Waterford 3

2015 RO NRC Exam

JOB PERFORMANCE MEASURE

A1

Determine Spent Fuel Pool (SFP) level by alternate monitoring and calculate time to reach 212°F in the SFP per OP-901-513, SFP Cooling Malfunction

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Determine Spent Fuel Pool (SFP) level by alternate monitoring and calculate time to reach 212°F in the SFP per OP-901-513, SFP Cooling Malfunction

Task Standard: Determined Spent Fuel Pool (SFP) level by alternate monitoring and calculated time to boil in the SFP per OP-901-513, SFP Cooling Malfunction.

References: OP-901-513, revision 14

Alternate Path: No Time Critical: No Validation Time: 10 mins.

K/A 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc. Importance Rating 3.9 RO

Applicant: ____________________

Time Start: ____________ Time Finish: ____________

Performance Time: ____________ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____________________

Examiner: ____________________ Date: ____________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-901-513, revision 14

Description:

This JPM requires the applicant to determine Spent Fuel Pool (SFP) level by alternate monitoring and calculate time to reach 212°F in the SFP per OP-901-513, SFP Cooling Malfunction

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

Evaluator Note
The applicant will determine Spent Fuel Pool (SFP) level by alternate monitoring and calculate time to boil in the SFP per OP-901-513, SFP Cooling Malfunction. (all required data to perform the two calculations is supplied on the cue sheet)

TASK ELEMENT 1	STANDARD
Determines Spent Fuel Pool level using the data provided on the applicant cue sheet along with the guidance and table located in Attachment 2 of OP-901-513, Spent Fuel Pool Cooling Malfunction.	42.7 feet
Comment: The applicant will use Spent Fuel Pool temperature and suction pressure from Fuel Pool Pump A to determine Spent Fuel Pool level in accordance with the table in Attachment 2, Alternate SFP Parameter Monitoring. Note:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Determines time to reach 212°F in the Spent Fuel Pool using the data provided on the applicant cue sheet along with the curves provided in Attachment 3 of OP-901-513, Spent Fuel Pool Cooling Malfunction.	55 to 58 hours
Comment: The applicant will use Spent Fuel Pool temperature, knowledge of the SFP gates removed, and the date provided in the cue sheet to determine time to reach 212°F in the SFP using Graph B in Attachment 3, Spent Fuel Pool Level Graphs. The applicant will interpolate between the 110 and 120 °F lines and the time since the last refueling shutdown to determine the correct answer.	**<u>Critical</u>** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The date is 9/10/2015
- A loss of AC power has rendered Fuel Pool Pumps and Fuel Pool level annunciators in the Control Room unavailable.
- The crew has entered OP-901-513, Spent Fuel Pool Cooling Malfunction
- The Spent Fuel Pool Gates are removed.
- Spent Fuel Pool temperature is 115°F.
- The suction pressure reading from FS-102A (Fuel Pool Pump A suction drain) is 17.9 psig.

INITIATING CUES:

- The CRS directs you to determine Spent Fuel Pool level by alternate monitoring and calculate time to reach 212°F in the Spent Fuel Pool per OP-901-513, SFP Cooling Malfunction.
- Document the results on this cue sheet.

Spent Fuel Pool level: _______________

Time to reach 212°F: _______________

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE

Normal Review Class (check one):

☐ **OSRC**

☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-901-513	REVISION: 015

TITLE: Spent Fuel Pool Cooling Malfunction

PROCEDURE OWNER (Position Title): Operations Manager - Support

TERM (check one): ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 6/25/2015

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

Design basis assumptions have been incorporated into the procedure from existing approved design basis calculations: MNQ9-17, 9C2-5Y, ECM95-008 and ECE90-006. The assumptions have been incorporated into typical component operations within the skill set of the Operator to ensure design basis assumptions are preserved during design basis events. The changes provide consistency between the design basis assumptions and the procedure. This change also coincides with the direction in the EOPs to restore SFP cooling with TSC concurrence by providing the TSC with specific design basis criteria and considerations to evaluate. Therefore, this revision meets editorial correction criteria. This change to OP-901-513 is issued to meet the requirements of CR-WF3-2015-02117 and CR-WF3-2015-00739 CA-11.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES		PRINT NAME OR SIGNATURE	DATE
PREPARER		William M Crowley	6/23/2015
EC SUPERVISOR	Administrative Review and Approval	(sign)	6-23-15
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Design Engineering - Mechanical	Dale V. Gallodoro	6/23/2015
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐ PA Exclusion ☐	N/A	
TECHNICAL	Review ☐ Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐	N/A	
GROUP/DEPT. HEAD	Review ☐ Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐ Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS	Approval ☐	(sign) N/A	

E0 GENERAL (CONT'D)

	PLACEKEEPER		
	START	DONE	N/A
NOTE (1) If monitoring of SFP level and temperature by normal means (PMC and local indications) is not possible, then refer to Attachment 2, Alternate SFP Parameter Monitoring, to implement alternate monitoring methods. **[INPO IER 11-2 Recommendation 4]** (2) Attachment 3 contains graphs specific to the current cycle or Refueling outage during Reactor Core Off-load.			
6. If SFP Cooling is unavailable, then implement continuous monitoring of SFP level and temperature.	☐	☐	☐
6.1 Based on SFP configuration; determine SFP boil-off times using the applicable graph in Attachment 3, Spent Fuel Pool Level Graphs. **[INPO IER 11-2 Recommendation 1]**		☐	

ATTACHMENT 2 ALTERNATE SFP PARAMETER MONITORING

[INPO IER 11-2 Recommendation 4]

1. Alternate SFP Level Monitoring

NOTE

(1) The following alternate methodology of monitoring SFP Level can be used if a loss of AC power has rendered Fuel Pool Pumps and Control Room Annunciators H1002 (Fuel Pool Level Lo) and H0902 (Fuel Pool Level Hi) unavailable, and SFP level cannot be monitored locally on the FHB +46

(2) This monitoring methodology is not accurate for either of the following conditions:

- SFP Level is below the suction of the Fuel Pool Pumps (40.5' MSL).
- The FHB +46 area atmosphere becomes pressurized (will cause a false high level reading)

1.1 Attach a digital pressure gage at either FS-102A (FUEL POOL PUMP A SUCTION DRAIN) or FS-102B (FUEL POOL PUMP B SUCTION DRAIN).

1.2 Open applicable drain valve FS-102A (FUEL POOL PUMP A SUCTION DRAIN) or FS-102B (FUEL POOL PUMP B SUCTION DRAIN).

1.3 Based on current SFP Temperature and the reading on the installed pressure gage at FS-102A(B), determine SFP Level using the table on page 2 of 3 of this attachment (Spent Fuel Pool Level in Feet Based on Pressure Reading at FS-102A(B) and Bulk Temperature).

1.4 If Radiation Monitoring System is not functioning, then direct Radiation Protection Personnel to monitor radiation levels locally using hand held radiation monitors in accordance with HP-001-123, Plant Conditions and Radiological Concerns.

ATTACHMENT 2 ALTERNATE SFP PARAMETER MONITORING (CONT'D)

Spent Fuel Pool Level in Feet Based on Pressure Reading at FS-102A(B) and Bulk Temperature

Formula: $L = P_{FS\text{-}102} * 144 * (1.74E\text{-}8 * T^2 - 5.95E\text{-}8 * T + 0.01597) + 1$; (Valid between 40.6 ft and 44.8 ft only)

SFP Temp, °F	Pressure at FS-102A(B), psig																									
	16.4	16.5	16.6	16.7	16.8	16.9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	18	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9
90	LO	LO	LO	LO	LO	LO	LO	40.7	40.9	41.1	41.4	41.6	41.8	42.0	42.3	42.5	42.7	43.0	43.2	43.4	43.7	43.9	44.1	44.4	44.6	HI
95	LO	LO	LO	LO	LO	LO	LO	40.7	40.9	41.2	41.4	41.6	41.9	42.1	42.3	42.6	42.8	43.0	43.3	43.5	43.7	43.9	44.2	44.4	44.6	HI
100	LO	LO	LO	LO	LO	LO	40.5	40.7	41.0	41.2	41.4	41.7	41.9	42.1	42.4	42.6	42.8	43.1	43.3	43.5	43.8	44.0	44.2	44.5	44.7	HI
105	LO	LO	LO	LO	LO	LO	40.5	40.8	41.0	41.2	41.5	41.7	41.9	42.2	42.4	42.6	42.9	43.1	43.3	43.6	43.8	44.0	44.3	44.5	44.7	HI
110	LO	LO	LO	LO	LO	LO	40.6	40.8	41.1	41.3	41.5	41.8	42.0	42.2	42.5	42.7	42.9	43.2	43.4	43.6	43.9	44.1	44.3	44.6	44.8	HI
115	LO	LO	LO	LO	LO	LO	40.6	40.9	41.1	41.3	41.6	41.8	42.0	42.3	42.5	42.7	43.0	43.2	43.4	43.7	43.9	44.1	44.4	44.6	HI	HI
120	LO	LO	LO	LO	LO	LO	40.7	40.9	41.2	41.4	41.6	41.9	42.1	42.3	42.6	42.8	43.0	43.3	43.5	43.7	44.0	44.2	44.4	44.7	HI	HI
125	LO	LO	LO	LO	LO	40.5	40.7	41.0	41.2	41.4	41.7	41.9	42.1	42.4	42.6	42.8	43.1	43.3	43.5	43.8	44.0	44.2	44.5	44.7	HI	HI
130	LO	LO	LO	LO	LO	40.6	40.8	41.0	41.3	41.5	41.7	42.0	42.2	42.4	42.7	42.9	43.1	43.4	43.6	43.8	44.1	44.3	44.5	44.8	HI	HI
135	LO	LO	LO	LO	LO	40.6	40.9	41.1	41.3	41.6	41.8	42.0	42.3	42.5	42.7	43.0	43.2	43.4	43.7	43.9	44.1	44.4	44.6	HI	HI	HI
140	LO	LO	LO	LO	LO	40.7	40.9	41.1	41.4	41.6	41.8	42.1	42.3	42.6	42.8	43.0	43.3	43.5	43.7	44.0	44.2	44.4	44.7	HI	HI	HI
145	LO	LO	LO	LO	LO	40.7	41.0	41.2	41.4	41.7	41.9	42.1	42.4	42.6	42.8	43.1	43.3	43.6	43.8	44.0	44.3	44.5	44.7	HI	HI	HI
150	LO	LO	LO	LO	40.6	40.8	41.0	41.3	41.5	41.7	42.0	42.2	42.4	42.7	42.9	43.2	43.4	43.6	43.9	44.1	44.3	44.6	44.8	HI	HI	HI
155	LO	LO	LO	LO	40.6	40.9	41.1	41.3	41.6	41.8	42.0	42.3	42.5	42.7	43.0	43.2	43.5	43.7	43.9	44.2	44.4	44.6	HI	HI	HI	HI
160	LO	LO	LO	LO	40.7	40.9	41.2	41.4	41.6	41.9	42.1	42.3	42.6	42.8	43.1	43.3	43.5	43.8	44.0	44.2	44.5	44.7	HI	HI	HI	HI
165	LO	LO	LO	40.5	40.8	41.0	41.2	41.5	41.7	41.9	42.2	42.4	42.7	42.9	43.1	43.4	43.6	43.8	44.1	44.3	44.5	44.8	HI	HI	HI	HI
170	LO	LO	LO	40.6	40.8	41.1	41.3	41.5	41.8	42.0	42.2	42.5	42.7	43.0	43.2	43.4	43.7	43.9	44.1	44.4	44.6	HI	HI	HI	HI	HI
175	LO	LO	LO	40.7	40.9	41.1	41.4	41.6	41.8	42.1	42.3	42.6	42.8	43.0	43.3	43.5	43.7	44.0	44.2	44.5	44.7	HI	HI	HI	HI	HI
180	LO	LO	LO	40.7	41.0	41.2	41.4	41.7	41.9	42.2	42.4	42.6	42.9	43.1	43.4	43.6	43.8	44.1	44.3	44.5	44.8	HI	HI	HI	HI	HI
185	LO	LO	40.6	40.8	41.0	41.3	41.5	41.8	42.0	42.2	42.5	42.7	43.0	43.2	43.4	43.7	43.9	44.1	44.4	44.6	HI	HI	HI	HI	HI	HI
190	LO	LO	40.6	40.9	41.1	41.4	41.6	41.8	42.1	42.3	42.6	42.8	43.0	43.3	43.5	43.8	44.0	44.2	44.5	44.7	HI	HI	HI	HI	HI	HI
195	LO	LO	40.7	41.0	41.2	41.4	41.7	41.9	42.2	42.4	42.6	42.9	43.1	43.4	43.6	43.8	44.1	44.3	44.6	44.8	HI	HI	HI	HI	HI	HI
200	LO	40.6	40.8	41.0	41.3	41.5	41.8	42.0	42.2	42.5	42.7	43.0	43.2	43.4	43.7	43.9	44.2	44.4	44.6	HI	HI	HI	HI	HI	HI	HI
205	LO	40.7	40.9	41.1	41.4	41.6	41.9	42.1	42.3	42.6	42.8	43.1	43.3	43.5	43.8	44.0	44.3	44.5	44.7	HI	HI	HI	HI	HI	HI	HI
210	LO	40.7	41.0	41.2	41.5	41.7	41.9	42.2	42.4	42.7	42.9	43.1	43.4	43.6	43.9	44.1	44.4	44.6	HI	HI	HI	HI	HI	HI	HI	HI
212	40.5	40.8	41.0	41.3	41.5	41.7	42.0	42.2	42.5	42.7	42.9	43.2	43.4	43.7	43.9	44.1	44.4	44.6	HI	HI	HI	HI	HI	HI	HI	HI

ATTACHMENT 2 ALTERNATE SFP PARAMETER MONITORING (CONT'D)

2. Alternate SFP Temperature Monitoring

2.1 M&TE may be used per the below table to monitor Spent Fuel Pool Temperature on a loss of the PMC.

2.2 Fluke instruments may be obtained from the PMI Shop, Met Lab, Control Room or EOF.

Note limitations listed in the table for use of each instrument.

Instrument	Description	Power Source	Normal Readout	Loss of Power Contingency	Limitations
FS ITE2000-1	FUEL POOL WATER TEMPERATURE	120VAC PDP 345AB ckt 16	PMC – A47004	Connect Fluke Meter set for Type E thermocouple at CP-50, terminals on VLL Card Slot 0431 (cable 30631P).	None
FS ITE2000-2	FUEL POOL WATER TEMPERATURE	120VAC PDP 345AB ckt 16	PMC – A47005	Connect Fluke Meter set for Type E thermocouple at Mux FH0101, Terminals F06-07, H&L.	None
FS ITE2010	FUEL POOL WATER TO FUEL POOL PUMPS TEMPERATURE	120VAC PDP 345AB ckt 16	PMC – A47002	Connect Fluke Meter set for Type E thermocouple at Mux FH0101, Terminals F06-05, H&L.	Only accurate if a Fuel Pool Pump is running
FS ITE2020	FUEL POOL HEAT EXCHANGER OUTLET HDR TEMPERATURE	120VAC PDP 345AB ckt 16	PMC – A47003	Connect Fluke Meter set for Type E thermocouple at Mux FH0101, Terminals F06-04, H&L.	Only accurate if a Fuel Pool Pump is running

ATTACHMENT 3 SPENT FUEL POOL LEVEL GRAPHS

The purpose of these graphs is to provide estimated spent fuel pool level based on spent fuel pool loading and whether the spent fuel pool gates are installed or not. The Graphs are calculated to show Spent Fuel Pool Level to three positions, Time to 200F, Time to 212F and Time to Top of Spent Fuel Assemblies.

- Graph A, Time to 200F, Length of Cycle, Gates Removed
- Graph B, Time to 212F, Length of Cycle, Gates Removed
- Graph C, Time to top of Fuel Assemblies, Length of Cycle, Gates Removed
- Graph D, Time to 200F, Length of Cycle, Gates Installed
- Graph E, Time to 212F, Length of Cycle, Gates Installed
- Graph F, Time to top of Fuel Assemblies, Length of Cycle, Gates Installed

Length of Cycle is applicable during Operating Cycle until RF 20 Core Offload begins.

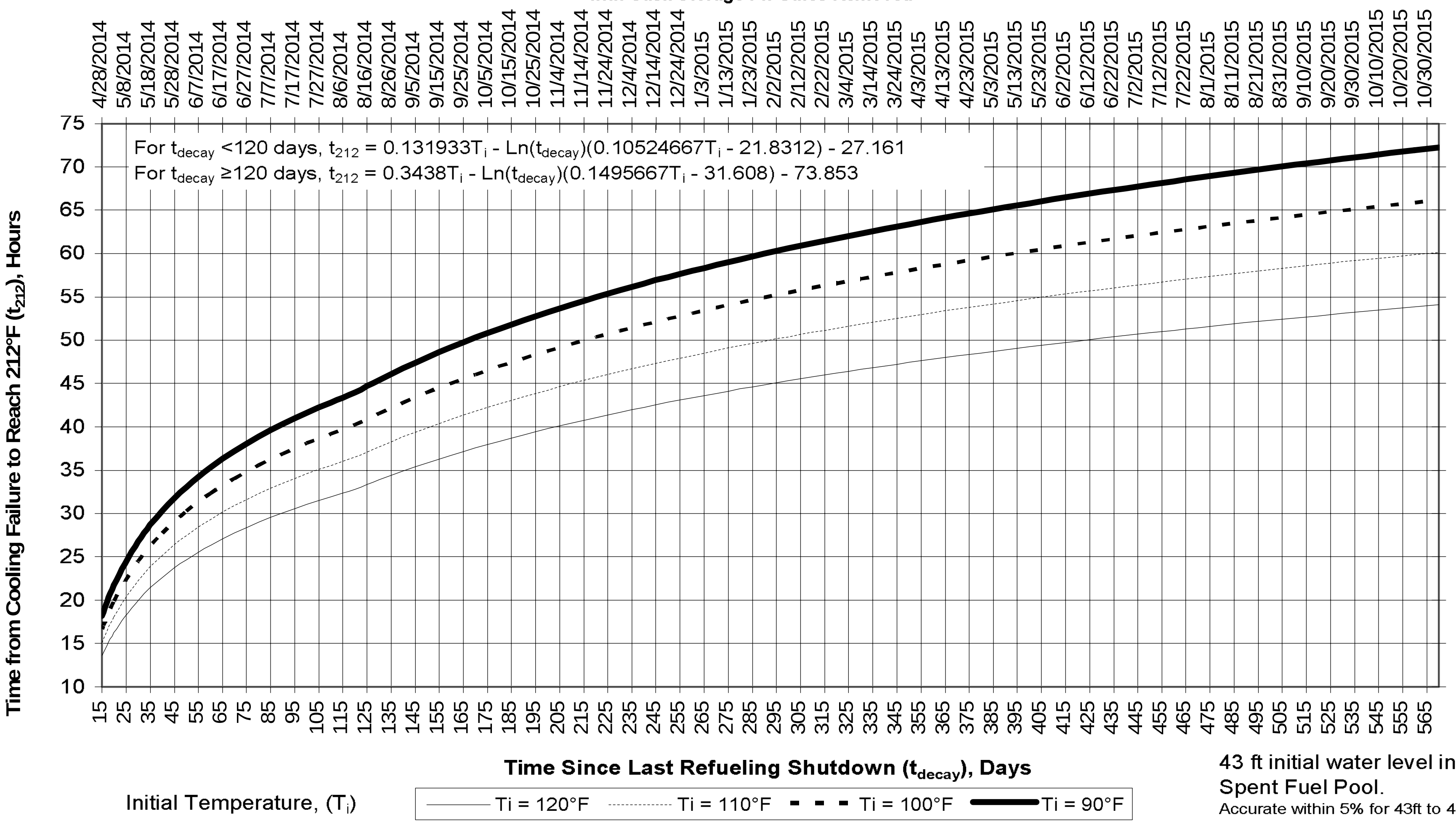
Applicable as soon as the last Fuel Assembly has been transferred to the Refueling Cavity for the Operating Cycle 20 Core load and all during Operating Cycle 20 until Refuel 20 Core Offload begins.

GRAPH B, TIME TO 212F, LENGTH OF CYCLE, GATES REMOVED

Applicable as soon as the last Fuel Assembly has been transferred to the Refueling Cavity for the Operating Cycle 20 Core load and all during Operating Cycle 20 until RF-20 Core Offload begins.

Refuel 19 shutdown was on April 13, 2014 @ 00:00

Time to Reach 212°F in Spent Fuel Pool
After Loss of All Cooling
with Cask Storage Pit Gates Removed



43 ft initial water level in Spent Fuel Pool.
Accurate within 5% for 43ft to 44ft.

Waterford 3

2015 NRC Exam

JOB PERFORMANCE MEASURE

A2

Perform OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data

Task Standard: Applicant correctly calculates new values for Core Protection Calculator constants KCAL, TCREF, and TPC.

References: OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data

Alternate Path: No Time Critical: No Validation Time: 15 mins.

K/A 2.1.18 Ability to make accurate, clear, and concise logs, records, status boards, and reports. Importance Rating 3.6 RO

Applicant: ______________________________

Time Start: __________________ Time Finish: __________________

Performance Time: __________________ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____

____

____

Examiner: ______________________________ Date: ______________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data

Description:

Applicant will use given values for PMC and Core Protection Calculator B to input data and calculate CPC constants KCAL, TCREF, and TPC. The procedure has provisions to collect 5 sets of data and average them over a 5 minute period, but it is optional at the supervisor's request. The applicants will not have to collect 5 sets of data. The applicants will not have to change the constants, just perform the calculations.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

TASK ELEMENT 1	STANDARD
Complete OP-903-001, Attachment 11.18 according to key.	Student must record values given in correct places and Determine new values correctly for KCAL, TCREF, and TPC.
Comment: Data entry and calculations are displayed on the key. Information that would be N/A is not critical.	**<u>Critical</u>** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

1. COLSS is Operable.
2. The UFM is in service.
3. The plant is at steady state operation.
4. Channel B CPC and applicable PMC readings are as follows:
   - TPC, CPC PID 064 = 0.84399
   - KCAL, CPC PID 065 = 1.0070
   - PCALIB, CPC PID 104 = 100
   - TC 1, CPC PID 160 = 543.59
   - TC 2, CPC PID 161 = 543.46
   - PHICAL, CPC PID 171 = 99.96
   - BDT, CPC PID 177 = 99.82
   - TCORF, CPC PID 180 = 0.99902
   - BSCAL, C24230 = 99.87
   - BDELT, C24104 = 99.78
   - BTSFP, C24101 = 99.50

INITIATING CUES:

The CRS directs you to complete the following calculations for Channel B on Attachment 11.18:

- step 11.10.6 for KCAL and TCREF
- step 11.10.7 for TPC

Linear potentiometer data collection is not required for this task.

Data collection from CP-10 is not required for this task.

The CRS directs you to fill in required data once for column “0”, averaging columns 0 through 4 is not required.

This task is complete when you reach step 11.10.8.

A2 Key

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA

DATE _______________ CHANNEL UNDER ADJUSTMENT: A ☐ B ☒ C ☐ D ☐

11.10.3.1 Calculate and record the averages of each parameter in the space provided.

	0	1	2	3	4	Average	Adjusted
BSCAL ① ② PMC PID-C24230	**99.87**						③
HI LINEAR POWER BISTABLE 1 VOLTS	**N/A**						
HIGH LINEAR POWER % VOLT X 20	**N/A**						
PHICAL. (Calibrated Neutron Flux Power) CPC PID 171	**99.96**						
BDT (Static Thermal Power) CPC PID 177	**99.82**						

Calculations Performed by: ____________________ Verified by: ______________________
Signature Signature

① Refer to attachment 11.1 Note 9.1 to determine appropriate power indication if linear power is not ≥35% steady state. Document indication used in Remarks.

② If COLSS is Inoperable, then use NE-005-201, Heat Balance Calculations, to determine Secondary Calorimetric Power substitute when PMC or CORE POWER is specified.

③ *Adjusted* is the average value plus 8.5% (8% to10%) if adjustments are being made to PHICAL and/or BDT as listed in Notes above steps 11.10.6 or 11.10.7 (refer to Attachment 11.1 Note 9.8). Otherwise N/A this block. Use the *Average* value, not the *Adjusted* value, for DVM calculation.

11.10.4 Record the following for channel under adjustment:

TPC (Thermal Power Calibration Constant) CPC PID 064	**0.84399**
KCAL (Neutron Flux Power Cal. Constant) CPC PID 065	**1.0070**
PCALIB (Secondary Calorimetric Power Used in Latest CPC Power Calibration) CPC PID 104	**100**
TC 1 (Loop 1 Cold Leg Temperature) CPC PID 160	**543.59**
TC 2 (Loop 2 Cold Leg Temperature) CPC PID 161	**543.46**
TCORF (Temp Shadowing Correction Factor) CPC PID 180	**0.99902**
EXCORE LINEAR POWER CALIBRATE POTENTIOMETER POSITION ROM	N/A

A2 Key

11.10.5 Calculate the new DVM reading or new potentiometer position as follows:

DVM (new) =	Avg. Core Power (Step 11.10.3.1)* / 20	=	**N/A** / 20

* Use the *Average* value from the table of step 11.10.3.1, <u>not</u> the *Adjusted* value.

DVM (new) =	**N/A**

<u>or</u>

Potentiometer position (new) =

Avg. Core Power % (Step 11.10.3.1)* X Old Potentiometer Setting (Step 11.10.4)
/ Avg. Linear Power % (Step 11.10.4)

N/A X **N/A**
/ **N/A**

* Use the *Average* value from the table of step 11.10.3.1, <u>not</u> the *Adjusted* value.

Potentiometer position (new) = **N/A**

Performed by: **N/A** (Initials) **IV** by: **N/A** (Initials)

11.10.6.1 Calculate KCAL (new):

KCAL (new)	=	(Step 11.10.3.1)* Avg. Core Power (%) x (step 11.10.4) KCAL x (step 11.10.4) TCORF / Avg. PHICAL (step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.6.

KCAL (new)	=	**99.87** x **1.0070** x **.99902** / **99.96**
KCAL (new)	=	**1.0051**

KCAL (new) = **1.0051** (CPC PID 065)

11.10.6.3 New TCREF (CPC PID 098) = Minimum TC from step 11.10.4:
TC 1 (CPC PID 160) <u>or</u> TC 2 (CPC PID 161).

TCREF (new) = **543.46** (CPC PID 098)

Performed by: ____________ (Initials) **IV** by: ____________ (Initials)

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA (CONT'D)

11.10.7 Calculate TPC (CPC PID 064):

TPC (new)=	Avg. Core Power % (Step 11.10.3.1)* X TPC (Step 11.10.4)
	Avg. BDT (Step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.7.

TPC (new)=	**99.87**	X	**0.84399**
	99.82		

TPC (new) =	**0.84441**	(CPC PID 064).

Performed by: ____________ **IV** by: ____________
(Initials) (Initials)

11.10.11.1 Record the following:

- Applicable CORE POWER PMC.................................. ________
- PCALIB CPC PID 104 .... ________
- HI LINEAR POWER BISTABLE 1 VOLTS .... ________
- HI LINEAR POWER % VOLTS x 20 .... ________
- PHICAL CPC PID 171 .... ________
- BDT CPC PID 177 .... ________

11.10.11.2.1 Record answers:

- HI LINEAR POWER %, VOLTS X 20.................... YES/NO ________
- PHICAL, CPC PID 171 .... YES/NO ________
- BDT, CPC PID 177 .... YES/NO ________

11.10.12 Performed by: ____________ **IV** by: ____________
(Initials) (Initials)

11.10.13 Reviewed by: ____________ ____________
SM/CRS Date/Time

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA

DATE _______________ CHANNEL UNDER ADJUSTMENT: A ☐ B ☐ C ☐ D ☐

11.10.3.1 Calculate and record the averages of each parameter in the space provided.

	0	1	2	3	4	Average	Adjusted
BSCAL ① ② PMC PID-C24230							③
HI LINEAR POWER BISTABLE 1 VOLTS	**N/A**						
HIGH LINEAR POWER % VOLT X 20	**N/A**						
PHICAL. (Calibrated Neutron Flux Power) CPC PID 171							
BDT (Static Thermal Power) CPC PID 177							

Calculations Performed by: ____________________ Verified by: ______________________
Signature Signature

① Refer to attachment 11.1 Note 9.1 to determine appropriate power indication <u>if</u> linear power is <u>not</u> ≥35% steady state. Document indication used in Remarks.

② <u>If</u> COLSS is Inoperable, <u>then</u> use NE-005-201, Heat Balance Calculations, to determine Secondary Calorimetric Power substitute <u>when</u> PMC <u>or</u> CORE POWER is specified.

③ *Adjusted* is the average value plus 8.5% (8% to10%) <u>if</u> adjustments are being made to PHICAL and/or BDT as listed in Notes above steps 11.10.6 <u>or</u> 11.10.7 (refer to Attachment 11.1 Note 9.8). Otherwise N/A this block. Use the *Average* value, <u>not</u> the *Adjusted* value, for DVM calculation.

11.10.4 Record the following for channel under adjustment:

TPC (Thermal Power Calibration Constant)
CPC PID 064 .... ______________

KCAL (Neutron Flux Power Cal. Constant)
CPC PID 065 .... ______________

PCALIB (Secondary Calorimetric Power Used in
Latest CPC Power Calibration) CPC PID 104 ______________

TC 1 (Loop 1 Cold Leg Temperature)
CPC PID 160 .... ______________

TC 2 (Loop 2 Cold Leg Temperature)
CPC PID 161 .... ______________

TCORF (Temp Shadowing Correction Factor)
CPC PID 180 .... ______________

EXCORE LINEAR POWER CALIBRATE
POTENTIOMETER POSITION ROM .... N/A

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA (CONT'D)

11.10.5 Calculate the new DVM reading or new potentiometer position as follows:

DVM (new) =	Avg. Core Power (Step 11.10.3.1)* / 20	=	**N/A** / 20

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

DVM (new) =	**N/A**

or

Potentiometer position (new) =

$$\frac{\text{Avg. Core Power \% (Step 11.10.3.1)* X Old Potentiometer Setting (Step 11.10.4)}}{\text{Avg. Linear Power \% (Step 11.10.4)}}$$

$$\frac{\textbf{N/A} \quad \text{X} \quad \textbf{N/A}}{\textbf{N/A}}$$

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

Potentiometer position (new) = **N/A**

Performed by: **N/A** (Initials) Verified by: **N/A** (Initials)

11.10.6.1 Calculate KCAL (new):

KCAL (new)	=	(Step 11.10.3.1)* Avg. Core Power (%) x (step 11.10.4) KCAL x (step 11.10.4) TCORF / Avg. PHICAL (step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.6.

KCAL (new)	=	x x /
KCAL (new)	=	

KCAL (new) = ______________________ (CPC PID 065)

11.10.6.3 New TCREF (CPC PID 098) = Minimum TC from step 11.10.4:
TC 1 (CPC PID 160) or TC 2 (CPC PID 161).

TCREF (new) = ______________________ (CPC PID 098)

Performed by: ______________________ (Initials) **IV** by: ______________________ (Initials)

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA (CONT'D)

11.10.7 Calculate TPC (CPC PID 064):

TPC (new)=	Avg. Core Power % (Step 11.10.3.1)* X TPC (Step 11.10.4)
	Avg. BDT (Step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.7.

TPC (new)=	X

TPC (new) =		(CPC PID 064).

Performed by: ____________________ **IV** by: ____________________
(Initials) (Initials)

11.10.11.1 Record the following:

- Applicable CORE POWER PMC..................................______
- PCALIB CPC PID 104 ....______
- HI LINEAR POWER BISTABLE 1 VOLTS ....______
- HI LINEAR POWER % VOLTS x 20 ....______
- PHICAL CPC PID 171 ....______
- BDT CPC PID 177 ....______

11.10.11.2.1 Record answers:

- HI LINEAR POWER %, VOLTS X 20.................... YES/NO ______
- PHICAL, CPC PID 171 .... YES/NO ______
- BDT, CPC PID 177 .... YES/NO ______

11.10.12 Performed by: ____________________ **IV** by: ____________________
(Initials) (Initials)

11.10.13 Reviewed by: ____________________ ____________________
SM/CRS Date/Time

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ **OSRC** ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-903-001	REVISION: 061

TITLE: Technical Specification Surveillance Logs

PROCEDURE OWNER (Position Title): Operations Manager - Support

TERM (check one): ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 5/26/2015

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

In steps 11.10.6.2 and 11.10.8.5.1 changed the trigger value of CPC PID 065 (KCAL) for listed notifications (administrative actions) from "<0.75" to "<0.8" A requirement to generate a Condition Report has also been added. The steps, since they contain multiple actions were broken into bullet items for the CR generation and the notifications. Also, the scopes of the notifications to Reactor Engineering (RXE) and PMI were clarified: Rather than just stating that that these groups need to be notified that Linear Channel Sub-Gain needs to be adjusted, it is clarified that RXE is notified to complete NE-002-010, Linear Power Subchannel Gain Adjustment and PMI is notified that adjustment will be required on the affected channel (PMID 2806). This change addresses a communication miss between Operations and RXE as is documented in CR-WF3-2015-02641.

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			David R. Voisin	5/21/2015
EC SUPERVISOR		Administrative Review and Approval	(sign)	5-22-15
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Operations [Licensed Operator Peer Review]		J.R. Maynard	5/21/2015
	Reactor Engineering		Pamela Hernandez	5/21/2015
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

11.10 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION INSTRUCTION

DATE ______________ CHANNEL UNDER ADJUSTMENT: A ☐ B ☐ C ☐ D ☐

NOTE

During physics testing, Note 2 of TS Table 4.3-1 applies and allows the suspension of this adjustment until the next power plateau is reached. The assigned Shift Test Director should be notified during testing prior to making any adjustments per this attachment.

11.10.1 If a non-conservative adjustment (indicated power is lowered) is required to be made on CPC and Excore Nuclear Instrumentation, then verify that both of the following conditions are met:

- BDELT (C24104) is within 2% of BTFSP (C24101)
- The average of BDELT (C24104) and BTFSP (C24101) is within 2% of Calorimetric Power

11.10.1.1 If either of these conditions cannot be met, then notify Reactor Engineering (RE) for further evaluation prior to making any adjustment.

11.10.2 If either of the following conditions are not met, then use the applicable power for CORE POWER PMC as specified in Note 9.1 of Attachment 11.1.

- UFM is in service
- Plant is in steady state operation

NOTE

Averages are recommended for accuracy, but are not required.

11.10.3 Record the following data at approximately one minute intervals on Attachment 11.18:

- BSCAL- PMC PID C24230
- HI LINEAR POWERBISTABLE 1 VOLTS
- HIGH LINEAR POWER % VOLT X 20
- PHICAL (Calibrated Neutron Flux Power) CPC PID 171
- BDT (Static Thermal Power) CPC PID 177

11.10.3.1 Calculate and record averages of each parameter on Attachment 11.18.

11.10.4 Record the following data for channel under adjustment on Attachment 11.18:

- TPC (Thermal Power Calibration Constant) CPC PID 064
- KCAL (Neutron Flux Power Cal. Constant) CPC PID 065
- PCALIB (Secondary Calorimetric Power Used in Latest CPC Power Calibration) CPC PID 104
- TC 1 (Loop 1 Cold Leg Temperature) CPC PID 160
- TC 2 (Loop 2 Cold Leg Temperature) CPC PID 161
- TCORF (Temp Shadowing Correction Factor) CPC PID 180
- EXCORE LINEAR POWER CALIBRATE POTENTIOMETER POSITION ROM (may be N/A'd if not using in step 11.10.5)

11.10.5 If Hi Linear Power requires adjustment, then calculate the new DVM reading or new potentiometer position on Attachment 11.18

.

NOTE

Under the following conditions, PHICAL (CPC PID 171) must be adjusted to between +8.0% and +10.0% above the calorimetric power indication (refer to Note 9.8 on Attachment 11.1). This is performed by adding 8.5% (8% to10%) to the average core power value on Attachment 11.18 to obtain an *Adjusted* value that will be used as the Avg. Core Power value in the KCAL (new) calculation (this requirement does not apply during initial power ascension to <80% RTP following refueling): **[CR-WF3-2006-03726]**

- Calorimetric power is between 15% RTP and 80% RTP.

  and

- PHICAL is greater than 10.0% above Calorimetric power.

