-OI-2.

4.2.17.2 VERIFY Main Condenser vacuum is available. REFER TO 2-OI-66.

4.2.17.3 OPEN BOTH Inboard and Outboard MSIVs on at least one main steam line. REFER TO 2-OI-1.

4.2.17.4 OPEN Bypass valves as necessary to maintain the Reactor depressurized and moderator temperature less than 212°F.

4.2.18 IF the Cold Shutdown Condition (Mode 4 or Mode 5) cannot be maintained, THEN

PERFORM the following:

4.2.18.1 VERIFY the Main Condenser vacuum is available. REFER TO 2-OI-66.

4.2.18.2 VERIFY CLOSED RPV HEAD VENT INBD(OUTBD) VALVES, 2-FCV-3-98(99).

4.2.18.3 PERFORM the required actions for systems and components required with the reactor in other than a Cold Shutdown Condition (Mode 4 or Mode 5) by the following:

- Technical Specifications (Improved Technical Specifications)
- 2-SI-1(2-SR-1)
- 2-GOI-100-1A

4.2 Subsequent Actions (continued)

4.2.19 IF the Reactor is in a Hot Shutdown Condition (Mode 3), THEN

PERFORM the following:

4.2.19.1 IF the Reactor is to be maintained in a Hot Shutdown condition (Mode 3) (reactor coolant temperature above 212°F), THEN

REFER TO 2-GOI-100-12A.

4.2.19.2 EVALUATE the ability to achieve AND maintain the Reactor in a Cold Shutdown condition (Mode 4 or Mode 5) (reactor coolant temperature at or below 212°F).

4.2.19.3 IF the Reactor is to be depressurized, AND The Main Condenser is available, THEN

DEPRESSURIZE using one or more of the following systems:

- Turbine Bypass Valves.
- RFPT Drains.
- HPCI Steam Line Drains.
- RCIC Steam Line Drains.

NOTE:
Use of Non-ADS SRVs, if available is preferred to complete the next step.

4.2.19.4 IF the Reactor is to be depressurized AND the Main Condenser is NOT available AND RPV Pressure is above 50 psig, THEN

DEPRESSURIZE using the Suppression Pool as follows:

4.2.19.4.1 OPEN SRVs as required.

4.2.19.4.2 INITIATE 2-SI-4.7.A.1.a~~,~~ (2-SR-3.6.2.1.1), Suppression Chamber Water Check.

4.2.19.4.3 INITIATE Suppression Pool Cooling. REFER TO 2-OI-74.

4.2 Subsequent Actions (continued)

4.2.20 IF the Reactor Vessel Head is removed AND the Reactor Cavity is flooded, THEN

4.2.20.1 NOTIFY RADCON to closely MONITOR airborne radiation levels on the Refuel Floor due to higher water temperature.

4.2.20.2 VERIFY Refuel Floor ventilation fans are in FAST speed.

4.2.20.3 IF Reactor Well temperature and/or Reactor Vessel temperature increases to above 150°F, THEN

CONSIDER Evacuating the Refuel Floor.

4.2.21 IF Fuel Pool gates are removed, THEN

PERFORM the following:

4.2.21.1 MAINTAIN Fuel Pool temperature below 125°F by operating the Fuel Pool Cooling System at maximum capacity. REFER TO 2-OI-78.

4.2.21.2 VERIFY Reactor Well Cooling is in service. REFER TO 2-OI-78.

4.2.21.3 IF necessary to remove additional decay heat, THEN

INITIATE RHR Supplemental Fuel Pool Cooling. REFER TO 2-OI-74.

5.0 REFERENCES

5.1 Technical Specifications
(Improved Technical Specifications-ITS/Requirements)

Section 3.2.A, Primary Containment and Reactor Building Isolation Functions.
Section 3.2.B, Core and Containment Cooling Systems Initiation and Control.
Section 3/4.5.B, RHR System.
Section 3/4.5.C, RHR Service Water and EECW Systems.
Section 3.6.B, Coolant Chemistry.
Section 3.7.A, Primary Containment (3.7.A.1, 3.7.A.2, 3.7.A.6).
Section 3.7.D, Primary Containment Isolation Valves.
Section 6.8, Procedures/Instructions and Programs.
(ITS Section 3.3.5.1, Emergency Core Cooling System (ECCS) Instrumentation)
(ITS Section 3.3.6.1, Primary Containment Isolation Instrumentation)
(ITS Section 3.3.6.2, Secondary Containment Isolation Instrumentation)
(ITS Section 3.4.7, Residual Heat Removal (RHR) Shutdown Cooling System - Hot Shutdown)
(ITS Section 3.4.8, Residual Heat Removal (RHR) Shutdown Cooling System - Cold Shutdown)
(ITS Section 3.4.9, RCS Pressure and Temperature (P/T) Limits)
(ITS Section 3.5.1, ECCS - Operating)
(ITS Section 3.5.2, ECCS - Shutdown)
(ITS Section 3.6.1.1, Primary Containment)
(ITS Section 3.6.1.3, Primary Containment Isolation Valves (PCIVs))
(ITS Section 3.6.2.1, Suppression Pool Average Temperature)
(ITS Section 3.6.2.2, Suppression Pool Water Level)
(ITS Section 3.6.2.3, Residual Heat Removal (RHR) Suppression Pool Cooling)
(ITS Section 3.6.2.4, Residual Heat Removal (RHR) Suppression Pool Spray)
(ITS Section 3.6.2.5, Residual Heat Removal (RHR) Drywell Spray)
(ITS Section 3.6.2.6, Drywell-to-Suppression Chamber Differential Pressure)
(ITS Section 3.6.4.1, Secondary Containment)
(ITS Section 3.6.4.2, Secondary Containment Isolation Valves (SCIVs))
(ITS Section 3.7.1, Residual Heat Removal Service Water (RHRSW) System)
(ITS Section 3.7.2, Emergency Equipment Cooling Water (EECW) System and Ultimate Heat Sink (UHS))
(ITS Section 3.9.6, Reactor Pressure Vessel (RPV) Water Level)
(ITS Section 3.9.7, Residual Heat Removal (RHR) - High Water Level)
(ITS Section 3.9.8, Residual Heat Removal (RHR) - Low Water Level)
(ITS Section 5.4, Procedures)
(ITS Section 5.5, Programs and Manuals)
(Technical Requirements Manual-TRM)
(TRM Section 3.3.3.1, ECCS Keep Fill)
(TRM Section 3.3.3.2, RHR and Core Spray Pump Motor Cooler Thermostats)
(TRM Section 3.3.3.5, Containment Spray Pressure Permissive)
(TRM Section 3.4.1, Coolant Chemistry)
(TRM Section 3.5.1, RHR Cross-Connect)
(TRM Section 3.5.2, Standby Coolant Supply)
(TRM Section 3.5.3, Equipment Area Coolers)
(TRM Section 3.5.4, Maintenance of Filled Discharge Pipe)
(TRM Section 3.6.5, Nitrogen Makeup to Containment)

5.0 REFERENCES (continued)

5.2 Final Safety Analysis Report
Section 4.8, RHR System
Section G.5.3.5.2, Event 35 Loss of Shutdown Cooling

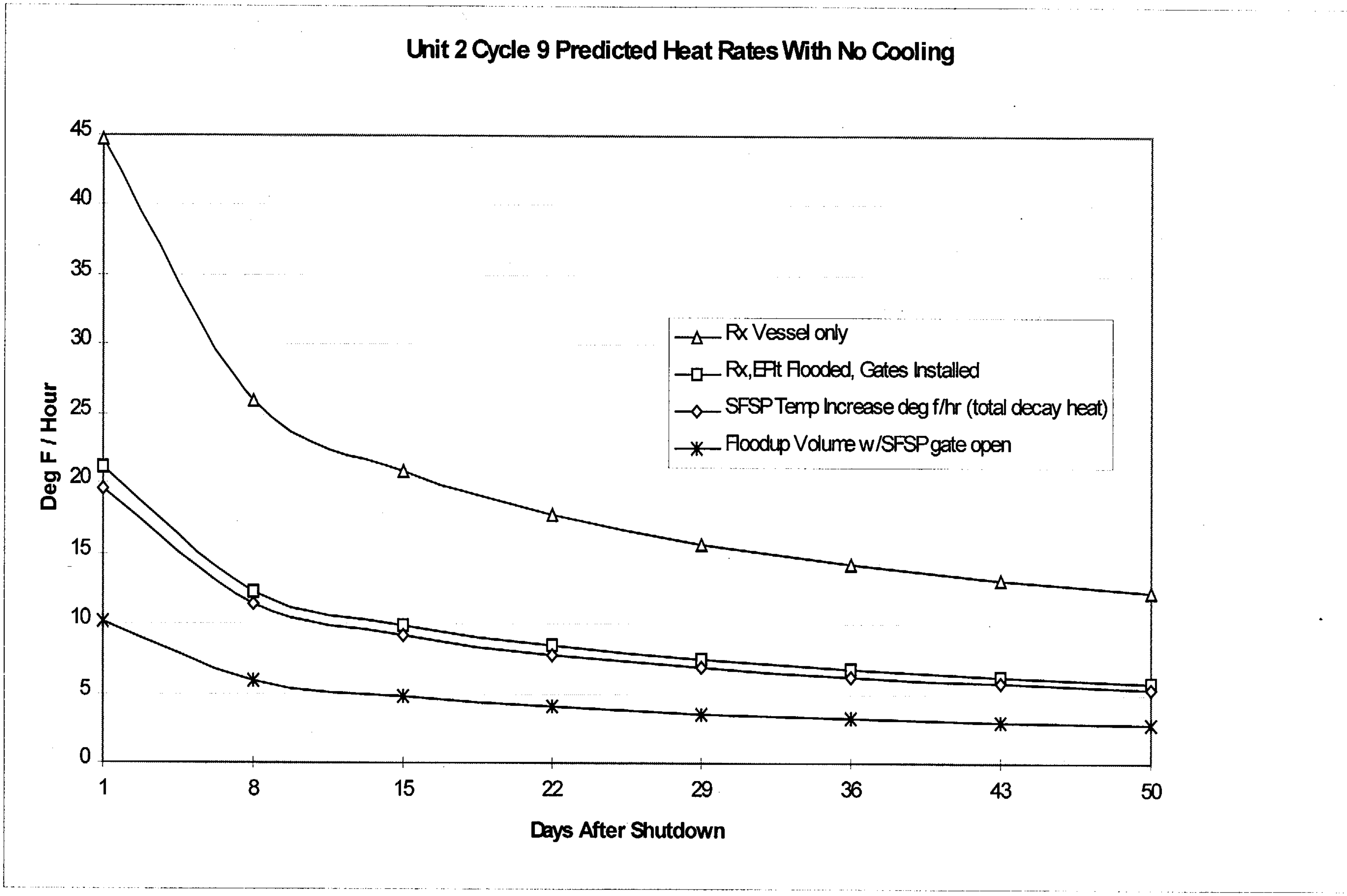
5.3 Plant Instructions
2-ARP-9-3, Panel 9-3 Annunciator Response Procedure
EPIP-1, Emergency Plan Classification Logic
2-GOI-100-1A, Unit Startup from Cold Shutdown to Power Operation and Return to Full Power from Power Reductions
2-GOI-100-3, Refueling Operations
2-GOI-100-12A, Unit Shutdown from Power Operation to Cold Shutdown and Reductions in Power During Power Operations
2-OI-1, Main Steam System
0-OI-23, RHRSW System
2-OI-47, Turbogenerator System
2-OI-68, Reactor Recirculation System
2-OI-71, Reactor Core Isolation Cooling System
2-OI-73, High Pressure Coolant Injection System
2-OI-74, RHR System
2-OI-75, Core Spray System
2-OI-78, Fuel Pool Cooling and Demin System
0-OI-82, Standby Diesel Generator System
2-SI-1~~,~~ (2-SR-1), Surveillance Program
2-SI-4.6.A.1 (2-SR-3.4.9.1(A)), Reactor Heatup or Cooldown Rate Monitoring
2-SI-4.6.A.5 (2-SR-3.4.9.5-7), RPV Temperature Monitoring with Head Tensioned
2-SI-4.7.A.1.a~~,~~ (2-SR-3.6.2.1.1), Suppression Chamber Water Check
2-OI-66, Off-gas Operating Instruction

5.4 Plant Drawings
2-47E811-1, Flow Diagram, Residual Heat Removal System
2-47E855-1, Flow Diagram, Fuel Pool Cooling System
2-45E779-22, Wiring Diagram 480V Shutdown Aux Power Schematic
2-45E2671-4, Wiring Diagram Unit Aux Instrument Board Panel 9-33
2-45E2670-6, Wiring Diagrams Unit Aux Instrument Boards Relay Cabinet Panel 9-32
2-730E937-7, 4 Elementary Diagram Residual Heat Removal System
2-791E441, Engineered Safeguard Subsystem II Relay Cabinet (Panel 9-33)

5.5 Miscellaneous Documents
GE SIL 251, Control of RPV Bottom Head Temperatures
GE SIL 357, Control of Reactor Vessel/Temperature During Shutdown
GE SIL 430, Reactor Pressure Vessel Temperature Monitoring
NRC IE Notice 90-005, Inter-System Discharge of Reactor Coolant
NRC IE Notice 91-050, A Review of Water Hammer Events after 1985.

ILLUSTRATIONS/ATTACHMENTS
Illustration 1 - Unit 2 Cycle 9 Predicted Heat Rates With No Cooling.
Illustration 2 - Defeating/Restoring PCIS Group 2 Isolation Logic for Shutdown Cooling

END OF TEXT


Unit 2 Cycle 9 Predicted Heat Rates With No Cooling
45
40
35
30
25
20
15
10
5
0
Deg F / Hour
1
8
15
22
29
36
43
50
Days After Shutdown
Rx Vessel only
Rx,EFlt Flooded, Gates Installed
SFSP Temp Increase deg f/hr (total decay heat)
Floodup Volume w/SFSP gate open

1.0 Defeating PCIS GROUP 2 Isolation Logic for Shutdown Cooling

~~INITIALS & DATE~~

~~NOTES:~~

~~(1) This Illustration is ONLY to be used for an isolation due to a verified false or spurious signal OR an instrument failure. Allowance for defeating these interlocks is not permitted for isolations due to an actual low water level condition.~~

~~(2) If at any time during the use of this attachment, Primary Containment is required, the restoration section of this attachment must be completed immediately.~~

~~(3) Caution order tags should be placed on the affected valve hand switches stating:~~

~~"Group 2 PCIS ISOLATIONS of this valve have been DEFEATED PER 2-AOI-74-1, Illustration 2. GROUP 2 PCIS ISOLATIONS of this valve MUST BE RESTORED prior to Primary Containment being required".~~

~~(4) CISS will remain illuminated.~~

NOTES:

(1) When PCIS Group 2 Logic is defeated by this instruction, CISS will remain illuminated.

~~(5) Within the context of this procedure a field-~~2) Within the context of this procedure a field-side wire refers to an individual wire which is contained within a cable which is pulled between control panels to interconnect same at an interface terminal strip. A panel-side wire refers to the internal panel wiring which is utilized to connect internal relays, switches, terminal strips, and other panel components.

1.1 IF the isolation is due to an actual low water level condition, THEN

DO NOT use this Illustration for defeating these interlocks.

1.2 If at any time during the use of this attachment, Primary Containment is required, THEN

PERFORM the restoration section of this attachment immediately.

1.3 Check that, this Illustration is ONLY being used for an isolation due to a verified false or spurious signal OR an instrument failure.

1.4 PLACE Caution order tags on the affected valve hand switches stating:

"Group 2 PCIS ISOLATIONS of this valve have been DEFEATED PER 2-AOI-74-1, Illustration 2. GROUP 2 PCIS ISOLATIONS of this valve MUST BE RESTORED prior to Primary Containment being required".

1.5 PERFORM the following to DEFEAT the Group 2 PCIS isolation logic for Shutdown Cooling for the associated valves:

1.5.1 LIFT the GRAY, field-side wire on terminal GG-4 at Panel 2-9-32(REAR), for 2-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE.

_______/_______
1st 2nd

1.5.2 LIFT the GRAY, field-side wire on terminal GG-2 at Panel 2-9-33(REAR), for 2-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE.

_______/_______
1st 2nd

1.5.3 LIFT the BLACK, field-side wire on terminal BB-79 at Panel 2-9-43(FRONT), for 2-FCV-74-47, RHR SHUTDOWN COOLING SUCT OUTBD ISOL VLV.

______/______
1st 2nd

1.5.4 LIFT the BLACK, field-side wire on terminal CC-51 at Panel 2-9-42(FRONT), for 2-FCV-74-48, RHR SHUTDOWN COOLING SUCT INBD ISOL VLV.

______/______
1st 2nd

1.~~2 PLACE~~6 VERIFY a Caution Order has been placed on the above listed valve control room hand switches to inform the operator that the conditions of this illustration are in affect.

______/______
INITIALS / DATE

Responsible Organization: Operations

Retention Period: NONE

2.0 Restoring PCIS Group 2 Isolation Logic for Shutdown Cooling

2.1 VERIFY Shutdown Cooling REMOVED from service.
REFER TO 2-OI-74.

_________/_________
INITIALS / DATE

****

CAUTION

Landing leads could cause spurious Group 2 PCIS isolation signals.

****

2.2 PERFORM the following to RESTORE the Group 2 PCIS isolation logic for Shutdown Cooling to the associated valves:

2.2.1 LAND the GRAY, field-side wire on terminal GG-4 at Panel 2-9-32(REAR), for 2-FCV-74-53, RHR SYS I LPCI INBD INJECT VALVE.

_________/_________
1st 2nd

2.2.2 LAND the GRAY, field-side wire on terminal GG-2 at Panel 2-9-33(REAR), for 2-FCV-74-67, RHR SYS II LPCI INBD INJECT VALVE.

_________/_________
1st 2nd

2.2.3 LAND the BLACK, field-side wire on terminal BB-79 at Panel 2-9-43(FRONT), for 2-FCV-74-47, RHR SHUTDOWN COOLING SUCT OUTBD ISOL VLV.

_________/_________
1st 2nd

2.2.4 LAND the BLACK, field-side wire on terminal CC-51 at Panel 2-9-42(FRONT), for 2-FCV-74-48, RHR SHUTDOWN COOLING SUCT INBD ISOL VLV.

_________/_________
1st 2nd

2.3 RESET isolation by momentarily PLACING PCIS DIV I RESET, 2-HS-64-16A-S32, and PCIS DIV II RESET, 2-HS-64-16A-S33, in the reset position.

_________/_________
INITIALS / DATE

2.4 Momentarily DEPRESS RHR SYS I(II) SD CLG INBD INJECT ISOL RESET, 2-XS-74-126 and 2-XS-74-132 AND VERIFY 2-IL-74-126 and 2-IL-74-132 extinguished.

_________/_________
INITIALS / DATE

2.5 VERIFY relays 16A-K29 on Panel 2-9-42 and 16A-K30 on Panel 2-9-43 are picked up.

_________/_________
INITIALS / DATE

2.6 REMOVE the Caution Order placed in step 1.2 on the control room hand switches.

_________/_________
INITIALS / DATE

Responsible Organization: Operations   Retention Period: NONE

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 106

TITLE: MANUALLY START A D/G LOCALLY

TASK NUMBER: A-082-NO-03

Why isn't depressing the fuel priming pump PB critical?

SUBMITTED BY: Russell A Eder DATE: 10/27/99

VALIDATED BY: [illegible] DATE: 10/27/99

APPROVED: [illegible] TRAINING DATE: 10/27/99

PLANT CONCURRENCE: [illegible] OPERATIONS DATE: 10.28.99

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
0			NEW JPM
1		ALL	GENERAL REVISION
2	10/3/94	ALL	GENERAL REVISION
3	11/29/94	3	CHANGED PROCEDURE REV
4	10/31/95	4	GENERAL REVISION
5	8/2/96	ALL	PROCEDURE REV, ADDED CRITICAL STEPS ON TOUCH STAAR AND SAFETY, UNIT, AND DELETED UNDERSTAND
6	10/24/96	4, 18, 19	CHANGED CRIT. STEPS ON TOUCH STAAR AND SAFETY TO NON-CRIT.
7	11/18/96	ALL	PROCEDURE UPGRADE
8	8/4/97	ALL	FORMAT DOCUMENT, NEW REVISION, ADD NON-CRITICAL 3-WAY COMM.
9	10/1/97	3,9,12,14	PROCEDURE UPDATE
10	10/27/98	3	PROCEDURE REVISION
11	10/26/99	ALL	PROCEDURE REVISION & NEW FORMAT, MGT. EXPECT TO PLANT WORK EXPECT.

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR: ____________________ SS# ____________________

RO ________ SRO ________ DATE: ____________________

JPM NUMBER: 106

TASK NUMBER: A-082-NO-03

TASK TITLE: MANUALLY START A DIESEL GENERATOR LOCALLY

K/A NUMBER: 264000G9 K/A RATING: RO 3.8 SRO: 3.9

****

TASK STANDARD: SIMULATE PERFORMING ACTIONS REQUIRED TO START 'A' D/G LOCALLY

LOCATION OF PERFORMANCE: SIMULATOR ___ PLANT X CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 0-OI-82, REV 68

VALIDATION TIME: CONTROL ROOM: ________ LOCAL: 12:00

MAX. TIME ALLOWED: ________ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM ______ LOCAL ______

COMMENTS: ____

____

Additional comment sheets attached? YES ______ NO ____

RESULTS: SATISFACTORY ________ UNSATISFACTORY ________

SIGNATURE: ____________________ DATE: ____________________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEPS: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

1. **PERFORMER** shall abide by all SAFETY RULES (hardhats, safety glasses, sideshields, and hearing protection shall be worn **AS REQUIRED**). **Electrical Safety** shall also be in compliance: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within **REACHING DISTANCE** of exposed energized electrical conductors of 50 volts or greater. **CAUTION IS WARRANTED** when utilizing a laser pointer to perform TOUCH STAAR around electrical components during plant JPM's.

2. **PERFORMER** shall demonstrate the use of TOUCH STAAR during this JPM.

3. **PERFORMER** shall demonstrate the use of 3-WAY COMMUNICATION.

****

INITIAL CONDITIONS: You are an extra operator. D/G 'A' Special Test 2-82-1A is in progress. D/G 'A' is in standby readiness in accordance with Section 4.0 of 0-OI-82 and has been rolled in the last 24 hours.

INITIATING CUES: "NAME" slow start D/G 'A' locally at the diesel engine control cabinet as directed by 0-OI-82.

5.5 Manual Slow Start at Diesel Engine Control Cabinet

****

Performance Step : Critical____ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required procedure.

Standard:

IDENTIFIED OR OBTAINED copy of 0-OI-82.

SAT___UNSAT___N/A___ COMMENTS:

NOTE:

The diesel generator will be made inoperable as a result of taking 0-BKR-254-000A(B,C,D)/06, DSL GEN A(B,C,D) logic relay panel, (logic breaker) in "OFF" for the purpose of a manual slow start. The diesel generator shall be considered operable when 0-BKR--254-000A (B,C,D)/06, DSL GEN A(B,C,D) LOGIC RELAY PANEL, (logic breaker)is returned in "ON". **REFER TO** Tech Spec 3.8.1 and 3.8.2, Operation with Inoperable Equipment.

****

Performance Step: Critical___ Not Critical X

5.5.1 VERIFY the following initial conditions:

5.5.1.1 All Precautions and Limitations in Section 3.0 have been reviewed.

Standard:

REVIEWED section 3.0 of 0-OI-82.

SAT___UNSAT___N/A___ COMMENTS:

START TIME______

****

Performance Step: Critical___ Not Critical X

5.5.1.2 Diesel Generator A(B,C,D) is in Standby Readiness. **REFER TO** Section 4.0.

Standard:

None

SAT___UNSAT___N/A X COMMENTS: Given in the Initial Conditions.

NOTE: All manipulations of the Diesel Generator Logic Breaker shall be logged in the Narrative Log.

****

Performance Step: Critical X Not Critical__

5.5.1.3 IF the Diesel Generator A(B,C,D) does NOT need to be rolled OR has been rolled in the last 24 hours, THEN

OPEN 0-BKR-254-000A(B,C,D)/06, DSL GEN A(B, C,D) LOGIC RELAY PANEL (LOGIC BREAKER) and DELETE Step 5.5.3.

Standard:

SIMULATED PLACING 0-BKR-254-000A/06 in the OFF position.

SAT___UNSAT___N/A___ COMMENTS:________________

CUE: [WHEN SIMULATED] THE LOGIC BREAKER IS IN THE OFF POSITION.

****

Performance Step: Critical___ Not Critical X

5.5.2 **OBTAIN** an Illustration 2, for each diesel generator to be operated.

CUE: ANOTHER OPERATOR WILL PERFORM ILLUSTRATION 2.

Standard:

NONE.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical X

5.5.3 PERFORM Diesel Generator rolling per Section 5.6.

Standard:

None

SAT___UNSAT___N/A X COMMENTS: Given in the Initial Conditions.

____

NOTE:

EECW pumps assigned to automatic service on the EECW headers will receive an automatic start signal when a diesel generator is started.

****

Performance Step: Critical___ Not Critical_X_

5.5.4 VERIFY the presence of EECW cooling water flow to the diesel.

Standard:

VERIFIED EECW cooling water flow to 'A' diesel generator by valve position and/or sound of flow through pipe.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

NOTE:

[II/C] The DG governor must be adjusted to low speed setting after the stop logic has reset and the governor has automatically readjusted to the fast start setting. [BF PER950677]

****

Performance Step: Critical X Not Critical ___

5.5.5 HOLD GOVERNOR CONTROL switch in LOWER until the SPEED setting adjustment control knob is adjusted to its minimum setting.

Standard:

SIMULATED HOLDING the governor control switch in the LOWER position for several seconds. **LOCATED** speed setting adjustment control knob and **INDICATED** location of minimum (0) indication.

EVALUATOR NOTE: Only holding the governor control switch in the lower position is a Critical Step.

CUE: SPEED ADJUSTMENT SETTING INDICATES ZERO.

SAT___UNSAT___N/A___ COMMENTS: ______________________________

____

****

Performance Step: Critical___ Not Critical X

5.5.6 DEPRESS FUEL PRIMING PUMP pushbutton, 0-HS-18-49A (B,C,D), until fuel pressure exceeds 20 psig as indicated on PRIMING FUEL PRESS, 0-PI-18-51A(B,C, D).

Standard:

SIMULATED MOMENTARILY DEPRESSING fuel priming pump pushbutton 0-HS-18-49A and **INDICATED** position of 20 psig on 0-PI-18-51A.

CUE: THE PRIMING PUMP HAS STARTED.

IF EXAMINEE CHECKS PRIMING FUEL PRESSURE GAUGE 0-PI-18-51A INDICATES 26 PSIG.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

****

Performance Step: Critical X Not Critical__

5.5.7 DEPRESS ENGINE START pushbutton, 0-HS-82-596, (533, 557,570) and VERIFY the following:

5.5.7.1 Diesel engine starts, accelerates and stabilizes at an engine speed of 440 to 460 RPM.

5.5.7.2 Lube oil pressure rises to greater than 20 psig as indicated on MAIN BEARING LUBE OIL PRESS, 0-PI-82-28A (B, C, D).

Standard:

SIMULATED MOMENTARILY DEPRESSING engine start pushbutton 0-HS-82-596. **INDICATED** position of 440 to 460 RPM on D/G 'A' engine speed indicator located on the diesel engine control cabinet and **INDICATED** position of 20 psig indication of 0-PI-82-28A.

Evaluator Note: Only depressing the engine start pushbutton is a Critical Step.

CUE: THE DIESEL ENGINE HAS STARTED.

IF THE EXAMINEE CHECKS THE SPEED INDICATOR INDICATED SPEED IS 453 RPM.

IF THE EXAMINEE CHECKS THE LUBE OIL PRESSURE INDICATOR 0-PI-82-28A INDICATES 26 PSIG.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical X

5.5.8 RECORD reason for start, type of start and time/date started on Illustration 2.

CUE: ANOTHER OPERATOR WILL PERFORM ILLUSTRATION 2.

Standard:

NONE.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

****

Performance Step: Critical___ Not Critical X

5.5.9 ALLOW engine to idle at between 440 and 460 RPM for at least 10 minutes.

Standard:

SIMULATED allowing the engine to idle.

CUE: TEN MINUTES HAVE ELAPSED AND DIESEL ENGINE SPEED HAS REMAINED UNCHANGED.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

****

Performance Step: Critical X Not Critical__

5.5.10 HOLD GOVERNOR CONTROL 0-HS-082-000A(B,C, D)/3C switch in RAISE until engine speed stops rising (930 RPM).

Standard:

SIMULATED HOLDING the governor control switch in the RAISE position and **INDICATED** position of 930 RPM speed indication on speed indicator located on diesel engine control cabinet. **SIMULATED RELEASING** the governor control switch.

Evaluator Note: Only simulating holding the governor control switch in the raise position is a Critical Step.

CUE: THE DIESEL ENGINE SPEED IS RISING. [PAUSE] THE DIESEL ENGINE SPEED IS NOW CONSTANT.

IF EXAMINEE CHECKS THE SPEED INDICATOR ENGINE SPEED IS INDICATED AT 930 RPM.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

NOTE:

RIGHT BANK AIR CMP AC MOTOR control switch, 0-HS-086-0669A,B,C, or D and the LEFT BANK AIR CMP AC MOTOR control switch, 0-HS-086-0668A/AC,B,C,or D must remain in AUTO or MANUAL to allow for manual generator field flashing.

****

Performance Step: Critical_X_ Not Critical__

5.5.11 DEPRESS FIELD FLASH pushbutton and VERIFY the following:

5.5.11.1 Engine speed stabilizes at between 885 RPM and 915 RPM.

5.5.11.2 Diesel generator voltage stabilizes between 4250 VOLTS and 4400 VOLTS as indicated on Diesel Generator A(B,C,D) Protective Relay Cabinet.

EVALUATOR NOTE: ONLY DEPRESSING THE FIELD FLASH PUSHBUTTON IS CRITICAL.

Standard:

SIMULATED MOMENTARILY DEPRESSING the field flash pushbutton. **INDICATED** position of indicated engine speed of between 885 and 915 RPM as indicated on diesel engine speed indicator located on diesel engine control cabinet and position of indicated D/G voltage of between 4250 VOLTS and 4400 volts as indicated on D/G 'A' protective relay cabinet.

CUE: THE FIELD HAS BEEN FLASHED.

IF THE EXAMINEE CHECKS THE SPEED INDICATOR INDICATED ENGINE SPEED STABILIZED AT 905 RPM.

IF THE EXAMINEE CHECKS THE VOLTAGE INDICATOR INDICATED VOLTAGE IS 4325 VOLTS.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

____

****

Performance Step: Critical___ Not Critical X

5.5.12 STATION an operator at Panel 9-23.

Standard:

SIMULATED CONTACTING control room.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

CUE: AN OPERATOR IS STANDING BY AT PANEL 9-23.

NOTE: All manipulations of the Diesel Generator Logic Breaker shall be logged in the Narrative Log.

****

Performance Step: Critical X Not Critical ___

5.5.13 PLACE 0-BKR-254-000A(B,C,D)/06, DSL GEN A(B,C,D) LOGIC RELAY PANEL, (LOGIC BREAKER) in "ON" on 0-BDGG-254-0000A(B,C,D), 125V DC DSL SYS BAT BOARD A (B,C,D).

Standard:

SIMULATED PLACING 0-BKR-254-000A/06 in the ON position.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

CUE: [WHEN SIMULATED] THE LOGIC BREAKER IS IN THE ON POSITION.

****

Performance Step: Critical___ Not Critical X

5.5.14 NOTIFY operator at Panel 9-23 that control of the diesel generator has been transferred to Panel 9-23.

Standard:

SIMULATED NOTIFYING Panel 9-23 operator.

SAT___UNSAT___N/A___ COMMENTS:______________________________

5.5.15 PLACE the associated Diesel Generator control switch to START at Panel 9-23:

Diesel	Handswitch Name	Handswitch No.	Panel
A	DG A CONTROL	0-HS-82-A/1A	0-9-23-7
B	DG B CONTROL	0-HS-82-B/1A	0-9-23-7
C	DG C CONTROL	0-HS-82-C/1A	0-9-23-8
D	DG D CONTROL	0-HS-82-D/1A	0-9-23-8

CUE: THE UNIT OPERATOR AT PANEL 9-23 HAS PERFORMED STEP 5.5.15 BY PLACING THE DIESEL GENERATOR 'A' ENGINE CONTROL SWITCH IN THE START POSITION.

****

Performance Step: Critical___ Not Critical_X_

5.5.16 VERIFY Diesel Generator A(B,C,D) Electrical Control Cabinet Exhaust Fan is operating.

Standard:

SIMULATED VERIFYING control cabinet exhaust fan is operating by holding sheet of paper next to louvers or looking at fan shaft.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

CUE: THE DIESEL GENERATOR 'A' ELECTRICAL CONTROL CABINET EXHAUST FAN IS OPERATING PROPERLY.

NOTE:

The "A" exhaust fan for each diesel generator room is normally selected for automatic operation. If the "A" fan fails to start, the "B" fan will automatically start if it has been previously selected for standby operation.

****

Performance Step: Critical___ Not Critical_X_

5.5.17 VERIFY Diesel Generator Room A(B,C,D) Exhaust Fan A or B running on Diesel Generator Building elevation 583'.

Standard:

SIMULATED VERIFYING exhaust fan running by **SIMULATING OBSERVING** illuminated RED motor breaker position indicating switch above associated hand switch on elevation 583'.

CUE: 'A' DIESEL GENERATOR ROOM 'A' EXHAUST FAN RED MOTOR BREAKER POSITION INDICATING LAMP IS ILLUMINATED.

SAT___UNSAT___N/A___ COMMENTS:_______________________________

____

****

Performance Step: Critical___ Not Critical X

5.5.18 MONITOR and RECORD diesel generator operating parameters in accordance with Illustration 2.

CUE: ANOTHER OPERATOR WILL PERFORM ILLUSTRATION 2.

Standard:

NONE.

SAT___UNSAT___N/A___ COMMENTS:______________________________

____

CUE: THE CONTROL ROOM OPERATOR WILL COMPLETE THE TASK.

****

Performance Step: Critical____ Not Critical_X_

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCH STAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT___ UNSAT____ COMMENTS:________________________________

****

Performance Step: Critical____Not Critical__X__

PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION (Standard is subjective and instructor must evaluate the need for additional training on 3-WAY COMMUNICATION to maintain plant standards.

SAT___ UNSAT____ COMMENTS:________________________________

____

____

****

Performance Step: Critical____ Not Critical _X_

PERFORMER complied with all safety rules and regulations.

Standard:

PERFORMER complied with all safety rules and regulations (hardhat, safety glasses, sideshields, and hearing protection was worn **AS REQUIRED.**) (INSTRUCTOR determines if N/A due to plant conditions)

ELECTRICAL SAFETY was also adhered to: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within **reaching distance** of exposed energized electrical conductors of 50 volts or greater.

SAT____ UNSAT____ N/A____ COMMENTS:________________________________

END OF TASK

STOP TIME ____________

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

OPERATING INSTRUCTION

0-OI-82

STANDBY DIESEL GENERATOR SYSTEM

REVISION 68

PREPARED BY: Phillip C Chadwell PHONE: 7921

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: RUSSELL W. GILBERT DATE: 08/19/99

EFFECTIVE DATE: 08/19/99

LEVEL OF USE: REFERENCE USE

VALIDATION DATE: 06/18/91

QUALITY-RELATED

TABLE OF CONTENTS

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Diesel Generator should be secured prior to reaching 208° engine jacket water outlet temperature. This temperature will be reached approximately 30 seconds after loss of cooling water to a fully loaded operating diesel generator and approximately 3 minutes after a diesel generator is started from standby readiness without cooling water and is loaded to a fully loaded condition. [NRC/C] Cooling water flow may be checked by cooling water valve position, the presence of flow noise in the cooling water piping, or by the presence of proper operating temperatures when the diesel is running. [LER 296-88007]

3.2 Continuous operation of Diesel Generators at loads below 550 kW should be avoided to prevent oil and soot accumulation in exhaust system, air box, cylinders, and injection nozzles. If diesel generator idle time exceeds 8 hours, or if diesel operates greater than 4 1/2 hours at full speed (900 RPM) at less than 550 kW load, the diesel should be loaded greater than 1100 kW for at least 30 minutes prior to engine shutdown. This will allow the engine to clean out any oil accumulations from the exhaust manifolds.

3.3 Fast starts during the time period of 15 minutes to 3 hours after shutdown should be avoided except in an emergency condition. However, manual slow starts from the Engine Control Cabinet are allowed during this time period. This minimizes the possibility of damage to the turbocharger thrust bearing.

3.4 Engine oil level should be checked with engine hot and running at idle speed. Lube oil reservoir should not be overfilled with engine stopped.

3.5 Anytime the position of an EECW cooling water supply throttle valve to the Diesel Generators is changed, the valve should be repositioned for normal operation using 0-OI-67 valve line up checklist. Verify the outlet valve is open before setting the inlet valve.

3.6 The applicable control Panel and diesel generator room will normally be manned prior to starting diesels. They will be manned as soon as possible after diesels are started as a result of a condition which required the diesels to be available for immediate loading.

3.7 Standby Diesel Generators shall be operated at or below the following ratings:

Rating	Description	Time
1. Engine - Short-Time 2860/2800* kW	Maximum steady-state active power output (running kW)	0 - 2 hours
2. Engine - Continuous 2600/2550* kW	Maximum steady-state active power output (running kW)	greater than 2 hours
3. Engine - Instantaneous (Cold) 2850/2815** kW	Maximum instantaneous active power output (running kW + starting kW)	0 - 3 minutes after start from cold conditions
4. Engine - Instantaneous (Hot) 3050/3025** kW	Maximum instantaneous active power output (running kW + starting kW)	greater than 3 minutes after cold start or immediately after hot start
5. Generator - Short-Time 3575 kVA	Maximum steady-state apparent power output (running kVA) I(amps) X V(volts) X 1.732	0 - 2 hours
6. Engine - Continuous 3250 kVA	Maximum steady-state apparent power output (running kVA) I(amps) X V(volts) X 1.732	greater than 2 hours

* Reduced rating applies for engine cooling water outlet temperature exceeding 190°F in conjunction with combustion air (outside air) exceeding 90°F.

** Reduced rating applies when combustion air (outside air) exceeds 90°F regardless of engine cooling water outlet temperature.

3.8 If plant conditions allow, both local and remote diesel generator operating parameters should be recorded once every 15 minutes during the first hour of operation at rated speed and once every 30 minutes thereafter on Illustration 2.

3.9 Each diesel generator has three pressure switches that sense main bearing oil pressure. One switch feeds an audible annunciator and one feeds DG A(B,C,D) LOW-LOW OIL PRESSURE light on Panel 9-23. If a low lube oil pressure condition exists after the diesel is started, the audible annunciator will not alarm for 2 minutes due to an associated time delay relay. However, DG A(B,C,D) LOW-LOW OIL PRESSURE light only has a 5.5 second time delay relay and will illuminate after this time period if a low lube oil pressure condition exists. If this light illuminates continuously, shutdown the D/G in accordance with Section 7.4 unless continued operation is absolutely required.

3.10 Diesel generator frequency indication is not available unless the associated synchroscope switch is placed in the ON position. When observing generator frequency, the synchroscope switch should only be placed in the ON position long enough to obtain a reading and then placed back in the OFF position.

3.11 Operation of diesel generators in parallel with off site sources other than for surveillance testing is an abnormal operation and shall only be done under the following conditions:

3.11.1 The explicit permission of the Operations Superintendent must be granted.

3.11.2 The operation must be conducted in accordance with an approved test.

3.11.3 Diesel generators shall not be paralleled with an unstable offsite source or with any offsite source during inclement weather (e.g., lightning, heavy wind) except momentarily to transfer load to the diesel or to the system.

3.11.4 Only one Unit 1/2 diesel generator at a time shall be operated in parallel with the system under any circumstances.

3.11.5 A diesel generator running in parallel with the system for any reason except surveillance testing or load transfer shall be considered to be inoperable with respect to the Tech Specs Required LCO actions shall be taken prior to the operation.

3.11.6 Be aware of Tech Spec LCO, concerning SBGT, if U-1 & 2 D and U-3 3ED D/G's are run at the same time.

3.11.7 [II/C] Starting 4kV loads while a diesel generator is in parallel with offsite sources may result in operation of the diesel generator overload relays. [BFPER 951098]

3.12 Diesel Generator Fuel Pressure Abnormal annunciation may alarm momentarily on D/G start. If alarm persists **REFER TO** 1/2-ARP-9-23.

3.13 Personnel working in the D/G rooms should remain aware that the possibility exists of CO_2 discharge into the room. Upon CO_2 initiation an alarm will sound. Personnel then have 20 seconds to evacuate the area before CO_2 is dispensed. For detection purposes a wintergreen odor is injected into CO_2 discharge.

3.14 [NER/C] When the breakers feeding the D/G air dryers (LC-31, bkrs 8, 9, 10 & 11) are opened, the D/G air compressor auto starts are inhibited. [II-S-91-004]

3.15 When returning a D/G to service after maintenance, ensure the D/G is in S/B Readiness with the following exceptions.

(1) DSL GEN A(B,C,D) LOGIC RELAY PANEL, 0-BKR-254-000A(B,C,D)/06, D/G logic breaker open.

(2) DG A(B,C,D) START CIRCUIT 1 CONT POWER BKR, 0-BKR-082-000A(B,C,D) 35W1 and DG A(B,C,D) START CIRCUIT 2 CONT POWER BKR, 0-BKR-082-000A(B,C,D) 35W2 open.

(3) DG A(B,C,D) LEFT BANK AIR HDR SHUTOFF VLV, 0-SHV-086-0539A(B,C,D) and DG A(B,C,D) RIGHT BANK AIR HDR SHUTOFF VLV, 0-SHV-086-0540A(B,C,D) closed.

DEPRESS BOTH LOCAL ENGINE STOP P.B.'s SIMULTANEOUSLY AND WAIT 15 MINUTES.

NOTE: This ensures the D/G Start Failure Auxiliary (SFA) Relay is de-energized thus preventing inadvertent auto start of D/G.

3.16 Environmental calculations assume DG battery ambient temperatures are within 40°F to 110°F.

3.17 When the D/G is the only feed to the shutdown board and in single unit operations, starting an RHR Pump with other 4kV motor loads running on the associated board may result in D/G overload.

3.18 After operation of 4160V breakers, the charging spring shall be verified to have recharged by verifying locally the breaker closing spring target indicates charged and the amber breaker spring charged light is on to ensure future breaker operation.

3.19 Diesel Generators will automatically start as follows:

a) Degraded voltage or undervoltage on 4-kV Shutdown Board A, B, C, or D will start its associated diesel generator.

b) A Pre-Accident Signal (Reactor Vessel Low Low Low water level OR High Drywell pressure) on Unit 2 or Unit 3 will start all eight Diesel Generators. (Unit 1 initiation signal defeated by DCNs H2735A and W20217A.)

3.20 Under normal conditions any of the following will auto trip the Diesel Generator output breaker:

a) Differential overcurrent
b) Timed overcurrent
c) Reverse power
d) Loss of field
e) Overspeed
f) Common Accident Signal (Low Low Low Reactor water level OR Low Reactor pressure in conjunction with High Drywell pressure on Unit 2 or Unit 3.)

3.21 With a Common Accident Signal present on Unit 2, all Diesel Generator output breaker trips are defeated except for the following:

a) Differential overcurrent
b) Overspeed

3.22 With a Common Accident Signal present on Unit 3, all Unit 1/2 Diesel Generator output breakers will receive a Unit Priority Re-Trip in the event a Unit 2 Accident Signal is received.

3.23 [II/C] Avoid adjusting the load tap changer or selecting a different unit station service transformer winding while a diesel generator is operating in the parallel with system mode. Adjusting the load tap changer or selecting a different transformer winding while a diesel generator is operating parallel with the system may result in tripping of the shutdown board normal supply breaker. [BFPER 950311]

3.24 The following is a table providing information on the Diesel Generator lube oil storage tank.

MARKS ON DIPSTICK	USABLE OIL(GALLONS)
LOW -12	
-11	15.64
-10	33.82
-9	53.61
-8	72.86
-7	89.97
-6	112.70
-5	127.61
-4	151.00
-3	169.18
-2	197.53
-1	218.65
FULL 0	236.16

3.25 All manipulations of the Diesel Generator Logic Breaker shall be logged in the Narrative Log.

5.5 Manual Slow Start at Diesel Engine Control Cabinet

NOTE:

The diesel generator will be made inoperable as a result of taking 0-BKR-254-000A(B,C,D)/06, DSL GEN A(B,C,D) logic relay panel, (logic breaker) in "OFF" for the purpose of a manual slow start. The diesel generator shall be considered operable when 0-BKR-254-000A(B,C,D)/06, DSL GEN A(B,C,D) LOGIC RELAY PANEL, (logic breaker) is returned in "ON". **REFER TO** Tech Spec 3.8.1 and 3.8.2, Operation with Inoperable Equipment.

5.5.1 VERIFY the following initial conditions:

5.5.1.1 All Precautions and Limitations in Section 3.0 have been reviewed.

5.5.1.2 Diesel Generator A(B,C,D) is in Standby Readiness. **REFER TO** Section 4.0.

NOTE: All manipulations of the Diesel Generator Logic Breaker shall be logged in the Narrative Log.

5.5.1.3 IF the Diesel Generator A(B,C,D) does NOT need to be rolled OR has been rolled in the last 24 hours, THEN

OPEN 0-BKR-254-000A(B,C,D)/06, DSL GEN A(B,C,D) LOGIC RELAY PANEL, (LOGIC BREAKER) and DELETE Step 5.5.3.

5.5.2 OBTAIN an Illustration 2, for each diesel generator to be operated.

5.5.3 PERFORM Diesel Generator rolling per Section 5.6.

NOTE:

EECW pumps assigned to automatic service on the EECW headers will receive an automatic start signal when a diesel generator is started.

5.5.4 VERIFY the presence of EECW cooling water flow to the diesel.

NOTE:

[II/C] The DG governor must be adjusted to low speed setting after the stop logic has reset and the governor has automatically readjusted to the fast start setting. [BFPER950677]

5.5.5 HOLD GOVERNOR CONTROL 0-HS-082-000A(B,C,D)/3C switch in LOWER until the SPEED setting adjustment control knob is adjusted to its minimum setting.

5.5.6 DEPRESS FUEL PRIMING PUMP pushbutton, 0-HS-18-49A(B,C,D), until fuel pressure exceeds 20 psig as indicated on PRIMING FUEL PRESS, 0-PI-18-51A(B,C,D).

5.5.7 DEPRESS ENGINE START pushbutton, 0-HS-82-596, (533,557,570) and VERIFY the following:

5.5.7.1 Diesel engine starts, accelerates and stabilizes at an engine speed between 440 RPM and 460 RPM.

5.5 Manual Slow Start at Diesel Engine Control Cabinet (Continued)

5.5.7.2 Lube oil pressure rises to greater than 20 psig as indicated on MAIN BEARINGS LUBE OIL PRESS, 0-PI-82-28A (B,C,D).

5.5.8 RECORD reason for start, type of start, and time/date started on Illustration 2.

5.5.9 ALLOW engine to idle at between 440 RPM and 460 RPM for at least 10 minutes.

5.5.10 HOLD GOVERNOR CONTROL 0-HS-082-000A(B,C,D)/3C switch in RAISE until engine speed stops rising (930 RPM).

NOTE:

RIGHT BANK AIR CMP AC MOTOR control switch, 0-HS-086-0669A,B,C,or D and the LEFT BANK AIR CMP AC MOTOR control switch, 0-HS-086-0668A/AC,B,C,or D must remain in AUTO or MANUAL to allow for manual generator field flashing.

