HARRIS 2020 NRC SCENARIO 1

Facility: Harris Nuclear Plant Scenario No.: 1 Op Test No.: 05000400/2020301

Examiners: ____________ Operators: SRO: ____________

____________ RO: ____________

____________ BOP: ____________

Initial Conditions: IC-26 MOL, 88% power

- ‘B’ MDAFW Pump is under clearance for pump packing repairs
- 1SI-3 Out Of Service
- ‘B’ DEH Pump Out of Service

Turnover:	The plant is at 88% power, middle of core life. GP-006 step 10 to Adjust MS Flow to HP Turbine per OP-131.04 Section 8.6 as applicable
Critical Task:	• Manually align at least one high head ECCS pump flow path to prevent RVLIS Dynamic Range Level from lowering below 60% • Depressurize the RCS to minimize primary to secondary leakage to prevent SG ‘C’ exceeding 95% level

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – RO/SRO N – BOP/SRO	Power reduction from 88% power
2	crf14b	C – RO/SRO	Control rods fail to move in Auto - continue down power with rods in manual (AOP-001)
3	lt:112	I – RO/SRO	Failure of VCT LT-112 to 100%, which will full divert letdown to RHT (AOP-003)
4	hva011 z3274tib	C – BOP/SRO TS – SRO	Trip of running AH-85C fan, standby fails to Auto Start
5	pt:2307	I – BOP/SRO	MFW Pump Suction Pressure to CBP controller failure
6	sgn05c	C – RO/SRO TS – SRO	'C' Steam Generator Tube Leak (AOP-016)
7	sgn05c	M – ALL	'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0 and EOP-E-3)
8	zrpk603a	C – BOP/SRO	Relay failure on resultant SI signal K603A
9	zdsq2:6b jpb9101b	C – RO/SRO	‘B’ ESW Pump fails to auto start on SI

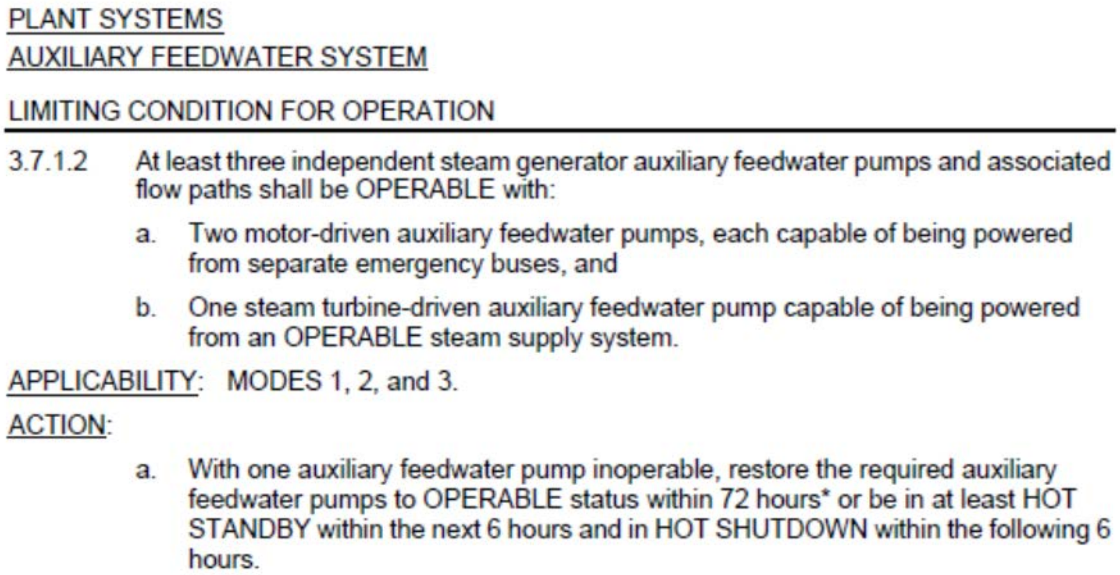
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1

The plant is at 88% power, middle of core life. Due to the ‘B’ MDAFW pump LCO expiring, a normal shutdown in accordance with GP-006, Normal Plant Shutdown From Power Operation To Hot Standby (Mode 1 To Mode 3) is in progress as directed by plant management. It is to continue after shift turnover at 4 MW / minute.

The following equipment is under clearance:

- MDAFW Pump B-SB is under clearance for pump packing repairs. The pump has been inoperable for 68 hours and cannot be restored to operable status. Tech Spec 3.7.1.2 Action **a** and Tech Spec 3.3.3.5.b Action **c** applies.



PLANT SYSTEMS
AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

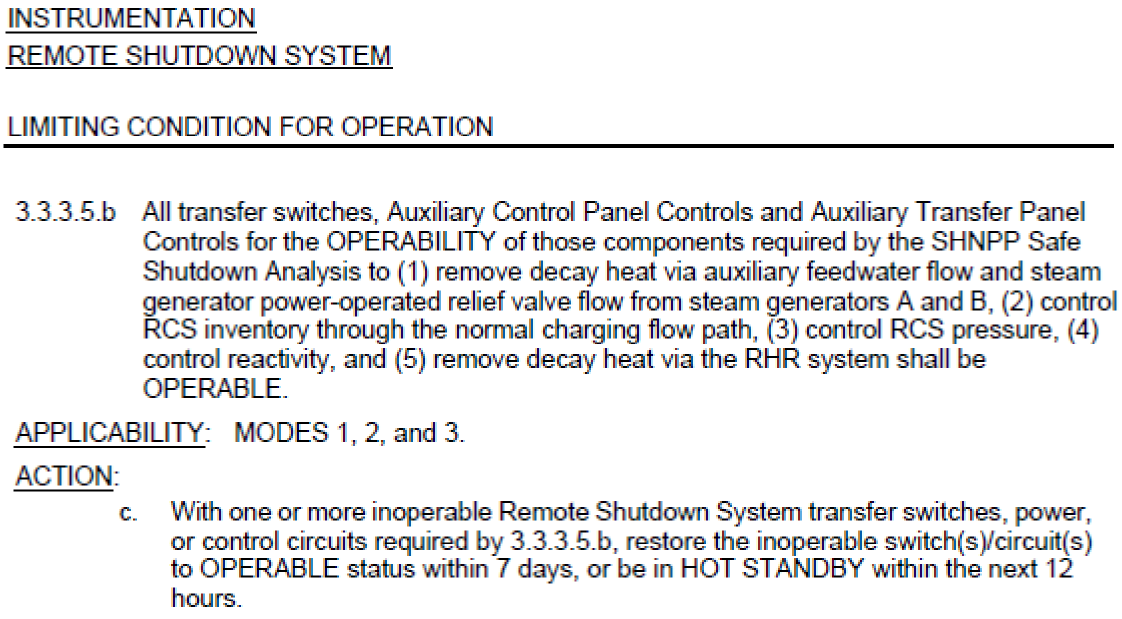
a. Two motor-driven auxiliary feedwater pumps, each capable of being powered from separate emergency buses, and

b. One steam turbine-driven auxiliary feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one auxiliary feedwater pump inoperable, restore the required auxiliary feedwater pumps to OPERABLE status within 72 hours* or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.



INSTRUMENTATION
REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

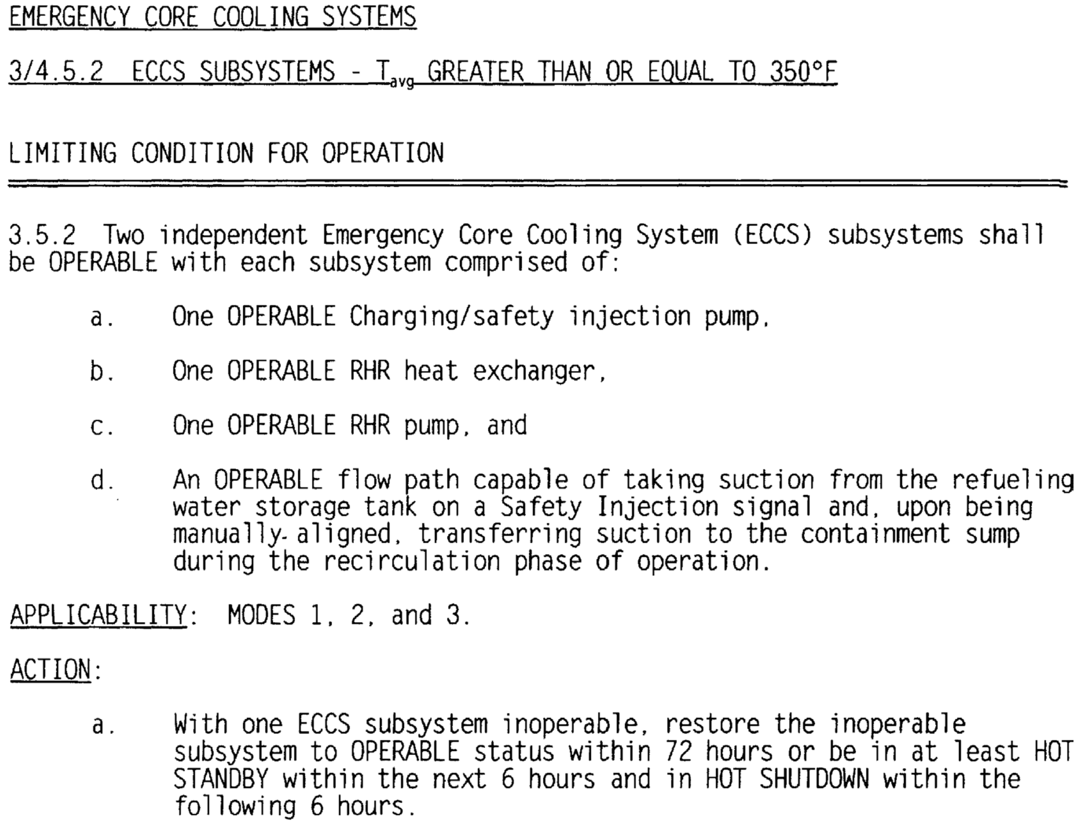
c. With one or more inoperable Remote Shutdown System transfer switches, power, or control circuits required by 3.3.3.5.b, restore the inoperable switch(s)/circuit(s) to OPERABLE status within 7 days, or be in HOT STANDBY within the next 12 hours.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1 continued

The following equipment is under clearance (continued):

- ‘B’ DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours.

- 1SI-3, Boron Injection Tank Outlet valve has been under clearance the last 12 hours for breaker repairs. The repairs are close to completion and the valve is expected to be returned to service within the next hour. The valve is currently shut with power removed. OWP-SI-01 has been completed. Tech Specs 3.5.2 Action **a** and Tech Specs 3.6.3 applies.



EMERGENCY CORE COOLING SYSTEMS

3/4.5.2 ECCS SUBSYSTEMS - T_{avg} GREATER THAN OR EQUAL TO 350°F

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent Emergency Core Cooling System (ECCS) subsystems shall be OPERABLE with each subsystem comprised of:

a. One OPERABLE Charging/safety injection pump,

b. One OPERABLE RHR heat exchanger,

c. One OPERABLE RHR pump, and

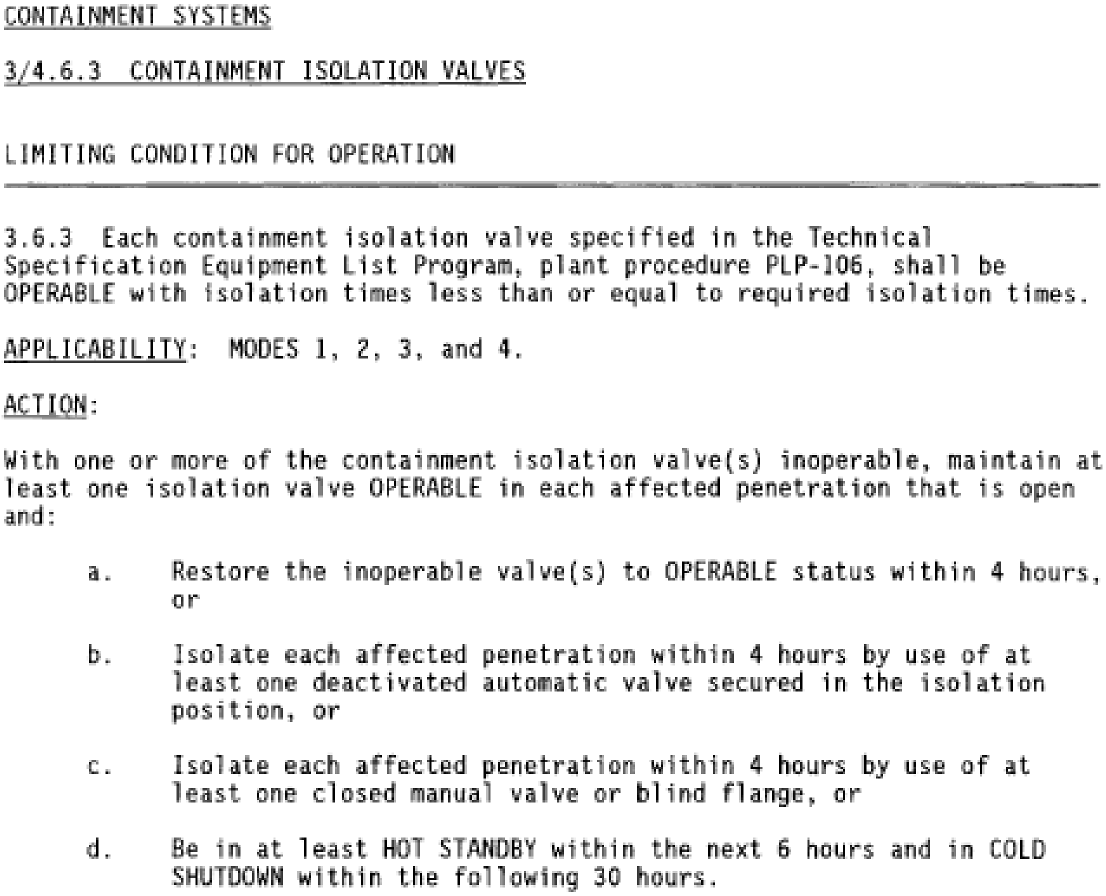
d. An OPERABLE flow path capable of taking suction from the refueling water storage tank on a Safety Injection signal and, upon being manually aligned, transferring suction to the containment sump during the recirculation phase of operation.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1 (Continued)



CONTAINMENT SYSTEMS

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve specified in the Technical Specification Equipment List Program, plant procedure PLP-106, shall be OPERABLE with isolation times less than or equal to required isolation times.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With one or more of the containment isolation valve(s) inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and:

a. Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

b. Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

c. Isolate each affected penetration within 4 hours by use of at least one closed manual valve or blind flange, or

d. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1 (Continued)

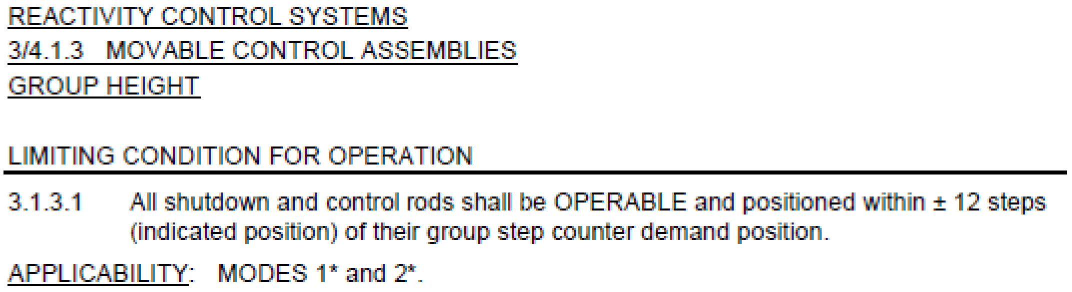
Event 1: Plant Shutdown (GP-006). Turnover takes place with the unit at 88% Reactor power. The crew will be given credit for a reactivity manipulation during the down power.

Verifiable Action: It is expected that the SRO will conduct a reactivity brief, the RO will borate and monitor auto rod insertion per the reactivity plan. The BOP will operate the TCS Load control to adjust the Turbine ramp rate from 1 GVPC units to 4 GVPC units per minute then ensure the controls are set correctly to lower power. After power is reduced 3% - 5% and the crew has demonstrated that they have control of the plant during a shutdown Event 2 is pre- inserted and will be identified once the T_{avg}/T_{ref} mismatch is greater than 2°F.

Event 2: Control rods fail to move in Auto. T_{avg}/T_{ref} recorder TR-408 along with ERFIS quick plot Tave will provide indication of the T_{avg}/T_{ref} mismatch. If the crew allows the mismatch to reach +/- 5°F ALB 010-6-4B, RCS Tref/Tavg High-Low, will alarm.

Verifiable Action: The crew will enter AOP-001 and carry out the immediate actions. The RO will perform the immediate actions of AOP-001 by verifying that <2 rods are dropped (no rods have dropped), place Rod Control in MANUAL and then verify no rod motion. Once the immediate actions are complete the BOP should place the Turbine in Hold it stabilize the plant. With concurrence from the SRO the RO will restore T_{avg} to match T_{ref} by inserting the rods in manual.

The SRO should evaluate Tech Spec 3.1.3.1, Reactivity Control Systems- Movable Control Assemblies - Group Height and 3.1.3.5, Reactivity Control Systems- Shutdown Rod Insertion Limit both conditions are satisfied based on AOP-001 Attachment 5.

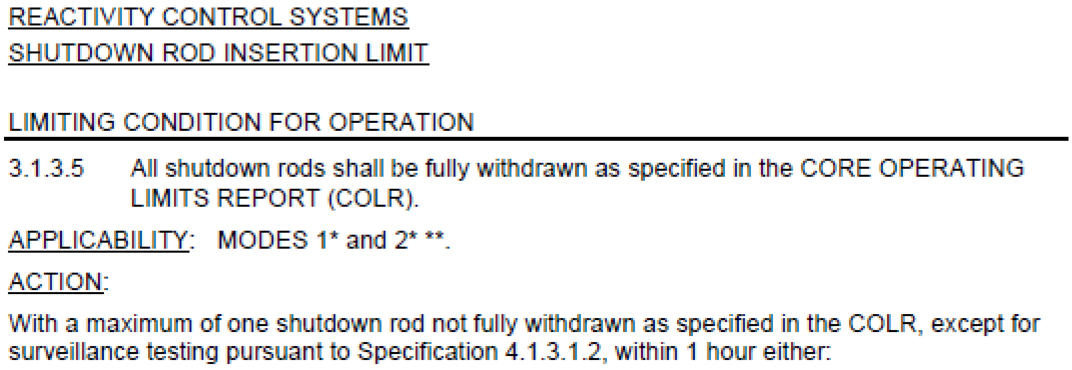


REACTIVITY CONTROL SYSTEMS
3/4.1.3 MOVABLE CONTROL ASSEMBLIES
GROUP HEIGHT

LIMITING CONDITION FOR OPERATION

3.1.3.1 All shutdown and control rods shall be OPERABLE and positioned within ± 12 steps (indicated position) of their group step counter demand position.

APPLICABILITY: MODES 1* and 2*.



REACTIVITY CONTROL SYSTEMS
SHUTDOWN ROD INSERTION LIMIT

LIMITING CONDITION FOR OPERATION

3.1.3.5 All shutdown rods shall be fully withdrawn as specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODES 1* and 2* **.

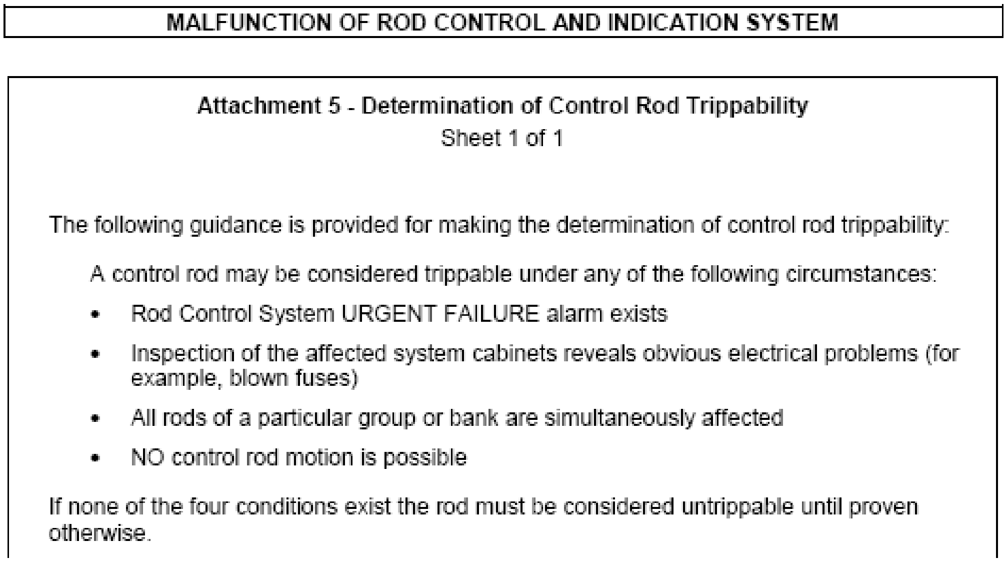
ACTION:

With a maximum of one shutdown rod not fully withdrawn as specified in the COLR, except for surveillance testing pursuant to Specification 4.1.3.1.2, within 1 hour either:

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1 (Continued)

Event 2: Tech Spec evaluation continued

AOP-001 Attachment 5



MALFUNCTION OF ROD CONTROL AND INDICATION SYSTEM

Attachment 5 - Determination of Control Rod Trippability

Sheet 1 of 1

The following guidance is provided for making the determination of control rod trippability:

A control rod may be considered trippable under any of the following circumstances:

- Rod Control System URGENT FAILURE alarm exists
- Inspection of the affected system cabinets reveals obvious electrical problems (for example, blown fuses)
- All rods of a particular group or bank are simultaneously affected
- NO control rod motion is possible

If none of the four conditions exist the rod must be considered untrippable until proven otherwise.

The SRO should provide a temperature band of +/- 5°F to the RO in accordance with OMM-001, Attachment 11, Control Bands And Administrative Limits. The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 3: Failure of VCT LT-112 to 100% which will full divert letdown to RHT. ALB 007-5-5, Computer Alarm Chem & Vol Systems, will alarm due to LT-112 being greater than 75%. If the crew allows actual level on LT-115 to reach 20% an auto makeup from the Reactor Makeup System will occur.

Verifiable Action: The crew will respond by entering AOP-003 which has NO immediate actions. A failure of LT-112 high will cause 1CS-120, Letdown VCT/Hold Up Tank valve to shift to the Hold Up Tank. The RO will have to return the MCB switch to the VCT position. Since VCT level has failed HIGH auto CSIP suction switch over on 5% VCT level to the RWST will not occur until Maintenance has lifted the leads associated with LT-112. The operator will have to monitor VCT level and communicate with Maintenance to resolve this failure.

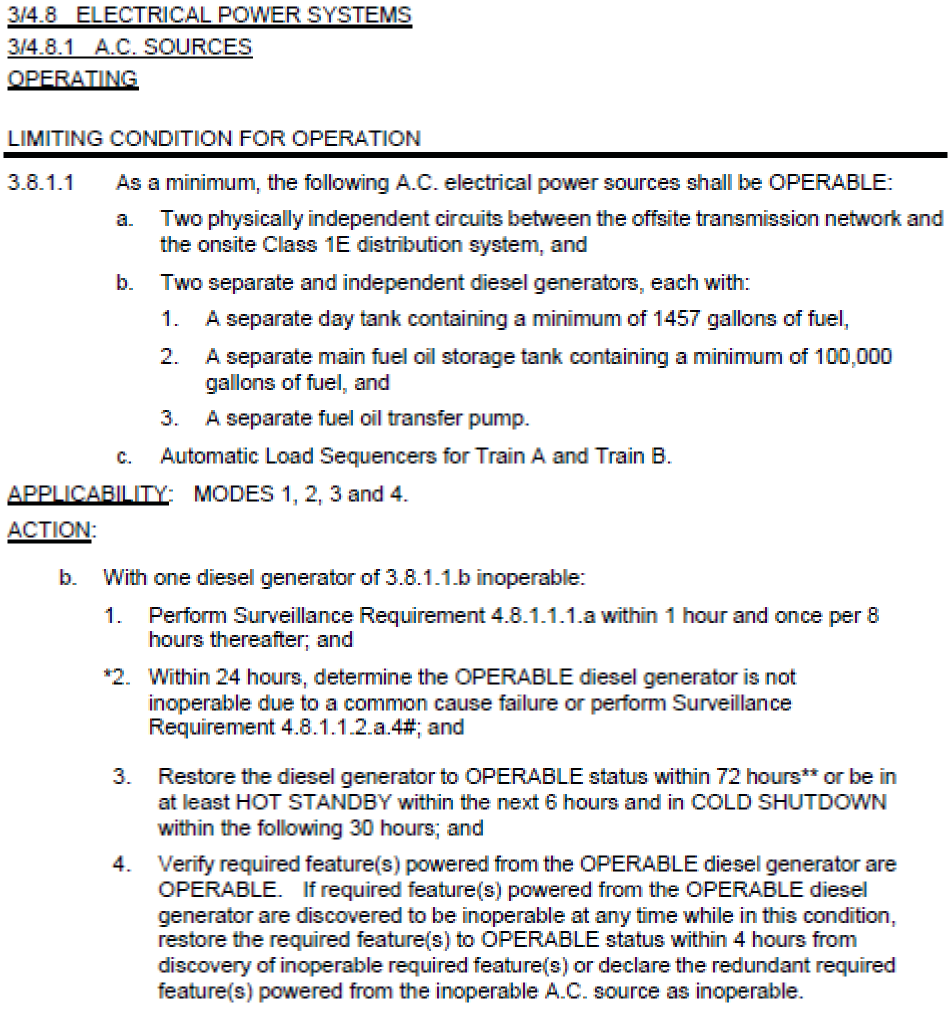
The SRO should provide a level band of 20 to 70% to the RO in accordance with AOP-003, Section 3.1, Step 4 RNO. The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1 (Continued)

Event 4: Trip of running AH-85C fan, standby fails to Auto Start. This will cause the running Diesel Generator electrical equipment room supply fan AH-85 1C-SB. ALB 027-1-4, Diesel Gen Elec Equip Rm Sup Fans AH-85 Low Flow – O/L, will alarm and the standby fan AH-85 1D-SB fails to automatically start.

Verifiable Action: The BOP should identify that the auto start feature of the standby AH-85 1D-SB has failed. The crew will use the APP-ALB 027 to start the standby fan AH-85 1D-SB.

The SRO should evaluate Tech Spec 3.8.1.1, Electrical Power Systems - AC Sources – Operating and 3.3.3.5.b, Instrumentation - Remote Shutdown System Action: **b** and **c** respectively.



3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system, and
- b. Two separate and independent diesel generators, each with:
  - 1. A separate day tank containing a minimum of 1457 gallons of fuel,
  - 2. A separate main fuel oil storage tank containing a minimum of 100,000 gallons of fuel, and
  - 3. A separate fuel oil transfer pump.
- c. Automatic Load Sequencers for Train A and Train B.

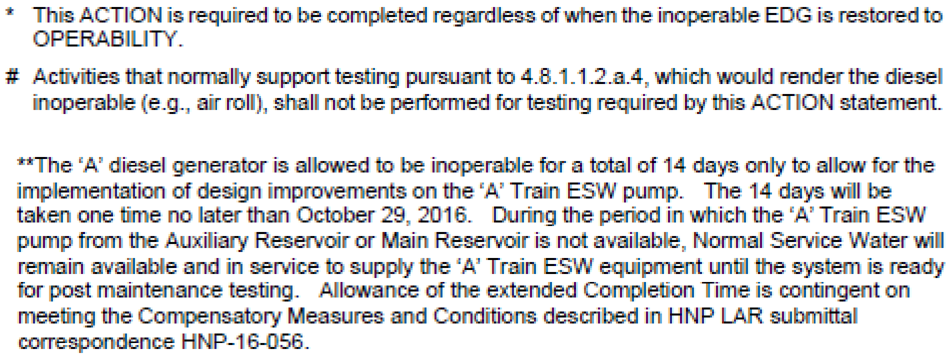
APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- b. With one diesel generator of 3.8.1.1.b inoperable:
  - 1. Perform Surveillance Requirement 4.8.1.1.1.a within 1 hour and once per 8 hours thereafter; and
  - *2. Within 24 hours, determine the OPERABLE diesel generator is not inoperable due to a common cause failure or perform Surveillance Requirement 4.8.1.1.2.a.4#; and
  - 3. Restore the diesel generator to OPERABLE status within 72 hours** or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; and
  - 4. Verify required feature(s) powered from the OPERABLE diesel generator are OPERABLE. If required feature(s) powered from the OPERABLE diesel generator are discovered to be inoperable at any time while in this condition, restore the required feature(s) to OPERABLE status within 4 hours from discovery of inoperable required feature(s) or declare the redundant required feature(s) powered from the inoperable A.C. source as inoperable.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1 (Continued)

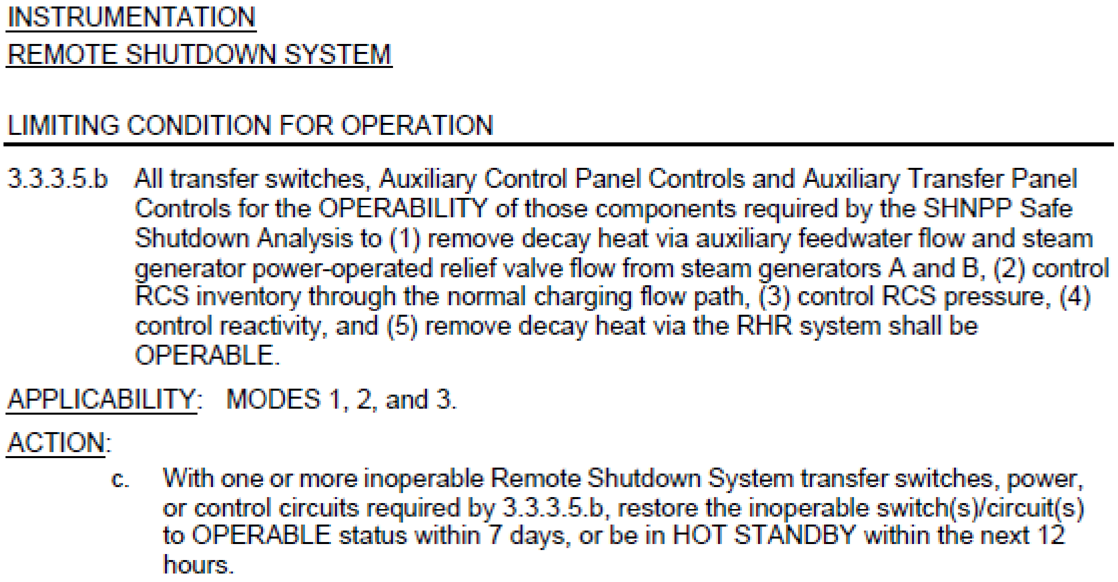
Event 4: Tech Spec evaluation continued



* This ACTION is required to be completed regardless of when the inoperable EDG is restored to OPERABILITY.

\# Activities that normally support testing pursuant to 4.8.1.1.2.a.4, which would render the diesel inoperable (e.g., air roll), shall not be performed for testing required by this ACTION statement.

**The ‘A’ diesel generator is allowed to be inoperable for a total of 14 days only to allow for the implementation of design improvements on the ‘A’ Train ESW pump. The 14 days will be taken one time no later than October 29, 2016. During the period in which the ‘A’ Train ESW pump from the Auxiliary Reservoir or Main Reservoir is not available, Normal Service Water will remain available and in service to supply the ‘A’ Train ESW equipment until the system is ready for post maintenance testing. Allowance of the extended Completion Time is contingent on meeting the Compensatory Measures and Conditions described in HNP LAR submittal correspondence HNP-16-056.



INSTRUMENTATION

REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

c. With one or more inoperable Remote Shutdown System transfer switches, power, or control circuits required by 3.3.3.5.b, restore the inoperable switch(s)/circuit(s) to OPERABLE status within 7 days, or be in HOT STANDBY within the next 12 hours.

OWP-HVAC Attachment 1, HVAC Support System Requirements, lists AH-85 1C-SB TS 3.3.3.5.b since ONLY AH-85 1C-SB can be credited for supported system operability, since AH-85 1D-SB does not start automatically during an accident.

The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 5: MFW Pump Suction Pressure to CBP controller failure. A transmitter failure will cause the Condensate Booster Pump controller to reject to manual. ALB 019-4-1A and 4-1B, Cndbstr Pmps 10% Deviation and Cndbstr Pmps 20% Dev/Man Rej, respectively will alarm and both Condensate Booster pump M/A stations to go manual. There will also be alarms on Feedwater heater levels and if the crew does not respond quickly then SG level deviation alarms will alarm. The failure will cause SG levels increase due to the higher suction pressure being supplied to the MFW pumps.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1 (Continued)

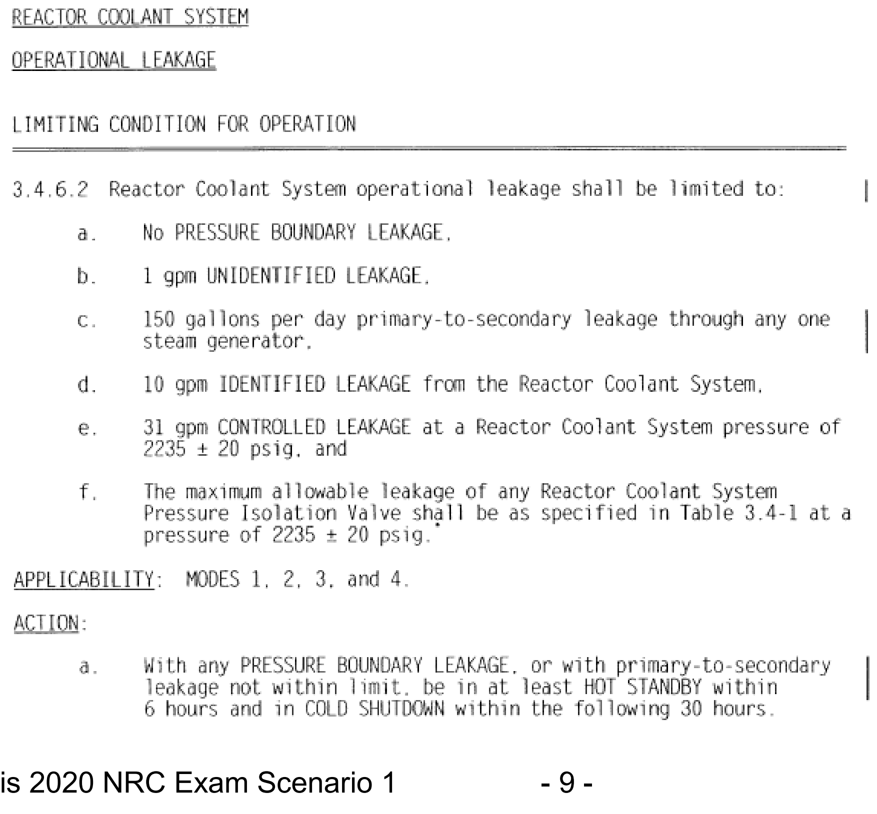
Verifiable Action: The BOP will respond to the failure by taking actions contained in the APP-ALB 019 4-1B by manually controlling PI-2200, FW pumps suction header pressure at 430 psig using both Condensate Booster pump M/A stations (PK-2307 and PK-2308). Both controls will quickly reach 100% and must be individually lowered to regain normal supply pressure.

The SRO should provide a pressure band of 430 psig +/- 5 psig to the BOP in accordance with AD-OP-ALL-1000, Conduct of Operations, (5.5.6) for operation Control Bands and APP-ALB 019-4-1B. The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 6: 'C' Steam Generator Tube Leak (AOP-016). The RCS Loop ‘C’ will leak into its associated SG requiring the crew to implement the actions for AOP-016. Minor changes in Pressurizer Level and Charging flow will occur. Radiation monitors will alarm on the RMS computer for CVPETS and MSL ‘C’. Additionally ALB 010-4-5, Rad Monitor System Trouble, will alarm due to the MSL ‘C’ RM-23 alarming.

Verifiable Action: The crew will respond by entering AOP-016 which has NO immediate actions. The RO will perform a leak rate calculation and determine the leakage is ~30 gpm. The BOP will make plant announcements and contact various support organizations (HP, Chemistry, etc.) as directed by the AOP. The SRO should determine that leak rate is in excess of Action Level 3 and the unit must be less than 50% within the hour and removed from service within the next 2 hours. The crew will implement AOP-038, Rapid Down power to complete this action.

The SRO should evaluate Tech Spec 3.4.6.2, Reactor Coolant System – Operational Leakage Action: a. which will be completed by performing the more restrictive PSAL 3 requirements.



REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System operational leakage shall be limited to:

a. No PRESSURE BOUNDARY LEAKAGE.

b. 1 gpm UNIDENTIFIED LEAKAGE.

c. 150 gallons per day primary-to-secondary leakage through any one steam generator.

d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System.

e. 31 gpm CONTROLLED LEAKAGE at a Reactor Coolant System pressure of 2235 ± 20 psig, and

f. The maximum allowable leakage of any Reactor Coolant System Pressure Isolation Valve shall be as specified in Table 3.4-1 at a pressure of 2235 ± 20 psig.*

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

a. With any PRESSURE BOUNDARY LEAKAGE, or with primary-to-secondary leakage not within limit, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 1 (Continued)

The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 7: 'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0 and EOP-E-3). The major event is a Steam Generator Tube Rupture. The RCS Loop ‘C’ leak will degrade to a rupture into its associated SG requiring the crew to implement the continuous actions for AOP-016 with leak rate in excess of VCT makeup ability and trip the Reactor and actuate Safety Injection. Major changes in Pressurizer Level and Charging flow will occur.

Verifiable Action: The RO will manually trip the Reactor in accordance with AOP-016, then following verification of the Turbine trip actuate Safety Injection and the crew will continue with EOP-E-0. The crew will then transition from EOP-E-0 and go to EOP-E-3, Steam Generator Tube Rupture.

Event 8: Relay failure on resultant SI signal K603A. The failure of K603A will result in the failure of 3 ‘A’ train SI signals 1SI-4 fails to open, 1CS-238 fails to shut and CRI fails to occur.

Verifiable Action: The RO will manually open 1SI-4 (**Critical Task #1**) and shut 1CS-238 in accordance with EOP-E-0, Attachment 1, SI Emergency Alignment. The BOP should identify the ‘A’ train Control Room Area Ventilation are not properly aligned and will manually align the components in accordance with EOP-E-0, Attachment 3, Safeguards Actuation Verification or AD-OP-ALL-1000, Conduct of Operations, (5.6.3.8) for Equipment Manipulation and Status Control.

Event 9: ‘B’ ESW Pump fails to auto start on SI.

Verifiable Action: The crew should identify this failure and manually start the Emergency Service Water Pump once the ‘B’ Sequencer reaches Load Block 9, Automatic Manual Loading Permissive, in accordance with AD-OP-ALL-1000, Conduct of Operations, (5.6.3.8) for Equipment Manipulation and Status Control or EOP-E-0, Attachment 3, Safeguards Actuation Verification. The crew may elect to perform the immediate actions of AOP-022, Service Water Malfunctions, and secure both the ‘B’ EDG and the ‘B’ CSIP with service water loss to the respective running component.

The scenario termination is met in EOP-E-3 after the RCS has been depressurized to minimize primary to secondary leakage prior to SG ‘B’ exceeding 95% level (**Critical Task #2**) and all but one CSIP is secured.

CRITICAL TASK JUSTIFICATION:

1. Manually align at least one high head ECCS pump flow path to prevent RVLIS Dynamic Range Level from lowering below 60%.

In this scenario the 1SI-3 is out of service and the 1SI-4 does not automatically open from sequencer actuation. The operator must manually open 1SI-4 which was currently in the shut position. Plant parameter grading criteria for the task is opening 1SI-4 to prevent RVLIS Dynamic Range Level from lowering below 60% which constitutes a significant core uncover with 3 Reactor Coolant Pumps in operation.

2. Depressurize the RCS to minimize primary to secondary leakage to prevent SG 'C' exceeding 95% level

Failure to depressurize the RCS needlessly complicates mitigation of a SGTR event by allowing the reactor coolant leak to continue. It constitutes a significant reduction of safety margin beyond that introduced by the SGTR event analysis.

If primary to secondary leakage is not stopped the SG pressure will increase until either the SG PORV or Safety valve(s) open releasing radioactivity to the environment. If leakage is allowed to continue the increased inventory will result in water release through the PORV once SG overfill conditions are reached.

At Harris the plant 95% level on the narrow range indicators is the value at which overfill conditions will start to exist and the adverse effects of the condition may start to manifest themselves.

Note: Causing an unnecessary plant trip or ESF actuation (automatic or manual) may constitute a CT failure. Actions taken by the applicant(s) will be validated using the methodology for critical tasks in Appendix D to NUREG-1021.

Simulator Setup

Reset to IC-141 password “NRC3sros”

Go to RUN

Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens for normal full power conditions, ensure VCT Level Channel LCS0112 is indicated on QP VCT

(The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS

Provide a Reactivity Plan to candidates for shutting down the plant

Provide a copy of the following procedures:

- GP-006, NORMAL PLANT SHUTDOWN FROM POWER OPERATION TO HOT STANDBY (MODE 1 TO MODE 3) **marked up** through section 6.2 step 10

Press START on Counter Scaler
Post conditions for status board from IC-26 Reactor Power 88%
Control Bank D at 201 steps
RCS boron 980 ppm

Turnover: The plant is at 88% power, middle of core life. Due to the ‘B’ MDAFW pump LCO expiring, a normal shutdown in accordance with GP-006, Normal Plant Shutdown From Power Operation To Hot Standby (Mode 1 To Mode 3) is in progress as directed by plant management. It is to continue after shift turnover at 4 MW / minute.

Equipment Under Clearance:

- ‘B-SB’ MDAFW Pump is under clearance for motor high vibrations. The pump has been inoperable for 68 hours and cannot be restored to operable status. Tech Spec 3.7.1.2 LCO Action **a** and Tech Spec 3.3.3.5.b Action **c** applies.

- ‘B’ DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours.

- 1SI-3, Boron Injection Tank Outlet valve has been under clearance the last 12 hours for breaker repairs. The repairs are close to completion and the valve is expected to be returned to service within the next hour. The valve is currently shut with power removed. OWP-SI-01 has been completed. Tech Specs 3.5.2 Action **a** and Tech Specs 3.6.3 applies.

Simulator Setup (continued)

Align equipment for repairs:

Place CIT on 'B-SB' MDAFW pump MCB Switch
Place protected train placards in accordance with OMM-001 Attachment 5
    Protected Train placards on 'A-SA' MDAFW pump, 'B-SB' RHR Pump, 'B-SB' CCW Pump, 'B-SB' ESW Pump, 1MS-70 and 1MS-72

Place the ‘B’ DEH Pump in PTL and then hang a CIT on MCB switch
Place protected train placards in accordance with AD-OP-ALL-0210, Single Point Vulnerabilities
    Protected Train placards on ‘A’ DEH Pump

Place a CIT on the switch for 1SI-3.

Place protected train placards in accordance with Response to Industry Best Practices, Expectations
    Protected train placards on ‘A-SA’ ESW Pump, ‘A-SA’ CCW Pump, and ‘A-SA’ SFP Hx

Place filled out copies of OWP’s into the OWP book – ensure they are removed at end of day

- OWP-SI-01 and place in MCR OWP book for 1SI-3 clearance

Hang restricted access signs on MCR entry swing gates

Op Test No.: NRC	Scenario # 1	Event # 1 Page 14 of 83
Event Description:		**Power Reduction**
Time	Position	Applicant's Actions or Behavior

Lead Evaluator:	**The crew has been directed to re-commence a power reduction from 88% to the unit is off line. The power reduction is on hold for turnover. The SRO is expected to conduct a reactivity brief prior to commencing the power reduction. This brief may be conducted outside the simulator prior to starting the scenario.**
	When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce: **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**

Simulator Operator:	**When directed by the Lead Evaluator, ensure that the annunciator horns are on and place the Simulator in RUN.**

Evaluator Note:		**The crew may elect to begin Boration prior to lowering turbine load.**
	RO	OP-107.01, Section 5.2
	RO	1. DETERMINE the volume of boric acid to be added. (Current OPT-1536 data or approved reactivity plan from Engineering may be used.)
	SRO	Directs Boration
Procedure Note:		**FIS-113, BORIC ACID BATCH COUNTER, has a tenths position.**

Op Test No.:	NRC	Scenario #	1	Event #	1	Page	15	of 83
Event Description:			**Power Reduction**					

Time	Position	Applicant's Actions or Behavior
Procedure Caution:		**If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.**
	RO	2. SET FIS-113, BORIC ACID BATCH COUNTER, to obtain the desired quantity. 3. ENSURE the RMW CONTROL switch has been placed in the STOP position. 4. ENSURE the RMW CONTROL switch green light is lit.
Procedure Note:		• **Boric Acid flow controller must be set between 0.2 and 6 (1 and 30 gpm.).** • **Performing small borations at high flow rates may result in an overboration based on equipment response times. Boration flow should be set such that the time required to reach the desired setpoint will happen after release of the control switch.**
	RO	5. IF the current potentiometer setpoint of controller 1CS-283, FK-113 BORIC ACID FLOW, needs to be changed to obtain makeup flow, THEN: (N/A)
		a. RECORD the current potentiometer setpoint of controller 1CS-283, FK-113 BORIC ACID FLOW, in Section 5.2.3. b. SET controller 1CS-283, FK-113 BORIC ACID FLOW, for the desired flow rate.
	RO	6. PLACE control switch RMW MODE SELECTOR to the BOR position.

Op Test No.:	NRC	Scenario #	1	Event #	1	Page	16	of	83
Event Description:				**Power Reduction**					

Time	Position	Applicant's Actions or Behavior

Procedure Note:	**• Boration may be manually stopped at any time by turning control switch RMW CONTROL to STOP.** **• During makeup operations following an alternate dilution, approximately 10 gallons of dilution should be expected due to dilution water remaining in the primary makeup lines.**

	RO	7. START the makeup system as follows: a. TURN control switch RMW CONTROL to START momentarily. b. ENSURE the RED indicator light is LIT. c. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP. 8. ENSURE boration automatically terminates when the desired quantity of boron has been added.
	RO	9. IF controller 1CS-283, FK-113 BORIC ACID FLOW, was changed in Step 5.2.2.5, THEN: (N/A)
		a. REPOSITION controller 1CS-283, FK-113 BORIC ACID FLOW, to the position recorded in Step 5.2.2.5.a. b. INDEPENDENTLY VERIFY controller 1CS-283, FK-113 BORIC ACID FLOW, position.
	RO	10. Monitor Tavg and rod control for proper operation. 11. Establish VCT pressure between 20-30 psig. 12. Turn control switch RMW MODE SELECTOR to AUTO. 13. START the makeup system as follows: a. TURN control switch RMW CONTROL to START momentarily. b. ENSURE the RED indicator light is LIT. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP. (Ref. 4.0.31)

Op Test No.: NRC	Scenario # 1	Event # 1 Page 17 of 83
Event Description:		**Power Reduction**
Time	Position	Applicant's Actions or Behavior

Evaluator Note:		**The following steps have been completed to achieve the current power level. The crew should validate status of the turbine load reduction in accordance with GP-006 section 6.2 step 5 before re-initiating the turbine load reduction.**
GP-006		GP-006, Section 6.2
Procedure Note:		**Routine load changes must be coordinated with the Load Dispatcher to meet system load demands** **GVPC is the preferred method of Load Control. Megawatt Control is normally used only during GV and TV testing** **Controls and indications in following steps are on the TCS Load Control screen** **If Oper Entry is selected with the Turbine in GO, the value currently in the Ramp Rate Entry Window will become the load rate in effect. It may be desirable to place the turbine in HOLD to avoid undesirable ramp rates**
Evaluator Note:		**There is no procedural guidance directing when the boration to lower power is required. The crew may elect to perform the boration prior to placing the Turbine in GO.**
	SRO	DIRECTS BOP to start power reduction at 4 MW/Min. May direct initiation of a boration before the power reduction begins.
	BOP	Requests PEER check prior to manipulations of TCS Load Control screen

Op Test No.:	NRC	Scenario #	1	Event #	1	Page	18	of 83
Event Description:				**Power Reduction**				

Time	Position	Applicant's Actions or Behavior
	BOP	5. On TCS Load Control screen, Load Control section, perform the following: a. IF GVPC indicator is TRUE, THEN go to Step 5.c c. Select Ramp Rate Selection, Select button d. Select the desired ramp rate OR Oper Entry on Load Ramp Rate Selection menu • ENTER the desired rate, **NOT** to exceed 5 MW/MIN, in the DEMAND display. (4 DEH Units/minute) e. IF Oper Entry is selected, THEN enter the desired loading rate in the Ramp Rate Entry window and depress Enter. • ENTER the desired rate, **NOT** to exceed 5 MW/MIN, in the DEMAND display. (4 DEH Units/minute) • DEPRESS the ENTER push-button.
Procedure Note:		**The unloading of the unit can be stopped at any time by selecting the Hold button. The load reduction can be resumed by selecting the Go button**
	BOP	6. Reduce turbine load as follows: a. Enter desired Target Load (120 MW if shutting down) in Target Entry window and depress Enter b. Select the Go button c. Check that Demand window indication counts down towards desired Target Load d. Check that load ramps towards desired Target Load
Procedure Note:		**Once a raise/lower command button is activated, it will remain in the visually depressed state as an indication the button cannot be activated again for approximately two seconds. After two seconds, command buttons automatically return to their default visual state indicating the button may be activated again**

Op Test No.: NRC Scenario # 1 Event # 1 Page 19 of 83

Event Description: **Power Reduction**

Time	Position	Applicant's Actions or Behavior
	BOP	7. IF AT ANY TIME, a small incremental change of Target Load value (1 or 5 megawatts) is desired, THEN select any of the following buttons: • ▲1 MW • ▲▲5 MW • ▼ 1 MW • ▼▼ 5 MW
	BOP	8. Ensure Generator load is lowering
Evaluator Note:		**As the crew demonstrates a satisfactory load reduction Event 2, Control rods fail to move in AUTO (AOP-001) will become apparent as Tavg/Tref mismatch continues to grow with no rod motion. NO Trigger is required for this event.**

Op Test No.:	NRC	Scenario #	1	Event #	2	Page	20	of	83
Event Description:			**Control rods fail to move in AUTO (AOP-001)**						

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Event 2 (Rods do not move in AUTO) will become apparent when the crew identifies that rod control system signals from power and temperature mismatches have no effect on the rod control system.**
Simulator Operator:		**No triggers are required for this malfunction. The malfunction is pre-loaded**
Evaluator Note:		**The crew may take action to enter AOP-001 prior to receiving any alarms based on monitoring TAVG-TREF deviation indicated by ERFIS points TRC0408Z (median TAVG) and TRC0408b (TREF). The first section of the guide is written to the response of the APP and then AOP-001.**
Indications Available		• **ALB 010-6-4B, RCS TREF/TAVG HIGH-LOW** ○ NOTE: This alarm is only expected if the Tavg/Tref mismatch reaches the alarm setpoint of +5°F/-5°F • **Tavg/Tref recorder indications**
	RO	Responds to ALB-010-6-4B, RCS TREF/TAVG HIGH-LOW **OR** identifies that the Tavg/Tref indications should have provided a step signal to rod control and has not
	CREW	1. CONFIRM alarm using: a. Tavg/Tref recorder TR-408 (MCB) b. Turbine first stage pressure indicators (PI-446 and PI 447)
Simulator Communicator		**If I&C is contacted to investigate the rod control failure, wait approximately 3 minutes and report back that an I&C technician is at the rod control system and looking for indications of a failure.**

Op Test No.:	NRC	Scenario #	1	Event #	2	Page	21	of 83
Event Description:			Control rods fail to move in AUTO (AOP-001)					

Time	Position	Applicant's Actions or Behavior	
	RO	2. VERIFY Automatic Functions: None 3. PERFORM Corrective Actions: c. **IF** there is an indication of a control rod malfunction (MCB and AEP-1), **THEN GO TO** AOP-001, Malfunction of Rod Control and Indication System.	
AOP-001		Malfunction of Rod Control and Indication System	
	SRO	ENTERS and directs actions of AOP-001 Conducts a Crew Update Makes PA announcement for AOP entry	
	RO	PERFORMS immediate actions.	
Immediate Action	RO	1. CHECK that LESS THAN TWO control rods are dropped.	(YES)
Immediate Action	RO	2. POSITION Rod Bank Selector Switch to MAN.	
Immediate Action	RO	3. CHECK Control Bank motion STOPPED.	(YES)
	SRO	4. READS immediate actions and proceeds to Section 3.3, Failure of a Control Bank To Move. Directs BOP to place Turbine to HOLD if in GO.	
	BOP	Places Turbine to HOLD if in GO.	
	RO	1. CHECK that AT LEAST ONE of the following conditions is present: • ALB 13-7-1, ROD CONTROL URGENT ALARM, is ALARMED • Control Bank will NOT move • Shutdown Bank will NOT move	(NO) (YES) (NO)

Op Test No.:	NRC	Scenario #	1	Event #	2	Page	22	of	83
Event Description:	**Control rods fail to move in AUTO (AOP-001)**								

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>RO</td><td>2. ADJUST Turbine load OR Boron concentration to equalize Tavg with Tref</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>SRO</td><td>DIRECTS RO to equalize Tavg with Tref (Boron or Turbine adjustments) then proceeds to step 6
Directs RO to maintain TAVG within 2°F of Tref per OMM-001 attachment 11.
(NOTE: during a transient such as continuation of the power reduction the control band will change to TAVG within 5°F of Tref)
<table>
<tr><th rowspan="2">Controller</th><th rowspan="2">Control Band</th><th colspan="2">Administrative Limit</th></tr>
<tr><th>Low</th><th>High</th></tr>
<tr><td>Rod Control Stable Plant</td><td>T Avg within 2° of T Ref</td><td>T Avg Within 10° of T Ref</td><td>T Avg Within 10° of T Ref</td></tr>
<tr><td>Rod Control Transient Plant</td><td>T Avg within 5° of T Ref</td><td>T Avg Within 10° of T Ref</td><td>T Avg Within 10° of T Ref</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO/ BOP</td><td>Adjusts RCS Boron or turbine load to equalize Tavg with Tref. (may borate based on SRO direction)</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">Procedure Note:</td><td>• Surveillance Requirement 4.1.1.1.1.a requires performing a shutdown margin calculation upon detecting an inoperable rod. [C.1]
• It is acceptable to use incore detectors or ERFIS Point from DRPI (or other methods if developed) to meet 4.1.3.1.1 and the Rod Insertion Limit SRs 4.1.3.5 and 4.1.3.6.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>SRO</td><td>Reviews note</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>SRO</td><td>3. Refer To the following AND CHECK that ALL control rods are operable:
• Tech Spec 3.1.3.1 (does not apply)
• Tech Spec 3.1.3.5 (does not apply)
Does not apply in this situation since rod control can be demonstrated operable by rods moving in MANUAL
• Attachment 5, Determination of Control Rod Trippability (can determine rods are trippable)</td></tr>
</table>

Op Test No.:	NRC	Scenario #	1	Event #	2	Page	23	of	83
Event Description:		Control rods fail to move in AUTO (AOP-001)							

Time	Position	Applicant's Actions or Behavior	
	SRO	4. **DETERMINE** if the Westinghouse Rod Control System Troubleshooting Guidelines should be initiated. (Priority 1 Work Request is required) May contact Reactor Engineering or asks for help when contacting Work Control	
	RO	Determines Tref based on 1st Stage pressure using Curve G-4. He/she may instead use Tref just before the failure to determine the current value of Tref or use OSI-PI plot values.	
Procedure Caution:		If ALB-13-7-1, ROD CONTROL URGENT ALARM, is alarming due to a logic error, resetting the alarm before correcting the cause could result in dropping rods supplied from the affected power cabinet.	
	SRO	Reviews Caution	
	SRO	5. **CHECK** that ALB-13-7-1, ROD CONTROL URGENT ALARM, is CLEARED.	(YES)
	SRO	6. **CHECK** automatic AND manual Rod Control FUNCTIONING PROPERLY.	(NO)
Evaluator Note:		**Step 6 of AOP-001 will not be met until rod control has been repaired. Plant shutdown will need to continue with rod control in MANUAL.**	
	SRO	Completes an Emergent Issue Checklists and contacts WCC for assistance. (WR, LCOTR and Maintenance support)	
	CREW	Dispatch operators to rod control cabinets to determine if urgent failure alarms are on locally.	
Simulator Communicator		**2-3 minutes after WCC/Engineering or Maintenance has been contacted, report that System Engineer has identified the problem exists in the AUTO circuit only inside PIC-8.**	

Op Test No.:	NRC	Scenario #	1	Event #	2	Page	24	of	83
Event Description:			Control rods fail to move in AUTO (AOP-001)						

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**If necessary – prompt the crew to continue the plant shutdown by having the Manager of Ops call and direct that the plant shutdown continue with rod control in manual. The SM and AOM-Shift concur that JITT is not required for Maneuvering Plant with a Controller in Manual.** **Crew resumes load reduction.** **SRO asks RO for reactivity addition recommendation.** **BOP places the Turbine in GO to lower load** **With Turbine load lowering cue Simulator Operator to insert Trigger 3** **Event 3: Failure of VCT LT-112 to 100%, which will full divert letdown to RHT (AOP-003)**

Op Test No.:	NRC	Scenario #	1	Event #	3	Page	25	of 83
Event Description:	**Failure of VCT LT-112 to 100%, which will full divert letdown to RHT (AOP-003)**							

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 3 "Failure of VCT LT-112 to 100%, which will full divert letdown to RHT (AOP-003)"**
Indications Available:		**• ALB 007-5-5, COMPUTER ALARM CHEM & VOL SYSTEMS • 1CS-120 (LCV-115A), Letdown VCT / Holdup Tank, aligns to HUT**
	RO	Refers to ALB-007-5-5, COMPUTER ALARM CHEM & VOL SYSTEMS
Evaluator Note:		**Crew may place 1CS-120 (LCV-115A) to the VCT position per AD-OP-ALL-1000.**
	RO	3. **PERFORM** Corrective Actions: a. **CHECK** instrumentation on MCB associated with alarm point. b. **DISPATCH** an operator to check local indications associated with alarming points.
Simulator Communicator:		**Acknowledge the request to check for local indications of alarming points.**
	CREW	Identifies entry conditions to AOP-003, Malfunction of Reactor Makeup Control are met
AOP-003		Malfunction of Reactor Makeup Control
	SRO	ENTERS and directs actions of AOP-003, Conducts a Crew Update Makes PA announcement for AOP entry
	RO	1. Check IA available (YES)

Op Test No.:	NRC	Scenario #	1	Event #	3	Page	26	of	83
Event Description:	**Failure of VCT LT-112 to 100%, which will full divert letdown to RHT (AOP-003)**								

Time	Position	Applicant's Actions or Behavior	
	SRO	2. CHECK BOTH LT-112 and LT-115 functioning properly. 3. Determines LK-112 output has failed and goes to Section 3.1, LT-112 or LT-115 Malfunction.	
	RO	1. Assesses effects of LT-112 failure (Attachment 1)	
Simulator Communicator:		**When directed to report local indication for LT:112, Wait 1 minute then report that local indication is 100%.**	
Procedure Note:		An instrument malfunction may manifest itself as a slow drift rather than a "full high" or "full low" failure. Until the instrument has failed fully high or fully low, all steps should be reviewed for applicability periodically, even if not continuously applicable.	
	SRO	2. **CHECK** that LT-115 is FAILING.	(NO)
	SRO	Determines that LT-112 is failed high and DIRECTS RO to place 1CS-120 (LCV-115A), Letdown VCT / Holdup Tank, to VCT position	
	RO	2. Determines failure is NOT due to LT-115 and go to Step 8 8. Determines failure caused by LT-112 9. Monitor VCT level using either: • ERFIS point LCS0115 • LT-115 10. Check LT-112 is failing LOW - NO RNO action: Place 1CS-120 (LCV-115A), Letdown VCT / Holdup Tank, to VCT position – (places control to VCT)	
Procedure Note:		Normally, VCT level is maintained between 20 and 40% by auto makeup.	
	SRO	• Reviews note 11. DIRECTS RO to **CONTROL** VCT level in AUTO	
	RO	12. Maintains VCT level > 5%	

Op Test No.:	NRC	Scenario #	1	Event #	3	Page	27	of	83
Event Description:	**Failure of VCT LT-112 to 100%, which will full divert letdown to RHT (AOP-003)**								

Time	Position	Applicant's Actions or Behavior
Procedure Note:		Lifting leads in the following Step will simulate a low-low level signal from the failed instrument. This allows a valid low-low level signal from the good instrument to initiate emergency makeup.
	SRO	• Reviews note: 19. Determines LT-112 has failed high and directs Maintenance to lift leads in SSPS for auto switchover to RWST
		20. **DIRECT** Maintenance to investigate and repair the instrument malfunction. • Completes an Emergent Issue Checklist and contacts WCC for assistance. (WR, and Maintenance support)
Simulator Communicator:		**Acknowledge requests for assistance.**
Evaluator Note:		**After VCT level has been stabilized, cue Simulator Operator to insert Trigger 4** **Event 4: Trip of running AH-85C fan, standby fails to Auto Start.**

Op Test No.: NRC	Scenario # 1	Event # 4	Page 28 of 83
Event Description:	**Trip of running AH-85C fan, standby fails to Auto Start**		

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 4** **"Trip of running AH-85C fan, standby fails to Auto Start"**
Indications Available:		• **ALB 027-1-4, DIESEL GEN ELEC EQUIP RM SUP FANS AH-85 LOW FLOW - O/L**
ALB-027	BOP	RESPONDS to alarm on APP-ALB-027-1-4
	BOP	IDENTIFIES the tripped fan, AH-85 1C-SB
	BOP	REPORTS failure of the AH-85 1D-SB standby fan to start
	BOP	3. **PERFORM** Corrective Actions: a. STARTS standby AH-85 1D-SB b. Contacts AO's to investigate breaker failure
Simulator Communicator:		**Breaker failure was overcurrent – IF requested to take breaker to OFF acknowledge the request.** **Simulator Operator – do not take breaker off – not required to continue with scenario**
Evaluator Note:		**(Any Tech Spec evaluation can be conducted with a follow up question after the scenario).**
	SRO	REFER to Tech Specs • T.S 3.8.1.1.b, Action b, items 1-4 One EDG Inoperable Restore EDG to operable within 72 hours Requests BOP to contact AO's to perform OST-1023 Verify required features powered from the Operable EDG are operable • T.S. 3.3.3.5.b, Remote Shutdown System (7 days) OWP-HVAC – Attachment 1, Only AH-85 1C-SB can be credited for supported system operability, since AH-85 1D-SB does not start automatically during an accident.

Op Test No.: NRC	Scenario # 1	Event # 4	Page 29 of 83
Event Description:	**Trip of running AH-85C fan, standby fails to Auto Start**		

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**Acknowledge the request wait approximately 30 minutes and report back that OST-1023 is complete.**
	SRO	Completes an Emergent Issue Checklist and contacts WCC for assistance. (WR, LCOTR, and Maintenance support)
Simulator Communicator:		**Acknowledge requests for assistance.**
Lead Evaluator:		**Crew will probably place the Turbine on HOLD.** **Once the crew completes starts the standby Air Handler and Tech Specs have been evaluated, cue Simulator Operator to insert Trigger 5** **Event 5: MFW Pump Suction Pressure to CBP controller failure**

Op Test No.:	NRC	Scenario #	1	Event #	5	Page	30	of 83
Event Description:		**MFW Pump Suction Pressure to CBP controller failure**						

Time	Position	Applicant's Actions or Behavior

Simulator Operator:		**On cue from the Lead Evaluator insert Trigger 5** **MFW Pump Suction Pressure to CBP controller failure**
Available Indications		• **ALB 019 4-1A CNDBSTR PMPS 10% DEVIATION** • **ALB 019 4-1B CNDBSTR PMPS 20% DEVIATION** • **ALB 019 5-5 COMPUTER ALARM CONDENSATE SYSTEM** • **Both Condensate Booster Pump discharge pressures rises to >600 psig** • **FW Pump suction pressure PI-220 lowering** • **Both Condensate Booster Pump controllers PK-2307 and PK-2308 shift from Auto to Manual control** • **SG levels rising**
	Crew	Responds to multiple Condensate Booster Pump alarms and diagnoses that a failure has occurred in the Condensate Booster pump controller that caused both pump M/A stations to go to manual.
Evaluator Note:		**The crew may enter AOP-010 based on the changes to Feedwater flow (may be considered a flow transient but it really is a pressure transient). Page 32 lists the AOP-010 response.** **NOTE: Responding with ONLY AOP-010 guidance and NOT lowering the output of PK-2307 and PK-2308 in accordance with the APP directions will cause all SG levels to continue to rise.**
ALB-019 4-1B	SRO	Directs BOP to manually control PI-2200, FW Pumps Suction Hdr Press, at 430 psig using PK-2307 and PK-2308, Condensate Booster Pump 'A' and 'B' speed controllers in accordance with ALB-019 4-1B.
	BOP	4. **PERFORM** Corrective Actions: a. Takes PK-2307 and PK-2308 controllers and lowers the output to reduce PI-2200, FW Pumps Suction Hdr Press to 430 psig; verifies that SG levels are recovering and FRVs are responding correctly.

Op Test No.: NRC	Scenario # 1	Event # 5	Page 31 of 83
Event Description:	**MFW Pump Suction Pressure to CBP controller failure**		

Time	Position	Applicant's Actions or Behavior
	SRO	b. VERIFY 1CE-227 (1CE-268), Condensate Booster Pump A (B) Discharge OPEN. c. VERIFY the position of 1CE-220 (1CE-261), Condensate Booster Pump A (B) Recirc. d. DISPATCH an Operator to perform the following: (1) CHECK system line up using OP-134, Condensate System. (2) CHECK pump operation normal. (3) CHECK for leakage. (4) CHECK normal ΔP at Condensate Polishing Demins, AND BYPASS as necessary. e. IF necessary, THEN GO TO AOP-010, Feedwater Malfunctions.
	BOP	b. Verifies1CE-227 (1CE-268), Condensate Booster Pump A (B) Discharge is OPEN. c. Verifies the position of 1CE-220 (1CE-261), Condensate Booster Pump A (B) Recirc (as seen)
	BOP	Dispatches AO to check for system leakage and other abnormal system indications.
Simulator Communicator:		**Acknowledge communications** **After 2-3 minutes report back that nothing is abnormal with the system and no leaks were found**
Evaluator Note:		**If the SRO enters AOP-010 then the crew will perform the immediate actions of the AOP and enter the AOP. The AOP will address SG level issues but will not provide directions for the CBP speed control problems.** **The BOP will have to maintain FW pump suction pressure with both CBP speed controllers in manual for the remainder of this scenario.** **AOP-010 actions are on the next page.**

Op Test No.:	NRC	Scenario #	1	Event #	5	Page	32	of	83
Event Description:		MFW Pump Suction Pressure to CBP controller failure							

Time	Position	Applicant's Actions or Behavior	
AOP-010		Feedwater Malfunctions	
	SRO	ENTERS and directs actions of AOP-010 Conducts a Crew Update Makes PA announcement for AOP entry	
Procedure Note:		**Steps 1 through 4 are immediate actions.**	
Immediate Action	BOP	1. CHECK Feedwater Regulator valves operating properly.	(YES)
Immediate Action	BOP	2. CHECK ANY Main Feedwater Pump TRIPPED **RNO** GO TO STEP 6	(NO)
	BOP	6. MAINTAIN ALL of the following: • At least ONE Main Feedwater Pump RUNNING • Main Feedwater flow to ALL Steam Generators • ALL Steam Generator levels greater than 30% Maintains all of the above	
	BOP	7. CHECK Feedwater Regulator Valves operating properly in AUTO: • Response to SG levels • Valve position indication • Response to feed flow/steam flow mismatch	(YES)
Procedure Note:		Inability to monitor one or more Safety System Parameters concurrent with a turbine runback of greater than 25%, requires a change of event classification per the HNP Emergency Plan. [C.2, C.3]	
	BOP	8. CHECK turbine runs back less than 25% turbine load	YES

Op Test No.: NRC	Scenario # 1	Event # 5	Page 33 of 83
Event Description:	MFW Pump Suction Pressure to CBP controller failure		

Time	Position	Applicant's Actions or Behavior	
Procedure Note:		A feedwater train consists of a Condensate Pump, Condensate Booster Pump and Main Feedwater Pump.	
	SRO	9. GO TO the applicable section: EVENT: All Condensate/Feedwater flow malfunctions (other than pump trips) Section 3.1 Page 10	
	BOP	1. CHECK the following Recirc and Dump Valves operating properly in MODU: • Main Feedwater Pumps • Condensate Booster Pumps • Condensate Pumps • 1CE-293, Condensate Recirc • 1CE-142, Condensate Dump To CST Isolation Valve (SLB-4/7-1)	 (YES) (YES) (YES) (YES) (YES)
	BOP	2. CHECK the Condensate and Feedwater System INTACT.	
Procedure Note:		Pumps should be stopped in the order of higher to lower pressure. (To stop a Condensate Pump, stop a Main Feedwater Pump followed by a Condensate Booster Pump and then the Condensate Pump.)	
	BOP	3. CHECK pumps for NORMAL OPERATION.	(YES)
	SRO	4. NOTIFY Load Dispatcher of ANY load limitations. **(No load limitations so Dispatcher will not be called)**	
	SRO	5. CHECK Reactor thermal power changed by less than 15% in any one hour period.	(YES)
	SRO	6. EXIT this procedure.	

Op Test No.:	NRC	Scenario #	1	Event #	5	Page	34 of 83
Event Description:	**MFW Pump Suction Pressure to CBP controller failure**						

Time	Position	Applicant's Actions or Behavior
	SRO	Completes an Emergent Issue Checklist and contacts WCC for assistance. (WR, LCOTR, and Maintenance support)
Lead Evaluator:		**Once the plant has stabilized, cue Simulator Operator to insert Trigger 6** **Event 6: 'C' Steam Generator Tube Leak (AOP-016)**

Op Test No.: NRC	Scenario # 1	Event # 6	Page	35 of 83	
Event Description:	**'C' Steam Generator Tube Leak (AOP-016)**				

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 6** **“'C' Steam Generator Tube Leak (AOP-016)”**	
Indications Available:		• **Charging Flow rising** • **VCT Level lowering** • **Pressurizer Level and Pressure lowering** • **‘C’ MSL Rad monitor**	
	CREW	Identifies entry conditions to AOP-016, Excessive Primary Plant Leakage are met	
AOP-016		Excessive Primary Plant Leakage	
	SRO	ENTERS and directs actions of AOP-016, Conducts a Crew Update Makes PA announcement for AOP entry	
Procedure Note:		**This procedure contains no immediate actions.**	
	RO	1. CHECK RHR in operation	(NO)
	SRO	3. REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Matrix.	
	RO	4. CHECK RCS leakage within VCT makeup capability May report that the leak is exceeding Tech Spec SG leakage.	(YES)
Procedure Note:		If CSIP suction is re-aligned to the RWST, negative reactivity addition should be anticipated.	
	RO	5. MAINTAIN VCT level GREATER THAN 5%. 6. GO TO STEP 10.	(YES)

Op Test No.:	NRC	Scenario #	1	Event #	6	Page	36 of 83
Event Description:		**'C' Steam Generator Tube Leak (AOP-016)**					

Time	Position	Applicant's Actions or Behavior
	SRO	10. CHECK valid CNMT Ventilation Isolation monitors (REM-3561A, B, C and D) ALARM CLEAR (YES) 11. CHECK RM 3502A, RCS Leak Detection Radiation Monitor, ALARM CLEAR (YES) 12. CHECK ALL valid Area Radiation Monitors ALARM CLEAR (YES) 13. CHECK valid Stack Monitors ALARM CLEAR (YES)
	SRO	14. DETERMINE if unnecessary personnel should be evacuated from affected areas, as follows: a. CHECK that a valid RMS Secondary Monitor HIGH ALARM Indicates a SG tube leak may exist.
	BOP	b. SOUND local evacuation alarm. c. ANNOUNCE on the PA: "Attention all personnel. High radiation levels may exist in portions of the power block due to SG tube leakage. Unnecessary personnel evacuate the RAB and Turbine Building, including the Steam Tunnel. Further announcements will be made as surveys are performed."
	BOP	15. NOTIFY Chemistry to stop any primary sampling activities.
Simulator Communicator:		**Acknowledge request to stop primary sampling activities.**
Procedure Note:		• The following qualitative flow balance is to quickly determine if RCS leakage exceeds Tech Spec limits, EAL classification thresholds, or RCS makeup capability. • RCS influent and effluent flow rates are compared and PRZ level rate of change is used to determine the RCS flow balance.

Op Test No.: NRC	Scenario # 1	Event # 6	Page 37 of 83
Event Description:	**'C' Steam Generator Tube Leak (AOP-016)**		

Time	Position	Applicant's Actions or Behavior
	RO	16. PERFORM a qualitative RCS flow balance, as follows: a. ESTIMATE leak rate considering the following parameters: • PRZ level rate of change (~55 gal/% at 653°F) • Charging flow • Total seal injection flow • Letdown flow • Total seal return flow **Reports estimate to SRO of 30 gpm (25 to 75 gpm)**
		b. OPERATE the following letdown orifice valves as necessary to maintain charging flow on scale: • 1CS-7, 45 gpm Letdown Orifice A • 1CS-8, 60 gpm Letdown Orifice B • 1CS-9, 60 gpm Letdown Orifice C (No changes required)
Procedure Note:		Performance of surveillance tests to determine if leakage exceeds Tech Spec limits, or to more accurately quantify leakage is up to CRS discretion.
	SRO	Determines that more accurate quantification is not needed due to excessive leakage indications present.
Evaluator Note:		**Any Tech Spec evaluation can be conducted as a follow up question after the scenario.**
	SRO	18. EVALUATE RCS leakage (refer to Tech Spec 3.4.6.2).
		Reviews Reactor Coolant System TS 3.4.6.2 Reactor Coolant System operational leakage shall be limited to: c. 150 gallons per day primary-to-secondary leakage through any one steam generator. ACTION **a.** - With any PRESSURE BOUNDARY LEAKAGE or with primary-to-secondary leakage not within limits, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

Op Test No.:	NRC	Scenario #	1	Event #	6	Page	38 of 83
Event Description:	**'C' Steam Generator Tube Leak (AOP-016)**						

Time	Position	Applicant's Actions or Behavior
	SRO	19. DETERMINE leak location from one or more of the following: • MCB indications and Valid Radiation Monitors
	BOP	20. NOTIFY Health Physics of the following: a. Leak location: • Source inside or outside CNMT • To closed system, SG or to atmosphere b. Applicable radiation levels.
Simulator Communicator:		**Acknowledge communications**
	SRO	21. WHEN leakage location has been determined, THEN PERFORM the applicable Attachment: Primary-to-Secondary Attachment 1 page 13
	BOP	1. DIRECT Chemistry to implement CRC-804, Primary-To-Secondary Leak Rate Monitoring, to accomplish the following: a. NOTIFY the MCR as soon as the leaking SG has been determined. b. NOTIFY the MCR when the following results are obtained: • Quantify leak rate • Quantify leak rate trend
Simulator Communicator:		**Acknowledge communications**
Procedure Note:		For a known leak rate greater than 100 gpd (PSAL 3 threshold), the CRS may direct performance of Attachments 9, 10 and 11 while the remaining steps of Attachment 1 are being completed.

Op Test No.: NRC	Scenario # 1	Event # 6	Page 39 of 83
Event Description:	'C' Steam Generator Tube Leak (AOP-016)		

Time	Position	Applicant's Actions or Behavior
	SRO	2. CHECK known leak rate is LESS THAN 100 gpd (0.0694 gpm).- NO leak is > 100 gpm – GO TO STEP 4
	SRO	4. DETERMINE leaking SG(s) using the following information: a. Individual SGBD samples b. Main Steam Line radiation monitor levels c. Local surveys of SGBD lines Determines leak is from 'C' SG from various indication sources.
	SRO	5. CHECK the following valid radiation monitors ALARM CLEAR: • RM-01MS-3593 SB, Main Steam Line C (DICSP Grids 5, 6) REM-01TV-3534, Condenser Vacuum Pump Effluent (DICSP Grid 2) REM-01BD-3527, Steam Generator Blowdown (DICSP Grid 2) RM-01TV-3536-1, Turbine Building Vent Stack Effluent (DICSP Grids 2, 5, 6) NO not clear

Op Test No.:	NRC	Scenario #	1	Event #	6	Page	40	of 83
Event Description:		**'C' Steam Generator Tube Leak (AOP-016)**						

Time	Position	Applicant's Actions or Behavior
	BOP	5. PERFORM the following: a. DIRECT Health Physics to survey the following outside the RCA: • SG Blowdown piping • Vicinity of Main Steam piping b. IF ANY valid monitor is in HIGH ALARM, THEN: (1) DIRECT HP to evaluate the alarm (refer to HPP-780, Radiation Monitoring Systems Operator's Manual). (2) SOUND the local evacuation alarm. (3) ANNOUNCE evacuation of the following areas: • Steam Tunnel • SG PORVs/SG Safety valves area • Turbine Building 314' elevation (4) REPEAT sounding the local evacuation alarm AND the announcement.
	SRO	(5) IF ANY valid Main Steam Line Monitor is in HIGH ALARM, THEN PERFORM an Offsite Dose Calculation (Refer to PEP-340, Dose Assessment). - Refers to the STA for this assessment.
	SRO	6. CHECK BOTH of the following: • Turbine Building Vent Stack radiation monitor HIGH ALARM CLEAR • SG tube leakage is less than Tech Spec limits. NO – RNO actions: START CVPETS (refer to OP-133, Main Condenser Air Removal System).
	BOP	Contacts TB AO to Start CVPETS in accordance with OP-133
Simulator Communicator:		**Acknowledge communications to start CVPETS**

Op Test No.: NRC	Scenario # 1 Event # 6	Page 41 of 83
Event Description:	'C' Steam Generator Tube Leak (AOP-016)	
Time	Position	Applicant's Actions or Behavior

Simulator Operator:		**Perform the following actions from Sim Diagram CVP01 to operate start the CVPETS 'A' fan:** **Start CVPETS 'A' fan modify rf cnd035 ON, then have Communicator report back when completed**
Procedure Note:		B train Aux Condensate Equipment is in long term shutdown per EC 264640.
	SRO	7. CHECK valid Aux Steam Condensate radiation monitors ALARM CLEAR: • REM-21AC-3525, RAB Auxiliary Steam Condensate (DICSP Grid 1) • REM-21AC-3543A, AUX Steam Condensate Tank Pump Discharge A (DICSP Grid 4) YES - clear
	BOP	8. DIRECT Chemistry to sample the Auxiliary Steam System for activity.
Simulator Communicator:		**Acknowledge communications**
	SRO	9. CHECK Chemistry reports Auxiliary Steam System activity is satisfactory. (No reports yet – continues with procedure)
Procedure Note:		• For initial leakage reports, where no previous leakage existed, leakage should be assumed to have changed from zero to the current value in the last hour. • The monitoring requirements of Step 3 become optional if Step 10 directs performance of Attachment 9, 10, or 11.

Op Test No.: NRC	Scenario # 1	Event # 6	Page	42 of 83
Event Description:		'C' Steam Generator Tube Leak (AOP-016)		

Time	Position	Applicant's Actions or Behavior
	SRO	10. PERFORM the required actions based on the following: Action Level 3 - Greater than or equal to 150 gpd PERFORM Attachment 11 to obtain the following: • Reduce power to 50% within 1 hour of entering Action Level 3. • Mode 3 within the next 2 hours (total of 3 hours) • Mode 5 within the next 30 hours (total of 33 hours)
	SRO	Determines that SG leakage will require the unit power level to be reduced to <50% within 1 hour and Mode 3 in next 2 hours. • Requires AOP-038 entry to accomplish these time limits per Attachment 11 step 7 RNO
	SRO	11. WHEN required actions are complete OR leaking SG(s) are cooled down and depressurized to Mode 5, THEN: a. CONSULT plant operations staff concerning plant conditions needed to support recovery efforts. b. EXIT this procedure.
	SRO	Informs crew that they are transitioning to AOP-038
AOP-038		Rapid Downpower
	SRO	Enters AOP-038, RAPID DOWNPOWER Makes PA announcement Conducts a crew brief
Simulator Communicator:		**The crew may make calls to notify plant management in accordance with AD-OP-ALL-1000, Section 5.5.13 before or during the power reduction. Acknowledge and request a report from the MCR when more information becomes available.**

Op Test No.:	NRC	Scenario #	1	Event #	6	Page	43 of 83
Event Description:	**'C' Steam Generator Tube Leak (AOP-016)**						

Time	Position	Applicant's Actions or Behavior
Procedure Note:		• This procedure contains no immediate actions. • Steps may be performed simultaneously or out of sequence at the discretion of the Shift Manager. • If the ASI System is supplying RCP seal injection and no CSIP is available, boration is accomplished by the operation of the ASI pump and is not under control of the operator. Steps that perform boration or dilution cannot be performed and should be marked NA. Turbine load should be reduced at a rate between 5 MW/MIN (EOL) and 10 MW/MIN (BOL). Target rod heights as a function of power in Attachment 2 remain valid.
	SRO	1. ENTER the EAL Matrix (Refer to the following): [C.1] • AD-EP-ALL-0101, Emergency Classification • AD-EP-ALL-0109, Offsite Protective Action Recommendations
	BOP	2. NOTIFY Load Dispatcher that the Unit is reducing load.
Procedure Note:		Boration of the RCS commences at Step 9.
	RO	3. DETERMINE required boric acid addition as follows: 1. CHECK BOTH of the following conditions exist: • Reactor power is 100% • Target power level is provided in OPT-1536, Routine Reactivity Data Calculation. [C.3]
Evaluator Note:		**AOP-038 Attachment 2 is located in this guide on page 77.**
		NO – RNO actions: OBTAIN values from Attachment 2, Gallons of Boric Acid/Target Rod Height Required for Power Reduction. [C.3] • Desired Boration _______ gal • Target Rod height (D Bank) _______

Op Test No.:	NRC	Scenario #	1	Event #	6	Page	44 of 83
Event Description:			'C' Steam Generator Tube Leak (AOP-016)				

Time	Position	Applicant's Actions or Behavior
Procedure Note:		• If load reduction rates in excess of 45 MW/min are required, the Unit should be tripped. • GVPC is the preferred method of Load Control. Megawatt Control is normally used only during GV and TV testing. • If Oper Entry is selected with the Turbine in GO, the value currently in the Ramp Rate Entry Window will become the load rate in effect. It may be desirable to place the turbine in HOLD to avoid undesirable ramp rates.
	BOP	4. PERFORM the following on TCS Load Control screen, Load Control section: a. CHECK GVPC indicator is TRUE – YES b. SELECT Ramp Rate Selection, Select button c. CHECK desired ramp rate is listed on Load Ramp Rate Selection – YES d. SELECT desired ramp rate (NOT to exceed 45 MW/min). **(Should select 25 MW/min)** e. ENTER desired load (120 MW if shutting down) in Target Entry window. **(Should be previously select for 120 MW)** f. DEPRESS Enter.
	RO	5. CHECK Rod Control in AUTO (NO – auto is failed) • MANUALLY POSITION Control Rods to maintain Tavg within 5°F of Tref.
	RO	6. ENERGIZE ALL available PRZ Backup heaters. (ALL ON)
	SRO	7. DISCUSS Attachment 3, Reactivity Brief, with the MCR staff.
Procedure Note:		The MW output indication is displayed on the TCS Turbine Load Control screen. An accurate indication of Main Generator output can also be obtained from ERFIS point JEE1568B (Gross MWe).

Op Test No.:	NRC	Scenario #	1	Event #	6	Page	45	of	83
Event Description:	**'C' Steam Generator Tube Leak (AOP-016)**								

Time	Position	Applicant's Actions or Behavior
	BOP	8. COMMENCE turbine load reduction at the TCS Load Control screen: • SELECT GO pushbutton. • CHECK that Demand value counts-down to Target Load value.
Procedure Note:		• To prevent over-boration, only the amount of boron required to reduce power to the desired power level should be added. If the situation merits that the downpower may have to be halted for any substantial time (>2 hours) at lower powers prior to taking the plant off-line, the effects of Xenon and changes in feed flow should be considered. Reactivity control may become challenging if boron manipulations are not appropriately implemented. • Adjustments should be made to boric acid flow based on actual core/rod response.
	RO	9. COMMENCE RCS boration as required to maintain Control Rods above the Rod Insertion Limit (ROD Manual Sect 2.2).
Evaluator Note:		**The following boration steps of OP-107.01 are provided for evaluator use. They are not in AOP-038.** **Section 8.7 is provided below.**
OP-107.01		CVCS Boration, Dilution, And Chemistry Control Section 8.7, Rapid Addition of Boric Acid to the RCS

Op Test No.: NRC	Scenario # 1	Event # 6		Page	46 of	83
Event Description:	**'C' Steam Generator Tube Leak (AOP-016)**					

Time	Position	Applicant's Actions or Behavior
Procedure Note:		• If performing a rapid shutdown of the plant per AOP-038, the following calculation does not have to be completed before boration begins, but should be completed before half of the estimated (or before 500 gallons whichever is less) boron addition has been dispensed. • Reactivity Evolution category to be determined by the CRS. • If an RCS leak or SGTL is occurring and an Auto Makeup is in progress, it may be necessary to take RMUW control to stop in order to avoid flow deviations on RMUW system while performing the boration.
	RO	1. IF it is desired to stop Auto Makeup due to RCS leakage, THEN PERFORM the following: a. PLACE RMW CONTROL switch to stop. b. CHECK the green light is lit on the RMW Control switch.
		2. DETERMINE the volume of boric acid necessary to achieve the required RCS boron concentration. Required gallons of Boric Acid _____________Gal. 3. ENSURE the backup Boric Acid Transfer Pump control switch is in STOP.
Procedure Note:		• Required boration flow rate of greater than 45 gpm, is best achieved by using Step 8.7.2.4, 1CS 278 SB, EMERGENCY BORIC ACID ADDITION. • Required boration flow rate of less than 45 gpm, is best achieved by using Step 8.7.2.5, 1CS 283, BORIC ACID TO BORIC ACID BLENDER FCV-113A, and 1CS 156, MAKE UP TO CSIP SUCTION FCV 113B.

Op Test No.: NRC	Scenario # 1	Event # 6	Page	47 of 83		
Event Description:	**'C' Steam Generator Tube Leak (AOP-016)**					

Time	Position	Applicant's Actions or Behavior
	RO	4. IF using 1CS-278 SB, EMERGENCY BORIC ACID ADDITION for Boric Acid addition, THEN PERFORM the following: a. RECORD the initial BAT level for backup calculation of Boric Acid addition. Initial BAT level: _____________ % b. START the Boric Acid Transfer Pump aligned for Auto Makeup (switch in AUTO) by placing the control switch to START. c. SIMULTANEOUSLY PERFORM the following: • OPEN 1CS-278 SB, EMERGENCY BORIC ACID ADDITION. • MARK the START time. Time 1CS-278 opened. Time _____________ d. RECORD the Boric Acid flowrate from FI-110. Boric Acid flowrate (FI-110) _____________ Gpm e. CALCULATE the amount of time in minutes it will take to deliver the required amount of Boric Acid. Required gallons BA / BA flowrate = Time _________ ÷ _________ = _________ min 8.7.2.2 8.7.2.4.d
		f. CONTROL charging and letdown to maintain normal PRZ and VCT levels. g. CALCULATE the final BAT level for the required amount of Boric Acid being added. Initial BAT Lvl % – [(Required gallons BA) / (330 gal/%)] = Final BAT Lvl % ________ - (________ / 330) = ________ % 8.7.2.4.a 8.7.2.2
Procedure Note:		• Boration flow may be interrupted as needed by cycling 1CS-278, while maintaining the total boration time calculated in Step 8.7.2.4.e

Op Test No.: NRC	Scenario # 1	Event # 6	Page 48 of 83
Event Description:	'C' Steam Generator Tube Leak (AOP-016)		

Time	Position	Applicant's Actions or Behavior	
	RO	h. WHEN the calculated amount of time has elapsed, THEN SIMULTANEOUSLY: • SHUT 1CS-278 SB. • MARK the STOP time. Time 1CS-278 shut. Time ____________ i. ENSURE, using calculated final BAT level, that the required amount of Boric Acid has been dispensed.	
Procedure Note:		Boration flow may be interrupted as needed by cycling 1CS-278, while maintaining the total boration time calculated. During makeup operations following an alternate dilution, approximately 10 gallons of dilution should be expected due to dilution water remaining in the primary makeup lines.	
	RO	6. REQUEST Chemistry to sample the RCS boron concentration. 8. PLACE Reactor Makeup in Auto per Section 5.1.	
AOP-038		Rapid Downpower Actions - Continued (step 11)	
	BOP	10. ENSURE Generator load AND Reactor power LOWERING.	
	BOP	11. MAINTAIN Generator reactive load (VARs) within guidelines.	
Procedure Note:		Opening 3A and 3B Feedwater Heater vents helps minimize water hammer in 3A and 3B Feedwater Heaters.	
	RO	13. CHECK Tavg within 5°F of Tref	(YES)
	CREW	14. PERFORM the following: a. NOTIFY Chemistry of the following: Reactor power change will exceed 15% in a one hour period.	

Op Test No.: NRC	Scenario # 1	Event # 6	Page 49 of 83
Event Description:	'C' Steam Generator Tube Leak (AOP-016)		

Time	Position	Applicant's Actions or Behavior	
	SRO	b. DIRECT Chemistry to initiate surveillances specified in the applicable sections of the following: • RST-204, Reactor Coolant System Chemistry and Radiochemistry Surveillance • RST-211, Gaseous Effluent Radiochemistry Surveillance	
	SRO	15. CHECK that a planned load reduction will take the Unit to Turbine shutdown	(YES)
	SRO	16. DISPATCH an operator to start the Auxiliary Boiler using OP-130.02, Auxiliary Boiler and Fuel Oil. 17. DIRECT Radwaste Control Room to be prepared for the increased water processing requirements due to boration.	
	CREW	18. CHECK Power level at the target value	(NO)
Examiner Note:		**With AOP-038 in progress, cue Simulator Operator to insert Trigger 7** **Event 7: 'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0 and EOP-E-3).**	

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	50	of	83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0)**								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 7** **"'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0 and EOP-E-3)"**
Indications Available:		• **ALB-009-2-2, Pressurizer Control Low Level Deviation** • **ALB-010-4-5 Rad Monitor System Trouble** • **Pressurizer Level and Pressure lowering** • **Charging Flow rising** • **VCT Level lowering** • **'C' MSL Rad monitor** • **'C' SG level rising**
	CREW	Identifies re-entry conditions to AOP-016, Excessive Primary Plant Leakage are met
AOP-016		Excessive Primary Plant Leakage
	SRO	RE-ENTERS and directs continuous action step 4 of AOP-016, Conducts a Crew Update
	RO	4. CHECK RCS leakage within VCT makeup capability. NO
		NO – RNO actions 4. PERFORM the following: a. TRIP the Reactor, AND GO TO EOP-E-0. (Perform RNO substeps 4.b. and 4.c as time permits) **(Actuates Manually Rx Trip using MCB switch)**
EOP-E-0		Reactor Trip Or Safety Injection
	SRO	Enters EOP-E-0 Holds crew update
	RO/BOP	Performs E-0 Immediate Actions.

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	51	of 83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0)**							

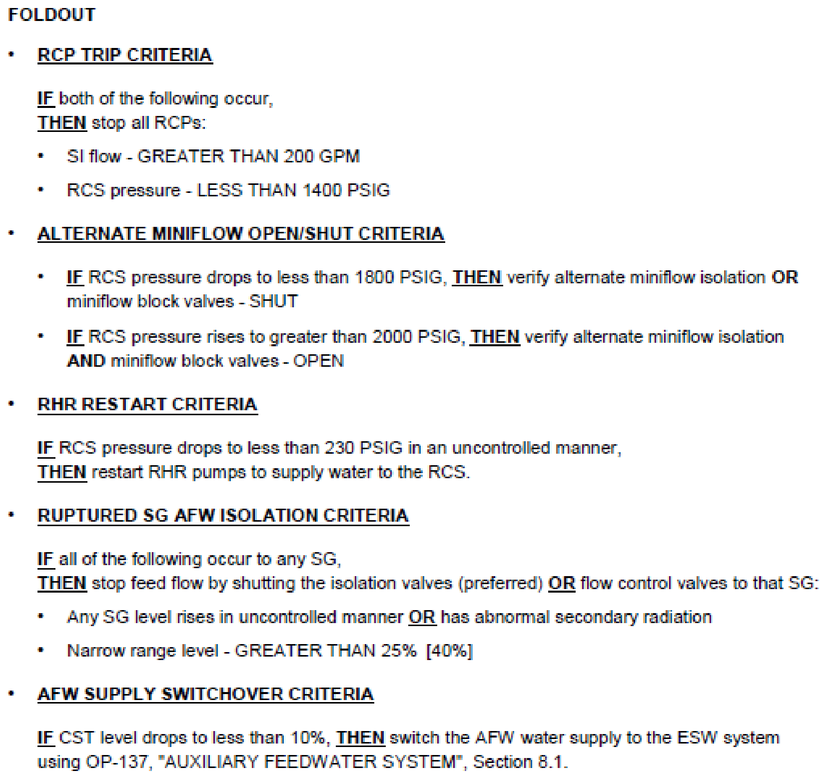
Time	Position	Applicant's Actions or Behavior	
Immediate Actions	RO	Ensure Reactor Trip. REACTOR TRIP CONFIRMATION Reactor Trip AND Bypass BKRs – OPEN Rod Bottom Lights (Zero Steps) – LIT Neutron Flux – DROPPING	 YES YES YES
Immediate Actions	BOP	Check Turbine Trip – ALL THROTTLE VALVES SHUT TURB STOP VLV 1 – TSLB-2-11-1 TURB STOP VLV 2 – TSLB-2-11-2 TURB STOP VLV 3 – TSLB-2-11-3 TURB STOP VLV 4 – TSLB-2-11-4	 YES YES YES YES
AOP-016		Excessive Primary Plant Leakage	
Procedure Note:		If SI Actuation is required, the Reactor and Turbine should be verified tripped in EOP-E-0 before manually actuating SI.	
	RO	b. MANUALLY INITIATE Safety Injection. [C.1] **(Actuates Manually Safety Injection using MCB switch)**	
	SRO	c. EXIT this procedure.	
EOP-E-0	SRO	E-0, Reactor Trip Or Safety Injection	

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	52	of 83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0)**							

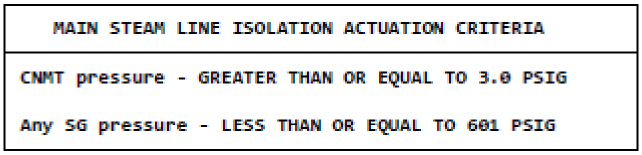
Time	Position	Applicant's Actions or Behavior	
Immediate Actions	BOP	3. Perform The Following: a. AC Emergency Buses – AT LEAST ONE ENERGIZED b. AC Emergency Buses – BOTH ENERGIZED	YES YES
Immediate Actions	RO	4. Safety Injection – ACTUATED (BOTH TRAINS) `BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY)`	YES
Procedure Note:		Steps 1 through 4 are immediate action steps Foldout applies. (Immediate actions should be completed prior implementing Foldout Page items.)	
	SRO	Reviews Foldout page	

Op Test No.: NRC Scenario # 1 Event # 7 Page 53 of 83

Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0)**

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**FOLDOUT** • **RCP TRIP CRITERIA** **IF** both of the following occur, **THEN** stop all RCPs: • SI flow - GREATER THAN 200 GPM • RCS pressure - LESS THAN 1400 PSIG • **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA** • **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT • **IF** RCS pressure rises to greater than 2000 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN • **RHR RESTART CRITERIA** **IF** RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS. • **RUPTURED SG AFW ISOLATION CRITERIA** **IF** all of the following occur to any SG, **THEN** stop feed flow by shutting the isolation valves (preferred) **OR** flow control valves to that SG: • Any SG level rises in uncontrolled manner **OR** has abnormal secondary radiation • Narrow range level - GREATER THAN 25% [40%] • **AFW SUPPLY SWITCHOVER CRITERIA** **IF** CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1. **If 'C' SG previously identified as the Ruptured Generator due to rising SG level, then Ruptured SG AFW Isolation foldout will apply**	
	SRO	5. Perform the following: a. Assigns Foldout Page: RCP Trip Criteria, Alternate Miniflow Open/Shut Criteria, RHR Restart Criteria, Ruptured SG AFW Isolation criteria, AFW Supply Switchover Criteria b. Directs Shift Manager to Evaluate EAL Matrix	
	SRO	b. Evaluate EAL Matrix (Refer to PEP-110)	
	RO	6. Verify CSIPs – ALL RUNNING	(YES)
	RO	7. Verify RHR pumps – ALL RUNNING	(YES)

Op Test No.:	NRC	Scenario #	1	Event #	8	Page	54	of 83
Event Description:			**Relay failure on resultant SI signal K603A**					

Time	Position	Applicant's Actions or Behavior	
	RO	8. Safety Injection flow – GREATER THAN 200 GPM	NO
(Event 8) Critical Task #1	RO	NO – RNO actions 8. Perform the following: a) Ensure high head safety injection alignment: (1) CSIP suction from RWST valves – OPEN (2) VCT outlet valves – SHUT (3) Charging line isolation valves - SHUT **(Shut 1CS-238 manually)** (4) BIT outlet valves - OPEN **(Open 1SI-4 manually)** *Critical to manually align at least one high head ECCS pump flow path to prevent RVLIS Dynamic Range Level from lowering below 60%*	YES YES NO NO
	RO	9. RCS pressure – LESS THAN 230 PSIG	(NO)
	SRO	9. RNO: GO TO Step 12.	
	BOP	12. MAIN Steam Line Isolation – ACTUATED	(NO)
	SRO	12. RNO: Perform the following:	
	BOP	• Check MAIN Steam isolation – REQUIRED  MAIN STEAM LINE ISOLATION ACTUATION CRITERIA CNMT pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG • <u>IF</u> Main Steam Isolation is <u>NOT</u> required , THEN GO TO Step 16.	(NO)

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	55	of 83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-0)**							

Time	Position	Applicant's Actions or Behavior	
	RO	16. CHECK CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG	(YES)
	BOP	17. Verify AFW flow – AT LEAST 200 KPPH ESTABLISHED	(YES)
	BOP	18. Sequencer Load Block 9 (Manual Loading Permissive) - ACTUATED (BOTH TRAINS)	(YES)
	BOP	19. Energize AC buses 1A1 AND 1B1	
Evaluator Note:		**The RO will perform all board actions until the BOP completes Attachment 3. The BOP is permitted to properly align plant equipment in accordance with Attachment 3 without SRO approval. The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 3 is not predictable.** **To follow BOP actions E-0 Attachment 3 is located in the back of this guide.**	
	BOP	20. VERIFY Alignment of Components From Actuation of ESFAS Signals Using Attachment 3, "Safeguards Actuation Verification", While Continuing with this Procedure.	
	BOP	Directs TB AO – Place air compressor 1A and 1B in the Local Control mode. Directs RAB AO – Locally unlock and turn on the breakers for the CSIP Suction and Discharge Cross-Connect valves	

Op Test No.: NRC	Scenario # 1	Event # 8/9	Page	56 of 83	
Event Description:	**Failure of Control Room Isolation to actuate 'B' ESW Pump fails to auto start on SI**				

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**When contacted to place A/B air compressors in Local Control mode, run CAEP :\air\ACs_to_local.txt.**
Simulator Communicator:		**When CAEP is complete, report that the air compressors are running in local control mode.**
Simulator Operator:		**When contacted to Unlock and Turn ON the breakers for the CSIP suction and discharge cross-connect valves, run CAEP *:*\cvc\E-0 Att 2 CSIP suct & disc valve power.txt.**
Simulator Communicator:		**When the CAEP is complete, report task to the MCR.**
Event 9	RO	Ensure All ESW AND ESW Booster Pumps – RUNNING Identifies that the 'B' ESW Pump is NOT running and manually starts pump.
Event 8	BOP	Ensure Control Room Area Ventilation - Main Control Room Aligned For Emergency Operation (Refer to OMM-004, "Post Trip/Safeguards Actuation Review", Attachment 5, Sheets 1 and 2, Sections for Main Control Board, SLB-5 and SLB-6.) Identifies that the Control Room Area Ventilation is NOT aligned for Emergency Operation and aligns the ventilation system correctly. **OMM-004 Attachment 5 is located in the back of this guide on page 80**.
	BOP	The following items should be completed due to Control Room Ventilation not being aligned: Opens CZ-D66 Starts R2 A-SA fan (Emergency Filtration) Stops E9A fan (Normal Exhaust) Opens Battery Room A Return Dampers AC-D4

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	57 of 83

Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (E-0) Continued**

Time	Position	Applicant's Actions or Behavior
	BOP	21. Stabilize AND maintain temperature between 555°F AND 559°F using Table 1.

TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP

- Guidance is applicable until another procedure directs otherwise.
- <u>IF</u> no RCPs running, <u>THEN</u> use wide range cold leg temperature.

	RCS TEMPERATURE TREND		
	LESS THAN 557°F AND DROPPING	GREATER THAN 557°F AND RISING	STABLE AT OR TRENDING TO 557°F
OPERATOR ACTION	• Stop dumping steam • Control feed flow • Maintain total feed flow greater than 200 KPPH until level greater than 25% [40%] in at least one on intact SG • <u>IF</u> cooldown continues, <u>THEN</u>, shut MSIVs AND BYPASS valves	• <u>IF</u> condenser available <u>THEN</u> transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser - OR - • Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F

- Control feed flow and steam dump to stabilize temperature between 555˚F AND 559˚F

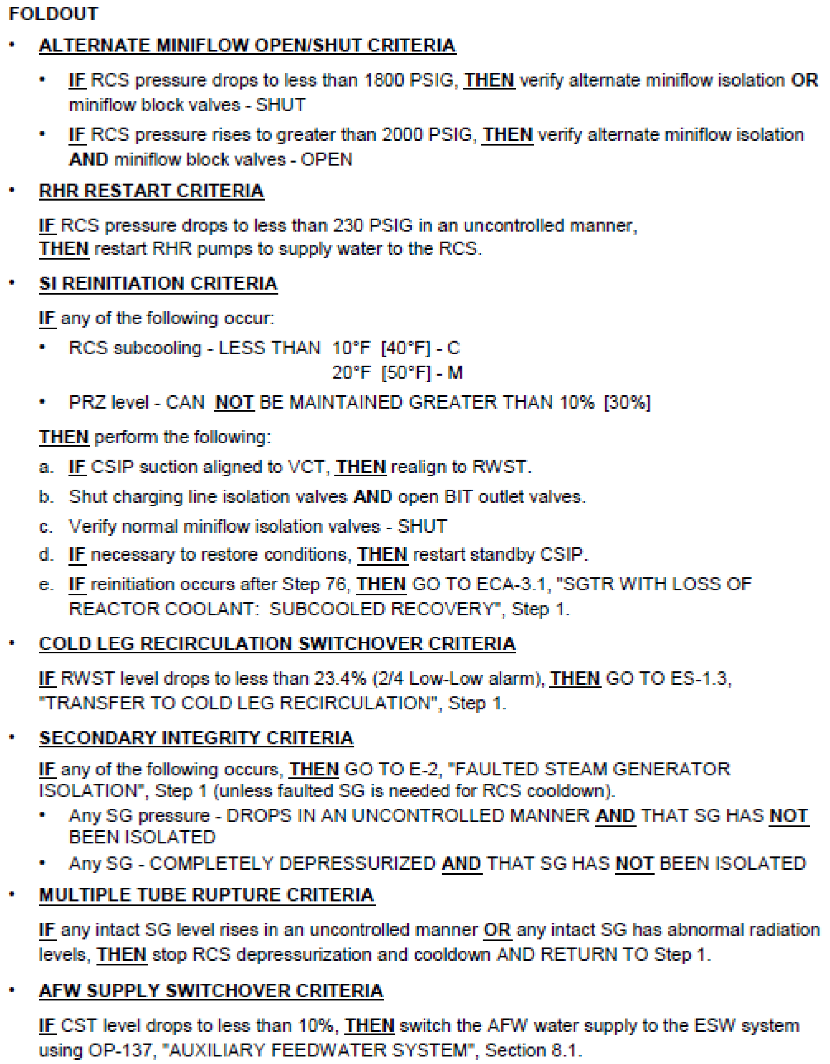
Op Test No.:	NRC	Scenario #	1	Event #	7	Page	58 of 83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (E-0) Continued**						

Time	Position	Applicant's Actions or Behavior	
	RO	22. PRZ PORVs – SHUT	(YES)
	RO	23. PRZ spray valves – SHUT	(YES)
	RO	24. PRZ PORV block valves – AT LEAST ONE OPEN (All OPEN)	(YES)
	BOP/SRO	25. ANY SG pressures – DROPPING IN AN UNCONTROLLED MANNER <u>OR</u> COMPLETELY DEPRESSURIZED Go to Step 27.	(NO) (NO)
	BOP/SRO	27. ANY SG ABNORMAL RADIATION <u>OR</u> UNCONTROLLED LEVEL RISE Crew identifies 'C' SG.	(YES) (YES)
	SRO	28. Check Feed Flow to Ruptured SG(s) – ISOLATED (The crew should have isolated the 'C' SG Feed Flow earlier utilizing the Ruptured SG AFW Isolation Criteria Foldout)	(YES)
	SRO	29. Go to E-3, "STEAM GENERATOR TUBE RUPTURE", Step 1.	

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	59	of	83

Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**

Time	Position	Applicant's Actions or Behavior
EOP-E-3	SRO	Enters E-3, Steam Generator Tube Rupture Holds crew update
Procedure Note:		**Foldout applies.**

Evaluator Note:		 FOLDOUT
		- **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**
		  - **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
		  - **IF** RCS pressure rises to greater than 2000 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN
		- **RHR RESTART CRITERIA**
		IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.
		- **SI REINITIATION CRITERIA**
		IF any of the following occur:
		  - RCS subcooling - LESS THAN 10°F [40°F] - C
		    20°F [50°F] - M
		  - PRZ level - CAN **NOT** BE MAINTAINED GREATER THAN 10% [30%]
		THEN perform the following:
		a. **IF** CSIP suction aligned to VCT, **THEN** realign to RWST.
		b. Shut charging line isolation valves **AND** open BIT outlet valves.
		c. Verify normal miniflow isolation valves - SHUT
		d. **IF** necessary to restore conditions, **THEN** restart standby CSIP.
		e. **IF** reinitiation occurs after Step 76, **THEN** GO TO ECA-3.1, "SGTR WITH LOSS OF REACTOR COOLANT: SUBCOOLED RECOVERY", Step 1.
		- **COLD LEG RECIRCULATION SWITCHOVER CRITERIA**
		IF RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1.
		- **SECONDARY INTEGRITY CRITERIA**
		IF any of the following occurs, **THEN** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1 (unless faulted SG is needed for RCS cooldown).
		  - Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **AND** THAT SG HAS **NOT** BEEN ISOLATED
		  - Any SG - COMPLETELY DEPRESSURIZED **AND** THAT SG HAS **NOT** BEEN ISOLATED
		- **MULTIPLE TUBE RUPTURE CRITERIA**
		IF any intact SG level rises in an uncontrolled manner **OR** any intact SG has abnormal radiation levels, **THEN** stop RCS depressurization and cooldown AND RETURN TO Step 1.
		- **AFW SUPPLY SWITCHOVER CRITERIA**
		IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.
		No actions should result from FOLDOUT page during the remainder of the scenario.

Op Test No.: NRC Scenario # 1 Event # 7 Page 60 of 83

Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**

Time	Position	Applicant's Actions or Behavior	
	SRO	Assigns Foldout items: Alternate Miniflow Open/Shut Criteria, RHR Restart Criteria, SI Reinitiation Criteria, Cold Leg Recirculation Switchover Criteria Secondary Integrity Criteria, Multiple Tube Rupture Criteria, AFW Supply Switchover Criteria 1. Initiates Monitoring Of Critical Safety Function Status Trees.	
	RO	2. Any RCP – RUNNING	(YES)
Procedure Note:		The RCP Trip Criteria is in effect until an RCS cooldown is initiated.	
	RO	3. CHECK RCP Trip Criteria: a. Check all of the following: • SI flow - GREATER THAN 200 GPM • RCS pressure - LESS THAN 1400 PSIG	(YES) (NO)
	SRO	RNO: GO TO Step 4.	
	BOP	4. CHECK RCP Ruptured SG(s) - IDENTIFIED Ruptured SG Identification (Any of the following) SG level - RISING IN AN UNCONTROLLED MANNER SG Sample - HIGH RADIATION Main Steamlines - HIGH RADIATION • RM-01MS-3591 SB, Main Steam Line A • RM-01MS-3592 SB, Main Steam Line B • RM-01MS-3593 SB, Main Steam Line C	(YES)

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	61	of	83	

Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**

<table>
<tr><td>Time</td><td>Position</td><td colspan="2">Applicant's Actions or Behavior</td></tr>
<tr><td></td><td>BOP</td><td colspan="2">5. ADJUST ruptured SG PORV controller setpoint to 88% (1145 PSIG) AND place in AUTO.</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>BOP</td><td>6. CHECK ruptured SG PORV – SHUT.</td><td>(YES)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>7. Check Feed Flow To Intact SG(s) - AVAILABLE FROM MDAFW PUMP</td><td>(YES)</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Procedure Caution:</td><td colspan="2">The steam supply valve from the ruptured SG to the TDAFW pump should be shut OR isolated before initiating RCS cooldown (unless this prevents feeding SGs to be used for cooldown).</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>BOP</td><td>8. SHUT ruptured SG steam supply valve to TDAFW pump:
SG B: 1MS-70
SG C: 1MS-72
(May have been closed previously in E-0)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>9. VERIFY blowdown isolation valves from ruptured SG – SHUT
<table>
<tr><td colspan="3">SG Blowdown Isolation Valves</td></tr>
<tr><td>Process Line</td><td>Outside CNMT (MLB-1A-SA)</td><td>Inside CNMT (MLB-1B-SB)</td></tr>
<tr><td>SG A Blowdown</td><td>1BD-11</td><td>1BD-1</td></tr>
<tr><td>SG B Blowdown</td><td>1BD-30</td><td>1BD-20</td></tr>
<tr><td>SG C Blowdown</td><td>1BD-49</td><td>1BD-39</td></tr>
</table></td><td>(YES)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>10. SHUT ruptured SG main steam drain isolation before MSIV:
SG A: 1MS-231
SG B: 1MS-266
SG C: 1MS-301</td><td>(YES)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table>

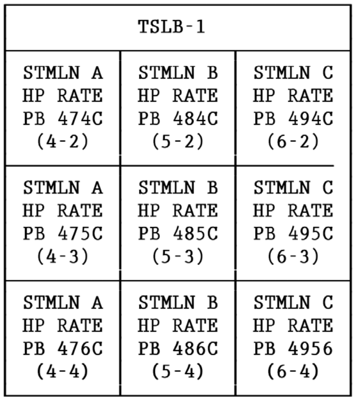
Op Test No.:	NRC	Scenario #	1	Event #	7	Page	62	of	83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**								

Time	Position	Applicant's Actions or Behavior	
	BOP	11. SHUT ruptured SG MSIV AND BYPASS valve.	(YES)
Procedure Caution:		IF ruptured SG is faulted AND is NOT needed for RCS cooldown, THEN feed flow to that SG should remain isolated.	
	BOP	12. Ruptured SG Level – GREATER THAN 25% [40%]	(YES)
	BOP	13. Ensure Feed Flow To Ruptured SG(s) - ISOLATED	(YES)
	BOP	14. CHECK Ruptured SG(s) Pressure – GREATER THAN 260 PSIG [350 PSIG]	(YES)
	RO	15. Check PRZ Pressure - LESS THAN 2000 PSIG	(NO)
	SRO	RNO: 15. WHEN pressure lowers to less than 2000 PSIG during RCS cooldown, THEN perform Steps 16 AND 17. Continue with Step 18.	
Evaluator Note:		**During validation the pressure was greater than 2000 psig The "Check PRZ Pressure" could be answered YES or NO, depending on the pace at which the SRO progresses through the EOP network. The following two steps are the actions to be taken once PRZ Pressure is less than 2000 psig.**	

Op Test No.: NRC Scenario # 1 Event # 7 Page 63 of 83

Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**

Time	Position	Applicant's Actions or Behavior	
	RO	16. Check Steamline High Pressure Rate Bistables - CLEAR (**NOT** LIT)	(YES)



TSLB-1		
STMLN A HP RATE PB 474C (4-2)	STMLN B HP RATE PB 484C (5-2)	STMLN C HP RATE PB 494C (6-2)
STMLN A HP RATE PB 475C (4-3)	STMLN B HP RATE PB 485C (5-3)	STMLN C HP RATE PB 495C (6-3)
STMLN A HP RATE PB 476C (4-4)	STMLN B HP RATE PB 486C (5-4)	STMLN C HP RATE PB 4956 (6-4)

Procedure Note:		After the low steam pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.	
	RO	17. Block Low Steam Pressure SI.	
	SRO	18. At least one intact SG - AVAILABLE FOR RCS COOLDOWN	(YES)
	SRO	19. Go to Step 23.	

Op Test No.: NRC Scenario # 1 Event # 7 Page 64 of 83

Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**

Time	Position	Applicant's Actions or Behavior
	SRO	23. Determine required core exit temperature based on lowest ruptured SG pressure:

LOWEST RUPTURED SG PRESSURE (PSIG)	ERFIS AVAILABLE: CORE EXIT TEMPERATURE (°F)	ERFIS <u>NOT</u> AVAILABLE: HIGHEST CORE EXIT TC (PREFERRED) OR ACTIVE LOOP WIDE RANGE T-HOT (°F)
1100 TO 1145	530 [500]	520 [490]
1050 TO 1099	525 [495]	515 [485]
1000 TO 1049	520 [490]	510 [480]
950 TO 999	515 [485]	505 [475]
900 TO 949	505 [475]	495 [465]
850 TO 899	500 [470]	490 [460]
800 TO 849	495 [465]	485 [455]
750 TO 799	485 [455]	475 [445]
700 TO 749	480 [450]	470 [440]
650 TO 699	470 [440]	460 [430]
600 TO 649	460 [430]	450 [420]
550 TO 599	450 [420]	440 [410]
500 TO 549	445 [415]	435 [405]
450 TO 499	430 [400]	420 [390]
400 TO 449	420 [390]	410 [380]
350 TO 399	410 [380]	400 [370]
300 TO 349	395 [365]	385 [355]
260 TO 299	380 [350]	370 [340]

Time	Position	Applicant's Actions or Behavior	
	BOP	24. Condenser - Available For Steam Dump:	(YES)

Condenser Available Requirements
Any Intact SG MSIV - OPEN
Condenser Available (C-9)- LIT (BPLB 3-3)
Steam Dump Contol - AVAILALBE

Time	Position	Applicant's Actions or Behavior
	BOP	25. Place steam dump pressure controller in manual AND decrease output to 0%.

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	65	of 83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**							

Time	Position	Applicant's Actions or Behavior	
	BOP	26. Place steam dump mode select switch in STEAM PRESS.	
	BOP	27. Check RCS temperature - LESS THAN OR EQUAL 553˚F (P-12) BPLB-4-4 LOW-LOW TAVG STEAM DUMP BLOCKED (P-12)	(YES)
	BOP	28. Momentarily place both steam dump interlock bypass switches to INTLK BYP.	
	BOP	29. Check LOW-LOW STEAM DUMP (P-12) BYPASSED Status Light - ILLUMINATED BPLB-5-4 LOW-LOW TAVG STEAM DUMP BLOCKED (P-12) BYPASSED	(YES)
	BOP	30. Dump steam from intact SGs to Condenser at Maximum Rate	
	SRO	31. Core Exit TCs - LESS THAN REQUIRED TEMPERATURE	(NO)
	SRO	31. RNO: WHEN core exit TCs less than required temperature, THEN perform Steps 32 AND 33. Observe CAUTION Prior To Step 34 AND Continue with Step 34.	

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	66	of	83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**								

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**During cooldown at Max Rate, Main Steam Line Isolation may occur, requiring use of SG 'A' and 'B' PORVs to continue cooling down.** **The crew will continue with the procedure while the cooldown is in progress. When the CET temperature is less than the target then the crew should terminate the cooldown and continue with the procedure.**	
Procedure Caution:		If no RCPs running, the following actions may cause a false indication for the INTEGRITY CSFST. Disregard ruptured SG wide range cold leg temperature until Step 94 complete.	
	RO	34. Maintain RCP Seal Injection Flow Between 8 GPM And 13 GPM.	
Procedure Caution:		If an AFW isolation to an intact SG occurs, the signal may be reset to allow restoration of AFW. (An AFW isolation will occur if a main steam line isolation signal is present AND one SG pressure decreases 100 PSIG below the other two SGs.) If the steam supply valve from the ruptured SG to TDAFW pump reopens due to decreasing SG level, it must be restored to the shut position. (Two out of three SG levels decreasing below 25% will open both steam supply vales to the TDAFW pump.)	
	BOP	35. Any Intact SG Level - GREATER THAN 25% [40%]	(YES)
	BOP	36. AFW flow - AT LEAST 200 KPPH AVAILABLE	(YES)
	BOP	37. Control Feed Flow To Maintain Intact SG Levels Between 25% And 50% [40% and 50%]	
	RO	38. Ensure Power To PORV Block Valves - AVAILABLE	(YES)
	RO	39. PRZ PORVs - SHUT	(YES)

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	67	of	83

Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**

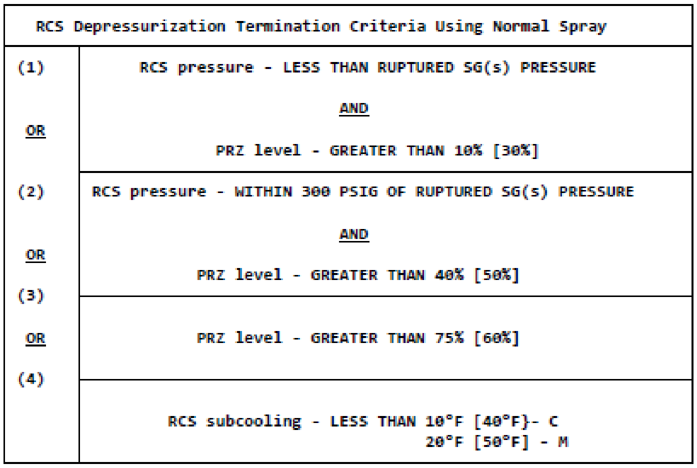
Time	Position	Applicant's Actions or Behavior	
	RO	40. Check block valves - AT LEAST ONE OPEN	(YES)
	RO	41. Reset SI.	
	SRO	42. Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (Directs RO)	
	RO	43. Reset Phase A AND Phase B Isolation Signals. (Phase A only is actuated)	
	RO	44. Open Instrument Air **AND** Nitrogen Valves To CNMT: 1IA-819 (ISOL VALVE CONT. BLDG 236' PENETRATION (M-80)) 1SI-287 (ACCUMULATOR & PRZ PORV N2 SUPPLY ISO VLV)	
	RO	45. Check RHR pump suction - ALIGNED TO RWST RWST SUCTION (OPEN) RHR A: 1SI-322 RHR B: ISI-323	(YES)
	RO	46. RCS pressure - GREATER THAN 230 PSIG	(YES)
	RO	47. Stop RHR pumps.	
	RO	48. Core exit TCs - LESS THAN REQUIRED TEMPERATURE	(YES/NO)

Op Test No.: NRC Scenario # 1 Event # 7 Page 68 of 83

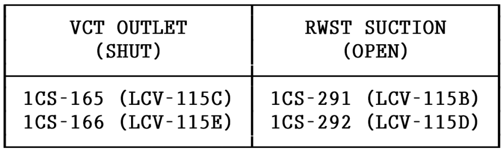
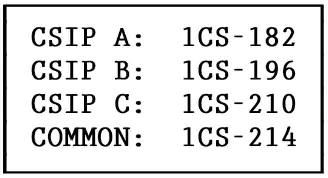
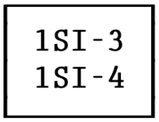
Event Description: **'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**

Time	Position	Applicant's Actions or Behavior	
	BOP	49. Stop RCS cooldown	
	BOP	50. Maintain core exit TCs less than required temperature.	
	BOP	51. Check ruptured SG pressure - STABLE OR RISING	(YES)
	RO	52. Check RCS Subcooling - GREATER THAN 30 ˚F – C	(YES)
	RO	53. Normal PRZ spray - AVAILABLE (INCLUDING INSTRUMENT AIR TO CNMT) Normal PRZ Spray Valves 1RC-107 (PCV-444C) 1RC-103 (PCV-444D)	(YES)
	RO	54. Check PRZ level - LESS THAN OR EQUAL TO 75% [60%]	(YES)
Critical Task #2	RO	55. Manually Open All Available Normal PRZ Spray Valves AND Spray At Maximum Rate (Until ANY Of The RCS Depressurization Termination Criteria in Step 56 Satisfied). *Critical to depressurize the RCS to minimize primary to secondary leakage prior to SG 'C' exceeding 95% level*	
Evaluator Note:		**Crew will maintain the spray valves open until one of the RCS Depressurization Termination Criteria on the following page is SATISFIED**	

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	69 of 83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**						

Time	Position	Applicant's Actions or Behavior	
	RO	56. Check RCS Depressurization Termination Criteria – SATISFIED  RCS Depressurization Termination Criteria Using Normal Spray (1) RCS pressure - LESS THAN RUPTURED SG(s) PRESSURE AND PRZ level - GREATER THAN 10% [30%] OR (2) RCS pressure - WITHIN 300 PSIG OF RUPTURED SG(s) PRESSURE AND PRZ level - GREATER THAN 40% [50%] OR (3) PRZ level - GREATER THAN 75% [60%] OR (4) RCS subcooling - LESS THAN 10°F [40°F]- C 20°F [50°F] - M	(NO)
	SRO	56. RNO: Continue to monitor termination criteria. • WHEN criteria satisfied, THEN GO TO Step 57.	
	RO	57. Shut spray valve used for depressurization:	
	SRO	58. Go to Step 65.	
	RO	65. RCS subcooling – GREATER THAN 10°F - C	(YES)
	BOP	66. Level In At Least One Intact SG - GREATER THAN 25% [40%]	(YES)
	SRO	67. Go to Step 69.	
	RO	69. RCS pressure - STABLE OR RISING	(YES)
	RO	70. PRZ level - GREATER THAN 10% [30%]	(YES)

Op Test No.:	NRC	Scenario #	1	Event #	7	Page	70	of 83
Event Description:	**'C' Steam Generator Tube Rupture of 250 gpm (EOP-E-3)**							

Time	Position	Applicant's Actions or Behavior	
	RO	71. Stop All But One CSIP.	
	RO	72. Check CSIP Suction - ALIGNED TO RWST  VCT OUTLET (SHUT): 1CS-165 (LCV-115C) 1CS-166 (LCV-115E) RWST SUCTION (OPEN): 1CS-291 (LCV-115B) 1CS-292 (LCV-115D)	(YES)
	RO	73. Open Normal Miniflow Isolation Valves:  CSIP A: 1CS-182 CSIP B: 1CS-196 CSIP C: 1CS-210 COMMON: 1CS-214	
	RO	74. Shut BIT outlet valves:  1SI-3 1SI-4	
Lead Evaluator:		**Terminate the scenario after BIT outlet valves 1SI-3 and 1SI-4 are SHUT.** **Announce 'Crew Update' - End of Evaluation - I have the shift.** **Have crew remain in the Simulator without discussing the exam. Examiners will formulate any follow-up questions.**	

Simulator Operator:	**When directed by Lead Evaluator go to FREEZE**

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 7
SAFEGUARDS ACTUATION VERIFICATION

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. **Ensure** Two CSIPs - RUNNING

☐ 2. **Ensure** Two RHR Pumps - RUNNING

☐ 3. **Ensure** Two CCW Pumps - RUNNING

☐ 4. **Ensure** All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. **Ensure** SI Valves - PROPERLY ALIGNED

(**Refer** to Attachment 1.)

☐ 6. **Ensure** CNMT Phase A Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 7. **Ensure** SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. IF Main Steam Line Isolation Actuated OR Is Required By Any Of The Following, THEN **Ensure** MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. IF CNMT Spray Actuation Signal Actuated OR Is Required, THEN **Ensure** The Following:

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 10. **Ensure** Both Main FW Pumps - TRIPPED

☐ 11. **Ensure** FW Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. **Ensure** Both MDAFW pumps - RUNNING

13. **IF** Any Of The Following Conditions Exist, **THEN Ensure** The TDAFW Pump - RUNNING

- ☐ Undervoltage on either 6.9 KV emergency bus
- ☐ Level in two SGs - LESS THAN 25%
- ☐ Manual actuation to control SG level

14. **Ensure** AFW Valves - PROPERLY ALIGNED

- ☐ **IF** no AFW Isolation Signal, **THEN ensure** isolation **AND** flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

- ☐ **IF** AFW Isolation Signal present, **THEN ensure** MDAFW **AND** TDAFW isolation **AND** flow control valves to affected SG - SHUT

☐ 15. **Ensure** Both EDGs - RUNNING

☐ 16. **Ensure** CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 17. **Ensure** CNMT Ventilation Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. **Ensure** Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. **Ensure** Essential Service Chilled Water System Operation:

- ☐ **Ensure** both WC-2 chillers - RUNNING
- ☐ **Ensure** both P-4 pumps - RUNNING

☐ (**Refer** to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. **Ensure** CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

NOTE

Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. **Ensure** AC buses 1A1 **AND** 1B1 - ENERGIZED

☐ 22. **Place** Air Compressor 1A **AND** 1B In The LOCAL CONTROL Mode.

(**Refer to** Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 7
SAFEGUARDS ACTUATION VERIFICATION

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To **Unlock** And **Close** The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(**Refer** to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. **Check** If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN place** C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL AND VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 7
SAFEGUARDS ACTUATION VERIFICATION

25. **Start** The Spent Fuel Pump Room Ventilation System:

    a. At AEP-1, **ensure** the following ESCWS isolation valves - OPEN

    1) SLB-11 (Train A)

    ☐ • AH-17 SUP CH 100 (Window 9-1)

    ☐ • AH-17 RTN CH 105 (Window 10-1)

    2) SLB-9 (Train B)

    ☐ • AH-17 SUP CH 171 (Window 9-1)

    ☐ • AH-17 RTN CH 182 (Window 10-1)

    b. At AEP-1, **start** one SFP PUMP ROOM FAN COOLER:

    ☐ • AH-17 1-4A SA

    ☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 7
SAFEGUARDS ACTUATION VERIFICATION

NOTE

- Fuel pool levels and temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. **Check** Status Of Fuel Pools:

☐ a. **Operate** spent fuel cooling pumps to maintain fuel pool temperatures between 85°F to 105°F.

b. **Monitor** fuel pool levels **AND** temperatures:

☐ • **Refer to** AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.

☐ • **Refer to** Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.

☐ • Levels - GREATER THAN LO ALARM (284 FT, 0 IN)

☐ • Temperatures - LESS THAN HI TEMP ALARM (105°F)

NOTE

If control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, then follow-up actions will be required to restore the alignment.