11.10.6 If KCAL (PHICAL) requires adjustment, then perform the following.

11.10.6.1 Calculate KCAL (new) on Attachment 11.18.

CAUTION

CPC PID 065 (KCAL) limit is 0.7 to 2.0. **[CR-WF3-1998-00919]**

11.10.6.2 If KCAL (new) is < 0.8, then then perform the following: **[CR-WF3-1998-00919, CR-WF3-2015-02641]**

- Generate a Condition Report.
- Notify RXE to complete NE-002-010, Linear Power Subchannel Gain Adjustment.
- Notify PMI that adjustment will be required on the affected channel (PMID 2806).

11.10.6.3 Document new TCREF(CPC PID 098) on Attachment 11.18.

NOTE

Under the following conditions, BDT (CPC PID 177) must be adjusted to between +8.0% and +10.0% above the calorimetric power indication (refer to Note 9.8 on Attachment 11.1). This is performed by adding 8.5% (8% to10%) to the average core power value on Attachment 11.18 to obtain an *Adjusted* value that will be used as the Avg. Core Power value in the TPC calculation (this requirement does not apply during initial power ascension to <80% RTP following refueling): **[CR-WF3-2006-03726]**

- Calorimetric power is between 15% RTP and 80% RTP.

  and

- BDT is greater than 10.0% above Calorimetric power.

11.10.7 If BDT requires adjustment, then Calculate TPC (CPC PID 064) on Attachment 11.18.

DATE _______________ CHANNEL UNDER ADJUSTMENT: A ☐ B ☐ C ☐ D ☐

11.10.3.1 Calculate and record the averages of each parameter in the space provided.

	0	1	2	3	4	Average	Adjusted
BSCAL ① ② PMC PID-C24230							③
HI LINEAR POWER BISTABLE 1 VOLTS							
HIGH LINEAR POWER % VOLT X 20							
PHICAL. (Calibrated Neutron Flux Power) CPC PID 171							
BDT (Static Thermal Power) CPC PID 177							

Calculations Performed by: ____________________ Verified by: ______________________
Signature Signature

① Refer to attachment 11.1 Note 9.1 to determine appropriate power indication <u>if</u> linear power is <u>not</u> ≥35% steady state. Document indication used in Remarks.

② <u>If</u> COLSS is Inoperable, <u>then</u> use NE-005-201, Heat Balance Calculations, to determine Secondary Calorimetric Power substitute <u>when</u> PMC <u>or</u> CORE POWER is specified.

③ *Adjusted* is the average value plus 8.5% (8% to10%) <u>if</u> adjustments are being made to PHICAL and/or BDT as listed in Notes above steps 11.10.6 <u>or</u> 11.10.7 (refer to Attachment 11.1 Note 9.8). Otherwise N/A this block. Use the *Average* value, <u>not</u> the *Adjusted* value, for DVM calculation.

11.10.4 Record the following for channel under adjustment:

TPC (Thermal Power Calibration Constant)
CPC PID 064 .... _______________

KCAL (Neutron Flux Power Cal. Constant)
CPC PID 065 .... _______________

PCALIB (Secondary Calorimetric Power Used in
Latest CPC Power Calibration) CPC PID 104 _______________

TC 1 (Loop 1 Cold Leg Temperature)
CPC PID 160 .... _______________

TC 2 (Loop 2 Cold Leg Temperature)
CPC PID 161 .... _______________

TCORF (Temp Shadowing Correction Factor)
CPC PID 180 .... _______________

EXCORE LINEAR POWER CALIBRATE
POTENTIOMETER POSITION ROM .... _______________

11.10.5 Calculate the new DVM reading or new potentiometer position as follows:

DVM (new) =	Avg. Core Power (Step 11.10.3.1)* / 20	=	____ / 20

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

DVM (new) =	

or

Potentiometer position (new) =

$$\frac{\text{Avg. Core Power \% (Step 11.10.3.1)* X Old Potentiometer Setting (Step 11.10.4)}}{\text{Avg. Linear Power \% (Step 11.10.4)}}$$

$$\frac{\qquad \text{X} \qquad}{\qquad}$$

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

Potentiometer position (new) = ________________

Performed by: ____________________ **IV** by: ____________________
(Initials) (Initials)

11.10.6.1 Calculate KCAL (new):

KCAL (new)	=	[(Step 11.10.3.1)* Avg. Core Power (%) x (step 11.10.4) KCAL x (step 11.10.4) TCORF] / [Avg. PHICAL (step 11.10.3.1)]

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.6.

KCAL (new)	=	[____ x ____ x ____] / [____]
KCAL (new)	=	

KCAL (new) = ____________________ (CPC PID 065)

11.10.6.3 New TCREF (CPC PID 098) = Minimum TC from step 11.10.4:
TC 1 (CPC PID 160) or TC 2 (CPC PID 161).

TCREF (new) = ____________________ (CPC PID 098)

Performed by: ____________________ **IV** by: ____________________
(Initials) (Initials)

11.10.7 Calculate TPC (CPC PID 064):

TPC (new)=	Avg. Core Power % (Step 11.10.3.1)* X TPC (Step 11.10.4) / Avg. BDT (Step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.7.

TPC (new)=	X /

TPC (new) =		(CPC PID 064).

Performed by: ____________ **IV** by: ____________
(Initials) (Initials)

11.10.11.1 Record the following:

- Applicable CORE POWER PMC.................................... ____________
- PCALIB CPC PID 104 .... ____________
- HI LINEAR POWER BISTABLE 1 VOLTS..................... ____________
- HI LINEAR POWER % VOLTS x 20 .... ____________
- PHICAL CPC PID 171 .... ____________
- BDT CPC PID 177 .... ____________

11.10.11.2.1 Record answers:

- HI LINEAR POWER %, VOLTS X 20.................... YES/NO ________
- PHICAL, CPC PID 171 .... YES/NO ________
- BDT, CPC PID 177 .... YES/NO ________

11.10.12 Performed by: ____________ **IV** by: ____________
(Initials) (Initials)

11.10.13 Reviewed by: ____________ ____________
SM/CRS Date/Time

Waterford 3

2015 RO NRC Exam

JOB PERFORMANCE MEASURE

A3

Determine Acceptability of Containment Temperature In Accordance With OP-903-001

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Determine Acceptability of Containment Temperature In Accordance With OP-903-001

Task Standard: Determined Containment Average Temperature does not meet acceptance criteria with instrument error accounted for and Tech Spec 3.6.1.5 entry is required.

References: OP-903-001, revision 49; TS 3.6.1.5; TS Bases 3/4.6

Alternate Path: No Time Critical: No Validation Time: 15 mins.

K/A 2.2.12, Knowledge of surveillance procedures. Importance Rating 3.7 RO

Applicant: ____________________

Time Start: ____________ Time Finish: ____________

Performance Time: ____________ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____________________

Examiner: ____________________ Date: ____________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-903-001, Attachment 11.1 MODES 1-4 Technical Specification Surveillance Logs, revision 61
- OP-903-001, Attachment 11.20 MODES 1-4 PMC Technical Specification Surveillance Logs revision 61
- Waterford 3 Technical Specifications

Description:

This JPM requires the candidate to use Containment temperature readings from the PMC (provided on the cue sheet), calculate the average temperature using 3 of the 4 readings, and determine compliance with TS 3.6.1.5 and OP-903-001. Based on the readings of the 3 running CFC intake temperatures and tighter acceptance criteria of OP-903-001 (based on instrument error) TS 3.6.1.5 ACTION a must be complied with.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

Evaluator Note
The candidate will determine Containment Average Temperature using Containment Fan Cooler inlet temperatures from the PMC, Containment Fan Coolers running, and reactor power (all provided on the cue sheet)

TASK ELEMENT 1	STANDARD
Determines Containment Average Temperature	98.3°F -99.7°F
Comment: 1. The applicant will use the provided CFC temperatures and average the 3 running CFC temperatures (A, C and D). The average will be 98.7°F. Note: Averaging the 3 running CFC temperatures is preferred but not required. Any 3 can be used. The range given covers the various combinations that can be averaged.	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Determines Average Containment Temperature does **NOT** meet Acceptance Criteria.	Determined that acceptance criteria is not met and TS 3.6.1.5 entry is required.
Comment: If the candidate just compares the temperature to the 3.6.1.5 LCO they will determine that no action is required and acceptance criteria is met. However, Tech Spec 3.6.1.5 does not take into account instrument uncertainties. and notes 2.0 – 2.3 of OP-903-001, Attachment 11.1 should be reviewed to determine acceptability of Containment Temperature.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER TO UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Reactor power is at 100%
- I & C has just completed calibration of CFC Air Intake temperature loops
- Containment Fan Coolers A, C, and D are operating
- Primary Containment Average Air temperatures are as follows:
    - PID A51115, CFC A Air Inlet Temp reads 97°F
    - PID A51119, CFC B Air Inlet Temp reads 100°F
    - PID A51123, CFC C Air Inlet Temp reads 101°F
    - PID A51127, CFC D Air Inlet Temp reads 98°F

INITIATING CUES:

- The CRS directs you to determine compliance of Containment Average Temperature per OP-903-001.
- Document results and actions required, if any, on OP-903-001, Attachment 11.20.

REQUEST/APPROVAL PAGE

# SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ **OSRC** ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-903-001		REVISION: 061
TITLE: Technical Specification Surveillance Logs		
PROCEDURE OWNER (Position Title) : Operations Manager - Support		

TERM (check one) : ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 5/26/2015

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

In steps 11.10.6.2 and 11.10.8.5.1 changed the trigger value of CPC PID 065 (KCAL) for listed notifications (administrative actions) from "<0.75" to "<0.8" A requirement to generate a Condition Report has also been added. The steps, since they contain multiple actions were broken into bullet items for the CR generation and the notifications. Also, the scopes of the notifications to Reactor Engineering (RXE) and PMI were clarified: Rather than just stating that that these groups need to be notified that Linear Channel Sub-Gain needs to be adjusted, it is clarified that RXE is notified to complete NE-002-010, Linear Power Subchannel Gain Adjustment and PMI is notified that adjustment will be required on the affected channel (PMID 2806). This change addresses a communication miss between Operations and RXE as is documented in CR-WF3-2015-02641.

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			David R. Voisin	5/21/2015
EC SUPERVISOR	Administrative Review and Approval		(sign)	5-22-15
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Operations [Licensed Operator Peer Review]		J.R. Maynard	5/21/2015
	Reactor Engineering		Pamela Hernandez	5/21/2015
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

1.0 With RCS Temperature greater than or equal to 539°F determine SHUTDOWN MARGIN using OP-903-090, Shutdown Margin <u>or</u> using OP-004-019, Estimated Critical Configuration. <u>If</u> NE-002-020, CEA Insertion Time Measurement is in progress, <u>then</u> verify SDM in accordance with NE-002-020. During Plant Startup in accordance with OP-010-003, control of SHUTDOWN MARGIN is transferred from OP-903-090 to OP-004-019 by verifying <u>both</u> of the following:

- Actual RCS boron concentration is no more than 20 ppm below the Critical Boron Concentration of OP-004-019, Column F on Attachment 1

<u>and</u>

- The question "Allowable CEA Range is verified to be above Transient Insertion Limit for critical operations (Group 5 ≥ 60 inches)" is answered YES.

NA <u>if</u> RCS Temperature less than 539°F. Determine SHUTDOWN MARGIN within 1 hour using OP-903-090 for Modes 1-5 in <u>all</u> cases involving Inoperable CEAs. Attach documentation to Attachment 11.1. **[CR-WF3-1998-00970, CR-WF3-2001-00209]**

1.1 With RCS Temperature less than 539°F determine SHUTDOWN MARGIN using OP-903-090, Shutdown Margin. Refer to Technical Specification 3.1.1.2.

NA if RCS Temperature ≥539°F. Determine SHUTDOWN MARGIN within 1 hour using OP-903-090 for Modes 1-5 in <u>all</u> cases involving Inoperable CEAs. Attach documentation to Attachment 11.1. **[CR-WF3-1998-00970, CR-WF3-2001-00209]**

2.0 Containment Average Air Temperature shall be the average of temperatures taken at <u>any</u> three CFC Air Intake locations. The preferred instruments used should be on the operating CFC's, but this is <u>not</u> a requirement.

Containment Average Air Temperature limits are as follows:

- Technical Specification limits are ≥95°F <u>and</u> ≤120°F. The lower limit of ≥95°F does <u>not</u> apply ≤70% Rated Thermal Power.

Maintaining Containment Average Air Temperature >100°F by PMC indication (PMC PIDs A51115, A51119, A51123, and A51127) ensures Peak Clad Temperature accident analysis remains bounding for a LOCA/Emergency Core Cooling Condition. With Containment Average Air Temperature <100°F <u>or</u> >115°F, comply with the actions of TS 3.6.1.5. **[ECI92-003, EC-6785]**

2.1 If PMC indication is not available, then the following indicators (within listed temperature range requirements) may be used to meet the Surveillance Requirement:

- QSPDS 2 Page 102 indication

  The average of three indications shall be ≥100.5°F and ≤114.5°F to comply with Technical Specification 3.6.1.5.

- The following temperature recorders:

  CFC Fan A – CCSITR5150A
  CFC Fan B – CCSITR5150B
  CFC Fan C – CCSITR5155A
  CFC Fan D – CCSITR5155B

The average of three indications shall be ≥100.7°F and ≤114.3°F to comply with Technical Specification 3.6.1.5. **[ECI92-003, EC-6785]**

2.2 Reducing the peak linear heat generation rate limit in accordance with the COLR to comply with Technical Specification 3.6.1.5 LCO Action a., may be accomplished by changing COLSS Constant T42 (PMC PID K24409), Linear Heat Rate limit adjustment factor, to 0.984 in accordance with OP-004-005, Core Operating Limits Supervisory System Operation. COLSS Constant T42 should be restored to the value 1.000 upon exiting Technical Specification 3.6.1.5 LCO Action a.

2.3 Prior to Containment Average Air Temperature lowering below specification, then perform the following:

- Operate a Boric Acid Concentrator in Recirculation Mode in accordance with OP-007-001, Boron Management System (to arrest lowering of CCW System temperature).
- If three Containment Fan Coolers are in service, then secure one Containment Fan Cooler in accordance with OP-008-003, Containment Cooling System.

3.0 If either Boron Dilution alarm is Inoperable, then verify Primary Makeup to Dilution Tee and Chem Add Tank, PMU-136, Locked Closed or power removed from all Charging Pumps. N/A if both Boron Dilution alarms are Operable, or in Modes 1 and 2.

3.1 In Mode 3 and 4, verify plant conditions comply with TS. 3.1.2.9.a.2 or 3.1.2.9.b.2 at least once per 24 hours. NA if not in Modes 3 or 4.

4.0 Containment Spray Riser Level is not applicable in Mode 4 with RCS Pressure ≤ 400 PSIA.

5.0 Verify that RCP(s) are in operation and circulating RCS flow by checking the following:

- RCP is drawing amperage.
- RCP indicates a differential pressure (If a RCP is secured, then the operating RCP(s) differential pressure shall indicate higher than the secured RCP(s)). NA if not applicable.

11.20 MODES 1-4 PMC TECHNICAL SPECIFICATION SURVEILLANCE LOGS

(typical)

DATE

DESCRIPTION	NOTE	MODE	T. S.	COMP #	LIMIT	UNITS	0000	1200
ACCW Temperature:	36.0	1-4	4.7.4.a	PMC				
A Train				A46201	≤89	°F		
B Train				A46301	≤89	°F		
UHS Meteorology		1-4		PMC				
Dry Bulb Temperature	57.0			C48517	<92	°F		
Wet Bulb Temperature	45.0			C48521	≥40	°F		
Primary Containment Average Air Temp:	2.0	1-4	4.6.1.5	PMC				
CFC A Air Inlet Temp	2.1			A51115	N/A	°F		
CFC B Air Inlet Temp	2.1			A51119	N/A	°F		
CFC C Air Inlet Temp	2.1			A51123	N/A	°F		
CFC D Air Inlet Temp	2.1			A51127	N/A	°F		
Average CFC Inlet Temp	2.0, 2.1, 2.2, 2.3			N/A	≥100 to ≤115	°F		
CONTAINMENT SUMP FLOW	16.0	1-4	4.4.5.1.b	C42614	< 1 Increase	GPM		
Axial Shape Index:	19.0	1, >20%	4.2.7	PMC				
COLSS Operable ≥50%	19.1			C24003	-0.16 to +0.16	N/A		
COLSS Operable <50%	19.2			C24003	-0.26 to +0.26	N/A		

REMARKS:

3/4.6.1.4 INTERNAL PRESSURE

The limitations on containment internal pressure ensure that (1) the containment structure is prevented from exceeding its design negative pressure differential with respect to the annulus atmosphere of 0.65 psid, (2) the containment peak pressure does not exceed the design pressure of 44 psig during either LOCA or steam line break conditions, and (3) the minimum pressure of the ECCS performance analysis (BTP CSB 61) is satisfied.

The limit of +27 inches water (approximately 1.0 psig) for initial positive containment pressure is consistent with the limiting containment pressure and temperature response analyses inputs and assumptions.

The limit of 14.275 psia for initial negative containment pressure ensures that the minimum containment pressure is consistent with the ECCS performance analysis ensuring core reflood under LOCA conditions, thus ensuring peak cladding temperature and cladding oxidation remain within limits. The 14.275 psia limit also ensures the containment pressure will not exceed the containment design negative pressure differential with respect to the annulus atmosphere in the event of an inadvertent actuation of the containment spray system.

3/4.6.1.5 AIR TEMPERATURE

→(DRN 04-1243, Ch. 38; EC-7193, Am. 54)

The limitation on containment minimum average air temperature ensures that the ECCS is capable of maintaining a peak clad temperature (PCT) less than or equal to 2200°F under LOCA conditions. A lower containment average air temperature results in a lower post accident containment pressure, a lower reflood rate, and therefore a higher PCT. The containment minimum average air temperature limit is only applicable above 70% rated thermal power. At power levels of 70% or below and a containment minimum average air temperature of less than 95°F, ECCS is capable of maintaining the peak clad temperature (PCT) less than or equal to 2200°F under LOCA conditions. Core Operating Limits Report (COLR) requires that the linear heat rate be reduced by 0.2 kw/ft when the containment air temperature is less than 95°F but greater than or equal to 90°F.

←(DRN 04-1243, Ch. 38; EC-7193, Am. 54)

The limit of 120°F on high average containment temperature is consistent with the limiting containment pressure and temperature response analyses inputs and assumptions. The limits currently adopted by Waterford 3 are 269.3°F during LOCA conditions and 413.5°F during MSLB conditions.

→(DRN 02-1904; 04-1243, Ch. 38; EC-7193, Am. 54)

The 95°F minimum and 120°F maximum indicated values specified in the TS are the values used in the accident analysis.

←(DRN 02-1904; 04-1243, Ch. 38; EC-7193, Am. 54)

3/4.6.1.6 CONTAINMENT VESSEL STRUCTURAL INTEGRITY

This limitation ensures that the structural integrity of the containment steel vessel will be maintained comparable to the original design standards for the life of the facility. Structural integrity is required to ensure that the containment vessel will withstand the maximum pressure resulting from the design basis LOCA and main steam line break accident. A visual inspection in conjunction with Type A leakage test is sufficient to demonstrate this capability.

Waterford 3

2015 RO NRC Exam

JOB PERFORMANCE MEASURE

A4

Calculate Stay Times Based on Dose Rates

Applicant: ________________________________

Examiner: ________________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Calculate Stay Times Based on Dose Rates

Task Standard: Applicant correctly calculated the allowed stay time to complete the described tagout without exceeding his yearly Waterford 3 administrative radiation dose limits.

References: UNT-001-016, Radiation Protection

Alternate Path: No Time Critical: No Validation Time: 15 mins.

K/A 2.3.4, Knowledge of radiation exposure limits under normal and emergency conditions. Importance Rating 3.2 RO

Applicant: ______________________

Time Start: ________________ Time Finish: ________________

Performance Time: ________________ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ______________________________________

Examiner: ______________________ Date: ______________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

None

Description:

This JPM requires the applicant to correctly calculate the allowed stay time to complete the described tagout without exceeding his yearly Waterford 3 administrative radiation dose limits.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

TASK ELEMENT	STANDARD
Calculate stay time based on dose rate and Waterford 3 yearly TEDE limits.	Applicant calculated the stay time as 8.8 to 8.824 minutes.
Comment: Waterford 3 administrative TEDE limit: 2000 mrem Dose for the year: 1875 mrem Remaining dose for the year: 125 mrem Time allowed in room: 125 mrem / 850 mrem/hour 0.147 hour or 8.8 minutes	**<u>Critical</u>** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

You have been assigned to verify a 5 valve tagout on the -11 Elevation in Containment.

- Your yearly dose to date is 1875 mrem TEDE for the year.
- The dose rate in that area is 850 mrem/hour.

Based on Waterford 3 yearly administrative limits, what is your maximum allowed stay time in the room?

Do all of your calculations on this sheet.

SAFETY RELATED
PROCEDURE

Normal Review Class (check one):
☒ **OSRC**
☐ **QUALIFIED REVIEW**

PROCEDURE NUMBER:	UNT-001-016	REVISION:	303

TITLE: Radiation Protection

PROCEDURE OWNER (Position Title): Radiation Protection Manager

TERM (check one): ☒ **PERMANENT** ☐ **TEMPORARY**

Effective Date / Milestone (if applicable): 01-14-2014

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (check one):

☒ Revision ☐ Deletion ☐ New Procedure

DESCRIPTION AND JUSTIFICATION:

Section 2.1, Use References, were updated.
The definition of DLR was updated to match the latest fleet definition in EN-RP-100, Radworker Expectations.
Position titles in section 4.0, Responsibilities, were updated to match new HCM position titles.
Step 4.11.8 "Informing Radiation Protection of any proposed work activity that will occur inside a radiologically controlled area," was removed due to the new Normal Risk process contained in EN-RP-100.

This revision was driven by LO-WLO-2012-00107 CA-00018.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (check one): ☒ Normal ☐ Editorial Correction (Revisions only) ☐ Technical Verification (Revisions only)

REVIEW AND APPROVAL ACTIVITIES					PRINT NAME OR SIGNATURE	DATE
PREPARER					JP White	10/23/2013
EC SUPERVISOR	Administrative Review and Approval				(sign) N/A	N/A
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)					N/A	N/A
					N/A	N/A
					N/A	N/A
					N/A	N/A
					N/A	N/A
PROCESS APPLICABILITY DETERMINATION	Performed	☑	PA Exclusion	☐	JP White	11-5-13
TECHNICAL	Review	☑	Verification	☐	[illegible]	11-20-2013
QUALIFIED REVIEWER	Review	☐			N/A	N/A
GROUP/DEPT. HEAD	Review	☑	Approval	☐	(sign) [illegible]	12-2-13
GM, PLANT OPERATIONS	Review	☐	Approval	☑	(sign) [illegible]	1-11-14
VICE PRESIDENT, OPERATIONS			Approval	☐	(sign) N/A	N/A

4.10.2 Distributing tasks among personnel to minimize the possibility of overexposure and to maintain individual and collective doses ALARA,

4.10.3 Ensuring workers are prepared for tasks with appropriate tools, equipment, and training to minimize radiation exposure, and

4.10.4 Evaluating performance of subordinates in radiologically controlled areas.

4.11 Individuals are responsible for:

4.11.1 Complying with Radiation Protection postings,

4.11.2 Knowing the radiological conditions at the job site.

4.11.3 Remaining knowledgeable of their current dose limits and TEDE to date,

4.11.4 Using good radiological work practices within radiologically controlled areas,

4.11.5 Taking only tools and materials necessary for the task being performed into Controlled Access Areas (CAA) or Radiologically Controlled Areas,

4.11.6 Obtaining, wearing, and returning personnel radiation monitoring equipment in accordance with applicable procedures,

4.11.7 Reporting any occurrences to Radiation Protection which may have caused or indicated a change in radiological conditions or a loss of control of radioactive material,

4.11.8 Knowing and understanding the requirements and contents of the Radiation Work Permit (RWP) under which they will work,

4.11.9 Notifying Radiation Protection of any internally deposited radionuclides as a result of medical diagnosis or treatment,

4.11.10 Notifying Radiation Protection of any radioactive material they bring onsite,

4.11.11 Reporting to their supervisor, Radiation Protection Manager, <u>or</u> other appropriate Entergy Operations management any condition that may lead to a violation of NRC Regulations, Licenses or unnecessary exposure to radiation or radioactive material in accordance with 10CFR19.

4.11.12 The proper use and care of respiratory protection equipment issued to them, 4.11.13 Ensuring their respiratory protection training, physical examinations and fit tests are current prior to equipment issuance, and

4.11.14 Notifying Radiation Protection any time a personnel contamination monitor alarms while they are using it.

5.0 PROCEDURE

5.1 Radiation Protection Program Commitment

5.1.1 Waterford 3 (W3) is committed to operate WF3 in a manner that protects the health and safety of Entergy personnel, its contractors and visitors, and the general public.

5.1.2 W3 is committed to maintaining radiation exposures ALARA.

5.1.3 W3 is further committed to comply strictly with all regulatory requirements including exposure limits, radioactive material release limits, transportation and disposal limits for radioactive material and waste.

5.1.4 W3 implements these commitments through a comprehensive radiation protection program.

5.2 Exposure Control

5.2.1 W3 monitors individual and collective internal and external doses.

5.2.1.1 The sum of deep dose equivalent (DDE) and committed effective dose equivalent (CEDE) is evaluated to ensure that the total effective dose equivalent (TEDE) is ALARA.

5.2.1.2 When possible, internal doses are minimized through the use of engineering or other controls without impacting doses to the extent that TEDE is no longer ALARA.

5.2.2 Administrative dose limits have been established to ensure:

- federal dose limits are not exceeded, and
- appropriate levels of management are aware of each individual's dose.

Waterford 3

2015 NRC SRO Exam

JOB PERFORMANCE MEASURE

A5

Review DNBR and LPD Limits Associated with OP-901-501, PMC or COLSS Malfunction

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review DNBR and LPD Limits Associated with OP-901-501, PMC or COLSS Malfunction

Task Standard: Applicant reviews completed OP-901-501 paperwork discovers errors on Attachments 2 and Attachment 3.

References: OP-901-501, PMC or COLSS Malfunction
Technical Specification 3.2.4 and COLR 3.2.4

Alternate Path: No   Time Critical: No   Validation Time: 25 mins.

K/A 2.1.20, Ability to interpret and execute procedure steps.   Importance Rating 4.6 SRO

Applicant: ______________________________

Time Start: __________________   Time Finish: __________________

Performance Time: __________________ minutes
Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____

____

____

Examiner: __________________________________   Date: ________________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-901-501, PMC or Core Operating Limit Supervisory System Malfunction

Description:

This JPM requires the applicant to review completed OP-901-501 paperwork and discover errors on Attachments 2 and Attachment 3.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

TASK ELEMENT	STANDARD
Applicant discovers that all 4 CPC LPD limits calculated on Attachment 2 were done with the calculation in step 5 vice step 4.	Corrected CPC LPD limits to 12.12, 11.91, 12.11, and 13.41 for Channels A through D.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT	STANDARD
OP-901-501 Attachment 3 LPD limit lists correct value.	Applicant corrected the 4 CPC LPD limits on Attachment 3.
Comment:	**SAT / UNSAT**

TASK ELEMENT	STANDARD
Applicant discovers that the BOP operator filled in No for DNBR within limits of Tech Spec 3.2.4 on any operable CPC Channel.	Applicant determined Channel A or Channel B meet the limits of Tech Spec 3.2.4, using COLR figure 8A on page 3/4-2-6B.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- 100% power
- Both CEACs are operable
- 250 EFPD
- Containment temperature is 102 °F
- The Plant Monitoring Computer failed at 1900 on 9/14/2015.
- You have entered OP-901-501, PMC or Core Operating Limit Supervisory System Malfunction.

INITIATING CUES:

- The BOP operator has completed Attachment 1, CPC DNBR Limit Calculation, Attachment 2, CPC LPD Limit Calculation , and Attachment 3, 15 Minute Log, of OP-901-501.
- He has also informed you that the plant is not in compliance with Tech Spec 3.2.4 as a result of his calculations.
- Review the attached paperwork for accuracy and document any errors or discrepancies identified.

A5 Key

ATTACHMENT 1: CPC DNBR LIMIT CALCULATION

1. Record CPC DNBR in column (1) and CPC PHICAL in column (3) using data from CPC's.

2. Record COLSS DNBR POL in column (2) using last valid value for COLSS DNBR POL, PMC PID C24560 as found on dedicated trend pen recorder.

3. Perform CPC DNBR Limit calculation for each CPC Channel with data from applicable column using the formula shown below. Record results in column (4).

$$[(2) - (3)] \times 0.03 = (4)$$

4. If available DNBR margin > 0.15, then perform the following calculation. Record results in column (5).

$$(1) - 0.1 = (5)$$

5. If available DNBR margin ≤ 0.15, then perform the following calculation. Record results in column (5).

$$(1) - (4) = (5)$$

Available DNBR Limit					
CPC Channel	(1) CPC DNBR PID 406	(2) COLSS DNBR POL	(3) CPC PHICAL PID 171	(4) Available Margin	(5) CPC DNBR Limit
A	2.17	109	100.7	0.249	2.07
B	2.13	109	100.5	0.255	2.03
C	2.17	109	100.5	0.255	2.07
D	2.13	109	100.9	0.243	2.03

Performed ___*jhmendoza*___ Date/Time ___9/14/15 1905___

Verified ___*joe operator*___ Date/Time ___9/14/15 1910___

SM/CRS ______________________ Date/Time ____________

—Transmit with OP-903-001, Technical Specification Surveillance Logs.—

A5 KEY

ATTACHMENT 2: CPC LPD LIMIT CALCULATION

1. Record CPC LPD in column (1) and CPC PHICAL in column (3) using data from CPC's.

2. Record COLSS KW/FT POL (2) using last valid value for COLSS KW/FT POL, PMC PID C24561 as found on dedicated trend pen recorder.

$$\frac{[(2)-(3)]}{18}=(4)$$

3. Perform CPC KW/FT Limit calculation for each CPC Channel with data from applicable column using the formula shown below. Record results in column (4).

4. If available LPD margin > 0.4, then perform the following calculation. Record results in column (5).

(1) + 0.25 = (5)

5. If available LPD margin ≤ 0.4, then perform the following calculation. Record results in column (5).

(1) + (4) = (5)

(Incorrect LPD limit calculated)

Available LPD Margin Limit					
CPC Channel	(1) CPC LPD PID 179	(2) COLSS KW/FT POL	(3) CPC PHICAL PID 171	(4) Available Margin	(5) CPC LPD Limit
A	11.87	113	100.7	0.683	12.55
B	11.66	113	100.5	0.694	12.35
C	11.86	113	100.5	0.694	12.55
D	13.16	113	100.9	0.672	13.83

Performed ______jhemdoza__________________________ Date/Time_9/14/15 1905

Verified ______joe operator________________________ Date/Time_9/14/15 1910

SM/CRS ______________________________________ Date/Time__________

—Transmit with OP-903-001, Technical Specification Surveillance Logs.—

A5 KEY

ATTACHMENT 3: 15 MINUTE LOG

[P-461, P-13445, P-13446, P-20634]

(Incorrect limits for LPD from Attachment 2)

TIME:		1915	1930			
CPC Channel A Limits	LPD PID 179	11.87	11.87			
LPD = 12.55	DNBR PID 406	2.17	2.15	**(COLR met, 2.11 required)**		
DNBR = 2.07	ASI PID 268	0.01	0.01			
CPC Channel B Limits	LPD PID 179	11.66	11.67			
LPD = 12.35	DNBR PID 406	2.13	2.12	**(COLR met, 2.09 required)**		
DNBR = 2.03	ASI PID 268	-0.02	-0.02			
CPC Channel C Limits	LPD PID 179	11.86	11.85			
LPD = 12.55	DNBR PID 406	2.10	2.06	**(COLR not met , 2.10 required)**		
DNBR = 2.07	ASI PID 268	-0.005	-0.01			
CPC Channel D Limits	LPD PID 179	13.16	13.17			
LPD = 13.83	DNBR PID 406	2.07	2.04	**(COLR not met, 2.10 required)**		
DNBR = 2.03	ASI PID 268	-0.01	-0.015			
CPC LPD < CPC LPD LIMIT ON ALL "OPERABLE" CPC CHANNELS (Y/N)		Y	Y			
LPD WITHIN LIMITS OF T.S. 3.2.1 ON ANY "OPERABLE" CPC CHANNEL. (Y/N) Note (1) and (2)		Y	Y			
CPC DNBR > CPC DNBR LIMIT ON ALL "OPERABLE" CPC CHANNELS (Y/N)		Y	N			
DNBR WITHIN LIMITS OF T.S. 3.2.4 ON ANY "OPERABLE" CPC CHANNEL (Y/N) **		Y	N	**(Should be a "Y")**		
ASI ACCEPTABLE (Y/N) ***		Y	Y			
PERFORMED BY (INITIALS)		*jho*	*jho*			

Note (1) IF LPD is not within the limits of T.S. 3.2.1 on any "operable" CPC Channel, then enter Technical Specification 3.2.1.

Note (2) If complying with the applicable action of Technical Specification 3.6.1.5 due to low Containment temperatures, then apply the action in the COLR 3.2.1 for reducing LPD. This requirement for Containment temperature is applicable when > 70% power. (Due to instrument inaccuracies, OP-903-001 applies the minimum temperature of 100 °F vice 95°F.)

** If DNBR is not within the limits of T.S. 3.2.4 on any "operable" CPC Channel, then enter Technical Specification 3.2.4.

*** ASI is acceptable IF within limits of Technical Specification 3.2.7.

Performed by: *joe operator* (Signature) 9/14/15 (Date)

SM/CRS Review: ____________________ (Signature) ______ / ______ (Date/Time)

A5 Student

ATTACHMENT 1: CPC DNBR LIMIT CALCULATION

1. Record CPC DNBR in column (1) and CPC PHICAL in column (3) using data from CPC's.

2. Record COLSS DNBR POL in column (2) using last valid value for COLSS DNBR POL, PMC PID C24560 as found on dedicated trend pen recorder.

3. Perform CPC DNBR Limit calculation for each CPC Channel with data from applicable column using the formula shown below. Record results in column (4).

[(2) - (3)] X 0.03 = (4)

4. If available DNBR margin > 0.15, then perform the following calculation. Record results in column (5).

(1) - 0.1 = (5)

5. If available DNBR margin ≤ 0.15, then perform the following calculation. Record results in column (5).

(1) - (4) = (5)

Available DNBR Limit					
CPC Channel	(1) CPC DNBR PID 406	(2) COLSS DNBR POL	(3) CPC PHICAL PID 171	(4) Available Margin	(5) CPC DNBR Limit
A	2.17	109	100.7	0.249	2.07
B	2.13	109	100.5	0.255	2.03
C	2.17	109	100.5	0.255	2.07
D	2.13	109	100.9	0.243	2.03

Performed ___*jhmendoza*___________________________ Date/Time__9/14/15 1900

Verified ___*joe operator*___________________________ Date/Time__9/14/15 1910

SM/CRS ____ Date/Time____________

—Transmit with OP-903-001, Technical Specification Surveillance Logs.—

ATTACHMENT 2: CPC LPD LIMIT CALCULATION

1. Record CPC LPD in column (1) and CPC PHICAL in column (3) using data from CPC's.

2. Record COLSS KW/FT POL (2) using last valid value for COLSS KW/FT POL, PMC PID C24561 as found on dedicated trend pen recorder.