5.5.11 DEPRESS FIELD FLASHING pushbutton and VERIFY the following:

5.5.11.1 Engine speed stabilizes between 885 RPM and 915 RPM.

5.5.11.2 Diesel generator voltage stabilizes between 4250 VOLTS and 4400 VOLTS as indicated on Diesel Generator A(B,C,D) Protective Relay Cabinet.

5.5.12 STATION an operator at Panel 9-23.

NOTE: All manipulations of the Diesel Generator Logic Breaker shall be logged in the Narrative Log.

5.5.13 PLACE 0-BKR-254-000A(B,C,D)/06, DSL GEN A(B,C,D) LOGIC RELAY PANEL, (LOGIC BREAKER) in "ON" on 0-BDGG-254-0000A(B,C,D), 125V DC DSL SYS BAT BOARD A(B,C,D).

5.5.14 NOTIFY operator at Panel 9-23 that control of the diesel generator has been transferred to Panel 9-23.

5.5.15 PLACE the associated Diesel Generator control switch in START at Panel 9-23:

Diesel	Handswitch Name	Handswitch No.	Panel
A	DG A CONTROL	0-HS-82-A/1A	0-9-23-7
B	DG B CONTROL	0-HS-82-B/1A	0-9-23-7
C	DG C CONTROL	0-HS-82-C/1A	0-9-23-8
D	DG D CONTROL	0-HS-82-D/1A	0-9-23-8

5.5.16 VERIFY Diesel Generator A(B,C,D) Electrical Control Cabinet Exhaust Fan is operating.

5.5 Manual Slow Start at Diesel Engine Control Cabinet (Continued)

NOTE:

The "A" exhaust fan for each diesel generator room is normally selected for automatic operation. If the "A" fan fails to start, the "B" fan will automatically start if it has been previously selected for standby operation.

5.5.17 VERIFY Diesel Generator Room A(B,C,D) Exhaust Fan A or B is running on Diesel Generator Building elevation 583'.

5.5.18 MONITOR and RECORD diesel generator operating parameters in accordance with Illustration 2.

****

CAUTION

Continuous operation of diesel generators at loads below 550 kW should be avoided to prevent oil and soot accumulation in exhaust system, air box, cylinders, and injection nozzles.

****

5.5.19 IF the diesel generator is to be paralleled with offsite, THEN

REFER TO Section 8.1, 8.5, or the applicable surveillance instruction.

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 311

TITLE: 3-EOI APPENDIX 1A - REMOVAL AND REPLACEMENT OF RPS SCRAM SOLENOID FUSES

TASK NUMBER: U-000-EM-19

Ok
Good. term. ue.

SUBMITTED BY: Russell A Eds DATE: 11/04/99

VALIDATED BY: N/A DATE: 11/04/99

APPROVED: [signature] TRAINING DATE: 11/4/99

PLANT CONCURRENCE: JR Steele OPERATIONS DATE: 11.4.99

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
0	10/17/95	ALL	NEW JPM
1	11/11/96	4, 11	ADDED NON-CRITICAL STEP ON TOUCH STAAR, CHANGED ASOS TO US.
2	11/04/99	4,11	CHANGED MGT. EXPECT. TO PLANT WORK EXPECT., ADDED NON-CRITICAL STEP 3-WAY COMM., FORMAT DOCUMENT

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR:________________________SS#__________________

RO ________ SRO ________ DATE:__________________

JPM NUMBER: 311

TASK NUMBER: U-000-EM-19

TASK TITLE: EOI APPENDIX 1A - REMOVAL AND REPLACEMENT OF RPS SCRAM SOLENOID FUSES

K/A NUMBER: 212000A2.20 K/A RATING: RO 4.1 SRO: 4.2

****

TASK STANDARD: SIMULATE REMOVING EIGHT (8) SCRAM SOLENOID FUSES AS DIRECTED BY APPENDIX 1A

LOCATION OF PERFORMANCE: SIMULATOR ___ PLANT X CONTROL ROOM __

REFERENCES/PROCEDURES NEEDED: 3-EOI APPENDIX 1A, REV 0

VALIDATION TIME: CONTROL ROOM: ________ LOCAL: 6:00

MAX. TIME ALLOWED: _______ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: _________ CONTROL ROOM _____ LOCAL _____

COMMENTS: ____

Additional comment sheets attached? YES _____ NO ____

RESULTS: SATISFACTORY _______ UNSATISFACTORY _______

SIGNATURE: ______________________ DATE: ______________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. When you complete the task successfully, the objective for this job performance measure will be satisfied. When your task is given, you will repeat the task and I will acknowledge "That's Correct". (OR "That's Incorrect", if applicable). When you have completed your assigned task, you will say, "my task is complete" and I will acknowledge that your task is complete.

****

NON-CRITICAL STEPS: At the end of this JPM, **PERFORMER** will be evaluated on **PLANT WORK EXPECTATIONS:**

1. **PERFORMER** shall abide by all SAFETY RULES (hardhats, safety glasses, sideshields, and hearing protection shall be worn **AS REQUIRED**). **Electrical Safety** shall also be in compliance: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within **REACHING DISTANCE** of exposed energized electrical conductors of 50 volts or greater. **CAUTION IS WARRANTED** when utilizing a laser pointer to perform TOUCH STAAR around electrical components during plant JPM's.

2. **PERFORMER** shall demonstrate the use of TOUCH STAAR during this JPM.

3. **PERFORMER** shall demonstrate the use 3-WAY COMMUICATION.

****

INITIAL CONDITIONS: You are the Extra Operator. The Unit 3 reactor has scrammed and all control rods did not fully insert. All eight scram solenoid lights on Panel 9-5 are still illuminated. EOI-1 has been entered and followed to RC/Q-23.

INITIATING CUES: The Unit 3 "UNIT SUPERVISOR" has directed you to remove the RPS scram solenoid fuses in accordance with 3-EOI Appendix 1A, REMOVAL AND REPLACEMENT OF RPS SCRAM SOLENOID FUSES, beginning at Step 2.a.

START TIME__________

****

Performance Step: Critical___ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of the required procedure.

Standard:

IDENTIFIED OR OBTAINED copy of 3-EOI Appendix 1A.

SAT___UNSAT___N/A___ COMMENTS:____

1. **VERIFY CLOSED** Scram Discharge Volume Vent and Drain Valves at the SCRAM DISCHARGE VOLUME VENT/DRAIN VLVS display on Panel 9-5.

2. **DISPATCH** personnel to Unit 3 Auxiliary Instrument Room to perform the following:

****

Performance Step: Critical____ Not Critical X

a. **REFER TO** Attachment 1 and **OBTAIN** fuse pullers from EOI Equipment Storage box.

Standard:

REFERRED to Attachment 1 and **SIMULATED** unlocking the EOI Storage Box and **OBTAINING** fuse pullers from EOI Equipment Storage box.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

CUE: YOU HAVE A SMALL FUSE PULLER.

****

Performance Step: Critical___ Not Critical X

b. **LOCATE** Terminal Strip CC inside Panel 3-9-15, Bay 2, Rear.

Standard:

INDICATED location of terminal strip CC inside Panel 3-9-15.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step: Critical X Not Critical ____

c. **REMOVE** the following fuses (located at the bottom of terminal strip CC, Panel 3-9-15):

RPS BUS "A"

BLOCK	NUMBER	FUSE ID	REMOVED	REPLACED
CC	FOUR (4)	3-FU1-085-0037AA	____	____
CC	FIVE (5)	3-FU1-085-0039A/2	____	____
CC	SIX (6)	3-FU1-085-0039A/3	____	____
CC	SEVEN (7)	3-FU1-085-0039A/4	____	____

Standard:

SIMULATED REMOVING listed fuses.

RPS BUS "A"

BLOCK	NUMBER	FUSE ID	REMOVED	REPLACED
CC	FOUR (4)	3-FU1-085-0037AA	____	____
CC	FIVE (5)	3-FU1-085-0039A/2	____	____
CC	SIX (6)	3-FU1-085-0039A/3	____	____
CC	SEVEN (7)	3-FU1-085-0039A/4	____	____

SAT____ UNSAT____ N/A____ COMMENTS:________________________________

____

CUE: [WHEN PROPER FUSES INDICATED] THE FUSES HAVE BEEN REMOVED.

****

Performance Step: Critical____ Not Critical_X_

d. **LOCATE** terminal strip CC inside Panel 3-9-17, Bay 2, Rear.

Standard:

INDICATED location of terminal strip CC inside Panel 3-9-17.

SAT____UNSAT____N/A____ COMMENTS:______________________________

____

****

Performance Step: Critical X Not Critical ___

e. **REMOVE** the following fuses (located at the bottom of terminal strip CC, Panel 3-9-17):

RPS BUS "B"

BLOCK	NUMBER	FUSE ID	REMOVED	REPLACED
CC	FOUR(4)	3-FU1-085-0037BA	____	____
CC	FIVE(5)	3-FU1-085-0039B/2	____	____
CC	SIX (6)	3-FU1-085-0039B/3	____	____
CC	SEVEN(7)	3-FU1-085-0039B/4	____	____

Standard:

SIMULATED REMOVING listed fuses.

RPS BUS "B"

BLOCK	NUMBER	FUSE ID	REMOVED	REPLACED
CC	FOUR(4)	3-FU1-085-0037BA	____	____
CC	FIVE(5)	3-FU1-085-0039B/2	____	____
CC	SIX (6)	3-FU1-085-0039B/3	____	____
CC	SEVEN(7)	3-FU1-085-0039B/4	____	____

SAT____ UNSAT____ N/A____ COMMENTS:______________________________

____

CUE: [WHEN PROPER FUSES INDICATED] THE FUSES HAVE BEEN REMOVED.

****

Performance Step: Critical___ Not Critical _X_

f. WHEN...ALL fuses are removed,
THEN...**NOTIFY** the Unit Operator.

Standard:

SIMULATED NOTIFYING Unit 3 Operator after all fuses removed.

SAT____ UNSAT____ N/A____ COMMENTS:____________________________

CUE: [UNIT OPERATOR REPEATS BACK] "ALL EIGHT RPS SCRAM SOLENOID FUSES HAVE BEEN REMOVED PER APPENDIX 1A."
PAUSE
THE UNIT SUPERVISOR DOES NOT WANT THE FUSES REPLACED AT THIS TIME.

****

Performance Step: Critical___ Not Critical _X_

PERFORMER complied with all safety rules and regulations.

Standard:

PERFORMER complied with all safety rules and regulations (hardhat, safety glasses, sideshields, and hearing protection was worn **AS REQUIRED.**) (INSTRUCTOR determines if N/A due to plant conditions)

ELECTRICAL SAFETY was also adhered to: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within **reaching distance** of exposed energized electrical conductors of 50 volts or greater.

SAT____ UNSAT____ N/A____ COMMENTS:____________________________

****

Performance Step: Critical___ Not Critical X

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCH STAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT_____ UNSAT______ N/A ______ COMMENTS:______________________

****

Performance Step: Critical___ Not Critical X

PERFORMER demonstrated the use of 3-WAY COMMUNICATION during this JPM.

Standard:

PERFORMER utilized 3-WAY COMMUNICATION (Standard is subjective and instructor must evaluate the need for additional training on 3-WAY COMMUNICATION to maintain plant standards).

SAT_____ UNSAT______ N/A ______ COMMENTS:______________________

END OF TASK

STOP TIME ______

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT

EOI PROGRAM MANUAL SECTION IX

3-EOI APPENDIX-1A

REMOVAL AND REPLACEMENT OF RPS SCRAM SOLENOID FUSES

REVISION 0

4325577361
BFNP EOI-PM
3-EOI APPENDIX-1A
101395 0

PREPARED BY: William Scott PHONE: 2913

RESPONSIBLE ORGANIZATION: OPERATIONS

APPROVED BY: GENE PRESTON **DATE: 7/28/95**

EFFECTIVE DATE: 10/13/95

LEVEL OF USE: REFERENCE USE

VALIDATION DATE: 1/8/92

QUALITY-RELATED

HISTORY OF REVISION/REVIEW
3-EOI APPENDIX-1A

REV NO.	DATE	REVISED PAGES	REASON FOR CURRENT REVISION
0	7/28/95	ALL	New procedure. Necessary to support implementation of BFNP Unit 3 EOIs.

3-EOI APPENDIX-1A

REMOVAL AND REPLACEMENT OF RPS SCRAM SOLENOID FUSES

LOCATION: Unit 3 Auxiliary Instrument Room

ATTACHMENTS: 1. Tools and Equipment (✓)

1. **VERIFY CLOSED** Scram Discharge Volume Vent and Drain Valves at the SCRAM DISCH VOL VENT/DRAIN VLVS display on Panel 3-9-5. ____

2. **DISPATCH** personnel to Unit 3 Auxiliary Instrument Room to perform the following:

   a. **REFER TO** Attachment 1 and **OBTAIN** fuse pullers from EOI Equipment Storage box. ____

   b. **LOCATE** Terminal Strip CC inside Panel 3-9-15, Bay 2, Rear. ____

   c. **REMOVE** the following fuses (located at bottom of terminal strip CC, Panel 3-9-15):

<u>RPS BUS "A"</u>

BLOCK	NUMBER	FUSE ID	REMOVED	REPLACED
CC	FOUR (4)	3-FU1-085-0037AA	____	____
CC	FIVE (5)	3-FU1-085-0039A/2	____	____
CC	SIX (6)	3-FU1-085-0039A/3	____	____
CC	SEVEN (7)	3-FU1-085-0039A/4	____	____

   d. **LOCATE** Terminal Strip CC inside Panel 3-9-17, Bay 2, Rear. ____

   e. **REMOVE** the following fuses (located at bottom of terminal strip CC, Panel 3-9-17):

<u>RPS BUS "B"</u>

BLOCK	NUMBER	FUSE ID	REMOVED	REPLACED
CC	FOUR (4)	3-FU1-085-0037BA	____	____
CC	FIVE (5)	3-FU1-085-0039B/2	____	____
CC	SIX (6)	3-FU1-085-0039B/3	____	____
CC	SEVEN (7)	3-FU1-085-0039B/4	____	____

   f. WHEN ... <u>ALL</u> fuses are removed,
      THEN ... **NOTIFY** Unit Operator. ____

g. WHEN ... Unit ASOS directs replacement of the fuses,
THEN ... **REPLACE** fuses listed in Steps 2.c and 2.e above. ____

h. WHEN ... ALL fuses are replaced,
THEN ... **NOTIFY** Unit Operator. ____

END OF TEXT

TOOLS AND EQUIPMENT	LOCATION
1. Fuse pullers	Unit 3, Auxiliary Instrument Room, EOI Equipment Storage Box.

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

JPM NUMBER: 101

TITLE: PLACE PSC SYSTEM IN SERVICE

TASK NUMBER: A-075-NO-05

SUBMITTED BY: ______________________________ DATE: __________

VALIDATED BY: ______________________________ DATE: __________

APPROVED: ______________________________ DATE: __________
TRAINING

PLANT CONCURRENCE: ______________________________ DATE: __________
OPERATIONS

* Examination JPMs Require Operations Training Manager or Designee Approval and Plant Concurrence

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

REVISION LOG

Revision Number	Effective Date	Pages Affected	Description of Revision
2	10/26/94	ALL	GENERAL REVISION
3	10/27/98	ALL	PROCEDURE REVISION

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

OPERATOR:____________________ SS#____________
RO ________ SRO ________ DATE:____________

JPM NUMBER: 101

TASK NUMBER: A-075-NO-05

TASK TITLE: PLACE PSC SYSTEM IN SERVICE

K/A NUMBER: 209001K1.03 K/A RATING: RO 2.9 SRO: 3.0

****

TASK STANDARD: SIMULATE PERFORMING OUTSIDE CONTROL ROOM FUNCTIONS REQUIRED TO PLACE THE PSC HEAD TANK SYSTEM IN SERVICE

LOCATION OF PERFORMANCE: SIMULATOR ___ PLANT X CONTROL ROOM ___

REFERENCES/PROCEDURES NEEDED: 2-OI-75, REV 54

VALIDATION TIME: CONTROL ROOM: 21:00 LOCAL: 17:00

MAX. TIME ALLOWED: ________ (Completed for Time Critical JPMs only)

PERFORMANCE TIME: ________ CONTROL ROOM ______ LOCAL ______

COMMENTS: ____

Additional comment sheets attached? YES _____ NO _____

RESULTS: SATISFACTORY _______ UNSATISFACTORY

SIGNATURE: ______________________________ DATE: __________
EXAMINER

BROWNS FERRY NUCLEAR PLANT
JOB PERFORMANCE MEASURE

****

IN-PLANT: I will explain the initial conditions and state the task to be performed. All steps shall be simulated. I will provide initiating cues and indicate any steps to be discussed. Ensure that you observe electrical safety precautions when working near energized equipment. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task and when you have completed the assigned task.

IN-SIMULATOR: I will explain the initial conditions and state the task to be performed. I will provide initiating cues and reports on other actions when directed by you. When you complete the task successfully, the objective for this job performance measure will be satisfied. Ensure you indicate to me when you understand your assigned task and when you have completed the assigned task.

****

INITIAL CONDITIONS: You are an operator. Unit 2 Reactor is in cold shutdown. The PSC head tank system was previously removed from service IAW 2-OI-75, Section 8.5.

INITIATING CUES: ______(NAME)______, return the PSC head tank system to service to both loops of RHR and Core Spray as directed by 2-OI-75.

START TIME____________

****

Performance Step: Critical___ Not Critical X

WHEN REQUESTED BY EXAMINER identify/obtain copy of required procedure.

Standard:

IDENTIFIED OR OBTAINED copy of 2-OI-75

SAT___UNSAT___N/A___ COMMENTS:____

____

8.9 Returning the PSC Head Tank to Service

****

CAUTION

[NRC/C] The suppression pool water will be highly radioactive after a LOCA. Chemical Engineering input/advice should be considered when deciding where to pump the contaminated water. [NRC Inspection Report 89-16]

8.9.1VERIFY that the PSC Head Tank has been removed from service in accordance with Section 8.8.

****

Performance Step : Critical X Not Critical __

8.9.2 DEPRESS local PSC WATER HEAD TANK PMP 2A and 2B RESET handswitches, 2-HS-075-0075B and 2-HS-075-0076B on Panel 25-256.

Standard:

SIMULATED DEPRESSING handswitches 2-HS-075-0075B and 2-HS-075-0076B.

SAT___ UNSAT___ N/A___ COMMENTS:______________________________

CUE: [WHEN SIMULATED] 2-HS-075-0075B AND 0076B HAVE BEEN RESET.

****

Performance Step: Critical___ Not Critical X

8.9.3 DEPRESS local PSC STN-RESET handswitches, 2-HS-0075-0074 A and B on Panel 25-256.

Standard:

SIMULATED DEPRESSING 2-HS-0075-0074 A and B.

SAT___ UNSAT___ N/A___ COMMENTS:______________________________

****

Performance Step: Critical___ Not Critical X

8.9.4 If PSC Pump Suction Isolation Valves are closed, THEN

OPEN the PSC PUMP SUCTION INBD and OUTBD ISOL VALVEs, 2-FCV-75-58 and 2-FCV-75-57, from Panel 2-9-3.

Standard:

SIMULATED CONTACTING Unit 2 Control room to verify 2-FCV-75-58 and 57 OPEN.

CUE: UNIT 2 OPERATOR REPORTS THAT 2-FCV-75-58 AND 2-FCV-75-57 ARE OPEN.

SAT___UNSAT___N/A___ COMMENTS:___

****

Performance Step: Critical___ Not Critical X

8.9.5 VERIFY RESET the following annunciators on Panel 2-9-3

- PSC HEAD TANK LOW LEVEL (2-XA-55-3A, window 26)
- PSC HEAD TANK LEVEL HIGH (2-XA-55-3A, window 19)

Standard:

SIMULATED CONTACTING Unit 2 control room to confirm annunciator PSC HEAD TANK LOW LEVEL (2-XA-55-3A, Window 26) and PCS HEAD TANK LEVEL HIGH (2-XA-55-3A, window 19) are clear.

CUE: PSC HEAD TANK LOW LEVEL ALARM IS CLEAR.

SAT___UNSAT___N/A___ COMMENTS:

****

Performance Step: Critical X Not Critical___

8.9.6 START PSC HEAD TANK PUMPS 2A and 2B, using 2-HS-75-75A and 2-HS-75-76A, on Panel 2-9-3.

Standard:

SIMULATED Contacting Unit 2 control to start PSC HEAD TANK Pumps 2A & 2B.

CUE: PSC HEAD TANK PUMPS STARTED.

NOTE: THE RHR SYSTEM I VALVES ARE LOCATED NEAR THE FUEL POOL COOLING PUMPS IN A C-ZONE. DUE TO ALARA CONSIDERATIONS IT WILL SUFFICE FOR THE EXAMINEE TO INDICATE THE GENERAL LOCATION OF THE VALVES.

****

Performance Step: Critical _X_ Not Critical __

8.9.7 VERIFY LOCKED OPEN the appropriate valves to supply the individual headers from the PSC Head Tank:

- For Core Spray System I, PSC WATER TO CS SYSTEM I FILL SHUTOFF VALVE, 2-075-0608.
- For Core Spray System II, PSC WATER TO CS SYSTEM II FILL SHUTOFF VALVE, 2-075-0611.
- For RHR System I, RHR SYS FILL FROM PSC HEAD TANK, 2-74-801.
- For RHR System II, RHR SYS FILL FROM PSC HEAD TANK, 2-74-793.

Standard:

SIMULATED OPENING 2-075-0608, 2-075-0611, 2-74-801 and 2-74-793 by turning the valve handwheel in the COUNTERCLOCKWISE direction [CRITICAL]. **SIMULATED LOCKING** each valve handwheel [NOT CRITICAL].

FOR EACH VALVE, CUE: THE HANDWHEEL IS TURNING, THE STEM IS MOVING OUTWARD. [PAUSE] THE HANDWHEEL IS SNUG, THE STEM HAS STOPPED MOVING.
FOR EACH VALVE THAT IS LOCKED, CUE: THE CHAIN AND LOCKING TAB ARE IN PLACE.

SAT___ UNSAT___ N/A___ COMMENTS:______________________________

____

NOTE: THE RHR SYSTEM I VALVES ARE LOCATED NEAR THE FUEL POOL COOLING PUMPS IN A C-ZONE. DUE TO ALARA CONSIDERATIONS IT WILL SUFFICE FOR THE EXAMINEE TO INDICATE THE GENERAL LOCATION OF THE VALVES.

****

Performance Step: Critical X Not Critical__

8.9.8 VERIFY LOCKED CLOSED the appropriate CNDS FLUSH & FILL SHUTOFF VALVE to isolate the individual headers from the Condensate Transfer System:

- For Core Spray System I, 2-SHV-075-0582A.
- For Core Spray System II, 2-SHV-075-0582B.
- For RHR System I, 2-74-704.
- For RHR System II, 2-74-828.

Standard:

SIMULATED CLOSING 2-SHV-075-0582A, 2-SHV-075-0582B, 2-74-704 and 2-74-828 by turning the valve handwheel in the CLOCKWISE direction [CRITICAL]. SIMULATED LOCKING each valve handwheel.

FOR EACH VALVE, CUE: THE HANDWHEEL IS TURNING, THE STEM IS MOVING INWARD. [PAUSE] THE HANDWHEEL IS SNUG, THE STEM HAS STOPPED MOVING.
FOR EACH VALVE THAT IS LOCKED, CUE: THE CHAIN AND LOCKING TAB ARE IN PLACE.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step : Critical___ Not Critical X

8.9.9 VERIFY LOCKED CLOSED CS SYSTEM I & II FILL FROM CONDENSATE SHUTOFF VALVE, 2-SHV-075-0700.

Standard:

SIMULATED VERIFYING 2-SHV-075-0700 CLOSED AND LOCKED.

SAT____UNSAT____N/A____ COMMENTS:________________________________

____

CUE: [WHEN LOCATED AND INDICATED] 2-SHV-075-0700 IS CLOSED AND LOCKED.

****

CAUTION

Leakage of Suppression Pool quality water into the RPV may occur when Core Spray or RHR System pressure is above RPV pressure due to a 1/4 in. hole drilled into the outlet side disc face of CORE SPRAY SYS I(II) INBD INJECT VALVE, 2-FCV-75-25(53) AND RHR SYS I(II) INBD INJECTION VALVE, 2-FCV-74-53(67).

****

****

Performance Step: Critical___ Not Critical X

8.9.10 CHECK the appropriate system pressures indicates greater than 48 psig:

8.6.9.1 CORE SPRAY SYS I DISCH PRESS, 2-PI-75-20.

8.6.9.2 CORE SPRAY SYS II DISCH PRESS, 2-PI-75-48.

8.6.9.3 RHR SYS I PRESS, 2-PI-74-51.

8.6.9.4 RHR SYS II PRESS, 2-PI-74-65.

Standard:

SIMULATED CONTACTING Unit 2 control room to verify the above pressure indicators read above 48 psi.

CUE: EACH PRESSURE INDICATOR READS 52 PSI.

SAT___UNSAT___N/A___ COMMENTS:______________________________

****

Performance Step: Critical___ Not Critical X

PERFORMER complied with all safety rules and regulations.

Standard:

PERFORMER complied with all safety rules and regulations (hardhat, safety glasses, sideshields, and hearing protection was worn **AS REQUIRED.**) (INSTRUCTOR determines if N/A due to plant conditions)

ELECTRICAL SAFETY was also adhered to: Exposed conductive articles such as rings, metal wristwatches, bracelets, and metal necklaces shall not be worn by employees within **reaching distance** of exposed energized electrical conductors of 50 volts or greater.

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

****

Performance Step: Critical___ Not Critical X

PERFORMER demonstrated the use of TOUCH STAAR during this JPM.

Standard:

PERFORMER verified applicable components by utilizing TOUCH STAAR (Standard is subjective and instructor must evaluate the need for additional training on TOUCH STAAR to maintain plant standards).

SAT___UNSAT___N/A___ COMMENTS:________________________________

____

____

END OF TASK

STOP TIME___________

INITIAL SUBMITTAL

BROWNS FERRY 2000-301
50-259, 260, and 296/2000-301

JUNE 12 - 15, JUNE 27 - 29, AND
JUNE 30, 2000

INITIAL SUBMITTAL

OPERATING TEST
SIMULATOR SCENARIOS

+ TRANSIENT EVENT CHECKLIST

+ COMPETENCIES CHECK LIST

Facility: _Browns Ferry ____ Scenario No.: ____2___ Op-Test No.: _______

Examiners: ______________________ Operators: ______________________

______________________ ______________________

______________________ ______________________

Initial Conditions: Rx Power 100% MOC

2A RHR out for preventative maintenance, 6 hours into a 7 day LCO.
2-LI-3-58B is OOS for repair it has been 5 of 24 hours.
IRM Channel C has failed downscale low and was bypassed for maintenance. It is expected to be repaired in approximately 8 hours.
No other equipment is OOS.

Turnover: Maintain 100% reactor power.

Event No.	Malf. No.	Event Type*	Event Description
1		R/RO	Power Reduction due to rod adjustment.
2	SW02A	C/RO	Loss of 2A RBCCW pump.
3		N/RO/ BOP	Restores RWCU to service following RBCCW return to service.
4A	ior an:2xa55 3c10	I/BOP	ADS Permissive switch failure. (From Scenario OPL177.052, review as necessary to use necessary malfunctions)
4	?	I/RO	RPS low level Instrument Failure. OR APRM C fails downscale, Half Scram
5	?	C/BOP	Loss of stator coolant, (use the malfunction in OPL177.049), but no turbine trip.
6		MT	Use rest of scenario from OP177.049 Turbine trips at >80% Rx power
	imf tc02 0		Turbine bypass valves fail closed, requires alternate pressure control
	imf hp03 (e1 0)0		HPCI controller automatic controller failed. Will operate in manual.

Facility: _Browns Ferry ____ Scenario No.: ____2___ Op-Test No.: _______

Examiners: ______________________ Operators: ______________________

Initial Conditions: Rx Power 100% MOC

2A RHR out for preventative maintenance, 6 hours into a 7 day LCO.
2-LI-3-58B is OOS for repair it has been 5 of 24 hours.
IRM Channel C has failed downscale low and was bypassed for maintenance. It is expected to be repaired in approximately 8 hours.
No other equipment is OOS.

Turnover: Maintain 100% reactor power.

	lmfth21		Small LOCA in recirculation system causes increase in drywell pressure and temperature. Crew enters EOI-2
	impc16 a, e, m		Failure of suppression chamber vent valve, Appendix 12 must vent the drywell.
			Increase in containment temperature and pressure causes the suppression chamber to take place.
			LOCA and failed open drywell to torus vacuum breakers crew will attempt to spray drywell.
	iorzdihs 7474a close, iorzdihs 7460a close		Both loop's spray valve will fail to open, preventing spraying the drywell.
			The crew will have to emergency depressurize based on pressure suppression curve and/or exceeding 280 degrees F.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor
Most of this scenario comes from OPL 177.049. Review and use necessary malfunctions to complete this form.

Op-Test No.: _____ Scenario No.: __2___ Event No.: __1___

Event Description: Reduce power for rod adjustment

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Add steps necessary to accomplish this evolution.
	SRO	
	RO/BOP	

Op-Test No.: _____ Scenario No.: __2___ Event No.: __2___

Event Description: Loss of 2A RBCCW pump.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Reports "Motor trip out" "RBSCCW Pump disch press low alarms.
		Identifies 2 A RBCCW pump has tripped.
		Attempts to restart the pump. (Will not work)
		Reports FCV 70-48 closing
		Raises pwr w/Recirc with peer ck. (Why would they do this action?)
	SRO	Refers to 2-AOI-70-1
		Directs U 1 to start spare RBCCW pump
	RO	Reports RWCU isolation or removes from service prior to isolation
	RO	Verifies auto action per AOI-64a if RWCU auto isolates.
	SRO	Refers to TRM 3.4.1
		Notifies Chemistry to begin samples
	All	Monitors containment paramters
	SRO	Directs DUO to monitor Recirc pump temperatures
	RO/BOP	Monitors Recirc. pump temperatures
	US	Contacts AUO to check 2A RBCCW pump and breaker
	RO/BOP	After spare pump in service re-opens 70-48
		Restores RWCU per OI-69

Op-Test No.: _____ Scenario No.: __2___ Event No.: __3__

Event Description: Restores RWCU to service following RBCCW return to service

Time	Position	Applicant's Actions or Behavior
	RO	Restores RWCU per OI-69
		Need to add the steps for OI 69
	SRO	
	BOP	

Op-Test No.: _____ Scenario No.: __2___ Event No.: __4A___

Event Description: ADS Permissive switch failure.

Time	Position	Applicant's Actions or Behavior
	BOP	Announce RHR or CS pumps Running ADS Blowdown Permissive Alarm Consults ARP
		Dispatches AUO/US to Aux Inst room to verify if following relays energized: 2E-K4; 2E-K15 2E-K27; 2E-K31
	BOP	Relays report of relay 2E-K4 and 2E-K15 being energized

ROLE PLAY: AS US, 4 minutes after he is sent to investigate the relay for ADS alarm, reports that relays 2E-K4,2E-K15 energized. If asked, 10A-K102A energized. As AUO/IM, 5 minutes after they are sent to investigate, report PS 74-8A is picked up. (2A RHR Pump)

Time	Position	Applicant's Actions or Behavior
	SRO	Directs checking status of 10A-K102A
	RO/BOP	Reports 10A-K102A energized
	SRO	Directs IM's to investigate why relays 10A-K102A, 2E-K4, and 2E-K15 are energized
		Receives word that PS-74-8A closed
		Checks Technical Specifications 3.3.5.1, determines 8 days to repair or declare ADS logic inop (may direct Sys Engr to inhibit pressure switch as 2A RHR Pump tagged)
		Directs IMs to repair pressure switch

Op-Test No.: _____ Scenario No.: __2___ Event No.: __4A___

Event Description: ADS Permissive switch failure.

Op-Test No.: _____ Scenario No.: __2___ Event No.: __4___

Event Description: RPS Low Level Instrument Failure (From OPL 177.064) or APRM C fails downscale

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Announces half scram Reports half scram due to level from 2-XA-55-4A-2 Refers to 2-9-4 ARP
	SRO	Dispatches individual to Auxiliary Instrument Room to check LIS 3-203 B and D
		Consults Tech Specs, 3.3.1.1 determines Required actions are met at this time. (may address TS 3.3.6.1, PCIV's, no action required but crew may conservatively close and deactivate the in-line valve)
		Directs IMs to troubleshoot and repair.
		Conducts briefing on loss of instrumentation.

Op-Test No.: _____ Scenario No.: __2___ Event No.: __5___

Event Description: LOSS OF STATOR COOLANT,

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Responds to annunciator 2-XA-55-7A #22 "Gen Stator Coolant Sys Abnormal by ARP:
		Verifies stator coolant pump is running
		Checks temperature on 2-TR-57-59 on panel 9-8
		Dispatches AUO to check Stator Coolant Control Cabinet
	SRO	Directs load reduction per ARP with recirc pumps.
		Directs start of the standby stator coolant pump.
	RO/BOP	Starts other stator coolant pump
	SRO	Directs Manual Reactor Scram
	RO	Inserts a Manual reactor Scram

Op-Test No.: _____ Scenario No.: __2___ Event No.: ___6__

Event Description: Main Transient. Scram/LOCA

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Scrams reactor manually or reports turbine trip and reactor scram
		Verifies all rods in by one or more of the following: - Blue one rod permissive light illuminated in Refuel mode - Verifies all rods have green backgrounds - ICS
		Identifies and reports bypass valve failure, SRVs open
	SRO	Contacts IM's to troubleshoot BPVs
		Directs pressure band 800-1000 psig
	RO/BOP	Controls pressure with MSRVs, 800-1000 psig
	SRO	Enters EOI-1 on high RPV pressure and/or Low Level
		Directs water level be maintained +12" to +51" using available sytems
		Directs alternate pressure control systems - HPCI, Appendix 11C - RCIC, Appendix 11B - RFPT's Appendix 11F - Main Steam Line Drains, Appendix 11D
		Directs enter AOI-100-1 for scram subsequent actions
	RO/.BOP	Operates available injection systems to maintain level +12" to +51"
		If water level decreases to -45" or HPCI is used to restore water level/or pressure control, recognizes automatic function of HPCI controller failed and takes manual control

Op-Test No.: _____ Scenario No.: __2___ Event No.: ___6__

Event Description: Main Transient. Scram/LOCA

	RO/BOP	Carries out AOI-100-1 actions: Inserts nuclear instrumentation Changes recorders from APRMs to IRMs Ranges down to follow power Removes unnecessary equipment If RPV water level >+12" gets permission to reset scram and PCIS
		Resets scram and PCIS if >+12" and <2.45 psig DW pressure
		Restores RB ventilation and DW control air
		Controls pressure as directed
		Establishes alternate pressure control with one or more of the following: - Main Steam Line Drains per Appendix 11D - RFPTs per Appendix 11F - HPCI per Appendix 11C - RCIC per Appendix 11B
	SRO	Enters EOI-3 if steam tunnel temperature exceeds 160°
		Directs appendix 8E (if PCIS not reset)
	BO/BOP	Restores R.B. vent system
	SRO	Directs cooldown on SRVs, alternate pressure control
	RO/BOP	Commences cooldown
		Places suppression pool cooling in service

Op-Test No.: _____ Scenario No.: __2___ Event No.: ___6__

Event Description: Main Transient. Scram/LOCA

	RO/BOP	Recognizes offgas pretreatment rad monitor high & offgas annual release rate exceeded
		Recognizes Rx building high rad alarm
		Evacuates Rx building
		Notifies Rad Con
	ALL	Recognize Drywell Pressure and/or temperature increase
	SRO	At 2.45 psig DW pressure enters EOI-2 & EOI-1
	ALL	Verifies Diesels/HPCI start
	SRO	Directs all available DW coolers be placed in service
		Directs venting suppression chamber per Appendix 12 and perform 8G
	RO/BOP	Monitors suppression pool temperature
		Monitors suppression pool level
	SRO	Directs H2/O2 analyzer placed in service using keylock switches
		Directs following actions if not previously accomplished in EOI-1 (after 2.45 psig DW pressure)
		CAD to DW Control air Appendix 8G
	RO/BOP	Places all available DW blowers in service
		Attempts to vent suppression chamber and recognizes failure of FCV 64-32
		Vents Supp. Chamber through 84-20
		Places keylock bypass switches for H2O2 analyzers in bypass
		Carries out actions for Appendix 8G

Op-Test No.: _____ Scenario No.: __2___ Event No.: ___6__

Event Description: Main Transient. Scram/LOCA

	SRO	Directs Suppression Chamber Sprays be placed in service
	RO/BOP	Places suppression chamber sprays in service per Appendix 17C
	SRO	When suppression chamber pressure exceeds 12 psig: OR Based on DW temperature not being maintained less than 280 degrees F
		Directs DW blowers shutdown
	RO/BOP	Shuts down drywell blowers
		Attempts to Spray drywell and reports spray valve failure to open
		Dispatches AUO to manually open drywell spray valve
	SRO	Directs DW blowers be placed back in service
	CREW	Recognizes RB high rad alarm evacuates RB
	SRO	Determines either DW temperature cannot be maintained less than 280 degrees F or inside safe area of PSP curve and enters C-2
		Directs emergency depressurization
	RO/BOP	Closes feedpump discharge valves; if not, must shutdown condensate booster pumps to keep from flooding steam lines
		Opens 6 ADS valves Verifies 6 ADS valves open Stabilizes water level +12" to +51" after depressurization
		Places all available suppression pool cooling in service after emergency depressurization completed.
	SRO	Directs drywell sprayed when sprays available
	RO/BOP	Sprays drywell as directed

Op-Test No.: _____ Scenario No.: __2___ Event No.: ___6__

Event Description: Main Transient. Scram/LOCA

	SRO	Classifies event as an SAE (2.1-S)

Crew Critical Tasks	
1	Emergency depressurizes RPV based either upon drywell temperature cannot be maintained <280 F or exceeding safe area of PSP curve (but prior to 55 psig).
2	Sprays drywell when sprays are available.

Facility: _Browns Ferry ____ Scenario No.: ____3___ Op-Test No.: _______

Examiners: ______________________ Operators: ______________________

Initial Conditions: RWCU Pump 2B is under clearance for pump seal replacement and is expected to be under clearance until next shift.

IRM Channel C is failed downscale and has been placed in the tripped condition IAW OI-18.

Turnover:. The plant is operating at 49% power. Plant startup is in progress.

Event No.	Malf. No.	Event Type*	Event Description
1		R	Increase Power to 100% power.
2	imf rd07r02 31	C/RO	CONTROL ROD DRIFT (Pulled from OPL177.058)
3	RD02	I/RO	CRD Flow control Valve Fails Closed.
4		N/RO/BOP?	Swap CRD Flow Control Valves
4a			need another Component for the BOP ?? Help
5		C/RO	2B RECIRC PUMP GENERATOR LOCKOUT
6	HP01	I/BOP	Inadvertent HPCI Pump Start.
7		MT	Fuel Failure, Main Steam line leak, RCIC Break, HPCI inverter failure, CRD pump failure. (FROM OPL 177.064)

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

Op-Test No.: _____ Scenario No.: __3___ Event No.: __1___

Event Description: Power Increase.

Time	Position	Applicant's Actions or Behavior
	SRO	Refer to 2-GOI-100-1A, Step 5.121
		Call RE for instructions on power increase.
		Direct Rod withdrawal and core flow increase per RE instructions.
	RO	Commence power increase.
		Monitor level, power, pressure, and flow during power increase.
	BOP	Coordinate with RO on actions for power increase.
		{What other actions would be necessary to have here for the examiner?}

Op-Test No.: _____ Scenario No.: __3___ Event No.: __2___		
Event Description: Control Rod Drift		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Reduces power IAW 2-GOI-100-12
		Announces "Rod Drift" alarm Identifies rod 02-31 as drifting in
	SRO	Directs actions per 2-AOI-85-5
		Directs rod be continuously inserted to 00
		Informs Reactor Engineer
	RO/BOP	Checks Thermal Limits Verifies CRD operating parameters within limits
		Directs AUO to check the following: - scram pilot air header aligned - check scram outlet valve for leakage - check scram inlet valve for leakage
		Directs charging water to 02-31 be closed
	SRO	Declares accumulator inoperable per Tech Spec 3.1.5 and addresses actions (when charging water is isolated)
		Directs scramming of affected rod from panel 9-16 in Aux. Inst. Room
		Directs operator to Aux. Inst. Room for rod scram
	RO/BOP	Establishes communication with operator and AUO Directs operator to scram rod by taking scram switch to "down" position Verifies rod Full In Direct operator to return scram switch to 'up' position

Op-Test No.: _____ Scenario No.: __3___ Event No.: __2___

Event Description: Control Rod Drift

		Reports rod still at full-in over travel position
	SRO	Directs rod be disarmed electrically
		Contact Maintenance, RE and Operations Superintendent to report problem.

Op-Test No.: _____ Scenario No.: __3___ Event No.: __3/4___
Event Description: CRD Flow control Valve Fails Closed. Shift CRD flow Control Valves

Time	Position	Applicant's Actions or Behavior
	RO	CRD ACCUM CHG WTR HDR PRESS HIGH alarm (Window number _____) (Additional annunciators that may come in when this happens)
		Recognize/ announce that the CRD Flow Control Valve has failed closed
	SRO	Refer to 2-ARP-9-5A-10, 2-AOI-85-3, and 2-OI-85.
	RO	Attempt to manually open in service FCV. Report attempt unsuccessful. Directs NLO to inspect in service CRD FCV.
NOTE: Simulator Operator should when asked, that the FCV indicates closed locally and no other abnormalities were noted.		
	SRO	Direct shifting of standby FCV.
	RO	Direct NLO to perform section 6.2.3 of 2-OI-85. (NEED TO VERIFY THIS BECAUSE DO NOT HAVE THE PROCEDURE)
		Balance controller and shift to standby FCV.
	SRO	Initiate maintenance action to repair failed FCV.
	BOP	Assist RO.

Op-Test No.: _____ Scenario No.: __3___ Event No.: __3/4___

Event Description: CRD Flow control Valve Fails Closed. Shift CRD flow Control Valves

Op-Test No.: _____ Scenario No.: __3___ Event No.: __4a___ Page ___ of ___

Event Description: BOP Component

Time	Position	Applicant's Actions or Behavior

Op-Test No.: _____ Scenario No.: __3___ Event No.: __5___
Event Description: 2B RECIRC PUMP GENERATOR LOCKOUT

Time	Position	Applicant's Actions or Behavior
	RO	Recognizes and reports decrease in "2B" Recirc. Pump speed
	SRO	Directs actions the following actions per AOI-68-1: Power to flow map checked for Region Reactor Engineer to control room
	RO/BOP	Checks power to flow map
		Recognizes power oscillations
	SRO	Directs rods inserted to dampen oscillations (conditional)
	RO/BOP	Inserts control rods as directed (conditional)
	SRO	Directs maintenance to investigate loss of "2B" Recirc Pump
	ALL	Consults Tech Specs and determines 24 hour LCO to satisfy requirements of SLO
	SRO	Directs RE to perform 2-SR-3.4.1(SLO)

Op-Test No.: ______ Scenario No.: __3___ Event No.: __6___

Event Description: Inadvertent HPCI Pump Start.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize/Announce that HPCI has started.
	SRO	Refer to 2-OI-73
	BOP	Reset auto initiation
		Depress and hold HPCI Turbine Trip pushbutton.
		Close Steam Supply Valve, 2-FCV-73-16.
		When Turbine speed indicates zero, release HPCI Turbine Trip Pushbutton.
		Close Min flow valve.
		Take Aux Oil pump to Pull To Lock
		Close HPCI Injection Valve.
	SRO	Consult Tech Specs. , Enter Appropriate LCO. (NEED THAT HERE)
		Take action to start maintenance, notify SS and operations manager.
	RO	Monitor plant parameters and take action as necessary.

Op-Test No.: _____ Scenario No.: __3___ Event No.: __7___

Event Description: Fuel Failure, Main Steam line leak, RCIC Break, HPCI inverter failure, CRD pump failure. (FROM OPL 177.064)

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Announces alarms as follows: - OG Avg. Annual Release limit exceeded.
		- OG Pre Trt. Rad High
		- Main steam line high radiation Turbine Bldg area radiation high Note: Condenser Corridor > 1000 mr/hr
		Evacuates TB/RB area
		Check instruments as follows, reporting increase in radiation RR-90-157 (OG Pretrt) RR-90-135 (MSL Rad)
		Notifies Rad. Con.
		Checks off-gas flow
		Announce Rx Bldg area Rad. High (RM 90-21A and 90-20A)
		Notifies Chem Lab to Sample
	SRO	Directs power reduction via reduction in core flow
	ALL	Recognizes Group 6 isolation on Hi rad
		Evacuates Reactor Building
	SRO	Declares NOUE (1.4-U or 6.1-U) [If time permits]
		Enters 2-EOI-3
		Directs manual scram
	RO/BOP	Manually scrams and verifies all rods inserted

Op-Test No.: _____ Scenario No.: __3___ Event No.: __7___

Event Description: Fuel Failure, Main Steam line leak, RCIC Break, HPCI inverter failure, CRD pump failure. (FROM OPL 177.064)

	RO/BOP	Carries out 2-AOI-100-1 actions
		- Trips main turbine - Trips 2 RFPS - Verify recirc pumps at minimum - Verifies Gp 2 and 3 isolations
	All	Reports MSIVs not closed on MSL high temp (194 F) on panel 9-5 alarms.
	SRO	Directs MSIV closure
		Enters EOI-4
		NOUE 4.2-U
	RO/BOP	Closes MSIVs
		Announces CRD Pump Trip
	SRO	Enters 2-EOI-1
		Directs pressure control <1043 psig Directs level control > -162"
	RO/BOP	Controls pressure as directed using SRVs; Controls level as directed using HPCI
		Reports reactor pressure decrease or response to MSRV open alarm
		Reports PCV 1-179 open
		Cycles PCV 1-179

Op-Test No.: _____ Scenario No.: __3___ Event No.: __7___

Event Description: Fuel Failure, Main Steam line leak, RCIC Break, HPCI inverter failure, CRD pump failure. (FROM OPL 177.064)

	US	Directs actions to close PCV 1-179 per AOI-1-1 outside control room
	RO/BOP	Reports PCV 1-179 does not close, Monitors torus temperature
	SRO	Enters EOI-2 at 95 degrees F
		Directs available RHR placed in suppression pool cooling.
		Directs available RHR placed in suppression pool cooling.
	RO/BOP	Places Loop II in suppression pool cooling.
	US	Directs HPCI placed in Press and/or level control
	RO/BOP	Reports HPCI failure (120V Power Alarm)
		Reports RCIC high temp and/or isolation lights and failure to isolate
	SRO	Directs RCIC isolation
	RO/BOP	Closes FCV 71-2 and 3
	SRO	Directs Appendix 8G
	RO/BOP	Announce Recirc Trip at -45"
	SRO	Directs Appendix 7B
	RRO/BOP	Performs Appendix 7B

Op-Test No.: _____ Scenario No.: __3___ Event No.: __7___

Event Description: Fuel Failure, Main Steam line leak, RCIC Break, HPCI inverter failure, CRD pump failure. (FROM OPL 177.064)

	SR	Directs preventing flooding vessel via Condensate system by closing RFP discharge valves
	RO/BOP	Closes RFP discharge valves
	SRO	Directs H2O2 analyzers placed in service
	RO/BOP	Places H2O2 analyzers in service, performs Appendix 8G
	ALL	Announces loss of "C" Unit Bd
	SRO	Directs outside US to check Board
		Enters C1, Directs ADS inhibited
	RO/BOP	Inhibits ADS
		Reports SRV closed
	SRO	When level decreases to TAF directs Emergency depressurization
	RO/BOP	Opens 6 ADS Valves, verifies open
	SRO	Renters EOI-1 and 2 at 2.45 psig DWP (Conditional)
		Declares Alert 2.1-A. (Conditional)
	RO/BOP	Restores water level +12 to +51 with LPCI, Condensate, Core Spray

Op-Test No.: _____ Scenario No.: __3___ Event No.: __7___

Event Description: Fuel Failure, Main Steam line leak, RCIC Break, HPCI inverter failure, CRD pump failure. (FROM OPL 177.064)

	SRO	Classifies event as Site Area Emergency (1.1-S1)
	STA	Assist SRO by informing him/her of EOI entry conditions and recommending required actions

Critical Tasks

1 Isolates MSIVs prior to 2 Area Radiations/Temperatures reaching Max Safe

2 Isolates RCIC prior to 2 Area Radiations/Temperatures reaching Max Safe

3 Emergency depressurizes when RPV water level decreases below TAF, but prior to -200"

4 Restores and maintains RPV water level above TAF after emergency depressurization.

Facility: _Browns Ferry____ Scenario No.: ____4___ Op-Test No.: _______

Examiners: ______________________ Operators: ______________________

Initial Conditions: Both 2B and 2D RHR pumps inoperable. A unit shut down is in progress

Turnover: Shut down Unit 2 based on RHR pumps inoperable. 85% and decreasing power.