27. **Consult** Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

☐ • Site Emergency Coordinator - Control Room

☐ • Site Emergency Coordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

RAPID DOWNPOWER

Attachment 2 - Boric Acid/Target Rod Height for Power Reduction

Sheet 1 of 2

NOTE

- This Attachment serves as a reactivity plan. **[C.3]**
- These tables are developed from HNEI-0400 Series Harris Cycle-Specific Startup Operations Report (SOR). These tables are cycle-specific, but will only need to be updated for the new cycle if the table values fall outside of the acceptable range established in the SOR.
- Target rod heights correspond to the lower (target) power level in each row and are applicable regardless of the rate of power reduction or source of boration.
- Gallons of boric acid in Table 1 are for 10% power reduction increments. These are additive for power reductions of greater than 10%.
  Example: A power reduction from 90% to 60% at BOL would require [180 gal + 163 gal +146 gal = 489 gal]
- For purposes of this procedure, 5% increments can be obtained by dividing by two, or by referring to Table 2 - 5% Power Reduction Increments.
- As used in this table, the following times in core life are assumed:
  BOL (0 ≤ EFPD ≤150) (3000 MWD/MTU)
  MOL (150 < EFPD ≤ 350) (10,000 MWD/MTU)
  EOL (350 < EFPD) (17,000 MWD/MTU)

Table 1 - 10% Power Reduction Increments

Power Level (%)	Target Rod Height (D Bank)	Gallons of Boric Acid Required for Power Reduction		
		BOL 0 ≤ EFPD ≤ 150	MOL 150 < EFPD ≤ 350	EOL 350 < EFPD
100 to 90	206	223	273	285
90 to 80	194	180	215	234
80 to 70	183	163	200	212
70 to 60	171	146	167	198
60 to 50	159	138	159	192
50 to 40	147	139	151	194
40 to 30	135	122	144	204
30 to 20	124	141	154	230
20 to 10	112	123	137	266

RAPID DOWNPOWER

Attachment 2 - Boric Acid/Target Rod Height for Power Reduction

Sheet 2 of 2

Table 2 - 5% Power Reduction Increments

Power Level (%)	Target Rod Height (D Bank)	Gallons of Boric Acid Required for Power Reduction		
		BOL $0 \leq$ EFPD ≤ 150	**MOL** $150 <$ EFPD ≤ 350	**EOL** $350 <$ EFPD
100 to 95	212	112	137	143
95 to 90	206	111	136	142
90 to 85	200	90	108	117
85 to 80	194	90	107	117
80 to 75	188	82	100	106
75 to 70	183	81	100	106
70 to 65	177	73	84	99
65 to 60	171	73	83	99
60 to 55	165	69	80	96
55 to 50	159	69	79	96
50 to 45	153	70	76	97
45 to 40	147	69	75	97
40 to 35	141	61	72	102
35 to 30	135	61	72	102
30 to 25	129	71	77	115
25 to 20	124	70	77	115
20 to 15	118	62	69	133
15 to 10	112	61	68	133

--END OF ATTACHMENT 2--

POST TRIP/SAFEGUARDS ACTUATION REVIEW	OMM-004
	Rev. 42
	Page 51 of 88

ATTACHMENT 5
Page 1 of 4

<< Reference Use - Control Room Ventilation Isolation Verification >>

TRAIN - A Components	REQ POS	POS CK	TRAIN - B Components	REQ POS	POS CK
MAIN CONTROL BOARD					
CZ-19 SA EMERGENCY FILTRATION DISCHARGE	OPEN [Note 1]		CZ-20 SB EMERGENCY FILTRATION DISCHARGE	OPEN [Note 1]	
R2 A-SA EMERGENCY FILTRATION FAN	START		R2 B-SB EMERGENCY FILTRATION FAN	START	
CZ-9 SA EMERG FILT SOUTH OUTSIDE AIR INLET	SHUT		CZ-10 SB EMERG FILT SOUTH OUTSIDE AIR INLET	SHUT	
CZ-11 SA EMERG FILT NORTH OUTSIDE AIR INLET	SHUT		CZ-12 SB EMERG FILT NORTH OUTSIDE AIR INLET	SHUT	
CZ-D66 SA EMERGENCY FILTRATION RECIRC	OPEN		CZ-D61 SB EMERGENCY FILTRATION RECIRC	OPEN	
ES-1A PURGE EXHAUST FAN	STOP		ES-1B PURGE EXHAUST FAN	STOP	
CZ-13 SA PURGE EXHAUST	SHUT		CZ-14 SB PURGE EXHAUST	SHUT	
CZ-17 SA PURGE MAKE UP	SHUT		CZ-18 SB PURGE MAKE UP	SHUT	
CZ-D69 SA CONT RM NORMAL REC DAMPER	OPEN [Note 1]		CZ-D70 SB CONT RM NORMAL REC DAMPER	OPEN [Note 1]	
CZ-1 SA NORMAL INTAKE	SHUT		CZ-2 SB NORMAL INTAKE	SHUT	
CZ-3 SA NORMAL EXHAUST	SHUT		CZ-4 SB NORMAL EXHAUST	SHUT	
E-9A NORMAL EXHAUST FAN	STOP		E-9B NORMAL EXHAUST FAN	STOP	
ACTUATED BY EITHER TRAIN A OR B			E-5A CNMT PRE-ENTRY PURGE EXHAUST FAN	STOP	
			E-5B CNMT PRE-ENTRY PURGE EXHAUST FAN	STOP	

Note:

1. This component does not receive direct actuation signal but is slaved to other equipment.

POST TRIP/SAFEGUARDS ACTUATION REVIEW	OMM-004
	Rev. 42
	Page 52 of 88

ATTACHMENT 5
Page 2 of 4

<< Reference Use - Control Room Ventilation Isolation Verification >>

TRAIN - A Components		REQ POS	POS CK	TRAIN - B Components		REQ POS	POS CK
SLB - 5 TRAIN A				**SLB - 6 TRAIN B**			
8-1	AH-15 IN CZ-D1	OPEN		8-1	AH-15 IN CZ-D2	OPEN	
8-2	AH-15 DISCH CZ-25	OPEN		8-2	AH-15 DISCH CZ-26	OPEN	
8-3	R2 IN CZ-23	OPEN [Note 2]		8-3	R2 IN CZ-24	OPEN [Note 2]	
8-4	R2 OUT CZ-21	OPEN [Note 2]		8-4	R2 OUT CZ-22	OPEN [Note 2]	
AEP - 1							
E-28 A SA BATTERY ROOM A EXHAUST FAN		STOP		E-29 A SB BATTERY ROOM B EXHAUST FAN		STOP	
E-28 B SA BATTERY ROOM A EXHAUST FAN		STOP		E-29 B SB BATTERY ROOM B EXHAUST FAN		STOP	
E-10 A SA NORMAL EXHAUST FAN		STOP		E-10 B SB NORMAL EXHAUST FAN		STOP	
AC-D4 SA BATTERY ROOM A RETURN DAMPER		OPEN		AC-D6 SB BATTERY ROOM B RETURN DAMPER		OPEN	
1CZ-7 SA EXHAUST FAN DISCHARGE ISOL		SHUT		1CZ-8 SB EXHAUST FAN DISCHARGE ISOL		SHUT	
1CZ-5 SA RAB ELEC EQUIP ROOM OAI PURGE ISOL		SHUT		1CZ-6 SB RAB ELEC EQUIP ROOM OAI PURGE ISOL		SHUT	
E-6 A SA EMERGENCY EXHAUST FAN		START [Note 3]		E-6 B SB EMERGENCY EXHAUST FAN		START [Note 3]	
ACTUATED BY EITHER TRAIN A OR B				E-17 X NNS NORMAL EXHAUST FAN		STOP	
				E-18 X NNS NORMAL EXHAUST FAN		STOP	
				E-19 X NNS NORMAL EXHAUST FAN		STOP	
				E-20 X NNS NORMAL EXHAUST FAN		STOP	
				S-3 A NNS RAB NORMAL SUPPLY FAN		STOP	
				S-3 B NNS RAB NORMAL SUPPLY FAN		STOP	

Notes:

2. This component does not receive direct actuation signal but is slaved to other equipment.

3. This component starts from the SI signal not the CRIS.

POST TRIP/SAFEGUARDS ACTUATION REVIEW	OMM-004
	Rev. 42
	Page 53 of 88

ATTACHMENT 5
Page 3 of 4

<< Reference Use - Control Room Ventilation Isolation Verification >>

TRAIN - A Components		REQ POS	POS CK	TRAIN - B Components		REQ POS	POS CK
SLB - 10				**SLB - 8**			
1-2	ISOL AV D 23	SHUT		1-2	ISOL AV D 24	SHUT	
1-3	ISOL AV D 21	SHUT		1-3	ISOL AV D 22	SHUT	
1-4	ISOL AV D 19	SHUT		1-4	ISOL AV D 20	SHUT	
2-2	ISOL AV D 62	SHUT		2-2	ISOL AV D 63	SHUT	
2-3	ISOL AV D 70	SHUT		2-3	ISOL AV D 71	SHUT	
2-4	ISOL AV D 66	SHUT		2-4	ISOL AV D 67	SHUT	
3-2	ISOL AV D 15	SHUT		3-2	ISOL AV D 16	SHUT	
3-3	ISOL AV D 27	SHUT		3-3	ISOL AV D 28	SHUT	
3-4	ISOL AV D 25	SHUT		3-4	ISOL AV D 26	SHUT	
4-2	ISOL AV D 82	SHUT		4-2	ISOL AV D 83	SHUT	
4-3	ISOL AV D 74	SHUT		4-3	ISOL AV D 75	SHUT	
4-4	ISOL AV D 58	SHUT		4-4	ISOL AV D 59	SHUT	
5-2	ISOL AV D 17	SHUT		5-2	ISOL AV D 18	SHUT	
5-3	ISOL AV D 13	SHUT		5-3	ISOL AV D 14	SHUT	
5-4	ISOL AV D 11	SHUT		5-4	ISOL AV D 12	SHUT	
6-2	ISOL AV D 78	SHUT		6-2	ISOL AV D 79	SHUT	
6-3	ISOL AV D 52	SHUT		6-3	ISOL AV D 53	SHUT	
6-4	ISOL AV D 33	SHUT		6-4	ISOL AV D 34	SHUT	
7-2	ISOL AV D 35	SHUT		7-2	ISOL AV D 36	SHUT	
7-3	ISOL AV D 3	SHUT		7-3	ISOL AV D 4	SHUT	
7-4	ISOL AV D 9	SHUT		7-4	ISOL AV D 10	SHUT	
8-2	ISOL AV D 37	SHUT		8-2	ISOL AV D 38	SHUT	
8-3	ISOL AV D 7	SHUT		8-3	ISOL AV D 8	SHUT	
8-4	ISOL AV D 5	SHUT		8-4	ISOL AV D 6	SHUT	
9-2	ISOL AV D 86	SHUT		9-2	ISOL AV D 87	SHUT	
9-3	ISOL AV D 31	SHUT		9-3	ISOL AV D 32	SHUT	
9-4	ISOL AV D 29	SHUT		9-4	ISOL AV D 30	SHUT	

POST TRIP/SAFEGUARDS ACTUATION REVIEW	OMM-004 Rev. 42 Page 54 of 88

ATTACHMENT 5
Page 4 of 4

<< Reference Use - Control Room Ventilation Isolation Verification >>

Components		REQ POS	POS CK
AEP - 3			
ACTUATED BY EITHER TRAIN A OR B	R-13 (1 & 2A NNS) EMER FAN	START	
	R-13 (1 & 2B NNS) EMER FAN	START	
	ES-7 (1 & 2 NNS) SMOKE PURGE EXHAUST FAN	STOP	
	CK-B6 1 & 2 SMOKE PURGE INTAKE VLV	SHUT	
	CK-B7 1 & 2 NORMAL INTAKE VLV	SHUT	
	CK-B8 1 & 2 NORMAL INTAKE VLV	SHUT	

Comment No. Description

_______________ ____

_______________ ____

_______________ ____

_______________ ____

_______________ ____

_______________ ____

_______________ ____

_______________ ____

_______________ ____

_______________ ____

_______________ ____

Signature: ______________________________ Time __________ ... Date __________

2020 NRC Exam Scenario 1
Turnover

Plant Status

- Normal shutdown is in progress with TCS Load Control at 1 GVPC units / min in accordance with GP-006, Normal Plant Shutdown, due to LCO expiring on ‘B’ MDAFW pump.
- Reactor power ~ 88% power. On hold through shift turnover. GP-006 Section 6.2, Step 10 is being coordinated by the FSRO, raise TCS Load Control to 4 GVPC units/ min and continue the downpower @ 4 MW/min. The SRO will conduct a reactivity brief, prior to the crew entering the simulator for evaluation
- Current rod position is CBD @ 201 steps
- An RCS Boron sample taken 30 minutes ago was 980 ppm
- Middle of life conditions
- “A” Train equipment is in service
- Normal Dayshift
- Status Board is updated
- Additional Protected items “A” ESW Pump, “A” CCW Pump, “A” SFP Hx, RWST, due to Response to Industry Best Practices

Equipment Out of Service:

- “B” MDAFW Pump, placed under clearance 68 hours ago for pump seal repairs. Not expected to be returned to service in 10 hours. T.S. 3.7.1.2 action **a** (72 hour LCO). "A" MDAFW Pump, MS-70 and 72, "B" ESW Pump, "B" RHR Pump, "B" CCW Pump and 'A' Train PICs: 1, 3, 9, 13, and 17 are protected.

- 1SI-3, Boron Injection Tank Outlet Valve has been under clearance the last 12 hours for breaker repairs. The repairs are close to completion and the valve is expected to be returned to service within the next hour. Tech Spec 3.6.3 LCO Action **b** and Tech Specs 3.5.2 Action **a** applies. OWP-SI-01 has been completed.

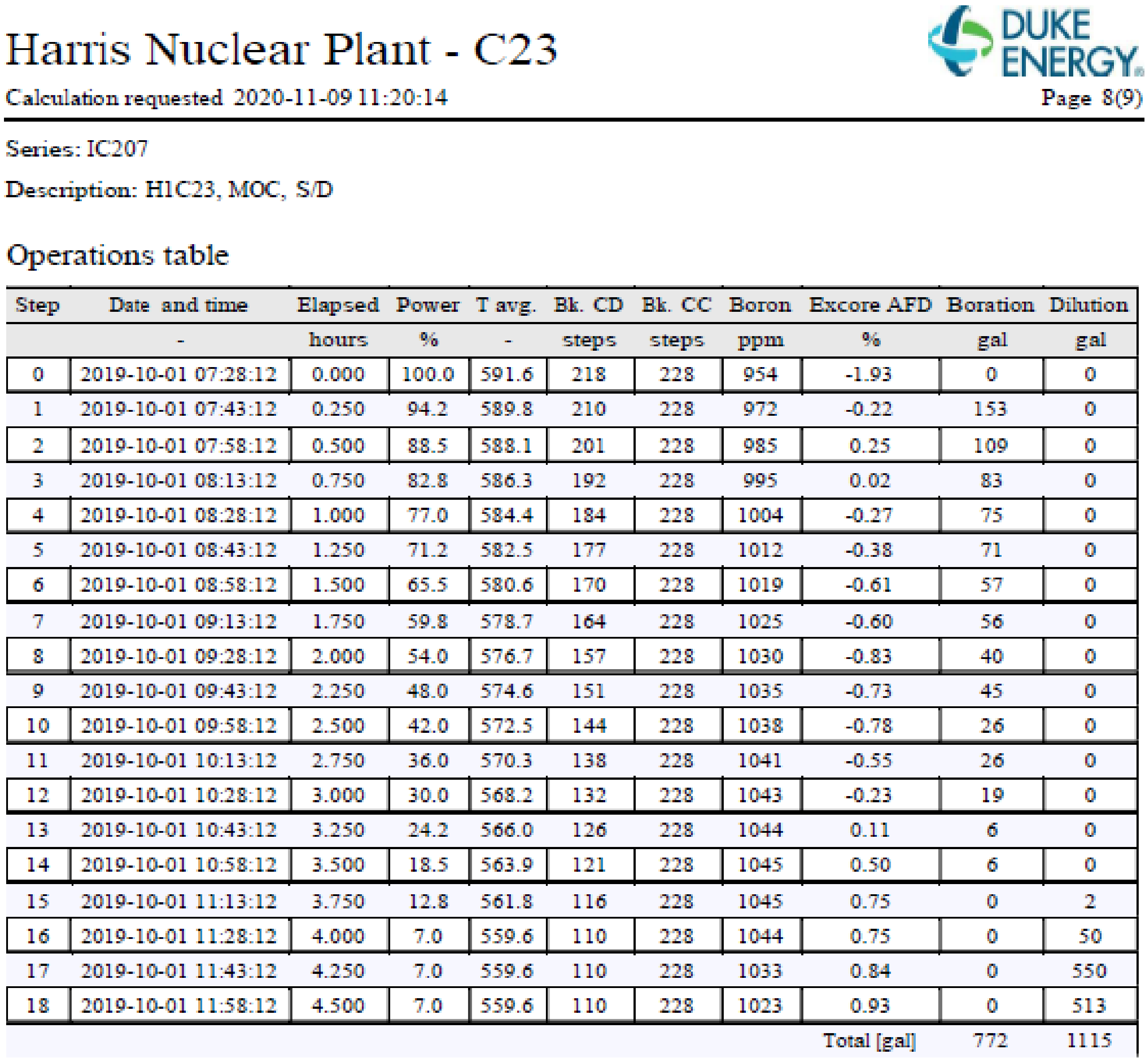
- “B” DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours. “A” DEH pump is protected in accordance with AD-OP-ALL-0210, Section 5.5, Conditional Single Point Vulnerabilities

Reactivity Plan/Brief:

- Use attached Reactivity Plan to take unit off line at 4 MW/Min.

Risk Assessment:

- **YELLOW**



Harris Nuclear Plant - C23

Calculation requested 2020-11-09 11:20:14

DUKE ENERGY.

Page 8(9)

Series: IC207

Description: H1C23, MOC, S/D

Operations table

Step	Date and time	Elapsed	Power	T avg.	Bk. CD	Bk. CC	Boron	Excore AFD	Boration	Dilution
	-	hours	%	-	steps	steps	ppm	%	gal	gal
0	2019-10-01 07:28:12	0.000	100.0	591.6	218	228	954	-1.93	0	0
1	2019-10-01 07:43:12	0.250	94.2	589.8	210	228	972	-0.22	153	0
2	2019-10-01 07:58:12	0.500	88.5	588.1	201	228	985	0.25	109	0
3	2019-10-01 08:13:12	0.750	82.8	586.3	192	228	995	0.02	83	0
4	2019-10-01 08:28:12	1.000	77.0	584.4	184	228	1004	-0.27	75	0
5	2019-10-01 08:43:12	1.250	71.2	582.5	177	228	1012	-0.38	71	0
6	2019-10-01 08:58:12	1.500	65.5	580.6	170	228	1019	-0.61	57	0
7	2019-10-01 09:13:12	1.750	59.8	578.7	164	228	1025	-0.60	56	0
8	2019-10-01 09:28:12	2.000	54.0	576.7	157	228	1030	-0.83	40	0
9	2019-10-01 09:43:12	2.250	48.0	574.6	151	228	1035	-0.73	45	0
10	2019-10-01 09:58:12	2.500	42.0	572.5	144	228	1038	-0.78	26	0
11	2019-10-01 10:13:12	2.750	36.0	570.3	138	228	1041	-0.55	26	0
12	2019-10-01 10:28:12	3.000	30.0	568.2	132	228	1043	-0.23	19	0
13	2019-10-01 10:43:12	3.250	24.2	566.0	126	228	1044	0.11	6	0
14	2019-10-01 10:58:12	3.500	18.5	563.9	121	228	1045	0.50	6	0
15	2019-10-01 11:13:12	3.750	12.8	561.8	116	228	1045	0.75	0	2
16	2019-10-01 11:28:12	4.000	7.0	559.6	110	228	1044	0.75	0	50
17	2019-10-01 11:43:12	4.250	7.0	559.6	110	228	1033	0.84	0	550
18	2019-10-01 11:58:12	4.500	7.0	559.6	110	228	1023	0.93	0	513
								Total [gal]	772	1115

HARRIS 2020 NRC SCENARIO 2

Facility: Harris Nuclear Plant Scenario No.: 2 Op Test No.: 05000400/2020301

Examiners: ____________ Operators: SRO: ____________

____________ RO: ____________

____________ BOP: ____________

Initial Conditions: IC-5 BOL, 53% power

- ‘A-SA’ Boric Acid Transfer Pump is under clearance for breaker repairs
- 1CS-9, Letdown Isolation Valve is under clearance for solenoid replacement
- ‘A’ Gland Steam Condenser Exhauster Fan is under clearance due to high vibrations on the motor bearing

Turnover:	The plant is at 53% power, beginning of core life. GP-005 step 134.e, comparison of diverse indications of power after exceeding 50% power is complete.
Critical Task:	• Manually start the standby DEH Pump prior to DEH pressure lowering below 1150 psig to prevent an automatic Turbine Trip/Reactor trip • Manually maintain control of SG ‘B’ level below 78% to prevent an automatic Reactor trip after steam generator level transmitter LT-486 fails low • Manually trip all RCPs within 10 minutes of a Phase B isolation signal • Shut BIT Outlet valve 1SI-4 prior to establishing flow through the charging header

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – RO/SRO N – BOP/SRO	Power ascension from 53% power
2	nis08b	I – RO/SRO TS – SRO	PRNIS Channel NI-42 fails HIGH (AOP-001)
3	lt:460	I – RO/SRO TS – SRO	Pressurizer Level Transmitter for LT-460 fails low
4	tur24a jmsehpas	C – BOP/SRO	DEH pump shaft shear and failure of the standby pump to start
5	lt:486	C – BOP/SRO TS – SRO	'B' SG Controlling Level Transmitter fails Low (AOP-010)
6	mss01b	M – ALL	Steam line Break on 'B' SG inside Containment (EOP-E-0 and EOP-E-2)
7	zrpk643b zrpk644b zrpk645b	C – RO/SRO	‘B’ Containment Spray pump fails to auto start
8	sis017 sis018	C – BOP/SRO	1SI-4 failure to close from MCB switch

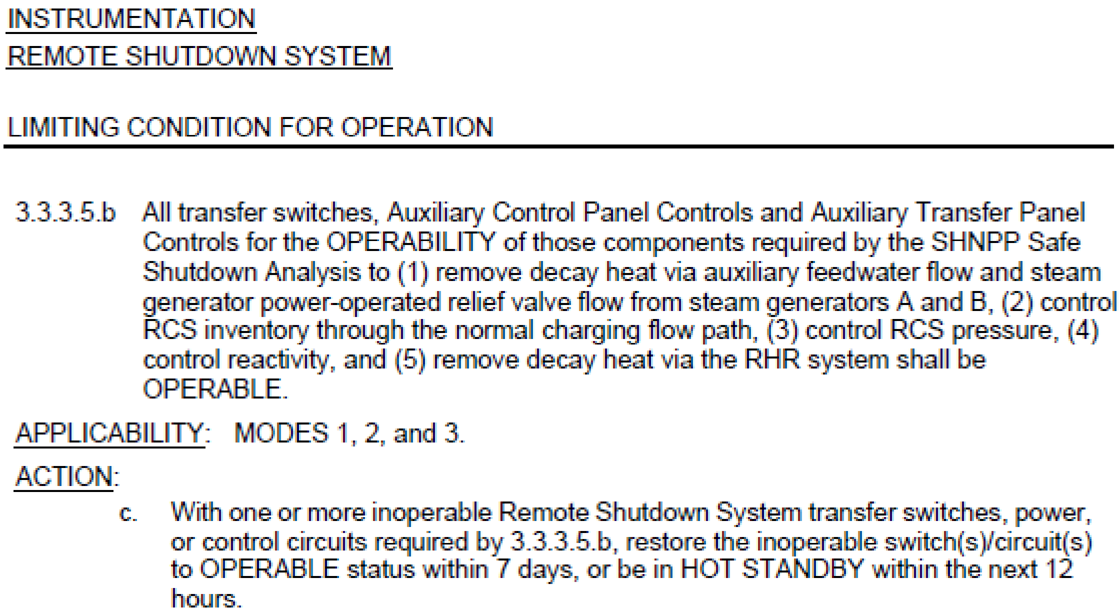
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2

The plant is at 53% power, beginning of core life. GP-005, Power Operation (Mode 2 To Mode 1) is in progress as directed by plant management. GP-005 step 134.e, comparison of diverse indications of power after exceeding 50% power is complete and the turbine is in hold for turnover. Once turnover is complete, raise TCS Load Control to 4 GVPC units/ min and continue the power ascension @ 4 MW/min.

The following equipment is under clearance:

- Boric Acid Transfer Pump A-SA is under clearance due to breaker blown control power fuses. Has been under clearance for 12 hours. The problem with the breaker has been repaired and the clearance will be removed later this shift. Tech Spec 3.3.3.5.b Action **c** and 3.1.2.2 applies (3.1.2.2 is for tracking only). OWP-CS-04 has been completed.



INSTRUMENTATION

REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

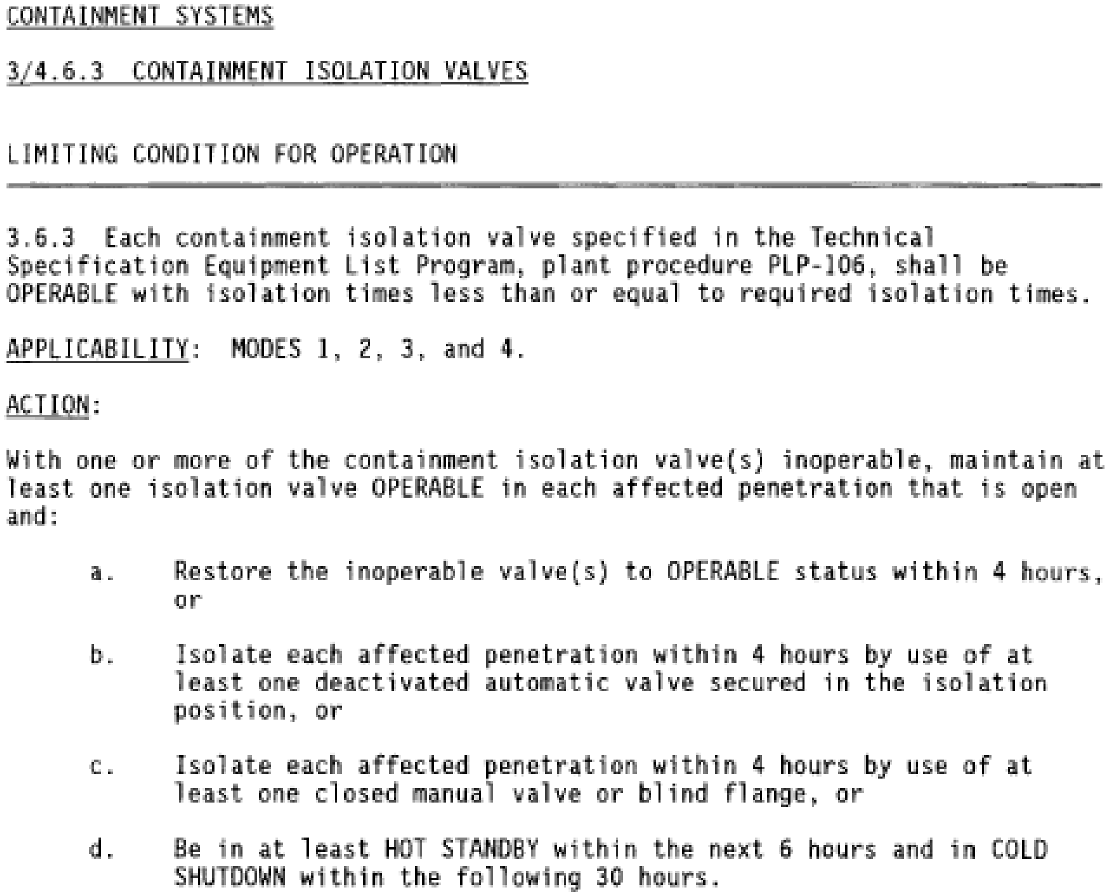
c. With one or more inoperable Remote Shutdown System transfer switches, power, or control circuits required by 3.3.3.5.b, restore the inoperable switch(s)/circuit(s) to OPERABLE status within 7 days, or be in HOT STANDBY within the next 12 hours.

- 1CS-9, Letdown Orifice Isolation valve, has been under clearance the last 12 hours for solenoid replacement. The repairs are close to completion and the valve is expected to be returned to service within the next hour. The valve is currently shut with power removed. OWP-CS-09 has been completed. Tech Specs 3.6.3 Action **b** applies.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2 (continued)

The following equipment is under clearance (continued):

- 1CS-9, Letdown Orifice Isolation valve Tech Spec (continued)



CONTAINMENT SYSTEMS

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve specified in the Technical Specification Equipment List Program, plant procedure PLP-106, shall be OPERABLE with isolation times less than or equal to required isolation times.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With one or more of the containment isolation valve(s) inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and:

a. Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

b. Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

c. Isolate each affected penetration within 4 hours by use of at least one closed manual valve or blind flange, or

d. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

- ‘A’ Gland Seal Exhauster Fan is under clearance for high vibrations on the motor bearing. The fan has been under clearance for 8 hours. Repairs are expected to be completed within 24 hours.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2 (Continued)

Event 1: Power ascension from 53% power (GP-005). Turnover takes place with the unit at 53% Reactor power. The crew will be given credit for a reactivity manipulation during the power ascension.

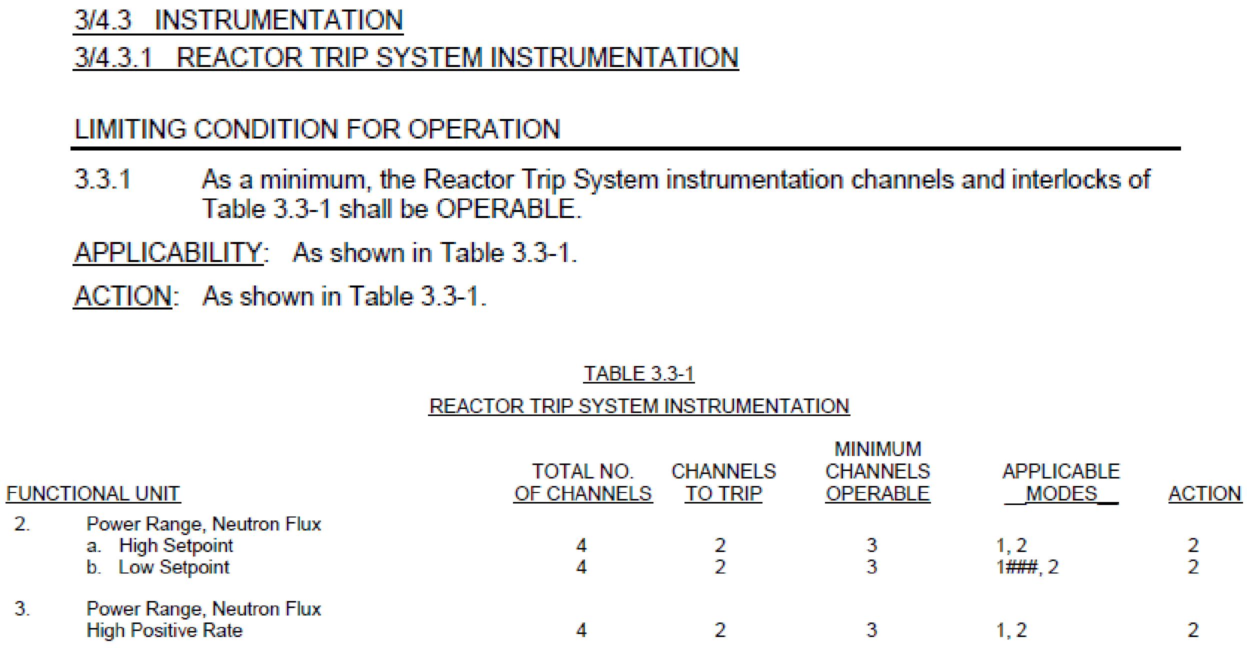
Verifiable Action: It is expected that the SRO will conduct a reactivity brief, the OATC will dilute and monitor auto rod withdrawal per the reactivity plan. The BOP will operate the DEH Turbine controls as necessary to raise power. After power is raised 3% - 5% and the crew has demonstrated that they have control of the plant Event 2 may be inserted.

Event 2: PRNIS Channel NI-42 fails HIGH (AOP-001). NI-42 along with the Rod Control system MCB response will provide indications of the malfunction. Multiple ALB 013 annunciator window associated with the Power Range Nuclear Instruments will alarm.

Verifiable Action: The crew will enter AOP-001 and carry out the immediate actions. The OATC will perform the immediate actions of AOP-001 by verifying that <2 rods are dropped (no rods have dropped), place Rod Control in MANUAL and then verify no rod motion. Once the immediate actions are complete the BOP should place the Turbine in Hold to stabilize the plant. The SRO should continue with the implementation of AOP-001 to bypass NI-42 and restore T_{avg} to match T_{ref} in order to return Rod Control to Auto.

The SRO should provide a temperature band of +/- 5°F to the OATC in accordance with OMM-001, Attachment 11, Control Bands And Administrative Limits. The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

The SRO should evaluate Tech Spec 3.3.1, Instrumentation – Reactor Trip System Instrumentation Action: 2.



3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION: As shown in Table 3.3-1.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
2. Power Range, Neutron Flux					
a. High Setpoint	4	2	3	1, 2	2
b. Low Setpoint	4	2	3	1###, 2	2
3. Power Range, Neutron Flux High Positive Rate	4	2	3	1, 2	2

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2 (Continued)

Event 2: Tech Spec evaluation continued

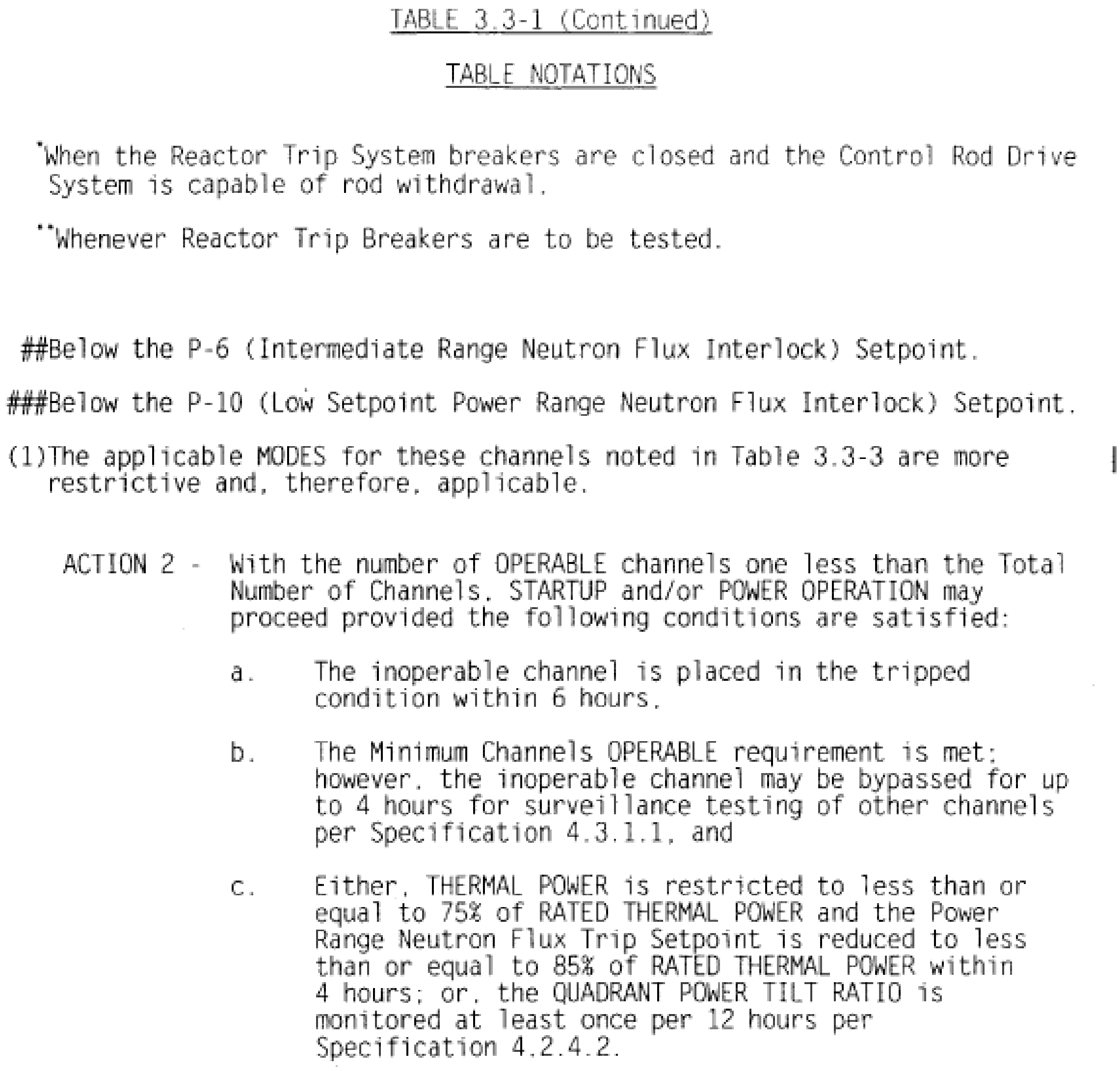


TABLE 3.3-1 (Continued)

TABLE NOTATIONS

*When the Reactor Trip System breakers are closed and the Control Rod Drive System is capable of rod withdrawal.

**Whenever Reactor Trip Breakers are to be tested.

##Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

###Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1)The applicable MODES for these channels noted in Table 3.3-3 are more restrictive and, therefore, applicable.

ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours,

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1, and

c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or, the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2.

Event 3: Pressurizer Level Transmitter for LT-460 fails low. ALB 009-4-3, Pressurizer Low Level Ltdn Secured And Htrs Off, will alarm due to LT-460 being less than 17%.

Verifiable Action: The crew will respond in accordance with APP-ALB-009 and verify all Pressurizer Heaters off and Letdown has automatically isolated. The OATC will select the 459/461 position on the MCB to restore two operable channels and reset each pressurizer heater as required. The BOP will ensure the failed channel is not the selected recorder channel.

The SRO should provide a level band of +/- 5% to the OATC in accordance with OMM-001, Attachment 11, Control Bands And Administrative Limits. The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists, for the failure and request assistance from the WCC.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2 (Continued)

The SRO should evaluate Tech Spec 3.3.1, Instrumentation – Reactor Trip System Instrumentation Action: 6.

3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION: As shown in Table 3.3-1.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

	FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
11.	Pressurizer Water Level--High (Above P-7)	3	2	2	1	6

TABLE 3.3-1 (Continued)

TABLE NOTATIONS

*When the Reactor Trip System breakers are closed and the Control Rod Drive System is capable of rod withdrawal.

**Whenever Reactor Trip Breakers are to be tested.

##Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

###Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1)The applicable MODES for these channels noted in Table 3.3-3 are more restrictive and, therefore, applicable.

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2 (Continued)

Event 4: DEH pump shaft shear and failure of the standby pump to start. The running pump will continue to indicate running until DEH pressure lowers to < 1600 psig when annunciator ALB-020-4-2B, DEH Fluid Low Press, will alarm. The crew should dispatch an Aux Operator to investigate the cause and confirm the standby pump is not affected by the failure.

Verifiable Action: The BOP will respond to the failure by taking actions contained in the APP-ALB 020-4-2B and ensuring the start of the standby DEH pump **(Critical Task #1)**. If DEH pressure lowers to < 1500 psig the standby pump should auto start but a relay failure will prevent the pump from auto starting which will require the pump to be started manually. AD-OP-ALL-1000, Conduct of Operations, (5.6.3.8) for Equipment Manipulation and Status Control may be used to start the standby DEH pump prior to 1500 psig.

The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 5: 'B' SG Controlling Level Transmitter fails Low (AOP-010). ALB 014-2-1B, 5-1A, 5-4B, SG B NR LVL/SP Hi/Lo Dev, SG B FW > Stm Flow Mismatch, and Steam Gen B Low-Low Level, respectively will alarm. The crew will respond by entering AOP-010, Feedwater Malfunction and taking manual control of ‘B’ Main Feedwater Regulating Valve to reduce Feedwater flow and stabilize level.

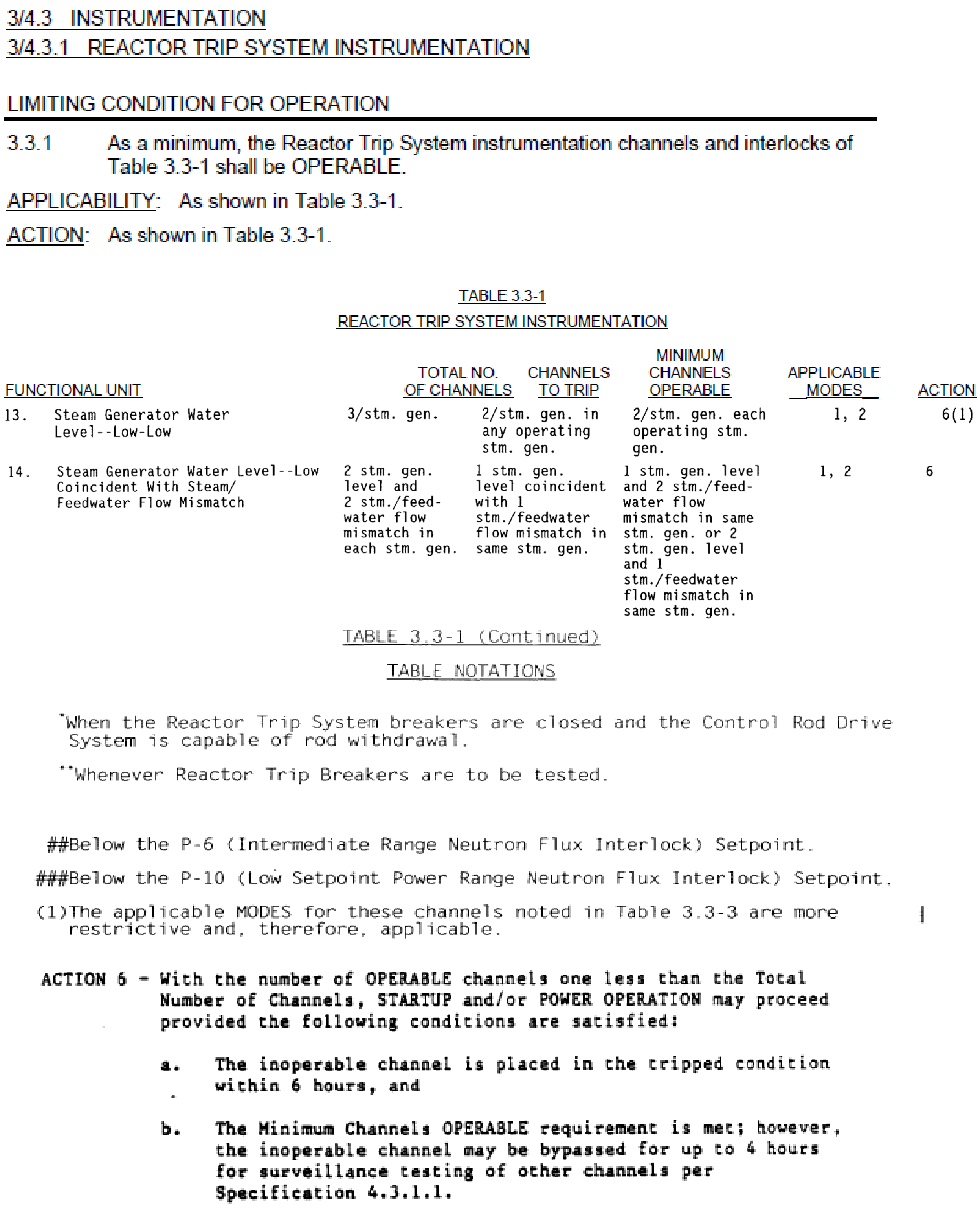
Verifiable Action: Taking manual control of ‘B’ Main Feedwater Regulating Valve to reduce Feedwater flow and stabilize level **(Critical Task #2)**. With the controller in manual and the plant stabilized, the crew will implement OWP-RP-06 to remove the failed channel from service.

The SRO should provide a level band of 52% to 62% to the BOP in accordance with AOP-010 and OMM-001, Attachment 11, Control Bands And Administrative Limits. The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists, for the failure and request assistance from the WCC.

The SRO should evaluate Tech Spec 3.3.1, Instrumentation – Reactor Trip System Instrumentation and Tech Spec 3.3.2, Instrumentation – Engineered Safety Features Actuation System Instrumentation Action: 6 and 19 apply respectively.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2 (Continued)

Event 5: Tech Spec evaluation continued



3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION: As shown in Table 3.3-1.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
13. Steam Generator Water Level--Low-Low	3/stm. gen.	2/stm. gen. in any operating stm. gen.	2/stm. gen. each operating stm. gen.	1, 2	6(1)
14. Steam Generator Water Level--Low Coincident With Steam/ Feedwater Flow Mismatch	2 stm. gen. level and 2 stm./feed-water flow mismatch in each stm. gen.	1 stm. gen. level coincident with 1 stm./feedwater flow mismatch in same stm. gen.	1 stm. gen. level and 2 stm./feed-water flow mismatch in same stm. gen. or 2 stm. gen. level and 1 stm./feedwater flow mismatch in same stm. gen.	1, 2	6

TABLE 3.3-1 (Continued)

TABLE NOTATIONS

*When the Reactor Trip System breakers are closed and the Control Rod Drive System is capable of rod withdrawal.

**Whenever Reactor Trip Breakers are to be tested.

##Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

###Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1)The applicable MODES for these channels noted in Table 3.3-3 are more restrictive and, therefore, applicable. |

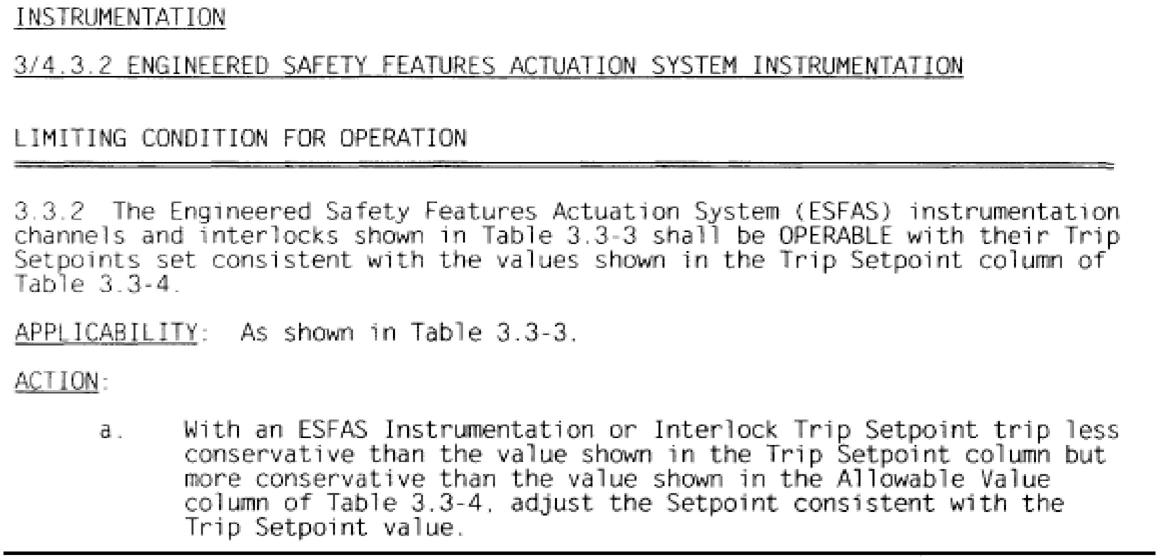
ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2 (Continued)

Event 5: Tech Spec evaluation continued



INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4.

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS Instrumentation or Interlock Trip Setpoint trip less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 3.3-4, adjust the Setpoint consistent with the Trip Setpoint value.

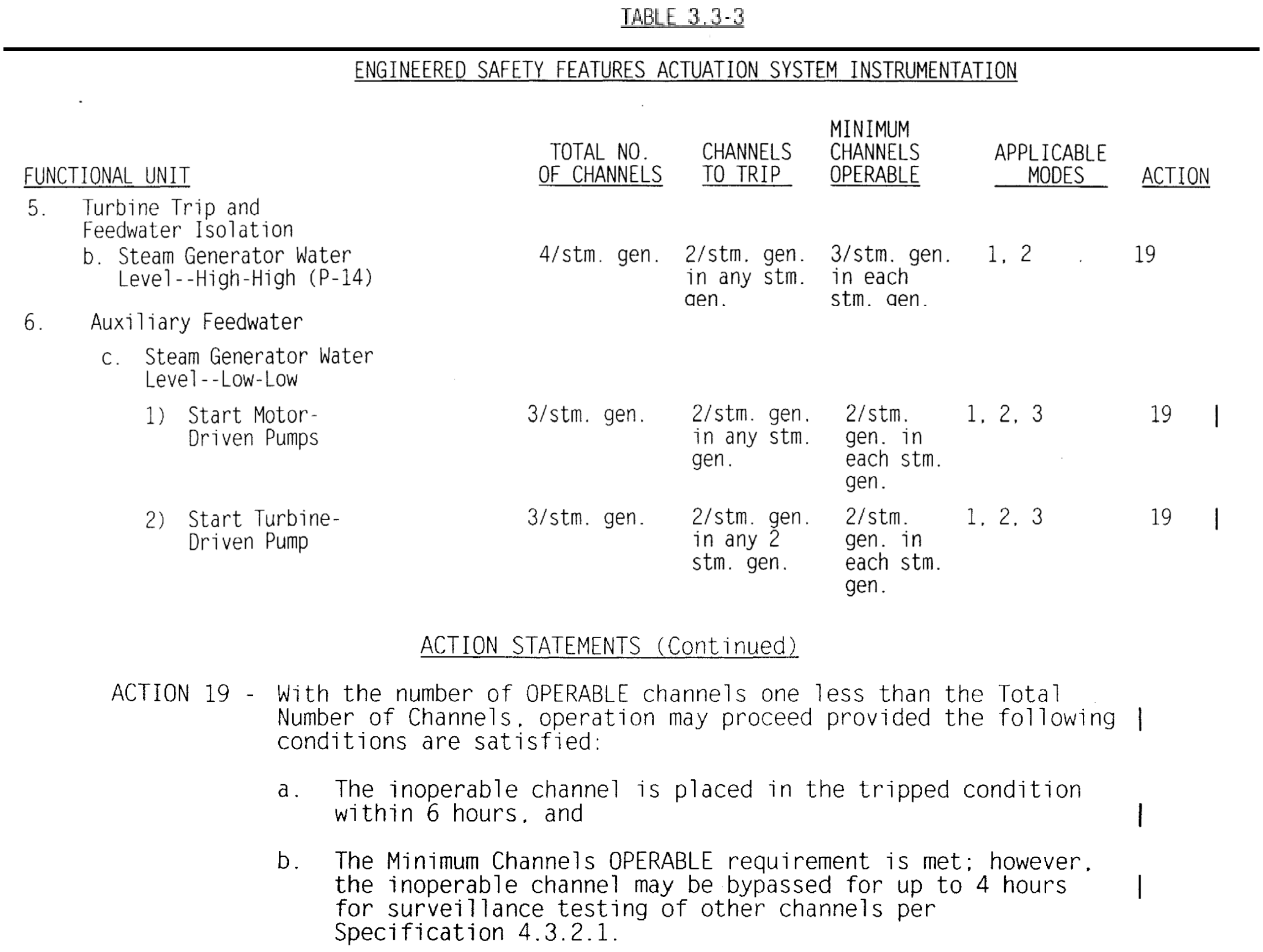


TABLE 3.3-3

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
5. Turbine Trip and Feedwater Isolation					
b. Steam Generator Water Level--High-High (P-14)	4/stm. gen.	2/stm. gen. in any stm. gen.	3/stm. gen. in each stm. gen.	1, 2	19
6. Auxiliary Feedwater					
c. Steam Generator Water Level--Low-Low					
1) Start Motor-Driven Pumps	3/stm. gen.	2/stm. gen. in any stm. gen.	2/stm. gen. in each stm. gen.	1, 2, 3	19
2) Start Turbine-Driven Pump	3/stm. gen.	2/stm. gen. in any 2 stm. gen.	2/stm. gen. in each stm. gen.	1, 2, 3	19

ACTION STATEMENTS (Continued)

ACTION 19 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 2 (Continued)

Event 6: Steam line Break on 'B' SG inside Containment (EOP-E-0 and EOP-E-2). The major event is a Steam line break. The RCS Loop ‘B’ will degrade into a break inside containment requiring the crew to implement the continuous actions for AOP-042 with change in Reactor Power greater than 5% due to a steam leak and trip the Reactor and shut Main Steam Isolation Valves and MSIV Bypass Valves. Major changes in Pressurizer Level and Charging flow will occur.

Verifiable Action: The OATC will manually trip the Reactor in accordance with AOP-042, then shut Main Steam Isolation Valves and MSIV Bypass Valves. Due to the break size the crew may actuate Safety Injection and continue with EOP-E-0. The crew will then transition from EOP-E-0 and go to EOP-E-2, Faulted Steam Generator Isolation. While the crew is performing actions of EOP-E-2 the Containment pressure will continue to rise beyond 10 psig which will actuate a Phase B isolation signal. This will require ALL RCPs to be secured.

All RCPs will need to be manually tripped within 10 minutes of a Phase B isolation signal. **(Critical Task #3)**

Event 7: ‘B’ Containment Spray pump fails to auto start. ‘B’ CT pump should auto start when Containment pressure is > 10 psig but does not.

Verifiable Action: The operator will first attempt to actuate Containment Spray using the MCB actuation switches but the actuation still does not occur requiring manual starting of the ‘B’ CT pump and alignment of the ‘B’ Train CT valves AD-OP-ALL-1000, Conduct of Operations, (5.6.3.8) for Equipment Manipulation and Status Control.

Event 8: 1SI-4 failure to close from MCB switch. While implementing EOP-E-2 the crew will be directed to reset SI and shut BIT outlet valves then establish a normal Charging lineup. When the crew attempts to shut 1SI-4 from the MCB the valve will not close.

Verifiable Action: The crew should identify this failure and direct an Aux Operator to locate and shut the 1SI-4 locally in accordance with the EOP-E-2 RNO step. Not shutting 1SI-4 prior to establishing a normal Charging lineup will cause simultaneous flow through the Charging and SI lines and cause a CSIP run out condition indicated by oscillating discharge pressure. **(Critical Task #4).**

The scenario termination is met in EOP-ES-1.1 when Safety Injection has been terminated and the crew restores letdown to service. With PZR level lowering and RCS Hot Leg Temperatures stable or lowering the RCS pressure challenge will be removed.

CRITICAL TASK JUSTIFICATION:

1. Manually start the standby DEH Pump prior to DEH pressure lowering below 1150 psig to prevent an automatic or manual Turbine Trip/Reactor trip

   An unnecessary automatic or manual Reactor Trip for this event will create a critical task. See note below.

2. Manually maintain control of SG ‘B’ level below 78% to prevent an automatic or manual Turbine Trip/Reactor trip after steam generator level transmitter LT-486 fails low

   An unnecessary automatic or manual Reactor Trip for this event will create a critical task. See note below.

3. Manually trip all RCPs within 10 minutes of a Phase B isolation signal

   Securing RCPs during a large steam break inside Containment is procedurally required when Containment pressure has exceeded the High 3 setpoint of 10 psig. Exceeding this pressure causes a Phase B actuation which will isolate CCW flow to the RCP motor coolers. Operation of RCPs for greater than 10 minutes without CCW cooling to the motor oil coolers may result in RCP bearing damage.

4. Shut BIT Outlet valve 1SI-4 prior to establishing flow through the charging header.

   Isolation of Safety Injection is required to allow the operator to stabilize RCS plant conditions. Eventually the Pressurizer will fill with water rendering pressurizer control ineffective. Consequently, in order to decrease RCS pressure to conserve makeup water, Safety Injection flow must be decreased. Because Safety Injection flow cannot be throttled, once the criteria to reduce Safety Injection flow is met Safety Injection is terminated by isolating Safety Injection flow, reducing to one CSIP in operation and realigning the CSIP discharge to the normal charging header. Shutting the BIT outlet valves is the first step in realigning normal charging to the RCS. Not shutting 1SI-4 prior to establishing a normal Charging lineup will cause simultaneous flow through the Charging and SI lines and cause a CSIP run out condition indicated by oscillating discharge pressure.

Note: Causing an unnecessary plant trip or ESF actuation (automatic or manual) may constitute a CT failure. Actions taken by the applicant(s) will be validated using the methodology for critical tasks in Appendix D to NUREG-1021.

Simulator Setup

Reset to IC-142 password “NRC3sros”

Go to RUN

Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens for normal full power conditions

(The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS

Provide a Reactivity Plan to candidates for shutting down the plant

Provide a copy of the following procedures:

- GP-005, Power Operations, (Mode 2 To Mode 1) **marked up** through section 6.2 step 134

Press START on Counter Scaler
Post conditions for status board from IC-5 Reactor Power 53%
Control Bank D at 156 steps
RCS boron 1725 ppm

Turnover: The plant is at 53% power, beginning of core life. GP-005 step 134.e on hold for turnover. Once turnover is complete, raise TCS Load Control to 4 GVPC units/ min and continue the power ascension @ 4 MW/min.

Equipment Under Clearance:

- Boric Acid Transfer Pump A-SA is under clearance due to breaker blown control power fuses. Has been under clearance for 12 hours. The problem with the breaker has been repaired and the clearance will be removed later this shift. Tech Spec 3.3.3.5.b Action **c** and 3.1.2.2 applies (3.1.2.2 is for tracking only). OWP-CS-04 has been completed.

- 1CS-9, Letdown Orifice Isolation valve, has been under clearance the last 12 hours for solenoid replacement. The repairs are close to completion and the valve is expected to be returned to service within the next hour. The valve is currently shut with power removed. OWP-CS-09 has been completed. Tech Specs 3.6.3 Action **b** applies.

- ‘A’ Gland Seal Exhauster Fan is under clearance for high vibrations on the motor bearing. The fan has been under clearance for 8 hours. Repairs are expected to be completed within 24 hours.

Simulator Setup (continued)

Align equipment for repairs:

Place CIT on ‘A-SA’ Boric Acid Transfer pump MCB Switch
Place protected train placards IAW OMM-001 Attachment 5
    Protected Train placards on ‘B-SB’ BA Transfer pump

Place CIT on ‘A’ Gland Steam Condenser Exhaust Fan MCB switch

Place CIT on 1CS-9 MCB switch

Place filled out copies of OWP’s into the OWP book – ensure they are removed at end of day

- OWP-CS-04 and place in MCR OWP book for ‘A’ BA Transfer pump
- OWP-CS-09 and place in MCR OWP book for 1CS-9 clearance

Hang restricted access signs on MCR entry swing gates

Op Test No.:	NRC	Scenario #	2	Event #	1	Page	14 of 81
Event Description:			**Power Ascension**				

Time	Position	Applicant's Actions or Behavior

Lead Evaluator:	**The crew has been directed to re-commence a power ascension from 53% to the unit is at 100%. The power ascension is on hold for turnover. The SRO is expected to conduct a reactivity brief prior to commencing the power ascension. This brief may be conducted outside the simulator prior to starting the scenario.**
	When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce: **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**

Simulator Operator:	**When directed by the Lead Evaluator, ensure that the annunciator horns are on and place the Simulator in RUN.**

Evaluator Note:		**The crew may elect to begin dilution prior to raising turbine load.**
	OATC	OP-107.01, Section 5.4
	OATC	1. DETERMINE the volume of makeup water to be added. (Current OPT-1536 data may be used.)
	SRO	Directs dilution
Procedure Note:		**FIS-114 may be set for one gallon less than desired. A pressure transient caused by 1CS-151 shutting results in FIS-114 normally indicating one gallon more than actual flow but two gallons more would be unexpected.**

Op Test No.:	NRC	Scenario #	2	Event #	1	Page	15	of 81
Event Description:				**Power Ascension**				

Time	Position	Applicant's Actions or Behavior
Procedure Caution:		**If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.**
	OATC	2. SET FIS-114, TOTAL MAKEUP WTR BATCH COUNTER, to obtain the desired quantity.
	OATC	3. ENSURE the RMW CONTROL switch has been placed in the STOP position. 4. ENSURE the RMW CONTROL switch green light is lit.
	OATC	5. IF the current potentiometer setpoint of controller 1CS-151, FK-114 RWMU FLOW, needs to be changed to obtain makeup flow, THEN PERFORM the following: (N/A)
		a. RECORD the current potentiometer setpoint of controller 1CS-151, FK-114 RWMU FLOW, in Section 5.4.3. b. SET controller 1CS-151, FK-114 RWMU FLOW, for the desired flow rate.
	OATC	6. PLACE control switch RMW MODE SELECTOR to the ALT DIL position.
Procedure Note:		• **Alternate Dilution may be manually stopped at any time by turning the control switch RMW CONTROL to STOP.**

Op Test No.: NRC	Scenario # 2	Event # 1	Page 16 of 81
Event Description:	**Power Ascension**		

Time	Position	Applicant's Actions or Behavior
	OATC	7. START the makeup system as follows: a. TURN control switch RMW CONTROL to START momentarily. b. ENSURE the RED indicator light is LIT. c. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP. 8. ENSURE dilution automatically terminates when the desired quantity has been added.
	OATC	9. IF controller 1CS-151, FK-114 RWMU FLOW, potentiometer was changed in Step 5.4.2.5, THEN PERFORM the following: (N/A)
		a. REPOSITION controller FK-114 to the position recorded in Section 5.4.3. b. INDEPENDENTLY VERIFY FK-114 potentiometer position of Step 5.4.2.9.a is correct.
	OATC	10. Monitor Tavg and rod control for proper operation. 11. Establish VCT pressure between 20-30 psig. 12. Turn control switch RMW MODE SELECTOR to AUTO. 13. START the makeup system as follows: a. TURN control switch RMW CONTROL to START momentarily. b. ENSURE the RED indicator light is LIT. c. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP. (Ref. 4.0.31)
Evaluator Note:		**There is no procedural guidance directing when the dilution to raise power is required. The crew may elect to perform the raise prior to placing the Turbine in GO.**
	SRO	DIRECTS BOP to start power ascension at 4 MW/Min. May direct initiation of a dilution before the power ascension begins.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 17 of 81
Event Description:	**Power Ascension**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**The following steps have been completed to achieve the current power level. The crew should validate status of the turbine load ascension in accordance with GP-005 section 6.2 step 108 and 110 before re-initiating the turbine load ascension.**
	BOP	Requests PEER check prior to manipulations of TCS Load Control screen
	BOP	108.On the TCS Load Control screen, Load Control section, perform the following: a. Select Ramp Rate Selection, Select button b. Select the desired ramp rate determined in Step 16.a OR Oper Entry **(4 GVPC Units/minute)** c. IF Oper Entry is selected, THEN enter the desired ramp rate determined in Step 16.a in the Ramp Rate Entry window and depress Enter. • ENTER the desired rate. **(4 GVPC Units/minute)** • DEPRESS the ENTER push-button.
Procedure Note:		**If Oper Entry is selected with the Turbine in GO, the value currently in the Ramp Rate Entry Window will become the rate in effect. It may be desirable to place the turbine in HOLD to avoid undesirable rates.**
	BOP	110.WHEN ready to continue raising turbine load, THEN perform the following on TCS Load Control screen, Load Control section:
		a. IF 960 GVPC Units was NOT entered in the Target Entry window in Step 109.b, THEN enter 960 GVPC Units in the Target Entry window and depress Enter. **(960 GVPC Units)**. b. Select the Go button
	BOP	Ensure Generator load is rising

Op Test No.:	NRC	Scenario #	2	Event #	1	Page	18 of 81
Event Description:			**Power Ascension**				

Time	Position	Applicant's Actions or Behavior

Evaluator Note:	**Once the crew demonstrates a satisfactory load ascension cue Simulator Operator to insert Trigger 2** **Event 2: PRNIS Channel NI-42 fails HIGH (AOP-001)**

Op Test No.:	NRC	Scenario #	2	Event #	2	Page	19	of	81
Event Description:			PRNIS Channel NI-42 fails HIGH (AOP-001)						

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from Lead Evaluator actuate Trigger 2** **"PRNIS Channel NI-42 fails HIGH (AOP-001)"**	
Indications Available		• **Uncontrolled inward rod motion** • **ALB-013-4-1, POWER RANGE HIGH NEUTRON FLUX HIGH SP ALERT** • **ALB-013-4-2, POWER RANGE HIGH NEUTRON FLUX HIGH ALERT** • **ALB-013-4-5, POWER RANGE CHANNEL DEVIATION** • **ALB-013-5-1, OVERPOWER ROD STOP** • **ALB-013-8-5, COMPUTER ALARM ROD DEV/SEQ NIS PWR RANGE TILTS**	
	OATC	RESPONDS to uncontrolled rod motion.	
AOP-001		Malfunction of Rod Control and Indication System	
	SRO	ENTERS and directs actions of AOP-001 Conducts a Crew Update Makes PA announcement for AOP entry	
	OATC	PERFORMS immediate actions.	
Immediate Action	OATC	1. CHECK that LESS THAN TWO control rods are dropped.	(YES)
Immediate Action	OATC	2. POSITION Rod Bank Selector Switch to MAN.	
Immediate Action	OATC	3. CHECK Control Bank motion STOPPED.	(YES)
	SRO	READS immediate actions and proceeds to Section 3.2. Directs BOP to place Turbine to HOLD if in GO.	

Op Test No.:	NRC	Scenario #	2	Event #	2	Page	20	of 81
Event Description:			PRNIS Channel NI-42 fails HIGH (AOP-001)					

Time	Position	Applicant's Actions or Behavior	
	BOP	Places Turbine to HOLD if in GO.	
	OATC	1. CHECK that instrument channel failure has NOT OCCURRED by observing the following: • RCS Tavg • RCS Tref • Power Range NI channels • Turbine first stage pressure	 (NO) (NO) (YES) (NO)
	OATC	1. PERFORM the following: • IF a power supply is lost, THEN GO TO AOP-024, Loss of Uninterruptible Power Supply. • IF an individual instrument failed, THEN MAINTAIN manual rod control until corrective action is complete. • IF a Power Range NI Channel failed, THEN BYPASS the failed channel using OWP-RP.	 (NO) (YES) (YES)
	BOP	Proceeds to the Detector Current Comparator Drawer and places NI-42 Rod Stop Bypass switch to BYPASS • Reports completion of task to the SRO.	
Procedure Note:		**Failure of RCS Median TAVE will cause an improper response of the PRESSURIZER AUTOMATIC LEVEL CONTROL and AUTOMATIC STEAM DUMP CONTROL systems.**	
	OATC	• IF RCS MEDIAN Tavg is failed THEN PERFORM the following: ○ ENSURE Charging FK-122.1 charging flow 1CS-231 is in manual and CONTROL charging to maintain pressurizer level. ○ ENSURE steam dumps are in Steam Pressure Mode using OP-126, section 5.3.	(NO) (N/A) (N/A)

Op Test No.:	NRC	Scenario #	2	Event #	2	Page	21	of	81
Event Description:	**PRNIS Channel NI-42 fails HIGH (AOP-001)**								

Time	Position	Applicant's Actions or Behavior	
	OATC	2. MANUALLY OPERATE affected control bank to restore the following: • EQUILIBRIUM power and temperature conditions • RODS above the insertion limits of Tech Spec 3.1.3.6 and PLP-106, Technical Specification Equipment List Program and Core Operating Limits Report. • Withdraws Control Bank 'D' to restore Tave with Tref.	
	SRO	• Directs RO to maintain TAVG within 5°F of Tref per OMM-001 attachment 11.	
Evaluator Note:		The following will be done when Tave is restored.	
	OATC	3. VERIFY proper operation of the following: • CVCS demineralizers • BTRS • REACTOR Makeup Control System	(YES) (N/A) (YES)
	SRO	4. CHECK that this section was entered due to control banks MOVING OUT.	(NO)
	SRO	6. CHECK that NEITHER of the following OCCURRED: • Unexplained RCS Boration • Unplanned RCS dilution	(NO) (NO)

Controller	Control Band	Administrative Limit	
		Low	High
Rod Control Stable Plant	T Avg within 2° of T Ref	T Avg Within 10° of T Ref	T Avg Within 10° of T Ref
Rod Control Transient Plant	T Avg within 5° of T Ref	T Avg Within 10° of T Ref	T Avg Within 10° of T Ref

Op Test No.:	NRC	Scenario #	2	Event #	2	Page	22	of 81
Event Description:	**PRNIS Channel NI-42 fails HIGH (AOP-001)**							

Time	Position	Applicant's Actions or Behavior
Procedure Note:		**Failure of RCS Median TAVE will cause an improper response of the PRESSURIZER AUTOMATIC LEVEL CONTROL and AUTOMATIC STEAM DUMP CONTROL systems.**
	SRO	7. CHECK that spurious rod motion is due to malfunction of the Automatic Rod Control System. (NO) NO – RNO GO TO Step 9.
	SRO	9. EXIT this procedure.
	SRO	Exits AOP-001
OWP-RP-24	SRO	Refer to OWP-RP-24 to remove channel from service.
	SRO	• Direct operator and I&C to perform OWP-RP-24 • Completes an Emergent Issue Checklists for the failure of NI-42. • Contacts WCC for assistance (WR, LCOTR and Maintenance support)
Simulator Communicator:		**Acknowledge request and reports from SRO.** **IF asked to report to MCR to perform OWP-RP-24 state that you will report as soon as possible.**
Simulator Operator:		**It is not required to implement the OWP prior to continuing with the scenario.**
Evaluator Note:		**Any Tech Spec evaluation may be completed with a follow-up question after the scenario.**

Op Test No.: NRC Scenario # 2 Event # 2 Page 23 of 81

Event Description: **PRNIS Channel NI-42 fails HIGH (AOP-001)**

Time	Position	Applicant's Actions or Behavior
	SRO	Enters Instrumentation TS 3.3.1 Functional Unit 2, and 3 ACTION 2 - With the number of OPERABLE channels one less than the Total Number of Channels. STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 6 hours. b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1. and c. Either, THERMAL POWER is restricted to less than or equal to 75% of RATED THERMAL POWER and the Power Range Neutron Flux Trip Setpoint is reduced to less than or equal to 85% of RATED THERMAL POWER within 4 hours; or,. the QUADRANT POWER TILT RATIO is monitored at least once per 12 hours per Specification 4.2.4.2 **Reference the below T.S. but it will not apply for this conditions because 3 instruments is the Minimum Number required** 3.3.1 Functional Unit 19 b, c, and d. ACTION 7 - With less than the Minimum Number of Channels OPERABLE, within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.
Evaluator's Note:		**When Tavg is restored and AOP-001 exited, cue Simulator Operator to insert Trigger 3** **Event 3: Pressurizer Level Transmitter for LT-460 fails low**

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	24	of 81
Event Description:	**Pressurizer Level Transmitter for LT-460 fails low**							

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 3 "Pressurizer Level Transmitter for LT-460 fails low"**
Indications Available:		• **ALB-009-4-3, PRESSURIZER LOW LEVEL LTDN SECURED AND HTRS OFF** • **LI-460, Pressurizer Level Indication** • **FI-150.1, Letdown Flow Indication**
	RO	Responds to ALB-009-4-3 or indication of a failed Pressurizer Level Channel on LI-460.
APP-ALB-009	SRO	Enters APP-ALB-009-4-3
Evaluator Note:		Operator may use AD-OP-ALL-1000 guidance to take manual control of charging to avoid a trip or transient prior to the SRO direction.
	RO	1. CONFIRM alarm using: a. Pressurizer level LI-459A1, LI-460, LI-461.1 (LI-460 low) b. Letdown flow FI-150.1
	RO	2. VERIFY Automatic Functions: a. All pressurizer heaters off b. Letdown isolated
	SRO	• Directs RO to maintain controlling band +/- 5% of reference level per OMM-001 attachment 11.

Controller	Control Band	Administrative Limit	
		Low	High
Pressurizer Level	Within 5% of Reference Level	10%	75%

Op Test No.: NRC	Scenario # 2	Event # 3	Page 25 of 81	
Event Description:	**Pressurizer Level Transmitter for LT-460 fails low**			

Time	Position	Applicant's Actions or Behavior	
	RO	3. PERFORM Corrective Actions: a. IF PRZ level is low, THEN VERIFY letdown is isolated AND heaters are off. b. IF RCS leakage is indicated, THEN GO TO AOP-016, Excessive Primary Plant Leakage. c. IF alarm is due to malfunction of level control system, THEN MANUALLY RESTORE normal level. **(LT-459 is controlling channel for PZR level)** d. IF the alarm is due to a failed level instrument (1) USING the Pressurizer Level Controller Selector switch, THEN SELECT a position which places the two operable channels into service. **(Select channels 459/461)** (2) VERIFY the failed channel is not selected, at the MCB recorder panel. (3) RESET the control heaters by placing the control switch to OFF and then back to ON. (4) IF maintenance is to be performed, THEN REFER TO OWP-RP, Reactor Protection.	(YES) (NO) (NO) (YES)
	RO	SELECT 459/461 on Pressurizer Level Controller Selector	
OWP-RP-03	SRO	Refer to OWP-RP-03 to remove channel from service.	
	SRO	• Direct operator and I&C to perform OWP-RP-03 • Completes an Emergent Issue Checklists for the failure of LT-460. • Contacts WCC for assistance (WR, LCOTR and Maintenance support)	
Simulator Communicator:		**Acknowledge request and reports from SRO.** **IF asked to report to MCR to perform OWP-RP-03 state that you will report as soon as possible.**	
Simulator Operator:		**It is not required to implement the OWP prior to continuing with the scenario.**	

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	26	of 81

Event Description: **Pressurizer Level Transmitter for LT-460 fails low**

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Any Tech Spec evaluation may be completed with a follow-up question after the scenario.**
	SRO	Enters Instrumentation TS 3.3.1 Functional Unit 11 ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels. STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 6 hours. b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.
	SRO	• Completes an Emergent Issue Checklists for the failure of LI-460. • Contacts WCC for assistance (WR, LCOTR and Maintenance support)
Simulator Communicator		**Acknowledge request.**
Evaluator's Note:		**Once the crew has taken manual control of Charging FCV-122 and selects an alternate controlling Pressurizer channel normal letdown flow may be restored.** **IF desired to observe the restoration of normal letdown the actions have been listed on pages 27-31.** **IF desired to have normal letdown remain isolated continue to page 32 and cue Simulator Operator to insert Trigger 4** **Event 4: DEH pump shaft shear and failure of the standby pump to start**

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	27	of 81
Event Description:	**Restore letdown IAW OP-107, Chemical and Volume Control System**							

Time	Position	Applicant's Actions or Behavior	
OP-107		OP-107, Section 5.4	
	RO	Verifies Initial Conditions: 1. Charging flow has been established per Section 5.3. 2. Pressurizer level is greater than 17%. 3. The following valves are shut: ○ 1CS-7, 45 GPM Letdown Orifice A ○ 1CS-8, 60 GPM Letdown Orifice B ○ 1CS-9, 60 GPM Letdown Orifice C	(YES) (YES) (YES)
Procedure Caution:		If Charging flow was stopped or greatly reduced prior to letdown being secured, there is a possibility that the Letdown line contains voids due to insufficient cooling. This is a precursor to water hammer, and should be evaluated prior to initiating letdown flow.	
	RO	1. VERIFY 1CC-337, TK-144 LTDN TEMPERATURE, controller is: • In AUTO AND • Set for 110 to 120˚F (4.0 to 4.7 on potentiometer) normal operation OR • Set for 90 to 120˚F (2.67 to 4.7 on potentiometer) if operating per Section 8.11	
Procedure Note:		PK-145.1 LTDN PRESSURE, 1CS-38, may have to be adjusted to control at lower pressures.	
	RO	2. VERIFY 1CS-38 Controller, PK-145.1 LTDN PRESSURE: • in MAN • output set at 50%	
		3. VERIFY open the following Letdown Isolation Valves: • 1CS-2, LETDOWN ISOLATION LCV-459	

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	28	of	81

Event Description: **Restore letdown IAW OP-107, Chemical and Volume Control System**

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td></td><td></td><td>• 1CS-1, LETDOWN ISOLATION LCV-460</td></tr>
<tr><td></td><td>RO</td><td>4. VERIFY open 1CS-11, LETDOWN ISOLATION.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2" rowspan="3">Procedure Note:</td><td>The following table gives the minimum charging flow required to keep the regenerative heat exchanger temperature below the high temperature alarm when letdown is established:</td></tr>
<tr><td><table>
<tr><th>Letdown flow (to be established)</th><th>Minimum Charging Flow necessary when letdown is established</th></tr>
<tr><td>45 gpm</td><td>20 gpm</td></tr>
<tr><td>60 gpm</td><td>26 gpm</td></tr>
<tr><td>105 gpm</td><td>46 gpm</td></tr>
<tr><td>120 gpm</td><td>53 gpm</td></tr>
</table></td></tr>
<tr><td>If Pressurizer level is above the programmed level setpoint, charging flow should be adjusted to a point above the minimum required to prevent regenerative heat exchanger high temperature alarm but low enough to reduce pressurizer level.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO</td><td>5. ADJUST controller 1CS-231, FK-122.1 CHARGING FLOW, as required to:
• Maintain normal pressurizer level program.
• Keep regenerative heat exchanger temperature below the high temperature alarm when the desired letdown orifice is placed in service.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">Procedure Note:</td><td>If CVCS Demins have cooled from normal operating temperature, an increased reactivity affect may be observed. Consideration may be given to increasing CVCS Demins to operating temperature by flushing them to the RHT prior to restoring letdown. TIS-250, Recycle evaporator Feed Demineralizer Temperature Switch, can be used to determine temperature during flushing to the RHT.</td></tr>
<tr><td></td><td></td><td></td></tr>
</table>

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	29	of 81
Event Description:	**Restore letdown IAW OP-107, Chemical and Volume Control System**							

Time	Position	Applicant's Actions or Behavior	
	RO	6. IF flushing CVCS Demins to the RHT is desired for increasing temperature, THEN PERFORM the following: a. NOTIFY Radwaste Control Room that letdown flow will be diverted to the RHT. b. PLACE 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the RHT position.	(N/A)
Procedure Note:		Changes in Letdown flowrate will affect the displayed value for RM-3502A (Channel 2303) due to the detector's proximity to the LTDN line.	
	RO	7. OPEN an Orifice Isolation Valve (1CS-7, 1CS-8, 1CS-9) for the orifice to be placed in service. 8. ADJUST 1CS-38 position by adjusting PK-145.1 output as necessary to control LP LTDN Pressure (PI-145.1) at 340 to 360 psig, to prevent lifting the LP Letdown Relief.	
	RO	9. WHEN Letdown pressure has stabilized at 340 to 360 psig on PI-145.1, LP LTDN PRESS, THEN PERFORM the following: a. ADJUST PK-145.1 LTDN PRESSURE setpoint to 58%. b. PLACE the controller in AUTO. 10. VERIFY PK-145.1 LTDN PRESSURE Controller maintains Letdown pressure stable at 340 to 360 psig.	
	RO	11. IF Step 5.4.2.6 was performed AND CVCS Demin temperature is at normal operating temperature, THEN PERFORM the following: a. PLACE 1CS-120, LETDOWN TO VCT/HOLDUP TANK LCV-115A to the AUTO position. b. NOTIFY Radwaste Control Room that diversion to the RHT has been terminated.	(N/A)

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	30	of 81

Event Description: **Restore letdown IAW OP-107, Chemical and Volume Control System**

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td colspan="2">Procedure Note:</td><td>Changes in Letdown flowrate will affect the displayed value for RM-3502A (Channel 2303) due to the detector's proximity to the LTDN line.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO</td><td>12. OPEN additional orifice isolation valves (1CS-7, 1CS-8, 1CS-9) as required.
13. ADJUST charging flow as necessary to:
• Prevent high temperature alarm (per table above)
• Maintain pressurizer programmed level.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">Evaluator Note:</td><td>Placing LK-459F in AUTO may take several minutes due to matching PRZ level to reference level.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>RO</td><td>14. PLACE PRZ level controller, LK-459F, in AUTO, as follows:
a. PLACE PRZ level controller, LK-459F, in MAN to cancel any integrated signal.
b. Record FI-112A.1, Charging flow.
c. Determine PRZ level controller , LK-459F setpoint by using the table below:
<table>
<tr><th>LTDN Flow</th><th>Charging Flow</th><th>LK-459F Setpoint (approx. value)</th></tr>
<tr><td>45 gpm</td><td>27 gpm</td><td>*3%</td></tr>
<tr><td>60 gpm</td><td>42 gpm</td><td>*8%</td></tr>
<tr><td>105 gpm</td><td>87 gpm</td><td>*34%</td></tr>
<tr><td>120 gpm</td><td>102 gpm</td><td>*46%</td></tr>
<tr><td colspan="3">* Approximate values based on NOT/NOP</td></tr>
</table>
d. ADJUST PRZ level controller, LK-459F, to the calculated setpoint.
e. Place PRZ level controller, LK-459F, in AUTO</td></tr>
</table>

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	31	of 81
Event Description:	**Restore letdown IAW OP-107, Chemical and Volume Control System**							

Time	Position	Applicant's Actions or Behavior
	RO	15. WHEN the following occurs: • Program pressurizer level is matching the current pressurizer level AND • Letdown and seal return are balanced with seal injection flow and charging flow. THEN place controller 1CS-231, FK-122.1 CHARGING FLOW, in AUTO. 16. COMPLETE Section 5.4.3. (Position Verification)
Lead Evaluator:		**After the actions to restore Normal Letdown are complete, cue Simulator Operator to insert Trigger 4** **Event 4: DEH pump shaft shear and failure of the standby pump to start**

Op Test No.:	NRC	Scenario #	2	Event #	4	Page	32	of	81	
Event Description:	**DEH pump shaft shear and failure of the standby pump to start**									

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 4** **"DEH pump shaft shear and failure of the standby pump to start"**	
Evaluator Note:		**Due to the slow nature of the EHC system depressurizing (approximately 5-6 minutes) and only one MCB indication for pressure the crew may not notice a pressure reduction until the annunciator for EH fluid low pressure alarms**	
Available Indications:		• **ALB-020-4-2B, EH FLUID LOW PRESS** • **PI-4221 lowering trend**	
	BOP	Responds to ALB-20-4-2B or indication of degrading EHC pressure on PI-4221	
ALB-020	BOP	Enters APP-ALB-020-4-2B	
	BOP	1. CONFIRM alarm using	
		a. PI-4221, DEH Fluid Pressure indication b. PI-4220A and PI-4220B, Local DEH Pump discharge pressure indicators	
	BOP	2. VERIFY Automatic Functions:	
		a. Standby DEH Pump starts at 1500 psig, as sensed by PS-01TA-4223V	(NO)
Evaluator Note:		**The BOP may immediately start the standby pump or wait until after reading the APP and the report from the AO. IF pressure is allowed to continue to lower when pressure reaches 1150 psig the Main Turbine will trip.**	

Op Test No.:	NRC	Scenario #	2	Event #	4	Page	33	of	81
Event Description:	**DEH pump shaft shear and failure of the standby pump to start**								

Time	Position	Applicant's Actions or Behavior	
Critical Task #1	BOP	Starts EHC Pump 'B' and observes pressure returning to normal on PI-4221. Critical to start the standby DEH Pump prior to DEH pressure lowering below 1150 psig to prevent an automatic Turbine Trip/Reactor trip. (ALB-018 window 3-4, Turbine Trip Auto Stop Oil Trip)	
	BOP	3. PERFORM Corrective Actions:	
		a. IF the Reactor is tripped, THEN GO TO EOP-E-0. b. START the standby DEH Pump. ○ **Manually starts standby DEH Pump** c. IF EH fluid pressure drops to 1500 psig, THEN INITIATE a rapid plant shutdown using AOP-038, Rapid Downpower, while continuing with this procedure.	(NO) (NO) (NO)
	BOP	d. DISPATCH an operator to perform the following: (1) MONITOR DEH Pump and PCV operation. (2) VERIFY OPEN the following: (a) 1EH-1, A EH Pump Suction Vlv (b) 1EH-8, B EH Pump Suction Vlv (c) 1EH-31, Main Hdr Press Switch Isol Vlv (3) INVESTIGATE system for leaks. (4) IF a leak is found, THEN ISOLATE the leak AND IMMEDIATELY NOTIFY Control Room.	(NO)
		Dispatches AO to investigate failure of EHC Pump 'A'.	
Simulator Communicator:		**When dispatched to investigate, report the 'A' EHC Pump shaft is sheared and not producing any discharge pressure.**	
	SRO	- Completes an Emergent Issue Checklists for the failure of DEH Pump A. - Contacts WCC for assistance (WR, and Maintenance support)	

Op Test No.: NRC Scenario # 2 Event # 4		Page 34 of 81
Event Description:	**DEH pump shaft shear and failure of the standby pump to start**	
Time	Position	Applicant's Actions or Behavior

Lead Evaluator:	**After the crew has restored DEH header pressure, cue Simulator Operator to insert Trigger 5** **Event 5: 'B' SG Controlling Level Transmitter fails Low (AOP-010)**

Op Test No.:	NRC	Scenario #	2	Event #	5	Page	35 of	81
Event Description:	**SG 'B' Controlling Level Transmitter fails Low (AOP-010)**							

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 5 "SG 'B' Controlling Level Transmitter fails Low (AOP-010)"**	
Indications Available:		• **ALB-014-2-1B, SG B NR LVL/SP HI/LO DEV** • **ALB-014-5-1A, SG B FW > STM FLOW MISMATCH** • **ALB-014-5-4B, STEAM GEN B LOW-LOW LVL** • **SG 'B' levels rising**	
	BOP	RESPONDS to alarms and ENTERS AOP-010	
AOP-010		Feedwater Malfunctions	
	SRO	ENTERS and directs actions of AOP-010 Conducts a Crew Update Makes PA announcement for AOP entry	
Procedure Note:		**Steps 1 through 4 are immediate actions.**	
Critical Task # 2 **Immediate Action**	BOP	1. CHECK Feedwater Regulator valves operating properly. **RNO** 1. PERFORM the following: • PLACE affected Feedwater Regulator valve(s) in MANUAL. Places SG 'B' Feedwater Reg valve in MANUAL • MAINTAIN Steam Generator level(s) between 52 and 62%. Checks SG level and operates manual controller to maintain level between 52%-62%. ***Critical Task: Maintain control of SG 'B' level below 78% to prevent an automatic Turbine Trip/Reactor trip after the controlling level transmitter LT-486 fails low.*** • IF Steam Generator level(s) cannot be controlled, THEN TRIP the Reactor AND GO TO EOP-E-0. **(Should be controlled)**	(NO)

Op Test No.:	NRC	Scenario # 2	Event # 5	Page	36 of 81	
Event Description:	**SG 'B' Controlling Level Transmitter fails Low (AOP-010)**					

<table>
<tr><th>Time</th><th>Position</th><th colspan="2">Applicant’s Actions or Behavior</th></tr>
<tr><td>Immediate Action</td><td>BOP</td><td>2. CHECK ANY Main Feedwater Pump TRIPPED

RNO
2. GO TO STEP 6</td><td>(NO)</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>BOP</td><td colspan="2">6. MAINTAIN ALL of the following:
• At least ONE Main Feedwater Pump RUNNING
• Main Feedwater flow to ALL Steam Generators
• ALL Steam Generator levels greater than 30%
Maintains all of the above</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>BOP</td><td>7. CHECK Feedwater Regulator Valves operating properly in AUTO: (NO not ‘B’)
• Response to SG levels
• Valve position indication
• Response to feed flow/steam flow mismatch

RNO
7. PERFORM the following:
a. IF automatic SG water level control can be restored by selecting out a failed instrument, THEN USE OP-134.01, Feedwater System, Section 8.10 to swap Steam Flow/Feed Flow Control and Recorder Channels and restore level control to automatic.
b. REFER to Tech Spec 3.3.1 AND IMPLEMENT OWP-RP or OWP-ESF where appropriate.
c. IF needed, THEN CONTROL feed flow to SGs using Main Feed Reg Valve Bypass FCVs.</td><td>(NO)
(NO)
(NO)</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>SRO</td><td colspan="2">• Directs BOP to maintain controlling band of 52% to 62% per OMM-001 attachment 11.
<table>
<tr><th rowspan="2">Controller</th><th rowspan="2">Control Band</th><th colspan="2">Administrative Limit</th></tr>
<tr><th>Low</th><th>High</th></tr>
<tr><td>Steam Generator Level</td><td>52% to 62%</td><td>30%</td><td>73%</td></tr>
</table></td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Procedure Note:</td><td colspan="2">Inability to monitor one or more Safety System Parameters concurrent with a turbine runback of greater than 25%, requires a change of event classification per the HNP Emergency Plan. [C.2, C.3].</td></tr>
</table>

Op Test No.: NRC	Scenario # 2	Event # 5	Page	37 of 81	
Event Description:	SG 'B' Controlling Level Transmitter fails Low (AOP-010)				
Time	Position	Applicant's Actions or Behavior			

Time	Position	Applicant's Actions or Behavior	
	BOP	8. CHECK turbine runs back less than 25% turbine load	(YES)
Procedure Note:		A feedwater train consists of a Condensate Pump, Condensate Booster Pump and Main Feedwater Pump.	
	SRO	9. GO TO the applicable section: EVENT: All Condensate/Feedwater flow malfunctions (other than pump trips) Section 3.1 Page 10	
	BOP	1. CHECK the following Recirc and Dump Valves operating properly in MODU: • Main Feedwater Pumps • Condensate Booster Pumps • Condensate Pumps • 1CE-293, Condensate Recirc • 1CE-142, Condensate Dump To CST Isolation Valve (SLB-4/7-1)	(YES) (YES) (YES) (YES) (YES)
	BOP	2. CHECK the Condensate and Feedwater System INTACT.	
Procedure Note:		Pumps should be stopped in the order of higher to lower pressure. (To stop a Condensate Pump, stop a Main Feedwater Pump followed by a Condensate Booster Pump and then the Condensate Pump.)	
	BOP	3. CHECK pumps for NORMAL OPERATION.	(YES)
	SRO	4. NOTIFY Load Dispatcher of ANY load limitations. (No load limitations so Dispatcher will not be called)	
	SRO	5. CHECK Reactor thermal power changed by less than 15% in any one hour period.	(YES)

Op Test No.: NRC	Scenario # 2	Event # 5	Page	38	of	81
Event Description:	**SG 'B' Controlling Level Transmitter fails Low (AOP-010)**					

Time	Position	Applicant's Actions or Behavior
	SRO	EXIT this procedure.
OWP-RP-06	SRO	Refer to OWP-RP-06 to remove channel from service.
	SRO	Contacts WCC for support, requests WR and LCOTR. Contacts I&C to have channel removed from service.
Simulator Communicator:		**Respond to crew requests.**
Evaluator Note:		**Any Tech Spec evaluation may be completed with a follow-up question after the scenario.**

Op Test No.: NRC	Scenario # 2	Event # 5	Page	39 of 81		
Event Description:	**SG 'B' Controlling Level Transmitter fails Low (AOP-010)**					

Time	Position	Applicant's Actions or Behavior
	SRO	Enters Instrumentation TS <u>3.3.1 Functional Unit 13 and 14</u> ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels. STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 6 hours. b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1. <u>3.3.2 Functional Unit 5 and 6</u> ACTION 19 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the following conditions are satisfied : a. The inoperable channel is placed in the tripped condition within 6 hours, and b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.
Evaluator Note:		**Channel does NOT have to be removed from service using the OWP to continue the scenario. Once after SG level is under control and the TS has been identified, cue Simulator Operator to insert Trigger 6** **Event 6: Steam line Break on 'B' SG inside Containment (EOP-E-0 and EOP-E-2)**

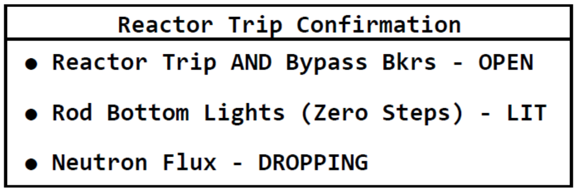
Op Test No.:	NRC	Scenario #	2	Event #	6	Page	40 of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-E-0 and EOP-E-2)**						

Time	Position	Applicant's Actions or Behavior

Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 6 "Steam line Break on 'B' SG inside Containment (EOP-E-0 and EOP-E-2)"**
Evaluator Note:		**The crew should identify the leak. The crew will enter E-0 and perform the immediate actions. The SRO may also direct a manual Steam Line Isolation. The crew should diagnose that a LOCA is NOT in progress and transition from E-0 to E-2, Faulted Steam Generator Isolation.** • **When SG 'B' pressure is < 100 psi of 'A' and 'C' SG (with MSLI) an AFW isolation signal will close the 'B' MD and TD AFW valves.** • **When Containment pressure > 3 psig the crew should identify 'Adverse Containment' conditions are required to be implemented.** • **When 1SI-4 is closed from the MCB it will fail to close requiring the RAB Aux Operator to locally close the valve** • **When Containment pressure exceeds 10 psig 'B' CT Pump should start but will NOT autostart. It must be manually started and aligned for spray.**
Indications Available		• ALB-028-5-1 CONTAINMENT AIR HIGH VACUUM will clear (if in due to earlier ESW Pump start) • ALB-028-8-5 COMPUTER ALARM VENTILATION SYSTEM • Rising pressure in Containment • Rising temperature in Containment • Rising SG steam flow • Tavg lowers • PRZ level and pressure lower • Power rises
Evaluator Note:		**The crew may go to AOP-042. They will not have time to make progress before requiring a trip.** **Depending on how timing the crew may or may not actuate a Manual Reactor trip based on conditions that will exceed an ESF actuation setpoint**

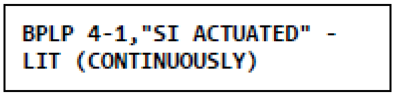
Op Test No.: NRC Scenario # 2 Event # 6 Page 41 of 81

Event Description: **Steam line Break on ‘B’ SG inside Containment (EOP-E-0)**

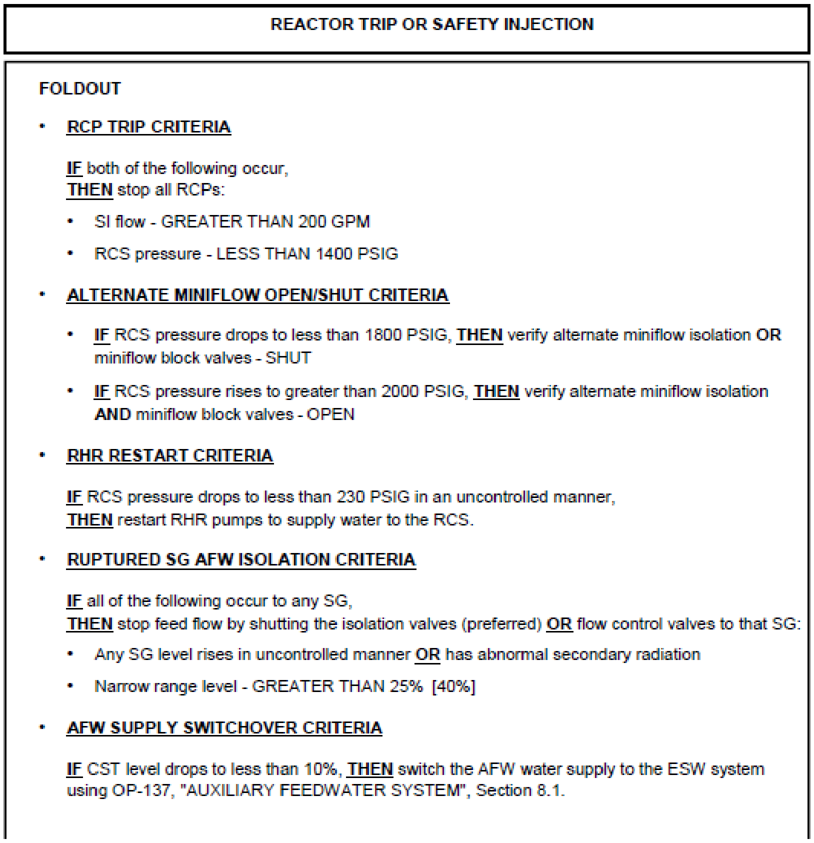
Time	Position	Applicant’s Actions or Behavior	
	RO	(Time permitting – an auto Reactor Trip may occur prior to announcement) Informs SRO then actuates a Manual Reactor Trip	
	SRO	Directs manual Reactor Trip and Ensure Safety Injection activation	
EOP-E-0		Reactor Trip Or Safety Injection	
	SRO	Enters EOP-E-0 Makes plant PA announcement Conducts a Crew Update	
Immediate Action	RO	1. Ensure Reactor Trip.  Reactor Trip Confirmation ● Reactor Trip AND Bypass Bkrs - OPEN ● Rod Bottom Lights (Zero Steps) - LIT ● Neutron Flux - DROPPING	(YES)
Immediate Action	BOP	2. Check Turbine is Tripped – All throttle valves shut  TURB STOP VLV 1 — TSLB-2-11-1 TURB STOP VLV 2 — TSLB-2-11-2 TURB STOP VLV 3 — TSLB-2-11-3 TURB STOP VLV 4 — TSLB-2-11-4	(YES)

Op Test No.: NRC Scenario # 2 Event # 6 Page 42 of 81

Event Description: **Steam line Break on ‘B’ SG inside Containment (EOP-E-0)**

Time	Position	Applicant’s Actions or Behavior	
Immediate Action	BOP	3. Perform The Following: a. AC emergency buses ‐ AT LEAST ONE ENERGIZED b. AC emergency buses – BOTH energized	(YES) (YES)
Immediate Action	RO	4. Safety Injection ‐ ACTUATED (BOTH TRAINS)  BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY)	(YES)
	SRO	5. Perform The Following: a. Review Foldout page and assign foldout. ▪ RCP Trip criteria ▪ Alternate Miniflow Open/Shut criteria ▪ RHR restart criteria ▪ Ruptured SG AFW Isolation criteria ▪ AFW supply switchover criteria	

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	43 of 81
Event Description:		**Steam line Break on 'B' SG inside Containment (EOP-E-0)**					

Time	Position	Applicant's Actions or Behavior	
Evaluator Aide:		**E-0 Foldout** 	

REACTOR TRIP OR SAFETY INJECTION

FOLDOUT

- **RCP TRIP CRITERIA**

  IF both of the following occur,
  THEN stop all RCPs:

  - SI flow - GREATER THAN 200 GPM
  - RCS pressure - LESS THAN 1400 PSIG

- **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**

  - **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
  - **IF** RCS pressure rises to greater than 2000 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN

- **RHR RESTART CRITERIA**

  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner,
  THEN restart RHR pumps to supply water to the RCS.

- **RUPTURED SG AFW ISOLATION CRITERIA**

  IF all of the following occur to any SG,
  THEN stop feed flow by shutting the isolation valves (preferred) **OR** flow control valves to that SG:

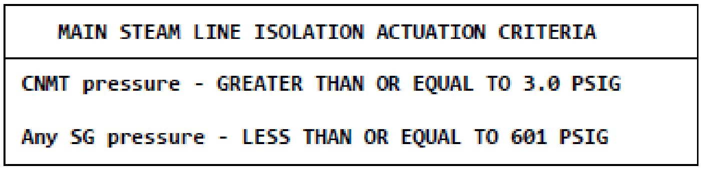
  - Any SG level rises in uncontrolled manner **OR** has abnormal secondary radiation
  - Narrow range level - GREATER THAN 25% [40%]

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

	SRO	b. Evaluate EAL Matrix.	
	CREW	Identifies Containment Adverse Conditions Containment Pressure > 3 psig	
	RO	6. Ensure CSIPs – ALL RUNNING 'A' and 'B' running	(YES)
	RO	7. Ensure RHR Pumps – ALL RUNNING 'A' and 'B' running	(YES)
	RO	8. Safety Injection flow > 200 gpm	(YES)

Op Test No.:	NRC	Scenario # 2	Event # 6	Page	44 of	81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-E-0)**					

Time	Position	Applicant's Actions or Behavior	
	SRO	9. RCS pressure LESS than 230 PSIG RNO 9. GO to Step 12	(NO)
	BOP	12. Main Steam Line Isolation – ACTUATED  MAIN STEAM LINE ISOLATION ACTUATION CRITERIA CNMT pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG	(YES)
	BOP	13. Ensure All MSIVs AND Bypass Valves – SHUT	(YES)
	BOP	14. Any SG pressure - 100 PSIG LOWER THAN PRESSURE IN TWO OTHER SGs	(YES)
	BOP	15. Ensure MDAFW AND TDAFW Isolation Valves AND Flow Control Valves To Affected SG – SHUT Both MDAFW and TDAFW isolation valve and FCV to the 'B' SG • 1AF-93 • 1AF-143 • FCV-2071 B (1AF-130) • FCV-2051B (1AF-51)	(YES) (SHUT) (SHUT) (SHUT) (SHUT)

Op Test No.: NRC	Scenario # 2	Event # 7	Page 45 of 81
Event Description:	**Failure of 'B' Train Containment Spray Pump to actuate (EOP-E-0)**		

Time	Position	Applicant's Actions or Behavior	
	BOP	16. Check CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG (YES/NO time dependent when YES) RNO 16. Perform the following: a) Ensure Containment Spray – ACTUATED Identifies that the 'B' Containment Spray pump has not started and attempts to actuate Containment Spray using the MCB Containment Spray switches (2 per train) – Pump does not start Manually starts 'B' Containment Spray pump and aligns spray valves Opens 1CT-11 and 1CT-88	(NO)

Op Test No.: NRC	Scenario # 2	Event # 6	Page 46 of 81
Event Description:		**Steam line Break on 'B' SG inside Containment (EOP-E-0)**	

Time	Position	Applicant's Actions or Behavior	
Critical Task #3	RO	16. Check CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG (YES/NO time dependent when YES) Start time: **Time ALB-001-5-1, Containment Isolation Phase B, received at ______________** RNO 16. Perform the following: b) Stop ALL RCP's Locates MCB switches and STOPS ALL 3 RCP's **Time ALL RCP's secured: ______________** **Total time: _____________** ***Critical to have all RCP's secured in < 10 Minutes***	
	BOP	17. Ensure AFW flow - AT LEAST 200 KPPH ESTABLISHED	(YES)
	BOP	18. Sequencer Load Block 9 (Manual Loading Permissive) ‐ ACTUATED (BOTH TRAINS)	(YES)
	BOP	19. Energize AC buses 1A1 AND 1B1	
Evaluator Note:		**E-0, Attachment 3 is located on page 67.**	
Evaluator Note:		**The RO will perform all board actions until the BOP completes Attachment 3. The BOP is permitted to properly align plant equipment IAW E-0 Attachment 3 without SRO approval.** **The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 3 is not predictable.**	

Op Test No.: NRC	Scenario # 2	Event # 6	Page 47 of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-E-0)**		

Time	Position	Applicant's Actions or Behavior
	BOP	20. Ensure Alignment Of Components From Actuation Of ESFAS Signals Using Attachment 3, "Safeguards Actuation Verification", While Continuing With This Procedure.
	BOP	Directs AO to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22
Simulator Communicator		**Acknowledge the request to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22**
Simulator Operator		**When directed to place the 1A and 1B Air Compressor in the local control mode: Run APP\air\acs_to_local**
Simulator Communicator		**When the APP for 1A and 1B Air Compressor has completed running call the MCR and inform them that the air compressors are running in local control.**
	BOP	Directs AO to Unlock AND Turn ON The Breakers For The CSIP Suction AND Discharge Cross-Connect Valves per E-0 Attachment 3 step 23 (or from step 11 - refer to Attachment 2)
Simulator Communicator		**Acknowledge the request to Unlock AND Turn ON The Breakers For The CSIP Suction AND Discharge Cross-Connect Valves**
Simulator Operator		**When directed to Unlock AND Turn ON The Breakers for the CSIP Suction AND Discharge Cross-Connect Valves: Run APP\cvc\E-0 Att 2 CSIP suct & disch valve power.txt.**
Simulator Communicator		**When the APP for CSIP Suction AND Discharge Cross-Connect Valves has completed running call the MCR and inform them that CSIP Suction AND Discharge Cross-Connect Valves are energized.**
Examiners Note:		**RCP's are secured therefore WR CL temperatures should be used when checking RCS temperature. RCS temp trend will be < 557°F and dropping – control FF, maintain total FF > 200 KPPH until SG level > 40% (all MSIV's are shut)**

Op Test No.: NRC	Scenario # 2	Event # 6	Page 48 of 81
Event Description:	**Steam line Break on ‘B’ SG inside Containment (EOP-E-0)**		

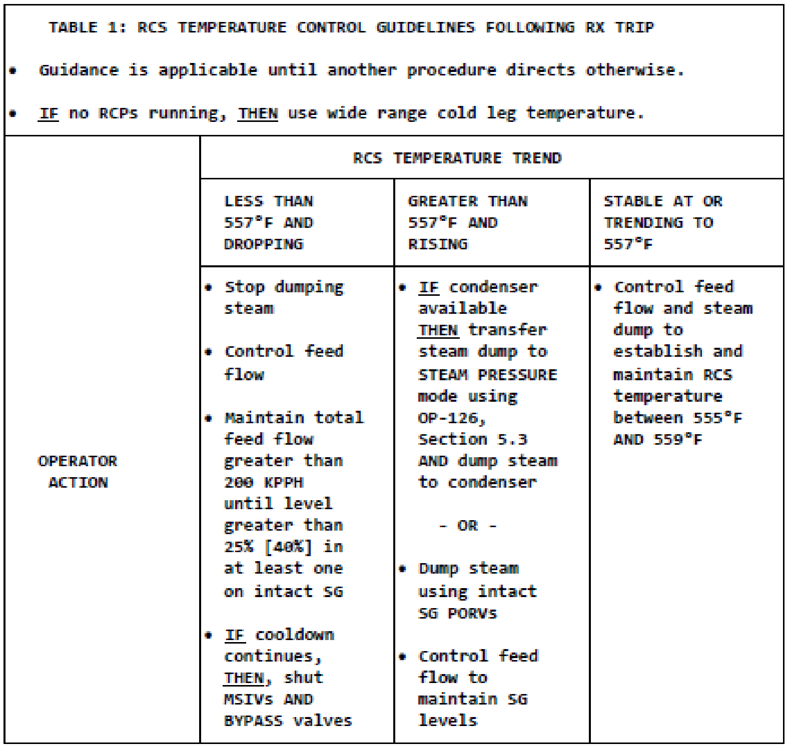
Time	Position	Applicant’s Actions or Behavior
	RO	21. Stabilize AND Maintain Temperature Between 555°F AND 559°F Using Table 1.
	RO	

TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP

- Guidance is applicable until another procedure directs otherwise.
- IF no RCPs running, THEN use wide range cold leg temperature.

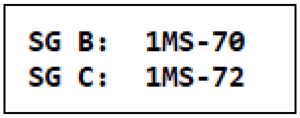
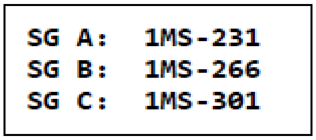
	RCS TEMPERATURE TREND		
	LESS THAN 557°F AND DROPPING	GREATER THAN 557°F AND RISING	STABLE AT OR TRENDING TO 557°F
OPERATOR ACTION	• Stop dumping steam • Control feed flow • Maintain total feed flow greater than 200 KPPH until level greater than 25% [40%] in at least one on intact SG • IF cooldown continues, THEN, shut MSIVs AND BYPASS valves	• IF condenser available THEN transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 AND dump steam to condenser - OR - • Dump steam using intact SG PORVs • Control feed flow to maintain SG levels	• Control feed flow and steam dump to establish and maintain RCS temperature between 555°F AND 559°F

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	49 of 81
Event Description:		**Steam line Break on 'B' SG inside Containment (EOP-E-2)**					

Time	Position	Applicant's Actions or Behavior	
	RO	22. PRZ PORVs – SHUT 23. PRZ Spray Valves – SHUT (RCPs are secured) 24. PRZ PORV Block Valves - AT LEAST ONE OPEN	(YES) (YES) (YES)
	SRO	25. Any SG pressure – DROPPING IN AN UNCONTROLLED MANNER OR COMPLETELY DEPRESSURIZED ('B' SG) 26. GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1.	(YES)
EOP-E-2		Faulted Steam Generator Isolation	
		Enters EOP-E-2 Conducts a Crew Update	
Procedure Caution:		• At least one SG must be maintained available for RCS cooldown. • Any faulted SG OR secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown.	
	SRO	1. Initiate Monitoring Of Critical Safety Function Status Trees.	
	BOP	2. Verify All MSIVs – SHUT 3. Verify All MSIV bypass valves – SHUT	(YES) (YES)
	BOP	4. Check Any SG pressure - STABLE OR RISING (NOT FAULTED) **('A' and 'C' SG)**	(YES)
	BOP	5. Any SG pressure – DROPPING IN AN UNCONTROLLED MANNER OR COMPLETELY DEPRESSURIZED **('B' SG)**	(YES)

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	50	of 81
Event Description:		**Steam line Break on 'B' SG inside Containment (EOP-E-2)**						

Time	Position	Applicant's Actions or Behavior

Procedure Caution:		IF the TDAFW pump is the only available source of feed flow, THEN maintain steam supply to the TDAFW pump from one SG.	
	BOP	6. Isolate Faulted SG(s) (Identified In Step 5): • Verify faulted SG(s) PORV – SHUT • Verify main FW isolation valves – SHUT (Automatically)	(YES) (YES)
	BOP	• Ensure MDAFW AND TDAFW pump isolation valves to faulted SG(s) – SHUT • 1AF-93 • 1AF-143 (YES / NO time dependent – may have identified and isolated these valves in E-0)	(SHUT) (SHUT)
	BOP	• Shut faulted SG(s) steam supply valve to TDAFW pump – SHUT  SG B: 1MS-70 SG C: 1MS-72 Shuts 1MS-70	(SHUT)
	BOP	• Ensure main steam drain isolation(s) before MSIVs - SHUT:  SG A: 1MS-231 SG B: 1MS-266 SG C: 1MS-301	(YES)

<table>
<tr><td>Op Test No.: <u>NRC</u></td><td>Scenario # 2</td><td>Event # 6</td><td>Page <u>51</u> of <u>81</u></td></tr>
<tr><td>Event Description:</td><td colspan="3">Steam line Break on ‘B’ SG inside Containment (EOP-E-2)</td></tr>
</table>

<table>
<tr><th>Time</th><th>Position</th><th colspan="2">Applicant’s Actions or Behavior</th></tr>
<tr><td></td><td>BOP</td><td>

- Ensure SG blowdown isolation valves – SHUT

<table>
<tr><th colspan="3">SG Blowdown Isolation Valves</th></tr>
<tr><th>Process Line</th><th>Outside CNMT (MLB-1A-SA)</th><th>Inside CNMT (MLB-1B-SB)</th></tr>
<tr><td>SG A Blowdown</td><td>1BD-11</td><td>1BD-1</td></tr>
<tr><td>SG B Blowdown</td><td>1BD-30</td><td>1BD-20</td></tr>
<tr><td>SG C Blowdown</td><td>1BD-49</td><td>1BD-39</td></tr>
</table>

</td><td>(YES)
(YES)
(YES)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>BOP</td><td>

- Ensure main steam analyzer isolation valves – SHUT Check CST Level - GREATER THAN 10%

</td><td>(YES)
(YES)</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">Procedure Note:</td><td colspan="2">A SG may be suspected to be ruptured if it fails to dry out following isolation of feed flow. Local checks for radiation can be used to confirm primary-to-secondary leakage.</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>CREW</td><td>

8. Any SG - ABNORMAL RADIATION OR UNCONTROLLED LEVEL RISE

<table>
<tr><th>Secondary Radiation Monitors And Indications</th></tr>
<tr><td>RM-01MS-3591 SB, Main Steam Line A</td></tr>
<tr><td>RM-01MS-3592 SB, Main Steam Line B</td></tr>
<tr><td>RM-01MS-3593 SB, Main Steam Line C</td></tr>
<tr><td>REM-01TV-3534, Condenser Vacuum Pump Effluent (RM-11: Grid 2 or Group 16)</td></tr>
<tr><td>REM-1BD-3527, Steam Generator Blowdown (RM-11: Grid 2 or Group 16)</td></tr>
<tr><td>RM-1TV-3536-1, Turbine Building Vent Stack Effluent (RM-11: Grid 2 or Group 16)</td></tr>
<tr><td>SG Activity Sample</td></tr>
</table>

RNO

Go to Step 10

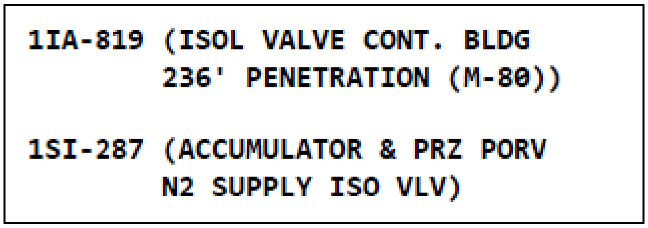
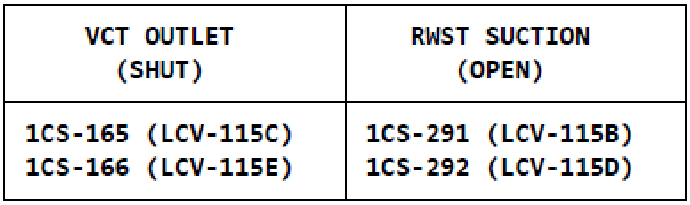
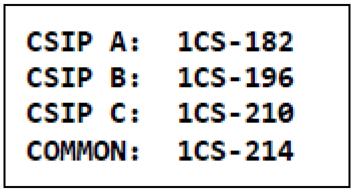
</td><td>(NO)</td></tr>
</table>

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	52 of 81

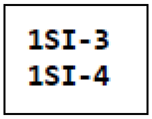
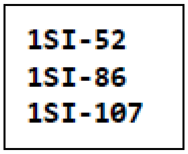
Event Description: **Steam line Break on 'B' SG inside Containment (EOP-E-2)**

Time	Position	Applicant's Actions or Behavior	
	RO	10. Check If SI Has Been Terminated: a. Check for all of the following: ○ Check BIT outlet valves – SHUT OR ISOLATED ▪ 1SI-3 (OPEN) ▪ 1SI-4 (OPEN) **RNO** Go to step 13	(NO) (NO)
	BOP	13. Check SI Termination Criteria: a. Check Subcooling – > 40°F b. Level in at least one SG > 40%	(YES) (YES)
	RO	c. RCS pressure – STABLE OR RISING d. PRZ level - > 30% (YES / NO – time dependent action)	(YES)
Evaluator Note:		**PRZ level > 30%** **IF YES** then crew will continue with E-2 below **IF NO** then crew will transition to E-1 – the actions for E-1 follow E-2 (included later in guide)	
E-2 Continues	RO	14. Reset SI	
	Crew	15. Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (There is no loss of power – N/A)	
	RO	16. Resets Phase A AND Phase B Isolation Signals. (both were actuated)	

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	53 of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-E-2)**						

Time	Position	Applicant's Actions or Behavior	
	RO	17. Open Instrument Air AND Nitrogen Valves to Containment:  1IA-819 (ISOL VALVE CONT. BLDG 236' PENETRATION (M-80)) 1SI-287 (ACCUMULATOR & PRZ PORV N2 SUPPLY ISO VLV) Locates and OPENS both valves	
	RO	18. Stop all but ONE CSIP (STOPS A / B CSIP) 19. RCS pressure – STABLE OR RISING	(YES)
	RO	20. Check CSIP suction - ALIGNED TO RWST  VCT OUTLET (SHUT) 1CS-165 (LCV-115C) 1CS-166 (LCV-115E) RWST SUCTION (OPEN) 1CS-291 (LCV-115B) 1CS-292 (LCV-115D)	(YES)
	RO	21. Open Normal Miniflow Isolation Valves:  CSIP A: 1CS-182 CSIP B: 1CS-196 CSIP C: 1CS-210 COMMON: 1CS-214 Locates controls and OPENS each valve	

Op Test No.: NRC	Scenario # 2	Event # 8	Page 54 of 81
Event Description:		**Failure of BIT outlet isolation valve 1SI-4 to close (EOP-E-2)**	

Time	Position	Applicant's Actions or Behavior	
		Event 8 - Failure of 1SI-4 to close	
Critical Task #4	RO	22. Shut BIT Outlet Valves:  1SI-3 1SI-4 Shuts 1SI-3 from MCB switch Attempts to shut 1SI-4 will not SHUT from MCB switch Dispatches RAB Aux Operator to locally shut 1SI-4 (may also request that the breaker for the valve OPEN) Critical Task to shut BIT Outlet valve 1SI-4 prior to establishing flow through the charging header or CSIP run out conditions will occur as indicated by oscillating discharge pressure.	
Simulator Communicator:		**IF this valve has not been previously shut then:** **Acknowledge request to locally shut 1SI-4 (A-230-FX32-W3-S2) AND if requested acknowledge request to OPEN breaker prior to locally valve operation.** **Report back approximately 1 minute after Simulator Operator completes actions below that 1SI-4 is SHUT.**	
Simulator Operator -		**Perform the following actions from Sim Diagram SIS02 to operate 1SI-4:** **(IF requested) OPEN control power rf sis016** **Engage handwheel rf sis017** **Shut valve modify rf sis018**	
	RO	23. Verify Cold Leg AND Hot Leg Injection Valves – SHUT  1SI-52 1SI-86 1SI-107	(YES)

Op Test No.: NRC Scenario # 2 Event # 6 Page 55 of 81

Event Description: **Steam line Break on 'B' SG inside Containment (EOP-E-2)**

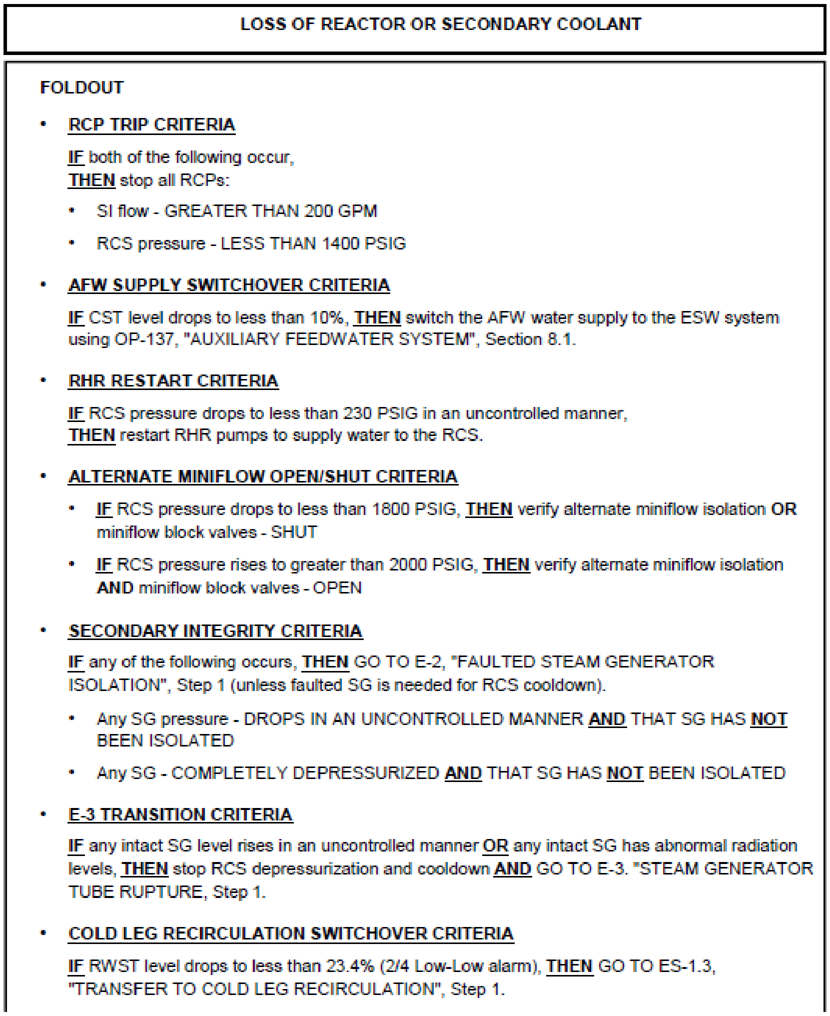
Time	Position	Applicant's Actions or Behavior
Procedure Note:		High head SI flow should be isolated before continuing.
	RO	26. Establish Charging Lineup: a. Shut charging flow control valve: FK-122.1 (SHUT) b. Open charging line isolation valves: 1CS-235 (OPEN) 1CS-238 (OPEN)
	RO	27. Monitor RCS Hot Leg Temperature: a. Check RCS hot leg temperature – STABLE (YES / NO – time dependent - probably rising) YES / NO – BOP action next step
	BOP	b. **IF YES** – Manually dump steam AND control feed flow to maintain RCS temperature stable.
	BOP	a.1) **IF NO** - If temperature rising, THEN manually dump steam from intact SG PORVs at maximum rate to stabilize temperature.
Procedure Note:		RCS temperature must be stabilized to allow evaluation of PRZ level trend.
	BOP	a.2) **IF NO** - WHEN temperature stabilizes, THEN manually dump steam AND control feed flow to maintain RCS temperature stable.
Procedure Caution:		Charging flow should NOT exceed 150 GPM to prevent damage to the regenerative heat exchanger.

	RO	28. Control Charging Flow To Maintain PRZ Level: a. Control charging using charging flow control valve: FK-122.1 b. Maintain charging flow less than 150 GPM	
	RO	c. PRZ level – CAN BE MAINTAINED STABLE OR RISING	(YES)
	SRO	29. GO TO ES-1.1, "SI TERMINATION", step 1	
Evaluator Note:		**IF the crew transitioned to EOP-E-1 based on PRZ level < 30% then continue on next page.** **If PRZ level is > 30% then continue with EOP- ES-1.1, SI Termination step 1 (see page 60 in this guide)**	
EOP-E-1		Loss of Reactor or Secondary Coolant	
Procedure Note:		Foldout applies	
	SRO	Assigns Foldout items to RO and or BOP RO: RCP Trip criteria, RHR Restart criteria, Alternate Miniflow Open/Shut criteria, Cold Leg Recirculation switchover criteria BOP: AFW supply switchover criteria, Secondary integrity criteria, E-3 transition criteria	

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	57 of 81
Event Description:	**Steam line Break on ‘B’ SG inside Containment (EOP-E-1)**						

Time	Position	Applicant’s Actions or Behavior

Evaluator Aide:	**E-1** Foldout



LOSS OF REACTOR OR SECONDARY COOLANT

FOLDOUT

- **RCP TRIP CRITERIA**

  IF both of the following occur,
  THEN stop all RCPs:

  - SI flow - GREATER THAN 200 GPM
  - RCS pressure - LESS THAN 1400 PSIG

- **AFW SUPPLY SWITCHOVER CRITERIA**

  IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

- **RHR RESTART CRITERIA**

  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner,
  THEN restart RHR pumps to supply water to the RCS.

- **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA**

  - **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT
  - **IF** RCS pressure rises to greater than 2000 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN

- **SECONDARY INTEGRITY CRITERIA**

  IF any of the following occurs, **THEN** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1 (unless faulted SG is needed for RCS cooldown).

  - Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **AND** THAT SG HAS **NOT** BEEN ISOLATED
  - Any SG - COMPLETELY DEPRESSURIZED **AND** THAT SG HAS **NOT** BEEN ISOLATED

- **E-3 TRANSITION CRITERIA**

  IF any intact SG level rises in an uncontrolled manner **OR** any intact SG has abnormal radiation levels, **THEN** stop RCS depressurization and cooldown **AND** GO TO E-3. "STEAM GENERATOR TUBE RUPTURE, Step 1.

- **COLD LEG RECIRCULATION SWITCHOVER CRITERIA**

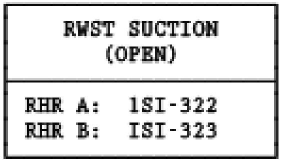
  IF RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1.

	CREW	1. Initiate Monitoring Of Critical Safety Function Status Trees.
	RO	2. Maintain RCP Seal Injection Flow Between 8 GPM and 13 GPM.

Op Test No.: NRC	Scenario # 2	Event # 6	Page	58 of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-E-1)**			

Time	Position	Applicant's Actions or Behavior	
	BOP	3. Check Intact SG Levels: a. Any level - GREATER THAN 40% b. Control Feed Flow to maintain all intact levels between 40% - 50%	(YES)
	BOP	c. Any level – RISING IN AN UNCONTROLLED MANNER	(NO)
	RO	4. Check PRZ PORV AND Block Valves:	
	RO	a. Verify AC buses 1A1 AND 1B1 – ENERGIZED b. Check PRZ PORVs – SHUT f. Check block valves - AT LEAST ONE OPEN	(YES) (YES) (YES)
	RO	5. Check SI Termination Criteria: a. RCS subcooling - >40°F	(YES)
	BOP	b. Level in at least one intact SG > 40% Total feed flow to intact SGs > 200 KPPH	(YES) (YES)
	RO	d. PRZ level > 30% (YES / NO time dependent) e. **YES** – GO TO **ES-1.1, SI Termination, Step 1 (later in guide)** **NO** – Continue with E-1 actions below	

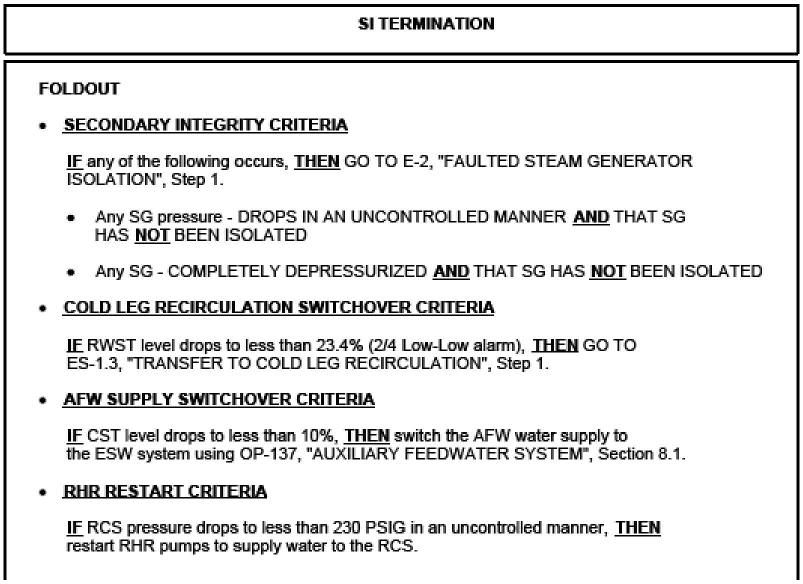
Op Test No.: NRC	Scenario # 2	Event # 6	Page	59 of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-E-1)**			

Time	Position	Applicant's Actions or Behavior	
E-1 Continues	RO	6. Check CNMT Spray Status: a. Check any CNMT spray pump – RUNNING Consult plant operations staff to determine if CNMT spray should be placed in standby. CNMT spray - TO BE PLACED IN STANDBY (When directed by plant operations staff)	(YES)
	RO	9. Check Source Range Detector Status: a. Intermediate range flux – LESS THAN 5x10-11 AMPS b. Verify source range detectors – ENERGIZED c. Transfer nuclear recorder to source range scale.	(YES) (YES)
	RO	10. Check RHR Pump Status: a. Check RHR pump suction – ALIGNED TO RWST  RWST SUCTION (OPEN) RHR A: 1SI-322 RHR B: ISI-323	(YES) (YES)
	RO	b. RCS Pressure - GREATER THAN 230 PSIG c. RCS pressure - STABLE OR RISING d. Stop RHR pumps (STOPS both RHR pumps)	(YES) (YES)

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	60	of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-ES-1.1)**							

Time	Position	Applicant's Actions or Behavior
	RO	Check RCS And SG Pressures: **(time dependent)** Check for both of the following: All SG Pressures - STABLE OR RISING (YES / NO) RCS pressure - STABLE OR DROPPING (YES / NO) **IF NO** - the crew will return to step 1 and loop back to through the procedure. When they reach step 5 to check PRZ level they will have adequate level and transition to ES-1.1, SI Termination.
Evaluator Note:		**SI Termination is entered from either E-2 step 29 or E-1 Step 5.e**
EOP-ES-1.1		SI Termination
Procedure Note:		Foldout Applies
	SRO	Assigns foldout action items to RO and or BOP • Cold leg recirculation switchover criteria • RHR restart criteria • Secondary integrity criteria • AFW switchover criteria

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	61 of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-ES-1.1)**						

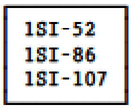
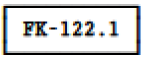
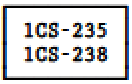
Time	Position	Applicant's Actions or Behavior	
Evaluator Aide:		**ES-1.1** Foldout	
		 **SI TERMINATION** **FOLDOUT** • **<u>SECONDARY INTEGRITY CRITERIA</u>** **<u>IF</u>** any of the following occurs, **<u>THEN</u>** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1. • Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **<u>AND</u>** THAT SG HAS **<u>NOT</u>** BEEN ISOLATED • Any SG - COMPLETELY DEPRESSURIZED **<u>AND</u>** THAT SG HAS **<u>NOT</u>** BEEN ISOLATED • **<u>COLD LEG RECIRCULATION SWITCHOVER CRITERIA</u>** **<u>IF</u>** RWST level drops to less than 23.4% (2/4 Low-Low alarm), **<u>THEN</u>** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1. • **<u>AFW SUPPLY SWITCHOVER CRITERIA</u>** **<u>IF</u>** CST level drops to less than 10%, **<u>THEN</u>** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1. • **<u>RHR RESTART CRITERIA</u>** **<u>IF</u>** RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **<u>THEN</u>** restart RHR pumps to supply water to the RCS.	
	SRO	1. Initiate Monitoring Of Critical Safety Function Status Trees.	
	RO	2. Check If SI Has Been Terminated: a. Check for all of the following: • Check BIT outlet valves – SHUT OR ISOLATED	
	RO	• 1SI-3 (YES / NO – shut in E-2 step 22 OR will be shut in ES-1.1 step 9.c – coming up) • 1SI-4 (YES / NO – shut in E-2 step 22 OR will be shut in ES-1.1 step 9.c – coming up) IF answer is **NO** then perform actions on following pages for "NO" response to reset SI If **YES** then do the following step and the actions then follow steps on page 66 of this guide after "NO" response ends.	
	RO	• Check cold leg AND hot leg injection valves – SHUT ○ 1SI-52 ○ 1SI-86 ○ 1SI-107	(YES) (YES) (YES)

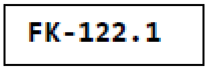
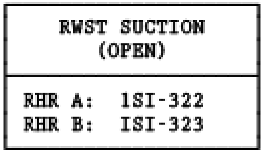
Op Test No.: NRC Scenario # 2 Event # 6 Page 62 of 81

Event Description: **Steam line Break on 'B' SG inside Containment (EOP-ES-1.1)**

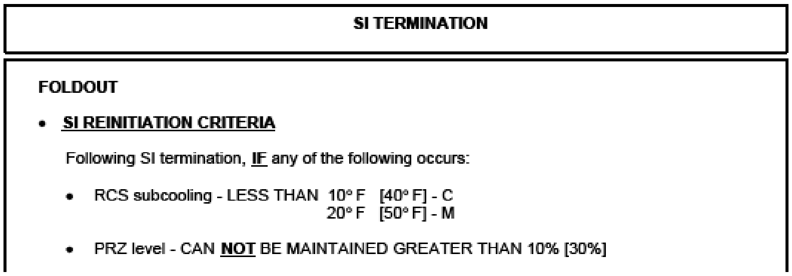
Time	Position	Applicant's Actions or Behavior	
"NO" response	RO	3. Reset SI 4. Manually realign Safeguards Equipment Following A Loss of Offsite Power (NO action required)\ 5. Reset Phase A and Phase B Isolation Signals 6. Open IA and Nitrogen Valves to CNMT: 1IA-819 (ISOL VALVE CONT. BLDG 236' PENETRATION (M-80)) 1SI-287 (ACCUMULATOR & PRZ PORV N2 SUPPLY ISO VLV) 7. Stop all but ONE CSIP 8. Check RCS Pressure – STABLE OR RISING 9. Isolate High Head SI Flow: a. Check CSIP suction – aligned to RWST VCT OUTLET (SHUT): 1CS-165 (LCV-115C), 1CS-166 (LCV-115E) RWST SUCTION (OPEN): 1CS-291 (LCV-115B), 1CS-292 (LCV-115D) b. Open normal miniflow isolation valves: CSIP A: 1CS-182 CSIP B: 1CS-196 CSIP C: 1CS-210 COMMON: 1CS-214	(DONE) (DONE) (DONE) (DONE) (YES)
Critical Task #4 "NO" response	RO	c. Shut BIT Outlet Valves: 1SI-3 1SI-4 Shuts 1SI-3 from MCB switch Attempts to shut 1SI-4 will not SHUT from MCB switch Dispatches RAB Aux Operator to locally shut 1SI-4 (may also request that the breaker for the valve OPEN) Critical Task to shut BIT Outlet valve 1SI-4 prior to establishing flow through the charging header or CSIP run out conditions will occur as indicated by oscillating discharge pressure.	