3. Perform CPC KW/FT Limit calculation for each CPC Channel with data from applicable column using the formula shown below. Record results in column (4).

$$\frac{[(2)-(3)]}{18}=(4)$$

4. If available LPD margin > 0.4, then perform the following calculation. Record results in column (5).

$$(1) + 0.25 = (5)$$

5. If available LPD margin ≤ 0.4, then perform the following calculation. Record results in column (5).

$$(1) + (4) = (5)$$

Available LPD Margin Limit					
CPC Channel	(1) CPC LPD PID 179	(2) COLSS KW/FT POL	(3) CPC PHICAL PID 171	(4) Available Margin	(5) CPC LPD Limit
A	11.87	113	100.7	0.683	12.55
B	11.66	113	100.5	0.694	12.35
C	11.86	113	100.5	0.694	12.55
D	13.16	113	100.9	0.672	13.83

Performed *jhemdoza* Date/Time 9/14/15 1900

Verified *joe operator* Date/Time 9/14/15 1910

SM/CRS ______________________ Date/Time _________

—Transmit with OP-903-001, Technical Specification Surveillance Logs.—

ATTACHMENT 3: 15 MINUTE LOG

[P-461, P-13445, P-13446, P-20634]

	TIME:	1915	1930			
CPC Channel A Limits	LPD PID 179	11.87	11.87			
LPD = 12.55	DNBR PID 406	2.17	2.15			
DNBR = 2.07	ASI PID 268	0.01	0.01			
CPC Channel B Limits	LPD PID 179	11.66	11.67			
LPD = 12.35	DNBR PID 406	2.13	2.12			
DNBR = 2.03	ASI PID 268	-0.02	-0.02			
CPC Channel C Limits	LPD PID 179	11.86	11.85			
LPD = 12.55	DNBR PID 406	2.10	2.06			
DNBR = 2.07	ASI PID 268	-0.005	-0.01			
CPC Channel D Limits	LPD PID 179	13.16	13.17			
LPD = 13.83	DNBR PID 406	2.07	2.04			
DNBR = 2.03	ASI PID 268	-0.01	-0.015			
CPC LPD < CPC LPD LIMIT ON <u>ALL</u> "OPERABLE" CPC CHANNELS (Y/N)		Y	Y			
LPD WITHIN LIMITS OF T.S. 3.2.1 ON <u>ANY</u> "OPERABLE" CPC CHANNEL. (Y/N) Note (1) and (2)		Y	Y			
CPC DNBR > CPC DNBR LIMIT ON <u>ALL</u> "OPERABLE" CPC CHANNELS (Y/N)		Y	N			
DNBR WITHIN LIMITS OF T.S. 3.2.4 ON <u>ANY</u> "OPERABLE" CPC CHANNEL (Y/N) **		Y	N			
ASI ACCEPTABLE (Y/N) ***		Y	Y			
PERFORMED BY (INITIALS)		jho	jho			

Note (1) <u>IF</u> LPD is <u>not</u> <u>within</u> the limits of T.S. 3.2.1 on <u>any</u> "operable" CPC Channel, <u>then</u> enter Technical Specification 3.2.1.

Note (2) <u>If</u> complying with the applicable action of Technical Specification 3.6.1.5 due to low Containment temperatures, then apply the action in the COLR 3.2.1 for reducing LPD. This requirement for Containment temperature is applicable when > 70% power. (Due to instrument inaccuracies, OP-903-001 applies the minimum temperature of 100 °F vice 95°F.)

** <u>If</u> DNBR is <u>not</u> <u>within</u> the limits of T.S. 3.2.4 on <u>any</u> "operable" CPC Channel, <u>then</u> enter Technical Specification 3.2.4.

*** ASI is acceptable <u>IF</u> within limits of Technical Specification 3.2.7.

Performed by: *joe operator* 9/14/15
(Signature) (Date)

SM/CRS Review: ______________________ ________/________
(Signature) (Date/Time)

REQUEST/APPROVAL PAGE

SAFETY RELATED
PROCEDURE

Normal Review Class (check one):

☐ **OSRC**

☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-901-501		REVISION: 015

TITLE: PMC or Core Operating Limit Supervisory System Malfunction

PROCEDURE OWNER (Position Title) : Operations Manager - Support

TERM (check one) : ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 6/19/2014

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

(1) In step E1.6, deleted the value ">0.02" as parenthetical reference to the condition where PMC PID C24404 is not in alarm. The setpoint is currently 0.03 and this value may be changed depending on what the new COLR value is. Referencing the alarm set-point value is unnecessary. This change reduces the level of informational detail only and meets Editorial Correction criteria.

(2) Replaced step E2.2 text with equivalent text of step E1.6 following the change described in change item (1). This change was made to be consistent with the method utilized for when the 12 hour surveillance is required to be performed. This change maintains procedural intent and clarifies information only. This change, therefore, meets Editorial Correction criteria.

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			David R Voisin	6/19/2014
EC SUPERVISOR		Administrative Review and Approval	(sign) D. J. Wood	6/19/2014
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Operations [Licensed Operator Peer Review]		David F. Litolff	6/19/2014
	Reactor Engineering		Jason Pleitt	6/19/2014
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

E_1 LOSS OF COLSS/PMC

NOTE

(1) CPC DNBR and LPD values are checked every 15 minutes to monitor for further degradation. An immediate power reduction is required if CPC DNBR is < or CPC LPD is > the calculated limits on any operable CPC channel. LPD and DNBR values are acceptable if within limits of Technical Specifications 3.2.1 (LPD) and 3.2.4 (DNBR) on any operable CPC channel. **[P-20634]**

(2) When a CEA drops into the core, the targeted CPC will trip. Recording data for the targeted CPC is not required and should not be accomplished due to the possibility of improperly evaluating limits on the Attachments.

	PLACEKEEPER		
	START	DONE	N/A
1. If >20 % Reactor Power, then perform the following:	☐	☐	☐
1.1 Inform Shift Technical Advisor (STA) that his assistance is required in manually performing COLSS related LCO calculations.		☐	
1.2 If a power reduction is not in progress, and no CEA movement has occurred, then within 15 minutes of loss of COLSS, perform the following: **[P-20634]**	☐	☐	☐
1.2.1 Calculate CPC DNBR Limit on operable CPC channels by performing Attachment 1, CPC DNBR Limit Calculation, and document limits on Attachment 3, 15 Minute Log. **[P-13446]**	☐	☐	
1.2.2 Calculate CPC LPD Limit on operable CPC channels by performing Attachment 2, CPC LPD Limit Calculation, and document limits on Attachment 3. **[P-13445]**	☐	☐	
1.2.3 Perform Attachment 3 to verify LPD, DNBR, and ASI within limits on operable CPC channels, and every 15 minutes thereafter. **[P-13445, P-13446, P-461]**	☐	Continuous ⬇	

ATTACHMENT 1: CPC DNBR LIMIT CALCULATION

1. Record CPC DNBR in column (1) <u>and</u> CPC PHICAL in column (3) using data from CPC's.

2. Record COLSS DNBR POL in column (2) using last valid value for COLSS DNBR POL, PMC PID C24560 as found on dedicated trend pen recorder.

3. Perform CPC DNBR Limit calculation for <u>each</u> CPC Channel with data from applicable column using the formula shown below. Record results in column (4).

$$[(2) - (3)] \times 0.03 = (4)$$

4. <u>If</u> available DNBR margin > 0.15, <u>then</u> perform the following calculation. Record results in column (5).

$$(1) - 0.1 = (5)$$

5. <u>If</u> available DNBR margin ≤ 0.15, <u>then</u> perform the following calculation. Record results in column (5).

$$(1) - (4) = (5)$$

Available DNBR Limit					
	(1)	(2)	(3)	(4)	(5)
CPC Channel	CPC DNBR PID 406	COLSS DNBR POL	CPC PHICAL PID 171	Available Margin	CPC DNBR Limit
A					
B					
C					
D					

Performed ____ Date/Time____________

Verified ____ Date/Time____________

SM/CRS ____ Date/Time____________

—Transmit with OP-903-001, Technical Specification Surveillance Logs.—

ATTACHMENT 2: CPC LPD LIMIT CALCULATION

1. Record CPC LPD in column (1) and CPC PHICAL in column (3) using data from CPC's.

2. Record COLSS KW/FT POL (2) using last valid value for COLSS KW/FT POL, PMC PID C24561 as found on dedicated trend pen recorder.

3. Perform CPC KW/FT Limit calculation for each CPC Channel with data from applicable column using the formula shown below. Record results in column (4).

$$\frac{[(2)-(3)]}{18}=(4)$$

4. If available LPD margin > 0.4, then perform the following calculation. Record results in column (5).

$$(1) + 0.25 = (5)$$

5. If available LPD margin $\leq$ 0.4, then perform the following calculation. Record results in column (5).

$$(1) + (4) = (5)$$

Available LPD Margin Limit					
CPC Channel	(1) CPC LPD PID 179	(2) COLSS KW/FT POL	(3) CPC PHICAL PID 171	(4) Available Margin	(5) CPC LPD Limit
A					
B					
C					
D					

Performed ____ Date/Time_________

Verified ____ Date/Time_________

SM/CRS ____ Date/Time_________

—Transmit with OP-903-001, Technical Specification Surveillance Logs.—

ATTACHMENT 3: 15 MINUTE LOG

[P-461, P-13445, P-13446, P-20634]

	TIME:					
CPC Channel A Limits	LPD PID 179					
LPD = _________	DNBR PID 406					
DNBR = _________	ASI PID 268					
CPC Channel B Limits	LPD PID 179					
LPD = _________	DNBR PID 406					
DNBR = _________	ASI PID 268					
CPC Channel C Limits	LPD PID 179					
LPD = _________	DNBR PID 406					
DNBR = _________	ASI PID 268					
CPC Channel D Limits	LPD PID 179					
LPD = _________	DNBR PID 406					
DNBR = _________	ASI PID 268					
CPC LPD < CPC LPD LIMIT ON <u>ALL</u> "OPERABLE" CPC CHANNELS (Y/N)						
LPD WITHIN LIMITS OF T.S. 3.2.1 ON <u>ANY</u> "OPERABLE" CPC CHANNEL. (Y/N) Note (1) and (2)						
CPC DNBR > CPC DNBR LIMIT ON <u>ALL</u> "OPERABLE" CPC CHANNELS (Y/N)						
DNBR WITHIN LIMITS OF T.S. 3.2.4 ON <u>ANY</u> "OPERABLE" CPC CHANNEL (Y/N) **						
ASI ACCEPTABLE (Y/N) ***						
PERFORMED BY (INITIALS)						

Note (1) <u>IF</u> LPD is <u>not</u> <u>within</u> the limits of T.S. 3.2.1 on <u>any</u> "operable" CPC Channel, <u>then</u> enter Technical Specification 3.2.1.

Note (2) <u>If</u> complying with the applicable action of Technical Specification 3.6.1.5 due to low Containment temperatures, then apply the action in the COLR 3.2.1 for reducing LPD. This requirement for Containment temperature is applicable when > 70% power. (Due to instrument inaccuracies, OP-903-001 applies the minimum temperature of 100 °F vice 95°F.)

** <u>If</u> DNBR is <u>not</u> <u>within</u> the limits of T.S. 3.2.4 on <u>any</u> "operable" CPC Channel, <u>then</u> enter Technical Specification 3.2.4.

*** ASI is acceptable <u>IF</u> within limits of Technical Specification 3.2.7.

Performed by: ______________________________ ___________
(Signature) (Date)

SM/CRS Review: ______________________________ _________/_________
(Signature) (Date/Time)

—Transmit with OP-903-001, Technical Specification Surveillance Logs.—

3/4.2.4 DNBR MARGIN

LIMITING CONDITION FOR OPERATION

3.2.4 The DNBR margin shall be maintained by one of the following methods:

a. Maintaining COLSS calculated core power less than or equal to COLSS calculated core power operating limit based on DNBR (when COLSS is in service, and either one or both CEACs are operable); or

b. Maintaining COLSS calculated core power less than or equal to COLSS calculated core power operating limit based on DNBR decreased by the amount specified in the COLR (when COLSS is in service and neither CEAC is operable); or

c. Operating within the region of acceptable operation specified in the COLR using any operable CPC channel (when COLSS is out of service and either one or both CEACs are operable); or

d. Operating within the region of acceptable operation specified in the COLR using any operable CPC channel (when COLSS is out of service and neither CEAC is operable).

APPLICABILITY: MODE 1 above 20% of RATED THERMAL POWER.

ACTION:

a. With the DNBR limit not being maintained as indicated by COLSS calculated core power exceeding the COLSS calculated core power operating limit based on DNBR, within 15 minutes initiate corrective action to reduce the DNBR to within the limits and either:

1. Restore the DNBR to within its limits within 1 hour, or

2. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

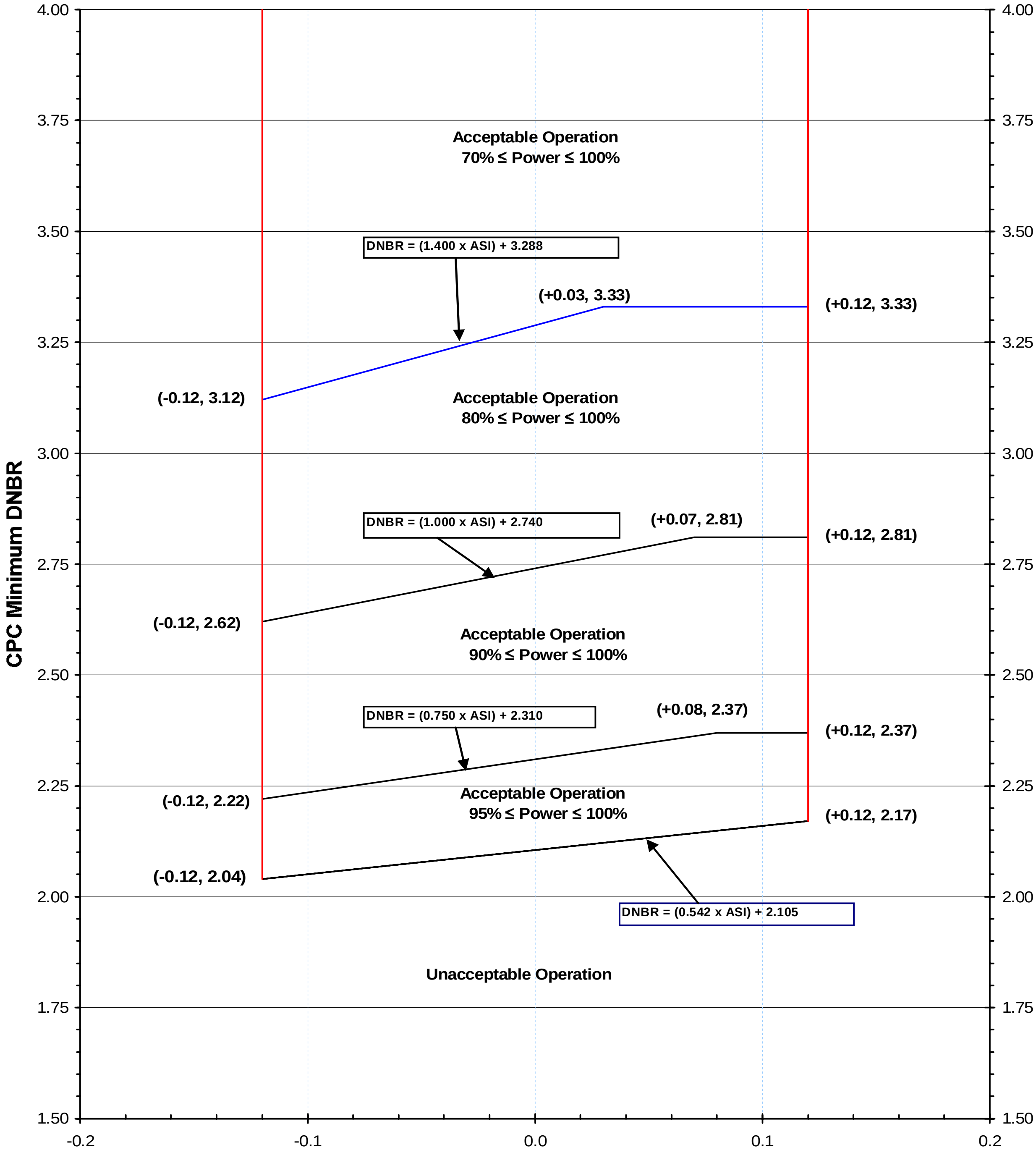
b. With the DNBR limit not being maintained as indicated by operation outside the region of acceptable operation specified in the COLR with COLSS out of service, either:

1. Restore COLSS to service within 2 hours, or

2. Restore the DNBR to within its limits within the next 2 hours, or

3. Reduce THERMAL POWER to less than or equal to 20% of RATED THERMAL POWER within the next 6 hours.

Subset of Allowable DNBR with Any CEAC Operable
(COLSS Out of Service)



Core Average ASI
(COLR Figure 8A)

Waterford 3

2015 NRC SRO Exam

JOB PERFORMANCE MEASURE

A6

Review and Approve OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data.

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review and approve OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data.

Task Standard: Applicant discovers 3 errors on the surveillance affecting power calibrations in accordance with the JPM key.

References: OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data

Alternate Path: No   Time Critical: No   Validation Time: 20 mins.

K/A 2.1.18, Ability to make accurate, clear, and concise logs, records, status boards, and reports   Importance Rating 3.8 SRO

Applicant: ____________________

Time Start: ______________   Time Finish: ______________

Performance Time: ______________ minutes

Critical Time: N/A minutes

Performance Rating: SAT   UNSAT

Comments: ____

____

____

Examiner: ______________________   Date: ______________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data

Description:

Applicant will review a completed set of calculations for CPC constants KCAL, TCREF, and TPC.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

TASK ELEMENT 1	STANDARD
Review and approve OP-903-001, Attachment 11.18.	Applicant must identify 3 errors that were committed performing the surveillance in accordance with the A6 Key.
Comment: Error 1: Step 11.10.6.1, In the KCAL calculation, BDT power was recorded instead of PHICAL. Error 2: Step 11.10.6.1, Error 1 caused an error to be carried forward in the calculation of KCAL. Error 3: Step 11.10.6.3, the minimum Tc was not selected. PID 161 should have been selected instead of PID 160.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Reactor power is 100% and steady
- The UFM is in service.
- OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data, has been completed for Channel B.
- Data collection from CP-10 and for the Linear Power Potentiometer is not required for this task. “N/A” has been placed on the surveillance for those items.

INITIATING CUES:

- Review and approve the provided surveillance
- The previous CRS directed the reactor operator to gather required data once for column “0”, averages were not required.

A6 Key

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA

DATE ______________ CHANNEL UNDER ADJUSTMENT: A ☐ B ☒ C ☐ D ☐

11.10.3.1 Calculate and record the averages of each parameter in the space provided.

	0	1	2	3	4	Average	Adjusted
BSCAL ① ② PMC PID-C24230	**99.87**						③
HI LINEAR POWER BISTABLE 1 VOLTS	**N/A**						
HIGH LINEAR POWER % VOLT X 20	**N/A**						
PHICAL. (Calibrated Neutron Flux Power) CPC PID 171	**99.96**						
BDT (Static Thermal Power) CPC PID 177	**99.82**						

Calculations Performed by: *joe operator* Verified by: *jane operator*

Signature Signature

① Refer to attachment 11.1 Note 9.1 to determine appropriate power indication if linear power is not ≥35% steady state. Document indication used in Remarks.

② If COLSS is Inoperable, then use NE-005-201, Heat Balance Calculations, to determine Secondary Calorimetric Power substitute when PMC or CORE POWER is specified.

③ *Adjusted* is the average value plus 8.5% (8% to10%) if adjustments are being made to PHICAL and/or BDT as listed in Notes above steps 11.10.6 or 11.10.7 (refer to Attachment 11.1 Note 9.8). Otherwise N/A this block. Use the *Average* value, not the *Adjusted* value, for DVM calculation.

11.10.4 Record the following for channel under adjustment:

TPC (Thermal Power Calibration Constant) CPC PID 064	**0.84399**
KCAL (Neutron Flux Power Cal. Constant) CPC PID 065	**1.0070**
PCALIB (Secondary Calorimetric Power Used in Latest CPC Power Calibration) CPC PID 104	**100**
TC 1 (Loop 1 Cold Leg Temperature) CPC PID 160	**543.59**
TC 2 (Loop 2 Cold Leg Temperature) CPC PID 161	**543.46**
TCORF (Temp Shadowing Correction Factor) CPC PID 180	**0.99902**
EXCORE LINEAR POWER CALIBRATE POTENTIOMETER POSITION ROM	N/A

11.10.5 Calculate the new DVM reading or new potentiometer position as follows:

DVM (new) =	Avg. Core Power (Step 11.10.3.1)* / 20	=	**N/A** / 20

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

DVM (new) =	**N/A**

or

Potentiometer position (new) =

$$\frac{\text{Avg. Core Power \% (Step 11.10.3.1)* X Old Potentiometer Setting (Step 11.10.4)}}{\text{Avg. Linear Power \% (Step 11.10.4)}}$$

$$\frac{\textbf{N/A} \quad \text{X} \quad \textbf{N/A}}{\textbf{N/A}}$$

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

Potentiometer position (new) = **N/A**

Performed by: **N/A** (Initials) Verified by: **N/A** (Initials)

11.10.6.1 Calculate KCAL (new):

KCAL (new)	=	(Step 11.10.3.1)* Avg. Core Power (%) x (step 11.10.4) KCAL x (step 11.10.4) TCORF / Avg. PHICAL (step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.6.

KCAL (new)	=	**99.87** x **1.0070** x **.99902** / **99.96** **(99.82, selected BDT instead of PHICAL - ERROR 1)**
KCAL (new)	=	**1.0051** **(1.0065, error carried forward - ERROR 2)**

KCAL (new) = **1.0051** **(1.0065, error carried forward ERROR 2)** (CPC PID 065)

11.10.6.3 New TCREF (CPC PID 098) = Minimum TC from step 11.10.4:
TC 1 (CPC PID 160) or TC 2 (CPC PID 161).

TCREF (new) = **543.46** **(543.59, not the min Tc ERROR 3)** (CPC PID 098)

Performed by: *joe operator* (Initials) Verified by: *jane operarator* (Initials)

A6 Key

11.10.7 Calculate TPC (CPC PID 064):

TPC (new)=	Avg. Core Power % (Step 11.10.3.1)*	X	TPC (Step 11.10.4)
	Avg. BDT (Step 11.10.3.1)		

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.7.

TPC (new)=	**99.87**	X	**0.84399**
	99.82		

TPC (new) =	**0.84441**	(CPC PID 064).

Performed by: *joe operator* (Initials) IV by: *jane operarator* (Initials)

11.10.11.1 Record the following:

- Applicable CORE POWER PMC.................................... ____________
- PCALIB CPC PID 104 .... ____________
- HI LINEAR POWER BISTABLE 1 VOLTS .... ____________
- HI LINEAR POWER % VOLTS x 20 .... ____________
- PHICAL CPC PID 171 .... ____________
- BDT CPC PID 177 .... ____________

11.10.11.2.1 Record answers:

- HI LINEAR POWER %, VOLTS X 20.................... YES/NO ________
- PHICAL, CPC PID 171 .... YES/NO ________
- BDT, CPC PID 177 .... YES/NO ________

11.10.12 Performed by: ____________________ (Initials) IV by: ____________________ (Initials)

11.10.13 Reviewed by: ________________________ SM/CRS ________________ Date/Time

A6 Student

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA

DATE __*Today*_____ CHANNEL UNDER ADJUSTMENT: A ☐ B ☒ C ☐ D ☐

11.10.3.1 Calculate and record the averages of each parameter in the space provided.

	0	1	2	3	4	Average	Adjusted
BSCAL ① ② PMC PID-C24230	**99.87**						③
HI LINEAR POWER BISTABLE 1 VOLTS	**N/A**						
HIGH LINEAR POWER % VOLT X 20	**N/A**						
PHICAL. (Calibrated Neutron Flux Power) CPC PID 171	**99.96**						
BDT (Static Thermal Power) CPC PID 177	**99.82**						

Calculations Performed by: ____________________ Verified by: ______________________
Signature Signature

① Refer to attachment 11.1 Note 9.1 to determine appropriate power indication <u>if</u> linear power is <u>not</u> ≥35% steady state. Document indication used in Remarks.

② <u>If</u> COLSS is Inoperable, <u>then</u> use NE-005-201, Heat Balance Calculations, to determine Secondary Calorimetric Power substitute <u>when</u> PMC <u>or</u> CORE POWER is specified.

③ *Adjusted* is the average value plus 8.5% (8% to10%) <u>if</u> adjustments are being made to PHICAL and/or BDT as listed in Notes above steps 11.10.6 <u>or</u> 11.10.7 (refer to Attachment 11.1 Note 9.8). Otherwise N/A this block. Use the *Average* value, <u>not</u> the *Adjusted* value, for DVM calculation.

11.10.4 Record the following for channel under adjustment:

TPC (Thermal Power Calibration Constant) CPC PID 064	**0.84399**
KCAL (Neutron Flux Power Cal. Constant) CPC PID 065	**1.0070**
PCALIB (Secondary Calorimetric Power Used in Latest CPC Power Calibration) CPC PID 104	**100**
TC 1 (Loop 1 Cold Leg Temperature) CPC PID 160	**543.59**
TC 2 (Loop 2 Cold Leg Temperature) CPC PID 161	**543.46**
TCORF (Temp Shadowing Correction Factor) CPC PID 180	**0.99902**
EXCORE LINEAR POWER CALIBRATE POTENTIOMETER POSITION ROM	N/A

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA (CONT'D)

11.10.5 Calculate the new DVM reading or new potentiometer position as follows:

DVM (new) =	Avg. Core Power (Step 11.10.3.1)* / 20	=	**N/A** / 20

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

DVM (new) =	**N/A**

or

Potentiometer position (new) =

$$\frac{\text{Avg. Core Power \% (Step 11.10.3.1)* X Old Potentiometer Setting (Step 11.10.4)}}{\text{Avg. Linear Power \% (Step 11.10.4)}}$$

$$\frac{\textbf{N/A} \quad \text{X} \quad \textbf{N/A}}{\textbf{N/A}}$$

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

Potentiometer position (new) = **N/A**

Performed by: **N/A** (Initials) Verified by: **N/A** (Initials)

11.10.6.1 Calculate KCAL (new):

KCAL (new)	=	(Step 11.10.3.1)* Avg. Core Power (%) x (step 11.10.4) KCAL x (step 11.10.4) TCORF / Avg. PHICAL (step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.6.

KCAL (new)	=	**99.87** x **1.0070** x **.99902** / **99.82**
KCAL (new)	=	**1.0065**

KCAL (new) = **1.0065** (CPC PID 065)

11.10.6.3 New TCREF (CPC PID 098) = Minimum TC from step 11.10.4:
TC 1 (CPC PID 160) or TC 2 (CPC PID 161).

TCREF (new) = **543.59** (CPC PID 098)

Performed by: *PO* (Initials) Verified by: *VO* (Initials)

11.18 ADJUSTMENT OF CPC AND EXCORE NUCLEAR INSTRUMENTATION DATA (CONT'D)

11.10.7 Calculate TPC (CPC PID 064):

TPC (new)=	Avg. Core Power % (Step 11.10.3.1)* X TPC (Step 11.10.4) / Avg. BDT (Step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.7.

TPC (new)=	**99.87**	X	**0.84399**
	99.82		

TPC (new) =	**0.84441**	(CPC PID 064).

Performed by: PO (Initials) IV by: VO (Initials)

11.10.11.1 Record the following:

- Applicable CORE POWER PMC.................................... ____________
- PCALIB CPC PID 104 .... ____________
- HI LINEAR POWER BISTABLE 1 VOLTS .... ____________
- HI LINEAR POWER % VOLTS x 20 .... ____________
- PHICAL CPC PID 171 .... ____________
- BDT CPC PID 177 .... ____________

11.10.11.2.1 Record answers:

- HI LINEAR POWER %, VOLTS X 20.................... YES/NO ________
- PHICAL, CPC PID 171 .... YES/NO ________
- BDT, CPC PID 177 .... YES/NO ________

11.10.12 Performed by: ____________ (Initials) IV by: ____________ (Initials)

11.10.13 Reviewed by: ____________ SM/CRS ____________ Date/Time

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ **OSRC** ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-903-001		REVISION: 061

TITLE: Technical Specification Surveillance Logs

PROCEDURE OWNER (Position Title) : Operations Manager - Support

TERM (check one) : ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 5/26/2015

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

In steps 11.10.6.2 and 11.10.8.5.1 changed the trigger value of CPC PID 065 (KCAL) for listed notifications (administrative actions) from “<0.75” to “<0.8” A requirement to generate a Condition Report has also been added. The steps, since they contain multiple actions were broken into bullet items for the CR generation and the notifications. Also, the scopes of the notifications to Reactor Engineering (RXE) and PMI were clarified: Rather than just stating that that these groups need to be notified that Linear Channel Sub-Gain needs to be adjusted, it is clarified that RXE is notified to complete NE-002-010, Linear Power Subchannel Gain Adjustment and PMI is notified that adjustment will be required on the affected channel (PMID 2806). This change addresses a communication miss between Operations and RXE as is documented in CR-WF3-2015-02641.

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			David R. Voisin	5/21/2015
EC SUPERVISOR		Administrative Review and Approval	(sign)	5-22-15
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Operations [Licensed Operator Peer Review]		J.R. Maynard	5/21/2015
	Reactor Engineering		Pamela Hernandez	5/21/2015
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

DATE ______________ CHANNEL UNDER ADJUSTMENT: A ☐ B ☐ C ☐ D ☐

NOTE
During physics testing, Note 2 of TS Table 4.3-1 applies and allows the suspension of this adjustment until the next power plateau is reached. The assigned Shift Test Director should be notified during testing prior to making any adjustments per this attachment.

11.10.1 If a non-conservative adjustment (indicated power is lowered) is required to be made on CPC and Excore Nuclear Instrumentation, then verify that both of the following conditions are met:

- BDELT (C24104) is within 2% of BTFSP (C24101)
- The average of BDELT (C24104) and BTFSP (C24101) is within 2% of Calorimetric Power

11.10.1.1 If either of these conditions cannot be met, then notify Reactor Engineering (RE) for further evaluation prior to making any adjustment.

11.10.2 If either of the following conditions are not met, then use the applicable power for CORE POWER PMC as specified in Note 9.1 of Attachment 11.1.

- UFM is in service
- Plant is in steady state operation

NOTE
Averages are recommended for accuracy, but are not required.

11.10.3 Record the following data at approximately one minute intervals on Attachment 11.18:

- BSCAL- PMC PID C24230
- HI LINEAR POWERBISTABLE 1 VOLTS
- HIGH LINEAR POWER % VOLT X 20
- PHICAL (Calibrated Neutron Flux Power) CPC PID 171
- BDT (Static Thermal Power) CPC PID 177

11.10.3.1 Calculate and record averages of each parameter on Attachment 11.18.

11.10.4 Record the following data for channel under adjustment on Attachment 11.18:

- TPC (Thermal Power Calibration Constant) CPC PID 064
- KCAL (Neutron Flux Power Cal. Constant) CPC PID 065
- PCALIB (Secondary Calorimetric Power Used in Latest CPC Power Calibration) CPC PID 104
- TC 1 (Loop 1 Cold Leg Temperature) CPC PID 160
- TC 2 (Loop 2 Cold Leg Temperature) CPC PID 161
- TCORF (Temp Shadowing Correction Factor) CPC PID 180
- EXCORE LINEAR POWER CALIBRATE POTENTIOMETER POSITION ROM (may be N/A'd if not using in step 11.10.5)

11.10.5 If Hi Linear Power requires adjustment, then calculate the new DVM reading or new potentiometer position on Attachment 11.18

.

NOTE

Under the following conditions, PHICAL (CPC PID 171) must be adjusted to between +8.0% and +10.0% above the calorimetric power indication (refer to Note 9.8 on Attachment 11.1). This is performed by adding 8.5% (8% to10%) to the average core power value on Attachment 11.18 to obtain an *Adjusted* value that will be used as the Avg. Core Power value in the KCAL (new) calculation (this requirement does not apply during initial power ascension to <80% RTP following refueling): **[CR-WF3-2006-03726]**

- Calorimetric power is between 15% RTP and 80% RTP.

  and

- PHICAL is greater than 10.0% above Calorimetric power.

11.10.6 If KCAL (PHICAL) requires adjustment, then perform the following.

11.10.6.1 Calculate KCAL (new) on Attachment 11.18.

CAUTION

CPC PID 065 (KCAL) limit is 0.7 to 2.0. **[CR-WF3-1998-00919]**

11.10.6.2 If KCAL (new) is $<$ 0.8, then then perform the following: **[CR-WF3-1998-00919, CR-WF3-2015-02641]**

- Generate a Condition Report.
- Notify RXE to complete NE-002-010, Linear Power Subchannel Gain Adjustment.
- Notify PMI that adjustment will be required on the affected channel (PMID 2806).

11.10.6.3 Document new TCREF(CPC PID 098) on Attachment 11.18.

NOTE

Under the following conditions, BDT (CPC PID 177) must be adjusted to between +8.0% and +10.0% above the calorimetric power indication (refer to Note 9.8 on Attachment 11.1). This is performed by adding 8.5% (8% to10%) to the average core power value on Attachment 11.18 to obtain an *Adjusted* value that will be used as the Avg. Core Power value in the TPC calculation (this requirement does not apply during initial power ascension to <80% RTP following refueling): **[CR-WF3-2006-03726]**

- Calorimetric power is between 15% RTP and 80% RTP.

  and

- BDT is greater than 10.0% above Calorimetric power.

11.10.7 If BDT requires adjustment, then Calculate TPC (CPC PID 064) on Attachment 11.18.

DATE _______________ CHANNEL UNDER ADJUSTMENT: A ☐ B ☐ C ☐ D ☐

11.10.3.1 Calculate and record the averages of each parameter in the space provided.

	0	1	2	3	4	Average	Adjusted
BSCAL ① ② PMC PID-C24230							③
HI LINEAR POWER BISTABLE 1 VOLTS							
HIGH LINEAR POWER % VOLT X 20							
PHICAL. (Calibrated Neutron Flux Power) CPC PID 171							
BDT (Static Thermal Power) CPC PID 177							

Calculations Performed by: ____________________ Verified by: ______________________
Signature Signature

① Refer to attachment 11.1 Note 9.1 to determine appropriate power indication <u>if</u> linear power is <u>not</u> ≥35% steady state. Document indication used in Remarks.

② <u>If</u> COLSS is Inoperable, <u>then</u> use NE-005-201, Heat Balance Calculations, to determine Secondary Calorimetric Power substitute <u>when</u> PMC <u>or</u> CORE POWER is specified.

③ *Adjusted* is the average value plus 8.5% (8% to10%) <u>if</u> adjustments are being made to PHICAL and/or BDT as listed in Notes above steps 11.10.6 <u>or</u> 11.10.7 (refer to Attachment 11.1 Note 9.8). Otherwise N/A this block. Use the *Average* value, <u>not</u> the *Adjusted* value, for DVM calculation.

11.10.4 Record the following for channel under adjustment:

TPC (Thermal Power Calibration Constant)
CPC PID 064 .... _______________

KCAL (Neutron Flux Power Cal. Constant)
CPC PID 065 .... _______________

PCALIB (Secondary Calorimetric Power Used in Latest CPC Power Calibration) CPC PID 104 _______________

TC 1 (Loop 1 Cold Leg Temperature)
CPC PID 160 .... _______________

TC 2 (Loop 2 Cold Leg Temperature)
CPC PID 161 .... _______________

TCORF (Temp Shadowing Correction Factor)
CPC PID 180 .... _______________

EXCORE LINEAR POWER CALIBRATE
POTENTIOMETER POSITION ROM .... _______________

11.10.5 Calculate the new DVM reading or new potentiometer position as follows:

DVM (new) =	Avg. Core Power (Step 11.10.3.1)* / 20	=	/ 20

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

DVM (new) =	

or

Potentiometer position (new) =

$$\frac{\text{Avg. Core Power \% (Step 11.10.3.1)* X Old Potentiometer Setting (Step 11.10.4)}}{\text{Avg. Linear Power \% (Step 11.10.4)}}$$

X

* Use the *Average* value from the table of step 11.10.3.1, not the *Adjusted* value.