Event No.	Malf. No.	Event Type*	Event Description
1		R/RO	Decrease power to Cold Shutdown
2	imfth20r	I/RO	Jet Pump failure
3		N/BOP	Perform Jet Pump operability test per 2-SI-4.6.E.1/ Begin Plant shutdown.
4	FW05B	C/BOP	"B" Feedwater heater string isolates - High Pressure Heater String
5	TC11	I/BOP	EHC Pressure Regulator Failure, causes shift in regulators and slight pressure increase
6	RD01A	C/RO	"A" CRD pump trip
7	imf ed09d imf rc 09 imf rc10	MT C	Loss of 4 KV Shutdown Board D, **(Obtained from OPL 177.047)** RCIC Steam Line Break, failure of RCIC to automatically isolate
	imf rh04, imf pc 14	C	Low Suppression Pool Water Level, torus level leak
		C	ADS Valve failure
		C	HPCI autostart failure.

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

Op-Test No.: _____ Scenario No.: _____ Event No.: __½___

Event Description: Lower power to 85% power using recirculation flow, with, Jet pump failure

Time	Position	Applicant's Actions or Behavior
	SRO	Direct RO to lower reactor power using recirculation flow.
	RO	Adjusts recirculation flow to lower reactor power
		Observe reactor power - monitor for power oscillations
		observe that reactor power has lowered.
		Recognize jet pump 16 has failed, notice: A decrease in Generator Mwe due to a decrease in core flow. Core plate delta p will drop corresponding to the core flow decrease.
		Report this to the SRO
	SRO	Refer to TS concerning operability of the jet pump. (NEED TS NUMBER HERE _____________)
		Directs BOP to perform SI 4.6.E.1, Jet pump operability
	BOP	Observes the loss of turbine megawatts
		Monitors other steam plant indications for problems.
		Perform SI 4.6.E.1

Op-Test No.: _____ Scenario No.: __4___ Event No.: __3___		
Event Description: Perform Jet Pump operability test per 2-SI-4.6.E.1/ Begin Plant shutdown		

Time	Position	Applicant's Actions or Behavior
	SRO	Direct BOP to perform the surveillance
		Determine that the surveillance does not meet the acceptance criteria
		Determine that an LCO exists TS 3.6.E.1, Plant shutdown in 24 hours is required.
		Call operations Management and report that a shutdown is required.
	BOP	Review the surveillance procedure
		Review precautions and ensure the prerequisites are met
		Comply with procedural guidance for completing
		NEED TO ADD STEPS OF THE PROCEDURE HERE OR ATTACH PROCEDURE TO THE SCENARIO. THE PROCEDURE WAS NOT AVAILABLE AT TIME OF DEVELOPMENT.

Op-Test No.: _____ Scenario No.: __4___ Event No.: __4___

Event Description: "B" Feedwater heater string isolates - High Pressure Heater String

Time	Position	Applicant's Actions or Behavior
	BOP	Observes: Feedwater temperature lowers Reactor power rises Speed of the operating reactor feed pump turbines rises
		May receive on panel 2.9.5: LPRM High (2-XA-55-5A, Window 11) RBM High/ INOP (2-XA-55-5a, Window 24) ADD ADDITIONAL ANNUNCIATORS THAT MAY COME IN. xxxx
		Diagnose that "B" HP feedwater heater string has isolated.
	BOP	Take actions in accordance with 2 AOI-6-1A: VERIFY AUTOMATIC ACTIONS OCCUR: The High Pressure Heater Extraction Isolation Valves close, the Moisture Separator Drain Pump Suction Valve closes and the Moisture Separator Drain Pumps Trip. IS there a way to prevent an automatic action from happening and have the BOP take action to do the isolation? If so, this would be a better event.
	SRO	Direct operator actions in accordance with 2 AOI-6-1A, Feedwater Heater String/Extraction Steam Isolation.
		Direct RO to reduce reactor power using recirc flow and rods as necessary.
		NOTIFY Reactor Engineer of feedwater heater isolation and power reduction
	RO	**ADJUST reactor power and flow as directed by Reactor Engineer/Unit Supervisor to stay within required thermal and feedwater temperature limits. REFER TO 2-GOI-100-12 or 2-GOI-100-12A for the power reduction.**

Op-Test No.: _____ Scenario No.: __4___ Event No.: __4___

Event Description: "B" Feedwater heater string isolates - High Pressure Heater String

	BOP	ISOLATE heater drain flow from the feedwater heater string by closing the appropriate FEEDWATER HEATER A2(B2)(C2) DRAIN TO HTR A3(B3)(C3), 2-FCV-6-94(95)(96)
	SRO	REFER TO 2-OI-6 for turbine load restrictions
	BOP	Verify the following valves closed: The following valves must be manually closed: 2-FCV-3-31, HP HTR 2B2 FW INLET ISOL VALVE 2-FCV-3-76, HP HTR 2B1 FW OUTLET ISOL VALVE The following valves and pumps AUTO Isolate 2-FCV-5-9, HP HEATER 2B1 EXTR ISOL VLV 2-FCV-5-21, HP HEATER 2B2 EXTR ISOL VLV 2-FCV-6-74, MSR DR PMP 2B1 SUCTION VALVE 2-FCV-6-172, MSR DR PMP 2B2 SUCTION VALVE MSR Drain Pumps 2B1 and 2B2 trip

Op-Test No.: _____ Scenario No.: __4___ Event No.: ___5__

Event Description: EHC Pressure Regulator Failure, causes shift in regulators and slight pressure increase.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize/announce the pressure regulator shift
		1 If the controlling reactor pressure control unit fails downscale the following symptoms may occur: 2.1.1 Reactor pressure rises 2 to 5 psig. 2.1.2 Reactor thermal power rises slightly. 2.1.3 Generator output will lower slightly. 2.1.4 On Panel 9-7, Pressure Regulator will swap from A(B) in control to B(A) in control.
		3.0 AUTOMATIC ACTIONS 3.1 If the controlling reactor pressure control unit FAILS DOWNSCALE the following may occur: 3.1.1 The backup reactor pressure control unit takes control (B pressure control unit is normally the backup unit).
	SRO	Direct actions of 2-AOI-47-2, REACTOR PRESSURE CONTROL UNIT FAILURE
	BOP	Verify that backup pressure control unit takes control. (NOTE: Can this be made to not transfer requiring a manual transfer? If so could the operators do it reasonably with getting a reactor scram?)
	RO/BOP	Monitor Reactor power and pressure
	SRO	Direct repair of the EHC pressure regulator.

Op-Test No.: _____ Scenario No.: ___4__ Event No.: __6___

Event Description: "A" CRD pump trip.

Time	Position	Applicant's Actions or Behavior
	RO	Recognize "A" CRD pump has tripped.
		Review annunciators/indications: CRD Pump A breaker tripped ·CRD PUMP A SUCT PRESS LOW annunciator, (2-XA-55-5A, Window 2) in alarm. CRD DRIVE WTR HDR DP, 2-PDI-85-17A, less than 250 psid
		Report to SRO
	SRO	Acknowledge the report of loss of CRD "A" pump trip. Direct actions of 2-AOI-85-3, CRD system Failure

Op-Test No.: _____ Scenario No.: __4__ Event No.: __6___		
Event Description: "A" CRD pump trip.		
	RO	4.1.1 IF operating CRD Pump has tripped and Standby CRD Pump is AVAILABLE, THEN PERFORM the following at Panel 2-9-5: 4.1.1.1 PLACE CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, in MAN at minimum setting. 4.1.1.2 START associated standby CRD Pump using one of the following: · CRD PUMP 1B, using 2-HS-85-2A. · CRD Pump 2A, using 2-HS-85-1A. 4.1.1.3 IF CRD Pump 1B was started, THEN OPEN CRD PUMP 1B DISCH TO U2, using 2-HS-85-8A. 4.1.1.4 ADJUST CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, to establish the following conditions: · CRD CLG WTR HDR DP, 2-PDI-85-18A, approximately 20 psid. · CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, between 40 and 65 gpm. 4.1.1.5 BALANCE CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, and PLACE in AUTO or BALANCE.
	SRO	Ensure RO has taken appropriate actions.
	SRO	Ensure that maintenance is initiated on the "A" pump.
		Direct RO to balance CRD system flow control and place in automatic.
	BOP	Take necessary actions to assist RO and monitor plant parameters.

Op-Test No.: _____ Scenario No.: ___4__ Event No.: __6___		
Event Description: "A" CRD pump trip.		

Op-Test No.: _____ Scenario No.: __4___ Event No.: ___7__

Event Description: Loss of 4 KV Shutdown Board D, RCIC Steam Line Leak

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Identifies/Reports a loss of both RPS Buses
	ALL	Identifies/Reports a loss of 4kV Shutdown Board "D"
	RO	Verifies all rods in by:
		- one rod permissive - green backgrounds - ICS
	Crew	Identifies/reports MSIV closure
	RO/BOP	Transfers 480V Shutdown Board 2B and 'B' Diesel Aux Bd
	SRO	Enters EOI 1 and directs the following:
		- UOs to enter AOI-100-1 for power control
		Pressure be maintained 800 to 1000 psig with one or more of the following *MSRV's (App 11A) *HPCI (App 11C) *RCIC (App 11B)
		- RPV level maintained +12" to +51" with one or more of the following *HPCI *RCIC *CRD
	RO/BOP	Carries out the following actions
		- Inserts SRM's and IRM's
		- Changes recorders from APRM's to IRM's
		- Mode switch to shutdown

Op-Test No.: _____ Scenario No.: __4___ Event No.: ___7__		
Event Description: Loss of 4 KV Shutdown Board D, RCIC Steam Line Leak		
	RO/BOP	Ranges down to follow power
	RO/BOP	Ranges down to follow power
		Maintains RPV pressure between 800 to 1000 psig
		Maintains RPV level between +12" and +51"
		When HPCI used for pressure or level control, recognizes automatic control on controller failed, and operates in manual
		Places RCIC in service for level control
	SRO	Directs App 8G be performed
	RO/BOP	Performs App 8G
	CREW	Monitors containment parameters
	RO/BOP	Identifies/reports "RCIC Steam Line Leak Detection Temp. High" alarm
	SRO	Enters EOI 3 and directs the following: - Rx Bldg be evacuated - RCIC area temperature be monitored - verify RCIC is isolated - Radcon be notified
	RO/BOP	Evacuates affected area of the Reactor Building Monitors RCIC room temperature Identifies/reports RCIC failure to isolate
	SRO	Directs RCIC be isolated

Op-Test No.: _____ Scenario No.: __4___ Event No.: ___7__

Event Description: Loss of 4 KV Shutdown Board D, RCIC Steam Line Leak

	RO/BOP	Isolates RCIC
	SRO	Direct SP/C placed in service per OI-74
	RO/BOP	Places suppression pool cooling in service

Op-Test No.: _____ Scenario No.: ___4__ Event No.: ___8__		
Event Description: LOW SUPPRESSION POOL LEVEL/EMERGENCY DEPRESSURIZATION		

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Announces alarm "Core Spray Loop I/RCIC Pump Room Flood Level High
	SRO	Enters EOI 3 on flood alarms
		Directs investigation of area for level and leakage source
	RO/SRO	Announces alarm "Suppr Chamber Water Level Abnormal"
		Reports level < 6.25"
		Reports abnormal operation of Loop I RHR pumps (Pressure and Amps swinging)
	SRO	Directs Cooldown at <100°F
		Enters EOI 2 on Suppression Pool Level
		Direct Appendix 18 for Suppression Pool level control
		Directs opening 71-34 at breaker
		Directs Loop I RHR pumps be secured
	RO/BOP	Secure RHR pumps 'A' and 'C'
	SRO	Directs App. R switches transferred to "shutdown" and closure of RHR 'A' and 'C' Suppression pool suction valves (possible)
	CREW	Monitors cntmt parameters

Op-Test No.: _____ Scenario No.: ___4__ Event No.: ___8__

Event Description: LOW SUPPRESSION POOL LEVEL/EMERGENCY DEPRESSURIZATION

		Re-enters EOI 2 on SP/T
	SRO	Directs HPCI locked out when SP level reaches 12.75 feet
	RO/BOP	Locks out HPCI at 12.75 feet
		Initiate cooldown with MSRVs
	SRO	Directs Emergency Depressurization at 11.5 feet Suppression Pool Level
	RO/BOP	Opens 6 ADS valves
		Recognizes only 4 ADS valves opened
	SRO	Directs 2 additional SRV's be opened
	RO/BOP	Opens 2 additional SRVs
	SRO	Directs level restoration to +12 to +51"
	RO/BOP	Restores water level +12 to +51"
	SRO	Classifies event as a SAE (1.5-S or 2.1-S)

Op-Test No.: _____ Scenario No.: _____ Event No.: _____		
Event Description: Crew Critical Tasks		

Time	Position	Applicant's Actions or Behavior
1.	Isolates RCIC	
2.	Locks out HPCI before suppression pool water level decreases below 12.75 feet	
3.	Maintains RPV water level above TAF (-162")	
4.	Emergency depressurizes RPV based upon exceeding Heat Capacity Level Limit (HCLL)	

SPARE SCENARIO

Facility: _Browns Ferry ____ Scenario No.: ____1___ Op-Test No.: _______

Examiners: Operators:

Initial Submittal.

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Turnover:

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Pressure 2-SR-3.5.3.3, is due to be performed this shift. It has been completed up to step XXX.

Shift Orders: Rx power is at 90 percent power. Power should be increased to full power ASAP. You are required to complete the RCIC Flow test per 2-SR-3.5.3.3

Event No.	Malf. No.	Event Type*	Event Description
1		N/C/ BOP	RCIC Flow test, SR-3.5.3.3, RCIC divert valve fails open to the suppression pool.
2	FW25 D 0	I/BOP	Failure of any 3 element Steam Flow input, FT 1-50, "D" Main Steam line fails to "0".
3	TH31P	I/RO	Downscale failure of Reactor Pressure Transmitter 3-74A.
4	FW31	C/N/ BOP	'A' RFPT making noise, failed bearing report called into the control room from the plant/Removal of RFPT 'A' from service. Also receive alarm 2-XA-55-6C Make this such that it looks real for the A RFPT.
5		R/RO	Load Decrease to Support removal of RFPT from service.

Facility: _Browns Ferry ____ Scenario No.: ____1___ Op-Test No.: _______

Examiners: ______________________ Operators: ______________________

Initial Conditions: Rx Power 90% MOC

RWCU pump 2B is under clearance for pump seal replacement and is expected to be under clearance for 9 hours.

IRM Channel C has failed downscale low and was bypassed for maintenance. It is expected to be repaired in approximately 8 hours.

No other equipment is OOS.

Turnover: The plant is operating at 90% power. MOC. RHR SW has been placed in service (IAW 2-OI-74) and RHR Train B was placed in service for the RCIC System Test. RCIC System Rated Flow at Normal Operating Pressure 2-SR-3.5.3.3, is due to be performed this shift. It has been completed up to step XXX.

Shift Orders: Rx power is at 90 percent power. Power should be increased to full power ASAP. You are required to complete the RCIC Flow test per 2-SR-3.5.3.3

6	FW22	I/RO	Spurious RFPT Low suction Pressure Trip of the "A" RFPT. This will occur before the complete reduction of power to the required power for 2 RFPT operation. Other feed pumps have to be controlled by manual. Additionally have a failure of the recirculation system to runback. Manual should work.
7		MT	Loss of all Main Feed water
			ATWS, RCIC fails to auto start, and HPCI starts and runs for 30 seconds.
8		C	Recirc loop rupture
			Loss of Level indication
9		C	Failure of bus to auto transfer (Alternate MG Set DA)

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

Op-Test No.: __1___ Scenario No.: __1___ Event No.: __1___

Event Description: RCIC Flow Test, SR-3.5.3.3, RCIC divert valve fails open to the Suppression pool.

Time	Position	Applicant's Actions or Behavior
	BOP	Determine RCIC System Divert valve has inadvertently opened
		Inform SRO and RO of decrease in flow
		Recognize that the RCIC divert valve repositioned to the Suppression Pool. Secure RCIC turbine.
		Inform RO and SRO
	SRO	Inform maintenance to investigate and repair valve.
		Refer to appropriate T. S. to determine operability requirements. XXXXX
	BOP	Continue to monitor plant parameters and perform duties as directed by the SRO.

Op-Test No.: __1___ Scenario No.: __1___ Event No.: __2___

Event Description: Failure of Steam Flow Transmitter, FT 1-50 "D" to "0"

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of instrument failure
		Not sure if this still works the same way.
		Place feedwater control to single element as directed by the SRO.
	SRO	Direct operator actions in accordance with 2-AOI-3-1, Loss of Reactor Feedwater or Reactor Water Level High/low
		Direct BOP to place feedwater control to single element.

Op-Test No.: __1___ Scenario No.: __1___ Event No.: __3___

Event Description: Down scale failure of Reactor Pressure Transmitter 3-74A

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize Acknowledge and announce alarm.
	SRO	Refer to ARP 2-SRP-9-3C window 35
	BOP	Verify RPV Pressure using multiple indications
		Monitor Drywell Pressure
		Determine instrument has failed
	SRO	Refer to TS Table 3.2.B
		Enter LCO as required by Table 3.2.B
		Contact Maintenance and I&C to repair.

Op-Test No.: __1___ Scenario No.: __1___ Event No.: __4/5___

Event Description: A' RFPT making noise, failed bearing report called into the control room from the plant/Removal of RFPT 'A' from service. Also receive alarm 2-XA-55-6C Make this such that it looks real for the A RFPT.

Load Decrease to Support removal of RFPT from service

Time	Position	Applicant's Actions or Behavior
	RO	Receive report of failed bearing, inform SRO
	SRO	Refers to 2-GOI-100-12A
		Calls for support for Load Decrease
		Direct RO to decrease core low, drive rods to lower power to remove the RFPT.
	RO	Lowers core flow, pressure, power, flow during load decrease.
	SRO	Directs removal of "A" RFPT.
	RO	Refers to 2-OI-3
		Verify Turning gear in Auto
		Place PDS in manual and verify column 3 selected.
		Lower RFPT speed slowly using Ramp UP/Ramp down pushbuttons.
		Observe Operating RFPT speed increases.
		Lower speed to approximately 600 rpm.
		Depress the trip pushbutton.
		Verify closed testable check valve
		Close discharge and min flow valves.
	SRO	Take action to tap RFPT and start repairs.

Op-Test No.: __1___ Scenario No.: __1___ Event No.: __6__

Event Description: Spurious RFPT Low suction Pressure Trip of the "A" RFPT. This will occur before the complete reduction of power to the required power for 2 RFPT operation. Other feed pumps have to be controlled by manual. Additionally have a failure of the recirculation system to runback. Manual should work.

Time	Position	Applicant's Actions or Behavior
	RO/BOP	Recognize/ announce loss of RFPT "A"
		Need representative annunciators that would come in.
	SRO	Refer to 2-AOI-3-1
		Direct actions of the AOI, Reduce recirculation flow OR take manual control of the "A" RFPT as required to avoid a scram on low water level.
	RO	Reduce recirculation flow OR take manual control of the "A" RFPT as required to avoid a scram on low water level.
		Obtain SRO permission and attempt to restart RFPT.
NOTE: Attempts to restart the "A" RFPT will be unsuccessful.		
	SRO	Take action to inform maintenance and start repairs.

Op-Test No.: _____ Scenario No.: _____ Event No.: ___7__

Event Description: Loss of all Main Feed water

ATWS, RCIC fails to auto start, and HPCI starts and runs for 30 seconds.

Recirc loop rupture, Loss of Level indication, Failure of bus to auto transfer (Alternate MG Set DA)

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize RFPT Tripped (2-XA-55-6C, window 29) annunciator is in alarm
		Inform SRO and RO
		Determine all remaining feed pumps tripped and speeds are decreasing.
	RO/BOP	Recognize decrease in RX VESSEL LEVEL
	SRO	Enter 2-AOI-3-1, Loss of Reactor Feedwater or Reactor Water Level High/Low, and direct actions for loss of all RFPTs.
		Recognize water level will go below the scram setpoint, and direct a Manual Scram
	RO	Insert a Manual Scram as directed by the SRO
	SRO	Recognize the need to enter EOI-1 (RC/L, RC/Q)
	RO/BOP	Perform actions as directed by the SRO
	RO	Recognize that control rods failed to insert beyond position 02.
		Inform the SRO
	SRO	Determine the need to enter C5 per RC/L, direct operator actions.
	RO/BOP	Verify/confirm directions of SRO.

Op-Test No.: _____ Scenario No.: _____ Event No.: __8___

Event Description: Recirc loop rupture, Loss of Level indication

Time	Position	Applicant's Actions or Behavior
	BOP/RO	Recoginze increase in drywell parameters
		Inform SRO
	SRO	Enter EOI-1, RC/P
		Direct actions per EOI and contingencies
		Recognize the need to enter C2, C4
	BOP/RO	Perform actions as directed by SRO

Op-Test No.: _____ Scenario No.: _____ Event No.: _____ Page ___ of ___

Event Description:

Time	Position	Applicant's Actions or Behavior

OPERATING TEST NO.:

Applicant Type	Evolution Type	Minimum Number	Scenario Number							
			R1B		R2B		R4B		R3B	
RO	Reactivity	1			1		1		1	
	Normal	1				3		3		4
	Instrument	2			4	4 A	2	5	3	6
	Component	2			2	5	6	4	2 5	4 A
	Major	1			6	6	7	7	7	7
					R					
SRO-I As RO	Reactivity	1			1					
	Normal	0								
	Instrument	1			4					
	Component	1			2					
	Major	1			6					
							S			
SRO-I As SRO	Reactivity	0					1			
	Normal	1					3			
	Instrument	1					2 5			
	Component	1					4 6			
	Major	1					7			
					U123		U1,2	B	U3	
SRO-U	Reactivity	0			1		1		1	
	Normal	1			3		3	3	4	
	Instrument	1			4 4 A		2 5	5	3 6	
	Component	1			2 5		4 6	4	2 5 4 A	
	Major	1			6		7	7	7	

Instructions: (1) Enter the operating test number and Form ES-D-1 event numbers for each evolution type.

(2) Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.4.d) but must be significant per Section C.2.a of Appendix D.

Author: __RICHARD S. BALDWIN________________

Chief Examiner: __RICHARD S. BALDWIN________________

Competencies	Applicant #1 SRO-**U1**(S/BOP)				Applicant #2 SRO-**I1**(RO/SRO)				Applicant #3 **RO1**(BOP/RO)			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms		2		4,5,7		2		2,4,5,6,7		2,3,5		2,6,7
Diagnose Events and Conditions		2		4,5,7		2,4,6,		2,4,5,6,7		3,5		2,6,7
Understand Plant and System Response		1		3,4,7		1,2,		1,2,3,4,5		3,5		1,2,6,7
Comply With and Use Procedures (1)		1,2,6		3,5,7		1,2,6		1,3,4,5,6,7		3,5,6		1,2,6,7
Operate Control Boards (2)				3,4,5,7		1,2,4,6		NA		3,4A,5,6		1,2,6,7
Communicate and Interact With the Crew		1,2,3,4,4A,5,6		1,2,3,4,5,6,7		1,2,3,4,5,6		1,2,3,4,5,6,7		1,2,3,4A,5,6		1,2,3,4,5,6,7
Demonstrate Supervisory Ability (3)		1,2,3,4,5,6		NA		NA		1,2,3,4,5,6,7		NA		NA
Comply With and Use Tech. Specs. (3)		4		NA		NA		1,2,4,5,6,7		NA		NA

Notes:

(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: __RICHARD S. BALDWIN________________
Chief Examiner: __RICHARD S. BALDWIN________________

Competencies	Applicant #1 SRO-**U2**(S/BOP)				Applicant #2 SRO-**I2**(RO/SRO)				Applicant #3 **RO2**(BOP/RO)			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms		2		4,5,7		2		2,4,5,6,7		2,3,5		2,6,7
Diagnose Events and Conditions		2		4,5,7		2,4,6,		2,4,5,6,7		3,5		2,6,7
Understand Plant and System Response		1		3,4,7		1,2,		1,2,3,4,5		3,5		1,2,6,7
Comply With and Use Procedures (1)		1,2,6		3,5,7		1,2,6		1,3,4,5,6,7		3,5,6		1,2,6,7
Operate Control Boards (2)				3,4,5,7		1,2,4,6		NA		3,4A,5,6		1,2,6,7
Communicate and Interact With the Crew		1,2,3,4,4A,5,6		1,2,3,4,5,6,7		1,2,3,4,5,6		1,2,3,4,5,6,7		1,2,3,4A,5,6		1,2,3,4,5,6,7
Demonstrate Supervisory Ability (3)		1,2,3,4,5,6		NA		NA		1,2,3,4,5,6,7		NA		NA
Comply With and Use Tech. Specs. (3)		4		NA		NA		1,2,4,5,6,7		NA		NA

Notes:

(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: __RICHARD S. BALDWIN________________
Chief Examiner: __RICHARD S. BALDWIN________________

Competencies	Applicant #1 SRO-U3(SRO)				Applicant #2 RO3(RO/BOP)				Applicant #3 RO4(BOP/RO)			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms		2	2,3.4 A,5,6, 7			2	2,3, 5,7			2,3, 5	2,3, 5,6, 7	
Diagnose Events and Conditions		2	2,3,4, 4A,5, 6,7			2,4, 6,	2,3, 5,7			3,5	2,3, 5,6, 7	
Understand Plant and System Response		1	2,3,4, 6,7			1,2,	4,6			3,5	2,3, 5,6, 7	
Comply With and Use Procedures (1)		1,2, 6	1,2,3, 4			1,2, 6	4,4 A			3,5, 6	1,2, 3,7	
Operate Control Boards (2)		NA	NA			1,2, 4,6	4,4 A,6			3, 4A, 5,6	1,2, 3,5, 7	
Communicate and Interact With the Crew		1,2, 3,4, 4A, 5,6	1,2,3, 4,4A, 5,6,7			1,2, 3,4, 5,6	1,2, 3,4, 4A, 5,6. 7			1,2, 3,4 A,5, 6	1,2, 3,4, 4A, 5,6. 7	
Demonstrate Supervisory Ability (3)		1,2, 3,4, 5,6	1,2,3, 4,4A, 5,6,7			NA	NA			NA	NA	
Comply With and Use Tech. Specs. (3)		4	2,5,6			NA	NA			NA	NA	

Notes:

(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: __RICHARD S. BALDWIN________________
Chief Examiner: __RICHARD S. BALDWIN________________

Competencies	Applicant #1 SURROGATE				Applicant #2 RO5(RO/BOP)				Applicant #3 RO6(BOP/RO)			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms		2	2,3.4 A,5,6, 7			2	2,3, 5,7			2,3, 5	2,3, 5,6, 7	
Diagnose Events and Conditions		2	2,3,4, 4A,5, 6,7			2,4, 6,	2,3, 5,7			3,5	2,3, 5,6, 7	
Understand Plant and System Response		1	2,3,4, 6,7			1,2,	4,6			3,5	2,3, 5,6, 7	
Comply With and Use Procedures (1)		1,2, 6	1,2,3, 4			1,2, 6	4,4 A			3,5, 6	1,2, 3,7	
Operate Control Boards (2)		NA	NA			1,2, 4,6	4,4 A,6			3, 4A, 5,6	1,2, 3,5, 7	
Communicate and Interact With the Crew		1,2, 3,4, 4A, 5,6	1,2,3, 4,4A, 5,6,7			1,2, 3,4, 5,6	1,2, 3,4, 4A, 5,6. 7			1,2, 3,4 A,5, 6	1,2, 3,4, 4A, 5,6. 7	
Demonstrate Supervisory Ability (3)		1,2, 3,4, 5,6	1,2,3, 4,4A, 5,6,7			NA	NA			NA	NA	
Comply With and Use Tech. Specs. (3)		4	2,5,6			NA	NA			NA	NA	

Notes:

(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: __RICHARD S. BALDWIN________________
Chief Examiner: __RICHARD S. BALDWIN________________

Competencies	Applicant #1 SURROGATE				Applicant #2 RO7(RO/BOP)				Applicant #3 RO8(BOP/RO)			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms			2,3,4 A,5,6, 7	2,4 ,5, 6,7			2,3, 5,6, 7	4,5,7			2,3, 5,7	2,6,7
Diagnose Events and Conditions			2,3,4, 4A,5, 6,7	2,4 ,5, 6,7			2,3, 5,6, 7	4,5,7			2,3, 5,7	2,6,7
Understand Plant and System Response			2,3,4, 6,7	1,2 ,3, 4,5			2,3, 5,6, 7	3.4.7			4,6	1,2,6, 7
Comply With and Use Procedures (1)			1,2,3, 4	1,3 ,4, 5,6 ,7			1,2, 3,7	3,5,7			4,4 A	1,2,6, 7
Operate Control Boards (2)			NA	NA			1,2, 3,5, 7	3,4,5 ,7			4,4 A,6	1,2,6, 7
Communicate and Interact With the Crew			1,2,3, 4,4A, 5,6,7	1,2 ,3, 4,5 ,6, 7			1,2, 3,4, 4A, 5,6. 7	1,2,3 ,4,5, 6,7			1,2, 3,4, 4A, 5,6. 7	1,2,3, 4,5,6, 7
Demonstrate Supervisory Ability (3)			1,2,3, 4,4A, 5,6,7	1,2 ,3, 4,5 ,6, 7			NA	NA			NA	NA
Comply With and Use Tech. Specs. (3)			2,5,6	1,2 ,4, 5,6 ,7			NA	NA			NA	NA

Notes:

(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: __RICHARD S. BALDWIN________________
Chief Examiner: __RICHARD S. BALDWIN________________

Competencies	Applicant #1 SURROGATE				Applicant #2 RO9(RO/BOP)				Applicant #3 RO10(BOP/RO)			
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3	4	1	2	3	4	1	2	3	4
Understand and Interpret Annunciators and Alarms			2,3.4 A,5,6, 7	2,4 ,5, 6,7			2,3, 5,6, 7	4,5,7			2,3, 5,7	2,6,7
Diagnose Events and Conditions			2,3,4, 4A,5, 6,7	2,4 ,5, 6,7			2,3, 5,6, 7	4,5,7			2,3, 5,7	2,6,7
Understand Plant and System Response			2,3,4, 6,7	1,2 ,3, 4,5			2,3, 5,6, 7	3.4.7			4,6	1,2,6, 7
Comply With and Use Procedures (1)			1,2,3, 4	1,3 ,4, 5,6 ,7			1,2, 3,7	3,5,7			4,4 A	1,2,6, 7
Operate Control Boards (2)			NA	NA			1,2, 3,5, 7	3,4,5 ,7			4,4 A,6	1,2,6, 7
Communicate and Interact With the Crew			1,2,3, 4,4A, 5,6,7	1,2 ,3, 4,5 ,6, 7			1,2, 3,4, 4A, 5,6. 7	1,2,3 ,4,5, 6,7			1,2, 3,4, 4A, 5,6. 7	1,2,3, 4,5,6, 7
Demonstrate Supervisory Ability (3)			1,2,3, 4,4A, 5,6,7	1,2 ,3, 4,5 ,6, 7			NA	NA			NA	NA
Comply With and Use Tech. Specs. (3)			2,5,6	1,2 ,4, 5,6 ,7			NA	NA			NA	NA

Notes:

(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Circle the applicant's license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

Author: __RICHARD S. BALDWIN________________
Chief Examiner: __RICHARD S. BALDWIN________________

INITIAL SUBMITTAL

BROWNS FERRY 2000-301
50-259, 260, and 296/2000-301

JUNE 12 - 15, JUNE 27 - 29, AND
JUNE 30, 2000

INITIAL SUBMITTAL
SRO WRITTEN EXAMINATION

Facility: Browns Ferry Date of Exam: June 30, 2000 Exam Level: SRO

Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	4	5	4				7	4			2	26
	2	1	4	2				3	4			3	17
	Tier Totals	5	9	6				10	8			5	43
2. Plant Systems	1	1	3	2	4	1	3	1	2	1	2	3	23
	2	2	1	2	0	0	2	3	0	2	1		13
	3	0	0	0	1	1	0	0	0	1	0	1	4
	Tier Totals	3	4	4	5	2	5	4	2	4	3	4	40

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	
	5	3	3	6	17

Note:
1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.

6.* The generic K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.

7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
295003 Partial or Complete Loss of AC Pwr / 6		02 	 06 	 01			Emergency Generators Containment Isolation AC Electrical Distribution	4.1/4.2 3.7/3.7 3.7/3.8	
295006 SCRAM / 1					06		Cause of Reactor Scram	3.5/3.8	
295007 High Reactor Pressure / 3		02					Reactor Power	3.8/3.8	
295009 Low Reactor Water Level / 2			01				Recirc Pump Runback	3.2/3.3	
295010 High Drywell Pressure / 5		02					Drywell/Suppression Chamber Differential Pressure	3.5/3.5	
295013 High Suppression Pool Temp. / 5				02			Suppression Pool Cooling	3.9/3.9	
295014 Inadvertent Reactivity Addition / 1				03 		 2.1.7	RMCS Evaluate Plant Performance	3.5/3.5 3.7/4.4	
295015 Incomplete SCRAM / 1		01					CRD Hydraulics	3.8/3.9	
295016 Control Room Abandonment / 7					06		Cooldown Rate	3.3/3.5	
295017 High Off-site Release Rate / 9				03			Ventilation System	3.4/3.4	
295023 Refueling Accidents Cooling Mode / 8				05 	 02		Fuel Transfer System Fuel Pool Level	2.8/3.5 3.4/3.7	
295024 High Drywell Pressure / 5	01						Drywell Integrity	4.1/4.2	
295025 High Reactor Pressure / 3				05			RCIC	3.7/3.7	
295026 Suppression Pool High Water Temp. / 5			04				SBLC Injection	3.7/4.1	
295027 High Containment Temperature / 5									
295030 Low Suppression Pool Water Level / 5	01						Drywell Combustible Limit	3.8/4.1	
295031 Reactor Low Water Level / 2		01 	 05 	 08			Reactor Water Level Indication Emergency Depressurization Alt Injection System	4.4/4.4 4.2/4.3 3.8/3.9	
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1						2.4.6	Knowledge of Symptom Based EOPs	3.1/4.0	
295038 High Off-site Release Rate / 9	02						Protection of General Public	4.2/4.4	
500000 High Containment Hydrogen Conc. / 5	01 				 03		Containment Integrity Drywell Combustible Limit	3.3/3.9 3.3/3.8	
K/A Category Totals:	4	5	4	7	4	2	Group Point Total:		26

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Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4				06			Neutron Monitoring System	3.3/3.4	
295002 Loss of Main Condenser Vacuum / 3				06			Reactor/Pressure Turbine Regulating System	3.0/3.1	
295004 Partial or Total Loss of DC Pwr / 6		03					DC Bus Loads	3.3/3.3	
295005 Main Turbine Generator Trip / 3					05		Reactor Power	3.8/3.9	
295008 High Reactor Water Level / 2		06					RCIC	3.4/3.6	
295011 High Containment Temperature / 5									
295012 High Drywell Temperature / 5					01		Drywell Temperature	3.8/3.9	
295018 Partial or Total Loss of CCW / 8			01				Isolation of non-essential heat loads	2.9/3.2	
295019 Partial or Total Loss of Inst. Air / 8				03			IA Compressor Power Supply	3.0/3.0	
295020 Inadvertent Cont. Isolation / 5 & 7						2.4.4	Indications for EOP and AOP entry	4.0/4.3	
295021 Loss of Shutdown Cooling / 4		01					Reactor Water Temperature	3.6/3.7	
295022 Loss of CRD Pumps / 1									
295028 High Drywell Temperature / 5	01				03		Reactor Water Level Measurement Reactor Water Level	3.5/3.7 3.6/3.8	
295029 High Suppression Pool Water Level / 5		05					Containment/drywell Vacuum Breaker	3.1/3.3	
295032 High Secondary Containment Area Temperature / 5						2.4.4	Indications for EOP and AOP entry Conditions	4.0/4.3	
295033 High Secondary Containment Area Radiation Levels / 9						2.3.10	Reduce Excessive Radiation Levels	2.9/3.3	
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5			03				Isolating Affected Systems	3.5/3.6	
600000 Plant Fire On Site / 8					15		Fire Watch	2.3/3.5	
K/A Category Point Totals:	1	4	2	3	4	3	Group Point Total:		17

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Plant Systems - Tier 2/Group 1

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201005 RCIS														
202002 Recirculation Flow Control							05			09		Reactor Power Core Flow	3.6/3.6 3.2/3.3	
203000 RHR/LPCI: Injection Mode				06								NPSH	3.5/3.5	
206000 HPCI		01										System Valves	3.2/3.3	
207000 Isolation (Emergency) Condenser														
209001 LPCS				08								Automatic System Initiation	3.8/4.0	
209002 HPCS														
211000 SLC		02										Explosive Valves	3.1/3.2	
212000 RPS						05						RPS Sensor Inputs	3.5/3.8	
215004 Source Range Monitor								02				SRM INOP	3.4/3.7	
215005 APRM / LPRM						01						RPS	3.7/3.8	
216000 Nuclear Boiler Instrumentation											2.1.28	Purpose of Major Components	3.2/3.3	
217000 RCIC								19				High Suppression Pool Temperature	3.5/3.6	
218000 ADS		01										ADS Logic	3.1/3.3	
223001 Primary CTMT and Auxiliaries														
223002 PCIS/Nuclear Steam Supply Shutoff			01									High Suppression Pool Temperature	3.7/3.7	
226001 RHR/LPCI: CTMT Spray Mode										03		Keepfill System	3.5/3.4	
239002 SRVs				03	04							SRV Siphon Prevention Tail Pipe Temperature Monitoring	3.1/3.3 3.3/3.5	
241000 Reactor/Turbine Pressure Regulator			02									Reactor Pressure	4.2/4.3	
259002 Reactor Water Level Control									06			RX Water Level Following Scram	3.0/3.0	
261000 SGTS						01						A.C. Distribution	2.9/3.0	
262001 AC Electrical Distribution	01			03							2.1.1	Emergency Generators Interlocks Conduct of Ops	3.8/4.3 3.1/3.4 3.7/3.8	
264000 EDGs											2.1.32	System Limits and Precautions	3.4/3.8	
290001 Secondary CTMT														
K/A Category Point Totals:	1	3	2	4	1	3	1	2	1	2	3	Group Point Total:		23

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BWR SRO Examination Outline
Plant Systems - Tier 2/Group 2

Form ES-401-1

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201001 CRD Hydraulic			03									CRD Mechanism	3.1/3.2	
201002 RMCS														
201004 RSCS														
201006 RWM							02					Status of Control Rod Movement Blocks	3.4/3.5	
202001 Recirculation						01						Jet Pumps	3.5/3.7	
204000 RWCU									04			RWCU Interlocks and Trips	3.4/3.5	
205000 Shutdown Cooling						04						Reactor Water Level	3.6/3.6	
214000 RPIS														
215002 RBM														
215003 IRM	06									03		APRM SCRAM Signal IRM Range Switches	3.9/4.0 3.6/3.4	
219000 RHR/LPCI: Torus/Pool Cooling Mode														
230000 RHR/LPCI: Torus/Pool Spray Mode														
234000 Fuel Handling Equipment									02			Interlock Operation	3.1/3.7	
239003 MSIV Leakage Control														
245000 Main Turbine Gen. and Auxiliaries														
259001 Reactor Feedwater							02					Feedwater Inlet Temperature	3.2/3.3	
262002 UPS (AC/DC)														
263000 DC Electrical Distribution														
271000 Offgas														
272000 Radiation Monitoring			04									Main Steam System	3.7/3.8	
286000 Fire Protection							05					System Lineups	3.2/3.2	
290003 Control Room HVAC	01											Radiation Monitors	3.4/3.5	
300000 Instrument Air		01										Instrument Air Compressor	2.8/2.8	
400000 Component Cooling Water														
K/A Category Point Totals:	2	1	2			2	3		2	1		Group Point Total:		13

ES-401 | BWR SRO Examination Outline
Plant Systems - Tier 2/Group 3 | Form ES-401-1

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201003 Control Rod and Drive Mechanism														
215001 Traversing In-core Probe				01							2.1.32	Primary Containment Isolation System Limits and Precautions	3.4/3.5 3.4/3.8	
233000 Fuel Pool Cooling and Cleanup									02			Pump Trips	2.6/2.6	
239001 Main and Reheat Steam														
256000 Reactor Condensate					10							Air Ejection Operation	2.8/2.8	
268000 Radwaste														
288000 Plant Ventilation														
290002 Reactor Vessel Internals														
K/A Category Point Totals:				1	1				1		1	Group Point Total:		4

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points
Plant-Specific Priority Total (limit 10):			

Facility:	Date of Exam: June 30, 2000		Exam Level: SRO	
Category	**K/A #**	**Topic**	**Imp.**	**Points**
Conduct of Operations	2.1.6	Supervise During Transients	2.1/4.3	
	2.1.10	Conditions and Limitations in License	2.7/3.9	
	2.1.26	Non-Nuclear safety Procedures	2.2/2.6	
	2.1.29	Valve Lineup	3.4/3.3	
	2.1.1	Knowledge of Operations	3.7/3.8	
	2.1.			5
	Total			
Equipment Control	2.2.3	Unit Differences	3.1/3.3	
	2.2.13	Tagging and Clearance	3.6/3.8	
	2.2.32	RO Duties during Fuel Handling	3.5/3.3	
	2.2.			
	2.2.			
	2.2.			
	Total			3
Radiation Control	2.3.11	Control Radiation Release	2.7/3.2	
	2.3.10	Reduce Rad Levels	2.9/3.3	
	2.3.9	Containment Purge	2.5/3.4	
	2.3.			
	2.3.			
	2.3.			
	Total			3
Emergency Procedures/ Plan	2.4.1	EOP entry conditions	4.3/4.6	
	2.4.30	Event Reporting	2.2/3.6	
	2.4.44	EP Protective Actions	2.1/4.0	
	2.4.18	Specific Bases for EOP's	2.7/3.6	
	2.4.14	EOP Flow Charts	3.0/3.9	
	2.4.32	Loss of all Annunciators	3.3/3.5	
	Total			6
Tier 3 Point Total (SRO)				/17

Test Name: SRO.tst

Test Date: Wednesday, June 21, 2000

		Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1:	D	202002A1.05	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	2	215004A2.02	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	3	234000A3.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	4	261000K6.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	5	262001G2.1.1	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	6	295003AA1.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	7	295014G2.1.7	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	8	295016AA2.06	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	9	295017AA1.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	10	295023AA1.05	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	11	295028EK1.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	12	295031EA1.08	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	13	295031EK2.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	14	295033G2.3.10	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	15	295038EK1.02	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	16	500000EK1.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	17	600000AA2.15	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	18	G2.1.10	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	19	G2.1.26	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	20	G2.1.6	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	21	G2.3.11	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	22	G2.4.1	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	23	G2.4.18	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	24	G2.4.30	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	25	G2.4.44	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	26	0PL171.148	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	27	201001K3.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	28	201006A1.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	29	202001K6.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	30	202002A4.09	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	31	203000K4.06	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	32	204000A3.04	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	33	205000K6.04	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	34	206000K2.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	35	209001K4.08	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	36	211000K2.02	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	37	212000K6.05	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	38	215001G2.1.32	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	39	215001K4.01	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	40	215003A4.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	41	215003K1.06	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	42	215005K6.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	43	216000G2.1.28	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	44	217000A2.19	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	45	218000K2.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	46	223002K3.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	47	226001A4.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	48	233000A3.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	49	239002K4.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	50	239002K5.04	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C

Test Name: SRO.tst
Test Date: Wednesday, June 21, 2000

	Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1: 51	241000K3.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 52	256000K5.10	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 53	259001A1.02	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 54	259002A3.06	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 55	262001K1.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 56	262001K4.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 57	264000G2.1.32	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 58	272000K3.04	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 59	286000A1.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 60	290003K1.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 61	295002AA1.06	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 62	295003AK2.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 63	295003AK3.06	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 64	295004AK2.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 65	295005AA2.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 66	295006AA2.06	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 67	295007AK2.02	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 68	295008AK2.06	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 69	295009AK3.01	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 70	295010AK2.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 71	295012AA2.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 72	295013AA1.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 73	295014AA1.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 74	295015AK2.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 75	295018AK3.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 76	295019AA1.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 77	295020G2.4.4	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 78	295021AK2.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 79	295023AA2.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 80	295024EK1.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 81	295025EA1.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 82	295026EK3.04	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 83	295028EA2.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 84	295029EK2.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 85	295030EK1.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 86	295031EK3.05	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 87	295032G2.4.4	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 88	295036EK3.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 89	295037G2.4.6	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 90	300000K2.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 91	500000EA2.03	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 92	G2.1.1	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 93	G2.1.29	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 94	G2.2.13	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 95	G2.2.3	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 96	G2.2.30	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 97	G2.3.10	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 98	G2.3.9	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 99	G2.4.14	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 100	G2.4.32	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D

Name: ______________________________

1. 202002A1.05 001/ / SROT2G1/ 3.6/3.6/ MEMORY/ NEW/ BF00301/ SRO/ 117

Which one of the following is the purpose of the Maximum Extended Load Line Limit Analysis (MELLLA) region of the Power-to-Flow map?

A. to prevent cavitation of the jet pumps and the recirculation pumps.

B. to allow a maximum flow of 107.62 x 10E6 lbm/hr at 100% power and to lengthen the cycle when all rods are fully withdrawn.

C. to prevent a temporary rise in water level, a lowering of power, and a higher flow on the operating pump when recirculation pump stops or when there are rapid recirculation flow reductions.

✓D. to ensure that operation at the 100% Rod Line is easily achieved at full power and to take advantage of the neutron spectral shift which occurs at higher power/flow lines.

REF: OPL171.007, Revision 18
SOURCE: NEW
JMP
JUSTIFICATION
a. This is the purpose of the recirculation pump and jet pump NPSH limit lines
b. The Increased Core Flow area is bounded by points D, G, H, and I
c. Operation on this line causes these actions, it does not prevent them
d. (Correct)

2. 215004A2.02 001/ / SROT2G1/ 3.4/3.7/ MEMORY/ NEW/ BF00301/ SRO/ 143

What is the effect of the failure to remove shorting links on SRM performance?

A. Rod Block unless IRMs are on range 8 or higher.

✓B. SRM high high scram is bypassed.

C. Rod Block unless IRMs are on range 3 or lower.

D. Detector full in bypassed.

REF: 2-OI-92, rev 16 page 12
A. SRM high signal is not effected by link
B. Reactor scram is bypassed with shorting links
C. SRM downscale is not effected by links
D. SRM Detector wrong position not effected by shorting links.
JMP
JUSTIFICATION
3 cps is the minimum for an SRM to be operable
5 cps is for the rod block

3. 234000A3.02 001/ / SROT2G2/ 3.1/3.7/ C/A/ NEW/ BF00301/ SRO/ 133

During refueling activities, which one of the following conditions can cause a Fault lockout Light Status indicator to be lit?