Op Test No.: NRC	Scenario # 2 Event # 6	Page 63 of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-ES-1.1)**	
Time	Position	Applicant's Actions or Behavior

Simulator Communicator:		**IF this valve has not been previously shut then:** **Acknowledge request to locally shut 1SI-4 (A-230-FX32-W3-S2) AND if requested acknowledge request to OPEN breaker prior to locally valve operation.** **Report back approximately 1 minute after Simulator Operator completes actions below that 1SI-4 is SHUT.**	
Simulator Operator -		**Perform the following actions from Sim Diagram SIS02 to operate 1SI-4:** **(IF requested) OPEN control power rf sis016** **Engage handwheel rf sis017** **Shut valve rf sis018**	
"NO" response	RO	d. Verify cold leg AND hot leg injection valves – SHUT  1SI-52 1SI-86 1SI-107	(YES)
Procedure Caution:		High head SI flow should be isolated before continuing	
"NO" response * ends after this step	RO	11. Establish Charging Lineup: a. Shut charging flow control valve:  FK-122.1 b. Open charging line isolation valves:  1CS-235 1CS-238	(SHUTS) (OPEN) (OPEN)

Time	Position	Applicant's Actions or Behavior	
Procedure Caution:		Charging flow should NOT exceed 150 GPM to prevent damage to the regenerative heat exchanger.	
	RO	12. Control Charging Flow To Maintain PRZ Level: a. Control charging using charging flow control valve:  FK-122.1 b. Maintain charging flow < 150 gpm c. PRZ level – CAN BE MAINTAINED STABLE OR RISING	(YES)
	RO	13. Check If RHR Pumps Should Be Stopped: a. Check RHR pumps – ANY RUNNING WITH SUCTION ALIGNED TO RWST  RWST SUCTION (OPEN) RHR A: 1SI-322 RHR B: 1SI-323 b. Stop RHR pumps (locates MCB stop switches and STOPs both RHR pumps)	(YES)
Procedure Caution:		• Simultaneous flow through the charging and SI lines may cause CSIP runout (as indicated by oscillating discharge pressure). • Charging flow should NOT exceed 150 GPM to prevent damage to the regenerative heat exchanger.	
	RO	14. Check SI Reinitiation Criteria: a. RCS subcooling - GREATER THAN 40°F b. PRZ level - GREATER THAN 30% c. PRZ level - Can Be Maintained GREATER THAN 30%	(YES) (YES) (YES)

Op Test No.: NRC	Scenario # 2	Event # 6	Page 65 of 81
Event Description:	**Steam line Break on 'B' SG inside Containment (EOP-ES-1.1)**		

Time	Position	Applicant’s Actions or Behavior	
Procedure Note:		Additional foldout item, "SI REINITIATION CRITERIA" applies.	
Evaluator Aide:		**ES-1.1** Foldout “SI REINITIATION CRITERIA”	
		 **SI TERMINATION** **FOLDOUT** • **SI REINITIATION CRITERIA** Following SI termination, **IF** any of the following occurs: • RCS subcooling - LESS THAN 10° F [40° F] - C 20° F [50° F] - M • PRZ level - CAN **NOT** BE MAINTAINED GREATER THAN 10% [30%]	
	SRO	Assigns foldout for SI Reinitiation criteria	
	BOP	15. Establish Steam Generator Pressure Control Mode: a. Check if steam dump to condenser AVAILABLE:  Condenser Available Requirements Any Intact SG MSIV - OPEN Condenser Available (C-9)- LIT (BPLB 3-3) Steam Dump Contol - AVAILALBE a. Use intact SG PORV for steam dumping in subsequent steps.	(NO)
Procedure Note:		RCS temperature must be stabilized to allow evaluation of PRZ level trend.	
	RO	16. Monitor RCS Hot Leg Temperature: a. Check RCS hot leg temperature - STABLE	(YES)

Op Test No.:	NRC	Scenario #	2	Event #	6	Page	66	of 81
Event Description:		**Steam line Break on 'B' SG inside Containment (EOP-ES-1.1)**						

Time	Position	Applicant's Actions or Behavior	
Procedure Caution:		Excessive RCS activity can cause adverse radiological conditions when letdown is placed in service.	
Procedure Note:		Pressure controller PK-145.1 is normally set to maintain 350 PSIG (58%). If RCS pressure is low, the setpoint may have to be reduced to obtain proper letdown flow.	
	RO	17. Check If Letdown Can Be Placed In Service: a. Check PRZ Level – GREATER THAN 40% b. Establish Letdown.	(YES)
Examiners Note:		After letdown is established Pressurizer level can be lowered and Pressurizer pressure should no longer be a problem. END OF SCENARIO	

Lead Evaluator:	**Terminate the scenario when RCS hot leg temperature stable or stabilizing under the crews control and letdown established.** **Announce 'Crew Update' - End of Evaluation - I have the shift.** **Have crew remain in the Simulator without discussing the exam. Examiners will formulate any follow-up questions.**

Simulator Operator:	**When directed by Lead Evaluator go to FREEZE**

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 7
SAFEGUARDS ACTUATION VERIFICATION

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. **Ensure** Two CSIPs - RUNNING

☐ 2. **Ensure** Two RHR Pumps - RUNNING

☐ 3. **Ensure** Two CCW Pumps - RUNNING

☐ 4. **Ensure** All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. **Ensure** SI Valves - PROPERLY ALIGNED

(**Refer** to Attachment 1.)

☐ 6. **Ensure** CNMT Phase A Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 7. **Ensure** SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. **IF** Main Steam Line Isolation Actuated **OR** Is Required By Any Of The Following, **THEN Ensure** MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. **IF** CNMT Spray Actuation Signal Actuated **OR** Is Required, **THEN Ensure** The Following:

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 10. **Ensure** Both Main FW Pumps - TRIPPED

☐ 11. **Ensure** FW Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. **Ensure** Both MDAFW pumps - RUNNING

13. **IF** Any Of The Following Conditions Exist, **THEN** **Ensure** The TDAFW Pump - RUNNING

- ☐ Undervoltage on either 6.9 KV emergency bus
- ☐ Level in two SGs - LESS THAN 25%
- ☐ Manual actuation to control SG level

14. **Ensure** AFW Valves - PROPERLY ALIGNED

- ☐ **IF** no AFW Isolation Signal, **THEN** **ensure** isolation **AND** flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

- ☐ **IF** AFW Isolation Signal present, **THEN** **ensure** MDAFW **AND** TDAFW isolation **AND** flow control valves to affected SG - SHUT

☐ 15. **Ensure** Both EDGs - RUNNING

☐ 16. **Ensure** CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 17. **Ensure** CNMT Ventilation Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. **Ensure** Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. **Ensure** Essential Service Chilled Water System Operation:

☐ • **Ensure** both WC-2 chillers - RUNNING

☐ • **Ensure** both P-4 pumps - RUNNING

☐ (**Refer** to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. **Ensure** CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

> **NOTE**
>
> Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. **Ensure** AC buses 1A1 **AND** 1B1 - ENERGIZED

☐ 22. **Place** Air Compressor 1A **AND** 1B In The LOCAL CONTROL Mode.

(**Refer to** Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 7
SAFEGUARDS ACTUATION VERIFICATION

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To **Unlock** And **Close** The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(**Refer** to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. **Check** If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN place** C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL AND VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 7
SAFEGUARDS ACTUATION VERIFICATION

25. **Start** The Spent Fuel Pump Room Ventilation System:
    - a. At AEP-1, **ensure** the following ESCWS isolation valves - OPEN
        - 1) SLB-11 (Train A)
            - ☐ • AH-17 SUP CH 100 (Window 9-1)
            - ☐ • AH-17 RTN CH 105 (Window 10-1)
        - 2) SLB-9 (Train B)
            - ☐ • AH-17 SUP CH 171 (Window 9-1)
            - ☐ • AH-17 RTN CH 182 (Window 10-1)
    - b. At AEP-1, **start** one SFP PUMP ROOM FAN COOLER:
        - ☐ • AH-17 1-4A SA
        - ☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 7
SAFEGUARDS ACTUATION VERIFICATION

NOTE

- Fuel pool levels and temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. **Check** Status Of Fuel Pools:

☐ a. **Operate** spent fuel cooling pumps to maintain fuel pool temperatures between 85°F to 105°F.

b. **Monitor** fuel pool levels **AND** temperatures:

- ☐ **Refer to** AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.
- ☐ **Refer to** Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.
- ☐ Levels - GREATER THAN LO ALARM (284 FT, 0 IN)
- ☐ Temperatures - LESS THAN HI TEMP ALARM (105°F)

NOTE

If control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, then follow-up actions will be required to restore the alignment.

27. **Consult** Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

- ☐ Site Emergency Coordinator - Control Room
- ☐ Site Emergency Coordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

SECONDARY STEAM LEAK/ EFFICIENCY LOSS

3.0 OPERATOR ACTIONS

NOTE

This procedure contains no immediate actions.

INSTRUCTIONS	RESPONSE NOT OBTAINED
✱ 1. **CHECK** that the plant can be operated safely:	1. **PERFORM** the following:
☐ • **CHECK ALL** Reactor Protection parameters will remain **WITHIN TRIP LIMITS.**	☐ a. **TRIP** the Reactor **AND GO TO** EOP-E-0. (Continue with RNO Step 1.b.)
☐ • **CHECK** Turbine Building envelope safe for personnel entry.	**NOTE** If Main Steam Line Isolation is required, the Reactor and Turbine should be verified tripped in EOP-E-0 before manually initiating MSLI.
☐ • **CHECK** RAB Steam Tunnel safe for personnel entry.	
	☐ b. **IF** the Reactor was tripped due to a steam leak, **THEN MANUALLY INITIATE** a Main Steam Line Isolation signal.
	☐ c. **EXIT** this procedure.
☐ 2. **CHECK** a steam leak exists.	☐ 2. **GO TO** Step 4.

SECONDARY STEAM LEAK/ EFFICIENCY LOSS

INSTRUCTIONS	RESPONSE NOT OBTAINED
3.0 OPERATOR ACTIONS	
☐3. **NOTIFY** personnel of evacuation requirements.	
☐ a. **SOUND** the local evacuation alarm.	
☐ b. **ANNOUNCE** on the PA: "Attention all personnel. There is a steam leak (give location). All personnel stand clear of (give location)."	
☐ c. **ESTABLISH** a boundary to prevent unauthorized personnel entry.	
☐4. **REFER TO** PEP-110, Emergency Classification and Protective Action Recommendations, **AND ENTER** the EAL Matrix.	

NOTE

Initial target reduction may be up to 100 MW less than current REFERENCE value and may be changed as necessary to reduce power to less than 100%.

INSTRUCTIONS	RESPONSE NOT OBTAINED
☐5. **DETERMINE** the required megawatt change needed for the power reduction.	☐5. **IF** no power reduction is required, **THEN GO TO** Step 17 to determine leak location.
☐6. **NOTIFY** Load Dispatcher that the Unit is reducing load.	

SECONDARY STEAM LEAK/ EFFICIENCY LOSS

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

NOTE

- If load reduction rates in excess of 45 MW/min are required, the Unit should be tripped.
- If OSI-PI is available, VIDAR is functioning properly if the DEH_MEGAWATTS point is updating. (Attachment 1, Checking VIDAR Functioning, provides alternative methods of checking VIDAR functioning.)

CAUTION

Failure of the DEH computer VIDAR Unit while in OPER AUTO has resulted in a plant trip.

INSTRUCTIONS	RESPONSE NOT OBTAINED
7. **CHECK BOTH** of the following: ☐ • DEH System in AUTO ☐ • VIDAR functioning properly	☐ 7. **PREPARE** to reduce Turbine load manually using OP-131.01, Main Turbine, **AND GO TO** Step 9.

SECONDARY STEAM LEAK/ EFFICIENCY LOSS

INSTRUCTIONS	RESPONSE NOT OBTAINED
3.0 OPERATOR ACTIONS	
8. **PERFORM** the following at the DEH panel:	
☐ a. **DEPRESS** the LOAD RATE MW/MIN pushbutton.	
☐ b. **ENTER** desired rate (NOT to exceed 45 MW/MIN) in DEMAND display.	
☐ c. **DEPRESS** ENTER pushbutton.	
☐ d. **DEPRESS** REF pushbutton.	
☐ e. **ENTER** desired load in DEMAND display.	
☐ f. **DEPRESS** ENTER pushbutton.	
☐ g. **CHECK** HOLD pushbutton LIT.	
☐9. **CHECK** Rod Control in AUTO.	9. **PERFORM** ONE of the following: ☐ a. **PLACE** Rod Control selector switch in AUTO. ☐ b. **MANUALLY POSITION** Control Rods to maintain T_{avg} within 5°F of T_{ref}.

SECONDARY STEAM LEAK/ EFFICIENCY LOSS

3.0 OPERATOR ACTIONS

NOTE

During the load reduction, it is permissible to periodically move between GO and HOLD and to vary the load rate.

INSTRUCTIONS	RESPONSE NOT OBTAINED
10. **COMMENCE** turbine load reduction at the DEH panel:	
a. **CHECK** OPER AUTO Mode AVAILABLE.	☐ a. **MANUALLY REDUCE** Turbine load using OP-131.01, Main Turbine.
☐ (1) **DEPRESS** GO pushbutton.	☐ b. GO TO Step 11.
☐ (2) **VERIFY** the value in the REFERENCE display LOWERS.	
☐ 11. **VERIFY** Generator load AND Reactor power LOWERING.	
✱☐ 12. **MAINTAIN** Generator reactive load (VARs) within guidelines.	
✱☐ 13. **CHECK** T_{avg} within 5°F of T_{ref}.	13. **RESTORE** T_{avg} to within 5°F of T_{ref} by ANY of the following methods: ☐ • **ADJUST** Turbine load ☐ • **ADJUST** boron concentration ☐ • **MANUALLY CONTROL** rod insertion or withdrawal.

SECONDARY STEAM LEAK/ EFFICIENCY LOSS

INSTRUCTIONS	**RESPONSE NOT OBTAINED**
3.0 OPERATOR ACTIONS	
☐**14. WHEN** Reactor power is less than 100%, **THEN DEPRESS** the HOLD pushbutton.	
☐**15. CHECK** the HOLD pushbutton is LIT.	
☐**16. CHECK** a steam leak exists.	☐**16. GO TO** Step 19.
☐**17. DISPATCH** personnel to identify the leak location using all necessary safety practices.	
✱☐**18. CHECK** that the steam leak can be isolated.	☐**18. GO TO ONE** of the following, as applicable:
☐ **a. ISOLATE** the leak.	☐ • GP-006, Normal Plant Shutdown From Power Operation to Hot Standby (Mode 1 To Mode 3), for normal plant shutdown
	☐ • AOP-038, Rapid Downpower
☐**19. NOTIFY** the Load Dispatcher that power reduction is complete.	
☐**20. CHECK** REFERENCE and DEMAND windows equalized.	**20. PERFORM** the following:
	☐ **a. DEPRESS** the REF pushbutton.
	☐ **b. ENTER** the REFERENCE value in the DEMAND window.
	☐ **c. DEPRESS** the ENTER pushbutton.

SECONDARY STEAM LEAK/ EFFICIENCY LOSS

INSTRUCTIONS	RESPONSE NOT OBTAINED

3.0 OPERATOR ACTIONS

21. GO TO ONE of the following, as applicable:

☐ • GP-005, Power Operation (Mode 2 to Mode 1), for continued plant operation

☐ • GP-006, Normal Plant Shutdown From Power Operation to Hot Standby (Mode 1 To Mode 3), for normal plant shutdown

☐ • AOP-038, Rapid Downpower

☐ **22. EXIT** this procedure.

-- END OF SECTION 3.0 --

SECONDARY STEAM LEAK/ EFFICIENCY LOSS

INSTRUCTIONS	RESPONSE NOT OBTAINED

Attachment 1 – Checking VIDAR Functioning

Sheet 1 of 1

NOTE

If OSI-PI is NOT available, then accessing the ANALOG INPUTS screen on the Graphics Display Computer (located in the Termination Cabinet Room near the ATWS Panel) will show several points, most of which should be updating if the VIDAR Unit is functioning properly.

1. IF the DEH graphics computer is out of service,
THEN VIDAR can be checked as updating on the operator panel as follows:

☐ a. **DEPRESS** TURBINE PROGRAM DISPLAY button.

☐ b. **CHECK** TURBINE PROGRAM DISPLAY button is illuminated.

☐ c. **CHECK** REFERENCE and DEMAND displays indicate 0000.

☐ d. **DEPRESS** 1577.

☐ e. **DEPRESS** "ENTER".

f. **CHECK** the DEMAND display:

☐ • IF the DEMAND display indicates 0000, VIDAR is updating.

☐ • IF the DEMAND display indicates 0001, VIDAR is NOT updating.

2020 NRC Exam Scenario 2
Turnover

Plant Status

- Normal startup is in progress with TCS Load Control at 1 GVPC units / min in accordance with GP-005, Power Operation (Mode 2 To Mode 1) , Section 6.2, Step 134.e
- Reactor power ~ 53% power startup on hold through shift turnover. Once complete, raise TCS Load Control to 4 GVPC units/ min and continue the power ascension @ 4 MW/min
- Current rod position is CBD @ 162 steps
- An RCS Boron sample taken 30 minutes ago was 1725 ppm
- Beginning of life conditions
- "A" Train equipment is in service
- Normal Dayshift
- Status Board is updated
- Additional Protected items "A" ESW Pump, "A" CCW Pump, "A" SFP Hx, RWST, for Response to Industry Best Practices

Equipment Out of Service:

- 'A-SA' Boric Acid Transfer Pump is under clearance due to breaker blown control power fuses. Has been under clearance for 12 hours. The problem with the breaker has been repaired and the clearance will be removed later this shift. Tech Spec 3.3.3.5.b Action **c** and 3.1.2.2 applies (3.1.2.2 is for tracking only). OWP-CS-04 has been completed.

- 1CS-9, Letdown Orifice Isolation Valve is under clearance for solenoid replacement. Tech Spec 3.6.3 LCO Action **b** applies. OWP-CS-09 has been completed.

- 'A' Gland Seal Exhauster Fan is under clearance for high vibrations on the motor bearing. The fan has been under clearance for 8 hours. Repairs are expected to be completed within 24 hours.

Reactivity Plan/Brief:

- Use attached Reactivity Plan to continue bringing the unit on-line at 4 MW/Min.

Risk Assessment:

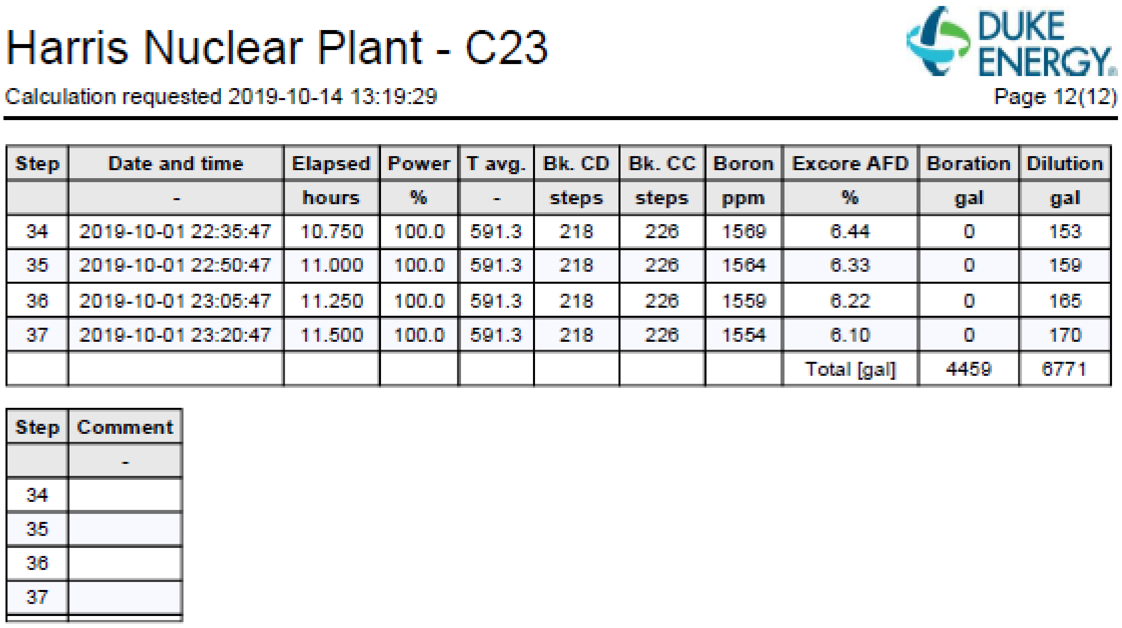
- **YELLOW**

Series: IC118

Description: H2C23, BOC, S/U

Operations table

Step	Date and time	Elapsed	Power	T avg.	Bk. CD	Bk. CC	Boron	Excore AFD	Boration	Dilution
	-	hours	%	-	steps	steps	ppm	%	gal	gal
0	2019-10-01 11:50:47	0.000	0.0	556.9	0	0	1273	0.00	0	0
1	2019-10-01 11:50:47	0.000	2.5	561.6	95	223	1758	-0.02	4396	0
2	2019-10-01 12:20:47	0.500	2.5	561.6	95	223	1758	-0.02	4	0
3	2019-10-01 12:50:47	1.000	2.5	561.6	95	223	1759	-0.02	4	0
4	2019-10-01 13:20:47	1.500	2.5	561.6	95	223	1759	-0.02	3	0
5	2019-10-01 13:35:47	1.750	4.2	562.2	102	224	1761	-0.13	22	0
6	2019-10-01 13:50:47	2.000	6.0	562.9	110	226	1765	-0.24	30	0
7	2019-10-01 14:20:47	2.500	6.0	562.9	110	226	1765	-0.24	0	0
8	2019-10-01 14:50:47	3.000	6.0	562.9	110	226	1765	-0.24	0	3
9	2019-10-01 15:20:47	3.500	6.0	562.9	110	226	1764	-0.24	0	7
10	2019-10-01 15:50:47	4.000	6.0	562.9	110	226	1764	-0.24	0	11
11	2019-10-01 16:05:47	4.250	10.5	564.6	112	226	1754	-0.51	0	288
12	2019-10-01 16:20:47	4.500	15.0	566.3	115	226	1746	-0.82	0	263
13	2019-10-01 16:50:47	5.000	15.0	566.3	115	226	1745	-0.82	0	27
14	2019-10-01 17:20:47	5.500	15.0	566.3	115	226	1744	-0.81	0	36
15	2019-10-01 17:50:47	6.000	15.0	566.3	115	226	1742	-0.80	0	44
16	2019-10-01 18:05:47	6.250	20.5	564.7	122	226	1739	-0.99	0	101
17	2019-10-01 18:20:47	6.500	26.0	566.7	129	226	1732	-1.07	0	232
18	2019-10-01 18:35:47	6.750	31.5	568.7	136	226	1724	-0.95	0	241
19	2019-10-01 18:50:47	7.000	37.0	570.7	142	226	1715	-0.73	0	275
20	2019-10-01 19:05:47	7.250	42.5	572.6	149	226	1707	-0.18	0	255
21	2019-10-01 19:20:47	7.500	48.0	574.5	156	226	1698	0.55	0	268
22	2019-10-01 19:35:47	7.750	53.2	576.3	162	226	1689	1.28	0	284
23	2019-10-01 19:50:47	8.000	58.4	578.1	168	226	1680	2.10	0	299
24	2019-10-01 20:05:47	8.250	63.6	579.8	175	226	1671	3.26	0	282
25	2019-10-01 20:20:47	8.500	68.8	581.5	181	226	1660	4.19	0	331
26	2019-10-01 20:35:47	8.750	74.0	583.2	187	226	1650	5.11	0	351
27	2019-10-01 20:50:47	9.000	79.2	584.9	193	226	1638	5.97	0	372
28	2019-10-01 21:05:47	9.250	84.4	586.5	199	226	1626	6.64	0	405
29	2019-10-01 21:20:47	9.500	89.6	588.2	206	226	1613	7.36	0	413
30	2019-10-01 21:35:47	9.750	94.8	589.7	212	226	1599	7.45	0	484
31	2019-10-01 21:50:47	10.000	100.0	591.3	218	226	1582	6.74	0	570
32	2019-10-01 22:05:47	10.250	100.0	591.3	218	226	1578	6.64	0	137
33	2019-10-01 22:20:47	10.500	100.0	591.3	218	226	1573	6.55	0	145



Harris Nuclear Plant - C23

DUKE ENERGY

Calculation requested 2019-10-14 13:19:29

Page 12(12)

Step	Date and time	Elapsed	Power	T avg.	Bk. CD	Bk. CC	Boron	Excore AFD	Boration	Dilution
	-	hours	%	-	steps	steps	ppm	%	gal	gal
34	2019-10-01 22:35:47	10.750	100.0	591.3	218	226	1569	6.44	0	153
35	2019-10-01 22:50:47	11.000	100.0	591.3	218	226	1564	6.33	0	159
36	2019-10-01 23:05:47	11.250	100.0	591.3	218	226	1559	6.22	0	165
37	2019-10-01 23:20:47	11.500	100.0	591.3	218	226	1554	6.10	0	170
								Total [gal]	4459	6771

Step	Comment
	-
34	
35	
36	
37	

HARRIS 2020 NRC SCENARIO 3

Facility: Harris Nuclear Plant Scenario No.: 3 Op Test No.: 05000400/2020301

Examiners: ______ Operators: SRO: ______

RO: ______

BOP: ______

Initial Conditions: IC-27, MOL, 3% power

- 'B' NSW Pump is under clearance for breaker repairs

Turnover:	The plant is at 3% power, middle of core life. Startup on HOLD for briefing GP-005 Rev 107 Step 87
Critical Task:	• Manually start AFW flow to maintain control of SG level above 25% to prevent an automatic Reactor trip after trip of the last running Main Feed Pump • Manually start at least one high head ECCS pump to prevent RVLIS Dynamic Range Level from lowering below 33% • During a Small Break LOCA secure all RCPs with SI flow > 200 gpm and RCS pressure < 1400 psig to prevent RVLIS Dynamic Range Level from lowering below 33%

Event No.	Malf. No.	Event Type*	Event Description
1	xd2i085 xd2o085w xn30d06	C – BOP/SRO TS – SRO	Control Room Air Handler AH-15 trip requiring standby Air Handler startup – (APP-030)
2	tt:144 jtb143b	I – RO/SRO	Letdown Temperature Controller fails LOW/Diversion Valve fails to bypass demineralizers
3	cnd04a	C – BOP/SRO	Main Condenser Evacuation Pump trips – (AOP-012)
4	rcs10	C – RO/SRO TS – SRO	Reactor Vessel Flange Leak – (AOP-016)
5	cfw16a xb1i155 zr211158 zr211113	C – BOP/SRO TS – SRO	Running MFW Pump trips – (AOP-010) Standby MFW Pump fails to start Both MDAFW Pump AUTO start failure
6	rcs09b	C – RO/SRO	RCP "B" rising vibration (AOP-018). Vibrations require a manual Reactor trip (E-0) , then secure 'B' RCP and PRZ spray valve.
7	rps01b	M – ALL	Failure of the Reactor Trip breakers to open auto or manual – (EOP-FR-S.1)
8	rcs01a	M – ALL	Small Break LOCA – (EOP-E-1)
9	dsg04a	C – RO/SRO	Failure of 'B' Sequencer Load Block 1 to actuate during the Safety Injection which fails to start 'B' CSIP
10	zrpk601a	C – BOP/SRO	Failure of Safety Injection Isolation valves on 'A' Train CSIP normal mini flow 1CS-214 fails to close automatically

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

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 3

The crew will assume the watch while the JITT Trained Startup crew is attending a briefing by Reactor Engineering. The plant was in Mode 1 with Turbine valve testing complete when secondary chemistry parameters degraded and Reactor power was lowered to < 5%. The plant startup is on hold in MODE 2. The candidates are to maintain current plant conditions with Reactor Power ~ 3%.

The following equipment is under clearance:

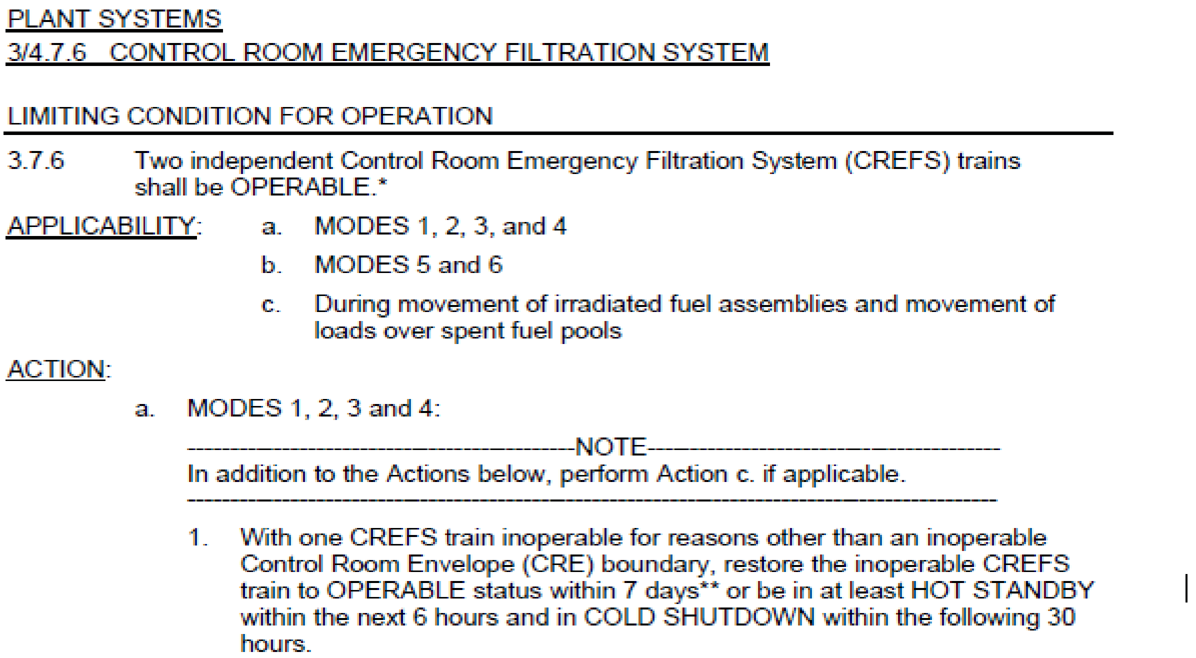
- ‘B’ NSW Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours.

Event 1: Control Room Air Handler AH-15A-SA trips. Annunciator ALB-030-6-4, Control Room HVAC Normal Supply Fans AH-15A-SA Low Flow – O/L will alarm. The HVAC dampers will automatically reposition and all Control Room Ventilation will secure.

Verifiable Action: The BOP will respond in accordance with the alarm procedure for ALB-030-6-4. The BOP should identify that the standby fan has failed to automatically start and report the failure to the SRO. The SRO should direct the BOP to manually start the standby fan using OP-173, Control Room Area HVAC Systems.

The SRO should evaluate Tech Spec 3.7.6, Control Room Emergency Filtration system and determine action a.1 applies.

- With one Control Room Emergency Filtration System inoperable, restore the inoperable system to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.



PLANT SYSTEMS
3/4.7.6 CONTROL ROOM EMERGENCY FILTRATION SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.6 Two independent Control Room Emergency Filtration System (CREFS) trains shall be OPERABLE.*

APPLICABILITY:
a. MODES 1, 2, 3, and 4
b. MODES 5 and 6
c. During movement of irradiated fuel assemblies and movement of loads over spent fuel pools

ACTION:

a. MODES 1, 2, 3 and 4:

------------------------------NOTE------------------------------
In addition to the Actions below, perform Action c. if applicable.
----

1. With one CREFS train inoperable for reasons other than an inoperable Control Room Envelope (CRE) boundary, restore the inoperable CREFS train to OPERABLE status within 7 days** or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

The SRO should prepare AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 3 (Continued)

Event 2: Letdown Temperature Controller fails - LD/Diversion Valve fails to bypass demineralizers. This failure will cause temperature controller TK-144 output to decrease to zero. Without cooling to the letdown heat exchanger, temperatures observed on TI-143 will rise. At 135°F annunciator ALB-007-3-2, Demin Flow Diversion High Temp will alarm.

Verifiable Action: The OATC will respond in accordance with the alarm procedure for ALB 007-3-2. The OATC should identify that the divert valve to the VCT has failed to respond and report the failure to the SRO. The OATC should manually bypass the CVCS Demineralizers with 1CS-50 (TCV-143), and then take manual control of TK-144 to restore letdown temperature to normal.

The SRO should provide a temperature band between 110°F to 120°F to the OATC in accordance with AD-OP-ALL-1000, Conduct of Operations, (5.5.6) for operation Control Bands. (Temperature band guidance can be found in OP-107, Chemical Volume And Control). The CVCS Demineralizers should remain bypassed pending an evaluation for continued resin use. The SRO should prepare AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 3: Main Condenser Evacuation Pump ‘A’ trips. – ALB -021-4-1, Condenser Vacuum Pump A Trip, will alarm and the breaker for the MCES Pump ‘A’ will indicate open on the MCB. Main condenser Vacuum will degrade slowly.

Verifiable Action: The BOP will respond in accordance with the alarm procedure for ALB 021-4-1 and identify that the ‘A’ MCES Pump has tripped based on MCB indication. The BOP will report the failure to the SRO and manually start the ‘B’ MCES Pump. The SRO should review AOP-012, Partial Loss of Condenser Vacuum, and work through the procedure to determine if any additional actions are required.

The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 4: Reactor Vessel Flange leak of ~ 15 gpm. The crew should notice Pressurizer level slowly lowering and a rise in charging flow. Annunciator ALB-010-5-5, Reactor vessel flange leakoff high temp will alarm when MCB temperature indicator TI-401 reaches 140°F.

Verifiable Action: The OATC will respond in accordance with the alarm procedure for ALB 010-3-2. The OATC should identify that the rising temperature on TI-401 and report the failure to the SRO. The OATC should shut 1RC-46 in accordance with the alarm response. manually actions for Reactor Vessel leakage directs shutting 1RC-46, Head Flange Seal Leakoff Line Isolation.
The closure of this valve will stop leakage from the inner Reactor head seal. AOP-016, Excessive Primary Plant Leakage may also be entered by the crew to address the flange leakage but the leakage will be stopped when addressed with the APP actions.

The SRO should evaluate Tech Spec 3.4.6.2, Reactor Coolant System – Operational Leakage and determine action b applies for condition d (briefly until 1RC-46 is shut):

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 3 (Continued)

Event 4: Tech Spec evaluation continued

T.S. 3.4.6.2: Reactor Coolant System operational leakage shall be limited to:

d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System (Modes 1, 2, 3, and 4)

Action:

b. With any Reactor Coolant System operational leakage greater than anyone of the above limits, excluding primary-to-secondary leakage, PRESSURE BOUNDARY LEAKAGE and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC for entry into Containment to complete the APP-ALB-010 actions.

Event 5: ‘A’ MFP trips with ‘B’ MFP failure to start and initiate AFW in accordance with AOP-010, Feedwater Malfunctions – ‘A’ MFP trip, with the ‘B’ MFW pump failing to auto start may be inserted once Pressurizer level and RCS Leakoff temperature have stabilized. Both MDAFW pumps fail to auto start but can be started in the MCR.

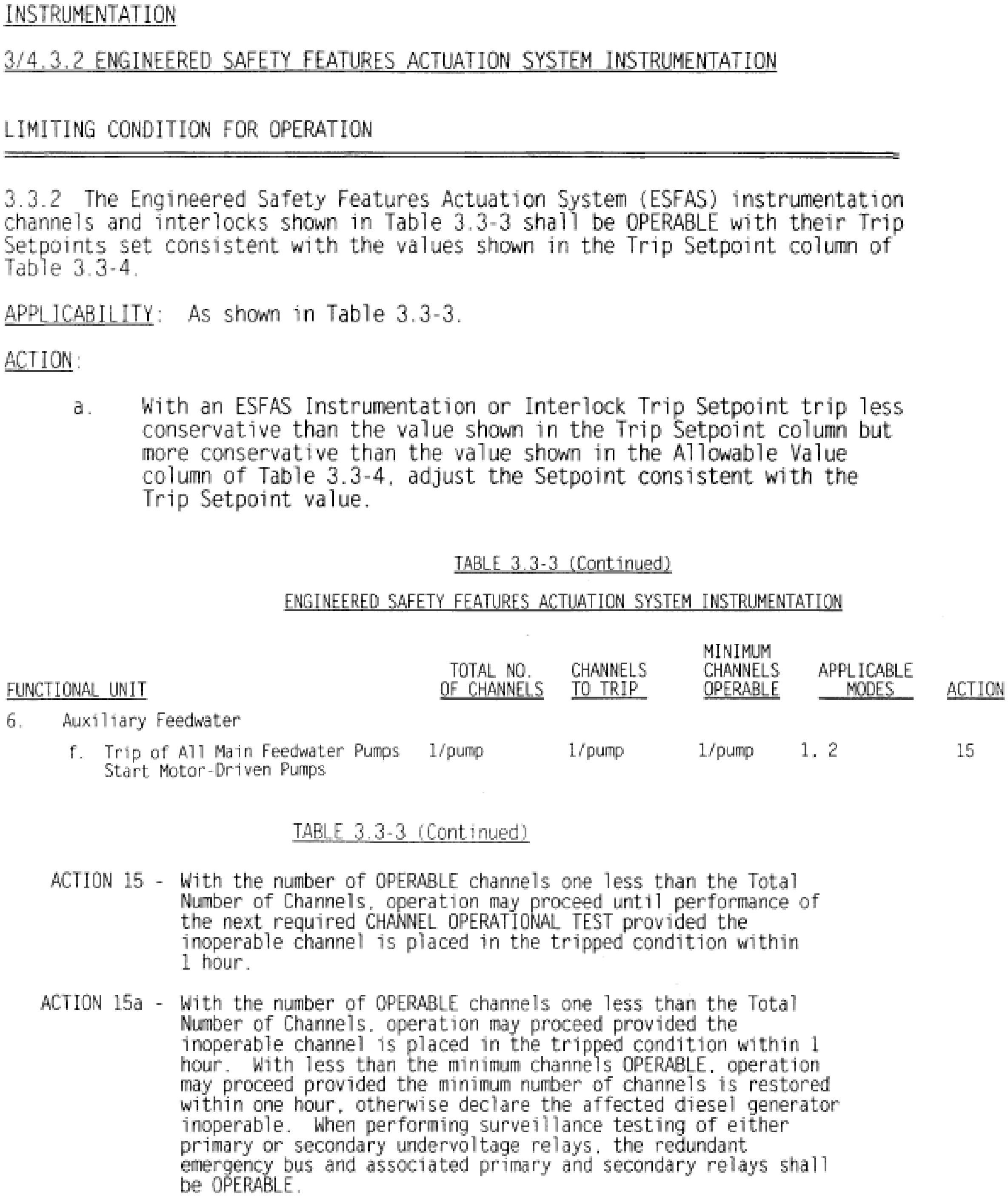
Verifiable Action: The BOP will respond in accordance with the alarm procedure for ALB 016-1-4. The BOP should identify that the ‘A’ MFP has tripped and the ‘B’ MFP failed to start based on Feedwater discharge pressure and plant response and report the failure to the SRO and verbalize the immediate actions of AOP-010. The SRO should enter AOP-010, Feedwater Malfunctions, and work through the procedure to initiate AFW flow to maintain Steam Generator Level between 52 and 62%(**Critical Task #1**). The BOP may place the ‘A’ MFP and ‘B’ MFP control switches in the stop position for the tripped MFP in accordance with APP-ALB-016-1-4. The crew will implement OWP-ESF-07 to install jumpers to place the inputs from the A and B MFPs to start the MDAFW Pumps and auto open of the MDAFW FCVs, in the trip condition.

The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists, for the failure and request assistance from the WCC.

The SRO should evaluate Tech Spec 3.3.2, Instrumentation – Engineered Safety Features Actuation System Instrumentation Action: 15 applies.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 3 (Continued)

Event 5: Tech Spec evaluation continued



INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4.

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS Instrumentation or Interlock Trip Setpoint trip less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 3.3-4, adjust the Setpoint consistent with the Trip Setpoint value.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
6. Auxiliary Feedwater					
f. Trip of All Main Feedwater Pumps Start Motor-Driven Pumps	1/pump	1/pump	1/pump	1, 2	15

TABLE 3.3-3 (Continued)

ACTION 15 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed until performance of the next required CHANNEL OPERATIONAL TEST provided the inoperable channel is placed in the tripped condition within 1 hour.

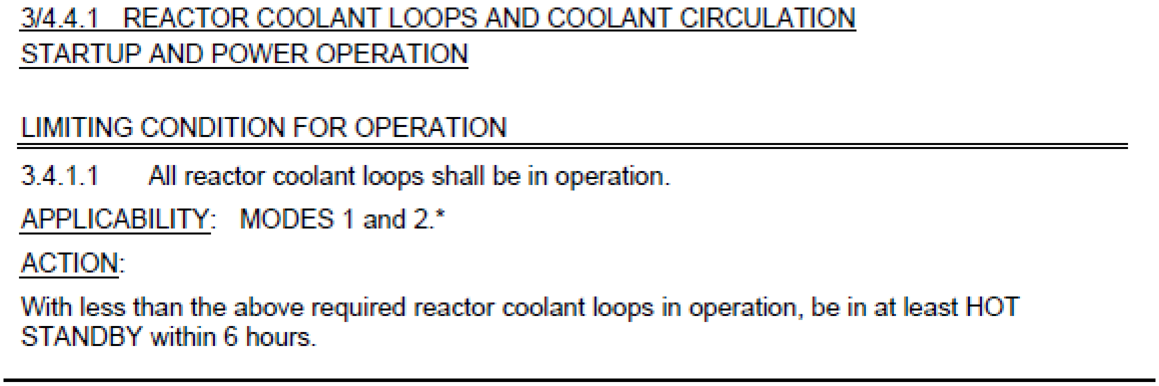
ACTION 15a - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the inoperable channel is placed in the tripped condition within 1 hour. With less than the minimum channels OPERABLE, operation may proceed provided the minimum number of channels is restored within one hour, otherwise declare the affected diesel generator inoperable. When performing surveillance testing of either primary or secondary undervoltage relays, the redundant emergency bus and associated primary and secondary relays shall be OPERABLE.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 3 (Continued)

Event 6: 'B' RCP high vibration. During this event the 'B' RCP vibrations will begin to rise over 3 minutes and peak at 28 mils shaft. Note: the shaft vibration instrumentation reads up to 30 mils. The crew will respond to the 'B' RCP malfunction by either identify rising vibrations or when ALB-010-2-5, RCP-B Trouble alarms.

Verifiable Action: The OATC will respond in accordance with the alarm procedure for ALB 010-2-5 and report this to the alarm to the SRO. The BOP should see the 'A' RCP vibration probe readings are rising and report the failure to the SRO. The SRO should enter AOP-018, Reactor Coolant Pump Abnormal Conditions and the OATC should perform the immediate actions of checking any CSIP running. Vibrations will continue to rise and exceed AOP-018 Attachment 1 RCP trip criteria of 20 mils shaft. The OATC will perform a manual Reactor trip and at which time the Reactor will fail to trip (ATWS) and the will have to implement EOP-FR-S.1.

The SRO should evaluate Tech Spec 3.4.1.1, Reactor Coolant Loops and Coolant Circulation Startup and Power Operation, and determine this action is applicable prior to opening the Reactor Trip Breakers. This may be discussed after the scenario based on the sequence of this event.



3/4.4.1 REACTOR COOLANT LOOPS AND COOLANT CIRCULATION
STARTUP AND POWER OPERATION

LIMITING CONDITION FOR OPERATION

3.4.1.1 All reactor coolant loops shall be in operation.

APPLICABILITY: MODES 1 and 2.*

ACTION:

With less than the above required reactor coolant loops in operation, be in at least HOT STANDBY within 6 hours.

Once the immediate actions of EOP-FR-S.1 are completed the crew will transition to EOP-E-0 and secure the 'A' RCP and associated PRZ spray valve after EOP-E-0 immediate actions are completed.

Event 7: Major - ATWS Reactor Trip breakers fail to open auto or manual. The crew should recognize that the Reactor has failed to trip and enter FR-S.1, Response to Nuclear Power Generation/ATWS. The Reactor Trip breakers will be opened locally one minute after a field operator has been dispatched to perform those actions. Once the crew has inserted negative reactivity via rod insertion (Auto or manual) or initiated the emergency Boration and have verified that the Reactor is tripped in FR-S.1, they should exit FR-S.1 and return to EOP-E-0.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 3 (Continued)

Event 7: Continued

Verifiable Action: The OATC will respond in accordance with EOP-FR-S.1 immediate actions and attempt to trip the Reactor via the second MCB Rector Trip switch. The BOP will respond in accordance with EOP-FR-S.1 immediate actions trip the Turbine from the MCB via the Turbine Trip switch. Once the immediate actions of EOP-FR-S.1 are complete the SRO should make a plant announcement for an available operator to come to the MCR for directions to locally trip the Reactor.

The next event Small Break LOCA will ramp in over the 4 minutes from the time the Reactor Trip breakers open allowing the crew to then transition from EOP E-0 to ES-0.1, Reactor Trip Response.

Event 8: Major - Small Break LOCA caused by a Loop 1 Cold Leg break resulting in either a Manual OR Automatic SI initiation. The crew should recognize a changing plant conditions with Pressurizer level and RCS pressure lowing. If the crew responds quickly to the event they may manually actuate a Safety Injection based on ES-0.1 foldout criteria of not being able to maintain Pressurizer level > 5% or RCS subcooling < 10°F. If they do not respond quickly an Automatic

Safety Injection will occur. The crew will then transition from ES-0.1 back to E-0, Reactor Trip or Safety Injection. After returning to EOP-E-0 and with SI actuated the crew will identify the ‘A’ CSIP has tripped and the ‘B’ CSIP has failed to start from the Sequencer and pressure in the Containment will continue to rise due to the LOCA. The degrading conditions in Containment will cause the crew to transition from EOP-E-0 to EOP-E-1, Loss of Reactor or Secondary Coolant.

Verifiable Action: Once the crew starts the ‘B’ CSIP (**Critical Task #2**). The Foldout Criteria for securing RCPs will be met and secure the RCPs (**Critical Task #3**). The OATC will report this condition to the SRO. The SRO should continue in EOP-E-0, and direct the OATC to implement the procedure foldout to ensure all RCPs are stopped.

Event 9: During the Safety Injection activation the ‘B’ Load Sequencer will skip the ‘B’ CSIP load block.

Verifiable Action: The OATC will report this condition to the SRO. The SRO should continue in EOP-E-0, and work through the procedure to ensure the OATC starts the ‘B’ CSIP in accordance with step 6. Provided the sequencer has reached Load Block 9 (Manual Loading Permissive) the OATC may start ‘B’ CSIP when the automatic function failure is observed in accordance with AD-OP-ALL-1000, Conduct of Operations, (5.6.3.8) for Equipment Manipulation and Status Control after notifying the SRO.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 3 (Continued)

Event 10: Failure of Safety Injection Isolation valves on 'A' Train CSIP normal mini flow 1CS-214 fails to close automatically.

Verifiable Action: The BOP or the OATC will report this condition to the SRO. The SRO should continue in EOP-E-0, and work through the procedure to ensure the BOP or the OATC shuts 1CS-214 in accordance with EOP-E-0, Attachment 1. The BOP or the OATC may shut 1CS-214 when the automatic function failure is observed in accordance with AD-OP-ALL-1000, Conduct of Operations, (5.6.3.8) for Equipment Manipulation and Status Control after notifying the SRO.

The crew will continue in EOP-0 into EOP-E-1, Loss of Reactor Or Secondary Coolant until the transition to EOP-ES-1.2, Post-LOCA Cooldown and Depressurization, is made. During the implementation of EOP-ES-1.2 a transition to EOP-FR-P.1, Response To Imminent Pressurized Thermal Shock may be required based on Cold Leg temperature of the broke RCS loop dropping below 240°F. The crew will return back to EOP-ES-1.2 where the scenario termination is met after the first SG pressure reduction has been completed.

CRITICAL TASK JUSTIFICATION:

1. Manually start AFW flow to maintain control of SG level above 25% to prevent an automatic or manual Reactor trip after trip of the last running Main Feed Pump

An unnecessary automatic or manual Reactor Trip for this event will create critical task. See note below.

2. Manually start at least one high head ECCS pump to prevent RVLIS Dynamic Range Level from lowering below 33%

In this scenario the ‘A’ CSIP has tripped and the ‘B’ CSIP has did not automatically start from sequencer actuation. The operator must manually start the ‘B’ CSIP which was in standby. Plant parameter grading criteria for the task is starting the ‘B’ CSIP to prevent RVLIS Dynamic Range Level from lowering below 33% which constitutes a significant core uncover with 2 Reactor Coolant Pumps in operation.

3. During a Small Break LOCA secure all RCPs with SI flow > 200 gpm and RCS pressure < 1400 psig to prevent RVLIS Dynamic Range Level from lowering below 33%

In this scenario EOP-E-0 foldout will apply following the completion of the immediate actions. The RCP trip criteria is BOTH of the following: SI flow > 200 gpm and RCS pressure < 1400 psig. These plant parameters are to be monitored continuously and when those conditions are met the operator must secure the operating RCPs. Plant parameter grading criteria for the task is tripping RCPs if SI flow > 200 gpm to prevent RVLIS Dynamic Range Level from lowering below 33% which constitutes a significant core uncover with 2 Reactor Coolant Pumps in operation.

Note: Causing an unnecessary plant trip or ESF actuation (automatic or manual) may constitute a CT failure. Actions taken by the applicant(s) will be validated using the methodology for critical tasks in Appendix D to NUREG-1021.

Simulator Setup

Reset to IC-143 password “NRC3sros”

Go to RUN

Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens for normal full power conditions

(The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS

Provide a Reactivity Plan to candidates for shutting down the plant

Provide a copy of the following procedures:

- GP-005, Power Operation (Mode 2 To Mode 1) **marked up** through section 6.0 step 87

Press START on Counter Scaler
Post conditions for status board from IC-27
Reactor Power 3%
Control Bank D at 102 steps
RCS boron 1453 ppm

Turnover: The plant is at 3% power, middle of core life. The crew will assume the watch while the JITT Trained Startup crew is attending a briefing by Reactor Engineering. The plant was in Mode 1 with Turbine valve testing complete when secondary chemistry parameters degraded and Reactor power was lowered to < 5%. The plant startup is on hold in MODE 2. The candidates are to maintain current plant conditions with Reactor Power ~ 3%.

Equipment Under Clearance:

- ‘B’ NSW Pump is under clearance for breaker repairs.

Align equipment for repairs:

Place protected train placards IAW OMM-001 Attachment 5
Protected Train placards on 'A' NSW pump

Place a CIT on the switch for ‘B’ NSW Pump.

Hang restricted access signs on MCR entry swing gates
Set CRT screen 3 to "QP STARTUP"

Op Test No.:	NRC	Scenario #	3	Event #	1	Page	11	of	73

Event Description: **Control Room Air Handler AH-15 trips, standby fails to Auto Start**

Time	Position	Applicant's Actions or Behavior

Lead Evaluator:	**The crew has been directed to hold power at 3% while the oncoming crew conducts a turnover briefing.**
	When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce: **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**

Simulator Operator:	**When directed by the Lead Evaluator, ensure that the annunciator horns are on and place the Simulator in RUN.**

Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 1** **"Control Room Air Handler AH-15 trips, standby fails to Auto Start"**
Indications Available:		• **ALB-030-6-4, Control Room HVAC Normal Supply Fans AH-15 Low Flow – O/L** • **Control Room ventilation damper re-alignment** • **White Overload light lit on AH-15 MCB switch**
ALB-030	BOP	RESPONDS to alarm on APP-ALB-030-6-4
	BOP	1. CONFIRM alarm using: • Fan status indication at MCB for AH-15 (1A-SA and 1B-SB) • Damper position indication on MCB for CZ-D2SB, CZ-25, and CZ-26 • ALB-030-6-3, Cont Room Normal Supply AH-15 Filter High ΔP
	BOP	2. VERIFY Automatic Functions: • Fans trip on overload

Op Test No.: NRC	Scenario # 3	Event # 1	Page 12 of 73	
Event Description:	**Control Room Air Handler AH-15 trips, standby fails to Auto Start**			
Time	Position	Applicant's Actions or Behavior		

	BOP	3. PERFORM Corrective Actions:	
		a. CHECK AH-15 fans status indication on MCB. b. IF fan is tripped, THEN PERFORM the following: (1) START the standby fan using OP-173, Control Room Area HVAC System.	(YES)
	SRO	Directs BOP to start Control Room ventilation alignment in accordance with OP-173	
	BOP	(2) IF white fan trouble light is LIT, THEN DISPATCH an operator to check overload relays on 1A36-SA-5A or 1B36-SB-3A. (3) DISPATCH an operator to check for tripped breaker on 1A36-SA-5A or 1B36-SB-3A. c. CHECK damper alignment on MCB for CZ-D1SA-1, CZ-D2SB-1, CZ-25 and CZ-26. d. IF ALB-030-6-3 is ALARMING, THEN REFER TO ALB-030-6-3.	(NO)
Simulator Communicator:		**When contacted to investigate fan failure report back in 2 minutes that breaker 1A-36-SA Cubical 5A is tripped on overload and no problems are noted locally at the fan unit.**	
Evaluator Note:		**(Any Tech Spec evaluation can be conducted with a follow up question after the scenario).**	
	SRO	Enters Instrumentation TS 3.7.6 ACTION **a.1** - With one Control Room Emergency Filtration System inoperable, restore the inoperable system to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.	
	SRO	Completes an Emergent Issue Checklist and contacts WCC for assistance. (WR, LCOTR, and Maintenance support)	

Op Test No.:	NRC	Scenario #	3	Event #	1	Page	13	of 73

Event Description: **Control Room Air Handler AH-15 trips, standby fails to Auto Start**

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**Acknowledge requests for assistance.**
Lead Evaluator:		**Once the crew completes start of the standby Air Handler and Tech Specs have been evaluated, cue Simulator Operator to insert Trigger 2** **Event 2: Letdown Temperature Control Failure**

Op Test No.:	NRC	Scenario #	3	Event #	2	Page	14	of	73
Event Description:		**Letdown Temperature Control Failure**							

Time	Position	Applicant’s Actions or Behavior

Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 2 “Letdown Temperature Control Failure”**	
Indications Available		• **ALB-007-3-2, DEMIN FLOW DIVERSION HIGH TEMP** • **TK-144 output lowers to 0** • **TI-143 temperature rising**	
ALB-007	RO	RESPONDS to alarm on APP-ALB-007-3-2	
	RO	1. CONFIRM alarm using TI-143, LP Letdown Temperature.	
	RO	2. VERIFY Automatic Functions:	
		a. 1CS-50, Letdown to VCT/Demin, diverts flow to the VCT, bypassing the BTRS and Purification Demineralizers **(Manually positions 1CS-50, Letdown to VCT/Demin, to divert flow to the VCT)**	(NO)
	RO	3. PERFORM Corrective Actions:	
		a. VERIFY that 1CS-50 diverts flow to the VCT, bypassing the BTRS and Purification b. PERFORM the following as needed to lower letdown temperature: (1) VERIFY proper charging flow is established. (2) LOWER letdown flow. (3) IF CCW flow to the Letdown Heat Exchanger appears low, THEN: a) TAKE manual control of TK-144. b) OPEN 1CC-337, to raise CCW flow.	(YES) (YES) (N/A) (YES)
	SRO	Directs RO to maintain a TK-144 outlet temperature controlling band of 110°F to 120°F per OP-107.	
		c. IF letdown temperature can NOT be lowered, THEN REFER TO OP-107, Chemical and Volume Control System, AND PERFORM the following: (1) REMOVE letdown from service. (2) IF desired, THEN PLACE Excess Letdown in service.	(NO) (NO) (N/A)

Op Test No.: <u>NRC</u> Scenario # 3 Event # 2		Page <u>15</u> of <u>73</u>
Event Description:		**Letdown Temperature Control Failure**
Time	Position	Applicant's Actions or Behavior

	SRO	d. NOTIFY RP that due to high temperatures closure of 1CS-50 has bypassed the demineralizers. Surveillance is necessary to identify areas in the plant that could have experienced changes to radiological conditions.
	SRO	Completes an Emergent Issue Checklist and contacts WCC for assistance. (WR, and Maintenance support)
Simulator Communicator:		**If contacted as WCC, System Engineer or Chemistry: Direct the control room to maintain flow bypassing the demineralizers until a resin damage assessment is completed.**
Lead Evaluator:		**When letdown temperature is under control, cue Simulator Operator to insert Trigger 3** **Event 3: Main Condenser Evacuation Pump 'A' trip**

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	16	of	73
Event Description:		**Main Condenser Evacuation Pump ‘A’ trip**							

Time	Position	Applicant’s Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 3 “Main Condenser Evacuation Pump ‘A’ trip”**	
Evaluator Note:		**Responding to the annunciator will direct the operator to start the standby MCES Pump if vacuum is degrading. With the plant at low power a degrading vacuum condition may not occur, however the MCES Pump trip will meet the conditions to enter AOP-012.**	
Indications Available		• **ALB-021-4-1, CONDENSER VACUUM PUMP A TRIP** • **MCES ‘A’ Pump MCB switch green light lit**	
ALB-021	BOP	RESPONDS to alarm on APP-ALB-021-4-1	
	BOP	1. CONFIRM alarm using:	
		a. Condenser Vacuum Pump status b. Condenser vacuum indication	
	BOP	2. VERIFY Automatic Functions:	
		a. Standby Vacuum Pump auto-starts on rising condenser pressure only if running Vacuum Pump has not tripped. **(Manually starts MCES ‘B’ Pump from MCB)**	(NO)
	BOP	3. PERFORM Corrective Actions:	
		a. IF Condenser vacuum is degrading, THEN GO TO AOP-012, Partial Loss of Condenser Vacuum. b. CHECK Vacuum Pump breaker indication (MCB). c. IF necessary, THEN START the standby Vacuum Pump. d. DISPATCH an Operator to check operation of seal water make-up to Vacuum Pump.	(N/A) (YES)
Simulator Communicator:		**When contacted to investigate pump trip report back in 2 minutes that breaker 1D3 Cubical 3D is tripped on overload and no problems are noted locally at the Vacuum Pump.**	

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	17	of	73
Event Description:		**Main Condenser Evacuation Pump 'A' trip**							

Time	Position	Applicant's Actions or Behavior	
	SRO	Completes an Emergent Issue Checklist and contacts WCC for assistance. (WR, and Maintenance support)	
Simulator Communicator:		**Acknowledge requests for assistance.**	
Lead Evaluator:		**Once the crew completes start of the standby MCES 'B' Pump, cue Simulator Operator to insert Trigger 4** **Event 4: Reactor Vessel Flange leak of ~ 15 gpm**	
Evaluator Note:		**The following write up is if AOP-012 is used for the response to the trip of the MCES Pump Trip.**	
	CREW	Identifies entry conditions to AOP-012, Partial Loss Of Condenser Vacuum are met	
AOP-012		Partial Loss Of Condenser Vacuum	
	SRO	ENTERS and directs actions of AOP-012, Conducts a Crew Update Makes PA announcement for AOP entry	
Procedure Note:		**This procedure contains no immediate actions.**	
	BOP	1. CHECK Turbine – IN Operation	(YES)
	BOP	2. CHECK Condenser pressure in both Zones LESS THAN 8.86 inches Hg absolute.	(YES)
Procedure Note:		Siemens recommends limiting operation in the Condenser Vacuum Exclusion Zone to 5 minutes per occurrence with a lifetime limit of 300 minutes.	

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	18	of	73
Event Description:	**Main Condenser Evacuation Pump 'A' trip**								

Time	Position	Applicant's Actions or Behavior	
	BOP	3.a PERFORM the following:	(NO)
	SRO	3.a RNO: GO TO Step 3.b.	
	SRO	3.b REDUCE Turbine load as necessary to maintain Condenser vacuum using ONE of the following:	(N/A)
	SRO	4. CONTINUE Turbine load reduction until directed otherwise by CRS based on the following: • Cause of vacuum loss identified and corrected • Vacuum stable or improving • Plant conditions require Reactor or Turbine trip	(N/A)
		•	
	BOP	5. CHECK ALL available Condenser Vacuum Pumps - OPERATING.	(NO)
	BOP	5. RNO: START the Standby Condenser Vacuum Pump. **(Manually starts MCES 'B' Pump from MCB)**	
	BOP	6. DISPATCH Operator(s) to locally perform actions of Attachment 1, Local Actions for a Loss of Condenser Vacuum.	
Simulator Communicator:		**Acknowledge requests for assistance.**	
	BOP	7. ENSURE the following valves - SHUT: • 1CE-447, Condenser Vac Breaker • 1CE-475, Condenser Vac Breaker	(YES) (YES)
	BOP	8. CONTACT Radwaste Control Room to determine if recent equipment operations using auxiliary steam or condensate may have caused loss of vacuum.	

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	19	of	73
Event Description:		**Main Condenser Evacuation Pump 'A' trip**							

Time	Position	Applicant's Actions or Behavior	
Simulator Communicator:		**Acknowledge requests and report that NO recent changes to auxiliary steam or condensate equipment operations.**	
	BOP	9. CHECK Circulating Water Pumps - ANY TRIPPED.	(NO)
	SRO	9. RNO: GO TO Step 11.	
Procedure Note:		If a Circulating Water Pump has tripped, it is not considered available until the cause of the trip has been identified and corrected.	
	BOP	11. CHECK ALL available Circulating Water Pumps - RUNNING.	(YES)
Procedure Caution:		When all Circulating Water Pumps are tripped, failure to shut MSIVs and MSIV Bypass Valves and opening condenser vacuum breakers may result in turbine rupture discs relieving due to elevated pressure and temperature.	
	BOP	12. CHECK ANY Circulating Water Pumps - RUNNING.	(YES)
	BOP	13. CHECK at least ONE Condensate Booster Pump - RUNNING.	(YES)
	BOP	14. CHECK BOTH of the following conditions EXIST: (indicates complete failure of a Circulating Water System expansion joint) [A.1] a. CHECK ALB-021-8-5 in ALARM due to Condenser Pit High Level.	(NO)
	SRO	14. RNO: GO TO Step 16.	
	SRO	16. CHECK major unisolable leak in Circulating Water System - EXISTS.	(NO)

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	20	of 73
Event Description:	**Main Condenser Evacuation Pump ‘A’ trip**							

Time	Position	Applicant’s Actions or Behavior	
	SRO	16. RNO: GO TO Step 19.	
	SRO	19. CHECK for isolable leak between Condenser Waterbox isolation valves - EXISTS.	(NO)
	SRO	19. RNO: GO TO Step 22.	
	SRO	22. CHECK Circulating Water temperatures using the following ERFIS Computer Points - STABLE OR IMPROVING:	(YES)
	SRO	23. CHECK plant shutdown - INITIATED.	(NO)
	SRO	23. RNO: GO TO Step 28.	
	SRO	28. CHECK cause of loss vacuum - IDENTIFIED AND CORRECTED.	(YES)
	SRO	29. RESTORE Turbine load as desired per GP-005, Power Operation.	
	SRO	30. EXIT this procedure.	
Lead Evaluator:		**Once the crew completes start of the standby MCES ‘B’ Pump, cue Simulator Operator to insert Trigger 4** **Event 4: Reactor Vessel Flange leak of ~ 15 gpm**	

Op Test No.: NRC Scenario # 3 Event # 4 Page 21 of 73

Event Description: **Reactor Vessel Flange leak of ~ 15 gpm**

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 4 "Reactor Vessel Flange leak of ~ 15 gpm"**
Indications Available:		• **ALB-10-5-5, REACTOR VESSEL FLANGE LEAKOFF HIGH TEMP** • **TI-401, Reactor Vessel Flange Leakoff Temp rising**
Evaluator Note:		**Responding to the annunciator will direct the operator to shut 1RC-46, Head Flange Seal leakoff Line Isolation to stop leakage from the inner Reactor head seal. With the condition clear the crew may not enter AOP-016.**
ALB-010	RO	Responds to alarm and evaluates APP-ALB-010-5-5
		1. CONFIRM alarm using: a. TI-401 Reports TI-401 reading or trending high. 2. VERIFY Automatic Functions: None 3. PERFORM Corrective Actions: a. CHECK containment temperature trend for high containment temperature resulting from a nearby steam/RCS leak (NONE) b. Shut 1RC-46, Head Flange Seal Leakoff Line Isolation to stop leakage from inner Reactor head seal Monitors TI-401 indications and identifies temperature is lowering c. COORDINATE Containment entry per AP-545, AND DISPATCH an Operator to containment to position the following valves: (1) SHUT 1RC-34, Head Flange Seal Inner Leakoff Isolation. (2) OPEN 1RC-33, Head Flange Seal Outer Leakoff Isolation.
	RO	Informs SRO Reactor Vessel Flange leakage is isolated

Op Test No.:	NRC	Scenario #	3	Event #	4		Page	22	of	73	
Event Description:			**Reactor Vessel Flange leak of ~ 15 gpm**								

Time	Position	Applicant's Actions or Behavior
	SRO	• Completes an Emergent Issue Checklists for the failure of the Rx Vessel Flange. • Contacts WCC to coordinate Containment entry per AP-545 (WR, LCOTR and Maintenance support).
Simulator Communicator:		**Acknowledge requests for assistance.**
Evaluator Note:		**Any Tech Spec evaluation can be conducted with a follow up question after the scenario. Leakrate may not be easily determinable due to changing RCS Temperature and may require Engineering assistance**
	SRO	Evaluates Reactor Coolant System TS 3.4.6.2 Reactor Coolant System operational leakage shall be limited to: d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System. ACTION **b.** - With any Reactor Coolant System operational leakage greater than anyone of the above limits, excluding primary-to-secondary leakage, PRESSURE BOUNDARY LEAKAGE and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
Evaluator Note:		**The following write up is if AOP-016 is used for the response to the Reactor Vessel Flange Leak.**
	CREW	Identifies entry conditions to AOP-016, Excessive Primary Plant Leakage are met
AOP-016		Excessive Primary Plant Leakage

Op Test No.: NRC	Scenario # 3	Event # 4	Page 23 of 73
Event Description:	**Reactor Vessel Flange leak of ~ 15 gpm**		

Time	Position	Applicant's Actions or Behavior	
	SRO	ENTERS and directs actions of AOP-016, Conducts a Crew Update Makes PA announcement for AOP entry	
Procedure Note:		**This procedure contains no immediate actions.**	
	OATC	1. CHECK RHR in operation	(NO)
	SRO	1. RNO: GO TO Step 3.	
	SRO	3. REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Matrix.	
	OATC	4. CHECK RCS leakage within VCT makeup capability May report that the leak is exceeding Tech Spec SG leakage.	(YES)
Procedure Note:		If CSIP suction is re-aligned to the RWST, negative reactivity addition should be anticipated.	
	OATC	5. MAINTAIN VCT level GREATER THAN 5%	(YES)
	SRO	6. GO TO Step 10.	
	OATC	10. CHECK valid CNMT Ventilation Isolation monitors (REM-3561A, B, C and D) ALARM CLEAR 11. CHECK RM 3502A, RCS Leak Detection Radiation Monitor, ALARM CLEAR 12. CHECK ALL valid Area Radiation Monitors ALARM CLEAR 13. CHECK valid Stack Monitors ALARM CLEAR	(YES) (YES) (YES) (YES)

Op Test No.:	NRC	Scenario #	3	Event #	4	Page	24	of 73
Event Description:		**Reactor Vessel Flange leak of ~ 15 gpm**						

Time	Position	Applicant's Actions or Behavior	
	SRO	14. DETERMINE if unnecessary personnel should be evacuated from affected areas, as follows:	
		14.a. CHECK that a valid RMS Secondary Monitor HIGH ALARM	(NO)
	SRO	14.a RNO: GO TO Step 14.d.	
		14.d CHECK that an RCS leak outside Containment, other than SG tube leakage, has caused a valid RMS alarm.	(NO)
	SRO	14.d RNO: GO TO Step 15.	
	BOP	15. DIRECT Chemistry to stop any primary sampling activities.	
Simulator Communicator:		**Acknowledge request to stop primary sampling activities.**	
Procedure Note:		• The following qualitative flow balance is to quickly determine if RCS leakage exceeds Tech Spec limits, EAL classification thresholds, or RCS makeup capability. • RCS influent and effluent flow rates are compared and PRZ level rate of change is used to determine the RCS flow balance.	
	OATC	16. PERFORM a qualitative RCS flow balance, as follows: a. ESTIMATE leak rate considering the following parameters: • PRZ level rate of change (~55 gal/% at 653°F) • Charging flow • Total seal injection flow • Letdown flow • Total seal return flow Reports estimate to SRO of ~ 15 gpm **(Band of 10 to 25 gpm)**	

Op Test No.:	NRC	Scenario #	3	Event #	4	Page	25	of	73
Event Description:			**Reactor Vessel Flange leak of ~ 15 gpm**						

Time	Position	Applicant's Actions or Behavior
		b. OPERATE the following letdown orifice valves as necessary to maintain charging flow on scale: • 1CS-7, 45 gpm Letdown Orifice A • 1CS-8, 60 gpm Letdown Orifice B • 1CS-9, 60 gpm Letdown Orifice C (No changes required)
Procedure Note:		Performance of surveillance tests to determine if leakage exceeds Tech Spec limits, or to more accurately quantify leakage is up to CRS discretion.
	SRO	17. Determines that more accurate quantification is not needed due to excessive leakage indications present.
Evaluator Note:		**Any Tech Spec evaluation can be conducted as a follow up question after the scenario.**
	SRO	18. EVALUATE RCS leakage (refer to Tech Spec 3.4.6.2).
		Reviews Reactor Coolant System TS 3.4.6.2 Reactor Coolant System operational leakage shall be limited to: d. 10 gpm IDENTIFIED LEAKAGE from the Reactor Coolant System. ACTION **b.** - With any Reactor Coolant System operational leakage greater than any one of the above limits, excluding primary-to-secondary leakage, PRESSURE BOUNDARY LEAKAGE and leakage from Reactor Coolant System Pressure Isolation Valves, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
	SRO	19. DETERMINE leak location from one or more of the following: MCB indications and Valid Radiation Monitors • From RV Flange

Op Test No.:	NRC	Scenario #	3	Event #	4	Page	26	of 73
Event Description:		**Reactor Vessel Flange leak of ~ 15 gpm**						

Time	Position	Applicant's Actions or Behavior
	BOP	20. NOTIFY Health Physics of the following: a. Leak location: • Source inside or outside CNMT • To closed system, SG or to atmosphere b. Applicable radiation levels. NOTIFY HP of Reactor Vessel Flange leakage
Simulator Communicator:		**Acknowledge RCs leakage is coming from Reactor Vessel Flange.**
	SRO	21. WHEN leakage location has been determined, THEN PERFORM the applicable Attachment: Leakage From RV Flange Attachment 6 page 28
	SRO	Transitions to Attachment 6: 1. Consult with Operation Management to determine leak isolation and recovery actions
Procedure Note:		Radiation Control personnel must identify radiological conditions or provide coverage and issue a special RWP prior to CNMT entry.
	SRO	2. IF CNMT entry is made to isolate the leak, THEN VERIFY valves manipulated for leak isolation are documented per the following: • OMM-001, Operations Administrative Requirements • OPS-NGGC-1303, Verification Practices
	SRO	Completes an Emergent Issue Checklists for the failure of the Rx Vessel Flange. Contacts WCC to coordinate Containment entry per AP-545 (WR, LCOTR and Maintenance support).
	SRO	3. Exit this procedure.

Op Test No.:	NRC	Scenario #	3	Event #	4	Page	27	of	73
Event Description:	**Reactor Vessel Flange leak of ~ 15 gpm**								

Time	Position	Applicant's Actions or Behavior

Evaluator Note:		**After Rx Vessel leakage has stabilized, cue Simulator Operator to insert Trigger 5** **Event 5: 'A' MFP trips with 'B' MFP failure to start AOP-010).**

Op Test No.:	NRC	Scenario #	3	Event #	5	Page	28 of 73
Event Description:	**MFP 'A' trips with MFP 'B' failure to start (AOP-010)**						

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator insert Trigger 5** **"MFP 'A' trips with 'B' MFP failure to start (AOP-010)"**	
Indications Available:		• **ALB-016-1-4, FW PUMP A/B O/C TRIP –GND OR BKR FAIL TO CLOSE** • **Multiple FW flow alarms**	
	BOP	RESPONDS to alarms and ENTERS AOP-010	
AOP-010		Feedwater Malfunctions	
	SRO	ENTERS and directs actions of AOP-010 Conducts a Crew Update Makes PA announcement for AOP entry	
Procedure Note:		**Steps 1 through 4 are immediate actions.**	
Immediate Action	BOP	1. CHECK Feedwater Regulator valves operating properly.	(YES)
Immediate Action	BOP	2. CHECK ANY Main Feedwater Pump TRIPPED	(YES)
Immediate Action	BOP	3. CHECK initial Reactor power less than 90%.	(YES)
Immediate Action	BOP	4. CHECK initial Reactor power less than 80%.	(YES)
Procedure Note:		Turbine runback will automatically terminate at approximately 50% power. Turbine runbacks are identified as follows: • ALB-20/2-2, TURBINE RUNBACK OPERATIVE in alarm • TCS Runback in Urgent Priority alarm	
	BOP	5. CHECK initial Reactor power less than 60%.	(YES)

Op Test No.:	NRC	Scenario #	3	Event #	5	Page	29	of 73
Event Description:	**MFP 'A' trips with MFP 'B' failure to start (AOP-010)**							

Time	Position	Applicant's Actions or Behavior	
	BOP	6. MAINTAIN ALL of the following: • At least ONE Main Feedwater Pump RUNNING • Main Feedwater flow to ALL Steam Generators • ALL Steam Generator levels greater than 30%	(NO) (YES) (YES)
	SRO	6. RNO: PERFORM the following:	
Critical Task # 1	BOP	a. IF ANY SG level drops to 30% THEN TRIP the Reactor AND GO TO EOP-E-0.Places SG 'B' Feedwater Reg valve in MANUAL b. IF Above POAH AND Reactor power is LESS THAN 10%, THEN: (1) INITIATE AFW flow to maintain Steam Generator levels between 52 and 62%. ***Critical Task: Manually start AFW flow to maintain control of SG level above 25% to prevent an automatic Reactor trip after trip of the last running Main Feed Pump.***	(NO) (YES)
Procedure Note:		Mode change occurs at 5% Reactor power.	
	SRO	(2) REDUCE power as necessary to maintain SG level.	
		c. IF below POAH, THEN:	(NO)
	BOP	7. CHECK Feedwater Regulator Valves operating properly in AUTO: • Response to SG levels • Valve position indication • Response to feed flow/steam flow mismatch	(YES)
Procedure Note:		Inability to monitor one or more Safety System Parameters concurrent with a turbine runback of greater than 25%, requires a change of event classification per the HNP Emergency Plan. [C.2, C.3]	

Op Test No.:	NRC	Scenario #	3	Event #	5	Page	30	of	73

Event Description: **MFP ‘A’ trips with MFP ‘B’ failure to start (AOP-010)**

Time	Position	Applicant’s Actions or Behavior	
	BOP	8. CHECK turbine runs back less than 25% turbine load	YES
Procedure Note:		A feedwater train consists of a Condensate Pump, Condensate Booster Pump and Main Feedwater Pump.	
	SRO	9. GO TO the applicable section: EVENT: Loss of Running Pumps Section 3.2 Page 14	
Procedure Note:		• A feedwater train consists of a Condensate Pump, Condensate Booster Pump and Main Feedwater Pump. • Target load for loss of a running pump is as follows: ○ One Heater Drain Pump with both FW Trains operating: Less than 100% Power ○ No Heater Drain Pumps with both FW Trains operating: 90% turbine load. ○ Single Main Feedwater Pump running with both Condensate Pumps and both Condensate Booster Pumps operating: 7.0 mpph Total FW Flow. ○ Single Feedwater Train with both Heater Drain Pumps operating: 7.0 mpph Total FW Flow. ○ Single Feedwater Train operating: 5.5 mpph Total FW Flow.	
	BOP	1. MAINTAIN ALL of the following: • At least ONE Main Feedwater Pump RUNNING • Main Feedwater flow to ALL Steam Generators • ALL Steam Generator levels greater than 30%	 (NO) (YES) (YES)
	SRO	1. RNO: PERFORM the following:	

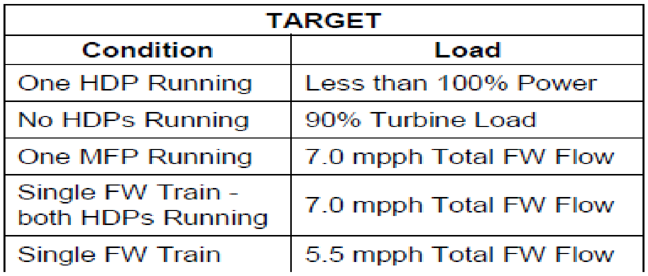
Op Test No.:	NRC	Scenario #	3	Event #	5	Page	31	of	73

Event Description: **MFP 'A' trips with MFP 'B' failure to start (AOP-010)**

Time	Position	Applicant's Actions or Behavior	
Critical Task # 1	BOP	a. IF ANY SG level drops to 30% THEN TRIP the Reactor AND GO TO EOP-E-0.Places SG 'B' Feedwater Reg valve in MANUAL b. IF Above POAH AND Reactor power is LESS THAN 10%, THEN: (1) INITIATE AFW flow to maintain Steam Generator levels between 52 and 62%. ***Critical Task: Manually start AFW flow to maintain control of SG level above 25% to prevent an automatic Reactor trip after trip of the last running Main Feed Pump***	(NO) (YES)
Procedure Note:		Mode change occurs at 5% Reactor power.	
	SRO	(2) REDUCE power as necessary to maintain SG level.	
		c. IF below POAH, THEN:	(NO)
	RO	2. CHECK control rods INSERTING to reduce Tavg - Tref mismatch. **(Rod Control is in Manual at this time)**	
	BOP	3. CHECK Main Steam pressure less than PORV controller setpoint. (nominally 1106 psig).	(YES)
Procedure Caution:		Improper operation of the Steam Dumps while in manual control can lead to excessive SG swell or overcooling of the RCS.	
	BOP	4. CHECK proper Steam Dump Valve operation.	(YES)
	BOP	5. CHECK SG levels TRENDING to between 52% and 62%.	(YES)

Op Test No.:	NRC	Scenario #	3	Event #	5	Page	32	of 73
Event Description:		**MFP 'A' trips with MFP 'B' failure to start (AOP-010)**						

Time	Position	Applicant's Actions or Behavior	
	RO	6. CHECK PZR PORVs SHUT.	(YES)
	RO	7. CHECK PZR pressure TRENDING to 2235 psig.	(YES)
	RO	8. CHECK PZR Level TRENDING to reference level.	(YES)
	BOP	9. ALIGN Main Feedwater Pump control switches, as applicable: Pumps • Tripped Pump - STOP (spring-return to AUTO) • Auto-started Pump - START (spring-return to AUTO) Pump Recirc Valves • Tripped Pump - SHUT • Auto-started Pump - MODU	
	BOP	10. CHECK BOTH Heater Drain Pumps TRIPPED.	(YES)
	BOP	11. CHECK the following high-high level alarms CLEAR:	(YES)
Procedure Note:		A feedwater train consists of a Condensate Pump, Condensate Booster Pump and Main Feedwater Pump.	
	BOP	12. CHECK load less than or equal to target based on final condition.	(YES)



TARGET	
Condition	**Load**
One HDP Running	Less than 100% Power
No HDPs Running	90% Turbine Load
One MFP Running	7.0 mpph Total FW Flow
Single FW Train - both HDPs Running	7.0 mpph Total FW Flow
Single FW Train	5.5 mpph Total FW Flow

Op Test No.:	NRC	Scenario #	3	Event #	5	Page	33	of 73
Event Description:	**MFP 'A' trips with MFP 'B' failure to start (AOP-010)**							

Time	Position	Applicant's Actions or Behavior	
	BOP	13. DISPATCH an operator to check the following seated, observing tailpipes: • MSR Relief Valves • SG Safety Valves	
Simulator Communicator:		**Acknowledge communications** **After 2-3 minutes report back that nothing is abnormal with the tailpipes and no leaks were found** **IF contacted by MCR to investigate the causes of the "A" and later the "B" MFW pump trip report that both breakers have tripped on overcurrent. There are no signs of damage at the pumps.**	
	BOP	14. CHECK Hotwell level trending to between 71% and 76%.	(YES)
	BOP	15. RESET Loss of Load interlocks C7A and C7B, as follows: **(Steam Dumps are in Steam Pressure Mode at this time)**	
	SRO	16. NOTIFY Load Dispatcher of ANY load limitations. **(Generator is not connected to the Grid at this time)**	
	SRO	17. CHECK Reactor thermal power changed by less than 15% in any one hour period. [C.1] 18. Within 1.5 hours of load rejection, CHECK control rods above insertion limits.	(YES) (YES)
	SRO	EXIT this procedure.	
OWP-ESF-07	SRO	Refer to OWP-ESF-07 to install jumpers to place required channels in the tripped condition.	
	SRO	Contacts WCC for support, requests WR and LCOTR. Contacts I&C to have channel removed from service.	

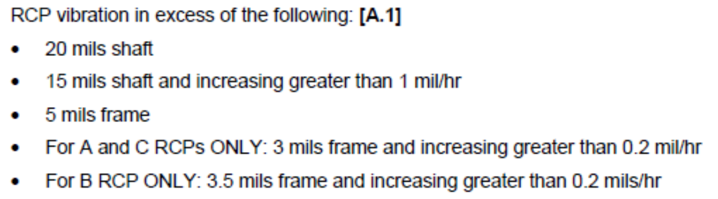
Op Test No.:	NRC	Scenario #	3	Event #	5	Page	34	of	73
Event Description:	**MFP ‘A’ trips with MFP ‘B’ failure to start (AOP-010)**								

Time	Position	Applicant’s Actions or Behavior
Simulator Communicator:		**IF WCC is contacted then report that Electrical Maintenance is investigating the problems with the breakers and any repairs will be made as quickly as possible.**
Evaluator Note:		**Any Tech Spec evaluation may be completed with a follow-up question after the scenario.**
	SRO	Enters Instrumentation TS 3.3.2 Functional Unit 6.f ACTION 15 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed until performance of the next required CHANNEL OPERATIONAL TEST provided the inoperable channel is placed in the tripped condition within 1 hour.
Lead Evaluator:		**Once the plant has stabilized, cue Simulator Operator to insert Trigger 6** **Event 6: RCP ‘B’ rising vibration (AOP-018)**

Op Test No.:	NRC	Scenario #	3	Event #	6	Page	35 of 73
Event Description:	**RCP ‘B’ rising vibration (AOP-018)**						

Time	Position	Applicant’s Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 6 “RCP ‘B’ rising vibration (AOP-018)”**	
Available Indications		• **ALB-010-2-5, RCP-B TROUBLE** • **RCP ‘B’ vibration monitors rising and red high vibration lights lit**	
	RO	RESPONDS to alarms and ENTERS AOP-018	
AOP-018		Reactor Coolant Pump Abnormal Conditions	
Immediate Action	RO	1. CHECK any CSIP running.	(YES)
	SRO	ENTERS and directs actions of AOP-018, Conducts a Crew Update Makes PA announcement for AOP entry	
	SRO	2. REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Matrix.	
Procedure Note:		Minimum allowable flow for a CSIP is 60 gpm which is provided by normal miniflow during normal operation and alternate miniflow during safety injection. Maintaining CSIP flow greater than or equal to 60 gpm also satisfies this requirement.	
		3. EVALUATE plant conditions AND GO TO the appropriate section: MALFUNCTION: High Reactor Coolant Pump Vibration, Section 3.2 Page 8	
Evaluator Note:		**The following question may be YES at this time but the limit will be exceeded quickly. This is a continuous action step and implemented when the limit is exceeded. The guide is therefore written as if the limit is exceeded.**	

Op Test No.:	NRC	Scenario #	3	Event #	6	Page	36 of 73
Event Description:	**RCP ‘B’ rising vibration (AOP-018)**						

Time	Position	Applicant’s Actions or Behavior	
	RO	1. CHECK ALL RCPs operating within the limits of Attachment 1 (Page 22).  RCP vibration in excess of the following: **[A.1]** • 20 mils shaft • 15 mils shaft and increasing greater than 1 mil/hr • 5 mils frame • For A and C RCPs ONLY: 3 mils frame and increasing greater than 0.2 mil/hr • For B RCP ONLY: 3.5 mils frame and increasing greater than 0.2 mils/hr	(NO)
	SRO	1. RNO: GO TO STEP 3	
	RO	3. CHECK the Reactor is TRIPPED.	(NO)
Evaluator Note:		**The SRO should conduct a Crew Update and review AOP-018 Section 3.2 steps 4 through 7 and direct these actions to be performed after the E-0 immediate actions are ensured complete.**	
	SRO	3. RNO: TRIP the Reactor AND GO TO EOP-E-0. (Perform Steps 4 through 7 as time permits.)	
Evaluator Note:		**Upon entering EOP-E-0, Rx WILL NOT trip from RPS or MCB switches**	
EOP-E-0		REACTOR TRIP OR SAFETY INJECTION	
	SRO	1. Directs manual Reactor Trip	
	RO	1. RNO Initiates a MANUAL Reactor trip. from center section of the Main Control Board (switch is failed).	
	RO	1.a RNO Attempts to initiate a MANUAL Reactor Trip from left section of the Main Control Board (switch is failed).	

Op Test No.:	NRC	Scenario #	3	Event #	6	Page	37 of 73
Event Description:	**RCP ‘B’ rising vibration (AOP-018)**						

Time	Position	Applicant’s Actions or Behavior
Procedure Note:		Both manual reactor trip switches must be actuated before initiating a manual turbine trip.
	SRO	1.a RNO IF the reactor will not trip after using both MCB manual trip switches, THEN go to FR-S.1, "RESPONSE TO NUCLEAR POWER GENERATION/ATWS", Step 1.

Op Test No.:	NRC	Scenario #	3	Event #	7	Page	38	of 73
Event Description:	**Failure of the Reactor Trip breakers to open auto or manual (EOP-FR-S.1)**							

Time	Position	Applicant's Actions or Behavior	
Simulator Communicator:		**During the ATWS - the crew makes a PA announcement for an operator to contact or report to the MCR for instructions to locally trip the Reactor. CALL the MCR as the TB AO and get the instructions.**	
Simulator Operator:		**After the TB AO has received instructions to locally trip the Reactor, wait 1 minute then run TRG-15. Trigger 15 will delete the ATWS malfunction (RPS01B) and trip the Reactor locally. After running TRG-15 call MCR and report that the Rx trip breakers were locally opened.**	
Evaluator Note:		**EOP-FR-S.1 is the first transition step from EOP-E-0 and contains immediate action step required to be performed from memory. Because of this the SRO may proceed directly to EOP-FR-S.1.**	
EOP- FR-S.1		Response to Nuclear Power Generation / ATWS	
Procedure Caution:		To maximize core cooling, RCPs should NOT be tripped with reactor power GREATER THAN 5%. (Normal support conditions for running RCPs are NOT required for these circumstances. The RCP TRIP CRITERIA for small break LOCA conditions is NOT applicable to this procedure.)	
Procedure Note:		Steps 1 through 2 are immediate action steps.	
Immediate Action	RO	1. Ensure Reactor Trip: a. Reactor Trip AND Bypass BKRs – OPEN b. Rod bottom lights (Zero Steps) – LIT c. Neutron flux – DROPPING	(NO) (NO) (NO)
	RO	1. RNO actions: IF the reactor will NOT trip (automatically AND after using both manual trip switches), THEN verify negative reactivity inserted by any of the following while continuing with this procedure: 1) Manually insert control rods 2) Ensure control rods inserting in automatic	

Op Test No.:	NRC	Scenario #	3	Event #	7	Page	39	of 73

Event Description: **Failure of the Reactor Trip breakers to open auto or manual (EOP-FR-S.1)**

Time	Position	Applicant's Actions or Behavior	
Immediate Action	BOP	2. Check Turbine Trip: d. All turbine throttle valves – SHUT	(NO)
	BOP	2. RNO actions: Manually Trip Main Turbine from MCB	
Evaluator Note:		**When the Main Turbine is tripped RCS pressure will rapidly raise and one or more Pressurizer PORV's will lift. With RCS break flow occurring, the RCS pressure will steadily drop. SG pressure will also rapidly rise and cause all SG PORV's to OPEN and most of the SG safety valves to lift.**	
	BOP	3. Ensure All AFW Pumps – RUNNING (Starts ALL available AFW pumps)	
	SRO	4. Direct an operator to report to the main control room to receive instructions for local actions (Local Actions to trip the reactor or turbine are directed in step 9).	
	SRO	5. Inform SM to Evaluate EAL Matrix (Refer to PEP-110).	

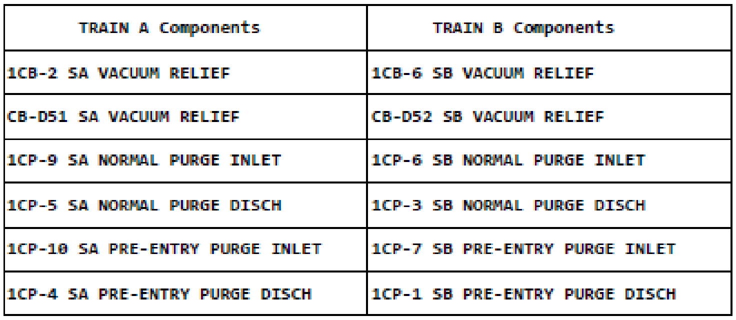
Op Test No.:	NRC	Scenario #	3	Event #	7	Page	40	of 73
Event Description:	**Failure of the Reactor Trip breakers to open auto or manual (EOP-FR-S.1)**							

Time	Position	Applicant's Actions or Behavior	
Procedure Note:		Actuation of the sequencer inhibits operation of the boric acid pumps. (If the sequencer runs on Program A, the pumps can be started manually after LB-9. Otherwise, the sequencer must be reset to restore operation of the pumps) SI flow accomplishes emergency boration.	
Evaluator Note:		**After the reactor is tripped, RCS pressure will rapidly lower to the Auto SI setpoint (1850 psig). The crew may/may not have time to manually actuate SI; as such, there is no problem with the crew NOT performing a manual SI.** **After the reactor is tripped, the 'A' CSIP will trip on an electrical fault, and the Safeguards Sequencer will fail to start the 'B' CSIP.**	
	RO	6. Initiate Emergency Boration of RCS: a. Check SI flow – GREATER THAN 200 GPM. 6.a RNO: Go to Step 6.c c. Emergency borate from the BAT: 1) Start a boric acid pump. 2) Perform any of the following (listed in order of preference): e. Open Emergency Boric Acid Addition valve: ➢ 1CS-278 f. Open normal boration valves: ➢ FCV-113A ➢ FCV-113B 3) Ensure boric acid flow to CSIP suction – AT LEAST 30 GPM 4) Ensure CSIP flow to RCS – AT LEAST 30 GPM	(NO)
	RO	d. Check PRZ Pressure – LESS THAN 2335 PSIG.	(YES)
	SRO	e. Go to Step 8.	

Op Test No.: NRC Scenario # 3 Event # 7 Page 41 of 73

Event Description: **Failure of the Reactor Trip breakers to open auto or manual (EOP-FR-S.1)**

Time	Position	Applicant's Actions or Behavior	
	BOP	8. Isolate CNMT Ventilation: a. Stop the following fans: (If running) • AH-82A NORMAL PURGE SUPPLY FAN • AH-82B NORMAL PURGE SUPPLY FAN • E-5A CNMT PRE-ENTRY PURGE EXHAUST FAN • E-5B CNMT PRE-ENTRY PURGE EXHAUST FAN	
	BOP	b. Ensure the valves and dampers listed in the table – SHUT.	(YES)



TRAIN A Components	TRAIN B Components
1CB-2 SA VACUUM RELIEF	1CB-6 SB VACUUM RELIEF
CB-D51 SA VACUUM RELIEF	CB-D52 SB VACUUM RELIEF
1CP-9 SA NORMAL PURGE INLET	1CP-6 SB NORMAL PURGE INLET
1CP-5 SA NORMAL PURGE DISCH	1CP-3 SB NORMAL PURGE DISCH
1CP-10 SA PRE-ENTRY PURGE INLET	1CP-7 SB PRE-ENTRY PURGE INLET
1CP-4 SA PRE-ENTRY PURGE DISCH	1CP-1 SB PRE-ENTRY PURGE DISCH

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**The following actions will be complete IF local AO actions have been completed; IF NOT the RNO steps will be directed by the Crew.**	
	RO	9. Check Trip Status: a. Check Reactor – TRIPPED	(NO)
	SRO	9.a RNO actions: Direct and AO to perform the following local actions: Locally trip the reactor using any of the following (listed in order of preference): 1) Locally trip both reactor trip breakers: 2) Locally trip both reactor trip bypass breakers: 3) Locally trip both rod drive MG set generator output breakers: 4) Locally trip both rod drive MG set motor breakers:	

Op Test No.: NRC	Scenario # 3 Event # 7	Page 42 of 73
Event Description:	**Failure of the Reactor Trip breakers to open auto or manual (EOP-FR-S.1)**	

Time	Position	Applicant's Actions or Behavior	
	BOP	b. Check turbine – TRIPPED	(YES)
Evaluator Note:		**The following actions will be performed once ATWS condition is clear (1 minute after the crew directs the Local AO actions).** **After the reactor is tripped, the 'A' CSIP will trip on an electrical fault,** **IF ATWS condition is not clear the REACTOR SUBCRITICALITY CRITERIA FOLDOUT will apply and the Crew will continue with EOP-FR-S.1 until the foldout criteria is satisfied.**	
	RO	10. Check Reactor Subcritical: a. Check for both of the following: • Power range channels – LESS THAN 5% • Intermediate range startup rate channels – NEGATIVE	(YES) (YES)
	SRO	b. Observe CAUTION prior to Step 25 and go to Step 25.	
Procedure Caution:		Boration should continue to obtain adequate shutdown margin during subsequent recovery actions.	
	SRO	25. Initiate Monitoring of Critical Safety Function Status Trees.	
	SRO	26. Return to Procedure And Step In Effect.	
	SRO	Returns to procedure in effect (EOP-E-0, Step 1)	
Evaluator Note:		**The SRO should return to EOP-E-0, Step 1**	

Op Test No.:	NRC	Scenario #	3	Event #	8	Page	43	of	73

Event Description: **Small Break LOCA (EOP-E-0)**

Time	Position	Applicant's Actions or Behavior	
	SRO	Transitions to EOP-E-0, Step 1	
EOP-E-0		Reactor Trip Or Safety Injection	
	SRO	Enters EOP-E-0 Holds crew update	
	RO/BOP	Re-performs E-0 Immediate Actions.	
Immediate Actions	RO	1. Ensure Reactor Trip: REACTOR TRIP CONFIRMATION Reactor Trip <u>AND</u> Bypass BKRs – OPEN Rod Bottom Lights (Zero Steps) – LIT Neutron Flux – DROPPING	 (YES) (YES) (YES)
Immediate Actions	BOP	2. Check Turbine Trip – ALL THROTTLE VALVES SHUT TURB STOP VLV 1 — TSLB-2-11-1 TURB STOP VLV 2 — TSLB-2-11-2 TURB STOP VLV 3 — TSLB-2-11-3 TURB STOP VLV 4 — TSLB-2-11-4	 (YES) (YES) (YES) (YES)
Immediate Actions	BOP	3. Perform The Following: • AC Emergency Buses – AT LEAST ONE ENERGIZED • AC Emergency Buses – BOTH ENERGIZED	 (YES) (YES)

Op Test No.:	NRC	Scenario #	3	Event #	8	Page	44	of	73

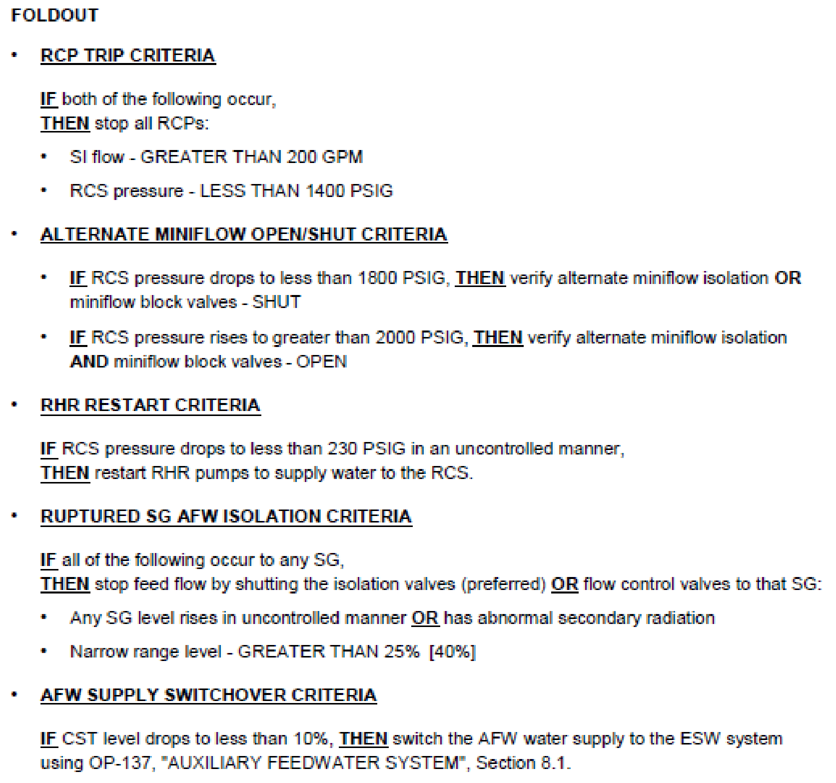
Event Description: **Small Break LOCA (EOP-E-0)**

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**After the reactor is tripped, RCS pressure will rapidly lower, to the Auto SI setpoint (1850 psig). The crew may/may not have time to manually actuate SI; as such, there is no problem with the crew NOT performing a manual SI.** **After the reactor is tripped, the 'A' CSIP will trip on an electrical fault, and the Safeguards Sequencer will fail to start the 'B' CSIP.**	
Immediate Actions	RO	4. Safety Injection – ACTUCATED (BOTH TRAINS) BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY)	(YES)
Procedure Note:		Steps 1 through 4 are immediate action steps Foldout applies. (Immediate actions should be completed prior implementing Foldout Page items.)	
Evaluator Note:		**Following completion of the EOP-E-0 immediate actions the RO should complete AOP-018, section 3.2 Step 4-7 as directed by the SRO prior to the ATWS Event.**	
AOP-018		Reactor Coolant Pump Abnormal Conditions	
	SRO	Directs RO/BOP to secure the RCP 'B' and continue with AOP-018 steps 4-7	
	RO/BOP	4. STOPS RCP 'B' 6. RNO places PK-444D.1 to manual then shuts valve with demand at 0%	

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	45	of	73
Event Description:	**Failure of ‘B’ Sequencer Load Block 1 to actuate during the Safety Injection which fails to start ‘B’ CSIP (EOP-E-0)**								

Time	Position	Applicant’s Actions or Behavior	
	SRO	Reviews Foldout page	

Evaluator Note:



FOLDOUT

- RCP TRIP CRITERIA

  IF both of the following occur,
  THEN stop all RCPs:
  - SI flow - GREATER THAN 200 GPM
  - RCS pressure - LESS THAN 1400 PSIG

- ALTERNATE MINIFLOW OPEN/SHUT CRITERIA
  - IF RCS pressure drops to less than 1800 PSIG, THEN verify alternate miniflow isolation **OR** miniflow block valves - SHUT
  - IF RCS pressure rises to greater than 2000 PSIG, THEN verify alternate miniflow isolation **AND** miniflow block valves - OPEN

- RHR RESTART CRITERIA

  IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner,
  THEN restart RHR pumps to supply water to the RCS.

- RUPTURED SG AFW ISOLATION CRITERIA

  IF all of the following occur to any SG,
  THEN stop feed flow by shutting the isolation valves (preferred) OR flow control valves to that SG:
  - Any SG level rises in uncontrolled manner OR has abnormal secondary radiation
  - Narrow range level - GREATER THAN 25% [40%]

- AFW SUPPLY SWITCHOVER CRITERIA

  IF CST level drops to less than 10%, THEN switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

Time	Position	Applicant’s Actions or Behavior	
	SRO	5.a Assigns Foldout items: Alternate Miniflow Open/Shut Criteria, RHR Restart Criteria, AFW Supply Switchover Criteria 5.b Directs Shift Manager to Evaluate EAL Matrix (Refer to PEP-110)	
	RO	6. Ensure CSIPs – ALL RUNNING	(NO)
Critical Task # 2	RO	Checks Safeguards Sequencer has reached Load Block 9 (Manual Load Permissive) Starts ‘B’ CSIP ***(Critical to manually start ‘B’ CSIP to prevent RVLIS Dynamic Range Level from lowering below 33%.)***	

Op Test No.:	NRC	Scenario #	3	Event #	8	Page	46	of 73
Event Description:	**Small Break LOCA (EOP-E-0) Continued**							

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**The following actions should be taken in accordance with EOP-E-0 Foldout criteria during the scenario:** • **When RCP trip criteria is met per Foldout the crew should have the 'B' CSIP running, identify the condition and then trip all running RCP's** • **Ensure Alternate Miniflow Isolation Valves CLOSE or CLOSE the Miniflow Block Valves when RCS Pressure lowers to less than 1800 PSIG.**	
	RO	7. Ensure RHR pumps – ALL RUNNING	(YES)
	RO	8. Safety Injection flow – GREATER THAN 200 GPM	(YES)
Critical Task # 3	RO	Identifies Foldout RCP Trip Criteria is MET SI flow > 200 GPM RCS pressure < 1400 psig Informs SRO that RCP trip criteria is met Secures ALL RCPs ***(Critical to secure all RCPs with SI flow > 200 gpm and RCS pressure < 1400 psig to prevent RVLIS Dynamic Range Level from lowering below 33%.)***	
	RO	9. RCS pressure – LESS THAN 230 PSIG	(NO)
	SRO	9. RNO: GO TO Step 12.	
	BOP	12. MAIN Steam isolation – ACTUATED.	(NO)
	SRO	12. RNO: Check Main Steam Line Isolation - REQUIRED Perform the following: • IF Main Steam Isolation is NOT required, THEN go to Step 16.	(NO)

Op Test No.: NRC	Scenario # 3	Event # 8	Page 47 of 73
Event Description:	**Small Break LOCA (EOP-E-0) Continued**		

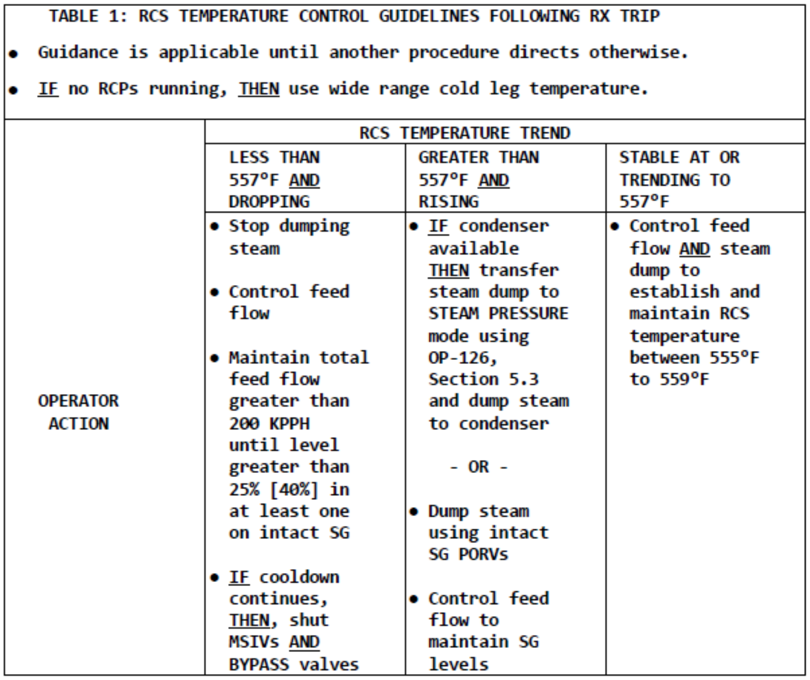
Time	Position	Applicant's Actions or Behavior	
	RO	16. CHECK CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG	(YES)
	RO/BOP	17. Ensure AFW flow – AT LEAST 200 KPPH ESTABLISHED	(YES)
	BOP	18. Sequencer Load Block 9 (Manual Loading Permissive) – ACTUATED (BOTH TRAINS)	(YES)
	BOP	19. Energize AC buses 1A1 AND 1B1	
Evaluator Note:		**The RO will perform all board actions until the BOP completes Attachment 3. The BOP is permitted to properly align plant equipment in accordance with EOP-E-0, Attachment 3 without SRO approval.** **The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 3 is not predictable.** **EOP-E-0, Attachment 3, "Safeguards Actuation Verification" has been included as Attachment 3 (Pg 67 of 73) at the end of this scenario.**	
	BOP	20. Ensure Alignment of Components From Actuation of ESFAS Signals Using Attachment 3, "Safeguards Actuation Verification", While Continuing with this Procedure.	

Op Test No.:	NRC	Scenario #	3	Event #	10	Page	48	of	73

Event Description: **Failure of Safety Injection Isolation valves on 'A' Train CSIP normal mini flow 1CS-214 fails to close automatically**

Time	Position	Applicant's Actions or Behavior
Event 10	BOP	Attachment 3 Step 5. Ensure SI Valves - PROPERLY ALIGNED (Refer to Attachment 1.) Identifies that 1CS-214, CSIP normal miniflow valve is not SHUT and manually shuts valve to align the system correctly. **Attachment 1 (Pg 66 of 73) at the end of this scenario.**
	BOP	Directs AO to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22
Simulator Communicator		**Acknowledge the request to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22**
Simulator Operator		**When directed to place the 1A and 1B Air Compressor in the local control mode: Run APP\air\acs_to_local**
Simulator Communicator		**When the APP for 1A and 1B Air Compressor has completed running call the MCR and inform them that the air compressors are running in local control.**
	BOP	Directs AO to Unlock AND Turn ON The Breakers For The CSIP Suction AND Discharge Cross‑Connect Valves per E-0 Attachment 3 step 23 (or from step 11 - refer to Attachment 2)
Simulator Communicator		**Acknowledge the request to Unlock AND Turn ON The Breakers For The CSIP Suction AND Discharge Cross‑Connect Valves**
Simulator Operator		**When directed to Unlock AND Turn ON The Breakers for the CSIP Suction AND Discharge Cross‑Connect Valves: Run APP\cvc\E-0 Att 2 CSIP suct & disch valve power.txt.**
Simulator Communicator		**When the APP for CSIP Suction AND Discharge Cross‑Connect Valves has completed running call the MCR and inform them that CSIP Suction AND Discharge Cross‑Connect Valves are energized.**

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	49	of	73
Event Description:				**Small Break LOCA (EOP-E-0) Continued**					

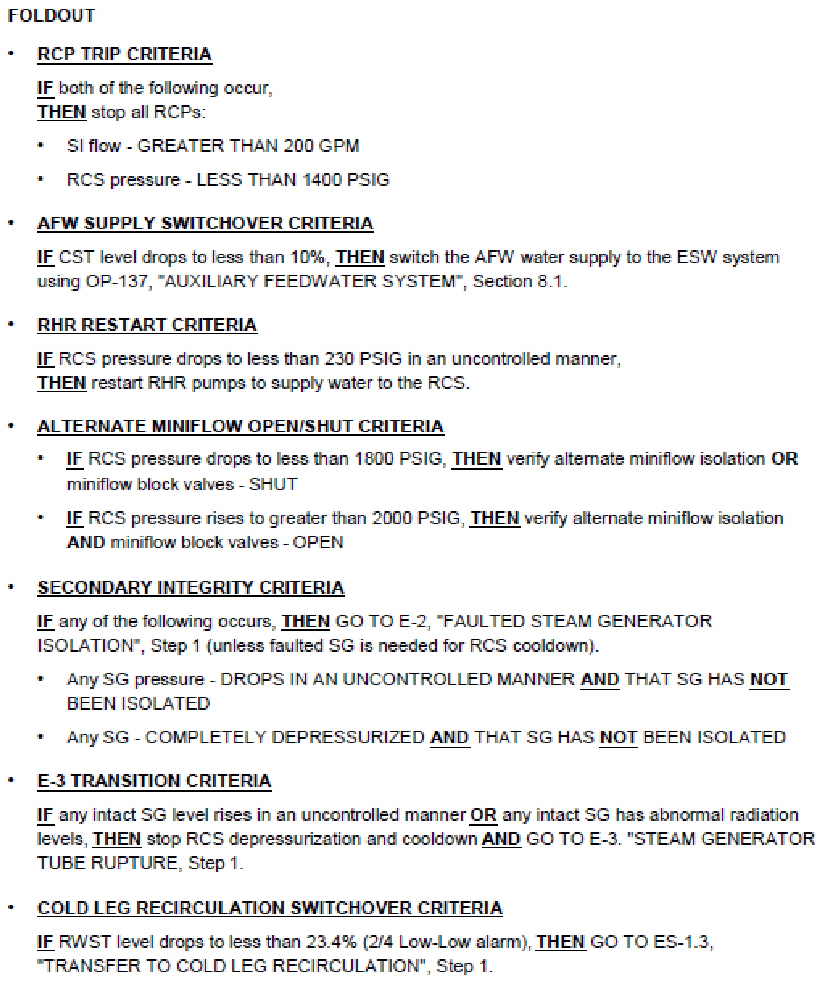
<table>
<tr><th>Time</th><th>Position</th><th colspan="2">Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>BOP/RO</td><td colspan="2">21. Stabilize And Maintain Temperature Between 555°F To 559°F Using Table 1.

<table>
<tr><th colspan="4">TABLE 1: RCS TEMPERATURE CONTROL GUIDELINES FOLLOWING RX TRIP
• Guidance is applicable until another procedure directs otherwise.
• <u>IF</u> no RCPs running, <u>THEN</u> use wide range cold leg temperature.</th></tr>
<tr><td></td><td colspan="3">RCS TEMPERATURE TREND</td></tr>
<tr><td></td><td>LESS THAN 557°F <u>AND</u> DROPPING</td><td>GREATER THAN 557°F <u>AND</u> RISING</td><td>STABLE AT OR TRENDING TO 557°F</td></tr>
<tr><td>OPERATOR ACTION</td><td>• Stop dumping steam
• Control feed flow
• Maintain total feed flow greater than 200 KPPH until level greater than 25% [40%] in at least one on intact SG
• <u>IF</u> cooldown continues, <u>THEN</u>, shut MSIVs <u>AND</u> BYPASS valves</td><td>• <u>IF</u> condenser available <u>THEN</u> transfer steam dump to STEAM PRESSURE mode using OP-126, Section 5.3 and dump steam to condenser
- OR -
• Dump steam using intact SG PORVs
• Control feed flow to maintain SG levels</td><td>• Control feed flow <u>AND</u> steam dump to establish and maintain RCS temperature between 555°F to 559°F</td></tr>
</table></td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>CREW</td><td colspan="2">Identifies RCS cooldown continues and shuts MSIV's
NOTE: MSIVs may have been shut from MSLI</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>RO</td><td>22. PRZ PORVs – SHUT
23. PRZ Spray Valves – SHUT (RCPs are secured)
24. PRZ PORV Block Valves - AT LEAST ONE OPEN</td><td>(YES)
(YES)
(YES)</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>SRO</td><td>25. Any SG pressure – DROPPING IN AN UNCONTROLLED MANNER OR COMPLETELY DEPRESSURIZED</td><td>(NO)</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>SRO</td><td colspan="2">25. RNO: GO TO Step 27.</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>SRO</td><td>27. Any SG - ABNORMAL RADIATION OR UNCONTROLLED LEVEL RISE</td><td>(NO)</td></tr>
</table>

Op Test No.: NRC	Scenario # 3	Event # 9	Page 50 of 73		
Event Description:	**Small Break LOCA (EOP-E-1)**				
Time	Position	Applicant's Actions or Behavior			

	SRO	27. RNO: GO TO Step 30.	
	SRO	30. CNMT pressure – NORMAL	(NO)
	SRO	30. RNO: GO TO E-1, "LOSS OF REACTOR OR SECONDARY COOLANT", Step 1.	
	SRO	Transitions to EOP-E-0, Step 1	
EOP-E-1		Loss Of Reactor Or Secondary Coolant	
	SRO	Enters EOP-E-1 Holds crew update	
Procedure Note		Foldout applies.	
	SRO	Review Foldout page	

Op Test No.: NRC Scenario # 3 Event # 9 Page 51 of 73

Event Description: **Small Break LOCA (EOP-E-1)**

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		 **FOLDOUT** • **RCP TRIP CRITERIA** **IF** both of the following occur, **THEN** stop all RCPs: • SI flow - GREATER THAN 200 GPM • RCS pressure - LESS THAN 1400 PSIG • **AFW SUPPLY SWITCHOVER CRITERIA** **IF** CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1. • **RHR RESTART CRITERIA** **IF** RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS. • **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA** • **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT • **IF** RCS pressure rises to greater than 2000 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN • **SECONDARY INTEGRITY CRITERIA** **IF** any of the following occurs, **THEN** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1 (unless faulted SG is needed for RCS cooldown). • Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **AND** THAT SG HAS **NOT** BEEN ISOLATED • Any SG - COMPLETELY DEPRESSURIZED **AND** THAT SG HAS **NOT** BEEN ISOLATED • **E-3 TRANSITION CRITERIA** **IF** any intact SG level rises in an uncontrolled manner **OR** any intact SG has abnormal radiation levels, **THEN** stop RCS depressurization and cooldown **AND** GO TO E-3. "STEAM GENERATOR TUBE RUPTURE, Step 1. • **COLD LEG RECIRCULATION SWITCHOVER CRITERIA** **IF** RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1.
	SRO	Assigns Foldout items:
	SRO	1. Initiate Monitoring Of Critical Safety Function Status Trees.
Evaluator Note:		**The crew should review foldout criteria.** **The crew identify and use Adverse Values identified in brackets in the EOP procedures [ ] when Containment Pressure exceeds 3 PSIG**
	RO	2. Maintain RCP Seal Injection flow between 8 GPM AND 13 GPM.

Op Test No.: NRC	Scenario # 3	Event # 9	Page 52 of 73
Event Description:	**Small Break LOCA** **(EOP-E-1)**		

Time	Position	Applicant's Actions or Behavior	
	BOP	3. Check Intact SG Levels: a. Any level – GREATER THAN 25% [40%]. **(Dependent on timing – same results)** b. Control feed flow to maintain all intact levels between 25% AND 50% [40% AND 50%]. c. Any level - RISING IN AN UNCONTROLLED MANNER.	(YES) (NO)
	SRO	3.c RNO: GO TO Step 4.	
	RO	4. Check PZR PORV block valves: a. Ensure AC buses 1A1 AND 1B1 – Energized b. Check PORV's Shut c. Go to Step 4.f. f. Check block valves - AT LEAST ONE OPEN.	(YES) (YES) (YES)
	RO	5. Check SI Termination Criteria: a. RCS subcooling – GREATER THAN ○ 10°F [40°F] – C ○ 20°F [50°F] – M **(Dependent on timing – same results)**	(YES/ NO)
Evaluator Note:		**IF Subcooling > 10°F then the check is performed, otherwise the following is N/A**	
	BOP	b. Check secondary heat sink by observing any of the following: ○ Level in at least one intact SG – >25% [40%] ○ Total feed flow to intact SGs – > 200 KPPH	(YES) (YES)
	RO	c. RCS pressure – Stable Or Rising d. PRZ level – GREATER THAN 10% [30%] **(Dependent on timing – same results)**	(YES/ NO)

Op Test No.: NRC	Scenario # 3	Event # 9	Page 53 of 73
Event Description:	**Small Break LOCA (EOP-E-1)**		
Time	Position	Applicant's Actions or Behavior	

	SRO	e. WHEN the SI termination criteria are met, THEN GO TO EOP-ES-1.1, "SI TERMINATION", Step 1. **(not met initially)**	
	RO	6. Check CNMT Spray Status: a. Check any CNMT Spray Pump – RUNNING.	(NO)
	SRO	6.a RNO: Perform the following: IF CNMT spray pumps were NOT stopped by operator action, THEN go to Step 9.	
	RO	9. Check Source Range Detector Status: a. Intermediate range flux – LESS THAN 5x10^{-11} AMPS b. Ensure source range detectors – ENERGIZED c. Transfer nuclear recorder to source range scale	(YES)
	RO	10. Check RHR Pump status: a. Check RHR pump suction – ALIGNED TO RWST b. RCS Pressure greater than 230 PSIG c. RCS pressure - STABLE OR RISING ○ YES – Stop RHR pumps b. RCS Pressure greater than 230 PSIG ○ NO – leave RHR pumps on. **(Dependent on timing)**	(YES) (YES) (YES) (NO)
Evaluator's Note:		**The evaluation/trend of RCS pressure in the next several steps is dependent on how long it took the crew to reach these steps (Decay Heat/Break Flow/ECCS flow). Pressure should be stable or lowering at this point.**	
		11. Check RCS And SG Pressures: a. Check for both of the following: • All SG Pressures – STABLE OR RISING. • RCS pressure – STABLE OR DROPPING.	(YES) (YES)

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	54	of	73
Event Description:		**Small Break LOCA (EOP-E-1)**							

Time	Position	Applicant's Actions or Behavior	
Evaluator's Note:		**If the evaluation/trend of RCS pressure in the previous step was rising the SRO will return to EOP-E-1, Step 1 (Pg 51 of 73) and wait for the plant to stabilize.**	
	RO	12. Establish CCW Flow To The RHR Heat Exchangers: a. Ensure both CCW Pumps running b. Open the following valves: (CCW Return From RHR HX) ○ 1CC-147 Train A ○ 1CC-167 Train B **(locates MCB switch and opens valves listed)**	(YES)
	RO	c. Ensure CCW flow to the RHR Heat Exchangers	(YES)
	RO	d. Perform one of the following to establish two independent CCW systems: ○ Shut train A CCW non-essential supply AND return valves: • 1CC-99 • 1CC-128 **OR** ○ Shut train B CCW non-essential supply AND return valves: • 1CC-113 • 1CC-127 **(locates MCB switch and shuts one Train of valves listed)**	
	BOP/RO	13. Check EDG status: a. Check AC emergency buses 1A-SA AND 1B-SB – ENERGIZED BY OFFSITE POWER ○ Check Bus voltages (Normal) ○ Check breakers 105 and 125 closed	(YES)
	SRO	b. GO TO Step 13.e.	

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	55 of 73
Event Description:	**Small Break LOCA (EOP-E-1)**						

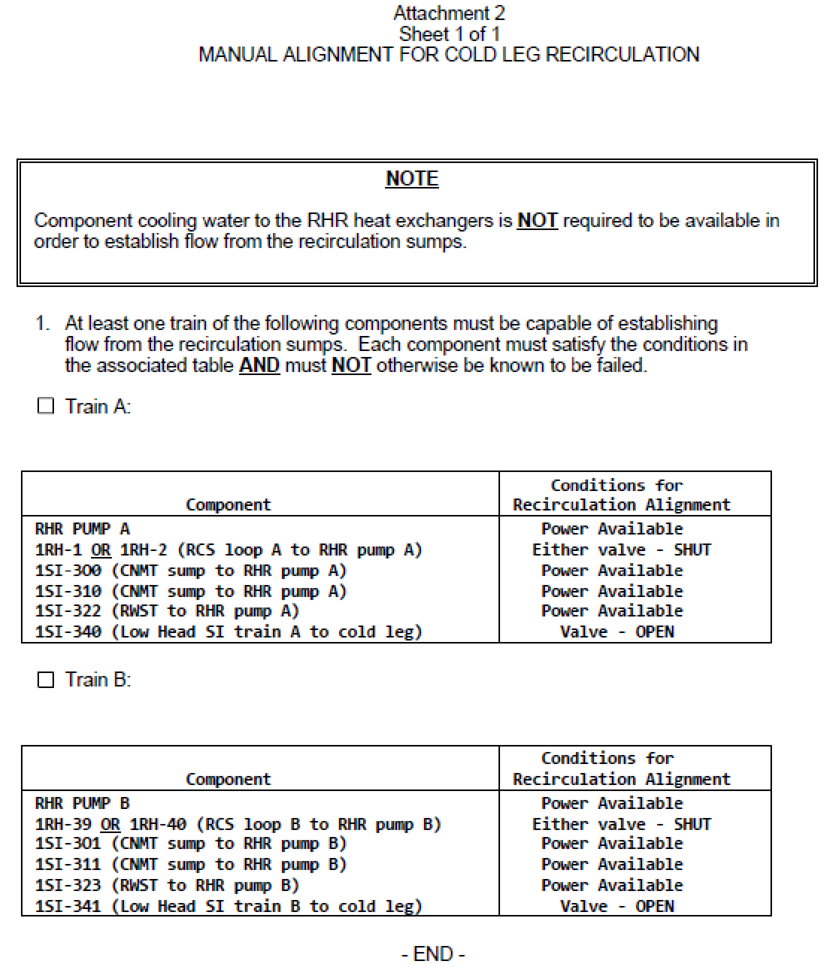
Time	Position	Applicant's Actions or Behavior	
	BOP/RO	e. Check any EDG – running unloaded	(YES)
	RO	f. Reset SI **(takes both SI reset switches to RESET and observes status light change from SI active to SI reset)**	
	SRO	g. Manually realign safeguards equipment following a loss of offsite power. (Refer to E-0, "REACTOR TRIP OR SAFETY INJECTION", Attachment 6.)	
	BOP	h. Shutdown any unloaded EDGs using OP-155, "Diesel Generator Emergency Power System", Section 7.0	
	SRO	14. Initiate Evaluation of Plant Status: a. RHR system – CAPABLE OF COLD LEG RECIRCULATION (Refer to Attachment 2) b. Check Auxiliary AND Radwaste Processing Building radiation – NORMAL c. Go to Step 15.	(YES) (YES)

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	56	of	73

Event Description: **Small Break LOCA (EOP-E-1)**

Time	Position	Applicant's Actions or Behavior

Evaluator Note:



Attachment 2
Sheet 1 of 1
MANUAL ALIGNMENT FOR COLD LEG RECIRCULATION

NOTE

Component cooling water to the RHR heat exchangers is **NOT** required to be available in order to establish flow from the recirculation sumps.

1. At least one train of the following components must be capable of establishing flow from the recirculation sumps. Each component must satisfy the conditions in the associated table **AND** must **NOT** otherwise be known to be failed.

☐ Train A:

Component	Conditions for Recirculation Alignment
RHR PUMP A	Power Available
1RH-1 OR 1RH-2 (RCS loop A to RHR pump A)	Either valve - SHUT
1SI-300 (CNMT sump to RHR pump A)	Power Available
1SI-310 (CNMT sump to RHR pump A)	Power Available
1SI-322 (RWST to RHR pump A)	Power Available
1SI-340 (Low Head SI train A to cold leg)	Valve - OPEN

☐ Train B:

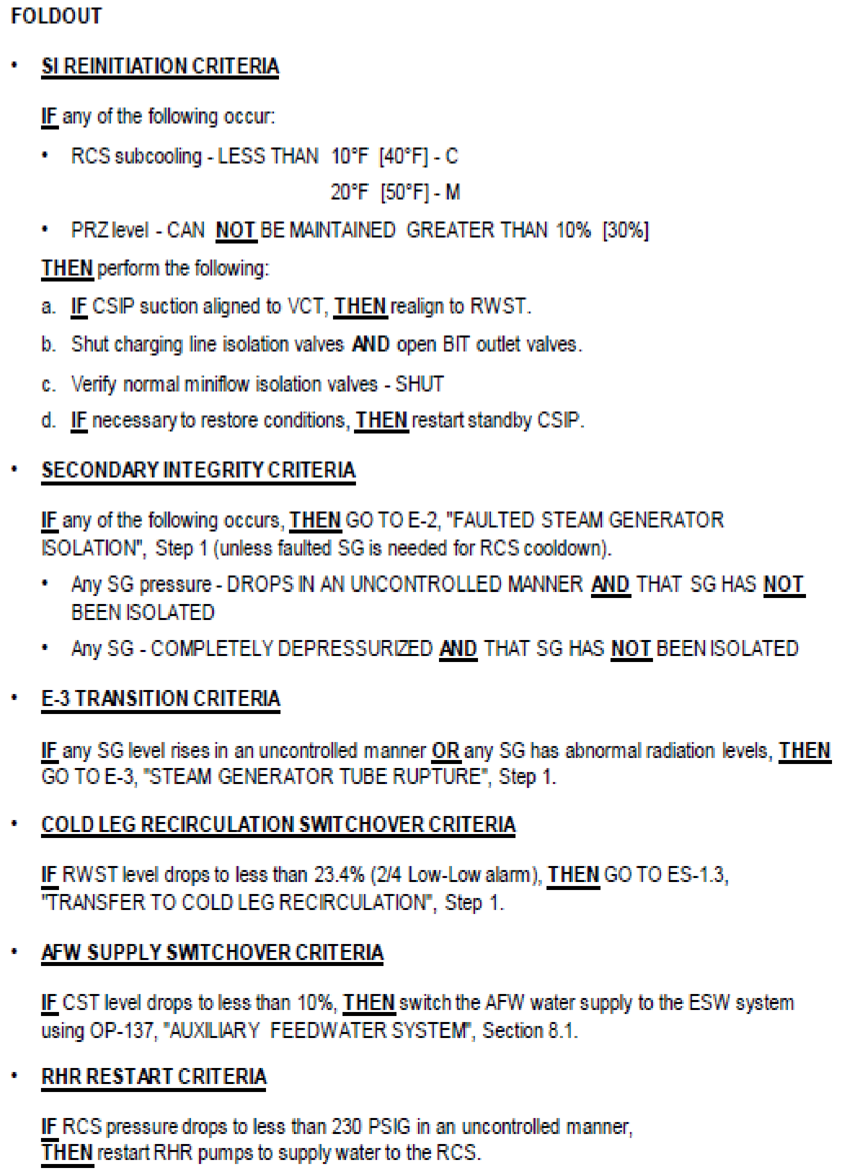
Component	Conditions for Recirculation Alignment
RHR PUMP B	Power Available
1RH-39 OR 1RH-40 (RCS loop B to RHR pump B)	Either valve - SHUT
1SI-301 (CNMT sump to RHR pump B)	Power Available
1SI-311 (CNMT sump to RHR pump B)	Power Available
1SI-323 (RWST to RHR pump B)	Power Available
1SI-341 (Low Head SI train B to cold leg)	Valve - OPEN

- END -

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	57	of	73	
Event Description:	**Small Break LOCA (EOP-ES-1.2)**									

Time	Position	Applicant's Actions or Behavior	
	RO	15. Check RCS Status a. Check for both of the following: o RCS pressure – LESS THAN 230 PSIG o Any RHR HX header flow - GREATER THAN 1000 GPM	(NO) (NO)
	SRO	15. RNO:GO TO **Go to** ES-1.2, "POST LOCA COOLDOWN AND DEPRESSURIZATION", Step 1	
	SRO	Transitions to EOP-ES-1.2, Step 1	
Evaluator Note:		**At some point during the implementation of EOP-ES-1.2 the break will clear and the Safety Injection flow filling the RCS with cold RWST water will cause a reduction in RCS pressure and temperature.** **The critical safety function status tree for RCS integrity will begin to toggle from Green to Yellow to Orange to Red. Eventually RCS Integrity will remain RED and the crew will transition to EOP-FR-P.1.** **The scenario guide is written for the transition that occurred based on the plant response during validation. When this transition occurs will vary based on the pace of implantation by the crew.**	
EOP-ES-1.2		Post LOCA Cooldown and Depressurization	
	SRO	Enters EOP-ES-1.2 Holds crew update	
Procedure Note		Foldout applies.	
	SRO	Review Foldout page	

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	58	of 73
Event Description:	**Small Break LOCA (EOP-ES-1.2)**							

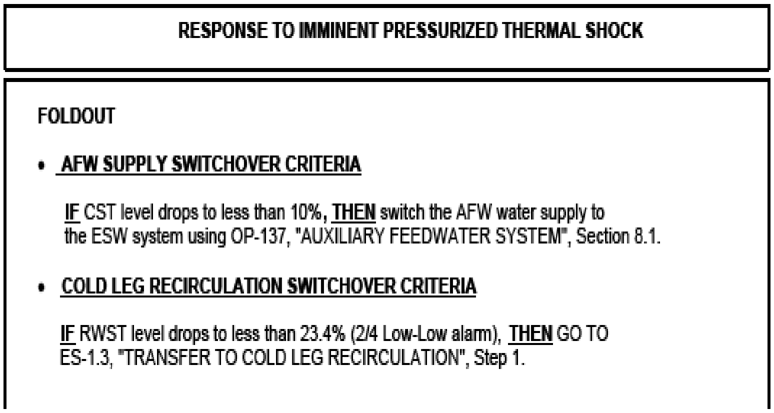
Time	Position	Applicant's Actions or Behavior
Evaluator Note:		 **FOLDOUT** • **SI REINITIATION CRITERIA** IF any of the following occur: • RCS subcooling - LESS THAN 10°F [40°F] - C 20°F [50°F] - M • PRZ level - CAN **NOT** BE MAINTAINED GREATER THAN 10% [30%] **THEN** perform the following: a. IF CSIP suction aligned to VCT, **THEN** realign to RWST. b. Shut charging line isolation valves **AND** open BIT outlet valves. c. Verify normal miniflow isolation valves - SHUT d. IF necessary to restore conditions, **THEN** restart standby CSIP. • **SECONDARY INTEGRITY CRITERIA** IF any of the following occurs, **THEN** GO TO E-2, "FAULTED STEAM GENERATOR ISOLATION", Step 1 (unless faulted SG is needed for RCS cooldown). • Any SG pressure - DROPS IN AN UNCONTROLLED MANNER **AND** THAT SG HAS **NOT** BEEN ISOLATED • Any SG - COMPLETELY DEPRESSURIZED **AND** THAT SG HAS **NOT** BEEN ISOLATED • **E-3 TRANSITION CRITERIA** IF any SG level rises in an uncontrolled manner **OR** any SG has abnormal radiation levels, **THEN** GO TO E-3, "STEAM GENERATOR TUBE RUPTURE", Step 1. • **COLD LEG RECIRCULATION SWITCHOVER CRITERIA** IF RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1. • **AFW SUPPLY SWITCHOVER CRITERIA** IF CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1. • **RHR RESTART CRITERIA** IF RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS.
	SRO	Assigns Foldout items:
	RO	1. Reset SI (already performed)
	SRO	2. Manually realign safeguards equipment following a loss of offsite power.