Potentiometer position (new) = ________________

Performed by: ______________________ **IV** by: ______________________
(Initials) (Initials)

11.10.6.1 Calculate KCAL (new):

KCAL (new)	=	(Step 11.10.3.1)* Avg. Core Power (%) x (step 11.10.4) KCAL x (step 11.10.4) TCORF / Avg. PHICAL (step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.6.

KCAL (new)	=	x x /
KCAL (new)	=	

KCAL (new) = ______________________ (CPC PID 065)

11.10.6.3 New TCREF (CPC PID 098) = Minimum TC from step 11.10.4:
TC 1 (CPC PID 160) or TC 2 (CPC PID 161).

TCREF (new) = ______________________ (CPC PID 098)

Performed by: ______________________ **IV** by: ______________________
(Initials) (Initials)

11.10.7 Calculate TPC (CPC PID 064):

TPC (new)=	Avg. Core Power % (Step 11.10.3.1)* X TPC (Step 11.10.4)
	Avg. BDT (Step 11.10.3.1)

* An *Adjusted* value may be required. Refer to Note preceding step 11.10.7.

TPC (new)=	X

TPC (new) =		(CPC PID 064).

Performed by: ____________________ **IV** by: ____________________
(Initials) (Initials)

11.10.11.1 Record the following:

- Applicable CORE POWER PMC.................................... ____________
- PCALIB CPC PID 104 .... ____________
- HI LINEAR POWER BISTABLE 1 VOLTS..................... ____________
- HI LINEAR POWER % VOLTS x 20 .... ____________
- PHICAL CPC PID 171 .... ____________
- BDT CPC PID 177 .... ____________

11.10.11.2.1 Record answers:

- HI LINEAR POWER %, VOLTS X 20.................... YES/NO ________
- PHICAL, CPC PID 171 .... YES/NO ________
- BDT, CPC PID 177 .... YES/NO ________

11.10.12 Performed by: ____________________ **IV** by: ____________________
(Initials) (Initials)

11.10.13 Reviewed by: ________________________ ____________________
SM/CRS Date/Time

Waterford 3

2015 NRC SRO Exam

JOB PERFORMANCE MEASURE

A7

Review of Containment Pressure Calculation

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review of Containment pressure calculation

Task Standard: Applicant reviewed a calculation for containment pressure in accordance with OP-903-001, Technical Specification Surveillance Logs. The results conform to the answer key. The applicant identified that Tech Spec 3.6.1.4 entry is required and identified the applicable Tech Spec action.

References: OP-903-001, Technical Specification Surveillance Logs
Technical Specification 3.6.1.4

Alternate Path: No Time Critical: No Validation Time: 15 mins.

K/A 2.2.12 Knowledge of Surveillance procedures

Importance Rating 4.1 SRO

Applicant: ______________________

Time Start: ______________ Time Finish: ______________

Performance Time: ______________ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ______________________

Examiner: ______________________ Date: ______________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-903-001, Technical Specification Surveillance Logs
- Copy of Attachment 11.15, Containment Pressure Calculation (performed by the ATC)
- Calculator

Description:

This JPM requires the applicant to verify a containment pressure calculation performed by the ATC.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

TASK ELEMENT 1	STANDARD
11.15.1 Barometric Pressure as measured by PMC (PID C48516). If local reading used, then add 0.05 INHG to obtain a value equivalent to Met Tower PMC point. BP=___________ INHG 11.15.1.2 Record M&TE data on TS Logs Remarks and WR, if applicable	Verified 29.44 entered.
Comment: Applicant should not add .05 INHG because the PMC is operable. If he adds .05 INHG, the final value of this calculation will be greater than the TS limit.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
11.15.2 Containment to Ambient Differential Pressure (PMC PID-A51000) C/A=____________INWC	Verified -5.4 entered
Comment: Value is from initial conditions	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
11.15.3 Convert Barometric Pressure (BP) from INHG to PSIA by performing the following: BP(PSIA) = [BP(INHG) x 0.4912 PSIA/INHG] BP(PSIA) = [______________ INHG x 0.4912 PSIA/INHG] BP(PSIA) = _______________PSIA	Verified BP (PSIA) in the range of 14.46 to 14.461.
Comment: 14.46 is rounded from 14.460928.	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
11.15.4 Convert Containment to Ambient Differential pressure (C/A) from INWC to PSIA by performing the following: C/A(PSIA) = [CA(INWC) x 0.0361 PSIA/INWC] C/A(PSIA) = [______________ INWC x 0.0361 PSIA/INWC] C/A(PSIA) = _______________PSIA	Recognize the wrong number inserted
Comment: -.195 is rounded from -.19494. The applicant should indentify that a positive number has been inserted and calculated for this step. The number is correct but the value should be negative. If this error is not identified, the final value of this calculation will be within TS limits.	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
11.15.5 Calculate Absolute Containment Internal Pressure (CP) by performing the following: CP(PSIA) = BP(PSIA) + C/A(PSIA) CP(PSIA) = _______________ PSIA + ________________ PSIA CP(PSIA) = _________________PSIA	Recognized the error carried forward from the previous step. Corrected value should be 14.265 (14.26-14.27)
Comment: CP(PSIA) should be 14.265 when corrected. This number is below the minimum TS limit.	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
The applicant should identify the corrected value is less than the Technical Specification 3.6.14 limit for containment pressure (14.275 PSIA) and the actions for Technical Specification 3.6.1.4 are required.	Identified corrected value is less than 14.275 PSIA. Identified TS 3.6.1.4 entry and the correct action required.
Comment: The action for TS 3.6.1.4 is to 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. Note: If applicant does not provide the action for TS 3.6.1.4, ask what the action is.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is at 100% power.
- Containment pressure reduction was secured during the previous shift.
- Containment Pressure is -5.4 INWC (PMC Point A51000).
- Barometric Pressure reading is 29.44 INHG as indicated on the PMC (Point C48516).

INITIATING CUE:

- Verify the containment pressure calculation performed by the ATC using OP-903-001, Technical Specification Surveillance Logs and identify any TS actions required, if any.

A7 KEY

11.15 CONTAINMENT PRESSURE CALCULATION

11.15.1 Barometric Pressure as measured by PMC (PID C48516). If local reading used, then add 0.05 INHG to obtain a value equivalent to Met Tower PMC point. BP = ______29.44 INHG

11.15.1.2 Record M&TE data on TS Logs Remarks and WR, if applicable.

11.15.2 Containment to Ambient Differential Pressure (PMC PID-A51000 or CAPIDPI5171 if PID is bad) C/A = ____-5.4___ INWC

11.15.3 Convert Barometric Pressure (BP) from INHG to PSIA by performing the following:

BP(PSIA) = [BP (INHG) X 0.4912 PSIA/INHG]

BP(PSIA) = [______29.44_______ INHG X 0.4912 PSIA/INHG]

BP(PSIA) = ____14.46__________ PSIA

11.15.4 Convert Containment to Ambient Differential Pressure (C/A) from INWC to PSIA by performing the following:

C/A(PSIA) = [C/A (INWC) X 0.0361 PSIA/INWC]

C/A(PSIA) = [__~~5.4~~______**(-5.4)**______ INWC X 0.0361 PSIA/INWC]

C/A(PSIA) = ~~.195~~______**(-.195)**_____ PSIA

11.15.5 Calculate Absolute Containment Internal Pressure (CP) by performing the following:

CP(PSIA) = BP(PSIA) + C/A(PSIA)

CP(PSIA) = _________14.46________ PSIA + ~~.195~~ **(-.195)**___ PSIA

CP(PSIA) = __~~14.655~~__**(14.265)**__ PSIA

11.15.6 Attach this Attachment to Attachment 11.1, Mode 1-4 Technical Specification Surveillance Log.

A7 Student

11.15 CONTAINMENT PRESSURE CALCULATION

11.15.1 Barometric Pressure as measured by PMC (PID C48516). If local reading used, then add 0.05 INHG to obtain a value equivalent to Met Tower PMC point. BP = ___29.44__ INHG

11.15.1.2 Record M&TE data on TS Logs Remarks and WR, if applicable.

11.15.2 Containment to Ambient Differential Pressure (PMC PID-A51000 or CAPIDPI5171 if PID is bad) C/A = ____-5.4___ INWC

11.15.3 Convert Barometric Pressure (BP) from INHG to PSIA by performing the following:

BP(PSIA) = [BP (INHG) X 0.4912 PSIA/INHG]

BP(PSIA) = [______29.44_______ INHG X 0.4912 PSIA/INHG]

BP(PSIA) = ____14.46_________ PSIA

11.15.4 Convert Containment to Ambient Differential Pressure (C/A) from INWC to PSIA by performing the following:

C/A(PSIA) = [C/A (INWC) X 0.0361 PSIA/INWC]

C/A(PSIA) = [_______5.4_______ INWC X 0.0361 PSIA/INWC]

C/A(PSIA) = _____0.195____ PSIA

11.15.5 Calculate Absolute Containment Internal Pressure (CP) by performing the following:

CP(PSIA) = BP(PSIA) + C/A(PSIA)

CP(PSIA) = ________14.46_______ PSIA + ______0.195___ PSIA

CP(PSIA) = _________14.655___ PSIA

11.15.6 Attach this Attachment to Attachment 11.1, Mode 1-4 Technical Specification Surveillance Log.

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ **OSRC** ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-903-001 | REVISION: 061

TITLE: Technical Specification Surveillance Logs

PROCEDURE OWNER (Position Title): Operations Manager - Support

TERM (check one): ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 5/26/2015

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

In steps 11.10.6.2 and 11.10.8.5.1 changed the trigger value of CPC PID 065 (KCAL) for listed notifications (administrative actions) from "<0.75" to "<0.8" A requirement to generate a Condition Report has also been added. The steps, since they contain multiple actions were broken into bullet items for the CR generation and the notifications. Also, the scopes of the notifications to Reactor Engineering (RXE) and PMI were clarified: Rather than just stating that that these groups need to be notified that Linear Channel Sub-Gain needs to be adjusted, it is clarified that RXE is notified to complete NE-002-010, Linear Power Subchannel Gain Adjustment and PMI is notified that adjustment will be required on the affected channel (PMID 2806). This change addresses a communication miss between Operations and RXE as is documented in CR-WF3-2015-02641.

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			David R. Voisin	5/21/2015
EC SUPERVISOR	Administrative Review and Approval		(sign) [signature]	5-22-15
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Operations [Licensed Operator Peer Review]		J.R. Maynard	5/21/2015
	Reactor Engineering		Pamela Hernandez	5/21/2015
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

DATE

DESCRIPTION	NOTE	MODE	T. S.	COMP #	LIMIT		UNITS	0000	1200
Wet Tower A & B Fans 1-4	45.0			CP-33	AUTO <u>or</u> OFF		AUTO, OFF, NA		
Wet Tower A & B Fans 5-8	45.0			CP-33	AUTO <u>or</u> OFF		AUTO, OFF, NA		
CNTMT Internal Press:		1-4	4.6.1.4	A51000/CP-18					
Calculated CNTMT Press	26.1			Step 11.15.5	>14.275		PSIA		
S/D Margin Verification		2*, 3-4							
RCS Temp ≥539°F	1.0		4.1.1.1.1.c 4.1.1.1.1.e 4.1.1.2	OP-903-090 <u>or</u> OP-004-019	See Applicable Procedure		√		
RCS Temp <539°F	1.1		4.1.1.2	OP-903-090	≥ COLR Limit		√		
DESCRIPTION	NOTE	MODE	T. S.	COMP #	LIMIT	Units	SETPOINT		
CNTMT Liquid Leak Rate	16.0	1-4	4.4.5.1.b	SP-IFR-6710	≤1 below setpoint	GPM			

REMARKS: *Mode 2 with the Reactor <u>not</u> Critical.

20.0 Individual CEA positions can be obtained by one of the following methods: (NA if not in Mode 1 or 2)

- PMC hard copy printout
- Attachment 11.8, Technical Specification Addendum Logsheet
- Satisfactory indication of CEA positions via the Excel spreadsheet (Att. 11.20)

If one of the above methods is not available, then record all CEA positions from all three indicating channels on Attachment 11.5, CEA Positions.

21.0 In Modes 1 and 2, two of the three CEA position indicator channels are required to be Operable. Verify all CEA Position Indicator channels are Operable by verifying that for the same CEA, the position indicator channels agree within 5 inches of each other. Position Indicator channels are the RSPT #1 and #2 (CEACs) and the CEA Pulse Counting position indicator channel (PMC). NA if not in Mode 1 or 2.

22.0 N/A if not in Modes 1 or 2. Verify the position of each CEA within 7 inches (indicated position) of all CEAs in its group. If either or both CEACs are Inoperable then verify individual CEA positions at least once per 4 Hours. If both CEACs are Inoperable, then comply with T.S. 3.2.4.b or T.S. 3.2.4.d.

23.0 N/A if not in Modes 1 or 2. Verify each S/D CEA is withdrawn to ≥ 145 inches.

24.0 N/A if not in Modes 1 or 2. Verify CEA Group P withdrawal within the Transient Insertion Limits of the COLR when in Mode 1, or Mode 2 with Keff ≥ once per 8 hours, or with PDIL alarm Inoperable once per 4 hours. Per the COLR, Group P CEA position is unrestricted at <20% power. If withdrawn between the Long Term Steady State and Transient Insertion Limits, then document per Attachment 11.7, Regulating Group and Group P Insertion Limits. **[TS 3.1.3.6]**

25.0 N/A if not in Modes 1 or 2. Verify CEA group withdrawal within the Transient Insertion Limits of the COLR when in Mode 1, or Mode 2 with Keff ≥ 1 once per 8 hours, or with PDIL alarm Inoperable once per 4 hours. In Mode 2 with Keff < 1, verify Estimated Critical Position is within the limits of the COLR within 4 hours prior to achieving Reactor Criticality. If withdrawn between the Long Term Steady State and Transient Insertion Limits, then document per Attachment 11.7, Regulating Group and Group P CEA Insertion Limits. **[TS 3.1.3.6]**

26.0 Verify Containment Pressure within limits of ≥ 0 to ≤ 24.2 INWC by PMC PID A51000 or ≥ 0 to ≤ 23.2 INWC by CP-18 indication in Modes 1-4. If Containment to Ambient Differential Pressure is < 0 INWC, then refer to Note 26.1 and N/A this reading.

26.1 Perform Attachment 11.15, Containment Pressure Calculation. (NA if Containment to Ambient Differential Pressure is ≥ 0 INWC.)

27.0 Verify Containment Purge Isolation Valves Open <90 Hours in the previous 365 Days, while in Modes 1-4.

11.15 CONTAINMENT PRESSURE CALCULATION

11.15.1 Barometric Pressure as measured by PMC (PID C48516). If local reading used, then add 0.05 INHG to obtain a value equivalent to Met Tower PMC point. BP = ____________ INHG

11.15.1.2 Record M&TE data on TS Logs Remarks and WR, if applicable.

11.15.2 Containment to Ambient Differential Pressure (PMC PID-A51000 or CAPIDPI5171 if PID is bad). C/A = __________INWC

11.15.3 Convert Barometric Pressure (BP) from INHG to PSIA by performing the following:

BP(PSIA) = [BP (INHG) X 0.4912 PSIA/INHG]

BP(PSIA) = [__________________ INHG X 0.4912 PSIA/INHG]

BP(PSIA) = __________________ PSIA

11.15.4 Convert Containment to Ambient Differential Pressure (C/A) from INWC to PSIA by performing the following:

C/A(PSIA) = [C/A (INWC) X 0.0361 PSIA/INWC]

C/A(PSIA) = [__________________ INWC X 0.0361 PSIA/INWC]

C/A(PSIA) = __________________ PSIA

11.15.5 Calculate Absolute Containment Internal Pressure (CP) by performing the following:

CP(PSIA) = BP(PSIA) + C/A(PSIA)

CP(PSIA) = ____________________ PSIA + ___________________ PSIA

CP(PSIA) = ____________________ PSIA

11.15.6 Attach this Attachment to Attachment 11.1, Mode 1-4 Technical Specification Surveillance Log.

CONTAINMENT SYSTEMS

INTERNAL PRESSURE

LIMITING CONDITION FOR OPERATION

3.6.1.4 Primary containment internal pressure shall be maintained less than 27 inches H_2O gauge and greater than 14.275 psia.

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.

SURVEILLANCE REQUIREMENTS

4.6.1.4 The primary containment internal pressure shall be determined to be within the limits at least once per 12 hours.

Waterford 3

2015 NRC SRO Exam

JOB PERFORMANCE MEASURE

A8

Authorize Emergency Exposure as the Emergency Coordinator

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Authorize Emergency Exposure as the Emergency Director

Task Standard: Correctly determined that authorization is not appropriate

References: EP-002-030, Emergency Radiation Exposure Guidelines and Controls, Rev 10

Alternate Path: No Time Critical: No Validation Time: 10 mins.

K/A 2.3.4, Knowledge of radiation exposure limits under normal or emergency conditions. Importance Rating 3.7 SRO

Applicant: ____________________

Time Start: ______________ Time Finish: ______________

Performance Time: ______________ minutes
Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____________________

Examiner: ____________________ Date: ______________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- EP-002-030, Emergency Radiation Exposure Guidelines and Controls

Description:

The applicant will review a situation where an event is in progress where a ruptured pipe is required to be isolated and there is a high dose rate present. The applicant should determine based on the given information and the requirements in EP-002-030, Emergency Radiation Exposure Guidelines and Controls that the task would result in exceeding established limits and not authorize the task.

READ TO APPLICANT

DIRECTION TO APPLICANT:

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the Applicant Cue Sheet, and then give the cue sheet to the applicant.)

TASK ELEMENT	STANDARD
Emergency Director reviews EP-002-030, Emergency Exposure Guidelines & Controls, and authorizes emergency exposure if criteria is met.	Candidate determines that emergency exposure limit of 10 REM TEDE would be exceeded (actual calculation would be 13.5 REM TEDE) and does not authorize emergency exposure.
Comment: EXAMINER NOTE: Candidate may state that he could authorize Emergency Exposure if the job could be split between two personnel.	**<u>Critical</u>** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- A ruptured pipe must be isolated in a high radiation area with dose rates of 18 REM/Hour.
- The job will take 45 minutes.
- The only available person to do this task is Joe Operator, SSN # 123-12-4567, Badge # 0303, with Operations.
- Radiation Protection has reported that they can take no action to reduce the dose rate.
- You are the Emergency Coordinator
- This is for Accident mitigation purposes and there are currently NO life saving activities occurring.

INITIATING CUE:

Evaluate authorizing Emergency Exposure as Emergency Director.

- Document all work and results on this sheet.

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	**Normal Review Class** (check one): ☐ **OSRC** ☒ **QUALIFIED REVIEW**

PROCEDURE NUMBER:	EP-002-030		REVISION:	010

TITLE: Emergency Radiation Exposure Guidelines & Controls

PROCEDURE OWNER (Position Title): Emergency Planning Manager

TERM (check one):	☒	**PERMANENT**	☐	**TEMPORARY**
Effective Date / Milestone (if applicable):	2-15-2011			
Expiration Date / Milestone (if applicable):		N/A		

PROCEDURE ACTION (check one):

☒ Revision ☐ Deletion ☐ New Procedure

DESCRIPTION AND JUSTIFICATION:

Changed position titles to correspond to those titles implemented as part of the Entergy Standard Emergency Response Organization implementation. This revision meets the Editorial Correction criteria established in W2.109, Attachment 7.9.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (check one): ☐ Normal ☒ Editorial Correction (Revisions only) ☐ Technical Verification (Revisions only)

REVIEW AND APPROVAL ACTIVITIES					PRINT NAME OR SIGNATURE	DATE
PREPARER					R.J. Perry	1/20/11
EC SUPERVISOR	Administrative Review and Approval				(sign) G.L. Fey/	1/26/11
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)					N/A	
					N/A	
					N/A	
					N/A	
					N/A	
PROCESS APPLICABILITY DETERMINATION	Performed	☐	PA Exclusion	☐	N/A	
TECHNICAL	Review	☐	Verification	☐	N/A	
QUALIFIED REVIEWER	Review	☐			N/A	
GROUP/DEPT. HEAD	Review	☐	Approval	☐	(sign) N/A	
GM, PLANT OPERATIONS	Review	☐	Approval	☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS			Approval	☐	(sign) N/A	

5.0 PROCEDURE

5.1 RADIATION EXPOSURE IN EXCESS OF 10CFR20 LIMITS

NOTE

To the extent practicable, Nuclear Regulatory Commission (NRC) personnel should be consulted prior to authorizing exposures in excess of 10CFR20 limits. Either the NRC Headquarters Duty Officer or Senior NRC Region IV response personnel may be contacted. It is recognized that coordination with the NRC may not be possible in all cases due to the nature of the situation.

5.1.1 The Emergency Plant Manager or EOF Emergency Director determines the need to perform specific tasks which are anticipated to result in exposure in excess of 10CFR20 limits by evaluating the risk of not performing the tasks against the anticipated exposure.

5.2 GUIDELINES FOR EMERGENCY EXPOSURE

5.2.1 Emergency Team members chosen to perform Corrective Actions for accident-mitigating activities shall not exceed the following exposure guidelines:

A. TEDE: 10 rem

B. Extremities: 100 rem

C. Thyroid: 100 rem

D. Lens of Eye: 30 rem

5.2.2 Emergency Team members chosen to perform Life Saving activities shall not exceed the following exposure guidelines except as noted in 5.2.3 below:

A. TEDE: 25 rem

B. Extremities: 250 rem

C. Thyroid: 250 rem

D. Lens of Eye: 75 rem

5.2.3 The limits in section 5.2.2 may be exceeded for Life Saving activities only by volunteers fully aware of the risks involved. (Refer to Attachment 7.1 as necessary.)

5.2.4 Emergency Team Members shall not enter any area where dose rates are unknown or unmeasurable with dose rate instruments.

5.2.5 All reasonable precautions for minimizing the radiological consequences of the emergency action shall be taken (i.e., protective clothing, respiratory protection, thyroid prophylaxis, etc.).

Waterford 3

2015 NRC Exam

JOB PERFORMANCE MEASURE

A9

Classify an Emergency Event

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Classify an Emergency event

Task Standard: Event classified correctly and declared within 15 minutes of JPM start.

References: EP-001-001, Recognition and Classification of Emergency Conditions Rev 30

Alternate Path: No   Time Critical: Yes   Validation Time: 10 mins.

K/A 2.4.41, Knowledge of the emergency action level thresholds and classifications   Importance Rating 4.6 SRO

Applicant: ____________________

Time Start: ____________   Time Finish: ____________

Performance Time: ____________ minutes
Critical Time: 15 minutes

Performance Rating: SAT   UNSAT

Comments: ____________________

Examiner: ____________________   Date: ____________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- EP-001-001, Recognition and Classification of Emergency Conditions

Description:

This JPM requires the applicant to determine the emergency action level from the initial conditions within 15 minutes IAW EP-001-001. The Declaration/Initiating Condition will be FA1 “ANY loss or ANY potential loss of EITHER fuel clad or RCS”. The appropriate EAL can be either RCB2 or RCB3. The JPM will be performed in the classroom using given data obtained from the Initial Conditions.

READ TO APPLICANT

DIRECTION TO APPLICANT:

This is a Time Critical Task

Each administrative JPM has a cue sheet with the instructions for that JPM. Each administrative JPM stands alone, and conditions from 1 JPM do not carry over to any other JPM. If you have any questions, raise your hand and I will come to your desk.

Provide all answers on the sheets provided.

(Read the Initial Condition and Cues from the colored Applicant cue Sheet, and then give the cue sheet and a copy of EP-001-001 to applicant)

EXAMINER NOTE
This JPM will be performed in the classroom using data obtained from the cue sheet provided. Ensure that the applicant turns in all paperwork prior to releasing.

Time Start: ___________

TASK ELEMENT 1	STANDARD
5.2 Classification 5.2.1 Verify the off-normal event to ensure that the event is real.	Determined Event is Real by initial conditions
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
5.2.2 Match the off-normal event with one of the following six emergency categories: 5.2.2.1 Abnormal Radiation Levels/Radiological Effluents TAB A 5.2.2.2 Cold Shutdown/Refueling System Malfunction TAB C 5.2.2.3 ISFSI Malfunction TAB E 5.2.2.4 Fission Product Barrier Degradation TAB F 5.2.2.5 Hazards and Other Conditions Affecting Plant Safety TAB H 5.2.2.6 System Malfunction TAB S	Determined Tab F is applicable
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
5.2.3 Refer to Attachment 7.1 Emergency Categories, under the category TAB selected in step 5.2.2 above; match the off-normal condition with the appropriate IC to determine the emergency classification.	Determined RCS Barrier Loss/Potential loss (FA1)
	Critical **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
5.2.4 If an event or condition existed which met or exceeded an IC but no emergency was declared the basis for the emergency classification no longer exists at the time of the discovery (rapidly concluded event, missed classification or misclassified event), then do not classify the emergency or make offsite notifications. 5.2.4.1 Notify the NRC within one hour of the discovery of the undeclared or misclassified event in accordance with UNT-006-010.	Determined step is N/A
Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
Procedure Note: The effects of combinations of initiating conditions that individually constitute a lower classification may be considered as a possibly higher emergency classification.	Note reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
5.2.5 Declare the highest emergency classification for which an IC has been met or exceeded	Declared Alert based on FA1; EAL RCB3 or RCB2 within 15 minutes of JPM start
Comment: Time Complete: __________ Examiner Note: **TIME CRITICAL STEP**	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

None.

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Plant was operating at 100% when a Steam Generator Tube Rupture occurred.
- Plant conditions:
    - o Steam Generator Tube leakage is 180 gpm
    - o RCS Pressure = 1200 PSIA and dropping
    - o The Condenser Exhaust WRGM reached a release rate of 4 E+2 μCi/sec for 10 minutes and now is trending down.
    - o The only manual actions taken by the crew was tripping the reactor.

INITIATING CUES:

- You are directed to classify and declare this event in accordance with EP-001-001, Recognition and Classification of Emergency Conditions
- This is a time critical task
- Write your Declaration (include Emergency Classification, Initiating Condition and Emergency Action Level(s)) on this sheet

Declaration ____

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☒ OSRC ☐ QUALIFIED REVIEW

PROCEDURE NUMBER: EP-001-001		REVISION: 030

TITLE: Recognition and Classification of Emergency Conditions

PROCEDURE OWNER (Position Title): Emergency Planning Manager

TERM (check one): ☒ PERMANENT ☐ TEMPORARY

Effective Date / Milestone (if applicable): June 19, 2012

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (check one):

☒ Revision ☐ Deletion ☐ New Procedure

DESCRIPTION AND JUSTIFICATION:

Added requirement to section 3.6 to classify emergency conditions within 15 minutes of conditions present to conform to new regulatory requirements. This revision is accordance with NRC amended 10 CFR Part 50, Appendix E, Section IV.C, "Activation of Emergency Organization".

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (check one): ☒ Normal ☐ Editorial Correction (Revisions only) ☐ Technical Verification (Revisions only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			Michael L. Huskey	05-24-12
EC SUPERVISOR	Administrative Review and Approval		(sign) N/A	
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups Functions, Positions, etc.)	Operations		Rick Williams	05-23-12
	Radiation Protection		Dennis Stevens	06-05-12
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☒	OSRC MEETING 03-03	
TECHNICAL	Review ☒	Verification ☐	Ronald J. Perry	06-06-12
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT HEAD	Review ☒	Approval ☐	(sign) B J. Pellegrin/ [signature]	6/18/12
GM, PLANT OPERATIONS	Review ☐	Approval ☒	(sign) [signature]	6/18/12
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

5.0 PROCEDURE

5.1 Definitions

5.1.1 Emergency Class - One of a minimum set of names or titles, established by the Nuclear Regulatory Commission (NRC), for grouping off-normal nuclear power plant conditions according to (1) their relative radiological seriousness, and (2) the time-sensitive onsite and offsite radiological emergency preparedness actions necessary to respond to such conditions. The existing radiological emergency classes, in ascending order of seriousness, are called: Notification of Unusual Event (Unusual Event), Alert, Site Area Emergency, and General Emergency.

5.1.2 Initiating Condition (IC) - One of a predetermined subset of nuclear power plant conditions where either the potential exists for a radiological emergency, or such an emergency has occurred.

5.1.3 Emergency Action Level (EAL) - A pre-determined, site-specific, observable threshold for a plant Initiating Condition that places the plant in a given emergency class. An EAL can be: an instrument reading; an equipment status indicator; a measurable parameter (onsite or offsite); a discrete, observable event; results of analyses; entry into specific emergency operating procedures; or another phenomenon which, if it occurs, indicates entry into a particular emergency class.

5.2 Classification

5.2.1 Verify the off-normal event to ensure that the event is real.

5.2.2 Match the off-normal event with one of the following six emergency categories:

5.2.2.1	Abnormal Radiation Levels/Radiological Effluents	TAB A
5.2.2.2	Cold Shutdown/Refueling System Malfunction	TAB C
5.2.2.3	ISFSI Malfunction	TAB E
5.2.2.4	Fission Product Barrier Degradation	TAB F
5.2.2.5	Hazards and Other Conditions Affecting Plant Safety	TAB H
5.2.2.6	System Malfunction	TAB S

5.2.3 Refer to Attachment 7.1, Emergency Categories, under the category TAB selected in step 5.2.2 above, match the off-normal condition with the appropriate IC to determine the emergency classification.

5.2.4 If an event or condition existed which met or exceeded an IC but no emergency was declared and the basis for the emergency classification no longer exists at the time of the discovery (rapidly concluded event, missed classification or misclassified event), then do not classify the emergency or make offsite notifications.

5.2.4.1 Notify the NRC within one hour of the discovery of the undeclared or misclassified event in accordance with UNT-006-010.

NOTE
The effects of combinations of initiating conditions that individually constitute a lower classification may be considered as a possibly higher emergency classification.

5.2.5 Declare the highest emergency classification for which an IC has been met or exceeded.

5.2.6 Perform the emergency actions in accordance with the appropriate Emergency Plan Implementing Instruction, one of which is provided for each classification, as follows:

5.2.6.1 Unusual Event - EP-001-010

5.2.6.2 Alert - EP-001-020

5.2.6.3 Site Area Emergency - EP-001-030

5.2.6.4 General Emergency - EP-001-040

5.2.7 Assessment actions shall be continued, and if necessary, the emergency classification escalated (or downgraded) as more definitive information becomes available or if the plant conditions change.

6.0 FINAL CONDITIONS

6.1 The plant conditions which activated this instruction have been declassified to non-emergency status.

7.0 ATTACHMENTS

7.1 Emergency Categories

Index of Initiating Conditions

TAB A	Abnormal Radiation Levels/Radiological Effluents
TAB C	Cold Shutdown/Refueling System Malfunction
TAB E	ISFSI Malfunction
TAB F	Fission Product Barrier Degradation
TAB H	Hazards and Other Conditions Affecting Plant Safety
TAB S	System Malfunction

7.2 Waterford 3 EAL Basis Document

8.0 RECORDS

None

INDEX OF INITIATING CONDITIONS

TAB A ABNORMAL RADIATION LEVELS/RADIOLOGICAL EFFLUENTS

1. Releases of gaseous or liquid radioactivity to the environment
2. Unplanned rise in plant radiation/damage to irradiated fuel/loss of water level
3. Rise in radiation levels within the facility that impedes operation of systems required to maintain safe operation

TAB C COLD SHUTDOWN/REFUELING SYSTEM MALFUNCTION

1. RCS Leakage
2. Unplanned loss of RCS/reactor vessel inventory
3. Unplanned loss of decay heat removal capability with irradiated fuel in the reactor vessel
4. Loss of AC power
5. Loss of required DC power
6. Inadvertent criticality
7. Loss of onsite or offsite communications

TAB E ISFSI MALFUNCTION

1. Damage to a loaded cask confinement boundary

TAB F FISSION PRODUCT BARRIER DEGRADATION

1. Loss of Containment, RCS, or Fuel Clad barrier(s)

TAB H HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

1. Security
2. Judgment
3. Control Room evacuation
4. Fire or explosion
5. Toxic, corrosive, asphyxiant or flammable gases
6. Natural or destructive phenomena

GENERAL EMERGENCY	SITE AREA EMERGENCY	ALERT	UNUSUAL EVENT
FISSION PRODUCT BARRIER DEGRADATION			
FG1 Loss of ANY two barriers AND loss or potential loss of the third barrier. 1 2 3 4	**FS1** Loss or potential loss of ANY two barriers. 1 2 3 4	**FA1** ANY loss or ANY potential loss of EITHER fuel clad or RCS. 1 2 3 4	**FU1** ANY loss or ANY potential loss of containment. 1 2 3 4

Plant Modes (white boxes indicate applicable modes) **1 Power Operations** **2 Startup** **3 Hot Standby** **4 Hot Shutdown** **5 Cold Shutdown** **6 Refueling** **D Defueled**

Note: Determine which combination of the three barriers are lost or have a potential loss and use the above key to classify the event. Also, multiple events could occur which result in the conclusion that exceeding the loss or potential loss EALs is IMMINENT. In this IMMINENT loss situation use judgment and classify as if the EALs are exceeded.

SEE FOLLOWING PAGE FOR EALS FOR BARRIER LOSS AND POTENTIAL LOSS

Fuel Clad Barrier EALs

LOSS	POTENTIAL LOSS
1. Safety Function Status (FCB1)	
Core Heat Removal Safety Function **NOT** met	RCS Heat Removal Safety Function **NOT** met
2. Primary Coolant Activity Level (FCB2)	
RCS Dose Equivalent Iodine > 300 µCi/gm as indicated by: a. Dose Rate at one foot from Primary Sample Panel > 950 mR/hr OR b. -4 RAB RADIOCHEMISTRY LAB area radiation monitor (ARM-IRE-5020) > 125 mR/hr OR c. Chemistry sample results	Not Applicable
3. Core Exit Thermocouple Readings (FCB3)	
≥ 1200 degrees F	≥ 700 degrees F
4. Reactor Vessel Water Level (FCB4)	
Not applicable	RVLMS upper plenum level 0%
5. Containment Radiation Monitoring (FCB5)	
Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 1000 R/hr	Not Applicable
6. Emergency Director Judgment (FCB6)	
Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Fuel Clad Barrier	

RCS Barrier EALs

LOSS	POTENTIAL LOSS
1. Safety Function Status (RCB1)	
Not Applicable	a. RCS Pressure Control Safety Function **NOT** met OR b. RCS Heat Removal Safety Function **NOT** met
2. RCS Leak Rate (RCB2)	
RCS leak rate > available makeup capacity as indicated by RCS subcooling < 28° F	UNISOLABLE RCS leak > 44 gpm
3. SG Tube Rupture (RCB3)	
SGTR that results in an ECCS (SI) actuation	Not Applicable
4. Containment Radiation Monitoring (RCB4)	
Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 100 R/hr	Not Applicable
5. Other Indications (RCB5)	
Not Applicable	RCS pressure dropping due to primary relief not reseating
6. Emergency Director Judgment (RCB6)	
Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the RCS Barrier	

Containment Barrier EALs

LOSS	POTENTIAL LOSS
1. Safety Function Status (CNB1)	
Not Applicable	Containment Temperature and Pressure Control Safety Function **NOT** met
2. Containment Pressure (CNB2)	
a. Rapid unexplained drop in containment pressure following an initial rise in containment pressure OR b. Containment pressure or sump level response not consistent with LOCA conditions	a. Containment pressure > 50 PSIA and rising OR b. Explosive mixture exists inside containment OR c. 1. Containment pressure > 17.7 PSIA AND 2. LESS THAN one full train of Containment Spray operating (1750 gpm)
3. Core Exit Thermocouple Readings (CNB3)	
Not Applicable	a. 1. Core exit thermocouples >1200 degrees F AND 2. restoration procedures not effective within 15 minutes OR b. 1. Core exit thermocouples > 700 degrees F AND 2. RVLMS upper plenum level equal to 0% or LOWER AND 3. Restoration procedures not effective within 15 minutes
4. SG Secondary Side Release With Primary-to-Secondary Leakage (CNB4)	
a. RUPTURED SG is also FAULTED outside of containment OR b. 1. Primary-to-Secondary leakrate > 10 gpm AND 2. UNISOLABLE steam release from affected SG to the environment	Not Applicable
5. Containment Isolation Failure or Bypass (CNB5)	
a. UNISOLABLE breach of containment AND b. Direct downstream pathway to the environment exists after containment isolation signal.	Not Applicable
6. Containment Radiation Monitoring (CNB6)	
Not Applicable	Containment High Range Radiation Monitor (ARM-IRE-5400AS or ARM-IRE-5400BS) > 4000 R/hr.
7. Emergency Director Judgment (CNB7)	
Any condition in the opinion of the Emergency Director that indicates Loss or Potential Loss of the Containment Barrier	

FISSION PRODUCT BARRIER DEGRADATION

FU1 – Initiating Condition – NOTIFICATION OF UNUSUAL EVENT

ANY loss or ANY Potential Loss of Containment.