A. The boundary zone has been by-passed.

B. The Bridge is over the core and a rod-out indication is detected.

C. The Bridge and/or Trolley has exceeded a Travel Limit.

✓D. There is demanded motion present when the refueling bridge motor is started.

REF: OPL171.053, Obj 4 Rev. 9, Page 12
New Question
a. This lights the Boundary Zone Bypass Light
b. This lights the Rod Block Interlock #1 light
c. This lights the safety travel interlock light
d. Correct answer
JMP

4. 261000K6.01 001/ / SROT2G1/ 2.9 / 3.0/ C/A/ NEW/ BF00301/ SRO/ 139

Unit 2 drywell pressure exceeds 2.45 psig and a 480 volt load shed logic is initiated three minutes later. Which one of the following describes expected status of the Standby Gas Treatment system 30 seconds after the load shed?

A. SGT trains A, B and C will be running.

B. Only SGT trains A and B will be running.

✓C. Only SGT train C will be running.

D. No SGT trains will be running.

REF: OPL171.018, Rev. 7, page 18
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
All pumps will auto start on High drywell pressure. SGT A and B will trip on initiation of the 480V load-shed logic but will auto.-restart after forty seconds if initiation signal is present. SGT C is not affected by 480 volt load shed logic initiation.

5. 262001G2.1.1 001/ / SROT2G1/ 3.7/3.8/ MEMORY/ BANK/ BF00301/ SRO/ 119

During RHR system surveillance testing, the 480V molded case breaker for Valve 2-FCV-74-61 trips immediately after closing.

In addition to making an operability determination, which one of the following choices describes the proper response to this situation?

A. One more attempt to close the breaker is permitted before notifying maintenance.

B. One more attempt to close the breaker is permitted after inspection and adjustment (if necessary) of cell switches.

C. Do not attempt to reclose the breaker until Electrical Maintenance is available at the breaker panel to observe.

✓D. Do not attempt to reclose the breaker. Initiate a Work Request to have the breaker inspected.

REF: 0-GOI-300-2, Rev. 34, Para. 3.20
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. This is not allowed by procedure, but some plants do it.
b. This is allowed for non-molded case 480V breakers.
c. This is a logical choice, but not allowed.
d. (Correct)

6. 295003AA1.01 001/ / SROT1G1/ 3.7/3.8/ MEMORY/ NEW/ BF00301/ SRO/ 103

Following a loss of all AC, which one of the following paths would restore one of the required qualified offsite circuits?

A. From the 500kV switchyard, through USST 1A to 4.16kV Unit Board 2B, to 4.16kV Shutdown Bus 1, to 4.16kV Shutdown Boards C and D.

✓B. From the 500kV switchyard, through USST 1B to 4.16kV Unit Board 1A, to 4.16kV Shutdown Bus 1, to 4.16kV Shutdown Boards A and B.

C. From Athens 161kV transmission system, through CSST B to Unit Board 2B, to Start Bus 1A, to Shutdown Bus 2, to Shutdown Boards A and B.

D. From Trinity 161kV transmission system, through CSST A to Unit Board 2A, to Start Bus 1A, to 4.16kV Shutdown Bus 2, to Shutdown Boards A and B.

REF: Technical Specification Basis, Page B 3.8-7
SOURCE; NEW QUESTION
JMP changed startup bus to start bus
JUSTIFICATION
a. Incorrect because USST 2B is the connection to 2B.
b. (Correct)
c. Incorrect because it must be through Shutdown Bus 1.
d. Incorrect because unit board must be 1A or 2B.

7. 295014G2.1.7 002/ / SROT1G1/ 3.7/4.4/ C/A/ MODIFIED/ BF00301/ SRO/ 105

Unit 2 is in refueling. You are the SRO on the refueling floor. Upon insertion of a new fuel assembly, there is an unexpected criticality. Your crew commences the immediate actions of 2-AOI-79-2, "INADVERTANT CRITICALITY DURING INCORE FUEL MOVEMENTS."

The crew verifies the fuel grapple is latched onto the fuel assembly handle and immediately removes the fuel assembly from the reactor core. However, you cannot determine if the reactor is subcritical again with the indications available.

Which one of the following describes the remaining immediate actions required by 2-AOI-79-2 for this situation?

A. Place the fuel assembly in a spent fuel storage pool location with the least possible number of surrounding fuel assemblies, leaving the fuel grapple latched to the fuel assembly handle. Evacuate the refueling floor.

B. Place the fuel assembly in a spent fuel storage pool location with the least possible number of surrounding fuel assemblies, and disengage the fuel grapple. Evacuate the refueling floor.

✓C. Move the refueling bridge and fuel assembly away from the reactor core, preferably to the area of the cattle chute, and evacuate the refuel floor.

D. If the Refueling Zone radiation monitors did not trip, instruct the control room operators to manually place the monitors in a tripped condition so that the Refueling Zone ventilation will isolate, SGT and CREV will actuate, and a Group 6 isolation will occur. Evacuate the refueling floor.

REF: 2-AOI-79-2, Rev. 0009, Para. 4.1
SOURCE: MODIFIED QUESTION
JMP
JUSTIFICATION

a. Required if the Rx is subcritical.
b. Required if the Rx is subcritical but an adverse radiological condition exists.
c. (Correct)
d. This may be appropriate after implementing the required immediate actions, but it is not delineated in the AOP.

8. 295016AA2.06 001/ / SROT1G1/ 3.3/3.5/ C/A/ NEW/ BF00301/ SRO/ 134

A fire has required evacuation of the Unit 2 control room. 2/3-SSI-001, "Safe Shutdown Instructions," has been implemented. The procedure directs a rapid depressurization of the RPV. Currently, only three MSRVs have been able to be opened. The following reactor pressures are recorded at the indicated times.

0000	750 psig
0015	510 psig
0030	390 psig
0045	300 psig
0100	210 psig

Which one of the following describes the correct operator actions?

A. Reduce the cooldown rate to less than 90 degrees per hour by periodically and sequentially closing MSRVs.

B. Increase cooldown rate if possible to 90 degrees per hour.

C. A fourth MSRV needs to be opened in order to provide sufficient blowdown to depressurize the RPV to allow LPCI injection.

✓D. No action is needed, adequate blowdown is available to depressurize the RPV to allow LPCI injection and no SSI cooldown limit requirements are being exceeded.

REF: 2/3-SSI-001, Rev. 3, page 78,TBD-23
2/3-SSI-2-1, Rev. 3, page 7, step 2.17
OPL171.039, Rev. 9, Page 12
SOURCE: 4/97 BSEP exam RO #98
JMP **add SSI COOLDOWN LIMITS to D ?help need steam tables**
JUSTIFICATION
90 degree cooldown limit is for a controlled cooldown
TBD-23 requires only 3 valves for adequate blowdown

9. 295017AA1.03 001/ / SROT1G1/ 3.4/3.4/ C/A/ NEW/ BF00301/ SRO/ 107

You are the Unit Supervisor on Unit 2. A chemistry technician taking routine samples reports that a sample from the roof vent monitored by RM-90-250 indicates there is a release of Xe133 from the roof of the reactor building. The sample had a total activity of 1.5E5 microcuries per cubic centimeter and no other gases or isotopes were detected.

Which one of the following states your required actions?

✓A. Direct the chemistry technician to continue routine monitoring.

B. Without delay, take appropriate actions to terminate the release.

C. Monitor the release and prepare to notify the NRC pursuant to 10 CFR 50.73.

D. Terminate the release within one hour and initiate a Special Report pursuant to the ODCM.

REF: ODCM, Rev. 10, Section 1/2.2
OPL171.033, Rev. 7
SOURCE: NEW QUESTION
help is this expected operator knowledge or a lookup
JUSTIFICATION

a. (Correct)
b. No action required. The objective was to confirm the candidate's knowledge that the reading was just about LLD for the RM.
c. Not a reportable release level.
d. No need to terminate the release, nor is it reportable by special report.

10. 295023AA1.05 001/ / SROT1G1/ 2.8/3.5/ MEMORY/ MODIFIED/ BF00301/ SRO/ 151

Fuel loading is in progress on Unit 2. A bundle is in transport from the SFSP to the core, when the fire alarm sounds. Which one of the following describes the correct actions to be taken?

A. Stop all fuel movement until determination of the fire's impact on refueling operations can be made.

B. Immediately lower the bundle to the closest location in the core and wait for determination of the fire's impact on refueling operations can be made.

✓C. Refueling SRO will monitor the Fire/Medical radio frequency and discontinue fuel movement only if the fire could adversely affect refueling.

D. Fire brigade team leader will determine if refueling operations could be adversely affected and direct the refueling SRO to discontinue fuel movement if necessary.

REF: OPL171.060, Rev. 9, Page 17
SOURCE: MODIFIED BANK QUESTION OPL171.060 005
lookup

11. 295028EK1.01 001/ / SROT1G2/ 3.5/3.7/ MEMORY/ BANK/ BF00301/ SRO/ 113

Which one of the following choices states the BASIS for Caution #1 in the EOIs?

A. Caution #1 is an accommodation for inaccuracies in RPV water level indication when plant conditions are different from those for which the instruments are calibrated.

✓B. Caution #1 defines conditions under which the value and trend of indicated level cannot be relied upon. Under extreme conditions, a high and increasing water level can be indicated when actual RPV level is decreasing.

C. Caution #1 defines conditions beyond the Environmental Qualification of the RPV level instrumentation. Excessive temperatures in the electronics make the indicated level and trend unreliable.

D. Caution #1 defines conditions under which drywell temperatures are high enough to interfere with the function of the condensing pots on the variable legs of the RPV level indicators.

REF: EOI PM, Operator Cautions, Rev. 2, Section 0-VB, Page 7
OPL171.003, Rev. 12, EO B.13
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. The EOI PM points out that the caution is not just a simple accommodation.
b. (Correct)
c. The caution does not address EQ considerations.
d. The condensing pots are on the reference legs.

12. 295031EA1.08 002/ / SROT1G1/ 3.8/3.9/ MEMORY/ NEW/ BF00301/ SRO/ 137

Due to a LOCA and a subsequent loss of all RHR pumps, Standby Coolant is being used to spray the drywell per appendix 17B. Due to high pressure injection failures, reactor water level lowers to the point that the Unit Supervisor enters C-1, Alternate Level Control. No Injection Subsystems can be ligned up for injection. What is the required action required of the RHR standby coolant system.

✓A. Secure the standby coolant drywell spray and line up for injection upon immediately.

B. Standby coolant drywell sprays can continue provided that other Alternate Injections subsystems are capable of restoring RPV water level to >-162 inches.

C. Standby coolant drywell sprays can continue until RPV water level drops to -162 inches.

D. Standby coolant drywell sprays can continue until Emergency Depressurization is required.

REF:
replaced
JUSTIFICATION

13. 295031EK2.01 001/ / SROT1G1/ 4.4/4.4/ C/A/ NEW/ BF00301/ SRO/ 141

During a small line break in the drywell, a controlled cooldown is being conducted per the guidance of EOI-1 RCP leg.

What effect will the cooldown have on delta P (sensed by the wide range level instrument) and what effect will this have on indicated reactor vessel wide range level?

This will result in:

A. lower sensed delta P and indicated level lower than actual level.

B. higher sensed delta P and indicated level lower than actual level.

✓C. lower sensed delta P and indicated level higher than actual level.

D. higher sensed delta P and indicated level higher than actual level.

a. Level is higher
b. Sensed delta P is lower due to boiling
C. Changes in ambient temperature change temperature and density of water in the reference leg. Changes in density causes erroneous indications in sensed delta P . Lower density in reference leg decreases sensed delta P and indicated level is higher than actual. When variable leg temperature is above saturation temperature for the existing Reactor pressure, water in the variable leg will boil. Boiling increases pressure on the variable leg side resulting in lower sensed delta P and indicated higher than actual level.
d. Level is higher

Changed EOP to EOI REF leg conditions stay constant in stem in justification we talk about it changing **confusing**

14. 295033G2.3.10 001/ / SROT1G2/ 2.9/3.3/ C/A/ NRC95301/ BF00301/ SRO/ 114

A RWCU Backwash Receiver Tank (BWRT) drain line has cracked during transfer to Radwaste and is spilling into the Reactor Building. Radiation levels in the Reactor Building are as follows:

Reactor Building Elevation 593	1200 mR/hr
Reactor Building Elevation 565 West	800 mR/hr
Reactor Building Elevation 565 East	850 mR/hr
Reactor Building Elevation 565 Northeast	1100 mR/hr
All other Reactor Building areas	NOT ALARMED

Per the EOIs, which one of the following is the required action that MUST be directed by the Unit Supervisor and/or Shift Manager?

A. Continue reactor operation and direct attempts to stop the tank drain line leakage.

✓B. Commence a normal reactor shutdown to Cold Shutdown.

C. Scram the reactor and commence a normal cooldown.

D. Scram the reactor and commence an emergency depressurization.

REF: EOI3, Rev. 6, SC/R
EOI PM, Section 0-VE, Rev. 1, Page 71.
SOURCE: 1995 BFNP SRO EXAM #72
JMP COLD S/D vice HOT S/D ref material?
JUSTIFICATION

a. This is only appropriate when the area radiation levels above the EOI-3 entry conditions (1000 mR/hr in all but the TIP room) are confined to one area.
b. (Correct)
c. Not a conservative option, and the EOI doesn't direct it for these conditions. Challenges safety systems and puts the plant through a transient.
d. This path is for when a primary system is discharging into the Reactor Building and the operators are unable to keep rad levels <1000 mR/hr.

15. 295038EK1.02 001/ / SROT1G1/ 4.2/4.4/ C/A/ NEW/ BF00301/ SRO/ 109

The following conditions have existed for 30 minutes:

- Plant Stack noble gas is 3.88E+8 uc/second.
- SI 4.8.B.1.a.1 release fraction is 2.7.
- Site boundary radiation reading is 28.7 mR/hr (gamma and beta).
- Site boundary I-131 is at 4.1E-8 uc/cc.

Which one of the following emergency classifications, if applicable, should be declared based on the above conditions? (Reference Material Provided)

A. None.

B. Unusual Event.

✓C. Alert.

D. Site Area Emergency.

REF: ODCM, Rev. 10
EPIP-1, Rev. 21, Section 4.0
SOURCE: NEW QUESTION
Reference material EPIP 1
JUSTIFICATION

a. This is incorrect because the plant is in an alert due to site boundary radiation levels.
b. This is incorrect because the condition must exist for 1 hour to be an Unusual Event.
c. (Correct) The site boundary radiation reading is about 2.5 times the 15-minute site boundary limit.
d. This is incorrect because based on the time the conditions have existed, the gaseous release rates are two orders of magnitude below their limits.

16. 500000EK1.01 001/ / SROT1G1/ 3.3/3.9/ C/A/ NEW/ BF00301/ SRO/ 110

Given the following conditions for Unit 2:

- All control rods have been inserted
- Drywell pressure is 2.1 psig
- Drywell temperature is 89 F
- Drywell hydrogen concentration is 3.1 percent
- RPV pressure is 1025 psig
- RPV water level is +16.2 inches
- Reactor Building ventilation exhaust radiation levels are 10 mR/hr
- Secondary containment temperatures are below maximum values
- Secondary containment sump water level is 56 inches
- Secondary containment area rad monitors are below maximum values
- Suppression pool temperature is 89 F
- Suppression pool level is - 4.3 inches

Based only on the above conditions, which one of the following describes the EOI flow paths you are REQUIRED to enter?

A. RC/P, RC/L and RC/Q.

B. PC/H, SP/L, SC/L, SC/T, DW/T, PC/P, SC/R and SP/T.

C. SC/L, SC/T, and SC/R.

✓D. DW/T, PC/P, SP/T, PC/H, AND SP/L.

REF: EOI-1,2 and 3
SOURCE: NEW QUESTION
eoi-3 entry due to 66" changed it to 56 inches, deleted "only" JMP
JUSTIFICATION

a. Incorrect because there are no required entries for EOI-1 and these are all EOI-1 flow paths.
b. Incorrect because entry into both EOI-3 and EOI-2 are not required.
c. Incorrect because entry into EOI-3 is not required.
d.

(Correct) Any entry into EOI-2 requires entry into each of the flow paths, irrespective of the entry conditions. EOI-2 entry is required because of hydrogen concentration in excess of 2.4 percent.

17. 600000AA2.15 001/ / SROT1G2/ 2.3/3.5/ MEMORY/ NEW/ BF00301/ SRO/ 116

A fire rated door listed in Table 9.3.11.E of the BFNP FIRE PROTECTION PLAN is about to become impaired by propping the door open. There is no fire detection equipment available to protect either side of the inoperable door. The door is located in a contamination zone.

Which one of the following is the MINIMUM action that must be taken to compensate for this impaired fire barrier?

A. Establish a roving hourly fire watch to monitor the area until the door is restored to an operable status.

B. If hot work is to be performed in either of the adjacent rooms, establish a continuous fire watch on either side of the open door.

✓C. Establish a continuous/dedicated fire watch to monitor the impaired fire door area until the door is restored to an operable status.

D. To reduce radiation exposures ALARA, establish a continuous/area fire watch to monitor the area at least once every 15 minutes until the door is restored to operable.

REF: BFNP Fire Protection Report, Vol. 1 (Rev 09), Page 9.0-14, and Vol. 2 (Rev 0002), Page 9 of 20.
SOURCE: NEW QUESTION
Compentent operator OR REF Material

JUSTIFICATION

a. This would be correct if fire detection and suppression were operable to protect one side of the door.
b. This would be correct if fire detection and suppression were operable to protect both sides of the door.
c. (Correct)
d. The PLAN does not permit this option if the fire watch has to deal with a C-zone.

18. G2.1.10 001/ / SROT3/ 2.7/3.9/ C/A/ NEW/ BF00301/ SRO/ 125

Given the following information about the total number of shifts worked during the first quarter of 2000:

SRO A worked: One 12 hour shift as Shift Manager, two 12 hour shifts as Unit 1 / 2 supervisor, and two 12 hour shifts as Unit 3 Unit Supervisor. While assigned as Shift Manager, SRO A spent approximately 4 hours attending Plan-of-the-Day meetings and routine interface with the Operations Work Control Group.

RO B worked: Three 8 hour shifts as Unit 2 Board UO, three 8 hour shifts as Unit 2 Desk UO, and one 8 hour shift as the Operations Representative in the Operations Work Control Group (Tagout Reviewer).

With regard to 10 CFR 55.53, "Conditions of Licenses," which one of the following describes the license status of the above operators?

A. Neither SRO A nor RO B have maintained an active license.

✓B. SRO A has maintained an active license, RO B has not maintained an active license.

C. RO B has maintained an active license, SRO A has not maintained an active license.

D. Both SRO A and RO B have maintained an active license.

REF: OSIL-105, 5/1/98.
10 CFR 55.53, Conditions of Licenses
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
The SRO met the requirements because he was actively performing the functions of a senior operator. As Shift Manager, he has certain management responsibilities, i.e., attending the POD, or periodic oversight of the Work Control Center.

The RO did not meet the requirements for an active license because normal duties under his license do not include collateral assignments such as Ops Rep in the Clearance process.

19. G2.1.26 001/ / SROT3/ 2.2/2.6/ C/A/ NEW/ BF00301/ SRO/ 144

During refueling operations a Portable floating work platform is being used and has been secured so that it is not free floating in the spent fuel pool (e.g. secured with tube lock or similar Attachment to pool wall, etc.).

According to 0-GOI-100-3C," FUEL MOVEMENT OPERATIONS DURING REFUELING," Work must stop and all personnel exit the portable floating work platform if which one of the following occurs?

A. Any testing of the neutron monitoring system.

B. Any time a control rod is not fully inserted in a control cell containing more than one fuel assemblies and the vessel head is removed.

✓C. Any time Fuel Handling Supervisor must leave the refuel floor without being properly relieved.

D. Any failure of the refueling floor CAM unit, that causes all three channels to be inoperable.

0GOI1003C, FUEL MOVEMENT OPERATIONS DURING REFUELING, Revision 32
took time reference out JMP
JUSTIFICATION
a. Must involve moving sources or the detectors.
b. Two or more must be removed
c. Correct. no minimum time allowed
d. Monitor not required for refueling floor work

20. G2.1.6 001/ / SROT3/ 2.1/4.3/ C/A/ NEW/ BF00301/ SRO/ 124

During abnormal or emergency conditions a UO shall not place an ECCS system in MANUAL unless directed by the Control Room Unit Supervisor/Shift Manager in compliance with EOIs or which of the following?

✓A. System misoperation in AUTOMATIC is confirmed by two independent indications.

B. Adequate core cooling is confirmed by at least one indication that meets REG Guide 1.97 requirements AND indications are approaching and cannot be prevented from exceeding an automatic action setpoint.

C. System misoperation in AUTOMATIC is confirmed by one indication AND adequate core cooling is confirmed by at least one indication that meets REG Guide 1.97 requirements.

D. Adequate core inventory is confirmed by at least two independent indications AND indications are approaching and cannot be prevented from exceeding an automatic action setpoint.

REF: SSP-12.1, Rev. 0037a, Pages 17, 19, and 25.
SOURCE: NEW

a. correct answer 3.1.10.k.2.c
b. requires two independent indications of adequate core cooling. Approaching a set point is initiation criteria, not criteria for taking system to manual.
c. requires two independent indications of adequate core cooling.
d. requires two independent indications of adequate core cooling not core inventory and Approaching a set point is initiation criteria, not criteria for taking system to manual.
JMP

21. G2.3.11 001/ / SROT3/ 2.7/3.2/ C/A/ NEW/ BF00301/ SRO/ 128

Liquid Radwaste Effluent Monitor RM-90-130 has been operating erratically. A release is scheduled for 10:00.

The following is the sequence of events:

09:58	Two independent samples of the tank being discharged were analyzed in accordance with the sampling and analysis program specified in the ODCM
10:00	Two qualified persons independently verified the release rate calculations and independently verified the valve line up prior to the release.
10:02	Commenced batch radwaste release
10:04	RM-90-130 fails

Which one of the following describes the MINIMUM actions required, if any?

✓A. Continue with the release. No additional actions are required for this situation.

B. Continue with the release. Within 1 hour, require an additional sample to confirm the original sample results. If the sample results confirm the previous results, complete the release. Require a qualified person to independently verify the release rate calculations.

C. Suspend the release. Require an additional sample to confirm the original sample results. If the sample results confirm the previous results, then resume the release.

D. Suspend the release. Require two additional independent samples of the tank being discharged. Require two qualified persons to independently verify the release rate calculations. If the sample results confirm the previous results and the release rate is confirmed, then resume the release.

REF: ODCM, Rev. 10, Table 1.1-1; 2.2.1
SOURCE: NEW QUESTION
REF MATERIAL ODCM JMP
JUSTIFICATION

a. (Correct) The ODCM requires either the monitor be operable OR prior to the release two independent samples of the tank being discharged were analyzed in accordance with the sampling and analysis program specified in the ODCM table 2.2.1. Two qualified persons independently verified the release rate calculations and independently verified the valve line up prior to the release.

b,c,d. Additional samples are not required; the minimum requirements for release have been met.

22. G2.4.1 001/ / SROT3/ 4.3/4.6/ C/A/ NRC95301/ BF00301/ SRO/ 99

Unit 3 is operating at 100% power.

Which one of the following is the reason for entering EOI-1 at Step RC1 if drywell temperature cannot be maintained below 200F per EOI-2?

A. To prevent exceeding the design temperature of the drywell structure.

B. To prevent exceeding the maximum normal operating temperature of the drywell with the reactor at power.

C. To ensure drywell temperature remains below the design temperature of the environmentally qualified drywell components.

✓D. To ensure the reactor is shutdown by control rod insertion should emergency depressurization be required.

REF: EOI PM, Rev. 0, SEC 0-VD, pg 23
OPL171.203, Rev 3, EO B4b
SOURCE: 1995 BFNP SRO EXAM #66
JMP
JUSTIFICATION
a. This action does nothing to cool the drywell below 280 F.
b. This action does nothing to cool the drywell below 200 F.
c. This action is to minimize the impact on non EQ equipment.
d.
(Correct)

23. G2.4.18 001/ / SROT3/ 2.7/3.6)/ MEMORY/ NEW/ BF00301/ SRO/ 142

While performing Steam Cooling, which one of the following describes the level at which Emergency Depressurization must be initiated and the reason for emergency depressurizing?

A. -190 inches to ensure adequate core cooling by core submergence.

B. -200 inches to ensure adequate core cooling by core submergence.

C. -190 inches to ensure the covered portion of the core will generate sufficient steam to prevent any fuel clad damage in the uncovered portion of the core.

✓D. -200 inches to ensure the covered portion of the core will generate sufficient steam to prevent any fuel clad damage in the uncovered portion of the core.

REF: EOI program manual, Section 0-V-I, page 15 of 18
SOURCE: NEW QUESTION

JUSTIFICATION
-162 inches is TAF

24. G2.4.30 001/ / SROT3/ 2.2/3.6/ C/A/ NEW/ BF00301/ SRO/ 138

A chemistry sample has been directed due to steadily rising SJAE rad monitor readings. The following sequence of events occur at the times noted:

0855 Chemistry reports coolant activity of 4.3 µci/ml based on sample
0900 SM enters a 12 to Hot Shutdown LCO based on coolant activity
0905 SM declares an Unusual Event based on abnormal core conditions
0910 A plant shutdown is started to comply with Technical Specifications.

The NRC must be notified of events in progress no later than

A. 0955

B. 1000

✓C. 1005

D. 1010

REF: 10 CFR 50.72
SOURCE: 4/97 BSEP exam RO #80
JMP

25. G2.4.44 001/ / SROT3/ 2.1/4.0/ MEMORY/ NEW/ BF00301/ SRO/ 140

Which one of the following has the authority for offsite recovery efforts during an emergency?

A. Site Emergency Director (SED)

B. Central Emergency Control Center (CECC) Director

✓C. State of Alabama

D. Nuclear Regulatory Commission

REF: EPIP-16, revision 3, Section 3.1.2.2 page 2
SOURCE: NEW QUESTION
JMP

26. 0PL171.148 001/ NEW/ 2/ PRNM/ / 295001/ AA1.06/ 3.3/3.4/ 6

Unit 2 is operating with only the 2B Recirc Pump (Single Loop Operation) at 60% power. The following alarms and conditions currently exist:

- Jet Pump Flow No. 11 Thru 20 (2-FI-68-46) 13 Mlbm/hr
- Jet Pump Flow No. 1 Thru 10 (2-FI-68-48) 57 Mlbm/hr
- TOTAL CORE FLOW Recorder (2-XR-68-50) 43.4 Mlbm/hr
- APRM FLOW 43.5%
- Mode Switch in RUN

DETERMINE how the Core Flow Indication and PRNM Systems are affected by these conditions.

A. The OPRM trip function is BYPASSED and the Total Core Flow Indication is correct.

✓B. The OPRM trip function is ENABLED and the Total Core Flow Indication is correct.

C. The OPRM trip function is BYPASSED and the Total Core Flow Indication may be inaccurate.

D. The OPRM trip function is ENABLED and the Total Core Flow Indication may be inaccurate.

T=4

AOI-68-1

27. 201001K3.03 001/ ROT2G1/ SROT2G2/ 3.1/3.2/ C/A/ BANK/ BF00301/ BOTH/ 38

Control Rod 38-23 has been selected for a single notch withdrawal from position 02 to position 04. The following response from the CRD system was observed:

- Insert light illuminates and goes out.
- Withdrawal light illuminates and goes out.
- Settle light illuminates and goes out.

The operator also observes and reports that the selected rod is now at position 06 and is continuing to drift out. A rod drift alarm is also present.

Which one of the following has caused this condition?

A. The automatic sequence timer has failed.

✓B. Stuck open collet fingers.

C. Low CRDM cooling water pressure/flow.

D. Leaking scram outlet valve.

REF: OPL171.006, Rev. 5, EO 13d
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. This would more than likely cause failures to notch in or out.
b. (Correct)
c. High pressure/flow might cause drift. Low pressure/flow will not.
d. Might cause rod insert drift.

28. 201006A1.02 001/ ROT2G2/ SROT2G2/ 3.4/3.5/ C/A/ NRC96301/ BF00301/ BOTH/ 67

With the Rod Worth Minimizer keylock switch in NORMAL, which one of the following describes the effect of a loss of all control rod position signals from the RPIS?

✓A. Withdraw, insert, and select rod blocks will occur if power is less than the Low Power Alarm point.

B. Only withdraw and select rod blocks will occur if power is less than the Low Power setpoint.

C. Withdraw, insert, and select rod blocks will occur at any power level.

D. RWM-PROG lights on INOP-RESET pushbutton. This will occur at any power level.

REF: OPL171.024, Rev. 8, Page 36, 4.d.(1), and Page 12, 2.f.(3)
2-AOI-85-4, Rev. 11
SOURCE: 1996 BFNP RO EXAM #31
CHANGED REV ON AOI JMP
JUSTIFICATION

a. (Correct)
b. There is also an insert block. This choice implies that the operator can insert at any time to add negative reactivity.
c. These features do not activate when the plant is above the low power setpoint.
d. This is in effect when the switch is turned from normal to bypass (lsm)

29. 202001K6.01 001/ ROT2G2/ SROT2G2/ 3.5/3.7/ C/A/ NRC96301/ BF00301/ BOTH/ 68

With both reactor recirculation pump speeds matched and the reactor at 100% power, which one of the following is an indication of a reactor recirculation jet pump failure?

In the loop with the failed jet pump, if indicated recirculation loop flow:

A. decreases, indicated core pressure will increase.

✓B. increases, indicated main generator output will decrease.

C. decreases, indicated total core flow will increase.

D. increases, indicated core thermal power will increase.

REF: AOI-68-2, Rev. 11, Page 1, Para 2.0.
OPL171.007, Rev. 15, Page 55, Para E.1
ITS Basis 3.4.2
SOURCE: 1996 BFNP EXAM #37, distractors modified
help check AOI
JUSTIFICATION
a. Loop flow decreased because of jet pump fracture, causing lower D/P across the jet pump. This causes the summation of D/Ps to lower the indicated loop flow. However, because of the malfunctioning jet pump, total core flow decreases, as does core pressure drop.
b. (correct)
c. 2-AOI-68-2 lists an increase in indicated core flow as a symptom. This is only true if the jet pump throat is restricted or clogged, causing a high D/P across the jet pump.
d. Core thermal power will decrease with any jet pump flow degradation, whether it be caused by jet pump fracture or obstruction.

30. 202002A4.09 001/ ROT2G1/ SROT2G1/ 3.2/3.3/ MEMORY/ NEW/ BF00301/ BOTH/ 40

By disconnecting the recirc pump motor from the generator rather than tripping the MG set supply breakers, which of the following occurs?

A. The recirc pump will coast down more quickly. Lower core flow causes more voiding. This lowers the slowing down length of fast neutrons which raises the thermal neutron flux. Higher thermal neutron flux results in more power.

B. The recirc pump will coast down more slowly. Higher core flow causes less voiding. This raises the slowing down length of fast neutrons which lowers the thermal neutron flux. Lower thermal neutron flux results in less fission and less power.

C. The recirc pump will coast down more slowly. Higher core flow causes less voiding. This lowers the slowing down length of fast neutrons which raises the thermal neutron flux. Higher thermal neutron flux results in more power.

✓D. The recirc pump will coast down more quickly. Lower core flow causes more voiding. This raises the slowing down length of fast neutrons which lowers the thermal neutron flux. Lower thermal neutron flux results in less fission and less power.

REF: OPL171.007, Rev. 18, Page 55
Obj.V.B.4, V.C.2
Obj.V.C.1.b
SOURCE: NEW
Solution:
A. Raises the slowing down length. Lowers power
B. Pumps slow more slowly
C. Pumps slow more slowly. Lowers power
D. Correct - The recirc pump will coast down more quickly. Lower core flow causes more voiding. This raises the slowing down length of fast neutrons which lowers the thermal neutron flux. Lower thermal neutron flux results in less fission and less power
HELP check LP
JUSTIFICATION
a. Only when the field breaker for the idle pump is racked out.
b. This is true for both or no recirc pumps running.
c. (Correct) The summing circuit adds a negative number due to reverse flow in the idle jet pumps.
d. Technically achievable, but not true.

31. 203000K4.06 001/ ROT2G1/ SROT2G1/ 3.5/3.5/ C/A/ BANK/ BF00301/ BOTH/ 41

During the performance of RHR System MOV operability testing, the RHR pump torus suction valves were closed. Immediately thereafter, a LPCI initiation signal is received.

Assuming the LPCI initiation signal remains present, which one of the following statements is correct?

A. The suction valves will open automatically, and then the respective RHR pumps will auto start.

B. The suction valves will open automatically and then the respective RHR pump must be started manually.

C. The suction valves will not open automatically. They must be fully reopened manually, and then the respective RHR pumps will auto start.

✓D. The suction valves will not open automatically. The valves must be fully reopened manually, and then the pumps must be manually started.

REF: OPL171.044, Rev. 8, Page 38; EO V.B.12
SOURCE: BANK QUESTION
*
JUSTIFICATION
a,b,c,d. Anti-pump logic will prevent the pump from automatically responding to an ESF signal unless there is a suction path, and it is not automatic.

32. 204000A3.04 001/ ROT2G2/ SROT2G2/ 3.4/3.5/ C/A/ BANK/ BF00301/ BOTH/ 69

On Unit 3, the Reactor Water Cleanup (RWCU) System is operating with RWCU Pump A running and the Filter/Demineralizer B in service with 130 gpm flow.

Which one of the following choices describes the expected automatic response of the RWCU system if Filter/Demineralizer B is inadvertently valved out of service?

✓A. Filter/Demineralizer B holding pump will start. RWCU Pump A trips when system flow decreases to less than 56 gpm for 35 seconds.

B. Filter/Demineralizer B BYPASS valve will automatically open to maintain at least 90 gpm and RWCU Pump A will continue to operate.

C. Filter/Demineralizer A automatically returns to service when Filter/Demineralizer B dp exceeds 20 psid.

D. The system automatically isolates and Pump A trips when system flow decreases to less than 40 gpm for 7 seconds.

REF: OPL 171.013, Rev. 8, pAGE 19
SOURCE: BANK QUESTION
Changed time delay*
JUSTIFICATION

a. (Correct)
b. The BYPASS valve is not automatic. 90 gpm is the Unit 1 pump trip setpoint. A check valve prevents bypass flow via the holding pump piping.
c. This feature does not exist; however, there is a flow controller that is normally in manual.
d. The system doesn't isolate, and the 40 gpm setpoint is for the F/D holding pumps to start.

33. 205000K6.04 001/ ROT2G2/ SROT2G2/ 3.6/3.6/ C/A/ MODIFIED/ BF00301/ BOTH/ 121

The Unit 2 reactor is in cold shutdown with RHR Loop B in the Shutdown Cooling (SDC) mode when reactor water level rapidly decreases to -130.0 inches. Which one of the following correctly describes the operation of the RHR System?

A. The LPCI Inboard Injection valves automatically open and the operator must wait 5 minutes before throttling flow.

B. The LPCI Inboard Injection valves automatically close and the operator must wait 5 minutes before manually opening the valve.

✓C. The operator must depress the SDC isolation reset pushbuttons on panel 9-3 before the LPCI Inboard Injection valves automatically open.

D. The operator must manually open the LPCI Inboard Injection valves after resetting the PCIS isolation using the reset switches on panel 9-4.

REF: OPL171.044, Rev. 8, EO B.16
OPL171.017, Rev. 8, Page 21, 33
SOURCE: 1995 BFNP EXAM RO # stem modified to change LPCI injection valves to SDC supply.
Changed answer to "C" and "130" to "-130" stem is confusing why 74-48 help
JUSTIFICATION:
c. SDC reset is only for LPCI injection valves

34. 206000K2.01 001/ ROT2G1/ SROT2G1/ 3.2/3.3/ C/A/ NRC96301/ BF00301/ BOTH/ 61

The following conditions exist during a loss of all A/C power (Onsite and Offsite):

- The high pressure coolant injection (HPCI) system was started in response to a valid actuation signal.
- A valid HPCI isolation signal is subsequently generated.

Which one of the following is the expected result?

A. The HPCI pump will continue to operate with the mini-flow valve open.

B. The steam supply inboard isolation Valve 73-2 will close, and the turbine will trip.

✓C. The steam supply outboard isolation Valve 73-3 will close, and the turbine will trip.

D. A full HPCI system isolation will occur, and the turbine will trip.

REF: OPL171.042, Rev. 11, Pages 33 - 37.
SOURCE: 1996 BFNP SRO EXAM #60
changed station blackout verses a loss of all AC power
JUSTIFICATION

a. The pump turbine will trip on a HPCI isolation.
b. Valve 73-2 will fail as is upon loss of AC power.
c. (Correct)
d. When normal or emergency AC power is available, and there is a valid isolation signal, a full HPCI isolation and turbine trip will occur. Valves 73-2, 73-81, and 73-64 are 480 Volt AC powered.

35. 209001K4.08 001/ ROT2G1/ SROT2G1/ 3.8/4.0/ C/A/ BANK/ BF00301/ BOTH/ 43

During a Unit 2 LOCA, the following plant conditions exist:

- Reactor water level is dropping at a rate of 20 inches per minute.
- RPV level is currently at -132 inches.
- RPV pressure is 468 psig.
- Drywell pressure is 2.5 psig.

Which one of the following describes the expected status of the Core Spray System?

A. The Core Spray System has not initiated.

✓B. The Core Spray pumps have started, but the injection valves are CLOSED.

C. The Core Spray pumps have started, and the injection valves are OPEN, but pump flow is dead headed against the closed check valve.

D. Core Spray pumps have started and are injecting into the RPV.

REF: OPL171.045, Rev. 8; EO B.2
SOURCE: BANK QUESTION
changed typo -132" initiated *
JUSTIFICATION

a. Core Spray initiates at -122"
b. (Correct)
c. The inboard injection valve does not open until #450 psig in the RPV
d. (Same as c.)

36. 211000K2.02 001/ ROT2G1/ SROT2G1/ 3.1/3.2/ C/A/ NEW/ BF00301/ BOTH/ 131

Unit 3 is operating at power with Diesel Generator 3A under clearance. A transient occurs resulting in a reactor scram signal and an ATWS. The SLC control switch is taken to the START PUMP B position. Plant conditions are as follows:

Reactor power	10%
480v S/D bd 3A	De-energized (A/C only)
SLC switch	NOR-AFT-START

How will the SLC system respond?

A. SLC squib valve A fires, no SLC pump starts.

B. SLC squib valve B fires, no SLC pump starts.

✓C. SLC squib valves A and B fire, one SLC pump starts.

D. SLC squib valve B fires, both SLC pump starts.

REF: OPL171.039, Rev. 9, Page 12
SOURCE: 4/97 BSEP exam RO #9
Changed "a lockout of the BOP bus" to "a turbine trip" Change 480 v S/D bd major changes
Help
JUSTIFICATION
In the START PUMP B position, normally pump B starts and both squibs fire. Pump B and Squib B power from SD BD 3B which is energized. Squib A is powered from SD BD 3A and will fire when SD BD 3b is energized.

37. 212000K6.05 001/ ROT2G1/ SROT2G1/ 3.5/3.8/ C/A/ BANK/ BF00301/ BOTH/ 45

During main turbine stop valve testing, the No. 2 Stop Valve would not close. The Unit Supervisor directs placing the Stop Valve No. 2 input to the Reactor Protection System (RPS) in a tripped condition.

Which one of the following describes the impact of this action on the RPS?

No. 2 Stop Valve provides input to:

A. only RPS Channel A, and placing the inputs in a tripped condition will cause a half scram.

B. only RPS Channel B, but placing the inputs in a tripped condition will NOT cause a half scram.

C. both RPS Channels A and B, and placing the inputs in a tripped condition will cause a full scram.

✓D. both RPS Channels A and B, but placing the inputs in a tripped condition will NOT cause a half scram.

REF: ITS LCO 3.3.1.1, Amendment 253
OPL171.028, Rev. 10, Page 13
SOURCE: BANK QUESTION
*
JUSTIFICATION
a,b,c,d. All 4 TSVs open a pair of contacts at 10% closure, and input RPS Channels A and B. No one TSV will cause a half scram.

38. 215001G2.1.32 001/ ROT2G3/ SROT2G3/ 3.4/3.8/ MEMORY/ BANK/ BF00301/ BOTH/ 123

While walking down the control room panels on a tour, the Unit 2 Unit Supervisor notices the F5 fuse indicator for the TIP channel B Valve Control Monitor is de-energized.

Which one of the following statements correctly describes the information provided by this condition?

A. The TIP shear valve will not fire.

B. The TIP ball valve will not open when the TIP is out of the shield.

C. The TIP channel will not respond to a automatic scan.

✓D. The TIP channel will not respond to a containment isolation signal.

REF: OPL171.023, Rev. 3, EO B.3
SOURCE: BANK QUESTION
help ? blown fuse removes power from isolation relays
JUSTIFICATION
a. There is a Squib monitor for this.
b. There are other indicating lights for the ball valve.
c. There is a scan light.

39. 215001K4.01 002/ ROT2G3/ SROT2G3/ 3.4/3.5/ C/A/ MODIFIED/ BF00301/ BOTH/ 85

A traversing in-core probe (TIP) trace is being performed on Unit 2. With the probe in core, a spurious Group 8 isolation occurs.

Which one of the following describes how the TIP system responds to the isolation signal?

A. No response; the TIP system only responds to a Group 2 isolation signal.

✓B. The TIP drive withdraws at fast speed and the ball valve closes once the probe has withdrawn to the shield chamber.

C. The TIP drive withdraws at slow speed until the core bottom is cleared, then shifts to fast speed, withdraws from the core and the ball valve closes when the probe has withdrawn to the indexer.

D. The TIP drive withdraws at fast speed and if the probe is not in the shield within 30 seconds, the shear valve fires to cut the cable and seal the tube.

REF: OPL171.023
SOURCE: MODIFIED QUESTION
*
JUSTIFICATION
a. The same signals trip the Group 2 (RWCU) isolation.
b. (Correct)
c. Slow speed is used for scanning the core. The implication of the distractor is that the TIP only moves in slow speed when in the core, which is not so.
d. The shear valve fires manually with a key-lock switch. That option is open to the operator, but there is no 30-second time constraint.

40. 215003A4.03 001/ ROT2G1/ SROT2G2/ 3.6/3.4/ MEMORY/ BANK/ BF00301/ BOTH/ 132

A unit 3 IRM channel is set to range 5 and reading 60. Which one of the following is correct if the IRM range selector switch is turned to range 6?

A. A different preamplifier circuit is put into service and the reading should be about 6.

B. A different preamplifier circuit is put into service and the reading should be about 19.

C. The same preamplifier circuit remains in service and the reading should be about 6.

✓D. The same preamplifier circuit remains in service and the reading should be about 19.

REF: OPL171.020, Rev. 5, Page 12
changed answer from a to d *
JUSTIFICATION
Readings vary by a factor of the square root of 10 from one channel to the next. The different pre-amplifiers are put into service between channels 6 and 7.

41. 215003K1.06 001/ ROT2G1/ SROT2G2/ 3.9/4.0/ C/A/ MODIFIED/ BF00301/ BOTH/ 46

A reactor startup is in progress on Unit 3 with reactor power at 20%. APRM 1 is bypassed due to failing high. Then, IRM A fails high.

Which one of the following describes the response of the RPS to the IRM upscale trip?

✓A. No RPS trip action

B. A rod block

C. A half scram

D. A full scram

REF: OPL171.020, Rev. 5
Learning Objective B.7
MODIFIED QUESTION
*
JUSTIFICATION
b,c,d. The candidate needs to demonstrate knowledge of companion APRM/IRMs and the effects of bypassing one companion. The distractors were designed to do that.

42. 215005K6.01 001/ ROT2G1/ SROT2G1/ 3.7/3.8/ C/A/ BANK/ BF00301/ BOTH/ 48

Unit 2 is operating at 100% power, when a loss of RPS B power occurs.

Which one of the following describes the type of fault detected for BOTH the RBM and APRM channels?

A. A critical fault is generated in both the RBM channels, and in all of the APRM channels.

B. A non-critical fault is generated in both the RBM channels, and in all of the APRM channels.

C. A critical fault is generated in RBM Channel B, and in APRM Channels 2 and 4.

✓D. A critical fault is generated in RBM Channel B, and non-critical faults are generated in all of the APRM channels.

REF: OPL171.148, Rev. 2, Page 67 and 10
SOURCE: BANK QUESTION
help verify on simulator
JUSTIFICATION
a. RBM Channel A is unaffected, as are the APRMs.
b. A critical fault is generated in RBM Channel B.
c. None of the APRM channels have a critical fault.
d. (Correct)

43. 216000G2.1.28 001/ ROT2G1/ SROT2G1/ 3.2/3.3/ C/A/ NRC95301/ BF00301/ BOTH/ 49

Which one of the following describes a characteristic of a fill oil leak from a Rosemount transmitter?

A. The instrument readings repeatedly drift in both directions over a period of time.

B. The instrument exhibits an inability to follow plant transients over a period of time.

C. The instrument responds normally until the isolating diaphragm contacts the convolution plate, when it fails to function properly.

✓D. The instrument responds more slowly until the isolating diaphragm contacts the convolution plate, when it fails to function properly.

*REF: Reactor Vessel Process Instrumentation, OPL171.003, Rev. 11, pg. 18
Learning Objective V.B.2
NRC Bulletin 90-01 and NRC Info Notice 89-42
SOURCE: 1995 BFNP SRO EXAM, Question #1, some distractors changed
changed obj reference JMP
JUSTIFICATION
a. A sustained drift in the same direction is detectable over a period of time.
b. (Same as b)
c. The instrument exhibits slowed response to, or inability to follow planned plant transients.
d. (Correct)

"B" may be correct

44. 217000A2.19 001/ ROT2G1/ SROT2G1/ 3.5/3.6/ C/A/ NEW/ BF00301/ BOTH/ 50

The following Unit 2 plant conditions are given:

Reactor power is 65%
Suppression Pool temperature is 78 degrees
Suppression Pool temperature is increasing by 2 degrees every 12 minutes
Suppression Pool cooling is in service providing maximum cooling
The time is 12:00 noon.

2-SR-3.5.3.3, RCIC SYSTEM RATED FLOW AT NORMAL OPERATING PRESSURE is in progress.

Which one of the following is the latest time the test may be conducted before Technical Specifications limits would be exceeded?

A. 1:42 pm

✓B. 2:42 pm

C. 3:12 pm

D. 5:24 pm

REF: TS 3.6.2.1, Amendment 253
2-SR-3.5.3.3, Rev. 0002, Para 3.3
SOURCE: NEW QUESTION
*Good question A will be selected JMP
JUSTIFICATION

a. Based on the 95EF limit applicable when no testing is going on.
b. (Correct) 105-78÷2×12=162 min or 2 hrs; 42 min.
c. Based on the 110 degrees limit when in IRM Range 7.
d. Based on 105 degrees limit, but forgot to divide by 2.

45. 218000K2.01 001/ ROT2G1/ SROT2G1/ 3.1/3.3/ MEMORY/ NEW/ BF00301/ BOTH/ 51

Which one of the following would occur if power is lost to 250VDC RMOV Board 3B?

A. The ADS logic will not operate after automatic transfer to the alternate power supply.

B. The ADS logic will not operate, however, TWO of the six ADS valves can be operated manually.

✓C. The ADS logic will not operate, however, FOUR of the six ADS valves can be operated manually

D. The ADS logic will not operate, however, the SIX ADS valves can be operated manually.

REF: OPL171.043, Rev. 7, Pages 11 and 16
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
a. Board 3B does not have an automatic transfer to the alternate power supply
b. Two ADS valves are powered from 3B
d. Two of the six ADS valves lose power with no alternate. Thus only four are left that will function manually.

46. 223002K3.01 001/ ROT2G1/ SROT2G1/ 3.7/3.7/ MEMORY/ NEW/ BF00301/ BOTH/ 53

Which one of the following gives the two PCIS groups **NOT** affected by RPV water level?