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	59	of	73

Event Description: **Small Break LOCA (EOP-ES-1.2)**

Time	Position	Applicant's Actions or Behavior	
		(Refer to E-0, "REACTOR TRIP OR SAFETY INJECTION", Attachment 6.)	
	RO	3. Reset Phase A and Phase B Isolation signals • Reset Phase A (if actuated) **(locates MCB Phase A switch and resets Phase A)** • Reset Phase B (if actuated) **(Phase B not actuated)**	
	RO	4. Open Instrument Air and Nitrogen valves to CNMT • 1IA-819 • 1SI-287 **(locates MCB switches and opens valve)**	
	BOP/RO	5. Monitor AC Buses: a. Check AC emergency buses 1A-SA AND 1B-SB – ENERGIZED BY OFFSITE POWER ○ Check Bus voltages (Normal) ○ Check breakers 105 and 125 closed	(YES)
	SRO	b. GO TO Step 5.e.	
Evaluator Note:		**The scenario guide is written for the transition to EOP-FR-P.1 at this point in the scenario based on the plant response during validation. When this transition occurs will vary based on the pace of implantation by the crew.**	
EOP-FR-P.1		Response to Imminent Pressurized Thermal Shock	
	SRO	Enters EOP-FR-P.1 Holds crew update	
Procedure Note		Foldout applies.	

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	60	of 73
Event Description:	**Small Break LOCA (EOP-FR-P.1)**							

Time	Position	Applicant's Actions or Behavior	
	SRO	Review Foldout page	
Evaluator Note:		 **RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK** FOLDOUT • **AFW SUPPLY SWITCHOVER CRITERIA** **IF** CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1. • **COLD LEG RECIRCULATION SWITCHOVER CRITERIA** **IF** RWST level drops to less than 23.4% (2/4 Low-Low alarm), **THEN** GO TO ES-1.3, "TRANSFER TO COLD LEG RECIRCULATION", Step 1.	
	RO	1. Check RCS Pressure: a. Check for both of the following: • RCS pressure - LESS THAN 230 PSIG • Any RHR HX header flow - > 1000 GPM RO restarts RHR pumps when RCS pressure < RHR shutoff head – EOP-ES-1.2 foldout action item	(NO) (NO)
	SRO	1.a RNO: GO TO Step 2.	
	RO	2. Check RCS Cold Leg Temperature Trend: a. Check RCS Cold Leg Temperatures - STABLE OR RISING	(NO)
	SRO	2. RNO: Observe NOTE prior to Step 3 and GO TO Step 3.	
Procedure Note:		A faulted SG is any SG that is depressurizing in an uncontrolled manner or is completely depressurized.	

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	61	of	73
Event Description:	**Small Break LOCA** **(EOP-FR-P.1)**								

Time	Position	Applicant's Actions or Behavior	
	BOP	3. Stop RCS Cooldown: a. Ensure SG PORVs – SHUT b. Ensure condenser steam dump valves – SHUT c. Check RHR system – IN SHUTDOWN COOLING MODE 3.c. RNO: Go to Step 3.e. e. Any non-faulted SG level - > 25% [40%] f. Control feed flow to non-faulted SG(s) to stop RCS cooldown.	(YES) (YES) (NO) (YES)
Procedure Caution:		IF the TDAFW pump is the only available source of feed flow, THEN maintain steam supply to the TDAFW pump from one SG.	
	BOP	4. Minimize RCS Cooldown From Faulted SG(s): a. Check any SG – FAULTED	(NO)
	SRO	4.a. RNO: GO TO Step 5.	
	RO	5. Check PRZ PORV Block Valves: a. Ensure power to block valves – AVAILABLE b. Check block valves - AT LEAST ONE OPEN	(YES) (YES)
Procedure Note:		IF PRZ PORV opens on high pressure, Step 6 should be repeated after pressure drops to less than PORV setpoint.	
	RO	6. Check PRZ PORVs: a. Check all of the following: 1) Check LTOPS control switches - IN NORMAL (NOT BLOCKED)	(NO)
	SRO	6.a. RNO: GO TO Step 6.d.	
	RO	d. Check PRZ pressure - < 2335 psig e. Ensure PRZ PORVs – SHUT	(YES) (YES)

Op Test No.: NRC	Scenario # 3	Event # 9	Page 62 of 73
Event Description:	**Small Break LOCA** **(EOP-FR-P.1)**		

Time	Position	Applicant's Actions or Behavior	
	RO	7. Check SI Flow - > 200 gpm	(YES)
	SRO	8. Check SI Termination Criteria: a. Check for both of the following: 1) RCS subcooling - > 60°F [90°F] – C	(NO)
		8.a. RNO: Observe CAUTION prior to Step 9 and go to Step 9.	
Procedure Caution:		Following a complete loss of normal seal cooling, the affected RCP(s) should NOT be started prior to a status evaluation performed by the Plant Operations Staff or responsible engineer.	
	SRO	9. Check If An RCP Should Be Started: a. RCS subcooling - GREATER THAN 10°F [40°F] – C	(NO)
		9.a. RNO: Observe CAUTION prior to Step 33 and go to Step 33.	
Procedure Caution:		Following an excessive cooldown, reactor vessel stress must be relieved to enhance and maintain vessel integrity. Do NOT perform any actions that raise pressure OR cause an RCS cooldown until the soak is complete.	
Procedure Note:		Even if a soak period is required, steam may be released from intact SGs with pressure higher than the saturation pressure for lowest cold leg temperature.	
	SRO	33. Determine RCS Soak Requirements: a. RCS cooldown rate - > 100°F in any 60 min period b. Perform one hour RCS soak: • Maintain RCS temperature stable. • Maintain RCS pressure stable. • Perform actions of other procedures that do NOT cause an RCS cooldown OR raise pressure.	(YES)

Op Test No.: NRC	Scenario # 3	Event # 9	Page 63 of 73
Event Description:	**Small Break LOCA (EOP-ES-1.2)**		

Time	Position	Applicant's Actions or Behavior	
	SRO	34. Establish Subsequent Cooldown: a. RCS subcooling monitor - AVAILABLE b. Maintain RCS subcooling between 10°F and 190°F [40°F and 160°F]. c. Maintain RCS cooldown rate less than 50°F in any sixty minute period.	(YES)
	SRO	35. Return to Procedure And Step In Effect.	
EOP-ES-1.2			
	SRO	Returns to EOP-ES-1.2 Step 5.e Holds crew update	
	SRO	b. GO TO Step 5.e.	
	BOP/RO	e. Check all non-emergency AC buses – ENERGIZED	(YES)
Procedure Caution:		PRZ heaters should NOT be energized until PRZ water level indicates greater than minimum recommended by plant operations staff to ensure heaters are covered.	
	RO	6. Secure PRZ Heaters: • Place backup heaters in the OFF position • Ensure control heaters – OFF	
	SRO	• Consult plant operations staff for a recommended minimum indicated PRZ water level that will ensure heaters are covered. (Refer to ERG Executive Volume, Generic Issue: Evaluations by the Plant Engineering Staff.)	

Op Test No.:	NRC	Scenario #	3	Event #	9	Page	64	of 73

Event Description: **Small Break LOCA (EOP-ES-1.2)**

Time	Position	Applicant's Actions or Behavior	
	RO	7. Check if RHR Pumps should be stopped: a. Check RHR pump suction – ANY RUNNING WITH SUCTION ALIGNED TO RWST b. Check RCS Pressure: • RCS Pressure greater than 230 PSIG • RCS Pressure STABLE OR RISING c. Stop RHR pumps • RCS Pressure STABLE OR RISING ○ NO – leave RHR pumps on and go to Step 8. **(Dependent on timing)**	(YES) (YES) (YES) (NO)
	BOP	8. Check Intact SG Levels: a. Any level - GREATER THAN 25% [40%] b. Control feed flow to maintain all intact levels between 25% and 50% [40% and 50%].	(YES)
Procedure Note:		After the low steam pressure SI signal is blocked, main steamline isolation will occur if the high steam pressure rate setpoint is exceeded.	
	RO	9. Check PRZ Pressure: a. Pressure – less than 2000 PSIG b. Block low steam pressure SI **(Locates Low Steam Line Pressure SI MCB block switch and places switch to block – verifies block on status lights)**	(YES)
Procedure Note:		Even if the lowest RCS cold leg temperature has dropped by 100°F in the last 60 minutes, steam may be released from intact SGs with pressure higher than the saturation pressure for lowest cold leg temperature.	
	SRO	10. Initiate RCS Cooldown To Cold Shutdown: a. Maintain Cooldown rate in RCS cold legs - <100˚F/HR **(SRO should maintain requirements of EOP-FR-P.1 <50˚F/HR until the 1 hour soak is complete.)**	

Op Test No.:	NRC	Scenario # 3	Event #	9	Page	65	of	73
Event Description:	**Small Break LOCA** **(EOP-ES-1.2)**							

Time	Position	Applicant's Actions or Behavior	
	RO	b. Check RHR system - OPERATING IN SHUTDOWN COOLING MODE	(NO)
	SRO	10.b RNO: GO TO Step 10.f	
	BOP	f. Check all of the following to determine if steam can be dumped to condenser: o Check any intact SG MSIV – OPEN o Condenser Available (C-9)- LIT (BPLB 3-3) o Steam Dump Control – AVAILABLE	(NO) (NO) (YES)
Evaluator Note:		**The may recouple RCS with SG's which will require SG PORV's to be opened and SG pressure reduced. The SRO should maintain requirements of EOP-FR-P.1 until the 1 hour soak is complete.** **o Maintain RCS temperature stable.** **o Maintain RCS pressure stable.** **o Perform actions of other procedures that do NOT cause an RCS cooldown OR raise pressure.**	
	BOP	10.f. RNO: Dump steam from intact SGs using any of the following (listed in order of preference): 1) SG PORVs 2) Locally operate SG PORVs 3) TDAFW pump	

Lead Evaluator:	**Terminate the scenario when the crew discusses their plan for cooldown of the RCS.** **Announce 'Crew Update' - End of Evaluation - I have the shift.** **Have crew remain in the Simulator without discussing the exam. Examiners will formulate any follow-up questions.**

Simulator Operator:	**When directed by Lead Evaluator go to FREEZE**

REACTOR TRIP OR SAFETY INJECTION

Attachment 1
Sheet 1 of 1
SI EMERGENCY ALIGNMENT

- Charging line isolation valves - SHUT:

  1CS-235
  1CS-238

- CSIP suction from RWST valves - OPEN:

  1CS-291 (LCV-115B)
  1CS-292 (LCV-115D)

- VCT outlet valves - SHUT:

  1CS-165 (LCV-115C)
  1CS-166 (LCV-115E)

- BIT outlet valves - OPEN:

  1SI-3
  1SI-4

- CSIP alternate miniflow isolation valves - SHUT (IF RCS PRESSURE LESS THAN 1800 PSIG) OR OPEN (IF RCS PRESSURE GREATER THAN 2000 PSIG):

  1CS-746
  1CS-752

- CSIP alternate miniflow block valves - OPEN (UNLESS SHUT TO ISOLATE AN ALTERNATE MINIFLOW ISOLATION VALVE)

  1CS-745
  1CS-753

- CSIP normal miniflow valves - SHUT:

  1CS-214
  1CS-182
  1CS-196
  1CS-210

- Low head SI to cold leg valves - OPEN:

  1SI-340
  1SI-341

- Low head SI to hot leg crossover valves - OPEN:

  1SI-326
  1SI-327

- Low head SI to hot leg valve - SHUT:

  1SI-359

- RWST to RHR pump suction valves - OPEN:

  1SI-322
  1SI-323

- END -

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 7
SAFEGUARDS ACTUATION VERIFICATION

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. **Ensure** Two CSIPs - RUNNING

☐ 2. **Ensure** Two RHR Pumps - RUNNING

☐ 3. **Ensure** Two CCW Pumps - RUNNING

☐ 4. **Ensure** All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. **Ensure** SI Valves - PROPERLY ALIGNED

(**Refer** to Attachment 1.)

☐ 6. **Ensure** CNMT Phase A Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 7. **Ensure** SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. IF Main Steam Line Isolation Actuated OR Is Required By Any Of The Following, THEN **Ensure** MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. IF CNMT Spray Actuation Signal Actuated OR Is Required, THEN **Ensure** The Following:

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 10. **Ensure** Both Main FW Pumps - TRIPPED

☐ 11. **Ensure** FW Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. **Ensure** Both MDAFW pumps - RUNNING

13. **IF** Any Of The Following Conditions Exist, **THEN** **Ensure** The TDAFW Pump - RUNNING

- ☐ Undervoltage on either 6.9 KV emergency bus
- ☐ Level in two SGs - LESS THAN 25%
- ☐ Manual actuation to control SG level

14. **Ensure** AFW Valves - PROPERLY ALIGNED

- ☐ **IF** no AFW Isolation Signal, **THEN** **ensure** isolation **AND** flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

- ☐ **IF** AFW Isolation Signal present, **THEN** **ensure** MDAFW **AND** TDAFW isolation **AND** flow control valves to affected SG - SHUT

☐ 15. **Ensure** Both EDGs - RUNNING

☐ 16. **Ensure** CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 17. **Ensure** CNMT Ventilation Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. **Ensure** Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. **Ensure** Essential Service Chilled Water System Operation:

- ☐ • **Ensure** both WC-2 chillers - RUNNING
- ☐ • **Ensure** both P-4 pumps - RUNNING
- ☐ (**Refer** to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. **Ensure** CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

<u>NOTE</u>

Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. **Ensure** AC buses 1A1 **<u>AND</u>** 1B1 - ENERGIZED

☐ 22. **Place** Air Compressor 1A **<u>AND</u>** 1B In The LOCAL CONTROL Mode.

(**Refer to** Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 7
SAFEGUARDS ACTUATION VERIFICATION

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To **Unlock** And **Close** The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(**Refer** to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. **Check** If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN place** C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL AND VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 7
SAFEGUARDS ACTUATION VERIFICATION

25. **Start** The Spent Fuel Pump Room Ventilation System:

    a. At AEP-1, **ensure** the following ESCWS isolation valves - OPEN

        1) SLB-11 (Train A)

        ☐ • AH-17 SUP CH 100 (Window 9-1)

        ☐ • AH-17 RTN CH 105 (Window 10-1)

        2) SLB-9 (Train B)

        ☐ • AH-17 SUP CH 171 (Window 9-1)

        ☐ • AH-17 RTN CH 182 (Window 10-1)

    b. At AEP-1, **start** one SFP PUMP ROOM FAN COOLER:

    ☐ • AH-17 1-4A SA

    ☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 7
SAFEGUARDS ACTUATION VERIFICATION

NOTE

- Fuel pool levels and temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. **Check** Status Of Fuel Pools:

☐ a. **Operate** spent fuel cooling pumps to maintain fuel pool temperatures between 85°F to 105°F.

b. **Monitor** fuel pool levels **AND** temperatures:

- ☐ **Refer to** AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.
- ☐ **Refer to** Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.
- ☐ Levels - GREATER THAN LO ALARM (284 FT, 0 IN)
- ☐ Temperatures - LESS THAN HI TEMP ALARM (105°F)

NOTE

If control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, then follow-up actions will be required to restore the alignment.

27. **Consult** Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

- ☐ Site Emergency Coordinator - Control Room
- ☐ Site Emergency Coordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

Plant Status

- A Reactor S/U has been completed 72 hours after a Reactor trip
- GP-005 was being performed by the previous shift
- The plant was in Mode 1
- GP-005 Turbine valve testing complete
- At that time secondary chemistry parameters degraded and Reactor power was lowered to < 5%
- Conditions are as follows:
  - The plant is in Mode 2 at 3% power
  - Mode 1 MEL is complete
  - Turbine speed is 1700 rpm
  - ‘A’ Train equipment is in service
  - ‘A’ Train Main Feedwater Pump and Both Condensate and Condensate Booster pumps are in service
  - FRV bypass valves are controlling S/G levels
  - Rod position is CBD at 102 steps
  - RCS Boron is 1472 ppm
  - MOL conditions
  - Normal Dayshift
  - Status Board is updated
- Your crew directions are to hold present plant condition
- You will then be relieved by the JITT Trained Startup crew

Equipment Out of Service:

- ‘B’ NSW Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours. ‘A’ NSW Pump is protected

Reactivity Plan/Brief:

- Use the current OPT-1536, Routine Reactivity Data Calculation, maintain current reactor power. The previous reactivity addition was a 20 gallon boration 15 minutes earlier

Risk Assessment:

- **GREEN**

HARRIS 2020 NRC SCENARIO 4

Facility:	Harris Nuclear Plant	Scenario No.:	4	Op Test No.:	05000400/2020301
Examiners:			Operators:	SRO:	
				RO:	
				BOP:	

Initial Conditions: IC-19 MOL, 100% power

- 1CS-9, Letdown Isolation Valve is under clearance for solenoid replacement
- ‘B’ MDAFW Pump is under clearance for pump packing repairs
- ‘B’ DEH Pump Out of Service

Turnover:	The plant is at 100% power, middle of core life. GP-006 step 4
Critical Task:	• Manually maintain control of SG ‘A’ level above 25% to prevent an automatic Reactor trip after steam pressure transmitter PT-475 fails low • Manually maintain control of PRZ Pressure above 1960 psig to prevent an automatic Reactor trip after the pressure transmitter PT-444 fails high • Initiate RCS Bleed and Feed for Successful High-Head SI Pump Injection prevent RVLIS Full Range Level from lowering below 39%.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – RO/SRO N – BOP/SRO	Power reduction from 100% power
2	sws07a	C – RO/SRO TS – SRO	Normal Service Water Pump ‘A’ sheared shaft (AOP-022)
3	prs06a	I – RO/SRO TS – SRO	Pressurizer PORV 445A Leakage (AOP-016)
4	gen15	C – BOP/SRO	Generator Voltage Regulator Failure
5	pt:475	I – BOP/SRO TS – SRO	Feed pressure transmitter failure low on ‘A’ SG PT-475 (AOP-010)
6	pt:444	C – RO/SRO TS – SRO	PT-444 Fails HIGH (AOP-019)
7	eps01 cfw01c cfw20a	M – ALL	Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0)
8	mss05a mss05b mss05c dsg04b	C – BOP/SRO	Main Steamline Isolation fails, 'B' CCW pump fails to Auto start
9	cfw01a	M – ALL	'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)
10	prs03e	C – RO/SRO	Pressurizer PORV 445B fails to open

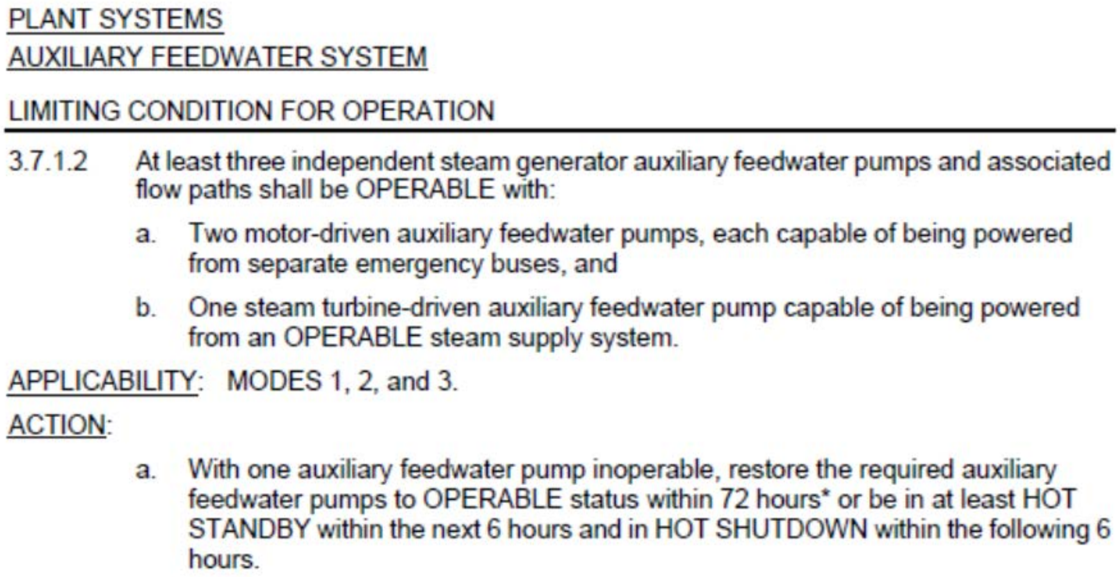
* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4

The plant is at 100% power, middle of core life. Due to the ‘B’ MDAFW pump LCO expiring, a normal shutdown in accordance with GP-006, Normal Plant Shutdown From Power Operation To Hot Standby (Mode 1 To Mode 3) is in progress as directed by plant management. Continue the shutdown @ 4 MW/min with TCS Load Control at 4 GVPC units/ min

The following equipment is under clearance:

- MDAFW Pump B-SB is under clearance for pump packing repairs. The pump has been inoperable for 66 hours and cannot be restored to operable status. Tech Spec 3.7.1.2 Action **a** and Tech Spec 3.3.3.5.b Action **c** applies.



PLANT SYSTEMS
AUXILIARY FEEDWATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.1.2 At least three independent steam generator auxiliary feedwater pumps and associated flow paths shall be OPERABLE with:

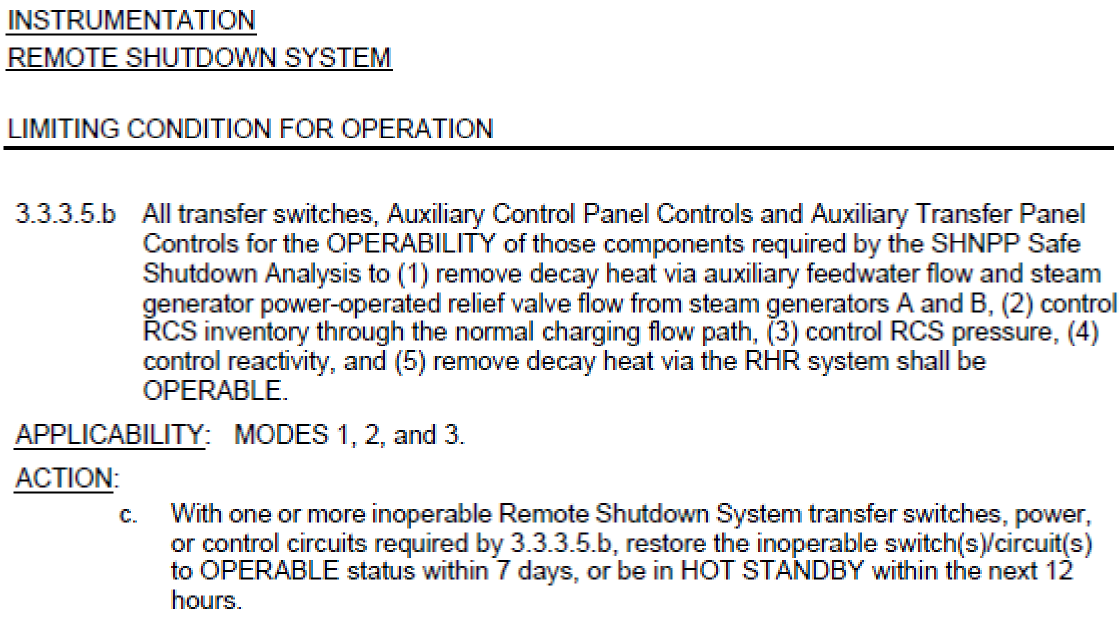
a. Two motor-driven auxiliary feedwater pumps, each capable of being powered from separate emergency buses, and

b. One steam turbine-driven auxiliary feedwater pump capable of being powered from an OPERABLE steam supply system.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

a. With one auxiliary feedwater pump inoperable, restore the required auxiliary feedwater pumps to OPERABLE status within 72 hours* or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.



INSTRUMENTATION
REMOTE SHUTDOWN SYSTEM

LIMITING CONDITION FOR OPERATION

3.3.3.5.b All transfer switches, Auxiliary Control Panel Controls and Auxiliary Transfer Panel Controls for the OPERABILITY of those components required by the SHNPP Safe Shutdown Analysis to (1) remove decay heat via auxiliary feedwater flow and steam generator power-operated relief valve flow from steam generators A and B, (2) control RCS inventory through the normal charging flow path, (3) control RCS pressure, (4) control reactivity, and (5) remove decay heat via the RHR system shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTION:

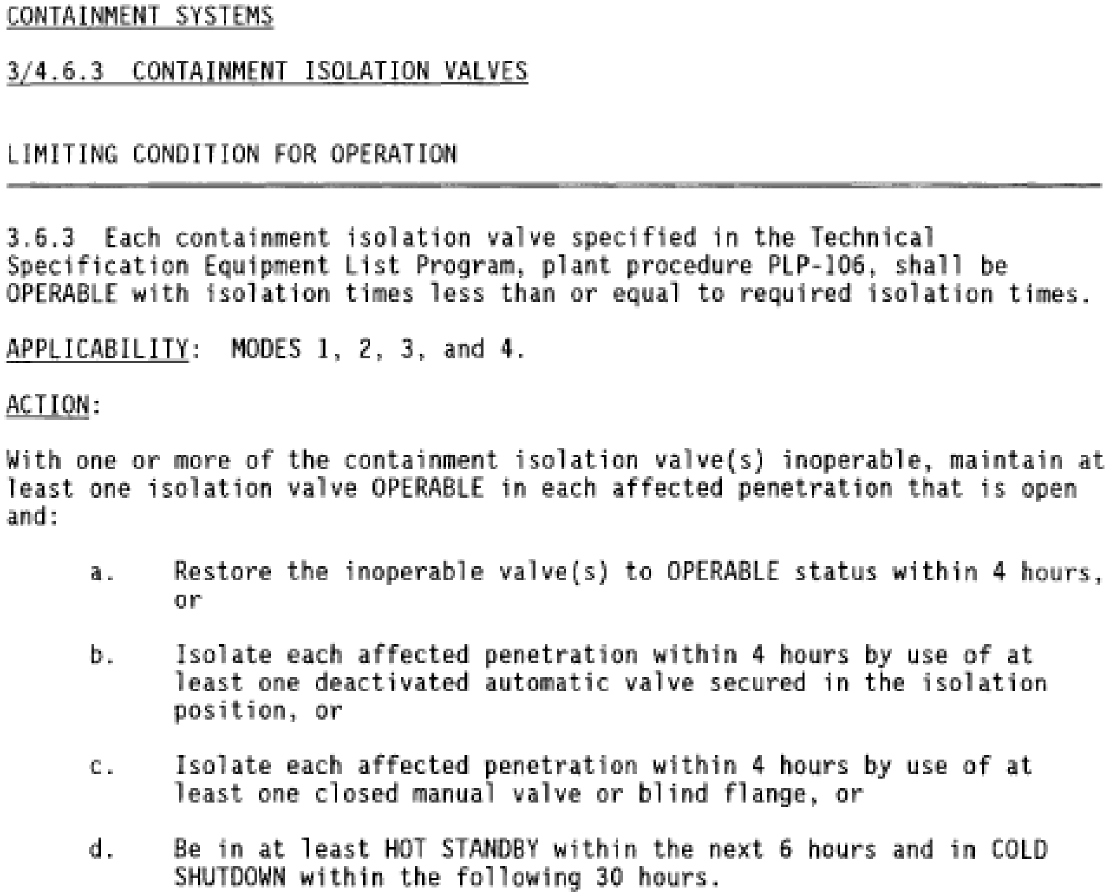
c. With one or more inoperable Remote Shutdown System transfer switches, power, or control circuits required by 3.3.3.5.b, restore the inoperable switch(s)/circuit(s) to OPERABLE status within 7 days, or be in HOT STANDBY within the next 12 hours.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4 continued

The following equipment is under clearance (continued):

- ‘B’ DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours.

- 1CS-9, Letdown Orifice Isolation valve, has been under clearance the last 12 hours for solenoid replacement. The repairs are close to completion and the valve is expected to be returned to service within the next hour. The valve is currently shut with power removed. OWP-CS-09 has been completed. Tech Specs 3.6.3 Action **b** applies.



CONTAINMENT SYSTEMS

3/4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 Each containment isolation valve specified in the Technical Specification Equipment List Program, plant procedure PLP-106, shall be OPERABLE with isolation times less than or equal to required isolation times.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With one or more of the containment isolation valve(s) inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and:

a. Restore the inoperable valve(s) to OPERABLE status within 4 hours, or

b. Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

c. Isolate each affected penetration within 4 hours by use of at least one closed manual valve or blind flange, or

d. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4 (Continued)

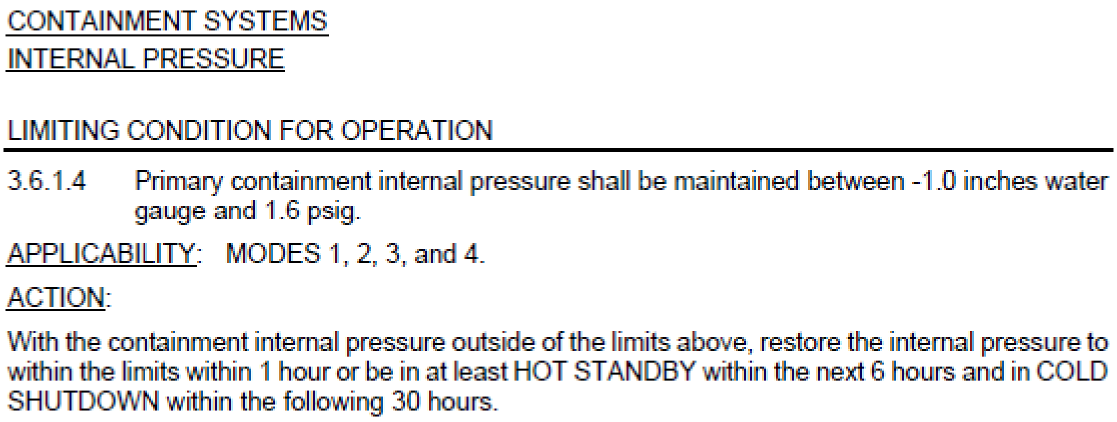
Event 1: Plant Shutdown (GP-006). Turnover takes place with the unit at 100% Reactor power. The crew will be given credit for a reactivity manipulation during the down power.

Verifiable Action: It is expected that the SRO will conduct a reactivity brief, the RO will borate and monitor auto rod insertion per the reactivity plan. The BOP will operate the DEH Turbine controls as necessary to lower power. After power is reduced 3% - 5% and the crew has demonstrated that they have control of the plant during a shutdown Event 2 will be inserted.

Event 2: Normal Service Water Pump ‘A’ sheared shaft (AOP-022). This failure will result in multiple NSW alarms on ALB 002 and the crew should enter AOP-022. While NSW system pressure is low the ESW system will automatically start and isolate into the ‘A’ and ‘B’ train headers. With lower temperature ESW water providing cooling into Containment the potential exists for a low pressure condition to occur. This will be indicated by ALB 028-5-1, Containment Air High Vacuum.

Verifiable Action: The crew will enter AOP-022 and carry out the immediate actions. The RO will perform the immediate actions of AOP-022 by verifying that the ESW pump automatically starts and the running CSIP does not operate greater than 1 minute without cooling water. The BOP will verbalize that no EDG is running to complete the immediate actions. Once the immediate actions are complete the BOP should place the Turbine in Hold to stabilize the plant and the crew should use the AOP to start up the standby NSW pump and verify proper system operation.

The SRO should evaluate Tech Spec 3.6.1.4, Containment Systems – Internal Pressure Action.



CONTAINMENT SYSTEMS
INTERNAL PRESSURE

LIMITING CONDITION FOR OPERATION

3.6.1.4 Primary containment internal pressure shall be maintained between -1.0 inches water gauge and 1.6 psig.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the containment internal pressure outside of the limits above, restore the internal pressure to within the limits within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

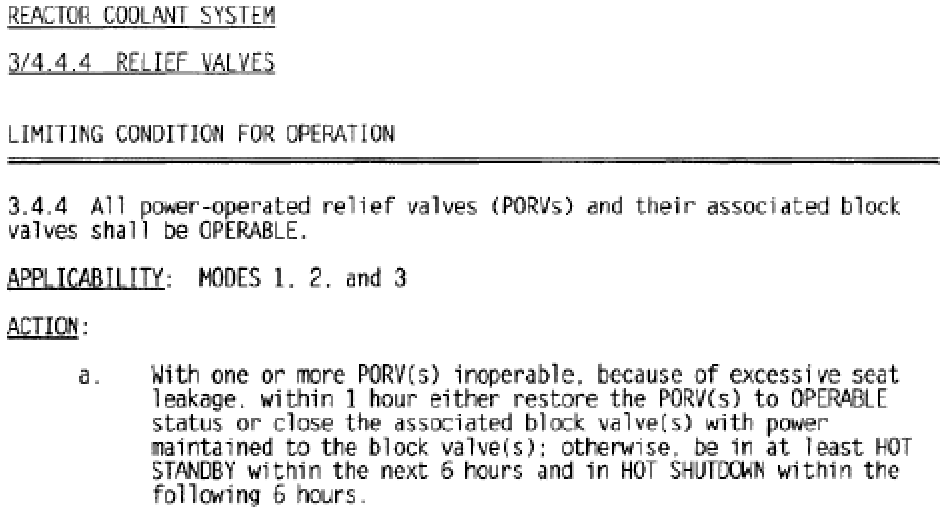
The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 3: Pressurizer PORV 445A Leakage (AOP-016). This failure will cause PRZ PORV 445A to leak, resulting in rising PRT pressure and level. PORV Line Temp indicator TI-463 will rise as observed on the MCB and the crew will respond in accordance with ALB 009-8-2, Pressurizer Relief Discharge High Temp. The crew may utilize AOP-016, Excessive Primary Plant Leakage, Attachment 5 to determine which PORV is leaking.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4 (Continued)

Verifiable Action: The crew may respond in accordance with the alarm response procedure APP-ALB-009 or by entering AOP-016, which has NO immediate actions. The RO will place the block valve (1RC-117) for the affected PRZ PORV (1RC-118) in the shut position and monitor the PRT parameters to confirm isolation of the PORV.

The SRO should evaluate Tech Spec 3.4.4, Reactor Coolant System – Relief Valves Action **a**.



REACTOR COOLANT SYSTEM

3/4.4.4 RELIEF VALVES

LIMITING CONDITION FOR OPERATION

3.4.4 All power-operated relief valves (PORVs) and their associated block valves shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTION:

a. With one or more PORV(s) inoperable, because of excessive seat leakage, within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) with power maintained to the block valve(s); otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 4: Generator Voltage Regulator Failure. This will cause the automatic function of the voltage regulator to oscillate which will be indicated on the ERFIS computer Quick Plot “VAC” and the MCB indication EI-567, Megavars. As the amplitude of the oscillations grows if the crew continues to operate the AVR in Auto the system will reject to manual after 10 minutes.

Verifiable Action: Event 4: Generator Voltage Regulator Failure. This will cause the automatic function of the voltage regulator to oscillate which will be indicated on the ERFIS computer Quick Plot “VAC” and MCB indication EI-565 and EI-567, Generator Megawatts and Megavars respectively. As the amplitude of the oscillations grows ALB 022-9-4, Computer Alarm Gen/Exciter Systems and 4-3, Gen Volt/Freq Ratio Limiter Active Or Under-Freq, alarm requiring the BOP to take manual control of the AVR in order to restore control of Generator Megavars.

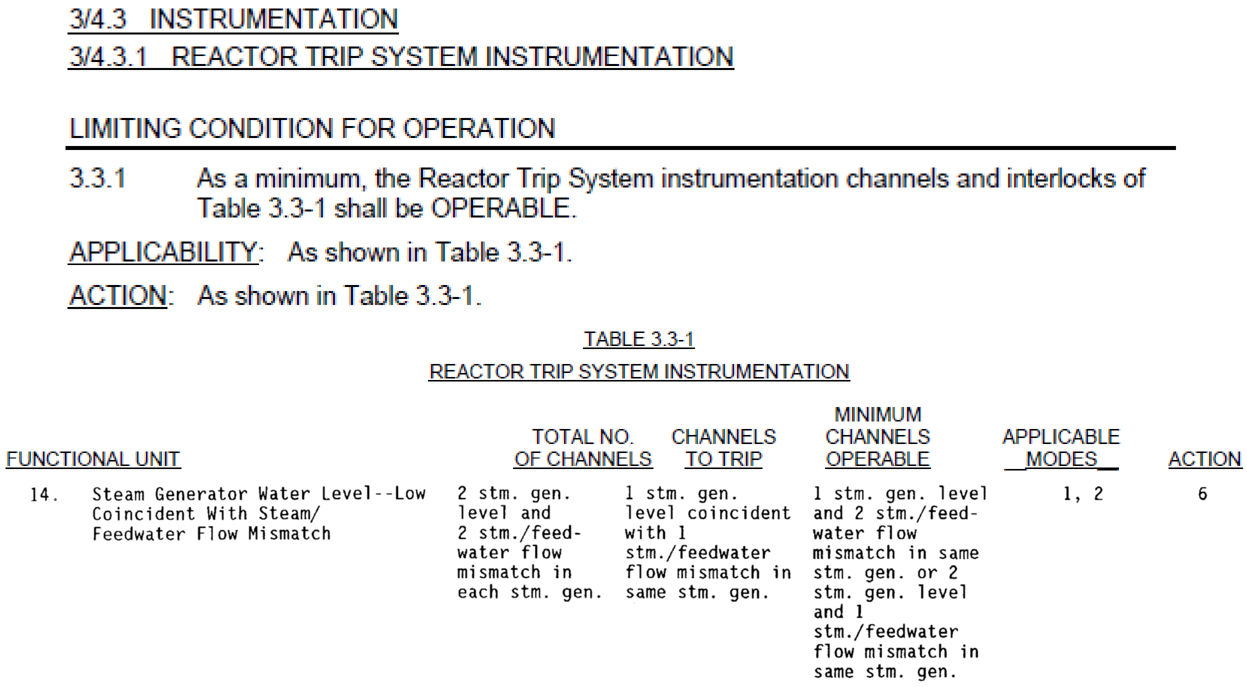
The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 5: Feed pressure transmitter failure low on ‘A’ SG FT-475 (AOP-010). This failure will cause ALB 014-1-2, 1-4, 4-1B, 4-2A, Loop A Hi Steam Line ΔP Low-P1, Loop A Hi Steam Line Press Rate Alert, SG A Stm > FW Flow Mismatch, and Loop A Low Stm Line Press Alert respectively to alarm. The crew will respond by entering AOP-010, Feedwater Malfunction and taking manual control of ‘A’ Main Feedwater Regulating Valve to raise Feedwater flow and stabilize level.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4 (Continued)

Verifiable Action: The BOP will respond to the failure by taking the immediate actions of AOP-010 by manually controlling the ‘A’ FRV and restoring level 57%. With the controller in manual and the plant stabilized the crew will implement OWP-ESF-02 to remove the failed channel from service (**Critical Task #1**).

The SRO should evaluate Tech Spec 3.3.1, Instrumentation – Reactor Trip System Instrumentation, Tech Spec 3.3.2, Instrumentation – Engineered Safety Features Actuation System Instrumentation and Tech Spec 3.3.3.6. Action: 6 and 19 apply respectively.



3/4.3 INSTRUMENTATION

3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the Reactor Trip System instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE.

APPLICABILITY: As shown in Table 3.3-1.

ACTION: As shown in Table 3.3-1.

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
14. Steam Generator Water Level--Low Coincident With Steam/Feedwater Flow Mismatch	2 stm. gen. level and 2 stm./feed-water flow mismatch in each stm. gen.	1 stm. gen. level coincident with 1 stm./feedwater flow mismatch in same stm. gen.	1 stm. gen. level and 2 stm./feed-water flow mismatch in same stm. gen. or 2 stm. gen. level and 1 stm./feedwater flow mismatch in same stm. gen.	1, 2	6

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4 (Continued)

Event 5: Tech Spec evaluation continued

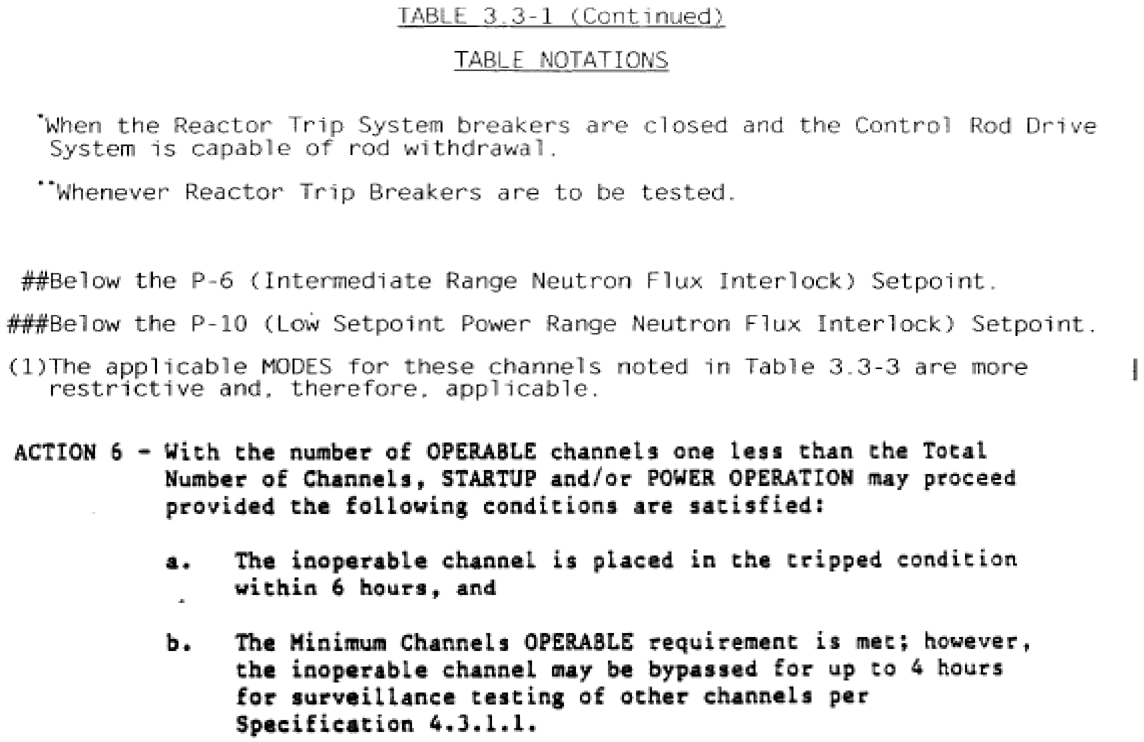


TABLE 3.3-1 (Continued)

TABLE NOTATIONS

*When the Reactor Trip System breakers are closed and the Control Rod Drive System is capable of rod withdrawal.

**Whenever Reactor Trip Breakers are to be tested.

##Below the P-6 (Intermediate Range Neutron Flux Interlock) Setpoint.

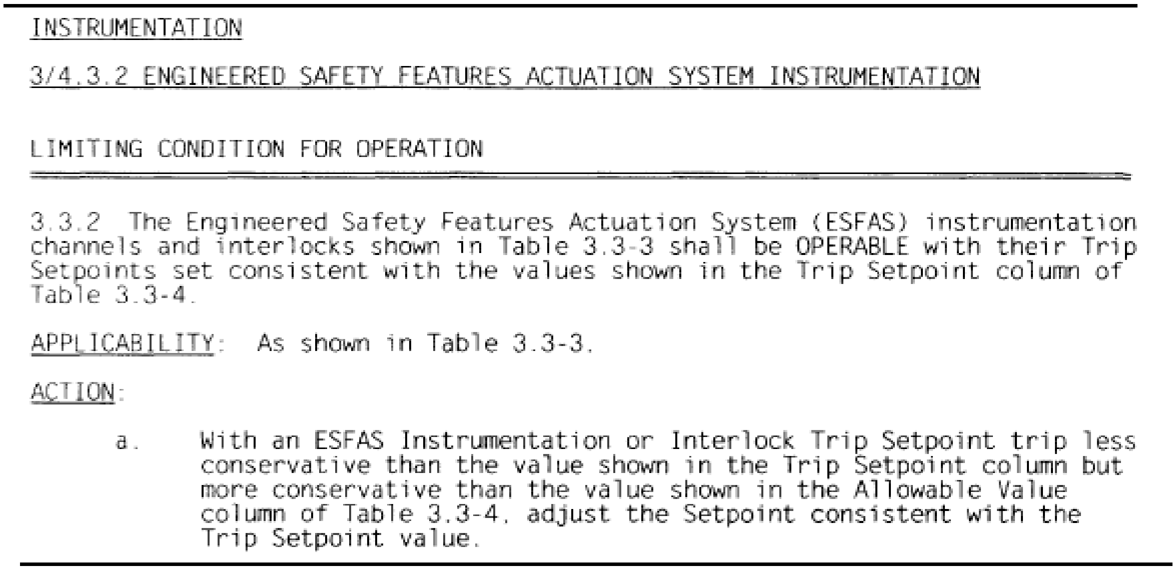
###Below the P-10 (Low Setpoint Power Range Neutron Flux Interlock) Setpoint.

(1)The applicable MODES for these channels noted in Table 3.3-3 are more restrictive and, therefore, applicable.

ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1.



INSTRUMENTATION

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Features Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4.

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS Instrumentation or Interlock Trip Setpoint trip less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 3.3-4, adjust the Setpoint consistent with the Trip Setpoint value.

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4 (Continued)

Event 5: Tech Spec evaluation continued

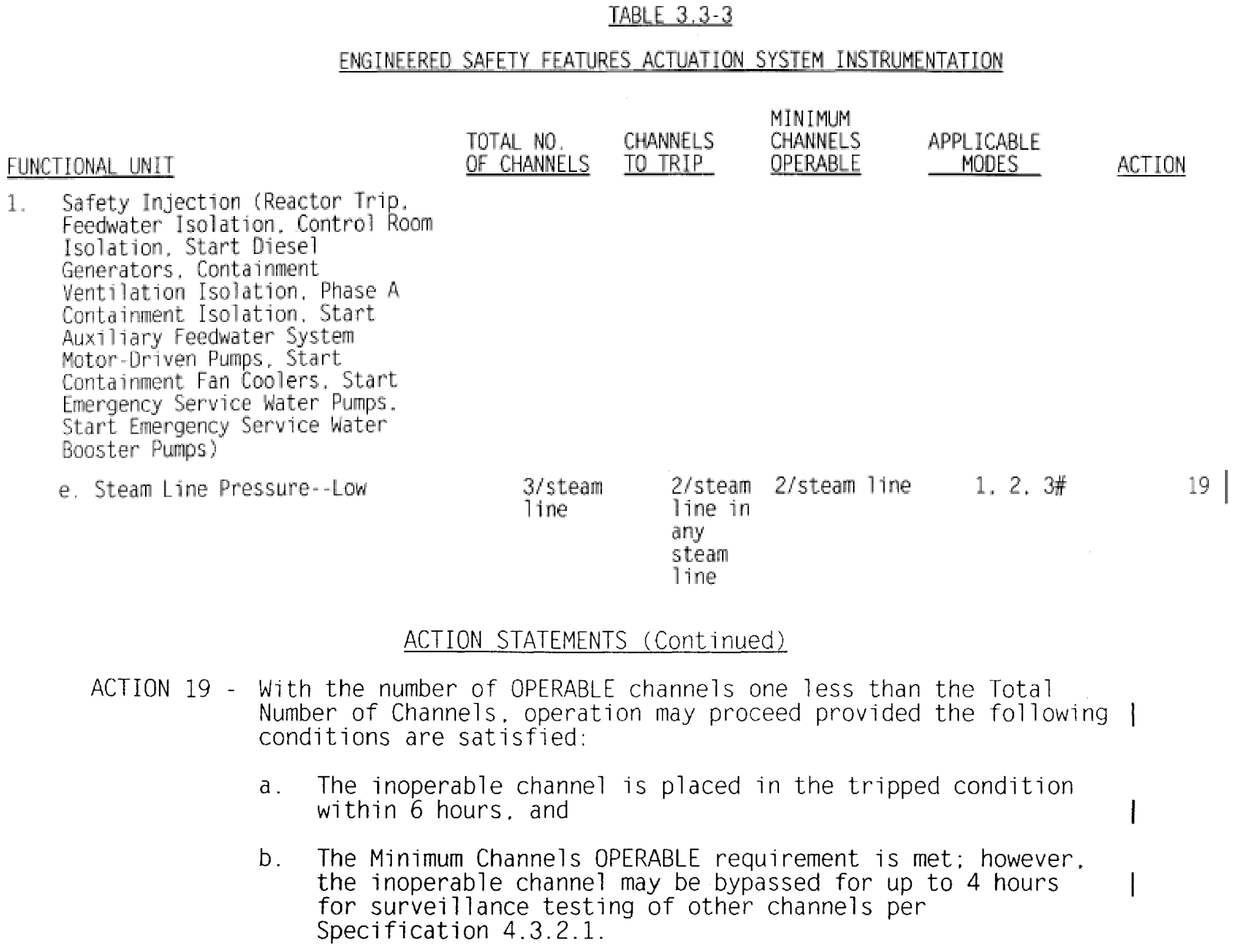


TABLE 3.3-3

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Safety Injection (Reactor Trip, Feedwater Isolation, Control Room Isolation, Start Diesel Generators, Containment Ventilation Isolation, Phase A Containment Isolation, Start Auxiliary Feedwater System Motor-Driven Pumps, Start Containment Fan Coolers, Start Emergency Service Water Pumps, Start Emergency Service Water Booster Pumps)					
e. Steam Line Pressure--Low	3/steam line	2/steam line in any steam line	2/steam line	1, 2, 3#	19

ACTION STATEMENTS (Continued)

ACTION 19 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 6 hours, and

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.

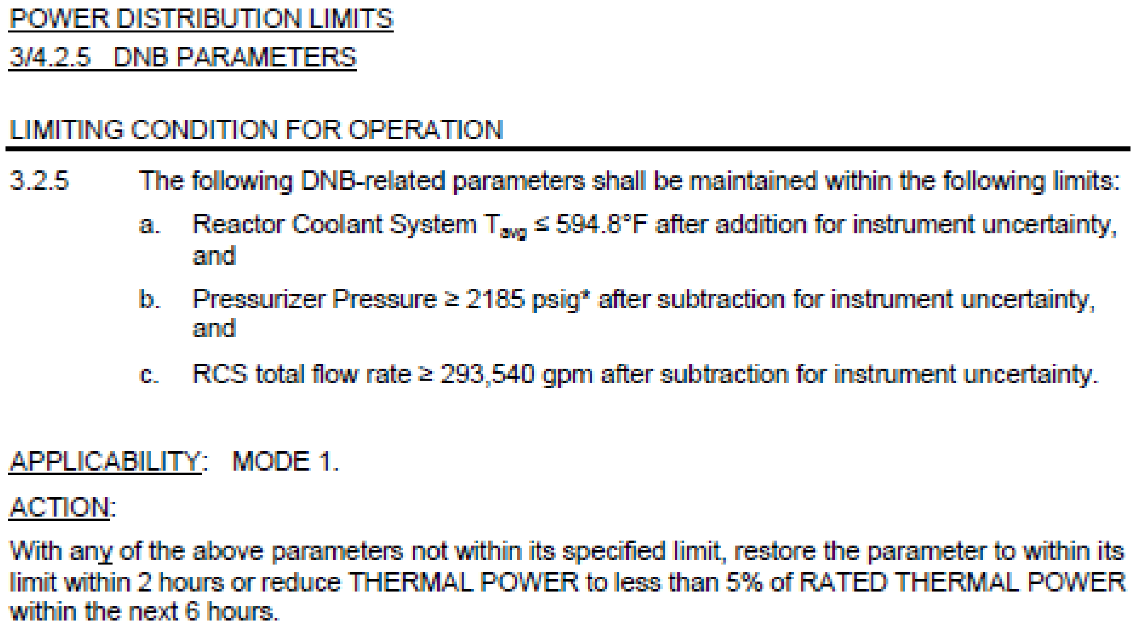
The SRO should provide a level band of 52% to 62% to the BOP in accordance with AOP-010 and OMM-001, Attachment 11, Control Bands And Administrative Limits. The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 6: PT-444 Fails HIGH (AOP-019). This failure will cause multiple ALB 009 annunciators to alarm along with lowering RCS pressure and changes in Pressurizer Level and Charging flow. This will require the crew to implement the immediate actions for AOP-019. Additionally ALB 010-8-5A, Cmptr Alarm Rx Coolant, will alarm if RCS pressure is allowed to lower below 2215 psig.

Verifiable Action: The crew will respond by entering AOP-019 and performing the immediate actions. Depending on the timing of the RO 1RC-114, PRZ PORV 444B SB may open be when the PORV status is evaluated during the AOP-019 immediate actions which will require the RO to place 1RC-114 in the shut position. The RO will place the Master Pressure controller in manual and reduce the output to shut the PRZ spray valves and 1RC-114, while energizing the PRZ Backup Heaters to restore pressure (**Critical Task #2**).

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4 (Continued)

The SRO should evaluate Tech Spec 3.2.5, Power Distribution Limits – DNB Parameters Action.



POWER DISTRIBUTION LIMITS

3/4.2.5 DNB PARAMETERS

LIMITING CONDITION FOR OPERATION

3.2.5 The following DNB-related parameters shall be maintained within the following limits:

a. Reactor Coolant System T_{avg} ≤ 594.8°F after addition for instrument uncertainty, and

b. Pressurizer Pressure ≥ 2185 psig* after subtraction for instrument uncertainty, and

c. RCS total flow rate ≥ 293,540 gpm after subtraction for instrument uncertainty.

APPLICABILITY: MODE 1.

ACTION:

With any of the above parameters not within its specified limit, restore the parameter to within its limit within 2 hours or reduce THERMAL POWER to less than 5% of RATED THERMAL POWER within the next 6 hours.

The SRO should refer to AD-OP-ALL-1000 Attachment 4, Emergent Issue Checklists for the failure and request assistance from the WCC.

Event 7: Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0). The major event is a Feed line Break inside containment. The SG ‘A’ will degrade to a fault inside containment coincident with a loss of offsite power requiring the crew to implement the immediate actions of EOP-E-0 and stabilize the unit.

Verifiable Action: The crew will perform the EOP-E-0 immediate actions to ensure the Reactor is tripped, Turbine is tripped, and both AC emergency buses are energized. The crew should determine Safety Injection actuation is required based on rising containment pressure and sump level. They should monitor Safety Injection to ensure it automatically actuates at 3.0 psig in containment and continue with EOP-E-0. The BOP will stabilize RCS temperature using EOP-E-0, Table 1 and energize AC buses 1A1 and 1B1.

Event 8: Main Steam line Isolation fails, 'B' CCW pump fails to Auto start. The MSIVs will fail to close at 3.0 psig in containment and the sequencer will fail to start the ‘B’ CCW pump.

Verifiable Action: The BOP will attempt to manually actuate MSLI from the MCB in accordance with EOP-E-0, which will not be successful and then manually place each switch in the shut position in accordance with AD-OP-ALL-1000, Conduct of Operations, (5.6.3.8) for Equipment Manipulation and Status Control, but this will not be successful as well. The RO will manually start the ‘B’ CCW Pump once the ‘B’ Sequencer reaches Load Block 9, Automatic Manual

SCENARIO SUMMARY: 2020 NRC EXAM SCENARIO 4 (Continued)

Loading Permissive, in accordance with AD-OP-ALL-1000, Conduct of Operations, (5.6.3.8) for Equipment Manipulation and Status Control or EOP-E-0, Attachment 3, Safeguards Actuation Verification.

Event 9: 'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1). The crew should identify this failure and attempt to restore a source of Feedwater. Transition to EOP-FR-H.1 will be required at this time. The crew will continue with EOP-FR-H.1 until heat sink is restored or the requirement to initiate Bleed and Feed are met.

Verifiable Action: The RO will be required to secure any running RHR pumps in in accordance with EOP-FR-H.1

Event 10: Pressurizer PORV 445B fails to open. During the performance of EOP-FR-H.1 actions to establish Bleed and Feed PORV 445B the non-safety PRZ PORV will fail to open.

Verifiable Action: The crew should identify this failure and open the Reactor Vent valve to ensure an adequate RCS Bleed Path is established, in accordance with EOP-FR-H.1 step 30.

The scenario termination is met in EOP-FR-H.1 after RCS Bleed and Feed has been established prior to PRZ PORVs automatically opening (**Critical Task #3**).

CRITICAL TASK JUSTIFICATION:

1. Manually maintain control of SG ‘A’ level above 25% to prevent an automatic or manual Reactor trip after steam pressure transmitter PT-475 fails low

An unnecessary automatic or manual Reactor Trip for this event will create critical task. See note below.

2. Manually maintain control of PRZ Pressure above 1960 psig to prevent an automatic or manual Reactor trip after the pressure transmitter PT-444 fails high

An unnecessary automatic or manual Reactor Trip for this event will create critical task. See note below.

3. Initiate RCS Bleed and Feed for Successful High-Head SI Pump Injection to prevent RVLIS Full Range Level from lowering below 39%

Failure to initiate RCS bleed and feed before the RCS saturates at a pressure above the shutoff head of the high-head ECCS pumps results in significant and sustained core uncovery. If RCS bleed is initiated so that the RCS is depressurized below the shutoff head of the high-head ECCS pumps, then core uncovery is prevented or minimized. At Harris the plant with no Reactor Coolant Pump operating RVLIS Full Range Level lowering below 39% will provide indication of significant core uncovery.

Note: Causing an unnecessary plant trip or ESF actuation (automatic or manual) may constitute a CT failure. Actions taken by the applicant(s) will be validated using the methodology for critical tasks in Appendix D to NUREG-1021.

Simulator Setup

Reset to IC-144 password “NRC3sros”

Go to RUN

Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner.

Set ERFIS screens for normal full power conditions

(The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

SPECIAL INSTRUCTIONS

Provide a Reactivity Plan to candidates for shutting down the plant

Provide a copy of the following procedures:

- GP-006, NORMAL PLANT SHUTDOWN FROM POWER OPERATION TO HOT STANDBY (MODE 1 TO MODE 3) **marked up** through section 6.2 step 4

Press START on Counter Scaler
Post conditions for status board from IC-19 Reactor Power 100%
Control Bank D at 218 steps
RCS boron 954 ppm

Turnover: The plant is at 100% power, middle of core life. Due to the ‘B’ MDAFW pump LCO expiring, a normal shutdown in accordance with GP-006, Normal Plant Shutdown From Power Operation To Hot Standby (Mode 1 To Mode 3) is in progress as directed by plant management. Continue the shutdown @ 4 MW/min with TCS Load Control at 4 GVPC units/ min

Equipment Under Clearance:

- MDAFW Pump B-SB is under clearance for motor high vibrations. The pump has been inoperable for 66 hours and cannot be restored to operable status. Tech Spec 3.7.1.2 LCO Action **a** and Tech Spec 3.3.3.5.b Action **c** applies.

- ‘B’ DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours.

- 1CS-9, Letdown Orifice Isolation valve, has been under clearance the last 12 hours for solenoid replacement. The repairs are close to completion and the valve is expected to be returned this shift. The valve is currently shut with power removed. OWP-CS-09 has been completed. Tech Specs 3.6.3 Action **b** applies.

Simulator Setup (continued)

Align equipment for repairs:

Place CIT on 'B-SB' MDAFW pump MCB Switch
Place protected train placards in accordance with OMM-001 Attachment 5
    Protected Train placards on 'A-SA' MDAFW pump, 'B-SB' RHR Pump, 'B-SB' CCW Pump, 'B-SB' ESW Pump, 1MS-70 and 1MS-72

Place the “B” DEH Pump in PTL and then hang a CIT on MCB switch
Place protected train placards in accordance with AD-OP-ALL-0210, Single Point Vulnerabilities
    Protected Train placards on “A” DEH Pump

Place CIT on 1CS-9 MCB switch

Place protected train placards in accordance with Response to Industry Best Practices, Expectations
    Protected train placards on ‘A-SA’ ESW Pump, ‘A-SA’ CCW Pump, and ‘A-SA’ SFP Hx

Place filled out copies of OWP’s into the OWP book – ensure they are removed at end of day

- OWP-CS-09 and place in MCR OWP book for 1CS-9 clearance

Op Test No.: NRC	Scenario # 4	Event # 1	Page 14 of 71
Event Description:	**Power Reduction**		

Time	Position	Applicant's Actions or Behavior

Lead Evaluator:	**The crew has been directed to commence a power reduction from 100% to the unit is off line. The power reduction is on hold for turnover. The SRO is expected to conduct a reactivity brief prior to commencing the power reduction. This brief may be conducted outside the simulator prior to starting the scenario.**
	When the crew has completed their board walk down and are ready to take the shift inform the Simulator Operator to place the Simulator in Run. When the Simulator is in run announce: **CREW UPDATE – (SRO's Name) Your crew has the shift. END OF UPDATE**

Simulator Operator:	**When directed by the Lead Evaluator, ensure that the annunciator horns are on and place the Simulator in RUN.**

GP-006		GP-006, Section 6.2
Procedure Note:		When PRZ backup heaters are energized in manual, then PK-444A1 (PRZ Master Pressure Controller) (a PI controller) will integrate up to a greater than normal output, opening PRZ Spray Valves to return and maintain RCS pressure at setpoint. The result is as follows: • PORV PCV-444B will open at a lower than expected pressure. • ALB-009-3-2 (Pressurizer High Press Deviation Control), will activate at a lower than expected pressure. • Higher probability for exceeding Tech Spec DNB limit for RCS pressure.
	RO	4. Energize all available Pressurizer Backup Heaters per OP-100 Section 8.15.
Evaluator Note:		**The crew may elect to begin boration prior to lowering turbine load.**

Op Test No.: NRC Scenario # 4 Event # 1 Page 15 of 71

Event Description: **Power Reduction**

Time	Position	Applicant's Actions or Behavior
	RO	OP-107.01, Section 5.2
	RO	1. DETERMINE the volume of boric acid to be added. (Current OPT-1536 data or approved reactivity plan from Engineering may be used.)
	SRO	Directs boration
Procedure Note:		FIS-113, BORIC ACID BATCH COUNTER, has a tenths position.
Procedure Caution:		If the translucent covers associated with the Boric Acid and Total Makeup Batch counters FIS-113 and FIS-114, located on the MCB, are not closed, the system will not automatically stop at the preset value.
	RO	2. SET FIS-113, BORIC ACID BATCH COUNTER, to obtain the desired quantity. 3. ENSURE the RMW CONTROL switch has been placed in the STOP position. 4. ENSURE the RMW CONTROL switch green light is lit.
Procedure Note:		• Boric Acid flow controller must be set between 0.2 and 6 (1 and 30 gpm.). • Performing small borations at high flow rates may result in an overboration based on equipment response times. Boration flow should be set such that the time required to reach the desired setpoint will happen after release of the control switch.

Op Test No.:	NRC	Scenario #	4	Event #	1	Page	16	of	71
Event Description:				**Power Reduction**					

Time	Position	Applicant's Actions or Behavior
	RO	5. IF the current potentiometer setpoint of controller 1CS-283, FK-113 BORIC ACID FLOW, needs to be changed to obtain makeup flow, THEN: (N/A)
		a. RECORD the current potentiometer setpoint of controller 1CS-283, FK-113 BORIC ACID FLOW, in Section 5.2.3. b. SET controller 1CS-283, FK-113 BORIC ACID FLOW, for the desired flow rate.
	RO	6. PLACE control switch RMW MODE SELECTOR to the BOR position.
Procedure Note:		• Boration may be manually stopped at any time by turning control switch RMW CONTROL to STOP. • During makeup operations following an alternate dilution, approximately 10 gallons of dilution should be expected due to dilution water remaining in the primary makeup lines.
	RO	7. START the makeup system as follows: a. TURN control switch RMW CONTROL to START momentarily. b. ENSURE the RED indicator light is LIT. c. IF expected system response is not obtained, THEN TURN control switch RMW CONTROL to STOP. 8. ENSURE boration automatically terminates when the desired quantity of boron has been added.
	RO	9. IF controller 1CS-283, FK-113 BORIC ACID FLOW, was changed in Step 5.2.2.5, THEN: (N/A)
		a. REPOSITION controller 1CS-283, FK-113 BORIC ACID FLOW, to the position recorded in Step 5.2.2.5.a. b. INDEPENDENTLY VERIFY controller 1CS-283, FK-113 BORIC ACID FLOW, position.

Op Test No.: <u>NRC</u>	Scenario # 4	Event # 1	Page <u>17</u> of <u>71</u>
Event Description:	**Power Reduction**		

Time	Position	Applicant's Actions or Behavior
	RO	10. Monitor Tavg and rod control for proper operation. 11. Establish VCT pressure between 20-30 psig. 12. Turn control switch RMW MODE SELECTOR to AUTO. 13. START the makeup system as follows: a. TURN control switch RMW CONTROL to START momentarily. b. ENSURE the RED indicator light is LIT.
	SRO	GP-006, Section 6.2 continued
	SRO	DIRECTS BOP to start power reduction at 4 MW/Min. May direct initiation of a boration before the power reduction begins.
Procedure Note:		**Routine load changes must be coordinated with the Load Dispatcher to meet system load demands** **GVPC is the preferred method of Load Control. Megawatt Control is normally used only during GV and TV testing** **Controls and indications in following steps are on the TCS Load Control screen** **If Oper Entry is selected with the Turbine in GO, the value currently in the Ramp Rate Entry Window will become the load rate in effect. It may be desirable to place the turbine in HOLD to avoid undesirable ramp rates**
	BOP	Requests PEER check prior to manipulations of TCS Load Control screen
	BOP	5. On TCS Load Control screen, Load Control section, perform the following:

Op Test No.:	NRC	Scenario #	4	Event #	1	Page	18	of	71
Event Description:					**Power Reduction**				

Time	Position	Applicant's Actions or Behavior
		a. IF GVPC indicator is TRUE, THEN go to Step 5.c c. Select Ramp Rate Selection, Select button d. Select the desired ramp rate OR Oper Entry on Load Ramp Rate Selection menu • ENTER the desired rate, **NOT** to exceed 5 MW/MIN, in the DEMAND display. **(4 DEH Units/minute)** e. IF Oper Entry is selected, THEN enter the desired loading rate in the Ramp Rate Entry window and depress Enter. • ENTER the desired rate, NOT to exceed 5 MW/MIN, in the DEMAND display. **(4 DEH Units/minute)** • DEPRESS the ENTER push-button.
Procedure Note:		The unloading of the unit can be stopped at any time by selecting the Hold button. The load reduction can be resumed by selecting the Go button
Evaluator Note:		**There is no procedural guidance directing when the boration to lower power is required. The crew may elect to perform the boration prior to placing the Turbine in GO.**
	BOP	6. Reduce turbine load as follows: a. Enter desired Target Load (120 MW if shutting down) in Target Entry window and depress Enter b. Select the Go button c. Check that Demand window indication counts down towards desired Target Load d. Check that load ramps towards desired Target Load
Procedure Note:		Once a raise/lower command button is activated, it will remain in the visually depressed state as an indication the button cannot be activated again for approximately two seconds. After two seconds, command buttons automatically return to their default visual state indicating the button may be activated again

Op Test No.:	NRC	Scenario #	4	Event #	1	Page	19	of 71
Event Description:			**Power Reduction**					

Time	Position	Applicant's Actions or Behavior
	BOP	7. IF AT ANY TIME, a small incremental change of Target Load value (1 or 5 megawatts) is desired, THEN select any of the following buttons: • ▲1 MW • ▲▲5 MW • ▼ 1 MW • ▼▼ 5 MW
	BOP	8. Ensure Generator load is lowering
Evaluator Note:		**As the crew demonstrates a satisfactory load reduction, cue Simulator Operator to insert Trigger 2** **Event 2: Normal Service Water Pump 'A' sheared shaft (AOP-022)**

Op Test No.:	NRC	Scenario #	4	Event #	2	Page	20	of 71
Event Description:	**Normal Service Water Pump 'A' sheared shaft (AOP-022)**							

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 2 "Normal Service Water Pump 'A' sheared shaft (AOP-022)"**	
Indications Available:		• **ALB 002-4-5, SERV WTR LEAKAGE** • **ALB 002-5-5, SERV WTR HEADER A HIGH-LOW FLOW** • **ALB-002-6-1, SERV WTR SUPPLY HDR A LOW PRESS** • **ALB 002-6-6, SERV WTR HEADER B HIGH-LOW FLOW** • **ALB-002-7-1, SERV WTR SUPPLY HDR B LOW PRESS** • **ALB-002-7-2, SERV WTR PUMPS DISCHARGE LOW PRESS**	
	RO	Responds to ALB-002 alarms – reports low NSW header pressure with pump running indication.	
Evaluator Note:		**The ESW Pumps will auto start on low header pressure after 20 second time delay.**	
AOP-022		Loss Of Service Water	
	SRO	ENTERS and directs actions of AOP-022, Conducts a Crew Update Makes PA announcement for AOP entry.	
Immediate Action	RO	1. CHECK ESW flow lost to ANY RUNNING CSIP - MORE THAN 1-minute:	(NO)
	SRO	1. RNO: GO TO Step 2.	
Immediate Action	RO	2. CHECK ESW flow lost to ANY RUNNING EDG - MORE THAN 1-minute:	(NO)
	SRO	2. RNO: GO TO Step 3.	

Op Test No.:	NRC	Scenario #	4	Event #	2	Page	21	of	71	
Event Description:	**Normal Service Water Pump 'A' sheared shaft (AOP-022)**									

Time	Position	Applicant's Actions or Behavior	
Simulator Communicator:		**There are several points in the AOP where an AO may be dispatched to check for leaks and proper operation of equipment. Report no leaks, no breaker problems but when dispatched to the pump, after 1 to 2 minutes report that the coupling appears to have failed and request maintenance assistance.**	
Simulator Operator:		**IF REQUESTED TO OPEN KNIFE SWITCH ON THE 'A' NSW PUMP BREAKER: go to rf SWS100 and "open the knife switch" then have Communicator report back when completed**	
	SRO	3. GO TO the appropriate step as indicated by the parameter LOST: • NSW Pump failure • NSW Pump loss of flow GO TO 3.0/ Step 6 (Page 9)	(YES)
	SRO	6. PERFORM the following for a loss of NSW flow:	
	RO	a. CHECK loss of NSW Header due to NSW Pump FAILED or LOSS OF FLOW. b. START standby NSW Pump as follows: (1) ENSURE discharge valve for affected pump is CLOSING by placing affected pump control switch to STOP. (2) START standby NSW Pump in priming mode by momentarily placing standby NSW Pump control switch to START. (3) WHEN discharge valve for affected pump is fully SHUT, THEN PLACE and HOLD control switch for running pump to START to fully OPEN pump discharge valve. c. CHECK ANY NSW Pump - RUNNING.	(YES) (YES)
	SRO	d. GO TO Section 3.2 (page 37)	

Op Test No.:	NRC	Scenario #	4	Event #	2		Page	22	of	71

Event Description: **Normal Service Water Pump 'A' sheared shaft (AOP-022)**

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**The following alarms will annunciate due to loss of cooling in containment and subsequent start of ESW:** • **ALB-028-5-1, CONTAINMENT AIR HIGH VACUUM** • **ALB-028-8-5, COMPUTER ALARM VENTILATION SYSTEM** **The BOP should identify these alarms and identify Tech Specs 3.6.1.4, 3.6.1.1, 3.6.3, 3.6.5 and 3.9.4 to be referenced**	
	BOP	MAY go to MANUAL and shut FK-7624, Norm Purge Exh Flow, in order to raise CNMT pressure to exit T.S. 3.6.1.4 (ALB-028-5-1, 3.c and AD-OP-ALL-1000) NOTE: informs CRS prior to taking manual control for need of actions	
	SRO	T.S. 3.6.1.4 – Restore within 1 hour LCO or HSB within next 6 hours: due to High Vac in CNMT	
	SRO	1. CHECK Turbine trip required by ANY of the following conditions - EXIST:	
	RO	• No NSW Pump can be operated • Non-isolable leak exists in the NSW system • Major isolable leak exists on the Turbine Building NSW Header AND time does not permit a controlled plant shutdown	(NO)
	SRO	1. RNO: GO TO Step 13.	
Procedure Note:		Steps 13 through 19 address leaks on NSW turbine building header. Leaks on individual components supplied by the Turbine Building header are addressed by Steps 20 and 21.	

Op Test No.:	NRC	Scenario #	4	Event #	2	Page	23	of	71
Event Description:	**Normal Service Water Pump 'A' sheared shaft (AOP-022)**								

Time	Position	Applicant's Actions or Behavior	
	CREW	13. CHECK for minor isolable leak on Turbine Building header – ANY EXISTING.	(NO)
	SRO	13. RNO: GO TO Step 20.	
	CREW	20. CHECK for leak in an individual component - ANY EXISTING.	(NO)
	SRO	20. RNO: GO TO Step 22.	
	CREW	22. CHECK for leak on WPB header - ANY EXISTING.	(NO)
	SRO	22. RNO: GO TO Step 24.	
	RO	24. CHECK that NSW Pump(s) - MALFUNCTIONED.	(YES)
	CREW	25. PERFORM the following for affected NSW Pump(s): a. PERFORM the following: (1) CHECK NSW Pump breaker(s) - MALFUNCTIONED.	(NO)
	SRO	25.a.1. RNO: GO TO Step 25.b.	

Op Test No.: NRC	Scenario # 4	Event # 2	Page 24 of 71
Event Description:	**Normal Service Water Pump 'A' sheared shaft (AOP-022)**		

Time	Position	Applicant's Actions or Behavior	
Procedure Note:		If Service Water Chamber level indication is not available, a substituted conservative value of LESS THAN 31 INCHES Cooling Tower Basin level (LI-1931) may indicate that Service Water Chamber level is low.	
	CREW	b. CHECK adequate pump suction inventory EXISTS: • LI-9300.1, Service Water PMP A CHMBR LVL, GREATER THAN 51% (ERFIS LSW9300) • LI-9302, Service Water PMP B CHMBR LVL, GREATER THAN 51% (ERFIS LSW9302)	(YES) (YES)
	CREW	c. Locally ENSURE the following for the affected NSW Pump per OP-139, Service Water System: • Proper cooling and seal water supply to NSW Pumps. • Proper operation of NSW strainer backwash. d. Locally CHECK NSW Pump(s) for signs of damage (shaft shear or other obvious problems).	(YES) (YES) (YES)
	SRO	26. INITIATE appropriate corrective action for the loss of NSW. • Completes an Emergent Issue Checklists and contacts WCC for the failure of "A" NSW Pump assistance. (WR, LCOTR and Maintenance support)	
Simulator Communicator:		**Acknowledge communications**	
	SRO	27. CHECK Reactor thermal power changed by less than 15% in any one hour period	(YES)
	RO	28. IF ESW Pump(s) were placed in service by this procedure, THEN NOTIFY Chemistry to sample the return to the Auxiliary Reservoir per CRC-155	

Op Test No.:	NRC	Scenario #	4	Event #	2	Page	25	of 71
Event Description:	**Normal Service Water Pump 'A' sheared shaft (AOP-022)**							

Time	Position	Applicant's Actions or Behavior
	SRO	29. Exit this procedure.
Evaluator Note:		**With NSW restored to the Turbine and load lowering, cue Simulator Operator to insert Trigger 3** **Event 3: Pressurizer PORV 445A Leakage (AOP-016)**

Op Test No.: NRC Scenario # 4 Event # 3	Page 26 of 71	
Event Description:	**Pressurizer PORV 445A Leakage (AOP-016)**	
Time	Position	Applicant's Actions or Behavior

Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 3 "Pressurizer PORV 445A Leakage (AOP-016)"**
Indications Available:		• **ALB-009-8-2, PRESSURIZER RELIEF DISCHARGE HIGH TEMP** • **TI-463, PRZ PORV discharge line temperature rising** • **LI-470.1, Pressurizer relief tank level rising** • **PI-472.1, Pressurizer relief tank pressure rising** • **TI-471.1, Pressurizer relief tank temperature rising**
Evaluator Note:		**Responding to the annunciator will direct the operator to shut 1RC-117, PRZ PORV Isolation valve to stop leakage from PRZ PORV PCV-445A. With the condition clear the crew may not enter AOP-016.**
APP-ALB-009	RO	Responds to alarm and evaluates APP-ALB-009-8-2
Procedure Note:		Past experience has shown that this alarm may come in due to valve stem leakoff from one of the PORV Block Valves. The block valves share a common leak-off line with the PORVs. This can be checked using ERFIS points TVL5647 and TVL5646
	RO	1. CONFIRM alarm using: a. TI-463, PRZ PORV discharge line temperature b. LI-470.1, Pressurizer relief tank level b. PI-472.1, Pressurizer relief tank pressure b. TI-471.1, Pressurizer relief tank temperature o Reports TI-463, LI-470.1, PI-472.1, TI-471.1 reading or trending high. 2. VERIFY Automatic Functions: None

Op Test No.:	NRC	Scenario #	4	Event #	3	Page	27	of 71
Event Description:		**Pressurizer PORV 445A Leakage (AOP-016)**						

Time	Position	Applicant's Actions or Behavior	
Procedure Caution:		Any PORV isolations that are shut due to decreasing RCS Pressure should NOT be reopened without further evaluation	
	RO	3. PERFORM Corrective Actions: Monitors TI-401 indications and identifies temperature is lowering	
	RO	a. IF a PORV is open, THEN CHECK PRZ pressure using PI-444, PI-445.1, PI-455.1, PI-456, and PI-457.	(NO)
Procedure Note:		For minor leakage, it may be necessary to have Engineering assistance to develop proper strategies	
	RO	b. IF all PORV's indicate closed and RCS pressure is NOT normal: c. IF all PORV's indicate closed and RCS pressure is normal: (1) THEN SHUT one PORV isolation at the time. (2) IF PRZ PORV discharge line temperature is not affected, THEN REOPEN the isolation valve.	(NO) (YES)
Evaluator Note:		**ERFIS Point TRC-0463 can be used to evaluate if PORV is leaking. ERFIS Quick Plot "QP PRT" can be used to monitor this parameter.**	
	RO	• Shuts PORV isolations as directed by SRO o After shutting 1RC-117, PRT Relief Line Temperature stops rising and PRT pressure stabilizes • Determines/reports PRZ PORV-445A leaking. • Informs SRO leakage from PRZ PORV PCV-445A is isolated	
	SRO	Directs RO to reopen 1RC-115 and or 1RC-113 if shut.	

Op Test No.:	NRC	Scenario #	4	Event #	3	Page	28	of	71
Event Description:	**Pressurizer PORV 445A Leakage (AOP-016)**								

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**Any Tech Spec evaluation can be conducted with a follow up question after the scenario.**	
	SRO	Evaluates Reactor Coolant System TS 3.4.4 All power-operated relief valves (PORVs) and their associated block valves shall be OPERABLE. ACTION a**.** - With one or more PORV(s) inoperable because of excessive seat leakage within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) with power maintained to the block valve(s): otherwise be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.	
	SRO	Completes an Emergent Issue Checklists for leakage from PRZ PORV PCV-445A.	
Simulator Communicator:		**Acknowledge communications**	
Evaluator Note:		**The following write up is if AOP-016 is used for the response to the leakage from PRZ PORV PCV-445A.**	
	CREW	Identifies entry conditions to AOP-016, Excessive Primary Plant Leakage are met	
AOP-016		Excessive Primary Plant Leakage	
	SRO	ENTERS and directs actions of AOP-016, Conducts a Crew Update Makes PA announcement for AOP entry	
Procedure Note:		**This procedure contains no immediate actions.**	
	OATC	1. CHECK RHR in operation	(NO)

Op Test No.:	NRC	Scenario #	4	Event #	3	Page	29	of	71
Event Description:		**Pressurizer PORV 445A Leakage (AOP-016)**							

Time	Position	Applicant's Actions or Behavior	
	SRO	1. RNO: GO TO Step 3.	
	SRO	3. REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Matrix.	
	RO	4. CHECK RCS leakage within VCT makeup capability May report that the leak is exceeding Tech Spec SG leakage.	(YES)
Procedure Note:		If CSIP suction is re-aligned to the RWST, negative reactivity addition should be anticipated.	
	RO	5. MAINTAIN VCT level GREATER THAN 5%	(YES)
	SRO	6. GO TO Step 10.	
	RO	10. CHECK valid CNMT Ventilation Isolation monitors (REM-3561A, B, C and D) ALARM CLEAR 11. CHECK RM 3502A, RCS Leak Detection Radiation Monitor, ALARM CLEAR 12. CHECK ALL valid Area Radiation Monitors ALARM CLEAR 13. CHECK valid Stack Monitors ALARM CLEAR	(YES) (YES) (YES) (YES)
	SRO	14. DETERMINE if unnecessary personnel should be evacuated from affected areas, as follows:	
		14.a. CHECK that a valid RMS Secondary Monitor HIGH ALARM	(NO)
	SRO	14.a RNO: GO TO Step 14.d.	

Op Test No.:	NRC	Scenario #	4	Event #	3	Page	30	of 71
Event Description:		**Pressurizer PORV 445A Leakage (AOP-016)**						

Time	Position	Applicant's Actions or Behavior	
		14.d CHECK that an RCS leak outside Containment, other than SG tube leakage, has caused a valid RMS alarm.	(NO)
	SRO	14.d RNO: GO TO Step 15.	
	BOP	15. DIRECT Chemistry to stop any primary sampling activities.	
Simulator Communicator:		**Acknowledge request to stop primary sampling activities.**	
Procedure Note:		• The following qualitative flow balance is to quickly determine if RCS leakage exceeds Tech Spec limits, EAL classification thresholds, or RCS makeup capability. • RCS influent and effluent flow rates are compared and PRZ level rate of change is used to determine the RCS flow balance.	
	OATC	16. PERFORM a qualitative RCS flow balance, as follows: a. ESTIMATE leak rate considering the following parameters: • PRZ level rate of change (~55 gal/% at 653°F) • Charging flow • Total seal injection flow • Letdown flow • Total seal return flow Reports estimate to SRO of < 10 gpm **(Due to the small amount of leakage No credit will be taken for this leak rate determination)**	
		b. OPERATE the following letdown orifice valves as necessary to maintain charging flow on scale: • 1CS-7, 45 gpm Letdown Orifice A • 1CS-8, 60 gpm Letdown Orifice B • 1CS-9, 60 gpm Letdown Orifice C (No changes required)	

Op Test No.: NRC	Scenario # 4	Event # 3	Page 31 of 71
Event Description:	**Pressurizer PORV 445A Leakage (AOP-016)**		

Time	Position	Applicant's Actions or Behavior
Procedure Note:		Performance of surveillance tests to determine if leakage exceeds Tech Spec limits, or to more accurately quantify leakage is up to CRS discretion.
	SRO	17. Determines that more accurate quantification is not needed due to excessive leakage indications present.
Evaluator Note:		**Any Tech Spec evaluation can be conducted as a follow up question after the scenario.**
	SRO	18. EVALUATE RCS leakage (refer to Tech Spec 3.4.6.2). **(N/A < 10 gpm based on changes in plant parameters)**
	SRO	19. DETERMINE leak location from one or more of the following: MCB indications and Valid Radiation Monitors • From PRZ PORV PCV-445A
	BOP	20. NOTIFY Health Physics of the following: a. Leak location: • Source inside or outside CNMT • To closed system, SG or to atmosphere b. Applicable radiation levels. NOTIFY HP of leakage from PRZ PORV PCV-445A
Simulator Communicator:		**Acknowledge RCS leakage is coming from PRZ PORV PCV-445A.**
	SRO	21. WHEN leakage location has been determined, THEN PERFORM the applicable Attachment: Leakage From Pressurizer PORV Attachment 5 page 27

Op Test No.:	NRC	Scenario #	4	Event #	3	Page	32	of	71
Event Description:	**Pressurizer PORV 445A Leakage (AOP-016)**								

Time	Position	Applicant's Actions or Behavior
	SRO	Transitions to Attachment 5:
	RO	1. CHECK the PRZ PORVs SHUT. (YES) 2. CHECK that the leaking PORV has been identified. (NO)
	SRO	2. RNO: PERFORM ONE of the following based on severity of leak:
	RO	a. SHUT AND REOPEN ONE PORV Block Valve at a time to identify the affected PORV. (YES) b. IF leakage is significant AND RCS pressure is normal, THEN: (NO) (1) SHUT ALL PORV Block Valves. (2) REOPEN ONE PORV Block Valve at a time to identify the affected PORV.
Evaluator Note:		**Any Tech Spec evaluation can be conducted with a follow up question after the scenario.**
	SRO	3. REFER TO Tech Spec 3.4.4.
		Evaluates Reactor Coolant System TS 3.4.4 All power-operated relief valves (PORVs) and their associated block valves shall be OPERABLE. ACTION a. - With one or more PORV(s) inoperable because of excessive seat leakage within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) with power maintained to the block valve(s): otherwise be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
	SRO	4. VERIFY valves manipulated for leak isolation are documented per the following: • OMM-001, Operations Administrative Requirements • OPS-NGGC-1303, Verification Practices

Op Test No.:	NRC	Scenario #	4	Event #	3	Page	33	of	71
Event Description:	**Pressurizer PORV 445A Leakage (AOP-016)**								

Time	Position	Applicant's Actions or Behavior
	SRO	5. Exit this procedure.
	SRO	Completes an Emergent Issue Checklists for leakage from PRZ PORV PCV-445A. Contacts WCC for assistance. (WR, LCOTR and Maintenance support).
Simulator Communicator:		**Acknowledge communications**
Evaluator Note:		**After Pressurizer PORV 445A Leakage has stabilized, cue Simulator Operator to insert Trigger 4** **Event 4: Generator Voltage Regulator Failure.**

Op Test No.:	NRC	Scenario #	1	Event #	4	Page	34	of	71
Event Description:	**Generator Voltage Regulator Failure**								

Time	Position	Applicant's Actions or Behavior
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 4 "Generator Voltage Regulator Failure"**
Indications Available:		**ERFIS Quick Plot "QP VAC"** **EI-565, Generator Megawatts** **EI-567, Megavars** **ALB 022-9-4, COMPUTER ALARM GEN/EXCITER SYSTEMS** **ALB 022-4-3, GEN VOLT/FREQ RATIO LIMITER ACTIVE OR UNDER-FREQ**
Evaluator Note:		**ALB-022-9-4 is a computer alarm.** **ALB-022-4-3 and 6-3 provide direction to place the Voltage Regulator in manual for corrective actions.** **ALB-022-4-3 response provided as this is the first alarmed received during the transient.** **The crew may refer to AOP-006, Turbine Generator Trouble but no actions will result.**
ALB-022	BOP	RESPONDS to alarm on APP-ALB-022-4-3
Evaluator Note:		**Operator may use AD-OP-ALL-1000 guidance to take manual control of voltage regulator to avoid a trip or transient prior to receiving ALB-022-4-3.**
	BOP	1. CONFIRM alarm using: a. At MCB: (1) EI-525, Generator Frequency. (2) EI-520, Generator Phase Volts. (YES-Reports voltage regulation problem) (3) EI-540, Gen Exciter Field Volts. (4) EI-541, Gen Exciter Field Current.

Op Test No.:	NRC	Scenario #	1	Event #	4	Page	35	of	71
Event Description:			**Generator Voltage Regulator Failure**						

Time	Position	Applicant's Actions or Behavior

	BOP	2. VERIFY Automatic Functions: a. VOLTAGE Regulator Limiter decreases Generator excitation b. IF Voltage Limiter is unable to control excitation increase, a Generator Lockout occurs	
	BOP	3. PERFORM Corrective Actions:	
		a. CHECK for the following at MCB: (1) EI-525, Generator Frequency, stable at 60 Hz. (2) EI-520, Generator Phase Volts, stable at 22 KV. (3) EI-540, Exciter Field Voltage stable. (4) EI-541, Exciter Field Current stable.	(YES) (NO) (NO) (YES)
Procedure Note:		An automatic transfer to MANUAL voltage control is indicated by CS-1538, Operation Mode switch, white light being lit. The CS-1538, Operation Mode switch, amber light will be off.	
	BOP	b. OPERATE CS-1539, Voltage Setpoint Reference switch, to restore Generator voltage to 22 KV and reduce MVARS.	
		c. IF CS-1539, Voltage Setpoint Reference switch, is ineffective AND an automatic voltage regulator control failure is suspected, THEN PERFORM the following to transfer and maintain voltage manually: (1) PLACE CS-1538, Operation Mode switch, in MANUAL mode. (2) OPERATE CS-1539, Voltage Setpoint Reference switch, to stabilize the Generator Stator Voltage at 22KV and reduce MVARS. (3) DISPATCH operator to 286 TB switchgear room to check the Excitation Control Terminal (ECT) (1EE-E258:137) on the ABB Automatic Voltage Regulator (AVR) cabinet for any event or alarm indications. (a) IF any event or alarm indications are present, THEN NOTIFY Maintenance.	(YES)
Simulator Communicator:		**If dispatched to 286' Switchgear to inspect ABB Automatic Voltage Regulator locally, wait approximately 2 minutes and report that there are no abnormal indications at the ABB Automatic Voltage Regulator.**	

Op Test No.:	NRC	Scenario #	1	Event #	4	Page	36	of	71
Event Description:			**Generator Voltage Regulator Failure**						

Time	Position	Applicant's Actions or Behavior
	SRO	Directs BOP to maintain a MVAR output controlling band of 75 to 160 MVAR gross output per OP-153.01.
	BOP	(4) IF AVR in Manual, THEN NOTIFY Load Dispatcher within 30 minutes of an Automatic Voltage Regulator status change. (The notification shall include an explanation of the status change and an estimate of expected duration.) [R – Reference 5]
Simulator Communicator:		**Acknowledge report from Control Room**
	SRO	d. REFERENCE AOP-028, Grid Instability. [R - Reference 6]
	BOP	e. VERIFY Main Generator is operating per the Generator Capability Curve.
	SRO	Completes an Emergent Issue Checklist and contacts WCC for assistance. (WR, Maintenance support)
Simulator Communicator:		**Acknowledge requests for assistance.**
Lead Evaluator:		**After the Generator Voltage Regulator is stabilized, cue Simulator Operator to insert Trigger 5** **Event 5: Feed pressure transmitter failure low on 'A' SG PT-475 (AOP-010)**

Op Test No.:	NRC	Scenario #	4	Event #	5	Page	37	of 71
Event Description:	**Feed pressure transmitter failure low on 'A' SG PT-475 (AOP-010)**							

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator insert Trigger 5** **Feed pressure transmitter failure low on 'A' SG PT-475 (AOP-010)**	
Available Indications		• **ALB 014-1-2, LOOP A HI STEAM LINE ΔP LOW-P1** • **ALB 014-1-4, LOOP A HI STEAM LINE PRESS RATE ALERT** • **ALB 014-4-1A, SG A FW > STM FLOW MISMATCH** • **ALB 014- 4-2A, LOOP A LOW STM LINE PRESS ALERT**	
	BOP	RESPONDS to alarms and ENTERS AOP-010	
AOP-010		Feedwater Malfunctions	
Critical Task # 1 **Immediate Action**	BOP	1. CHECK Feedwater Regulator valves operating properly. **1. RNO:** PERFORM the following: a. PLACE affected Feedwater Regulator valve(s) in MANUAL. Places SG 'A' Feedwater Reg valve in MANUAL b. MAINTAIN Steam Generator level(s) between 52 and 62%. Checks SG level and operates manual controller to maintain level between 52%-62% ***Critical Task: Maintain control of SG 'A' level above 25% to prevent an automatic Reactor trip after the controlling level transmitter PT-475 fails low.*** c. IF Steam Generator level(s) cannot be controlled, THEN TRIP the Reactor AND GO TO EOP-E-0. **(Should be controlled)**	(NO)
Immediate Action	BOP	2. CHECK ANY Main Feedwater Pump TRIPPED	(NO)
	SRO	2. RNO: GO TO STEP 6	

Op Test No.:	NRC	Scenario #	4	Event #	5	Page	38	of	71
Event Description:	**Feed pressure transmitter failure low on ‘A’ SG PT-475 (AOP-010)**								

<table>
<tr><th>Time</th><th>Position</th><th colspan="2">Applicant’s Actions or Behavior</th></tr>
<tr><td></td><td></td><td colspan="2">ENTERS and directs actions of AOP-010,
Conducts a Crew Update
Makes PA announcement for AOP entry</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>SRO</td><td colspan="2">
Directs BOP to maintain controlling band of 52% to 62% per OMM-001 attachment 11.
<table>
<tr><th rowspan="2">Controller</th><th rowspan="2">Control Band</th><th colspan="2">Administrative Limit</th></tr>
<tr><th>Low</th><th>High</th></tr>
<tr><td>Steam Generator Level</td><td>52% to 62%</td><td>30%</td><td>73%</td></tr>
</table>
</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>BOP</td><td colspan="2">6. MAINTAIN ALL of the following:
At least ONE Main Feedwater Pump RUNNING
Main Feedwater flow to ALL Steam Generators
ALL Steam Generator levels greater than 30%
Maintains all of the above</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>BOP</td><td>7. CHECK Feedwater Regulator Valves operating properly in AUTO: (NO not ‘A’)
Response to SG levels
Valve position indication
Response to feed flow/steam flow mismatch
7. RNO: PERFORM the following:
a. IF automatic SG water level control can be restored by selecting out a failed instrument, THEN USE OP-134.01, Feedwater System, Section 8.10 to swap Steam Flow/Feed Flow Control and Recorder Channels and restore level control to automatic.</td><td>(NO)
(YES)</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="2">OP-134.01</td><td colspan="2">Feedwater Systems, Section 8.10</td></tr>
<tr><td></td><td>BOP</td><td>1. IF swapping Steam Generator A channels. THEN PERFORM the following:
a. PLACE MAIN FW A REGULATOR FK-478, 1FW-133 in MAN.
b. IF selecting Channel III, THEN PERFORM the following:
c. IF selecting Channel IV, THEN PERFORM the following:</td><td>(N/A)</td></tr>
</table>

Op Test No.:	NRC	Scenario #	4	Event #	5	Page	39	of	71
Event Description:		**Feed pressure transmitter failure low on ‘A’ SG PT-475 (AOP-010)**							

Time	Position	Applicant’s Actions or Behavior	
		(1) PLACE the following selector switches to the position specified: ○ STM GEN A FW FLOW CONTROL AND RECORDER Selector Switch to FT-476. ○ STM GEN A STM FLOW CONTROL AND RECORDER Selector Switch to FT-475.	
	BOP	d. PERFORM the following to restore 1FW-133 to AUTO: (1) ENSURE proper indication for steam flow and feed flow on the S/G 1A LEVEL, STEAM FLOW & FEEDWATER FLOW recorder, UR-478. (2) ENSURE associated SG level (LT-476) is trending towards 57%. (3) PLACE MAIN FW A REGULATOR FK-478, 1FW-133 to AUTO.	
AOP-010		Feedwater Malfunctions, Section 3.0	
	BOP	7.b. REFER to Tech Spec 3.3.1 AND IMPLEMENT OWP-RP or OWP-ESF where appropriate. c. IF needed, THEN CONTROL feed flow to SGs using Main Feed Reg Valve Bypass FCVs	(NO)
Procedure Note:		Inability to monitor one or more Safety System Parameters concurrent with a turbine runback of greater than 25%, requires a change of event classification per the HNP Emergency Plan. [C.2, C.3].	
	BOP	8. CHECK turbine runs back less than 25% turbine load	(YES)
Procedure Note:		A feedwater train consists of a Condensate Pump, Condensate Booster Pump and Main Feedwater Pump.	
	SRO	9. GO TO the applicable section: EVENT: All Condensate/Feedwater flow malfunctions (other than pump trips) Section 3.1 Page 10	

Op Test No.:	NRC	Scenario #	4	Event #	5	Page	40	of	71
Event Description:	**Feed pressure transmitter failure low on 'A' SG PT-475 (AOP-010)**								

Time	Position	Applicant's Actions or Behavior	
	BOP	1. CHECK the following Recirc and Dump Valves operating properly in MODU: • Main Feedwater Pumps • Condensate Booster Pumps • Condensate Pumps • 1CE-293, Condensate Recirc • 1CE-142, Condensate Dump To CST Isolation Valve (SLB-4/7-1)	(YES) (YES) (YES) (YES) (YES)
	BOP	2. CHECK the Condensate and Feedwater System INTACT.	
Procedure Note:		Pumps should be stopped in the order of higher to lower pressure. (To stop a Condensate Pump, stop a Main Feedwater Pump followed by a Condensate Booster Pump and then the Condensate Pump.)	
	BOP	3. CHECK pumps for NORMAL OPERATION	(YES)
	SRO	4. NOTIFY Load Dispatcher of ANY load limitations. (No load limitations so Dispatcher will not be called)	
	SRO	5. CHECK Reactor thermal power changed by less than 15% in any one hour period.	(YES)
	SRO	6. EXIT this procedure.	
OWP-ESF-02	SRO	Refer to OWP-ESF-02 to remove channel from service.	
	SRO	Contacts WCC for support, requests WR and LCOTR. Contacts I&C to have channel removed from service.	
Simulator Communicator:		**Respond to crew requests.**	

Op Test No.: NRC Scenario # 4 Event # 5 Page 41 of 71

Event Description: **Feed pressure transmitter failure low on 'A' SG PT-475 (AOP-010)**

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**Any Tech Spec evaluation may be completed with a follow-up question after the scenario.**
	SRO	Enters Instrumentation TS 3.3.1 Functional Unit 14 ACTION 6 - With the number of OPERABLE channels one less than the Total Number of Channels. STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied: a. The inoperable channel is placed in the tripped condition within 6 hours. b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.1.1. 3.3.2 Functional Unit 1.e ACTION 19 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may proceed provided the following conditions are satisfied : a. The inoperable channel is placed in the tripped condition within 6 hours, and b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels per Specification 4.3.2.1.
Evaluator Note:		**Channel does NOT have to be removed from service using the OWP to continue the scenario. Once SG level is under control and the TS has been identified, cue Simulator Operator to insert Trigger 6** **Event 6: PT-444 Fails HIGH (AOP-019).**

Op Test No.:	NRC	Scenario #	4	Event #	6	Page	42 of 71
Event Description:		**PT-444 Fails HIGH (AOP-019)**					

Time	Position	Applicant's Actions or Behavior	
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 6 "PT-444 Fails HIGH (AOP-019)"**	
Indications Available:		• **ALB-009-3-2 PRESSURIZER HIGH PRESS DEVIATION CONTROL** • **ALB-009-5-1 PRESSURIZER HIGH-LOW PRESS** • **ALB-009-8-1 PRESSURIZER RELIEF TANK HIGH-LOW LEVEL PRESS OR TEMP** • **ALB-009-8-2 PRESSURIZER RELIEF DISCHARGE HIGH TEMP**	
	CREW	Identifies entry conditions to AOP-019, Malfunction Of RCS Pressure Control are met	
AOP-019		Malfunction Of RCS Pressure Control	
Immediate Action	RO	1. CHECK that a bubble exists in the PRZ.	(YES)
Evaluator Note:		**Depending on timing of the RO response, 1RC-114 may be in the proper position (shut) and no action will be required. Reducing the Master Pressure controller output in subsequent steps will ensure the valve remains shut.**	
Immediate Action	RO	2. VERIFY ALL PRZ PORVs AND associated block valves properly positioned for current PRZ pressure and plant conditions. **(SHUTS 1RC-114)** **2. RNO** IF ANY PRZ PORV will NOT shut when required, THEN SHUT its associated block valve	(NO) **(N/A)**
	RO	3. CHECK BOTH PRZ Spray Valves properly positioned for current PRZ pressure and plant conditions.	(NO)

Op Test No.: NRC Scenario # 4 Event # 6 Page 43 of 71

Event Description: **PT-444 Fails HIGH (AOP-019)**

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td>Critical Task # 2
Immediate Action</td><td></td><td>3. RNO CONTROL PRZ spray valves using ONE of the following methods (listed in order of preference):
a. AFFECTED Spray Valve controller in MANUAL (if only one is obviously malfunctioning)
OR
b. PK-444A, Master Pressure Controller
(Manually Controls PK-444A to restore pressure)
OR
c. Both individual spray valve controllers
<i>Critical Task: Maintain control of PRZ Pressure above 1960 psig to prevent an automatic Reactor trip after the pressure transmitter PT-444 fails high.</i></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>SRO</td><td>ENTERS and directs actions of AOP-019,
Conducts a Crew Update
Makes PA announcement for AOP entry</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>SRO</td><td>• Directs RO to maintain PRZ Pressure controlling band of 2210 to 2260 PSIG per OMM-001 attachment 11.
<table><tr><th rowspan="2">Controller</th><th rowspan="2">Control Band</th><th colspan="2">Administrative Limit</th></tr><tr><th>Low</th><th>High</th></tr><tr><td>Pressurizer Pressure</td><td>2210 – 2260 PSIG</td><td>2050 PSIG</td><td>2350 PSIG</td></tr></table></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>SRO</td><td>4. GO TO Section 3.1, Pressure Control Malfunctions While Operating With a Pressurizer Bubble.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td colspan="2">Procedure Note:</td><td>Loss of RCS pressure control may require initiation of the SHNPP Emergency Plan.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>SRO</td><td>1. REFER TO PEP-110, Emergency Classification And Protective Action Recommendations, AND ENTER the EAL Matrix.</td></tr>
</table>

Op Test No.: NRC Scenario # 4 Event # 6 Page 44 of 71

Event Description: **PT-444 Fails HIGH (AOP-019)**

Time	Position	Applicant's Actions or Behavior	
	RO	2. MONITOR PRZ pressure by observing other reliable indication.	
	SRO	3. CHECK plant in MODE 1 OR 2.	(YES)
Evaluator Note:		**ERFIS Quick Plot "ITREND" can be used to monitor this parameter.**	
	RO	4. CHECK PRZ pressure CONTROLLED.	(YES)
		5. CHECK PRZ pressure 2335 PSIG OR LESS.	(YES)
Procedure Note:		• If PT-445 is failed low, normal plant operation is not affected. However, PORVs 1RC-118 (PCV-445A SA) and 1RC-116 (PCV-445B) will NOT open on high PRZ pressure when in AUTO. • Auto actuation is NOT required for PORV operability.	
	RO	6. CHECK ALL of the following PRZ PORV block valves OPEN: • 1RC-117 (for PCV-445A SA) • 1RC-115 (for PCV-445B) • 1RC-113 (for PCV-444B SB)	(NO) (YES) (YES)
Procedure Note:		• Attachment 2 lists the controller outputs corresponding to heater, spray, and PRZ PORV operation that are applicable during normal operation.	
	RO	7. CHECK that a malfunction of one or more of the following has occurred: • PT-444 • PK-444A • PRZ heater(s) • PRZ spray valve(s) or controller(s)	(YES) (NO) (NO) (NO)
	RO	8. CHECK PK-444A controlling properly in AUTO.	(NO)

Op Test No.: NRC	Scenario # 4	Event # 6	Page 45 of 71
Event Description:	**PT-444 Fails HIGH (AOP-019)**		
Time	Position	Applicant's Actions or Behavior	

	RO	8. RNO: PERFORM the following: a. VERIFY PK-444A in MANUAL b. ADJUST PK-444A output as necessary, to attempt to restore and maintain PRZ pressure.	(YES)
	RO	9. CONTROL PRZ pressure as follows:	
Procedure Note:		If individual spray valve controllers are already in MAN, do NOT return to AUTO.	
	RO	a. CHECK BOTH PRZ spray valve controllers in AUTO AND BOTH spray valves operating as desired.	(YES)
Procedure Note:		Cycling a heater control switch to OFF and back to AUTO will restore normal heater function if the anti-pumping circuit has disabled the heater.	
	RO	b. CHECK ALL PRZ heaters operating as desired.	(YES)
	RO	10. CHECK at least one of the following conditions present: • PRZ pressure is UNCONTROLLED • Status of a normal spray valve or a PRZ heater bank is UNCONTROLLED	(NO)
	SRO	10. RNO: GO TO Step 22.	
	SRO	22. REFER TO Tech Spec 3.2.5 AND IMPLEMENT action where appropriate. (DNB Parameters, Limit is 2185 psig – restore within 2 hours)	
	SRO	23. PERFORM the following: a. REFER TO Attachment 3, Pressure Control Malfunction Symptoms—Bubble in Pressurizer. b. DIRECT Maintenance to investigate and repair the PRZ Pressure Control System component malfunction	

Op Test No.: NRC	Scenario # 4	Event # 6	Page	46	of	71
Event Description:	**PT-444 Fails HIGH (AOP-019)**					
Time	Position	Applicant's Actions or Behavior				

Simulator Communicator:		**Respond to crew requests.**
	SRO	Contacts WCC for support, requests WR and LCOTR. Contacts I&C to have channel removed from service.
Examiner Note:		**After the TS have been identified and the plant has stabilized, cue Simulator Operator to insert Trigger 7** **Event 7: Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0).**

Op Test No.:	NRC	Scenario #	4	Event #	7	Page	47	of	71

Event Description: **Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0)**

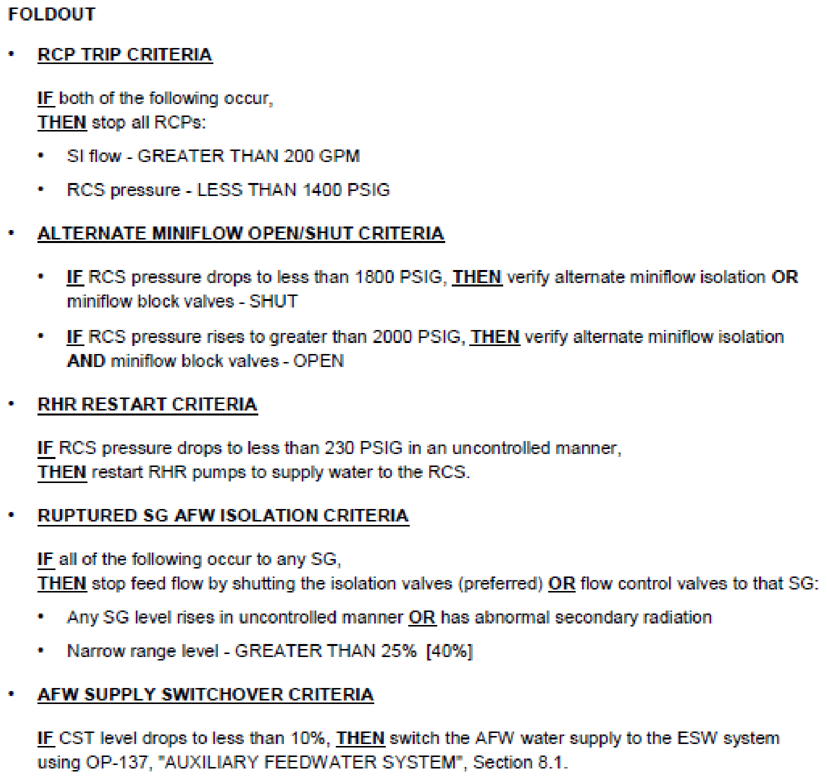
Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**A Loss of Offsite power will occur coincident with a Feedline Break inside Containment from the 'A' SG. The loss of power to the RCPs will result in an automatic trip of the Reactor and the Feedline Break will result in an auto actuation of SI requiring entry into EOP-E-0. The crew will initiate a MSL Isolation. The crew should diagnose that a LOCA is NOT in progress. The TDAFW pump will trip immediately after starting and four (4) minutes after the reactor trips the 'A' MDAFW Pump will trip requiring the crew to transition to EOP-FR-H.1, Response To Loss Of Secondary Heat Sink.**
Simulator Operator:		**On cue from the Lead Evaluator actuate Trigger 7** **"Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0) "**
Indications Available:		• **Multiple alarms due to a Reactor trip** • **Containment press/temp and humidity rising** • **Containment Sump level rising** • **Momentary loss of MCR lighting**
	CREW	Identifies re-entry conditions to EOP-E-0, Reactor Trip Or Safety Injection are met
EOP-E-0		Reactor Trip Or Safety Injection
	SRO	Enters EOP-E-0 Holds crew update
	RO/BOP	Performs E-0 Immediate Actions.

Op Test No.: NRC	Scenario # 4	Event # 7	Page 48 of 71
Event Description:	**Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0)**		

Time	Position	Applicant's Actions or Behavior	
Immediate Actions	RO	1. Ensure Reactor Trip: REACTOR TRIP CONFIRMATION Reactor Trip <u>AND</u> Bypass BKRs – OPEN Rod Bottom Lights (Zero Steps) – LIT Neutron Flux – DROPPING	(YES) (YES) (YES)
Immediate Actions	BOP	2. Check Turbine Trip – ALL THROTTLE VALVES SHUT TURB STOP VLV 1 — TSLB-2-11-1 TURB STOP VLV 2 — TSLB-2-11-2 TURB STOP VLV 3 — TSLB-2-11-3 TURB STOP VLV 4 — TSLB-2-11-4	(YES) (YES) (YES) (YES)
Immediate Actions	BOP	3. Perform The Following: a. AC Emergency Buses – AT LEAST ONE ENERGIZED b. AC Emergency Buses – BOTH ENERGIZED	(YES) (YES)
Immediate Actions	RO	4. Safety Injection – ACTUCATED (BOTH TRAINS) BPLP 4-1,"SI ACTUATED" - LIT (CONTINUOUSLY)	(YES)
Evaluator Note:		**The Main Feedwater Pumps will lose power when Off-site power is lost. The TD AFW Pump will trip once the turbine comes up to speed. The crew should identify the trip by the following annunciator:** **ALB-017-7-3, Aux Feedwater Pump Turbine Trip**	

Op Test No.:	NRC	Scenario #	4	Event #	7	Page	49	of	71

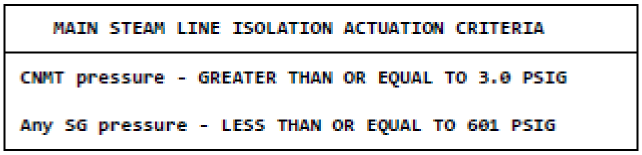
Event Description: **Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0)**

Time	Position	Applicant's Actions or Behavior
Simulator Communicator:		**IF contacted to investigate the cause of the TDAFW pump trip report the mechanical overspeed leakage is damaged and will not reset. No other sign of damage at the pump.** **WHEN / IF WCC is contacted report that Mechanical Maintenance is investigating the damage and that repairs will be made as quickly as possible.** **IF asked about the "B" MD AFW pump status report that it is still waiting on parts to complete emergent repairs.**
Procedure Note:		Steps 1 through 4 are immediate action steps Foldout applies. (Immediate actions should be completed prior implementing Foldout Page items.)
	SRO	5.a. Reviews Foldout page
Evaluator Note:		 **FOLDOUT** • **RCP TRIP CRITERIA** **IF** both of the following occur, **THEN** stop all RCPs: • SI flow - GREATER THAN 200 GPM • RCS pressure - LESS THAN 1400 PSIG • **ALTERNATE MINIFLOW OPEN/SHUT CRITERIA** • **IF** RCS pressure drops to less than 1800 PSIG, **THEN** verify alternate miniflow isolation **OR** miniflow block valves - SHUT • **IF** RCS pressure rises to greater than 2000 PSIG, **THEN** verify alternate miniflow isolation **AND** miniflow block valves - OPEN • **RHR RESTART CRITERIA** **IF** RCS pressure drops to less than 230 PSIG in an uncontrolled manner, **THEN** restart RHR pumps to supply water to the RCS. • **RUPTURED SG AFW ISOLATION CRITERIA** **IF** all of the following occur to any SG, **THEN** stop feed flow by shutting the isolation valves (preferred) **OR** flow control valves to that SG: • Any SG level rises in uncontrolled manner **OR** has abnormal secondary radiation • Narrow range level - GREATER THAN 25% [40%] • **AFW SUPPLY SWITCHOVER CRITERIA** **IF** CST level drops to less than 10%, **THEN** switch the AFW water supply to the ESW system using OP-137, "AUXILIARY FEEDWATER SYSTEM", Section 8.1.

Op Test No.:	NRC	Scenario # 4	Event # 7	Page	50	of	71
Event Description:	**Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0)**						

Time	Position	Applicant's Actions or Behavior	
	SRO	Assigns Foldout items: Alternate Miniflow Open/Shut Criteria, RHR Restart Criteria, AFW Supply Switchover Criteria 5.b. Directs Shift Manager to Evaluate EAL Matrix (Refer to PEP-110)	
	RO	6. Ensure CSIPs – ALL RUNNING	(YES)
	RO	7. Ensure RHR pumps – ALL RUNNING	(YES)
	RO	8. Safety Injection flow – GREATER THAN 200 GPM	(YES)
	RO	9. RCS pressure – LESS THAN 230 PSIG	(NO)
	SRO	9. RNO: GO TO Step 12.	
	BOP	12. MAIN Steam Line Isolation – ACTUATED.	(NO)
	SRO	12. RNO: Check MAIN Steam isolation – REQUIRED	

Op Test No.: <u>NRC</u>	Scenario # 4	Event # 8	Page <u>51</u> of <u>71</u>
Event Description:	**Main Steam line Isolation fails**		

Time	Position	Applicant's Actions or Behavior	
Event 8	BOP	MAIN STEAM LINE ISOLATION ACTUATION CRITERIA CNMT pressure - GREATER THAN OR EQUAL TO 3.0 PSIG Any SG pressure - LESS THAN OR EQUAL TO 601 PSIG Perform the following: • IF Main Steam Isolation is required THEN perform the following: (1) Manually actuate Main Steam Line Isolation. (2) Go to Step 13. Identifies that the MSLI did not automatically actuate and attempts to manually from the MCB. **(Manually actuation of MSLI from MCB switch fails)**	(YES)
Event 8	BOP	13. Ensure All MSIVs AND Bypass Valves – SHUT Identifies that the MSIV's are not shut and attempts to manually shut by placing MCB in Shut. **(MSIVs fail to close from the MCB)**	(NO)
	BOP	14. Any SG pressure - 100 PSIG LOWER THAN PRESSURE IN TWO OTHER SGs	(NO)
	SRO	14. RNO: GO TO Step 16.	
	RO	16. CHECK CNMT Pressure – HAS REMAINED LESS THAN 10 PSIG	(NO)
	SRO	16. RNO: Perform the following:	
	BOP	a. Ensure CNMT spray – ACTUATED b. Stop all RCPs	(YES) (YES)

Op Test No.: NRC	Scenario # 4	Event # 7	Page 52 of 71
Event Description:	**Loss of Offsite Power with a Feed line break inside CNMT (EOP-E-0) Continued**		
Time	Position	Applicant's Actions or Behavior	

Evaluator Note:		**Depending on the pace of the crew the four minute timer for the trip of the 'A' MDAFW Pump may have elapsed. Evaluation of AFW flow is a continuous action step and once the time has elapsed and the pump trips the crew should return to this step (EOP-E-0, Step 17).** **The following steps assume the 'A' MDAFW Pump has tripped and will transition the crew to EOP-FR-H.1.** **The crew should identify the trip by the following annunciator:** **ALB-017-5-4, Aux Feedwater Pump A Trip or Close Ckt Trouble**	
Simulator Communicator:		**IF contacted to investigate the cause of the 'A' MDAFW pump trip report the breaker is tripped on overcurrent. No signs of damage at the pumps.** **WHEN / IF WCC is contacted report that Electrical Maintenance is investigating the breaker and that repairs will be made as quickly as possible.**	
	BOP	17. Ensure AFW flow – AT LEAST 200 KPPH ESTABLISHED	(NO)
	SRO	17. RNO: Perform the following:	
	BOP	a. IF any SG level greater than 25% [40%], THEN go to Step 18. b. IF no SG level greater than 25% [40%], THEN perform the following: (1) Manually start AFW pumps (2) Ensure AFW valves - PROPERLY ALIGNED **(Manually alignment of the AFW system is not successful)**	(NO) (NO)
	SRO	c. IF at least 200 KPPH can NOT be established THEN perform the following:	(NO)

Op Test No.: NRC	Scenario # 4	Event # 8	Page 53 of 71
Event Description:	**'B' CCW Pump fails to auto start on SI**		

Time	Position	Applicant's Actions or Behavior
Evaluator Note:		**The RO will perform all board actions until the BOP completes Attachment 3. The BOP is permitted to properly align plant equipment in accordance with Attachment 3 without SRO approval. The Scenario Guide still identifies tasks by board position because the time frame for completion of Attachment 3 is not predictable.** **To follow BOP actions E-0 Attachment 3 is located in the back of this guide.**
	BOP	(1) Ensure alignment of components from actuation of ESFAS Signals Attachment 3, "Safeguards Actuation Verification", while continuing with implementation of EOPs.
Event 8	BOP	Attachment 3 Step 3. Ensure Two CCW Pumps – RUNNING Identifies that the 'B' CCW Pump is NOT running and manually starts pump.
	BOP	Directs TB AO to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22
Simulator Communicator		**Acknowledge the request to place 1A and 1B Air Compressor in the local control mode per E-0 Attachment 3 step 22**
Simulator Operator		**When directed to place the 1A and 1B Air Compressor in the local control mode: Run APP\air\acs_to_local**
Simulator Communicator		**When the APP for 1A and 1B Air Compressor has completed running call the MCR and inform them that the air compressors are running in local control.**
	BOP	Directs AO to Unlock AND Turn ON The Breakers For The CSIP Suction AND Discharge Cross-Connect Valves per E-0 Attachment 3 step 23 (or from step 11 - refer to Attachment 2)

Op Test No.: NRC	Scenario # 4	Event # 8	Page	54 of 71	
Event Description:	**‘B’ CCW Pump fails to auto start on SI**				
Time	Position	Applicant’s Actions or Behavior			

Simulator Communicator		**Acknowledge the request to Unlock AND Turn ON The Breakers For The CSIP Suction AND Discharge Cross-Connect Valves**
Simulator Operator		**When directed to Unlock AND Turn ON The Breakers for the CSIP Suction AND Discharge Cross-Connect Valves: Run APP\cvc\E-0 Att 2 CSIP suct & disch valve power.txt.**
Simulator Communicator		**When the APP for CSIP Suction AND Discharge Cross-Connect Valves has completed running call the MCR and inform them that CSIP Suction AND Discharge Cross-Connect Valves are energized.**

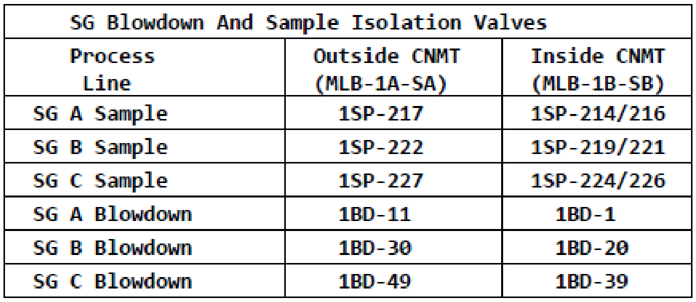
Op Test No.: NRC	Scenario # 4	Event # 9	Page	55 of 71	
Event Description:	**'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)**				

Time	Position	Applicant's Actions or Behavior
	SRO	(2) Go to FR-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK", Step 1.
EOP-FR-H.1		EOP-FR-H.1, Response To Loss Of Secondary Heat Sink
Procedure Caution:		• This procedure should NOT be performed if total feed flow capability of 200 KPPH is available and total feed flow has been reduced due to operator action as directed by the EOPs. (The following EOPs direct feed flow to be reduced below 200 KPPH: ECA-2.1, "UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS" FR-S.1, "RESPONSE TO NUCLEAR POWER GENERATION/ATWS" FR-P.1, "RESPONSE TO IMMINENT PRESSURIZED THERMAL SHOCK" FR-P.2, "RESPONSE TO ANTICIPATED PRESSURIZED THERMAL SHOCK" FR-Z.1, "RESPONSE TO HIGH CONTAINMENT PRESSURE") • Feed flow should NOT be established to any faulted SG while a non-faulted SG is available.
	SRO	1. Perform The Following:
		(3) Initiate Monitoring Of Critical Safety Function Status Trees (4) Directs Shift Manager to Evaluate EAL Matrix
	SRO	2. Check Secondary Heat Sink Requirements:

Op Test No.: NRC Scenario # 4 Event # 9 Page 56 of 71

Event Description: **'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)**

Time	Position	Applicant's Actions or Behavior	
	RO	a. RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE b. RCS temperature – GREATER THAN 350°F [330°F] c. Stop any running RHR pumps.	(YES) (YES)
	SRO	3. Check If Bleed And Feed Is Required:	
		a. SG wide range levels - ANY TWO LESS THAN 15% [30%]	(NO)
	SRO	3.a. RNO: Observe NOTE prior to Step 4 and go to Step 4.	
Procedure Note:		Foldout applies.	
	SRO	Assigns Foldout items: RCS Bleed and Feed Initiation Criteria, Cold Leg Recirculation Switchover Criteria, AFW Supply Switchover Criteria and RHR Restart Criteria 4. Check SG Blowdown And SG Sample Isolation Valves:	
	BOP	a. Check SG blowdown AND SG sample isolation valves in table – SHUT	(YES)



SG Blowdown And Sample Isolation Valves		
Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

Time	Position	Applicant's Actions or Behavior
	SRO	5. ESTABLISH AFW Flow to at least ONE SG:

Op Test No.: NRC	Scenario # 4	Event # 9	Page 57 of 71		
Event Description:	**'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)**				

Time	Position	Applicant's Actions or Behavior	
	BOP	a. OBSERVE MCB indications to determine cause of AFW failure: ○ CST level ○ MDAFW pump power supplies ○ TDAFW pump steam supply valves ○ TDAFW pump speed controller ○ TDAFW pump control power ○ AFW valve alignment	(NO) (YES) (YES) (NO) (NO) (NO)
		b. TRY to restore AFW flow at the MCB. (Refer to EOP-FR-H.1 Attachment 1 for guidance of rate of feed flow.) (Refer to OP-137, Auxiliary Feedwater System, for guidance regarding AFW pump operations, precautions and limitations and valve operation.)	
	CREW	Contacts AO's to investigate failures	
Simulator Communicator:		**During the remainder of the scenario any communications for a request to restore MFW or AFW** **Maintenance is looking at the situation and will make repairs as soon as they can.** **When ANY pump is available the WCC will contact the MCR.**	
	SRO	6. Check If AFW Flow Established:	
		a. Total feed flow to SGs – GREATER THAN 200 KPPH	(NO)
	SRO	6.a. RNO: Go to Step 6.c.	
	SRO	6.c. Check AFW flow - ESTABLISHED TO ANY SG	(NO)
	SRO	6.c. RNO: Perform the following:	

Op Test No.: NRC	Scenario # 4	Event # 9	Page 58 of 71
Event Description:	**'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)**		

Time	Position	Applicant's Actions or Behavior	
		1) Continue attempts to restore AFW flow at the MCB. 2) TRY to restore AFW flow locally. (Refer to OP-137, Auxiliary Feedwater System, for guidance regarding AFW pump operations, precautions and limitations and valve operation.) 3) Observe NOTE prior to Step 7 and continue with Step 7.	
Procedure Note:		After stopping all RCPs and placing steam dump in the steam pressure mode, RCS pressure and temperature will rise as natural circulation is established. A large loop ΔT prior to PRZ PORV opening confirms natural circulation.	
	SRO	7. Stop Heat Input From RCP Operations:	
		a. Stop All RCPs. b. Check steam dump to condenser - AVAILABLE:	(YES) (NO)
	SRO	7.b RNO: Use intact SG(s) PORV for steam dumping in subsequent steps.	
		• Go to Step 8.	
	RO	8. CHECK SI - ACTUATED	(YES)
	SRO	9. Perform The Following To Verify Proper Sequencer And Component Operations While Continuing With This Procedure:	
	RO	a. Sequencer Load Block 9 (Manual Loading Permissive) - ACTUATED (BOTH TRAINS) b. Energize AC buses 1A1 AND 1B1	(YES)
	SRO	c. Ensure Automatic Actions From SI Actuation While Continuing With This Procedure. • (Refer to E-0, "REACTOR TRIP OR SAFETY INJECTION", Attachment 3.)	

Op Test No.:	NRC	Scenario #	4	Event #	9	Page	59	of 71
Event Description:	**'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)**							

Time	Position	Applicant's Actions or Behavior	
Procedure Caution:		SI reset can NOT occur until sixty seconds after SI signal actuation.	
	RO	d. Reset SI	
	SRO	e. Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. • (Refer to E-0, "REACTOR TRIP OR SAFETY INJECTION", Attachment 6.)	
	RO	f. Reset Phase A g. Open Instrument Air AND Nitrogen Valves To CNMT: 1IA-819 (ISOL VALVE CONT. BLDG 236' PENETRATION (M-80)) 1SI-287 (ACCUMULATOR & PRZ PORV N2 SUPPLY ISO VLV)	
	SRO	10. Establish Main FW Flow To At Least One SG:	
		a. Check condensate system – IN SERVICE	(NO)
	SRO	10.a. RNO: Place condensate system in service. (Refer to OP-134, "CONDENSATE SYSTEM", Section 5.0.)	
		• IF condensate system can NOT be placed in service, THEN go to Step 16.	(NO)
Simulator Communicator:		**If contacted by the by the crew for a time for the return of Offsite Power acknowledge the request and report that Offsite Power to the Harris should be restored within 4 hour.**	
Procedure Note:		The EDMP should NOT be used unless other sources are unavailable.	