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

FA1 – Initiating Condition – Alert

ANY loss or ANY Potential Loss of EITHER Fuel Clad or RCS

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

FS1 – Initiating Condition – Site Area Emergency

Loss or Potential Loss of ANY two barriers

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

FG1 – Initiating Condition – General Emergency

Loss of ANY two Barriers AND Loss or Potential Loss of the third barrier

Operating Mode Applicability: Power Operations (Mode 1)
Startup (Mode 2)
Hot Standby (Mode 3)
Hot Shutdown (Mode 4)

FISSION PRODUCT BARRIER DEGRADATION

RCS Leak Rate (RCB2)

Loss: RCS leak rate > available makeup capacity as indicated by RCS subcooling < 28° F.

Potential Loss: UNISOLABLE RCS leak > 44 gpm.

Basis:

Loss

This EAL addresses conditions where leakage from the RCS is greater than available inventory control capacity such that a loss of subcooling has occurred. The loss of subcooling is the fundamental indication that the inventory control systems are inadequate in maintaining RCS pressure and inventory against the mass loss through the leak.

Potential Loss

This EAL is based on the apparent inability to maintain normal liquid inventory within the RCS by normal operation of the Chemical and Volume Control System which is considered to be the flow rate equivalent to one charging pump discharging to the charging header. Isolating letdown is a standard abnormal operating procedure action and may prevent unnecessary classifications when a non-RCS leakage path such as a CVCS leak exists. The intent of this condition is met if attempts to isolate Letdown are NOT successful. Additional charging pumps being required is indicative of a substantial RCS leak.

RCS Barrier Emergency Action Levels:

SG Tube Rupture (RCB3)

Loss: SGTR that results in an ECCS (SI) actuation

Potential Loss: Not Applicable

Basis:

This EAL addresses the full spectrum of Steam Generator (SG) tube rupture events in conjunction with Containment barrier Loss EALs. It addresses RUPTURED SG(s) for which the leakage is large enough to cause actuation (either automatic or manual) of ECCS (SI). This is consistent to the RCS leak rate barrier Potential Loss EAL.

By itself, this EAL will result in the declaration of an Alert. However, if the SG is also FAULTED (i.e., two barriers failed), the declaration escalates to a Site Area Emergency in accordance with Containment barrier Loss EAL CNB3.

There is no Potential Loss EAL associated with this item.

Waterford 3

2015 NRC RO/SRO Exam

JOB PERFORMANCE MEASURE

S1

ATC Immediate Operator Actions on 2 Dropped CEAs

Applicant: ________________________________

Examiner: ________________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: ATC Immediate Operator Actions on 2 Dropped CEAs

Task Standard: Applicant tripped the reactor using 32 A and 32 B breakers in accordance with OP-902-000, Standard Post Trip Actions.

References: OP-901-102, CEA or CEDMCS Malfunction
OP-902-000, Standard Post Trip Actions

Alternate Path: Yes Time Critical: No Validation Time: 2 mins.

K/A 001 A2.13, ATWS Importance Rating 4.4 / 4.6
RO / SRO

Applicant: ______________________

Time Start: ______________ Time Finish: ______________

Performance Time: ______________ minutes
Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____

____

____

Examiner: ______________________ Date: ______________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

None

Description:

Applicant will position himself as the ATC operator at CP-2. CEAs 79 and 86 will drop into the core. The applicant should notice the condition, announce the condition, and trip the reactor without direction. The normal reactor trip pushbuttons will not function. The applicant should move to the first contingency and use the Diverse Reactor Trip pushbuttons. One of these buttons is faulted. The DRTS alarms will come in, but the CEA MG set load contactors will not open. The applicant should then move to the second contingency, and open both 32 Bus Feeder breakers, and reclose them 5 seconds later. The task should be stopped after the applicant completes the immediate operator actions for the ATC position.

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is at 100% power.

INITIATING CUES:

- Respond to conditions observed.
- Perform actions as required by the ATC operator.

Evaluator Note
1. All of the listed steps are from OP-901-102, CEA or CEDMCS Malfunction, and OP-902-000, Standard Post Trip Actions, but the applicant is required to perform the listed steps from memory. 2. Direct simulator operator to initiate trigger 1 when ready to begin.

TASK ELEMENT 1	STANDARD
OP-901-102 D.1. If in Mode 1 and two or more Control Element Assemblies drop or are misaligned by > 19 inches, then manually trip the Reactor and go to OP-902-00, Standard Post Trip Actions.	Pushes both reactor trip pushbuttons on CP-2 or CP-8.
Comment: Trip pushbuttons are faulted and Reactor Trip Circuit Breakers will not open. Applicant determines 2 CEAs have dropped, attempts to trip the reactor from CP-2 or CP-8	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
OP-902-000 1.a.1.2 Manually initiate DIVERSE REACTOR TRIP.	Pushes both DRTS pushbuttons on CP-2.
Comment: One DRTS pushbutton is faulted and CEA MG set load contactors will not open.	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
OP-902-000 1.a.1.3 Open **BOTH** the following breakers for 5 seconds and close: • SST A32 FEEDER • SST B32 FEEDER	Opens SST A32 FEEDER and SST B32 FEEDER breakers for 5 seconds and then re-closes both breakers.
Comment: Evaluator: If applicant stops after re-closing the A and B 32 Feeder breakers, prompt him as the CRS to perform his Standard Post Trip Actions.	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
1. Determine Reactivity Control acceptance criteria are met: • <u>Check</u> reactor power is dropping. • <u>Check</u> startup rate is negative. • <u>Check</u> less than **TWO** CEAs are **NOT** fully inserted.	Verifies listed parameters.
Comment: Evaluator: Notify the applicant that the JPM is complete after the Reactivity Control Acceptance criteria is complete.	**SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-164

Verify the following Malfunctions:

- No Trigger
    - RP01A, RPS manual pushbutton a
    - RP01B, RPS manual pushbutton b
    - RP01C, RPS manual pushbutton c
    - RP01D, RPS manual pushbutton d
    - M_K04 Fail off

- Trigger 1:
    - RD02A79, dropped CEA 79
    - RD02A86, dropped CEA 86

Verify the following Overrides:

- No Trigger
    - DI-02A06S02-1, DRT pushbutton 1 of 2 to “OFF”

Coordinate with examiner to initiate Trigger 1 on his cue.

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ OSRC ☑ QUALIFIED REVIEWER

PROCEDURE NUMBER: OP-901-102		REVISION: 302

TITLE: CEA or CEDMCS Malfunction

PROCEDURE OWNER (Position Title) :Operations Manager - Support

TERM (check one) : ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 7/3/14

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one) :

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

This Revision changes step 11 of Subsection E1 to remove the Az Tilt limit of 0.03 referenced in the step. The step was changed to direct referencing the COLR for the TS Limit. The step was also reworded to direct complying with TS 3.2.3.b if this limit is exceeded. EC-51582 changed the COLR limit for Azimuthal Tilt from 0.03 to 0.05 as a result of CR-WF3-2014-3332. There is no reason to have the limit listed in the off-normal procedure since it may change and can easily be looked up in the TS/COLR. Additionally, the previous wording of the step did a poor job of summarizing compliance with the TS, so the step was changed to reference the TS Action for compliance.

This procedure change does not change the performance or intent of any procedural steps. It merely removes unnecessary procedural detail that can be obtained from another controlled document (TS/COLR). This change, therefore, meets Editorial Correction criteria.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES		PRINT NAME OR SIGNATURE	DATE
PREPARER		David F. Litolff	6/30/2014
EC SUPERVISOR	Administrative Review and Approva	(sign)	7-1-14
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Reactor Engineering	Chris Eastus	7/1/2014
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐ PA Exclusion ☐	N/A	
TECHNICAL	Review ☐ Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐	N/A	
GROUP/DEPT. HEAD	Review ☐ Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐ Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS	Approval ☐	(sign) N/A	

D IMMEDIATE OPERATOR ACTIONS

1. If in Mode 1 and two or more Control Element Assemblies drop or are misaligned by >19 inches, then manually trip the Reactor and go to OP-902-000, Standard Post Trip Actions.

4.0 INSTRUCTIONS/CONTINGENCY ACTIONS

INSTRUCTIONS	CONTINGENCY ACTIONS
Verify Reactivity Control	
___1. Determine Reactivity Control acceptance criteria are met:	
___a. Check reactor power is dropping.	a.1 Perform the following as necessary to insert CEAs: 1) Manually trip the reactor. 2) Manually initiate DIVERSE REACTOR TRIP. 3) Open **BOTH** the following breakers for 5 seconds and close: • SST A32 FEEDER • SST B32 FEEDER
___b. Check startup rate is negative.	
___c. Check less than **TWO** CEAs are **NOT** fully inserted.	c.1 Commence emergency boration.

Waterford 3

2015 NRC RO Exam

JOB PERFORMANCE MEASURE

S2

Charging to the RCS via the HPSI Header

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: ATC aligns Charging to HPSI Header A

Task Standard: Applicant establishes charging flow to HPSI header A in accordance with OP-901-112, Charging or Letdown Malfunction

References: OP-901-112, Charging or Letdown Malfunction, revision 6

Alternate Path: No   Time Critical: No   Validation Time: 9 mins.

K/A 004 A4.08, Charging   Importance Rating 3.8 / 3.4
RO / SRO

Applicant: ______________________

Time Start: ____________   Time Finish: ____________

Performance Time: ____________ minutes
Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ______________________

Examiner: ______________________ Date: ____________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-901-112, Charging or Letdown Malfunction

Description:
This task is performed at CP-8 and CP-4. The operator aligns charging flow to High Pressure Safety Injection (HPSI) Header A due to a rupture of the charging line inside containment. The operator will perform step 6 of section E1 (Charging Malfunction) of OP-901-112, Charging or Letdown Malfunction.

This JPM is to be performed concurrently with JPM S8.

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in Mode 3
- The normal charging path is not available due to a break downstream of CVC-209.
- The crew is responding in accordance with OP-901-112, Charging or Letdown Malfunction.
- Letdown Stop Valve (CVC-101) is closed and all Charging Pumps are in OFF in accordance with Section E1, step 5, Charging or Letdown Malfunction.
- Tech Spec implications for this event have already been addressed.

INITIATING CUES:

- The CRS has directed you to align Charging to the RCS via the HPSI Header in accordance with OP-901-112, Charging or Letdown Malfunction, sect. E1 step 6.
- Once Charging is aligned to the HPSI Header, you are directed to maintain pressurizer level 33%-35%.

Evaluator Note
1. Cue the Simulator Operator to place the Simulator in RUN.

TASK ELEMENT 1	STANDARD
Procedure Caution: IF HPSI PUMPS ARE OPERATING, THEN CHARGING PUMPS SHOULD NOT BE ALIGNED TO HPSI HEADER.	Caution reviewed and HPSI pumps are verified to be not operating.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Procedure Note: Aligning Charging to HPSI Train A renders HPSI train A INOPERABLE and Charging Pumps INOPERABLE. Enter TS 3.5.2 and 3.1.2.4. Refer to TS 3.5.3.	Note reviewed.
Comment: Examiner Note: Initial conditions states that TS have already been addressed.	**SAT / UNSAT**

6. IF flow can NOT be established through the normal Charging Pump discharge path, THEN align Charging Pumps to discharge through HPSI Header A as follows:

TASK ELEMENT 3	STANDARD
6.1 Locally open CHARGING HEADER XCONN TO HPSI HEADER A ISOLATION (SI 504) (-35 Wing Area, Col. 6A & L).	Directs NAO to open SI-504.
Comment: Examiner Note: Cue the booth operator to initiate trigger 2 to open SI-504 Examiner Cue: Inform the applicant that SI-504, Charging Header Xconn to HPSI Header A Isolation, has been opened.	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
6.2 Open <u>ONE</u> of the following Train A HPSI COLD LEG INJECTION valves: • 1A (SI 225A) • 1B (SI 226A) • 2A (SI 227A) • 2B (SI 228A)	Applicant opens one of the listed Train A HPSI Cold Leg Injection valves.
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
6.3 Locally open CHARGING PUMPS DISCHARGE TO HPSI ISOLATION (CVC 199) (Charging Pump Room A).	Directs the NAO to open CVC-199
Comment: Examiner Note: Cue the booth operator to initiate trigger 3 to close CVC-199. Examiner Cue: Inform the applicant that CHARGING PUMPS DISCHARGE TO HPSI ISOLATION (CVC 199) is closed.	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
Procedure Note: Charging Header flow will not indicate with CHARGING PUMPS HEADER ISOLATION VALVE (CVC 209) closed.	Reviewed note
Comment:	**SAT / UNSAT**

TASK ELEMENT 7	STANDARD
6.4 Close Charging Pumps Header Isolation Valve (CVC 209).	Applicant closes CVC 209.
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
6.5 Operate Charging Pumps as necessary to maintain Pressurizer level within the limits of Attachment 1, Pressurizer Level Versus Tave Curve.	Applicant starts at least one Charging Pump
Comment: Examiner Note: The applicant may ask the CRS if he desires the seal package running before starting the Charging Pump. Inform the applicant it is not required to start the seal package. Examiner Note: Loop 1A, 1B, 2A or 2B INJ LINE CHECK VLV LEAKAGE on Cabinet M or Cabinet N is an expected alarm depending on which HPSI FCV was opened. Examiner Note: The JPM is complete when at least one Charging Pump has been started. If applicant asks which Charging pump should be started, inform applicant to start Charging pump B.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-165
2. For 2015 NRC Exam, JPM S8 is performed concurrently.
3. Verify the following Malfunction:
    a. CV16 10% severity inserted (active)
4. Verify the following Overrides:
    b. None
5. Verify the following Remotes
    c. SIR05 for SI-504 on event Trigger 2
    d. CVR 27 for CVC-199 on event Trigger 3

Setup with specific IC unavailable or for non NRC/AUDIT exams:

1. *Reset the simulator to an IC in Mode 3*
2. *Insert malfunction CV16 with a 10% severity*
3. *Place all Charging pumps in OFF and close CVC-101*
4. *Allow simulator to run until all conditions stabilize*
5. *Acknowledge annunciators*
6. *Place simulator in freeze and save IC*

E_1 CHARGING MALFUNCTION (CONT'D)

CAUTION

IF HPSI PUMPS ARE OPERATING, THEN CHARGING PUMPS SHOULD NOT BE ALIGNED TO HPSI HEADER.

NOTE

Aligning Charging to HPSI Train A renders HPSI train A INOPERABLE and Charging Pumps INOPERABLE. Enter TS 3.5.2 and 3.1.2.4. Refer to TS 3.5.3.

	PLACEKEEPER START	DONE	N/A
6. IF flow can NOT be established through the normal Charging Pump discharge path, THEN align Charging Pumps to discharge through HPSI Header A as follows:	☐	☐	☐
6.1 Locally open CHARGING HEADER XCONN TO HPSI HEADER A ISOLATION (SI 504) (-35 Wing Area, Col. 6A & L).	☐	☐	
6.2 Open ONE of the following Train A HPSI COLD LEG INJECTION valves: • 1A (SI 225A) • 1B (SI 226A) • 2A (SI 227A) • 2B (SI 228A)	☐	☐	
6.3 Locally open CHARGING PUMPS DISCHARGE TO HPSI ISOLATION (CVC 199) (Charging Pump Room A).	☐	☐	

E$_1$ CHARGING MALFUNCTION (CONT'D)

	PLACEKEEPER		
	START	DONE	N/A

NOTE

Charging Header flow will not indicate with CHARGING PUMPS HEADER ISOLATION VALVE (CVC 209) closed.

	START	DONE	N/A
6.4 Close Charging Pumps Header Isolation Valve (CVC 209).	☐	☐	
6.5 Operate Charging Pumps as necessary to maintain Pressurizer level within the limits of Attachment 1, Pressurizer Level Versus Tave Curve.	☐	☐	
7. WHEN repairs have been completed to the Charging Header, THEN restore Charging Pumps discharge alignment to normal as follows:	☐	☐	
7.1 Stop ALL Charging Pumps.	☐	☐	
7.2 Restore HPSI Header as follows:	☐	☐	
7.2.1 Locally close CHARGING HEADER XCONN TO HPSI HEADER A ISOLATION (SI 504) (-35 Wing Area, Col. 6A & L).	☐	☐	
7.2.2 Verify closed the following Train A HPSI COLD LEG INJECTION valves: • 1A (SI 225A) • 1B (SI 226A) • 2A (SI 227A) • 2B (SI 228A)	☐	☐	
7.2.3 Locally close CHARGING PUMP DISCHARGE TO HPSI ISOLATION (CVC 199) (Charging Pump Room A).	☐	☐	

REQUEST/APPROVAL PAGE

SAFETY RELATED
PROCEDURE

Normal Review Class (check one):

☐ **OSRC**

☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-901-112		REVISION: 006

TITLE: Charging or Letdown Malfunction

PROCEDURE OWNER (Position Title): Operations Manager - Support

TERM (check one): ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 3/18/15

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ Revision ☐ Deletion ☐ New Procedure

DESCRIPTION AND JUSTIFICATION:

Added additional information to the note in step E2 (6) to address CR-WF3-2013-264.

Added UNID and Nomenclature to Attachment 2 steps 13 and 14.

This procedure change adds information only and serves to enhance the procedure. This change does not alter the intent of the procedure and merely replaces missing nomenclature information. This change meets the criteria of an Editorial Correction.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ Normal ☑ Editorial Correction (Revisions Only) ☐ Technical Verification (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			Nicole Blank	3/17/2015
EC SUPERVISOR	Administrative Review and Approval		(sign) [signature]	3-17-15
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

E1 CHARGING MALFUNCTION (CONT'D)

CAUTION

IF HPSI PUMPS ARE OPERATING, THEN CHARGING PUMPS SHOULD NOT BE ALIGNED TO HPSI HEADER.

NOTE

Aligning Charging to HPSI Train A renders HPSI train A INOPERABLE and Charging Pumps INOPERABLE. Enter TS 3.5.2 and 3.1.2.4. Refer to TS 3.5.3.

	PLACEKEEPER		
	START	DONE	N/A
6. IF flow can NOT be established through the normal Charging Pump discharge path, THEN align Charging Pumps to discharge through HPSI Header A as follows:	☐	☐	☐
6.1 Locally open CHARGING HEADER XCONN TO HPSI HEADER A ISOLATION (SI 504) (-35 Wing Area, Col. 6A & L).	☐	☐	
6.2 Open ONE of the following Train A HPSI COLD LEG INJECTION valves: • 1A (SI 225A) • 1B (SI 226A) • 2A (SI 227A) • 2B (SI 228A)	☐	☐	
6.3 Locally open CHARGING PUMPS DISCHARGE TO HPSI ISOLATION (CVC 199) (Charging Pump Room A).	☐	☐	

E1 CHARGING MALFUNCTION (CONT'D)

	PLACEKEEPER		
	START	DONE	N/A

NOTE

Charging Header flow will not indicate with CHARGING PUMPS HEADER ISOLATION VALVE (CVC 209) closed.

	START	DONE	N/A
6.4 Close Charging Pumps Header Isolation Valve (CVC 209).	☐	☐	
6.5 Operate Charging Pumps as necessary to maintain Pressurizer level within the limits of Attachment 1, Pressurizer Level Versus Tave Curve.	☐	☐	
7. <u>WHEN</u> repairs have been completed to the Charging Header, <u>THEN</u> restore Charging Pumps discharge alignment to normal as follows:	☐	☐	
7.1 Stop <u>ALL</u> Charging Pumps.	☐	☐	
7.2 Restore HPSI Header as follows:	☐	☐	
7.2.1 Locally close CHARGING HEADER XCONN TO HPSI HEADER A ISOLATION (SI 504) (-35 Wing Area, Col. 6A & L).	☐	☐	
7.2.2 Verify closed the following Train A HPSI COLD LEG INJECTION valves: • 1A (SI 225A) • 1B (SI 226A) • 2A (SI 227A) • 2B (SI 228A)	☐	☐	
7.2.3 Locally close CHARGING PUMP DISCHARGE TO HPSI ISOLATION (CVC 199) (Charging Pump Room A).	☐	☐	

Waterford 3

2015 NRC RO Exam

JOB PERFORMANCE MEASURE

S3

Place Shutdown Cooling Train B in Service

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Place Shutdown Cooling Train B in Service

Task Standard: Applicant places Shutdown Cooling Train B in service in accordance with OP-009-005 and secures Low Pressure Safety Injection Pump B after SI-405B fails closed.

References: OP-009-005, Shutdown Cooling
OP-901-131, Shutdown Cooling Malfunction

Alternate Path: Yes Time Critical: No Validation Time: 20 mins.

K/A 005 A4.01, Controls and indication for RHR pumps Importance Rating 3.6 / 3.4
RO / SRO

Applicant: ______________________________

Time Start: __________________ Time Finish: __________________

Performance Time: __________________ minutes
Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ______________________________

____

____

Examiner: ______________________________ Date: ______________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-009-005, Shutdown Cooling

Description:

This task is performed at CP-8. The applicant must place Shutdown Cooling Train B in service. The fault in this task is that SI-405B, RC Loop 2 SDC Suction Inside Containment Isol, will fail closed, requiring the applicant to secure Low Pressure Safety Injection Pump B. The task can be stopped after LPSI Pump B is secured.

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet (next page), and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in Mode 4
- Protected Train is B
- RCS temperature is approximately 322 °F
- RCS pressure is approximately 370 PSIA
- Shutdown Cooling Train A is in service.
- SDC Train B suction penetration piping has been manually vented in accordance with Attachment 11.7, Manual Venting of SDC Train Suction Penetration Piping.
- Shutdown Cooling Train B has been placed in Standby in accordance with OP-009-005, Shutdown Cooling, section 5.4.

INITIATING CUE:

- The CRS has directed you to place Shutdown Cooling Train B in service in accordance with OP-009-005, section 6.2.

TASK ELEMENT 1	STANDARD
Procedure Caution: THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Procedure Note: (1)The Shutdown Cooling Train placed in service should be on the Protected Train. (2) The SDC loop may be removed from operations for up to one hour per 8-hour period during the performance of Core Alterations in the vicinity of the reactor pressure vessel hot legs, <u>provided</u> no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the minimum required boron concentration of Technical Specification 3.9.1.	Notes reviewed.
Comment: Protected Train is B as given in initial conditions.	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
Procedure Caution: Following a design basis tornado event, delaying the initiation of Shutdown Cooling (SDC) for up to 7 days will be required to ensure the Component Cooling Water System is capable of removing Reactor Coolant System decay heat. The actual delay time will depend on UHS damage and ambient temperature and will be determined by engineering. Emergency Feedwater supports decay heat removal until SDC can be initiated.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
6.2.1: Verify Shutdown Cooling Train B has been aligned to Standby condition in accordance with Section 5.4, Alignment of Shutdown Cooling Train B to Standby Condition.	Notes Section 5.4 is complete and continues in procedure.
Comment: Cue sheet lists this as complete.	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
6.2.2: Verify sufficient number of Dry Cooling Tower Fans running to accept increased heat load on CCW System.	Continues in procedure after cue.
Comment: **EVALUATOR CUE:** Inform the applicant to leave the Dry Cooling Tower Fans in automatic and allow Auxiliary Component Cooling Water to pick up the heat load.	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
Procedure Caution: (1)CC-963B is required to be maintained open while in Mode 4 to preserve the design temperature basis of piping and associated components at the CCW outlet of shutdown cooling heat exchanger B. With CC-963B open, flow through Shutdown Cooling Heat Exchanger A will be maintained above 2305 gpm. (2) Shutdown Heat Exchanger B CCW Flow Control, CC-963B, is also required to remain open if LPSI pump B discharge flow control, SI-129B has been forced closed per OP-009-008 following a loss of instrument air.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 7	STANDARD
6.2.3: Place Shutdown HX B CCW Flow Control, CC-963B, control switch to Open.	CC-963 B control switch taken to the open position.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
Procedure Caution: (1) The following Reactor Coolant System limits shall be met for Shutdown Cooling Entry: • RCS temperature limit: < 350 °F • RCS pressure limit: < 392 psia • If Containment harsh environment conditions (>200°F) have been exceeded then RCS pressure limit: <358 Psia (2) If Containment Spray Header B Isolation, CS-125 B, is open while Shutdown Cooling Train B is operating, then Containment Spray B riser may fill and possibly spray water into Containment, due to leakage past Containment Spray Pump A discharge stop check, CS-117B.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 9	STANDARD
6.2.4: To minimize the effect of air introduction to a LPSI pump Verify RC Loop 2 SDC suction piping meets <u>one</u> of the following conditions: ▪ The SDC Train is placed in-service with RCS pressure $\geq$ 100 PSIA by PMC indication (PIDs A12203, A12204, A12222) or $\geq$ 110 PSIA by board indication (RC-IPI0103,-0104,-0105,-0106). <u>or</u> ▪ The SDC Train's suction penetration has been manually vented. Venting should be accomplished through SI-4051B using RCS/Cavity as water source in accordance with Attachment 11.7, Manual Venting of SDC Train Suction Penetration Piping. <u>or</u> ▪ The SDC Train was previously in-service since the unit has been shutdown.	One of the conditions is verified. Cue sheet lists SDC Train B suction penetration has been manually vented in accordance with Attachment 11.7 (satisfies second bullet).
Comment:	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
6.2.5: Unlock <u>and</u> Open RC Loop 1 SDC Suction Outside Containment Isol, SI-407B.	SI-407 B is open.
Comment: Key 142 required.	<u>**Critical**</u> **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
6.2.6: Inform Radiation Protection Department that Shutdown Cooling Train B is being placed in service.	Call is made.
Comment:	**SAT / UNSAT**

TASK ELEMENT 12	STANDARD
6.2.7: Start LPSI Pump B.	LPSI Pump B is started.
Comment: Annunciator LPSI Pump B Flow Lost (Cabinet N, F-13) is expected. It will clear when the applicant raises flow > 2900 gpm.	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 13	STANDARD
Procedure Note: If Instrument Air is unavailable, LPSI Pump B Discharge Flow Control, SI-129B, will need to be operated locally per OP-009-008. If the safeguards rooms are inaccessible (post RAS), LPSI Pump B Discharge Flow Control, SI-129B, must be remotely forced closed per OP-009-008. In this case, SDC flow/temperature will need to be controlled using Shutdown Cooling HX B Temperature Control, SI-415B.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 14	STANDARD
6.2.8: Raise Shutdown Cooling flow by Manually adjusting LPSI Header Flow controller 1A/1B, SI-IFIC-0306, output <u>until</u> Shutdown Cooling Header B Flow indicates 4100 GPM, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.	Flow is raised to ~ 4100 GPM.
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 15	STANDARD
6.2.9: Adjust LPSI Header Flow Controller 1A/1B, SI-IFIC-0306, setpoint potentiometer to 73%, <u>and</u> place controller to AUTO.	Setpoint potentiometer is ~ 73%, and controller is in AUTO
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 16	STANDARD
6.2.10: Verify LPSI Header Flow Controller 1A/1B, SI-IFIC-0306, is maintaining 4100 GPM Shutdown Cooling Header A flow, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.	Flow is verified.
Comment:	**SAT / UNSAT**

TASK ELEMENT 17	STANDARD
Procedure note: If a sample was drawn prior to shutdown <u>and</u> no interim shutdown has occurred where SDC was placed in service and boron concentration could have been reduced, then sampling is not required.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 18	STANDARD
6.2.11: At SM/CRS discretion, direct Chemistry Department to sample Shutdown Cooling Train B for boron concentration.	None
Comment: **EVALUATOR CUE:** When requested provide information to applicant that all required Chemistry requirements are met.	**SAT / UNSAT**

TASK ELEMENT 19	STANDARD
Procedure Note: Shutdown Cooling Train B requires one operable Low Pressure Safety Injection Flow Control Valve for the train to be operable.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 20	STANDARD
Procedure Caution: The Reactor Coolant System shall not exceed the 100 °F per hour cooldown rate of Technical Specification 3.4.8.1.	Caution reviewed.
Comment: Examiner Note: If asked, state that another operator is tracking cooldown rates.	**SAT / UNSAT**

6.2.12 Raise Shutdown Cooling Train B temperature to within 100 °F of Reactor Coolant Hot temperature as follows:

TASK ELEMENT 21	STANDARD
6.2.12.1: Open the following valves: • SI-139B LPSI Header to RC Loop 1A Flow Control • SI-138B LPSI Header to RC Loop 1B Flow Control	SI-139 B and SI-138 B are open.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 21	STANDARD
6.2.12.2: Throttle Closed RC Loop 1 Shdn Cooling Warmup, SI-135B, until one of the following is within 100°F of Shutdown Cooling Train B temperature, as indicated by LPSI Pump B Discharge Header Temperature Indicator, SI-ITI-0352X: ▪ Hot Leg 1 temperature, as indicated by RC Loop 1 Hot Leg Temperature Indicator, RC-ITI-0112-HB or ▪ Hot Leg 2 temperature, as indicated by RC Loop 2 Hot Leg Temperature Indicator, RC-ITI-0122-HA	Temperature is within 100 °F
Comment: SI-135 B is a large gate valve with a very long stroke.	**Critical** **SAT / UNSAT**

TASK ELEMENT 22	STANDARD
6.2.12.3: Close RC Loop 2 Shdn Cooling Warmup, SI-135 B.	SI-135 B is closed
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
Coordinate with the simulator operator to initiate trigger 1 to close SI-405 B.

TASK ELEMENT 23	STANDARD
Secure LPSI Pump B	LPSI Pump B is off.
Comment: This is an immediate operator action in accordance with OP-901-131, Shutdown Cooling Malfunction, section D.1.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-167

Verify the following Malfunctions:

- SI23B for SI-405B on Trigger 1

Coordinate with the examiner so that when SI-135 B is fully closed at step 6.2.12.3, Trigger 1 is initiated to close SI-405B. (Use Extreme View to monitor SI-135B position)

3.0 PRECAUTIONS AND LIMITATIONS

3.1 PRECAUTIONS

3.1.1 The maximum temperature for Purification Ion Exchanger(s) is 140°F.

3.1.2 If Letdown to Ion Exchangers Inlet/Bypass, CVC-140, is in AUTO then Purification Ion Exchangers will automatically bypass at 140°F.

3.1.3 The following applies to Shutdown Cooling flow:

3.1.3.1 A total minimum Shutdown Cooling flow necessary to remove decay heat and prevent boron stratification should be maintained at all times.

3.1.3.2 When considering the minimum Shutdown Cooling flow required to adequately remove decay heat and prevent boron stratification, then the flow from the operating Shutdown Cooling train or the combined flow of both operating Shutdown Cooling trains may be used.

3.1.3.3 The required minimum Shutdown Cooling flow for Modes 5 and 6 are as follows:

TIME AFTER SHUTDOWN (HOURS)	REQUIRED FLOW (GPM)
0 - <175 hours ①	≥4000 GPM
≥175 - <375 hours	≥3000 GPM
≥375 hours	≥2000 GPM

① If the Reactor has been shutdown <175 hours, then Shutdown Cooling flow may be reduced to ≥3000 GPM, if RCS temperature is verified to be <135°F at least once per hour.

3.1.3.4 Changes to the Shutdown Cooling flow rate will cause the Alternate Shutdown Cooling Purification flow rate to change with SI-424 throttled or full open. For example, with Alternate Shutdown Cooling Purification in service via SI-424, if Shutdown Cooling flow rate is lowered, then the Alternate Shutdown Cooling Purification flow rate will increase due to increased LPSI Discharge Header pressure. This change in flow rate may require readjustment of SI-424 so the 250 GPM limit is not exceeded.

3.1.3.5 The maximum Shutdown Cooling Flow rate to prevent vortexing for one train operating at RCS Midloop condition is 3130 gpm. Refer to Attachment 11.6, SDC Maximum Flowrates to Prevent Vortexing (Per Train), for additional flow rates. **[ECM98-007]**

3.1.3.6 The SDC loop may be removed from operations for up to one hour per 8-hour period during the performance of Core Alterations in the vicinity of the reactor pressure vessel hot legs, provided no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the minimum required boron concentration of Technical Specification 3.9.1.

3.1.4 LPSI pumps shall not be run for >3 hours in any 24 hour period on recirculation flow only.

3.1.5 If LPSI Pump flow is limited to >100 gpm and <2000 gpm for 3 consecutive hours, then contact the System Engineer for guidance on LPSI Pump monitoring. **[CR-W3-2000-1376]**

3.1.6 To minimize a hydraulic transient that could challenge the integrity of SI-406A(B) during the opening of SI-405A(B), one of the following conditions shall be met prior to opening SI-405A(B). **[EC-14765, ECN-25944]**

- Piping between SI-407A(B) and SI-405A(B) is pressurized through SI-4052A(B) with SI-401A(A) open.

  or

- The SDC Train's suction penetration piping has been manually vented. Venting should be accomplished in accordance with Attachment 11.7, Manual Venting of SDC Train suction penetration piping.

  or

- The SDC Train was previously in-service since the unit has been shutdown.

  or

- If RC Loop 2(1) SDC Suct Hdr Press Equalizing and Insd Cntmnt Isol, SI-4052A(B) fails to open, RCS pressure is <213 psia by PMC indication (PIDs A12203, A12204, A12221, A12222) or <203 psia by control board indication (RC-IPI0103, -0104, -0105, -0106).
  [EC-14765, ECN-25944]

3.1.7 The preferred pressure indication to use for entering shutdown cooling is RC-IPI-0103, RC-IPI-0104, RC-IPI-0105, and RC-IPI-0106 or the associated PMC PIDs A12203, A12204, A12221, and A12222. The highest indication on functioning instrumentation should be used to make the entry decision. Low Range RCS pressure indication is preferred because at shutdown cooling entry conditions this pressure instrumentation is the least affected by instrument uncertainties.

3.1.8 A RCS pressure limitation is established for SDC entry if Containment Harsh Environment Conditions (≥200°F) have been exceeded. This limitation is to prevent lifting SDC suction thermal relief valves SI-408A or SI-408B.

3.2 LIMITATIONS

3.2.1 Shutdown Cooling shall not be initiated until Reactor Coolant System (RCS) temperature <350°F and RCS Pressure <392 PSIA. **[P-4055]**

3.2.2 If Containment Harsh Environment Conditions (≥200°F) have been exceeded then SDC shall not be initiated until RCS Pressure <358 PSIA. **[CR-WF3-2012-1036]**

3.2.3 RCS temperature changes shall be limited by the following:

- A maximum heatup rate of 60°F per hour
- A maximum cooldown rate of 100°F per hour

3.2.4 RCS temperature and pressure shall be limited in accordance with the limit lines shown on Technical Specification Figures 3.4-2 and 3.4-3 with instrument uncertainty incorporated for pressure and temperature as follows: **[ER-W3-2004-00439]**

- Subtract 30°F from indicated temperature
- Add 35 PSI to the indicated pressure from the following instruments:

  CP-2
  - RC IPI0103 (100-750 PSIA)
  - RC IPI0104 (100-750 PSIA)

  CP-4
  - RC IPI0105 (100-750 PSIA)
  - RC IPI0106 (100-750 PSIA)

  CP-7
  - RC IPI0101A(B,C,D) (1500-2500 PSIA)

  LCP-43
  - RC IPI0105-1 (100-750 PSIA)
  - RC IPI0106-1 (100-750 PSIA)

- Add 110 PSI to the indicated pressure from the following instruments:

  CP-2
  - RC IPI0102A3 (B3) (0-3000 PSIA)

  CP-4
  - RC IPI0102A2 (B2) (0-3000 PSIA)

  CP-7
  - RC IPI0102A (B,C,D) (0-3000 PSIA)

  LCP-43
  - RC IPI0102A1 (B1,C1,D1) (0-3000 PSIA)

3.2.5 Maximum flow through a Purification Ion Exchanger is 126 GPM.

3.2.6 When RCS is in Mode 4 and any RCS Cold Leg temperature is <230°F or in Mode 5 or Mode 6 with Reactor Vessel Head on, then Low Temperature Overpressure Protection (Tech. Spec. 3.4.8.3) shall be provided by one of the following: **[P-5804]**

- Both Shutdown Cooling Suction Header Relief Valves aligned to RCS

  or

- RCS depressurized with an RCS vent ≥5.6 in^2

3.2.7 In Mode 4 with RCS pressure >400 PSIA, Both Containment Spray Trains shall be operable in accordance with Tech Spec 3.6.2.1.