A. Groups 1 and 4

✓B. Groups 4 and 5

C. Groups 5 and 6

D. Groups 6 and 8

REF: OPL171.017, Rev. 8, Page 15
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
This question was designed to challenge the candidate's knowledge of what systems are in each group, and to either figure out or remember that Groups 4 and 5 (HPCI and RCIC), must not isolate when there is a water inventory problem. Groups 1,2,3,6,&8 all isolate on RPV low levels.

47. 226001A4.03 001/ ROT2G2/ SROT2G1/ 3.5/3.4/ C/A/ MODIFIED/ BF00301/ BOTH/ 72

Given the following conditions:

RPV level	-190 inches
RPV Pressure	920 psig
Drywell pressure	2.95 psig

A valid LPCI initiation signal is present

Which one of the following are required to be completed in conjunction with **ONLY** placing the RHR Containment Spray select switch XS-74-1-121/129 in Select to open the Containment Spray valves?

✓A. Raise RPV level to -180 inches only.

B. Reduce drywell pressure to 1.6 psig only.

C. Raise RPV level >-120" AND reset the LPCI initiation signal.

D. Raise RPV level to >-120 inch reactor level AND reduce drywell pressure to 1.6 psig.

REF: OPL171.044, Rev. 8, Page 34/36, Sections m.(4) / o.(4).
1996 BFNP RO EXAM #65 modified to give plant conditions

HELP significant work required change to the select switch being operated JMP
JUSTIFICATION
a.& d. RPV level interlock is bypassed with keylock
c. LPCI initiation signal is bypassed

48. 233000A3.02 001/ ROT2G3/ SROT2G3/ 2.6/2.6/ MEMORY/ NEW/ BF00301/ BOTH/ 146

A trip of the 480 V Shutdown Board 1A will have which of the following effects on the spent fuel pool system?

✓A. Trips Fuel Pool Circulating Pump 1A.

B. Trips Fuel Pool Circulating Pump 1B.

C. Isolates the fuel pool water flow to the fuel pool heat exchanger.

D. Isolates the RBCCW to the fuel pool heat exchangers.

NEW - OPL171.052 003 Rev 5 Obj. V.B.7
Solution:
A. Correct - Obj. V.B.7.
B. Pump 1B powered from 480 V Shutdown Board 1B (Similar for Unit 2 & 3)
C. Trips only one pump, does not isolate flow to the heat exchanger.
D. Does not effect the Shell side - reactor building closed cooling water (RBCCW)
JMP

49. 239002K4.03 001/ ROT2G1/ SROT2G1/ 3.1/3.3/ C/A/ NEW/ BF00301/ BOTH/ 64

Both MSRV vacuum breakers (the 10 inch and the 2 1/2 inch) on each relief line have failed closed. Some water from the suppression pool was siphoned into the relief line upon completion of blowdown when the steam in the relief line condensed.

What are the potential consequences of future MSRV operation?

A. Insufficient flow through the relief line.

B. Uneven heating of the suppression pool.

C. Direct pressurization of the drywell air space.

✓D. Overpressurize the relief line.

REF: OPL171.009, Rev. 6, Pg. 13 OBj VB5 VC2 VC3
SOURCE: new
Changed DW Vac Breakers to MSRV Vac bkr, failed Vac bkr closed, future msrv operation.
JMP
JUSTIFICATION
a. There would be no significant effect on the flow
b. This would occur if the relief valves were not used in a prescribed pattern
c. This could only occur if the vacuum breaker fails open
d. (correct) Due to the presence of moisture in the line.

50. 239002K5.04 001/ ROT2G1/ SROT2G1/ 3.3/3.5/ C/A/ MODIFIED/ BF00301/ BOTH/ 54

The following plant conditions exist:

- The reactor is operating at 100% power and 1000 psig.
- A turbine control valve malfunction resulted in reactor safety relief valve (SRV) 1-4 lifting and failing to reseat.

Which one of the following SRV tailpipe temperatures would you expect to see on the SRV that failed to close? (References attached)

A. 212 degrees Fahrenheit

✓B. 290 degrees Fahrenheit

C. 345 degrees Fahrenheit

D. 545 degrees Fahrenheit

REF: Steam Tables or Mollier Diagram (INCLUDE WITH EXAM AS ATTACHMENT)
SOURCE: 1996 BFNP RO EXAM #99
check for training coverage JMP
JUSTIFICATION

a. Saturation temperature for steam at tailpipe pressure (atmospheric).
b. (Correct) This is a throttling process and is therefore isoenthalpic.
c. 340 degrees Fahrenheit would be incorrectly determined if the candidate considered the process to be isoenthalpic to the saturation line, then followed the constant superheat line to atmospheric pressure.
d. Saturation temperature for reactor pressure.

THE ANSWER ON THE 1996 EXAM WAS GIVEN AS 370 DEGREES.

51. 241000K3.02 001/ ROT2G1/ SROT2G1/ 4.2/4.3/ C/A/ BANK/ BF00301/ BOTH/ 55

The following conditions exist on Unit 2:

Turbine Steam Throttle Press: 990 psig
Pressure setpoint: 970 psig
Load Limit: 100%
Load Setpoint: 100%

Which one of the following describes the EHC Pressure Regulating System response, and the effect on RPV pressure, if the turbine steam throttle pressure transmitter input to Pressure Regulator A failed upscale to 1100 psig?

A. Pressure Regulator B takes over; RPV pressure increases.

B. Pressure Regulator B takes over; RPV pressure decreases.

C. Pressure Regulator A remains in control; RPV pressure increases.

✓D. Pressure Regulator A remains in control; RPV pressure decreases.

REF: OPL171.014, Rev. 5, Pages 13-15
SOURCE: BANK QUESTION
JMP changed based on PUR plant values 920 = 970 950 = 990 failed to 1100
JUSTIFICATION

a. P.R. B won't take over when there is a failure causing P.R. A, which is normally the in-service regulator, to put out a TCV open signal.
b. P.R. B doesn't take over, but pressure will decrease until the MSIVs close on low steamline pressure.
c. P.R. A remains in control, but RPV pressure drops off as the P.R. sends out a TCV open signal in error.
d. (Correct)

52. 256000K5.10 001/ ROT2G2/ SROT2G3/ 2.8/2.8/ MEMORY/ BANK/ BF00301/ BOTH/ 76

Which one of the following states the reason why the condensate pump header pressure should be between 100 and 150 psig during a reactor startup?

A. To minimize thrust on the condensate pump motor bearings.

✓B. To ensure adequate condensate flow for the steam jet air ejectors.

C. To ensure adequate flow through the condensate demineralizers.

D. To maximize condensate pump efficiency.

REF: OPL171.011, Rev. 6
SOURCE: BANK QUESTION
REF info JMP
JUSTIFICATION

a. Makes sense; however, this is not the reason.
b. (Correct) The Unit 3 SJAE will shut down at <60 psig condensate incoming pressure.
c. The condensate demins will always get whatever the feedwater demand is for the existing reactor power.
d.

Theoretically, the pumps will draw less current at higher pressure, but at the same time, more water is being bypassed around the wear rings, thus it may be a wash. This is not the reason.

53. 259001A1.02 001/ ROT2G1/ SROT2G2/ 3.2/3.3/ MEMORY/ BANK/ BF00301/ BOTH/ 56

Which one of the following is an acceptable method for reducing thermal duty on RPV feedwater nozzles during low power and/or hot standby operation?

A. Minimize reactor power.

B. Increase reactor pressure.

✓C. Maximize RWCU flow.

D. Reduce CRD flow.

REF: OPL171.026, Rev. 7, Page 36
2-OI-3, Rev. 0071, Page 9
SOURCE: BANK QUESTION
JMP
JUSTIFICATION

a. OI-3 suggests minimizing time at low power, not power level.
b. OI-3 suggests reducing reactor pressure, or increasing power.
c. (Correct) Warm RWCU return mixes with cooler feedwater.
d. The only CRD flow path that would help is normally isolated anyway.

54. 259002A3.06 001/ ROT2G1/ SROT2G1/ 3.0/3.0/ C/A/ BANK/ BF00301/ BOTH/ 57

A full scram from 100% power occurred on Unit 2 as a result of a fault in the main turbine EHC system. After the SCRAM, the following conditions exist: (Assume no operator actions have occured)

All three Reactor Feed Pumps (RFPs) are in AUTO
Master Level Controller is in AUTO
Reactor water level is at 10 inches and rising
Scram Response logic is not inhibited

Which one of the following describes the Reactor Feed System response to this situation?

✓A. RFPs A and B are available for AUTO or MANUAL mode of operation and may be taken to 5600 rpm.

B. RFPs A and B are set at 600 rpm, and cannot be raised to >600 rpm until the Scram Response logic is reset.

C. RFPs A and B are available for MANUAL mode only and will be limited to 3900 rpm until the Scram Response logic is reset.

D. RFPs A and B are available for AUTO or MANUAL mode of operation but are limited to 3900 rpm until the Scram Response logic is reset.

REF: OPL171.012, Rev. 7, Page 26
SOURCE: BANK QUESTION
5050 is an operational limit JMP change 5600 to 5050?
JUSTIFICATION

a. (Correct)
b. A&B get set by the algorithm at 600 rpm (0% output), but they can be manually rolled up to 5600 rpm.
c. RFP C gets set by the algorithm at a demand limit of 3900 rpm.
d. A&B are available in either mode, but the manual speed limit is 5600, and not to be confused with the 3900 rpm demand limit set on RFP C.

55. 262001K1.01 001/ ROT2G2/ SROT2G1/ 3.8/4.3/ MEMORY/ NEW/ BF00301/ BOTH/ 120

Unit 2 and 3 are operating normally and are tied to the grid. Which one of the following would occur if a DG control switch was taken to start and the output breaker was closed? (Assume the diesel generator speed setpoint is higher than grid frequency and no other operator actions were performed)

A. The speed regulator will keep lowering the fuel supply to the diesel in order to try and lower grid/DG output voltage to the governor's setpoint. The DG will trip on under voltage.

B. The zero droop governor will keep advancing the fuel supply to the diesel in order to try and raise grid/DG output frequency to the governor's setpoint. This will cause the DG to overspeed.

✓C. The zero droop governor will keep advancing the fuel supply to the diesel in order to try and raise grid/DG output frequency to the governor's setpoint. This will cause the diesel to overload.

D. The speed regulator will keep lowering the fuel supply to the diesel in order to try and lower grid/DG output frequency to the governor's setpoint. This will cause the DG to trip on reverse current.

REF: OPL171.038, Rev. 10, Page 30
SOURCE: NEW QUESTION
JMP do we want to say no other actions performed, PWS or single unit
JUSTIFICATION
Explanation:

The speed regulator senses output frequency, but now the generator output frequency is fixed by the other loads on the grid. If the diesel speed setpoint is higher than grid frequency, the zero droop governor will keep advancing the fuel supply to the diesel in order to try and raise grid/DG output frequency to the governor's setpoint. This will cause the diesel to overload. (495 amps.)

56. 262001K4.03 001/ ROT2G2/ SROT2G1/ 3.1/3.4/ C/A/ MODIFIED/ BF00301/ BOTH/ 77

On Unit 2, the operator is attempting a manual fast transfer of the 4kV Shutdown Board C normal power supply to the first alternate power supply. The following conditions are in effect:

- The Emergency Control Transfer Switch (ECTS) is in NORMAL.
- The Shutdown Board C AUTO TO MANUAL TRIP pushbutton was depressed, and the amber light extinguished.
- The alternate breaker synchronizing selector switch is in the OFF position.
- The operator is holding the alternate power supply breaker control switch in the CLOSED position.

Which one of the following describes the plant equipment response when the operator next trips the normal supply breaker?

A. A fast transfer to the alternate supply occurs.

✓B. A slow transfer to the alternate supply occurs.

C. The alternate breaker trips and Shutdown Board C is locked out.

D. The alternate breaker trips and Emergency Diesel Generator C starts and ties to Shutdown Board C.

REF: OPL171.036, Rev. 4, Page 18
0-OI-57A, Rev. 0063, Para 8.1
SOURCE: MODIFIED QUESTION
JMP
JUSTIFICATION

a. A fast transfer cannot happen because the synch switch was off.
b. (Correct)
c. The alternate breaker is interlocked with the normal breaker. As soon as the normal breaker opened, the alternate breaker received a signal to close.
d. Same as c. with or without the EDG.

57. 264000G2.1.32 001/ ROT2G1/ SROT2G1/ 3.4/3.8/ C/A/ NEW/ BF00301/ BOTH/ 135

Diesel Generator 3A is synchronized to 4KV Shut Down Board 3A. The instrumentation readings for the diesel generator are as follows:

voltage: 4160 VAC
frequency = 59.8
current = 340 amps
vars = 1600 Kvars
watts = 2585 KW

What actions are required if the diesel is expected to be operated for an extended period?

A. The operator must take the voltage regulator control switch to raise to avoid excessive stator currents.

B. The operator must take the voltage regulator control switch to lower to avoid excessive stator currents.

✓C. The operator must take the governor control switch to raise to avoid excessive field current.

D. The operator must take the governor control switch to lower to avoid excessive field current.

REF: OI-82
OPL171.038 Rev. 9, page 31
Exam bank question OPL171.038 003
SOURCE: NEW QUESTION (MEE)
ATTACHMENT: Need 3-OI-82, Illustration 1 for exam.
JMP

58. 272000K3.04 001/ ROT2G2/ SROT2G2/ 3.7/3.8/ C/A/ MODIFIED/ BF00301/ BOTH/ 81

Which one of the following describes the response of the Main Steam Line Radiation Monitoring System when a level of 3 times normal full power background radiation is reached?

A. The system will trip the mechanical condenser vacuum pump and close the condenser vacuum pump discharge valves.

B. The system will trip the mechanical condenser vacuum pump, close the condenser vacuum pump suction valves, scram the reactor, and initiate a PCIS Group 1 isolation.

✓C. The system will trip the mechanical condenser vacuum pump and close the condenser vacuum pump suction valves.

D. The system will trip the mechanical condenser vacuum pump, close the condenser vacuum pump discharge valves, scram the reactor, and initiate a PCIS Group 1 isolation.

REF: OPL171.033, Rev. 7, Page 14
SOURCE: new
JMP
JUSTIFICATION
a. Closes suction valves
b. DCN deleted the Group 1 isolation and scram.
c. Correct
d. DCN deleted the Group 1 isolation and scram. Closes suction valves

59. 286000A1.05 001/ ROT2G2/ SROT2G2/ 3.2/3.2/ C/A/ BANK/ BF00301/ BOTH/ 82

The 3B Raw Service Water (RSW) pump has automatically started to increase level in the RSW storage tanks. Subsequently, Fire Pump A receives an automatic start signal.

Which one of the following describes the response of the RSW storage tank isolation valves and the RSW pump to this situation?

A. The 3B RSW pump immediately trips. The RSW storage tank isolation valves CLOSE but will automatically REOPEN when the fire pump stops. The 1A RSW pump will automatically start if the tank level demand signal is still present.

✓B. The 3B RSW pump immediately trips. The RSW storage tank isolation valves CLOSE. When the fire pump stops, one of the isolation valves automatically REOPENS; however, the backup isolation valve must be manually REOPENED. The 1A RSW pump can then automatically start if the tank level demand signal is still present.

C. The 3B RSW pump continues running in support of the fire pump. The RSW storage tank isolation valves CLOSE, and will automatically REOPEN when the fire pump stops. When the tank is filled, the 3B RSW pump stops.

D. The 3B RSW pump continues running in support of the fire pump. The RSW storage tank isolation valves CLOSE. When the fire pump stops, the 3B RSW pump stops. Both tank isolation valves remain CLOSED until manually reopened, and normal tank level control will then resume.

REF: OPL171.049, Rev. 9, Page 42
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. One valve, the backup, does not open.
b. (Correct)
c. With a mini-flow bypass, this would work.
d.
This distractor throws in some doubt as to whether the tank isolation valves are in series or parallel.

60. 290003K1.01 001/ ROT2G2/ SROT2G2/ 3.4/3.5/ C/A/ MODIFIED/ BF00301/ BOTH/ 83

A small break LOCA on Unit 2 results in the following plant conditions:

- Reactor water level 12 inches above instrument zero.
- Drywell pressure 2.0 psig.
- Ventilation radiation:
  Reactor building 68 mR/hr.
  Refueling Zone 35 mR/hr.
  Air inlets to Control Room 200 cpm above background.

Which one of the following statements describes the expected status of the control room ventilation system under the above conditions?

A. The normal ventilation system is operating. The control room emergency ventilation (CREV) system is supplying filtered air from the control bay.

✓B. The normal ventilation system is supplying air to the control room from the control bay supply fans.

C. The CREV system is operating, supplying filtered outside air. The normal ventilation system is isolated.

D. The CREV system is operating, supplying filtered outside air. The normal ventilation system is NOT isolated.

REF: OPL171.067, Rev. 7, Page 23
MODIFIED QUESTION
JMP
JUSTIFICATION
a.The CREV doesn't take fresh air from the control bay, whether actuated or not.
b. (Correct) None of the initiation trip setpoints were reached.
c. If initiated, this would be the status.
d. This is the status when the CREV is started from the control room.

61. 295002AA1.06 001/ ROT1G2/ SROT1G2/ 3.0/3.1/ C/A/ BANK/ BF00301/ BOTH/ 16

The following plant conditions exist:

- Reactor mode switch: STARTUP/HOT STANDBY
- Main turbine: Shell warming
- Feedwater lineup: RFP A maintaining level in single element

Which one of the following statements describes the expected sequence of actions as a condensate system leak causes condenser vacuum to decrease from 24 inches Hg Vacuum to atmospheric pressure?

✓A. The Main turbine trips, then later, the RFP turbine trips and the main turbine bypass valves close at the same time.

B. The RFP turbine trips, then later, the turbine bypass valves close, followed by a reactor scram on low condenser vacuum.

C. The RFP turbine trips and the main turbine bypass valves close at the same time, then later, the main turbine trips

D. Main turbine trips and the reactor scrams in response to the turbine trip, then later, the RFP turbine trips and main turbine bypass valves close at the same time.

REF: 2AOI473, Rev. 0010, Section 3.0
SOURCE: BANK QUESTION
JMP could someone argue C
JUSTIFICATION

a. (Correct)
b. There is no reactor scram on low main condenser vacuum.
c. A true statement at 7" Hg Vac; however, this is preceded by a main turbine trip at 21" Hg Vac.
d. The reactor won't trip on a turbine trip below 30% RTP.

62. 295003AK2.02 001/ ROT1G2/ SROT1G1/ 4.1/4.2/ MEMORY/ NEW/ BF00301/ BOTH/ 136

An accident has occurred concurrent with a partial loss of AC power on Unit 2 resulting in the following indications:

Drywell pressure	2.1 psig
RPV	-135 inches
Reactor pressure	490 psig

The diesel operator incorrectly diagnoses a loss of lube oil and initiates an emergency stop at panel 9-23. Which one of the following is required to reset the Diesel Generator Auto Start Lockout?

A. Both generator lockout relays (86 relays) AND the protective relay logic (74) must be manually reset.

B. The core spray initiation signal seal-ins on Panel 9-3 must be reset.

C. Both the core spray initiation signal seal-ins on Panel 9-3 must be reset and the DG control switch must be taken to RESET.

✓D. The DG control switch must be taken to RESET.

REF: OPL171.038, Rev. 9, Page 26
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
A. Required for loss of DC control power.
B. Raising the water level to greater than -122 allows manual reset of the core spray logic.
C. Raising the water level to greater than -122 allows manual reset of the core spray logic.
D. A lockout generated by a stop signal with a CASx or PASx locked in will automatically reset when the CASx and PASx signals clear and the seal-ins are reset. (In this case the water level) The lockout from an emergency stop of the DG from Panel 9-23 can only be reset by manually taking the DG control switch to reset.

63. 295003AK3.06 001/ ROT1G2/ SROT1G1/ 3.7/3.7/ MEMORY/ MODIFIED/ BF00301/ BOTH/ 17

The following plant conditions exist:

- The plant is operating at 100% power.
- A loss of RPS 'B' power occurs.

Which one of the following isolation valve groups will close?

A. Group 1 Isolation Valves, Inboard Only

✓B. Group 2 Isolation Valves, Outboard only

C. Group 2 Isolation Valves, Inboard and Outboard

D. Group 3 Isolation Valves, Inboard and Outboard

REF: 2AOI991, Loss of Power to One RPS Bus, Rev 16, page 2 of 6, section 3.0
2-OI-99, RPS, Rev. 39, Para 3.11
SOURCE: 1996 BFNP EXAM - changed to RPS bus B loss
JMP
JUSTIFICATION
a. Only the half-trip logic deenergizes in PCIS Group 1.
c. inboard close on loss of a
d. outboard only close on loss of B

64. 295004AK2.03 001/ ROT1G2/ SROT1G2/ 3.3/3.3/ C/A/ NRC95301/ BF00301/ BOTH/ 18

A reactor startup is in progress and reactor power is on IRM Range 7, when the operator observes the following instrument failures:

- SRM Channels A and C fail downscale.
- IRM Channels A, C, and E fail downscale.

Which one of the following power supplies would have to be lost to cause such failures?

✓A. 24 VDC Power Distribution Panel

B. 48 VDC Power Distribution Panel

C. 125 VDC Power Distribution Panel

D. 120 VAC Instrument and Control Power Distribution Panel

REF: OPL171.037, Rev 7, pg 16, EO B9
SOURCE: 1995 BFNP RO EXAM #58, new distractor b
JMP
JUSTIFICATION

a. (Correct)
b. Provides power for annunciators and communications. This is different than the 48 VDC center-tapped battery used for nuclear instruments.
c. 125 VDC power is dedicated for the EDGs.
d. 125 VAC I&C power supplies the +/-24 VDC battery chargers; however, the NIs would not go downscale until about 3 hours when the batteries discharged. The operators would be forewarned if 120 VAC was lost.

65. 295005AA2.05 001/ ROT1G1/ SROT1G2/ 3.8/3.9/ C/A/ NRC95301/ BF00301/ BOTH/ 1

Given the following plant conditions:

- Reactor power is 38% power.
- Main turbine load is 23%.
- Turbine bypass valves are partially open.
- Total main steam flow is 38%.

Which one of the following describes the response of the reactor if a main turbine trip occurs?

A. Reactor immediately scrams on turbine stop valve 10% closure.

✓B. Reactor scrams on high reactor pressure.

C. Reactor continues to operate at 38% power.

D. Reactor continues to operate and power decreases to 30%.

REF: OPL171.028, Rev. 10, Pg. 26
FSAR Section 11.5.3
SOURCE: 1995 BFNP SRO EXAM #48 modified to remove initial condition of bypass ON changed answer to b due to first stage pressure is seeing 23% so TSV scram is bypassed JMP
JUSTIFICATION

b. This would occur were if the bypass in effect.

c. The turbine bypasses do not have sufficient capacity to handle 38% power. This choice is also distracting because turbine runback occurs at >40% power mismatch.

d. 30% is the point at which the bypass normally automatically comes into effect . The turbine bypasses could handle this power level, but the reactor was producing 38% and reactor power could not be reduced quickly enough to prevent the pressure transient.

66. 295006AA2.06 001/ ROT1G1/ SROT1G1/ 3.5/3.8/ C/A/ MODIFIED/ BF00301/ BOTH/ 2

Unit 3 is operating at 100% power.

Which one of the following combinations of events will **ONLY** initiate a **half scram**signal?

A. Both MSIVs in steam lines “B” and “C” drift to less than 90% open.

B. Both MSIVs in steam lines "A" and "D" drift to less than 90% open.

✓C. PRMN voter #1 to test X relay

D. APRMs 3 and 4 trip on hi-hi flux.

REF: OPL171.028, Rev 12,
SOURCE: BANK QUESTION
JMP PRNMS changed this logic Is "D" a valid distractor
JUSTIFICATION

a. Isolating steam lines “B” and “C” does not cause a halfscram.
b. Isolating steam lines “A” and “D” does not cause a halfscram.
c. (Correct) One voter to test X or Y relay will cause an 1/2 scram
d. APRMs 3 and 4 will cause a full scram

67. 295007AK2.02 001/ ROT1G1/ SROT1G1/ 3.8/3.8/ C/A/ NEW/ BF00301/ BOTH/ 104

Unit 2 is operating at 100 % power. Reactor pressure is being controlled by Pressure Regulator A.

If Pressure Regulator A fails down scale, which one of the following lists of symptoms is likely to occur? (Assume all systems respond as designed and no operator action.)

A. Reactor pressure will increase, reactor thermal power will increase, and generator output will increase.

✓B. Reactor pressure will increase, reactor thermal power will increase, but generator output will decrease.

C. Reactor pressure will decrease, reactor thermal power will decrease, and generator output will decrease.

D. Reactor pressure will decrease, reactor thermal power will decrease, but generator output will increase.

REF: OPL171.014, Rev. 5
2-AOI-47-2, Rev. 0010, Para. 2.0
SOURCE; NEW QUESTION
JMP
JUSTIFICATION

a. Generator power will decrease as the CVs throttle down in response to the pressure regulator sensing low pressure.
b. (Correct)
c. This happens if either pressure regulator fails upscale.
d. If Rx power and pressure decreased due to an opening of the CVs, generator output would increase...for a while.

68. 295008AK2.06 001/ ROT1G2/ SROT1G2/ 3.4/3.6/ MEMORY/ BANK/ BF00301/ BOTH/ 19

The following plant conditions exist:

- The reactor has scrammed from 100% power.
- HPCI and RCIC initiated due to a drop in reactor vessel level.

Which one of the following would result in a RCIC turbine trip and the Trip Throttle Valve, FCV 71-9, remaining open? (Assume no operator action.)

A. Electrical overspeed.

B. High Turbine exhaust pressure.

C. Manual Trip.

✓D. High Reactor Vessel Water Level.

REF: OPL171.040, Rev. 14, Page 13.
SOURCE: BANK QUESTION
JMP
JUSTIFICATION

a. Electrical overspeed trips the throttle valve, but can be reset from the control room.
b. High exhaust pressure is sensed by a pressure switch which electrically trips the throttle valve.
c. Manual trip trips the throttle valve.
d. (correct) The steam supply valve FCV-71-8 isolate on high RPV level.

69. 295009AK3.01 001/ ROT1G1/ SROT1G1/ 3.2/3.3/ MEMORY/ NEW/ BF00301/ BOTH/ 4

Following a reactor feed pump trip from 100% thermal power, which one of the following reactor recirculation runback circuits seals in and must be manually reset?

✓A. 75% runback.

B. Core flow runback.

C. Mid power runback.

D. Upper power runback.

REF: OPL171.007, Rev. 18, Page 30-37 Obj. V.B.17
Obj.V.C.6
JMP
SOURCE: NEW
JUSTIFICATION

A. (Correct) will initiate an automatic runback of recirc pump speed if any individual RFP flow is < 19% AND RPV water level drops to the low level alarm setpoint (+27") The purpose of this limiter is to automatically reduce reactor power to a value within the capacity of the remaining feedwater pumps

B. is enabled (blue light lit) when total core flow is greater than 58%(approx. 60 Mlbm/hr). When manually initiated, the speed setpoint will lower until total core flow is » 58% or until rpm lowers to 575. The runback can be stopped when it is in progress by depressing the pushbutton a second time, or if an automatic runback condition occurs, the manual runback will stop./

C. is enabled (blue light lit) when total steam flow is greater than ≈10.9 Mlbm/hr (≈78.5%). When manually initiated, the speed setpoint will lower until total steam flow is less than the setpoint or until rpm lowers to 575. The runback can be stopped when it is in progress by depressing the pushbutton a second time, or if an automatic runback condition occurs, the manual runback will stop.

D. is enabled (blue light lit) when total steam flow is greater than ≈ 12.7 Mlbm/hr(≈ 90%). The steam flow signal is received from the Feedwater Level Control System.
When manually initiated, the speed setpoint will lower until total steam flow is less than the setpoint or until rpm lowers to 700. The runback can be stopped when it is in progress by depressing the pushbutton a second time, or if an automatic runback condition occurs, the manual runback will stop

70. 295010AK2.02 001/ ROT1G1/ SROT1G1/ 3.3/3.5/ MEMORY/ NRC96301/ BF00301/ BOTH/ 5

During a LOCA on Unit 3, it is determined that the drywell is in the action required region of the drywell spray initiation limit curve.

Which one of the following describes the proper use of drywell sprays in this condition?

Drywell sprays must:

A. be secured, if currently in use, to prevent exceeding the drywell/suppression chamber differential pressure limits.

B. remain in service, if currently in use, until drywell/suppression chamber differential pressure reaches -0.5 psid.

C. NOT be placed in service, if NOT currently in use, to prevent dropping below the drywell high pressure scram setpoint. If in use, drywell sprays may remain in use.

✓D. NOT be placed in service, if NOT currently in use, to prevent exceeding drywell/suppression chamber differential pressure limits. If in use, drywell sprays may remain in use.

REF: EOI Program Manual, EOIPM Section 2-VID, Rev 2, Drywell Spray Worksheet 3, page 2 of 11, section 1.1 and page 11 of 11, Figure 10.2 (DWSIL Curve)
2-EOI-2 Flowchart, Rev. 7

SOURCE: 1996 SRO EXAM #63
Change "UNSAFE" TO "ACTION REQUIRED" JMP
JUSTIFICATION

a. If the candidate does not understand that the DWSIL curve is an initiation limit, this becomes a plausible distractor.
b. 0.5 psid is a TS operating limit for the vacuum breakers implying a limit of 0.5 psid between the drywell and torus.
c. The drywell high pressure scram setpoint is an interlock associated with initiating drywell/torus spray, but is not of concern during a LOCA with drywell pressure at 12 psig and increasing.
d. (Correct)

71. 295012AA2.01 001/ ROT1G2/ SROT1G2/ 3.8/3.9/ MEMORY/ BANK/ BF00301/ BOTH/ 20

Following a LOCA, the unit operator (board) notices that drywell pressure peaked at 52 psig and drywell temperature peaked at 290 degrees.

Which one of the following describes the conclusions that can be made from this information?

A. Both drywell design pressure and temperature were exceeded.

B. Only drywell design pressure was exceeded.

✓C. Only drywell design temperature was exceeded.

D. Neither the drywell design pressure nor temperature were exceeded.

REF: OPL171.016, Rev. 10, Page 13; Enabling Objective B.2.
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
This question challenges the candidate's ability to remember when and if the drywell was outside of its design pressure and temperature, given the actuals. The choices are self-explanatory.

72. 295013AA1.02 001/ ROT1G2/ SROT1G1/ 3.9/3.9/ C/A/ NEW/ BF00301/ BOTH/ 21

Following a LOCA the following Containment characteristics exist.

Steam is condensing in the drywell and drywell pressure is steadily lowering and is approaching the external design pressure. Which one of the following has caused these conditions?

A. CS System Suction valve from CST failed open with the suction MOV from Torus open.

B. CS System Suction valve from CST failed open with the CS test valve open.

C. The torus-drywell vacuum breakers have failed open.

✓D. The torus-drywell vacuum breakers have failed closed.

REF: 2-AOI-1-1, Rev. 0021, OPL171.016, Rev. 11, Page 28,29 & 19

SOURCE: NEW

JUSTIFICATION

A. This will only add water to the suppression pool (obj V.B.12)

B. This will add water to the suppression pool

C. Steam flows from drywell to torus through vacuum breakers, equalizing pressure between the two immediately. Steam is not forced through the water of the suppression pool, so now it will operate only as a surface condenser. As a result, drywell pressure will probably exceed the design pressure. (Obj V.B.6 and V.C.5)

D. Correct answer Steam in drywell will condense and drywell pressure will lower. With vacuum breakers failed shut, pressure cannot equalize between the suppression pool and the drywell. With this condition drywell pressure may lower such that external design pressure is reached. (Obj V.B.6 and V.C.5)

73. 295014AA1.03 001/ ROT1G1/ SROT1G1/ 3.5/3.5/ MEMORY/ NRC96301/ BF00301/ BOTH/ 6

The following conditions exist:

- Reactor power is 90%.
- A control rod initially at position 24 begins to drift out.

Per 2-AOI-85-6, which one of the following is the required IMMEDIATE action?

✓A. Select and insert the control rod to position 24.

B. Insert and maintain the control rod at position 00.

C. Reduce core flow to prevent a power increase.

D. Manually scram the reactor.

REF: 2-AOI-85-6, Rev. 13, Para. 4.1
SOURCE: 1996 BFNP SRO EXAM #84
JMP
JUSTIFICATION

a. (Correct)
b. Subsequent action if rod will not latch but responds to EMERG ROD IN signal, and persists drifting out.
c. Subsequent action if the rod does not respond to INSERT signal.
d.

Subsequent action if power cannot be satisfactorily controlled with core flow.

74. 295015AK2.01 001/ ROT1G1/ SROT1G1/ 3.8/3.9/ C/A/ BANK/ BF00301/ BOTH/ 106

Unit 2 is operating at 100% power. The Unit Operator notes that three turbine stop valves have drifted to 80% open. No rod movement has occurred. You observe that the individual blue lights for each control rod on the full core display are illuminated. Also, the eight scram solenoid group indicating lights are extinguished.

Which one of the following describes the status of the RPS?

A. Both scram pilot valves have failed to open on all HCUs.

B. Only one RPS bus has deenergized.

C. Scram inlet and outlet valves have failed to open on all HCUs.

✓D. A hydraulic lock has occurred on the scram discharge volume.

REF: OPL171.005, Rev. 8, Page 25, Objective 16
OPL171.028, Rev. 7, Page 10
SOURCE: BANK QUESTION
JUSTIFICATION

a,c. The pilots had to open, because the scram inlet and outlet valves are open as indicated by the blue lights.
b. All eight RPS lights are out, therefore both busses are de-energized.
d. (Correct)

75. 295018AK3.01 001/ ROT1G2/ SROT1G2/ 2.9/3.2/ MEMORY/ NEW/ BF00301/ BOTH/ 24

Unit 3 is operating at full power with 3A and 3B RBCCW pumps running. 3B RBCCW pump trips due to an operator error. Discharge header pressure drops to 60 psig before the pump is restarted.

Which one of the following describes the response of FCV-70-48 (non-essential equipment loop Isolation valve) to the above condition?

A. FCV-70-48 will close and isolate the non-essential equipment loop. Operator action will be required to reopen the valve, which can ONLY be operated from the MCR.

B. FCV-70-48 will close and isolate the non-essential equipment loop. Operator action will be required to reopen the valve, which can ONLY be operated locally.

C. FCV-70-48 will close and isolate the non-essential equipment loop. Operator action will be required to reopen the valve from the MCR or locally.

✓D. FCV-70-48 will not close and the non-essential equipment loop will not isolate.

REF: OPL171.047, Rev. 11, page 11 of 31 objective V.B.4
SOURCE: NEW QUESTION
JMP changed supply header pressure to discharge header
JUSTIFICATION
a. The valve will not close. Operator action is only required after automatic closure
b. The valve will not close. Operator action is only required after automatic closure
c. The valve will not close. Operator action is only required after automatic closure
d. (correct) The header pressure does not reach the setpoint for non-essential loop isolation.

76. 295019AA1.03 001/ ROT1G2/ SROT1G2/ 3.0/3.0/ MEMORY/ BANK/ BF00301/ BOTH/ 25

Which one of the following correctly describes the power supplies to the motors for Control Air Compressors "A" through "D?"

A. "A" and "B" are fed from 480V Common Board #1, and "C" and "D" from 480V Shutdown Boards 1B and 2B respectively.

B. "A" and "D" are fed from 480V Common Board #1, and "B" and "C" from 480V Shutdown Boards 1B and 2B respectively.

C. "A" is fed from 480V Shutdown Board 2A, "B" from 480V Common Board #3, "C" from 480V Shutdown Board 1A, and "D" from 480V Shutdown Board 2B.

✓D. "A" is fed from 480V Shutdown Board 1A, "D" from 480V Shutdown Board 2A, and "B" and "C" from 480V Common Board #1.

REF: OPL171.054, Rev. 6, OE V.B.1.
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
The distractors are set up with an assortment of possible power sources that are incorrect. The objective is to discriminate between those candidates who know the correct power sources and those who do not.

77. 295020G2.4.4 001/ ROT1G2/ SROT1G2/ 4.0/4.3/ C/A/ BANK/ BF00301/ BOTH/ 26

During calibration of Unit 2 temperature switches on the RWCU System, 2-TIS-69-11A (NonRegenerative Heat Exchanger outlet temperature switch) was inadvertently actuated.

Which one of the following will be the response of the RWCU System?

A. The system will isolate; the RWCU pumps will remain running for 30 seconds and then trip on low flow.

B. The system will isolate; the RWCU pumps will receive a trip signal on NRHX outlet temperature >140 degrees.

✓C. The system will isolate; the pumps will trip upon isolation valve closure.

D. The system will isolate; the pumps will trip on low flow (following a 7 second time delay).

REF: OPL171.013, Rev. 8; 2-AOI-64-2a, Rev. 0017
SOURCE: BANK QUESTION
JUSTIFICATION

a. The pumps would trip in 30 seconds were it not for the closure interlock between the pumps and FCVs 69-1, 2, and 12.
b. There is only a Group 3 isolation initiated by the pressure switch at >140°F.
c. (Correct)
d. TDCN 40287 changed the 7 second time delay to 30 seconds for Unit 2 only.

NOTE: NOT SURE IF THIS K/A FITS?

78. 295021AK2.01 001/ ROT1G3/ SROT1G2/ 3.6/3.7/ C/A/ MODIFIED/ BF00301/ BOTH/ 34

Unit 2 is in Cold Shutdown for a short mid-cycle outage, when a complete loss of Shutdown Cooling occurs. Plant conditions are as follows:

- Reactor Recirculation pumps are out of service
- Reactor recirculation suction temperature is 140 degrees and slowly decreasing
- Shutdown cooling flow cannot be re-established in a timely manner

The Shift Manager has directed that RPV level be adjusted.

Which one of the following is the appropriate action and the basis for this action?

A. Verify level is 60 inches to aid in heat removal by injecting cold water.

B. Verify level is 80 inches, to provide natural circulation cooling for the reactor.

C. Verify level is 60 inches, to increase core submergence thereby preventing or minimizing localized fuel channel boiling.

✓D. Verify level is 80 inches, to reduce stratification so that more representative temperatures can be obtained to assess bulk reactor coolant temperature.

REF: 2-AOI-74-1, Rev. 0021, LOSS OF SDC, pg 6
SOURCE: MODIFIED QUESTION
we would be at 70-90 inches modified choices to read verify vice raise JMP
JUSTIFICATION

a. 60 inches is not appropriate per the AOP, though there may be some cooling with stratification.
b. Though 80 inches facilitates natural circulation, there is not a heat sink that facilitates cooling during a short mid-cycle outage.
c. 60 is an old number, and it was for the purpose of obtaining better temperatures.
d. (Correct)

79. 295023AA2.02 001/ ROT1G3/ SROT1G1/ 3.4/3.7/ MEMORY/ NEW/ BF00301/ BOTH/ 108

Operators are moving fuel assemblies within the RPV. Water level is 23½ feet above the top of the RPV flange.

Which one of the following describes the basis for a minimum RPV water level requirement during fuel handling operations according to ITS 3.9.6?

✓A. Sufficient water is necessary to retain iodine fission product activity in the water in the event of a fuel handling accident.

B. An adequate water shield thickness is necessary to protect refueling personnel from excessive radiation exposure as they perform the refueling process.

C. To keep the vessel cavity walls and other contaminated surfaces wet and under water as much as possible during the refueling process to minimize airborne contamination.

D. To provide radiation protection to refueling personnel in the event of an inadvertent criticality event while moving fuel assemblies and control rods.

REF: BFN Unit 2 Basis B 3.9.6, Rev. 0
BFN ITS LCO 3.9.6, Amendment No. 253
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
a. (Correct)
b,c,d. While the other three choices are true statements, they are not the basis of the 22-foot requirement.

80. 295024EK1.01 001/ ROT1G1/ SROT1G1/ 4.1/4.2/ MEMORY/ BANK/ BF00301/ BOTH/ 8

Which one of the following describes the basis for the Drywell Spray Initiation Limit Curve?

A. To prevent unstable steam condensation in the MSRV tailpipes from exerting excessive cyclic hydraulic loads on suppression pool structure.

✓B. To ensure that the torus to drywell delta P limit is maintained.

C. To prevent chugging in the drywell to torus downcomers from exerting excessive cyclic hydraulic loads on the suppression pool structure.

D. To ensure adequate noncondensibles remain in the drywell to prevent the torus to drywell vacuum breakers from opening during drywell steam condensation.

REF: · EOI PM, Section 0-VD, Rev 0, p.75 of 244
SOURCE: BANK QUESTION
changed torus to RB vac bkr to DW to torus vac bkr JMP
JUSTIFICATION

a. Conceivably, the colder water spraying on the MSRV discharge piping could cause a water hammer effect due to steam condensing. The MSRV vacuum breakers would have to fail closed for this to credibly happen.
b. (Correct)
c. Some chugging could occur in the downcomers; however, the short length and volumetric capacity prevent this from being a concern.
d. The partial pressure of noncondensible inerting nitrogen is considered in the derivation of the DSIL curve, but is not germane to this question.

81. 295025EA1.05 001/ ROT1G1/ SROT1G1/ 3.7/3.7/ C/A/ BANK/ BF00301/ BOTH/ 9

During a plant transient on Unit 2, a Group I isolation is caused by high temperature. Five control rods fail to insert. Suppression pool level is 12 feet and suppression pool temperature is 94 degrees.

Which one of the following identifies the systems available to help maintain pressure below 1073 psig?

A. HPCI and RCIC.

✓B. RCIC and RWCU.

C. RWCU and MSL drains.

D. MSL drains and HPCI.

REF: OPL171.202, Rev. 4, Pg. 9; Obj. V.B.8
OPL171.203, Rev. 3, Pg. 13
EOIPM Section 0-V-C, Page 43 of 127
EOIPM Section 0-V-D, Page 101 of 244
SOURCE: BANK QUESTION
JMP changed radiation to temperature as cause for isolation AND 1043 TO 1073
JUSTIFICATION

a. HPCI is unavailable because SP level is below the exhaust pipe (12.75').
b. (Correct)
c. With the knowledge that a Group I isolation is in effect, the operator should know that this is an MSIV isolation, and as such, the MSL drains are isolated.
d. Neither HPCI nor the MSL drains are available as discussed above.

82. 295026EK3.04 001/ ROT1G2/ SROT1G1/ 3.7/4.1/ MEMORY/ BANK/ BF00301/ BOTH/ 28

Unit 3 is in an ATWS condition and EOI-2 (Primary Containment Control) has been entered.

Which one of the following describes the reason for injecting SLC prior to suppression pool temperature exceeding 110 degrees?

A. To ensure that "power chugging" does not occur within the reactor vessel during subsequent use of the MSRVs.

B. To ensure that hot shutdown boron weight is adequate to maintain the reactor subcritical under all hot shutdown conditions.

✓C. To ensure the reactor is subcritical prior to leaving the safe area of the heat capacity temperature limit curve.

D. To ensure the reactor is subcritical prior to leaving the safe area of the pressure suppression pressure curve.

REF: EOIPM Section 0-V-D, Rev. 0, Page 87 of 244
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
The purpose of this question is to ensure the operators understand that the heat capacity temperature limit may be exceeded if the reactor is allowed to remain critical with the suppression pool average temperature at or above 110 degrees.

83. 295028EA2.03 001/ ROT1G2/ SROT1G2/ 3.7/3.9/ MEMORY/ BANK/ BF00301/ BOTH/ 118

Unit 2 has just experienced a small LOCA. Drywell pressure is 3 psig and increasing. Reactor pressure is 800 psig and steady. The increasing drywell temperature causes the most reliability concerns for which one of the following level instruments?

A. Emergency Range indicators.

B. Normal Range indicators.

C. Post Accident indicators.

✓D. Shutdown Flood-up indicator.

REF: EOIPM Section IIB, Rev. 2, Operator Cautions, page 4
OPL171.003, Rev. 12
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a,b,c. These three instruments do not have a specified minimum indicated level associated with maximum DW run temperatures. See EOP Caution #1.
d. (Correct)

84. 295029EK2.05 001/ ROT1G2/ SROT1G2/ 3.1/3.3/ C/A/ NRC95301/ BF00301/ BOTH/ 30

During an accident on Unit 2, suppression pool water level reaches 18 feet and continues to increase. Reactor pressure is 300 psig and decreasing.

Which one of the following containment components will NOT properly function at this point?

A. Normal control room suppression pool level instrumentation.

✓B. Suppression Chamber-to-Drywell vacuum breakers.

C. Suppression chamber spray nozzles.

D. MSRV tail pipes and/or supports.

REF: EOI PM, SEC 0-V-D, Rev. 0, pg 111
OPL171.203, Rev 3, pg 13, EO B7.b
SOURCE: 1995 BFNP RO EXAM #73, new distractor d
check eoi handout*
JUSTIFICATION
a. Ceases to function at 20 ft.
b. Correct (Ceases to function at 18 ft)
c. Ceases to function at 26 ft.
d. Ceases to function at 20 ft. per Curve 4

85. 295030EK1.01 001/ ROT1G2/ SROT1G1/ 3.8/4.1/ MEMORY/ BANK/ BF00301/ BOTH/ 31

Which one of the following is the MINIMUM suppression pool level at which the drywell-to-torus downcomers will be covered?

A. 9.75 feet.

B. 10.75 feet.

✓C. 11.75 feet.

D. 12.75 feet.

REF: EOI Program Manual, Section 0VD, Rev. 0, page 105, and Section 3-IV, Rev. 4, Curve 7.
OPL171.203, Rev. 3, Page 13.
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. This is the level at which HPCI turbine exhaust is uncovered.
b. No significance to this number.
c. (Correct) See Curve 7.
d. No significance to this number.

86. 295031EK3.05 001/ ROT1G1/ SROT1G1/ 4.2/4.3/ C/A/ NEW/ BF00301/ BOTH/ 10

During an ATWS, conditions develop which require Emergency Depressurization.

Which one of the following describes the minimum number of Main Safety Relief Valves (MSRVs) required for Emergency Depressurization, and the basis for this number?

A. 6 ADS MSRVs, to reliably depressurize the reactor vessel as rapidly as possible, and to uniformly distribute the heat load to the suppression pool.

B. 6 MSRVs, which, if opened, will remove all decay heat from the core at a pressure sufficiently low that ECCS with the lowest head will be capable of making up for MSRV steam flow.

C. 4 ADS MSRVs, the least number of the most reliable MSRVs that correspond to a minimum alternate RPV flooding pressure sufficiently low that ECCS with the lowest head will be capable of making up MSRV steam flow.

✓D. 4 MSRVs, which, if opened, will remove all decay heat from the core at a pressure sufficiently low that ECCS with the lowest head will be capable of making up MSRV steam flow.

REF: EOIPM Section 0-V-H, Rev. 0, Page 23 of 40
SOURCE: NEW QUESTION
HELP does this question discriminate a competent operator
JUSTIFICATION

a. 6 ADS MSRVs are preferred because they are of the best quality and should be more reliable; however, 6 is not the minimum.
b. 6 MSRVs are the second choice, but are not the minimum.
c. 4 is the minimum, but not necessarily from ADS.
d.
(Correct)

87. 295032G2.4.4 001/ ROT1G3/ SROT1G2/ 4.0/4.3/ MEMORY/ BANK/ BF00301/ BOTH/ 150

EOI-3, Secondary Containment control is being executed due to an unisolable RCIC steam line break in the reactor building. EOI-3 requires that EOI-1, RPV Control be entered and executed concurrently before which one of the following occur.

A. Any area temperature reached the maximum normal operating temperature.

B. Reactor zone ventilation exhaust reached 72 mr/hr.

✓C. Any area radiation level reached the maximum safe operating level.