Op Test No.: NRC	Scenario # 4	Event # 9	Page	60 of 71
Event Description:	**'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)**			

Time	Position	Applicant's Actions or Behavior	
Evaluator Note:		**Due to the MSIVs failing to shut as part of the scenario design the crew may elect to dispatch an operator to perform the local actions of EOP-E-2 to isolate instrument air to the RAB 261 elevation and vent the system to fail the MSIVs shut.**	
Simulator Communicator:		**Acknowledge request for EOP-E-2 local action but do not perform any actions.**	
	SRO	16. Prepare To Depressurize Two SGs:	
		a. Identify 2 SGs to be fed.	(YES)
	BOP	b. Shut the following valves for the SG that is NOT to be fed. ○ MSIVs ○ MSIV bypass valves ○ SG main steam drain isolations before MSIV:	(NO) (YES) (YES)
	SRO	16.b RNO: Shut the following valves for the SGs to be fed.	
		○ MSIVs ○ MSIV bypass valves ○ SG main steam drain isolations before MSIV:	(NO) (YES) (YES)
	SRO	c. Align EDMP to SGs as follows:	
	BOP	1) Direct local installation of connections/hoses using ISG-HS, "HEAT SINK", Attachment 5 Steps 3 through 7.	
		Contacts AO's to perform ISG-HS task	
Simulator Communicator:		**Acknowledge request**	
	SRO	2) Check local installation - COMPLETE	(NO)

Op Test No.: NRC	Scenario # 4	Event # 9	Page	61 of 71	
Event Description:	**'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)**				

Time	Position	Applicant's Actions or Behavior	
		16.c.2) RNO: WHEN local installation of connection/hoses is complete, THEN go to Step 16.c.3. b. Continue with Step 19.	
	SRO	19. Check For Loss Of Secondary Heat Sink:	
		a. SG wide range levels - ANY TWO LESS THAN 15% [30%]	(NO)
		19.a. RNO: Return to Step 1.	
Evaluator Note:		**The SRO will loop back to the beginning of the procedure and evaluate the status of infield actions and foldout criteria until the RCS Bleed and Feed Initiation Criteria is met at which time the crew will continue EOP-FR-H.1 returning to step 20.**	
Procedure Caution:		Perform Steps 20 through 30 without delay to establish RCS heat removal by RCS bleed and feed.	
	RO	20. Actuate Safety Injection.	
	SRO	21. Ensure RCS Feed Path:	
Critical Task #3	RO	a. SI flow - GREATER THAN 200 GPM b. Check CSIPs - BOTH RUNNING c. Observe NOTE prior to Step 23 and go to Step 23. *Critical to initiate RCS Bleed and Feed for Successful High-Head SI Pump Injection before RCS temperature rises above 730°F and RVLIS Full Range Level lowers below 39%*	(YES) (YES)
Procedure Note:		SI reset can NOT occur until sixty seconds after SI signal actuation.	
	RO	23. Reset SI	

Op Test No.: NRC Scenario # 4 Event # 9 Page 62 of 71

Event Description: **'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1)**

Time	Position	Applicant's Actions or Behavior	
	SRO	24. Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (Refer to E-0, "REACTOR TRIP OR SAFETY INJECTION", Attachment 6.)	
	SRO	25. Reset Phase A AND Phase B Isolation:	
	RO	a. Reset Phase A (if actuated) b. Reset Phase B (if actuated)	(YES) (YES)
	SRO	26. Check Sequencers - RESET (BOTH TRAINS)	(NO)
		26. RNO: For any Sequencer that is NOT reset, perform the following:	
Procedure Note:		Manual actuation of Load Block 9 cannot occur for 150 SECONDS after sequencer operation.	
	BOP	a. Check Sequencer Load Block 9 (Manual Loading Permissive) - ACTUATED	(YES)
		27. Energize AC buses 1A1 AND 1B1	(YES)
	RO	28. Open Instrument Air AND Nitrogen Valves To CNMT: 1IA-819 (ISOL VALVE CONT. BLDG 236' PENETRATION (M-80)) 1SI-287 (ACCUMULATOR & PRZ PORV N2 SUPPLY ISO VLV)	(YES)

<table>
<tr><td colspan="3">Op Test No.: NRC Scenario # 4 Event # 10 Page 63 of 71</td></tr>
<tr><td colspan="3">Event Description: Pressurizer PORV 445B fails to open</td></tr>
<tr><td>Time</td><td>Position</td><td>Applicant’s Actions or Behavior</td></tr>
</table>

<table>
<tr><td></td><td>SRO</td><td colspan="2">29. Establish RCS Bleed Path:</td></tr>
<tr><td></td><td>RO</td><td>a. Establish ALL RCS bleed paths listed in table by performing the following:
1) Ensure PRZ PORV Block
2) Open all PRZ PORVs (safety and non-safety regardless of operability status).
<table>
<tr><td colspan="3">RCS Bleed Paths Based On PRZ PORV AND Associated Block Valve</td></tr>
<tr><td>Bleed Path</td><td>Block Valve</td><td>PRZ PORV</td></tr>
<tr><td>"A" Train PRZ PORV</td><td>1RC-117</td><td>1RC-118 (PCV-445A SA)</td></tr>
<tr><td>"B" Train PRZ PORV</td><td>1RC-113</td><td>1RC-114 (PCV-444B SB)</td></tr>
<tr><td>Non Safety PRZ PORV</td><td>1RC-115</td><td>1RC-116 (PCV-445B)</td></tr>
</table>
(PRZ PORV 445B (1RC-116) fails to open)</td><td>(YES)
(NO)</td></tr>
<tr><td></td><td></td><td colspan="2"></td></tr>
<tr><td></td><td>SRO</td><td colspan="2">30. Ensure Adequate RCS Bleed Path:</td></tr>
<tr><td></td><td>RO</td><td>c. PRZ PORVs - ALL OPEN
(PRZ PORV 445B (1RC-116) fails to open)
d. PRZ PORV block valves – ALL OPEN</td><td>(NO)
(YES)</td></tr>
<tr><td>Critical Task #3</td><td></td><td>30. RNO: Open all RCS vent valves to commence venting:
• 1RC-900
• 1RC-901
• 1RC-902
• 1RC-903
• 1RC-904
• 1RC-905
<i>Critical to initiate RCS Bleed and Feed for Successful High-Head SI Pump Injection before RCS temperature rises above 730°F and RVLIS Full Range Level lowers below 39%</i></td><td>(YES)
(YES)
(YES)
(YES)
(YES)
(YES)
(YES)</td></tr>
</table>

Op Test No.:	NRC	Scenario #	4	Event #	7	Page	64	of	71
Event Description:	**'A' MDAFW pump trips after the Reactor trips (EOP-FR-H.1) Continued**								

Time	Position	Applicant's Actions or Behavior
	SRO	31. Ensure Automatic Actions From SI Actuation While Continuing With This Procedure. (Refer to E-0, "REACTOR TRIP OR SAFETY INJECTION", Attachment 3.)
	SRO	32. Maintain RCS Heat Removal:
		• Maintain SI flow. • Maintain RCS bleed paths.
Lead Evaluator:		**Terminate the scenario after RCS Heat Removal has been established.** **Announce 'Crew Update' - End of Evaluation - I have the shift.** **Have crew remain in the Simulator without discussing the exam. Examiners will formulate any follow-up questions.**

Simulator Operator:	**When directed by Lead Evaluator go to FREEZE**

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 1 of 7
SAFEGUARDS ACTUATION VERIFICATION

NOTE

- General guidance for verification of safeguards equipment is contained in Attachment 4 of this procedure.
- ERFIS displays of safeguards equipment status are not reliable while any associated safety-related electrical buses are de-energized.

☐ 1. **Ensure** Two CSIPs - RUNNING

☐ 2. **Ensure** Two RHR Pumps - RUNNING

☐ 3. **Ensure** Two CCW Pumps - RUNNING

☐ 4. **Ensure** All ESW **AND** ESW Booster Pumps - RUNNING

☐ 5. **Ensure** SI Valves - PROPERLY ALIGNED

(**Refer** to Attachment 1.)

☐ 6. **Ensure** CNMT Phase A Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 4.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 2 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 7. **Ensure** SG Blowdown **AND** SG Sample Isolation Valves In Table 1 - SHUT

Table 1: SG Blowdown And Sample Isolation Valves

Process Line	Outside CNMT (MLB-1A-SA)	Inside CNMT (MLB-1B-SB)
SG A Sample	1SP-217	1SP-214/216
SG B Sample	1SP-222	1SP-219/221
SG C Sample	1SP-227	1SP-224/226
SG A Blowdown	1BD-11	1BD-1
SG B Blowdown	1BD-30	1BD-20
SG C Blowdown	1BD-49	1BD-39

8. **IF** Main Steam Line Isolation Actuated **OR** Is Required By Any Of The Following, **THEN** **Ensure** MSIVs **AND** MSIV Bypass Valves - SHUT

☐ • Steam line pressure - LESS THAN 601 PSIG

☐ • CNMT pressure - GREATER THAN 3.0 PSIG

9. **IF** CNMT Spray Actuation Signal Actuated **OR** Is Required, **THEN** **Ensure** The Following:

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 9.)

☐ • CNMT spray pumps - RUNNING

☐ • CNMT spray valves - PROPERLY ALIGNED

☐ • Phase B isolation valves - SHUT

☐ • All RCPs - STOPPED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 3 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 10. **Ensure** Both Main FW Pumps - TRIPPED

☐ 11. **Ensure** FW Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 6.)

☐ 12. **Ensure** Both MDAFW pumps - RUNNING

13. **IF** Any Of The Following Conditions Exist, **THEN** **Ensure** The TDAFW Pump - RUNNING

- ☐ Undervoltage on either 6.9 KV emergency bus
- ☐ Level in two SGs - LESS THAN 25%
- ☐ Manual actuation to control SG level

14. **Ensure** AFW Valves - PROPERLY ALIGNED

- ☐ **IF** no AFW Isolation Signal, **THEN** **ensure** isolation **AND** flow control valves - OPEN

NOTE

An AFW Isolation signal signal requires a Main Steam Line Isolation coincident with one SG pressure 100 PSIG below the other two SGs.

- ☐ **IF** AFW Isolation Signal present, **THEN** **ensure** MDAFW **AND** TDAFW isolation **AND** flow control valves to affected SG - SHUT

☐ 15. **Ensure** Both EDGs - RUNNING

☐ 16. **Ensure** CNMT Fan Coolers - ONE FAN PER UNIT RUNNING IN SLOW SPEED

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 4 of 7
SAFEGUARDS ACTUATION VERIFICATION

☐ 17. **Ensure** CNMT Ventilation Isolation Valves - SHUT

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 7.)

☐ 18. **Ensure** Control Room Area Ventilation - MAIN CONTROL ROOM ALIGNED FOR EMERGENCY OPERATION

(**Refer to** OMM-004, "POST TRIP/SAFEGUARDS ACTUATION REVIEW", Attachment 5, Sheets 1 and 2, Sections for MAIN CONTROL BOARD, SLB-5 and SLB-6.)

19. **Ensure** Essential Service Chilled Water System Operation:

☐ • **Ensure** both WC-2 chillers - RUNNING

☐ • **Ensure** both P-4 pumps - RUNNING

☐ (**Refer** to AOP-026, "LOSS OF ESSENTIAL SERVICE CHILLED WATER SYSTEM" for loss of any WC-2 chiller.)

20. **Ensure** CSIP Fan Coolers - RUNNING

☐ AH-9 A SA
☐ AH-9 B SB
☐ AH-10 A SA
☐ AH-10 B SB

> **NOTE**
>
> Security systems are powered by bus 1A1 (normal supply) or bus 1B1 (alternate supply). Backup power will be available for approximately 30 MINUTES after the supplying bus is de-energized. (Refer to OP-115, "CENTRAL ALARM STATION ELECTRICAL SYSTEMS", Section 8.9 and 8.10.)

☐ 21. **Ensure** AC buses 1A1 **AND** 1B1 - ENERGIZED

☐ 22. **Place** Air Compressor 1A **AND** 1B In The LOCAL CONTROL Mode.

(**Refer to** Attachment 7.)

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 5 of 7
SAFEGUARDS ACTUATION VERIFICATION

CAUTION

The maximum calculated dose rate in the vicinity of MCC 1A35-SA and MCC 1B35-SB is between 10 MREM/HR and 150 MREM/HR.

☐ 23. Dispatch An Operator To **Unlock** And **Close** The Breakers For The CSIP Suction **AND** Discharge Cross-Connect Valves:

(**Refer** to Attachment 2.)

MCC 1A35-SA		MCC 1B35-SB	
VALVE	CUBICLE	VALVE	CUBICLE
1CS-170	4A	1CS-171	4D
1CS-169	4B	1CS-168	7D
1CS-218	14D	1CS-220	9D
1CS-219	14E	1CS-217	12C

24. **Check** If C CSIP Should Be Placed In Service:

☐ • **IF** two charging pumps can **NOT** be verified to be running, **AND** C CSIP is available, **THEN place** C CSIP in service in place of the non-running CSIP using OP-107, "CHEMICAL AND VOLUME CONTROL SYSTEM, Section 8.5 or 8.7.

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 6 of 7
SAFEGUARDS ACTUATION VERIFICATION

25. **Start** The Spent Fuel Pump Room Ventilation System:

    a. At AEP-1, **ensure** the following ESCWS isolation valves - OPEN

    1) SLB-11 (Train A)

    ☐ • AH-17 SUP CH 100 (Window 9-1)

    ☐ • AH-17 RTN CH 105 (Window 10-1)

    2) SLB-9 (Train B)

    ☐ • AH-17 SUP CH 171 (Window 9-1)

    ☐ • AH-17 RTN CH 182 (Window 10-1)

    b. At AEP-1, **start** one SFP PUMP ROOM FAN COOLER:

    ☐ • AH-17 1-4A SA

    ☐ • AH-17 1-4B SB

REACTOR TRIP OR SAFETY INJECTION

Attachment 3
Sheet 7 of 7
SAFEGUARDS ACTUATION VERIFICATION

NOTE

- Fuel pool levels and temperatures should be monitored approximately every 1 to 2 HOURS.
- Following the initial check of fuel pool levels and temperature, monitoring responsibilities may be assumed by the plant operations staff (including the TSC or STA).
- Only fuel pools containing fuel are required to be monitored.

26. **Check** Status Of Fuel Pools:

☐ a. **Operate** spent fuel cooling pumps to maintain fuel pool temperatures between 85°F to 105°F.

b. **Monitor** fuel pool levels **AND** temperatures:

- ☐ • **Refer to** AOP-041, "SPENT FUEL POOL EVENT" Attachments 7, 8, 9, 10 and 11 for SFP parameter monitoring methods.
- ☐ • **Refer to** Curves H-X-24, H-X-25 and H-X-26 for SFP time to 200°F.
- ☐ • Levels - GREATER THAN LO ALARM (284 FT, 0 IN)
- ☐ • Temperatures - LESS THAN HI TEMP ALARM (105°F)

NOTE

If control room ventilation was previously aligned to an emergency outside air intake for post-accident operations, then follow-up actions will be required to restore the alignment.

27. **Consult** Plant Operations Staff Regarding Alignment Of The Control Room Ventilation System:

- ☐ • Site Emergency Coordinator - Control Room
- ☐ • Site Emergency Coordinator - Technical Support Center

(Refer to PEP-230, "CONTROL ROOM OPERATIONS".)

- END -

2020 NRC Exam Scenario 4
Turnover

Plant Status

- Commence a shutdown at 4 MW / min with TCS Load Control at 4 GVPC units/ min in accordance with GP-006, Normal Plant Shutdown, due to LCO expiring on ‘B’ MDAFW pump
- Reactor power ~ 100% power
- GP-006 Section 6.2, Step 4, continue the shutdown @ 4 MW/min with TCS Load Control at 4 GVPC units/ min
- Current rod position is CBD @ 218 steps
- An RCS Boron sample taken 30 minutes ago was 954 ppm
- Middle of life conditions
- “A” Train equipment is in service
- Normal Dayshift
- Status Board is updated
- Additional Protected items “A” ESW Pump, “A” CCW Pump, “A” SFP Hx, RWST, for Response to Industry Best Practices

Equipment Out of Service:

- “B” MDAFW Pump, placed under clearance 62 hours ago for pump seal repairs. Not expected to be returned to service in 10 hours. T.S. 3.7.1.2 action **a** (72 hour LCO). "A" MDAFW Pump, MS-70 and 72, "B" ESW Pump, "B" RHR Pump, "B" CCW Pump and 'A' Train PICs: 1, 3, 9, 13, and 17 are protected.

- 1CS-9, Letdown Orifice Isolation Valve is under clearance for solenoid replacement. Tech Spec 3.6.3 LCO Action **b** applies. OWP-CS-09 has been completed.

- “B” DEH Pump is under clearance for motor repairs. The pump has been unavailable for 8 hours. Repairs are expected to be completed within 24 hours. “A” DEH pump is protected in accordance with AD-OP-ALL-0210, Section 5.3, Conditional Single Point Vulnerabilities

Reactivity Plan/Brief:

- Use attached Reactivity Plan to take unit off line at 4 MW/Min.

Risk Assessment:

- **YELLOW**

Simulator Use Only

Harris Nuclear Plant - C23

Calculation requested 2020-11-09 11:20:14

Page 8(9)

Series: IC207

Description: H1C23, MOC, S/D

Operations table

Step	Date and time	Elapsed	Power	T avg.	Bk. CD	Bk. CC	Boron	Excore AFD	Boration	Dilution
	-	hours	%	-	steps	steps	ppm	%	gal	gal
0	2019-10-01 07:28:12	0.000	100.0	591.6	218	228	954	-1.93	0	0
1	2019-10-01 07:43:12	0.250	94.2	589.8	210	228	972	-0.22	153	0
2	2019-10-01 07:58:12	0.500	88.5	588.1	201	228	985	0.25	109	0
3	2019-10-01 08:13:12	0.750	82.8	586.3	192	228	995	0.02	83	0
4	2019-10-01 08:28:12	1.000	77.0	584.4	184	228	1004	-0.27	75	0
5	2019-10-01 08:43:12	1.250	71.2	582.5	177	228	1012	-0.38	71	0
6	2019-10-01 08:58:12	1.500	65.5	580.6	170	228	1019	-0.61	57	0
7	2019-10-01 09:13:12	1.750	59.8	578.7	164	228	1025	-0.60	56	0
8	2019-10-01 09:28:12	2.000	54.0	576.7	157	228	1030	-0.83	40	0
9	2019-10-01 09:43:12	2.250	48.0	574.6	151	228	1035	-0.73	45	0
10	2019-10-01 09:58:12	2.500	42.0	572.5	144	228	1038	-0.78	26	0
11	2019-10-01 10:13:12	2.750	36.0	570.3	138	228	1041	-0.55	26	0
12	2019-10-01 10:28:12	3.000	30.0	568.2	132	228	1043	-0.23	19	0
13	2019-10-01 10:43:12	3.250	24.2	566.0	126	228	1044	0.11	6	0
14	2019-10-01 10:58:12	3.500	18.5	563.9	121	228	1045	0.50	6	0
15	2019-10-01 11:13:12	3.750	12.8	561.8	116	228	1045	0.75	0	2
16	2019-10-01 11:28:12	4.000	7.0	559.6	110	228	1044	0.75	0	50
17	2019-10-01 11:43:12	4.250	7.0	559.6	110	228	1033	0.84	0	550
18	2019-10-01 11:58:12	4.500	7.0	559.6	110	228	1023	0.93	0	513
								Total [gal]	772	1115

Facility:	Harris Nuclear Plant	Task No.:	004055H101
Task Title:	BTRS End of Life Dilution Operation (OP-108)	JPM No.:	2020 NRC Exam Simulator JPM a
K/A Reference:	004 A4.07 RO 3.9 SRO 3.7	**ALTERNATE PATH – YES**	
Examinee:	________________________	NRC Examiner:	_________________
Facility Evaluator:	________________________	Date: ________	

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• The plant is operating at 100% power End of Life. • RCS temperature is ~0.3°F low. • The BTRS system has been filled and vented • EST-394, ASME System Pressure Test For The CVCS – C/D Thermal Regeneration Demineralizers is not required • EST-702, Moderator Temperature Coefficient - EOL is complete • BTRS is aligned OP-108, Boron Thermal Regeneration System per Attachments 1 and 2 • Chemistry has recommended placing the BTRS Demineralizer B resin bed in service. • All other parameters are normal.

Initiating Cue:	• The CRS has directed you to rinse in BTRS Demineralizer B resin bed for 10 minutes for a chemistry sample using End of Life Dilution Operation per OP-108, Section 8.9. • The initial conditions for the aligning the system are complete. • The RAB AO is standing by to support placing BTRS in service. • OP-108, Section 8.9.2 step 1 and Attachment 3 are complete.

Evaluator Note:	***To reduce student prep time, consider supplying student with a copy of the procedure and pre-briefing student prior to entry into the Simulator.***

Task Standard:	Properly align 'B' BTRS Demineralizer for operation in accordance with OP-108 and Verify open the BTRS bypass, 1CS-98 and verify shut the BTRS inlet, 1CS-570 due to malfunction of the BTRS system.
Required Materials:	None
General References:	OP-108, Boron Thermal Regeneration System, Rev. 25
Handout:	OP-108, Rev. 25, pages 1- 7, Prerequisites, P&L's OP-108, Rev. 25, pages 43 – 47, Section, 8.9, End of Life Dilution Operation, **with the Initial Conditions signed off if desired**
Time Critical Task:	No
Validation Time:	10 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 5	Critical to open inlet valve to demin to establish correct lineup.
Step 7	Critical to open outlet valve to demin to establish correct lineup.
Step 9	Critical to open air to BTRS inlet valve to establish correct lineup.
Step 10	Critical to open BTRS outlet valve to establish correct lineup.
Step 11	Critical to place BTRS inlet valve in Auto to establish correct lineup.
Step 12	Critical to place BTRS bypass valve in Auto to establish correct lineup.
Step 16	Critical to have in correct position to flush the new resin bed prior to initiating dilution flow.
Step 18	Critical to place BTRS switch in the DIL position to initiate dilution flow.
Step 20	Critical to make adjustment in order to initiate dilution flow.
Step 22	Critical to identify that the BTRS has malfunctioned and bypass the BTRS system to prevent a unexpected dilution event and initiate a request for repairs to be made.

2020 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-145
- Password "NRC3sros"
- Go to run
- Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-20
- Shut 1CS-638 and 1CS-647 to remove the A Demin from service and place BTRS in Standby in accordance with OP-108, Section 8.9.2, step 23.a - d
- Borate the RCS to get approximately - 0.3°F mismatch between Tave and Tref
- Remove the jumper from TB B1494 by lifting the leads using the malfunction below.
  - imf cvc154 (n 00:00:00 00:00:00) LIFTED
- Remove air to 1CS-570 by inserting the malfunction below.
  - irf xazi141 (n 00:00:00 00:00:00) FAIL_ASIS
- Silence Acknowledge and Reset Annunciators
- Freeze and Snap these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: ____________

OP-108, Section 8.9.1, Initial Conditions

Performance Step: 1 Initial Conditions

1. BTRS aligned per Attachments 1 and 2.
2. ASME Section XI Pressure Testing Program Manager (Engineering) has been notified to perform EST-394, if needed.
3. BTRS filled and vented per Section 8.10.

Standard: Reviews initial cue and determines the initial conditions for starting the system are complete

Comment:

OP-108, Section 8.9.2 Procedure Steps, Step 1

Performance Step: 2 VERIFY Part 1 of Attachment 3 complete.

Standard: Reviews Attachment 3 and determines I&C has installed the required jumpers in Term Box B1494.

Comment:

OP-108, Section 8.9.2 NOTE prior to step 2

Performance Step: 3 NOTE: For End of Life Dilution Operation as many as three beds may be used, one at a time.

Standard: Operator reads and placekeeps note

Comment:

OP-108, Section 8.9.2 Step 2

Performance Step: 4 CONTACT Chemistry, and determine BTRS demin bed to be used for dilution.

Standard: Reviews initial cue and determines the BTRS demin bed to be placed in service is the BTRS Demineralizer B resin bed.

Comment:

Evaluator Cue:	**If the candidate contacts Chemistry confirm the BTRS demin bed to be used is the BTRS Demineralizer B resin bed.**

OP-108, Section 8.9.2 Step 3

✓ **Performance Step: 5** OPEN inlet isolation valve for demin bed to be used.

- 1CS-638 BTRS Demineralizer A Isolation
- **1CS-628 BTRS Demineralizer B Isolation**
- 1CS-618 BTRS Demineralizer C Isolation
- 1CS-608 BTRS Demineralizer D Isolation

Standard: Locates MCB switch for 1CS-628 and places switch to open:

- 1CS-628 BTRS Demineralizer B Isolation - OPEN

Comment:

OP-108, Section 8.9.2 Step 4

Performance Step: 6 **VERIFY SHUT** inlet isolation valves for demin beds that will NOT be used.

- **1CS-638 BTRS Demineralizer A Isolation**
- 1CS-628 BTRS Demineralizer B Isolation
- **1CS-618 BTRS Demineralizer C Isolation**
- **1CS-608 BTRS Demineralizer D Isolation**

Standard: Locates MCB switch for 1CS-638 and places switch to shut:

Locates MCB switches for BTRS demin inlet isolation valves and verifies shut (switch position and green light)

- **1CS-638 BTRS Demineralizer A Isolation**
- **1CS-618 BTRS Demineralizer C Isolation**
- **1CS-608 BTRS Demineralizer D Isolation**

Comment:

OP-108, Section 8.9.2 Step 5

✓ **Performance Step: 7** OPEN outlet isolation valve for demin bed to be used.

- 1CS-647 1A Demin Lower Isolation Valve
- **1CS-637 1B Demin Lower Isolation Valve**
- 1CS-627 1C Demin Lower Isolation Valve
- 1CS-617 1D Demin Lower Isolation Valve

Standard: Contacts the RAB AO to open:

- 1CS-637 1B Demin Lower Isolation Valve

Comment:

Simulator Operator Communication:	**Use Sim Drawing CVC\btr01 and OPEN 1CS-637 when open then:** **Report 1CS-637, 1B Demin Lower Isolation Valve is OPEN**

OP-108, Section 8.9.2 Step 6

Performance Step: 8 **VERIFY SHUT** outlet isolation valves for demin beds that will NOT be used.

- **1CS-647 1A Demin Lower Isolation Valve**
- 1CS-637 1B Demin Lower Isolation Valve
- **1CS-627 1C Demin Lower Isolation Valve**
- **1CS-617 1D Demin Lower Isolation Valve**

Standard: Contacts the RAB AO to verify shut:

- **1CS-647 1A Demin Lower Isolation Valve**
- **1CS-627 1C Demin Lower Isolation Valve**
- **1CS-617 1D Demin Lower Isolation Valve**

Comment:

Simulator Operator Communication:	**Wait 1 minute and report** **1CS-647 1A Demin Lower Isolation Valve** **1CS-627 1C Demin Lower Isolation Valve** **1CS-617 1D Demin Lower Isolation Valve** **Are all shut.**

OP-108, Section 8.9.2 Step 7

✓ **Performance Step: 9** OPEN 1IA-1221-I2 IA Isol Valve to 1CS-570, BTRS INLET.

Standard: Contacts the RAB AO to open:

- 1IA-1221-I2 IA Isol Valve to 1CS-570, BTRS INLET

Comment:

Simulator Operator Communication:	**Delete remote function xazi141 and report** **1IA-1221-I2 IA Isol Valve to 1CS-570, BTRS INLET is Open**

OP-108, Section 8.9.2 Step 8

✓ **Performance Step: 10** OPEN 1CS-669 BTRS Outlet Isolation Valve.

Standard: Contacts the RAB AO to open:

- OPEN 1CS-669 BTRS Outlet Isolation Valve.

Comment:

Simulator Operator Communication:	**Wait 1 minute and report** **1CS-669 BTRS Outlet Isolation Valve is Open**

OP-108, Section 8.9.2 Step 9

✓ **Performance Step: 11** POSITION the control switch for 1CS-570, BTRS INLET to AUTO.

Standard: Locates the MCB control switch for 1CS-570 and verifies it is in the AUTO position.

Comment:

OP-108, Section 8.9.2 Step 10

✓ **Performance Step: 12** POSITION the control switch for 1CS-98, BTRS BYPASS to AUTO.

Standard: Locates the MCB control switch for 1CS-98 and verifies it is in the AUTO position.

Comment:

OP-108, Section 8.9.2 Step 11

Performance Step: 13 VERIFY HC-387, BTRS DEMIN BYPASS 1CS-606, has a 100% demand signal.

Standard: Locates the MCB control switch for HC-387, BTRS DEMIB BYPASS 1CS-606 and verifies the horizontal demand meter output signal is at 100% demand.

Comment:

OP-108, Section 8.9.2 NOTES prior to Step 12

Performance Step: 14 NOTE: Flowing borated water through the bed and into the RHT for extended periods of time will exhaust the bed prematurely. This can be minimized by limiting the time letdown is diverted to that necessary for Chemistry to obtain a sample and securing flow through the system until the results are obtained.

NOTE: Blockage in BTRS while 1CS-120 is aligned to RHT during flushes will be seen as flow to the VCT. 1CS-47, LD Hx Relief Vlv, relieves to the VCT. This has previously been misdiagnosed as a 1CS-120 issue.

Standard: Operator reads and placekeeps notes

Comment:

OP-108, Section 8.9.2 CAUTION prior to Step 12

Performance Step: 15 CAUTION: Failure to divert letdown to the holdup tank when a new resin bed is being placed in service could result in a change in RCS chemistry.

Standard: Operator reads and placekeeps caution

Comment:

OP-108, Section 8.9.2 Step 12

✓ **Performance Step: 16**

IF any, one (1) of the following is true:

- BTRS has been shut down for greater than 30 days,

OR

- A new BTRS resin bed has been placed in service,

OR

- Fill and vent has been performed,

THEN PLACE 1CS-120, LETDOWN TO VCT/HOLD UP TANK LCV-115A, to the RHT position.

Standard:

Reviews initiating cues and determines that the condition “a new BTRS resin bed has been placed in service” is true and places 1CS-120, LETDOWN TO VCT/HOLD UP TANK LCV-115A, to the RHT position.

Comment:

OP-108, Section 8.9.2 Step 13

Performance Step: 17

IF flow was diverted to the RHT is Step 8.9.2.12, THEN NOTIFY the RMS Tech that flushing operations are in progress and will lower VCT level. This will increase radiation levels in the room.

Standard:

Contacts the RMS Tech and notifies them of the flushing operations per the note.

Comment:

Simulator Operator Communication:	**Acknowledges flushing operations are in progress.**

Evaluator Cue:	**If an Auto makeup of the Reactor Water Makeup system occurs cue the candidate that the another operator will monitor the Auto makeup for proper operation.**

OP-108, Section 8.9.2 Step 14

✓ **Performance Step: 18** PERFORM the following steps:

- POSITION the BTRS FUNCTION SELECTOR switch to DIL position.
- VERIFY that the white DIL light is NOT LIT.

Standard: Locates the control switch for the BTRS FUNCTION SELECTOR, and verifies the switch in the DIL position and verifies the white DIL light is not lit.

Comment:

OP-108, Section 8.9.2 NOTE prior to Step 15

Performance Step: 19 NOTE: HC-387 operates the opposite of what may be expected. To move the output from right to left (100% to 0%), HC-387 must be rotated to the right (clockwise). Operating Experience shows the white DIL light comes on at about 70% output of HC-387 and goes off at about 100% output.

Standard: Operator reads and placekeeps note

Comment:

OP-108, Section 8.9.2 Step 15

✓ **Performance Step: 20** PERFORM the following steps:

- POSITION HC-387, BTRS DEMIN BYPASS 1CS-606, at a less than 100% demand signal.
- VERIFY that the WHITE DIL light illuminates.

Standard: Locates the control switch for HC-387, BTRS DEMIN BYPASS 1CS-606, reduces the demand signal to less than 100% and determines the WHITE DIL light **does NOT** illuminates.

Comment:

OP-108, Section 8.9.2 NOTE prior to Step 16

Performance Step: 21 NOTE: If the White DIL light is not illuminated, an improper BTRS valve lineup may be the cause, and a loss of letdown flow may occur.

Standard: Operator reads and placekeeps note

Comment:

OP-108, Section 8.9.2 Step 17 – Alternate Path Begins Here

✓ **Performance Step: 22** IF the DIL light does not illuminate, PERFORM the following steps:

- VERIFY OPEN 1CS-98, BTRS BYPASS.
- VERIFY SHUT 1CS-570, BTRS INLET.
- INITIATE a work request to have the BTRS repaired.

Standard:

- Locates the control switch for 1CS-98, BTRS BYPASS and takes control switch to OPEN.
- Locates the control switch for 1CS-570, BTRS INLET and takes control switch to SHUT.
- Notifies the CRS to initiate a work request to repair the BTRS system

Comment:

Evaluator Cue:	**When the CRS is notified that a work request needs to be initiated to repair the BTRS system. Evaluation on this JPM is complete.** **Direct Simulator Operator to place the Simulator in Freeze.**

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam Simulator JPM a
BTRS End of Life Dilution Operation

In accordance with OP-108, Boron Thermal Regeneration System

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

Initial Conditions:	• The plant is operating at 100% power End of Life • RCS temperature is ~0.3°F low • The BTRS system has been filled and vented • EST-394, ASME System Pressure Test For The CVCS – C/D Thermal Regeneration Demineralizers is not required • EST-702, Moderator Temperature Coefficient - EOL is complete • BTRS is aligned OP-108, Boron Thermal Regeneration System per Attachments 1 and 2 • Chemistry has recommended placing the BTRS Demineralizer B resin bed in service • All other parameters are normal

Initiating Cue:	• The CRS has directed you to rinse in BTRS Demineralizer B resin bed for 10 minutes for a chemistry sample using End of Life Dilution Operation per OP-108, Section 8.9 • The initial conditions for the aligning the system are complete • The RAB AO is standing by to support placing BTRS in service • OP-108, Section 8.9.2 step 1 and Attachment 3 are complete

Facility: Harris Nuclear Plant Task No.: 004016H101

Task Title: Place Excess Letdown In Service JPM No.: 2020 HNP NRC Exam Simulator JPM b

K/A Reference: 004 A4.06 3.6 RO 3.1 SRO **ALTERNATE PATH - NO**

Examinee: ________________________ NRC Examiner: ________________

Facility Evaluator: ________________________ Date: ________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• The unit is operating at 100% power MOL • Normal letdown needs to be secured for maintenance due to a problem with PCV-145 • PCV-145 is in manual

Initiating Cue:	• You are the OATC and have been directed by the CRS to establish Excess Letdown to the VCT per OP-107, Section 8.2. • Excess letdown has not been in service during this refueling cycle

Evaluator Note:	**The candidates should be briefed outside of the Simulator prior to performing this JPM. Provide them with a copy of the procedure and inform them that ALL initial conditions are satisfied.** **This will allow them to review the Precautions and Limitations associated with OP-107 and have time for a task preview of the steps to accomplish establishing Excess Letdown. Expect that the candidates will take about 10-15 minutes to complete this review.**

Task Standard:	Excess letdown is established with proper flow and temperature
Required Materials:	None
General References:	OP-107, Rev. 117
Handout:	OP-107, Rev. 117, pages 1 – 17, Prerequisites, P&L’s OP-107, Rev. 117, pages 46 – 52, Section 8.2, Excess Letdown Heat Exchanger Operation
Time Critical Task:	No
Validation Time:	15 minutes

PERFORMANCE STEP	**CRITICAL STEP JUSTIFICATION**
Step 12	Excess Letdown flow cannot be established if 1CS-466, EXCESS LETDOWN TO VCT/RCDT, is NOT positioned to the RCDT.
Step 13	Excess Letdown flow cannot be established if 1CS-461, EXCESS LETDOWN valve is NOT opened.
Step 14	Excess Letdown flow cannot be established if 1CS-460, EXCESS LETDOWN valve is NOT opened
Step 17	Exceeding procedural parameters limits for outlet temperatures or pressure could damage the Excess Letdown Heat Exchanger OR the relief line flow path to the RCDT.
Step 19	Exceeding procedural parameters limits for outlet temperatures or pressure could damage the Excess Letdown Heat Exchanger and for this flow path the excess pressure would go to the RCDT.
Step 22	Exceeding procedural parameters limits for outlet temperatures or pressure could damage the Excess Letdown Heat Exchanger and for this flow path the high pressure will lift the Letdown relief which discharges to the PRT.

2020 NRC Exam JPM b - SIMULATOR SETUP

Simulator Operator

- Reset to IC-151
- Password “NRC3sros”
- Place RED Off Normal placard on PCV-145
- Go to RUN
- Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. **DO NOT GO TO RUN** until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-19
- Initialize to IC-19, go to RUN
- Place PCV-145 in manual
- Silence Acknowledge and Reset Annunciators
- FREEZE and Snap these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: ____________

Performance Step: 1 **OBTAIN PROCEDURE**

Standard: Obtains OP-107 and reviews P & L's and Section 8.2 for Excess Letdown Heat Exchanger Operation. Reviews and verifies initial conditions are satisfied.

Evaluator Cue:	**Initial conditions have been established**

Comment:

OP-107, Section 8.2.2, Note prior to step 1

Performance Step: 2

NOTE: Normally Excess Letdown will go to the VCT. However, if plant conditions warrant, the RCDT may be selected. When the Excess Letdown line has been flushed, the VCT position can then be re-selected.

NOTE: If Excess Letdown is to remain in service for sufficient time for dilution or boration to be necessary then VCT level should be lowered to accommodate the expected level increase before placing Excess Letdown in service

NOTE: Placing Excess Letdown in service will result in increased dose rates in the Seal Water Heat Exchanger Room.

Standard: Operator reads and placekeeps notes

Comment:

OP-107, Section 8.2.2, Caution prior to step 1

Performance Step: 3 Caution: Excess Letdown operation during times of BTRS operation may result in damage to the RCP seals (due to increased contaminants and higher pH water). This should not prevent any AOP or EOP actions. The Responsible Engineer for RCP or CVCS may provide additional guidance if needed.

Standard: Operator reads and placekeeps caution

Comment:

OP-107, Section 8.2.2, Step 1

Performance Step: 4 **INFORM** Radwaste Control Room to monitor Seal Water Filter ∆P while Excess Letdown is in service.

Standard: Contacts RW Control Room operator to monitor Seal Water Filter ∆P while Excess Letdown is in service

Simulator Operator:	**Acknowledge request to monitor Seal Water Filter ∆P while Excess Letdown is in service**

Comment:

OP-107, Section 8.2.2, Step 2.a

Performance Step: 5 **PLACE** the excess letdown heat exchanger in operation as follows:

VERIFY 1CC-188, CCW TO EXCESS LETDOWN HEAT EXCHANGER, is open.

Standard: Locates MCB switch for 1CC-188, CCW TO EXCESS LETDOWN HEAT EXCHANGER, verifies it is open

Comment:

OP-107, Section 8.2.2, Step 2.b

Performance Step: 6 **VERIFY** 1CC-202 SB, CCW FM EXCESS LTDN & RCDT HEAT EXCHANGERS, is open.

Standard: Locates MCB switch for 1CC-202 SB, CCW FM EXCESS LTDN & RCDT HEAT EXCHANGERS, verifies it is open.

Comment:

OP-107, Section 8.2.2, Step 2.c

Performance Step: 7 **VERIFY** 1CC-176, CCW TO EXCESS LTDN & RCDT HEAT EXCHANGERS, is open.

Standard: Locates MCB switch for 1CC-176, CCW TO EXCESS LTDN & RCDT HEAT EXCHANGERS, verifies it is open.

Comment:

OP-107, Section 8.2.2, Note prior to step 3

Performance Step: 8 NOTE: Flushing the excess letdown line to the RCDT is required if the boron concentration in the excess letdown line from the RCS isolation valves to 1CS-466 is unknown or differs from RCS concentration. The volume of this line is 74 gallons. Two volumes (148 gallons) should be adequate to prevent unexpected reactivity changes in the RCS when flow is aligned to the VCT.

Standard: Operator reads and placekeeps note

Comment:

OP-107, Section 8.2.2, Caution prior to step 3

Performance Step: 9 Caution: 1CS-464, HC-137 EXCESS LTDN FLOW is rated for 1500 psid. Anytime that 1CS-464 is exposed to greater than 1500 psid, leakby should be expected.

Standard: Operator reads and placekeeps caution

Comment:

OP-107, Section 8.2.2, Step 3.a

Performance Step: 10 **IF** excess letdown flow is to be aligned to the RCDT, **THEN PERFORM** the following:

NOTIFY Radwaste Control Room of expected RCDT level change.

Standard: Contacts RW Control Room and informs the operator to expect RCDT level change.

Simulator Operator:	**RW Operator acknowledges**

Comment:

OP-107, Section 8.2.2, Step 3.b

Performance Step: 11 **VERIFY** 1CS-464, HC-137 EXCESS LTDN FLOW is shut (potentiometer to zero).

Standard: Operator verifies 1CS-464, HC-137 EXCESS LTDN FLOW is shut (potentiometer to zero).

Comment:

OP-107, Section 8.2.2, Step 3.c

✓ **Performance Step: 12** **PLACE** 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the RCDT position.

Standard: Operator locates MCB switch and places 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the RCDT position.

Comment:

OP-107, Section 8.2.2, Step 4

✓ **Performance Step: 13** **PLACE** 1CS-461, EXCESS LETDOWN to OPEN.

Standard: Operator locates MCB switch and places 1CS-461, EXCESS LETDOWN valve to OPEN.

Comment:

OP-107, Section 8.2.2, Step 5

✓ **Performance Step: 14** **PLACE** 1CS-460, EXCESS LETDOWN to OPEN.

Standard: Operator locates switch and places 1CS-460, EXCESS LETDOWN valve to OPEN.

Comment:

OP-107, Section 8.2.2, Note prior to Step 6

Performance Step: 15 NOTE: Seal Water Flow should be observed on FR-154A and FR-154B when adjusting 1CS-464, HC-137 EXCESS LTDN FLOW for the following reasons:

- RCP No 1 seal leakoff flow will be affected, and
- The possibility exists of lifting the 150 psi safety on the excess letdown/No. 1 seal return line.

Standard: Operator reads and placekeeps note

Comment:

OP-107, Section 8.2.2, Caution prior to Step 6

Performance Step: 16 Caution: Do **NOT** exceed 174°F outlet temperature as indicated on TI-139.

Caution: Do **NOT** exceed 150 psig as indicated on PI-138.

Standard: Operator reads and placekeeps cautions

Comment:

OP-107, Section 8.2.2, Step 6

✓ **Performance Step: 17**

ADJUST 1CS-464, HC-137 EXCESS LTDN FLOW as necessary to establish excess letdown flow, and not exceed the following parameters:

- 174°F outlet temperature as indicated on TI-139
- 150 psig as indicated on PI-138

Standard:

Operator adjusts 1CS-464, HC-137 EXCESS LTDN FLOW to establish excess letdown flow while not exceeding 174°F outlet temperature as indicated on TI-139 and 150 psig as indicated on PI-138 until ≥ 148 gallons have been flushed to the RCDT.

Examiner Cue: **(NOTE: This should be enough time for the candidate to determine that an adequate flush has been completed.)**	After adjustments to 1CS-464 have been made establishing Excess letdown to RCDT allow applicant to stabilize temperature and pressure then cue the applicant: **“Time compression is being used; approximately 10 minutes have elapsed since 1CS-464 has been opened.”**

Comment:

OP-107, Section 8.2.2, Step 7.a

Performance Step: 18

IF excess letdown flow is to be aligned to the VCT, THEN PERFORM the following:
VERIFY 1CS-464, HC-137 EXCESS LTDN FLOW is shut (potentiometer to zero).

Standard:

Locates and verifies 1CS-464, HC-137 EXCESS LTDN FLOW is SHUT

Comment:

OP-107, Section 8.2.2, Step 7.b

✓ **Performance Step: 19** PLACE 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the VCT position.

Standard: Locates MCB switch and places 1CS-466, EXCESS LETDOWN TO VCT/RCDT, to the VCT position.

Comment:

OP-107, Section 8.2.2, Note prior to Step 7.c

Performance Step: 20 NOTE: Seal Water Flow should be observed on FR-154A and FR-154B when adjusting 1CS-464, HC-137 EXCESS LTDN FLOW for the following reasons:

- RCP No 1 seal leakoff flow will be affected, and
- The possibility exists of lifting the 150 psi safety on the excess letdown/No. 1 seal return line.

Standard: Operator reads and placekeeps note

Comment:

OP-107, Section 8.2.2, Caution prior to Step 7.c

Performance Step: 21 Caution: Do **NOT** exceed 174°F outlet temperature as indicated on TI-139.

Caution: Do **NOT** exceed 150 psig as indicated on PI-138.

Standard: Operator reads and placekeeps cautions

Comment:

OP-107, Section 8.2, Step 7.c

✓ **Performance Step: 22** ADJUST 1CS-464, HC-137 EXCESS LTDN FLOW as necessary to establish excess letdown flow and not exceed the following parameters:

- 174°F outlet temperature as indicated on TI-139.
- 150 psig as indicated on PI-138.

Standard: Locates MCB control for 1CS-464, HC-137 EXCESS LTDN FLOW to establish flow and adjusts excess letdown flow while not exceeding 174°F outlet temperature as indicated on TI-139 or 150 psig as indicated on PI-138.

Comment:

Examiner Cue:	**NOTE: It may be necessary to ask the candidate if Excess Letdown has been placed in service IF they do not report to the CRS after Excess Letdown has clearly been established.** **After Excess Letdown has been established and reported to the CRS then:** **Announce: I have the shift, END OF JPM** **Contact Simulator Operator to place the Simulator in Freeze.**

STOP TIME: ______________

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam Simulator JPM b

Establish Excess Letdown to the VCT
In accordance with OP-107, Section 8.2, Excess Letdown Heat Exchanger Operation

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

Initial Conditions:	• The unit is operating at 100% power MOL • Normal letdown needs to be secured for maintenance due to a problem with PCV-145 • PCV-145 is in manual

Initiating Cue:	• You are the OATC and have been directed by the CRS to establish Excess Letdown to the VCT per OP-107, Section 8.2. • Excess letdown has not been in service during this refueling cycle

Facility:	Harris Nuclear Plant	Task No.:	301135H601
Task Title:	Take Corrective Action For Failure of CSIP Mini-Flow Valves to Re-Position	JPM No.:	2020 NRC Exam Simulator JPM c

K/A Reference: 006 A4.07 RO 4.4 SRO 4.4 **ALTERNATE PATH - YES**

Examinee: ________________________ NRC Examiner: _________________

Facility Evaluator: ________________________ Date: ________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• The Unit was at 100% power when a technician's error resulted in a Reactor Trip and Safety Injection • The crew is performing EOP-E-0, Reactor Trip or Safety Injection, and are at step 37

Initiating Cue:	• You are the OATC • Beginning at Step 37, you are to continue performing EOP-E-0

Task Standard:	Terminate Safety injection flow and obtain adequate flow through a running CSIP after the common miniflow isolation valve fails to open in accordance with EOP-E-0.
Required Materials:	E-0, Reactor Trip or Safety Injection, Rev. 15
General References:	E-0, Reactor Trip or Safety Injection, Rev. 15
Handout:	None
Time Critical Task:	No
Validation Time:	10 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 2	Resetting SI removes the active signal to allow termination of SI (allows component re-positioning).
Step 4	Stopping one CSIP prevents unnecessary PRZ overfill to a solid condition.
Step 9	Shutting FK-122.1 prevents CSIP runout when establishing a charging flowpath.
Step 10	Opening 1CS-235 and 1CS-238 establishes a charging flowpath.
Step 11	Opening FK-122.1 to a minimum of 10% establishes minimal charging flow prior to isolating the BIT to ensure the running CSIP is not deadheaded.
Step 12	Shutting 1SI-3 and 1SI-4 isolates flow through the BIT to prevent CSIP runout.
Step 14	Establishing a flow rate of >60 gpm is required by procedure.

PERFORMANCE STEP	ALTERNATE PATH JUSTIFICATION
Steps 7 - 14	1CS-214 (common miniflow isolation) failing to open prevents normal miniflow for the running CSIP to be established. The candidate must establish minimal charging flow prior to isolating the BIT to ensure that the running CSIP is not deadheaded.

2020 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-146
- Password "NRC3sros"
- Go to run
- Silence and Acknowledge annunciators
- It may be necessary to roll the Generator 86 relays at the start of this JPM or between runs. To accomplish this run the AMS file "Roll Gen 86 Relays" to get the 86 relays to the trip condition.
- **NOTE: The ERFIS screen that normally displays Tavg needs to be switched to Turn on code "ITREND" for RCS temperature and pressure.**

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-19
- Pre-load failure of control switch 1CS-214
  - IDI XA2I162 (n 00:00:00 00:00:00) ASIS

Insert:

- SIS01A (1 00:00:00 00:00:00) INADVERTENT_INIT
- SIS01B (1 00:00:00 00:00:00) INADVERTENT_INIT
- Go To RUN and initiate Trigger 1 – Inadvertent SI Train A and B
- Perform / markup E-0 through Step 37 (SI Termination Criteria).
- Set up ERFIS Plot to include RCS Pressure
- Adjust AFW flow to approx. 80 KPPH/SG
- Secure TDAFWP by closing 1MS-70 and 1MS-72
- Energize 1A1 and 1B1
- Silence Acknowledge and Reset Annunciators
- FREEZE (with PZR Level at approx. 60%) and Snap these conditions to your exam IC
- **NOTE: The ERFIS screen that normally displays Tavg needs to be switched to Turn on code "ITREND" for RCS temperature and pressure.**

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: ____________

Performance Step: 1 **OBTAIN PROCEDURE**

Standard: Obtains copy of EOP-E-0 and reviews steps that will be performed prior to initiation of step.

Comment:

E-0, Step 37

✓ **Performance Step: 2** Reset Safety Injection.

Standard: **(✓) Locates Train A and Train B SI reset MCB switch and takes respective train switch to reset position and then allows switch to return to normal position.**

Verifies that SI is reset by observation of Bypass Permissive Lights

- SI Actuated light stays on until both A and B train reset is completed.
- When train A or B is reset the SI Reset Auto SI Blocked light blinks on and off
- When both train A and B are reset the SI Actuated light extinguishes and the SI Reset Auto SI Blocked Light stays ON

Comment:

E-0, Step 38

Performance Step: 3 Manually Realign Safeguards Equipment Following A Loss Of Offsite Power. (Refer to Attachment 6)

Standard: Acknowledges requirement to manually realign Safeguards Equipment following a loss of Offsite Power

(Notes that no loss of power has occurred)

Comment:

E-0, Step 39

✓ **Performance Step: 4** Stop All But One CSIP.

Standard: Observes that A and B CSIP are running.

- Locates MCB switch for the CSIP control and secures ONE CSIP.

Comment:

E-0, Step 40

Performance Step: 5 RCS Pressure - STABLE OR RISING

Standard: Verifies RCS pressure is rising by trends on ERFIS, OSI PI or MCB RCS pressure meters. (may report trend to CRS)

Evaluator Cue:	**(IF reported that RCS pressure is rising: acknowledge report)**

Comment:

E-0, Step 41

Performance Step: 6

Open Normal Miniflow Isolation Valves:
- CSIP A: 1CS-182
- CSIP B: 1CS-196
- CSIP C: 1CS-210
- COMMON: 1CS-214

Standard:

Locates MCB switch for each of the following valves and takes switch to OPEN position
- CSIP A: 1CS-182
- CSIP B: 1CS-196
- CSIP C: 1CS-210

Locates MCB switch for 1CS-214 and after attempting to open valve determines that the valve will NOT OPEN

Determines RNO for step 41 is needed

Comment:

E-0, Step 41 RNO - ALTERNATE PATH begins here

Performance Step: 7

- If normal miniflow for running CSIP established, THEN GO TO Step 42. (NO)
- IF normal miniflow for running CSIP can NOT be established, THEN Observe NOTE prior to Step 45 AND GO TO Step 45. (YES)

Standard:

Determines that RNO action is to go to step 45 and proceed with actions there.

Comment:

E-0, Step 45 – NOTE prior to step (ALTERNATE PATH)

Performance Step: 8
NOTE: The following step contains a Safety Injection termination sequence for which CSIP normal miniflow is not available. The charging flow control valve is opened a minimal amount prior to isolating the BIT to ensure the running CSIP is not deadheaded.

Standard:
Operator reads and placekeeps note

Comment:

E-0, Step 45.a (ALTERNATE PATH)

✓ **Performance Step: 9**
Establish Minimum Charging Flow AND Isolate BIT Flow:
Shut charging flow control valve: FK-122.1

Standard:
Locates MCB control for FK-122.1, places FK-122.1 in MANUAL and reduces output to 0 (shuts valve)

Comment:

E-0, Step 45.b (ALTERNATE PATH)

✓ **Performance Step: 10**
Open charging line isolation valves:

- 1CS-235
- 1CS-238

Standard:
Locates MCB control switches for each valve and takes switches to OPEN

- 1CS-235 (red light on)
- 1CS-238 (red light on)

Comment:

E-0, Step 45.c (ALTERNATE PATH)

✓ **Performance Step: 11** Set charging flow controller demand position to 30%.

Standard: Locates MCB control for 1FK-122.1 and adjusts FK-122.1 open to 30%. (critical to establish an indication of a positive increase in charging flow)

Comment:

E-0, Step 45.d (ALTERNATE PATH)

✓ **Performance Step: 12** Shut BIT outlet valves:

- 1SI-3
- 1SI-4

Standard: Locates MCB control switches for each valve and takes switches to SHUT

- 1SI-3 (green light on)
- 1SI-4 (green light on)

Comment:

E-0, Step 45.e (ALTERNATE PATH)

Performance Step: 13 Ensure cold leg AND hot leg injection valves – SHUT

- 1SI-52
- 1SI-86
- 1SI-107

Standard: Locates MCB control for 1SI-52, 1SI-86 and 1SI-107 and verifies that all three valves are shut (green lights on)

Comment:

E-0, Step 45.f (ALTERNATE PATH)

✓ **Performance Step: 14** Establish and maintain at least 60 GPM flow through CSIP.

Evaluator Note:	**Total flow through the running CSIP consists of Charging Flow (FI-122A.1) in addition to the three RCP Seal Injection Flows (FI-130A, FI-127A and FI-124A).** **With FK-122.1 set to ~30% flow will be >60 GPM**

Standard: Totals flow of Charging flow through FI-122A.1 and RCP Seal Injection flows (3) through FI-130A, FI-127A, and FI-124A. IF the total is < 60 gpm THEN Locates MCB for CSIP flow (FI-122) and adjusts Charging Flow Controller FK-122.1 until total flow maintained is ≥ 60 gpm.

Comment:

Evaluator Cue:	**After applicant adjusts/ensures Charging Flow + Seal Injection flow is verified to be maintaining ≥60 gpm flow – Evaluation on this JPM is complete.** **Announce: I have the shift. END OF JPM** **Contact the Simulator Operator and place the Simulator in Freeze.**

STOP TIME: ______________

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam Simulator JPM c

Take Corrective Action For Failure of CSIP Mini-Flow Valves to Re-Position

In accordance with EOP-E-0, Reactor Trip or Safety Injection

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

Initial Conditions:	• The Unit was at 100% power when a technician's error resulted in a Reactor Trip and Safety Injection • The crews is performing EOP-E-0, Reactor Trip or Safety Injection and are at step 37

Initiating Cue:	• You are the OATC • Beginning at Step 37, you are to continue performing EOP-E-0

Facility:	Harris Nuclear Plant	Task No.:	003001H101
Task Title:	Start a RCP with Spray Valve Failure	JPM No.:	2020 NRC Exam Simulator JPM d
K/A Reference:	002 A1.01 RO 3.8 SRO 4.1	**ALTERNATE PATH - YES**	

Examinee: ________________________ NRC Examiner: _____________

Facility Evaluator: ________________________ Date: ________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE
I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• You are the extra RO during a plant startup. • GP-004, Reactor Startup is in progress and is currently on HOLD. • The plant has been stabilized with Shutdown Banks withdrawn. • Two hours ago the "B" RCP was removed from service for maintenance. • Maintenance has been completed and the "B" RCP is ready for operation. • The previous crew has verified that all initial conditions to start the RCP are met and have initialed all steps

Initiating Cue:	• The CRS has instructed you to start "B" RCP, in accordance with OP-100, Reactor Coolant System, Section 5.1, Reactor Coolant Pump Start-up. • The initial conditions have been verified.

Evaluators Note:	***To reduce student prep time, consider supplying student with a copy of the procedure and pre-briefing student prior to entry into the Simulator.***

Task Standard: “B” RCP started in accordance with OP-100 and PRZ spray manually controlled in accordance with AOP-019, Malfunction of RCS Pressure Control, due to a failed open PRZ spray valve following the pump start.

Required Materials: OP-100 mark up with Attachment 3 included.

General References: OP-100, Reactor Coolant System, Rev. 47 and AOP-019, Malfunction of RCS Pressure Control, Rev. 25

Handout: OP-100, Rev. 47, pages 1 – 8, Prerequisites, P&L’s

OP-100, Rev. 47, pages 9 – 12, Section 5.1, Reactor Coolant Pump Start-up, **with the Initial Conditions signed off if desired**

OP-100, Rev. 47, page 94, Attachment 3, #1 Seal Performance Parameters

Time Critical Task: No

Validation Time: 10 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 9	System interlock requires proper oil pressure be established prior to starting pump
Step 13	Administrative requirements state the System flow cannot be established until the lift oil pump breaker is closed for > 2 mins to prevent pump damage
Step 21	AOP-019 requires the operator to perform the immediate actions including the RNO response to control a PRZ Spray valve (shut valve). Performing these actions correctly will prevent an unnecessary Safety Injection from occurring.

PERFORMANCE STEP	ALTERNATE PATH CRITICAL STEP JUSTIFICATION
Step 16-21	Entry conditions are met for AOP-019, Malfunction of RCS Pressure Control when PRZ Spray valve controller PK-444D.1, PRZ Spray Loop B, 1RC-103 fails open upon starting the ‘B’ RCP. AOP-019 requires the operator to perform the immediate actions including the RNO response to control a PRZ Spray valve (shut valve) when that valve is NOT properly positioned for current PRZ pressure or plant conditions.

2020 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-147
- Password “NRC3sros”
- Go to RUN
- CRT displays – CRT 2: QP VCT, CRT 3: QP TAVG and CRT 4: QP SGLVL
- Set Source Range Audio Multiplier to 1000 to establish audible counts
- Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-7, Mode 3 HSD, MOL conditions – RCS pressure 2235, RCS temp. 557°F, all rods in
- GO to run
- Secure the “B” RCP
- Wait approximately 5 minutes for the simulator to stabilize
- Create a conditional Trigger to open PRZ spray valve PK-444D.1 with a 45 second delay and 45 second ramp after the control switch for the ‘B’ RCP is taken to start

  To create the conditional trigger:
  - Go to malfunctions
  - Find PRS14B Pressurizer Spray Valve 444D Failure (with manual control)
    - Open the malfunction window
    - Set delay to 45 seconds
    - Set ramp time to 45 seconds
    - Set initial severity to 30 (that way the meter will not go to 0 – adjust this to whatever percent open 1RC-103 is at after securing the ‘B’ RCP and the simulator is stable)
    - Set the malfunction to Trigger 1
  - Go to triggers
    - Click on Trigger 1
    - Click on ‘Assign File’
    - Choose RCP_B_START
    - (source file should now have RCP_B_START)

- Silence Acknowledge and Reset Annunciators

- Freeze and Snap these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

Evaluator Note:	The candidates should be briefed outside of the Simulator prior to performing this JPM. Provide them with a copy of the procedure (with initial conditions initialed as completed). This will allow them to review the Precautions and Limitations associated with OP-100 and have time for a task preview of the steps to accomplish starting the RCP. Expect that the candidates will take about 20 minutes to complete this review. **During the performance of the JPM the candidate may use either MCB indication or ERFIS indications when reviewing RCP pump indications.**

START TIME: ____________

Obtain Procedure

Performance Step: 1 Procedure obtained and begins the task of starting the RCP

Standard: Reviews initial cue and determines the initial conditions for starting the system are complete

Comment:

OP-100, Section 5.1.2, Caution prior to Step 1

Performance Step: 2 CAUTION: Only one RCP is to be started at any one time. If the motor is allowed to coast to a stop between starts, two successive starts are permitted. A third start may be made when the winding and the core have cooled by running for 20 minutes, or by standing idle for 45 minutes.

Standard: Operator reads and placekeeps caution

Comment:

OP-100, Section 5.1.2, Step 1.a

Performance Step: 3 **VERIFY** the following before pump start:

IF jogging RCPs per GP-001, **THEN VERIFY** RCS Pressure is greater than 325 psig.

Standard: Step 1.a is marked N/A

Comment:

OP-100, Section 5.1.2, Step 1.b

Performance Step: 4 **VERIFY** # 1 Seal ΔP is greater than 200 psid.

Standard: Locates PI-156A1 and verifies that the 'A' RCP #1 Seal ΔP is greater than 200 psid.

Comment:

OP-100, Section 5.1.2, Note prior to Step 1.c

Performance Step: 5 NOTE: VCT Outlet Temp TE-116 should be used for seal injection water temperature.

Standard: Operator reads and placekeeps note

Comment:

OP-100, Section 5.1.2, Step 1.c

Performance Step: 6 **VERIFY** Seal Injection flow is between 8 and 13 gpm at a temperature between 60 and 130°F.

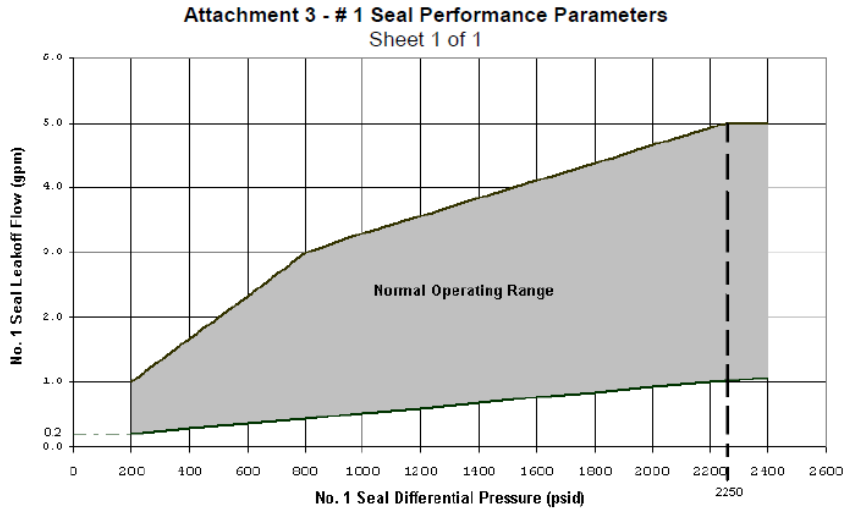
Standard: Locates seal injection flow indication FI-156A and verifies flow between 8-13 gpm and also verifies VCT temperature indicator TI-116.1 reading between 60-130°F. The candidate my use ERFIS points rather than MCB indications.

Comment:

OP-100, Section 5.1.2, Step 1.d

Performance Step: 7 **VERIFY** # 1 Seal Leakoff is in the normal operating range of Attachment 3.

Standard: Locates #1 Seal Leakoff flow indicator FR-154A and verifies that it meets Attachment 3 requirements (see below).



Evaluator Note:	**Seal Leakoff flow is also available via multiple programs on the Plant Computer (ERFIS, OSI-PI, etc). It is acceptable for the candidate to complete this step using ANY of the available indications.**

Comment:

OP-100, Section 5.1.2, Caution prior to Step 2

Performance Step: 8 CAUTION: RCPs shall not be started with one or more of the RCS cold leg temperatures less than or equal to 325°F unless the secondary water temperature is less than 50°F above each of the RCS cold leg temperatures. This caution is only applicable to the first RCP to be started.

Standard: Operator reads and placekeeps caution

- Understands the caution is N/A.

Comment:

OP-100, Section 5.1.2, Step 2

✓ **Performance Step: 9** **START** the RCP Oil Lift Pump.

Standard: Locates 'B' RCP Oil Lift Pump switch and starts the oil lift pump. **(Critical to start the RCP Oil Lift Pump)**

START Time ____________

Comment:

OP-100, Section 5.1.2, Step 3

Performance Step: 10 **VERIFY** the amber permissive light on the lift pump control switch is lit indicating proper lift oil pressure has been achieved.

Standard: Locates amber permissive light on the 'B' RCP Oil Lift Pump Switch and verifies it is lit.

Comment:

OP-100, Section 5.1.2, Step 4

Performance Step: 11 **ALLOW** the RCP Oil Lift Pump to run for a minimum of 2 minutes before starting an RCP**.**

Standard: Waits minimum of 2 minutes after starting the oil lift pump prior to starting the 'A' RCP.

Comment:

OP-100, Section 5.1.2, Note prior to Step 5

Performance Step: 12 When an RCP is started, the RCP ammeter will go off scale high, and then decrease to the normal hot or cold running amps after 15 to 25 seconds.

Standard: Operator reads and placekeeps note

Comment:

Evaluator Note:	**When the 'B' RCP start switch is taken to "start" a timer starts and runs for 45 seconds after which 1RC-103 will ramp open over 45 seconds lowering RCS pressure and requiring the operator to enter into AOP-019.** **Annunciators ALB-009-5-1, PRZ High-Low Press and ALB-009-3-3, PRZ Cont Low Press and Heaters On will alarm ~60 seconds after 1RC-103 begins to fail open.** **IF no actions are taken a SI will occur ~4:30 minutes from event onset.**

OP-100, Section 5.1.2, Step 5

✓ **Performance Step: 13** **START** the RCP.

Standard: Locates control switch for ‘B’ RCP and starts ‘B’ RCP

Comment: **START Time ____________ (≥ 2minutes since lift pump start)**

The two minute minimum is not critical but ensures start permissives are met for the RCP start.

OP-100, Section 5.1.2, Step 6

Performance Step: 14 **VERIFY** the following normal operating parameters:

- Running amps: Hot 460 to 540 amps Cold 715 amps
- RCS flow: Greater than or equal to 98%
- # 1 Seal ΔP Greater than 200 psid
- # 1 Seal leakoff in the normal operating range of Attachment 3
- Motor Winding temperature <300°F

Standard: Locates and verifies each parameter is in the normal operating range (ERFIS or MCB indications may be used)

Comment: **Note: Hot running motor amp range of 460 to 540 amps will apply.**

Evaluators Note:	**The actions to secure the 'B' RCP oil lift pump do not have to be performed since the RCS pressure reduction will take precedence over this step.**

OP-100, Section 5.1.2, Note prior to Step 7

Performance Step: 15 NOTE: The oil lift pump should be run at least 1 minute after starting an RCP.

After at least 1 minute, STOP the RCP OIL LIFT PUMP.

Standard: Waits at least 1 minute then secures the 'B' RCP oil lift pump.

Comment: **Secure Time ____________ ($\geq$ 1 minute since RCP start)**

ALTERNATE PATH

Performance Step: 16 **Identifies RCS pressure lowering and Spray valve 1RC-103 failure**

Annunciators:

- **ALB-009-5-1, PRZ High-Low Press**
- **ALB-009-3-3, PRZ Cont Low Press and Heaters On**

Standard: Identifies RCS pressure lowering

Identifies PRZ Spray Loop A PCV-444D (1RC-103) red indication light and valve demand increasing (or at 100%)

Acknowledges alarms and reports conditions to CRS

May review APP or directly enter AOP-019 based on current plant indications

Announces "AOP-019 Entry Conditions met, taking immediate actions for AOP-019."

Comment:

Evaluator Cue:	**CRS acknowledges report**

Evaluator Note:	**Securing 'B' RCP is an action contained in AOP-019 but this action is not performed immediately. Stopping the 'B' RCP would be performed at step 14 in Section 3.1 of the procedure unless other trip limits on the RCP are exceeded prior to reaching this step.**

AOP-019, Malfunction of RCS Pressure Control

Performance Step: 17

- Steps 1 through 3 are immediate actions

Standard: Performs immediate actions from memory without accessing or reading from the AOP

Comment:

AOP-019, Step 1

Performance Step: 18 **CHECK** that a bubble exists in the PRZ. **(YES)**

Standard: States that a bubble exists in the PRZ

Comment:

AOP-019, Step 2

Performance Step: 19 **VERIFY** ALL PRZ PORVs **AND** associated block valves properly positioned for current PRZ pressure and plant conditions. **(YES)**

Standard: Verifies ALL PRZ PORVs **AND** associated block valves properly Positioned by observing green shut lights indicated for all PRZ PORV and all red open lights on for PRZ PORV Block Valve control switches.

Comment:

AOP-019, Step 3

Performance Step: 20 **CHECK** BOTH PRZ Spray Valves properly positioned for current PRZ pressure and plant conditions.

PCV-444C PRZ Spray Loop A (1RC-107) - SHUT **(YES)**
PCV-444D PRZ Spray Loop B (1RC-103) - OPEN **(NO)**

Standard: Identifies that the PRZ Spray valves are NOT properly positioned for current plant conditions.

- Takes RNO actions

Comment: **1RC-107 is shut which is its proper position.**
1RC-103 should not be full open (or going full open for this condition).

AOP-019, Step 3 RNO

✓ **Performance Step: 21** CONTROL PRZ Spray Valves using ONE of the following methods (listed in order of preference):

- AFFECTED Spray Valve controller in MANUAL (if only one is obviously malfunctioning)

OR

- PK-444A, Master Pressure Controller, in MANUAL

OR

- BOTH individual Spray Valve controllers in MANUAL

Standard: Places PCV-444D PRZ Spray Loop B controller to manual and lowers the output to zero (0).

Stops RCS pressure reduction caused from open spray valve.

Stabilizes RCS pressure.

Comment: **(Critical to stop the RCS pressure reduction using one of the methods listed to prevent an unnecessary automatic SI from occurring.)**

AOP-019, Malfunction of RCS Pressure Control

Performance Step: 22	Obtain copy of AOP-019
Standard:	Announces immediate actions of AOP-019 are complete and obtains a copy of AOP-019 to continue actions associated with the procedure.
Evaluator Cue:	**CRS acknowledges report**
Comment:	

Examiner Cue:	**After the candidate has shut 1RC-103 and has obtained a copy of AOP-019: Evaluation on this JPM is complete.** **Announce END OF JPM** **Direct Simulator Operator to place the Simulator in FREEZE.**

STOP TIME: ______________

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam Simulator JPM d
Start a RCP with Spray Valve Failure

In accordance with OP-100, Reactor Coolant System
In accordance with AOP-019, Malfunction Of RCS Pressure Control

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ________________________ Date: ______________

Initial Conditions:	• You are the extra RO during a plant startup. • GP-004, Reactor Startup is in progress and is currently on HOLD. • The plant has been stabilized with Shutdown Banks withdrawn. • Two hours ago the “B” RCP was removed from service for maintenance. • Maintenance has been completed and the “B” RCP is ready for operation. • The previous crew has verified that all initial conditions to start the RCP are met and have initialed all steps

Initiating Cue:	• The CRS has instructed you to start “B” RCP, in accordance with OP-100, Reactor Coolant System, Section 5.1, Reactor Coolant Pump Start-up. • The initial conditions have been verified.

Facility:	Harris Nuclear Plant	Task No.:	022001H101
Task Title:	Return the Containment Fan Coolers to normal following a Safety Injection actuation	JPM No.:	2020 NRC Exam Simulator JPM e
K/A Reference:	022 A4.01 RO 3.6 SRO 3.6	**ALTERNATE PATH - NO**	

Examinee: NRC Examiner:

Facility Evaluator: Date:

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• An automatic SI initiation occurred due to a combination of equipment failure and technician error • SI has been terminated

Initiating Cue:	You have been directed to return Containment Fan Coolers to the normal alignment per ES-1.1, SI Termination, Attachment 1 step 6.a using OP-169, Containment Cooling And Ventilation, Section 8.4. The A-SA train will be used for normal operation.

Task Standard:	The ‘A-SA’ train of Containment Fan Coolers are returned to NORMAL lineup in accordance with EOP-ES-1.1 and OP-169.
Required Materials:	None
General References:	EOP-ES-1.1, SI Termination, Rev 3 OP-169, Containment Cooling And Ventilation, Rev 28
Handout:	EOP-ES-1.1 Attachment 1 Sheet 3 of 7 OP-169, Rev. 28, pages 1 – 6, Prerequisites, P&L’s OP-169, Rev. 28, pages 7 – 9, Section 5.1, Start Up of Containment Fan Cooler Units (Normal Cooling Mode) OP-169, Rev. 28, pages 27 – 28, Section, 8.4, Returning System to Normal from SI Operation
Time Critical Task:	No
Validation Time:	15 Minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 4	The fan must be stopped in order to be in the correct operating mode for the current plant condition with the emergency dampers shut.
Step 13	To comply with OP-169, Precaution and Limitation #11 After any fan cooler is started in low speed, the fan should be allowed to come up to speed for approximately 15 seconds before shifting to fast speed. This reduces the starting current required for high speed operation.
Step 15	The fan must be stopped in order to change fan speed from low speed to high speed in order to be in the correct operating mode for the current plant condition.
Step 17	The fan must be stopped in order to be in the correct operating mode for the current plant condition with the emergency dampers shut.

2020 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-148
- Password “NRC3sros”
- Go to RUN and wait ~ 10 seconds then silence and acknowledge alarms.

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-19
- Insert a Manual SI or MALF for Inadvertent SI
- Perform / markup E-0 through transition to ES-1.1
- Perform / markup ES-1.1 actions up to step 35 which is Realign Plant Systems for Normal Ops using Attachment 1 (restoration of Containment Fan Coolers is directed)
- Leave Fan Coolers in SI Mode
- Silence Acknowledge and Reset Annunciators
- FREEZE and Snap these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: ____________

OP-169, 8.4.1

Performance Step: 1 Review applicable procedure.

Standard: Verifies Initial Conditions are met.

- SI Reset (YES)
- Instrument Air restored to dampers (YES)

Comment:

OP-169, 8.4.2, Caution prior to step 1

Performance Step: 2 CAUTION: Failure of equipment to secure in this section will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

Standard: Operator reads and placekeeps caution

Comment:

OP-169, 8.4.2 Step 1

Performance Step: 3 CIRCLE the train to be used for normal operation. A-SA (B-SB)

Evaluator Cue:	**The CRS designates Train “A” for normal operation.**

Standard:

- Circles the A-SA components for alignment in step 2

Comment:

OP-169, 8.4.2 Step 2

✓ **Performance Step: 4** PLACE the following control switches for the selected train’s Air Handling Units to STOP:

- AH-2 A-SA (~~AH-1 A-SB~~)
- AH-2 B-SA (~~AH-1 B-SB~~)
- AH-3 A-SA (~~AH-4 A-SB~~)
- AH-3 B-SA (~~AH-4 B-SB~~)

Standard:

- Places AH-2 A-SA control switch in STOP.
- Places AH-2 B-SA control switch in STOP.
- Places AH-3 A-SA control switch in STOP.
- Places AH-3 B-SA control switch in STOP.

Comment:

OP-169, 8.4.2 Step 3

Performance Step: 5 CHECK the following post-accident discharge nozzle dampers SHUT on Status Light Box 5 (~~6~~) for the selected train of fans:

a. CV-D3 for AH-2 (~~CV-D1 for AH-1~~)
b. CV-D5 for AH-3 (~~CV-D7 for AH-4~~)

Standard: Verifies CV-D3 and CV-D5 indicate SHUT on Status Light Box 5.

Comment:

OP-169, 8.4.2 Step 4

Performance Step: 6 PLACE the train secured in Step 8.4.2.2 in operation per Section 5.1.

Standard: Proceeds to Section 5.1.

Evaluator Cue:	**Provide OP-169, Section 5.1 to the candidate at this time.**

Comment:

OP-169, Note prior to Section 5.1

Performance Step: 7 NOTE: Where the Operator has a choice between Train A or Train B, this procedure will list Train A number and letter identification first with Train B in parentheses.

Standard: Operator reads and placekeeps note

Comment:

OP-169, 5.1.1, Initial Conditions

Performance Step: 8

Verify Initial Conditions:

- Attachments 1 and 2 are completed.
- ESW train is in service which corresponds to the AH unit train to be started.

Standard:

- Acknowledges cue for Attachments 1 and 2.
- Verifies ESW Train "A" in service.

Evaluator Cue:	**Attachments 1 and 2 have been completed.**

Comment:

OP-169, 5.1.2, Note prior to step 1

Performance Step: 9

NOTE: When changing Containment Cooling modes, or swapping Containment Fan Cooler Trains, care must be taken to prevent the following:

- Entering Technical Specification 3.6.1.4 at -1.0 inwg Containment pressure (1 hour action).
- Opening the Containment Vacuum Breakers at -2.25 inwg Containment pressure.

This may be accomplished by performing the evolution slowly, monitoring CNMT pressure effects using ERFIS point PCP7611. Also, placing the Containment Normal Purge Exhaust flow controller (FK-7624) in manual and shutting CP-B9, will allow CNMT pressure to slowly rise, thus compensating for the CNMT pressure drop that will occur during each fan start.

Standard:

Operator reads and placekeeps note

Comment:

OP-169, 5.1.2, Caution prior to step 1

Performance Step: 10 CAUTION: Failure of equipment to secure in this section will result in the associated EDG being inoperable. Tech Spec 3.8.1.1 is applicable until the breaker for the affected load is opened.

Standard: Operator reads and placekeeps caution

Comment:

OP-169, 5.1.2, step 1

Performance Step: 11 IF CNMT Normal Purge is in service AND IF desired for CNMT pressure control, THEN PERFORM the following:

a. PLACE FK-7624, NORM PURGE EXH FLOW, in MANUAL.
b. Using FK-7624, SHUT CP-B9, NORM CONT PURGE MODULATING VALVE (SLB-7 / 5-3).
c. IF CNMT Normal Purge needs to be restored at any time during the performance of this procedure section, THEN PERFORM the following:
    (1) IF CNMT Normal Purge has NOT tripped, THEN RESTORE FK-7624 to AUTO.
    (2) IF CNMT Normal Purge has tripped, THEN STARTUP CNMT Normal Purge per OP-168.

Standard:

- Checks CNMT Normal Purge secured and N/A's steps 1.a, 1.b, and 1.c

Evaluator Cue:	**CNMT Normal Purge will be restored by another operator per ES-1.1 Attachment 1 step 12.**

Comment:

OP-169, 5.1.2, Note prior to step 2

Performance Step: 12 NOTE: In winter months, the operating train should be secured per Section 7.1 prior to starting the idle train, to minimize the potential for entering Technical Specification 3.6.1.4 at -1.0 inwg Containment pressure (1 hour action), or opening the Containment Vacuum Breakers at -2.25 inwg Containment pressure.

Standard: Operator reads and placekeeps note

Comment:

OP-169, 5.1.2, step 2

✓ **Performance Step: 13** Place the control switches for both fans in each Containment cooler unit AH-2 A-SA (~~AH-1 B-SB~~) and AH-3 A-SA (~~AH-4 B-SB~~) to LO-SPD.

Standard:

- Places control switch for AH-2 A-SA in LO-SPD.
- Places control switch for AH-2 B-SA in LO-SPD.
- Places control switch for AH-3 A-SA in LO-SPD.
- Places control switch for AH-3 B-SA in LO-SPD.

Comment:

OP-169, 5.1.2, Notes prior to step 3

Performance Step: 14 NOTE: After any fan cooler is started in low speed, the fan should be allowed to come up to speed for approximately 15 seconds before shifting to fast speed. This reduces the starting current required for high speed operation.

NOTE: The following switch sequence must be performed without delay, one fan at a time, to prevent fan coast down before being started in fast speed. This sequence is functionally related (obtain a single result in close sequence or time), allowing signoff to be delayed until running in HI-SPD.

Standard: Operator reads and placekeeps notes

Comment:

OP-169, 5.1.2, step 3

✓ **Performance Step: 15** Place the control switch for the fans started in Step 5.1.2.2, START in HI-SPD as follows:

- AH-2 A-SA (~~AH-1 A-SB~~)
  - (1) **PLACE** AH-2 A-SA (~~AH-1 A-SB~~) control switch to STOP
  - (2) **PLACE** AH-2 -SA (~~AH-1 A-SB~~) control switch to HI-SPD
- AH-2 B-SA (~~AH-B-SB~~)
  - (1) **PLACE** AH-2 B-SA (~~AH-1 B-SB~~) control switch to STOP
  - (2) **PLACE** AH-2 B-SA (~~AH-1 B-SB~~) control switch to HI-SPD
- AH-3 A-SA (~~AH-4 A-SB~~)
  - (1) **PLACE** AH-3 A-SA (~~AH-4 A-SB~~) control switch to STOP
  - (2) **PLACE** AH-3 A-SA (~~AH-3 A-SB~~) control switch to HI-SPD
- AH-3 B-SA (~~AH-4 B-SB~~)
  - (1) **PLACE** AH-3 B-SA (~~AH-4 B-SB~~) control switch to STOP
  - (2) **PLACE** AH-3 B-SA (~~AH-4 B-SB~~) control switch to HI-SPD

Standard:

- Places control switch for AH-2 A-SA in STOP, then HI-SPD
- Places control switch for AH-2 B-SA in STOP, then HI-SPD
- Places control switch for AH-3 A-SA in STOP, then HI-SPD
- Places control switch for AH-3 B-SA in STOP, then HI-SPD

Comment:

OP-169, 5.1.2, step 4, 5, and 6

Performance Step: 16

- IF FK-7624 was taken to MANUAL in Step 5.1.2.1.a, THEN RESTORE FK-7624 to AUTO.
- IF CNMT Normal Purge is not in service, AND it is desired to place CNMT Normal Purge in service, THEN STARTUP CNMT Normal Purge per OP-168.
- IF both trains of Containment Fan Cooler fans are running (such as during a train swap evolution), THEN PROCEED to Section 7.1 to secure the desired train.

Standard:

Reviews steps 4, 5, and 6 and marks these steps N/A
Returns to Section 8.4.2 and proceeds with step 5

Comment:

OP-169, 8.4.2, step 5

✓ **Performance Step: 17**

PLACE the following control switches for the standby train to STOP:
• AH-1 A-SB (~~AH-2 A-SA~~)
• AH-1 B-SB (~~AH-2 B-SA~~)
• AH-4 A-SB (~~AH-3 A-SA~~)
• AH-4 B-SB (~~AH-3 B-SA~~)

Standard:

- Places control switch for AH-1 A-SB in STOP
- Places control switch for AH-1 B-SB in STOP
- Places control switch for AH-4 A-SB in STOP
- Places control switch for AH-4 A-SB in STOP

Comment:

OP-169, 8.4.2, step 6

Performance Step: 18 CHECK the following post-accident discharge nozzle dampers SHUT on Status Light Box 6 (~~5~~) for the standby train of fans:

a. CV-D1 for AH-1 (~~CV-D3 for AH-2~~) (Shut)
b. CV-D7 for AH-4 (~~CV-D5 for AH-3)~~ (Shut)

Standard: Checks CV-D1 for AH-1 and CV-D7 for AH-4 indicate SHUT on Status Light Box 6.

Comment:

OP-169, 8.4.2, step 7

Performance Step: 19 If containment temperature is greater than 118 ˚F or if additional cooling is desired, refer to Section 8.1, Start-Up of Fan Cooler Units (Maximum Cooling mode).

Standard: Verifies containment temperature is less than 118 ˚F.
(Maybe > 118° but trending DOWN at this time.)

Marks step 7 as N/A

	Evaluator Cue:	**If requested to perform section 8.1 cue the candidate that another operator will complete section 8.1.**

Comment:

Evaluator Cue:	**After containment temperature is verified at or trending to less than 118 ˚F: Evaluation on this JPM is complete.** **Announce END OF JPM** **Direct Simulator Operator to place the Simulator in FREEZE.**

STOP TIME: ______________

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam Simulator JPM e

Return the Containment Fan Coolers to normal following a Safety Injection actuation

In accordance with OP-169, Containment Cooling And Ventilation
In accordance with EOP-ES-1.1, SI Termination

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

Initial Conditions:	• An automatic SI initiation occurred due to a combination of equipment failure and technician error • SI has been terminated

Initiating Cue:	You have been directed to return Containment Fan Coolers to the normal alignment per ES-1.1, SI Termination, Attachment 1 step 6.a using OP-169, Containment Cooling And Ventilation, Section 8.4. The A-SA train will be used for normal operation.

Facility:	Harris Nuclear Plant	Task No.:	064005H101
Task Title:	Shutdown EDG A-SA From MCB For Maintenance – Field Flash Stays Energized	JPM No.:	2020 NRC Exam Simulator JPM f

K/A Reference: 064 A4.06 RO 3.9 SRO 3.9 **ALTERNATE PATH - YES**

Examinee: ________________________ NRC Examiner: _________________

Facility Evaluator: ________________________ Date: ________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• The Unit is operating 100% power • The 'A' EDG is running in parallel with the grid to support testing of the governor • OST-1013, 1A-SA Emergency Diesel Generator Operability Test Monthly Interval Modes 1-2-3-4-5-6 is NOT in progress • Testing of the governor is complete • The previous shift has reduced the EDG load from 6.3 MW to 2.3 MW and 1 MVAR over the last 30 minutes per OP-155, Emergency Diesel Generator Section 7.1

Initiating Cue:	• You are the BOP. The CRS directs you to continue shutting down the 'A' EDG using OP-155 Section 7.1.2 starting at Step 4.

***Evaluator NOTE*:**	**The candidate should be briefed outside of the simulator prior to performing this JPM. Provide them with a copy of OP-155, pages 1 – 14, 42 – 46, 177 – 182. This will allow them to review the Precautions and Limitations associated with OP-155 and have time for a task review of the steps. Expect the candidate to take about 10 - 15 minutes to complete this review.**

Task Standard: ‘A’ EDG unloaded and shutdown using the STOP control switch per OP-155 then EMERGENCY STOPPED following a failure of the field flash to de-energize.

Required Materials: None

General References: OP-155, Diesel Generator Emergency Power System, Rev. 91

Handout: OP-155, Rev. 91, pages 1 – 14, Prerequisites, P&L’s

OP-155, Rev. 91, pages 42 – 46, Section 7.1, Unloading and Shutdown of Emergency Diesel Generators From the MCB, **signed off up to 7.1.2 Step 4.**

OP-155, Rev. 91, pages 177 – 182, Attachment 7 - Emergency Diesel Generator Post Run Checklist

Time Critical Task: No

Validation Time: 10 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 4	Controlled load reduction to 0.5 MW prevents reverse powering the ‘A’ EDG.
Step 5	Opening Breaker 106 separates the ‘A’ EDG from the grid which removes load from the EDG and allows the stack exhaust temperatures to lower limiting thermal stresses on the EDG.
Step 13	Normal stopping the EDG closes the Air admission valves and positions the EDG fuel racks to minimum slow the EDG speed.
Step 15	Emergency stopping the EDG de-energizes the field flashing circuit voltage to prevent the voltage regulator from catching fire if not de-energized.

PERFORMANCE STEP	ALTERNATE PATH JUSTIFICATION
Steps 14 & 15	Generator continues to produce voltage following normal shutdown requiring operator to emergency stop the EDG.

2020 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-149
- Password “NRC3sros”
- Put reactivity data sheets for IC-19 and MOL on status board
- Go to run
- Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-19
- Go To RUN
- Start and load the ‘A’ EDG to approximately 2.3 MW and 1 MVAR.
- To simulate that the EDG has been stopped and field flashing is still occurring by still having voltage on meter EI-6955A and EI-5945A, create a CAEP as follows:

```
TRG 1 "EDG_A_Start_Switch_to_Stop"

iao xd1d010m (1 00:00:05 00:00:00) 7.2 00:00:05 7.08
iao xd1d022m (1 00:00:05 00:00:00) 210 00:00:05 167
iao xd1d023m (1 00:00:05 00:00:00) 56 00:00:05 51

TRG 2 "EDG_A_Emergency_Stop_Switch_to_Stop"

trg= 2 dao xd1d010m
trg= 2 dao xd1d022m
trg= 2 dao xd1d023m
```

- Silence Acknowledge and Reset Annunciators
- FREEZE and Snap these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: ____________

OP-155 Section 7.1.2, Note prior to step 4

Performance Step: 1

NOTE: The EDG should be completely unloaded from 35% load in less than 5 minutes to minimize carbon buildup.

Standard:

Operator reads and placekeeps note

Comment:

OP-155 Section 7.1.2 Step 4.a

Performance Step: 2

PERFORM the following:

a. ENSURE load has been less than 6.2 to 6.4 MW for at least 20 minutes

Standard:

Refers to Initial Conditions and determines the ‘A’ EDG load has been below 6.2 MW for the last 30

Comment:

OP-155, Section 7.1.2 Step 4.b

Performance Step: 3 b. ENSURE Generator Winding Temperature is less than 135°C

Standard: Contacts AO at the ECP or obtains winding temperature from ERFIS

Simulator Operator:	**If contacted, Generator Winding Temperature is 125°C.**

Comment:

Evaluator Note:	**Terminate the JPM if the candidate reverse powers the 'A' EDG**

OP-155, Section 7.1.2 Step 4.c

✓ **Performance Step: 4** c. REDUCE load to 0.5 MW

Standard: **Time Started Load Reduction: ______**

Locates the Governor Control and Auto Voltage Adjust control switches and adjust the control switches to reduce the 'A' EDG load to 0.5 MW while maintaining load within the Attachment 9 – Emergency Diesel Generator Capacity Curve limits

Comment:

OP-155, Section 7.1.2 Step 4.d

✓ **Performance Step: 5** d. PLACE DIESEL GEN A-SA BREAKER 106 SA to TRIP.

Standard: Locates Diesel Gen A-SA Breaker 106 SA control switch and places the switch in the trip position in ≤ 5 minutes from resuming load reduction

Comment:

OP-155, Section 7.1.2 Step 5. a

Performance Step: 6 ENSURE the following:

a. DIESEL GEN A-SA BREAKER 106 SA to indicates OPEN.

Standard: Locates Diesel Gen A-SA Breaker 106 SA control switch and determines the Green light is Lit and the Red light is extinguished.

Comment:

OP-155, Section 7.1.2 Step 5.b

Performance Step: 7 b. EI-6957A1 SA, A Power, indicates zero..

Standard: Locates EI-6957A1 SA, A Power indication and determines the meter is on the lower peg indicating zero.

Comment:

OP-155, Section 7.1.2 Step 5.c

Performance Step: 8 c. EI-6951A SA, A Amps, indicates zero.

Standard: Locates EI-6951A SA, A Amps indication and determines the meter is on the lower peg indicating zero.

Comment:

OP-155, Section 7.1.2 Step 6

Performance Step: 9 RECORD time DIESEL GEN A-SA BREAKER 106 SA is opened on Attachment 7.

Standard: Refers to Attachment 7 - Emergency Diesel Generator Post Run Checklist, and records the time Breaker 106 SA is open in Step 17.j.

Comment:

OP-155, Section 7.1.2 Step 7

Performance Step: 10 IF performing monthly EDG test, THEN PERFORM the following:

a. MARK the remainder of this section "N/A."
b. CONTINUE EDG shutdown per OST-1013 (OST-1073).

Standard: Refers to initial conditions and determines step is not applicable and marks step 7a and 7b N/A.

Comment:

OP-155, Note prior to Section 7.1.2 Step 8

Performance Step: 11 To determine that cylinder temperatures are less than 450°F, the stack exhaust temperature will be monitored until temperature is less than 500°F.

Standard: Operator reads and placekeeps note

Comment:

OP-155, Section 7.1.2 Step 8

Performance Step: 12 At the ECP, POSITION temperature selector switch to positions 17 and 18 to monitor stack exhaust temperatures.

Standard:

- Contacts AO at the ECP and requests stack exhaust temperatures.

Simulator Operator:	**Stack Exhaust Temperatures are 475°F on positions 17 and 18.**

Comment:

OP-155, Section 7.1.2 Step 9

✓ **Performance Step: 13** At the MCB, WHEN stack exhaust temperatures are less than 500°F, THEN POSITION DIESEL GENERATOR A-SA CONTROL SWITCH TO STOP.

Standard: Locates Diesel Generator A-SA control switch and places the switch in the stop position

Comment:

Alternate Path begins here

OP-155, Section 7.1.2 Step 10

Performance Step: 14	At the MCB, CHECK the following: (Reference 2.7.4, 2.7.7, 2.8.11) a. EI-6955A SA, A VOLTS, voltage is decreasing. b. EI-6954A SA, A FLD VOLTS, voltage is decreasing.
Standard:	Locates EI-6955A SA, A Volts and EI-6954A SA, A FLD Volts indications and determines the meters are unchanged and the generator is still producing voltage.
Comment:	

OP-155, Section 7.1.2 Step 11 (ALTERNATE PATH)

✓ **Performance Step: 15**	IF voltage is NOT decreasing, THEN EMERGENCY STOP the EDG to prevent the voltage regulator from catching fire.
Standard:	**(✓) Locate Diesel Generator A-SA Emergency Stop control switch and places the switch in the emergency stop position** Reports to CRS that EDG A had to be Emergency Stopped due to field flashing still occurring.
Comment:	

Evaluator Communication:	**Acknowledge any communications.**

Evaluator Note:	**After the A EDG has been Emergency stopped and communications are completed:** **Cue – END OF JPM – I have the shift.** **Direct Simulator Operator to go to FREEZE**

STOP TIME: _______________

Simulator Operator:	***When directed by the Lead Examiner go to FREEZE.***

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam Simulator JPM f

Shutdown EDG A-SA From MCB For Maintenance – Field Flash Stays Energized

In accordance with OP-155, Diesel Generator Emergency Power System

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ________________________ Date: ______________

JPM CUE SHEET

Initial Conditions:	• The Unit is operating 100% power • The 'A' EDG is running in parallel with the grid to support testing of the governor • OST-1013, 1A-SA Emergency Diesel Generator Operability Test Monthly Interval Modes 1-2-3-4-5-6 is NOT in progress • Testing of the governor is complete • The previous shift has reduced the EDG load from 6.3 MW to 2.3 MW and 1 MVAR over the last 30 minutes per OP-155, Emergency Diesel Generator Section 7.1

Initiating Cue:	• You are the BOP. The CRS directs you to continue shutting down the 'A' EDG using OP-155 Section 7.1.2 starting at Step 4 .

Facility:	Harris Nuclear Plant	Task No.:	015001H101
Task Title:	Power Range NI Gain Adjustment	JPM No.:	2020 NRC Exam Simulator JPM g
K/A Reference:	015 A4.02 RO 3.9 SRO 3.9	**ALTERNATE PATH - NO**	

Examinee: ________________________ NRC Examiner: ______________

Facility Evaluator: ________________________ Date: ________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• The unit is at 100% equilibrium conditions. • Following maintenance on PR Channel NI-41, all required testing has been completed and the channel is ready to be returned to service. A calorimetric has just been performed per OST-1000, Power Range Heat Balance, ERFIS Online Calculation, Daily Interval, Mode 1 (Above 15% Power). The OST requires that an NI gain adjustment be performed. • The calculated power is 99.88%. Indicated power on PR channel NI-41 at the time of the calorimetric was at its current value. • Rod Control is in Automatic.

Initiating Cue:	You are to perform the Power Range NI Gain Adjust for PR channel NI-41 in accordance with OP-105, “Excore Nuclear Instrumentation,” Section 8.3 and Attachment 2.

NOTE: The Simulator Operator will be required to adjust the Pot Setting for NI-41 per the Simulator Setup instructions each time this JPM is administered.

***Evaluator NOTE*:**	**The candidate should be briefed outside of the simulator prior to performing this JPM. Provide them with a copy of OP-105, pages 1-8, 19, 37-48. This will allow them to review the Precautions and Limitations associated with OP-105 and have time for a task review of the steps. Expect the candidate to take about 10 - 15 minutes to complete this review.**

Task Standard:	Gain has been adjusted within limits for PR Channel N-41 in accordance with OP-105.
Required Materials:	None
General References:	OP-104, Rod Control System, Rev. 45 OP-105, Excore Nuclear Instrumentation Rev. 30
Handout:	OP-104, Rev. 45, pages 1- 8, Prerequisites, P&L's OP-104, Rev. 45, page 54, and Section, 8.15, Placing Rod Control In Manual For Testing/Plant Conditions OP-105, Rev. 30, pages 1 – 7, Prerequisites, P&L's OP-105, Rev. 30, page 19, Section, 8.3, Power Range NI Gain Adjustment OP-105, Rev. 30, pages 37 – 48, Attachment 2, Power Range NI Gain Adjustment
Time Critical Task:	No
Validation Time:	15 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 4	Must determine the desired indication, including sign, of N-41 to return the instrumentation to the current power level.
Step 6	Must place Rod control from Automatic control to Manual control to prevent unnecessary reactivity change from occurring due to control rod motion that would occur while adjusting NI gain on channel N-41.
Step 14	Must adjust the gain pot in CW direction until indicated power is within 0.5% of value determined to meet the acceptance criteria prior to relocking the pots. Note: the procedure acceptance is within 0.2% but due to the sensitivity of the pots, acceptance for this step is ± 0.5%
Step 17	Must determine reset the RATE TRIP signal to restore RPS logic from 1 of 3 logic to the normal 2 of 4 logic if the RATE TRIP signal is present.

2020 NRC Exam - SIMULATOR SETUP

Simulator Operator

- Reset to IC-152
- Password “NRC3sros”
- Put reactivity data sheets for IC-19 and MOL on status board
- Go to run
- Place Meter Rate on front of PR channel NI-41 to Fast
- Unlock gain pot on the front of PR channel NI-41
    - **If this is the first performance of the day, swipe the pot by rotating it several turns in each direction to clean it. The pots can become very sensitive over time.**
- Slowly adjust the gain to 2.70 (verify that it indicates approximately 3 % - 4 % below the other 3 PR channels)
- Lock gain pot
- Place Meter Rate on front of PR channel NI-41 to Slow
- Silence and Acknowledge annunciators

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

This portion of Simulator setup is now compete and must be completed between each evaluation.

To recreate the IC setup for this JPM:

- Initial Simulator IC was IC-19
- Initialize to IC-19, go to RUN
- Place Rod Control in MAN
- Place Meter Rate on front of PR channel NI-41 to Fast
- Unlock gain pot on the front of PR channel NI-41
- **If this is the first performance of the day, swipe the pot by rotating it several turns in each direction to clean it. During Validation it was noted the pots can become very sensitive over time.**
- Slowly adjust the gain to 2.70 (verify that it indicates approximately 3 % - 4 % below the other 3 PR channels)
- Ensure any alarms caused by this adjustment are acknowledged
- Lock gain pot
- Place Meter Rate on front of PR channel NI-41 to Slow
- Place Rod Control in AUTO
- Silence Acknowledge and Reset Annunciators
- Freeze and Snap these conditions to your exam IC

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: ____________

OP-105 Attachment 2 Notes and Caution prior to step 1

Performance Step: 1

NOTE: Calculated power shall be that power calculated by OST-1000, OST-1004 or other applicable plant procedures.

NOTE: If the indicator on the NI drawers is not available, the corresponding ERFIS point may be used. The following computer points update every two seconds, and can be used for initial adjustment:

- **ANM0120 NI-41 PR CHANNEL**
- **ANM0121 NI-42 PR CHANNEL**
- **ANM0122 NI-43 PR CHANNEL**
- **ANM0123 NI-44 PR CHANNEL**

The following computer points are the one minute average of the points above, and are used in recording indicated power and making final determinations on adequacy of the adjustment:

- **ANM0120M NI-41 PR CHANNEL**
- **ANM0121M NI-42 PR CHANNEL**
- **ANM0122M NI-43 PR CHANNEL**
- **ANM0123M NI-44 PR CHANNEL**

Caution: To prevent a possible non-conservative adjustment being made, no significant power decreases should be made between the time of performance of the calorimetric and the following adjustments.

Standard: Reads and place keeps notes and caution

Comment:

OP-105 Attachment 2 Step 1

Performance Step: 2

MARK portions of Attachment 2 N/A for any NI not being adjusted as follows:
IF NI-41 will not be adjusted, THEN MARK the following N/A:
IF NI-42 will not be adjusted, THEN MARK the following N/A:
IF NI-43 will not be adjusted, THEN MARK the following N/A:
IF NI-44 will not be adjusted, THEN MARK the following N/A:

Standard:

Determines NI-42, NI-43 and NI-44 will not be adjusted and marks through the applicable section with N/A.

Comment:

Evaluator Note:	**The candidate should be allowed to complete this step as part of the pre-job brief prior to entering the simulator for evaluation.**

OP-105 Attachment 2 Step 2

Performance Step: 3

DETERMINE the difference, including sign, between the calculated power (from OST-1000 or OST-1004) and the indicated reactor power at the time data was obtained as follows:

CALC PWR - N41 IND PWR = N41 DIFFERENCE
99.88 – 96.0 = +3.88

Standard:

Calculates difference

(Determined by subtracting present indicated value of N-41 from 99.88% calculated power.)

(Band 99.88 - 95.8 = 3.68 to 99.88 - 96.2 = 4.08)

Comment:

Evaluator Note:	**You will be asked to initial for IV during the procedure. State that you can assume that the IV has been performed for each step performed.** **The candidate is responsible to ensure each step is completed correctly**

OP-105 Attachment 2 Step 3

✓ **Performance Step: 4**

DETERMINE the desired indication, including sign, of NIS as follows:

N41 PRESENT IND ± N41 DIFFERENCE = N41 DESIRED IND
96.0 + (+3.88) = 99.88

Standard:

Calculates desired N-41 indication to be 99.9%

Determined by algebraically summing N-41 difference from Step 2 and N-41 present indicated value.

(Band 95.8 + 3.68 = 99.48 to 96.2 + 4.08 = 100.28)

Comment:

OP-105 Attachment 2 Step 4

Performance Step: 5

Record the as found setting of the GAIN potentiometer on the front of Power Range Drawer B

Standard:

Records setting as 2.70

Comment:

OP-105 Attachment 2 Step 5

✓ **Performance Step: 6** VERIFY the ROD BANK SELECTOR switch is in MANUAL per OP-104 Section 8.15, Placing Rod Control In Manual For Testing/Plant Conditions, to prevent undesired rod movement during the adjustment.

Standard:

Obtains copy of OP-104 Section 8.15 and places Rod Bank Selector switch in Manual position.

OP-104 Section 8.15

Initial conditions: Plant conditions or testing require Rod Control to be in Manual

Step 1. At the MCB, ROTATE the ROD BANK SELECTOR Switch to MAN

Step 2. VERIFY Rod Speed of 48 steps per minute on SI-408

NOTE: OMM-001, Operations Administrative Requirements, suggest a trip limit of Tavg not within 10° of Tref, whether high or low, in stable plant conditions.

Step 3. MAINTAIN Tavg within 2°F of Tref.

Step 4. IF desired WHEN testing is completed or plant conditions have changed, THEN **PLACE** Rod Control in AUTO per Section 5.5.

Evaluator Cue:	**Provide OP-104, Section 8.15 to the candidate at this time.**

Comment:

OP-105 Attachment 2 Step 6

Performance Step: 7

VERIFY the Feed Reg Bypass Valve Controllers are in manual to prevent undesired valve motion during adjustment.
1FW-140, MN FW A REG BYP FK-479.1
1FW-256, MN FW B REG BYP FK-489.1
1FW-198, MN FW C REG BYP FK-499.1

Standard:

Locates MCB switches for Feed Reg Bypass Valve Controllers and verifies that all 3 are in manual

Comment:

OP-105, Attachment 2, N41 Adjustments (sheet 4 of 12)
Step 1

Performance Step: 8

RECORD N41 DESIRED IND from calculation performed in Step 2 on Sheet 3 in the space provided.

N41 DESIRED IND _______________

Standard:

Records desired indication from calculation performed in Step 2 on sheet 3 in the space provided

N41 desired indication (99.88)
(Band 99.48 to 100.28)

Comment:

OP-105, Attachment 2, N41 Adjustments,
Caution prior to Step 2

Performance Step: 9 Caution: Adjustments should NOT be made to a Power Range channel while another channel has tripped bistables. This may cause a reactor trip due to required logic being completed. (Reference CR 97-03027-5)

Standard: Reads and place keeps caution

Comment:

OP-105, Attachment 2, N41 Adjustments, Step 2

Performance Step: 10 VERIFY that there are no PR trip bistables energized on TSLB-3 or TSLB-4, except for trip bistables that are manually blocked.

Standard: Verifies no PR trip bistables energized on TSLB-3 or TSLB-4, with exception of PR High Flux Lo Setpoint, which is manually blocked

Comment:

OP-105, Attachment 2, N41 Adjustments,
Note prior to Step 3

Performance Step: 11 After the GAIN adjustment, the METER RATE switch may be returned to SLOW to evaluate if the adjustment is adequate.

Standard: Reads and place keeps Note

Comment:

OP-105, Attachment 2, N41 Adjustments, Step 3

Performance Step: 12 At N41 power range drawer A, PLACE the METER RATE switch in FAST.

Standard: Places Meter Rate switch to Fast position

Comment:

OP-105, Attachment 2, N41 Adjustments,
Caution prior to Step 4

Performance Step: 13 Adjustment of GAIN potentiometer should be made slowly to avoid producing a RATE TRIP signal.

Standard: Reads and place keeps Caution

Comment:

OP-105, Attachment 2, N41 Adjustments, Step 4

✓ **Performance Step: 14** At N41 power range drawer B, PERFORM the following:

- **a.** UNLOCK GAIN potentiometer.
- **b.** SLOWLY ADJUST GAIN potentiometer until the indicated power is within 0.2% of the DESIRED IND from Step 1.

Standard: Unlocks and slowly adjusts Gain pot in CW direction until indicated power is within 0.2 % of value previously determined in Step 1

(STEP 1 was 99.9, band is 99.5 to 100.2)

Comment: Due to the sensitivity of the pots, acceptance for this step is lower limit of 99.5% and upper limit of 100.2%

OP-105, Attachment 2, N41 Adjustments, Step 5

Performance Step: 15 IF there is insufficient fine gain adjustment using the drawer B gain potentiometer, THEN PERFORM Attachment 3 AND RETURN to Step 4.b: (Otherwise, this Step is N/A)

Standard: N/A's step since adequate adjustment exists

Comment:

OP-105, Attachment 2, N41 Adjustments, Step 6

Performance Step: 16 LOCK GAIN potentiometer(s) in place.

Standard: Locks Gain pot on N-41 in place

Comment:

OP-105, Attachment 2, N41 Adjustments, Step 7

Performance Step: 17 IF a RATE TRIP signal occurs, THEN RESET the RATE TRIP signal before going to the next channel.
(Otherwise this Step is N/A)

Standard: N/A's step Rate Trip should not have occurred

✓ **Comment:** **(✓) This step will become critical if a RATE TRIP signal is generated during the performance of the JPM.**

OP-105, Attachment 2, N41 Adjustments, Step 8

Performance Step: 18 RECORD the as left GAIN potentiometer setting.

Standard: Records current as left GAIN potentiometer setting in space provided.

Comment:

OP-105, Attachment 2, N41 Adjustments, Step 9

Performance Step: 19 On Drawer A, PLACE the METER RATE switch in SLOW.

Standard: Takes Drawer A Meter Rate switch to SLOW

Comment:

OP-105, Attachment 2, N41 Adjustments, Step 10

Performance Step: 20 RECORD the new indicated power (on drawer A)

Standard: Records the new indicated power on drawer A in space provided

Comment:

OP-105, Attachment 2, N41 Adjustments, Step 11

Performance Step: 21 VERIFY that new indicated power is within 2% of desired indication from Step 1 above.

Standard: Verifies that new indicated power is within 2% of desired indication from Step 1 above.

Comment:

OP-105, Attachment 2, Restoration

Performance Step: 22 NOTE: If placing ROD BANK SELECTOR switch in AUTO use OP-104 Section 5.5, Automatic Rod Control.

Standard: Reads and place keeps Note

Comment:

Evaluator Cue:	**After completing Attachment 2 up to the Restoration of Rod Control: Evaluation on this JPM is complete.** **END OF JPM** **Inform Simulator Operator to place the Simulator in Freeze.**

STOP TIME: ______________

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam Simulator JPM g

Power range NI Gain Adjustment
In accordance with OP-105, Excore Nuclear Instrumentation

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

Initial Conditions:	• The unit is at 100% equilibrium conditions. • Following maintenance on PR Channel N-41, all required testing has been completed and the channel is ready to be returned to service. A calorimetric has just been performed per OST-1000, Power Range Heat Balance, ERFIS Online Calculation, Daily Interval, Mode 1 (Above 15% Power). • The calculated power is 99.88%. Indicated power on PR channel NI-41 at the time of the calorimetric was at its current value. • Rod Control is in Automatic

Initiating Cue:	You are to perform the Power Range NI Gain Adjust for PR channel NI-41 in accordance with OP-105, Excore Nuclear Instrumentation, Section 8.3 and Attachment 2.

Facility:	Harris Nuclear Plant	Task No.:	008010H101
Task Title:	Align CCW to Support RHR System Operations	JPM No.:	2020 NRC Exam Simulator JPM CR h
K/A Reference:	008 A4.01 RO 3.3 SRO 3.1	**ALTERNATE PATH - NO**	

Examinee: ________________________ NRC Examiner: ______________

Facility Evaluator: ________________________ Date: ________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom ______ Simulator X Plant ________

READ TO THE EXAMINEE	
I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The Unit is in Mode 4, going to Mode 5 • Preparations are underway to place both trains of RHR in service • Both ESW Trains are in service • CCW Pump "A" is running

Initiating Cue:	• In accordance with OP-145, Component Cooling Water ○ Align CCW to support operation of both RHR trains ○ Align B train of CCW to supply the non-essential header • All Section 3.0 Prerequisites are met.

Examiners Note:	• **The candidate should be briefed outside of the simulator prior to performing this JPM. Provide a copy of OP-145, Rev. 80, pages 1-11, 15-19, 48-53 and 224-225.** • **Inform them that ALL initial conditions are satisfied.** • **The section 8.9 initial conditions should be signed off and section 5.2 initial conditions signed off. This will allow them to review the Precautions and Limitations associated with OP-145 and have time for a task review of the steps. Expect the candidate to take about 10 - 15 minutes to complete this review.**

Task Standard:	Two CCW Pumps running with the required CCW flow rate established through both RHR Heat Exchangers and 'B' Train of CCW supplying the non-essential header in accordance with OP-145.
Required Materials:	None
General References:	OP-145, Component Cooling Water, Rev. 80
Handout:	OP-145, Rev. 80, pages 1 – 11, Prerequisites, P&L's OP-145, Rev. 80, pages 15 – 19, Section 5.2, Starting a Second CCW Pump, **with the Initial Conditions signed off if desired** OP-145, Rev 80, pages 48 – 53, Section 8.9, Aligning CCW to Support RHR System Operations, **with the Initial Conditions signed off if desired** OP-145, Rev 80, pages 224 – 225, Attachment 18, RHR HX Outlet and RHR Pump Cooler Outlet Flows As Found / As Left Data
Time Critical Task:	No
Validation Time:	25 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 7	Critical because two CCW Pumps are required to support two RHR Trains and other loads.
Step 11	Critical to align flow through RHR HX "A" or heat exchanger will not provide cooling.
Step 15	Critical to isolate Train "A" from Non-Essential Header.
Step 17	Critical to isolate Train "A" from Non-Essential Header.
Step 26	Critical to align flow through RHR HX "B".

2020 NRC Exam - SIMULATOR SETUP

Simulator Operator – NOTE: The setup time for this JPM may take > 5 minutes

- Reset to IC-150
- Password “NRC3sros”
- Go to RUN and wait ~ 10 seconds then silence and acknowledge alarms.

GO TO FREEZE and inform the lead examiner the Simulator is ready. DO NOT GO TO RUN until directed by the lead examiner. (The examiner has provided to the candidate with initial conditions and the initiating cues prior to placing the simulator in RUN.)

To recreate the IC setup for this JPM:

- Reset to IC-16
- Place LTOPS in NORMAL and establish feed with AFW to prevent distracting alarms
- Start both ESW Pumps
- Throttle 1CC-575 irf ccw080 (n 0 0) 50 0 0
- Shut 1CC-522 irf ccw122 (n 0 0) 0 0 0
- Open 1CC-512 irf ccw083 (n 0 0) 100 0 0
- Check FI-652.1 in normal band 10,000 gpm to 11,000 gpm
    - Perform the following to adjust CCW flow on FI-652.1 to band of 7850 and 8500 gpm
        - Throttle 1CC-508 irf ccw073 (n 0 0) 4 00:00:30 41
- IF VCT makeup occurs during this set up allow the VCT to fill
- Stabilize the plant including AFW flows
- FREEZE and SNAP

Simulator Operator:	***When directed by the Lead Examiner go to Run.***

START TIME: ____________

OP-145, Section 8.9.1 Initial Conditions

Performance Step: 1 Implements procedure

Standard:

- Reviews Sections 1.0 through 4.0.
- Proceeds to Section 8.9.
- Reviews the initial conditions for 8.9
  1. RHR System operation desired for RCS cooldown (YES)

Comment:

OP-145, 8.9.2.1 Notes and Caution prior to step 1

Performance Step: 2

Note: The purpose of this section is to ensure CCW pump runout does not occur. Maximum flow through one CCW pump is 12,650 gpm. This section will ensure that one CCW pump is not supplying both essential cooling loops and the non-essential loop simultaneously.

Note: Normally it is desirable to place both RHR cooling trains in operation in Mode 4. This will require both CCW pumps to be in operation and one train of non-essential supply and return valves to be shut.

Caution: To prevent pump runout when aligning CCW flow to the RHR Hx, verify flow rate to the Non-essential header with one pump running is less than 8500 gpm, as indicated on FI-652.1 (FI-653.1) prior to opening 1CC-147 (1CC-167).

Standard: Reads and place keeps Notes and Caution

Comment:

OP-145, 8.9.2 step 1

Performance Step: 3 PERFORM the following to verify total CCW flow rate is between 7850 gpm and 8500 gpm:

- IF SFP 2&3A is in service, THEN THROTTLE SHUT 1CC-508, SFP HX 2&3A CCW Outlet Isolation Valve.
- IF SFP 2&3B is in service, THEN THROTTLE SHUT 1CC-521, SFP HX 2&3B CCW Outlet Isolation Valve.

Standard: Determines flow is within band and initials step

Simulator Operator / Communicator:	If contacted to throttle shut 1CC-508 use Simulator Drawing CCW07 / open window for 1CC-508 and adjust the percent open

Evaluator Note:	**FI-652.1 MCB indication reads 8400 gpm and 8200 gpm on ERFIS** **FI-652.1 Tolerance is ± 200 gpm based on which indication the candidate is monitoring.**

Comment:

OP-145, 8.9.2 step 2

Performance Step: 4 IF both trains of RHR cooling are to be placed in service, START the second CCW pump per Section 5.2.

Standard: Proceeds to Section 5.2 to start CCW Pump “B”.

Comment:

OP-145, 5.2.1

Performance Step: 5 Verifies Initial Conditions

Standard: Notes all Initial Conditions are signed (including the prestart checks)

Contacts Aux Operator to standby for “B” CCW pump start

Simulator Communicator:	When requested: Report you are standing by.

Comment:

OP-145, 5.2.2 Notes and Caution prior to step 1

Performance Step: 6 Note:

- Starting the second pump could cause ΔP fluctuations across REM-01CC-3501ASA (BSB) which may shut solenoid valves 1CC-23 and 1CC-40.
- Starting the second pump may cause flow oscillations which could shut 1CC-252. Re-opening of 1CC-252 should not be attempted until the second pump is secured.
- APP-ALB-005 Windows 1-3, 2-1, and 3-2 are expected alarms when starting the second CCW Pump.

Caution:

- With one CCW pump running and the standby pump capable of an automatic start, ensure a minimum flowrate of 7850 gpm exists as indicated on FI-652.1 (FI-653.1). If both CCW pumps are running OR the CCW trains are separated, a minimum of 3850 gpm per pump is required. This lower flowrate should only be allowed for short durations to accomplish pump swapping or system realignment.

Standard: Reads and place keeps notes and caution

Makes PA announcement for pump start then:

At the MCB, START CCW Pump Train B-SB.

Comment:

OP-145, 5.2.2 step 1

✓ **Performance Step: 7** At the MCB, **START** CCW Pump Train B-SB (A-SA).

Standard:

Selects CCW Pump “B” to start and releases **(critical)**
Verifies pump start indications (not critical)
Contacts Aux Operator to ensure good start (not critical)

Simulator Communicator:	IF contacted OR asked to report on “B” CCW pump start Report the “B” CCW pump had a good start and you will continue to monitor during pump warm up to full operating conditions.

Comment:

OP-145, 5.2.2 step 2

Performance Step: 8 VERIFY flow is greater than or equal to 3850 gpm on FI-653.1 and FI- 652.1.

Standard: Verifies ≥ 3850 gpm on FI-653.1 and FI-652.1.

Comment:

OP-145, 5.2.2 step 3

Performance Step: 9 VERIFY OPEN, 1CC-23 and 1CC-40, REM 3501 A CCW Inlet Solenoid Valve and REM 3501 B CCW Inlet Solenoid Valve respectively.

Standard: Contacts Aux Operator for verification

Simulator Communicator:	**Report: 1CC-23 and 1CC-40 are OPEN**

Comment:

OP-145, 5.2.2 steps 4 and 5

Performance Step: 10 IF 1CC-23 or 1CC-40 shut as a result of starting the CCW pump, THEN INITIATE a CR.

PERFORM one of the following:

- SECURE a second CCW Pump using Section 7.1
- ALIGN CCW to support RHR cooling using Section 8.9

Standard: N/As step 4 and returns to Section 8.9

Comment:

OP-145, 8.9.2 step 3

✓ **Performance Step: 11** OPEN 1CC-147 (~~1CC-167~~), CCW FROM RHR HEAT EXCHANGER A-SA (~~B-SB~~).

Standard: Locates switch and Places 1CC-147 in OPEN (RED indication).

Comment:

OP-145, 8.9.2 Caution prior to step 4

Performance Step: 12 Caution:

With one CCW pump running and the standby pump capable of an automatic start, ensure a minimum flowrate of 7850 gpm exists as indicated on FI-652.1 (FI-653.1). If both CCW pumps are running OR the CCW trains are separated, a minimum of 3850 gpm per pump is required. This lower flowrate should only be allowed for short durations to accomplish pump swapping or system realignment. (Reference 2.6.6)

Standard: Reads and place keeps Caution

Comment:

OP-145, 8.9.2 step 4

Performance Step: 13 VERIFY RHR HX A (~~B~~) out flow is 5600 to 8150 gpm on FI-688A1 ~~(FI-689A1).~~

Standard: Verifies RHR HX A out flow is 5600 to 8150 gpm on FI-688A1.

Comment:

OP-145, 8.9.2 Notes and Caution prior to step 5

Performance Step: 14 Note: Steps 8.9.2.5 and 8.9.2.6 are written to place the non-essential header on 'B' CCW. If desired to place the non-essential header on 'A' CCW, perform steps in parenthesis.

Note: If a leak occurs, and surge tank level is less than 40% (below the divider plate), make up water for the B CCW header will be supplied by demin water. Makeup water for the A CCW header must be supplied by the Reactor Makeup Water System.

Caution: Shutting both 1CC-99 and 1CC-113 will result in the loss of the Nonessential Header.

Standard: Reads and place keeps Notes and Caution

Comment:

OP-145, 8.9.2 step 5

✓ **Performance Step: 15** IF both CCW pumps are in service, CLOSE 1CC-99 (~~1CC-113~~), CCW HEAT EXCHANGER A(~~B~~) TO NONESSENTIAL SUP.

Standard: Locates switch and Closes only 1CC-99 (GREEN indication).

Comment:

OP-145, 8.9.2 Caution prior to step 6

Performance Step: 16 Caution: Shutting both 1CC-128 and 1CC-127 will result in the loss of the Nonessential Header.

Standard: Reads and place keeps Caution

Comment:

OP-145, 8.9.2 step 6

✓ **Performance Step: 17** IF both CCW pumps are in service, CLOSE 1CC-128 (~~1CC-127~~), CCW NONESSENTIAL RETURN TO HEADER A(~~B~~).

Standard: Locates switch and Closes 1CC-128 (GREEN indication).

Comment:

OP-145, 8.9.2 step 7.a.(1)

Performance Step: 18 VERIFY the following:

a. IF both CCW Pumps are in service, PERFORM the following, recording data on Attachment 18:
   - RECORD AS FOUND (AF) RHR Hx A-SA (~~B-SB~~) CCW outlet flow from FCC0688 (~~FCC0689~~).

Standard:

- Determines current reading on MCB indicator FI-688A1
- Circles appropriate step (8.9.2.7.a(1)) in the A Train column of Attachment 18
- Documents the as found (AF) value in the Reading column of Attachment 18

Comment:

OP-145, 8.9.2 step 7.a.(2)

Performance Step: 19 VERIFY the following:

a. IF both CCW Pumps are in service, PERFORM the following, recording data on Attachment 18:

- RECORD AS FOUND (AF) RHR Pump A (~~B~~) Cooler Outlet flow rate from FIS-646 (~~FIS-647~~).

Standard:

- Contacts local operator to determine the current reading on indicator FIS-646
- Circles appropriate step (8.9.2.7.a(2)) in the A Train column of Attachment 18
- Documents the as found (AF) value in the Reading column of Attachment 18

Simulator Communicator:	**Report: The as found value of FIS-646 is 8.4 gpm**

Comment:

OP-145, 8.9.2 step 7.a.(3)

Performance Step: 20 VERIFY the following:

a. IF both CCW Pumps are in service, PERFORM the following, recording data on Attachment 18:

- IF RHR Hx A-SA (~~B-SB~~) CCW outlet flow is NOT within 7850 - 8050 gpm, THEN PERFORM the following:

Standard:

- Determines steps 7.a (3) is N/A

Simulator Operator:	**If asked to adjust flow then reduce the percent open of 1CC-146 on Sim drawing for CCW03 from 46 to 44 to obtain slightly lower flow rate on FI-688A1**

Comment:

OP-145, 8.9.2 step 7.a.(4)

Performance Step: 21

VERIFY the following:

a. IF both CCW Pumps are in service, PERFORM the following, recording data on Attachment 18:

- RECORD throttle position of 1CC-146 (~~1CC-166~~), in DEGREES OPEN.

Standard:

- Contacts local operator to determine the current position of 1CC-146
- Circles appropriate step (8.9.2.7.a(4)) in the A Train column of Attachment 18
- Documents the as found (AF) position in the Reading column of Attachment 18

Simulator Communicator:	**Report: The position of 1CC-146 is 47.5 degrees OPEN**

Comment:

OP-145, 8.9.2 step 7.a.(5)

Performance Step: 22

VERIFY the following:

a. IF both CCW Pumps are in service, PERFORM the following, recording data on Attachment 18:

- IF CCW cooler outlet flow rate is NOT between 7 gpm and 10 gpm as indicated on FIS-646 (~~FIS-647~~), THEN PERFORM the following substeps:

Standard:

- Determines step 7.a (5) is N/A

Comment:

OP-145, 8.9.2 step 7.a.(6)

Performance Step: 23

VERIFY the following:
a. IF both CCW Pumps are in service, PERFORM the following, recording data on Attachment 18:

- RECORD AS LEFT (AL) RHR Hx A-SA (~~B-SB~~) CCW outlet flow from FCC0688 (~~FCC0689~~).

Standard:

- Determines current reading on MCB indicator FI-688A1
- Circles appropriate step (8.9.2.7.a(6)) in the A Train column of Attachment 18
- Documents the as found (AL) value in the Reading column of Attachment 18

Comment:

OP-145, 8.9.2 step 7.a.(7)

Performance Step: 24

VERIFY the following:
a. IF both CCW Pumps are in service, PERFORM the following, recording data on Attachment 18:

- RECORD AS LEFT (AL) RHR Pump A (~~B~~) Cooler Outlet flow rate from FIS-646 (~~FIS-647~~).

Standard:

- Contacts local operator to determine the current reading on indicator FIS-646
- Circles appropriate step (8.9.2.7.a(7)) in the A Train column of Attachment 18
- Documents the as found (AL) value in the Reading column of Attachment 18

Simulator Communicator:	**Report: The as left value of FIS-646 is 8.4 gpm**

Comment:

OP-145, 8.9.2 step 7.a.(8)

Performance Step: 23

VERIFY the following:
a. IF both CCW Pumps are in service, PERFORM the following, recording data on Attachment 18:

- PERFORM component verifications on Attachment 18.

Standard:

- Directs a second operator verify position of 1CC-146

Comment:

OP-145, 8.9.2 step 7.b

Performance Step: 24

VERIFY the following:
b. IF one CCW Pump is in service, THEN PERFORM the following:

Standard:

- Determines step 7.b is N/A

Comment:

OP-145, 8.9.2 Caution prior to step 8

Performance Step: 25

Caution: Do not supply CCW to both RHR Heat Exchangers simultaneously with only one CCW pump running.

Standard:

Reads and place keeps note

Comment:

OP-145, 8.9.2 step 8

✓ **Performance Step: 26** IF both trains of RHR cooling are to be placed in service, OPEN 1CC-167 (~~1CC-147~~), CCW FROM RHR HEAT EXCHANGER B-SB (~~A-SA~~).

Standard: Locates switch and Opens 1CC-167 (RED indication).

Comment:

OP-145, 8.9.2 step 9

Performance Step: 27 VERIFY CCW Pump B-SB (~~A-SA~~) flow rate in the required range, as follows:

- CHECK CCW Pump B-SB (~~A-SA~~) flow rate is between 10,000 and 12,500 gpm on MCB indicator FI-653.1 (~~FI-652.1~~). IF flow rate is not between 10,000 and 12,500 gpm, THEN ADJUST the applicable valve.

Standard: Verifies flow rate is between 10,000 and 12,500 gpm on FI-653.1 and there is NO need for flow adjustment and N/As step 9.b.

Comment:

OP-145, 8.9.2 step 10

Performance Step: 28 Locally VERIFY FI-693, CCW Flow Gross Failed Fuel Detector, is between 8 and 12 gpm.

Standard: Contacts Aux Operator to verify flow on FI-693 between 8 and 12 gpm

Simulator Communicator:	**Flow on FI-693 reads 10 gpm**

Comment:

OP-145, 8.9.2 step 11

Performance Step: 29 WHEN CCW is no longer required for RHR Operation, PERFORM the following steps:

Standard: Step is N/A at this time.

Comment:

Evaluator Cue:	**When Step 8.9.2.11 is read: Evaluation on this JPM is complete.** **Announce END OF JPM** **Direct Simulator Operator to place the Simulator in FREEZE.**

STOP TIME: ______________

Simulator Operator:	**When directed by the Lead Examiner then go to Freeze.**

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam Simulator JPM h
Align CCW to Support RHR System Operations

In accordance with OP-145, Component Cooling Water

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ____________________ Date: ____________

JPM CUE SHEET

Initial Conditions:	• The Unit is in Mode 4, going to Mode 5 • Preparations are underway to place both trains of RHR in service • Both ESW Trains are in service • CCW Pump "A" is running

Initiating Cue:	• In accordance with OP-145, Component Cooling Water o Align CCW to support operation of both RHR trains o Align B train of CCW to supply the non-essential header • All Section 3.0 Prerequisites are met.

Facility:	Harris Nuclear Plant	Task No.:	344074H504
Title:	Locally Start EDGs per OP-155	JPM No.:	2020 NRC Exam In-Plant JPM i
K/A Reference:	APE 068 AA1.10 RO 3.7 SRO 3.9	**ALTERNATE PATH - YES**	
Examinee:	______________	NRC Examiner:	______________
Facility Evaluator:	______________	Date:	________

Method of testing:

Simulated Performance: X   Actual Performance: _______

Classroom ______ Simulator ______ Plant X

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• AOP-004 has been entered due to a fire in the MCR • ‘A’ (‘B)’ Safety bus is not energized due to a SUT fault • EDG 1A-SA (1B-SB) was in standby operation but did not automatically start • AOP-004 has directed that the ‘A’ (‘B’) EDG be locally started and ‘A’ (‘B’) safety bus energized • Both safety and non-safety Plant DC Distribution Systems are in operation per OP-156.01 to support EDG operation • The manual transfer to LOCAL has been completed at MTP 1A-SA (1B-SB)

Initiating Cue:	• Your position is the Outside Operator • The CRS has directed you to locally start the ‘A’ (‘B’) EDG IAW OP-155 Section 8.14.2.

Evaluator:	**At this time provide the student with a copy of OP-155, Section 8.14, signed off up to 8.14.1, step 4 and the student Initiating Cue for the EDG the JPM will be performed on.** **This should be the NON- protected train EDG based on discussion with Shift Manager.**

Task Standard:	EDG ‘A’ (‘B’) is locally started and manually reset the K1 relay to allow the associated EDG field to self flash in accordance with OP-155
Required Materials:	Standard PPE Attachments 1 and 2, Pictures of K1 relay **(Optional)**
General References:	OP-155 (Rev. 91) APP-DGP-001 (Rev. 34)
Handout:	OP-155, Rev. 91, pages 1 – 14, Prerequisites, P&L’s OP-155, Rev. 91, pages 88 – 94, Section 8.14, Local Manual Start with an Emergency Bus Deenergized, **signed off up to 8.14.1 Step 4 if desired.**
Time Critical Task:	No
Validation Time:	15 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
6	Depressing the STOP pushbutton will reset the starting circuit and allow the EDG to be started. If this pushbutton is NOT depressed the EDG will not start and the bus will remain de-energized.
13	Depressing the START pushbutton will start the EDG. The EDG must be operating to power the emergency bus.
18	Required to reset K1 relay to allow EDG to flash.

PERFORMANCE STEP	ALTERNATE PATH JUSTIFICATION
17	Generator field fails to automatically flash requiring operator action to reset the K1 relay to allow the generator field to flash.