3.2.8 The Shutdown Cooling Train placed in service should be on the Protected Train.

3.2.9 Scaffolding will be required to Vent CS Header A, when restoring CS to operation after securing Shutdown Cooling.

3.3.10 Shutdown Cooling requires one Operable Low Pressure Safety Injection Flow Control Valve per train for Shutdown Cooling to be Operable.

3.3.11 The Shutdown Cooling suction line piping upstream of SI-407A(B) should not be filled from an external water source due to the potential to cause thermal binding of SI-405A(B). There is a possibility of air intrusion into and voiding of the Shutdown Cooling suction line piping upstream of SI-407A(B) following a period of operation in Modes 1 – 4, when the Safety Injection and Containment Spray Systems are aligned for the normal injection mode. This condition has been evaluated and is described in the Design Basis Document for the Safety Injection System (W3-DBD-001). The Safety Injection System retains the capability of performing its design safety function with the described voiding and no actions are required to fill the subject section of piping.
[ER-W3-2002-0283-002, CR-WF3-2004-01300, ECM03-003, W3-DBD-01]

3.2.12 Each pump start stresses motor windings both thermally and mechanically. A start means motor comes up to rated speed. Starts for LPSI pumps should be limited as follows:

3.2.12.1 LPSI Pump A:

3.2.12.1.1 With motor at ambient temperature, <u>do</u> <u>not</u> attempt more than 6 consecutive starts.

3.2.12.1.2 With motor at operating temperature, <u>do</u> <u>not</u> attempt more than 4 consecutive starts.

3.2.12.1.3 Allowed time between additional starts is 15 minutes with motor at operating temperature <u>or</u> 30 minutes with motor at ambient temperature.

3.2.12.2 LPSI Pump B:

3.2.12.2.1 With motor at ambient temperature, <u>do</u> <u>not</u> attempt more than 2 consecutive starts.

3.2.12.2.2 With motor at operating temperature, <u>do</u> <u>not</u> attempt more than 1 consecutive start.

3.2.12.2.3 Allowed time between additional starts is 15 minutes with motor at operating temperature <u>or</u> 45 minutes with motor at ambient temperature.

3.2.13 Following a Design Basis Tornado Event, delaying the initiation of Shutdown Cooling (SDC) for up to 7 days will be required to ensure the Component Cooling Water system is capable of removing Reactor Coolant System decay heat. The actual delay time will depend on UHS damage and ambient temperature and will be determined by Engineering. Emergency Feedwater supports decay heat removal until SDC can be initiated. **[EC-530]**

3.2.14 To assure that the RCS does not drop to the minimum RCS bolt up Temperature indicated on TS figures 3.4-2 and 3.4-3, the limits on the following instruments apply:

Instrument	Description	Min Value	Location
SI IT7114 / SI IT7115	RWSP Temperature	67.3°F	PMC
SI IT0351 X / SI IT0352 X	LPSI Pump Outlet Temperature	66.09°F	QSPDS
CS IT0303 X AND Y	Shutdown Cooling Outlet Temperature	66.09°F	QSPDS

3.2.15 When Alternate Shutdown Cooling Purification is aligned with parallel Purification Ion Exchangers and SI-424 is throttled or full open, then:

- A maximum Total Shutdown Cooling Purification flow of 250 GPM should not be exceeded.
- A minimum Total Shutdown Cooling Purification flow of 50 GPM should be minimized.
- If Total Shutdown Cooling Purification flow is to be <50 GPM, then single
- Purification Ion Exchanger operation is required.
- PMC PID S39205, SDC/LD Purification Full Range Flow is the only available indication when Letdown flow is >150 GPM.

CAUTION

RX THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY.

[INPO 06-006]

6.2 PLACING SHUTDOWN COOLING TRAIN B IN SERVICE

NOTE

(1) The Shutdown Cooling Train placed in service should be on the Protected Train.

(2) The SDC loop may be removed from operations for up to one hour per 8-hour period during the performance of Core Alterations in the vicinity of the reactor pressure vessel hot legs, provided no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the minimum required boron concentration of Technical Specification 3.9.1.

CAUTION

FOLLOWING A DESIGN BASIS TORNADO EVENT, DELAYING THE INITIATION OF SHUTDOWN COOLING (SDC) FOR UP TO 7 DAYS WILL BE REQUIRED TO ENSURE THE COMPONENT COOLING WATER SYSTEM IS CAPABLE OF REMOVING REACTOR COOLANT SYSTEM DECAY HEAT. THE ACTUAL DELAY TIME WILL DEPEND ON UHS DAMAGE AND AMBIENT TEMPERATURE AND WILL BE DETERMINED BY ENGINEERING. EMERGENCY FEEDWATER SUPPORTS DECAY HEAT REMOVAL UNTIL SDC CAN BE INITIATED. **[EC-530]**

6.2.1 Verify Shutdown Cooling Train B has been aligned to Standby condition in accordance with Section 5.4, Alignment of Shutdown Cooling Train B to Standby Condition.

6.2.2 Verify sufficient number of Dry Cooling Tower Fans running to accept increased heat load on CCW System.

CAUTION

(1) CC-963B IS REQUIRED TO BE MAINTAINED OPEN WHILE IN MODE 4 TO PRESERVE THE DESIGN TEMPERATURE BASIS OF PIPING AND ASSOCIATED COMPONENTS AT THE CCW OUTLET OF SHUTDOWN COOLING HEAT EXCHANGER B. WITH CC-963B OPEN, FLOW THROUGH SHUTDOWN COOLING HEAT EXCHANGER B WILL BE MAINTAINED ABOVE 2305 GPM. [EC-738] [EC-30976]

(2) SHUTDOWN HEAT EXCHANGER B CCW FLOW CONTROL, CC-963B, IS ALSO REQUIRED TO REMAIN OPEN IF LPSI PUMP B DISCHARGE FLOW CONTROL, SI-129B HAS BEEN FORCED CLOSED PER OP-009-008 FOLLOWING A LOSS OF INSTRUMENT AIR.

6.2.3 Place Shutdown HX B CCW Flow Control, CC-963B, control switch to Open.

CAUTION

1) THE FOLLOWING REACTOR COOLANT SYSTEM LIMITS <u>SHALL</u> BE MET FOR SHUTDOWN COOLING ENTRY:

- RCS TEMPERATURE LIMIT: <350°F
- RCS PRESSURE LIMIT: <392 PSIA
- <u>IF</u> CONTAINMENT HARSH ENVIRONMENT CONDITIONS ($\geq$200°F) HAVE BEEN EXCEEDED <u>THEN</u> RCS PRESSURE LIMIT: <358 PSIA

(2) <u>IF</u> CONTAINMENT SPRAY HEADER B ISOLATION, CS-125B, IS OPEN WHILE SHUTDOWN COOLING TRAIN B IS OPERATING, <u>THEN</u> CONTAINMENT SPRAY B RISER MAY FILL AND POSSIBLY SPRAY WATER INTO CONTAINMENT, DUE TO LEAKAGE PAST CONTAINMENT SPRAY PUMP B DISCHARGE STOP CHECK, CS-117B.

6.2.4 To minimize the effect of air introduction to a LPSI Pump Verify RC Loop 2 SDC suction piping meets <u>one</u> of the following conditions:

- The SDC Train is placed in-service with RCS pressure ≥100 PSIA by PMC indication (PIDs A12203, A12204, A12221, A12222) or ≥110 PSIA by board indication (RC-IPI0103, -0104, -0105, -0106).

  <u>or</u>

- The SDC Train’s suction penetration piping has been manually vented. Venting should be accomplished through SI-4051B using RCS/Cavity as water source in accordance with Attachment 11.7, Manual Venting of SDC Train Suction Penetration Piping.

or

- The SDC Train was previously in-service since the unit has been shutdown.

6.2.5 Unlock and Open RC Loop 1 SDC Suction Outside Containment Isol, SI-407B.

6.2.6 Inform Radiation Protection Department that Shutdown Cooling Train B is being placed in service.

6.2.7 Start LPSI Pump B.

NOTE

If Instrument Air is unavailable, LPSI Pump B Discharge Flow Control, SI-129B, will need to be operated locally per OP-009-008. If the Safeguards rooms are inaccessible (post RAS), LPSI Pump B Discharge Flow Control, SI-129B, must be remotely forced closed per OP-009-008. In this case, SDC flow/ temperature will need to be controlled using Shutdown Cooling HX B Temperature Control, SI-415B. **[EC-30976]**

6.2.8 Raise Shutdown Cooling flow by Manually adjusting LPSI Header Flow Controller 1A/1B, SI-IFIC-0306, output until Shutdown Cooling Header B flow indicates 4100 GPM, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.

6.2.9 Adjust LPSI Header Flow controller 1A/1B, SI-IFIC-0306, setpoint potentiometer to 73%, and place controller to AUTO.

6.2.10 Verify LPSI Header Flow Controller 1A/1B, SI-IFIC-0306, is maintaining 4100 GPM Shutdown Cooling Header B flow, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.

NOTE

If a sample was drawn prior to shutdown and no interim shutdown has occurred where SDC was placed in service and boron concentration could have been reduced, then sampling is not required.

6.2.11 At SM/CRS discretion, direct Chemistry Department to sample Shutdown Cooling Train B for boron concentration.

6.2.11.1 When Chemical Analysis results indicate that Shutdown Cooling Train B boron concentration is greater than Reactor Coolant boron concentration or ≥2050 PPM (required for Mode 6), then proceed to next step.

NOTE

Shutdown Cooling Train B requires one operable Low Pressure Safety Injection Flow Control Valve for the train to be operable.

CAUTION

THE REACTOR COOLANT SYSTEM SHALL NOT EXCEED THE 100°F PER HOUR COOLDOWN RATE OF TECHNICAL SPECIFICATION 3.4.8.1.

RX

6.2.12 Raise Shutdown Cooling Train B temperature to within 100°F of Reactor Coolant Hot Leg temperature as follows:

6.2.12.1 Open the following valves:

- SI-139B LPSI Header to RC Loop 1A Flow Control
- SI-138B LPSI Header to RC Loop 1B Flow Control

6.2.12.2 Throttle Closed RC Loop 1 Shdn Cooling Warmup, SI-135B, until one of the following is within 100°F of Shutdown Cooling Train B temperature, as indicated by LPSI Pump B Discharge Header Temperature Indicator, SI-ITI-0352X: **[P-23174]**

- Hot Leg 1 temperature, as indicated by RC Loop 1 Hot Leg Temperature Indicator, RC-ITI-0112-HB

or

- Hot Leg 2 temperature, as indicated by RC Loop 2 Hot Leg Temperature Indicator, RC-ITI-0122-HA

6.2.12.3 Close RC Loop 1 Shdn Cooling Warmup, SI-135B.

CAUTION

THE FOLLOWING APPLIES TO SHUTDOWN COOLING FLOW:

(1) A TOTAL MINIMUM SHUTDOWN COOLING FLOW NECESSARY TO REMOVE DECAY HEAT AND PREVENT BORON STRATIFICATION SHOULD BE MAINTAINED AT ALL TIMES.

(2) WHEN CONSIDERING THE MINIMUM SHUTDOWN COOLING FLOW REQUIRED TO ADEQUATELY REMOVE DECAY HEAT AND PREVENT BORON STRATIFICATION, THE FLOW OF BOTH OPERATING SHUTDOWN COOLING TRAINS MAY BE USED.

(3) THE REQUIRED MINIMUM SHUTDOWN COOLING FLOW FOR MODES 5 AND 6 ARE AS FOLLOWS:

TIME AFTER SHUTDOWN (HOURS)	REQUIRED FLOW (GPM)
<175 HOURS *	≥4000 GPM
≥175 HOURS	≥3000 GPM
≥375 HOURS	≥2000 GPM

* IF THE REACTOR HAS BEEN SHUTDOWN <175 HOURS, THEN SHUTDOWN COOLING FLOW MAY BE REDUCED TO ≥3000 GPM IF RCS TEMPERATURE IS VERIFIED TO BE <135°F AT LEAST ONCE PER HOUR.

6.2.13 Adjust LPSI Header Flow controller 1A/1B, SI-IFIC-0306, setpoint potentiometer to obtain desired Shutdown Cooling Train B flow, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.

CAUTION

(1) THE REACTOR COOLANT SYSTEM SHALL NOT EXCEED THE 100°F PER HOUR COOLDOWN RATE OF TECHNICAL SPECIFICATION 3.4.8.1.

(2) CC-963B IS REQUIRED TO BE MAINTAINED OPEN WHILE IN MODE 4 TO PRESERVE THE DESIGN TEMPERATURE BASIS OF PIPING AND ASSOCIATED COMPONENTS AT THE CCW OUTLET OF SHUTDOWN COOLING HEAT EXCHANGER B. WITH CC-963B OPEN, FLOW THROUGH SHUTDOWN COOLING HEAT EXCHANGER B WILL BE MAINTAINED ABOVE 2305 GPM. **[EC-738] [EC-30976]**

(3) SHUTDOWN HEAT EXCHANGER B CCW FLOW CONTROL, CC-963B, IS ALSO REQUIRED TO REMAIN OPEN IF LPSI PUMP B DISCHARGE FLOW CONTROL, SI-129B HAS BEEN FORCED CLOSED PER OP-009-008 FOLLOWING A LOSS OF INSTRUMENT AIR.

RX

6.2.14 Maintain RCS temperature control as follows:

6.2.14.1 Throttle Open Shutdown Cooling HX B Temperature Control, SI-415B, as required.

6.2.14.2 Place Shutdown HX B CCW Flow Control, CC-963B, to Open or Setpoint, as required.

NOTE

Once activated the SHUTDOWN COOLING TROUBLE annunciator (Window H-18 on cabinet N) will alarm since the Low Flow setpoints are initially failed High.

6.2.15 Verify Computer Point PID B43800, SDCS Alarm Processing, set to ACTIVE state in accordance with OP-004-012, Plant Computer System.

6.2.16 Verify Computer Point PID K43201, SDCS/LPSI PMP B LOW FLOW LIM, set to approximately 200 gpm below the established Shutdown Cooling Train B flow, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.

6.2.17 If Shutdown Cooling Train A is not in service, then set Computer Point PID K43101 SDCS/LPSI PMP A LOW FLOW LIM, to Zero in accordance with OP-004-012, Plant Computer System.

6.2.18 If CETs from QSPDS Channel 1(2) are not available, then set PID C26417(C26510), TRCET Representative CET, to Zero.

6.2.19 Verify SHUTDOWN COOLING TROUBLE annunciator (WINDOW H-18 ON CABINET N) is Clear.

NOTE

(1) Due to thermal expansion, the Shutdown Cooling Heat Exchanger A Outlet Stop Check, CS-117A, must be re-tightened in the Closed direction approximately 3 hours after Shutdown Cooling Train A is placed in service.

(2) To ensure CS-117A(B) properly seats when the valve reaches the closed position, it is necessary to apply sufficient torque in the closed direction, approximately 100 lbf on the installed handwheel, until the torque-limiter slips.

6.2.20 Verify Closed Shutdown Cooling Heat Exchanger B Stop Check, CS-117B, approximately 3 hours after Shutdown Cooling Train B is placed in service.

6.2.21 If splitting of CCW Trains is necessary as directed by the SM/CRS, then go to Section 6.13, Splitting Out CCW Trains when on Shutdown Cooling.

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ **OSRC** ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-009-005	REVISION: 035

TITLE: Shutdown Cooling

PROCEDURE OWNER (Position Title) : Operations Manager - Support

TERM (check one) : ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 9/15/2014

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ Revision ☐ Deletion ☐ New Procedure

DESCRIPTION AND JUSTIFICATION:

This procedure is being changed to reflect changes in plant configuration. LPSI Pump A(B) Discharge Flow Control, SI-129, can now be operated from the -15 valve gallery IAW OP-009-008. Changes in the procedure are to include references to OP-009-008 prior to operation of LPSI Pump A(B) Discharge Flow Control, SI-129, from the control room.

This procedure also is being updated to remove a note at the beginning of Section 6.3 and 6.4 which incorrectly stated that this section provides instructions to restore the Shutdown Cooling Train to standby status (section 5.4 returns the system to a standy configuration).

These changes are for clarification and do not change the intent of the procedure, therefore this change meets the editorial correction criteria.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES		PRINT NAME OR SIGNATURE	DATE
PREPARER		Chris Pratt	9/11/2014
EC SUPERVISOR	Administrative Review and Approval	(sign) [signature]	9-11-14
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Operations [Administrative Review]	Jacob Macarthur	9/11/2014
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐ PA Exclusion ☐	N/A	
TECHNICAL	Review ☐ Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐	N/A	
GROUP/DEPT. HEAD	Review ☐ Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐ Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS	Approval ☐	(sign) N/A	

CAUTION

RX THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY.

[INPO 06-006]

6.2 PLACING SHUTDOWN COOLING TRAIN B IN SERVICE

NOTE

(1) The Shutdown Cooling Train placed in service should be on the Protected Train.

(2) The SDC loop may be removed from operations for up to one hour per 8-hour period during the performance of Core Alterations in the vicinity of the reactor pressure vessel hot legs, provided no operations are permitted that would cause introduction into the RCS, coolant with boron concentration less than required to meet the minimum required boron concentration of Technical Specification 3.9.1.

CAUTION

FOLLOWING A DESIGN BASIS TORNADO EVENT, DELAYING THE INITIATION OF SHUTDOWN COOLING (SDC) FOR UP TO 7 DAYS WILL BE REQUIRED TO ENSURE THE COMPONENT COOLING WATER SYSTEM IS CAPABLE OF REMOVING REACTOR COOLANT SYSTEM DECAY HEAT. THE ACTUAL DELAY TIME WILL DEPEND ON UHS DAMAGE AND AMBIENT TEMPERATURE AND WILL BE DETERMINED BY ENGINEERING. EMERGENCY FEEDWATER SUPPORTS DECAY HEAT REMOVAL UNTIL SDC CAN BE INITIATED. **[EC-530]**

6.2.1 Verify Shutdown Cooling Train B has been aligned to Standby condition in accordance with Section 5.4, Alignment of Shutdown Cooling Train B to Standby Condition.

6.2.2 Verify sufficient number of Dry Cooling Tower Fans running to accept increased heat load on CCW System.

CAUTION

(1) CC-963B IS REQUIRED TO BE MAINTAINED OPEN WHILE IN MODE 4 TO PRESERVE THE DESIGN TEMPERATURE BASIS OF PIPING AND ASSOCIATED COMPONENTS AT THE CCW OUTLET OF SHUTDOWN COOLING HEAT EXCHANGER B. WITH CC-963B OPEN, FLOW THROUGH SHUTDOWN COOLING HEAT EXCHANGER B WILL BE MAINTAINED ABOVE 2305 GPM. [EC-738] [EC-30976]

(2) SHUTDOWN HEAT EXCHANGER B CCW FLOW CONTROL, CC-963B, IS ALSO REQUIRED TO REMAIN OPEN IF LPSI PUMP B DISCHARGE FLOW CONTROL, SI-129B HAS BEEN FORCED CLOSED PER OP-009-008 FOLLOWING A LOSS OF INSTRUMENT AIR.

6.2.3 Place Shutdown HX B CCW Flow Control, CC-963B, control switch to Open.

CAUTION

1) THE FOLLOWING REACTOR COOLANT SYSTEM LIMITS <u>SHALL</u> BE MET FOR SHUTDOWN COOLING ENTRY:

- RCS TEMPERATURE LIMIT: <350°F
- RCS PRESSURE LIMIT: <392 PSIA
- <u>IF</u> CONTAINMENT HARSH ENVIRONMENT CONDITIONS (≥200°F) HAVE BEEN EXCEEDED <u>THEN</u> RCS PRESSURE LIMIT: <358 PSIA

(2) <u>IF</u> CONTAINMENT SPRAY HEADER B ISOLATION, CS-125B, IS OPEN WHILE SHUTDOWN COOLING TRAIN B IS OPERATING, <u>THEN</u> CONTAINMENT SPRAY B RISER MAY FILL AND POSSIBLY SPRAY WATER INTO CONTAINMENT, DUE TO LEAKAGE PAST CONTAINMENT SPRAY PUMP B DISCHARGE STOP CHECK, CS-117B.

6.2.4 To minimize the effect of air introduction to a LPSI Pump Verify RC Loop 2 SDC suction piping meets <u>one</u> of the following conditions:

- The SDC Train is placed in-service with RCS pressure ≥100 PSIA by PMC indication (PIDs A12203, A12204, A12221, A12222) or ≥110 PSIA by board indication (RC-IPI0103, -0104, -0105, -0106).

  <u>or</u>

- The SDC Train’s suction penetration piping has been manually vented. Venting should be accomplished through SI-4051B using RCS/Cavity as water source in accordance with Attachment 11.7, Manual Venting of SDC Train Suction Penetration Piping.

<u>or</u>

- The SDC Train was previously in-service since the unit has been shutdown.

6.2.5 Unlock <u>and</u> Open RC Loop 1 SDC Suction Outside Containment Isol, SI-407B.

6.2.6 Inform Radiation Protection Department that Shutdown Cooling Train B is being placed in service.

6.2.7 Start LPSI Pump B.

<u>NOTE</u>

If Instrument Air is unavailable, LPSI Pump B Discharge Flow Control, SI-129B, will need to be operated locally per OP-009-008. If the Safeguards rooms are inaccessible (post RAS), LPSI Pump B Discharge Flow Control, SI-129B, must be remotely forced closed per OP-009-008. In this case, SDC flow/ temperature will need to be controlled using Shutdown Cooling HX B Temperature Control, SI-415B. **[EC-30976]**

6.2.8 Raise Shutdown Cooling flow by Manually adjusting LPSI Header Flow Controller 1A/1B, SI-IFIC-0306, output <u>until</u> Shutdown Cooling Header B flow indicates 4100 GPM, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.

6.2.9 Adjust LPSI Header Flow controller 1A/1B, SI-IFIC-0306, setpoint potentiometer to 73%, <u>and</u> place controller to AUTO.

6.2.10 Verify LPSI Header Flow Controller 1A/1B, SI-IFIC-0306, is maintaining 4100 GPM Shutdown Cooling Header B flow, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.

<u>NOTE</u>

<u>If</u> a sample was drawn prior to shutdown <u>and</u> no interim shutdown has occurred where SDC was placed in service and boron concentration could have been reduced, <u>then</u> sampling is not required.

6.2.11 At SM/CRS discretion, direct Chemistry Department to sample Shutdown Cooling Train B for boron concentration.

6.2.11.1 <u>When</u> Chemical Analysis results indicate that Shutdown Cooling Train B boron concentration is greater than Reactor Coolant boron concentration <u>or</u> ≥2050 PPM (required for Mode 6), <u>then</u> proceed to next step.

NOTE

Shutdown Cooling Train B requires one operable Low Pressure Safety Injection Flow Control Valve for the train to be operable.

CAUTION

THE REACTOR COOLANT SYSTEM SHALL NOT EXCEED THE 100°F PER HOUR COOLDOWN RATE OF TECHNICAL SPECIFICATION 3.4.8.1.

RX

6.2.12 Raise Shutdown Cooling Train B temperature to within 100°F of Reactor Coolant Hot Leg temperature as follows:

6.2.12.1 Open the following valves:

- SI-139B LPSI Header to RC Loop 1A Flow Control
- SI-138B LPSI Header to RC Loop 1B Flow Control

6.2.12.2 Throttle Closed RC Loop 1 Shdn Cooling Warmup, SI-135B, <u>until</u> one of the following is within 100°F of Shutdown Cooling Train B temperature, as indicated by LPSI Pump B Discharge Header Temperature Indicator, SI-ITI-0352X: **[P-23174]**

- Hot Leg 1 temperature, as indicated by RC Loop 1 Hot Leg Temperature Indicator, RC-ITI-0112-HB

<u>or</u>

- Hot Leg 2 temperature, as indicated by RC Loop 2 Hot Leg Temperature Indicator, RC-ITI-0122-HA

6.2.12.3 Close RC Loop 1 Shdn Cooling Warmup, SI-135B.

<u>CAUTION</u>

THE FOLLOWING APPLIES TO SHUTDOWN COOLING FLOW:

(1) A TOTAL MINIMUM SHUTDOWN COOLING FLOW NECESSARY TO REMOVE DECAY HEAT AND PREVENT BORON STRATIFICATION SHOULD BE MAINTAINED AT ALL TIMES.

(2) WHEN CONSIDERING THE MINIMUM SHUTDOWN COOLING FLOW REQUIRED TO ADEQUATELY REMOVE DECAY HEAT AND PREVENT BORON STRATIFICATION, THE FLOW OF BOTH OPERATING SHUTDOWN COOLING TRAINS MAY BE USED.

(3) THE REQUIRED MINIMUM SHUTDOWN COOLING FLOW FOR MODES 5 AND 6 ARE AS FOLLOWS:

TIME AFTER SHUTDOWN (HOURS)	REQUIRED FLOW (GPM)
<175 HOURS *	≥4000 GPM
≥175 HOURS	≥3000 GPM
≥375 HOURS	≥2000 GPM

* <u>IF</u> THE REACTOR HAS BEEN SHUTDOWN <175 HOURS, <u>THEN</u> SHUTDOWN COOLING FLOW MAY BE REDUCED TO ≥3000 GPM <u>IF</u> RCS TEMPERATURE IS VERIFIED TO BE <135°F AT LEAST ONCE PER HOUR.

6.2.13 Adjust LPSI Header Flow controller 1A/1B, SI-IFIC-0306, setpoint potentiometer to obtain desired Shutdown Cooling Train B flow, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.

CAUTION

(1) THE REACTOR COOLANT SYSTEM SHALL NOT EXCEED THE 100°F PER HOUR COOLDOWN RATE OF TECHNICAL SPECIFICATION 3.4.8.1.

(2) CC-963B IS REQUIRED TO BE MAINTAINED OPEN WHILE IN MODE 4 TO PRESERVE THE DESIGN TEMPERATURE BASIS OF PIPING AND ASSOCIATED COMPONENTS AT THE CCW OUTLET OF SHUTDOWN COOLING HEAT EXCHANGER B. WITH CC-963B OPEN, FLOW THROUGH SHUTDOWN COOLING HEAT EXCHANGER B WILL BE MAINTAINED ABOVE 2305 GPM. **[EC-738] [EC-30976]**

(3) SHUTDOWN HEAT EXCHANGER B CCW FLOW CONTROL, CC-963B, IS ALSO REQUIRED TO REMAIN OPEN IF LPSI PUMP B DISCHARGE FLOW CONTROL, SI-129B HAS BEEN FORCED CLOSED PER OP-009-008 FOLLOWING A LOSS OF INSTRUMENT AIR.

RX

6.2.14 Maintain RCS temperature control as follows:

6.2.14.1 Throttle Open Shutdown Cooling HX B Temperature Control, SI-415B, as required.

6.2.14.2 Place Shutdown HX B CCW Flow Control, CC-963B, to Open or Setpoint, as required.

NOTE

Once activated the SHUTDOWN COOLING TROUBLE annunciator (Window H-18 on cabinet N) will alarm since the Low Flow setpoints are initially failed High.

6.2.15 Verify Computer Point PID B43800, SDCS Alarm Processing, set to ACTIVE state in accordance with OP-004-012, Plant Computer System.

6.2.16 Verify Computer Point PID K43201, SDCS/LPSI PMP B LOW FLOW LIM, set to approximately 200 gpm below the established Shutdown Cooling Train B flow, as indicated by RC Loop 1 Shdn Line Flow Indicator, SI-IFI-1306-B1.

6.2.17 If Shutdown Cooling Train A is not in service, then set Computer Point PID K43101 SDCS/LPSI PMP A LOW FLOW LIM, to Zero in accordance with OP-004-012, Plant Computer System.

6.2.18 If CETs from QSPDS Channel 1(2) are not available, then set PID C26417(C26510), TRCET Representative CET, to Zero.

6.2.19 Verify SHUTDOWN COOLING TROUBLE annunciator (WINDOW H-18 ON CABINET N) is Clear.

NOTE

(1) Due to thermal expansion, the Shutdown Cooling Heat Exchanger A Outlet Stop Check, CS-117A, must be re-tightened in the Closed direction approximately 3 hours after Shutdown Cooling Train A is placed in service.

(2) To ensure CS-117A(B) properly seats when the valve reaches the closed position, it is necessary to apply sufficient torque in the closed direction, approximately 100 lbf on the installed handwheel, until the torque-limiter slips.

6.2.20 Verify Closed Shutdown Cooling Heat Exchanger B Stop Check, CS-117B, approximately 3 hours after Shutdown Cooling Train B is placed in service.

6.2.21 <u>If</u> splitting of CCW Trains is necessary as directed by the SM/CRS, <u>then</u> <u>go</u> <u>to</u> Section 6.13, Splitting Out CCW Trains <u>when</u> on Shutdown Cooling.

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ **OSRC** ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-901-131	REVISION: 304

TITLE: Shutdown Cooling Malfunction

PROCEDURE OWNER (Position Title): Operations Manager - Support

TERM (check one): ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 3/5/2015

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

This procedure revision added step 5 of section E0 which states, " IF RCS temperature is approaching 140° F AND Shutdown Cooling Purification Letdown Heat Exchanger Bypass Valve SI-424 is open, THEN at SM/CRS discretion perform one or both of the following as necessary to avoid damaging CVC ion exchanger resin:
- •Perform OP-009-005 section 6.5 Securing Alternate Shutdown Cooling Purification
- •Place Ion Exchanger Bypass, CVC-140, to BYPASS"

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES		PRINT NAME OR SIGNATURE	DATE
PREPARER		Daryl Roy	3/3/2015
EC SUPERVISOR	Administrative Review and Approval	(sign) [signature]	3/4/15
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐ PA Exclusion ☐	N/A	
TECHNICAL	Review ☐ Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐	N/A	
GROUP/DEPT. HEAD	Review ☐ Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐ Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS	Approval ☐	(sign) N/A	

D. IMMEDIATE OPERATOR ACTIONS

1. IF ANY of the following Shutdown Cooling Loop Suction Isolation valves close on the operating Shutdown Cooling train, THEN secure LPSI Pump:
   - For LPSI Pump A:
     - SDCS LOOP 2 SUCTION ISOL UPSTREAM INSIDE (SI 401A)
     - SDCS LOOP 2 SUCTION ISOL DOWNSTREAM INSIDE (SI 405A)
     - SDCS LOOP 2 SUCTION ISOL DOWNSTREAM OUTSIDE (SI 407A)
   - For LPSI Pump B:
     - SDCS LOOP 1 SUCTION ISOL UPSTREAM INSIDE (SI 401B)
     - SDCS LOOP 1 SUCTION ISOL DOWNSTREAM INSIDE (SI 405B)
     - SDCS LOOP 1 SUCTION ISOL DOWNSTREAM OUTSIDE (SI 407B).

Waterford 3

2015 NRC RO Exam

JOB PERFORMANCE MEASURE

S4

Balance of Plant Operator Immediate Operator Actions on Control Room Evacuation

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform balance of plant operator’s immediate operator action on Control Room evacuation with fire conditions.

Task Standard: Applicant performed immediate operator actions for BOP position for a fire in the Control Room in accordance with OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown. Applicant manually closed Atmospheric Dump Valve #2 due to setpoint failure.

References: OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown

Alternate Path: Yes Time Critical: No Validation Time: 4 mins.

K/A 039 A4.01 Main Steam Supply Valves Importance Rating 2.9 / 2.8 RO / SRO

Applicant: ____________________

Time Start: ______________ Time Finish: ______________

Performance Time: ______________ minutes
Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____

Examiner: ______________________ Date: ______________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

None

Description:

The applicant will be cued that there is a fire in CP-33. The CRS will direct him to carry out his immediate operator actions as BOP operator. ADV #2 setpoint will fail to 666 PSIG, spuriously opening ADV #2. The applicant will be required to place that controller to manual and set it to 0% output to close ADV #2. The task will end when the applicant goes to the key locker.

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is at 100% power
- A fire has started in CP-33
- The CRS has entered OP-901-502, Evacuation of Control Room and Subsequent Plant Shutdown
- The ATC is performing his immediate operator actions.

INITIATING CUE:

- The CRS directs you to perform the BOP immediate operator actions.

Evaluator Note
Cue the Simulator Operator to place the Simulator in RUN and initiate Trigger 1.

TASK ELEMENT 1	STANDARD
2.1 Verify Turbine trip: • Governor valves Closed • Throttle valves Closed	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
2.2 Verify Generator trip: • Exciter Field Breaker Tripped • Generator Breaker A Tripped • Generator Breaker B Tripped	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
2.3 RESET Moisture Separator Reheater controls.	Reset was depressed.
Comment:	**<u>Critical</u>** **SAT / UNSAT**

Evaluator Note
The Alternate Path becomes applicable when the applicant addresses the Atmospheric Dump Valves. ADV #2 will have spuriously opened.

2.4 IF evacuating the Control Room due to fire, THEN perform the following:

TASK ELEMENT 4	STANDARD
2.4.1 IF EITHER of the following valves has spuriously Opened, THEN place the applicable controller(s) in MANUAL AND lower the output to zero: MS-116A SG 1 Atmospheric Dump MS-116B SG 2 Atmospheric Dump	ADV #2 controller is placed in manual and output lowered to 0%.
Comment: ADV #2 setpoint fails, driving ADV #2 open with normal pressure in S/G #2.	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
2.4.2 Close the following valves: MS-124A Main Steam Isol Valve #1 MS-124B Main Steam Isol Valve #2	MS-124 A & MS-124 B are closed.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
2.5 Obtain assigned Operations Security Key Ring AND proceed to RAB +35 Relay Room.	Keys obtained.
Comment: Examiner Note: The key to open the SM key locker is located in the controlled key panel next to the RO desk.	**SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-166

Verify the following Malfunctions:

- o MS23B to 666 psi on Trigger 1 with a 5 second delay

Verify the following Overrides:

- o DI-02A04S01-0 on Trigger 1 (Reactor Trip push button 'A')
- o DI-02A04S02-0 on Trigger 1 (Reactor Trip push button 'D')

Coordinate with examiner to initiate Trigger 1 on his cue. This will trip the reactor and insert the ADV #2 malfunction.

REQUEST/APPROVAL PAGE

SAFETY RELATED
PROCEDURE

Normal Review Class (check one):

☐ **OSRC**

☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-901-502	REVISION: 030

TITLE: Evacuation of Control Room and Subsequent Plant Shutdown

PROCEDURE OWNER (Position Title): Operations Manager - Support

TERM (check one): ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 4/28/2015

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

(i) Attachment 3, ATC Time Critical Actions, was revised to ensure operators can meet the 10-minute time critical actions. The " [10 minutes] " was noted on the main step 3 which reads, "Perform the following as components are transferred to LCP-43 (power indicated):" This implied that all substeps under step 3 were required to be done in 10 minutes or less. This is not true. This notation was carried forward from previous revisions when this step was only matching switch position and depressing the control switches, which is a 10-minute critical action. The " [10 minutes] " notation was moved to the substeps which are actually time critical.
The substeps which were 10-minute actions were moved to be ahead of all other substeps.