D. At least two area temperature reached the maximum normal operating temperature.

REF: OPL171.039, Rev. 9, Page 12
SOURCE: BANK QUESTION OPL171.204 010
JMP

88. 295036EK3.03 001/ ROT1G3/ SROT1G2/ 3.5/3.6/ MEMORY/ BANK/ BF00301/ BOTH/ 37

The plant is operating at full power. The Reactor Building assistant unit operator reports there is about 6 inches of water accumulating on the floor in the RHR Room, SE area, and it appears to be from floor drains backing up.

Which one of the following is the first action the control room operators should taken in accordance with the EOIs?

✓A. Operate all available sump pumps to maintain the sump water level to less than 66 inches.

B. Enter EOI-1 and scram the reactor before RHR Room water level reaches 20 inches.

C. Isolate all systems discharging into the RHR Room, except those required for safe shutdown of the reactor.

D. Initiate a controlled shutdown of the reactor per 2-GOI-10012A.

REF: EOI-1, Rev. 4; EOI-3, Rev. 6
OPL171.204, Rev. 3, Page 10, EO V-B-3
EOIPM, Section 0-V-E, Page 37+
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. (Correct)
b. This is only applicable if a primary system is discharging into the room andthey cannot keep the room water level below 20 inches.
c. By procedure, the operators are required to establish that they cannot keep the sump level below 66 inches.
d. By procedure, the operators are required to determine that a primary system is not discharging into the area, and two pump rooms cannot be maintained below 20 inches water level.

89. 295037G2.4.6 001/ ROT1G1/ SROT1G1/ 3.1/4.0/ MEMORY/ NRC96301/ BF00301/ BOTH/ 11

The following conditions exist:

An ATWS has occurred.
Reactor water level is being lowered in accordance with C-5, Level/Power Control.
SLC has been initiated.

Which one of the following conditions would require RPV level to be restored to normal?

✓A. SLC Tank level drops to 41%.

B. SLC Tank level drops to 48%.

C. Reactor power drops below 5%.

D. All MSRVs remain closed with drywell pressure below 2.4 psig.

REF: C5, Rev. 7, Step, C5-17
SOURCE: 1996 BFNP RO EXAM #84
2c5 to C5 CHANGED VALUES OF SLC TANK LEVEL DUE TO REV. CHANGED ANSWER AND REF JMP
JUSTIFICATION
a. CORRECT
b. 43% is the SLC tank level at which C-5 restores water level.
c. 5% power and above is one criterion to initiate SLC.
d. If all MSRVs remain closed and drywell pressure is below 2.4 psig, one criterion is satisfied to get to the point of restoring level.

90. 300000K2.01 001/ ROT2G2/ SROT2G2/ 2.8/2.8/ C/A/ MODIFIED/ BF00301/ BOTH/ 84

Given the following switch positions for the control air compressors.

A - second lead
B - third lead
C- standby
D- standby
G-lead

- A loss of Common Board 1 occurs
- A small system leak causes control air pressure to drop to drop to 94 psig

Which one of the following describes all of expected control air compressors expected to be in operation?

A. G will be running at full load. A will be running at half load

B. G will be running at full load. B will be running at half load.

C. A and G will be running at full load. C will be running at half load.

✓D. A, and G will be running at full load. D will be running at half load.

REF: OPL171.054, Rev. 6.
SOURCE: MODIFIED QUESTION
JMP
JUSTIFICATION
B and C are powered from #1 Common Board
First pump comes on at half load at 97.5
First pump goes to full load at 96
Second pump goes to half load at 94.5

91. 500000EA2.03 001/ ROT1G1/ SROT1G1/ 3.3/3.8/ C/A/ BANK/ BF00301/ BOTH/ 12

Due to an accident condition, the following plant parameters exist:

- Drywell Hydrogen	5.4%
- Drywell Oxygen	6.0%
- Suppression Chamber Hydrogen	4.0%
- Suppression Chamber Oxygen	5.5%
- Suppression Pool Level	17 feet
- Drywell temperature	250 degrees
- Drywell Pressure	18 psig
- RPV Level	+30 inches
- Torus and Drywell Sprays are in service	

Which one of the following actions is required?
(Reference attached)

A. Perform Appendix 9 to determine and monitor Suppression Pool water level.

B. Stop Drywell Sprays.

✓C. Perform Appendix 14A, Nitrogen Make-up, to control containment hydrogen and oxygen levels.

D. Perform Emergency Depressurization.

REF: OPL171.203, Rev. 3, Page 15. Obj. V.B.14
Dwg. 2-EOI-2, Rev. 4, Page 2 of 2.
EOIPM Section 0-V-D, PC/H, Rev. 0
SOURCE: BANK QUESTION
REPLACE JMP
JUSTIFICATION
a.EOI-2 initiates CAD to the DW only.
b.EOI-2 initiates CAD to the DW only and sprays the SP.
c.(Correct)
d.Emergency Depress is an incorrect option under the existing conditions, per EOI-2.

NOTE; NOT EXACTLY SURE WHAT THE SUPPLIED REFERENCES SHOULD BE?

92. G2.1.1 001/ ROT3/ SROT3/ 3.7/3.8/ MEMORY/ NEW/ BF00301/ BOTH/ 145

Which one of the following positions represents the minimum level of approval required to make a currently approved operator aid permanent?

A. Site Engineering Labeling Coordinator.

B. Shift Manager.

✓C. Operations Superintendent.

D. Plant Manager.

REF: SSP-12.53, Revision 17, Section 3.10.2, page 11 of 38
SOURCE: NEW QUESTION
JMP IS THIS DISCRIMINATING A COMPETENT OPERATOR
A. requires coordination of labeling, but not approval
B. Can approve the aid, but not make it permanent.
C. Correct
D. This is not the minimum level

93. G2.1.29 001/ ROT3/ SROT3/ 3.4/3.3/ MEMORY/ BANK/ BF00301/ BOTH/ 92

Which one of the following choices describes the method used for verifying the position of a locked and throttled valve?

A. Remove the locking device, carefully close the valve counting the number of turns, then reopen the valve the same number of turns. Reapply a locking device to the valve and record the as left position.

B. Place "NA" in the verification signature space for this valve. Locked and/or throttled valves cannot be independently verified without disturbing the position.

C. Since the valve is already locked, the valve may be assumed to be throttled in the correct position. The verification may be signed off as complete.

✓D. Independent verification of this valve cannot be performed. Second party verification must be performed during initial valve positioning.

REF: OPL171.071, Rev. 10, EO B.20
SPP-10.3, Rev. 0, Para 3.3.1.E
SOURCE: BANK QUESTION
JMP Changed the reference
JUSTIFICATION
a. Incorrect because the action becomes an initial positioning again.
b. "NA" is contrary to the SSP. Second party verification is required.
c. Verification by assumption is incorrect.
d. (Correct)

94. G2.2.13 001/ ROT3/ SROT3/ 3.6/3.8/ MEMORY/ BANK/ BF00301/ BOTH/ 94

Unit 2 is in a refueling outage and RHR Pump 2A is tagged to replace the pump seal. Electrical Maintenance has determined that the motor must be replaced on the pump minimum flow valve which is part of the RHR Pump 2A clearance boundary.

Which one of the following statements describes how this additional work affects the clearance boundary?

A. The valve operator must have a collar installed to prevent motion before the clearance boundary can be modified.

B. The Shift Manager Representative can modify the clearance boundary with concurrence from the Maintenance Shift Supervisor.

C. All work under the clearance must be stopped while the clearance is modified and reissued.

✓D. An operator must be assigned to independently verify component positioning and tag replacement.

REF: OPL171.086, Rev. 8, Page 9
SSP-12.3, Rev. 26, Para 3.2.5.(9)
SOURCE: BANK QUESTION
Help*
JUSTIFICATION

a. Not a requirement of SSP-12.3
b. The SMR reviews and approves proposed changes, but cannot unilaterally modify the clearance with or without the Maint. Supv. concurrence. The process must be followed.
c. Work can continue in unaffected areas of the existing clearance.
d. (Correct)

95. G2.2.3 001/ ROT3/ SROT3/ 3.1/3.3/ MEMORY/ NEW/ BF00301/ BOTH/ 93

Which one of the following choices correctly describes the response of the Unit 2 and Unit 3 reactor recirculation pump (RRP) speed control to an increase in core differential pressure?

✓A. Both Unit 2 RRP and Unit 3 will automatically reposition the scoop tube to bring speed back to the setpoint.

B. Unit 2 will automatically reposition the scoop tube to bring speed back to the setpoint but on Unit 3 the RRP speed must be manually adjusted by the operator.

C. On Unit 2 the RRP speed must be manually adjusted by the operator but Unit 3 will automatically reposition the scoop tube to bring speed back to the setpoint.

D. Both Unit 2 and Unit 3 must be manually adjusted by the operator to bring speed back to the setpoint.

REF: OPL171.007, Rev. 15, Page 36
OPL171R007, Rev. 0, Page 11
SOURCE: NEW QUESTION
replace question*
JUSTIFICATION
Unit 2 and 3 speed feedback are enabled.

96. G2.2.30 001/ ROT3/ SROT3/ 3.5/3.3/ C/A/ BANK/ BF00301/ BOTH/ 96

While off-loading fuel bundles from the reactor, fuel pool level begins to decrease uncontrollably.
Which one of the following describes a method available from the control room to add water to the fuel pool?

A. Align fuel pool cooling and cleanup heat exchanger RBCCW supply to the fuel pool to maintain level.

✓B. Start a condensate pump and inject to the reactor vessel to maintain fuel pool level.

C. Open emergency makeup supply valve from EECW to the fuel pool to maintain level.

D. Gravity drain the CST, to the main condenser hotwell, then inject to the reactor vessel with condensate booster pumps.

REF: 2-AOI-78-1, Rev 0014, Para 4.2.2.3
2-ARP-9-4C, Rev. 0012, Page 2.
2-OI-78, Rev. 0040, Page 38
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a,c,d. These options are partially done from outside the control room.
b.
(Correct) Since the fuel pool to RPV gates are open, this is the simplest method, and can be done from the control room.

97. G2.3.10 001/ ROT3/ SROT3/ 2.9/3.3/ C/A/ NEW/ BF00301/ BOTH/ 149

Given the following conditions at a work site.

Airborne activity: 3 DAC
Radiation level: 40 mr/hr
Radiation level with shielding: 10 mr/hr
Time to place shielding: 15 minutes
Time to conduct task with respirator: 1 hour
Time to conduct task without respirator: 30 minutes

Assume the following:

- the airborne dose with a respirator will be zero.
- a dose rate of 40 mr/hr will be received while placing the shielding.
- all tasks will be performed by one worker.
- shielding can be placed in 15 minutes with or without a respirator.

Which one of the following would result in the lowest whole body dose?

A. Place shielding while wearing respirator and conduct task with respirator.

✓B. Place shielding while wearing respirator and conduct task without respirator.

C. Conduct task with respirator and without shielding.

D. Conduct task without respirator or shielding.

REF: 10 CFR 20
SOURCE: NEW QUESTION
HELP*
JUSTIFICATION
3 DAC x 2.5 mr/DAC X 0.5 hours = 3.75 mr
a. 10 mr placing shielding, 10 mr conducting task, zero airborne = 20 mr
b. 10 mr placing shielding, 5 mr conducting task, 3.75 mr airborne = 18.75 mr
c. 40 mr conducting task, zero airborne = 40 mr
d. 20 mr conducting task, 3.75 mr airborne = 23.75 mr

98. G2.3.9 001/ ROT3/ SROT3/ 2.5/3.4/ C/A/ BANK/ BF00301/ BOTH/ 98

Unit 2 startup is in progress with the reactor at 920 psig and 6% power. The Reactor Mode Switch is in STARTUP. Primary containment is being inerted with the purge filter fan in service.

Which one of the following statements is correct concerning inerting in this plant condition?

A. Turning the purge filter fan off will automatically close the drywell and suppression chamber exhaust valves.

✓B. Placing the Reactor Mode Switch in RUN will automatically close all valves required for inerting with the purge filter fan unless Bypass switches are placed in BYPASS on panel 9-3.

C. Placing the Reactor Mode Switch in RUN will give a Group 6 PCIS unless Bypass switches are placed in BYPASS on panel 9-3.

D. Placing the Reactor Mode Switch in RUN will automatically close the drywell and suppression chamber exhaust isolation valves unless the Drywell/Suppression Chamber Train A/B Vent keylock switches are positioned to DRYWELL.

REF: OPL171.032, Rev. 7.
SOURCE: BANK QUESTION
JMP

99. G2.4.14 001/ ROT3/ SROT3/ 3.0/3.9/ C/A/ BANK/ BF00301/ BOTH/ 100

EOI-1, RPV Control, is being executed following a scram due to a turbine trip at high power. During the initial phase of the transient, one of the SRV's stuck open. Suppression pool temperature has now (approximately 7 minutes after the turbine trip) reached 96 degrees.

Which one of the following states the Unit Supervisor's procedural response to this condition?

A. Re-enter EOI-1 at the beginning.

B. Re-enter EOI-1 at the beginning and simultaneously enter EOI-2.

✓C. Continue in EOI-1 and simultaneously enter EOI-2.

D. Continue in EOI-1.

REF: OPL171.201, Rev. 4, EO B.4
SOURCE: BANK QUESTION
JMP TYPOS EOI1 TO EOI-1
JUSTIFICATION
a. EOI-1 doesn't direct the operator to reenter EOI-1.
b. Same as (a) except entering EOI-2 is correct at SP temp >95 degrees.
c. (Correct)
d. Continuing in EOI-1 is correct; however EOI-2 must be entered.

100. G2.4.32 001/ ROT3/ SROT3/ 3.3/3.5/ C/A/ NEW/ BF00301/ BOTH/ 101

During a plant startup on Unit 3, reactor power was passing through 80% RTP when there was a loss of power to the control room annunciators. Thirty minutes have passed, and power has not yet been restored. SPDS and ICS are available.

Which one of the following describes the required control room operators' response?

A. Commence a reactor shutdown, dispatch personnel for local monitoring of equipment.

B. Scram the reactor manually, dispatch personnel to monitor and manipulate plant equipment in response to the scram.

✓C. Suspend the power ascension and avoid any system manipulation, dispatch personnel for local monitoring of equipment.

D. Expedite maintenance activities to restore power while slowly continuing the ascension to full power, monitor equipment with SPDS and ICS.

REF: 0-AOI-57-8, Rev. 0007, 4.2 (Caution)
EPIP-1, Rev. 21, Section 8.0
SOURCE: NEW QUESTION
JMP
JUSTIFICATION

a. d. The AOI requires avoidance of system manipulation
b. Scramming the reactor places the plant in a major transient, which should be avoided
c. (Correct)

INITIAL SUBMITTAL

BROWNS FERRY 2000-301
50-259, 260, and 296/2000-301

JUNE 12 - 15, JUNE 27 - 29, AND
JUNE 30, 2000

INITIAL SUBMITTAL
RO WRITTEN EXAMINATION

Facility: Browns Ferry | Date of Exam: June 30, 2000 | Exam Level: RO

Tier	Group	K/A Category Points											Point Total
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	
1. Emergency & Abnormal Plant Evolutions	1	1	3	2				2	3			2	13
	2	1	4	5				3	4			2	19
	3	0	1	1				0	1			1	4
	Tier Totals	2	8	8				5	8			5	36
2. Plant Systems	1	2	3	4	3	1	2	3	3	2	3	2	28
	2	2	2	2	3	1	2	3	0	1	2	1	19
	3	0	0	0	1	0	0	0	0	2		1	4
	Tier Totals	4	5	6	7	2	4	6	3	5	5	4	51

3. Generic Knowledge and Abilities	Cat 1	Cat 2	Cat 3	Cat 4	13
	3	4	3	3	

Note:
1. Ensure that at least two topics from every K/A category are sampled within each tier (i.e., the "Tier Totals" in each K/A category shall not be less than two).
2. Actual point totals must match those specified in the table.
3. Select topics from many systems; avoid selecting more than two or three K/A topics from a given system unless they relate to plant-specific priorities.
4. Systems/evolutions within each group are identified on the associated outline.
5. The shaded areas are not applicable to the category/tier.
6.* The generic K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system.
7. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings for the RO license level, and the point totals for each system and category. K/As below 2.5 should be justified on the basis of plant-specific priorities. Enter the tier totals for each category in the table above.

ES-401	BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1	Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
295005 Main Turbine Generator Trip / 3					05		Reactor Power	3.8/3.9	
295006 SCRAM / 1					06		Cause of Reactor Scram	3.5/3.8	
295007 High Reactor Pressure / 3		02					Reactor Power	3.8/3.8	
295009 Low Reactor Water Level / 2			01			2.1.31	Recirc Pump Runback Locate Controls and Indications	3.2/3.3 4.2/3.9	
295010 High Drywell Pressure / 5		02					Drywell/Suppression Chamber Differential Pressure	3.5/3.5	
295014 Inadvertent Reactivity Addition / 1				03			rmcs	3.5/3.5	
295015 Incomplete SCRAM / 1		01					CRD Hyrdaulics	3.8/3.9	
295024 High Drywell Pressure / 5	01						Drywell Integrity	4.1/4.2	
295025 High Reactor Pressure / 3				05			RCIC	3.7/3.7	
295031 Reactor Low Water Level / 2			05				Emergency Depressurization	4.2/4.3	
295037 SCRAM Condition Present and Power Above APRM Downscale or Unknown / 1						2.4.6	Knowledge of Symptom Based EOPs	3.1/4.0	
500000 High Containment Hydrogen Conc. / 5					03		Drywell Combustible Limit	3.3/3.8	
K/A Category Totals:	1	3	2	2	3	2	Group Point Total:		13

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4					02	2.4.11	Power Flow Map Abnormal Condition Procedures	3.5/3.8 3.4/3.6	
295002 Loss of Main Condenser Vacuum / 3				06			Reactor/Pressure Turbine Regulating System	3.0/3.1	
295003 Partial or Complete Loss of AC Pwr / 6		02	06				Emergency Generators Containment Isolation	4.1/4.2 3.7/3.7	
295004 Partial or Complete Loss of DC Pwr / 6		03					DC Bus Loads	3.3/3.3	
295008 High Reactor Water Level / 2		06					RCIC	3.4/3.6	
295011 High CTMT Temperature / 5									
295012 High Drywell Temperature / 5					01		Drywell Temperature	3.8/3.9	
295013 High Suppression Pool Temp. / 5				02			Suppression Pool Cooling	3.9/3.9	
295016 Control Room Abandonment / 7									
295017 High Off-site Release Rate / 9									
295018 Partial or Complete Loss of CCW / 8			01				Isolation of non-essential heat loads	2.9/3.2	
295019 Part. or Comp. Loss of Inst. Air / 8				03			IA Compressor Power Supply	3.0/3.0	
295020 Inadvertent Cont. Isolation / 5 & 7						2.4.4	Indications for EOP and AOP entry	4.0/4.3	
295022 Loss of CRD Pumps / 1					02		CRD System Status	3.3/3.4	
295026 High Suppression Pool Water Temp. / 5			04				SBLC Injection	3.7/4.1	
295027 High Containment Temperature / 5									
295028 High Drywell Temperature / 5					03		Reactor Water Level	3.4/3.7	
295029 High Suppression Pool Water Level / 5		05					Containment/drywell Vacuum Breaker	3.1/3.3	
295030 Low Suppression Pool Water Level / 5	01						Steam Condensation	3.8/4.1	
295033 High Sec. Cont. Area Rad. Levels / 9									
295034 Sec. Cont. Ventilation High Rad. / 9			01				Isolating Secondary Containment Ventilation	3.8/4.1	
295038 High Off-site Release Rate / 9									
600000 Plant Fire On Site / 8			04				Abnormal Procedure for Plant Fire	2.8/3.4	
K/A Category Point Totals:	1	4	5	3	4	2	Group Point Total:		19

ES-401	BWR RO Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 3	Form ES-401-2

E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	Imp.	Points
295021 Loss of Shutdown Cooling / 4		01					Reactor Water Temperature	3.6/3.7	
295023 Refueling Accidents / 8					02		Fuel Pool Level	3.4/3.7	
295032 High Secondary Containment Area Temperature / 5						2.4.4		4.0/4.3	
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5			03				Isolating Affected Systems	3.5/3.6	
K/A Category Point Totals:		1	1		1	1	Group Point Total:		4

ES-401 | BWR RO Examination Outline
Plant Systems - Tier 2/Group 1 | Form ES-401-2

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201001 CRD Hydraulic			03									CRD Mechanism	3.1/3.2	
201002 RMCS								04		09		Control Rod Block Core Flow	3.2/3.1 3.2/3.3	
201005 RCIS														
202002 Recirculation Flow Control			05									Recirculation Pump Speed	3.2/3.3	
203000 RHR/LPCI: Injection Mode				06								Core Flow	3.5/3.5	
206000 HPCI		01								01		System Valves Turbine Speed Controls	3.2/3.3 3.7/3.7	
207000 Isolation (Emerg.) Condenser														
209001 LPCS				08								Automatic System Initiation	3.8/4.0	
209002 HPCS														
211000 SLC		02							05			Explosive Valves Flow Indication	3.1/3.2 4.1/4.2	
212000 RPS						05						RPS Sensor Inputs	3.5/3.8	
215003 IRM	06									03		APRM SCRAM Signal IRM Range Switches	3.9/4.0 3.6/3.4	
215004 SRM														
215005 APRM / LPRM						01						RPS	3.7/3.8	
216000 Nuclear Boiler Instrumentation											2.1.28	Purpose of Major Components	3.2/3.3	
217000 RCIC								19				High Suppression Pool Temperature	3.5/3.6	
218000 ADS		01										High Suppression Pool Temperature	3.1/3.3	
223001 Primary CTMT and Auxiliaries	04						02					Drywell pressure Drywell Flor and Drain System	3.6/3.7 3.1/3.2	
223002 PCIS/Nuclear Steam Supply Shutoff			01				02					Reactor Water Level Valve Closures	3.7/3.7 3.7/3.7	
239002 SRVs				03	04							SRV Siphon Prevention Tail Pipe Temperature Monitoring	3.1/3.3 3.3/3.5	
241000 Reactor/Turbine Pressure Regulator			02									Reactor Pressure	4.2/4.3	
259001 Reactor Feedwater							02					Feedwater Inlet Temperature	3.2/3.3	
259002 Reactor Water Level Control									06			RX Water Level Following Scram	3.0/3.0	
261000 SGTS								13				High Sec Containment Vent Exh Radiation	3.4/3.7	
264000 EDGs											2.1.32	System Limits and Precautions	3.4/3.8	
K/A Category Point Totals:	2	3	4	3	1	2	3	3	2	3	2	Group Point Total:		28

ES-401 BWR RO Examination Outline Form ES-401-2

Plant Systems - Tier 2/Group 2

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
201003 Control Rod and Drive Mechanism				02								Detection of Uncoupled Rod	3.8/3.9	
201004 RSCS														
201006 RWM							02					Status of Control Rod Movement Blocks	3.4/3.5	
202001 Recirculation						01						Jet Pumps	3.5/3.7	
204000 RWCU									04			RWCU Interlocks and Trips	3.4/3.5	
205000 Shutdown Cooling						04						Reactor Water Level	3.6/3.6	
214000 RPIS														
215002 RBM														
219000 RHR/LPCI: Torus/Pool Cooling Mode										14		Overrides for Suppression Pool	3.7/3.5	
226001 RHR/LPCI: CTMT Spray Mode										03		Keepfill System	3.5/3.4	
230000 RHR/LPCI: Torus/Pool Spray Mode							03					Drywell Pressure	3.6/3.8	
239001 Main and Reheat Steam														
245000 Main Turbine Gen. and Auxiliaries				09								Turbine Control	3.1/3.2	
256000 Reactor Condensate					10							Air Ejection Operation	2.8/2.8	
262001 AC Electrical Distribution	01			03								Emergency Generators Transfer Interlocks	3.8/4.3 3.1/3.4	
262002 UPS (AC/DC)			01									Water Level Control	3.1/3.3	
263000 DC Electrical Distribution		01										Major DC Loads	3.1/3.4	
271000 Offgas											2.1.7	Evaluate Plant Performance	3.7/4.4	
272000 Radiation Monitoring			04									Main Steam System	3.7/3.8	
286000 Fire Protection							05					System Lineups	3.2/3.2	
290001 Secondary CTMT														
290003 Control Room HVAC	01											Radiation Monitors	3.4/3.5	
300000 Instrument Air		01										Instrument Air Compressor	2.8/2.8	
400000 Component Cooling Water														
K/A Category Point Totals:	2	2	2	3	1	2	3		1	2	1	Group Point Total:		19

ES-401 | BWR RO Examination Outline
Plant Systems - Tier 2/Group 3 | Form ES-401-2

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	Imp.	Points
215001 Traversing In-core Probe				01							2.1.32	Primary Containment Isolation System Limits and Precautions	3.4/3.5 3.4/3.8	
233000 Fuel Pool Cooling and Cleanup									02			Pump Trips	2.6/2.6	
234000 Fuel Handling Equipment														
239003 MSIV Leakage Control														
268000 Radwaste														
288000 Plant Ventilation									01			Isolation / Initiation Signals	3.8/3.8	
290002 Reactor Vessel Internals														
K/A Category Point Totals:				1					2		1	Group Point Total:		4

Plant-Specific Priorities

System / Topic	Recommended Replacement for...	Reason	Points
Plant-Specific Priority Total: (limit 10)			

Facility:	Date of Exam:	June 30, 2000	Exam Level: RO

Category	K/A #	Topic	Imp.	Points
Conduct of Operations	2.1.20	Execute Procedure Steps	4.3/4.2	
	2.1.29	Valve Lineup	3.4/3.3	
	2.1.1	Knowledge of Operations	3.7/3.8	
	2.1.			
	2.1.			
	Total			3
Equipment Control	2.2.22	Limiting Conditions and Safety Limits	3.4/4.1	
	2.2.3	Unit Differences	3.1/3.3	
	2.2.13	Tagging and Clearance	3.6/3.8	
	2.2.30	RO Duties during Fuel Handling	3.5/3.3	
	2.2.			
	2.2.			
	Total			4
Radiation Control	2.3.1	10 CFR: 20	2.6/3.0	
	2.3.9	Containment Purge	2.5/3.4	
	2.3.10	Reduce Rad Levels	2.9/3.3	
	2.3.			
	2.3.			
	Total			3
Emergency Procedures/ Plan	2.4.49	Perform Without Reference to Procedures	4.0/4.0	
	2.4.14	EOP Flow Charts	3.0/3.9	
	2.4.32	Loss of all Annunciators	3.3/3.5	
	2.4.			
	2.4.			
	Total			3
Tier 3 Point Total (RO)				13

Test Name: RO.tst
Test Date: Wednesday, June 21, 2000

		Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1:	1	201002A2.04	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	2	201003K4.02	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	3	202002K3.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	4	206000A4.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	5	211000A3.05	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	6	219000A4.14	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	7	223001A1.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	8	223001K1.04	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	9	223002A1.02	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	10	230000A1.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	11	245000K4.09	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	12	261000A2.13	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	13	262002K3.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	14	263000K2.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	15	271000G2.1.7	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	16	288000A3.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	17	295001G2.4.11	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	18	295009G2.1.31	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	19	295022AA2.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	20	295034EK3.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	21	600000AK3.04	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	22	G2.1.20	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	23	G2.2.22	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	24	G2.3.1	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	25	G2.4.49	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	26	0PL171.148	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	27	201001K3.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	28	201006A1.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	29	202001K6.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	30	202002A4.09	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	31	203000K4.06	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	32	204000A3.04	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	33	205000K6.04	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	34	206000K2.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	35	209001K4.08	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	36	211000K2.02	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	37	212000K6.05	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	38	215001G2.1.32	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	39	215001K4.01	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	40	215003A4.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	41	215003K1.06	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	42	215005K6.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	43	216000G2.1.28	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	44	217000A2.19	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	45	218000K2.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	46	223002K3.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	47	226001A4.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	48	233000A3.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	49	239002K4.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	50	239002K5.04	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C

Test Name: RO.tst
Test Date: Wednesday, June 21, 2000

	Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1: 51	241000K3.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 52	256000K5.10	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 53	259001A1.02	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 54	259002A3.06	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 55	262001K1.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 56	262001K4.03	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 57	264000G2.1.32	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 58	272000K3.04	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 59	286000A1.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 60	290003K1.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 61	295002AA1.06	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 62	295003AK2.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 63	295003AK3.06	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 64	295004AK2.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 65	295005AA2.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 66	295006AA2.06	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 67	295007AK2.02	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 68	295008AK2.06	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 69	295009AK3.01	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 70	295010AK2.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 71	295012AA2.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 72	295013AA1.02	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 73	295014AA1.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 74	295015AK2.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 75	295018AK3.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 76	295019AA1.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 77	295020G2.4.4	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 78	295021AK2.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 79	295023AA2.02	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 80	295024EK1.01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 81	295025EA1.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 82	295026EK3.04	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 83	295028EA2.03	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 84	295029EK2.05	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 85	295030EK1.01	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 86	295031EK3.05	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 87	295032G2.4.4	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 88	295036EK3.03	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 89	295037G2.4.6	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 90	300000K2.01	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 91	500000EA2.03	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 92	G2.1.1	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 93	G2.1.29	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 94	G2.2.13	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1: 95	G2.2.3	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1: 96	G2.2.30	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 97	G2.3.10	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 98	G2.3.9	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1: 99	G2.4.14	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1: 100	G2.4.32	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D

Name: ______________________________

1. 201002A2.04 001/ ROT2G1/ / 3.2/3.1/ C/A/ MODIFIED/ BF00301/ RO/ 39

With regard to the RWM, which one of the following describes the action(s) to be taken to allow manual rod insertion during an ATWS condition?

A. Mannually substitute rod positions through the Integrated Computer System.

✓B. Use the RWM Manual Bypass Switch.

C. Remove control power fuses from RWM.

D. Place Mode Switch in REFUEL, then use the EMERGENCY IN position of HS-85-47.

REF: Lesson Plan OPL171.029, Rev. 7
EO B.8.a and b
SOURCE: modified
JMP
JUSTIFICATION
a. Does not bypass the RWM
b. (Correct)
c. Will not bypass RWM.
d. NO requirement to place mode switch in Refuel. Will not allow operation of HS8547

2. 201003K4.02 001/ ROT2G2/ / 3.8/3.9/ MEMORY/ NEW/ BF00301/ RO/ 66

In addition to a ROD OVERTRAVEL annunciator, which one of the following is indication of an uncoupled control rod when fully withdrawing a control rod?

A. Backlighting is red on the 4 rod-display, backlighting is not present on the full core display.

✓B. Backlighting is not present on the 4 rod-display, backlighting is present on the full core display.

C. Backlighting is red on the 4 rod-display, backlighting is present on the full core display.

D. Backlighting is red and green on the 4 rod-display, backlighting is not present on the full core display.

REF: 2-AOI-85-2, Rev. 8, para 2.0
OPL171.029, Rev. 8, pages 20 thru 23
SOURCE: Modified
JMP
JUSTIFICATION

a. ROD DRIFT does not annunciate immediately, while in the process of withdrawing the rod.
b. (Correct)
c. The red backlighting for the uncoupled control rod on the full core display goes out.
d. The white rod selected light stays on.

THIS WAS MISTAKENLY LISTED AS A 2/3 KA. IT SHOULD BE 2/2

3. 202002K3.05 001/ ROT2G1/ / 3.2/3.3/ MEMORY/ BANK/ BF00301/ RO/ 60

While Reactor Recirculation Pump A is operating at 80%, a failure in the pump's individual Manual/Auto station occurs and a signal is sent to the Bailey Positioner, calling for a pump speed of zero.

Which one of the following states the expected response of the pump?

A. Speed will decrease to zero.

✓B. Speed will decrease to 20%.

C. Speed will decrease to 28%.

D. The scoop tube will lock up and speed will remain at 80%.

REF: OPL171.007, Rev. 15, Obj. 8, page 21-23
BANK QUESTION
JMP
JUSTIFICATION

a. 20% is as low as the pump will go until it is tripped.
b. (Correct)
c. This is the dual function limiter setpoint.
d. It takes a signal to maintain the scoop tube position for 80%...If anything, the scoop tube will lock up at minimum flow.

4. 206000A4.01 001/ ROT2G1/ / 3.7/3.7/ C/A/ NEW/ BF00301/ RO/ 42

Following a reactor trip the following conditions exist:

RPV water level at +19 inches.
Turbine exhaust pressure at 100 psig.
Steamline space temperature 150°F in the Torus Area.
Ambient temperature of 140°F HPCI Pump Room.
Suppression Pool Level High at +9 in.
RPV pressure at 300 psig (does not seal-in).
Pressure between HPCI rupture diaphragms at 3 psig.
Drywell pressure at 3.25 psig.

Based on these conditions, what is the status of the HPCI system?

A. OUTBD SUCT VLV, 2-FCV-73-27, and INBD SUCT VALVE, 2-FCV-73-26 open, HPCI System not running.

B. OUTBD SUCT VLV, 2-FCV-73-27, and INBD SUCT VALVE, 2-FCV-73-26 open, HPCI turbine tripped.

C. OUTBD SUCT VLV, 2-FCV-73-27, and INBD SUCT VALVE, 2-FCV-73-26 closed HPCI System isolated.

✓D. OUTBD SUCT VLV, 2-FCV-73-27, and INBD SUCT VALVE, 2-FCV-73-26 open, HPCI System running.

REF: 2-OI-73, Rev. 0059, Page 7
SOURCE: NEW QUESTION
typos
JUSTIFICATION
a. Drywell Pressure cause system to run
b. No conditions exist to cause turbine trip
c. No conditions exist to cause system isolation
d. (Correct) High Supression Pool level opens valves and high drywell pressure causes system to run

5. 211000A3.05 001/ ROT2G1/ / 4.1/4.2/ MEMORY/ BANK/ BF00301/ RO/ 62

Conditions on Unit 2 exist that required the initiation of Standby Liquid Control (SLC).

Which one of the following would indicate on panel 9-5 that SLC is injecting?

✓A. The selected pump red light is ILLUMINATED, the blue SQUIB valve continuity lights are EXTINGUISHED, SLC pump discharge pressure is at 1100 psig, and the red flow light is ILLUMINATED.

B. The selected pump white light is ILLUMINATED, the RWCU System ISOLATED, and the Loss of Squib Valve Continuity annunciator is in ALARM.

C. The selected pump red light is ILLUMINATED, the blue SQUIB valve continuity lights are ILLUMINATED, and SLC pump discharge pressure is 1100 psig.

D. The selected pump white light is ILLUMINATED, the blue SQUIB valve continuity lights are ILLUMINATED, SLC pump discharge pressure is 1100 psig, and the red flow light is EXTINGUISHED.

REF: OPL171.039, Rev.9, Page 18
SOURCE: BANK QUESTION
JMP deleted hold lights term
JUSTIFICATION
a. (Correct)
b. Pump light is red.
c. SLC pump pressure indicates an obstruction...it's running at the relief valve setpoint.
d. Wrong pump light color; red flow light is illuminated.

6. 219000A4.14 001/ ROT2G2/ / 3.7/3.5/ MEMORY/ NEW/ BF00301/ RO/ 71

Which one of the following choices describes the operation of the Unit 2 RHR pump torus suction valves with the RHR LOOP MODE SELECTOR (NORMAL/SHUTDOWN) switch in the SHUTDOWN position?

A. Allows operation at breaker only but does not bypass in-line valve interlock.

B. Allows operation from the Reactor MOV Boards only when the corresponding pump Shutdown Cooling suction valve is fully closed.

C. Causes the valves to cycle full open (unless stopped locally or the Unit Operator placed the 9-3 control switch in the close position) and cycle back closed.

✓D. Allows valve to be operated from the Control room or the Reactor MOV Boards.

*REF: OPL171.044, Rev. 9, Page 25
SOURCE: new
cHANGED EMERGENCY TO SHUTDOWN EMERGENCY IS A DIFFERENT SWITCH,
Changed the D choice to correct JMP
JUSTIFICATION
a. Correct
b. Emerg position allow operation at breaker only
c. Logic for the minimum flow valves - page 30
d. Logic for the minimum flow valves - page 30

7. 223001A1.02 001/ ROT2G1/ / 3.6/3.7/ C/A/ NEW/ BF00301/ RO/ 52

The unit receives an inadvertent Group 6 Isolation while operating at power. The unit remains at power. The group 6 isolation signal cleared and the isolation reset switches on panel 9-4 were taken to the reset positions. What additional procedural actions must be taken to open all of the following valves?:

- 64-17 DW / SUPPR CHMBR AIR PURGE ISOL VLV
- 64-30 DRYWELL VENT OUTBD ISOL VLV
- 64-33 SUPP CHMBR VENT OUTBD ISOL VLV
- 76-24 PRI CTMT N2 PURGE OUTBD ISOL VLV

✓A. Primary Containment Division II Run Mode Bypass switch on panel 9-3 is placed to the BYPASS position.

B. Drywell/Torus Bypass switch on panel 9-3 is taken to the DRYWELL or TORUS position and verify any SGT fan is running.

C. Drywell/Suppression Chamber Train A Vent keylock switch on panel 9-55 is placed to the SUPP CHBR position.

D. Drywell/Suppression Chamber Train B Vent keylock switch on panel 9-54 is placed to the DRYWELL position.

*REF: OPL171.032, Rev. 8

SOURCE: NEW QUESTION
Valve names JMP
JUSTIFICATION
a. Correct answer - Mode switch is still in run.
b. This is required to open 64-36
c. This is required to open 64-31
d. This is required to open 64-29

8. 223001K1.04 001/ ROT2G1/ / 3.1/3.2/ C/A/ NEW/ BF00301/ RO/ 63

When the drywell equipment drains sump automatic temperature controlled recirc loop senses a high temperature, it causes the recirc valve to open and discharge valves to close and routes the sump water through a heat exchanger. What is the purpose of this realignment?

A. to prevent the high temperature to the D/W floor drain inbd/outbd isol valve FCV-77-2A/B and a subsequent inadvertent group 2 isolation.

B. to prevent high temperature damage to the equipment drain integrator 2-FQ-77-16.

C. to prevent high temperature damage to both the Flow integrators and pump fill rate timers used to determine leakage in the drywell.

✓D. to prevent high temperature to damage to only the Radwaste components.

REF: OPL171.016, Rev. 11. Page 50 to 53
NEW QUESTION
JMP
JUSTIFICATION
a. DWFD & DWED sumps isolate on PCIS signals, they do not cause them
b. This is not temperature sensitive.
c. These are not temperature sensitive.
d. Correct answer. Prevents temperature sensitive radwaste equipment damage.

9. 223002A1.02 001/ ROT2G1/ / 3.7/3.7/ C/A/ NEW/ BF00301/ RO/ 126

Unit 3 receives a primary containment isolation actuated by Low-Low-Low reactor water level. All MSIVs closed; however, only the inboard main steam line drain valves and the recirculation loop sample valves have closed.

Which one of the following could have caused this condition?

A. PCIS channels A1 and B1 tripped, PCIS channels A2 and B2 did not trip.

✓B. PCIS channels A1, A2, and B1 tripped, PCIS channel B2 did not trip.

C. PCIS channels A2, B1, and B2 tripped, PCIS channel A1 did not trip.

D. PCIS channels A2 and B1 tripped, PCIS channels A1 and B2 did not trip.

REF: ITS Basis B 3.3.6.1 (Page B 3.3-189)
SOURCE: NEW QUESTION

TOUGH Question JMP
JUSTIFICATION
The following is the basic logic for the system. The incorrect answers will not result in the correct configuration:

A1 and B1 must trip to isolate the inboard isolation for the main steam line drains and recirculation loop sample valves.
A2 and B2 must trip to isolate the outboard isolation for the main steam line drains and recirculation loop sample valves.
A1 or A2 and B1 or B2 will cause the inboard and outboard MSIVs to close.

a. Incorrect because none of the main steam line drains and recirculation loop sample valves would trip.
b. (Correct)
c. Incorrect because the outboard main steam line drains and recirculation loop sample valves would trip.
d. Incorrect because none of the main steam line drains and recirculation loop sample valves would trip.

10. 230000A1.03 001/ ROT2G2/ / 3.6/3.8/ MEMORY/ MODIFIED/ BF00301/ RO/ 73

A transient has occurred on Unit 2 requiring initiation of torus spray. Plant conditions are as follows:

- Reactor water level -132 inches (slowly lowering)
- Reactor pressure 600 psig (steady)
- Drywell pressure 2.0 psig (slowly rising)
- Drywell temperature 205 degrees

of the following should have occurred?

A. Drywell pressure switches initiate LPCI mode of RHR, interlock Containment Cooling/spray valves closed, initiate PCIS Group 2 isolation and initiate a reactor scram.

✓B. Drywell pressure switches provide pressure permissive signal to containment spray valves.

C. Drywell pressure switches operated LPCI relays in the RHR Logic system, but did not work thru Core Spray

D. Drywell pressure switches operated relays in the RHR Logic system and worked thru Core Spray

REF: OPL171.044, Rev. 9, Page 30 - 35
SOURCE: NEW

JUSTIFICATION
a. requires pressure of greater than 2.45 psig
b. (correct) Drywell pressure switches provide pressure permissive signal to containment spray valves. Permits opening of containment spray only if pressure is significant in containment after accident. DWP decreasing to less than 1.96 psig will automatically close the spray valves if an accident signal is present.
c. requires pressure of greater than 2.45 psig
d. requires pressure of greater than 2.45 psig
C is also correct 1.96 relays operated and did not go through Core SprayJMP

11. 245000K4.09 001/ ROT2G2/ / 3.1/3.2/ C/A/ BANK/ BF00301/ RO/ 75

The following conditions exist on Unit 3:

Reactor power is 85%.
Load set is 100%.
Load Limit is 100%.
Maximum Combined Flow Limiter is set at 125%.

Which one of the following describes how the plant will respond if the Maximum Combined Flow Limiter setting is reduced to 75%?

A. Control valves close, turbine bypass valves open, and reactor pressure remains relatively constant.

✓B. Control valves close, turbine bypass valves remain closed, and reactor pressure increases.

C. Turbine bypass valves throttle open, control valve position remains relatively constant, and reactor pressure decreases.

D. Turbine bypass valves remain closed, control valves open, and reactor pressure lowers.

REF: OPL171.014, Rev. 5, Page 18
SOURCE: BANK QUESTION
JMP
JUSTIFICATION: The objective is to confirm that the candidate understands if the Limiter is set below Rx power, pressure will increase. This can be a MCPR concern.

12. 261000A2.13 001/ ROT2G1/ / 3.4/3.7/ C/A/ BANK/ BF00301/ RO/ 58

A refueling zone high radiation signal has just caused auto initiation of the Standby Gas Treatment (SGT) System.

Which one of the following is an ABNORMAL indication or lineup, given this radiation condition?

A. SGT Train A to Train B crosstie damper 65-22 shut.

B. SGT Train B charcoal temperature (TI-65-47) reading 125 DEG. F.

C. SGT Train C decay heat removal Damper 65-52 shut.

✓D. SGT Train C relative humidity heater outlet temperature (TI-65-62) reading 190 DEG. F.

REF: OPL171.018, Rev. 7
0-OI-65, Rev. 0035, Page 13
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a,c. These dampers are normally shut.
b. The train temperature is expected to be below 150EF.
d. (Correct) The heater should have shut down at 180EF.

13. 262002K3.01 001/ ROT2G2/ / 3.1/3.3/ C/A/ NEW/ BF00301/ RO/ 78

Which of the following describes the consequences of losing the Unit 2 Panel 9-9 Cabinet 6 while operating at power?

A. The high reactor water level trip circuit for the main turbine and the reactor feed pump turbines will be de-energized. RCIC and HPCI AC control circuits will become de-energized rendering those systems inoperable.

✓B. The automatic reactor feedwater control system becomes inoperable and controls on the last known setpoint, there is a loss of power to the Control Rod Drive FCV-85-11 valves, In addition to normal power to panel 9-9 cabinet 5

C. The short cycle valves FCV-2-29A and -29B fail open and the reactor feedwater pumps may trip on low suction. In addition, all of the reactor feedwater pump minimum flow valves will fail open, resulting in decreased flow to the reactor.

D. The Raw Service Water head tank isolation valve closes. The temperature control valves for the main turbine lube oil, reactor recirculation pump MG sets, feedwater pump turbine lube oil, RBCCW, and Main Turbine EHC hydraulics will all fail.

REF: OPL171.102, Rev. 3.
SOURCE: NEW QUESTION
Modified B to be correct, Changed stem to eliminate auto transfer. JMP
JUSTIFICATION

a. This occurs if the ECCS ATU inverters are lost.
b. (Correct) Referring to a loss of the Unit 2 panel 9-9 cabinet 6.
c. This occurs upon loss of the I&C power system.
d. This occurs upon loss of the plant preferred power system.

14. 263000K2.01 001/ ROT2G2/ / 3.1/3.4/ MEMORY/ MODIFIED/ BF00301/ RO/ 79

Which one of the following would be affected if the 48 VDC system was lost?

A. Microwave communications.

✓B. Control Room Annunciators.

C. Emergency Diesel Generator Control and Logic.

D. 480V Shutdown Board Control.

REF: OPL171.037, Rev. 8
SOURCE: BANK QUESTION
JMP
JUSTIFICATION

a. Powered by its own 24VDC system
b. (correct) Powered by 48 VDC system
c. Powered by the 125VDC EDG Power system.
d. Powered by the 250VDC Shutdown Board Battery system.

15. 271000G2.1.7 001/ ROT2G2/ / 3.7/4.1/ C/A/ NEW/ BF00301/ RO/ 80

Which of the following raises the rate of water decomposition?

A. Increase in the amount of freon, oil, or halogens in the Catalytic Recombiner.

B. Running the Off-gas system without the dehumidification coil in service.

C. Securing the Off-gas pre-heaters.

✓D. Removing Hydrogen Water Chemistry from service.

REF: OPL171.030, Rev. 11 OBJ V.B.4/V.C.2 Page 20.
SOURCE: new
HELP
JUSTIFICATION
a. Decreases the recombination rate, not the decomposition rate
b. Operation is allowed by OI-66, decreases the moisture removed, not the decomposition rate
c. Increases the moisture, not the decomposition rate
d. (Correct) Hydrogen addition decreases the decomposition rate

16. 288000A3.01 001/ ROT2G3/ / 3.8/3.8/ C/A/ MODIFIED/ BF00301/ RO/ 88

A barrel of trash was placed on the North side of Unit 2 Fuel Pool. The following conditions were noted on the Reactor and Refuel Zone Radiation Monitors:

Channel A:	Reactor Zone Detector A (2RM90142A)	85 MR/HR
	Reactor Zone Detector B (2RM90142B)	56 MR/HR
	Refuel Zone Detector A (2RM90140A)	67 MR/HR
	Refuel Zone Detector B (2RM90140B)	78 MR/HR
Channel B:	Reactor Zone Detector A (2RM90143A)	81 MR/HR
	Reactor Zone Detector B (2RM90143B)	62 MR/HR
	Refuel Zone Detector A (2RM90141A)	93 MR/HR
	Refuel Zone Detector B (2RM90141B)	84 MR/HR

Which one of the following describes the plant equipment response based on the above conditions?

A. Reactor zone supply and exhaust fans trip on Unit 3 only.

B. Reactor zone supply and exhaust fans are tripped on all units.

C. Drywell Control Air Compressor suction valves, FCV 32-62 and 32-63 close.

✓D. Isolates fresh air paths to Control Bay Elevation 3C.

REF: OPL171.033, Rev. 7, Page 21
OPL171.067, Rev. 7, Page 12
SOURCE: MODIFIED BANK QUESTION
Verified with Revison 9. Changed correct answer. LSM
VERify 1 high
Trip logic for Reactor zone isolation is both channels above 72 mr/hr
a & b. Reactor zones only isolate on a Reactor Zone alarm.
c. FCV 32-62,63 only close on a reactor zone alarm.
d. Correct - Revision 9 7d.(3).(a) page 32

17. 295001G2.4.11 001/ ROT1G2/ / 3.4/3.6/ C/A/ NEW/ BF00301/ RO/ 15

While operating at 90% power the Unit 3 B Reactor Recirculation Field Breaker is tripped.