BEFORE YOU START THIS JPM

IN-PLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAY BE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the candidate have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Have the candidate simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

NOTE:	**Add one minute for Take a Minute checks.**

Start time begins when the candidate is briefed outside the Blue Heaven conference Room

START TIME: ____________

Proceeds to 1A-SA (1B-SB) EDG

OP-155 Section 8.14.1 Notes prior to Initial Conditions

Performance Step: 1 NOTE: Equipment applicable to B train is shown in parenthesis.

NOTE: If power is NOT available to 1D131-3 (1E231-3), Engine Control Panel, the ECP Temperature Indication System and ENGINE HOURS meter are de-energized.

Standard: Operator reads and placekeeps notes

Comment:

OP-155 Section 8.14.1 Initial Conditions

Performance Step: 2

1. EDG 1A-SA (1B-SB) is not in operation. **(YES)**
2. AOP-004 has directed EDG to be started. **(YES)**
3. Both safety and non-safety Plant DC Distribution System in operation per OP-156.01 to support EDG operation. **(YES)**
4. Attachments 1, 3, 4 (1A-SA) or 2, 3, 5 (1B-SB) are complete. **(YES – the EDG was in standby and ready for an emergency start so all Attachments for these lineups have been previously completed)**

Standard: Reviews Initial Conditions 1 – 4 as complete

Evaluator Cue:	**If CRS is called at the ACP about the initial conditions then cue that the initial conditions are satisfied.**

OP-155 Section 8.14.2 Note prior to Step 1

Performance Step: 3

NOTE: Equipment applicable to B train is shown in parenthesis. Relay 43T-DG6/SA is N/A if transferring B train relays.

Standard: Operator reads and placekeeps notes

Comment:

OP-155 Section 8.14.2 Step 1

Performance Step: 4 IF necessary, THEN, At Main Transfer Panel 1A-SA (1B-SB), PERFORM a manual transfer to LOCAL by placing the following relays in TRANSF:

Relay	Position
43T-DG1SA/1082 (43T-DG1SB/1085)	TRANSF
43T-DG2SA/1082 (43T-DG2SB/1085)	TRANSF
43T-DG3SA/1082 (43T-DG3SB/1085)	TRANSF
43T-DG4SA/1082 (43T-DG4SB/1085)	TRANSF
43T-DG5SA/1082 (43T-DG5SB/1085)	TRANSF
43T-DG6SA/1082	TRANSF

Standard: **Initials step 1 completed**
(Provided in the JPM initial conditions)

Evaluator Cue:	**IF asked or if they are going to perform step 1 then CUE:** **The Main Transfer Panel 1A-SA (1B-SB) relays have been placed in LOCAL by another operator.**

Comment:

OP-155 Section 8.14.2 Step 2

Performance Step: 5 **ENSURE** the following:

a. NO non-emergency trips are active.

b. At GCP, **ENSURE** the UNIT-PARALLEL switch in PARALLEL.

Standard: Operator verifies on the EDG control panel that there are NO non-emergency trips active and the UNIT-PARALLEL switch is in the PARALLEL position

Evaluator Cue:	**(when checked) The non-emergency trip windows are clear**

Comment:

OP-155 Section 8.14.2 Step 3

✓ **Performance Step: 6** IF the FAILED TO START annunciator is in, THEN DEPRESS the STOP pushbutton

(**critical step** is to depress the STOP pushbutton; not the resetting of the annunciator)

Standard: Operator checks annunciator window G-6 clear

Evaluator Cue:	**Annunciator window G-6 "Failed to Start" is lit**

✓ **Standard:** Operator depresses 'RED' STOP pushbutton

Evaluator Cue:	**Annunciator window G-6 is slow flashing**

Standard: Operator depresses the alarm functions reset pushbutton

Evaluator Cue:	**Annunciator window G-6 is clear**

Comment:

OP-155 Section 8.14.2 Step 4

Performance Step: 7 At ECP, **ENSURE** the following OPERATIONAL MODE indicator lights are *LIT*:

a. A CONTROL CIRCUIT
b. B CONTROL CIRCUIT

Standard: Operator checks control circuit lights lit

Evaluator Cue:	**(when checked)** **The control circuit light for A Control Circuit is lit** **The control circuit light for B Control Circuit is lit**

Comment:

OP-155 Section 8.14.2 Step 5

Performance Step: 8 PERFORM a general inspection of the EDG, looking for any obvious reasons that the EDG failed to start

Standard: Operator performs inspection

Evaluator Cue:	**Allow the candidate 1 or 2 minutes to describe the actions for performing the inspection then cue them there are no obvious signs of damage and all indications associated with this EDG are as you see them now.**

Comment:

OP-155 Section 8.14.2 Step 6

Performance Step: 9 ENSURE the Fuel Limit Cylinder has retracted

Standard: Operator Verifies **the** Fuel Limit Cylinder has retracted

Evaluator Cue:	**NOTE: The examinee may want to climb on the EDG to verify where the Fuel Limit Cylinder is and inspect the current position. Direct them to use a flashlight and describe how they would verify the Fuel Limit Cylinder has retracted. (SAFETY FIRST)** ***On the left side of the mechanical governor is where the Fuel Limit Cylinder is located. On the engine side of the cylinder a rod extends and will contact a bolted on flat stock piece attached to the fuel rack rod. The fuel limit cylinder rod extends and contacts this piece to prevent full fuel rack motion. Looking at the back of the cylinder you can see if the rod that protrudes out of it is retracted or extended.*** **Cue: The Fuel Limit Cylinder (rod) has retracted**

Comment:

	OP-155 Section 8.14.2, Note before step 7
Performance Step: 10	NOTE: If starting air receiver pressures are low, but still above 100 psig, isolating one of the receivers prior to attempting to start the EDG will maximize the potential number of start attempts
Standard:	Operator reads and placekeeps notes
Comment:	

	OP-155 Section 8.14.2 step 7
Performance Step: 11	**ENSURE** at least one starting air receiver is greater than 100 psig
Standard:	Operator verifies at least one starting air receiver is greater than 100 psig

Evaluator Cue:	**Pressures are what you see - (current values)**

Comment:

OP-155 Section 8.14.2, Notes before step 8

NOTE: If the STOP pushbutton was depressed in Step 8.14.2.3, the control circuitry must reset before another start can be attempted. This takes approximately three minutes.

Performance Step: 12

NOTE: The EDG most likely will start in a fast start mode due to the undervoltage. Depending on what failure(s) occurred, however, the EDG may start in the slow start mode.

Standard: Operator reads and placekeeps notes

Evaluator Cue:	**If asked inform the candidate 5 minutes has elapsed**

Comment:

OP-155 Section 8.14.2 step 8

✓ **Performance Step: 13** **DEPRESS** EDG 1A-SA (1B-SB) PUSH TO START pushbutton

Standard: Operator depresses ***(BLACK)*** EDG 1A-SA (1B-SB) PUSH TO START pushbutton

Evaluator Cue:	**1A-SA (1B-SB) EDG has started** **(when checked) The Diesel Engine RPM's are rising and have now stabilized at 450 RPM**

Comment:

OP-155 Section 8.14.2, Caution before step 9

Performance Step: 14

CAUTION: EDG field flashing will occur at 360 to 380 RPM for a normal slow start. EDG field flashing will occur at 190 to 210 RPM for an emergency start. If EDG fails to start field flashing will remain energized resulting in possible fire in GCP control section. Depressing the EDG 1A-SA (1B-SB) STOP pushbutton will de-energize field flashing circuit.

Standard: Operator reads and placekeeps caution

Evaluator Cue:	**Operator may verify proper start of diesel. If operator requests or goes to observe these indication, provide the following information as requested:** • **DG LOCAL CONTROL PANEL AC VOLTMETER – 0 VAC** • **DG GEN FIELD AMMETER – 0 Amps** • **DG frequency is 0 Hz** • **DG FIELD DC VOLTAGE – 0 volts**

Comment:

OP-155 Section 8.14.2 step 9

Performance Step: 15 IF the FAILED TO START annunciator is received, THEN DEPRESS the STOP pushbutton

Standard: Operator checks annunciator and does not depress STOP

Evaluator Cue:	**(when checked) Annunciator G-6 “Failed To Start” is clear**

Comment:

OP-155 Section 8.14.2 notes before step 10

Performance Step: 16

NOTE: If EDG starts but the generator fails to flash:

- The EDG will be operating at 470 rpm with zero field volts.
- The K1 relay must be reset to enable any future field flashing.
- If EDG is left running, the EDG should self flash within 10 seconds, if the K1 relay is reset.

NOTE: Satisfactory field flash conditions are indicated by:

- Generator AC voltage between 6500 and 7200 volts
- Engine speed between 445 and 455 rpm
- Field DC voltage indicates a higher voltage

Standard: Operator reads and placekeeps notes

Evaluator Note:	**IF checking parameters cue these when asked:** • **DG LOCAL CONTROL PANEL AC VOLTMETER – 0 VAC** • **Engine speed is 450 RPM** • **DG 1A-SA FIELD DC VOLTAGE – 0 volts**

Comment:

OP-155 Section 8.14.2 step 10 - ALTERNATE PATH begins

Performance Step: 17 IF EDG starts but the generator fails to flash, THEN PERFORM the following

Standard: Operator identifies the generator failed to flash and implements step 8.14.2.10.

Evaluator Note:	**From the indications provided to the examinee, they should be able to identify that the field has NOT flashed.**

Comment:

Evaluator Note:	**The Attachment 1 pictures will be used once the location of the GCP has been demonstrated. Att. 1 should be shown first. When the operator points out the K1 relay, Att. 2 may be used for close up review of the relay.**

OP-155 Section 8.14.2 step 10.a (ALTERNATE PATH)

✓ **Performance Step: 18** In GCP behind left section door three feet above floor, **RESET** the K1 relay by pushing the reset switch in the direction of the arrow on the K1 Relay reset coil.

Standard: Operator locates and resets relay K1 in the GCP (left section).

Operator should determine the generator field has flashed.

Evaluator Note:	**(When reset) The K1 relay is reset.** **IF checking parameters, provide when asked:** • **DG LOCAL CONTROL PANEL AC VOLTMETER – 6900 VAC** • **Engine speed is 450 RPM** • **DG 1A-SA FIELD DC VOLTAGE – 45 volts**

Comment:

OP-155 Section 8.14.2 step 10.b (ALTERNATE PATH)

Performance Step: 19 **ENSURE** disconnect DS-DP-1A1-SA-13 (DS-DP-1B1-SB-13), Gen 1A-SA (1B-SB) Control Panel, in ON and power is present to panel.

Standard: Operator locates and verifies disconnect DS-DP-1A1-SA-13 (DS-DP-1B1-SB-13) is ON. Operator should also note that steps 8.14.2.10.c through 10.e are now N/A.

Evaluator Note:	**When checked, disconnect DS-DP-1A1-SA-13 (DS-DP-1B1-SB-13) is in the ON position.**

Comment:

OP-155 Section 8.14.2 step 11

Performance Step: 20 **ENSURE** the following:

a. CS-1983SA (CS-2003SB), A (B) EDG Auxiliary Lube Oil Pump, in *AUTO*

b. CS-1984SA (CS-2004SB), A (B) EDG Lube Oil Keep Warm Pump, in *AUTO*.

Standard: Operator verifies AUXILIARY LUBE OIL PUMP control switch in *AUTO*

Evaluator Cue:	**AUXILIARY LUBE OIL PUMP switch is in AUTO**

Standard: Operator verifies LUBE OIL KEEP WARM PUMP control switch in *AUTO*.

Evaluator Cue:	**LUBE OIL KEEP WARM PUMP control switch in AUTO**

Comment:

OP-155 Section 8.14.2 step 12

Performance Step: 21 At ECP, **ENSURE** the following:

a. Engine is running at 445 to 455 RPM.
b. JACKET WATER PRESS rises to 10 to 20 psig.
c. SHUTDOWN SYSTEM ACTIVE light lit.
d. READY TO LOAD light lit.

Standard: Operator verifies Engine is running at 445 to 455 RPM

Evaluator Cue:	**Engine RPM is 450**

Standard: Operator verifies JACKET WATER PRESS increases to 10 to 20 psig

Evaluator Cue:	**JACKET WATER PRESS is 16 psig**

Standard: Operator verifies SHUTDOWN SYSTEM ACTIVE light lit

Evaluator Cue:	**SHUTDOWN SYSTEM ACTIVE** (**Red**) **light is lit**

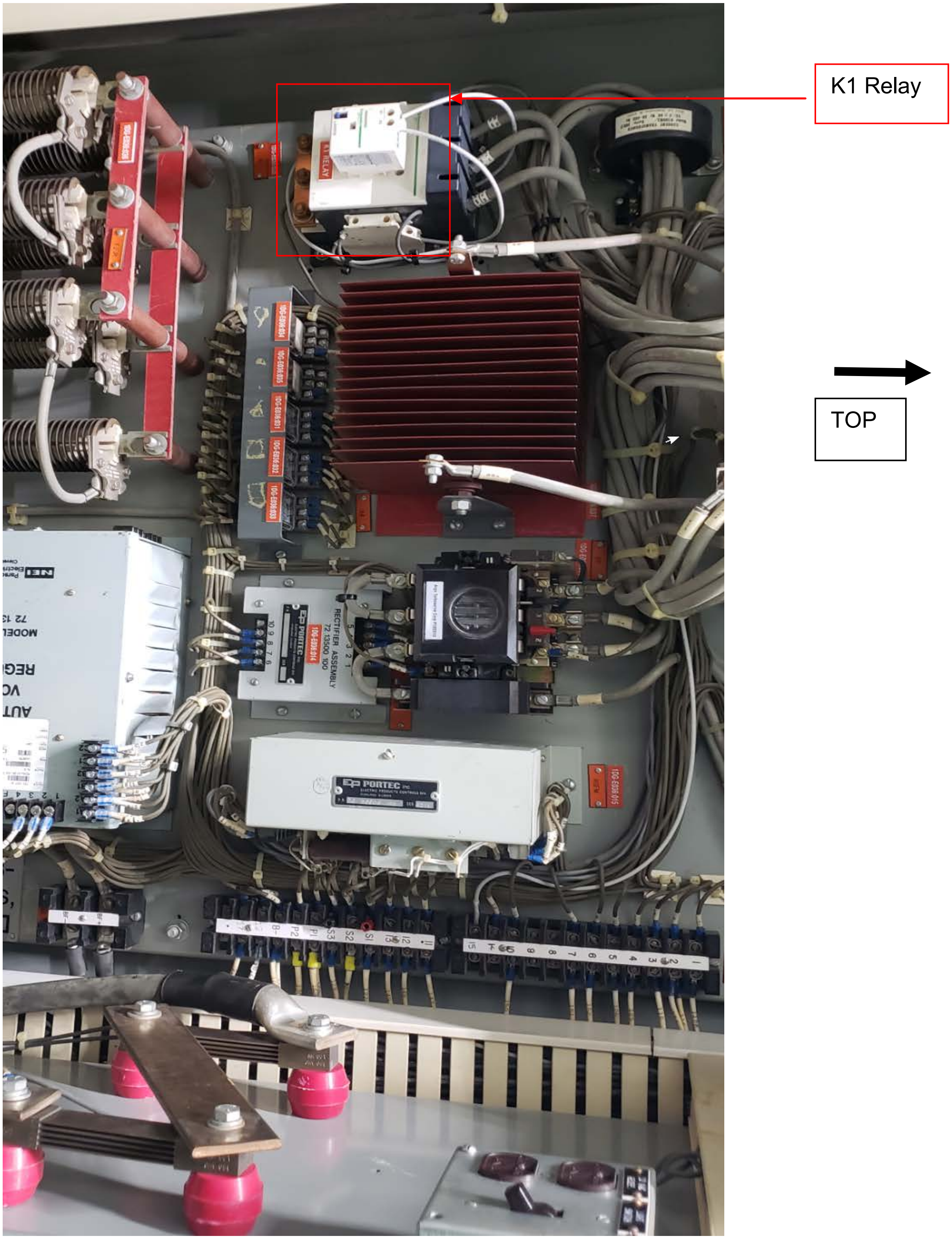
Standard: Operator verifies READY TO LOAD light lit

Evaluator Cue:	**READY TO LOAD** (**Blue**) **light is lit**

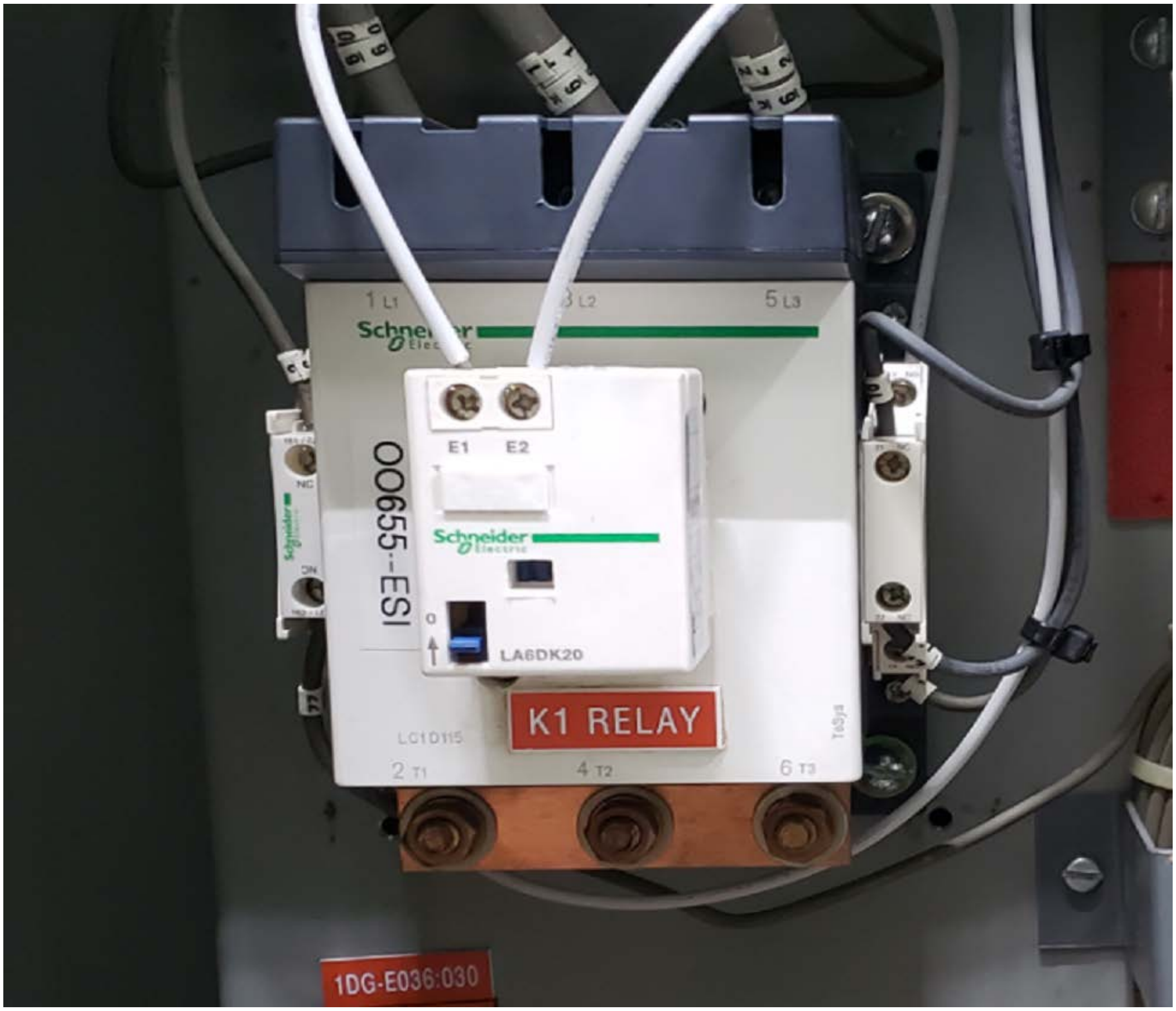
Comment:

STOP TIME: ______________

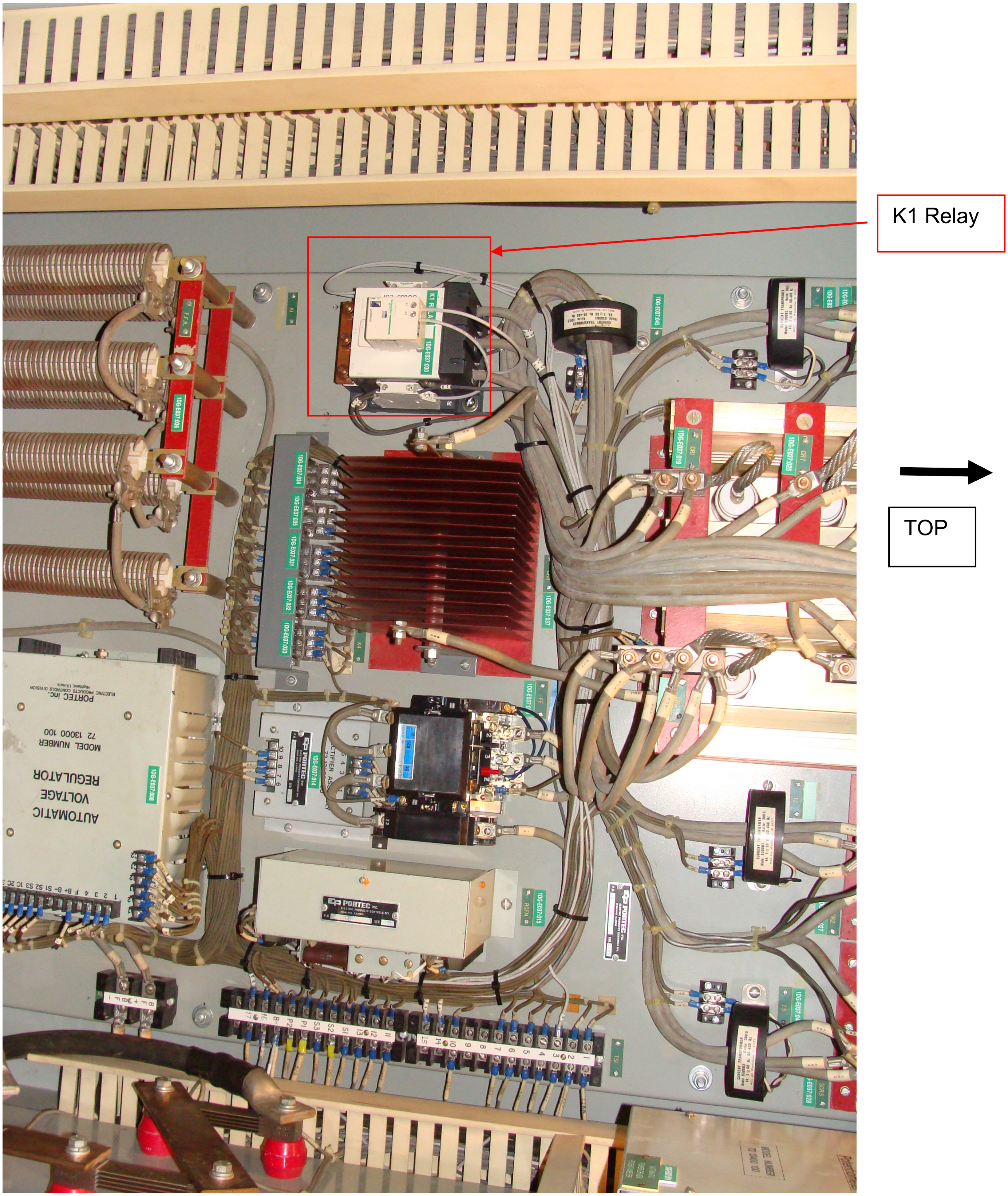
KEY 1A



KEY 2A


1 L1
3 L2
5 L3
Schneider Electric
E1
E2
OO655--ESI
LA6DK20
K1 RELAY
LC1D115
2 T1
4 T2
6 T3
TeSys
1DG-E036:030

KEY 1B



KEY 2B


K1 RELAY
1DG-E037:030
OO655-ESI
E1
E2
Schneider Electric
LA6DK20
0
LC1D115

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam In-Plant JPM j

Locally Start A-SA or B-SB EDG per OP-155

Examinee's Name:

Date Performed:

Facility Evaluator:

Time to Complete:

Question Documentation

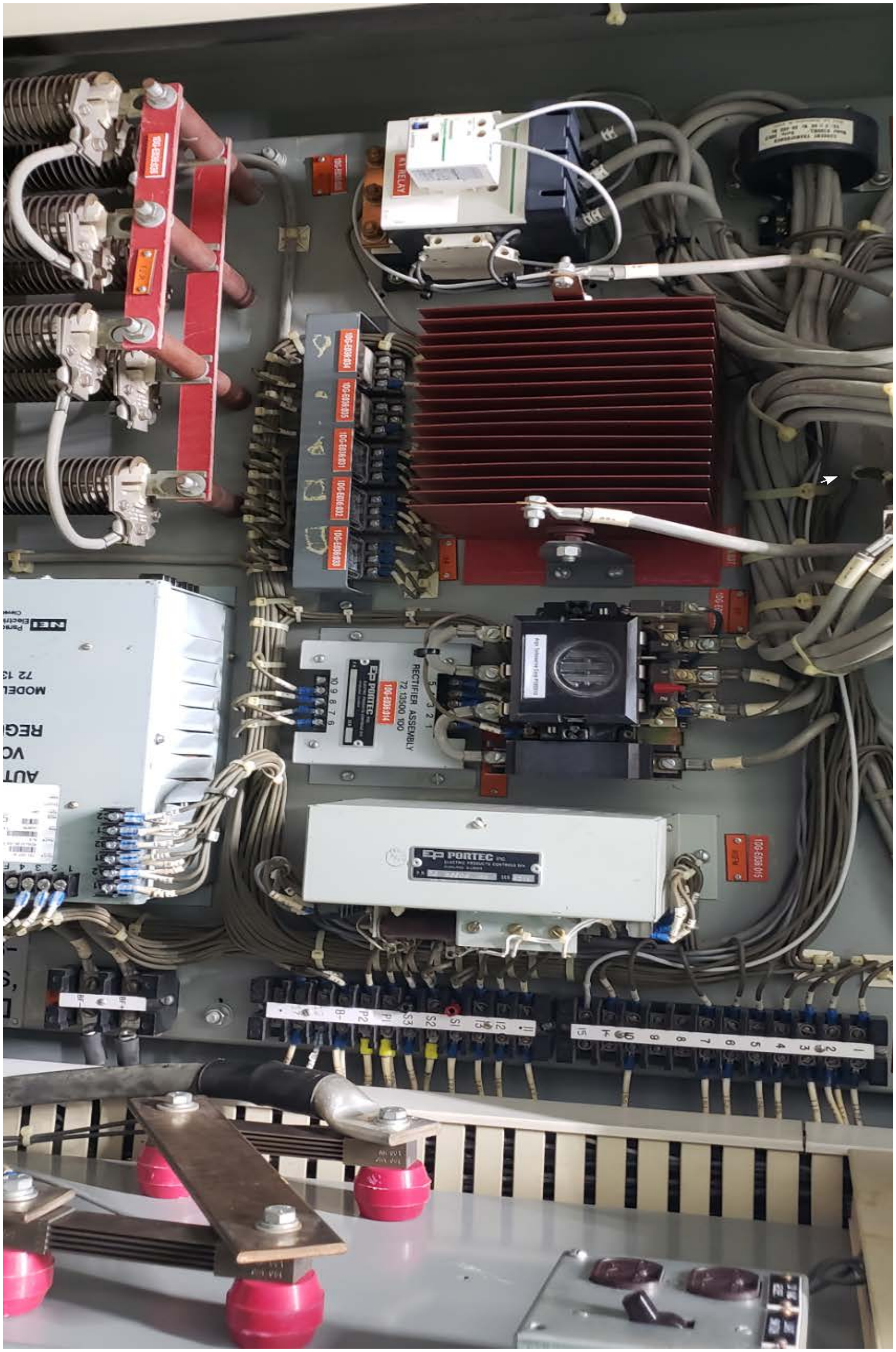
Question:

Response:

Result: PASS ________ FAIL ________

Examiner's Signature: ________________________________ Date: ______________________

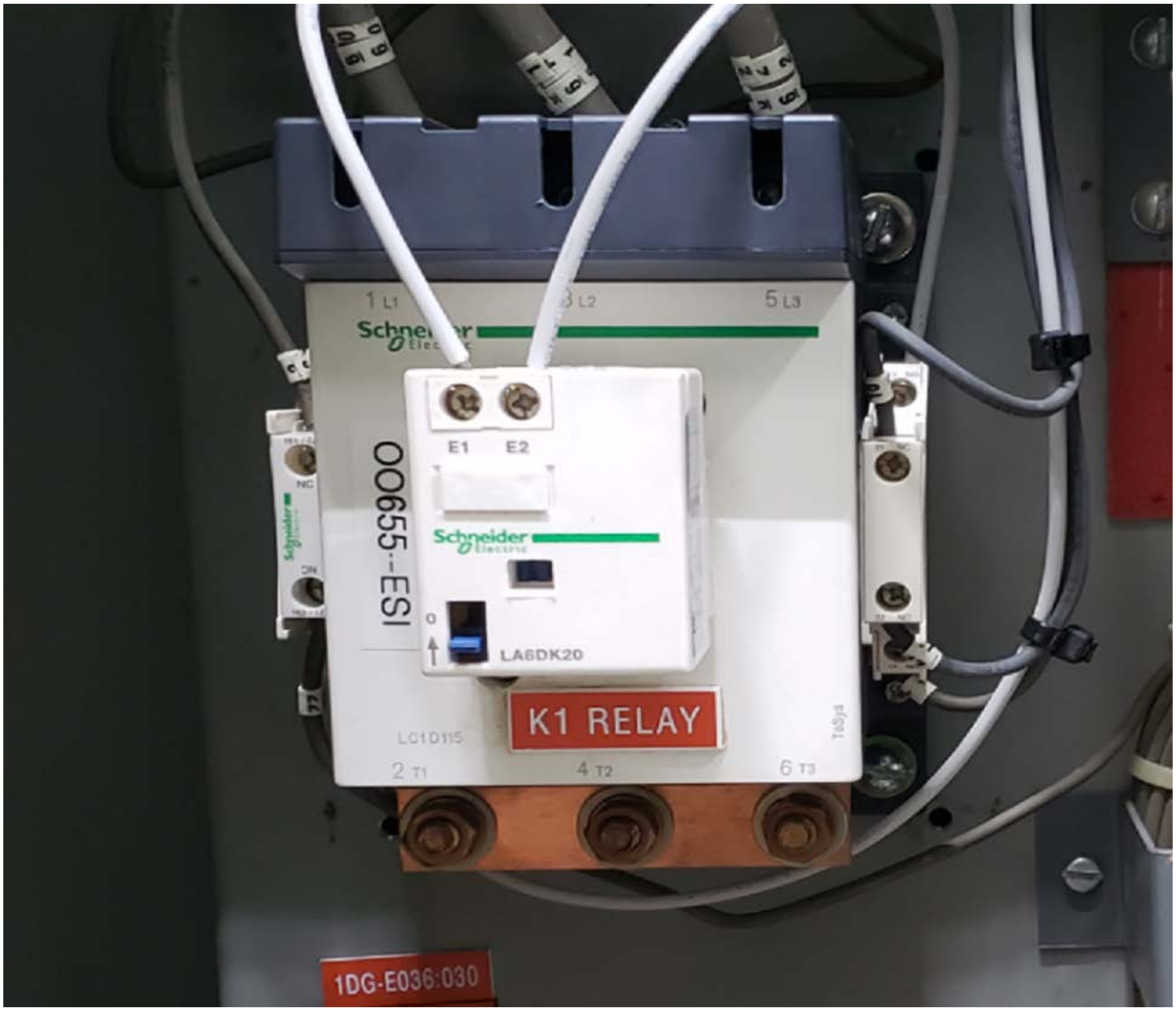
Attachment 1A



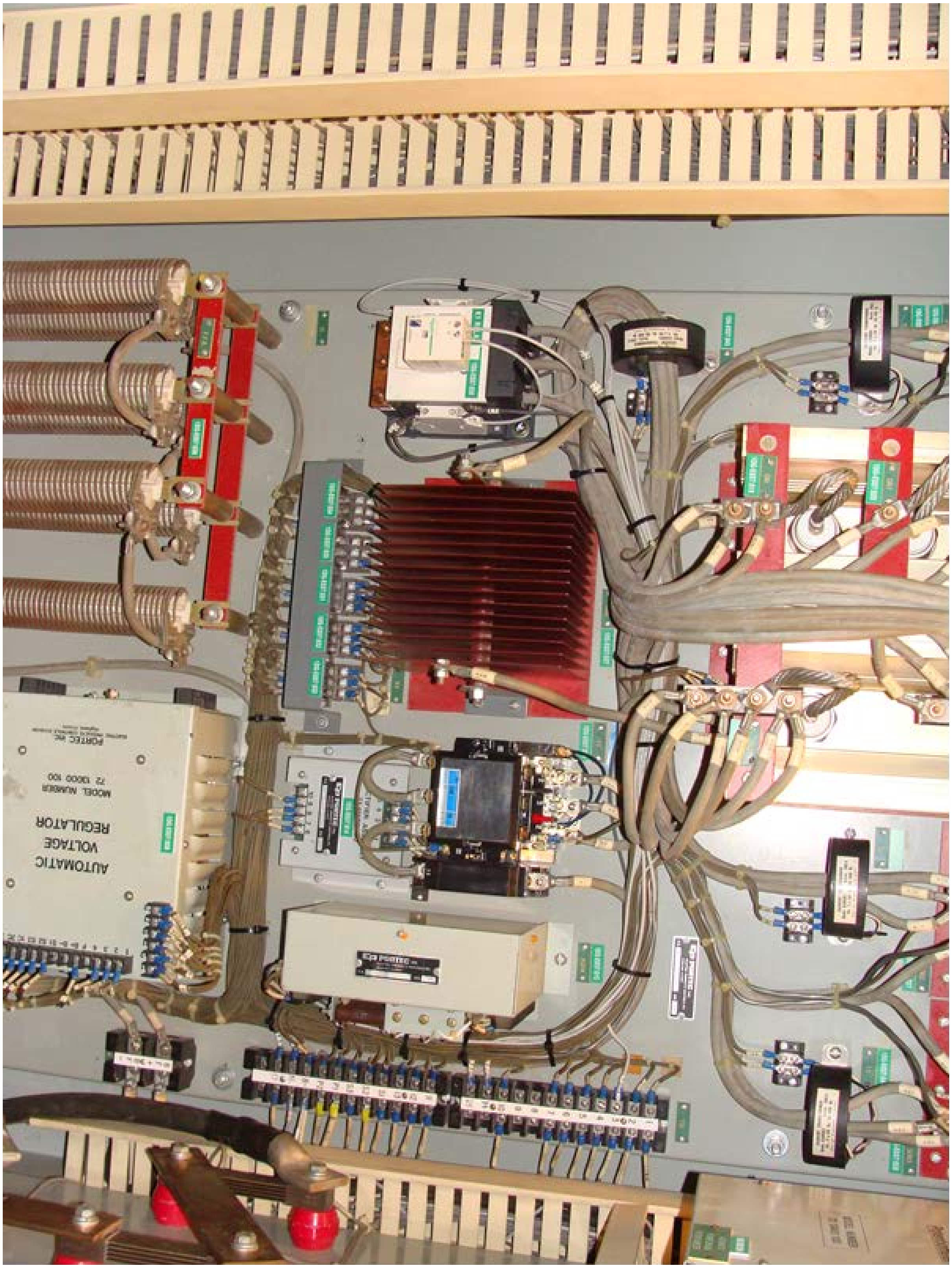
→

TOP

Attachment 2A



Attachment 1B



TOP

Attachment 2B

BEFORE YOU START THIS JPM

IN-PLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAYBE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the examiner have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

Initial Conditions:	• AOP-004 has been entered due to a fire in the MCR • 'A' ('B)' Safety bus is not energized due to a SUT fault • EDG 1A-SA (1B-SB) was in standby operation but did not automatically start • AOP-004 has directed that the 'A' ('B') EDG be locally started and 'A' ('B') safety bus energized • Both safety and non-safety Plant DC Distribution Systems are in operation per OP-156.01 to support EDG operation • The manual transfer to LOCAL has been completed at MTP 1A-SA (1B-SB)

Initiating Cue:	• Your position is the Outside Operator • The CRS has directed you to locally start the 'A' ('B') EDG IAW OP-155 Section 8.14.2.

Facility: Harris Nuclear Plant

Task No.: 121001H404

Task Title: Place the ASI System in Standby Alignment (OP-185)

JPM No.: 2020 NRC Exam In-Plant JPM j

K/A Reference: AA2.67 RO 2.9 SRO 3.1

ALTERNATE PATH - NO

Examinee: ______________________

NRC Examiner: ________________

Facility Evaluator: ______________________

Date: ________

Method of testing:

Simulated Performance: X

Actual Performance: _______

Classroom ______ Simulator ______ Plant X

READ TO THE EXAMINEE	
I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• A Normal Plant Heatup is in progress in accordance with GP-002, Normal Plant Heatup From Cold Solid To Hot Subcritical Mode 5 To Mode 3. • Current RCS temperature is 335°F • The ‘A’ CSIP is in service and providing 9 gpm to all 3 RCP Seals.

Initiating Cue:	• The MCR has directed you to perform OP-185, Alternate Seal Injection, Section 5.1, Automatic Standby Alignment Prior to MODE 3. • Initial Conditions have been met • You are to perform section 5.1.2. **For this task assume you have a set of AO RAB rounds keys.**

Evaluator:	**At this time provide the student with a copy of OP-185, Section 5.1, Marked up through Initial Conditions**

NOTE: Expect that the entry and exit from the RCA will add time to complete this JPM.

Task Standard: Place the ASI System in Standby Alignment in accordance with OP-185

Required Materials: Standard PPE
Photos of 1CS-828 and 1CS-827 (Attachment 1A and 1B)

General References: OP-185, Alternate Seal Injection, Rev. 12

Handout: OP-185, Rev. 12, pages 1 – 4, Prerequisites, P&L's
OP-185, Rev. 12, pages 5 – 8, Section 5.1, Automatic Standby Alignment Prior to MODE 3, **signed off up to 5.1.1 Step 7 if desired.**

Time Critical Task: No

Validation Time: 15 minutes

PERFORMANCE STEP	**CRITICAL STEP JUSTIFICATION**
Step 3	Required to ensure proper Alternate Seal Injection Standby Alignment Prior to entering Mode 3.
Step 4	Required to ensure proper Alternate Seal Injection Standby Alignment Prior to entering Mode 3.
Step 7	Must locate CS-210.1 switch and place CS-210.1, ASI PUMP, in the AUTO position in order for the ASI pump to work when required.
Step 8	Must locate CS-210.2, SQUIB VALVE 1ASI-21 BYPASS, switch and place the switch to NORMAL for the squib valve to work when required.
Step 9	Must locate CS-210.3, SQUIB VALVE 1ASI-22 BYPASS, switch and place the switch to NORMAL for the squib valve to work when required.
Step 10	Must locate and PLACE breaker PP-1D232-6, Feed to ASI System Control Panel, in the ON. position in order for the ASI pump to work when required.
Step 11	Must locate and PLACE breaker 1D23-1B, Alternate Seal Injection Pump in the ON. position in order for the ASI pump to work when required.

BEFORE YOU START THIS JPM

IN-PLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAY BE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the candidate have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Have the candidate simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

NOTE:	**Add one minute for Take a Minute checks.**

Start time begins when the candidate is briefed outside the Waste Process Building 276' Elevation conference Room

START TIME: ____________

OP-185, 5.1.2 Note prior to step 1

Performance Step: 1 The valves in step 5.1.2.2 and 5.1.2.3 are located in the CVCS Filter Valve Gallery.

Standard: Operator reads and placekeeps notes

Comment:

OP-185, 5.1.2.1

Performance Step: 2 IF aligning ASI for OPT-1532 testing, THEN:
a. MARK Steps 5.1.2.2, 5.1.2.3, 5.1.2.10 and 5.1.2.11 N/A.
b. CONTINUE with Step 5.1.2.4.

Standard: Determines steps 5.1.2.2, 5.1.2.3, 5.1.2.10 and 5.1.2.11 are applicable and marks Step 5.1.2.1 N/A

Comment:

OP-185, 5.1.2.2

✓ **Performance Step: 3** Lock Open 1CS-828, ASI Supply Header Upstream Isolation Vlv.

Evaluator Note:	**The location of 1CS-828 may be difficult to see when following the candidate into the CVCS filter valve gallery since the area to stand in is small. Have the candidate show you where the valve is located on the valve map outside the CVCS filter gallery before entering the area.** *** There may have be a change in dose conditions from when this JPM was validated. DO NOT ENTER THE AREA TO IDENTIFY THE VALVES IF YOU WILL RECEIVE A DOSE OF ≥1milliRem during the performance of this JPM. Instead use the valve map and Attachment 1A to allow the candidate to describe what would be done.**

Standard: Locates 1CS-828, ASI Supply Header Upstream Isolation valve (or **on the valve map** outside the CVCS filter valve gallery) (#51 on the map).

Evaluator Cue:	**Provide feedback that 1CS-828 as found position is locked open.**

Comment:

OP-185, 5.1.2.3

✓ **Performance Step: 4** Lock Open 1CS-827, ASI Supply Header Downstream Isolation Vlv.

Evaluator Note:	**The location of 1CS-827 may be difficult to see when following the candidate into the CVCS filter valve gallery since the area to stand in is small. Have the candidate show you where the valve is located on the valve map outside the CVCS filter gallery before entering the area.** *** There may have be a change in dose conditions from when this JPM was validated. DO NOT ENTER THE AREA TO IDENTIFY THE VALVES IF YOU WILL RECEIVE A DOSE OF ≥1milliRem during the performance of this JPM. Instead use the valve map and Attachment 1B to allow the candidate to describe what would be done.**

Standard: Locates 1CS-827, ASI Supply Header Downstream Isolation valve (or **on the valve map** outside the CVCS filter valve gallery) (#50 on the map).

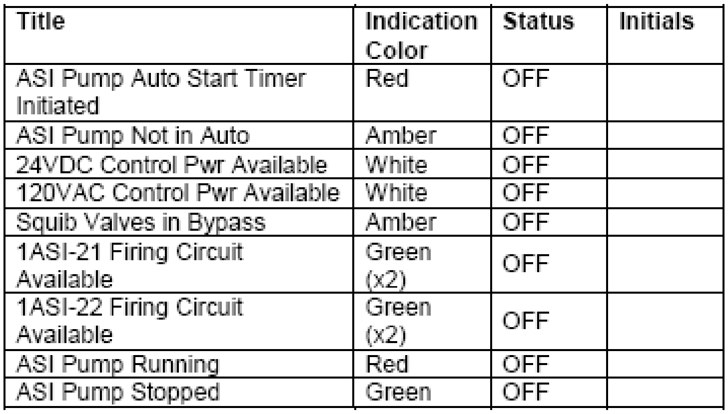
Evaluator Cue:	**Provide feedback that 1CS-827 as found position is locked open**.

Comment:

OP-185, 5.1.2.4

Evaluator Cue:	**Provide feedback as each component is checked that the associated light indication is OFF**.

Performance Step: 5 CHECK the ASI System Control Panel for the following:



Title	Indication Color	Status	Initials
ASI Pump Auto Start Timer Initiated	Red	OFF	
ASI Pump Not in Auto	Amber	OFF	
24VDC Control Pwr Available	White	OFF	
120VAC Control Pwr Available	White	OFF	
Squib Valves in Bypass	Amber	OFF	
1ASI-21 Firing Circuit Available	Green (x2)	OFF	
1ASI-22 Firing Circuit Available	Green (x2)	OFF	
ASI Pump Running	Red	OFF	
ASI Pump Stopped	Green	OFF	

Standard: Locates each indication in step 4 and checks that all lights are off.

Comment:

OP-185 section 5.1.2 Note prior to step 5

Performance Step: 6 The actions in Step 5.1.2.5 will clear ALB-8-2-3, ASI SYSTEM TROUBLE, if no other inputs to the ALB are active.

Standard: Operator reads and placekeeps notes

Comment:

OP-185 section 5.1.2.5.a

✓ **Performance Step: 7** At the ASI System Control Panel, PERFORM the following:

a. PLACE CS-210.1, ASI PUMP, in AUTO.

Evaluator Cue: **The initial switch position of CS-210.1 is OFF**

Standard: Locates CS-210.1 and places CS-210.1, ASI PUMP, in the AUTO position.

NOTE: Both lights are OUT and both lights will STILL BE OUT when CS-210.1 is placed in AUTO

Evaluator Cue: **Once the switch is turned provide feedback:**

CS-210.1 is now in AUTO

Comment:

OP-185 section 5.1.2.5.b (Begin Critical Steps)

✓ **Performance Step: 8** Place CS-210.2, SQUIB VALVE 1ASI-21 BYPASS, in NORMAL

Evaluator Cue:	**The initial switch position of CS-210.2 is in BYPASS**

Standard: Identifies that this step is a critical step. Locates CS-210.2 and determine that switch is in the bypass position. Repositions switch to NORMAL

Evaluator Cue:	**NOTE: Both lights are OUT and both lights will STILL BE OUT when CS-210.2 is placed in NORMAL** **Once the switch is turned:** **CS-210.2 is now in NORMAL.**

Comment:

OP-185 section 5.1.2.5.c

✓ **Performance Step: 9** Place CS-210.3, SQUIB VALVE 1ASI-22 BYPASS, in NORMAL

Evaluator Cue:	**The initial switch position of CS-210.3 is in BYPASS**

Standard: Locates CS-210.3 and determine that switch is in the bypass position. Repositions switch to NORMAL

Evaluator Cue:	**NOTE: Both lights are OUT and both lights will STILL BE OUT when CS-210.3 is placed in NORMAL** **Once the switch is turned:** **CS-210.3 is now in NORMAL.**

Comment:

OP-185 section 5.1.2.6

✓ **Performance Step: 10** PLACE breaker PP-1D232-6, Feed to ASI System Control Panel, to ON.

Evaluator Cue:	**PP-1D232-6, Feed to ASI System Control breaker Panel is OFF**

Standard: Locates PP-1D232-6 and determines that the breaker is OFF. Places breaker to the ON position.

Evaluator Cue:	**Once the breaker is manipulated:** **The breaker is now ON** **NOTE: Candidate may go back to the panel after the breaker is ON to check light conditions. IF they do and they want a response for the light indications then cue:** **24VDC control power available (white light ON)** **120VAC control power available (white light ON)** **ALL 4 Green lights on Firing Circuit Available (green ON)**

Comment:

OP-185 section 5.1.2.7

✓ **Performance Step: 11** PLACE breaker 1D23-1B, Alternate Seal Injection Pump, to ON.

Evaluator Cue:	**1D23-1B, Alternate Seal Injection Pump breaker is OFF** **IF ASKED: (both red and green lights should be OFF)**

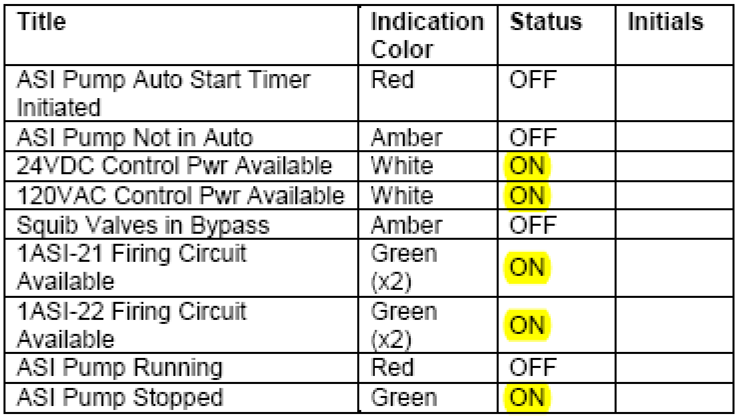
Standard: Locates breaker 1D23-1B, Alternate Seal Injection Pump is OFF and once the breaker is manipulated provide feedback that breaker is now ON.

Evaluator Cue:	**Once the breaker is manipulated:** **The breaker is now ON.** **IF ASKED: green light is LIT on breaker AND above the Auto switch 210.1 on the panel**

Comment:

End Critical Steps
OP-185 section 5.1.2.8

Performance Step: 12 Check the ASI system control Panel for the following:



Title	Indication Color	Status	Initials
ASI Pump Auto Start Timer Initiated	Red	OFF	
ASI Pump Not in Auto	Amber	OFF	
24VDC Control Pwr Available	White	ON	
120VAC Control Pwr Available	White	ON	
Squib Valves in Bypass	Amber	OFF	
1ASI-21 Firing Circuit Available	Green (x2)	ON	
1ASI-22 Firing Circuit Available	Green (x2)	ON	
ASI Pump Running	Red	OFF	
ASI Pump Stopped	Green	ON	

Evaluator Cue:	**As each indicator is read, provide feedback that each light is properly lit as determined from the table in this step.**

Standard: Locates each indication listed in step 8 and verifies that the lights are indicating properly.

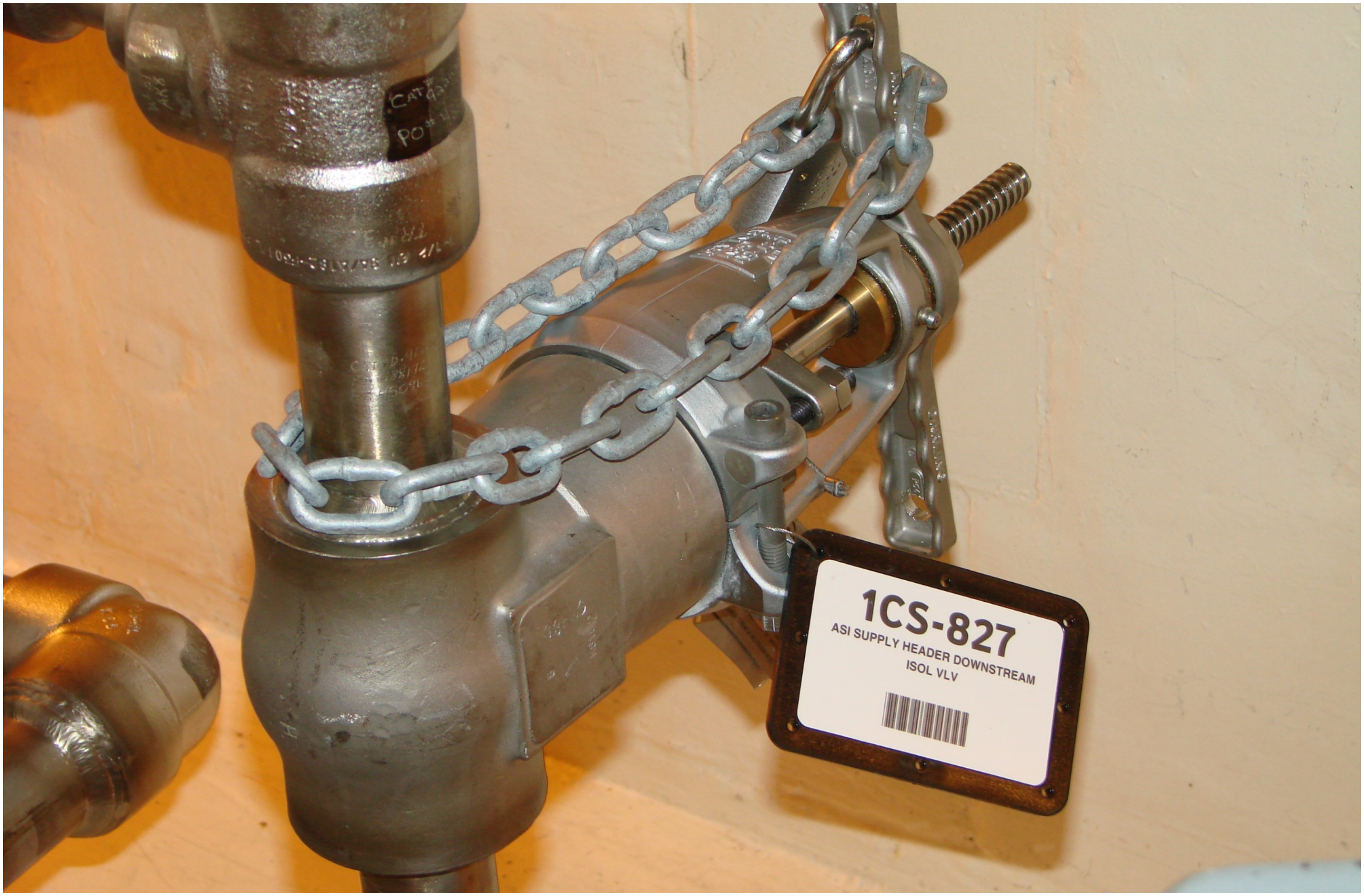
Evaluator Cue:	**Once Student reads step 5.1.2.9, Announce End of JPM.**

Comment:

STOP TIME: ________________

Attachment 1A

Attachment 1B



VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 HNP NRC Exam In-Plant JPM j

Place the ASI System in Standby Alignment
In accordance with OP-185

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

BEFORE YOU START THIS JPM

IN-PLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAYBE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the examiner have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

Initial Conditions:	• A Normal Plant Heatup is in progress in accordance with GP-002, Normal Plant Heatup From Cold Solid To Hot Subcritical Mode 5 To Mode 3. • Current RCS temperature is 335°F • The 'A' CSIP is in service and providing 9 gpm to all 3 RCP Seals.

Initiating Cue:	• The MCR has directed you to perform OP-185, Alternate Seal Injection, Section 5.1, Automatic Standby Alignment Prior to MODE 3. • Initial Conditions have been met • You are to perform section 5.1.2. **For this task assume you have a set of AO RAB rounds keys.**

Facility:	Harris Nuclear Plant	Task No.:	301013H401
Task Title:	Isolate the ECCS Accumulators After a Control Room Evacuation (AOP-004)	JPM No.:	2020 NRC Exam In-Plant JPM k
K/A Reference:	APE 068 AG2.1.30 RO 3.9 SRO 3.4	**ALTERNATE PATH - NO**	

Examinee: ______________________ NRC Examiner: ________________

Facility Evaluator: ______________________ Date: ________

Method of testing:

Simulated Performance: X Actual Performance: _______

Classroom ______ Simulator ______ Plant X

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• The control room has been evacuated due to a fire. • A cooldown is in progress in accordance with AOP-004, REMOTE SHUTDOWN. • RCS Pressure is 975 PSIG by PI-402.2.

Initiating Cue:	You are the TB AO and have been assigned to perform AOP-004, Section 3.1, Step 30 – Isolate SI Accumulators.

Task Standard: All accumulators isolated and MOV's de-energized in accordance with AOP-004.

Required Materials:

- Standard PPE
- Attachments 1, 2, 3, 4 and 5, ATP Pictures of 1SI-246, 1SI-247, 1SI-248

(Optional)

- ***Provide the evaluator with a key for ATP Cabinet (Key #33).***
- ***Opening the ATP door actuates an alarm in the control room.***
- ***To minimize Control room distractions Attachments 1-5 should be used.***
- ***Discuss with CRS the option of allowing applicants to reset local alarm caused by opening ATP Cabinet door on Sequencer Panel if Attachments 1-5 are not used.***

General References: AOP-004, Remote Shutdown, Rev 70

Handout: AOP-004, Rev. 70, page 37, Section 3.1, Step 30 (Pg. 37)

Time Critical Task: No

Validation Time: 20 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 2	Required action to reenergizes valve motor to allow valve operation
Step 3	Required action to reenergizes valve motor to allow valve operation
Step 4	Repositioning of this valve is required to isolated accumulator water flow path and possible inadvertent injection of nitrogen into the RCS
Step 5	Repositioning of this valve is required to isolated accumulator water flow path and possible inadvertent injection of nitrogen into the RCS

BEFORE YOU START THIS JPM

IN-PLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAY BE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the candidate have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Have the candidate simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

NOTE:	**Add one minute for Take a Minute checks.**

Start time begins when the candidate is briefed outside the Blue Heaven conference Room

START TIME: ____________

AOP-004

Performance Step: 1 Obtain locked valve and ATP Cabinet keys.

Standard: Discusses how to obtain keys (ACP Room Key Locker).

Evaluator Note:	**The Evaluator can elect to have the applicant locate the ACP Room Key Locker or to discuss the key acquisition. The key to the ACP Key Locker is in a "break glass" case.**

Evaluator Cue:	• **Provide Handout of AOP-004, Section 3.1, Step 30.** • **Acknowledge discussion and tell applicant to assume that they have the locked valve key.** • **Provide ATP Cabinet key if Attachment 1-5 will NOT be utilized.**

Comment:

AOP-004, Section 3.1, Step 30.a

✓ **Performance Step: 2**

WHEN RCS pressure is 900 to 1000 psig, as indicated on PI-402.2, THEN ISOLATE SI accumulators:
286' RAB / RO with locked valve key
a. UNLOCK AND TURN ON accumulator discharge valve breakers:

- Accumulator A: 1A21-SA-5C (both breakers)
- Accumulator C: 1A21-SA-3D (both breakers)

Standard:

- Locates 1A21-SA-5C, identifies UNLOCKS then places breaker in ON position for both breakers for Accumulator A
- Locates 1A21-SA-3D, identifies UNLOCKS then places breaker in ON position for both breakers for Accumulator C

Evaluator Cue:

Provide feedback on breaker position:
Valve indicating lights indicate the valves are OPEN, i.e. Red light ON, Green light OFF.
Voltage Vision lights indicate valve is energized, i.e. Red lights ON

Comment:

The locked valve key is on the key ring which is a turnover item for the TB AO watch station. Critical to unlock valve breaker in order to provide power to MOV for operation.

AOP-004, Section 3.1, Step 30.a

✓ **Performance Step: 3**

WHEN RCS pressure is 900 to 1000 psig, as indicated on PI-402.2, THEN ISOLATE SI accumulators:
286' RAB / RO with locked valve key
a. UNLOCK AND TURN ON accumulator discharge valve breakers:

- Accumulator B: 1B21-SB-5C (both breakers)

Standard:

- Locates 1B21-SB-5C, identifies UNLOCKS then places breaker in ON position for both breakers for Accumulator B

Evaluator Cue:

Provide feedback on breaker position.
Valve indicating lights indicate the valves are OPEN, i.e. Red light ON, Green light OFF.
Voltage Vision lights indicate valve is energized, i.e. Red lights ON

Comment:

The locked valve key is on the key ring which is a turnover item for the TB AO watch station. Critical to unlock valve breaker in order to provide power to MOV for operation.

Evaluator Note:	**Opening the ATP door actuates an alarm in the control room.** **The Attachment pictures will be used once the location of the ATP has been demonstrated. Att. 1 should be shown first.** **When the operator points out 1SI-246, Att. 2 may be used for close up review of the control switch.** **When the operator points out 1SI-248, Att. 3 may be used for close up review of the control switch.**

AOP-004, Section 3.1, Step 30.b

✓ **Performance Step: 4**

SHUT SI accumulator discharge valves at the Auxiliary Transfer Panels listed:
Cable Vault A / RO with ATP cabinet key
- 1SI-246, Accumulator A Discharge (at ATP A)

Cable Vault A / RO with ATP cabinet key
- 1SI-248, Accumulator C Discharge (at ATP A)

Standard:

- Locates and opens ATP “A” and identifies control switch for 1SI-246 then places switch in SHUT position
- Locates and opens ATP “A” and identifies control switch for 1SI-248 then places switch in SHUT position

Evaluator Cue:	**Provide feedback on switch position.** **Valve indication lights change status at this time, i.e.** **Green light ON, Red light OFF**

Comment: **Critical to close discharge valves to prevent inadvertent discharge during cooldown.**

Evaluator Note:	**Opening the ATP door actuates an alarm in the control room.** **The Attachment pictures will be used once the location of the ATP has been demonstrated. Att. 4 should be shown first.** **When the operator points out 1SI-247, Att. 5 may be used for close up review of the control switch.**

AOP-004, Section 3.1, Step 30.b

✓ **Performance Step: 5**

SHUT SI accumulator discharge valves at the Auxiliary Transfer Panels listed:
Cable Vault B / RO with ATP cabinet key

- 1SI-247, Accumulator B Discharge (at ATP B)

Standard:

- Locates and opens ATP "B" and identifies control switch for 1SI-247 then places switch in SHUT position

Evaluator Cue:	**Provide feedback on switch position.** **Valve indication lights change status at this time, i.e.** **Green light ON, Red light OFF**

Comment: **Critical to close discharge valves to prevent inadvertent discharge during cooldown.**

Evaluator Note:	***The Evaluator can elect to have the candidate discuss the remaining steps since it involves returning to equipment already located and re-opening the breakers that were previously closed.***

AOP-004, Section 3.1, Step 30.c

Performance Step: 6

286' RAB / RO with locked valve key
TURN OFF AND LOCK accumulator discharge valve breakers:

- Accumulator A: 1A21-SA-5C (both breakers)
- Accumulator C: 1A21-SA-3D (both breakers)

Standard:

- Returns to 1A21-SA-5C, identifies OFF then LOCK position for both breakers for Accumulator A.
- Returns to 1A21-SA-3D, identifies OFF then LOCK position for both breakers for Accumulator C.

Evaluator Cue:	**Provide feedback on breaker position.** **Voltage Vision lights indicate valve is de-energized, i.e.** **Red lights OFF** **Valve indicating lights indicate the valves are SHUT, i.e. Green light ON, Red light OFF**

Comment:

AOP-004, Section 3.1, Step 30.c

Performance Step: 7

286' RAB / RO with locked valve key
TURN OFF AND LOCK accumulator discharge valve breakers:

- Accumulator B: 1B21-SB-5C (both breakers)

Standard: Returns to 1B21-SB-5C, identifies OFF then LOCK position for both breakers for Accumulator B.

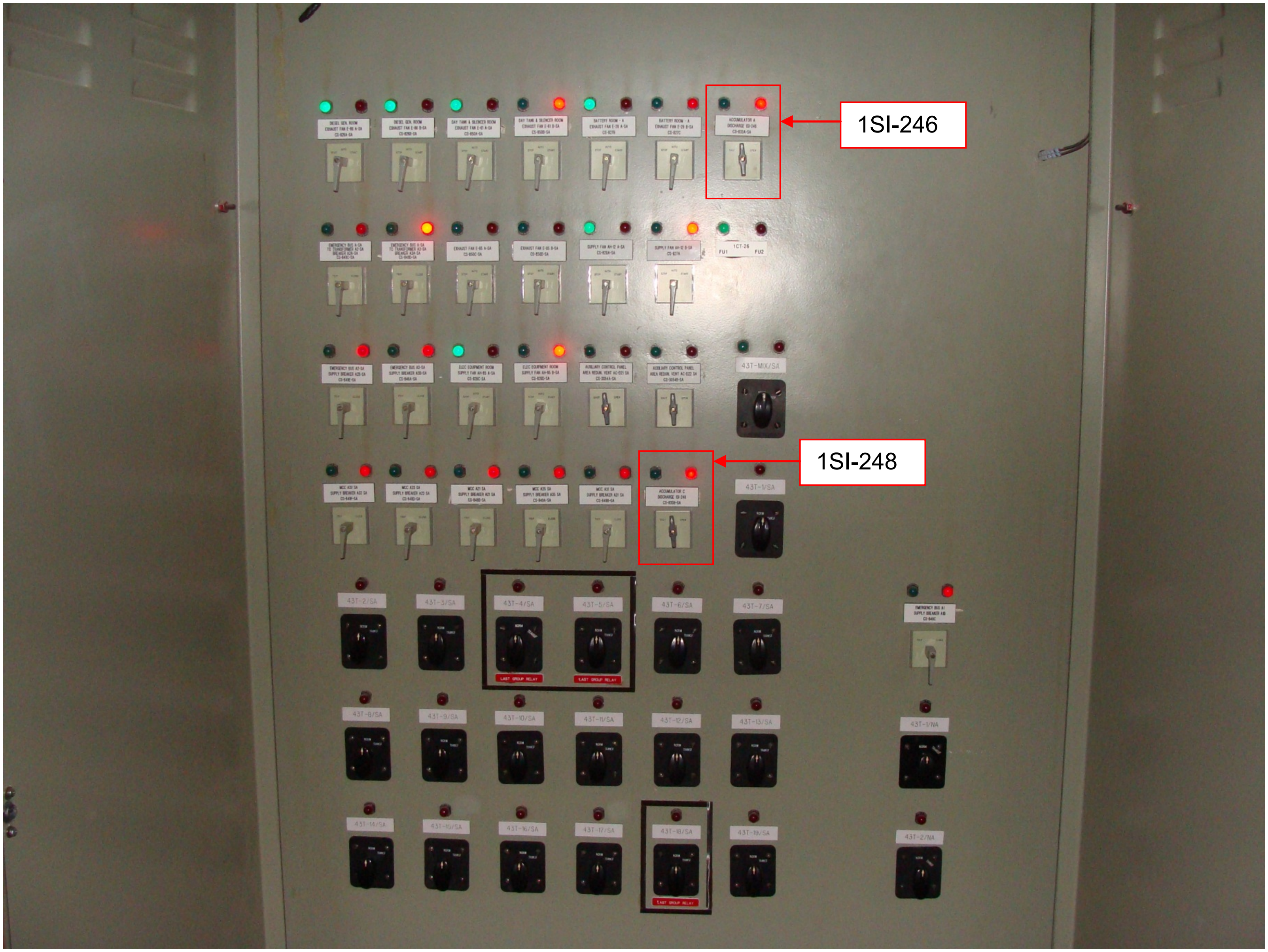
Evaluator Cue:	**Provide feedback on breaker position.** **Voltage Vision lights indicate valve is de-energized, i.e. Red lights OFF** **Valve indicating lights indicate the valves are SHUT, i.e. Green light ON, Red light OFF**

Comment:

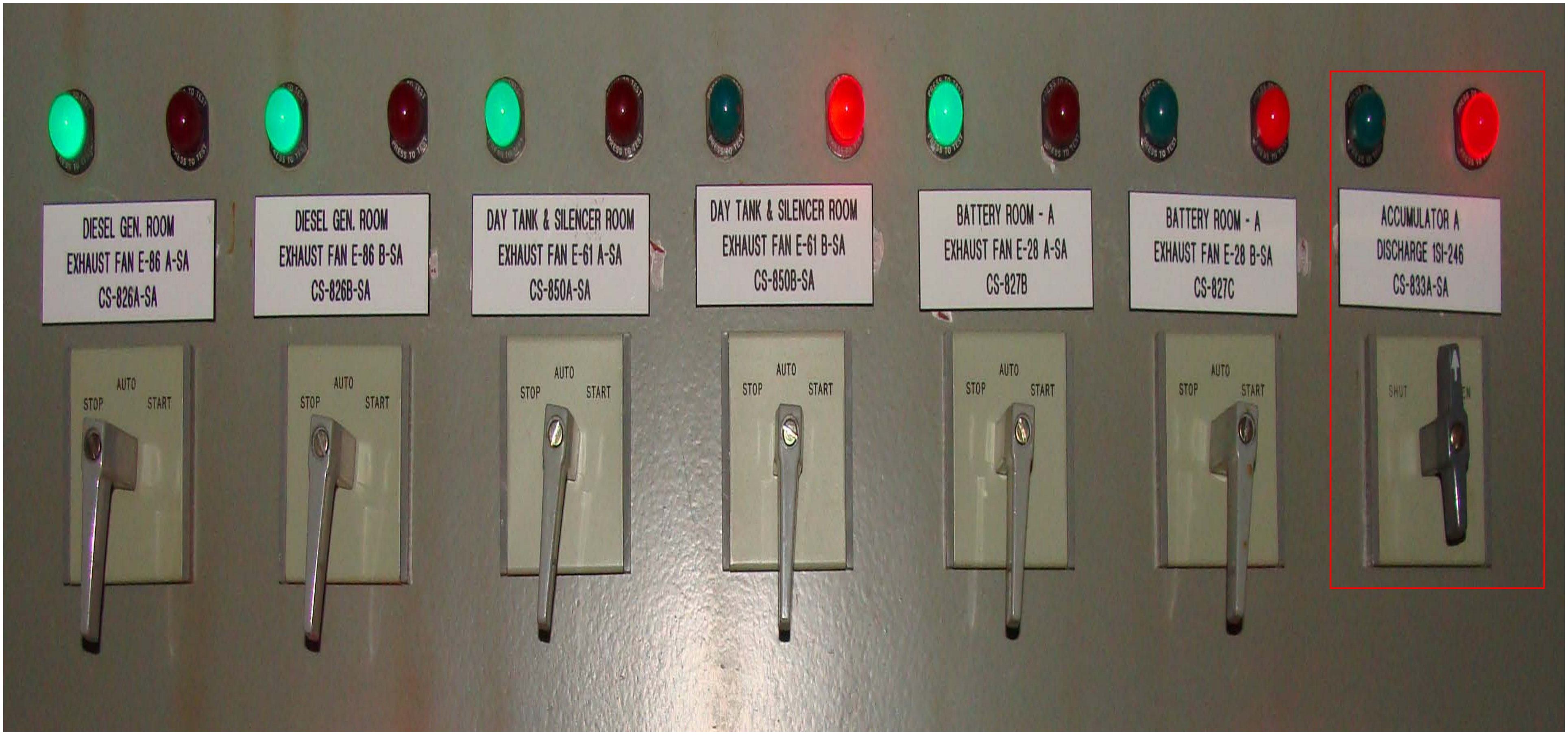
Terminating Cue:	**When all SI Accumulator Discharge Valves are de-energized: Evaluation on this JPM is complete.**

STOP TIME: ______________

KEY



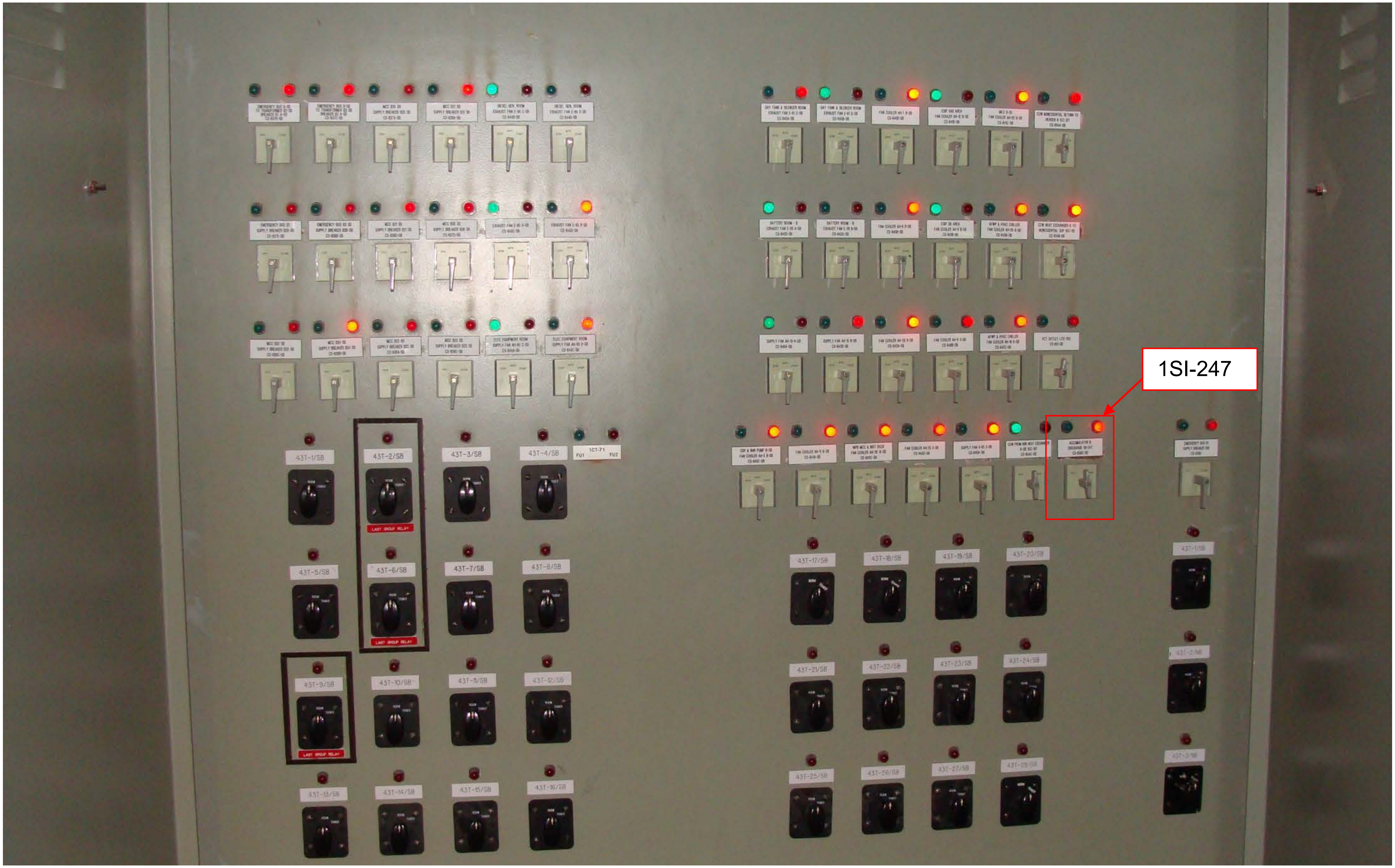
KEY


DIESEL GEN. ROOM
EXHAUST FAN E-86 A-SA
CS-826A-SA
DIESEL GEN. ROOM
EXHAUST FAN E-86 B-SA
CS-826B-SA
DAY TANK & SILENCER ROOM
EXHAUST FAN E-61 A-SA
CS-850A-SA
DAY TANK & SILENCER ROOM
EXHAUST FAN E-61 B-SA
CS-850B-SA
BATTERY ROOM - A
EXHAUST FAN E-28 A-SA
CS-827B
BATTERY ROOM - A
EXHAUST FAN E-28 B-SA
CS-827C
ACCUMULATOR A
DISCHARGE 1SI-246
CS-833A-SA
STOP
AUTO
START
SHUT

KEY


MCC A32 SA
SUPPLY BREAKER A32 SA
CS-849F-SA
TRIP
CLOSE
MCC A23 SA
SUPPLY BREAKER A23 SA
CS-848D-SA
TRIP
CLOSE
MCC A21 SA
SUPPLY BREAKER A21 SA
CS-848B-SA
TRIP
CLOSE
MCC A35 SA
SUPPLY BREAKER A35 SA
CS-849A-SA
TRIP
CLOSE
MCC A31 SA
SUPPLY BREAKER A31 SA
CS-849B-SA
TRIP
CLOSE
ACCUMULATOR C
DISCHARGE 1SI-248
CS-833B-SA
SHUT
OPEN
43T-1/
NORM

KEY


1SI-247
43T-1/SB
43T-2/SB
43T-3/SB
43T-4/SB
1CT-71
FU1
FU2
LAST GROUP RELAY
43T-5/SB
43T-6/SB
43T-7/SB
43T-8/SB
43T-9/SB
43T-10/SB
43T-11/SB
43T-12/SB
43T-13/SB
43T-14/SB
43T-15/SB
43T-16/SB
43T-17/SB
43T-18/SB
43T-19/SB
43T-20/SB
43T-21/SB
43T-22/SB
43T-23/SB
43T-24/SB
43T-25/SB
43T-26/SB
43T-27/SB
43T-28/SB

KEY


CSP & RHR PUMP B-SB
FAN COOLER AH-5 B-SB
CS-840C-SB
FAN COOLER AH-11 B-SB
CS-841A-SB
WPB MCC & INST RACK
FAN COOLER AH-29 1X-SB
CS-843C-SB
FAN COOLER AH-25 X-SB
CS-843D-SB
SUPPLY FAN S-65 X-SB
CS-840A-SB
CCW FROM RHR HEAT EXCHANGER
B-SB 1CC-167
CS-834C-SB
ACCUMULATOR B
DISCHARGE 1SI-247
CS-833C-SB
STOP
AUTO
START
SHUT
OPEN
PRESS TO TEST

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC Exam IP JPM k
Isolate the ECCS Accumulators After a Control Room Evacuation
In accordance with AOP-004

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

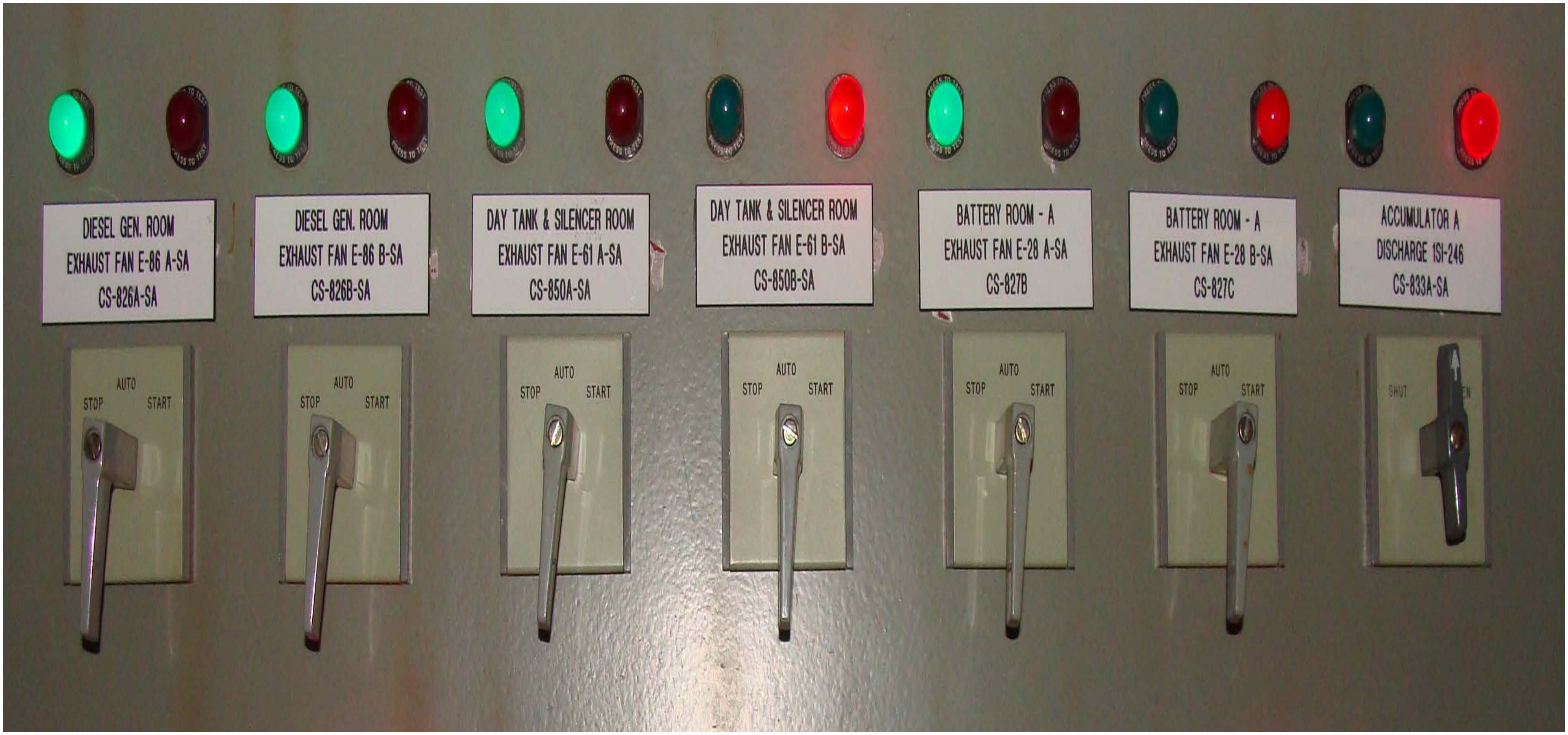
Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

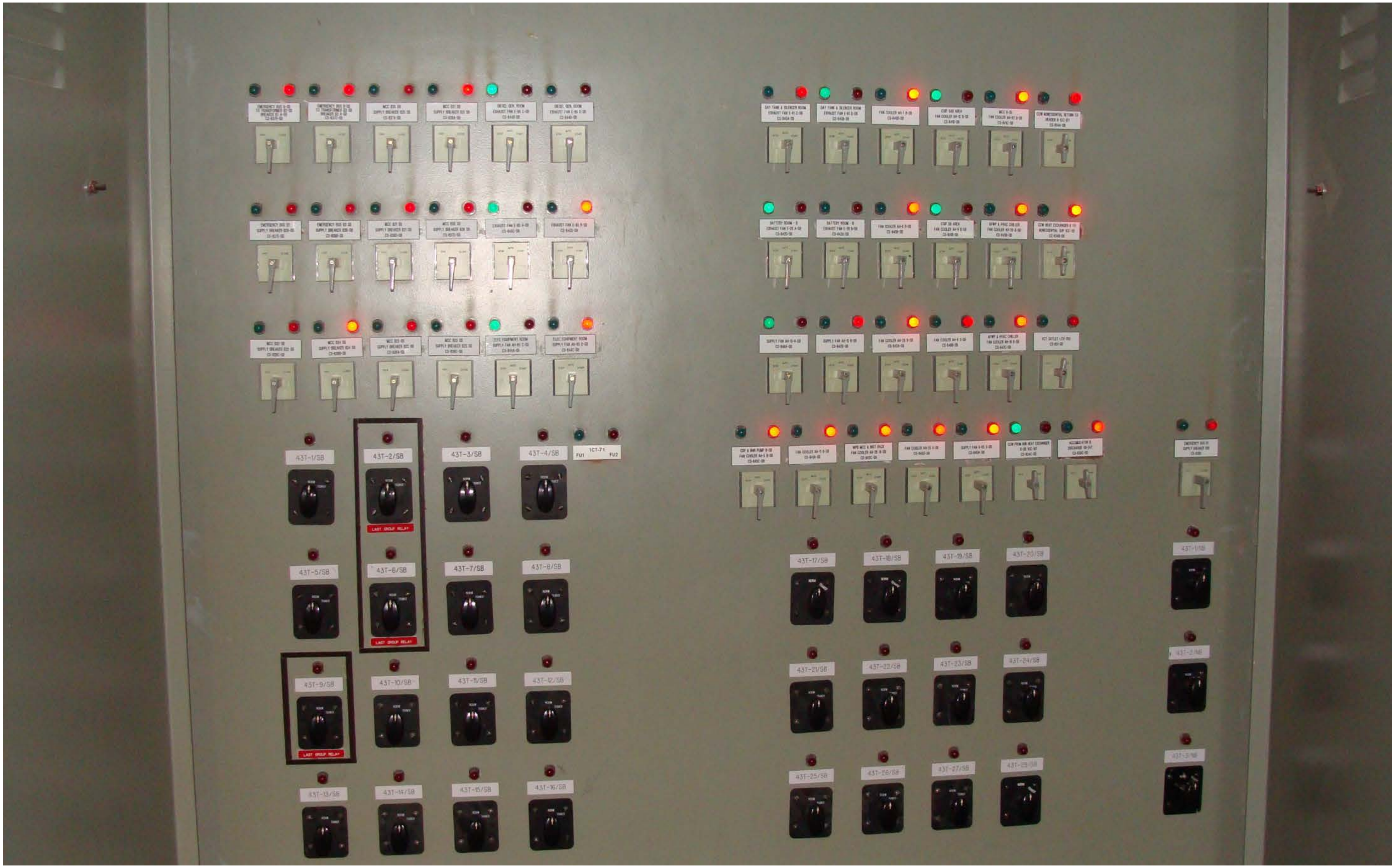
Attachment 1

Attachment 2



Attachment 3

Attachment 4



Attachment 5

BEFORE YOU START THIS JPM

IN-PLANT JPM SAFETY CONSIDERATIONS:

CAUTION: EQUIPMENT MAY AUTO START OR MAYBE ENERGIZED

- SIMULATE ONLY - DO NOT OPERATE ANY ACTUAL PLANT EQUIPMENT!!!

Before entering the performance location of this JPM, ensure you **AND** the examiner have the proper PPE for the area you are going to go to or will travel through to get there.
Avoid contacting any plant equipment.
Follow ALARA practices in the RCA.
Do NOT remove ladders from their storage locations. Simulate obtaining and using a ladder if one would be needed during the actual performance of this task.

Initial Conditions:	• The control room has been evacuated due to a fire. • A cooldown is in progress in accordance with AOP-004, REMOTE SHUTDOWN. • RCS Pressure is 975 PSIG by PI-402.2.

Initiating Cue:	You are the TB AO and have been assigned to perform AOP-004, Section 3.1, Step 30 – Isolate SI Accumulators.

Facility:	Harris Nuclear Plant	Task No.:	018003H101
Task Title:	Determine AFD with AFD Monitor INOP	JPM No.:	2020 NRC Exam Admin JPM RO A1-1
K/A Reference:	G 2.1.25 RO 3.9 SRO 4.2	**ALTERNATE PATH - NO**	

Examinee: ______________________ NRC Examiner: ______________

Facility Evaluator: ______________________ Date: ______________

Method of testing:

Simulated Performance: _____ Actual Performance: X

Classroom X Simulator _____ Plant _____

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate, discuss, or perform and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	- The plant was at 90% power, with a load reduction in progress - The load reduction has been stopped to evaluate AFD following oscillations at 0900

Initiating Cue:	With the information provided complete Attachment 5 of OST-1021, Daily Surveillance Requirements to determine Axial Flux Difference. After completing OST-1021, Attachment 5 evaluate the results and circle the response below. IF any 1 hour or less Technical Specifications apply list the associated LCO action(s) and the required completion time(s). **Base any action completion times from the time of 0900.** When complete return your results to the evaluator.

Task Standard:	All calculations within ± 1% of actual. Correct less than 1 hour Tech Spec and LCO action times are identified.
Required Materials:	Calculator
General References:	OST-1021, Daily Surveillance Requirements, Rev. 114 OP-163, ERFIS, Rev. 42 Rod Control Manual, Unit One Reactor Operating Data, Rev. 8 Technical Specifications, Rev 185
Handouts:	OP-163, Rev. 42, pages 1 – 8, Prerequisites, P&L's OP-163, Rev. 42, pages 14 – 15, Section 6.2, (Continuous Use) - Axial Flux Differential (AFD) Monitor Rod Control Manual, Section 2.1, Axial Flux Difference Limits, Rev. 0 Technical Specification 3.2.1, Power Distribution Limits - Axial Flux Difference OR 2020 NRC Exam Frozen Procedures Folder OST-1021, Rev. 114, pages 44-46, Attachment 5, Axial Flux Difference Log JPM Cue Sheets Pages 16 - 20
Time Critical Task:	No
Validation Time:	10 minutes

PERFORMANCE STEP	**CRITICAL STEP JUSTIFICATION**
Step 7	If the wrong values are selected then the results will NOT be correct
Step 10	If the wrong Limit is determined a required Tech Spec LCO action could be exceeded
Step 11	If the wrong Limit is determined a required Tech Spec LCO action could be exceeded
Step 12	If operation outside of the acceptable region is allowed to continue fuel damage may result.
Step 13	If the wrong Tech Spec Action is selected an LCO action could be exceeded

Start Time: __________.

OP-163

Performance Step: 1 OBTAIN PROCEDURE (provided in frozen procedure)

Standard: Obtains OP-163 and refers to Section 6.2.

Comment:

OP-163, Section 6.2.2, Step 1.a

Performance Step: 2 REVIEW the automatic or “On Demand” report print-out to verify the following:

- The print-out monitored values are consistent with MCB indications.

Standard: Locates JPM Cue sheet with attached On Demand and Shift Summary Report

Comment:

OP-163, Section 6.2.2, NOTE prior to Step 1.b

Performance Step: 3 NOTE: There may be rounding off differences between the automatic printout and the latest AFD curve generated by TE-NF-PWR-0809, Target AFD Calculation.

Standard: Operator reads and placekeeps notes

Comment:

OP-163, Section 6.2.2, Step 1.b

Performance Step: 4 REVIEW the automatic or "On Demand" report print-out to verify the following:

- The printout Operating Band Low and Operating Band High values match the latest Axial Flux Difference Limits As A Function of Rated Thermal Power curve as shown in the ROD Manual.

Standard: Locates Reactor Operating Data Manual and reviews Section 2.1, AFD Limits and determines the current limits are

-12.0% to + 8.0% at 100% Reactor Power

-26.0% to + 20.0% at 50% Reactor Power

Comment:

OP-163, Section 6.2.2, Step 2

Performance Step: 5 CHANNEL CHECK the following AFD ERFIS points against MCB indication:

- URE1540 CURRENT CHAN 1 AXIAL FLUX DIFF
- URE1541 CURRENT CHAN 2 AXIAL FLUX DIFF
- URE1542 CURRENT CHAN 3 AXIAL FLUX DIFF
- URE1543 CURRENT CHAN 4 AXIAL FLUX DIFF

Standard: Locates JPM Cue sheet with attached MCB Indication images and compares to information from Shift Summary Report

Comment:

OP-163, Section 6.2.2, NOTE prior to Step 3

Performance Step: 6 NOTE: Only one (1) channel having an unacceptable quality does not make the AFD Monitor inoperable.

Standard: Operator reads and placekeeps notes

Comment:

OP-163, Section 6.2.2, Step 3

✓ **Performance Step: 7** VERIFY the following AFD ERFIS points are restored to processing with acceptable quality codes as defined in Precaution & Limitation Step 4.0.4:

- URE1540 CURRENT CHAN 1 AXIAL FLUX DIFF
- URE1541 CURRENT CHAN 2 AXIAL FLUX DIFF
- URE1542 CURRENT CHAN 3 AXIAL FLUX DIFF
- URE1543 CURRENT CHAN 4 AXIAL FLUX DIFF
- ANM0120M PWR RNG CHANNEL N41 Q4 1-MIN AVG
- ANM0121M PWR RNG CHANNEL N42 Q2 1-MIN AVG
- ANM0122M PWR RNG CHANNEL N43 Q1 1-MIN AVG
- ANM0123M PWR RNG CHANNEL N44 Q3 1-MIN AVG

Standard: Reviews P&L # 4 determines the quality codes are **NOT** acceptable for

- **URE1541 CURRENT CHAN 2 AXIAL FLUX DIFF**
- **URE1542 CURRENT CHAN 3 AXIAL FLUX DIFF**
- **ANM0121M PWR RNG CHANNEL N42 Q2 1-MIN AVG**
- **ANM0122M PWR RNG CHANNEL N43 Q1 1-MIN AVG**

Notifies the CRS the AFD Monitor does **NOT** met the criteria for Operable status

Evaluator Cue:	**If necessary prompt the candidate to completed OST-1021, Attachment 5 as required.**

Comment:

OST-1021, Attachment 5, Page 2 of 3

Performance Step: 8

LOG current reading for the following instruments:

- NI-41C, PR 41 % Δ FLUX
- NI-42C, PR 42 % Δ FLUX
- NI-43C, PR 43 % Δ FLUX
- NI-44C, PR 44 % Δ FLUX

Standard:

Locates JPM Cue sheet with attached MCB Indication images and logs current reading

- **NI-41C, PR 41 % Δ FLUX = 11% +/- 1%**
- **NI-42C, PR 42 % Δ FLUX = 13% +/- 1%**
- **NI-43C, PR 43 % Δ FLUX = 14% +/- 1%**
- **NI-44C, PR 44 % Δ FLUX = 10% +/- 1%**

Comment:

OST-1021, Attachment 5, Page 2 of 3

Performance Step: 9

DETERMINE and LOG Average (AVG) Reactor Power:

- NI-41B, PR 41 % POWER
- NI-42B, PR 42 % POWER
- NI-43B, PR 43 % POWER
- NI-44B, PR 44 % POWER

Standard:

Locates JPM Cue sheet with attached MCB Indication images and logs current reading

- **NI-41B, PR 41 % POWER = 90% +/- 1%**
- **NI-42B, PR 42 % POWER = 90% +/- 1%**
- **NI-43B, PR 43 % POWER = 90% +/- 1%**
- **NI-44B, PR 44 % POWER = 90% +/- 1%**

Comment:

Performs calculation to determine AVG Reactor Power and logs value on OST-1021 Attachment 5

OST-1021, Attachment 5, Page 2 of 3

✓ **Performance Step: 10** DETERMINE and LOG AFD Lower limit:

Standard: **Critical action is to determine required limit.**

Locates Reactor Operating Data Manual I and reviews Section 2.1, AFD Limits and determines the current Lower limits is:

-14.5% at 90% Reactor Power (+/- 1%)

Comment: **May interpolate limit based on current power level**

OST-1021, Attachment 5, Page 2 of 3

✓ **Performance Step: 11** DETERMINE and LOG AFD Upper limit:

Standard: **Critical action is to determine required limit.**

Locates Reactor Operating Data Manual and reviews Section 2.1, AFD Limits and determines the current Upper limits is:

11.0% at 90% Reactor Power (+/- 1%)

Comment: **May interpolate limit based on current power level**

OST-1021, Attachment 5, Page 2 of 3

✓ **Performance Step: 12** PERFORM evaluation of AFD limits

Standard: Reviews current MCB readings and determines AFD Limits and determines two of four MCB indications are NOT within the curve for Acceptable Operation:

- **NI-42C, PR 42 % Δ FLUX = 13% +/- 1%**
- **NI-43C, PR 43 % Δ FLUX = 14% +/- 1%**

Notifies the CRS two of four MCB indications are NOT within the AFD curve for Acceptable Operation

Comment: **Must interpolate limit based on current power level**

Technical Specifications

✓ **Performance Step: 13** OBTAIN AND EVALUATE TECHNICAL SPECIFICATIONS

Standard: Obtains Technical Specifications and refers to LCO 3.2.1

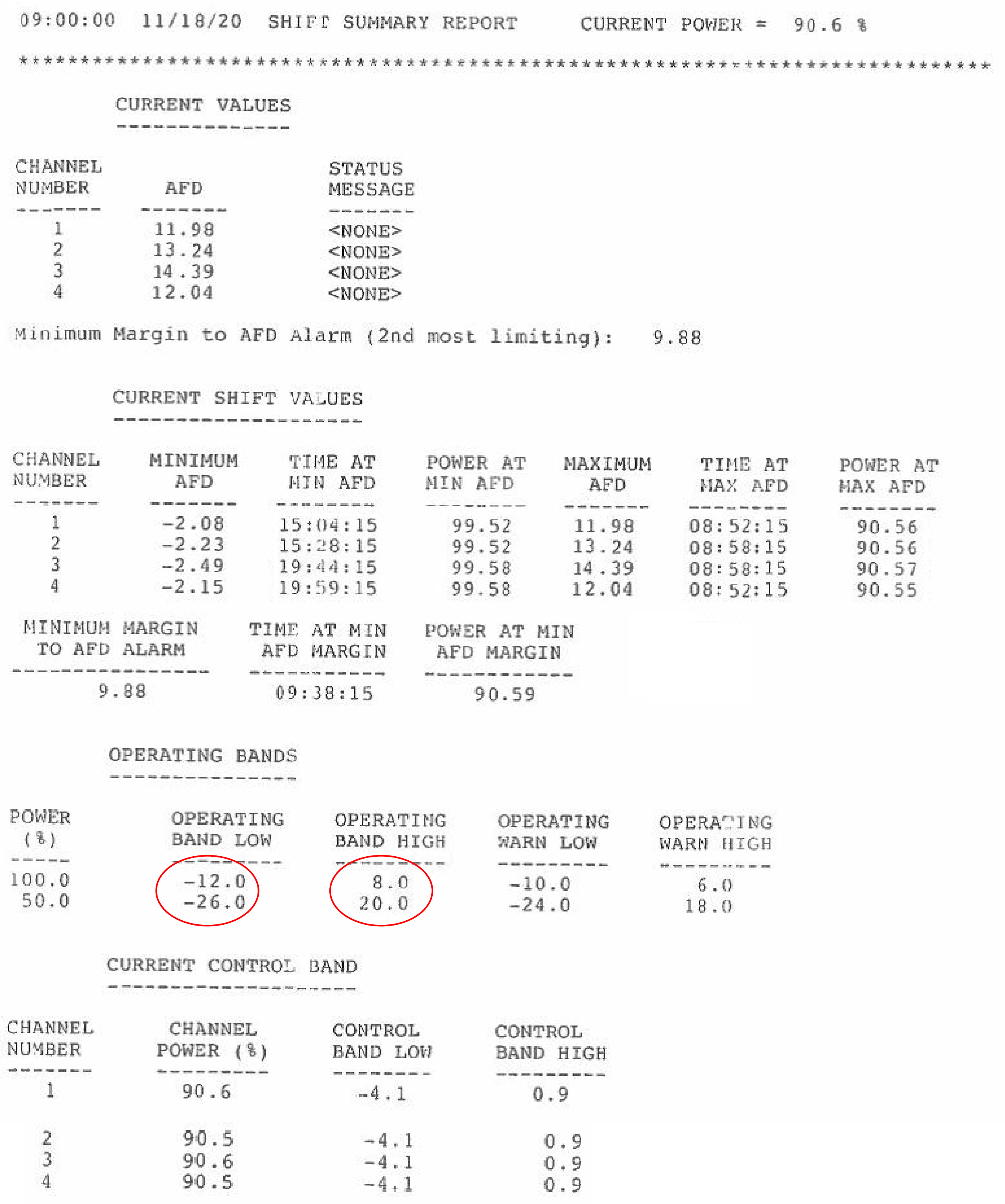
Determines that ACTION a. is applicable. (See page 14)

a. With the indicated AFD outside of the limits specified in the COLR, either:
   1. Restore the indicated AFD to within the limits specified in the COLR within 15 minutes, or **(0915)**
   2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes **(0930)**

Evaluator Note:	**After the candidate has determined the current values of Axial Flux Difference and its limits have been manually determined and performed a Technical Specification evaluation.** **END OF JPM**

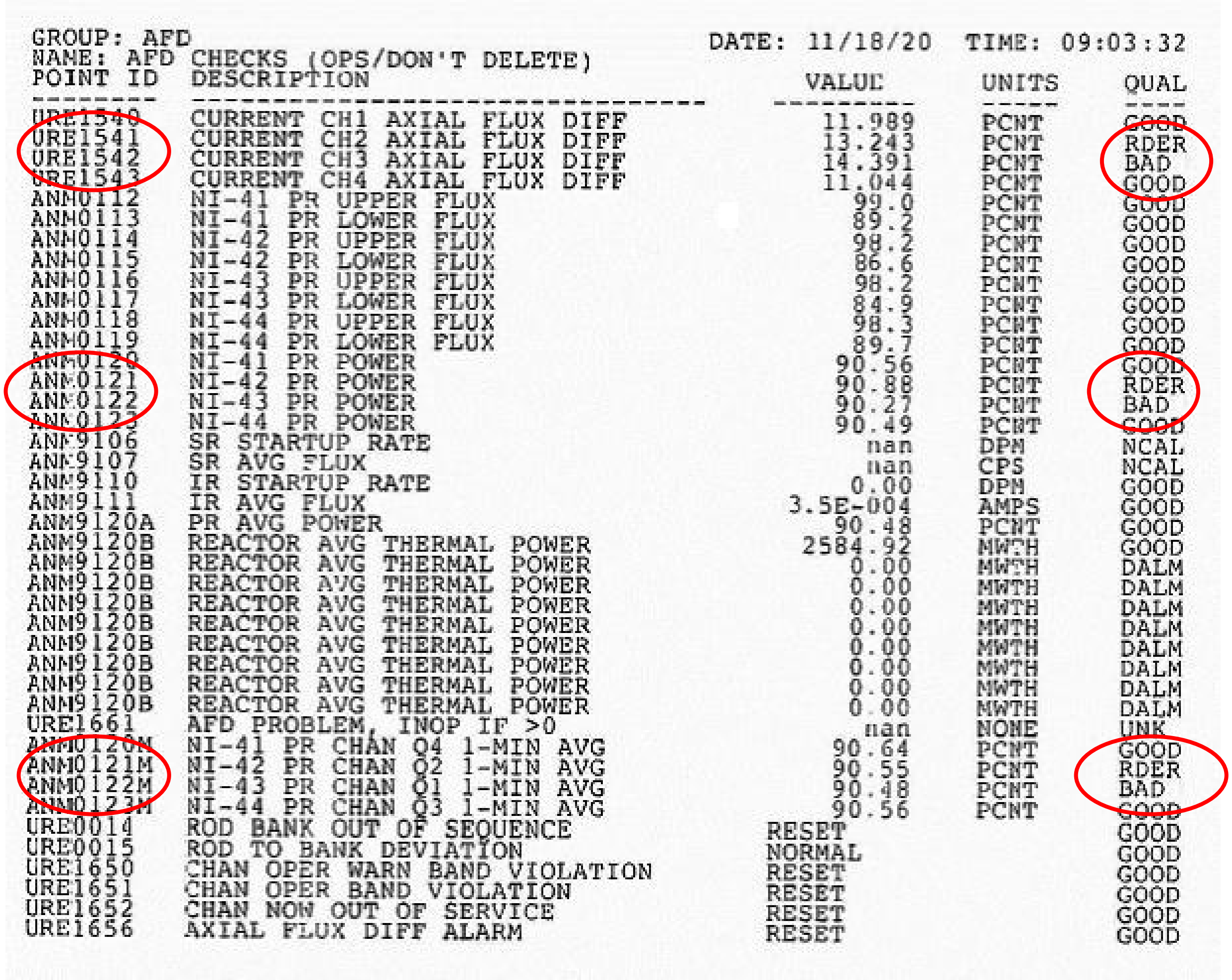
Terminating Cue:	Current value of Axial Flux Difference has been manually determined and the Technical Specifications evaluation completed.

KEY



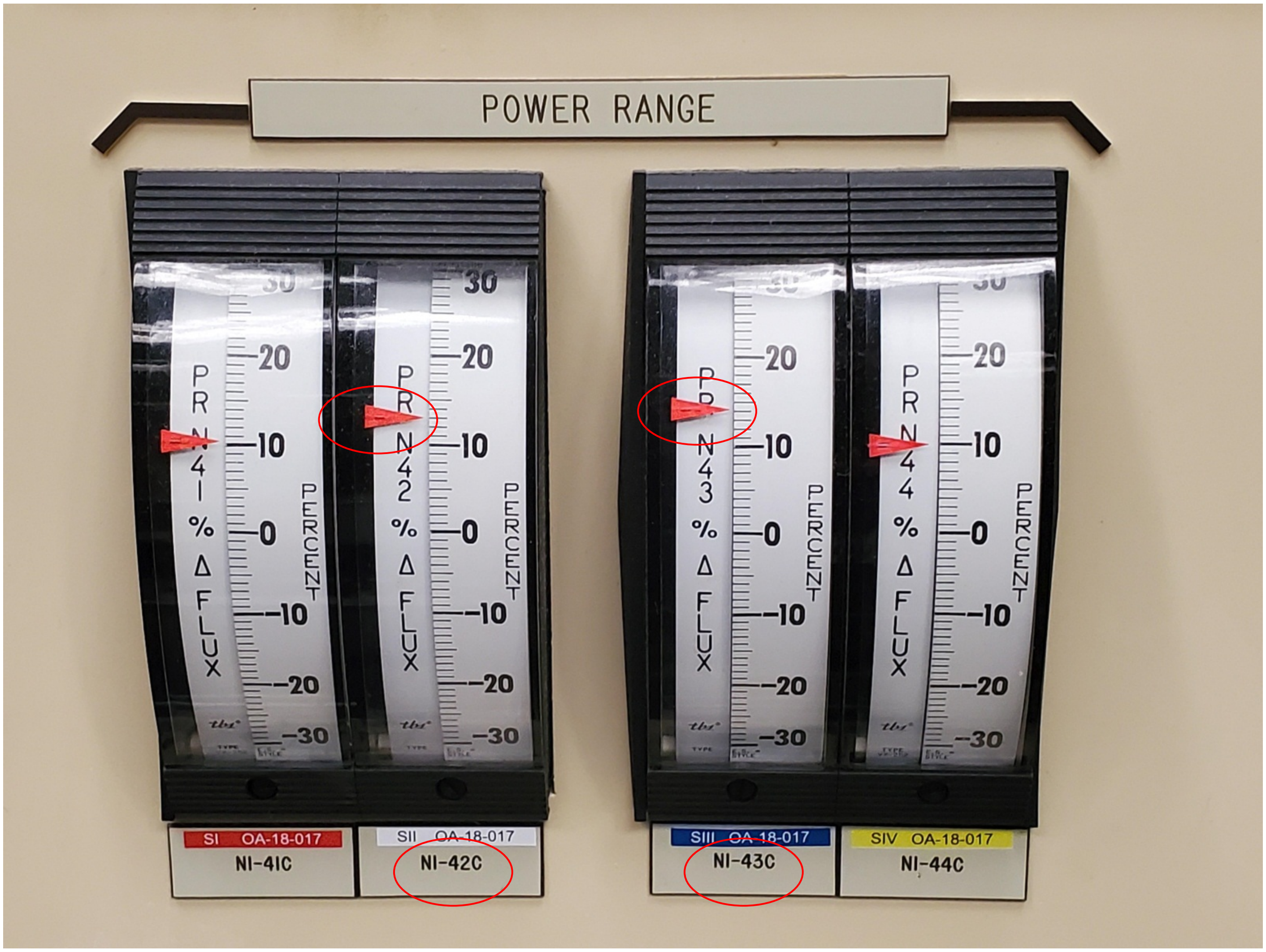
```
09:00:00  11/18/20  SHIFT SUMMARY REPORT     CURRENT POWER =  90.6 %
*******************************************************************************

          CURRENT VALUES
          --------------

CHANNEL                       STATUS
NUMBER       AFD              MESSAGE
-------    -------            -------
   1        11.98             <NONE>
   2        13.24             <NONE>
   3        14.39             <NONE>
   4        12.04             <NONE>

Minimum Margin to AFD Alarm (2nd most limiting):   9.88

          CURRENT SHIFT VALUES
          --------------------

CHANNEL    MINIMUM    TIME AT    POWER AT   MAXIMUM    TIME AT    POWER AT
NUMBER       AFD      MIN AFD    MIN AFD      AFD      MAX AFD    MAX AFD
-------    -------    --------   --------   -------    --------   --------
   1        -2.08     15:04:15    99.52      11.98     08:52:15    90.56
   2        -2.23     15:28:15    99.52      13.24     08:58:15    90.56
   3        -2.49     19:44:15    99.58      14.39     08:58:15    90.57
   4        -2.15     19:59:15    99.58      12.04     08:52:15    90.55

 MINIMUM MARGIN     TIME AT MIN    POWER AT MIN
  TO AFD ALARM       AFD MARGIN     AFD MARGIN
----------------   -----------    ------------
      9.88            09:38:15        90.59

          OPERATING BANDS
          ---------------

POWER         OPERATING     OPERATING     OPERATING     OPERATING
 (%)          BAND LOW      BAND HIGH     WARN LOW      WARN HIGH
-----         ---------     ---------     ---------     ---------
100.0           -12.0          8.0          -10.0          6.0
 50.0           -26.0         20.0          -24.0         18.0

          CURRENT CONTROL BAND
          --------------------

CHANNEL      CHANNEL      CONTROL      CONTROL
NUMBER      POWER (%)     BAND LOW     BAND HIGH
-------     ---------     --------     ---------
   1          90.6          -4.1          0.9

   2          90.5          -4.1          0.9
   3          90.6          -4.1          0.9
   4          90.5          -4.1          0.9
```

KEY

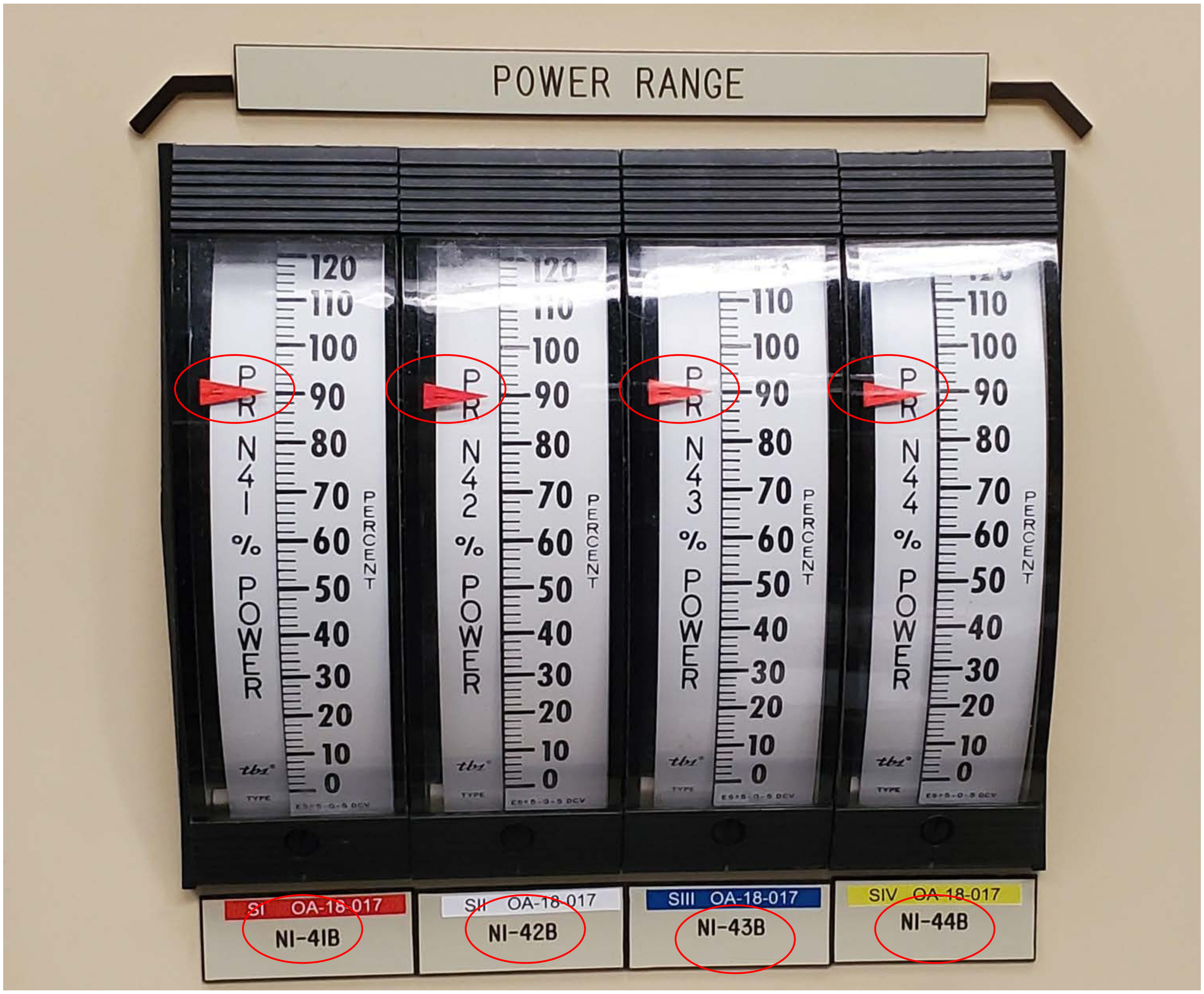


```
GROUP: AFD                                                   DATE: 11/18/20  TIME: 09:03:32
NAME: AFD CHECKS (OPS/DON'T DELETE)
POINT ID  DESCRIPTION                                          VALUE       UNITS     QUAL
--------  ------------------------------------------------   ----------   -----     ----
URE1540   CURRENT CH1 AXIAL FLUX DIFF                            11.989    PCNT      GOOD
URE1541   CURRENT CH2 AXIAL FLUX DIFF                            13.243    PCNT      RDER
URE1542   CURRENT CH3 AXIAL FLUX DIFF                            14.391    PCNT      BAD
URE1543   CURRENT CH4 AXIAL FLUX DIFF                            11.044    PCNT      GOOD
ANM0112   NI-41 PR UPPER FLUX                                      99.0    PCNT      GOOD
ANM0113   NI-41 PR LOWER FLUX                                      89.2    PCNT      GOOD
ANM0114   NI-42 PR UPPER FLUX                                      98.2    PCNT      GOOD
ANM0115   NI-42 PR LOWER FLUX                                      86.6    PCNT      GOOD
ANM0116   NI-43 PR UPPER FLUX                                      98.2    PCNT      GOOD
ANM0117   NI-43 PR LOWER FLUX                                      84.9    PCNT      GOOD
ANM0118   NI-44 PR UPPER FLUX                                      98.3    PCNT      GOOD
ANM0119   NI-44 PR LOWER FLUX                                      89.7    PCNT      GOOD
ANM0120   NI-41 PR POWER                                          90.56    PCNT      GOOD
ANM0121   NI-42 PR POWER                                          90.88    PCNT      RDER
ANM0122   NI-43 PR POWER                                          90.27    PCNT      BAD
ANM0123   NI-44 PR POWER                                          90.49    PCNT      GOOD
ANM9106   SR STARTUP RATE                                           nan    DPM       NCAL
ANM9107   SR AVG FLUX                                               nan    CPS       NCAL
ANM9110   IR STARTUP RATE                                          0.00    DPM       GOOD
ANM9111   IR AVG FLUX                                         3.5E-004    AMPS      GOOD
ANM9120A  PR AVG POWER                                            90.48    PCNT      GOOD
ANM9120B  REACTOR AVG THERMAL POWER                             2584.92    MWTH      GOOD
ANM9120B  REACTOR AVG THERMAL POWER                                0.00    MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                                0.00    MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                                0.00    MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                                0.00    MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                                0.00    MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                                0.00    MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                                0.00    MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                                0.00    MWTH      DALM
URE1661   AFD PROBLEM, INOP IF >0                                   nan    NONE      UNK
ANM0120M  NI-41 PR CHAN Q4 1-MIN AVG                              90.64    PCNT      GOOD
ANM0121M  NI-42 PR CHAN Q2 1-MIN AVG                              90.55    PCNT      RDER
ANM0122M  NI-43 PR CHAN Q1 1-MIN AVG                              90.48    PCNT      BAD
ANM0123M  NI-44 PR CHAN Q3 1-MIN AVG                              90.56    PCNT      GOOD
URE0014   ROD BANK OUT OF SEQUENCE                           RESET                   GOOD
URE0015   ROD TO BANK DEVIATION                              NORMAL                  GOOD
URE1650   CHAN OPER WARN BAND VIOLATION                      RESET                   GOOD
URE1651   CHAN OPER BAND VIOLATION                           RESET                   GOOD
URE1652   CHAN NOW OUT OF SERVICE                            RESET                   GOOD
URE1656   AXIAL FLUX DIFF ALARM                              RESET                   GOOD
```

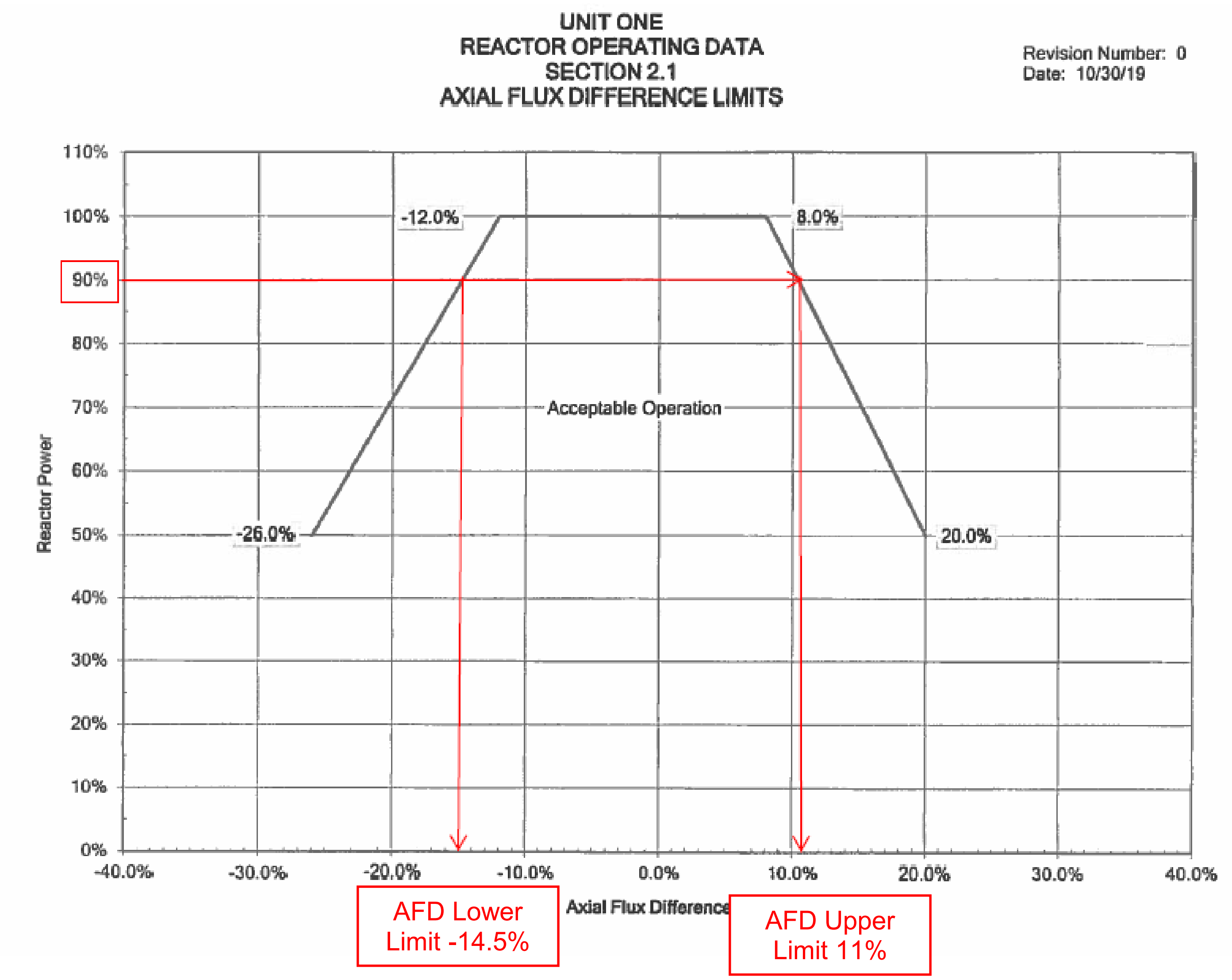
KEY


POWER RANGE
PRN41 % Δ FLUX
PRN42 % Δ FLUX
PRN43 % Δ FLUX
PRN44 % Δ FLUX
PERCENT
30
20
10
0
-10
-20
-30
SI OA-18-017
NI-41C
SII OA-18-017
NI-42C
SIII OA-18-017
NI-43C
SIV OA-18-017
NI-44C

KEY


POWER RANGE
PR N41 % POWER
PR N42 % POWER
PR N43 % POWER
PR N44 % POWER
PERCENT
SI OA-18-017
NI-41B
SII OA-18-017
NI-42B
SIII OA-18-017
NI-43B
SIV OA-18-017
NI-44B

KEY

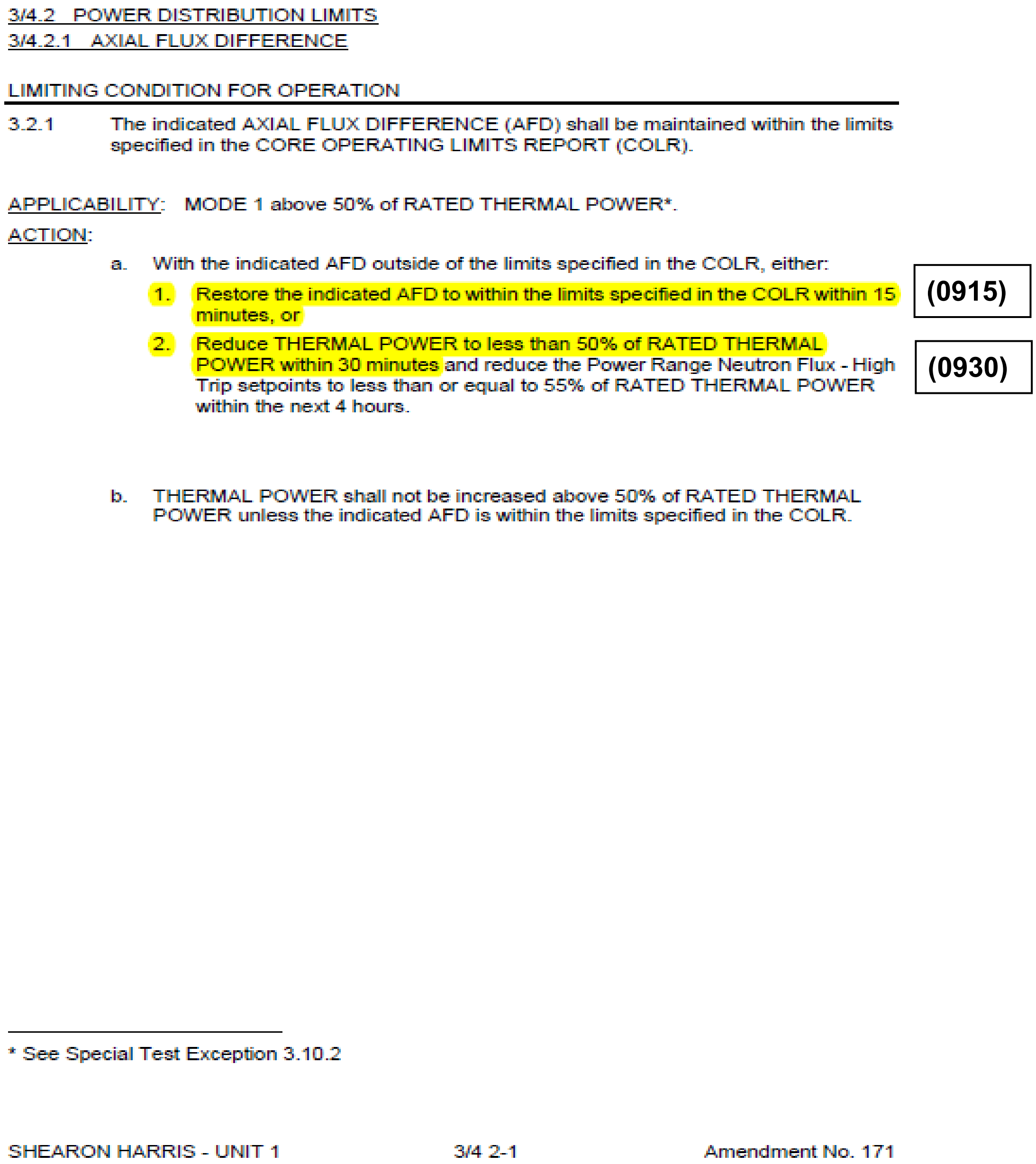

UNIT ONE
REACTOR OPERATING DATA
SECTION 2.1
AXIAL FLUX DIFFERENCE LIMITS
Revision Number: 0
Date: 10/30/19
110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Reactor Power
-12.0%
8.0%
-26.0%
20.0%
Acceptable Operation
-40.0%
-30.0%
-20.0%
-10.0%
0.0%
10.0%
20.0%
30.0%
40.0%
Axial Flux Difference
AFD Lower Limit -14.5%
AFD Upper Limit 11%

KEY

1. The current AFD Limits are **Upper AFD limit 11.0% at 90% Reactor Power (+/- 1%)**
   Lower AFD limit 14.5% at 90% Reactor Power (+/- 1%)

Circle the correct response that applies:

2. AFD Monitor Alarm is Operable / [✓ Inoperable]
3. Technical Specification(s) and applicable LCO's 1 hour actions that apply



3/4.2 POWER DISTRIBUTION LIMITS
3/4.2.1 AXIAL FLUX DIFFERENCE

LIMITING CONDITION FOR OPERATION

3.2.1 The indicated AXIAL FLUX DIFFERENCE (AFD) shall be maintained within the limits specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODE 1 above 50% of RATED THERMAL POWER*.

ACTION:

a. With the indicated AFD outside of the limits specified in the COLR, either:

1. Restore the indicated AFD to within the limits specified in the COLR within 15 minutes, or **(0915)**

2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes and reduce the Power Range Neutron Flux - High Trip setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours. **(0930)**

b. THERMAL POWER shall not be increased above 50% of RATED THERMAL POWER unless the indicated AFD is within the limits specified in the COLR.

---

* See Special Test Exception 3.10.2

SHEARON HARRIS - UNIT 1 3/4 2-1 Amendment No. 171

VERIFICATION OF COMPLETION

Job Performance Measure No.:	2020 NRC Admin Exam RO A1-1 Determine Axial Flux Difference (AFD) with AFD Monitor INOP OP-163, ERFIS OST-1021, Daily Surveillance Requirements

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

JPM CUE SHEET

Initial Conditions:	- The plant was at 90% power, with a load reduction in progress - The load reduction has been stopped to evaluate AFD following oscillations at 0900

Initiating Cue:	With the information provided complete Attachment 5 of OST-1021, Daily Surveillance Requirements to determine Axial Flux Difference. After completing OST-1021, Attachment 5 evaluate the results and circle the response below. IF any 1 hour or less Technical Specifications apply list the associated LCO action(s) and the required completion time(s). **Base any action completion times from the time of 0900.** When complete return your results to the evaluator.