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☑ **Normal** ☐ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES		PRINT NAME OR SIGNATURE	DATE
PREPARER		Brett Griffith	3/16/2015
EC SUPERVISOR	Administrative Review and Approval	(sign) N/A	
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Engineering, Fire Protection Systems	David Becker	3/19/2015
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
	N/A	N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☑ PA Exclusion ☐	David R. Voisin	4/13/2015
TECHNICAL	Review ☑ Verification ☐	Donovan Cooper	4/13/2015
QUALIFIED REVIEWER	Review ☑	David F. Litolff	4/27/2015
GROUP/DEPT. HEAD	Review ☐ Approval ☑	(sign) [signature]	4-27-15
GM, PLANT OPERATIONS	Review ☐ Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS	Approval ☐	(sign) N/A	

D. IMMEDIATE OPERATOR ACTIONS (CONT'D)

Step	PLACEKEEPER START	DONE	N/A
2. BOP Operator perform the following:	☐	☐	
2.1 Verify Turbine trip:		☐	
• Governor valves Closed		☐	
• Throttle valves Closed		☐	
2.2 Verify Generator trip:		☐	
• Exciter Field Breaker Tripped		☐	
• Generator Breaker A Tripped		☐	
• Generator Breaker B Tripped		☐	
2.3 RESET Moisture Separator Reheater controls.		☐	
2.4 <u>IF</u> evacuating the Control Room due to fire, <u>THEN</u> perform the following:		☐	☐
2.4.1 <u>IF</u> <u>EITHER</u> of the following valves has spuriously Opened, T<u>HEN</u> place the applicable controller(s) in MANUAL <u>AND</u> lower the output to zero:	☐	☐	
• MS-116A SG 1 Atmospheric Dump		☐	☐
• MS-116B SG 2 Atmospheric Dump		☐	☐
2.4.2 Close the following valves:			
• MS-124A Main Steam Isol Valve #1		☐	
• MS-124B Main Steam Isol Valve #2		☐	
2.5 Obtain <u>assigned</u> Operations Security Key Ring <u>AND</u> proceed to RAB +35 Relay Room.		☐	

Waterford 3

2015 NRC RO/SRO Exam

JOB PERFORMANCE MEASURE

S5

Realign Containment Spray for Auto Initiation following CSAS

Applicant: ___________________________________

Examiner: ___________________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Realign Containment Spray for Auto Initiation Following CSAS in accordance with OP-902-009 Attachment 5E, CSAS Reset Procedure

Task Standard: Reset initiation and actuation relays, stopped CS Pumps, and realigned discharge valves

References: OP-902-009 Attachment 5E, CSAS Reset Procedure Rev 310

Alternate Path: No   Time Critical: No   Validation Time: 13 min.

K/A 026A4.01 CSS controls   Importance Rating 4.5/4.3
RO / SRO

Applicant: ____________________

Time Start: ____________   Time Finish: ____________

Performance Time: ____________ minutes

Critical Time: N/A minutes

Performance Rating: SAT   UNSAT

Comments: ____________________

Examiner: ____________________   Date: ____________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-004, Excess Steam Demand Recovery
OP-902-009, Standard Appendices (Handout 1)

This JPM is performed concurrently with JPM S7.

Description:

This task will be performed at CP-8, CP-10, and CP-33 during an excess steam demand accident that resulted in a CSAS. Containment pressure has since reduced below 16.4 PSIA and conditions have been met to reset Containment Spray. The operator will realign containment spray for automatic initiation IAW OP-902-009 Appendix 5 Attachment 5-E. There are no faults associated with this JPM.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- An Excess Steam Demand Event is in progress
- The crew is responding in accordance with OP-902-004, Excess Steam Demand Recovery
- Containment pressure has reduced to <16.4 PSIA and is stable

INITIATING CUE:

- The CRS has directed you reset Containment Spray Actuation Signal in accordance with OP-902-009 Appendix 5E.

EXAMINER NOTE
Cue the Simulator Operator to place the Simulator in RUN.

TASK ELEMENT 1	STANDARD
1. Place Control switches for **ALL** CCW to RCP isolation valves to "CLOSE:" • CC 641, CCW RCP INLET OUTSIDE ISOL • CC 710, CCW RCP OUTLET INSIDE ISOL • CC 713, CCW RCP OUTLET OUTSIDE ISOL	Control switches for CC-641, CC-710, CC-713 in CLOSE
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
2 Reset CSAS Initiation relays on **ALL** four channels as follows: a. Place the Reset Permissive switch to "UNLK" position. (CP-10) b. Press CSAS Reset pushbutton. c. Verify the initiation relay indicator is illuminated on the ENGINNERED SAFETY FEATURES SYSTEM mimic. d. Place the Reset permissive switch to "LK" position.	Trains A, B, C, D reset permissive switch unlocked, CSAS reset pushbuttons depressed for each train, trains A, B, C, D, reset permissive switch to “LK”
Comment: Key # 218	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
3 Reset CSAS actuation logic on **BOTH** trains as follows: a. Press the CSAS Reset pushbuttons. (CP-33)	Train A and B CSAS reset pushbuttons depressed
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
3 Reset CSAS actuation logic on **BOTH** trains as follows: b. Verify the actuation relay indicator is illuminated on the ENGINEERED SAFETY FEATURES SYSTEM mimic. (CP-10)	Verified relay indicators lit
Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
4. **IF BOTH** CS Pumps are operating, **THEN** perform the following: a. Stop ONE CS pump • CS Pump A • CS Pump B	Either A or B CS pump switch placed to stop
Comment: Examiner Note: If asked which CS Pump the CRS would like to secure first, inform the applicant to secure CS Pump A.	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
4. b. Verify associated CS Pump Control Switch in mid-position	The CS pump control switch that was secured is in the mid-position
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
4. c. Monitor CNTMT parameters (pressure and temperature) for rising trends	Containment pressure and temperature monitored
Comment:	**SAT / UNSAT**

TASK ELEMENT 8	STANDARD
4. d. **IF** adverse CNTMT parameters (pressure and temperature) rising, **THEN** perform the following: 1) Evaluate need to continue to operate CS 2.) Exit this attachment	Evaluate that there is **not** a need to restart CS or exit this attachment
Comment:	**SAT / UNSAT**

TASK ELEMENT 9	STANDARD
4. e. **IF** containment parameters (pressure and temperature) are stable or trending down, **THEN** GO TO step 5:	Proceed to step 5
Comment: Examiner Note: If applicant states there is a slow rise in parameters, acknowledge the report and inform the applicant to continue.	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
5 **IF ONE** CS pump is operating**, THEN** perform the following: a. Stop CS pump • CS Pump A • CS Pump B	CS pump that was not stopped previously is stopped
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
5 b. Verify associated CS Pump Control switch in mid-position.	The second CS pump control switch is in the mid-position
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
5 c. <u>Monitor</u> CNTMT parameters (pressure and temperature) for rising trends.	Containment pressure and temperature trends are monitored.
Comment:	**SAT / UNSAT**

TASK ELEMENT 13	STANDARD
5 d. **IF** adverse CNTMT parameters (pressure and temperature) rising, **THEN** <u>evaluate</u> need to restart CS.	Determine no need to restart CS.
Comment: Examiner Cue: Containment temperature and pressure will be very slowly rising due to normal ambient heatup. If applicant asks CRS for guidance, inform the applicant to continue on with the procedure.	**SAT / UNSAT**

TASK ELEMENT 14	STANDARD
6 <u>Verify</u> Containment Spray valve(s) closed for **ANY** stopped CS pump(s): • CS 125A, CNTMT SPRAY HEADER A ISOL • CS 125B, CNTMT SPRAY HEADER B ISOL	CS-125A and CS-125B closed
Comment: EXAMINER NOTE: These valves will be closed by placing the control switch to open and then to close.	**<u>Critical</u>** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-168
2. Verify containment pressure < 16.4 PSIA
3. For 2015 NRC Exam, JPM S7 is performed concurrently.
4. For 2015 NRC Exam, ensure the applicant travels to CP-10 and CP-8 in a direction that limits encounters with the applicant performing S7.

Setup with specific IC unavailable or for non NRC exams:

1. *Reset the simulator to an IC at any power level in Mode 1*
2. *Insert a main steam line break inside Containment*
3. *When Containment Spray Actuates, delete the malfunction and insert the main steam line break on the same Steam Generator outside Containment (This is to empty the Steam Generator without raising Containment pressure too high)*
4. *Stop all RCPs*
5. *Once Steam Generator Blowdown is complete, delete the malfunction*
6. *Secure both EDGs; lower ACC-126 A&B setpoints to 75F*
7. *Allow Containment pressure to reduce below 16.4 PSIA*
8. *Allow conditions to stabilize.*
9. *Place simulator in freeze and save IC*

ESFAS Reset

Attachment 5-E: CSAS Reset Procedure

INSTRUCTIONS

1. Place Control switches for **ALL** CCW to RCP Isolation valves to "CLOSE:"
   - CC 641, RCP INLET OUTSIDE ISOL
   - CC 710, RCP OUTLET INSIDE ISOL
   - CC 713, RCP OUTLET OUTSIDE ISOL

2. Reset CSAS Initiation relays on **ALL** four channels as follows:
   a. Place the Reset Permissive switch to "UNLK" position. (CP-10)
   b. Press CSAS Reset pushbutton.
   c. Verify the initiation relay indicator is illuminated on the ENGINNERED SAFETY FEATURES SYSTEM mimic.
   d. Place the Reset permissive switch to "LK" position.

3. Reset CSAS actuation logic on **BOTH** trains as follows:
   a. Press the CSAS Reset pushbuttons. (CP-33)
   b. Verify the actuation relay indicator is illuminated on the ENGINEERED SAFETY FEATURES SYSTEM mimic. (CP-10)

INSTRUCTIONS

4. **IF BOTH** CS pumps are operating,
   THEN perform the following:

   a. Stop **ONE** CS pump:

      - CS Pump A
      - CS Pump B

   b. Verify associated CS Pump Control switch in mid-position.

   c. Monitor CNTMT parameters (pressure and temperature) for rising trends.

   d. **IF** adverse CNTMT parameters (pressure and temperature) rising,
      THEN perform the following:

      1) Evaluate need to continue to operate CS.

      2) Exit this attachment.

   e. **IF** CNTMT parameters (pressure and temperature) are stable or trending down,
      THEN GO TO step 5.

INSTRUCTIONS

5. **IF ONE** CS pump is operating,
   THEN perform the following :

   a. Stop CS pump:

      - CS Pump A
      - CS Pump B

   b. Verify associated CS Pump Control switch in mid-position.

   c. Monitor CNTMT parameters (pressure and temperature) for rising trends.

   d. **IF** adverse CNTMT parameters (pressure and temperature) rising,
      THEN evaluate need to restart CS.

6. Verify CNTMT Spray Header valve(s) closed for **ANY** stopped CS pump(s):

   - CS 125A, CNTMT SPRAY HEADER A ISOL
   - CS 125B, CNTMT SPRAY HEADER B ISOL

End of Appendix 5

ESFAS Reset

Attachment 5-E: CSAS Reset Procedure

INSTRUCTIONS

1. Place Control switches for **ALL** CCW to RCP Isolation valves to "CLOSE:"
   - CC 641, RCP INLET OUTSIDE ISOL
   - CC 710, RCP OUTLET INSIDE ISOL
   - CC 713, RCP OUTLET OUTSIDE ISOL

2. Reset CSAS Initiation relays on **ALL** four channels as follows:
   a. Place the Reset Permissive switch to "UNLK" position. (CP-10)
   b. Press CSAS Reset pushbutton.
   c. Verify the initiation relay indicator is illuminated on the ENGINNERED SAFETY FEATURES SYSTEM mimic.
   d. Place the Reset permissive switch to "LK" position.

3. Reset CSAS actuation logic on **BOTH** trains as follows:
   a. Press the CSAS Reset pushbuttons. (CP-33)
   b. Verify the actuation relay indicator is illuminated on the ENGINEERED SAFETY FEATURES SYSTEM mimic. (CP-10)

INSTRUCTIONS

4. **IF BOTH** CS pumps are operating,
THEN perform the following:

   a. Stop **ONE** CS pump:

      - CS Pump A
      - CS Pump B

   b. Verify associated CS Pump Control switch in mid-position.

   c. Monitor CNTMT parameters (pressure and temperature) for rising trends.

   d. **IF** adverse CNTMT parameters (pressure and temperature) rising,
   THEN perform the following:

      1) Evaluate need to continue to operate CS.

      2) Exit this attachment.

   e. **IF** CNTMT parameters (pressure and temperature) are stable or trending down,
   THEN GO TO step 5.

INSTRUCTIONS

5. **IF ONE** CS pump is operating,
   THEN perform the following :

   a. Stop CS pump:

      - CS Pump A
      - CS Pump B

   b. Verify associated CS Pump Control switch in mid-position.

   c. Monitor CNTMT parameters (pressure and temperature) for rising trends.

   d. **IF** adverse CNTMT parameters (pressure and temperature) rising,
      THEN evaluate need to restart CS.

6. Verify CNTMT Spray Header valve(s) closed for **ANY** stopped CS pump(s):

   - CS 125A, CNTMT SPRAY HEADER A ISOL
   - CS 125B, CNTMT SPRAY HEADER B ISOL

End of Appendix 5

Appendix 5 ESFAS Reset (cont'd)

EFAS Reset

These attachments verify that main feedwater is available to feed the steam generators. The operator then may reset the actuation logic for the EFAS by ensuring the manual actuation switches are in norm and relays are reset at CP-33. The remainder of the attachment will lineup for automatic system operation.

EFAS reset – the reset is designed to occur above the EFAS primary setpoint of 85% WR (62.77% NR). The primary setpoint is controlled by WR instrumentation, and the bistable is controlled by NR instrumentation. Accounting for WR uncertainty (ECI92-012) and NR uncertainty (ECI92-019) results in a reset of 68.4% NR. The reset value is documented in EC 8460.

CSAS Reset

Prior to reset of the CSAS, the control switches for CCW to the RCPs are placed in the close position. This prevents the CCW valves from opening and thermal shocking the RCP seals. The containment spray system is reset. Each containment spray pump is then secured sequentially while monitoring containment conditions. The control switches are restored to mid-position after each pump is stopped so that containment spray will automatically actuate if containment pressure rises above the actuation set point. The containment spray valves are identified for closure after both of the containment spray pumps are stopped and the pump control switch is restored for auto actuation, the valves should be closed when instrument air pressure is available.

Waterford 3

2015 NRC RO/SRO Exam

JOB PERFORMANCE MEASURE

S6

Restore Power to Bus 3B

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Restore Power to Safety Bus 3B IAW OP-902-000, Standard Post Trip Actions.

Task Standard: Applicant transfers Train A to Unit Auxiliary Transformer (UAT) A. Upon transfer of Train B to UAT B, the Reactor and turbine trip, the applicant performs Standard Post Trip Actions to restore power to Safety Bus 3B by adjusting EDG voltage.

References: OP-006-001, Plant Distribution (7KV, 4KV, and SSD) System Rev 316

OP-902-000, Standard Post Trip Actions Rev 15

Alternate Path: Yes Time Critical: No Validation Time: 7 min.

K/A A4.02 Adjustment of exciter voltage (using voltage control switch Importance Rating 3.3/3.4 RO / SRO

Applicant: ______________________

Time Start: ______________ Time Finish: ______________

Performance Time: ______________ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ______________________

____

____

Examiner: ______________________ Date: ______________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-006-001, Plant Distribution (7KV, 4KV, and SSD) System (Handout 1)
- OP-902-000, Standard Post Trip Actions

Description:

This task takes place at CP-1. The applicant will assume the shift as the BOP operator during a plant startup at the step to transfer auxiliaries to the Unit Auxiliary Transformers. The applicant will align the A train busses and when the B train is aligned, the B UAT will fail. The failure will result in a Reactor Trip due to a loss of flow to the RCS. The “B” generator output breaker will fail to open resulting in a loss of offsite power to the “B” electrical busses. The applicant will perform the maintenance of vital auxiliaries section of OP-902-000 from memory. The applicant will trip the main generator using the trip pushbuttons, trip the generator output breaker, and recognize that the EDG started but did not supply its respective bus. The applicant will perform immediate action to raise EDG voltage to 3920 to 4350 AC volts allowing the EDG to provide power to bus 3B.

<u>DIRECTIONS TO APPLICANT:</u>

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is performing a startup
- S/G levels are being maintained by an additional operator
- ATC watch is controlling RCS parameters
- You are the BOP operator
- Both Startup Transformers are in service
- Both Unit Auxiliary Transformers are in service in accordance with OP-006-008, Transformer Operation.

INITIATING CUE:

- The CRS directs you to transfer auxiliaries from the Startup Transformers to the Unit Auxiliary Transformers in accordance with OP-006-001, section 6.3.

EXAMINER NOTE
Cue the Simulator Operator to place the Simulator in RUN. Task Elements 1-8 are performed using OP-006-001, Plant Distribution (7KV, 4KV and SSD) System.

TASK ELEMENT 1	STANDARD
6.3.1 Transfer from Startup Transformer (SUT) A to Unit Auxiliary Transformer (UAT) A as follows: 6.3.1.1 Verify Unit Auxiliary Transformer A in service in accordance with OP-006-008, Transformer Operation.	Verified with initial conditions
Comment: **EXAMINER CUE: If asked, provide cue that the both UAT are in service in accordance with OP-006-008, Transformer Operation**	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
6.3.1.2 Verify all fault relays Reset on CP-15 for Unit Auxiliary Transformer A.	Fault Relays verified reset
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
6.3.1.3 Place Bus A Transfer switch to UAT.	Bus A transfer switch in UAT
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
6.3.1.3.1 Verify the following Startup Transformer A breakers Open: ▪ 7KV-EBKR-1A-4 Startup Transformer A 7KV Isolation ▪ 4KV-EBKR-2A-4 Startup Transformer A 4KV Isolation	7KV-EBKR-1A-4 and 4KV-EBKR-2A-4 checked open
Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
6.3.1.3.2 Verify the following Unit Auxiliary Transformer A breakers Closed: ▪ 7KV-EBKR-1A-1 Unit Auxiliary Transformer A 7KV Isolation ▪ 4KV-EBKR-2A-1 Unit Auxiliary Transformer A 4KV Isolation	Verifies the breakers are closed
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
6.3.2 Transfer from Startup Transformer (SUT) B to Unit Auxiliary Transformer (UAT) B as follows: 6.3.2.1 Verify Unit Auxiliary Transformer B in service in accordance with OP-006-008, Transformer Operation.	Verified with initial conditions
Comment:	**SAT / UNSAT**

TASK ELEMENT 7	STANDARD
6.3.2.2 Verify all fault relays Reset on CP-15 for Unit Auxiliary Transformer B.	Fault Relays verified reset
Comment:	**SAT / UNSAT**

EXAMINER NOTE
The fault is inserted at the following step and these steps should be performed from memory.

TASK ELEMENT 8	STANDARD
6.3.2.3 Place Bus B Transfer switch to UAT.	Bus B transfer switch in UAT
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 9	STANDARD
Recognize Turbine and Reactor Trip, proceed to SPTAs	Steps for OP-902-000, Standard Post Trip Actions, are commenced.
Comment: **EXAMINER NOTE: Alternate Path Begins Here** **EXAMINER CUE: Provide cue to applicant to perform Standard Post Trip Actions as the Balance of Plant Operator**	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
2. Determine that Maintenance of Vital Auxiliaries acceptance criteria are met: a. Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed	Governor valves and throttle valves checked closed
Comment:	**SAT / UNSAT**

TASK ELEMENT 11	STANDARD
b. Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped	Determined Generator Breaker B is closed and proceeded to contingency
Comment:	**SAT / UNSAT**

TASK ELEMENT 12	STANDARD
b.1 Perform **ANY** of the following: 1) Manually trip the Main Generator using BOTH GENERATOR EMERG TRIP pushbuttons. 2) Manually trip the Main Generator by performing **ALL** of the following: a. Transfer **BOTH** electrical buses from UAT to SUT. b. Open the following breakers: • GENERATOR BREAKER A • GENERATOR BREAKER B • EXCITER FIELD BREAKER	Pushed Both Generator emergency Trip pushbuttons or opened Generator Breaker B
Comment: EXAMINER NOTE: Applicant will be successful either by pushing both Generator Emergency pushbuttons or manually tripping the Generator output breaker. Preferred order would be using the Generator Pushbuttons as they are numbered steps. The motoring of the Generator isolated offsite power due to the breaker failure to open scheme so the Generator is no longer motoring after offsite power was lost to the B busses.	**SAT / UNSAT**

TASK ELEMENT 13	STANDARD
c. Check station loads are energized from offsite electrical power as follows: **Train A** • A1, 6.9 KV non safety bus • A2, 4.16 KV non safety bus • A3, 4.16 KV safety bus • A-DC electrical bus • A or C vital AC Instrument Channel **Train B** • B1, 6.9 KV non safety bus • B2, 4.16 KV non safety bus • B3, 4.16 KV safety bus • B-DC electrical bus • B or D vital AC Instrument Channel	Recognized bus B3 deenergized and proceeded to contingency
Comment:	**SAT / UNSAT**

TASK ELEMENT 14	STANDARD
c.1 **IF ANY** 4.16 KV safety bus is **NOT** powered from offsite, **THEN:** 1) Verify associated EDG has started **AND** EDG output breaker closed. 2) **IF** EDG output breaker is **NOT** closed **THEN**: • Verify stable EDG Voltage 3920 - 4350 AC Volts. • Verify 3-2 Breaker open. • Check Sequencer LOCKOUT **NOT** illuminated. 3) **IF** EDG output breaker is **NOT** closed **AND** Step c.1.2) is met **THEN** locally close EDG output breaker. 4) Verify CCW cooling available to EDG.	Determined EDG output Breaker not closed, EDG Voltage checked and determined to be out of the band low, adjusted voltages to within the band, verified 3-2 tie breaker open, checked sequencer lockout not illuminated, and checked CCW pump running for B EDG.
Comment: EXAMINER NOTE: Only the adjustment of EDG voltage is critical for task completion. The EDG B output breaker will auto closed when voltage is within the band. Examiner NOTE: The JPM is complete once the EDG B output breaker has closed.	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-169
2. **RESET ANY FAULT RELAYS ON CP-15 BETWEEN EACH RESET FOR THIS JPM**
3. **RESET SIMULATOR LIGHTING BETWEEN EACH RESET FOR THIS JPM**
4. Verify the following (Should be loaded in IC):
   a. EG04B, MAIN GENERATOR B OUTPUT BREAKER FAILS TO OPEN (Active)
   b. EG04B is set to delete in 1 second on Event Trigger 2
   c. EG13B, EDG B AUTO VOLTAGE REG FAILED LO, tied to Event Trigger 1 (Inactive)
   d. ED02F, LOSS OF UAT-B TRANSFORMER tied to Event Trigger 1 (Inactive)
5. Ensure Event Trigger 1 is inserted as follows (Should be loaded in IC)
   a. Event – UAT/SUT B SWITCH in UAT
   b. Code is ZDIEDSTECS2235(1) == 1
6. Ensure Event Trigger 2 is inserted as follows: (Should be loaded in IC)
   a. Event – Generator Trip – Both Required
   b. Code is ZDIEGGENECS2201(1) == 1 & ZDIEGGENECS2205(1) == 1

Setup with specific IC unavailable or for non NRC exams:

1. *Reset the simulator to an IC with the turbine ready to sync to the Grid*
2. *Sync the turbine to the grid in accordance with OP-010-004*
3. *Adjust Generator load to obtain approximately 60 MWe*
4. *Stabilize plant conditions*
5. *Enter malfunctions and Triggers listed above*
6. *Place simulator in freeze and save IC*

3.0 PRECAUTIONS AND LIMITATIONS

3.1 PRECAUTIONS

3.1.1 If any electrical maintenance is being performed at any time when equipment is to be energized or power supplies are to be aligned, then particular consideration must be given to the possibility of backfeed to persons working.

3.1.2 No more than one incoming supply feeder per bus may be energized unless making live bus transfers from synchronized sources.

3.1.3 Priorto attempting any bus transfer, supply power should be verified available from the source that will be transferred to. Interlocks mustnot be relied upon.

3.1.4 Priorto attempting to cross-connect the following switchgear, the switchgear being cross-connected must be verified deenergized from its primary source:

- SSD-ESWGR-21A, Switchgear 21A, to SSD-ESWGR-21B, Switchgear 21B
- SSD-ESWGR-22A, Switchgear 22A, to SSD-ESWGR-22B, Switchgear 22B
- SSD-ESWGR-4A, Switchgear 4A, to SSD-ESWGR-4B, Switchgear 4B

3.1.5 Priorto attempting to restore the primary source of power to the following switchgear, the switchgear being restored to its primary source must be verified deenergized from its respective cross-connected source:

- SSD-ESWGR-21A Switchgear 21A
- SSD-ESWGR-21B Switchgear 21B
- SSD-ESWGR-22A Switchgear 22A
- SSD-ESWGR-22B Switchgear 22B
- 4KV-ESWGR-4A Switchgear 4A
- 4KV-ESWGR-4B Switchgear 4B

3.1.6 Transfer of power source to the following busses and motor control centers (MCCs) will be a dead bus transfer. Components fed from these busses will be deenergized during transfer:

- 4KV-ESWGR-3AB Switchgear 3AB
- SSD-ESWGR-31AB Switchgear 31AB
- SSD-EMCC-222AB Motor Control Center 222AB

3.1.7 The Main Turbine Generator must be shut down before attempting a backfeed of the Main Transformers to supply plant auxiliaries.

3.1.8 Security Diesel Generator engine radiator fill cap may only be removed if radiator coolant temperature is below its boiling point. Extreme care must be taken when coolant is hot to ensure the radiator is not under pressure by loosening fill cap to the vent position before fully removing it.

3.1.9 Security Diesel Generator engine oil pressure should rise to > 20 PSIG within 10 seconds of starting. <u>If</u> Security Diesel Generator engine oil pressure is < 20 PSIG after 10 seconds, <u>then</u> Security Diesel Generator should be secured immediately by placing the Automatic/Manual select toggle switch to Automatic.

3.1.10 <u>If</u> the Security Diesel Generator engine is stopped at any time while operating under load, <u>and</u>the load contactor is verified open, <u>then</u> an attempt should be made to re-start it by placing Automatic/Manual select toggle switch to OFF & RESET, then back to MANUAL. This is to allow cooldown with no load to prevent overheating of turbocharger parts.

3.1.11 Isophase Bus duct fans must be danger tagged in accordance with OP-102, Protective and Caution Tagging, <u>priorto</u> removing Main Generator disconnect links to prevent introducing dust and debris into Isophase Bus. As a minimum, the following breakers must be tagged:

- GEN-EBKR-211A-2H Isophase Bus Duct Exhaust Fan
- GEN-EBKR-212A-3M Isophase Bus Duct Supply Fan A
- GEN-EBKR-212B-3M Isophase Bus Duct Supply Fan B

3.1.12 Proper Personnel Protection Equipment and safety requirements are required in accordance with EN-IS-123, Electrical Safety, when closing any of the following breakers with the breaker cubicle door open:

- SSD-EBKR-21A-4B Switchgear 21A Feeder
- SSD-EBKR-21B-4B Switchgear 21B Feeder
- SSD-EBKR-21B-4C Switchgear 21B Tie To Switchgear 21A

3.2 LIMITATIONS

3.2.1 Appropriate guidelines have been incorporated into this procedure to ensure compliance with EN-OP-116. The following sections have been identified as infrequently performed tests or evolutions in accordance with EN-OP-116, Infrequently Performed Tests or Evolutions:

- Section 8.4, Backfeed of Main Transformers to Supply Plant Auxiliaries
- Section 8.5, Restoration of Main Transformers for Normal Service

3.2.2 Gretna Transmissions Operations Center operates equipment in the Switchyard and will require notification to realign breakers S7172, S7176, S7182, and S7186, if necessary.

3.2.3 If the Security Diesel Generator engine cranks for 30 seconds without starting, then the Security Diesel Generator should be stopped by placing Automatic/Manual select toggle switch to Automatic.

3.2.4 The Security Diesel Fuel Oil Tank should not be allowed to run out of fuel. If Security Diesel Generator engine stops due to lack of fuel supply, then it may necessitate refilling and bleeding of engine fuel lines.

3.2.5 If during startup or operation of the Security Diesel Generator there is a significantly noticeable diesel exhaust plume that is visible for >6 minutes in any consecutive 60 minute period, then UNT-006-010, Event Notification and Reporting, must be complied with.

3.2.6 When closing any of the following breakers with the breaker fully racked in, the door on the front of the breaker cubicle must be open and the Close Latch on the breaker must be depressed (similar to discharging the closing springs when these breakers are fully racked out). The black Close button on the front of the breaker only works in the test position:

- SSD-EBKR-21A-4B Switchgear 21A Feeder
- SSD-EBKR-21B-4B Switchgear 21B Feeder
- SSD-EBKR-21B-4C Switchgear 21B Tie To Switchgear 21A

6.3 TRANSFER FROM STARTUP TO UNIT AUXILIARY TRANSFORMER [C]

6.3.1 Transfer from Startup Transformer (SUT) A to Unit Auxiliary Transformer (UAT) A as follows:

6.3.1.1 Verify Unit Auxiliary Transformer A in service in accordance with OP-006-008, Transformer Operation.

6.3.1.2 Verify all fault relays Reset on CP-15 for Unit Auxiliary Transformer A.

6.3.1.3 Place Bus A Transfer switch to UAT.

6.3.1.3.1 Verify the following Startup Transformer A breakers Open:

- 7KV-EBKR-1A-4 Startup Transformer A 7KV Isolation
- 4KV-EBKR-2A-4 Startup Transformer A 4KV Isolation

6.3.1.3.2 Verify the following Unit Auxiliary Transformer A breakers Closed:

- 7KV-EBKR-1A-1 Unit Auxiliary Transformer A 7KV Isolation
- 4KV-EBKR-2A-1 Unit Auxiliary Transformer A 4KV Isolation

6.3.2 Transfer from Startup Transformer (SUT) B to Unit Auxiliary Transformer (UAT) B as follows:

6.3.2.1 Verify Unit Auxiliary Transformer B in service in accordance with OP-006-008, Transformer Operation.

6.3.2.2 Verify all fault relays Reset on CP-15 for Unit Auxiliary Transformer B.

6.3.2.3 Place Bus B Transfer switch to UAT.

6.3.2.3.1 Verify the following Startup Transformer B breakers Open:

- 7KV-EBKR-1B-4 Startup Transformer B 7KV Isolation
- 4KV-EBKR-2B-4 Startup Transformer B 4KV Isolation

6.3.2.3.2 Verify the following Unit Auxiliary Transformer B breakers Closed:

- 7KV-EBKR-1B-1 Unit Auxiliary Transformer B 7KV Isolation
- 4KV-EBKR-2B-1 Unit Auxiliary Transformer B 4KV Isolation

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE

Normal Review Class (check one):

☐ OSRC

☑ QUALIFIED REVIEWER

PROCEDURE NUMBER: OP-006-001	REVISION: 316

TITLE: Plant Distribution (7KV, 4KV and SSD) System

PROCEDURE OWNER (Position Title) : Operations Manager - Support

TERM (check one) : ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 9/4/2014

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one) :

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

(a) Add a new step (11.5.10) as the last step of Attachment 11.5 (Post AB Bus Transfer Restoration) to verify AB Essential Chiller Hot Gas Bypass Temperature Controller, CHW-ITIC-0106AB, is set per OP-002-004, Chilled Water System. CR-WF3-2014-03310 identified Chiller AB tripped on load recycle, which occurred following an AB Bus swap in which Hot Gas Bypass valve for Chiller AB had reset to 0 degrees Fahrenheit (the normal setpoint per OP-002-004 is 45 degrees Fahrenheit). The direction to verify the AB Essential Chiller Hot Gas Bypass Temperature Controller operation in accordance with OP-002-004 will ensure the AB Essential Chiller operation is restored to normal operation in a timely manner should this condition reoccur. This change directs the use of another approved procedure and meets Editorial Correction criteria. This change completes the assigned action of CR-WF3-2014-01811 CA-64.

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			David R Voisin	8/28/2014
EC SUPERVISOR	Administrative Review and Approval		(sign) [signature] David J Melancon	9-3-14
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

6.3 TRANSFER FROM STARTUP TO UNIT AUXILIARY TRANSFORMER [C]

6.3.1 Transfer from Startup Transformer (SUT) A to Unit Auxiliary Transformer (UAT) A as follows:

6.3.1.1 Verify Unit Auxiliary Transformer A in service in accordance with OP-006-008, Transformer Operation.

6.3.1.2 Verify all fault relays Reset on CP-15 for Unit Auxiliary Transformer A.

6.3.1.3 Place Bus A Transfer switch to UAT.

6.3.1.3.1 Verify the following Startup Transformer A breakers Open:

- 7KV-EBKR-1A-4 Startup Transformer A 7KV Isolation
- 4KV-EBKR-2A-4 Startup Transformer A 4KV Isolation

6.3.1.3.2 Verify the following Unit Auxiliary Transformer A breakers Closed:

- 7KV-EBKR-1A-1 Unit Auxiliary Transformer A 7KV Isolation
- 4KV-EBKR-2A-1 Unit Auxiliary Transformer A 4KV Isolation

6.3.2 Transfer from Startup Transformer (SUT) B to Unit Auxiliary Transformer (UAT) B as follows:

6.3.2.1 Verify Unit Auxiliary Transformer B in service in accordance with OP-006-008, Transformer Operation.

6.3.2.2 Verify all fault relays Reset on CP-15 for Unit Auxiliary Transformer B.

6.3.2.3 Place Bus B Transfer switch to UAT.

6.3.2.3.1 Verify the following Startup Transformer B breakers Open:

- 7KV-EBKR-1B-4 Startup Transformer B 7KV Isolation
- 4KV-EBKR-2B-4 Startup Transformer B 4KV Isolation

6.3.2.3.2 Verify the following Unit Auxiliary Transformer B breakers Closed:

- 7KV-EBKR-1B-1 Unit Auxiliary Transformer B 7KV Isolation
- 4KV-EBKR-2B-1 Unit Auxiliary Transformer B 4KV Isolation

INSTRUCTIONS	CONTINGENCY ACTIONS
Verify Maintenance of Vital Auxiliaries	
___2. <u>Determine</u> that Maintenance of Vital Auxiliaries acceptance criteria are met:	
___a. <u>Check</u> the Main Turbine is tripped: • Governor valves closed • Throttle valves closed	a.1 <u>Perform</u> **ANY** of the following: 1) Manually <u>trip</u> the Main Turbine using TURBINE TRIP and THINK pushbuttons. 2) <u>Close</u> **BOTH** MSIVs.
___b. <u>Check</u> the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped (continue)	b.1 <u>Perform</u> **ANY** of the following: 1) Manually <u>trip</u> the Main Generator using **BOTH** GENERATOR EMERG TRIP pushbuttons. 2) Manually <u>trip</u> the Main Generator by performing **ALL** of the following: a. <u>Transfer</u> **BOTH** electrical buses from UAT to SUT. b. <u>Open</u> the following breakers: • GENERATOR BREAKER A • GENERATOR BREAKER B • EXCITER FIELD BREAKER

INSTRUCTIONS	CONTINGENCY ACTIONS
2. (continued)	
___ c. Check station loads are energized from offsite electrical power as follows: **Train A** • A1, 6.9 KV non safety bus • A2, 4.16 KV non safety bus • A3, 4.16 KV safety bus • A-DC electrical bus • A or C vital AC Instrument Channel **Train B** • B1, 6.9 KV non safety bus • B2, 4.16 KV non safety bus • B3, 4.16 KV safety bus • B-DC electrical bus • B or D vital AC Instrument Channel	c.1 **IF ANY** 4.16 KV safety bus is **NOT** powered from offsite, **THEN:** 1) Verify associated EDG has started **AND** EDG output breaker closed. 2) **IF** EDG output breaker is **NOT** closed **THEN**: • Verify stable EDG Voltage 3920 - 4350 AC Volts. • Verify 3-2 Breaker open. • Check Sequencer LOCKOUT **NOT** illuminated. 3) **IF** EDG output breaker is **NOT** closed **AND** Step c.1.2) is met **THEN** locally close EDG output breaker. 4) Verify CCW cooling available to EDG.