Immediately upon the field breaker trip the associated jet pump loop flow is:

✓A. subtracted from total core flow. This results in a severe lowering in indicated core flow, then as the tripped loop indicated flow decays toward zero, the core flow indication will rise toward the actual core flow value.

B. subtracted from total core flow. This results in a severe increase in indicated core flow, then as the tripped loop indicated flow decays toward zero, the core flow indication will rise toward the actual core flow value.

~~17. 295001G2.4.11 001/ ROT1G2/ / 3.4/3.6/ C/A/ NEW/ BF00301/ RO/ 15~~

D. added to total core flow. This results in a severe increase in indicated core flow, then as the tripped loop indicated flow trend toward zero, the core flow indication will lower toward the actual core flow value.

A

REF: 2-AOI-68-1
SOURCE: NEW
jmp
Reference: 3-AOI-68-1

CAUTION

Operation with one Recirc pump out of service and the inservice jet pump loop flow 41 x 10E6 lbm/hr (3FI6846 or 3FI6848) can result in inaccurate core flow indication. This results from positive jet pump flow in the out of service loop being subtracted instead of added. If operation in this condition is required, contact Reactor Engineers to perform Attachment 2 of 3-SR-3.4.1(SLO) to determine actual core flow and to substitute that value into the ICS as necessary.

Erratic core flow indication can result from Recirc pump field breaker trips. Immediately upon a field breaker trip the associated jet pump loop flow is subtracted even though the loop flow is still positive. This results in a severe indicated lowering in core flow, then as the tripped loop flow decays toward zero, the core flow indication will rise toward the actual value. The severity of the indicated core flow perturbation will depend upon the cause of the Recirc pump trip (i.e., field breaker trip versus drive motor breaker trip) and the speed of the MG set prior to the trip.

[NER/C] The natural circulation line on the Power/Flow map only shows the approximate, nominal characteristic for operation with both Recirc loops out of service. Therefore, indicated core flow in natural circulation operation may not fall directly on the natural circulation line as depicted on the Power/Flow map. [NRC IN 96-016, GE SIL 516]

Per Technical Specifications, the reactor CAN BE operated indefinitely with one Recirc loop out of service, provided the requirements of T.S. 3.4.1 are implemented within 24 hours of entering single loop operations.

18. 295009G2.1.31 001/ ROT1G1/ / 4.2/3.9/ C/A/ BANK/ BF00301/ RO/ 14

During a level transient on Unit 2 the following events occurred:

- RPV water level decreased to -125 inches during the transient
- ADS actuated
- RHR Pump 2A and 2B started and injected to the reactor vessel
- RPV water level is now +25 inches and increasing
- No operator actions have been taken

Which one of the following statements describes the RHR system response to placing the RHR Pump 2A control switch to the STOP position?

✓A. RHR Pump 2A will stop and the amber light above the control switch will light.

B. No change; RHR Pump 2A will continue to run until the LOCA initiation signal is reset.

C. RHR Pump 2A will stop and the amber light above the control switch will extinguish.

D. RHR Pump 2A will stop and then restart when the switch is released. The amber light above the control switch will not change indication.

REF: 2-OI-74, Rev. 0083, Section 7.1, pg. 30
OPL171.44, Rev. 8, Pg. 48
SOURCE: BANK QUESTION
JMP changed 125 to -125
JUSTIFICATION
a. (Correct)
b. The RHR system is designed to allow a pump to be secured and auto-initiation lock-out.
c.The amber light is the auto-init. lockout indication and will not extinguish until the LOCA signal is reset.
d. Both sentences are incorrect.

19. 295022AA2.02 001/ ROT1G2/ / 3.3/3.4/ C/A/ NEW/ BF00301/ RO/ 27

Initial Conditions:
Reactor pressure is approximately 1000 psig.
The Unit is slowly heating up.
The operating CRD Pump has tripped
Standby CRD Pump (1B) is AVAILABLE

You perform the following actions at Panel 2-9-5:

PLACE CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, in MAN at minimum setting.
START associated standby CRD PUMP 1B by using 2-HS-85-2A.
OPEN CRD PUMP 1B DISCH TO U2, using 2-HS-85-8A.

ADJUST CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, and establish the following conditions:

CRD CLG WTR HDR DP, 2-PDI-85-18A, approximately 20 psid.
CRD SYSTEM FLOWCONTROL, 2-FIC-85-11, at approximately 55 gpm.

Balance the CRD flow and place the CRD SYSTEM FLOW CONTROL, 2-FIC-85-11 in AUTO.

Charging Water pressure is stable at 900 psig.

What are your required IMMEDIATE ACTIONS?

A. Manually SCRAM the reactor and Place the mode switch in the refuel position.

B. Verify the CRD system flow controller is nulled and ensure the CRD SYSTEM FLOW CONTROL, 2-FIC-85-11, is PLACED in Balance.

C. CLOSE CRD PUMP 1B DISCH TO U2, using 2-HS-85-8A.

✓D. There are no additional IMMEDIATE ACTIONS required.

REF: 2AOI-8-53, Rev. 19, CRD SYSTEM FAILURE
OPL171.074, Rev. 6, Obj. V.B.1 and 2
SOURCE: NEW
JMP IOA 85-11 could be placed in bal
JUSTIFICATION
a. Above 900 psig, there is time allowed to take corrective actions. Also there are no requirements to place mode switch in Refuel position.
b. The Auto position is an exceptable position. Balance is not required.
c. This is not an IMMEDIATE Action
d. (Correct). There are 20 minutes to restore flow or take other compensatory measures.

20. 295034EK3.01 001/ ROT1G2/ / 3.8/4.1/ C/A/ BANK/ BF00301/ RO/ 32

The Reactor Building ventilation exhaust duct radiation high signal has just been received on Unit 3.

Which one of the following describes the expected plant response?

A. Only the Reactor Zone isolates, SGT starts and aligns to the Reactor Zone only, and a Group 6 PCIS occurs, except the drywell air compressor suction valves remain open.

B. The Reactor and Refueling Zones isolate, SGT starts and aligns to Reactor and Refueling Zones, and a Group 6 PCIS occurs, except the drywell air compressor suction valves remain open.

C. Only the Reactor Zone isolates, SGT starts and aligns to the Reactor Zone only, and a complete Group 6 PCIS occurs.

✓D. The Reactor and Refueling Zones isolate, SGT starts and aligns to Reactor and Refueling Zones, and a complete Group 6 PCIS occurs.

REF: OPL171.067, Rev. 7, pg 16; Obj. V.B.2
2-AOI-64-2d, Rev. 0020
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a,b,c. These are logical, credible, but incorrect plant responses from which to choose.
d.
(Correct)

21. 600000AK3.04 001/ ROT1G2/ / 2.8/3.4/ C/A/ BANK/ BF00301/ RO/ 33

Due to a fire in the turbine building, the electrically driven fire pumps automatically started. While the fire pumps were running, a loss of 161KV and 500KV offsite power occurred. The EDGs then started and powered their respective shutdown boards.

Which one of the following describes how the fire pumps become available to fight the fire?

A. No operator action is required; the pumps will automatically restart after the busses are re-energized by the EDGs.

B. Ensure the diesel driven fire pump is running; the motor driven fire pumps do not have a source of power available.

✓C. Place the NORMAL/EMERGENCY switch for the associated fire pumps to EMERGENCY and back to NORMAL; pumps will start automatically.

D. Place the NORMAL/EMERGENCY switch for the associated fire pumps to EMERGENCY and back to NORMAL; manually start the pumps at the associated pump breakers.

REF: OPL171.074, Rev. 6, Page 11
0-AOI-57-1A, Rev. 0041, Page 6
SOURCE: BANK QUESTION
JMP
JUSTIFICATION

a. The motor driven fire pumps are not on the sequencer. If they happen to be running during a LOOP, a 52Y relay locks out each of the three pumps.
b. The candidate does not need to remember this, but he should know that the electric pumps are powered from the shutdown boards.
c. (Correct)
d.

If there is a signal in place for the pumps to start, they will start automatically after the 52Y relay is released.

22. G2.1.20 001/ ROT3/ / 4.3/4.2/ MEMORY/ NEW/ BF00301/ RO/ 148

When performing technical procedure with a level of classification of "Reference Use Procedure" in a C-Zone.

A. The procedure must be performed as though it was classified as a "Continuous Use Procedures."

✓B. A QC holdpoint can be marked N/A with Nuclear Assurance Approval.

C. Each step of the procedure must be read before performing the step and acknowledgment of the step's completion is required before proceeding to the next step.

D. Each step of the procedure must be read before performing the step, however, acknowledgment of the step's completion is not required before proceeding to the next step.

REF: SPP-2.1, Revision 3
SOURCE: NEW QUESTION
JMP
JUSTIFICATION

a. Should be performed as a reference use procedure
b. Correct - 3.3.6
c. This is a requirement of Continuous Use Procedures
d. The first part is required by continuous use procedures, the second part is false.

23. G2.2.22 001/ ROT3/ / 3.4/4.1/ MEMORY/ BANK/ BF00301/ RO/ 95

Which one of the following conditions is a violation of the Unit 3 ITS Safety Limits?

✓A. Reactor water level at -175 inches with all MSIVs open.

B. Reactor pressure at 750 psig and reactor power at 25%.

C. Reactor power at 95% and MFLCPR = 0.98.

D. A Group 1 isolation occurs due to main steam tunnel temperature high and reactor pressure reaches 1262 psig.

REF: OPL173.937, Rev. 4, EO B.4
TS 2.1.1.2
SOURCE: BANK QUESTION
changed 175 to -175 JMP
JUSTIFICATION

a. (Correct) RPV level would be lower than -162 inches (TAIF) to exceed the safety limit . It does not matter what the MSIV status is.
b. Reactor power would have to be greater than 25% to exceed the safety limit.
c. A MFLCPR of >1.0 would exceed the operating limit, even higher to exceed the SL.
d. The SL for RCS pressure is 1325 psig.

24. G2.3.1 001/ ROT3/ / 2.6/3.0/ MEMORY/ NEW/ BF00301/ RO/ 97

Committed Effective Dose Equivalent (CEDE) is defined as:

A. The dose equivalent to organs or tissues that will be received from an intake of radioactive material by an individual during the 50-year period following the intake.

B. The derived limit for the amount of radioactive materials taken into the body of an adult worker by inhalation or ingestion in a year.

✓C. The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues.

D. A numerical dose constraint established at a level below the regulatory limits set forth in 10CFR Part 20, which are established as a guideline to administratively control and help optimize individual and collective radiation exposure.

REF: SPP5.1, Rev. 3,
SOURCE: NEW
JMP
JUSTIFICATION
a. CDE
b. ALI
c. Correct
D. ADL

25. G2.4.49 001/ ROT3/ / 4.0/4.0/ MEMORY/ NEW/ BF00301/ RO/

The shift manager has just informed you that the Operations Duty Specialist reports that a breach of Wheeler Dam has just occurred. Level is lowering in the intake structure. What are your required immediate actions?

✓A. Begin a controlled shutdown to mode 4.

B. Activate the Automatic Paging System, obtain a hand held radio, proceed to 4kV Shutdown Board A.

C. Manually trip the reactor and enter the EOIs.

D. Verify automatic actions, perform any automatic action that failed to occur.

REF: 0-AOI-100-4, Revision 8, Immediate Operator Actions

A. Immediate actions of 0-AOI-100-4, Revision 8 (correct answer)
B. Required for control room abandonment
C. Controlled shutdown required
D. There are no required automatic actions
JMP

26. 0PL171.148 001/ NEW/ 2/ PRNM/ / 295001/ AA1.06/ 3.3/3.4/ 6

Unit 2 is operating with only the 2B Recirc Pump (Single Loop Operation) at 60% power. The following alarms and conditions currently exist:

- Jet Pump Flow No. 11 Thru 20 (2-FI-68-46) 13 Mlbm/hr
- Jet Pump Flow No. 1 Thru 10 (2-FI-68-48) 57 Mlbm/hr
- TOTAL CORE FLOW Recorder (2-XR-68-50) 43.4 Mlbm/hr
- APRM FLOW 43.5%
- Mode Switch in RUN

DETERMINE how the Core Flow Indication and PRNM Systems are affected by these conditions.

A. The OPRM trip function is BYPASSED and the Total Core Flow Indication is correct.

✓B. The OPRM trip function is ENABLED and the Total Core Flow Indication is correct.

C. The OPRM trip function is BYPASSED and the Total Core Flow Indication may be inaccurate.

D. The OPRM trip function is ENABLED and the Total Core Flow Indication may be inaccurate.

T=4

AOI-68-1

27. 201001K3.03 001/ ROT2G1/ SROT2G2/ 3.1/3.2/ C/A/ BANK/ BF00301/ BOTH/ 38

Control Rod 38-23 has been selected for a single notch withdrawal from position 02 to position 04. The following response from the CRD system was observed:

- Insert light illuminates and goes out.
- Withdrawal light illuminates and goes out.
- Settle light illuminates and goes out.

The operator also observes and reports that the selected rod is now at position 06 and is continuing to drift out. A rod drift alarm is also present.

Which one of the following has caused this condition?

A. The automatic sequence timer has failed.

✓B. Stuck open collet fingers.

C. Low CRDM cooling water pressure/flow.

D. Leaking scram outlet valve.

REF: OPL171.006, Rev. 5, EO 13d
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. This would more than likely cause failures to notch in or out.
b. (Correct)
c. High pressure/flow might cause drift. Low pressure/flow will not.
d. Might cause rod insert drift.

28. 201006A1.02 001/ ROT2G2/ SROT2G2/ 3.4/3.5/ C/A/ NRC96301/ BF00301/ BOTH/ 67

With the Rod Worth Minimizer keylock switch in NORMAL, which one of the following describes the effect of a loss of all control rod position signals from the RPIS?

✓A. Withdraw, insert, and select rod blocks will occur if power is less than the Low Power Alarm point.

B. Only withdraw and select rod blocks will occur if power is less than the Low Power setpoint.

C. Withdraw, insert, and select rod blocks will occur at any power level.

D. RWM-PROG lights on INOP-RESET pushbutton. This will occur at any power level.

REF: OPL171.024, Rev. 8, Page 36, 4.d.(1), and Page 12, 2.f.(3)
2-AOI-85-4, Rev. 11
SOURCE: 1996 BFNP RO EXAM #31
CHANGED REV ON AOI JMP
JUSTIFICATION

a. (Correct)
b. There is also an insert block. This choice implies that the operator can insert at any time to add negative reactivity.
c. These features do not activate when the plant is above the low power setpoint.
d. This is in effect when the switch is turned from normal to bypass (lsm)

29. 202001K6.01 001/ ROT2G2/ SROT2G2/ 3.5/3.7/ C/A/ NRC96301/ BF00301/ BOTH/ 68

With both reactor recirculation pump speeds matched and the reactor at 100% power, which one of the following is an indication of a reactor recirculation jet pump failure?

In the loop with the failed jet pump, if indicated recirculation loop flow:

A. decreases, indicated core pressure will increase.

✓B. increases, indicated main generator output will decrease.

C. decreases, indicated total core flow will increase.

D. increases, indicated core thermal power will increase.

REF: AOI-68-2, Rev. 11, Page 1, Para 2.0.
OPL171.007, Rev. 15, Page 55, Para E.1
ITS Basis 3.4.2
SOURCE: 1996 BFNP EXAM #37, distractors modified
help check AOI
JUSTIFICATION
a. Loop flow decreased because of jet pump fracture, causing lower D/P across the jet pump. This causes the summation of D/Ps to lower the indicated loop flow. However, because of the malfunctioning jet pump, total core flow decreases, as does core pressure drop.
b. (correct)
c. 2-AOI-68-2 lists an increase in indicated core flow as a symptom. This is only true if the jet pump throat is restricted or clogged, causing a high D/P across the jet pump.
d. Core thermal power will decrease with any jet pump flow degradation, whether it be caused by jet pump fracture or obstruction.

30. 202002A4.09 001/ ROT2G1/ SROT2G1/ 3.2/3.3/ MEMORY/ NEW/ BF00301/ BOTH/ 40

By disconnecting the recirc pump motor from the generator rather than tripping the MG set supply breakers, which of the following occurs?

A. The recirc pump will coast down more quickly. Lower core flow causes more voiding. This lowers the slowing down length of fast neutrons which raises the thermal neutron flux. Higher thermal neutron flux results in more power.

B. The recirc pump will coast down more slowly. Higher core flow causes less voiding. This raises the slowing down length of fast neutrons which lowers the thermal neutron flux. Lower thermal neutron flux results in less fission and less power.

C. The recirc pump will coast down more slowly. Higher core flow causes less voiding. This lowers the slowing down length of fast neutrons which raises the thermal neutron flux. Higher thermal neutron flux results in more power.

✓D. The recirc pump will coast down more quickly. Lower core flow causes more voiding. This raises the slowing down length of fast neutrons which lowers the thermal neutron flux. Lower thermal neutron flux results in less fission and less power.

REF: OPL171.007, Rev. 18, Page 55
Obj.V.B.4, V.C.2
Obj.V.C.1.b
SOURCE: NEW
Solution:
A. Raises the slowing down length. Lowers power
B. Pumps slow more slowly
C. Pumps slow more slowly. Lowers power
D. Correct - The recirc pump will coast down more quickly. Lower core flow causes more voiding. This raises the slowing down length of fast neutrons which lowers the thermal neutron flux. Lower thermal neutron flux results in less fission and less power
HELP check LP
JUSTIFICATION
a. Only when the field breaker for the idle pump is racked out.
b. This is true for both or no recirc pumps running.
c. (Correct) The summing circuit adds a negative number due to reverse flow in the idle jet pumps.
d. Technically achievable, but not true.

31. 203000K4.06 001/ ROT2G1/ SROT2G1/ 3.5/3.5/ C/A/ BANK/ BF00301/ BOTH/ 41

During the performance of RHR System MOV operability testing, the RHR pump torus suction valves were closed. Immediately thereafter, a LPCI initiation signal is received.

Assuming the LPCI initiation signal remains present, which one of the following statements is correct?

A. The suction valves will open automatically, and then the respective RHR pumps will auto start.

B. The suction valves will open automatically and then the respective RHR pump must be started manually.

C. The suction valves will not open automatically. They must be fully reopened manually, and then the respective RHR pumps will auto start.

✓D. The suction valves will not open automatically. The valves must be fully reopened manually, and then the pumps must be manually started.

REF: OPL171.044, Rev. 8, Page 38; EO V.B.12
SOURCE: BANK QUESTION
*
JUSTIFICATION
a,b,c,d. Anti-pump logic will prevent the pump from automatically responding to an ESF signal unless there is a suction path, and it is not automatic.

32. 204000A3.04 001/ ROT2G2/ SROT2G2/ 3.4/3.5/ C/A/ BANK/ BF00301/ BOTH/ 69

On Unit 3, the Reactor Water Cleanup (RWCU) System is operating with RWCU Pump A running and the Filter/Demineralizer B in service with 130 gpm flow.

Which one of the following choices describes the expected automatic response of the RWCU system if Filter/Demineralizer B is inadvertently valved out of service?

✓A. Filter/Demineralizer B holding pump will start. RWCU Pump A trips when system flow decreases to less than 56 gpm for 35 seconds.

B. Filter/Demineralizer B BYPASS valve will automatically open to maintain at least 90 gpm and RWCU Pump A will continue to operate.

C. Filter/Demineralizer A automatically returns to service when Filter/Demineralizer B dp exceeds 20 psid.

D. The system automatically isolates and Pump A trips when system flow decreases to less than 40 gpm for 7 seconds.

REF: OPL 171.013, Rev. 8, pAGE 19
SOURCE: BANK QUESTION
Changed time delay*
JUSTIFICATION

a. (Correct)
b. The BYPASS valve is not automatic. 90 gpm is the Unit 1 pump trip setpoint. A check valve prevents bypass flow via the holding pump piping.
c. This feature does not exist; however, there is a flow controller that is normally in manual.
d. The system doesn't isolate, and the 40 gpm setpoint is for the F/D holding pumps to start.

33. 205000K6.04 001/ ROT2G2/ SROT2G2/ 3.6/3.6/ C/A/ MODIFIED/ BF00301/ BOTH/ 121

The Unit 2 reactor is in cold shutdown with RHR Loop B in the Shutdown Cooling (SDC) mode when reactor water level rapidly decreases to -130.0 inches. Which one of the following correctly describes the operation of the RHR System?

A. The LPCI Inboard Injection valves automatically open and the operator must wait 5 minutes before throttling flow.

B. The LPCI Inboard Injection valves automatically close and the operator must wait 5 minutes before manually opening the valve.

✓C. The operator must depress the SDC isolation reset pushbuttons on panel 9-3 before the LPCI Inboard Injection valves automatically open.

D. The operator must manually open the LPCI Inboard Injection valves after resetting the PCIS isolation using the reset switches on panel 9-4.

REF: OPL171.044, Rev. 8, EO B.16
OPL171.017, Rev. 8, Page 21, 33
SOURCE: 1995 BFNP EXAM RO # stem modified to change LPCI injection valves to SDC supply.
Changed answer to "C" and "130" to "-130" stem is confusing why 74-48 help
JUSTIFICATION:
c. SDC reset is only for LPCI injection valves

34. 206000K2.01 001/ ROT2G1/ SROT2G1/ 3.2/3.3/ C/A/ NRC96301/ BF00301/ BOTH/ 61

The following conditions exist during a loss of all A/C power (Onsite and Offsite):

- The high pressure coolant injection (HPCI) system was started in response to a valid actuation signal.
- A valid HPCI isolation signal is subsequently generated.

Which one of the following is the expected result?

A. The HPCI pump will continue to operate with the mini-flow valve open.

B. The steam supply inboard isolation Valve 73-2 will close, and the turbine will trip.

✓C. The steam supply outboard isolation Valve 73-3 will close, and the turbine will trip.

D. A full HPCI system isolation will occur, and the turbine will trip.

REF: OPL171.042, Rev. 11, Pages 33 - 37.
SOURCE: 1996 BFNP SRO EXAM #60
changed station blackout verses a loss of all AC power
JUSTIFICATION

a. The pump turbine will trip on a HPCI isolation.
b. Valve 73-2 will fail as is upon loss of AC power.
c. (Correct)
d. When normal or emergency AC power is available, and there is a valid isolation signal, a full HPCI isolation and turbine trip will occur. Valves 73-2, 73-81, and 73-64 are 480 Volt AC powered.

35. 209001K4.08 001/ ROT2G1/ SROT2G1/ 3.8/4.0/ C/A/ BANK/ BF00301/ BOTH/ 43

During a Unit 2 LOCA, the following plant conditions exist:

- Reactor water level is dropping at a rate of 20 inches per minute.
- RPV level is currently at -132 inches.
- RPV pressure is 468 psig.
- Drywell pressure is 2.5 psig.

Which one of the following describes the expected status of the Core Spray System?

A. The Core Spray System has not initiated.

✓B. The Core Spray pumps have started, but the injection valves are CLOSED.

C. The Core Spray pumps have started, and the injection valves are OPEN, but pump flow is dead headed against the closed check valve.

D. Core Spray pumps have started and are injecting into the RPV.

REF: OPL171.045, Rev. 8; EO B.2
SOURCE: BANK QUESTION
changed typo -132" initiated *
JUSTIFICATION

a. Core Spray initiates at -122"
b. (Correct)
c. The inboard injection valve does not open until #450 psig in the RPV
d. (Same as c.)

36. 211000K2.02 001/ ROT2G1/ SROT2G1/ 3.1/3.2/ C/A/ NEW/ BF00301/ BOTH/ 131

Unit 3 is operating at power with Diesel Generator 3A under clearance. A transient occurs resulting in a reactor scram signal and an ATWS. The SLC control switch is taken to the START PUMP B position. Plant conditions are as follows:

Reactor power	10%
480v S/D bd 3A	De-energized (A/C only)
SLC switch	NOR-AFT-START

How will the SLC system respond?

A. SLC squib valve A fires, no SLC pump starts.

B. SLC squib valve B fires, no SLC pump starts.

✓C. SLC squib valves A and B fire, one SLC pump starts.

D. SLC squib valve B fires, both SLC pump starts.

REF: OPL171.039, Rev. 9, Page 12
SOURCE: 4/97 BSEP exam RO #9
Changed "a lockout of the BOP bus" to "a turbine trip" Change 480 v S/D bd major changes
Help
JUSTIFICATION
In the START PUMP B position, normally pump B starts and both squibs fire. Pump B and Squib B power from SD BD 3B which is energized. Squib A is powered from SD BD 3A and will fire when SD BD 3b is energized.

37. 212000K6.05 001/ ROT2G1/ SROT2G1/ 3.5/3.8/ C/A/ BANK/ BF00301/ BOTH/ 45

During main turbine stop valve testing, the No. 2 Stop Valve would not close. The Unit Supervisor directs placing the Stop Valve No. 2 input to the Reactor Protection System (RPS) in a tripped condition.

Which one of the following describes the impact of this action on the RPS?

No. 2 Stop Valve provides input to:

A. only RPS Channel A, and placing the inputs in a tripped condition will cause a half scram.

B. only RPS Channel B, but placing the inputs in a tripped condition will NOT cause a half scram.

C. both RPS Channels A and B, and placing the inputs in a tripped condition will cause a full scram.

✓D. both RPS Channels A and B, but placing the inputs in a tripped condition will NOT cause a half scram.

REF: ITS LCO 3.3.1.1, Amendment 253
OPL171.028, Rev. 10, Page 13
SOURCE: BANK QUESTION
*
JUSTIFICATION
a,b,c,d. All 4 TSVs open a pair of contacts at 10% closure, and input RPS Channels A and B. No one TSV will cause a half scram.

38. 215001G2.1.32 001/ ROT2G3/ SROT2G3/ 3.4/3.8/ MEMORY/ BANK/ BF00301/ BOTH/ 123

While walking down the control room panels on a tour, the Unit 2 Unit Supervisor notices the F5 fuse indicator for the TIP channel B Valve Control Monitor is de-energized.

Which one of the following statements correctly describes the information provided by this condition?

A. The TIP shear valve will not fire.

B. The TIP ball valve will not open when the TIP is out of the shield.

C. The TIP channel will not respond to a automatic scan.

✓D. The TIP channel will not respond to a containment isolation signal.

REF: OPL171.023, Rev. 3, EO B.3
SOURCE: BANK QUESTION
help ? blown fuse removes power from isolation relays
JUSTIFICATION

a. There is a Squib monitor for this.
b. There are other indicating lights for the ball valve.
c. There is a scan light.

39. 215001K4.01 002/ ROT2G3/ SROT2G3/ 3.4/3.5/ C/A/ MODIFIED/ BF00301/ BOTH/ 85

A traversing in-core probe (TIP) trace is being performed on Unit 2. With the probe in core, a spurious Group 8 isolation occurs.

Which one of the following describes how the TIP system responds to the isolation signal?

A. No response; the TIP system only responds to a Group 2 isolation signal.

✓B. The TIP drive withdraws at fast speed and the ball valve closes once the probe has withdrawn to the shield chamber.

C. The TIP drive withdraws at slow speed until the core bottom is cleared, then shifts to fast speed, withdraws from the core and the ball valve closes when the probe has withdrawn to the indexer.

D. The TIP drive withdraws at fast speed and if the probe is not in the shield within 30 seconds, the shear valve fires to cut the cable and seal the tube.

REF: OPL171.023
SOURCE: MODIFIED QUESTION
*
JUSTIFICATION

a. The same signals trip the Group 2 (RWCU) isolation.
b. (Correct)
c. Slow speed is used for scanning the core. The implication of the distractor is that the TIP only moves in slow speed when in the core, which is not so.
d. The shear valve fires manually with a key-lock switch. That option is open to the operator, but there is no 30-second time constraint.

40. 215003A4.03 001/ ROT2G1/ SROT2G2/ 3.6/3.4/ MEMORY/ BANK/ BF00301/ BOTH/ 132

A unit 3 IRM channel is set to range 5 and reading 60. Which one of the following is correct if the IRM range selector switch is turned to range 6?

A. A different preamplifier circuit is put into service and the reading should be about 6.

B. A different preamplifier circuit is put into service and the reading should be about 19.

C. The same preamplifier circuit remains in service and the reading should be about 6.

✓D. The same preamplifier circuit remains in service and the reading should be about 19.

REF: OPL171.020, Rev. 5, Page 12
changed answer from a to d *
JUSTIFICATION
Readings vary by a factor of the square root of 10 from one channel to the next. The different pre-amplifiers are put into service between channels 6 and 7.

41. 215003K1.06 001/ ROT2G1/ SROT2G2/ 3.9/4.0/ C/A/ MODIFIED/ BF00301/ BOTH/ 46

A reactor startup is in progress on Unit 3 with reactor power at 20%. APRM 1 is bypassed due to failing high. Then, IRM A fails high.

Which one of the following describes the response of the RPS to the IRM upscale trip?

✓A. No RPS trip action

B. A rod block

C. A half scram

D. A full scram

REF: OPL171.020, Rev. 5
Learning Objective B.7
MODIFIED QUESTION
*

JUSTIFICATION
b,c,d. The candidate needs to demonstrate knowledge of companion APRM/IRMs and the effects of bypassing one companion. The distractors were designed to do that.

42. 215005K6.01 001/ ROT2G1/ SROT2G1/ 3.7/3.8/ C/A/ BANK/ BF00301/ BOTH/ 48

Unit 2 is operating at 100% power, when a loss of RPS B power occurs.

Which one of the following describes the type of fault detected for BOTH the RBM and APRM channels?

A. A critical fault is generated in both the RBM channels, and in all of the APRM channels.

B. A non-critical fault is generated in both the RBM channels, and in all of the APRM channels.

C. A critical fault is generated in RBM Channel B, and in APRM Channels 2 and 4.

✓D. A critical fault is generated in RBM Channel B, and non-critical faults are generated in all of the APRM channels.

REF: OPL171.148, Rev. 2, Page 67 and 10
SOURCE: BANK QUESTION
help verify on simulator
JUSTIFICATION

a. RBM Channel A is unaffected, as are the APRMs.
b. A critical fault is generated in RBM Channel B.
c. None of the APRM channels have a critical fault.
d. (Correct)

43. 216000G2.1.28 001/ ROT2G1/ SROT2G1/ 3.2/3.3/ C/A/ NRC95301/ BF00301/ BOTH/ 49

Which one of the following describes a characteristic of a fill oil leak from a Rosemount transmitter?

A. The instrument readings repeatedly drift in both directions over a period of time.

B. The instrument exhibits an inability to follow plant transients over a period of time.

C. The instrument responds normally until the isolating diaphragm contacts the convolution plate, when it fails to function properly.

✓D. The instrument responds more slowly until the isolating diaphragm contacts the convolution plate, when it fails to function properly.

*REF: Reactor Vessel Process Instrumentation, OPL171.003, Rev. 11, pg. 18
Learning Objective V.B.2
NRC Bulletin 90-01 and NRC Info Notice 89-42
SOURCE: 1995 BFNP SRO EXAM, Question #1, some distractors changed
changed obj reference JMP
JUSTIFICATION

a. A sustained drift in the same direction is detectable over a period of time.
b. (Same as b)
c. The instrument exhibits slowed response to, or inability to follow planned plant transients.
d. (Correct)

"B" may be correct

44. 217000A2.19 001/ ROT2G1/ SROT2G1/ 3.5/3.6/ C/A/ NEW/ BF00301/ BOTH/ 50

The following Unit 2 plant conditions are given:

Reactor power is 65%
Suppression Pool temperature is 78 degrees
Suppression Pool temperature is increasing by 2 degrees every 12 minutes
Suppression Pool cooling is in service providing maximum cooling
The time is 12:00 noon.

2-SR-3.5.3.3, RCIC SYSTEM RATED FLOW AT NORMAL OPERATING PRESSURE is in progress.

Which one of the following is the latest time the test may be conducted before Technical Specifications limits would be exceeded?

A. 1:42 pm

✓B. 2:42 pm

C. 3:12 pm

D. 5:24 pm

REF: TS 3.6.2.1, Amendment 253
2-SR-3.5.3.3, Rev. 0002, Para 3.3
SOURCE: NEW QUESTION
*Good question A will be selected JMP
JUSTIFICATION

a. Based on the 95EF limit applicable when no testing is going on.
b. (Correct) 105-78÷2×12=162 min or 2 hrs; 42 min.
c. Based on the 110 degrees limit when in IRM Range 7.
d. Based on 105 degrees limit, but forgot to divide by 2.

45. 218000K2.01 001/ ROT2G1/ SROT2G1/ 3.1/3.3/ MEMORY/ NEW/ BF00301/ BOTH/ 51

Which one of the following would occur if power is lost to 250VDC RMOV Board 3B?

A. The ADS logic will not operate after automatic transfer to the alternate power supply.

B. The ADS logic will not operate, however, TWO of the six ADS valves can be operated manually.

✓C. The ADS logic will not operate, however, FOUR of the six ADS valves can be operated manually

D. The ADS logic will not operate, however, the SIX ADS valves can be operated manually.

REF: OPL171.043, Rev. 7, Pages 11 and 16
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
a. Board 3B does not have an automatic transfer to the alternate power supply
b. Two ADS valves are powered from 3B
d. Two of the six ADS valves lose power with no alternate. Thus only four are left that will function manually.

46. 223002K3.01 001/ ROT2G1/ SROT2G1/ 3.7/3.7/ MEMORY/ NEW/ BF00301/ BOTH/ 53

Which one of the following gives the two PCIS groups **NOT** affected by RPV water level?

A. Groups 1 and 4

✓B. Groups 4 and 5

C. Groups 5 and 6

D. Groups 6 and 8

REF: OPL171.017, Rev. 8, Page 15
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
This question was designed to challenge the candidate's knowledge of what systems are in each group, and to either figure out or remember that Groups 4 and 5 (HPCI and RCIC), must not isolate when there is a water inventory problem. Groups 1,2,3,6,&8 all isolate on RPV low levels.

47. 226001A4.03 001/ ROT2G2/ SROT2G1/ 3.5/3.4/ C/A/ MODIFIED/ BF00301/ BOTH/ 72

Given the following conditions:

RPV level	-190 inches
RPV Pressure	920 psig
Drywell pressure	2.95 psig

A valid LPCI initiation signal is present

Which one of the following are required to be completed in conjunction with **ONLY** placing the RHR Containment Spray select switch XS-74-1-121/129 in Select to open the Containment Spray valves?

✓A. Raise RPV level to -180 inches only.

B. Reduce drywell pressure to 1.6 psig only.

C. Raise RPV level >-120" AND reset the LPCI initiation signal.

D. Raise RPV level to >-120 inch reactor level AND reduce drywell pressure to 1.6 psig.

REF: OPL171.044, Rev. 8, Page 34/36, Sections m.(4) / o.(4).
1996 BFNP RO EXAM #65 modified to give plant conditions

HELP significant work required change to the select switch being operated JMP
JUSTIFICATION
a.& d. RPV level interlock is bypassed with keylock
c. LPCI initiation signal is bypassed

48. 233000A3.02 001/ ROT2G3/ SROT2G3/ 2.6/2.6/ MEMORY/ NEW/ BF00301/ BOTH/ 146

A trip of the 480 V Shutdown Board 1A will have which of the following effects on the spent fuel pool system?

✓A. Trips Fuel Pool Circulating Pump 1A.

B. Trips Fuel Pool Circulating Pump 1B.

C. Isolates the fuel pool water flow to the fuel pool heat exchanger.

D. Isolates the RBCCW to the fuel pool heat exchangers.

NEW - OPL171.052 003 Rev 5 Obj. V.B.7
Solution:
A. Correct - Obj. V.B.7.
B. Pump 1B powered from 480 V Shutdown Board 1B (Similar for Unit 2 & 3)
C. Trips only one pump, does not isolate flow to the heat exchanger.
D. Does not effect the Shell side - reactor building closed cooling water (RBCCW)
JMP

49. 239002K4.03 001/ ROT2G1/ SROT2G1/ 3.1/3.3/ C/A/ NEW/ BF00301/ BOTH/ 64

Both MSRV vacuum breakers (the 10 inch and the 2 1/2 inch) on each relief line have failed closed. Some water from the suppression pool was siphoned into the relief line upon completion of blowdown when the steam in the relief line condensed.

What are the potential consequences of future MSRV operation?

A. Insufficient flow through the relief line.

B. Uneven heating of the suppression pool.

C. Direct pressurization of the drywell air space.

✓D. Overpressurize the relief line.

REF: OPL171.009, Rev. 6, Pg. 13 OBj VB5 VC2 VC3
SOURCE: new
Changed DW Vac Breakers to MSRV Vac bkr, failed Vac bkr closed, future msrv operation.
JMP
JUSTIFICATION
a. There would be no significant effect on the flow
b. This would occur if the relief valves were not used in a prescribed pattern
c. This could only occur if the vacuum breaker fails open
d. (correct) Due to the presence of moisture in the line.

50. 239002K5.04 001/ ROT2G1/ SROT2G1/ 3.3/3.5/ C/A/ MODIFIED/ BF00301/ BOTH/ 54

The following plant conditions exist:

- The reactor is operating at 100% power and 1000 psig.
- A turbine control valve malfunction resulted in reactor safety relief valve (SRV) 1-4 lifting and failing to reseat.

Which one of the following SRV tailpipe temperatures would you expect to see on the SRV that failed to close? (References attached)

A. 212 degrees Fahrenheit

✓B. 290 degrees Fahrenheit

C. 345 degrees Fahrenheit

D. 545 degrees Fahrenheit

REF: Steam Tables or Mollier Diagram (INCLUDE WITH EXAM AS ATTACHMENT)
SOURCE: 1996 BFNP RO EXAM #99
check for training coverage JMP
JUSTIFICATION

a. Saturation temperature for steam at tailpipe pressure (atmospheric).
b. (Correct) This is a throttling process and is therefore isoenthalpic.
c. 340 degrees Fahrenheit would be incorrectly determined if the candidate considered the process to be isoenthalpic to the saturation line, then followed the constant superheat line to atmospheric pressure.
d. Saturation temperature for reactor pressure.

THE ANSWER ON THE 1996 EXAM WAS GIVEN AS 370 DEGREES.

51. 241000K3.02 001/ ROT2G1/ SROT2G1/ 4.2/4.3/ C/A/ BANK/ BF00301/ BOTH/ 55

The following conditions exist on Unit 2:

Turbine Steam Throttle Press: 990 psig
Pressure setpoint: 970 psig
Load Limit: 100%
Load Setpoint: 100%

Which one of the following describes the EHC Pressure Regulating System response, and the effect on RPV pressure, if the turbine steam throttle pressure transmitter input to Pressure Regulator A failed upscale to 1100 psig?

A. Pressure Regulator B takes over; RPV pressure increases.

B. Pressure Regulator B takes over; RPV pressure decreases.

C. Pressure Regulator A remains in control; RPV pressure increases.

✓D. Pressure Regulator A remains in control; RPV pressure decreases.

REF: OPL171.014, Rev. 5, Pages 13-15
SOURCE: BANK QUESTION
JMP changed based on PUR plant values 920 = 970 950 = 990 failed to 1100
JUSTIFICATION

a. P.R. B won't take over when there is a failure causing P.R. A, which is normally the in-service regulator, to put out a TCV open signal.
b. P.R. B doesn't take over, but pressure will decrease until the MSIVs close on low steamline pressure.
c. P.R. A remains in control, but RPV pressure drops off as the P.R. sends out a TCV open signal in error.
d. (Correct)

52. 256000K5.10 001/ ROT2G2/ SROT2G3/ 2.8/2.8/ MEMORY/ BANK/ BF00301/ BOTH/ 76

Which one of the following states the reason why the condensate pump header pressure should be between 100 and 150 psig during a reactor startup?

A. To minimize thrust on the condensate pump motor bearings.

✓B. To ensure adequate condensate flow for the steam jet air ejectors.

C. To ensure adequate flow through the condensate demineralizers.

D. To maximize condensate pump efficiency.

REF: OPL171.011, Rev. 6
SOURCE: BANK QUESTION
REF info JMP
JUSTIFICATION

a. Makes sense; however, this is not the reason.
b. (Correct) The Unit 3 SJAE will shut down at <60 psig condensate incoming pressure.
c. The condensate demins will always get whatever the feedwater demand is for the existing reactor power.
d.

Theoretically, the pumps will draw less current at higher pressure, but at the same time, more water is being bypassed around the wear rings, thus it may be a wash. This is not the reason.

53. 259001A1.02 001/ ROT2G1/ SROT2G2/ 3.2/3.3/ MEMORY/ BANK/ BF00301/ BOTH/ 56

Which one of the following is an acceptable method for reducing thermal duty on RPV feedwater nozzles during low power and/or hot standby operation?

A. Minimize reactor power.

B. Increase reactor pressure.

✓C. Maximize RWCU flow.

D. Reduce CRD flow.

REF: OPL171.026, Rev. 7, Page 36
2-OI-3, Rev. 0071, Page 9
SOURCE: BANK QUESTION
JMP
JUSTIFICATION

a. OI-3 suggests minimizing time at low power, not power level.
b. OI-3 suggests reducing reactor pressure, or increasing power.
c. (Correct) Warm RWCU return mixes with cooler feedwater.
d. The only CRD flow path that would help is normally isolated anyway.

54. 259002A3.06 001/ ROT2G1/ SROT2G1/ 3.0/3.0/ C/A/ BANK/ BF00301/ BOTH/ 57

A full scram from 100% power occurred on Unit 2 as a result of a fault in the main turbine EHC system. After the SCRAM, the following conditions exist: (Assume no operator actions have occured)

All three Reactor Feed Pumps (RFPs) are in AUTO
Master Level Controller is in AUTO
Reactor water level is at 10 inches and rising
Scram Response logic is not inhibited

Which one of the following describes the Reactor Feed System response to this situation?

✓A. RFPs A and B are available for AUTO or MANUAL mode of operation and may be taken to 5600 rpm.

B. RFPs A and B are set at 600 rpm, and cannot be raised to >600 rpm until the Scram Response logic is reset.

C. RFPs A and B are available for MANUAL mode only and will be limited to 3900 rpm until the Scram Response logic is reset.

D. RFPs A and B are available for AUTO or MANUAL mode of operation but are limited to 3900 rpm until the Scram Response logic is reset.

REF: OPL171.012, Rev. 7, Page 26
SOURCE: BANK QUESTION
5050 is an operational limit JMP change 5600 to 5050?
JUSTIFICATION

a. (Correct)
b. A&B get set by the algorithm at 600 rpm (0% output), but they can be manually rolled up to 5600 rpm.
c. RFP C gets set by the algorithm at a demand limit of 3900 rpm.
d. A&B are available in either mode, but the manual speed limit is 5600, and not to be confused with the 3900 rpm demand limit set on RFP C.

55. 262001K1.01 001/ ROT2G2/ SROT2G1/ 3.8/4.3/ MEMORY/ NEW/ BF00301/ BOTH/ 120

Unit 2 and 3 are operating normally and are tied to the grid. Which one of the following would occur if a DG control switch was taken to start and the output breaker was closed? (Assume the diesel generator speed setpoint is higher than grid frequency and no other operator actions were performed)

A. The speed regulator will keep lowering the fuel supply to the diesel in order to try and lower grid/DG output voltage to the governor's setpoint. The DG will trip on under voltage.

B. The zero droop governor will keep advancing the fuel supply to the diesel in order to try and raise grid/DG output frequency to the governor's setpoint. This will cause the DG to overspeed.

✓C. The zero droop governor will keep advancing the fuel supply to the diesel in order to try and raise grid/DG output frequency to the governor's setpoint. This will cause the diesel to overload.

D. The speed regulator will keep lowering the fuel supply to the diesel in order to try and lower grid/DG output frequency to the governor's setpoint. This will cause the DG to trip on reverse current.

REF: OPL171.038, Rev. 10, Page 30
SOURCE: NEW QUESTION
JMP do we want to say no other actions performed, PWS or single unit
JUSTIFICATION
Explanation:

The speed regulator senses output frequency, but now the generator output frequency is fixed by the other loads on the grid. If the diesel speed setpoint is higher than grid frequency, the zero droop governor will keep advancing the fuel supply to the diesel in order to try and raise grid/DG output frequency to the governor's setpoint. This will cause the diesel to overload. (495 amps.)

56. 262001K4.03 001/ ROT2G2/ SROT2G1/ 3.1/3.4/ C/A/ MODIFIED/ BF00301/ BOTH/ 77

On Unit 2, the operator is attempting a manual fast transfer of the 4kV Shutdown Board C normal power supply to the first alternate power supply. The following conditions are in effect:

- The Emergency Control Transfer Switch (ECTS) is in NORMAL.
- The Shutdown Board C AUTO TO MANUAL TRIP pushbutton was depressed, and the amber light extinguished.
- The alternate breaker synchronizing selector switch is in the OFF position.
- The operator is holding the alternate power supply breaker control switch in the CLOSED position.

Which one of the following describes the plant equipment response when the operator next trips the normal supply breaker?

A. A fast transfer to the alternate supply occurs.

✓B. A slow transfer to the alternate supply occurs.

C. The alternate breaker trips and Shutdown Board C is locked out.

D. The alternate breaker trips and Emergency Diesel Generator C starts and ties to Shutdown Board C.

REF: OPL171.036, Rev. 4, Page 18
0-OI-57A, Rev. 0063, Para 8.1
SOURCE: MODIFIED QUESTION
JMP
JUSTIFICATION
a. A fast transfer cannot happen because the synch switch was off.
b. (Correct)
c. The alternate breaker is interlocked with the normal breaker. As soon as the normal breaker opened, the alternate breaker received a signal to close.
d. Same as c. with or without the EDG.

57. 264000G2.1.32 001/ ROT2G1/ SROT2G1/ 3.4/3.8/ C/A/ NEW/ BF00301/ BOTH/ 135

Diesel Generator 3A is synchronized to 4KV Shut Down Board 3A. The instrumentation readings for the diesel generator are as follows:

voltage: 4160 VAC
frequency = 59.8
current = 340 amps
vars = 1600 Kvars
watts = 2585 KW

What actions are required if the diesel is expected to be operated for an extended period?

A. The operator must take the voltage regulator control switch to raise to avoid excessive stator currents.

B. The operator must take the voltage regulator control switch to lower to avoid excessive stator currents.

✓C. The operator must take the governor control switch to raise to avoid excessive field current.

D. The operator must take the governor control switch to lower to avoid excessive field current.

REF: OI-82
OPL171.038 Rev. 9, page 31
Exam bank question OPL171.038 003
SOURCE: NEW QUESTION (MEE)
ATTACHMENT: Need 3-OI-82, Illustration 1 for exam.
JMP

58. 272000K3.04 001/ ROT2G2/ SROT2G2/ 3.7/3.8/ C/A/ MODIFIED/ BF00301/ BOTH/ 81

Which one of the following describes the response of the Main Steam Line Radiation Monitoring System when a level of 3 times normal full power background radiation is reached?

A. The system will trip the mechanical condenser vacuum pump and close the condenser vacuum pump discharge valves.

B. The system will trip the mechanical condenser vacuum pump, close the condenser vacuum pump suction valves, scram the reactor, and initiate a PCIS Group 1 isolation.

✓C. The system will trip the mechanical condenser vacuum pump and close the condenser vacuum pump suction valves.

D. The system will trip the mechanical condenser vacuum pump, close the condenser vacuum pump discharge valves, scram the reactor, and initiate a PCIS Group 1 isolation.

REF: OPL171.033, Rev. 7, Page 14
SOURCE: new
JMP
JUSTIFICATION
a. Closes suction valves
b. DCN deleted the Group 1 isolation and scram.
c. Correct
d. DCN deleted the Group 1 isolation and scram. Closes suction valves

59. 286000A1.05 001/ ROT2G2/ SROT2G2/ 3.2/3.2/ C/A/ BANK/ BF00301/ BOTH/ 82

The 3B Raw Service Water (RSW) pump has automatically started to increase level in the RSW storage tanks. Subsequently, Fire Pump A receives an automatic start signal.