Name: ____

Date: ___________________

1. The current AFD Limits are **UPPER** ____________ **LOWER** ______________

Circle the correct response that applies:

2. AFD Monitor Alarm is Operable / Inoperable

1 hour or less Technical Specification(s) and applicable LCO Action(s) that apply: _____

____

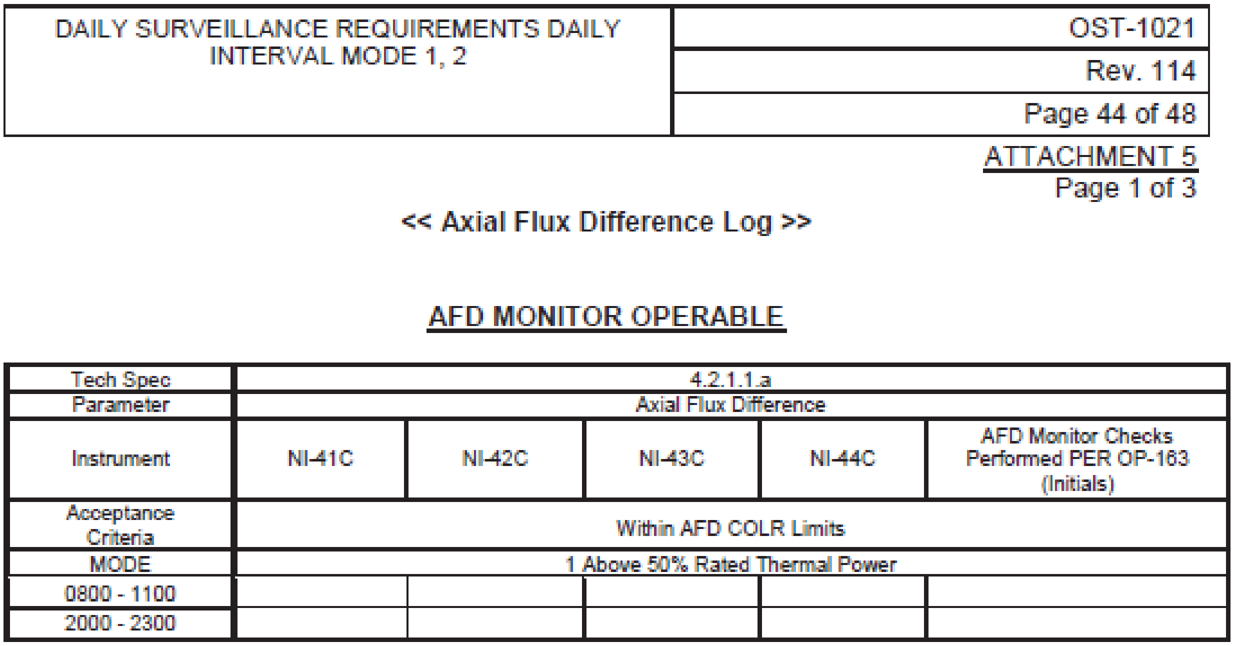
____

____

____

____

____



DAILY SURVEILLANCE REQUIREMENTS DAILY INTERVAL MODE 1, 2	OST-1021
	Rev. 114
	Page 44 of 48

ATTACHMENT 5
Page 1 of 3

<< Axial Flux Difference Log >>

AFD MONITOR OPERABLE

Tech Spec	4.2.1.1.a				
Parameter	Axial Flux Difference				
Instrument	NI-41C	NI-42C	NI-43C	NI-44C	AFD Monitor Checks Performed PER OP-163 (Initials)
Acceptance Criteria	Within AFD COLR Limits				
MODE	1 Above 50% Rated Thermal Power				
0800 - 1100					
2000 - 2300					

DAILY SURVEILLANCE REQUIREMENTS DAILY INTERVAL MODE 1, 2	OST-1021
	Rev. 114
	Page 45 of 48

ATTACHMENT 5
Page 2 of 3

<< Axial Flux Difference Log >>

AFD MONITOR INOPERABLE

Tech Spec	4.2.1.1.b, 4.2.1.2								
Parameter	Axial Flux Difference								
Instrument	NI-41C	NI-42C	NI-43C	NI-44C	AVG Reactor Power	AFD Limits			
						Lower	Upper	Perform	Verify
Acceptance Criteria	Within AFD COLR Limits								
MODE	1 Above 50% Rated Thermal Power								
0000 - 0005									
0030 - 0035									
0100 - 0105									
0130 - 0135									
0200 - 0205									
0230 - 0235									
0300 - 0305									
0330 - 0335									
0400 - 0405									
0430 - 0435									
0500 - 0505									
0530 - 0535									
0600 - 0605									
0630 - 0635									
0700 - 0705									
0730 - 0735									
0800 - 0805									
0830 - 0835									
0900 - 0905									
0930 - 0935									
1000 - 1005									
1030 - 1035									
1100 - 1105									
1130 - 1135									
1200 - 1205									

Nightshift CRS Review ____________________

DAILY SURVEILLANCE REQUIREMENTS DAILY INTERVAL MODE 1, 2	OST-1021
	Rev. 114
	Page 46 of 48

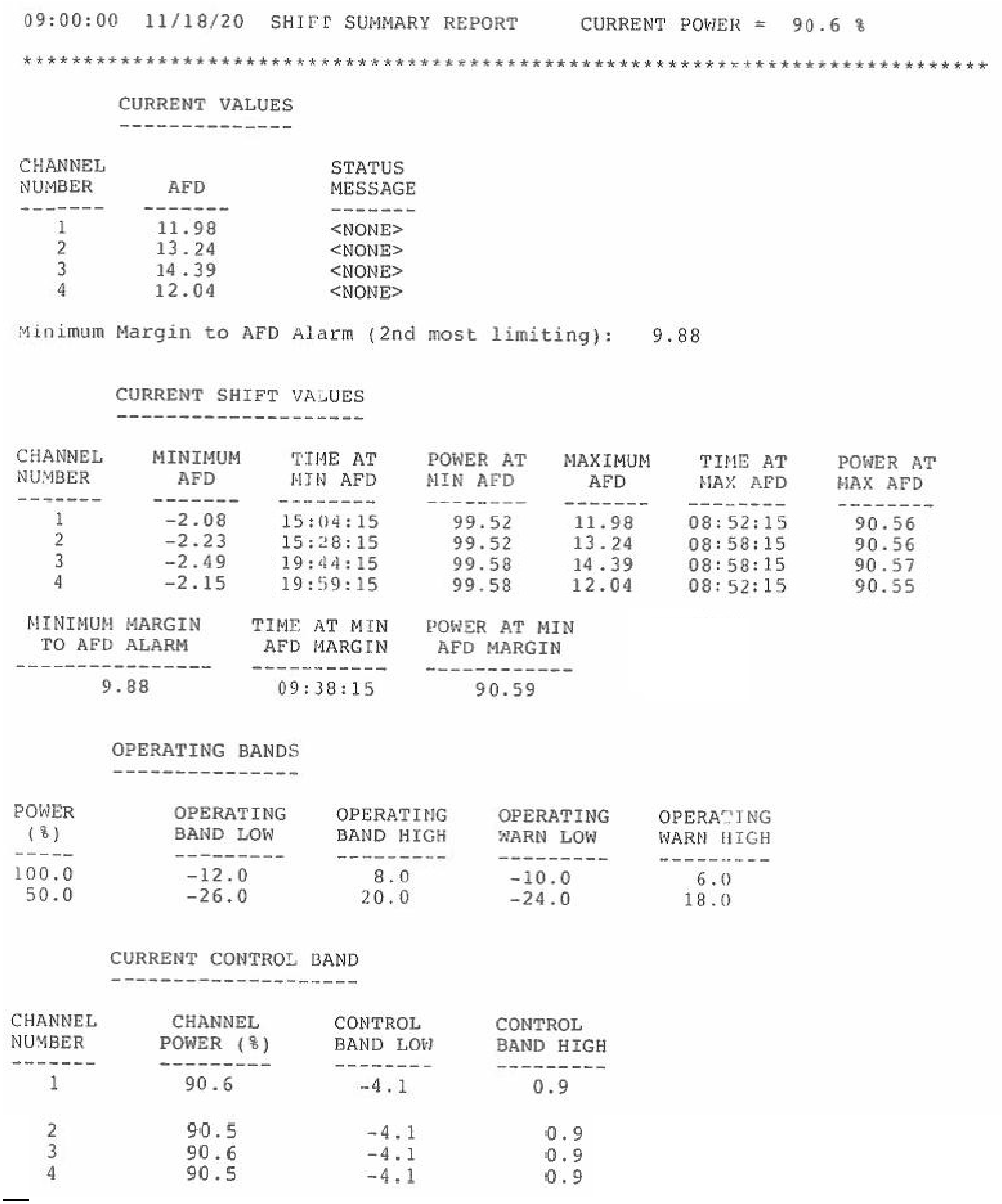
ATTACHMENT 5
Page 3 of 3

<< Axial Flux Difference Log >>

AFD MONITOR INOPERABLE

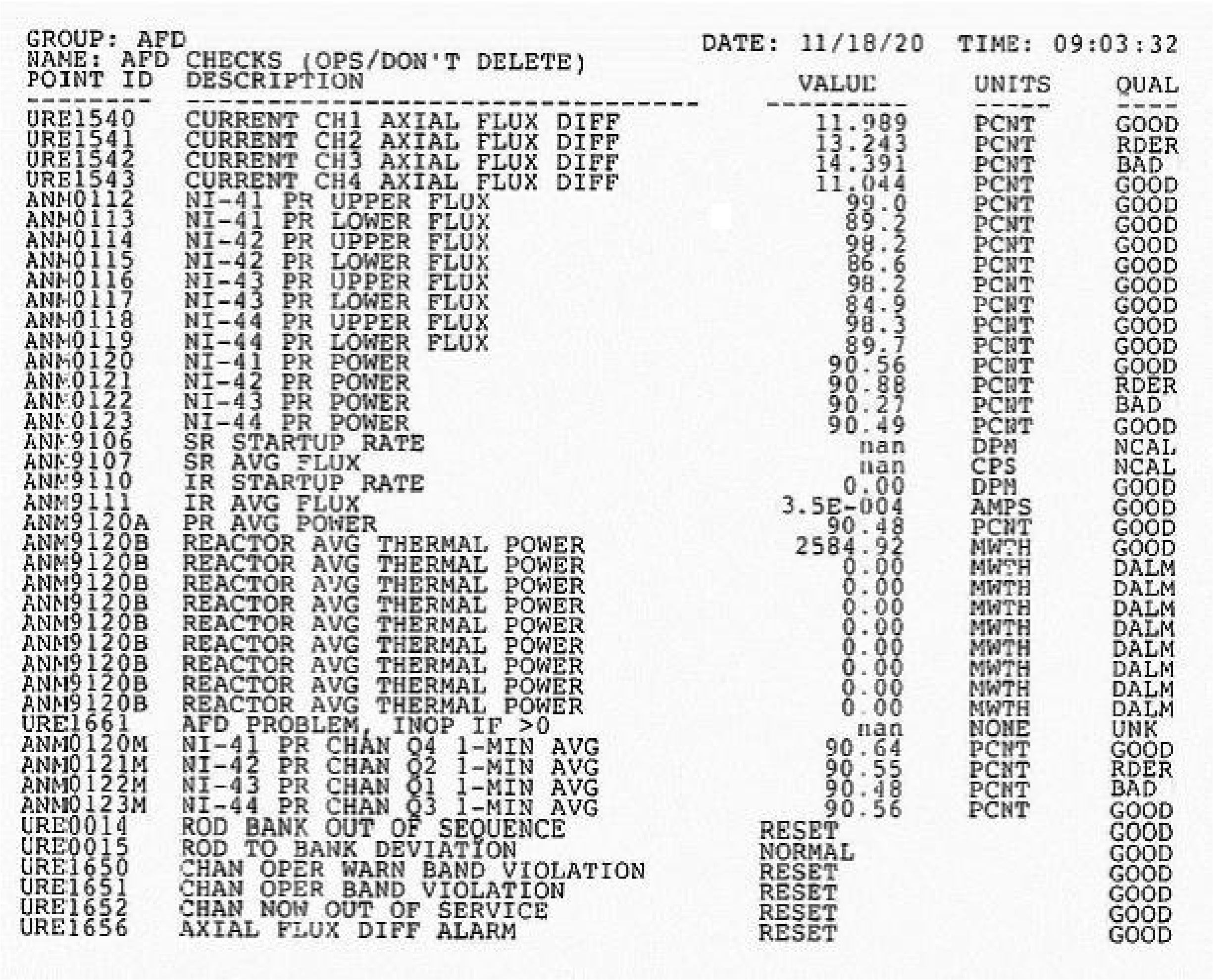
Tech Spec	4.2.1.1.b, 4.2.1.2								
Parameter	Axial Flux Difference								
Instrument	NI-41C	NI-42C	NI-43C	NI-44C	AVG Reactor Power	AFD Limits			
						Lower	Upper	Perform	Verify
Acceptance Criteria	Within AFD COLR Limits								
MODE	1 Above 50% Rated Thermal Power								
1230 - 1235									
1300 - 1305									
1330 - 1335									
1400 - 1405									
1430 - 1435									
1500 - 1505									
1530 - 1535									
1600 - 1605									
1630 - 1635									
1700 - 1705									
1730 -1735									
1800 - 1805									
1830 - 1835									
1900 - 1905									
1930 - 1935									
2000 - 2005									
2030 - 2035									
2100 - 2105									
2130 - 2135									
2200 - 2205									
2230 - 2235									
2300 - 2305									
2330 - 2335									

Dayshift CRS Review ____________________



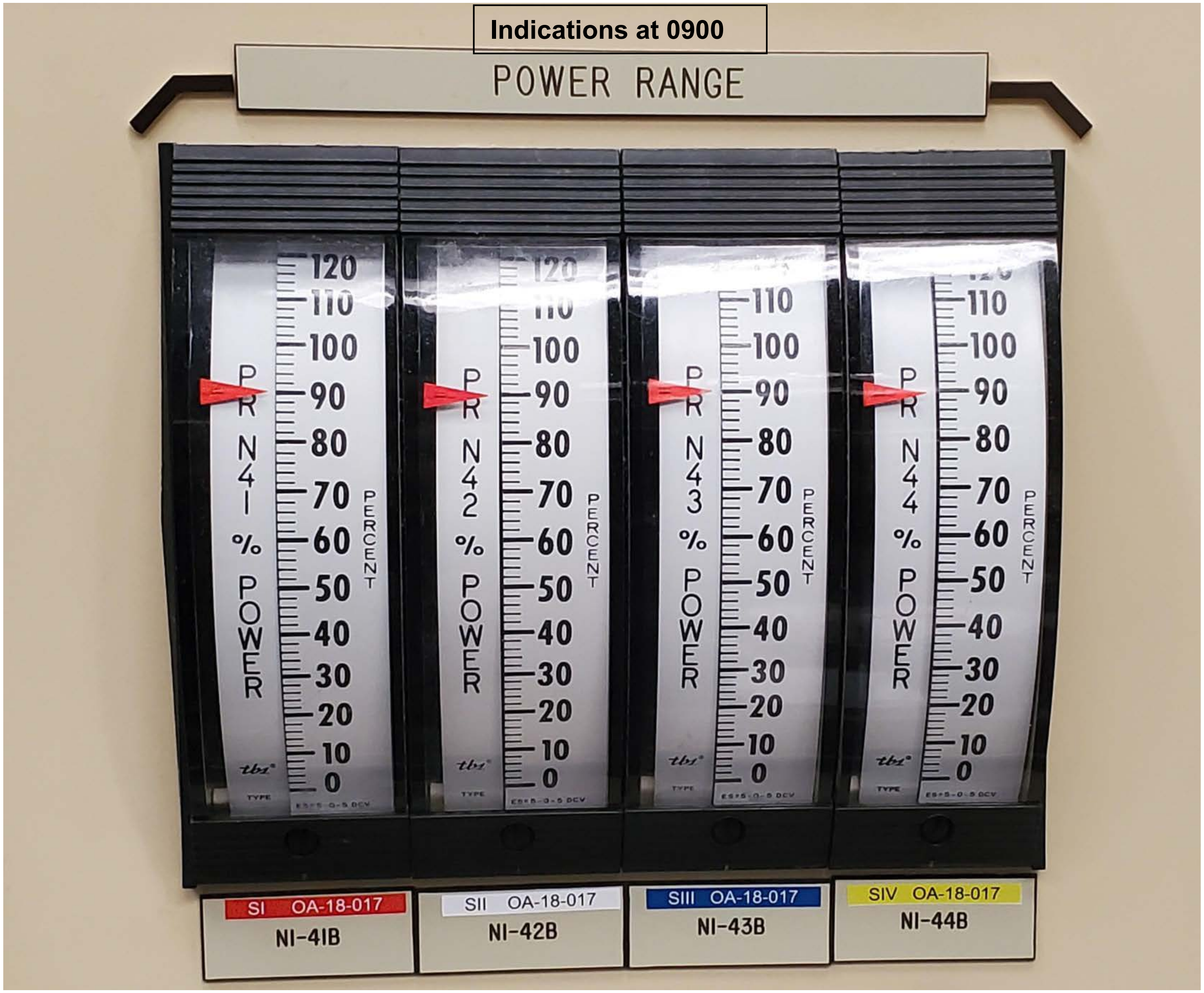
```
09:00:00  11/18/20  SHIFT SUMMARY REPORT     CURRENT POWER =  90.6 %
********************************************************************************

        CURRENT VALUES
        --------------

CHANNEL                        STATUS
NUMBER      AFD                MESSAGE
-------   -------              -------
   1       11.98               <NONE>
   2       13.24               <NONE>
   3       14.39               <NONE>
   4       12.04               <NONE>

Minimum Margin to AFD Alarm (2nd most limiting):   9.88

        CURRENT SHIFT VALUES
        --------------------

CHANNEL   MINIMUM    TIME AT    POWER AT   MAXIMUM    TIME AT    POWER AT
NUMBER      AFD      MIN AFD    MIN AFD      AFD      MAX AFD    MAX AFD
-------   -------   --------   --------   -------   --------   --------
   1       -2.08    15:04:15     99.52     11.98    08:52:15     90.56
   2       -2.23    15:28:15     99.52     13.24    08:58:15     90.56
   3       -2.49    19:44:15     99.58     14.39    08:58:15     90.57
   4       -2.15    19:59:15     99.58     12.04    08:52:15     90.55

 MINIMUM MARGIN     TIME AT MIN    POWER AT MIN
  TO AFD ALARM      AFD MARGIN     AFD MARGIN
----------------   -----------   ------------
      9.88           09:38:15        90.59

        OPERATING BANDS
        ---------------

POWER       OPERATING    OPERATING    OPERATING    OPERATING
 (%)        BAND LOW     BAND HIGH    WARN LOW     WARN HIGH
-----      ---------    ---------    ---------    ---------
100.0        -12.0          8.0        -10.0          6.0
 50.0        -26.0         20.0        -24.0         18.0

        CURRENT CONTROL BAND
        --------------------

CHANNEL     CHANNEL      CONTROL      CONTROL
NUMBER     POWER (%)     BAND LOW     BAND HIGH
-------    ---------     --------     ---------
   1          90.6         -4.1          0.9

   2          90.5         -4.1          0.9
   3          90.6         -4.1          0.9
   4          90.5         -4.1          0.9
```

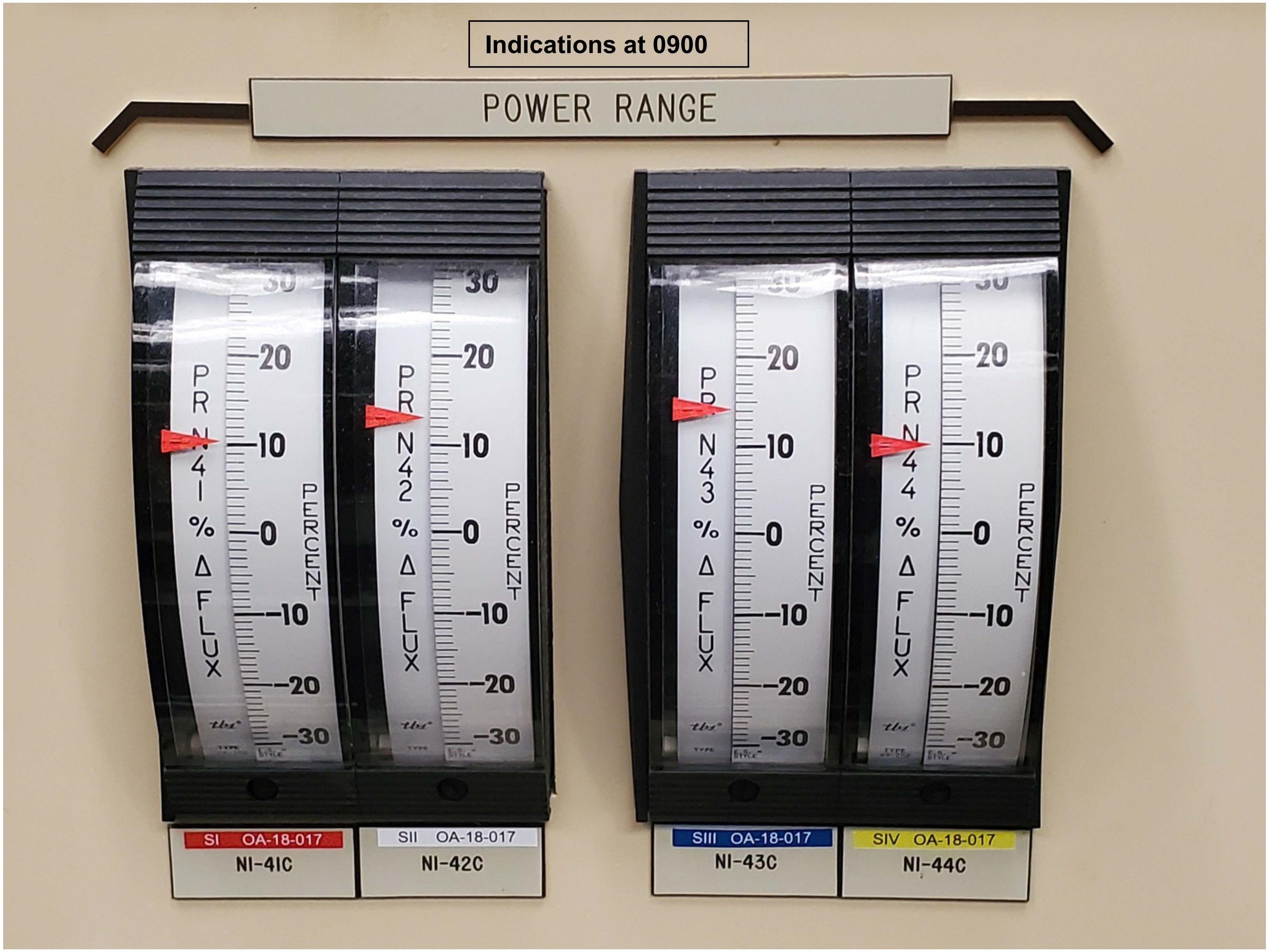
JPM CUE SHEET



```
GROUP: AFD                                                DATE: 11/18/20  TIME: 09:03:32
NAME: AFD CHECKS (OPS/DON'T DELETE)
POINT ID  DESCRIPTION                                     VALUE       UNITS     QUAL
--------  --------------------------------           ----------      -----     ----
URE1540   CURRENT CH1 AXIAL FLUX DIFF                     11.989      PCNT      GOOD
URE1541   CURRENT CH2 AXIAL FLUX DIFF                     13.243      PCNT      RDER
URE1542   CURRENT CH3 AXIAL FLUX DIFF                     14.391      PCNT      BAD
URE1543   CURRENT CH4 AXIAL FLUX DIFF                     11.044      PCNT      GOOD
ANM0112   NI-41 PR UPPER FLUX                               99.0      PCNT      GOOD
ANM0113   NI-41 PR LOWER FLUX                               89.2      PCNT      GOOD
ANM0114   NI-42 PR UPPER FLUX                               98.2      PCNT      GOOD
ANM0115   NI-42 PR LOWER FLUX                               86.6      PCNT      GOOD
ANM0116   NI-43 PR UPPER FLUX                               98.2      PCNT      GOOD
ANM0117   NI-43 PR LOWER FLUX                               84.9      PCNT      GOOD
ANM0118   NI-44 PR UPPER FLUX                               98.3      PCNT      GOOD
ANM0119   NI-44 PR LOWER FLUX                               89.7      PCNT      GOOD
ANM0120   NI-41 PR POWER                                   90.56      PCNT      GOOD
ANM0121   NI-42 PR POWER                                   90.88      PCNT      RDER
ANM0122   NI-43 PR POWER                                   90.27      PCNT      BAD
ANM0123   NI-44 PR POWER                                   90.49      PCNT      GOOD
ANM9106   SR STARTUP RATE                                    nan      DPM       NCAL
ANM9107   SR AVG FLUX                                        nan      CPS       NCAL
ANM9110   IR STARTUP RATE                                   0.00      DPM       GOOD
ANM9111   IR AVG FLUX                                   3.5E-004      AMPS      GOOD
ANM9120A  PR AVG POWER                                     90.48      PCNT      GOOD
ANM9120B  REACTOR AVG THERMAL POWER                      2584.92      MWTH      GOOD
ANM9120B  REACTOR AVG THERMAL POWER                         0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00      MWTH      DALM
URE1661   AFD PROBLEM, INOP IF >0                            nan      NONE      UNK
ANM0120M  NI-41 PR CHAN Q4 1-MIN AVG                       90.64      PCNT      GOOD
ANM0121M  NI-42 PR CHAN Q2 1-MIN AVG                       90.55      PCNT      RDER
ANM0122M  NI-43 PR CHAN Q1 1-MIN AVG                       90.48      PCNT      BAD
ANM0123M  NI-44 PR CHAN Q3 1-MIN AVG                       90.56      PCNT      GOOD
URE0014   ROD BANK OUT OF SEQUENCE                    RESET                     GOOD
URE0015   ROD TO BANK DEVIATION                       NORMAL                    GOOD
URE1650   CHAN OPER WARN BAND VIOLATION               RESET                     GOOD
URE1651   CHAN OPER BAND VIOLATION                    RESET                     GOOD
URE1652   CHAN NOW OUT OF SERVICE                     RESET                     GOOD
URE1656   AXIAL FLUX DIFF ALARM                       RESET                     GOOD
```

Indications at 0900





Indications at 0900

Facility:	Harris Nuclear Plant	Task No.:	005016H101
Task Title:	AOP-017 Attachment 4 manual makeup calculation	JPM No.:	2020 NRC Exam Admin JPM RO A1-2
K/A Reference:	G2.1.25 RO 3.9 SRO 4.2	**ALTERNATE PATH - NO**	
Examinee:	______________	NRC Examiner:	______________
Facility Evaluator:	______________	Date:	______________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ______

READ TO THE EXAMINEE	
I will explain the initial conditions, which steps to simulate, discuss, or perform and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	• The plant is in Mode 3 • Instrument air leak resulted header pressure lowering to 45 psig • Automatic Blender automatic makeup is not available • VCT level is currently 19% and stable

Initiating Cue:	The CRS has directed you to perform a Manual Makeup and to determine the following for these conditions: • Required Boric acid flow rate • The maximum possible makeup flow rate to achieve required boron concentration in the VCT. • Dilution flow rate **Record your results in the space provided or on the applicable procedure** **Show all work.**

Task Standard: Determines Required boric acid flow to be 27.5 gpm (27.0-28.0) and required dilution flow is 72.5 gpm (72.0 – 73.0), using AOP-017 Attachment 4 and OP-107.1 **OR** 30 gpm and required dilution flow is 79 gpm, using AOP-017 Attachment 4 Note prior to Step 2.

Required Materials:
AOP-017, Rev. 40
OP-107.01, Rev. 30
Calculator

General References:
AOP-017, Rev. 40
OP-107.01, Rev. 30

Handouts:
AOP-017, Rev. 40, pages 47 – 50, Manual Makeup
OP-107.01, Rev. 30, pages 120 – 128, Makeup Concentration Limits
OR
2020 NRC Exam Frozen Procedures Folder

JPM Cue Sheets

Time Critical Task: No

Validation Time: 15 minutes

NOTE: Performance Step 9, 12 and 13 are only critical if the candidate performs the calculations in accordance with the note prior to Attachment 4 Step 2.

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 7	Must calculate correct boric acid flow rate to ensure correct manual makeup is performed.
Step 8	Must calculate correct dilution flow rate to ensure correct manual makeup is performed.
Step 9	Must calculate correct Total flow rate to ensure correct manual makeup is performed.
Step 12	Must calculate correct boric acid flow rate to ensure correct manual makeup is performed.
Step 13	Must calculate correct dilution flow rate to ensure correct manual makeup is performed.

START TIME: ____________

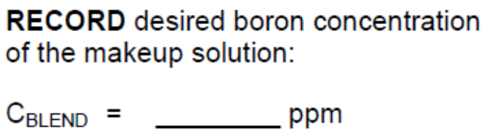
Performance Step: 1 Obtain a copy of the appropriate procedures **(AOP-017)**

Standard: Operator obtains a copy of AOP-017 to determine appropriate attachment is Attachment 4 to complete a manual makeup.

Comment:

AOP-017 ATT.4 Step 1

Performance Step: 2



RECORD desired boron concentration of the makeup solution:

C_{BLEND} = ________ ppm

Standard: References Reactivity sheet and uses the RCS Boron concentration of 1928.

Comment:

AOP-017 ATT.4 NOTE before Step 2

Performance Step: 3 NOTE

If RCS boron concentration is above 1750 ppm, blended makeup at 120 gpm may not be possible, due to the inability of the system to reliably deliver more than 30 gpm boric acid flow. In those cases, either select a conservatively low total makeup flow, or consult Attachment 7 of OP-107.01 to determine the maximum possible makeup flow.

Standard: Reads and placekeeps note and refers to OP-107.01, Attachment 7 **OR** performs calculation to select a conservatively low total makeup flow.

Comment:

Evaluator Note:	**Performance Step 4 - 8 are only applicable if the candidate performs the calculations in accordance with OP-107.01 Attachment 7.**

OP-107.01 Attachment 7

Performance Step: 4 Determine maximum total flow with a RCS boron concentration of 1928 ppm

Standard: References OP-107.01 Attachment 7 page 4 and determines the maximum total flow available to meet the 1928 ppm requirement is 100 gpm.

Comment:

AOP-017 ATT. 4 step 2

Performance Step: 5 RECORD desired total makeup flow rate:

MBLEND = ________ gpm

Standard: Records 100 gpm as the desired total makeup flow.

Comment:

AOP-017 ATT. 4 step 3

Performance Step: 6 RECORD most recent Boric Acid Tank boron concentration from Unit Status Board:

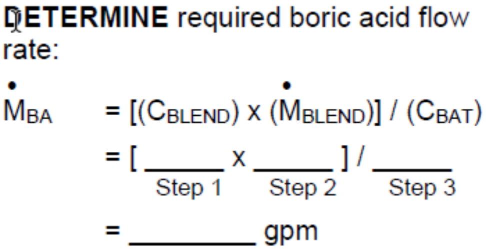
C_{BAT} = ________ ppm

Standard: References Reactivity data sheet and records 7000 ppm

Comment:

AOP-017 ATT. 4 step 4

✓ **Performance Step: 7**



DETERMINE required boric acid flow rate:

$$\dot{M}_{BA} = [(C_{BLEND}) \text{ x } (\dot{M}_{BLEND})] / (C_{BAT})$$

$$= [\underset{\text{Step 1}}{\_\_\_\_\_} \text{ x } \underset{\text{Step 2}}{\_\_\_\_\_}] / \underset{\text{Step 3}}{\_\_\_\_\_}$$

$$= \_\_\_\_\_\_\_\_ \text{ gpm}$$

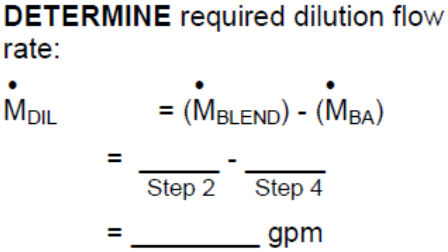
Standard: $[(C_{BLEND}) \text{ x } (M_{BLEND})] / (C_{BAT})$

(1928 ppm x 100gpm) / (7000ppm) = 27.5 gpm (27.0-28.0) gpm

Comment:

AOP-017 ATT. 4 step 6

✓ **Performance Step: 8**



DETERMINE required dilution flow rate:

$$\dot{M}_{DIL} = (\dot{M}_{BLEND}) - (\dot{M}_{BA})$$

$$= \underset{\text{Step 2}}{\_\_\_\_\_} - \underset{\text{Step 4}}{\_\_\_\_\_}$$

$$= \_\_\_\_\_\_\_\_ \text{ gpm}$$

Standard: Calculates

100 gpm – 27.5 gpm = 72.5 gpm (72.0 – 73.0) gpm

Comment:

Evaluator Cue:	**When the BA flow rate and total flow rate has been determined. Evaluation on this JPM is complete.** **END OF JPM**

Stop Time: _________

Evaluator Note:	**Performance Step 9 - 13 are only applicable if the candidate performs the calculations in accordance with the note prior to Attachment 4 Step 2.**

AOP-017 Attachment 4 Calculation

✓ **Performance Step: 9** Determine maximum total flow with a RCS boron concentration of 1928 ppm

Standard: References Note prior to AOP-017 Attachment 4 Step 2 and determines the maximum total flow available to meet the 1928 ppm requirement as follows:

$$\frac{30 \text{ gpm} \times 7000 \text{ ppm}}{1928 \text{ ppm}} \boxed{= 108.9 \text{ gpm}}$$

(Band 108 to 109 gpm)

Comment:

AOP-017 ATT. 4 step 2

Performance Step: 10 RECORD desired total makeup flow rate:

MBLEND = ________ gpm

Standard: Records 108.9 gpm as the desired total makeup flow.

(Band 108 to 109 gpm)

Comment:

AOP-017 ATT. 4 step 3

Performance Step: 11 RECORD most recent Boric Acid Tank boron concentration from Unit Status Board:

C_{BAT} = ________ ppm

Standard: References Reactivity data sheet and records 7000 ppm

Comment:

AOP-017 ATT. 4 step 4

✓ **Performance Step: 12** **DETERMINE** required boric acid flow rate:

Standard: $[(C_{BLEND}) \times (M_{BLEND})] / (C_{BAT})$

(1928 ppm x 109 gpm) / (7000ppm) = 30 gpm

(Band 29.0 - 30.0 gpm)

Comment:

AOP-017 ATT. 4 step 6

✓ **Performance Step: 13** **DETERMINE** required dilution flow rate:

$$\dot{M}_{DIL} = (\dot{M}_{BLEND}) - (\dot{M}_{BA})$$

$$= \underset{\text{Step 2}}{\underline{\qquad}} - \underset{\text{Step 4}}{\underline{\qquad}}$$

$$= \underline{\qquad\qquad} \text{ gpm}$$

Standard: Calculates
109 gpm – 30.0 gpm = 79.0 gpm (78.0 – 80.0) gpm

Comment:

Evaluator Cue:	**When the BA flow rate and total flow rate has been determined. Evaluation on this JPM is complete.** **END OF JPM**

Stop Time: __________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC Exam Admin JPM RO A1-2
AOP-017 Attachment 4 manual makeup calculation
AOP-017
OP-107.01

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT _______

Examiner's Signature: ______________________ Date: ______________

Initial Conditions:	• The plant is in Mode 3 • Instrument air leak resulted header pressure lowering to 45 psig • Automatic Blender automatic makeup is not available • VCT level is currently 19% and stable

Initiating Cue:	The CRS has directed you to perform Manual Makeup and to determine the following for these conditions: • Required Boric acid flow rate • The maximum possible makeup flow rate to achieve required boron concentration in the VCT. • Dilution flow rate **Record your results in the space provided or on the applicable procedure** **Show all work.**

Name: ______________________________________

Date: __________________

1. Identify the procedure required to be entered to address the current plant conditions.

   ____

2. Record your results below or on the procedure section / attachment required to complete the Manual Makeup for the current plant conditions.

- Required Boric acid flow rate

  ____

- The maximum possible makeup flow rate to achieve required boron concentration in the VCT

  ____

- Dilution flow rate

  ____

REACTIVITY DATA

Plant on-line: Date: **11/16/20** Time: **1535**

Core Burn up: **15** EFPD Date: **TODAY**

			Date / Time
RCS Boron:	**1928**	PPM	**NOW / NOW**
PZR Boron:	**1929**	PPM	**NOW / NOW**
BAT Boron:	**7000**	PPM	**NOW / NOW**
RWST Boron:	**2450**	PPM	**NOW / NOW**

Xenon Free SDM Boron Requirements

557°F	1378 ppm	**450°F**	1566 ppm	**300°F**	1668 ppm	**70°F**	1765 ppm
550°F	1397 ppm	**400°F**	1611 ppm	**250°F**	1686 ppm		
500°F	1500 ppm	**350°F**	1644 ppm	**200°F**	1721 ppm		

Facility:	Harris Nuclear Plant	Task No.:	119013H304
Task Title:	Determine Clearance Requirements for a CCW Pump	JPM No.:	2020 NRC Exam Admin JPM RO A2

K/A Reference: G 2.2.13 RO 4.1 SRO 4.3 **ALTERNATE PATH - NO**

Examinee: ____________________ NRC Examiner: ____________________

Facility Evaluator: ____________________ Date: ____________________

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom __X__ Simulator ______ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate, discuss, or perform and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• The plant is defueled • CCW Pump 1A-SA is required to be placed under a clearance for seal replacement • There is NO known isolation boundary leakage • eSOMS is currently OOS for an IT update

Initiating Cue:	You have been directed to determine the clearance requirements for CCW Pump 1A-SA. The AOM-Shift has approved using single valve isolation. **NOTE: LISTING OF CIT'S IS NOT REQUIRED FOR THIS JPM.** **IT IS NOT INTENDED THAT YOU ACTUALLY GENERATE A CLEARANCE. ONLY PROVIDE THE EVALUATOR WITH A LISTING OF THE REQUIRED COMPONENTS, POSITIONS AND THE INSTALLATION SEQUENCE.**

Task Standard:	Provide complete electrical and mechanical isolation of CCW Pump 1A-SA
Required Materials:	AD-OP-ALL-0200, Equipment Clearance, pgs. 40, 41 and 42, Rev. 20 OP-145, Component Cooling Water, Rev. 80 SFD 2165 S-1319 CWD 6-B-401 941 Additional copies of page 12 of this JPM available
General References:	AD-OP-ALL-0200, Equipment Clearance, Rev. 20 OP-145, Component Cooling Water, Rev. 80 SFD 2165 S-1319, 1320, and 1321 CWD 6-B-401 941, 942, and 943 OR 2020 NRC Exam Frozen Procedures Folder
Handouts:	JPM Cue Sheets SFD 2165 S-1319
Time Critical Task:	No
Validation Time:	20 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 2	Critical to remove power from the pump for personnel protection.
Step 3	Critical to isolate suction source to allow pump to be depressurized.
Step 4	Critical to isolate discharge path to allow pump to be depressurized.
Step 5	Critical to open vent path to allow pump to depressurize.
Step 6	Critical to open drain path to allow pump to depressurize.

NOTE: Provide applicants a copy of SFD 2165 S-1319, 1320 and 1321 along with CWD 6-B-401 Sheet 941, 942 and 943.

Laptops are to be used for this JPM.

Prior to starting this JPM: Ensure each candidate is familiar with the contents of the frozen procedures and are able to access the files containing OP-145, Component Cooling Water Activities and AD-OP-ALL-0200, Equipment Clearance.

START TIME: ____________

Performance Step: 1	Obtain a copy of the appropriate drawings and procedures **(AD-OP-ALL-0200, OP-145, SFD 2165 S-1319, CWD 6-B-401 Sheet 941)**
Standard:	Operator obtains a copy of OP-145 to determine electrical requirements. SFD 2165 S-1319 to determine mechanical requirements. AD-OP-ALL-0200 to determine proper installation sequence for clearance.
Comment:	

Evaluator Note:	***SEE JPM ATTACHMENT FOR A COMPLETE LISTING OF EACH COMPONENT AND REQUIRED POSITION. JPM STEPS ARE NOT REQUIRED TO BE PERFORMED IN THE LISTED SEQUENCE.***

✓ **Performance Step: 2**	**Determine the electrical supply breaker for CCW Pump 1A-SA**
Standard:	Refers to CWD 6-B-401 Sheet 941, OP-145 (or any other valid source) and determines the electrical supply breaker for CCW Pump 1A-SA to be 6.9 KV Emergency Bus 1A-SA, Cubicle 8 **(BREAKER RACKED OUT)** Also determines pump has MCB and ACP switch and includes a CIT on CCW Pump 1A-SA switch for each location
Comment:	

Evaluator Note:	**CRITICAL TO REMOVE POWER FROM PUMP.**

✓ **Performance Step: 3** **Determine the discharge isolation for CCW Pump 1A-SA**

Standard: Refers to S-1319 and determines the valve to isolate CCW Pump 1A-SA discharge is 1CC-36, CCW Pump A Discharge Isol Valve **(CLOSE)**

Comment:

✓ **Performance Step: 4** **Determine the suction valve for CCW Pump 1A-SA**

Standard: Refers to S-1319 and determines the suction valve for CCW Pump 1A-SA to be 1CC-27, CCW Pump A Suction Valve **(CLOSE)**

Comment:

✓ **Performance Step: 5** **Determine the vent path for CCW Pump 1A-SA**

Standard: Refers to S-1319 and determines the valve to vent CCW Pump 1A-SA is 1CC-28, CCW Pump A Suction Pressure Tap

(OPEN WITH CAP REMOVED)

Comment:

Evaluator Note:	***EITHER STEP 5 <u>OR</u> STEP 6 IS CRITICAL TO DEPRESSURIZE THE SYSTEM. ONE <u>OR</u> THE OTHER MUST BE PERFORMED, BUT <u>NOT BOTH</u>. HOWEVER, IF BOTH ARE PERFORMED, THIS IS ALSO ACCEPTABLE.***

✓ **Performance Step: 6** **Determine the drain path for CCW Pump 1A-SA**

Standard: Refers to S-1319 and determines the valves to drain CCW Pump 1A-SA suction piping to be 1CC-29, CCW Pump A Suction Drain Valve and discharge piping to be 1CC-30, CCW Pump A Discharge Drain Valve, and 1CC-31, CCW Pump A Discharge Line Drain Isol Valve

(ALL OPEN)

Comment:

Evaluator Note:	***EITHER STEP 5 OR STEP 6 IS CRITICAL TO DEPRESSURIZE THE SYSTEM. ONE OR THE OTHER MUST BE PERFORMED, BUT NOT BOTH. HOWEVER, IF BOTH ARE PERFORMED, THIS IS ALSO ACCEPTABLE.***

Evaluator Cue:	**When applicant completes and returns clearance list.** **END OF JPM**

Stop Time: _________

KEY
JPM ATTACHMENT

COMPONENT LISTING AND REQUIRED POSITIONS

Critical sequences:

1) Remove power from the CCW Pump 1A-SA
2) Shut 1CC-36, CCW Pump 1A-SA Discharge Isol Valve
2) Shut 1CC-27, CCW Pump 1A-SA Suction Isol Valve
3) Open Vent and/or Drain to depressurize boundary

COMPONENT	**POSITION**
1) CCW Pump 1A-SA P.S. - 6.9 KV Emergency Bus 1A-SA, Cubicle 8.	Racked Out
2) 1CC-36, CCW Pump 1A-SA, Discharge Isol Valve	Shut
3) 1CC-27, CCW Pump 1A-SA, Suction Isol Valve	Shut

4) Accept - EITHER **one vent path** OR **the drain path** or **BOTH a vent path and drain path**.

NOTE: Any of the following vent valves will support a vent path for the pump. One or more of these vent paths are required to be identified

VENT PATHS

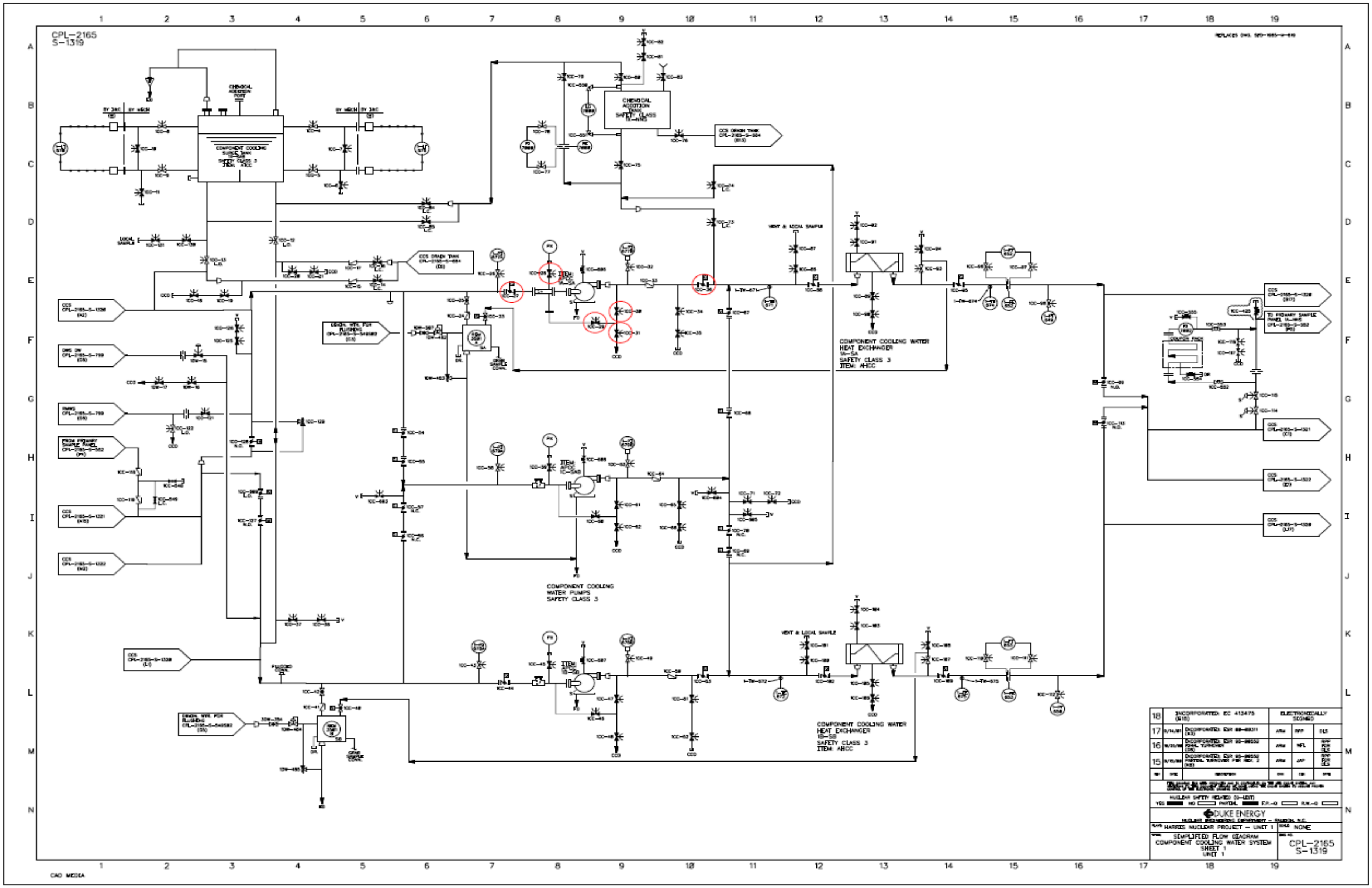
1CC-28, CCW Pump A Suction Pressure Tap	Uncapped/Open
- **OR** –	
1CC-606, CCW Pump 1A Casing Vent Valve	Uncapped/Open
- **OR** –	
1CC-32, PI-677B Root Isolation Valve	Uncapped/Open

DRAIN PATH

1CC-29, CCW Pump A Suction Drain Valve	Open
- **AND** -	
1CC-30, CCW Pump A Discharge Drain Valve	Open
- **AND** -	
1CC-31, CCW Pump A Discharge Drain Isolation Valve	Open
- **OR** –	
1CC-34, CCW Pump A Disch Line Inner Drain Valve	Open
- **AND** -	
1CC-35, CCW Pump A Disch Line Outer Drain Valve	Uncapped/Open

NOTE – CITs are NOT required for satisfactory completion of JPM.

KEY


CPL–2165
S–1319
COMPONENT COOLING SURGE TANK SAFETY CLASS 3
CHEMICAL ADDITION TANK SAFETY CLASS 3
COMPONENT COOLING WATER PUMPS SAFETY CLASS 3
COMPONENT COOLING WATER HEAT EXCHANGER 1A–SA SAFETY CLASS 3
COMPONENT COOLING WATER HEAT EXCHANGER 1B–SB SAFETY CLASS 3
VENT & LOCAL SAMPLE
LOCAL SAMPLE
CCS DRAIN TANK
TO PRIMARY SAMPLE PANEL
18 INCORPORATED: EC 413475 (E18)
ELECTRONICALLY SIGNED
17 INCORPORATED: ESR
16 INCORPORATED: ESR FINAL TURNOVER
15 INCORPORATED: ESR PARTIAL TURNOVER
NUCLEAR SAFETY RELATED (Q–LIST)
YES NO PARTIAL
DUKE ENERGY
HARRIS NUCLEAR PROJECT – UNIT 1
NONE
SIMPLIFIED FLOW DIAGRAM
COMPONENT COOLING WATER SYSTEM
SHEET 1
UNIT 1
CPL–2165
S–1319
CAD MEDIA

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC Exam Admin JPM RO A2
Determine Clearance Requirements for a CCW Pump
AD-OP-ALL-0200
OP-145

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

Initial Conditions:	• The plant is defueled • CCW Pump 1A-SA is required to be placed under a clearance for seal replacement • There is NO known isolation boundary leakage • eSOMS is currently OOS for an IT update

Initiating Cue:	You have been directed to determine the clearance requirements for CCW Pump 1A-SA. The AOM-Shift has approved using single valve isolation. **NOTE: LISTING OF CIT'S IS NOT REQUIRED FOR THIS JPM.** **IT IS NOT INTENDED THAT YOU ACTUALLY GENERATE A CLEARANCE. ONLY PROVIDE THE EVALUATOR WITH A LISTING OF THE REQUIRED COMPONENTS, POSITIONS AND THE INSTALLATION SEQUENCE.**

NOTE: Provide a list of components in the proper installation sequence to the examiner using the following page(s).

Additional pages are available upon request.

Name: ____

Date: ____________________

CCW Pump 1A-SA CLEARANCE COMPONENT LISTING AND REQUIRED POSITIONS

SEQUENCE	**COMPONENT**	**POSITION**

Facility: Harris Nuclear Plant Task No.: 344171H404

Task Title: <u>Given a set of conditions, determine and apply the facility dose limits.</u> JPM No.: 2020 NRC Exam Admin JPM RO A3

K/A Reference: G 2.3.7 RO 3.5 SRO 3.6 **ALTERNATE PATH - NO**

Examinee: ____________________ NRC Examiner: ____________________

Facility Evaluator: ____________________ Date: ____________________

<u>Method of testing:</u>

Simulated Performance: ______ Actual Performance: __X__

Classroom __X__ Simulator ______ Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• A fire has occurred in 1-A-SWGRA • The reactor is tripped • The operating crew is performing AOP-036.08, Fire Areas: 1-A-SWGRA, 1-A-SWGRB • Charging flow cannot be controlled from the control room

Initiating Cue:	• You have been assigned to locally control charging in accordance with AOP-036.08, Section 3.1, Step 10.d • This is not considered to be an emergency evolution. Your accumulated TEDE dose for this year is 1550 mrem • You will be performing the evolution under RWP # 23, Operations Activities • Identify the Minimum Operation Activities Task # to perform this evolution • Determine the maximum permissible stay time before the first Stop Work limit requires you to exit the area **(ASSUME NO DOSE IN TRANSIT AND THE OPERATOR WILL REMAIN NEXT TO THE EQUIPMENT UNTIL THE STOP LIMIT IS REACHED.)**

Task Standard:	Lowest facility limit determined and stay time calculated within tolerance band.
Required Materials:	Calculator
General References:	AOP-036.08, Fire Areas: 1-A-SWGRA, 1-A-SWGRB, Rev. 21 AD-RP-ALL-2000, Preparation And Management Of Radiation Work Permits (RWP), Rev. 4 RWP # 23 Operations Activities, Rev. 12 Valve Map 9, RAB 236’ Mechanical Penetration Area Survey HNP-M-20200621-4, RAB 236’ Mechanical Penetration Area OR 2020 NRC Exam Frozen Procedures Folder
Handout:	JPM Cue Sheets pages 5 - 19
Time Critical Task:	No
Validation Time:	10 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 2	Must determine the location of the valve in order to calculate the dose value until an alarm limit is reached
Step 3	Must determine the area classification of the valve location in order to minimum task dose alarm setpoint and dose rate alarm limits
Step 4	Must determine the RWP limits in order to calculate the dose value until an alarm limit is reached
Step 5	Must determine the time allowed in order to exit the area once the alarm limit is reached

(Denote Critical Steps with a check mark)

START TIME: ____________

Performance Step: 1 Determine the general location of the valves from AOP-036.08 on the survey map.

Standard: Uses Valve Map to determine location of the required valves (1CS-227 and 1CS-228)

Locates general area on the Survey Map.

Evaluator Cue:

- **Provide the handout.**
- **Assume that all handout materials are the most recent, approved documents.**

Comment:

✓ **Performance Step: 2** Determine the radiation level in the area of the valves.

Standard: Using Survey HNP-M-20200621-4, determines general radiation level in the area of the valves to be 3 mr/hr.

Comment:

✓ **Performance Step: 3** Determines the RCA classification of the work area.

Standard: Using Survey HNP-M-20200621-4 and RWP # 23 determines the work area is only a RA and Task # 1 Operations Activities (No HRA Access) is the minimum RWP task required to perform the evolution.

Comment:

✓ **Performance Step: 4** Determine the first Stop Work limit.

Standard: Reviews RWP # 23 Task # 1 and determines first Stop Work limit will be reached when the Alarming Dosimeter actuates:

- 8 mr accumulated dose (80% of 10 mr)

or

- 75 mr/hr dose rate.

Comment:

✓ **Performance Step: 5** Calculate maximum stay time.

Standard: (8 mr)(1 hr/3 mr) = 2.67 hours or 2 hours and 40 minutes

≥ 2.60 hours ≤ 2.67 hours or

≥ 2 hours and 36 minutes ≤ 2 hours and 40 minutes.

Evaluator Note: **Tolerance allows for a delta of 4 minutes on the low end without exceeding the upper limit in the event the candidate truncates the answer down to the nearest minute (2.60 hours) based on the initiating cue.**

Comment:

Terminating Cue: **After stay time is reported: Evaluation on this JPM is complete.**

STOP TIME: ______________

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC ADM JPM RO A3

Given a set of conditions, determine and apply the facility dose limits.

AD-RP-ALL-2000,

RWP # 23, Operations Activities

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

JPM CUE SHEET

Initial Conditions:	• A fire has occurred in 1-A-SWGRA • The reactor is tripped • The operating crew is performing AOP-036.08, Fire Areas: 1-A-SWGRA, 1-A-SWGRB • Charging flow cannot be controlled from the control room

Initiating Cue:	• You have been assigned to locally control charging in accordance with AOP-036.08, Section 3.1, Step 10.d • This is not considered to be an emergency evolution. Your accumulated TEDE dose for this year is 1550 mrem • You will be performing the evolution under RWP # 23, Operations Activities • Identify the Minimum Operation Activities Task # to perform this evolution • Determine the maximum permissible stay time before the first Stop Work limit requires you to exit the area **(ASSUME NO DOSE IN TRANSIT AND THE OPERATOR WILL REMAIN NEXT TO THE EQUIPMENT UNTIL THE STOP LIMIT IS REACHED.)**

Name: ____

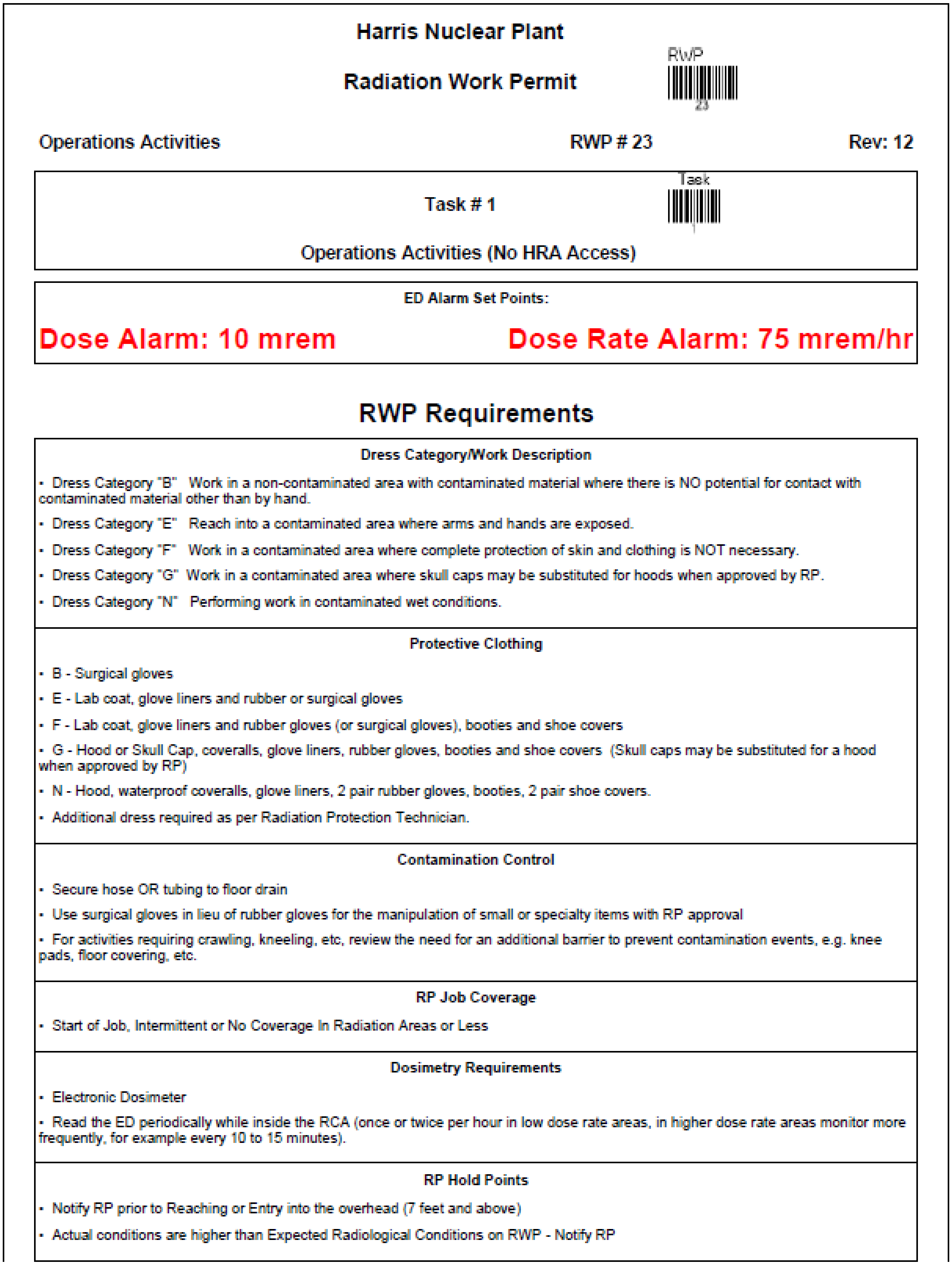
Date: __________________

1. Minimum Operation Activities Task # _______________________

2. Maximum permissible stay time before the first Stop Work limit requires you to exit the area for the identified Task # is __________ hrs and __________ mins

FIRE AREAS: 1-A-SWGRA, 1-A-SWGRB

INSTRUCTIONS	RESPONSE NOT OBTAINED
3.1 Fire Area: 1-A-SWGRA	
10. (Continued)	
NOTE • Pressurizer level can be maintained by cycling valves as specified above. • The following step is to be performed at the operator's discretion not to interfere with other required actions.	
d. WHEN local control is desired, **THEN LOCALLY PERFORM** the following (236 RAB scalloped area south mezzanine):	
☐ **(1) SHUT** 1CS-228, Normal Charging Line FCV Inlet Isol Vlv.	
☐ **(2) THROTTLE** 1CS-227, Norm Charging Line FCV Bypass Vlv, as necessary to control charging flow.	
☐ **11. MAINTAIN** RCS Inventory using current method.	◆ **11. ESTABLISH** throttled flow through the Hi Head SI Line, as follows:
	☐ **a. OPEN** the breaker 1B31-SB 4C, 1SI-3 BIT Outlet (RAB 286).
	☐ **b. WHEN** directed by MCR, **THEN LOCALLY THROTTLE** 1SI-3, BIT Outlet Isolation, to maintain PRZ level (RAB 216 north on platform at Containment wall).
☐ **12.** GO TO Step 16.	



Harris Nuclear Plant

Radiation Work Permit

Operations Activities RWP # 23 Rev: 12

Task # 1

Operations Activities (No HRA Access)

ED Alarm Set Points:

Dose Alarm: 10 mrem **Dose Rate Alarm: 75 mrem/hr**

RWP Requirements

Dress Category/Work Description

- Dress Category "B" Work in a non-contaminated area with contaminated material where there is NO potential for contact with contaminated material other than by hand.
- Dress Category "E" Reach into a contaminated area where arms and hands are exposed.
- Dress Category "F" Work in a contaminated area where complete protection of skin and clothing is NOT necessary.
- Dress Category "G" Work in a contaminated area where skull caps may be substituted for hoods when approved by RP.
- Dress Category "N" Performing work in contaminated wet conditions.

Protective Clothing

- B - Surgical gloves
- E - Lab coat, glove liners and rubber or surgical gloves
- F - Lab coat, glove liners and rubber gloves (or surgical gloves), booties and shoe covers
- G - Hood or Skull Cap, coveralls, glove liners, rubber gloves, booties and shoe covers (Skull caps may be substituted for a hood when approved by RP)
- N - Hood, waterproof coveralls, glove liners, 2 pair rubber gloves, booties, 2 pair shoe covers.
- Additional dress required as per Radiation Protection Technician.

Contamination Control

- Secure hose OR tubing to floor drain
- Use surgical gloves in lieu of rubber gloves for the manipulation of small or specialty items with RP approval
- For activities requiring crawling, kneeling, etc, review the need for an additional barrier to prevent contamination events, e.g. knee pads, floor covering, etc.

RP Job Coverage

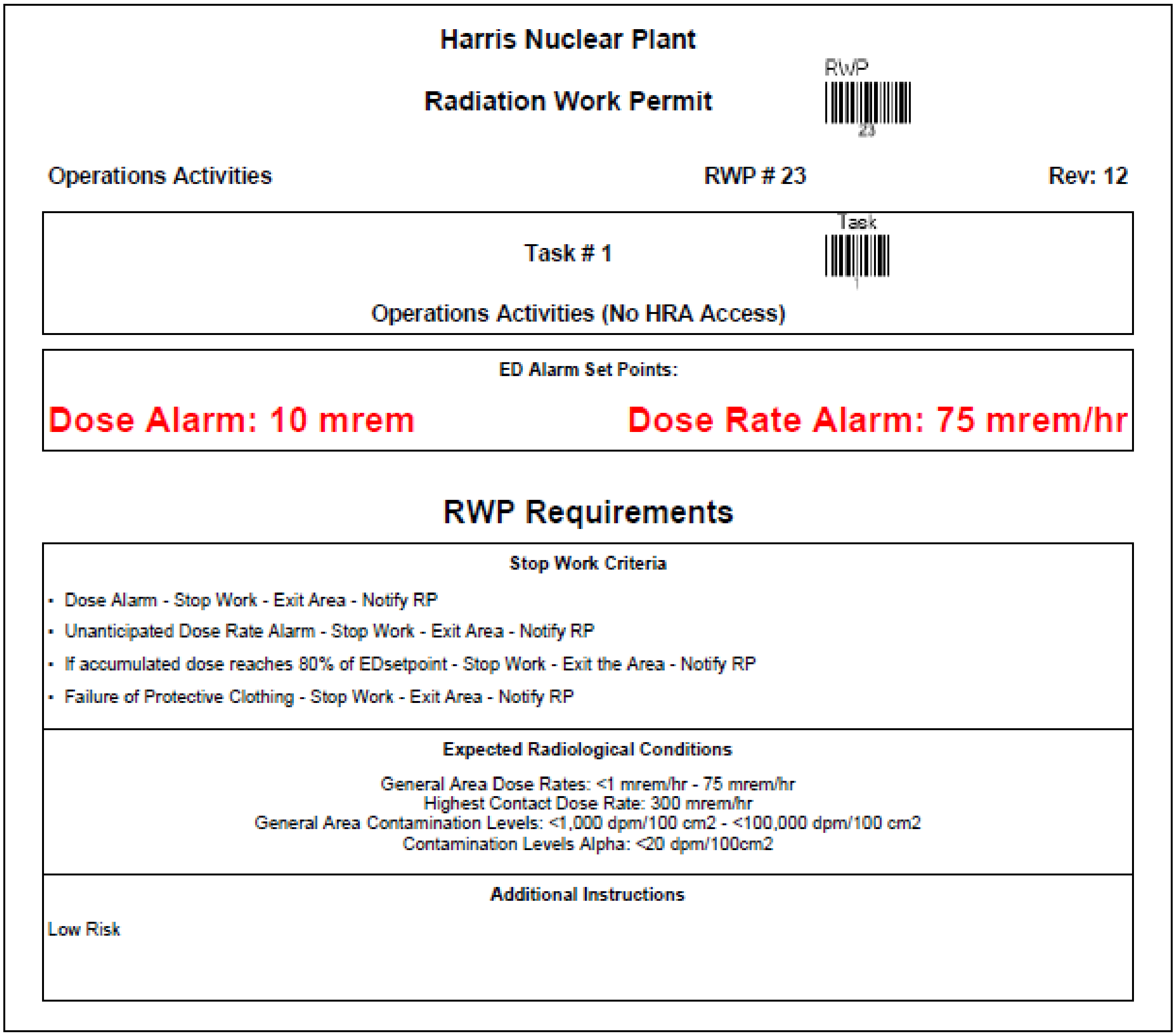
- Start of Job, Intermittent or No Coverage In Radiation Areas or Less

Dosimetry Requirements

- Electronic Dosimeter
- Read the ED periodically while inside the RCA (once or twice per hour in low dose rate areas, in higher dose rate areas monitor more frequently, for example every 10 to 15 minutes).

RP Hold Points

- Notify RP prior to Reaching or Entry into the overhead (7 feet and above)
- Actual conditions are higher than Expected Radiological Conditions on RWP - Notify RP



Harris Nuclear Plant

Radiation Work Permit

Operations Activities **RWP # 23** **Rev: 12**

Task # 1

Operations Activities (No HRA Access)

ED Alarm Set Points:

Dose Alarm: 10 mrem **Dose Rate Alarm: 75 mrem/hr**

RWP Requirements

Stop Work Criteria

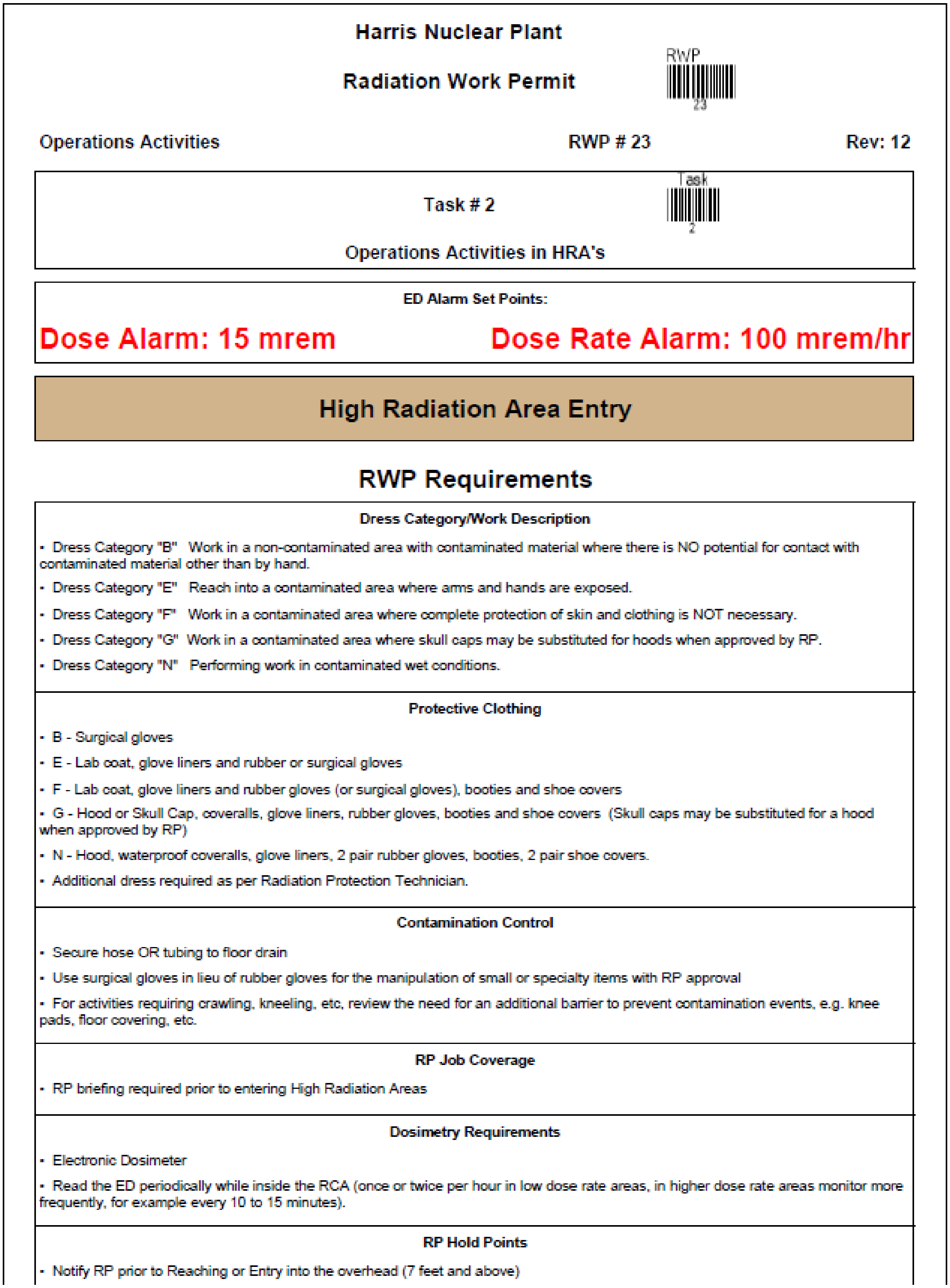
- Dose Alarm - Stop Work - Exit Area - Notify RP
- Unanticipated Dose Rate Alarm - Stop Work - Exit Area - Notify RP
- If accumulated dose reaches 80% of EDsetpoint - Stop Work - Exit the Area - Notify RP
- Failure of Protective Clothing - Stop Work - Exit Area - Notify RP

Expected Radiological Conditions

General Area Dose Rates: <1 mrem/hr - 75 mrem/hr
Highest Contact Dose Rate: 300 mrem/hr
General Area Contamination Levels: <1,000 dpm/100 cm2 - <100,000 dpm/100 cm2
Contamination Levels Alpha: <20 dpm/100cm2

Additional Instructions

Low Risk



Harris Nuclear Plant

Radiation Work Permit

Operations Activities **RWP # 23** **Rev: 12**

Task # 2

Operations Activities in HRA's

ED Alarm Set Points:

Dose Alarm: 15 mrem **Dose Rate Alarm: 100 mrem/hr**

High Radiation Area Entry

RWP Requirements

Dress Category/Work Description

- Dress Category "B" Work in a non-contaminated area with contaminated material where there is NO potential for contact with contaminated material other than by hand.
- Dress Category "E" Reach into a contaminated area where arms and hands are exposed.
- Dress Category "F" Work in a contaminated area where complete protection of skin and clothing is NOT necessary.
- Dress Category "G" Work in a contaminated area where skull caps may be substituted for hoods when approved by RP.
- Dress Category "N" Performing work in contaminated wet conditions.

Protective Clothing

- B - Surgical gloves
- E - Lab coat, glove liners and rubber or surgical gloves
- F - Lab coat, glove liners and rubber gloves (or surgical gloves), booties and shoe covers
- G - Hood or Skull Cap, coveralls, glove liners, rubber gloves, booties and shoe covers (Skull caps may be substituted for a hood when approved by RP)
- N - Hood, waterproof coveralls, glove liners, 2 pair rubber gloves, booties, 2 pair shoe covers.
- Additional dress required as per Radiation Protection Technician.

Contamination Control

- Secure hose OR tubing to floor drain
- Use surgical gloves in lieu of rubber gloves for the manipulation of small or specialty items with RP approval
- For activities requiring crawling, kneeling, etc, review the need for an additional barrier to prevent contamination events, e.g. knee pads, floor covering, etc.

RP Job Coverage

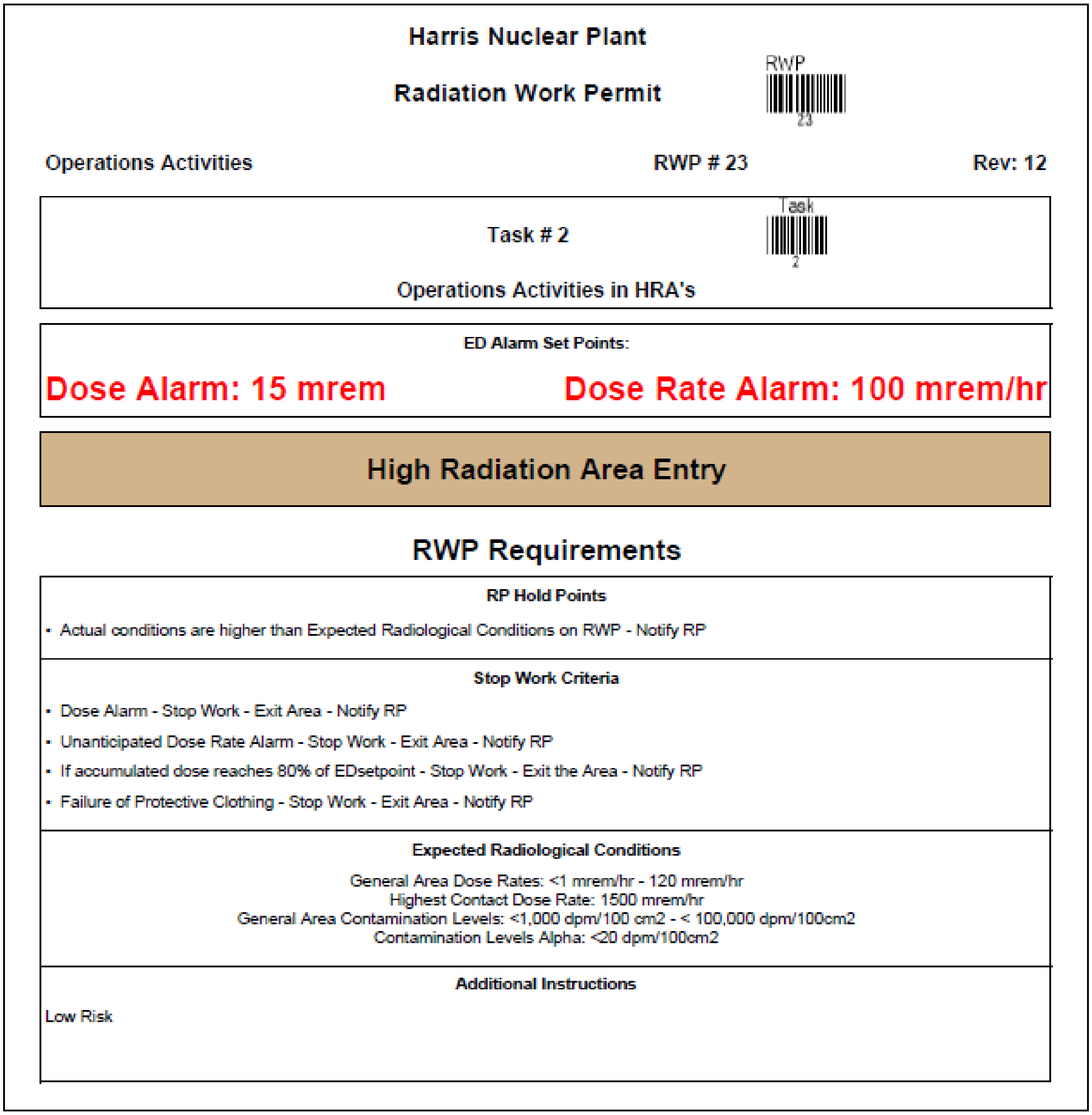
- RP briefing required prior to entering High Radiation Areas

Dosimetry Requirements

- Electronic Dosimeter
- Read the ED periodically while inside the RCA (once or twice per hour in low dose rate areas, in higher dose rate areas monitor more frequently, for example every 10 to 15 minutes).

RP Hold Points

- Notify RP prior to Reaching or Entry into the overhead (7 feet and above)



Harris Nuclear Plant

Radiation Work Permit

RWP

Operations Activities **RWP # 23** **Rev: 12**

Task # 2

Task

Operations Activities in HRA's

ED Alarm Set Points:

Dose Alarm: 15 mrem **Dose Rate Alarm: 100 mrem/hr**

High Radiation Area Entry

RWP Requirements

RP Hold Points

- Actual conditions are higher than Expected Radiological Conditions on RWP - Notify RP

Stop Work Criteria

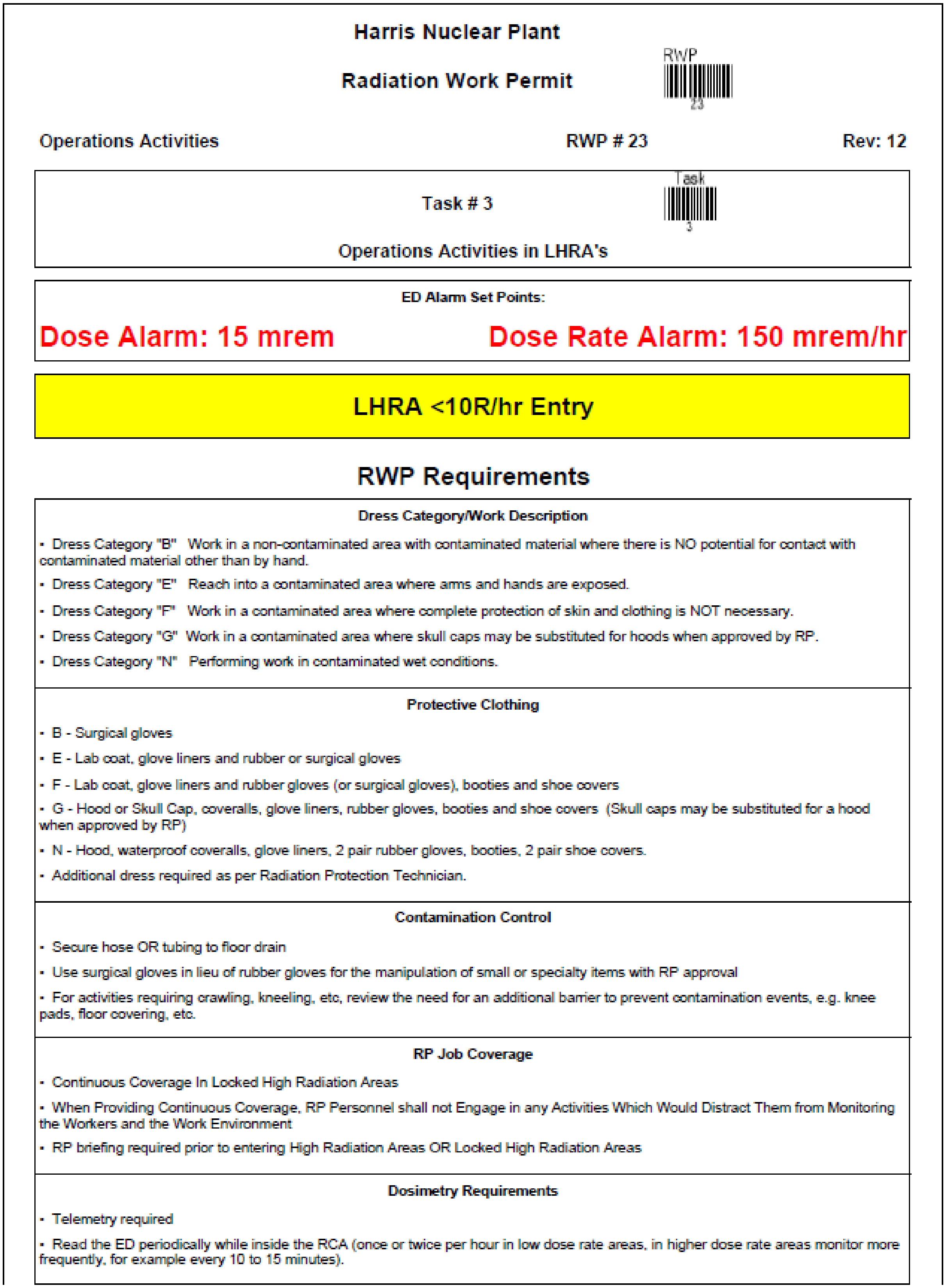
- Dose Alarm - Stop Work - Exit Area - Notify RP
- Unanticipated Dose Rate Alarm - Stop Work - Exit Area - Notify RP
- If accumulated dose reaches 80% of EDsetpoint - Stop Work - Exit the Area - Notify RP
- Failure of Protective Clothing - Stop Work - Exit Area - Notify RP

Expected Radiological Conditions

General Area Dose Rates: <1 mrem/hr - 120 mrem/hr
Highest Contact Dose Rate: 1500 mrem/hr
General Area Contamination Levels: <1,000 dpm/100 cm2 - < 100,000 dpm/100cm2
Contamination Levels Alpha: <20 dpm/100cm2

Additional Instructions

Low Risk



Harris Nuclear Plant

Radiation Work Permit

RWP

23

Operations Activities **RWP # 23** **Rev: 12**

Task # 3

Task

3

Operations Activities in LHRA's

ED Alarm Set Points:

Dose Alarm: 15 mrem **Dose Rate Alarm: 150 mrem/hr**

LHRA <10R/hr Entry

RWP Requirements

Dress Category/Work Description

- Dress Category "B" Work in a non-contaminated area with contaminated material where there is NO potential for contact with contaminated material other than by hand.
- Dress Category "E" Reach into a contaminated area where arms and hands are exposed.
- Dress Category "F" Work in a contaminated area where complete protection of skin and clothing is NOT necessary.
- Dress Category "G" Work in a contaminated area where skull caps may be substituted for hoods when approved by RP.
- Dress Category "N" Performing work in contaminated wet conditions.

Protective Clothing

- B - Surgical gloves
- E - Lab coat, glove liners and rubber or surgical gloves
- F - Lab coat, glove liners and rubber gloves (or surgical gloves), booties and shoe covers
- G - Hood or Skull Cap, coveralls, glove liners, rubber gloves, booties and shoe covers (Skull caps may be substituted for a hood when approved by RP)
- N - Hood, waterproof coveralls, glove liners, 2 pair rubber gloves, booties, 2 pair shoe covers.
- Additional dress required as per Radiation Protection Technician.

Contamination Control

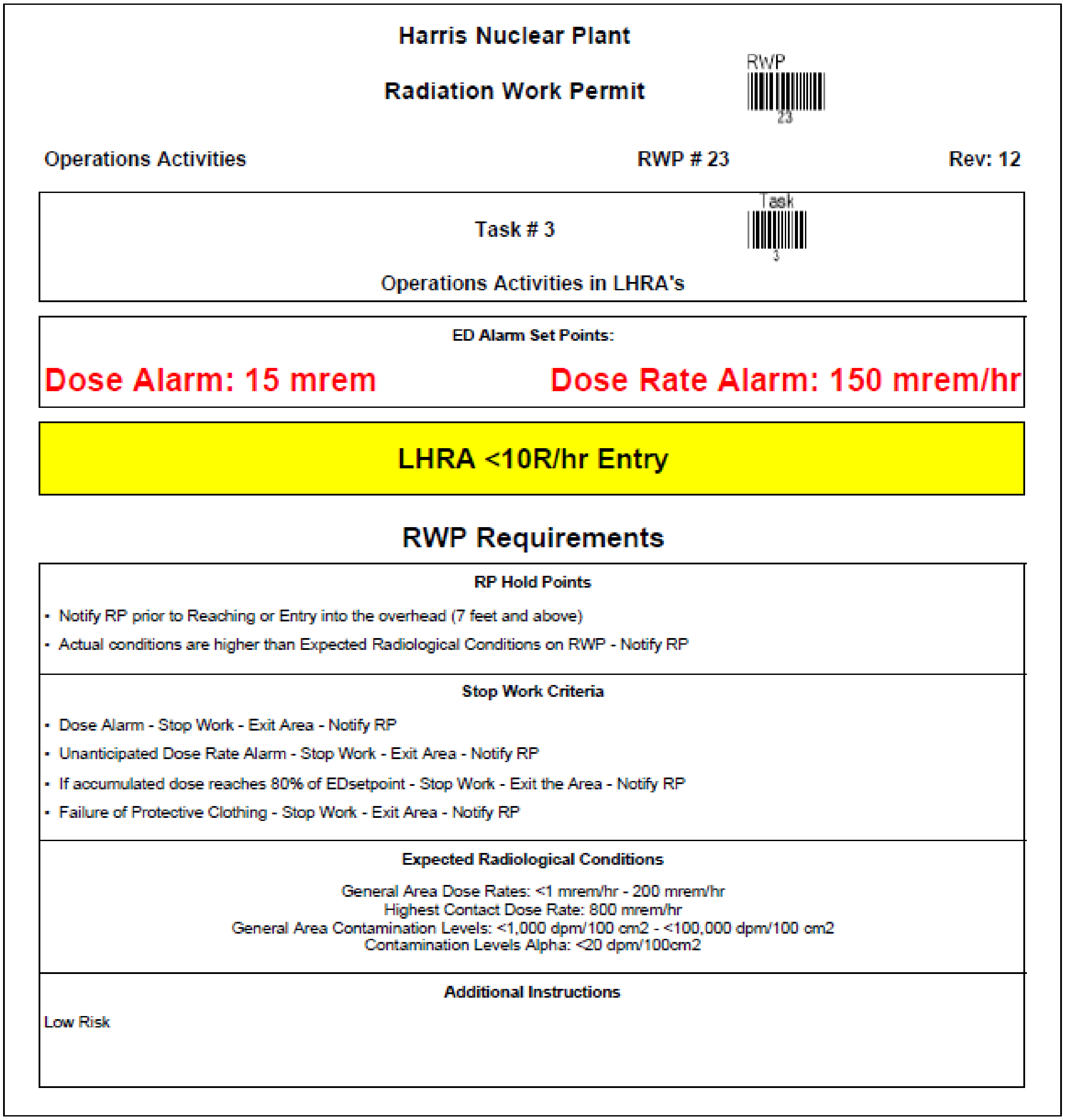
- Secure hose OR tubing to floor drain
- Use surgical gloves in lieu of rubber gloves for the manipulation of small or specialty items with RP approval
- For activities requiring crawling, kneeling, etc, review the need for an additional barrier to prevent contamination events, e.g. knee pads, floor covering, etc.

RP Job Coverage

- Continuous Coverage In Locked High Radiation Areas
- When Providing Continuous Coverage, RP Personnel shall not Engage in any Activities Which Would Distract Them from Monitoring the Workers and the Work Environment
- RP briefing required prior to entering High Radiation Areas OR Locked High Radiation Areas

Dosimetry Requirements

- Telemetry required
- Read the ED periodically while inside the RCA (once or twice per hour in low dose rate areas, in higher dose rate areas monitor more frequently, for example every 10 to 15 minutes).



Harris Nuclear Plant

Radiation Work Permit

Operations Activities **RWP # 23** **Rev: 12**

Task # 3

Operations Activities in LHRA's

ED Alarm Set Points:

Dose Alarm: 15 mrem **Dose Rate Alarm: 150 mrem/hr**

LHRA <10R/hr Entry

RWP Requirements

RP Hold Points

- Notify RP prior to Reaching or Entry into the overhead (7 feet and above)
- Actual conditions are higher than Expected Radiological Conditions on RWP - Notify RP

Stop Work Criteria

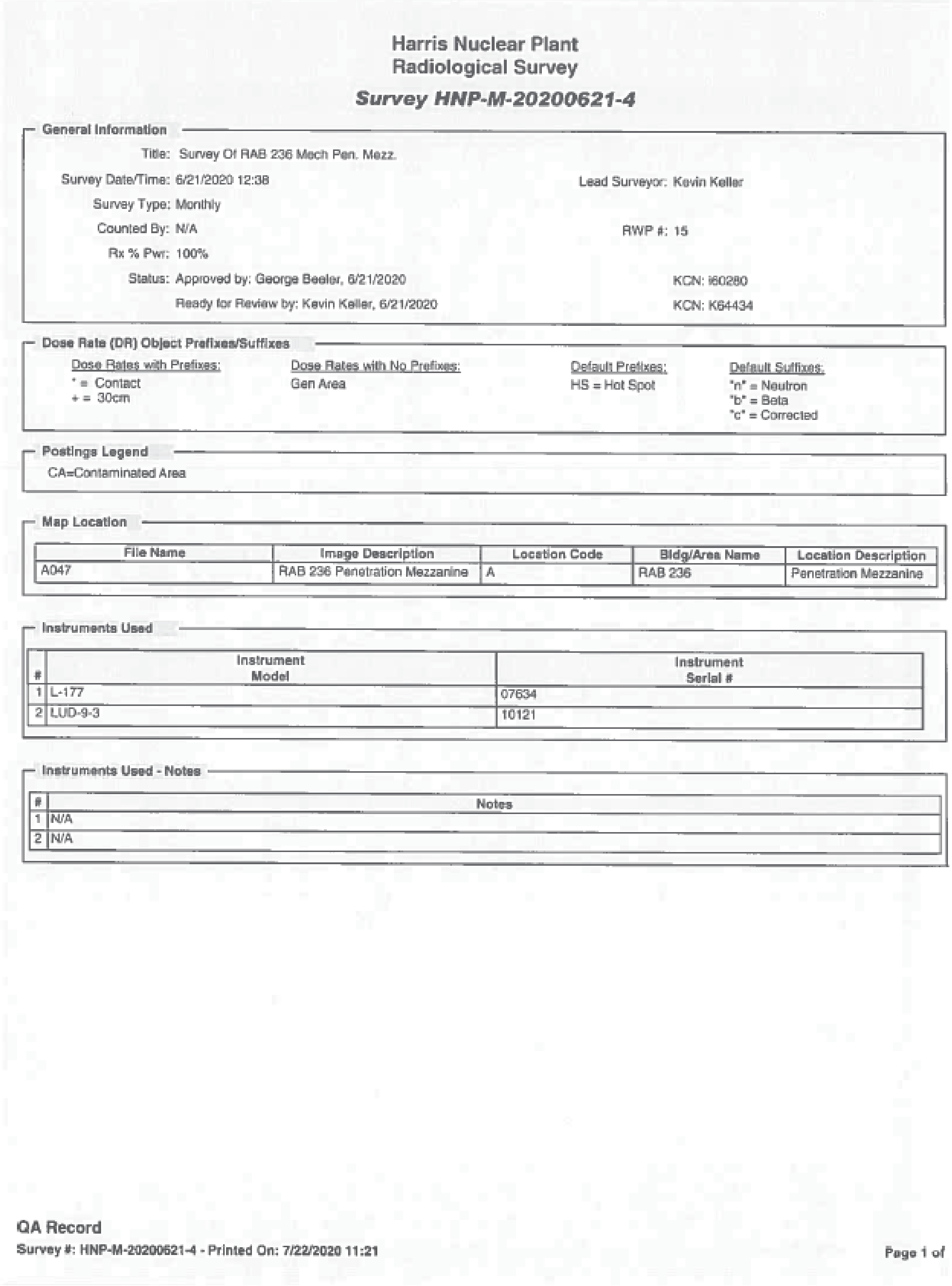
- Dose Alarm - Stop Work - Exit Area - Notify RP
- Unanticipated Dose Rate Alarm - Stop Work - Exit Area - Notify RP
- If accumulated dose reaches 80% of EDsetpoint - Stop Work - Exit the Area - Notify RP
- Failure of Protective Clothing - Stop Work - Exit Area - Notify RP

Expected Radiological Conditions

General Area Dose Rates: <1 mrem/hr - 200 mrem/hr
Highest Contact Dose Rate: 800 mrem/hr
General Area Contamination Levels: <1,000 dpm/100 cm2 - <100,000 dpm/100 cm2
Contamination Levels Alpha: <20 dpm/100cm2

Additional Instructions

Low Risk



Harris Nuclear Plant
Radiological Survey

Survey HNP-M-20200621-4

General Information

Title: Survey Of RAB 236 Mech Pen. Mezz.

Survey Date/Time: 6/21/2020 12:38

Lead Surveyor: Kevin Keller

Survey Type: Monthly

Counted By: N/A

RWP #: 15

Rx % Pwr: 100%

Status: Approved by: George Beeler, 6/21/2020

KCN: I60280

Ready for Review by: Kevin Keller, 6/21/2020

KCN: K64434

Dose Rate (DR) Object Prefixes/Suffixes

Dose Rates with Prefixes:	Dose Rates with No Prefixes:	Default Prefixes:	Default Suffixes:
* = Contact + = 30cm	Gen Area	HS = Hot Spot	"n" = Neutron "b" = Beta "c" = Corrected

Postings Legend

CA=Contaminated Area

Map Location

File Name	Image Description	Location Code	Bldg/Area Name	Location Description
A047	RAB 236 Penetration Mezzanine	A	RAB 236	Penetration Mezzanine

Instruments Used

#	Instrument Model	Instrument Serial #
1	L-177	07634
2	LUD-9-3	10121

Instruments Used - Notes

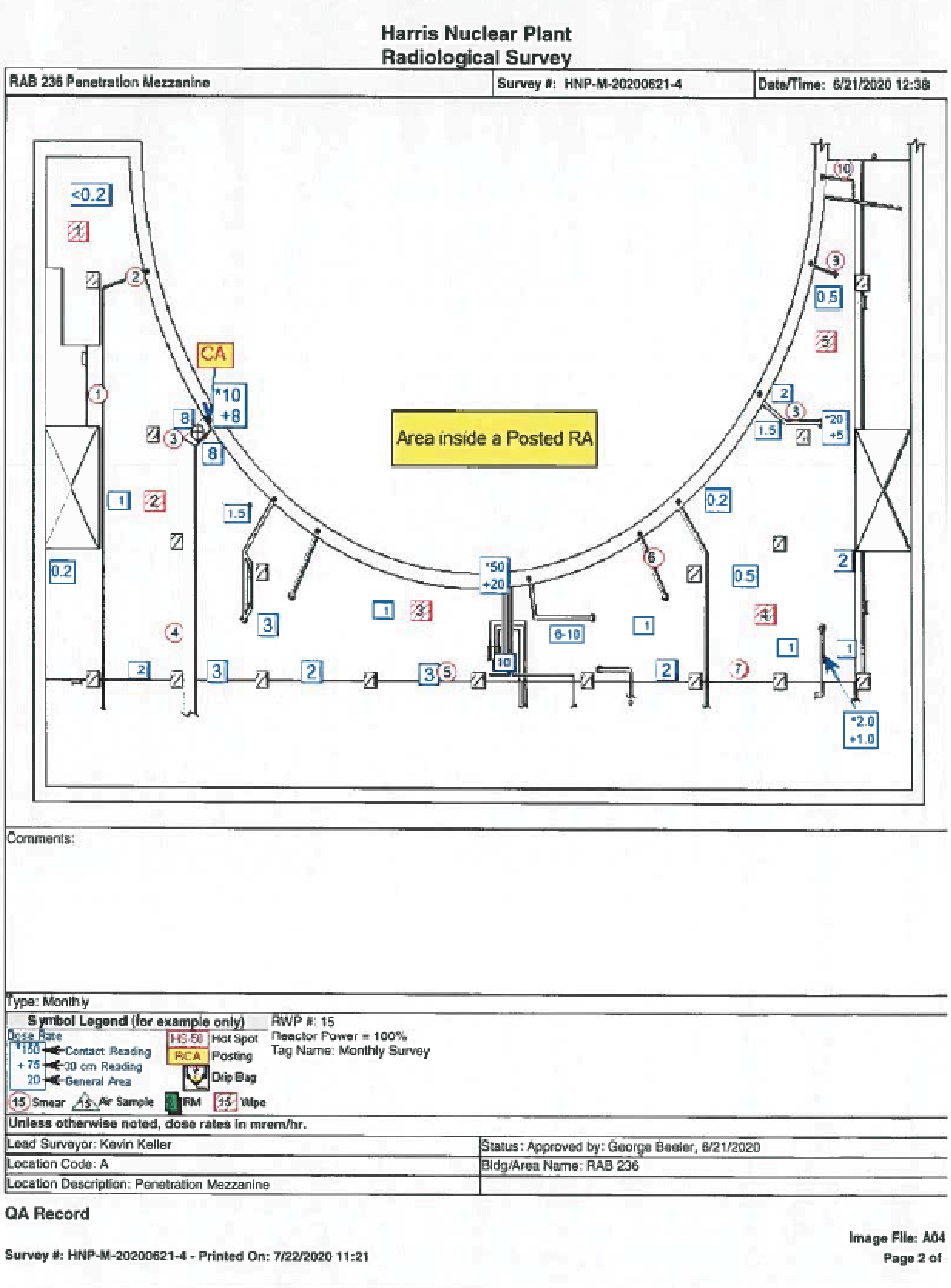
#	Notes
1	N/A
2	N/A

QA Record

Survey #: HNP-M-20200621-4 - Printed On: 7/22/2020 11:21

Page 1 of

JPM CUE SHEET



Harris Nuclear Plant
Radiological Survey

RAB 236 Penetration Mezzanine | Survey #: HNP-M-20200621-4 | Date/Time: 6/21/2020 12:38

Comments:

Type: Monthly

Symbol Legend (for example only)

Dose Rate
*150 Contact Reading
+ 75 30 cm Reading
20 General Area

HS-50 Hot Spot
RCA Posting
Drip Bag
15 Smear
15 Air Sample
RM
15 Wipe

RWP #: 15
Reactor Power = 100%
Tag Name: Monthly Survey

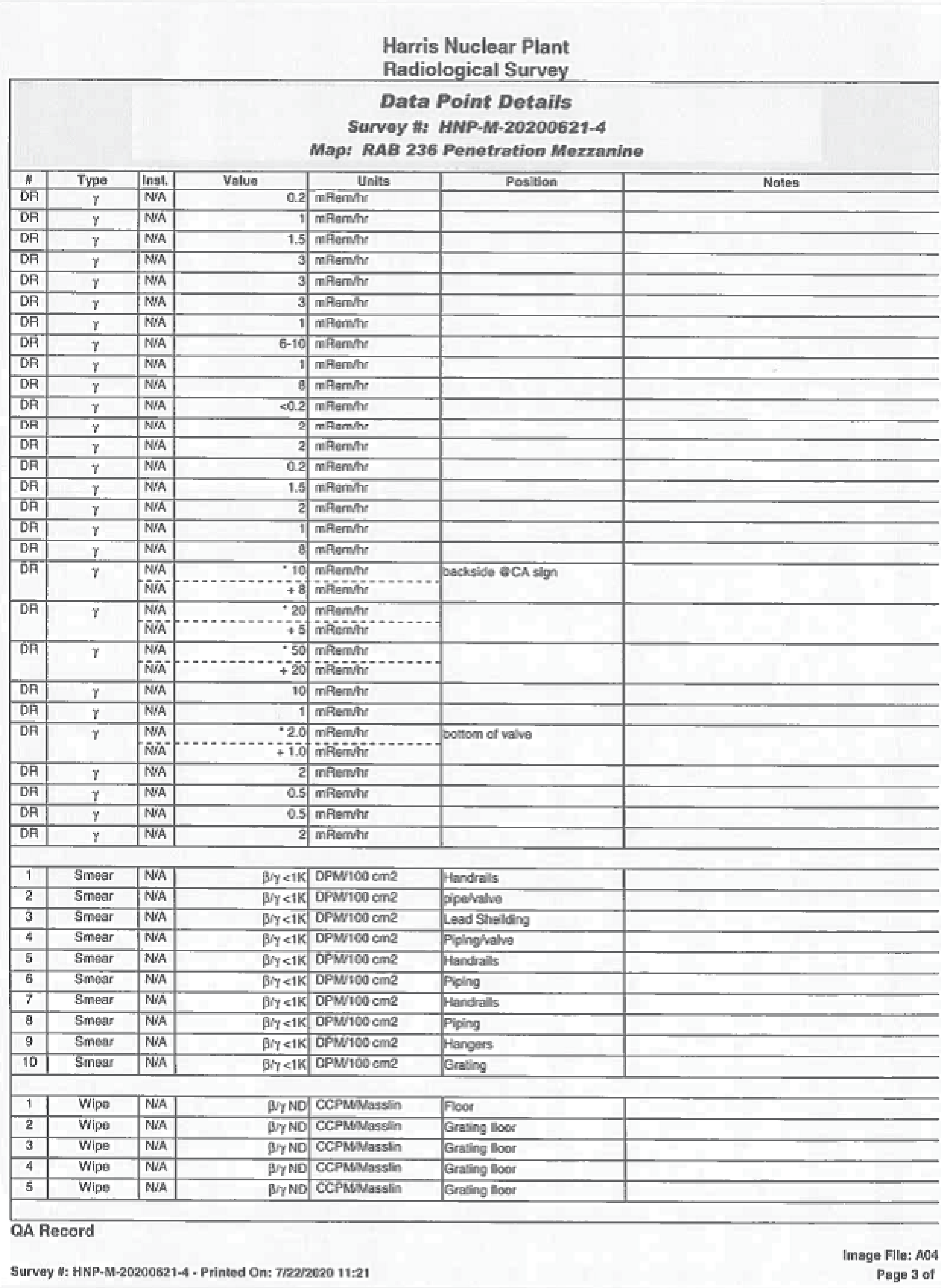
Unless otherwise noted, dose rates in mrem/hr.

Lead Surveyor: Kevin Keller
Status: Approved by: George Beeler, 6/21/2020
Location Code: A
Bldg/Area Name: RAB 236
Location Description: Penetration Mezzanine

QA Record

Survey #: HNP-M-20200621-4 - Printed On: 7/22/2020 11:21

Image File: A04
Page 2 of



Harris Nuclear Plant
Radiological Survey

Data Point Details
Survey #: HNP-M-20200621-4
Map: RAB 236 Penetration Mezzanine

#	Type	Inst.	Value	Units	Position	Notes
DR	γ	N/A	0.2	mRem/hr		
DR	γ	N/A	1	mRem/hr		
DR	γ	N/A	1.5	mRem/hr		
DR	γ	N/A	3	mRem/hr		
DR	γ	N/A	3	mRem/hr		
DR	γ	N/A	3	mRem/hr		
DR	γ	N/A	1	mRem/hr		
DR	γ	N/A	6-10	mRem/hr		
DR	γ	N/A	1	mRem/hr		
DR	γ	N/A	8	mRem/hr		
DR	γ	N/A	<0.2	mRem/hr		
DR	γ	N/A	2	mRem/hr		
DR	γ	N/A	2	mRem/hr		
DR	γ	N/A	0.2	mRem/hr		
DR	γ	N/A	1.5	mRem/hr		
DR	γ	N/A	2	mRem/hr		
DR	γ	N/A	1	mRem/hr		
DR	γ	N/A	8	mRem/hr		
DR	γ	N/A	* 10	mRem/hr	backside @CA sign	
		N/A	+ 8	mRem/hr		
DR	γ	N/A	* 20	mRem/hr		
		N/A	+ 5	mRem/hr		
DR	γ	N/A	* 50	mRem/hr		
		N/A	+ 20	mRem/hr		
DR	γ	N/A	10	mRem/hr		
DR	γ	N/A	1	mRem/hr		
DR	γ	N/A	* 2.0	mRem/hr	bottom of valve	
		N/A	+ 1.0	mRem/hr		
DR	γ	N/A	2	mRem/hr		
DR	γ	N/A	0.5	mRem/hr		
DR	γ	N/A	0.5	mRem/hr		
DR	γ	N/A	2	mRem/hr		
1	Smear	N/A	β/γ <1K	DPM/100 cm2	Handrails	
2	Smear	N/A	β/γ <1K	DPM/100 cm2	pipe/valve	
3	Smear	N/A	β/γ <1K	DPM/100 cm2	Lead Sheilding	
4	Smear	N/A	β/γ <1K	DPM/100 cm2	Piping/valve	
5	Smear	N/A	β/γ <1K	DPM/100 cm2	Handrails	
6	Smear	N/A	β/γ <1K	DPM/100 cm2	Piping	
7	Smear	N/A	β/γ <1K	DPM/100 cm2	Handrails	
8	Smear	N/A	β/γ <1K	DPM/100 cm2	Piping	
9	Smear	N/A	β/γ <1K	DPM/100 cm2	Hangers	
10	Smear	N/A	β/γ <1K	DPM/100 cm2	Grating	
1	Wipe	N/A	β/γ ND	CCPM/Masslin	Floor	
2	Wipe	N/A	β/γ ND	CCPM/Masslin	Grating floor	
3	Wipe	N/A	β/γ ND	CCPM/Masslin	Grating floor	
4	Wipe	N/A	β/γ ND	CCPM/Masslin	Grating floor	
5	Wipe	N/A	β/γ ND	CCPM/Masslin	Grating floor	

QA Record

Image File: A04
Page 3 of

Survey #: HNP-M-20200621-4 - Printed On: 7/22/2020 11:21

Harris Nuclear Plant
Radiological Survey

Data Point Details

Survey #: HNP-M-20200621-4

Map: RAB 236 Penetration Mezzanine

#	Type	Inst.	Value	Units	Position	Notes
	Posting		CA		inside shielding/ pipe chase	
	Text		Area inside a Posted RA			

QA Record

Survey #: HNP-M-20200621-4 - Printed On: 7/22/2020 11:21

Image File: AC
Page 4 c

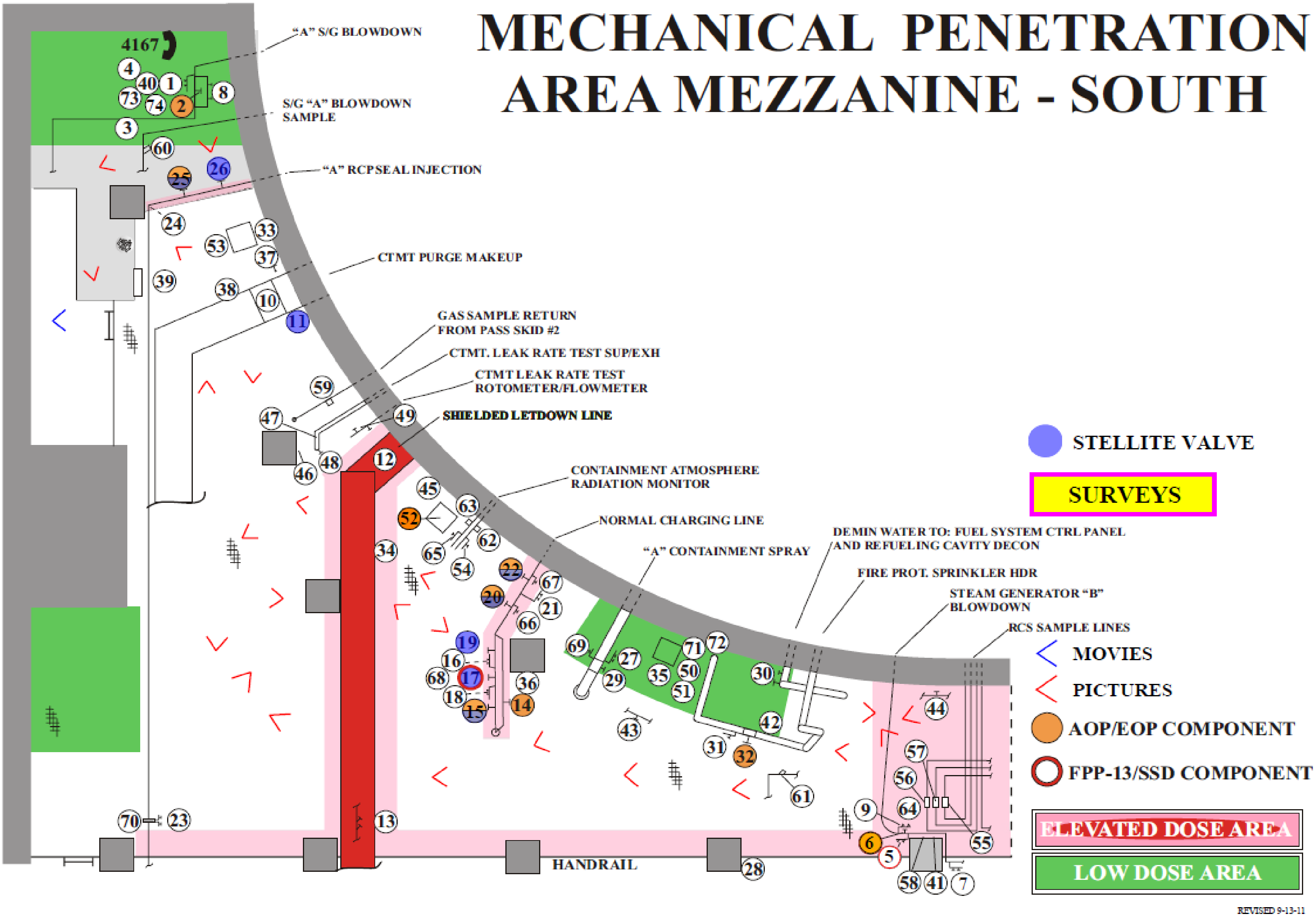
RAB 236' MECHANICAL PENETRATION AREA MEZZANINE - SOUTH

ITEM	DESCRIPTION	ELEV.(ft)	ITEM	DESCRIPTION	ELEV.(ft.)	ITEM	DESCRIPTION	ELEV.(ft.)	ITEM	DESCRIPTION	ELEV.(ft.)
1	1BD-009/10	1'	30	1DW-63/64	2'	61	1SP-0222	7'			
🟧 2	1BD-011	2'	31	1FP-0346	3'	62	1SP-0915	6'			
3	1BD-012/151	3'	🟧 32	1FP-0347	4'	63	1SP-917	6'			
4	1BD-012-HD1/	1'-5'	33	IFP-2924	9'	64	1SP-1139 to 1142	1'			
	HD2/HI1/HI2/		34	1FP-2925	5'	65	1SP-1184	5'			
	HV1/HV2/HV3		35	1IA-0213/214	3'	66	1VL-15	3'			
5	1BD-028/29	3'	36	1IA-1039-I2	3'	67	1VL-16	3'			
🟧 6	1BD-030	3'	37	1IA-1044-I1	1'	68	1VL-17/18/19	2'			
7	1BD-031/153	4'	38	1IA-1044-I2/I3	1'/3'	69	1VL-20	4'			
8	1BD-270/271	3'	39	1IA-1098	10'	70	FT-01CS-0130SW	8'			
9	1BD-272/273	3'	40	1IA-1099/1393-I1	2'/3'	71	PDT-01CB-7680	6'-9'			
10	1CP-6/7	2'	41	1IA-1331/1391-I1	2'/5'		ASA-CV/HI1/				
🟦 11	1CP-8	4'	42	1IA-1390-I7	9'		HV1/LI1/LI2/				
12	1CS-011	2'	43	1IA-1390-I8	9'		LV1				
13	1CS-014/15	9'	44	1IA-1392	9'	72	PDT-01CB-7680	9'			
🟧 14	1CS-227	6'	45	1IA-1393	8'		A1SA-CV/HI1				
🟦 🟧 15	1CS-228	2'	46	1IA-1908	4'	73	PI-01BD-8405A	4'			
16	1CS-229/230	0.5'	47	1LT-3	9'		1SA				
🟦 🟥 17	1CS-231	2'	48	1LT-4	4'	74	PT-01BD-8405A1SA	4'			
18	1CS-232/233	0.5'	49	1LT-5/6	3'						
🟦 19	1CS-234	2'	50	1SA-076 to 80	1'-6'						
🟦 🟧 20	1CS-235	3'	51	1SA-537/538	3'						
21	1CS-236/237	2'	52	1SI-107	2'						
🟦 🟧 22	1CS-238	3'	53	1SI-359	2'						
23	1CS-336/337	8'	54	1SP-0015	5'						
24	1CS-338/339	5'	55	1SP-0041	2'						
🟦 🟧 25	1CS-340	6'	56	1SP-0060	2'						
🟦 26	1CS-341	6'	57	1SP-0085	2'					Revised 9-13-11	
27	1CT-45/46	1'	58	1SP-0086/87	1'				🟦	STELLITE VALVE	
28	1CT-48-HV2/LV2	4'	59	1SP-0208	3'				🟧	AOP/EOP COMPONENT	
29	1CT-50	4'	60	1SP-0217	6'				🟥	FPP-13/SSD COMPONENT	

JPM CUE SHEET

RAB 236' MAP 9

MECHANICAL PENETRATION AREA MEZZANINE - SOUTH



Facility: Harris Nuclear Plant

Task No.: 018003H101

Task Title: Determine AFD with AFD Monitor INOP and Evaluate Tech Specs

JPM No.: 2020 NRC Exam Admin JPM SRO A1-1

K/A Reference: G 2.1.25 RO 3.9 SRO 4.2

ALTERNATE PATH - NO

Examinee: ______________________

NRC Examiner: ______________________

Facility Evaluator: ______________________

Date: ______________________

Method of testing:

Simulated Performance: ______

Actual Performance: X

Classroom X Simulator ______ Plant ______

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate, discuss, or perform and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	- The plant was at 90% power, with a load reduction in progress - The load reduction has been stopped to evaluate AFD following oscillations at 0900

Initiating Cue:	With the information provided complete Attachment 5 of OST-1021, Daily Surveillance Requirements to determine Axial Flux Difference. After completing OST-1021, Attachment 5 evaluate the results and circle the response below IF any Technical Specifications apply list the associated LCO action(s) and the maximum allowed completion time(s). **Base any action completion times from the time of 0900.** When complete return your results to the evaluator.

Task Standard: All calculations within ± 1% of actual.
Correct Tech Spec and LCO actions are identified.

Required Materials: Calculator

General References:
OST-1021, Daily Surveillance Requirements, Rev. 114
OP-163, ERFIS, Rev. 42
Rod Control Manual, Unit One Reactor Operating Data, Rev. 8
Technical Specifications, Rev 185

Handouts:
OP-163, Rev. 42, pages 1 – 8, Prerequisites, P&L's
OP-163, Rev. 42, pages 14 – 15, Section 6.2, (Continuous Use) - Axial Flux Differential (AFD) Monitor
Rod Control Manual, Section 2.1, Axial Flux Difference Limits, Rev. 0
Technical Specification 3.2.1, Power Distribution Limits - Axial Flux Difference
OR
2020 NRC Exam Frozen Procedures Folder

OST-1021, Rev. 114, pages 44-46, Attachment 5, Axial Flux Difference Log
JPM Cue Sheets Pages 16 - 20

Time Critical Task: No

Validation Time: 10 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 7	If the wrong values are selected then the results will NOT be correct
Step 10	If the wrong Limit is determined a required Tech Spec LCO action could be exceeded
Step 11	If the wrong Limit is determined a required Tech Spec LCO action could be exceeded
Step 12	If operation outside of the acceptable region is allowed to continue fuel damage may result.
Step 13	If the wrong Tech Spec Action is selected an LCO action could be exceeded

Start Time: __________.

OP-163

Performance Step: 1 OBTAIN PROCEDURE (provided in frozen procedure)

Standard: Obtains OP-163 and refers to Section 6.2.

Comment:

OP-163, Section 6.2.2, Step 1.a

Performance Step: 2 REVIEW the automatic or “On Demand” report print-out to verify the following:

- The print-out monitored values are consistent with MCB indications.

Standard: Locates JPM Cue sheet with attached On Demand and Shift Summary Report

Comment:

OP-163, Section 6.2.2, NOTE prior to Step 1.b

Performance Step: 3 NOTE: There may be rounding off differences between the automatic printout and the latest AFD curve generated by TE-NF-PWR-0809, Target AFD Calculation.

Standard: Operator reads and placekeeps notes

Comment:

OP-163, Section 6.2.2, Step 1.b

Performance Step: 4 REVIEW the automatic or "On Demand" report print-out to verify the following:

- The printout Operating Band Low and Operating Band High values match the latest Axial Flux Difference Limits As A Function of Rated Thermal Power curve as shown in the ROD Manual.

Standard: Locates Reactor Operating Data Manual I and reviews Section 2.1, AFD Limits and determines the current limits are

-12.0% to + 8.0% at 100% Reactor Power

-26.0% to + 20.0% at 50% Reactor Power

Comment:

OP-163, Section 6.2.2, Step 2

Performance Step: 5 CHANNEL CHECK the following AFD ERFIS points against MCB indication:

- URE1540 CURRENT CHAN 1 AXIAL FLUX DIFF
- URE1541 CURRENT CHAN 2 AXIAL FLUX DIFF
- URE1542 CURRENT CHAN 3 AXIAL FLUX DIFF
- URE1543 CURRENT CHAN 4 AXIAL FLUX DIFF

Standard: Locates JPM Cue sheet with attached MCB Indication images and compares to information from Shift Summary Report

Comment:

OP-163, Section 6.2.2, NOTE prior to Step 3

Performance Step: 6 NOTE: Only one (1) channel having an unacceptable quality does not make the AFD Monitor inoperable.

Standard: Operator reads and placekeeps notes

Comment:

OP-163, Section 6.2.2, Step 3

✓ **Performance Step: 7** VERIFY the following AFD ERFIS points are restored to processing with acceptable quality codes as defined in Precaution & Limitation Step 4.0.4:

- URE1540 CURRENT CHAN 1 AXIAL FLUX DIFF
- URE1541 CURRENT CHAN 2 AXIAL FLUX DIFF
- URE1542 CURRENT CHAN 3 AXIAL FLUX DIFF
- URE1543 CURRENT CHAN 4 AXIAL FLUX DIFF
- ANM0120M PWR RNG CHANNEL N41 Q4 1-MIN AVG
- ANM0121M PWR RNG CHANNEL N42 Q2 1-MIN AVG
- ANM0122M PWR RNG CHANNEL N43 Q1 1-MIN AVG
- ANM0123M PWR RNG CHANNEL N44 Q3 1-MIN AVG

Standard: Reviews P&L # 4 determines the quality codes are **NOT** acceptable for

- **URE1541 CURRENT CHAN 2 AXIAL FLUX DIFF**
- **URE1542 CURRENT CHAN 3 AXIAL FLUX DIFF**
- **ANM0121M PWR RNG CHANNEL N42 Q2 1-MIN AVG**
- **ANM0122M PWR RNG CHANNEL N43 Q1 1-MIN AVG**

Notifies the CRS the AFD Monitor does NOT met the criteria for Operable status

Evaluator Cue:	**If necessary prompt the candidate to completed OST-1021, Attachment 5 as required.**

Comment:

OST-1021, Attachment 5, Page 2 of 3

Performance Step: 8 LOG current reading for the following instruments:

- NI-41C, PR 41 % Δ FLUX
- NI-42C, PR 42 % Δ FLUX
- NI-43C, PR 43 % Δ FLUX
- NI-44C, PR 44 % Δ FLUX

Standard: Locates JPM Cue sheet with attached MCB Indication images and logs current reading

- **NI-41C, PR 41 % Δ FLUX = 11% +/- 1%**
- **NI-42C, PR 42 % Δ FLUX = 13% +/- 1%**
- **NI-43C, PR 43 % Δ FLUX = 14% +/- 1%**
- **NI-44C, PR 44 % Δ FLUX = 10% +/- 1%**

Comment:

OST-1021, Attachment 5, Page 2 of 3

Performance Step: 9 DETERMINE and LOG Average (AVG) Reactor Power:

- NI-41B, PR 41 % POWER
- NI-42B, PR 42 % POWER
- NI-43B, PR 43 % POWER
- NI-44B, PR 44 % POWER

Standard: Locates JPM Cue sheet with attached MCB Indication images and logs current reading

- **NI-41B, PR 41 % POWER = 90% +/- 1%**
- **NI-42B, PR 42 % POWER = 90% +/- 1%**
- **NI-43B, PR 43 % POWER = 90% +/- 1%**
- **NI-44B, PR 44 % POWER = 90% +/- 1%**

Comment: **Performs calculation to determine AVG Reactor Power and logs value on OST-1021 Attachment 5**

OST-1021, Attachment 5, Page 2 of 3

✓ **Performance Step: 10** DETERMINE and LOG AFD Lower limit:

Standard: **Critical action is to determine required limit.**

Locates Reactor Operating Data Manual and reviews Section 2.1, AFD Limits and determines the current Lower limits is:

-14.5% at 90% Reactor Power (+/- 1%)

Comment: **May interpolate limit based on current power level**

OST-1021, Attachment 5, Page 2 of 3

✓ **Performance Step: 11** DETERMINE and LOG AFD Upper limit:

Standard: **Critical action is to determine required limit.**

Locates Reactor Operating Data Manual and reviews Section 2.1, AFD Limits and determines the current Upper limits is:

11.0% at 90% Reactor Power (+/- 1%)

Comment: **May interpolate limit based on current power level**

OST-1021, Attachment 5, Page 2 of 3

✓ **Performance Step: 12** PERFORM evaluation of AFD limits

Standard: Reviews current MCB readings and determines AFD Limits and determines two of four MCB indications are NOT within the curve for Acceptable Operation:

- **NI-42C, PR 42 % Δ FLUX = 13% +/- 1%**
- **NI-43C, PR 43 % Δ FLUX = 14% +/- 1%**

Notifies the CRS two of four MCB indications are NOT within the AFD curve for Acceptable Operation

Comment: **Must interpolate limit based on current power level**

Technical Specifications

✓ **Performance Step: 13** OBTAIN AND EVALUATE TECHNICAL SPECIFICATIONS

Standard: Obtains Technical Specifications and refers to LCO 3.2.1

Determines that ACTION a. is applicable. (See page 14)

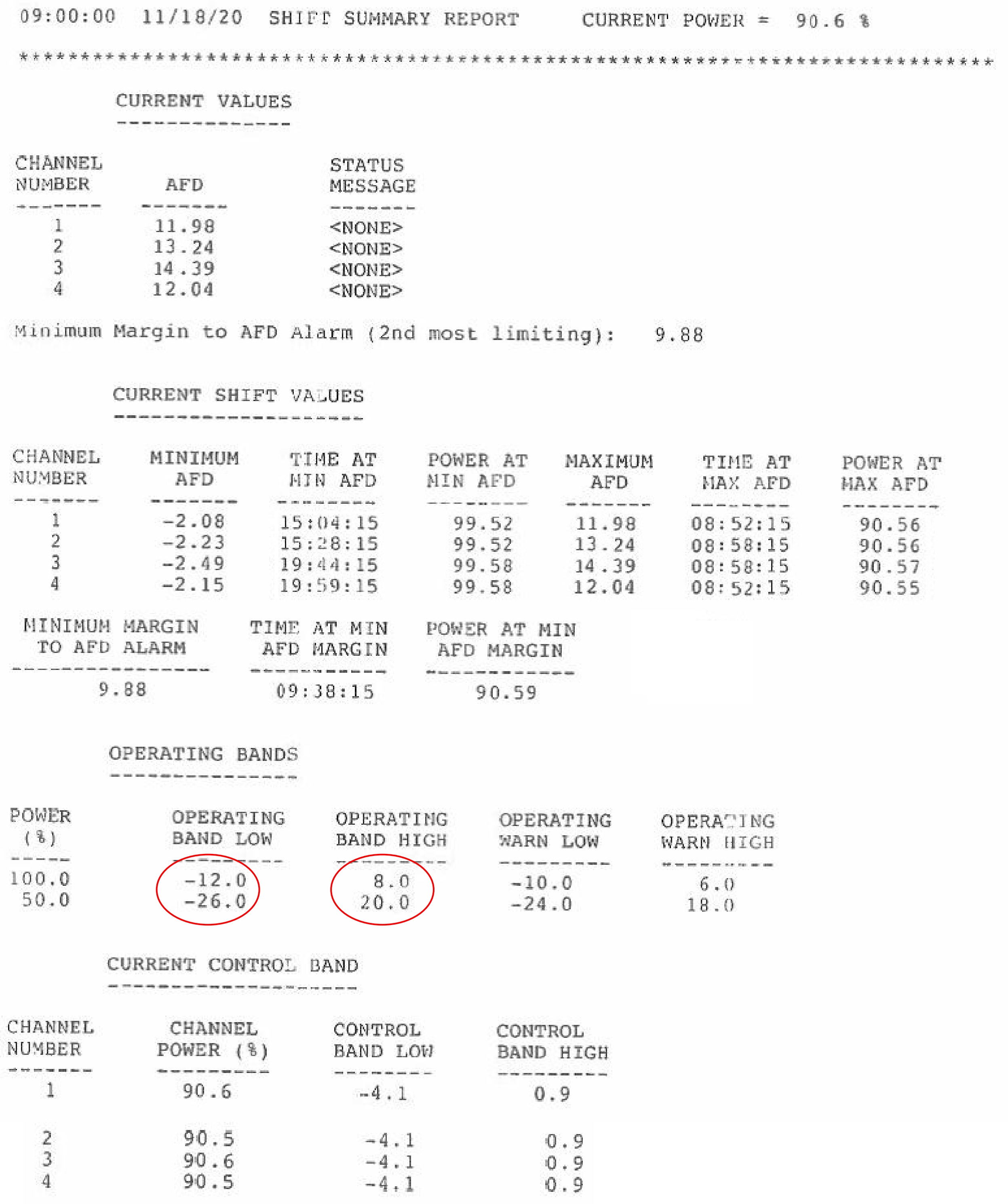
a. With the indicated AFD outside of the limits specified in the COLR, either:
   1. Restore the indicated AFD to within the limits specified in the COLR within 15 minutes, or **(0915)**
   2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes **(0930)** and reduce the Power Range Neutron Flux – High Trip setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours. **(1330)**

Evaluator Note:	**After the candidate has determined the current values of Axial Flux Difference and its limits have been manually determined and performed a Technical Specification evaluation.** **END OF JPM**

Terminating Cue:	Current value of Axial Flux Difference has been manually determined and the Technical Specifications evaluation completed.