Which one of the following describes the response of the RSW storage tank isolation valves and the RSW pump to this situation?

A. The 3B RSW pump immediately trips. The RSW storage tank isolation valves CLOSE but will automatically REOPEN when the fire pump stops. The 1A RSW pump will automatically start if the tank level demand signal is still present.

✓B. The 3B RSW pump immediately trips. The RSW storage tank isolation valves CLOSE. When the fire pump stops, one of the isolation valves automatically REOPENS; however, the backup isolation valve must be manually REOPENED. The 1A RSW pump can then automatically start if the tank level demand signal is still present.

C. The 3B RSW pump continues running in support of the fire pump. The RSW storage tank isolation valves CLOSE, and will automatically REOPEN when the fire pump stops. When the tank is filled, the 3B RSW pump stops.

D. The 3B RSW pump continues running in support of the fire pump. The RSW storage tank isolation valves CLOSE. When the fire pump stops, the 3B RSW pump stops. Both tank isolation valves remain CLOSED until manually reopened, and normal tank level control will then resume.

REF: OPL171.049, Rev. 9, Page 42
SOURCE: BANK QUESTION
JMP
JUSTIFICATION

a. One valve, the backup, does not open.
b. (Correct)
c. With a mini-flow bypass, this would work.
d.

This distractor throws in some doubt as to whether the tank isolation valves are in series or parallel.

60. 290003K1.01 001/ ROT2G2/ SROT2G2/ 3.4/3.5/ C/A/ MODIFIED/ BF00301/ BOTH/ 83

A small break LOCA on Unit 2 results in the following plant conditions:

- Reactor water level 12 inches above instrument zero.
- Drywell pressure 2.0 psig.
- Ventilation radiation:

  Reactor building 68 mR/hr.
  Refueling Zone 35 mR/hr.
  Air inlets to Control Room 200 cpm above background.

Which one of the following statements describes the expected status of the control room ventilation system under the above conditions?

A. The normal ventilation system is operating. The control room emergency ventilation (CREV) system is supplying filtered air from the control bay.

✓B. The normal ventilation system is supplying air to the control room from the control bay supply fans.

C. The CREV system is operating, supplying filtered outside air. The normal ventilation system is isolated.

D. The CREV system is operating, supplying filtered outside air. The normal ventilation system is NOT isolated.

REF: OPL171.067, Rev. 7, Page 23
MODIFIED QUESTION
JMP
JUSTIFICATION
a.The CREV doesn't take fresh air from the control bay, whether actuated or not.
b. (Correct) None of the initiation trip setpoints were reached.
c. If initiated, this would be the status.
d. This is the status when the CREV is started from the control room.

61. 295002AA1.06 001/ ROT1G2/ SROT1G2/ 3.0/3.1/ C/A/ BANK/ BF00301/ BOTH/ 16

The following plant conditions exist:

- Reactor mode switch: STARTUP/HOT STANDBY
- Main turbine: Shell warming
- Feedwater lineup: RFP A maintaining level in single element

Which one of the following statements describes the expected sequence of actions as a condensate system leak causes condenser vacuum to decrease from 24 inches Hg Vacuum to atmospheric pressure?

✓A. The Main turbine trips, then later, the RFP turbine trips and the main turbine bypass valves close at the same time.

B. The RFP turbine trips, then later, the turbine bypass valves close, followed by a reactor scram on low condenser vacuum.

C. The RFP turbine trips and the main turbine bypass valves close at the same time, then later, the main turbine trips

D. Main turbine trips and the reactor scrams in response to the turbine trip, then later, the RFP turbine trips and main turbine bypass valves close at the same time.

REF: 2AOI473, Rev. 0010, Section 3.0
SOURCE: BANK QUESTION
JMP could someone argue C
JUSTIFICATION

a. (Correct)
b. There is no reactor scram on low main condenser vacuum.
c. A true statement at 7" Hg Vac; however, this is preceded by a main turbine trip at 21" Hg Vac.
d. The reactor won't trip on a turbine trip below 30% RTP.

62. 295003AK2.02 001/ ROT1G2/ SROT1G1/ 4.1/4.2/ MEMORY/ NEW/ BF00301/ BOTH/ 136

An accident has occurred concurrent with a partial loss of AC power on Unit 2 resulting in the following indications:

Drywell pressure	2.1 psig
RPV	-135 inches
Reactor pressure	490 psig

The diesel operator incorrectly diagnoses a loss of lube oil and initiates an emergency stop at panel 9-23. Which one of the following is required to reset the Diesel Generator Auto Start Lockout?

A. Both generator lockout relays (86 relays) AND the protective relay logic (74) must be manually reset.

B. The core spray initiation signal seal-ins on Panel 9-3 must be reset.

C. Both the core spray initiation signal seal-ins on Panel 9-3 must be reset and the DG control switch must be taken to RESET.

✓D. The DG control switch must be taken to RESET.

REF: OPL171.038, Rev. 9, Page 26
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
A. Required for loss of DC control power.
B. Raising the water level to greater than -122 allows manual reset of the core spray logic.
C. Raising the water level to greater than -122 allows manual reset of the core spray logic.
D. A lockout generated by a stop signal with a CASx or PASx locked in will automatically reset when the CASx and PASx signals clear and the seal-ins are reset. (In this case the water level) The lockout from an emergency stop of the DG from Panel 9-23 can only be reset by manually taking the DG control switch to reset.

63. 295003AK3.06 001/ ROT1G2/ SROT1G1/ 3.7/3.7/ MEMORY/ MODIFIED/ BF00301/ BOTH/ 17

The following plant conditions exist:

- The plant is operating at 100% power.
- A loss of RPS 'B' power occurs.

Which one of the following isolation valve groups will close?

A. Group 1 Isolation Valves, Inboard Only

✓B. Group 2 Isolation Valves, Outboard only

C. Group 2 Isolation Valves, Inboard and Outboard

D. Group 3 Isolation Valves, Inboard and Outboard

REF: 2AOI991, Loss of Power to One RPS Bus, Rev 16, page 2 of 6, section 3.0
2-OI-99, RPS, Rev. 39, Para 3.11
SOURCE: 1996 BFNP EXAM - changed to RPS bus B loss
JMP
JUSTIFICATION
a. Only the half-trip logic deenergizes in PCIS Group 1.
c. inboard close on loss of a
d. outboard only close on loss of B

64. 295004AK2.03 001/ ROT1G2/ SROT1G2/ 3.3/3.3/ C/A/ NRC95301/ BF00301/ BOTH/ 18

A reactor startup is in progress and reactor power is on IRM Range 7, when the operator observes the following instrument failures:

- SRM Channels A and C fail downscale.
- IRM Channels A, C, and E fail downscale.

Which one of the following power supplies would have to be lost to cause such failures?

✓A. 24 VDC Power Distribution Panel

B. 48 VDC Power Distribution Panel

C. 125 VDC Power Distribution Panel

D. 120 VAC Instrument and Control Power Distribution Panel

REF: OPL171.037, Rev 7, pg 16, EO B9
SOURCE: 1995 BFNP RO EXAM #58, new distractor b
JMP
JUSTIFICATION

a. (Correct)
b. Provides power for annunciators and communications. This is different than the 48 VDC center-tapped battery used for nuclear instruments.
c. 125 VDC power is dedicated for the EDGs.
d. 125 VAC I&C power supplies the +/-24 VDC battery chargers; however, the NIs would not go downscale until about 3 hours when the batteries discharged. The operators would be forewarned if 120 VAC was lost.

65. 295005AA2.05 001/ ROT1G1/ SROT1G2/ 3.8/3.9/ C/A/ NRC95301/ BF00301/ BOTH/ 1

Given the following plant conditions:

- Reactor power is 38% power.
- Main turbine load is 23%.
- Turbine bypass valves are partially open.
- Total main steam flow is 38%.

Which one of the following describes the response of the reactor if a main turbine trip occurs?

A. Reactor immediately scrams on turbine stop valve 10% closure.

✓B. Reactor scrams on high reactor pressure.

C. Reactor continues to operate at 38% power.

D. Reactor continues to operate and power decreases to 30%.

REF: OPL171.028, Rev. 10, Pg. 26
FSAR Section 11.5.3
SOURCE: 1995 BFNP SRO EXAM #48 modified to remove initial condition of bypass ON changed answer to b due to first stage pressure is seeing 23% so TSV scram is bypassed JMP
JUSTIFICATION

b. This would occur were if the bypass in effect.

c. The turbine bypasses do not have sufficient capacity to handle 38% power. This choice is also distracting because turbine runback occurs at >40% power mismatch.

d. 30% is the point at which the bypass normally automatically comes into effect . The turbine bypasses could handle this power level, but the reactor was producing 38% and reactor power could not be reduced quickly enough to prevent the pressure transient.

66. 295006AA2.06 001/ ROT1G1/ SROT1G1/ 3.5/3.8/ C/A/ MODIFIED/ BF00301/ BOTH/ 2

Unit 3 is operating at 100% power.

Which one of the following combinations of events will **ONLY** initiate a **half scram**signal?

A. Both MSIVs in steam lines “B” and “C” drift to less than 90% open.

B. Both MSIVs in steam lines "A" and "D" drift to less than 90% open.

✓C. PRMN voter #1 to test X relay

D. APRMs 3 and 4 trip on hi-hi flux.

REF: OPL171.028, Rev 12,
SOURCE: BANK QUESTION
JMP PRNMS changed this logic Is "D" a valid distractor
JUSTIFICATION
a. Isolating steam lines “B” and “C” does not cause a halfscram.
b. Isolating steam lines “A” and “D” does not cause a halfscram.
c. (Correct) One voter to test X or Y relay will cause an 1/2 scram
d. APRMs 3 and 4 will cause a full scram

67. 295007AK2.02 001/ ROT1G1/ SROT1G1/ 3.8/3.8/ C/A/ NEW/ BF00301/ BOTH/ 104

Unit 2 is operating at 100 % power. Reactor pressure is being controlled by Pressure Regulator A.

If Pressure Regulator A fails down scale, which one of the following lists of symptoms is likely to occur? (Assume all systems respond as designed and no operator action.)

A. Reactor pressure will increase, reactor thermal power will increase, and generator output will increase.

✓B. Reactor pressure will increase, reactor thermal power will increase, but generator output will decrease.

C. Reactor pressure will decrease, reactor thermal power will decrease, and generator output will decrease.

D. Reactor pressure will decrease, reactor thermal power will decrease, but generator output will increase.

REF: OPL171.014, Rev. 5
2-AOI-47-2, Rev. 0010, Para. 2.0
SOURCE; NEW QUESTION
JMP
JUSTIFICATION

a. Generator power will decrease as the CVs throttle down in response to the pressure regulator sensing low pressure.
b. (Correct)
c. This happens if either pressure regulator fails upscale.
d. If Rx power and pressure decreased due to an opening of the CVs, generator output would increase...for a while.

68. 295008AK2.06 001/ ROT1G2/ SROT1G2/ 3.4/3.6/ MEMORY/ BANK/ BF00301/ BOTH/ 19

The following plant conditions exist:

- The reactor has scrammed from 100% power.
- HPCI and RCIC initiated due to a drop in reactor vessel level.

Which one of the following would result in a RCIC turbine trip and the Trip Throttle Valve, FCV 71-9, remaining open? (Assume no operator action.)

A. Electrical overspeed.

B. High Turbine exhaust pressure.

C. Manual Trip.

✓D. High Reactor Vessel Water Level.

REF: OPL171.040, Rev. 14, Page 13.
SOURCE: BANK QUESTION
JMP
JUSTIFICATION

a. Electrical overspeed trips the throttle valve, but can be reset from the control room.
b. High exhaust pressure is sensed by a pressure switch which electrically trips the throttle valve.
c. Manual trip trips the throttle valve.
d. (correct) The steam supply valve FCV-71-8 isolate on high RPV level.

69. 295009AK3.01 001/ ROT1G1/ SROT1G1/ 3.2/3.3/ MEMORY/ NEW/ BF00301/ BOTH/ 4

Following a reactor feed pump trip from 100% thermal power, which one of the following reactor recirculation runback circuits seals in and must be manually reset?

✓A. 75% runback.

B. Core flow runback.

C. Mid power runback.

D. Upper power runback.

REF: OPL171.007, Rev. 18, Page 30-37 Obj. V.B.17
Obj.V.C.6
JMP
SOURCE: NEW
JUSTIFICATION

A. (Correct) will initiate an automatic runback of recirc pump speed if any individual RFP flow is < 19% AND RPV water level drops to the low level alarm setpoint (+27") The purpose of this limiter is to automatically reduce reactor power to a value within the capacity of the remaining feedwater pumps

B. is enabled (blue light lit) when total core flow is greater than 58%(approx. 60 Mlbm/hr). When manually initiated, the speed setpoint will lower until total core flow is » 58% or until rpm lowers to 575. The runback can be stopped when it is in progress by depressing the pushbutton a second time, or if an automatic runback condition occurs, the manual runback will stop./

C. is enabled (blue light lit) when total steam flow is greater than ≈10.9 Mlbm/hr (≈78.5%). When manually initiated, the speed setpoint will lower until total steam flow is less than the setpoint or until rpm lowers to 575. The runback can be stopped when it is in progress by depressing the pushbutton a second time, or if an automatic runback condition occurs, the manual runback will stop.

D. is enabled (blue light lit) when total steam flow is greater than ≈ 12.7 Mlbm/hr(≈ 90%). The steam flow signal is received from the Feedwater Level Control System.
When manually initiated, the speed setpoint will lower until total steam flow is less than the setpoint or until rpm lowers to 700. The runback can be stopped when it is in progress by depressing the pushbutton a second time, or if an automatic runback condition occurs, the manual runback will stop

70. 295010AK2.02 001/ ROT1G1/ SROT1G1/ 3.3/3.5/ MEMORY/ NRC96301/ BF00301/ BOTH/ 5

During a LOCA on Unit 3, it is determined that the drywell is in the action required region of the drywell spray initiation limit curve.

Which one of the following describes the proper use of drywell sprays in this condition?

Drywell sprays must:

A. be secured, if currently in use, to prevent exceeding the drywell/suppression chamber differential pressure limits.

B. remain in service, if currently in use, until drywell/suppression chamber differential pressure reaches -0.5 psid.

C. NOT be placed in service, if NOT currently in use, to prevent dropping below the drywell high pressure scram setpoint. If in use, drywell sprays may remain in use.

✓D. NOT be placed in service, if NOT currently in use, to prevent exceeding drywell/suppression chamber differential pressure limits. If in use, drywell sprays may remain in use.

REF: EOI Program Manual, EOIPM Section 2-VID, Rev 2, Drywell Spray Worksheet 3, page 2 of 11, section 1.1 and page 11 of 11, Figure 10.2 (DWSIL Curve)
2-EOI-2 Flowchart, Rev. 7

SOURCE: 1996 SRO EXAM #63
Change "UNSAFE" TO "ACTION REQUIRED" JMP
JUSTIFICATION

a. If the candidate does not understand that the DWSIL curve is an initiation limit, this becomes a plausible distractor.
b. 0.5 psid is a TS operating limit for the vacuum breakers implying a limit of 0.5 psid between the drywell and torus.
c. The drywell high pressure scram setpoint is an interlock associated with initiating drywell/torus spray, but is not of concern during a LOCA with drywell pressure at 12 psig and increasing.
d. (Correct)

71. 295012AA2.01 001/ ROT1G2/ SROT1G2/ 3.8/3.9/ MEMORY/ BANK/ BF00301/ BOTH/ 20

Following a LOCA, the unit operator (board) notices that drywell pressure peaked at 52 psig and drywell temperature peaked at 290 degrees.

Which one of the following describes the conclusions that can be made from this information?

A. Both drywell design pressure and temperature were exceeded.

B. Only drywell design pressure was exceeded.

✓C. Only drywell design temperature was exceeded.

D. Neither the drywell design pressure nor temperature were exceeded.

REF: OPL171.016, Rev. 10, Page 13; Enabling Objective B.2.
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
This question challenges the candidate's ability to remember when and if the drywell was outside of its design pressure and temperature, given the actuals. The choices are self-explanatory.

72. 295013AA1.02 001/ ROT1G2/ SROT1G1/ 3.9/3.9/ C/A/ NEW/ BF00301/ BOTH/ 21

Following a LOCA the following Containment characteristics exist.

Steam is condensing in the drywell and drywell pressure is steadily lowering and is approaching the external design pressure. Which one of the following has caused these conditions?

A. CS System Suction valve from CST failed open with the suction MOV from Torus open.

B. CS System Suction valve from CST failed open with the CS test valve open.

C. The torus-drywell vacuum breakers have failed open.

✓D. The torus-drywell vacuum breakers have failed closed.

REF: 2-AOI-1-1, Rev. 0021, OPL171.016, Rev. 11, Page 28,29 & 19

SOURCE: NEW
JUSTIFICATION
A. This will only add water to the suppression pool (obj V.B.12)
B. This will add water to the suppression pool
C. Steam flows from drywell to torus through vacuum breakers, equalizing pressure between the two immediately. Steam is not forced through the water of the suppression pool, so now it will operate only as a surface condenser. As a result, drywell pressure will probably exceed the design pressure. (Obj V.B.6 and V.C.5)
D. Correct answer Steam in drywell will condense and drywell pressure will lower. With vacuum breakers failed shut, pressure cannot equalize between the suppression pool and the drywell. With this condition drywell pressure may lower such that external design pressure is reached. (Obj V.B.6 and V.C.5)

73. 295014AA1.03 001/ ROT1G1/ SROT1G1/ 3.5/3.5/ MEMORY/ NRC96301/ BF00301/ BOTH/ 6

The following conditions exist:

- Reactor power is 90%.
- A control rod initially at position 24 begins to drift out.

Per 2-AOI-85-6, which one of the following is the required IMMEDIATE action?

✓A. Select and insert the control rod to position 24.

B. Insert and maintain the control rod at position 00.

C. Reduce core flow to prevent a power increase.

D. Manually scram the reactor.

REF: 2-AOI-85-6, Rev. 13, Para. 4.1
SOURCE: 1996 BFNP SRO EXAM #84
JMP
JUSTIFICATION
a. (Correct)
b. Subsequent action if rod will not latch but responds to EMERG ROD IN signal, and persists drifting out.
c. Subsequent action if the rod does not respond to INSERT signal.
d.
Subsequent action if power cannot be satisfactorily controlled with core flow.

74. 295015AK2.01 001/ ROT1G1/ SROT1G1/ 3.8/3.9/ C/A/ BANK/ BF00301/ BOTH/ 106

Unit 2 is operating at 100% power. The Unit Operator notes that three turbine stop valves have drifted to 80% open. No rod movement has occurred. You observe that the individual blue lights for each control rod on the full core display are illuminated. Also, the eight scram solenoid group indicating lights are extinguished.

Which one of the following describes the status of the RPS?

A. Both scram pilot valves have failed to open on all HCUs.

B. Only one RPS bus has deenergized.

C. Scram inlet and outlet valves have failed to open on all HCUs.

✓D. A hydraulic lock has occurred on the scram discharge volume.

REF: OPL171.005, Rev. 8, Page 25, Objective 16
OPL171.028, Rev. 7, Page 10
SOURCE: BANK QUESTION
JUSTIFICATION

a,c. The pilots had to open, because the scram inlet and outlet valves are open as indicated by the blue lights.

b. All eight RPS lights are out, therefore both busses are de-energized.

d. (Correct)

75. 295018AK3.01 001/ ROT1G2/ SROT1G2/ 2.9/3.2/ MEMORY/ NEW/ BF00301/ BOTH/ 24

Unit 3 is operating at full power with 3A and 3B RBCCW pumps running. 3B RBCCW pump trips due to an operator error. Discharge header pressure drops to 60 psig before the pump is restarted.

Which one of the following describes the response of FCV-70-48 (non-essential equipment loop Isolation valve) to the above condition?

A. FCV-70-48 will close and isolate the non-essential equipment loop. Operator action will be required to reopen the valve, which can ONLY be operated from the MCR.

B. FCV-70-48 will close and isolate the non-essential equipment loop. Operator action will be required to reopen the valve, which can ONLY be operated locally.

C. FCV-70-48 will close and isolate the non-essential equipment loop. Operator action will be required to reopen the valve from the MCR or locally.

✓D. FCV-70-48 will not close and the non-essential equipment loop will not isolate.

REF: OPL171.047, Rev. 11, page 11 of 31 objective V.B.4
SOURCE: NEW QUESTION
JMP changed supply header pressure to discharge header
JUSTIFICATION
a.The valve will not close. Operator action is only required after automatic closure
b. The valve will not close. Operator action is only required after automatic closure
c. The valve will not close. Operator action is only required after automatic closure
d. (correct) The header pressure does not reach the setpoint for non-essential loop isolation.

76. 295019AA1.03 001/ ROT1G2/ SROT1G2/ 3.0/3.0/ MEMORY/ BANK/ BF00301/ BOTH/ 25

Which one of the following correctly describes the power supplies to the motors for Control Air Compressors "A" through "D?"

A. "A" and "B" are fed from 480V Common Board #1, and "C" and "D" from 480V Shutdown Boards 1B and 2B respectively.

B. "A" and "D" are fed from 480V Common Board #1, and "B" and "C" from 480V Shutdown Boards 1B and 2B respectively.

C. "A" is fed from 480V Shutdown Board 2A, "B" from 480V Common Board #3, "C" from 480V Shutdown Board 1A, and "D" from 480V Shutdown Board 2B.

✓D. "A" is fed from 480V Shutdown Board 1A, "D" from 480V Shutdown Board 2A, and "B" and "C" from 480V Common Board #1.

REF: OPL171.054, Rev. 6, OE V.B.1.
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
The distractors are set up with an assortment of possible power sources that are incorrect. The objective is to discriminate between those candidates who know the correct power sources and those who do not.

77. 295020G2.4.4 001/ ROT1G2/ SROT1G2/ 4.0/4.3/ C/A/ BANK/ BF00301/ BOTH/ 26

During calibration of Unit 2 temperature switches on the RWCU System, 2-TIS-69-11A (NonRegenerative Heat Exchanger outlet temperature switch) was inadvertently actuated.

Which one of the following will be the response of the RWCU System?

A. The system will isolate; the RWCU pumps will remain running for 30 seconds and then trip on low flow.

B. The system will isolate; the RWCU pumps will receive a trip signal on NRHX outlet temperature >140 degrees.

✓C. The system will isolate; the pumps will trip upon isolation valve closure.

D. The system will isolate; the pumps will trip on low flow (following a 7 second time delay).

REF: OPL171.013, Rev. 8; 2-AOI-64-2a, Rev. 0017
SOURCE: BANK QUESTION
JUSTIFICATION

a. The pumps would trip in 30 seconds were it not for the closure interlock between the pumps and FCVs 69-1, 2, and 12.
b. There is only a Group 3 isolation initiated by the pressure switch at >140°F.
c. (Correct)
d. TDCN 40287 changed the 7 second time delay to 30 seconds for Unit 2 only.

NOTE: NOT SURE IF THIS K/A FITS?

78. 295021AK2.01 001/ ROT1G3/ SROT1G2/ 3.6/3.7/ C/A/ MODIFIED/ BF00301/ BOTH/ 34

Unit 2 is in Cold Shutdown for a short mid-cycle outage, when a complete loss of Shutdown Cooling occurs. Plant conditions are as follows:

- Reactor Recirculation pumps are out of service
- Reactor recirculation suction temperature is 140 degrees and slowly decreasing
- Shutdown cooling flow cannot be re-established in a timely manner

The Shift Manager has directed that RPV level be adjusted.

Which one of the following is the appropriate action and the basis for this action?

A. Verify level is 60 inches to aid in heat removal by injecting cold water.

B. Verify level is 80 inches, to provide natural circulation cooling for the reactor.

C. Verify level is 60 inches, to increase core submergence thereby preventing or minimizing localized fuel channel boiling.

✓D. Verify level is 80 inches, to reduce stratification so that more representative temperatures can be obtained to assess bulk reactor coolant temperature.

REF: 2-AOI-74-1, Rev. 0021, LOSS OF SDC, pg 6
SOURCE: MODIFIED QUESTION
we would be at 70-90 inches modified choices to read verify vice raise JMP
JUSTIFICATION

a. 60 inches is not appropriate per the AOP, though there may be some cooling with stratification.
b. Though 80 inches facilitates natural circulation, there is not a heat sink that facilitates cooling during a short mid-cycle outage.
c. 60 is an old number, and it was for the purpose of obtaining better temperatures.
d. (Correct)

79. 295023AA2.02 001/ ROT1G3/ SROT1G1/ 3.4/3.7/ MEMORY/ NEW/ BF00301/ BOTH/ 108

Operators are moving fuel assemblies within the RPV. Water level is 23½ feet above the top of the RPV flange.

Which one of the following describes the basis for a minimum RPV water level requirement during fuel handling operations according to ITS 3.9.6?

✓A. Sufficient water is necessary to retain iodine fission product activity in the water in the event of a fuel handling accident.

B. An adequate water shield thickness is necessary to protect refueling personnel from excessive radiation exposure as they perform the refueling process.

C. To keep the vessel cavity walls and other contaminated surfaces wet and under water as much as possible during the refueling process to minimize airborne contamination.

D. To provide radiation protection to refueling personnel in the event of an inadvertent criticality event while moving fuel assemblies and control rods.

REF: BFN Unit 2 Basis B 3.9.6, Rev. 0
BFN ITS LCO 3.9.6, Amendment No. 253
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
a. (Correct)
b,c,d. While the other three choices are true statements, they are not the basis of the 22-foot requirement.

80. 295024EK1.01 001/ ROT1G1/ SROT1G1/ 4.1/4.2/ MEMORY/ BANK/ BF00301/ BOTH/ 8

Which one of the following describes the basis for the Drywell Spray Initiation Limit Curve?

A. To prevent unstable steam condensation in the MSRV tailpipes from exerting excessive cyclic hydraulic loads on suppression pool structure.

✓B. To ensure that the torus to drywell delta P limit is maintained.

C. To prevent chugging in the drywell to torus downcomers from exerting excessive cyclic hydraulic loads on the suppression pool structure.

D. To ensure adequate noncondensibles remain in the drywell to prevent the torus to drywell vacuum breakers from opening during drywell steam condensation.

REF: EOI PM, Section 0-VD, Rev 0, p.75 of 244
SOURCE: BANK QUESTION
changed torus to RB vac bkr to DW to torus vac bkr JMP
JUSTIFICATION

a. Conceivably, the colder water spraying on the MSRV discharge piping could cause a water hammer effect due to steam condensing. The MSRV vacuum breakers would have to fail closed for this to credibly happen.
b. (Correct)
c. Some chugging could occur in the downcomers; however, the short length and volumetric capacity prevent this from being a concern.
d. The partial pressure of noncondensible inerting nitrogen is considered in the derivation of the DSIL curve, but is not germane to this question.

81. 295025EA1.05 001/ ROT1G1/ SROT1G1/ 3.7/3.7/ C/A/ BANK/ BF00301/ BOTH/ 9

During a plant transient on Unit 2, a Group I isolation is caused by high temperature. Five control rods fail to insert. Suppression pool level is 12 feet and suppression pool temperature is 94 degrees.

Which one of the following identifies the systems available to help maintain pressure below 1073 psig?

A. HPCI and RCIC.

✓B. RCIC and RWCU.

C. RWCU and MSL drains.

D. MSL drains and HPCI.

REF: OPL171.202, Rev. 4, Pg. 9; Obj. V.B.8
OPL171.203, Rev. 3, Pg. 13
EOIPM Section 0-V-C, Page 43 of 127
EOIPM Section 0-V-D, Page 101 of 244
SOURCE: BANK QUESTION
JMP changed radiation to temperature as cause for isolation AND 1043 TO 1073
JUSTIFICATION

a. HPCI is unavailable because SP level is below the exhaust pipe (12.75').
b. (Correct)
c. With the knowledge that a Group I isolation is in effect, the operator should know that this is an MSIV isolation, and as such, the MSL drains are isolated.
d. Neither HPCI nor the MSL drains are available as discussed above.

82. 295026EK3.04 001/ ROT1G2/ SROT1G1/ 3.7/4.1/ MEMORY/ BANK/ BF00301/ BOTH/ 28

Unit 3 is in an ATWS condition and EOI-2 (Primary Containment Control) has been entered.

Which one of the following describes the reason for injecting SLC prior to suppression pool temperature exceeding 110 degrees?

A. To ensure that "power chugging" does not occur within the reactor vessel during subsequent use of the MSRVs.

B. To ensure that hot shutdown boron weight is adequate to maintain the reactor subcritical under all hot shutdown conditions.

✓C. To ensure the reactor is subcritical prior to leaving the safe area of the heat capacity temperature limit curve.

D. To ensure the reactor is subcritical prior to leaving the safe area of the pressure suppression pressure curve.

REF: EOIPM Section 0-V-D, Rev. 0, Page 87 of 244
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
The purpose of this question is to ensure the operators understand that the heat capacity temperature limit may be exceeded if the reactor is allowed to remain critical with the suppression pool average temperature at or above 110 degrees.

83. 295028EA2.03 001/ ROT1G2/ SROT1G2/ 3.7/3.9/ MEMORY/ BANK/ BF00301/ BOTH/ 118

Unit 2 has just experienced a small LOCA. Drywell pressure is 3 psig and increasing. Reactor pressure is 800 psig and steady. The increasing drywell temperature causes the most reliability concerns for which one of the following level instruments?

A. Emergency Range indicators.

B. Normal Range indicators.

C. Post Accident indicators.

✓D. Shutdown Flood-up indicator.

REF: EOIPM Section IIB, Rev. 2, Operator Cautions, page 4
OPL171.003, Rev. 12
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a,b,c. These three instruments do not have a specified minimum indicated level associated with maximum DW run temperatures. See EOP Caution #1.
d. (Correct)

84. 295029EK2.05 001/ ROT1G2/ SROT1G2/ 3.1/3.3/ C/A/ NRC95301/ BF00301/ BOTH/ 30

During an accident on Unit 2, suppression pool water level reaches 18 feet and continues to increase. Reactor pressure is 300 psig and decreasing.

Which one of the following containment components will NOT properly function at this point?

A. Normal control room suppression pool level instrumentation.

✓B. Suppression Chamber-to-Drywell vacuum breakers.

C. Suppression chamber spray nozzles.

D. MSRV tail pipes and/or supports.

REF: EOI PM, SEC 0-V-D, Rev. 0, pg 111
OPL171.203, Rev 3, pg 13, EO B7.b
SOURCE: 1995 BFNP RO EXAM #73, new distractor d
check eoi handout*
JUSTIFICATION
a. Ceases to function at 20 ft.
b. Correct (Ceases to function at 18 ft)
c. Ceases to function at 26 ft.
d. Ceases to function at 20 ft. per Curve 4

85. 295030EK1.01 001/ ROT1G2/ SROT1G1/ 3.8/4.1/ MEMORY/ BANK/ BF00301/ BOTH/ 31

Which one of the following is the MINIMUM suppression pool level at which the drywell-to-torus downcomers will be covered?

A. 9.75 feet.

B. 10.75 feet.

✓C. 11.75 feet.

D. 12.75 feet.

REF: EOI Program Manual, Section 0VD, Rev. 0, page 105, and Section 3-IV, Rev. 4, Curve 7.
OPL171.203, Rev. 3, Page 13.
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. This is the level at which HPCI turbine exhaust is uncovered.
b. No significance to this number.
c. (Correct) See Curve 7.
d. No significance to this number.

86. 295031EK3.05 001/ ROT1G1/ SROT1G1/ 4.2/4.3/ C/A/ NEW/ BF00301/ BOTH/ 10

During an ATWS, conditions develop which require Emergency Depressurization.

Which one of the following describes the minimum number of Main Safety Relief Valves (MSRVs) required for Emergency Depressurization, and the basis for this number?

A. 6 ADS MSRVs, to reliably depressurize the reactor vessel as rapidly as possible, and to uniformly distribute the heat load to the suppression pool.

B. 6 MSRVs, which, if opened, will remove all decay heat from the core at a pressure sufficiently low that ECCS with the lowest head will be capable of making up for MSRV steam flow.

C. 4 ADS MSRVs, the least number of the most reliable MSRVs that correspond to a minimum alternate RPV flooding pressure sufficiently low that ECCS with the lowest head will be capable of making up MSRV steam flow.

✓D. 4 MSRVs, which, if opened, will remove all decay heat from the core at a pressure sufficiently low that ECCS with the lowest head will be capable of making up MSRV steam flow.

REF: EOIPM Section 0-V-H, Rev. 0, Page 23 of 40
SOURCE: NEW QUESTION
HELP does this question discriminate a competent operator
JUSTIFICATION

a. 6 ADS MSRVs are preferred because they are of the best quality and should be more reliable; however, 6 is not the minimum.
b. 6 MSRVs are the second choice, but are not the minimum.
c. 4 is the minimum, but not necessarily from ADS.
d.

(Correct)

87. 295032G2.4.4 001/ ROT1G3/ SROT1G2/ 4.0/4.3/ MEMORY/ BANK/ BF00301/ BOTH/ 150

EOI-3, Secondary Containment control is being executed due to an unisolable RCIC steam line break in the reactor building. EOI-3 requires that EOI-1, RPV Control be entered and executed concurrently before which one of the following occur.

A. Any area temperature reached the maximum normal operating temperature.

B. Reactor zone ventilation exhaust reached 72 mr/hr.

✓C. Any area radiation level reached the maximum safe operating level.

D. At least two area temperature reached the maximum normal operating temperature.

REF: OPL171.039, Rev. 9, Page 12
SOURCE: BANK QUESTION OPL171.204 010
JMP

88. 295036EK3.03 001/ ROT1G3/ SROT1G2/ 3.5/3.6/ MEMORY/ BANK/ BF00301/ BOTH/ 37

The plant is operating at full power. The Reactor Building assistant unit operator reports there is about 6 inches of water accumulating on the floor in the RHR Room, SE area, and it appears to be from floor drains backing up.

Which one of the following is the first action the control room operators should taken in accordance with the EOIs?

✓A. Operate all available sump pumps to maintain the sump water level to less than 66 inches.

B. Enter EOI-1 and scram the reactor before RHR Room water level reaches 20 inches.

C. Isolate all systems discharging into the RHR Room, except those required for safe shutdown of the reactor.

D. Initiate a controlled shutdown of the reactor per 2-GOI-10012A.

REF: EOI-1, Rev. 4; EOI-3, Rev. 6
OPL171.204, Rev. 3, Page 10, EO V-B-3
EOIPM, Section 0-V-E, Page 37+
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a. (Correct)
b. This is only applicable if a primary system is discharging into the room andthey cannot keep the room water level below 20 inches.
c. By procedure, the operators are required to establish that they cannot keep the sump level below 66 inches.
d. By procedure, the operators are required to determine that a primary system is not discharging into the area, and two pump rooms cannot be maintained below 20 inches water level.

89. 295037G2.4.6 001/ ROT1G1/ SROT1G1/ 3.1/4.0/ MEMORY/ NRC96301/ BF00301/ BOTH/ 11

The following conditions exist:

An ATWS has occurred.
Reactor water level is being lowered in accordance with C-5, Level/Power Control.
SLC has been initiated.

Which one of the following conditions would require RPV level to be restored to normal?

✓A. SLC Tank level drops to 41%.

B. SLC Tank level drops to 48%.

C. Reactor power drops below 5%.

D. All MSRVs remain closed with drywell pressure below 2.4 psig.

REF: C5, Rev. 7, Step, C5-17
SOURCE: 1996 BFNP RO EXAM #84
2c5 to C5 CHANGED VALUES OF SLC TANK LEVEL DUE TO REV. CHANGED ANSWER AND REF JMP
JUSTIFICATION

a. CORRECT
b. 43% is the SLC tank level at which C-5 restores water level.
c. 5% power and above is one criterion to initiate SLC.
d. If all MSRVs remain closed and drywell pressure is below 2.4 psig, one criterion is satisfied to get to the point of restoring level.

90. 300000K2.01 001/ ROT2G2/ SROT2G2/ 2.8/2.8/ C/A/ MODIFIED/ BF00301/ BOTH/ 84

Given the following switch positions for the control air compressors.

A - second lead
B - third lead
C- standby
D- standby
G-lead

- A loss of Common Board 1 occurs
- A small system leak causes control air pressure to drop to drop to 94 psig

Which one of the following describes all of expected control air compressors expected to be in operation?

A. G will be running at full load. A will be running at half load

B. G will be running at full load. B will be running at half load.

C. A and G will be running at full load. C will be running at half load.

✓D. A, and G will be running at full load. D will be running at half load.

REF: OPL171.054, Rev. 6.
SOURCE: MODIFIED QUESTION
JMP
JUSTIFICATION
B and C are powered from #1 Common Board
First pump comes on at half load at 97.5
First pump goes to full load at 96
Second pump goes to half load at 94.5

91. 500000EA2.03 001/ ROT1G1/ SROT1G1/ 3.3/3.8/ C/A/ BANK/ BF00301/ BOTH/ 12

Due to an accident condition, the following plant parameters exist:

- Drywell Hydrogen	5.4%
- Drywell Oxygen	6.0%
- Suppression Chamber Hydrogen	4.0%
- Suppression Chamber Oxygen	5.5%
- Suppression Pool Level	17 feet
- Drywell temperature	250 degrees
- Drywell Pressure	18 psig
- RPV Level	+30 inches
- Torus and Drywell Sprays are in service	

Which one of the following actions is required?
(Reference attached)

A. Perform Appendix 9 to determine and monitor Suppression Pool water level.

B. Stop Drywell Sprays.

✓C. Perform Appendix 14A, Nitrogen Make-up, to control containment hydrogen and oxygen levels.

D. Perform Emergency Depressurization.

REF: OPL171.203, Rev. 3, Page 15. Obj. V.B.14
Dwg. 2-EOI-2, Rev. 4, Page 2 of 2.
EOIPM Section 0-V-D, PC/H, Rev. 0
SOURCE: BANK QUESTION
REPLACE JMP
JUSTIFICATION
a.EOI-2 initiates CAD to the DW only.
b.EOI-2 initiates CAD to the DW only and sprays the SP.
c.(Correct)
d.Emergency Depress is an incorrect option under the existing conditions, per EOI-2.

NOTE; NOT EXACTLY SURE WHAT THE SUPPLIED REFERENCES SHOULD BE?

92. G2.1.1 001/ ROT3/ SROT3/ 3.7/3.8/ MEMORY/ NEW/ BF00301/ BOTH/ 145

Which one of the following positions represents the minimum level of approval required to make a currently approved operator aid permanent?

A. Site Engineering Labeling Coordinator.

B. Shift Manager.

✓C. Operations Superintendent.

D. Plant Manager.

REF: SSP-12.53, Revision 17, Section 3.10.2, page 11 of 38
SOURCE: NEW QUESTION
JMP IS THIS DISCRIMINATING A COMPETENT OPERATOR
A. requires coordination of labeling, but not approval
B. Can approve the aid, but not make it permanent.
C. Correct
D. This is not the minimum level

93. G2.1.29 001/ ROT3/ SROT3/ 3.4/3.3/ MEMORY/ BANK/ BF00301/ BOTH/ 92

Which one of the following choices describes the method used for verifying the position of a locked and throttled valve?

A. Remove the locking device, carefully close the valve counting the number of turns, then reopen the valve the same number of turns. Reapply a locking device to the valve and record the as left position.

B. Place "NA" in the verification signature space for this valve. Locked and/or throttled valves cannot be independently verified without disturbing the position.

C. Since the valve is already locked, the valve may be assumed to be throttled in the correct position. The verification may be signed off as complete.

✓D. Independent verification of this valve cannot be performed. Second party verification must be performed during initial valve positioning.

REF: OPL171.071, Rev. 10, EO B.20
SPP-10.3, Rev. 0, Para 3.3.1.E
SOURCE: BANK QUESTION
JMP Changed the reference
JUSTIFICATION
a. Incorrect because the action becomes an initial positioning again.
b. "NA" is contrary to the SSP. Second party verification is required.
c. Verification by assumption is incorrect.
d. (Correct)

94. G2.2.13 001/ ROT3/ SROT3/ 3.6/3.8/ MEMORY/ BANK/ BF00301/ BOTH/ 94

Unit 2 is in a refueling outage and RHR Pump 2A is tagged to replace the pump seal. Electrical Maintenance has determined that the motor must be replaced on the pump minimum flow valve which is part of the RHR Pump 2A clearance boundary.

Which one of the following statements describes how this additional work affects the clearance boundary?

A. The valve operator must have a collar installed to prevent motion before the clearance boundary can be modified.

B. The Shift Manager Representative can modify the clearance boundary with concurrence from the Maintenance Shift Supervisor.

C. All work under the clearance must be stopped while the clearance is modified and reissued.

✓D. An operator must be assigned to independently verify component positioning and tag replacement.

REF: OPL171.086, Rev. 8, Page 9
SSP-12.3, Rev. 26, Para 3.2.5.(9)
SOURCE: BANK QUESTION
Help*
JUSTIFICATION

a. Not a requirement of SSP-12.3
b. The SMR reviews and approves proposed changes, but cannot unilaterally modify the clearance with or without the Maint. Supv. concurrence. The process must be followed.
c. Work can continue in unaffected areas of the existing clearance.
d. (Correct)

95. G2.2.3 001/ ROT3/ SROT3/ 3.1/3.3/ MEMORY/ NEW/ BF00301/ BOTH/ 93

Which one of the following choices correctly describes the response of the Unit 2 and Unit 3 reactor recirculation pump (RRP) speed control to an increase in core differential pressure?

✓A. Both Unit 2 RRP and Unit 3 will automatically reposition the scoop tube to bring speed back to the setpoint.

B. Unit 2 will automatically reposition the scoop tube to bring speed back to the setpoint but on Unit 3 the RRP speed must be manually adjusted by the operator.

C. On Unit 2 the RRP speed must be manually adjusted by the operator but Unit 3 will automatically reposition the scoop tube to bring speed back to the setpoint.

D. Both Unit 2 and Unit 3 must be manually adjusted by the operator to bring speed back to the setpoint.

REF: OPL171.007, Rev. 15, Page 36
OPL171R007, Rev. 0, Page 11
SOURCE: NEW QUESTION
replace question*
JUSTIFICATION
Unit 2 and 3 speed feedback are enabled.

96. G2.2.30 001/ ROT3/ SROT3/ 3.5/3.3/ C/A/ BANK/ BF00301/ BOTH/ 96

While off-loading fuel bundles from the reactor, fuel pool level begins to decrease uncontrollably.
Which one of the following describes a method available from the control room to add water to the fuel pool?

A. Align fuel pool cooling and cleanup heat exchanger RBCCW supply to the fuel pool to maintain level.

✓B. Start a condensate pump and inject to the reactor vessel to maintain fuel pool level.

C. Open emergency makeup supply valve from EECW to the fuel pool to maintain level.

D. Gravity drain the CST, to the main condenser hotwell, then inject to the reactor vessel with condensate booster pumps.

REF: 2-AOI-78-1, Rev 0014, Para 4.2.2.3
2-ARP-9-4C, Rev. 0012, Page 2.
2-OI-78, Rev. 0040, Page 38
SOURCE: BANK QUESTION
JMP
JUSTIFICATION
a,c,d. These options are partially done from outside the control room.
b.
(Correct) Since the fuel pool to RPV gates are open, this is the simplest method, and can be done from the control room.

97. G2.3.10 001/ ROT3/ SROT3/ 2.9/3.3/ C/A/ NEW/ BF00301/ BOTH/ 149

Given the following conditions at a work site.

Airborne activity: 3 DAC
Radiation level: 40 mr/hr
Radiation level with shielding: 10 mr/hr
Time to place shielding: 15 minutes
Time to conduct task with respirator: 1 hour
Time to conduct task without respirator: 30 minutes

Assume the following:

- the airborne dose with a respirator will be zero.
- a dose rate of 40 mr/hr will be received while placing the shielding.
- all tasks will be performed by one worker.
- shielding can be placed in 15 minutes with or without a respirator.

Which one of the following would result in the lowest whole body dose?

A. Place shielding while wearing respirator and conduct task with respirator.

✓B. Place shielding while wearing respirator and conduct task without respirator.

C. Conduct task with respirator and without shielding.

D. Conduct task without respirator or shielding.

REF: 10 CFR 20
SOURCE: NEW QUESTION
HELP*
JUSTIFICATION
3 DAC x 2.5 mr/DAC X 0.5 hours = 3.75 mr
a. 10 mr placing shielding, 10 mr conducting task, zero airborne = 20 mr
b. 10 mr placing shielding, 5 mr conducting task, 3.75 mr airborne = 18.75 mr
c. 40 mr conducting task, zero airborne = 40 mr
d. 20 mr conducting task, 3.75 mr airborne = 23.75 mr

98. G2.3.9 001/ ROT3/ SROT3/ 2.5/3.4/ C/A/ BANK/ BF00301/ BOTH/ 98

Unit 2 startup is in progress with the reactor at 920 psig and 6% power. The Reactor Mode Switch is in STARTUP. Primary containment is being inerted with the purge filter fan in service.

Which one of the following statements is correct concerning inerting in this plant condition?

A. Turning the purge filter fan off will automatically close the drywell and suppression chamber exhaust valves.

✓B. Placing the Reactor Mode Switch in RUN will automatically close all valves required for inerting with the purge filter fan unless Bypass switches are placed in BYPASS on panel 9-3.

C. Placing the Reactor Mode Switch in RUN will give a Group 6 PCIS unless Bypass switches are placed in BYPASS on panel 9-3.

D. Placing the Reactor Mode Switch in RUN will automatically close the drywell and suppression chamber exhaust isolation valves unless the Drywell/Suppression Chamber Train A/B Vent keylock switches are positioned to DRYWELL.

REF: OPL171.032, Rev. 7.
SOURCE: BANK QUESTION
JMP

99. G2.4.14 001/ ROT3/ SROT3/ 3.0/3.9/ C/A/ BANK/ BF00301/ BOTH/ 100

EOI-1, RPV Control, is being executed following a scram due to a turbine trip at high power. During the initial phase of the transient, one of the SRV's stuck open. Suppression pool temperature has now (approximately 7 minutes after the turbine trip) reached 96 degrees.

Which one of the following states the Unit Supervisor's procedural response to this condition?

A. Re-enter EOI-1 at the beginning.

B. Re-enter EOI-1 at the beginning and simultaneously enter EOI-2.

✓C. Continue in EOI-1 and simultaneously enter EOI-2.

D. Continue in EOI-1.

REF: OPL171.201, Rev. 4, EO B.4
SOURCE: BANK QUESTION
JMP TYPOS EOI1 TO EOI-1
JUSTIFICATION
a. EOI-1 doesn't direct the operator to reenter EOI-1.
b. Same as (a) except entering EOI-2 is correct at SP temp >95 degrees.
c. (Correct)
d. Continuing in EOI-1 is correct; however EOI-2 must be entered.

100. G2.4.32 001/ ROT3/ SROT3/ 3.3/3.5/ C/A/ NEW/ BF00301/ BOTH/ 101

During a plant startup on Unit 3, reactor power was passing through 80% RTP when there was a loss of power to the control room annunciators. Thirty minutes have passed, and power has not yet been restored. SPDS and ICS are available.

Which one of the following describes the required control room operators' response?

A. Commence a reactor shutdown, dispatch personnel for local monitoring of equipment.

B. Scram the reactor manually, dispatch personnel to monitor and manipulate plant equipment in response to the scram.

✓C. Suspend the power ascension and avoid any system manipulation, dispatch personnel for local monitoring of equipment.

D. Expedite maintenance activities to restore power while slowly continuing the ascension to full power, monitor equipment with SPDS and ICS.

REF: 0-AOI-57-8, Rev. 0007, 4.2 (Caution)
EPIP-1, Rev. 21, Section 8.0
SOURCE: NEW QUESTION
JMP
JUSTIFICATION
a. d. The AOI requires avoidance of system manipulation
b. Scramming the reactor places the plant in a major transient, which should be avoided
c. (Correct)