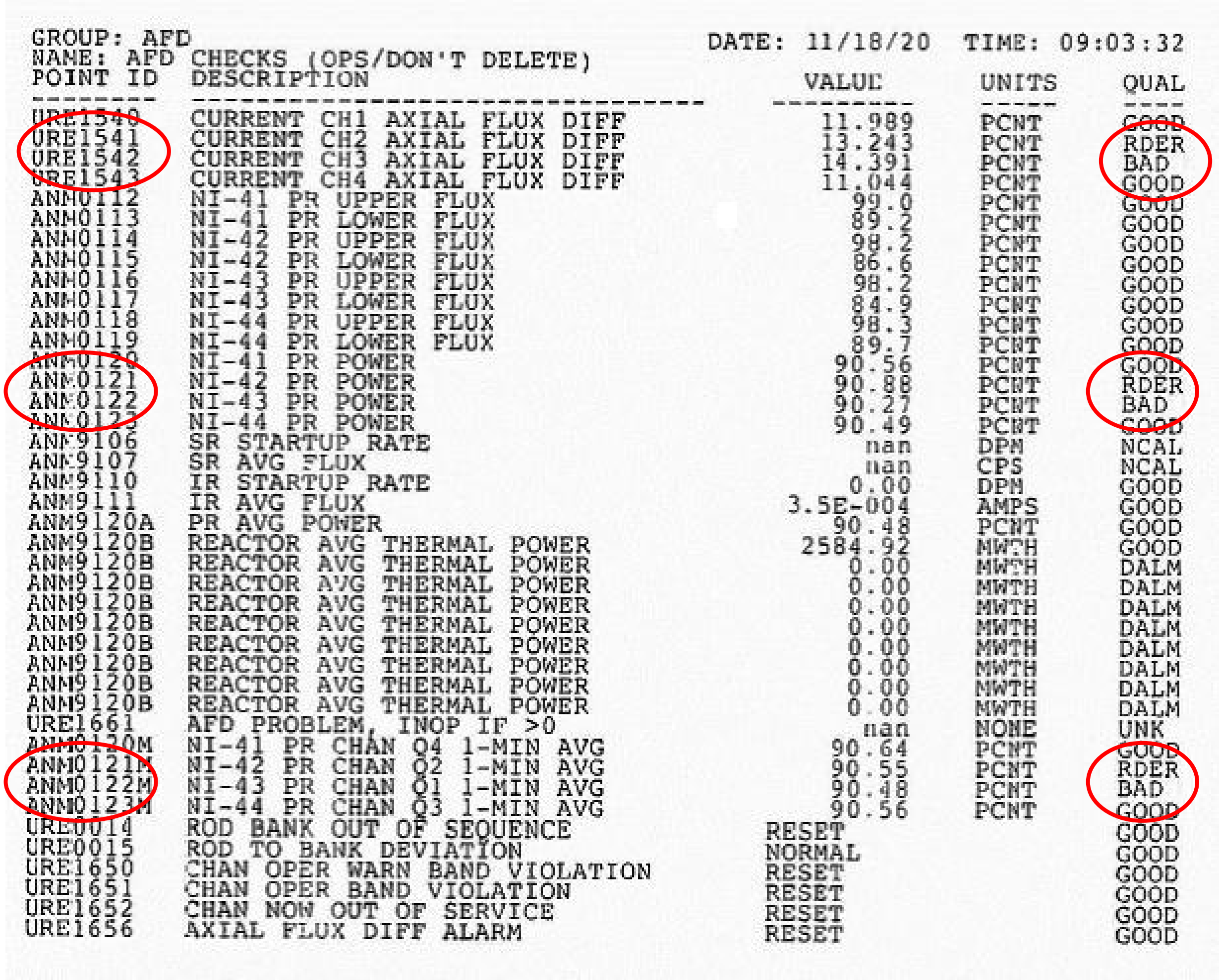
Stop Time: _________

KEY



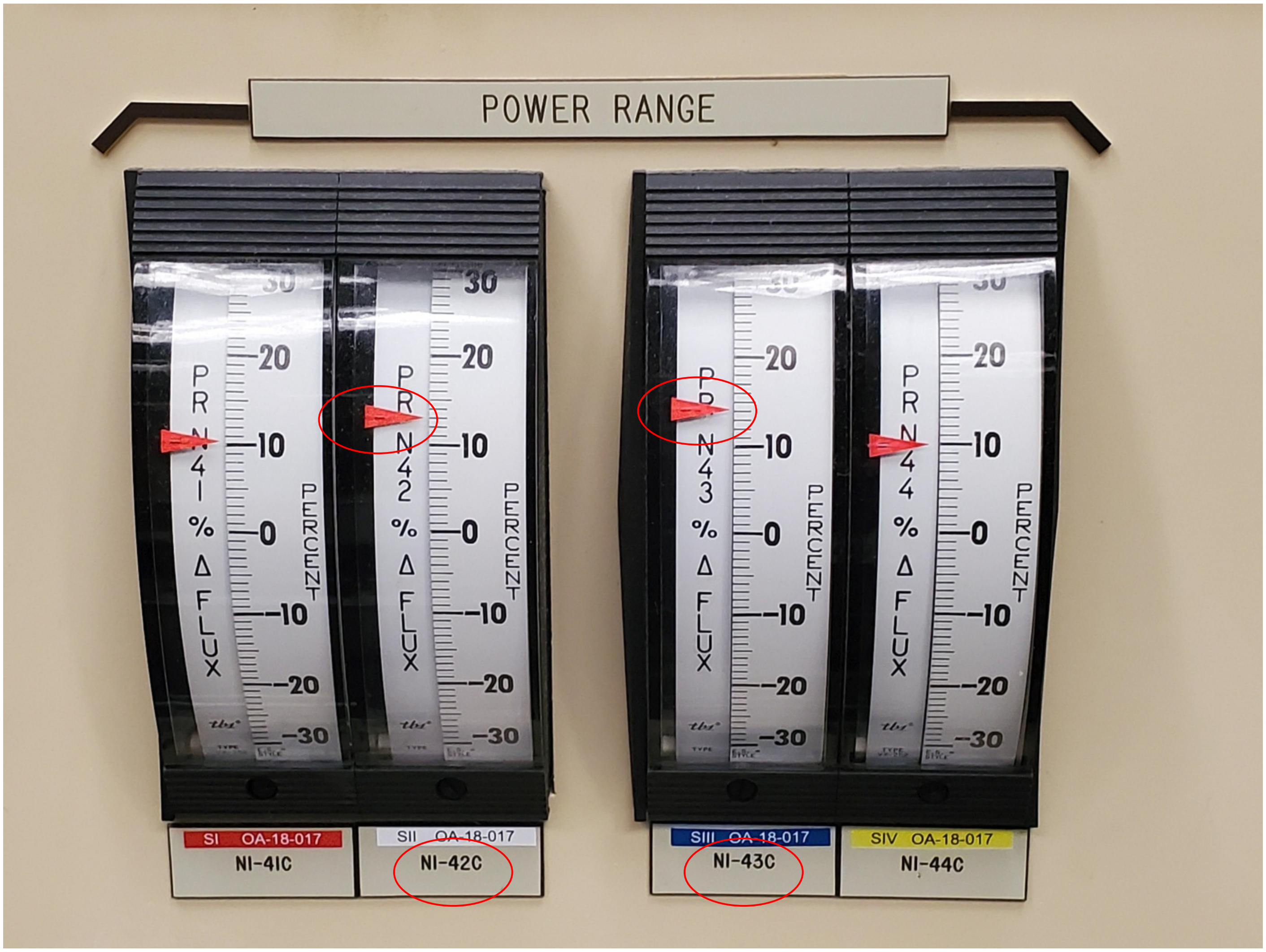
```
09:00:00  11/18/20  SHIFT SUMMARY REPORT     CURRENT POWER =  90.6 %

**********************************************************************************

          CURRENT VALUES
          --------------

CHANNEL                    STATUS
NUMBER      AFD            MESSAGE
-------    -------         -------
   1        11.98          <NONE>
   2        13.24          <NONE>
   3        14.39          <NONE>
   4        12.04          <NONE>

Minimum Margin to AFD Alarm (2nd most limiting):   9.88

          CURRENT SHIFT VALUES
          --------------------

CHANNEL    MINIMUM    TIME AT    POWER AT   MAXIMUM    TIME AT    POWER AT
NUMBER       AFD      MIN AFD    MIN AFD      AFD      MAX AFD    MAX AFD
-------    -------    --------   --------   -------    --------   --------
   1        -2.08     15:04:15    99.52      11.98     08:52:15    90.56
   2        -2.23     15:28:15    99.52      13.24     08:58:15    90.56
   3        -2.49     19:44:15    99.58      14.39     08:58:15    90.57
   4        -2.15     19:59:15    99.58      12.04     08:52:15    90.55

 MINIMUM MARGIN      TIME AT MIN     POWER AT MIN
  TO AFD ALARM        AFD MARGIN      AFD MARGIN
----------------     -----------     ------------
      9.88             09:38:15         90.59

          OPERATING BANDS
          ---------------

POWER         OPERATING     OPERATING     OPERATING     OPERATING
 (%)          BAND LOW      BAND HIGH     WARN LOW      WARN HIGH
-----         ---------     ---------     ---------     ---------
100.0          -12.0           8.0         -10.0           6.0
 50.0          -26.0          20.0         -24.0          18.0

          CURRENT CONTROL BAND
          --------------------

CHANNEL       CHANNEL       CONTROL       CONTROL
NUMBER       POWER (%)      BAND LOW      BAND HIGH
-------      ---------      --------      ---------
   1           90.6           -4.1           0.9

   2           90.5           -4.1           0.9
   3           90.6           -4.1           0.9
   4           90.5           -4.1           0.9
```

KEY

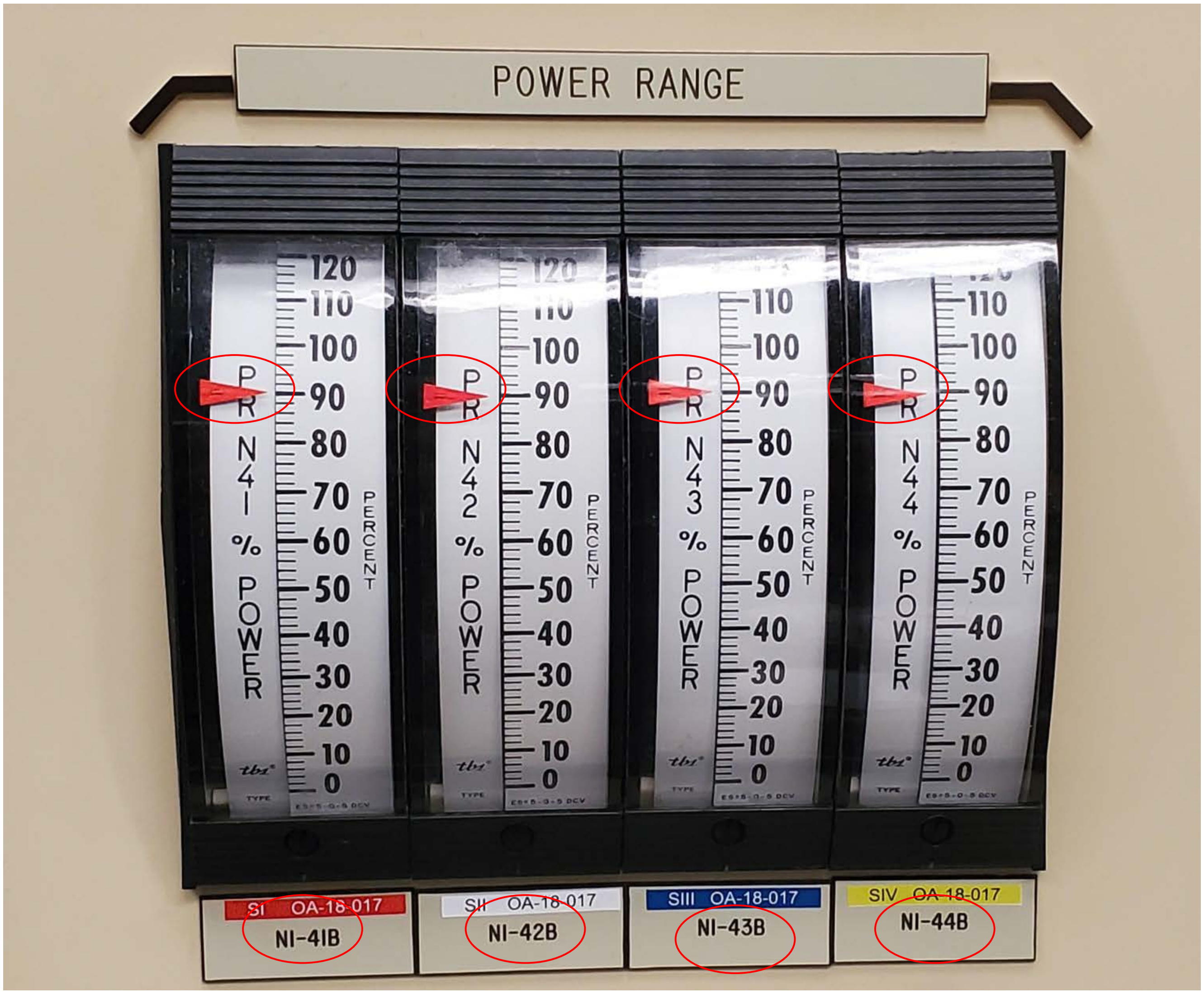


```
GROUP: AFD                                            DATE: 11/18/20   TIME: 09:03:32
NAME: AFD CHECKS (OPS/DON'T DELETE)
POINT ID  DESCRIPTION                                    VALUE       UNITS    QUAL
--------  ---------------------------------------     ----------    -----    ----
URE1540   CURRENT CH1 AXIAL FLUX DIFF                     11.989     PCNT     GOOD
URE1541   CURRENT CH2 AXIAL FLUX DIFF                     13.243     PCNT     RDER
URE1542   CURRENT CH3 AXIAL FLUX DIFF                     14.391     PCNT     BAD
URE1543   CURRENT CH4 AXIAL FLUX DIFF                     11.044     PCNT     GOOD
ANM0112   NI-41 PR UPPER FLUX                               99.0     PCNT     GOOD
ANM0113   NI-41 PR LOWER FLUX                               89.2     PCNT     GOOD
ANM0114   NI-42 PR UPPER FLUX                               98.2     PCNT     GOOD
ANM0115   NI-42 PR LOWER FLUX                               86.6     PCNT     GOOD
ANM0116   NI-43 PR UPPER FLUX                               98.2     PCNT     GOOD
ANM0117   NI-43 PR LOWER FLUX                               84.9     PCNT     GOOD
ANM0118   NI-44 PR UPPER FLUX                               98.3     PCNT     GOOD
ANM0119   NI-44 PR LOWER FLUX                               89.7     PCNT     GOOD
ANM0120   NI-41 PR POWER                                   90.56     PCNT     GOOD
ANM0121   NI-42 PR POWER                                   90.88     PCNT     RDER
ANM0122   NI-43 PR POWER                                   90.27     PCNT     BAD
ANM0123   NI-44 PR POWER                                   90.49     PCNT     GOOD
ANM9106   SR STARTUP RATE                                    nan     DPM      NCAL
ANM9107   SR AVG FLUX                                        nan     CPS      NCAL
ANM9110   IR STARTUP RATE                                   0.00     DPM      GOOD
ANM9111   IR AVG FLUX                                   3.5E-004     AMPS     GOOD
ANM9120A  PR AVG POWER                                     90.48     PCNT     GOOD
ANM9120B  REACTOR AVG THERMAL POWER                      2584.92     MWTH     GOOD
ANM9120B  REACTOR AVG THERMAL POWER                         0.00     MWTH     DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00     MWTH     DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00     MWTH     DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00     MWTH     DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00     MWTH     DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00     MWTH     DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00     MWTH     DALM
ANM9120B  REACTOR AVG THERMAL POWER                         0.00     MWTH     DALM
URE1661   AFD PROBLEM, INOP IF >0                            nan     NONE     UNK
ANM0120M  NI-41 PR CHAN Q4 1-MIN AVG                       90.64     PCNT     GOOD
ANM0121M  NI-42 PR CHAN Q2 1-MIN AVG                       90.55     PCNT     RDER
ANM0122M  NI-43 PR CHAN Q1 1-MIN AVG                       90.48     PCNT     BAD
ANM0123M  NI-44 PR CHAN Q3 1-MIN AVG                       90.56     PCNT     GOOD
URE0014   ROD BANK OUT OF SEQUENCE                    RESET                   GOOD
URE0015   ROD TO BANK DEVIATION                       NORMAL                  GOOD
URE1650   CHAN OPER WARN BAND VIOLATION               RESET                   GOOD
URE1651   CHAN OPER BAND VIOLATION                    RESET                   GOOD
URE1652   CHAN NOW OUT OF SERVICE                     RESET                   GOOD
URE1656   AXIAL FLUX DIFF ALARM                       RESET                   GOOD
```

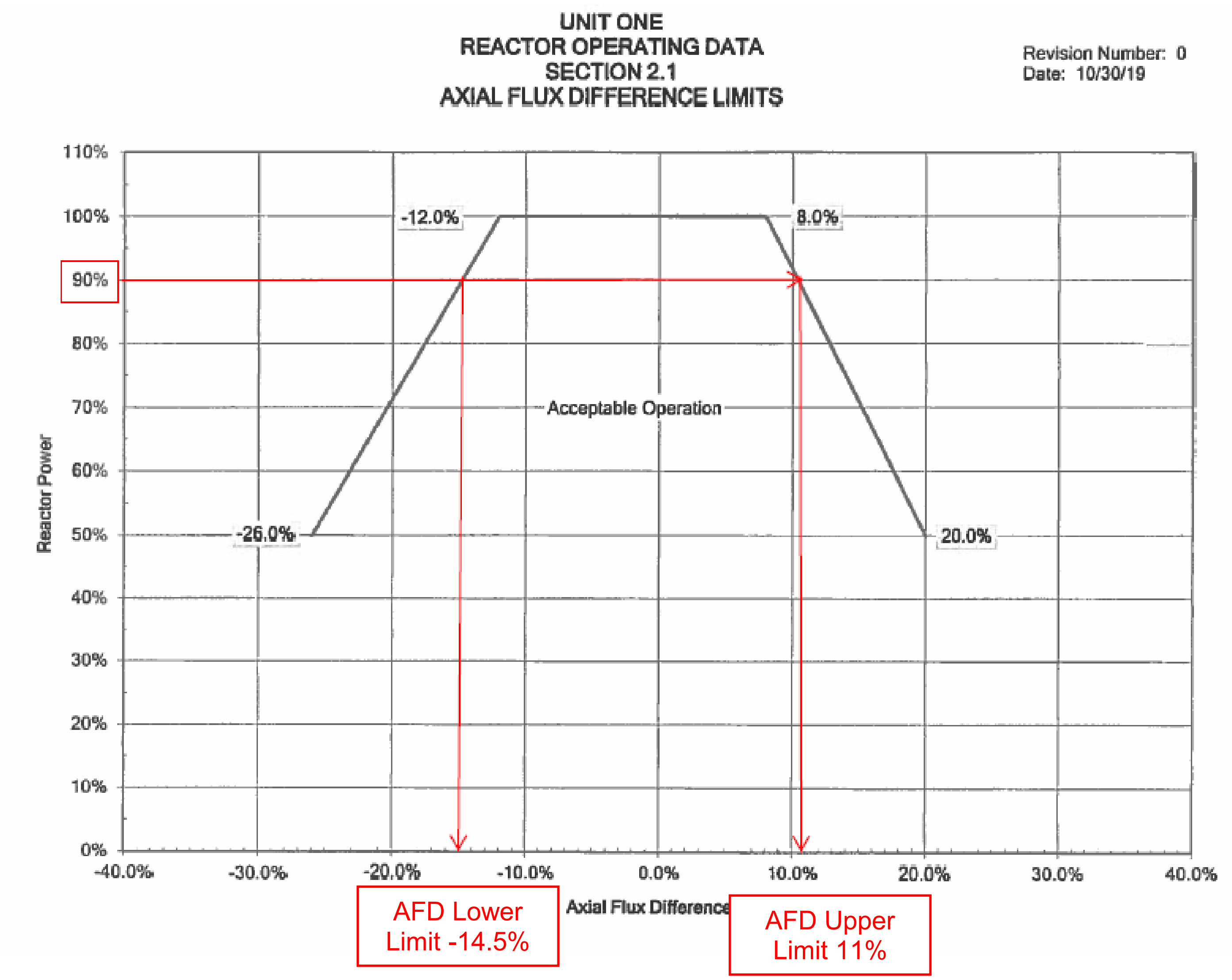
KEY


POWER RANGE
PR N41 % Δ FLUX
PR N42 % Δ FLUX
PR N43 % Δ FLUX
PR N44 % Δ FLUX
PERCENT
30
20
10
0
-10
-20
-30
SI OA-18-017
NI-41C
SII OA-18-017
NI-42C
SIII OA-18-017
NI-43C
SIV OA-18-017
NI-44C

KEY


POWER RANGE
PR N41 % POWER
PR N42 % POWER
PR N43 % POWER
PR N44 % POWER
PERCENT
120
110
100
90
80
70
60
50
40
30
20
10
0
SI OA-18-017
NI-41B
SII OA-18-017
NI-42B
SIII OA-18-017
NI-43B
SIV OA-18-017
NI-44B

KEY


UNIT ONE
REACTOR OPERATING DATA
SECTION 2.1
AXIAL FLUX DIFFERENCE LIMITS
Revision Number: 0
Date: 10/30/19
Reactor Power
110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
-40.0%
-30.0%
-20.0%
-10.0%
0.0%
10.0%
20.0%
30.0%
40.0%
Axial Flux Difference
-12.0%
8.0%
-26.0%
20.0%
Acceptable Operation
AFD Lower Limit -14.5%
AFD Upper Limit 11%

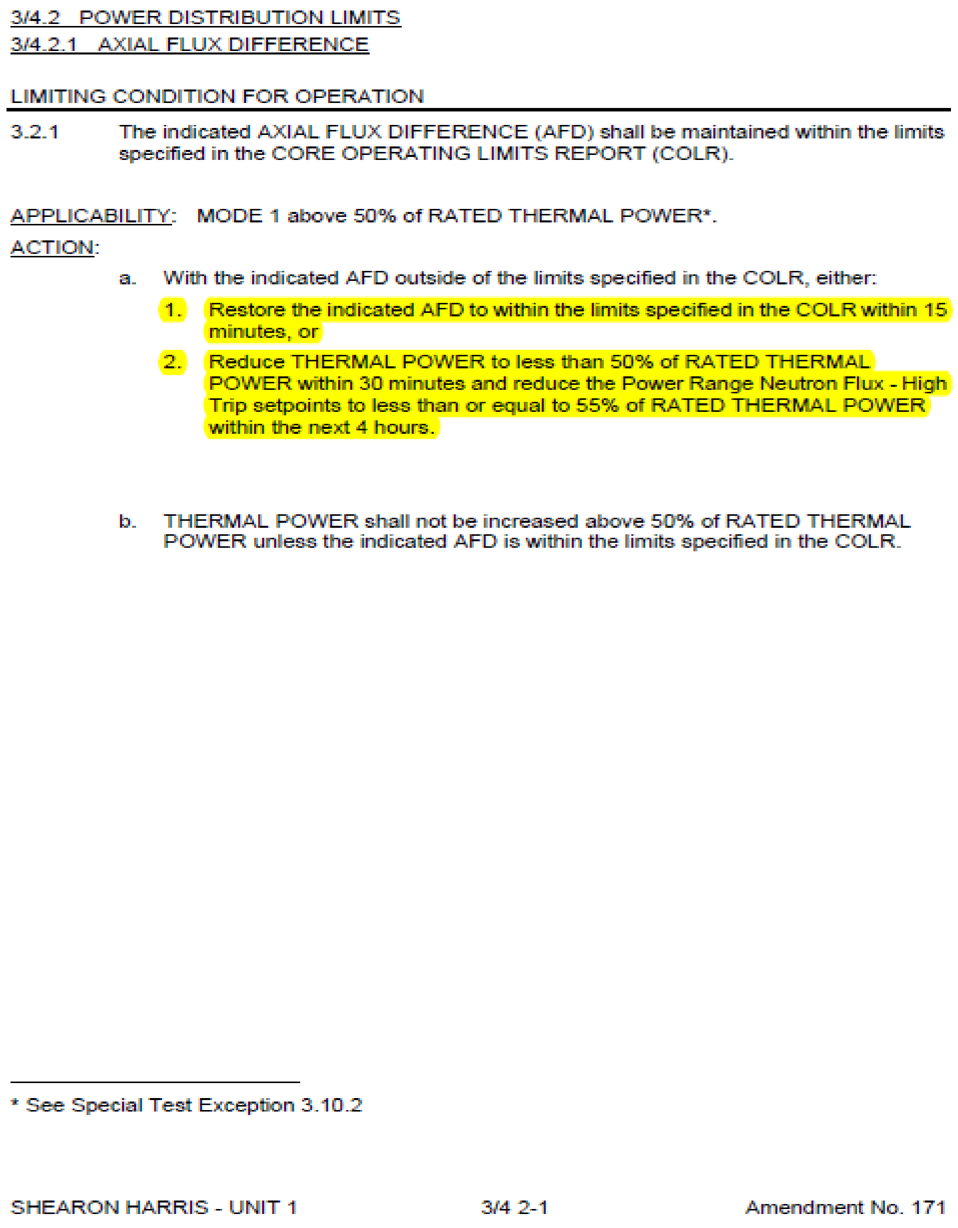
KEY

1. The current AFD Limits are **Upper AFD limit 11.0% at 90% Reactor Power (+/- 1%)**
Lower AFD limit 14.5% at 90% Reactor Power (+/- 1%)

Circle the correct response that applies:

2. AFD Monitor Alarm is Operable / [✓ Inoperable]

3. Technical Specification(s) and applicable LCO's that apply



3/4.2 POWER DISTRIBUTION LIMITS
3/4.2.1 AXIAL FLUX DIFFERENCE

LIMITING CONDITION FOR OPERATION

3.2.1 The indicated AXIAL FLUX DIFFERENCE (AFD) shall be maintained within the limits specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODE 1 above 50% of RATED THERMAL POWER*.

ACTION:

a. With the indicated AFD outside of the limits specified in the COLR, either:
   1. Restore the indicated AFD to within the limits specified in the COLR within 15 minutes, or
   2. Reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes and reduce the Power Range Neutron Flux - High Trip setpoints to less than or equal to 55% of RATED THERMAL POWER within the next 4 hours.

a.1 0915

a.2 0930

a.2 1330

b. THERMAL POWER shall not be increased above 50% of RATED THERMAL POWER unless the indicated AFD is within the limits specified in the COLR.

---

* See Special Test Exception 3.10.2

SHEARON HARRIS - UNIT 1 3/4 2-1 Amendment No. 171

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC Admin Exam SRO A1-1

Determine Axial Flux Difference (AFD) with AFD Monitor INOP and Evaluate Technical Specifications

OP-163, ERFIS

OST-1021, Daily Surveillance Requirements

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

JPM CUE SHEET

Initial Conditions:	• The plant was at 90% power, with a load reduction in progress • The load reduction has been stopped to evaluate AFD following oscillations at 0900

Initiating Cue:	With the information provided complete Attachment 5 of OST-1021, Daily Surveillance Requirements to determine Axial Flux Difference. After completing OST-1021, Attachment 5 evaluate the results and circle the response below IF any Technical Specifications apply list the associated LCO action(s) and the required completion time(s). **Base any action completion times from the time of 0900.** When complete return your results to the evaluator.

Name: ____

Date: ____________________

1. The current AFD Limits are **UPPER** _____________ **LOWER** _______________

Circle the correct response that applies:

2. AFD Monitor Alarm is Operable / Inoperable

Technical Specification(s) and applicable LCO Action(s) that apply: _________________

____

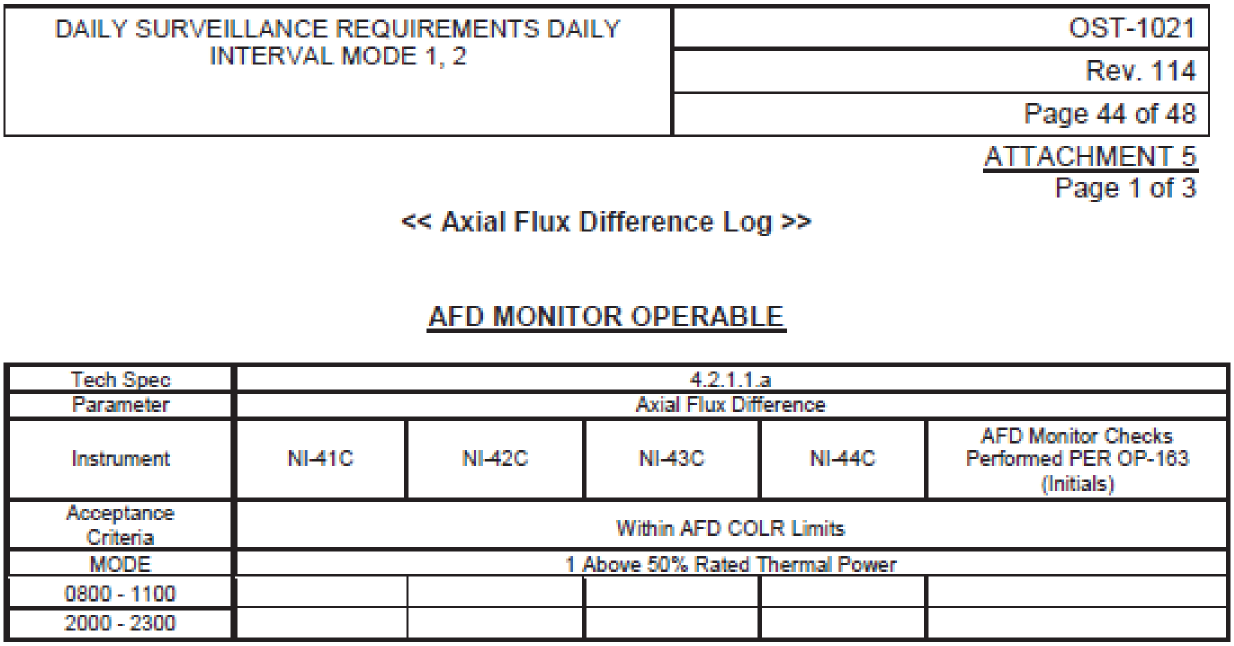
____

____

____

____

____



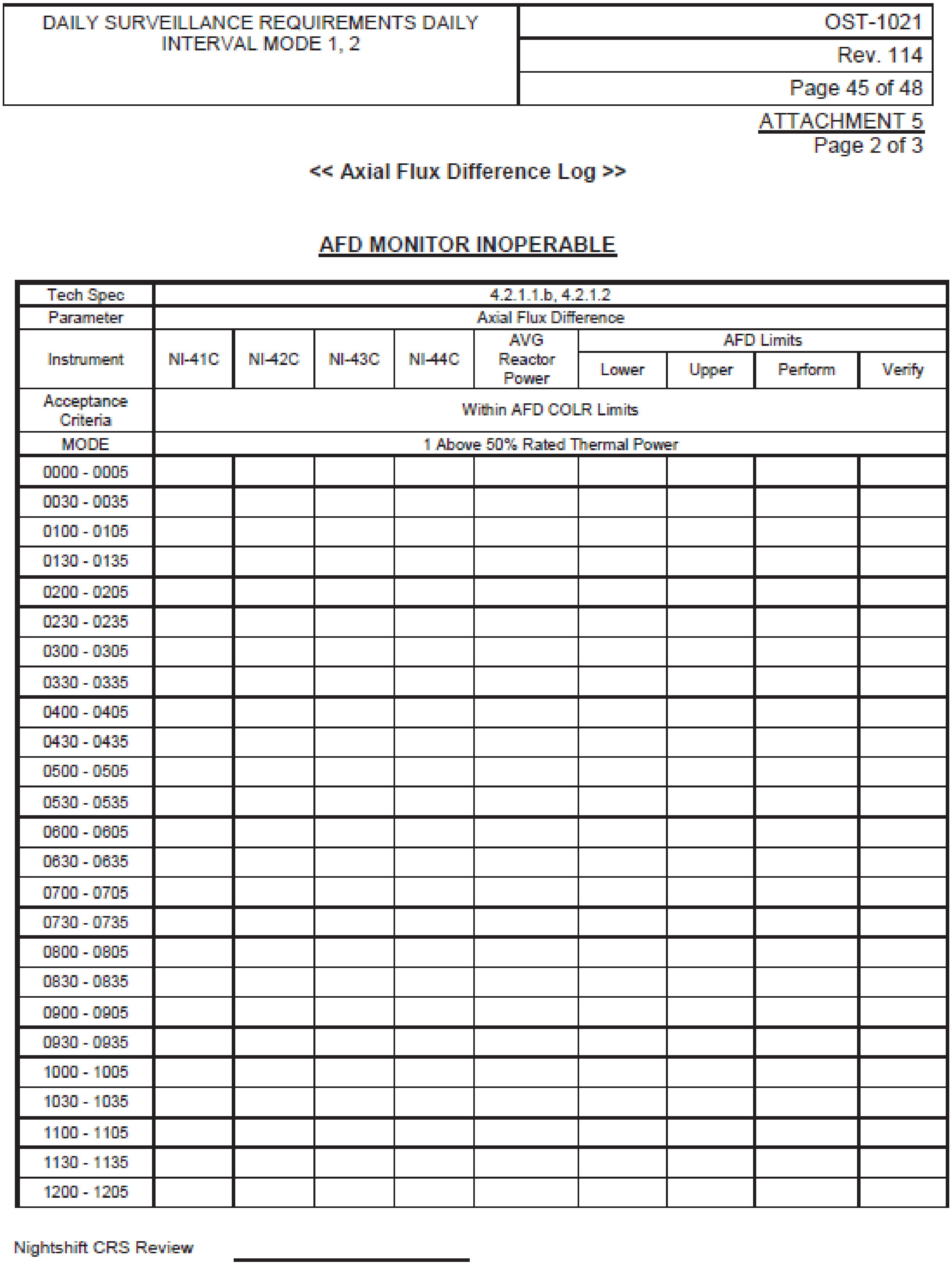
DAILY SURVEILLANCE REQUIREMENTS DAILY INTERVAL MODE 1, 2	OST-1021
	Rev. 114
	Page 44 of 48

ATTACHMENT 5
Page 1 of 3

<< Axial Flux Difference Log >>

AFD MONITOR OPERABLE

Tech Spec	4.2.1.1.a				
Parameter	Axial Flux Difference				
Instrument	NI-41C	NI-42C	NI-43C	NI-44C	AFD Monitor Checks Performed PER OP-163 (Initials)
Acceptance Criteria	Within AFD COLR Limits				
MODE	1 Above 50% Rated Thermal Power				
0800 - 1100					
2000 - 2300					



DAILY SURVEILLANCE REQUIREMENTS DAILY INTERVAL MODE 1, 2	OST-1021	
	Rev. 114	
	Page 45 of 48	

ATTACHMENT 5
Page 2 of 3

<< Axial Flux Difference Log >>

AFD MONITOR INOPERABLE

Tech Spec	4.2.1.1.b, 4.2.1.2								
Parameter	Axial Flux Difference								
Instrument	NI-41C	NI-42C	NI-43C	NI-44C	AVG Reactor Power	AFD Limits			
						Lower	Upper	Perform	Verify
Acceptance Criteria	Within AFD COLR Limits								
MODE	1 Above 50% Rated Thermal Power								
0000 - 0005									
0030 - 0035									
0100 - 0105									
0130 - 0135									
0200 - 0205									
0230 - 0235									
0300 - 0305									
0330 - 0335									
0400 - 0405									
0430 - 0435									
0500 - 0505									
0530 - 0535									
0600 - 0605									
0630 - 0635									
0700 - 0705									
0730 - 0735									
0800 - 0805									
0830 - 0835									
0900 - 0905									
0930 - 0935									
1000 - 1005									
1030 - 1035									
1100 - 1105									
1130 - 1135									
1200 - 1205									

Nightshift CRS Review ____________________

DAILY SURVEILLANCE REQUIREMENTS DAILY INTERVAL MODE 1, 2	OST-1021 Rev. 114 Page 46 of 48

ATTACHMENT 5
Page 3 of 3

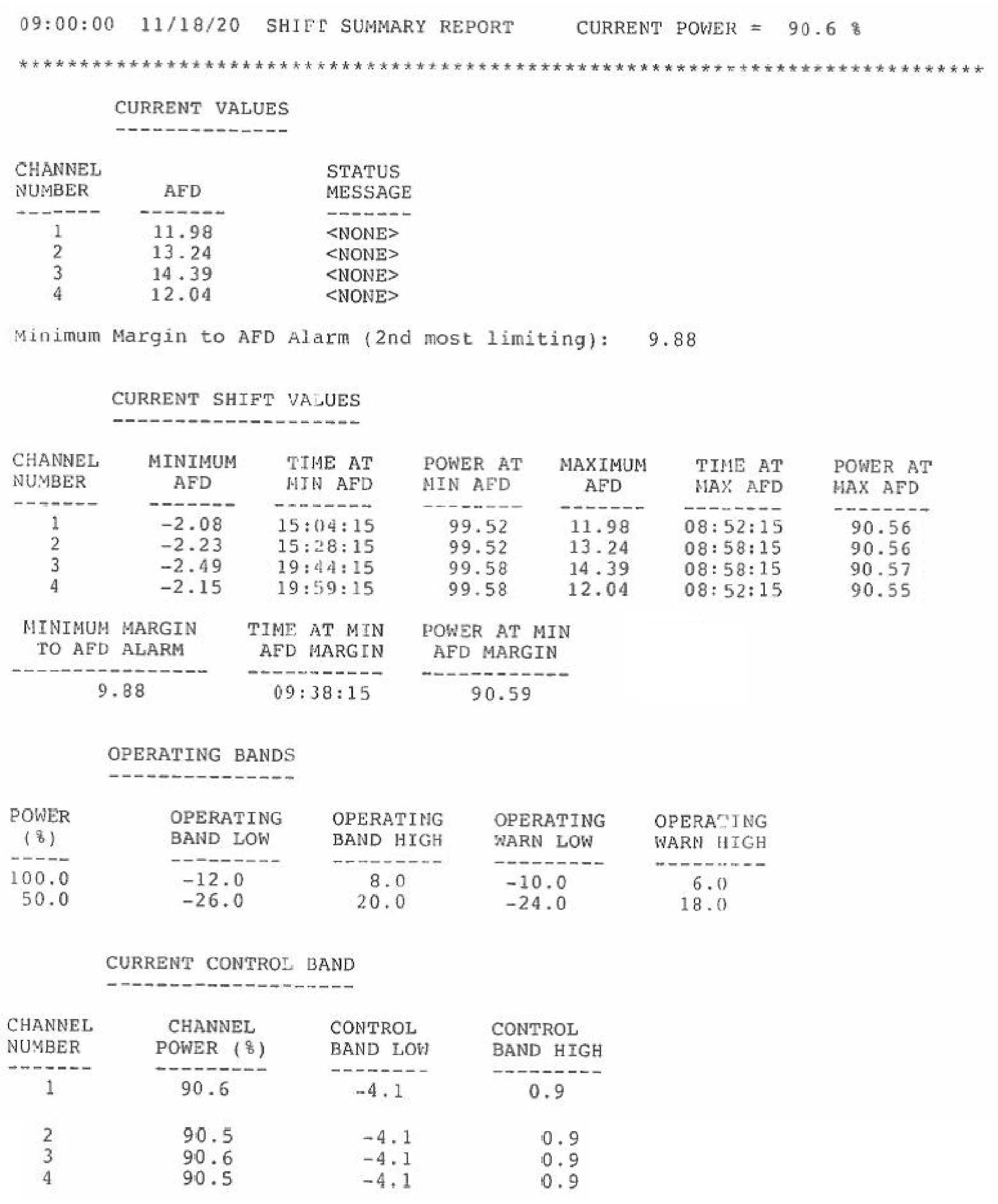
<< Axial Flux Difference Log >>

AFD MONITOR INOPERABLE

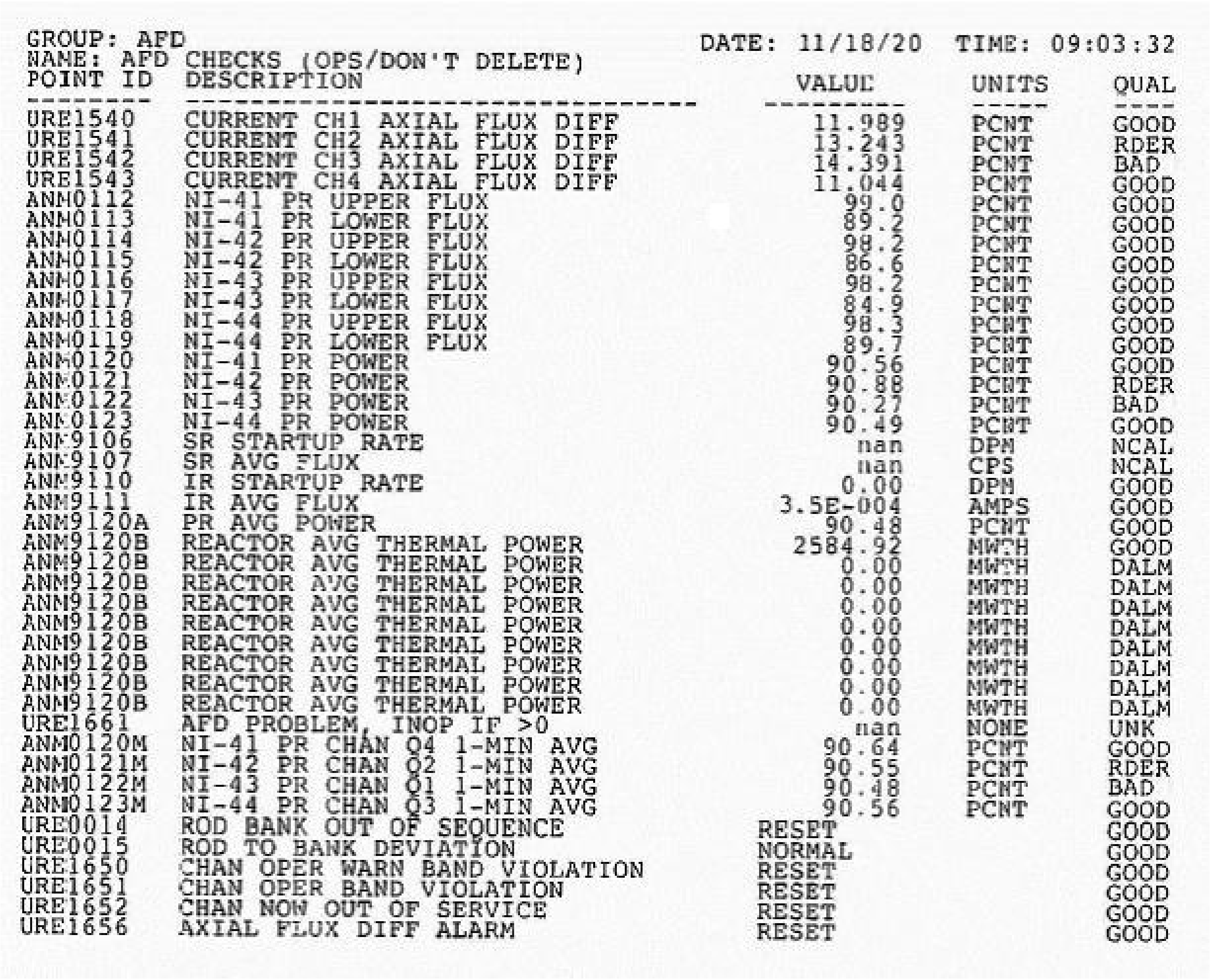
Tech Spec	4.2.1.1.b, 4.2.1.2								
Parameter	Axial Flux Difference								
Instrument	NI-41C	NI-42C	NI-43C	NI-44C	AVG Reactor Power	AFD Limits			
						Lower	Upper	Perform	Verify
Acceptance Criteria	Within AFD COLR Limits								
MODE	1 Above 50% Rated Thermal Power								
1230 - 1235									
1300 - 1305									
1330 - 1335									
1400 - 1405									
1430 - 1435									
1500 - 1505									
1530 - 1535									
1600 - 1605									
1630 - 1635									
1700 - 1705									
1730 -1735									
1800 - 1805									
1830 - 1835									
1900 - 1905									
1930 - 1935									
2000 - 2005									
2030 - 2035									
2100 - 2105									
2130 - 2135									
2200 - 2205									
2230 - 2235									
2300 - 2305									
2330 - 2335									

Dayshift CRS Review ____________________

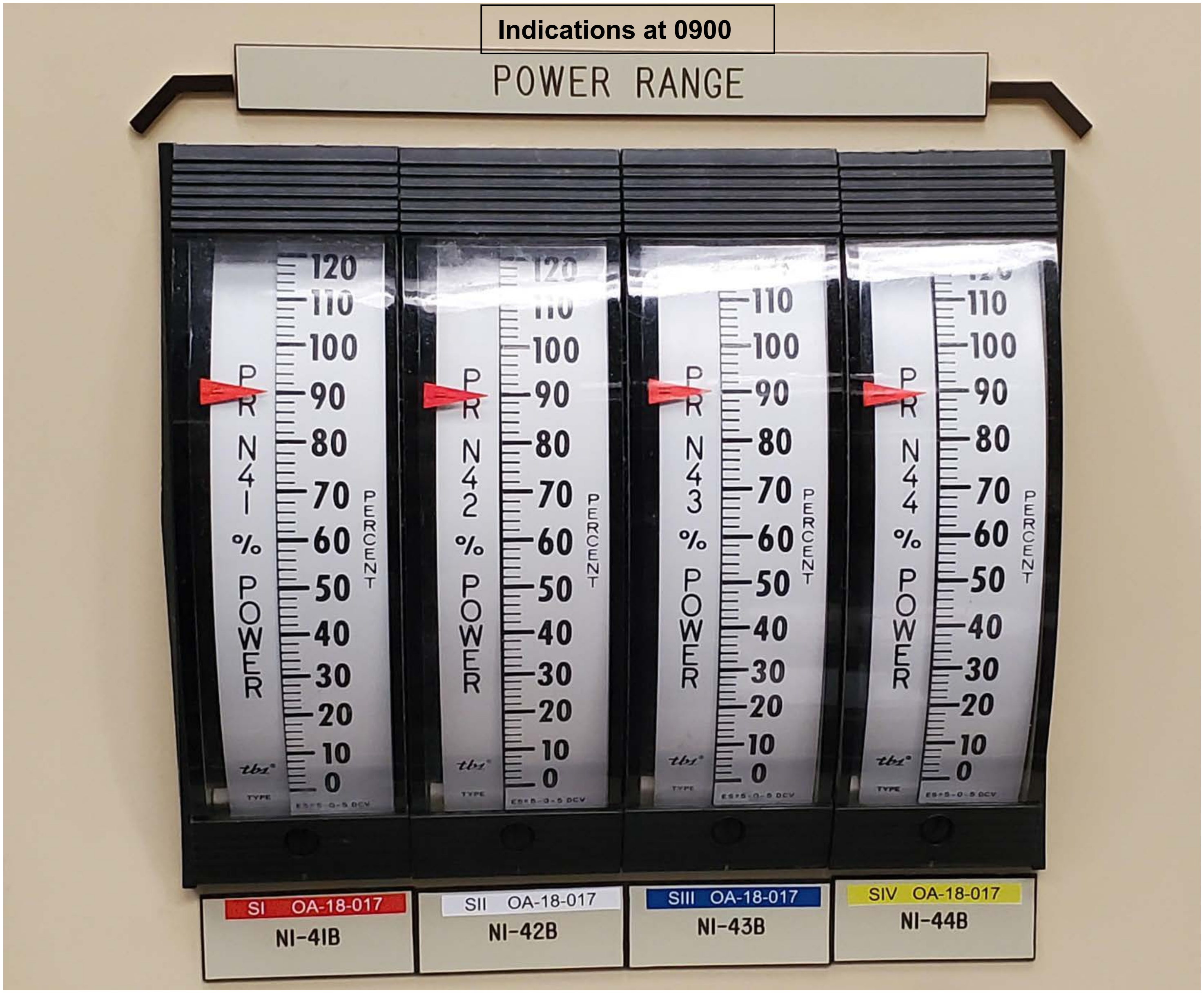
JPM CUE SHEET



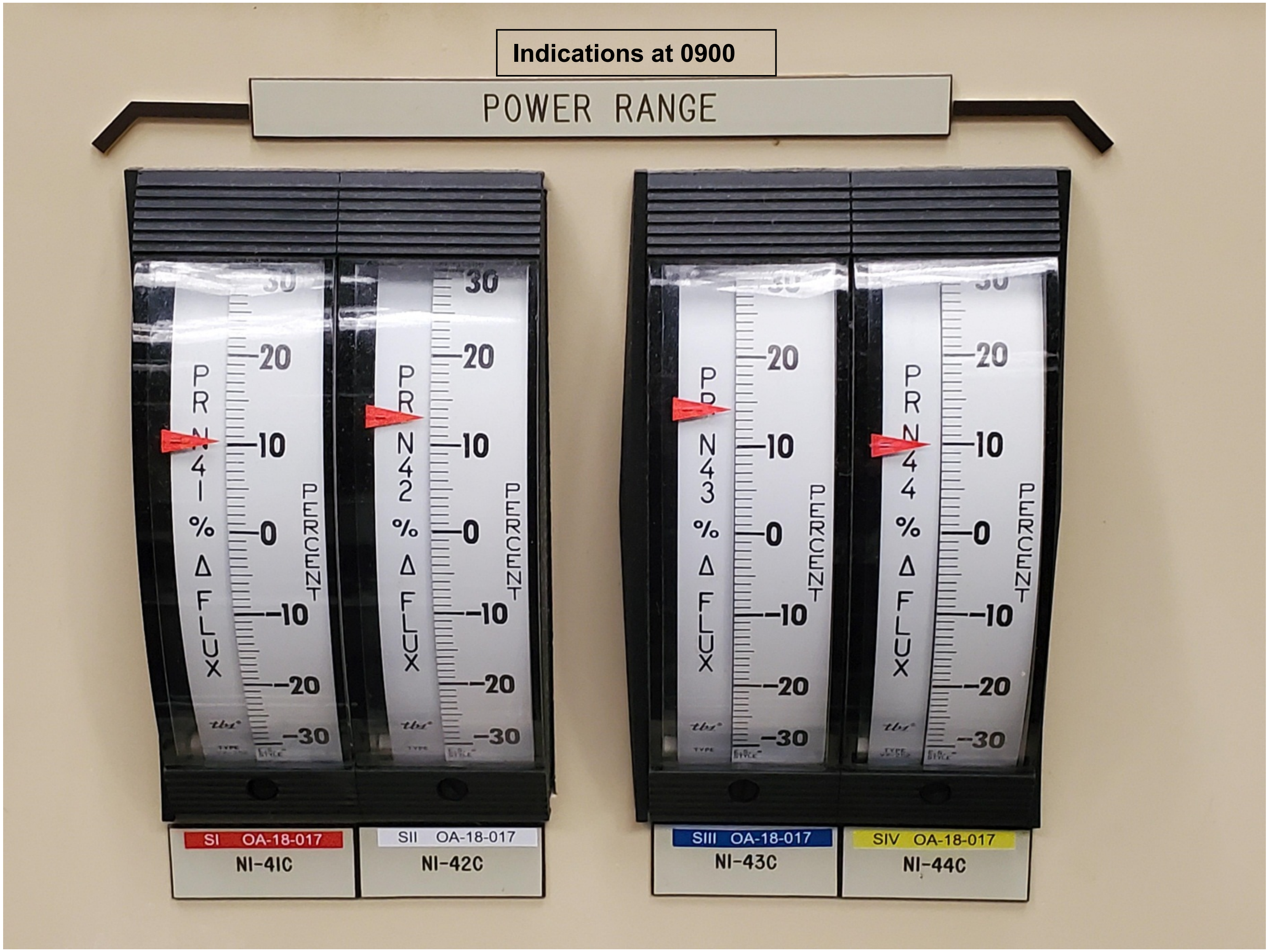
```
09:00:00  11/18/20  SHIFT SUMMARY REPORT     CURRENT POWER =  90.6 %
*******************************************************************************

        CURRENT VALUES
        --------------

CHANNEL                      STATUS
NUMBER     AFD               MESSAGE
-------  -------             -------
   1      11.98              <NONE>
   2      13.24              <NONE>
   3      14.39              <NONE>
   4      12.04              <NONE>

Minimum Margin to AFD Alarm (2nd most limiting):   9.88

        CURRENT SHIFT VALUES
        --------------------

CHANNEL   MINIMUM    TIME AT    POWER AT   MAXIMUM    TIME AT    POWER AT
NUMBER      AFD      MIN AFD    MIN AFD      AFD      MAX AFD    MAX AFD
-------   -------   --------   --------   -------   --------   --------
   1       -2.08    15:04:15     99.52     11.98    08:52:15     90.56
   2       -2.23    15:28:15     99.52     13.24    08:58:15     90.56
   3       -2.49    19:44:15     99.58     14.39    08:58:15     90.57
   4       -2.15    19:59:15     99.58     12.04    08:52:15     90.55

 MINIMUM MARGIN    TIME AT MIN   POWER AT MIN
  TO AFD ALARM     AFD MARGIN     AFD MARGIN
----------------   -----------   ------------
      9.88          09:38:15        90.59

        OPERATING BANDS
        ---------------

POWER       OPERATING    OPERATING    OPERATING    OPERATING
 (%)        BAND LOW     BAND HIGH    WARN LOW     WARN HIGH
-----       ---------    ---------    ---------    ---------
100.0        -12.0          8.0        -10.0          6.0
 50.0        -26.0         20.0        -24.0         18.0

        CURRENT CONTROL BAND
        --------------------

CHANNEL     CHANNEL      CONTROL      CONTROL
NUMBER     POWER (%)     BAND LOW     BAND HIGH
-------    ---------     --------     ---------
   1         90.6          -4.1          0.9

   2         90.5          -4.1          0.9
   3         90.6          -4.1          0.9
   4         90.5          -4.1          0.9
```



```
GROUP: AFD                                                    DATE: 11/18/20  TIME: 09:03:32
NAME: AFD CHECKS (OPS/DON'T DELETE)
POINT ID  DESCRIPTION                                 VALUE       UNITS     QUAL
--------  --------------------------------        ---------      -----     ----
URE1540   CURRENT CH1 AXIAL FLUX DIFF                11.989      PCNT      GOOD
URE1541   CURRENT CH2 AXIAL FLUX DIFF                13.243      PCNT      RDER
URE1542   CURRENT CH3 AXIAL FLUX DIFF                14.391      PCNT      BAD
URE1543   CURRENT CH4 AXIAL FLUX DIFF                11.044      PCNT      GOOD
ANM0112   NI-41 PR UPPER FLUX                          99.0      PCNT      GOOD
ANM0113   NI-41 PR LOWER FLUX                          89.2      PCNT      GOOD
ANM0114   NI-42 PR UPPER FLUX                          98.2      PCNT      GOOD
ANM0115   NI-42 PR LOWER FLUX                          86.6      PCNT      GOOD
ANM0116   NI-43 PR UPPER FLUX                          98.2      PCNT      GOOD
ANM0117   NI-43 PR LOWER FLUX                          84.9      PCNT      GOOD
ANM0118   NI-44 PR UPPER FLUX                          98.3      PCNT      GOOD
ANM0119   NI-44 PR LOWER FLUX                          89.7      PCNT      GOOD
ANM0120   NI-41 PR POWER                              90.56      PCNT      GOOD
ANM0121   NI-42 PR POWER                              90.88      PCNT      RDER
ANM0122   NI-43 PR POWER                              90.27      PCNT      BAD
ANM0123   NI-44 PR POWER                              90.49      PCNT      GOOD
ANM9106   SR STARTUP RATE                               nan      DPM       NCAL
ANM9107   SR AVG FLUX                                   nan      CPS       NCAL
ANM9110   IR STARTUP RATE                              0.00      DPM       GOOD
ANM9111   IR AVG FLUX                             3.5E-004      AMPS      GOOD
ANM9120A  PR AVG POWER                                90.48      PCNT      GOOD
ANM9120B  REACTOR AVG THERMAL POWER                 2584.92      MWTH      GOOD
ANM9120B  REACTOR AVG THERMAL POWER                    0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                    0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                    0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                    0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                    0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                    0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                    0.00      MWTH      DALM
ANM9120B  REACTOR AVG THERMAL POWER                    0.00      MWTH      DALM
URE1661   AFD PROBLEM, INOP IF >0                       nan      NONE      UNK
ANM0120M  NI-41 PR CHAN Q4 1-MIN AVG                  90.64      PCNT      GOOD
ANM0121M  NI-42 PR CHAN Q2 1-MIN AVG                  90.55      PCNT      RDER
ANM0122M  NI-43 PR CHAN Q1 1-MIN AVG                  90.48      PCNT      BAD
ANM0123M  NI-44 PR CHAN Q3 1-MIN AVG                  90.56      PCNT      GOOD
URE0014   ROD BANK OUT OF SEQUENCE                RESET                    GOOD
URE0015   ROD TO BANK DEVIATION                   NORMAL                   GOOD
URE1650   CHAN OPER WARN BAND VIOLATION           RESET                    GOOD
URE1651   CHAN OPER BAND VIOLATION                RESET                    GOOD
URE1652   CHAN NOW OUT OF SERVICE                 RESET                    GOOD
URE1656   AXIAL FLUX DIFF ALARM                   RESET                    GOOD
```



Indications at 0900


Indications at 0900
POWER RANGE
PR N41 % Δ FLUX
PR N42 % Δ FLUX
PR N43 % Δ FLUX
PR N44 % Δ FLUX
PERCENT
30
20
10
0
-10
-20
-30
SI OA-18-017
NI-41C
SII OA-18-017
NI-42C
SIII OA-18-017
NI-43C
SIV OA-18-017
NI-44C

Facility:	Harris Nuclear Plant	Task No.:	301079H401
Task Title:	During a Loss of Shutdown Cooling, determine the time that the RCS will reach Core Boiling and Boil-Off	JPM No.:	2020 NRC Exam Admin JPM SRO A1-2
K/A Reference:	G2.1.20 RO 4.6 SRO 4.6		**ALTERNATE PATH - NO**
Examinee:	__________________________	NRC Examiner:	__________________
Facility Evaluator:	__________________________	Date:	__________________

Method of testing:

Simulated Performance: ______ Actual Performance: __X__

Classroom __X__ Simulator ______ Plant ________

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	The unit was operating at 100% power for the last 17 months. On 10/31/20 at 0000 the plant was shut down for a refueling outage. • While the Reactor cavity was being filled the ‘A’ RHR pump tripped • Motor repairs are not expected to be completed until 11/25/20 • The Reactor cavity fill was completed to the normal refueling levels • No fuel has been moved due to problems with the Manipulator Crane The current date and time is 11/20/20 at 1200 • The ‘B’ RHR pump just tripped. • Fuel remains in the vessel with LEVEL at the RV Flange • SG primary manways are installed • RCPs remain coupled • Core exit thermocouples are rising; they are currently reading 105°F

Initiating Cue:	You are directed to determine: 1. The time to reach core boiling 2. Core boil-off time **and** 3. The action(s) required to maintain level and the associated band Mark up your curves to indicate where you are determining these times. Write your estimates of “time to boil” and “time to boil-off” and the required action(s) on the lines at the bottom of this page (below). Calculate your times in hours and minutes

Task Standard: Candidate obtains curves and correctly identifies the time to reach core boiling and core boil-off time

Required Materials: Curve Book
Straight Edge

General References: AOP-020, Loss Of RCS Inventory Or Residual Heat Removal While Shutdown, Rev. 39
Curve H-X-8, RCS Boiling Curves From Mid Loop, Rev. 3
Curve H-X-9, RCS Boiling Curves At Vessel Flange, Rev. 3
Curve H-X-10, RCS Boiloff Curves From Mid Loop To TAF, Rev. 3
Curve H-X-11, RCS Boiloff Curves From Vessel Flange To TAF, Rev. 3

OR

2020 NRC Exam Frozen Procedures Folder

Handout: JPM Cue Sheets pages 8 - 13

Time Critical Task: No

Validation Time: 10 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 3	Step required in order to accurately determine “time to boil” using the appropriate curve in order to determine the required actions in accordance with the appropriate plant procedure to maximize the available RCS inventory.
Step 4	Step required in order to accurately determine “time to boil-off” using the appropriate curve in order to determine the required actions in accordance with the appropriate plant procedure to maximize the available RCS inventory.
Step 5	Step required in order to determine the required actions in accordance with the appropriate plant procedure to maximize the available RCS inventory.

START TIME: ____________

Performance Step: 1 OBTAIN CURVES NEEDED FOR CALCULATION
(Curve Book will be provided to the candidate)

Standard: Refers to curves H-X-8 through H-X-11

Comment:

Performance Step: 2 Refers to provided data and determines that curve H-X-9 is required to calculate “time to boil” and curve H-X-11 is required to calculate “boil-off” time

Standard: Reviews curves and determines which ones are appropriate to determine the “time to boil” and “boil-off time”

Comment:

✓ **Performance Step: 3** Based on time since shutdown (10/31/20 – 11/20/20) 20 days 12 hours since shutdown and current RCS temperature of 105°F using curve H-X-9 determine “time to boil”.
(Interpolate 100°F - 125°F lines)

Standard: Reviews curve H-X-9
Determines that “time to boil” is ~**30 minutes**
(± 2 minutes, 28 – 32 min is acceptable)

Comment:

✓ **Performance Step: 4** Based on time since shutdown (10/31/20 – 11/20/20) 20 days 12 hours since shutdown and current RCS temperature of 105°F using curve H-X-11 determine "time to boil-off"

(Interpolate 100°F - 125°F lines)

Standard: Reviews curve H-X-11

Determines that "time to boil-off" is **4 hrs and 50 mins (4.8 hrs)**

(± 15 minutes) or (4 hours 35 minutes to 5 hours 5 minutes)

Comment:

✓ **Performance Step: 5** Determine the action required to maintain level for the plant conditions

Standard: Reviews AOP-020

Determines that the crew is required to REFER TO Table 1 below AND ADJUST CSIP flow to maintain level in accordance with current plant conditions.

Table 1

Plant Condition	RV Level to Maintain
RCS is **NOT** drained down for refueling or maintenance	Current RV level
Refueling Cavity flooded	Between 12 and 36 inches below RV flange
ALL SG primary manways **INSTALLED** AND ALL RCPs **COUPLED**	Between 12 and 36 inches below RV flange

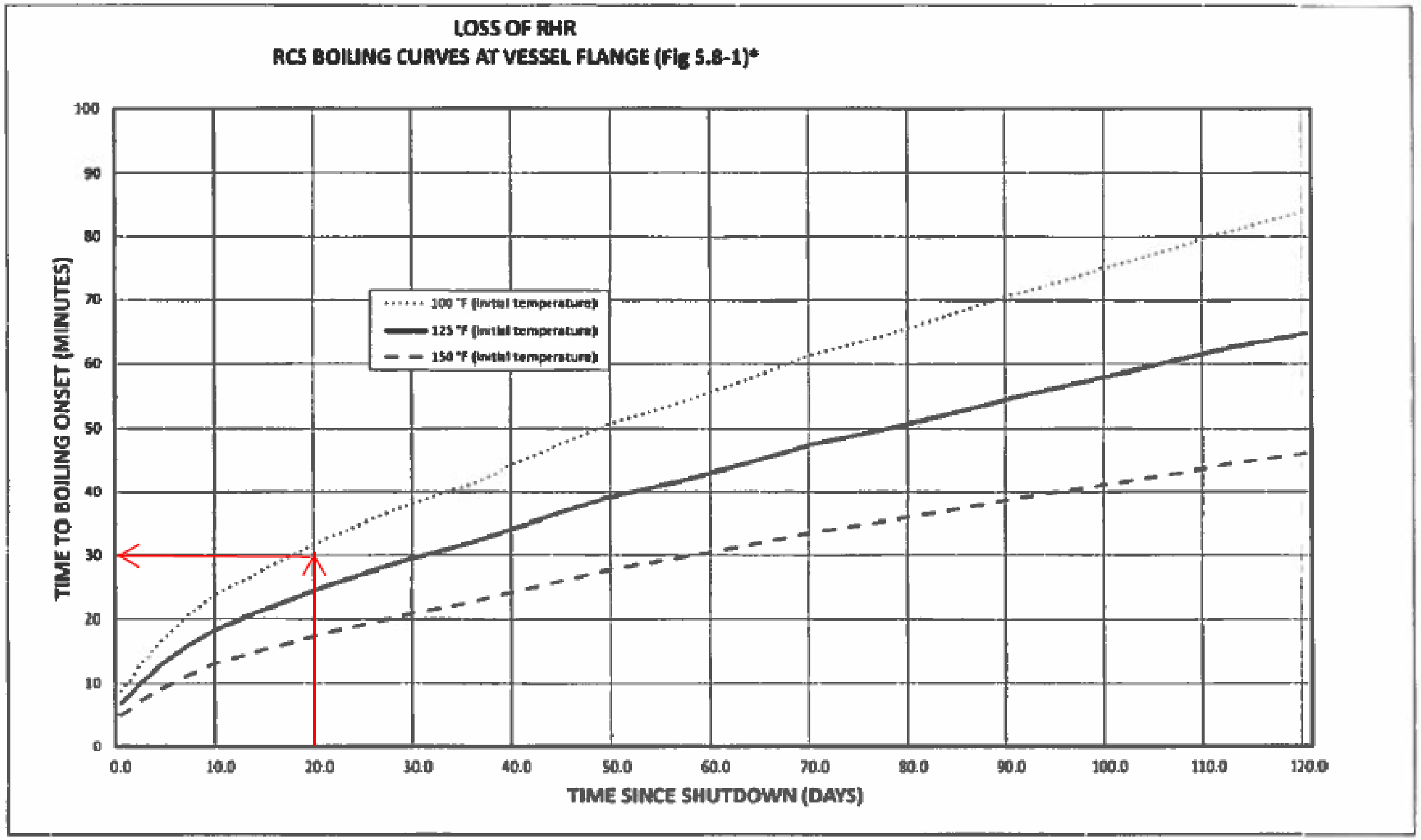
Comment:

Terminating Cue: **After completing the "time to boil", "time to boil-off" calculation and determining the action required, the evaluation on this JPM is complete.**

END OF JPM

STOP TIME: ____________

KEY



Initial conditions: Reactor cavity filled for refueling without fuel movement due to Manipulator Crane problems. Core cooling is lost at 1200 and 20 days after shutdown. Core Exit Thermocouples are rising and are currently 105°F. Estimated time to boiling onset will be approximately 30 minutes from the time of the loss of cooling event.

Curve No. H-X-9 Rev. No. 3

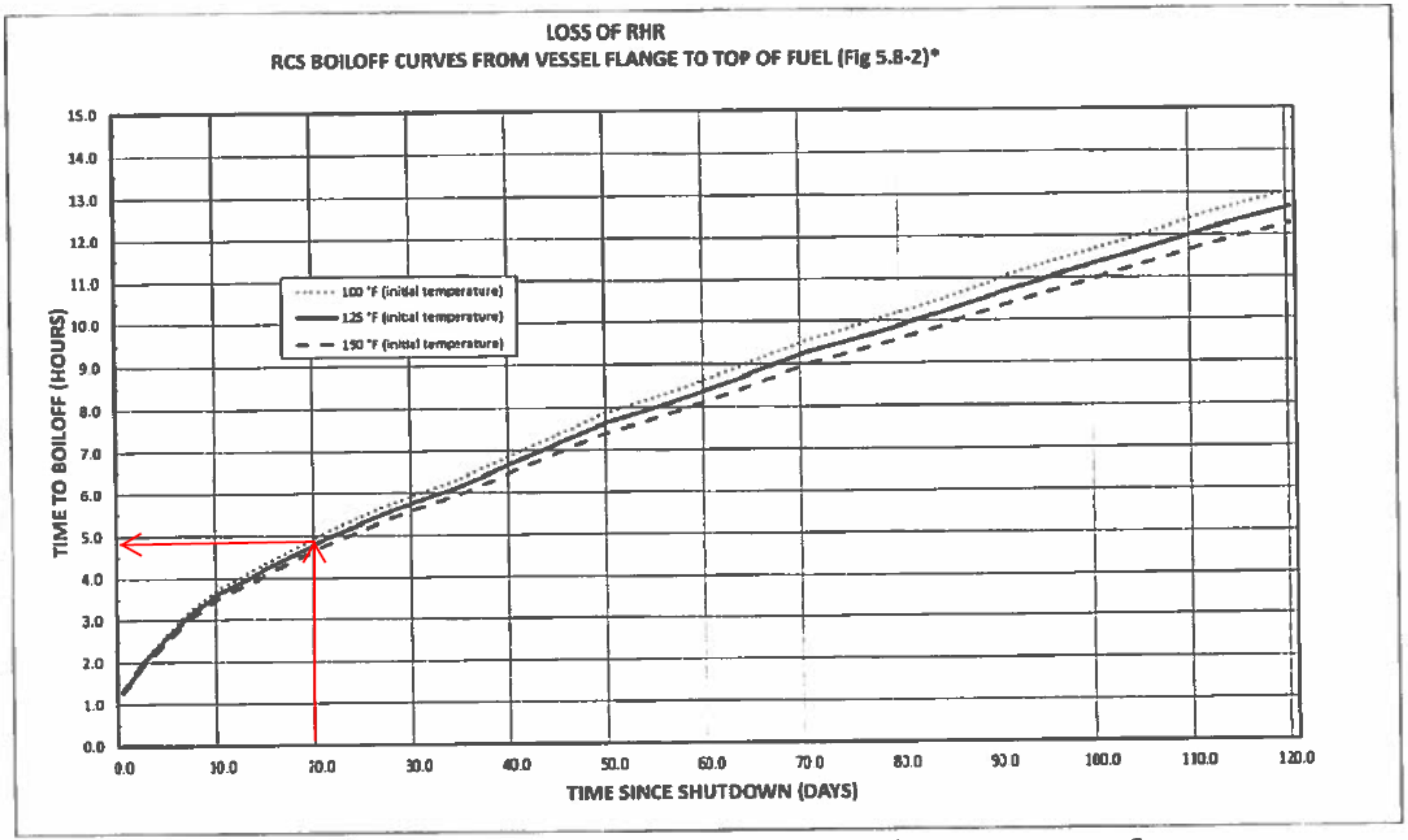
Originator Gregory A. Brown Date 6-22-12

Supervisor Date 6/25/12

Shift Manager Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010

KEY



LOSS OF RHR
RCS BOILOFF CURVES FROM VESSEL FLANGE TO TOP OF FUEL (Fig 5.8-2)*

Initial conditions: Reactor cavity filled for refueling without fuel movement due to Manipulator Crane problems. Core cooling is lost at 1200 and 20 days after shutdown. Core Exit Thermocouples are rising and are currently 105°F. Estimated time to boil off will be approximately 4.9 hours from the time of the loss of cooling event.

Curve No. H-X-11 Rev. No. 3

Originator Gregory A. Brown Date 6-22-12

Supervisor Date 6/25/12

Shift Manager Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC Exam Admin JPM SRO A1-2

During a Loss of Shutdown Cooling, determine the time that the RCS will reach Core Boiling, Boil-Off and Required Actions

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

JPM CUE SHEET

Initial Conditions:	The unit was operating at 100% power for the last 17 months. On 10/31/20 at 0000 the plant was shut down for a refueling outage. • While the Reactor cavity was being filled the 'A' RHR pump tripped. • Motor repairs are not expected to be completed until 11/25/20. • The Reactor cavity fill was completed to the normal refueling levels • No fuel has been moved due to problems with the Manipulator Crane The current date and time is 11/20/20 at 1200 • The 'B' RHR pump just tripped. • Fuel remains in the vessel with LEVEL at the RV Flange • SG primary manways are installed • RCPs remain coupled • Core exit thermocouples are rising; they are currently reading 105°F

Initiating Cue:	You are directed to determine: 1. The time to reach core boiling 2. Core boil-off time **and** 3. The action(s) required to maintain level and the associated band Mark up your curves to indicate where you are determining these times. Write your estimates of "time to boil" and "time to boil-off" and the required action(s) on the lines at the bottom of this page (below). Calculate your times in hours and minutes

Name ____

Date __________

Record your calculations here and return your curves to the examiner:

TIME TO BOIL (hours / minutes) ________________________

TIME TO BOIL-OFF (hours / minutes) ____________________

REQUIRED ACTION(S) TO MAINTAIN LEVEL AND ASSOCIATED BAND ________

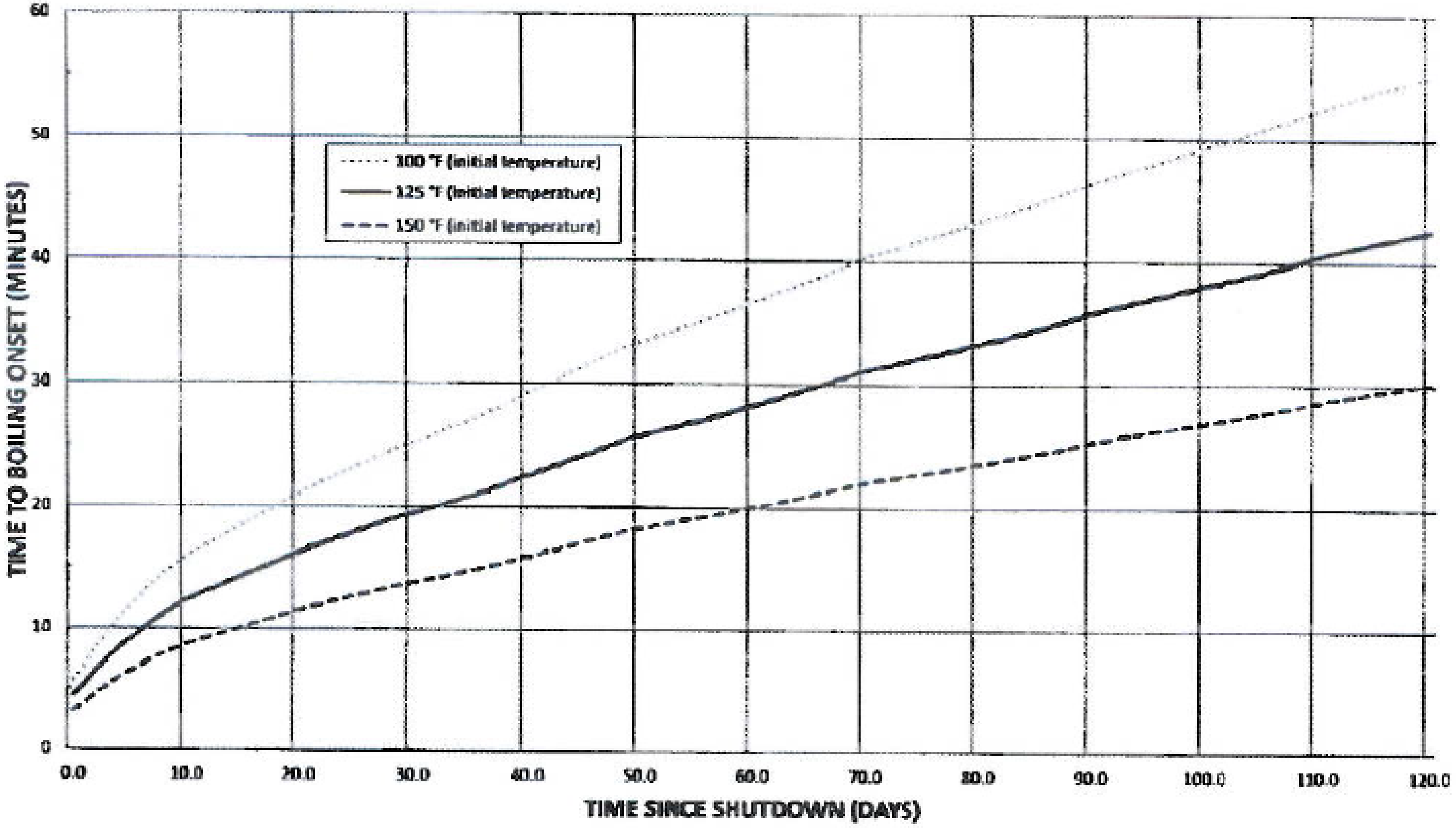
____

____

____

____

LOSS OF RHR
RCS BOILING CURVES FROM MIDLOOP (Fig 5.8-3)*



Curve No. H-X-8 Rev. No. 3

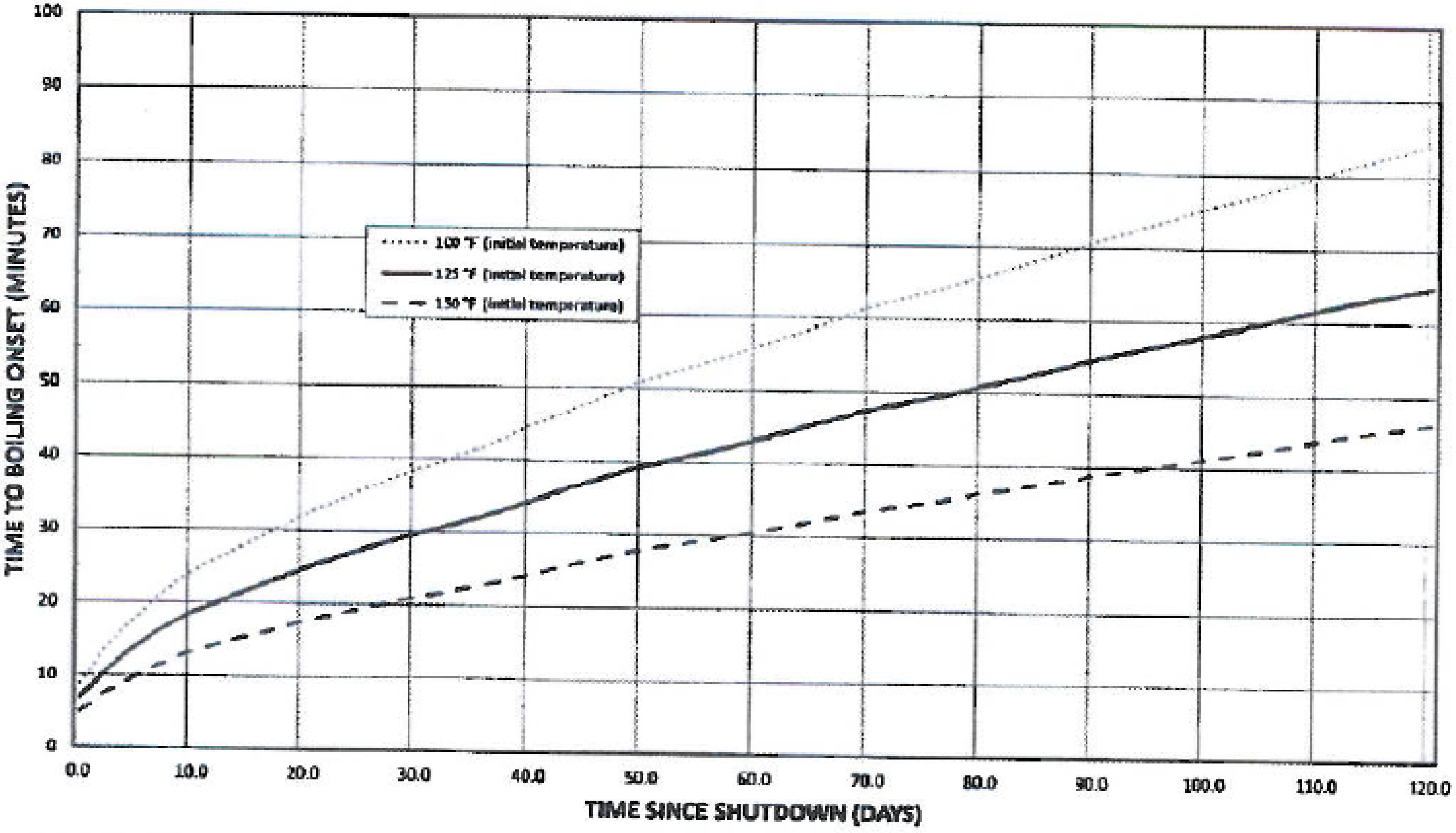
Originator Gregory A. Brown Date 6-22-12

Supervisor Date 6/25/12

Shift Manager Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010

LOSS OF RHR
RCS BOILING CURVES AT VESSEL FLANGE (Fig 5.8-1)*



Curve No. H-X-9 Rev. No. 3

Originator Gregory A. Brown Date 6·22·12

Supervisor Pat Chrisue Date 6/25/12

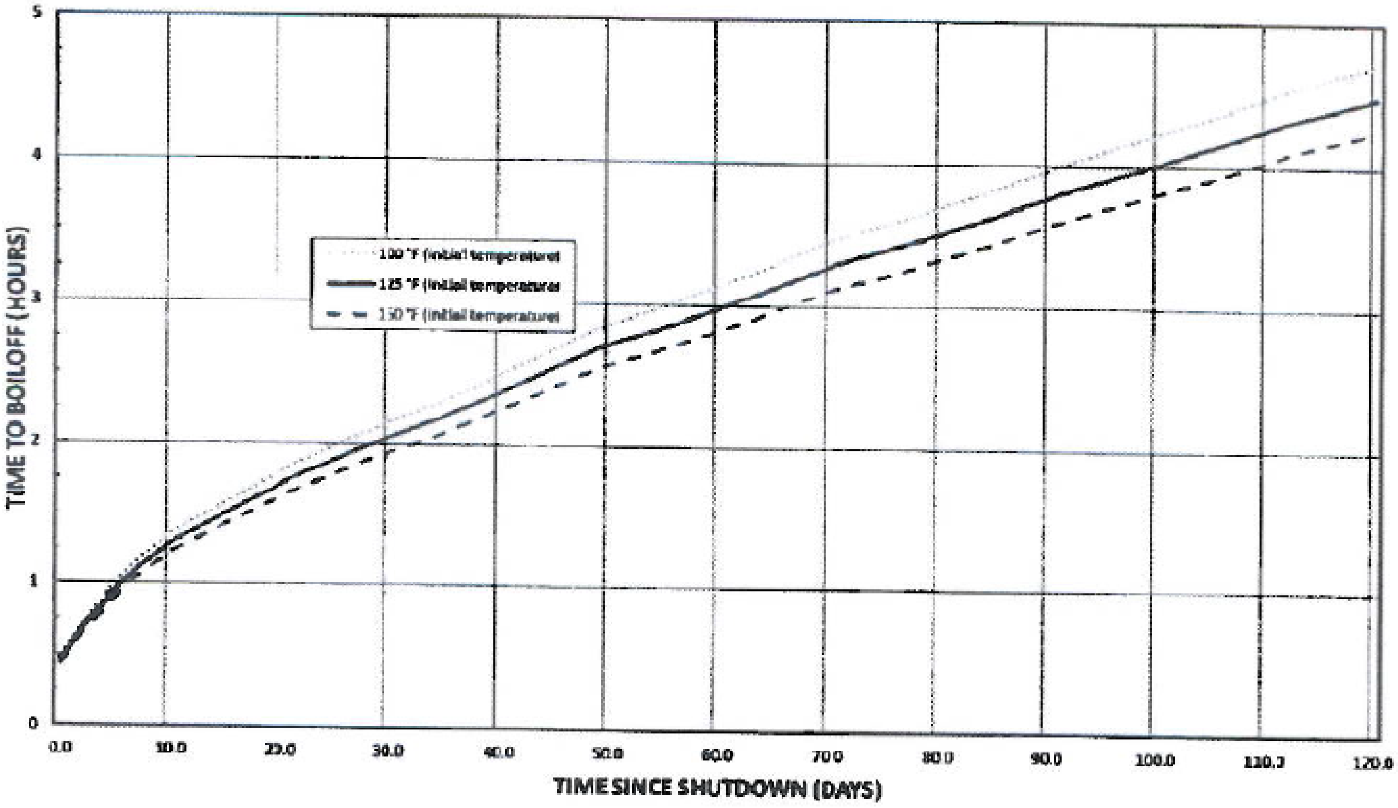
Shift Manager Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010

JPM CUE SHEET

LOSS OF RHR

RCS BOILOFF CURVES FROM MID LOOP TO TOP OF FUEL (Fig 5.8-4)*



Curve No. H-X-10 Rev. No. 3

Originator Gregory A. Brown GAB Date 6-22-12

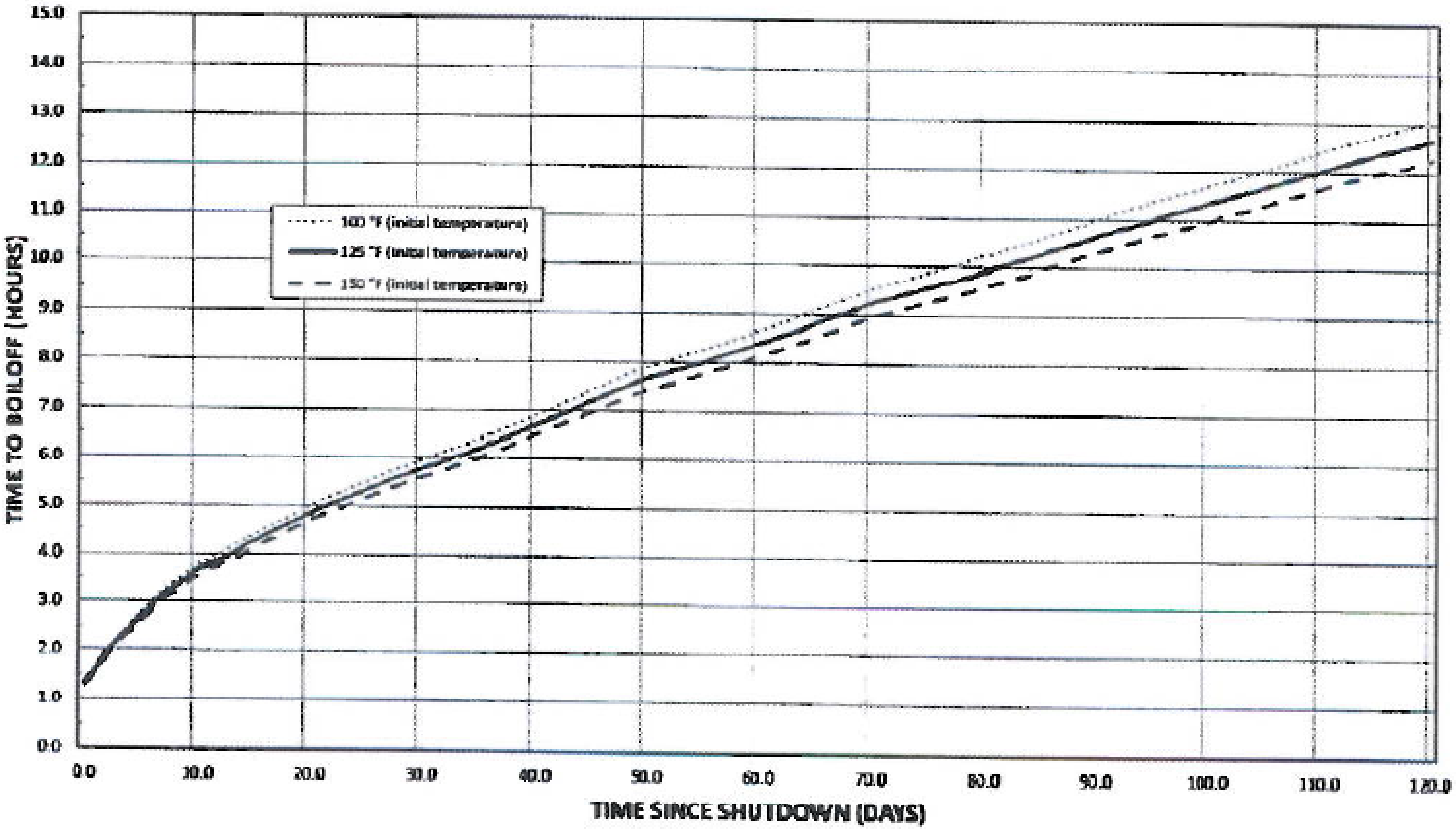
Supervisor Pat Chinque Date 6/25/12

Shift Manager G-S-L Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate." Nov 1, 2010

JPM CUE SHEET

LOSS OF RHR
RCS BOILOFF CURVES FROM VESSEL FLANGE TO TOP OF FUEL (Fig 5.8-2)*



Curve No. H-X-11 Rev. No. 3

Originator Gregory A. Brown Date 6·22·12

Supervisor Date 6/25/12

Shift Manager Date 6/26/12

*Westinghouse CN-PCSA-10-22, Revision 0, "Loss of RHR Evaluation for the Harris Unit 1 NSSS Measurement Uncertainty Recapture Uprate," Nov 3, 2010

Facility:	Harris Nuclear Plant	Task No.:	002001H201
Task Title:	Review (for approval) a completed surveillance for PORV block valves and Evaluate Tech Specs	JPM No.:	2020 NRC Exam Admin SRO JPM A2
K/A Reference:	G 2.1.25 RO 3.7 SRO 4.1		**ALTERNATE PATH - NO**
Examinee:	________________________	NRC Examiner:	________________
Facility Evaluator:	________________________	Date:	________________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ______

READ TO THE EXAMINEE

I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	• Today is 11/19/20 • The unit is operating at 100% power • PRZ PORV PCV-445B (1RC-116) has a failure in the SHUT circuit • 1RC-115 has been closed and power is removed • TS 3.4.4 Action b is in effect. LCOTR T-20-00431 has been initiated • The control room crew has completed OST-1017, Pressurizer PORV Block Valve Full Stroke Test Quarterly Interval Modes 1-2-3-4

Initiating Cue:	You are the CRS. Review the completed OST for approval. Identify ALL discrepancies and the required actions, if applicable. IF any Technical Specifications apply list the associated LCO action(s) and the required completion time(s). **Base any action completion times from the time of 0900.** When complete return your results to the evaluator.

Task Standard: Both errors and the correct Technical Specification actions identified.

Required Materials: None

General References: OST-1017, Pressurizer PORV Block Valve Full Stroke Test Quarterly Interval Modes 1-2-3-4, Rev. 22

Handout: Completed OST-1017 with errors that align with the JPM content.

Time Critical Task: No

Validation Time: 25 Minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
NOTE:	There are 2 items that will make the surveillance UNSAT. Either of which when identified would require a performance retest.
Step 2	The stopwatch is beyond the calibration date –all timing data collected with the use of this out of calibration device is non reliable therefore the test is invalid until a satisfactory stop watch calibration check is performed.
Step 3	The shut time for valve 1RC-113 has exceeded the limit – if not identified an inoperable component could fail when needed to perform it's intended action.
Step 4	If the wrong Tech Spec Action is selected an LCO action could be exceeded

START TIME: ____________

Performance Step: 1 Obtain procedure.

Standard: Reviews Sections 3.0, 4.0, 5.0, 6.0.

Evaluator Cue:	**Provide handout for 2020 NRC Exam Admin JPM SRO A2.**

Evaluator Note:	• **The steps of reviewing the procedure can be completed in any order.** • **There are two errors in the procedure. Only the errors are documented in the JPM.**

Comment:

✓ **Performance Step: 2** Review the completed OST-1017.

Standard: Identifies Stopwatch beyond calibration date per Prerequisite 3.0.4.

Comment:

✓ **Performance Step: 3** Review the completed OST-1017.

Standard: Identifies SHUT time for 1RC-113 exceeds LIMITING VALUE, **(✓) should be retest in accordance with Attachment 3 of OST-1017 or (✓) declared Inoperable** and an AR should be initiated.

Evaluator Cue:	**If a retest of 1RC-113 is determine inform the candidate the second stroke time results are the same as the first test.**

Comment:

✓ **Performance Step: 4** Obtain and Evaluate Technical Specifications

Standard: Obtains Technical Specifications and refers to LCO 3.4.4

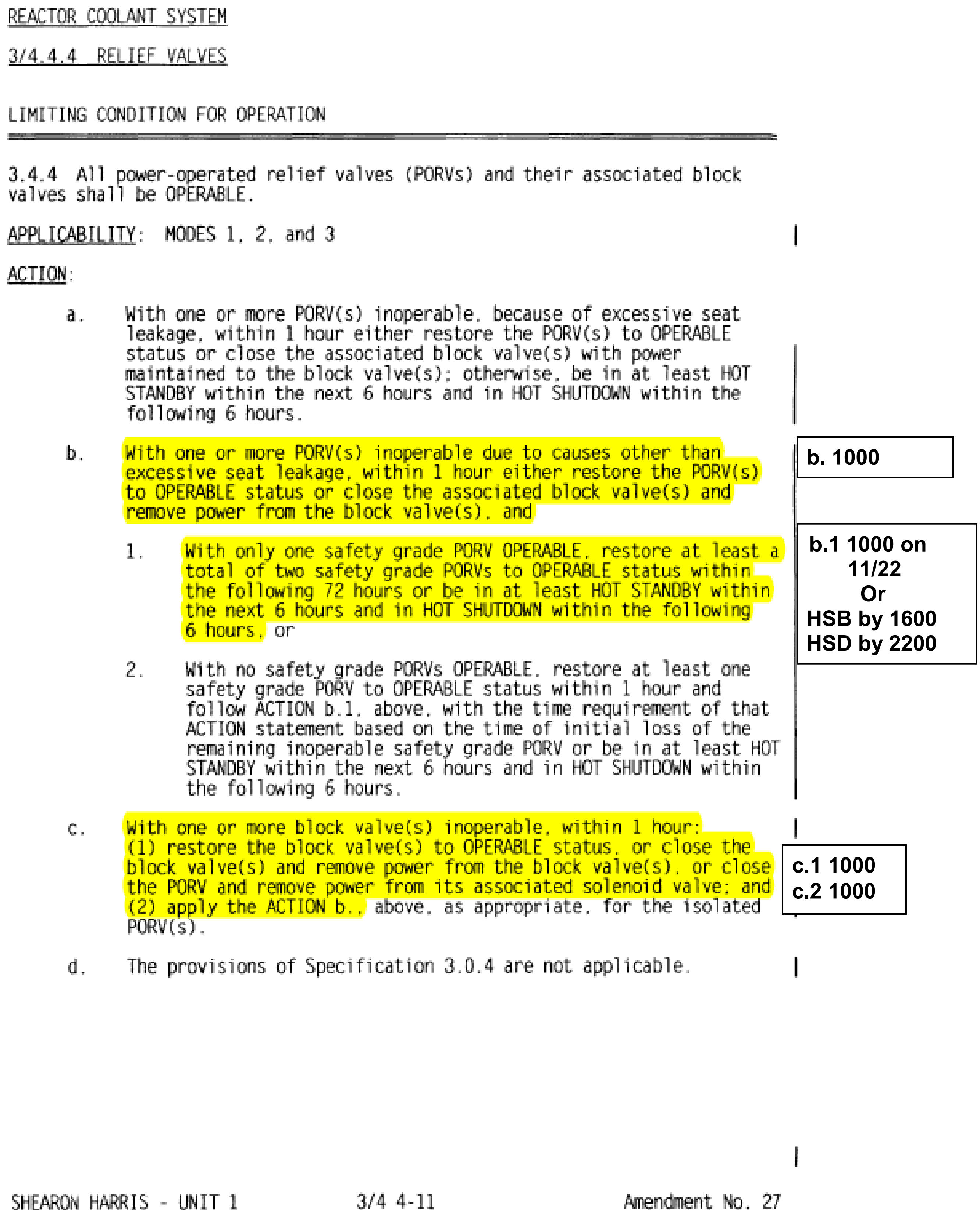
Determines that ACTION c. is applicable **(1000)** and ACTION b.1 would become applicable as directed by ACTION c(2) once the associated PRZ PORV PCV-444B SB is declared Inoperable. **(Restore to PORV Block operable by 1000 on 11/22/20 or be in HSB by 1600 on 11/22/20 and HSD by 2200 on 11/22/20)**
(See page 5)

Evaluator Note:	**After the candidate has identified the 2 errors in the procedure and performed a Technical Specification evaluation.** **END OF JPM**

Terminating Cue:	Current status of OST-1017 has been determined and the Technical Specifications evaluation completed.

STOP TIME: _______________

KEY



REACTOR COOLANT SYSTEM

3/4.4.4 RELIEF VALVES

LIMITING CONDITION FOR OPERATION

3.4.4 All power-operated relief valves (PORVs) and their associated block valves shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3

ACTION:

a. With one or more PORV(s) inoperable, because of excessive seat leakage, within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) with power maintained to the block valve(s); otherwise, be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

b. With one or more PORV(s) inoperable due to causes other than excessive seat leakage, within 1 hour either restore the PORV(s) to OPERABLE status or close the associated block valve(s) and remove power from the block valve(s), and

b. 1000

1. With only one safety grade PORV OPERABLE, restore at least a total of two safety grade PORVs to OPERABLE status within the following 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours, or

b.1 1000 on 11/22
Or
HSB by 1600
HSD by 2200

2. With no safety grade PORVs OPERABLE, restore at least one safety grade PORV to OPERABLE status within 1 hour and follow ACTION b.1, above, with the time requirement of that ACTION statement based on the time of initial loss of the remaining inoperable safety grade PORV or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.

c. With one or more block valve(s) inoperable, within 1 hour: (1) restore the block valve(s) to OPERABLE status, or close the block valve(s) and remove power from the block valve(s), or close the PORV and remove power from its associated solenoid valve; and (2) apply the ACTION b., above, as appropriate, for the isolated PORV(s).

c.1 1000
c.2 1000

d. The provisions of Specification 3.0.4 are not applicable.

SHEARON HARRIS - UNIT 1 3/4 4-11 Amendment No. 27

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC Admin SRO JPM A2

Review (for approval) a completed surveillance procedure for PORV block valves. OST-1017

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

Initial Conditions:	• Today is 11/19/20 • The unit is operating at 100% power • PRZ PORV PCV-445B (1RC-116) has a failure in the SHUT circuit • 1RC-115 has been closed and power is removed • TS 3.4.4 Action b is in effect. LCOTR T-20-00431 has been initiated • The control room crew has completed OST-1017, Pressurizer PORV Block Valve Full Stroke Test Quarterly Interval Modes 1-2-3-4

Initiating Cue:	You are the CRS. Review the completed OST for approval. Identify ALL discrepancies and the required actions, if applicable. IF any Technical Specifications apply list the associated LCO action(s) and the maximum allowed completion time(s). **Base any action completion times from the time of 0900.** When complete return your results to the evaluator.

NAME: ____

DATE: _____________________

IF discrepancies were identified from your review of OST-1017 list ALL of them on the lines below and any Technical Specification(s) along with the applicable LCO Action(s) that apply:

____

____

____

____

____

Facility: Harris Nuclear Plant

Task No.: 341021H102

Task Title: Review and complete Operations Actions of AP-545, Attachment 3, Section II. Pre-Entry Planning Actions

JPM No.: 2020 NRC Exam Admin JPM SRO A3

K/A Reference: G.2.3.13 RO 3.4 SRO 3.8

ALTERNATE PATH - NO

Examinee: ________________________

NRC Examiner: _________________

Facility Evaluator: ________________________

Date: ________

Method of testing:

Simulated Performance: ______

Actual Performance: X

Classroom X Simulator ______ Plant ________

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.

Initial Conditions:	The plant is operating at 100% power FIN is preparing AP-545, Attachment 3, RCB Entry Permit to identify the source of Containment sump in-leakage

Initiating Cue:	You are the WCC SRO and have been asked to complete the Operations Actions of the Attachment 3, Section II. Pre-Entry Actions, using the attached Information sheet. Note any problems or required actions in the spaces provided. When complete return your AP-545, Attachment 3 to the evaluator.

Task Standard:	Completes the Operations portion of AP-545, Attachment 3, Section II. Identifies the MIDS system is tagged out, the PAL is Operable, and but OST-1082 will be required to performed for the PAL.
Required Materials:	None
General References:	AP-545, Containment Entries, Rev 61 OR 2020 NRC Exam Frozen Procedures Folder
Handout:	JPM Information Sheet Partially completed AP-545, Attachment 3 JPM Cue Sheet for LCOTR T-20-00346 and T-20-00311
Time Critical Task:	No
Validation Time:	15 minutes

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 2	Must ensure the MIDS system is tagged out to prevent inadvertent exposure to a source of radiation that has not been evaluated during entry inside containment.
Step 3	Must determine operability status for the PAL and the EAL to comply with Technical Specifications
Step 4	Must determine surveillance requirements for the PAL and the EAL to comply with Technical Specifications

START TIME: ___________

	Performance Step: 1	Reviews AP-545, Attachment 3, Section I:Entry Description, for the completed RCB Entry Permit
	Standard:	Ensures proper conditions, signatures/initials, entry location and may verify the current revision of the procedure
	Comment:	
✓	**Performance Step: 2**	Reviews AP-545, Attachment 3, Section II: Pre-Entry Planning Actions, Operations Actions, Establish a clearance for all Incore Detector movement
	Standard:	**Reviews information sheet and determines OPS-1-16-1050-MIDSCLEAR-1292 has been established to tag-out the MIDS system and document the information on AP-545, Attachment 3 on Sheet 2 of 4.**
	Comment:	
✓	**Performance Step: 3**	Reviews AP-545, Attachment 3, Section II: Pre-Entry Planning Actions, Operations Actions, Determine operability of entry location
	Standard:	**Reviews provided LCOTR information and Technical Specification 4.6.1.3 to determine the PAL is Operable based on the last performance of the surveillance for the door.** **Documents the information on AP-545, Attachment 3 by checking the Operable box on Sheet 2 of 4.**
	Comment:	

✓ **Performance Step: 4** Reviews AP-545, Attachment 3, Section II: Pre-Entry Planning Actions, Operations Actions, Determine if TS surveillance requirement 4.6.1.3.b (OST-1082) is met for the door to be used for entry.

Standard: **Reviews LCOTR information and Technical Specification 4.6.1.3 to determine the PAL is NOT WITHIN PERIODICITY and documents the information on AP-545, Attachment 3 by circling NOT WITHIN PERIODICITY on Sheet 2 of 4. Documents that OST-1082 is required to be performed for the PAL on the JPM Cue sheet.**

Comment:

Performance Step: 5 Reviews AP-545, Attachment 3, Section II: Pre-Entry Planning Actions, Operations Actions, Determine if TS surveillance requirement 4.6.1.3.b (OST-1082) is met for the door to be used for entry.

Standard: **Reviews LCOTR information and Technical Specification 4.6.1.3 to determine the EAL is WITHIN PERIODICITY and documents the information on JPM cue sheet if OST-1082 is WITHIN PERIODICITY.**

Comment:

Performance Step: 6 Reviews AP-545, Attachment 3, Section II: Pre-Entry Planning Actions, Operations Actions, Establish maximum cooling mode.

Standard: **Reviews information sheet and determines Containment Cooling is in the Maximum Cooling Mode and initials AP-545, Attachment 3 on Sheet 2 of 4.**

Comment:

Performance Step: 7 Reviews AP-545, Attachment 3, Section II: Pre-Entry Planning Actions, Operations Actions, RCB elevator breaker operation.

Standard: **Reviews information sheet and determines RCB elevator breaker operation is not required and initials action as N/A on AP-545, Attachment 3 on Sheet 2 of 4.**

Comment:

Evaluator Note and Terminating Cue:	**When the procedure is returned: Evaluation on this JPM is complete.**

STOP TIME: ______________

KEY

CONTAINMENT ENTRIES	AP-545
	Rev. 61
	Page 27 of 42

ATTACHMENT 3
Page 2 of 4

<< RCB Entry Permit >>

II. Pre-Entry Planning Actions	INITIAL WHEN COMPLETED
RWO Lead(s) Actions	
• Contact all affected personnel to ensure they have completed Attachment 5,Attachment 6, and Attachment 7, as necessary.	e
• Ensure AD-RP-ALL-2011 ALARA briefing held.	e
• Discuss a communications plan including immediate RCB exit notification method (for example: pagers, PA or ASCOM phones) with entry team(s) to include method and expected frequency of communications.	e
• Review the material control chits and adjust Attachment 5,Attachment 6, and Attachment 7, as necessary (N/A if not applicable.)	e
• Designate and brief material control gatekeeper(s), if required to support the entry. (N/A if not applicable.)	N/A e
• Notify Security of the date and time of the entry.	e
Work Week Manager, Outage & Scheduling, Actions	
• Evaluate the impact of in-core detector maintenance on other work. (N/A if not applicable.)	N/A e
• The Work Week Manager has verified that there are no planned activities which will affect reactivity or reactor power (e.g., Feed Regulator Valve in Manual, Control Rod testing).	e
Operations Actions:	
• Establish a clearance for all Incore Detector movement: # OPS-1-16-1050-MID-1292	e
• Determine operability of entry location. ☑ Operable ☐ Inoperable	e
• Coordinate with the WCC SRO to determine if TS surveillance requirement 4.6.1.3.b (OST-1082) is met for the door to be used for entry: **PAL** – OST-1082 is WITHIN PERIODICITY / [✓ NOT WITHIN PERIODICITY] (circle one) **EAL** – OST-1082 is WITHIN PERIODICITY / NOT WITHIN PERIODICITY (circle one) If OST-1082 is NOT WITHIN PERIODICITY for either door, and that door is subsequently used for emergency exit, NOTIFY the WCC SRO or CRS that OST-1082 is required to be performed.	e
• Establish maximum cooling mode, if required. (Note: ESW temperature at suction is less than surface temperature and provides better cooling than NSW, AR 405289) N/A if not applicable.	e
• **IF** requested by RPM, **THEN close** the RCB elevator breakers per OP-113	N/A e
RC Actions	
RRSA Level per AD-RP-ALL-2006: ☑ N/A ☐ Medium ☐ High _______ / _______ RP/ALARA Technician Print/Sign	e
• Obtain Containment pre-entry atmosphere information. (radiological, oxygen, hydrogen (%LEL), carbon monoxide and temperature, as a minimum) by one of the following methods: 1. From the Normal Containment Purge Exhaust duct below CP-B9 (near RAB261 EAL) **OR** a. Verify with Operations that the Normal Containment Purge Exhaust is in service b. Remove a rubber plug from the duct work located below CP-B9 c. Obtain an atmospheric sample with a direct reading instrument (MX6 or equivalent) from the exhaust duct. d. Replace the rubber plug in the duct work. 2. Obtain a sample during the initial entry with a direct reading multi-gas instrument **OR** 3. Per CRC-244 **OR** CRC-821 within 24 hours of the start of the entry. 4. Record results in Section V - RCB Entry Comments of this Attachment	e
• Ensure that the RCB elevator has been locked out. Permission to use this elevator must be obtained from the RPM or designee.	e
Chemistry Actions:	
• Determine if RCS lithium hydroxide additions are in progress or planned.	e
• Sample Containment atmosphere, as requested. N/A if not applicable.	e
• Verify that all required chemicals and chemical cabinets have been requested. N/A if not applicable.	N/A e
• Notify Duty RP Supervisor, or designee, of any recently performed, in progress, or planned samples that could affect dose rates in Containment.	e
Maintenance Actions:	
• Designate a qualified door operator for the duration of the entry. N/A if not applicable.	e

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC Exam Admin JPM SRO A3 – Review and complete Operations Actions of AP-545, Attachment 3, RCB Entry Permit, Section II. Pre-Entry Planning Actions

AP-545, Containment Entries, Attachment 3, RCB Entry Permit

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT ______

Examiner's Signature: ______________________ Date: ______________

Initial Conditions:	The plant is operating at 100% power FIN is preparing AP-545, Attachment 3, RCB Entry Permit to identify the source of Containment sump in-leakage

Initiating Cue:	You are the WCC SRO and have been asked to complete the Operations Actions of the Attachment 3 Section II. Pre-Entry Actions using the attached Information sheet. Note any problems or required actions in the spaces provided. When complete return your AP-545, Attachment 3 to the evaluator.

NAME ____ DATE ______________________

IF any action(s) were identified in the review of AP-545 list them on the lines below

____

____

____

____

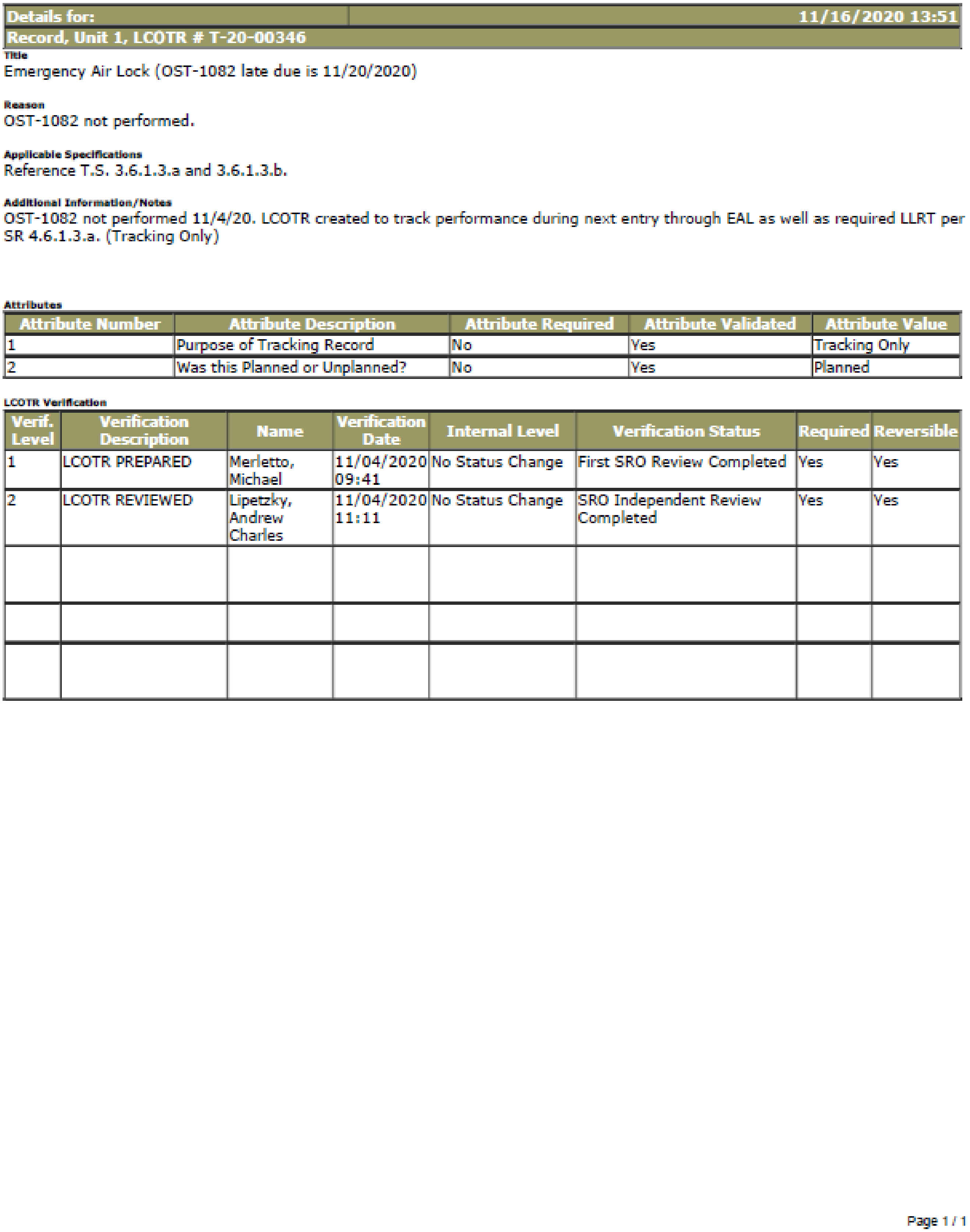
____

____

____

2020 NRC JPM SRO A3 Information Sheet

- Reactor Power is 98%
- Entry Date: November 19, 2020
- Entry Time: 0900
- Containment Temperature: 97˚F
- Allowable Reactor Power Band: 97% to 100%
- Entry Description: CNMT Entry to look for CNMT sump in-leakage. Remote robots will be used inside the bio-shield
- Entry Type: Planned
- Entry RWO Lead: FIN SRO.
- Entry Location: PAL
- RCB Elevator Operation is not required
- Clearance OPS-1-16-1050- MIDSCLEAR-1292 is hanging
- Containment Fan Coolers are in Maximum Cooling mode in accordance with OP-169
- LCOTR T-20-00346 and T-20-00311 are provided



Details for:	**11/16/2020 13:51**
Record, Unit 1, LCOTR # T-20-00346	

Title
Emergency Air Lock (OST-1082 late due is 11/20/2020)

Reason
OST-1082 not performed.

Applicable Specifications
Reference T.S. 3.6.1.3.a and 3.6.1.3.b.

Additional Information/Notes
OST-1082 not performed 11/4/20. LCOTR created to track performance during next entry through EAL as well as required LLRT per SR 4.6.1.3.a. (Tracking Only)

Attributes

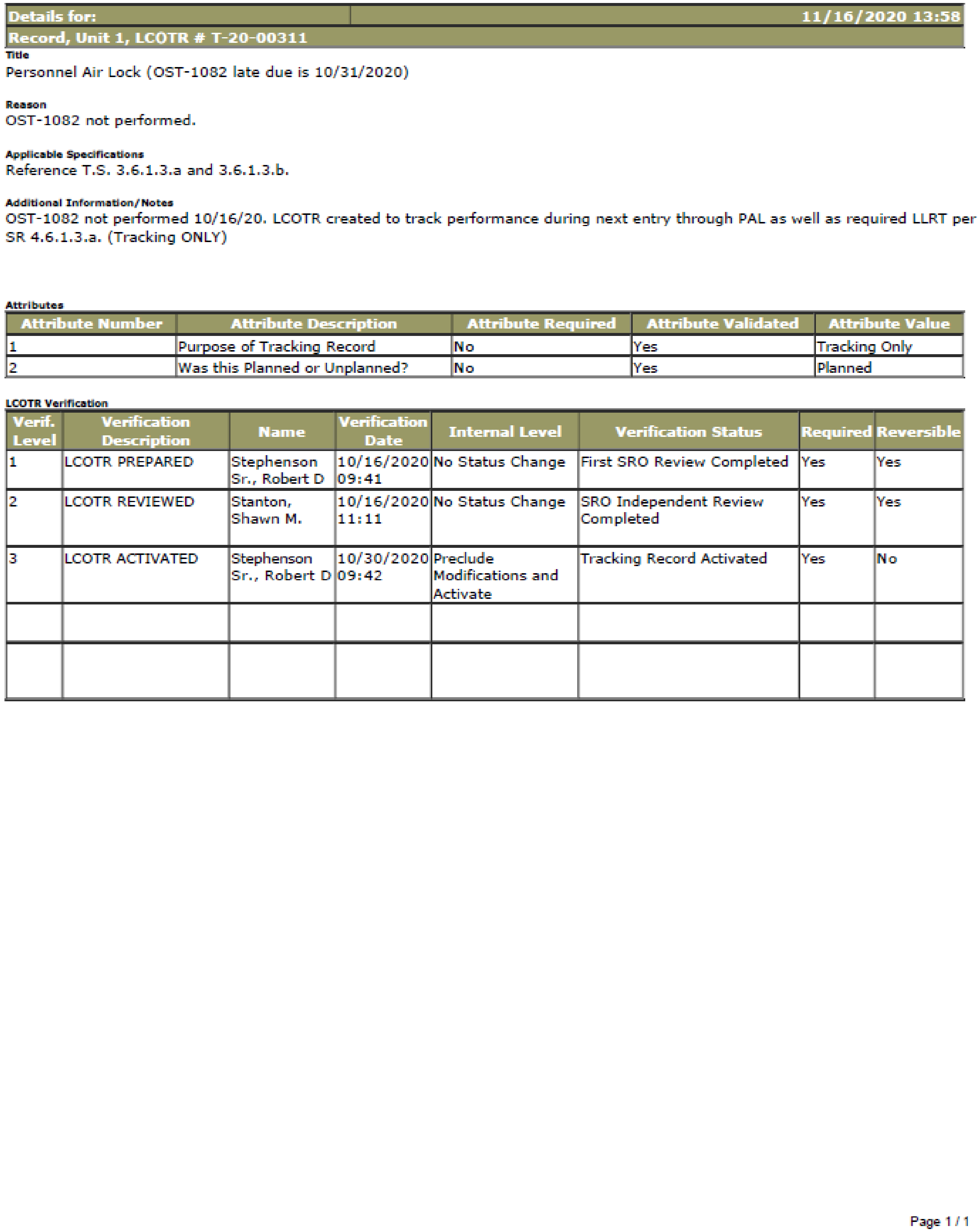
Attribute Number	Attribute Description	Attribute Required	Attribute Validated	Attribute Value
1	Purpose of Tracking Record	No	Yes	Tracking Only
2	Was this Planned or Unplanned?	No	Yes	Planned

LCOTR Verification

Verif. Level	Verification Description	Name	Verification Date	Internal Level	Verification Status	Required	Reversible
1	LCOTR PREPARED	Merletto, Michael	11/04/2020 09:41	No Status Change	First SRO Review Completed	Yes	Yes
2	LCOTR REVIEWED	Lipetzky, Andrew Charles	11/04/2020 11:11	No Status Change	SRO Independent Review Completed	Yes	Yes

Page 1 / 1

JPM CUE SHEET



Details for: **11/16/2020 13:58**

Record, Unit 1, LCOTR # T-20-00311

Title

Personnel Air Lock (OST-1082 late due is 10/31/2020)

Reason

OST-1082 not performed.

Applicable Specifications

Reference T.S. 3.6.1.3.a and 3.6.1.3.b.

Additional Information/Notes

OST-1082 not performed 10/16/20. LCOTR created to track performance during next entry through PAL as well as required LLRT per SR 4.6.1.3.a. (Tracking ONLY)

Attributes

Attribute Number	Attribute Description	Attribute Required	Attribute Validated	Attribute Value
1	Purpose of Tracking Record	No	Yes	Tracking Only
2	Was this Planned or Unplanned?	No	Yes	Planned

LCOTR Verification

Verif. Level	Verification Description	Name	Verification Date	Internal Level	Verification Status	Required	Reversible
1	LCOTR PREPARED	Stephenson Sr., Robert D	10/16/2020 09:41	No Status Change	First SRO Review Completed	Yes	Yes
2	LCOTR REVIEWED	Stanton, Shawn M.	10/16/2020 11:11	No Status Change	SRO Independent Review Completed	Yes	Yes
3	LCOTR ACTIVATED	Stephenson Sr., Robert D	10/30/2020 09:42	Preclude Modifications and Activate	Tracking Record Activated	Yes	No

Page 1 / 1

`Facility:	Harris Nuclear Plant	Task No.:	345001H602
Task Title:	Classify an Event	JPM No.:	2020 NRC Exam Admin JPM SRO A4
K/A Reference:	G2.4.38 RO 2.4 SRO 4.4 G2.4.41 RO 2.9 SRO 4.6	**ALTERNATE PATH - NO**	
Examinee:	______________________	NRC Examiner:	________________
Facility Evaluator:	______________________	Date:	________________

Method of testing:

Simulated Performance: ______ Actual Performance: X

Classroom X Simulator ______ Plant ________

READ TO THE EXAMINEE I will explain the initial conditions, which steps to simulate, discuss or perform, and provide initiating cues. When you complete the task successfully, the objective for this Job Performance Measure will be satisfied.	
Initial Conditions:	**This is a TIME CRITICAL JPM.** Given the following plant conditions: • A shutdown for refueling is underway • RCS Temperature is 193°F Fuel movement is taking place in the Spent Fuel Pool (SFP) when the Bridge Crane operator noted that the pool water level is rapidly lowering. The Control Room was notified and an AO was dispatched to investigate the possible leakage source. • The SFP Area radiation monitors are all reading slightly <1.0 mr/hr The following occurs at 1115: • A loss of offsite power occurs The time is now 1131: • The leak was identified on the 'A' SFP suction strainer and is now isolated • Offsite power has been restored • Spent fuel pool A level is at 280.6' at AEP-2 • Several SFP Area radiation monitors have increased to 2.5 mr/hr

Initiating Cue:	Evaluate the EAL Matrix and determine the **HIGHEST** classification required for these plant conditions. **NOTE: DO NOT use SEC judgment.** Write out the HIGHEST EAL classification in blank provided then return your assessment page to the Evaluator.

Task Standard: Event classified as an Unusual Event (RU2.1) within 15 minutes.

Required Materials: None

General References: CSD-EPHNP-0101-01, EAL Technical Basis Document, Rev 01
CSD-EPHNP-0101-02, EAL Matrix, Rev 00

OR

2020 NRC Exam Frozen Procedures Folder

Handouts: CSD-EPHNP-0101-01, EAL Technical Basis Document, Rev 01
CSD-EPHNP-0101-02, EAL Matrix, Rev 00
Attached Initial Conditions

Time Critical Task: **YES** – 15 minutes for classification.

Validation Time: 15 minutes for classification

PERFORMANCE STEP	CRITICAL STEP JUSTIFICATION
Step 2	Classification of the event is critical for determining State and County notifications, public information notices, site information notices, and event reportability to the Nuclear Regulatory Commission.
Step 4	Timely classification of the event is critical for determining State and County notifications, public information notices, site information notices, and event reportability to the Nuclear Regulatory Commission.

Evaluator Cue:	**Start Time for this portion of JPM begins when the individual has been briefed.**

START TIME: ____________

Performance Step: 1 OBTAINS EAL Technical Basis Document and EAL Matrix.

Standard : Obtains EAL Technical Basis Document and EAL Matrix.

Comments:

✓ **Performance Step: 2** Identify EAL Classification for events in progress

Standard : The candidate should evaluate three potential classifications for these conditions at a minimum:

CU1.2 Unusual Event
RCS water level cannot be monitored
AND EITHER
- UNPLANNED increase in any Table C-1 sump or tank due to a loss of RCS inventory
- Visual observation of UNISOLABLE RCS leakage

CU2.1 Unusual Event
AC power capability, Table C-6, to emergency 6.9 KV buses 1A-SA and 1B-SB reduced to a single power source for ≥ 15 min. (Note 1)
AND
Any additional single power source failure will result in loss of all AC power to SAFETY SYSTEMS

RU2.1 Unusual Event is MET for these conditions
UNPLANNED water level drop in the REFUELING PATHWAY as indicated by low water level alarm or indication (LI-01SF-5101A/LI-01SF-5102A/LI-01SF-5103A, LI-403 or RCS standpipe)
AND
UNPLANNED rise in corresponding area radiation levels as indicated by any Table R-2 area radiation monitors

Comments:

Performance Step: 3 Verify Classification

Standard : Reviews EAL Technical Basis Document to verify classification

Comments:

✓ **Performance Step: 4** Verify Classification Completion Time

Standard : Stop minus start time less than or equal to 15 minutes

Comments:

Examiners Cue:	**After the candidate returns this JPM Classification, document the stop time and then announce.** **END of JPM.**

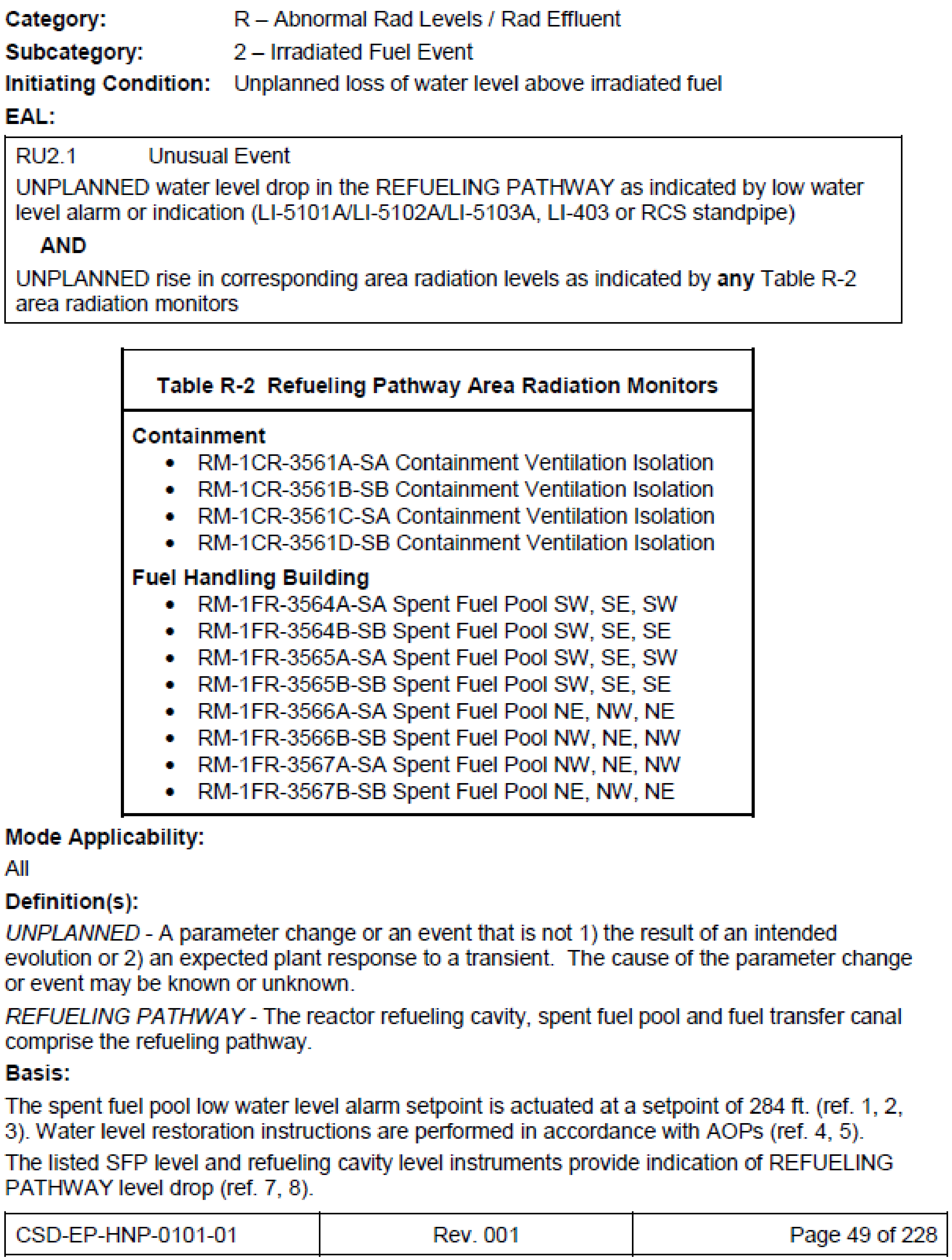
STOP TIME:

START TIME ____________________

STOP TIME ____________________

Stop minus start time less than or equal to 15 minutes ____________________

ATTACHMENT 1
EAL Bases



Category: R – Abnormal Rad Levels / Rad Effluent

Subcategory: 2 – Irradiated Fuel Event

Initiating Condition: Unplanned loss of water level above irradiated fuel

EAL:

RU2.1 Unusual Event

UNPLANNED water level drop in the REFUELING PATHWAY as indicated by low water level alarm or indication (LI-5101A/LI-5102A/LI-5103A, LI-403 or RCS standpipe)

AND

UNPLANNED rise in corresponding area radiation levels as indicated by **any** Table R-2 area radiation monitors

Table R-2 Refueling Pathway Area Radiation Monitors

Containment
- RM-1CR-3561A-SA Containment Ventilation Isolation
- RM-1CR-3561B-SB Containment Ventilation Isolation
- RM-1CR-3561C-SA Containment Ventilation Isolation
- RM-1CR-3561D-SB Containment Ventilation Isolation

Fuel Handling Building
- RM-1FR-3564A-SA Spent Fuel Pool SW, SE, SW
- RM-1FR-3564B-SB Spent Fuel Pool SW, SE, SE
- RM-1FR-3565A-SA Spent Fuel Pool SW, SE, SW
- RM-1FR-3565B-SB Spent Fuel Pool SW, SE, SE
- RM-1FR-3566A-SA Spent Fuel Pool NE, NW, NE
- RM-1FR-3566B-SB Spent Fuel Pool NW, NE, NW
- RM-1FR-3567A-SA Spent Fuel Pool NW, NE, NW
- RM-1FR-3567B-SB Spent Fuel Pool NE, NW, NE

Mode Applicability:

All

Definition(s):

UNPLANNED - A parameter change or an event that is not 1) the result of an intended evolution or 2) an expected plant response to a transient. The cause of the parameter change or event may be known or unknown.

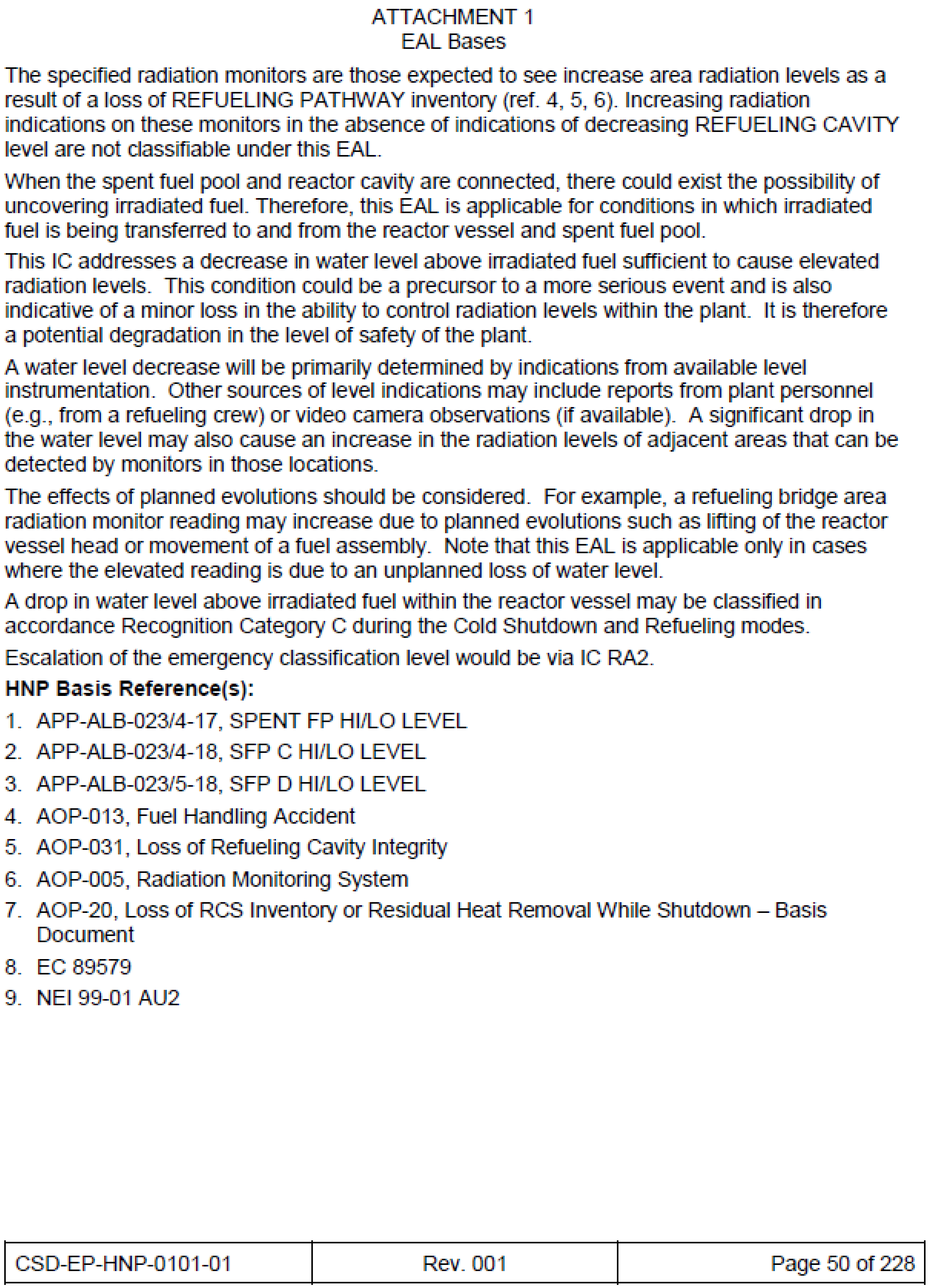
REFUELING PATHWAY - The reactor refueling cavity, spent fuel pool and fuel transfer canal comprise the refueling pathway.

Basis:

The spent fuel pool low water level alarm setpoint is actuated at a setpoint of 284 ft. (ref. 1, 2, 3). Water level restoration instructions are performed in accordance with AOPs (ref. 4, 5).

The listed SFP level and refueling cavity level instruments provide indication of REFUELING PATHWAY level drop (ref. 7, 8).

CSD-EP-HNP-0101-01	Rev. 001	Page 49 of 228



ATTACHMENT 1
EAL Bases

The specified radiation monitors are those expected to see increase area radiation levels as a result of a loss of REFUELING PATHWAY inventory (ref. 4, 5, 6). Increasing radiation indications on these monitors in the absence of indications of decreasing REFUELING CAVITY level are not classifiable under this EAL.

When the spent fuel pool and reactor cavity are connected, there could exist the possibility of uncovering irradiated fuel. Therefore, this EAL is applicable for conditions in which irradiated fuel is being transferred to and from the reactor vessel and spent fuel pool.

This IC addresses a decrease in water level above irradiated fuel sufficient to cause elevated radiation levels. This condition could be a precursor to a more serious event and is also indicative of a minor loss in the ability to control radiation levels within the plant. It is therefore a potential degradation in the level of safety of the plant.

A water level decrease will be primarily determined by indications from available level instrumentation. Other sources of level indications may include reports from plant personnel (e.g., from a refueling crew) or video camera observations (if available). A significant drop in the water level may also cause an increase in the radiation levels of adjacent areas that can be detected by monitors in those locations.

The effects of planned evolutions should be considered. For example, a refueling bridge area radiation monitor reading may increase due to planned evolutions such as lifting of the reactor vessel head or movement of a fuel assembly. Note that this EAL is applicable only in cases where the elevated reading is due to an unplanned loss of water level.

A drop in water level above irradiated fuel within the reactor vessel may be classified in accordance Recognition Category C during the Cold Shutdown and Refueling modes.

Escalation of the emergency classification level would be via IC RA2.

HNP Basis Reference(s):

1. APP-ALB-023/4-17, SPENT FP HI/LO LEVEL
2. APP-ALB-023/4-18, SFP C HI/LO LEVEL
3. APP-ALB-023/5-18, SFP D HI/LO LEVEL
4. AOP-013, Fuel Handling Accident
5. AOP-031, Loss of Refueling Cavity Integrity
6. AOP-005, Radiation Monitoring System
7. AOP-20, Loss of RCS Inventory or Residual Heat Removal While Shutdown – Basis Document
8. EC 89579
9. NEI 99-01 AU2

CSD-EP-HNP-0101-01	Rev. 001	Page 50 of 228

VERIFICATION OF COMPLETION

Job Performance Measure No.: 2020 NRC Exam Admin JPM SRO A4
Classify an Event
CSD-EPHNP-0101-01, EAL Technical Basis Document
CSD-EPHNP-0101-02, EAL Matrix

Examinee's Name:

Date Performed:

Facility Evaluator:

Number of Attempts:

Time to Complete:

Question Documentation:

Question:

Response:

Result: SAT ______ UNSAT _______

Examiner's Signature: ________________________________ Date: ____________________

JPM CUE SHEET

Initial Conditions:	**This is a TIME CRITICAL JPM.** Given the following plant conditions: • A shutdown for refueling is underway • RCS Temperature is 193°F Fuel movement is taking place in the Spent Fuel Pool (SFP) when the Bridge Crane operator noted that the pool water level is rapidly lowering. The Control Room was notified and an AO was dispatched to investigate the possible leakage source. • The SFP Area radiation monitors are all reading slightly <1.0 mr/hr The following occurs at 1115: • A loss of offsite power occurs The time is now 1131: • The leak was identified on the 'A' SFP suction strainer and is now isolated • Offsite power has been restored • Spent fuel pool A level is at 280.6' at AEP-2 • Several SFP Area radiation monitors have increased to 2.5 mr/hr

Initiating Cue:	Evaluate the EAL Matrix and determine the **<u>HIGHEST</u>** classification required for these plant conditions. **NOTE: DO NOT use SEC judgment.** Write out the **<u>HIGHEST</u>** EAL classification in blank provided then return your assessment page to the Evaluator.

Name: ____

Date: _________________

Highest EAL Classification for the plant conditions: _________________