Waterford 3

2014 AUDIT Exam

JOB PERFORMANCE MEASURE

S7

Functional Check of Startup Channel

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform Range check functional test of Startup Channel 1

Task Standard: Range Check Functional test complete for Startup Channel 1

References: OP-903-101, Startup Channel Functional Test Channel 1 and 2, Rev 8

Alternate Path: No Time Critical: No Validation Time: 18 min.

K/A 015 A3.03, Verification of proper functioning/operability Importance Rating 3.9 / 3.9 RO / SRO

Applicant: ______________________

Time Start: ______________ Time Finish: ______________

Performance Time: ______________ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ______________________

____

____

____

Examiner: ______________________ Date: ______________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-903-101, Startup Channel Functional Test Channel 1 and 2 Handout 1

This JPM is performed concurrently with S5.

Description:

The JPM begins with the plant in Mode 3 and stable. The applicant will be directed to perform Surveillance procedure OP-903-101 for range checks on Startup Channel 1. This JPM takes place at CP-2 and CP-12. There are no malfunctions associated with this JPM.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in Mode 3

INITIATING CUE:

- The CRS directs you, to perform section 7.2 for Range Checks only for Startup Channel 1 in accordance with OP-903-101, Startup Channel Functional Test Startup Channel 1 and 2.

EXAMINER NOTE
When Applicant is ready, cue the simulator operator to place the simulator in RUN.

TASK ELEMENT 1	STANDARD
7.2 RANGE CHECKS 7.2.1 Momentarily depress local Trouble bistable lamp, verify Trouble bistable lamp is extinguished <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Button depressed and documented on Att. 10.1
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
7.2.2 Place AUDIO COUNT CHANNEL SELECT switch (CP-2) to the channel not being tested.	Select switch in Channel 2
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
7.2.3 Place OPERATE/TEST LOW/TEST HIGH switch in Test Low <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Switch in Test Low and documented on Att. 10.1
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
7.2.4 Verify local Trouble bistable lamp is illuminated <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	bistable verified and data recorded
Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
7.2.5 Verify Control/Startup Channel 1(2) Trouble annunciator Alarms (M-3 (M-4), Cabinet H) <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Annunciator verified and data recorded
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
7.2.6 Record the following Startup Channel 1(2) indications <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet: ▪ Drawer local counts ▪ Remote recorder ENI-IJR-0005 (0006) ▪ Remote meter ENI-IJI-0005 (0006)	data recorded
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
7.2.7 Place OPERATE/TEST LOW/TEST HIGH switch to Test-High <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Switch in Test High and data recorded
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
7.2.8 Verify Channel 1(2) Neutron Flux High annunciator Alarms (K-3 (K-4), Cabinet H) <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Annunciator verified and data recorded
Comment:	**SAT / UNSAT**

TASK ELEMENT 9	STANDARD
7.2.9 Verify RCS Boron Channel 1(2) Dilution Hi annunciator Alarms (L-3 (L-4), Cabinet G) <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Annunciator verified and data recorded
Comment:	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
7.2.10 Record following Startup Channel 1(2) indications <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet: ▪ Drawer local counts ▪ Remote recorder ENI-IJR-0005 (0006) ▪ Remote meter ENI-IJI-0005 (0006)	data recorded
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
7.2.11 Place OPERATE/TEST LOW/TEST HIGH switch in Operate <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Switch in Operate and data recorded
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
7.2.12 Momentarily depress local Trouble bistable lamp, verify Trouble bistable lamp is extinguished <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Button depressed, bistable verified and data recorded
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 13	STANDARD
7.2.13 Verify Control/Startup Channel 1 (2) Trouble annunciator (M-3 (M-4), Cabinet H) is clear <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Annunciator verified and data recorded
Comment:	**SAT / UNSAT**

TASK ELEMENT 14	STANDARD
7.2.14 Verify Channel 1 (2) Neutron Flux High annunicator (K-3 (K-4), Cabinet H) is clear <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Annunciator verified and data recorded
Comment:	**SAT / UNSAT**

TASK ELEMENT 15	STANDARD
7.2.15 Verify RCS Boron Channel 1 (2) Dilution Hi annunciator (L-3 (L-4), Cabinet G) is clear <u>and</u> document on Attachment 10.1, Startup Channel Functional Test Data Sheet.	Annunciator verified and data recorded
Comment:	**SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-168
2. Place Simulator in Run on Lead Examiner's cue
3. For 2015 NRC Exam, JPM S5 is performed concurrently
4. For 2015 NRC Exam, ensure the applicant travels to CP-12 in a direction that limits encounters with the applicant performing S5.

There are no malfunctions associated with this JPM

Setup with specific IC unavailable or for non NRC/AUDIT exams:

1. *Reset the simulator to an IC in Mode 3*
2. *Allow simulator to run until all conditions stabilize*
3. *Acknowledge annunciators*
4. *Place simulator in freeze and save IC*

10.1 STARTUP CHANNEL FUNCTIONAL TEST DATA SHEET

Startup Channel _√____1 and ____2 (Check Applicable Space)

Permission: *Joe Supervisor*________/_____Today/Now______________ WO#:___123456________________
SM/CRS Date/Time

STEP	DESCRIPTION			INITIALS
	STARTUP CHANNEL HIGH VOLTAGE TEST			
7.1.1	Startup HV Low lamp is extinguished.			N/A
7.1.2	Startup HV On lamp is illuminated.			N/A
7.1.3	Startup HV Off lamp is extinguished.			N/A
7.1.4	STARTUP HV X 3/CONTROL HV X 1 switch in Startup HV X 3 .			N/A
7.1.5	Startup High Voltage meter reading: _______ VDC (600 to 800 VDC).			N/A
	RANGE CHECKS			
7.2.1	Local Trouble bistable lamp is extinguished.			________
7.2.3	Place OPERATE/TEST LOW/TEST HIGH switch to Test-Low.			________
7.2.4	Local Trouble bistable lamp is illuminated.			________
7.2.5	Control/Startup Channel 1(2) Trouble alarms (M-3 (M-4), Cabinet H).			________
7.2.6	LOCATION	REQUIRED	ACTUAL	
	Drawer local counts	5×10^{1} to 2×10^{2} CPS	________ CPS	________
	Remote recorder ENI-IJR-0005 (0006)	5×10^{1} to 2×10^{2} CPS	________ CPS	________
	Remote meter ENI-IJI-0005 (0006)	5×10^{1} to 2×10^{2} CPS	________ CPS	________

Startup Channel __√___1 and ____2 (Check Applicable Space)

STEP	DESCRIPTION				INITIALS
	RANGE CHECKS (CONT'D)				
7.2.7	Place OPERATE/TEST LOW/TEST HIGH switch to Test-High.				________
7.2.8	Channel 1(2) Neutron Flux High alarms (K-3 (K-4), Cabinet H).				________
7.2.9	RCS Boron Chnl 1(2) Dilution Hi alarms (L-3 (L-4), Cabinet G).				________
7.2.10	LOCATION	REQUIRED	ACTUAL		
	Drawer local counts	5 x 10^4 to 2 x 10^5 CPS	________	CPS	________
	Remote recorder ENI-IJR-0005 (0006)	5 x 10^4 to not pegged hi	________	CPS	________
	Remote meter ENI-IJI-0005 (0006)	5 x 10^4 to not pegged hi	________	CPS	________
7.2.11	Place OPERATE/TEST LOW/TEST HIGH switch in Operate.				________
7.2.12	Local Trouble bistable lamp is extinguished.				________
7.2.13	Control/Startup Channel 1 (2) Trouble annunciators (M-3(M-4), Cabinet H) are clear.				________
7.2.14	Channel 1 (2) Neutron Flux High annunciators (K-3(K-4) Cabinet H) are clear.				________
7.2.15	RCS Boron Channel 1 (2) Dilution Hi annunciator (L-3(L-4) Cabinet G) is clear.				________

10.1 STARTUP CHANNEL FUNCTIONAL TEST DATA SHEET (CONT'D)

Startup Channel __√___1 and ____2 (Check Applicable Space)

STEP	DESCRIPTION		INITIALS
	AUDIBLE COUNT RATE		
7.3.1	Audible count rate is present on Channel 1:	Control Room	________
		Containment	________
7.3.2	Audible count rate is present on Channel 2:	Control Room	________
		Containment	________

RESTORATION

	SWITCH	POSITION	PERFORMED	IV
7.4.1.1	OPERATE/TEST LOW/TEST HIGH	Operate	________	________
7.4.1.2	ZERO/OPERATE/125%	Operate	________	________
7.4.1.3	TRIP TEST	Off	________	________

TEST ACCEPTANCE: INITIAL

Startup Channel Functional Test performed satisfactory in accordance with Section 6.0, Acceptance Criteria. ________

Remarks: ____
____
____

Performed By: ________________/________________
Operator Date/Time

IV By: ________________/________________
Operator Date/Time

Reviewed By: ________________/________________
SM/CRS Date/Time

3.0 PRECAUTIONS AND LIMITATIONS

3.1 PRECAUTIONS

3.1.1 Verify only one Startup Drawer is under test at any given time.

3.2 LIMITATIONS

3.2.1 Do <u>not</u> energize Source Range High Voltage with Reactor Power $>10^{-6}$%. High Neutron Flux will destroy Startup BF_3 detectors over time (long term concern).

7.2 RANGE CHECKS

7.2.1 Momentarily depress local Trouble bistable lamp, verify Trouble bistable lamp is extinguished and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.2 Place AUDIO COUNT CHANNEL SELECT switch (CP-2) to the channel not being tested.

7.2.3 Place OPERATE/TEST LOW/TEST HIGH switch in Test Low and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.4 Verify local Trouble bistable lamp is illuminated and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.5 Verify Control/Startup Channel 1(2) Trouble annunciator Alarms (M-3 (M-4), Cabinet H) and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.6 Record the following Startup Channel 1(2) indications and document on Attachment 10.1, Startup Channel Functional Test Data Sheet:

- Drawer local counts
- Remote recorder ENI-IJR-0005 (0006)
- Remote meter ENI-IJI-0005 (0006)

7.2.7 Place OPERATE/TEST LOW/TEST HIGH switch to Test-High and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.8 Verify Channel 1(2) Neutron Flux High annunciator Alarms (K-3 (K-4), Cabinet H) and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.9 Verify RCS Boron Channel 1(2) Dilution Hi annunciator Alarms (L-3 (L-4), Cabinet G) and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.10 Record following Startup Channel 1(2) indications and document on Attachment 10.1, Startup Channel Functional Test Data Sheet:

- Drawer local counts
- Remote recorder ENI-IJR-0005 (0006)
- Remote meter ENI-IJI-0005 (0006)

7.2.11 Place OPERATE/TEST LOW/TEST HIGH switch in Operate and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.12 Momentarily depress local Trouble bistable lamp, verify Trouble bistable lamp is extinguished and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.13 Verify Control/Startup Channel 1 (2) Trouble annunciator (M-3 (M-4), Cabinet H) is clear and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.14 Verify Channel 1 (2) Neutron Flux High annunicator (K-3 (K-4), Cabinet H) is clear and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.15 Verify RCS Boron Channel 1 (2) Dilution Hi annunciator (L-3 (L-4), Cabinet G) is clear and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ OSRC ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-903-101		REVISION: 008
TITLE: Startup Channel Functional Test Channel 1 and 2		
PROCEDURE OWNER (Position Title): Assistant Operations Manager (Support)		

TERM (check one): ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 4/5/12

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

Changed the previous signoff designation "Verified" to "IV" indicating that the type of verification required is Independent Verification. This change merely clarifies and does not alter existing verification requirements. This change, therefore, meets Editorial Correction criteria.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			Justice Endris	3/30/2012
EC SUPERVISOR	Administrative Review and Approval		(sign) Richard Williams	4/3/2012
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

7.2 RANGE CHECKS

7.2.1 Momentarily depress local Trouble bistable lamp, verify Trouble bistable lamp is extinguished and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.2 Place AUDIO COUNT CHANNEL SELECT switch (CP-2) to the channel not being tested.

7.2.3 Place OPERATE/TEST LOW/TEST HIGH switch in Test Low and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.4 Verify local Trouble bistable lamp is illuminated and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.5 Verify Control/Startup Channel 1(2) Trouble annunciator Alarms (M-3 (M-4), Cabinet H) and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.6 Record the following Startup Channel 1(2) indications and document on Attachment 10.1, Startup Channel Functional Test Data Sheet:

- Drawer local counts
- Remote recorder ENI-IJR-0005 (0006)
- Remote meter ENI-IJI-0005 (0006)

7.2.7 Place OPERATE/TEST LOW/TEST HIGH switch to Test-High and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.8 Verify Channel 1(2) Neutron Flux High annunciator Alarms (K-3 (K-4), Cabinet H) and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.9 Verify RCS Boron Channel 1(2) Dilution Hi annunciator Alarms (L-3 (L-4), Cabinet G) and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.10 Record following Startup Channel 1(2) indications and document on Attachment 10.1, Startup Channel Functional Test Data Sheet:

- Drawer local counts
- Remote recorder ENI-IJR-0005 (0006)
- Remote meter ENI-IJI-0005 (0006)

7.2.11 Place OPERATE/TEST LOW/TEST HIGH switch in Operate and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.12 Momentarily depress local Trouble bistable lamp, verify Trouble bistable lamp is extinguished and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.13 Verify Control/Startup Channel 1 (2) Trouble annunciator (M-3 (M-4), Cabinet H) is clear and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.14 Verify Channel 1 (2) Neutron Flux High annunicator (K-3 (K-4), Cabinet H) is clear and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

7.2.15 Verify RCS Boron Channel 1 (2) Dilution Hi annunciator (L-3 (L-4), Cabinet G) is clear and document on Attachment 10.1, Startup Channel Functional Test Data Sheet.

10.1 STARTUP CHANNEL FUNCTIONAL TEST DATA SHEET

Startup Channel _____1 and _____2 (Check Applicable Space)

Permission:______________________/_________________ WO#:_______________________
SM/CRS Date/Time

STEP	DESCRIPTION	INITIALS
	STARTUP CHANNEL HIGH VOLTAGE TEST	
7.1.1	Startup HV Low lamp is extinguished.	________
7.1.2	Startup HV On lamp is illuminated.	________
7.1.3	Startup HV Off lamp is extinguished.	________
7.1.4	STARTUP HV X 3/CONTROL HV X 1 switch in Startup HV X 3 .	________
7.1.5	Startup High Voltage meter reading: _______ VDC (600 to 800 VDC).	________
	RANGE CHECKS	
7.2.1	Local Trouble bistable lamp is extinguished.	________
7.2.3	Place OPERATE/TEST LOW/TEST HIGH switch to Test-Low.	________
7.2.4	Local Trouble bistable lamp is illuminated.	________
7.2.5	Control/Startup Channel 1(2) Trouble alarms (M-3 (M-4), Cabinet H).	________

STEP	LOCATION	REQUIRED	ACTUAL	INITIALS
7.2.6	Drawer local counts	5×10^1 to 2×10^2 CPS	________ CPS	________
	Remote recorder ENI-IJR-0005 (0006)	5×10^1 to 2×10^2 CPS	________ CPS	________
	Remote meter ENI-IJI-0005 (0006)	5×10^1 to 2×10^2 CPS	________ CPS	________

10.1 STARTUP CHANNEL FUNCTIONAL TEST DATA SHEET (CONT'D)

Startup Channel _____1 and _____2 (Check Applicable Space)

STEP	DESCRIPTION			INITIALS
	RANGE CHECKS (CONT'D)			
7.2.7	Place OPERATE/TEST LOW/TEST HIGH switch to Test-High.			________
7.2.8	Channel 1(2) Neutron Flux High alarms (K-3 (K-4), Cabinet H).			________
7.2.9	RCS Boron Chnl 1(2) Dilution Hi alarms (L-3 (L-4), Cabinet G).			________
7.2.10	LOCATION	REQUIRED	ACTUAL	
	Drawer local counts	5×10^4 to 2×10^5 CPS	________ CPS	________
	Remote recorder ENI-IJR-0005 (0006)	5×10^4 to not pegged hi	________ CPS	________
	Remote meter ENI-IJI-0005 (0006)	5×10^4 to not pegged hi	________ CPS	________
7.2.11	Place OPERATE/TEST LOW/TEST HIGH switch in Operate.			________
7.2.12	Local Trouble bistable lamp is extinguished.			________
7.2.13	Control/Startup Channel 1 (2) Trouble annunciators (M-3(M-4), Cabinet H) are clear.			________
7.2.14	Channel 1 (2) Neutron Flux High annunciators (K-3(K-4) Cabinet H) are clear.			________
7.2.15	RCS Boron Channel 1 (2) Dilution Hi annunciator (L-3(L-4) Cabinet G) is clear.			________

10.1 STARTUP CHANNEL FUNCTIONAL TEST DATA SHEET (CONT'D)

Startup Channel _____1 and _____2 (Check Applicable Space)

STEP	DESCRIPTION		INITIALS
	AUDIBLE COUNT RATE		
7.3.1	Audible count rate is present on Channel 1:	Control Room	________
		Containment	________
7.3.2	Audible count rate is present on Channel 2:	Control Room	________
		Containment	________

RESTORATION

	SWITCH	POSITION	PERFORMED	IV
7.4.1.1	OPERATE/TEST LOW/TEST HIGH	Operate	________	________
7.4.1.2	ZERO/OPERATE/125%	Operate	________	________
7.4.1.3	TRIP TEST	Off	________	________

TEST ACCEPTANCE: INITIAL

Startup Channel Functional Test performed satisfactory in accordance with Section 6.0, Acceptance Criteria. ________

Remarks: ____

____

____

Performed By: ________________/________________
Operator Date/Time

IV By: ________________/________________
Operator Date/Time

Reviewed By: ________________/________________
SM/CRS Date/Time

Waterford 3

2015 NRC Exam

JOB PERFORMANCE MEASURE

S8

Placing Fuel Handling Building Emergency Filtration Unit A in Service

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Place FHB Emergency Filtration Unit A in service in accordance with OP-002-009, Fuel Handling Building HVAC.

Task Standard: Applicant aligned Fuel Handling Building Emergency Filtration Unit A to Service.

References: OP-002-009, Fuel Handling Building HVAC, revision 13

Alternate Path: No   Time Critical: No   Validation Time: 20 min.

K/A A4.01 Radiation levels   Importance Rating 3.3 / 3.7
RO / SRO

Applicant: ____________________

Time Start: ____________   Time Finish: ____________

Performance Time: ____________ minutes
Critical Time: N/A minutes

Performance Rating: SAT   UNSAT

Comments: ____________________

____

____

Examiner: ____________________   Date: ____________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-002-009, Fuel Handling Building HVAC, revision 13

Description:
This task takes place at CP-18. The applicant will secure FHB Normal HVAC and then place FHB Emergency Filtration Unit A is in service.

This JPM is to be performed concurrently with S2.

DIRECTIONS TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All control room steps shall be performed for this JPM, including any required communications. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

APPLICANT CUE SHEET

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The plant is in Mode 3

INITIATING CUE:

The CRS directs you to Place FHB Emergency Filtration Unit A in service in accordance with section 6.3 of OP-002-009, Fuel Handling Building HVAC

EXAMINER NOTE
Cue the Simulator Operator to place the Simulator in RUN. This JPM is performed concurrently with S2.

TASK ELEMENT 1	STANDARD
6.3 Placing FHB Emergency Filtration Unit in Service: Procedure Note: FHB Normal HVAC is maintained in service to provide air cooling to equipment located in non-rad areas.	Note reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Procedure Caution: (1) SECURE FHB NORMAL HVAC IF EITHER OF THE FOLLOWING OCCURS: • FHB EXHAUST RAD MONITOR FOR THE RUNNING FHB NORMAL EXHAUST FAN SHOWS AN UNEXPLAINED INCREASE IN RADIATION LEVELS, OR • RADIATION PROTECTION REPORTS AN INCREASE IN RADIATION LEVELS IN NON-RAD AREAS OF FHB (2) IF PAINTING IS IN PROGRESS, OR FIRE OR CHEMICAL RELEASE OCCURS INSIDE THE FHB, THEN FHB EMERGENCY FILTRATION UNITS SHOULD NOT BE RUN FOR NON-EMERGENCY PURPOSES (3) GUIDANCE CONTAINED IN PRECAUTION 3.1.3 OF THIS PROCEDURE LISTS COMPONENTS SUCH AS DOORS AND FLOOR PLUGS THAT AFFECT OPERABILITY OF FHB EMERGENCY FILTRATION UNITS.	Caution reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
6.3.1 Notify Radiation Protection of Placing FHB Emergency Filtration Unit in Service.	RP notified
Comment:	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
6.3.2 Remove FHB Normal HVAC from Service in accordance with Section 7.1, Removing FHB Normal HVAC from Service.	Applicant transitions to section 7.1 to remove FHB Normal HVAC from service
Comment: Instructor Note. The applicant will transition to section 7.1 of OP-002-009 to secure FHB Normal Ventilation	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
7.1 Removing FHB Normal HVAC from service Procedure Note: Fire detection instruments FPDEDETFHB-26R and FPDEDETFHB-26T may initiate alarms when FHB HVAC is secured for extended periods of time due to increase in humidity. Fire detection should be impaired in accordance with FP-001-015 and disarmed at the FDMCP if this occurs	Note reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
7.1.1 Notify Radiation Protection of Removing FHB Normal HVAC from Service.	RP notified
Comment:	**SAT / UNSAT**

TASK ELEMENT 7	STANDARD
7.1.2 If FHB Normal Exhaust Fan will be secured for an extended period of time (> 1 hr), then Notify Maintenance Support to secure the Temporary Chiller.	Step is reviewed
Comment: Instructor Note: If asked of 1 hour duration, inform the applicant that FHB Normal Exhaust will not be secured > 1 hr.	**SAT / UNSAT**

TASK ELEMENT 8	STANDARD
7.1.3 Denote which FHB Normal Exhaust Fan is being stopped (circle one): A B 7.1.3.1 Place control switch for the running FHB Normal Exhaust Fan, HVF-0003A(B), to STOP	Stopped FHB Normal Exhaust Fan A
Comment: Instructor Note: Placing the control switch for the FHB Normal Exhaust Fan, HVF-0003A, to STOP is the critical portion of this step.	**Critical** **SAT / UNSAT**

TASK ELEMENT 9	STANDARD
7.1.4 Verify FHB Exhaust Fan A(B) Inlet Damper CLOSED: • HVF-111A (PID D53642) or • HVF-111B (PID D53643)	FHB Exhaust Fan A Inlet damper (HVF-111A) is verified closed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
7.1.5 Place control switch for FHB Normal Supply Fan, HVF-0002, to STOP.	Stopped the FHB Normal Supply fan
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
7.1.6 Verify FHB Normal Supply Fan Inlet and Outlet Dampers CLOSED: • HVF-101 (PID D53641) • HVF-102 (PID D53668)	FHB Normal Supply Inlet and Outlet Dampers are verified closed
Comment: Examiner Note: The applicant will transition back to OP-002-009 step 6.3.3	**SAT / UNSAT**

TASK ELEMENT 12	STANDARD
6.3.3 Place both FHB Isol Damper control switches to CLOSE and verify the following dampers Close: • HVF-105 Spent Fuel Handling HVAC Upstream Supply Damper • HVF-106 Spent Fuel Handling HVAC Downstream Supply Damper • HVF-107 Spent Fuel Handling HVAC Upstream Return Damper • HVF-108 Spent Fuel Handling HVAC Downstream Return Damper	Both FHB Isol Damper control switches taken to close and dampers verified closed.
Comment: Examiner Note: Placing both FHB Isol Damper control switches to CLOSE is the critical portion of this step.	**Critical** **SAT / UNSAT**

TASK ELEMENT 13	STANDARD
6.3.4 Place both FHB Vent Mode Select control switches to Bypass, and perform the following: 6.3.4.1 Verify the following dampers Closed: • HVF-103 FP Cool & Purif HVAC Supply Damper • HVF-104 FP Cool & Purif HVAC Supply Damper 6.3.4.2 Verify the following Open: • HVF-109 FP Cool & Purif HVAC Return Damper • HVF-110 FP Cool & Purif HVAC Return Damper	Both FHB Vent Mode Select control switches in bypass and dampers verified
Comment: Examiner Note: Placing both FHB Vent Mode Select control switches to Bypass is the critical portion of this step.	**Critical** **SAT / UNSAT**

TASK ELEMENT 14	STANDARD
6.3.5 Denote which FHB Emergency Fltr Unit(s) is being started (circle one): A B 6.3.5.1 Place control switch for desired FHB Emergency Fltr Unit(s), HVF-0005A(B), to START.	Placed FHB EFU A to start.
Comment: Instructor Note: Placing the control switch for FHB Emergency Fltr Unit A, HVF-0005A, to START is the critical portion of this step.	**Critical** **SAT / UNSAT**

TASK ELEMENT 15	STANDARD
Procedure Caution: IF REQUIRED FHB EMERGENCY FILTRATION UNIT DIFFERENTIAL PRESSURE CANNOT BE ACHIEVED, EVEN THROUGH THE USE OF MANUAL ADJUSTMENTS TO THE INLET DAMPER HVFMVAAA202A(B), THEN A WORK REQUEST SHOULD BE GENERATED IN ACCORDANCE WITH WM-100, WORK ORDER GENERATION, SCREENING AND CLASSIFICATION.	Caution reviewed
Comment:	**SAT / UNSAT**

TASK ELEMENT 16	STANDARD
6.3.6 Verify FHB Emergency Fltr Unit DP 8.7 to 9.2 INWC.	Verified DP within the band
Comment:	**SAT / UNSAT**

TASK ELEMENT 17	STANDARD
6.3.7 Denote which FHB H&V Exhaust Fan is being started (circle one): A B 6.3.7.1 Place control switch for FHB H&V Exhaust Fan A(B), HVF-0006A(B), to START.	One FHB H&V Exhaust Fan is started
Comment: Instructor Note: Placing the control switch for FHB H&V Exhaust Fan A(B), HVF-0006A(B), to START is the critical portion of this step.	**Critical** **SAT / UNSAT**

TASK ELEMENT 18	STANDARD
6.3.8 Verify FHB H&V Room Exhaust Fan A(B) Intake Damper Open: • HVF-301A PID D53664 OPEN PID D53665 NT CLSD or HVF-301B PID D53666 OPEN PID D53667 NT CLSD	Verified intake dampers open for the exhaust fan that was started.
Comment:	**SAT / UNSAT**

TASK ELEMENT 19	STANDARD
6.3.9 Verify Sample Pump running for FHB Emergency Exhaust WRGM, PRM-IRI-3032, at <u>either</u> CP-6 <u>or</u> CP-52.	Sample pump started
Comment: Examiner Note: Direct the applicant to CP-52 such that the other JPM is not interfered with.	**Critical** **SAT / UNSAT**

TASK ELEMENT 20	STANDARD
6.3.10 Monitor applicable Range and Effluent Level for FHB Emergency Exhaust WRGM, PRM-IRI-3032, at either CP-6 or CP-52..	Step reviewed
Comment: Instructor Note: If the applicant desires to pull a trend at the RM-11 station, inform the applicant that the ATC will monitor trends such as not to interfere with JPM S2.	**SAT / UNSAT**

TASK ELEMENT 21	STANDARD
6.3.11 If radiation levels permit, then Place FHB Normal HVAC in Service in accordance with Section 6.1, Placing FHB Normal HVAC in Service.	Step reviewed
Comment: Examiner Note: Inform the applicant that another operator will place FHB Normal HVAC in service. This JPM is complete.	**SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

1. Reset to IC-165
2. For 2015 NRC Exam, JPM S2 is performed concurrently.

3.0 PRECAUTIONS AND LIMITATIONS

3.1 PRECAUTIONS

3.1.1 Operability requirements for FHB Radioactive Gaseous Effluent Monitoring instrumentation are given by Technical Specification 3.3.3.1 and Technical Requirement 3.3.3.11.

3.1.2 If painting is in progress, or fire or chemical release occurs inside the FHB, then FHB Emergency Filtration Units should not be run for non-emergency purposes.

3.1.3 With the exception of normal personnel transit of the FHB, both FHB Emergency Filtration Units are Inoperable when any of the doors or floor plugs listed below are Open, Propped Open or otherwise impaired (refer to OP-100-014):

- DOOR #D037 +21 Q-Deck to FHB
- DOOR #D067 +21 FHB to +1 FHB
- DOOR #D068 +1 FHB Railroad Cargo Train Bay
- DOOR #D069 +21 FHB to +46 FHB
- DOOR #D069A +30 FHB Access Area To Unloading Bay Door
- DOOR #D187 +46 FHB Spent Fuel Pool Door
- DOOR #D188 +1 FHB to +21 FHB
- Floor Plug from FHB +46 to the FHB +21
- Floor Plug from FHB +21 to the FHB +1

3.2 LIMITATIONS

3.2.1 Notify Radiation Protection when changing FHB HVAC alignments.

3.2.2 If required FHB Emergency Filtration Unit differential pressure cannot be achieved, even through the use of manual adjustments to the inlet damper HVFMVAAA202A(B), then a Work Request should be generated in accordance with WM-100, Work Order Generation, Screening and Classification.

3.2.3 Fire detection instruments FPDEDETFHB-26R and FPDEDETFHB-26T may initiate alarms when FHB HVAC is secured for extended periods of time, due to increase in humidity. Fire detection should be impaired in accordance with FP-001-015 and disarmed at the Fire Detection Main Control Panel if this occurs.

6.3 PLACING FHB EMERGENCY FILTRATION UNIT IN SERVICE

NOTE

FHB Normal HVAC is maintained in service to provide air cooling to equipment located in non-rad areas.

CAUTION

(1) SECURE FHB NORMAL HVAC IF EITHER OF THE FOLLOWING OCCURS:

- FHB EXHAUST RAD MONITOR FOR THE RUNNING FHB NORMAL EXHAUST FAN SHOWS AN UNEXPLAINED INCREASE IN RADIATION LEVELS,

  OR

- RADIATION PROTECTION REPORTS AN INCREASE IN RADIATION LEVELS IN NON-RAD AREAS OF FHB

(2) IF PAINTING IS IN PROGRESS, OR FIRE OR CHEMICAL RELEASE OCCURS INSIDE THE FHB, THEN FHB EMERGENCY FILTRATION UNITS SHOULD NOT BE RUN FOR NON-EMERGENCY PURPOSES

(3) GUIDANCE CONTAINED IN PRECAUTION 3.1.3 OF THIS PROCEDURE LISTS COMPONENTS SUCH AS DOORS AND FLOOR PLUGS THAT AFFECT OPERABILITY OF FHB EMERGENCY FILTRATION UNITS.

6.3.1 Notify Radiation Protection of Placing FHB Emergency Filtration Unit in Service.

6.3.2 Remove FHB Normal HVAC from Service in accordance with Section 7.1, Removing FHB Normal HVAC from Service.

6.3.3 Place both FHB Isol Damper control switches to CLOSE and verify the following dampers Close:

- HVF-105 Spent Fuel Handling HVAC Upstream Supply Damper
- HVF-106 Spent Fuel Handling HVAC Downstream Supply Damper
- HVF-107 Spent Fuel Handling HVAC Upstream Return Damper
- HVF-108 Spent Fuel Handling HVAC Downstream Return Damper

6.3.4 Place both FHB Vent Mode Select control switches to Bypass, and perform the following:

6.3.4.1 Verify the following dampers Closed:

- HVF-103 FP Cool & Purif HVAC Supply Damper
- HVF-104 FP Cool & Purif HVAC Supply Damper

6.3.4.2 Verify the following Open:

- HVF-109 FP Cool & Purif HVAC Return Damper
- HVF-110 FP Cool & Purif HVAC Return Damper

6.3.5 Denote which FHB Emergency Fltr Unit(s) is being started (circle one):

A B

6.3.5.1 Place control switch for desired FHB Emergency Fltr Unit(s), HVF-0005A(B), to START.

CAUTION

IF REQUIRED FHB EMERGENCY FILTRATION UNIT DIFFERENTIAL PRESSURE CANNOT BE ACHIEVED, EVEN THROUGH THE USE OF MANUAL ADJUSTMENTS TO THE INLET DAMPER HVFMVAAA202A(B), THEN A WORK REQUEST SHOULD BE GENERATED IN ACCORDANCE WITH WM-100, WORK ORDER GENERATION, SCREENING AND CLASSIFICATION.

6.3.6 Verify FHB Emergency Fltr Unit DP 8.7 to 9.2 INWC.

6.3.7 Denote which FHB H&V Exhaust Fan is being started (circle one):

A B

6.3.7.1 Place control switch for FHB H&V Exhaust Fan A(B), HVF-0006A(B), to START.

6.3.8 Verify FHB H&V Room Exhaust Fan A(B) Intake Damper Open:

- HVF-301A PID D53664 .... OPEN
  PID D53665 .... NT CLSD

or

- HVF-301B PID D53666 .... OPEN
  PID D53667 .... NT CLSD

6.3.9 Verify Sample Pump running for FHB Emergency Exhaust WRGM, PRM-IRI-3032, at either CP-6 or CP-52.

6.3.10 Monitor applicable Range and Effluent Level for FHB Emergency Exhaust WRGM, PRM-IRI-3032, at either CP-6 or CP-52.

6.3.11 If radiation levels permit, then Place FHB Normal HVAC in Service in accordance with Section 6.1, Placing FHB Normal HVAC in Service.

6.3.12 If temporary FHB air conditioning is installed, then the following dampers, may be reopened to facilitate cooling of the +46 elevation of the Fuel Handling Building:

- HVF-105 Spent Fuel Handling HVAC Upstream Supply Damper
- HVF-106 Spent Fuel Handling HVAC Downstream Supply Damper
- HVF-107 Spent Fuel Handling HVAC Upstream Return Damper
- HVF-108 Spent Fuel Handling HVAC Downstream Return Damper

REQUEST/APPROVAL PAGE

# SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ **OSRC** ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-002-009		REVISION: 013

TITLE: Fuel Handling Building HVAC

PROCEDURE OWNER (Position Title) : Operations Manager - Support

TERM (check one) : ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): ~~3/26/14~~ gpw 3/26/2014 3/27/2014

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

1) Updated precaution 3.1.3 to an inclusive list of doors and floor plugs that affect FHB EFU's operability. The list was updated to reflect what is already contained in OP-100-014 and OP-903-125. Also added to the caution prior to step 6.3.1 informing the operator that the precaution 3.1.3 contains guidance on doors and floor plugs affecting FHB EFU's operability. Making this list in precaution 3.1.3 with the source coming from OP-100-014 eliminates an error trap of incomplete information/guidance in this procedure and merely makes this procedure guidance agree with previous approved revisions in other procedures. This change is therefore editorial in nature.

☐ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☐ **Normal** ☑ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			Richard L Sanderson	3/19/2014
EC SUPERVISOR	Administrative Review and Approval		(sign) Richard Williams	3/24/2014
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☐	PA Exclusion ☐	N/A	
TECHNICAL	Review ☐	Verification ☐	N/A	
QUALIFIED REVIEWER	Review ☐		N/A	
GROUP/DEPT. HEAD	Review ☐	Approval ☐	(sign) N/A	
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

6.3 PLACING FHB EMERGENCY FILTRATION UNIT IN SERVICE

NOTE

FHB Normal HVAC is maintained in service to provide air cooling to equipment located in non-rad areas.

CAUTION

(1) SECURE FHB NORMAL HVAC IF EITHER OF THE FOLLOWING OCCURS:

- FHB EXHAUST RAD MONITOR FOR THE RUNNING FHB NORMAL EXHAUST FAN SHOWS AN UNEXPLAINED INCREASE IN RADIATION LEVELS,

  OR

- RADIATION PROTECTION REPORTS AN INCREASE IN RADIATION LEVELS IN NON-RAD AREAS OF FHB

(2) IF PAINTING IS IN PROGRESS, OR FIRE OR CHEMICAL RELEASE OCCURS INSIDE THE FHB, THEN FHB EMERGENCY FILTRATION UNITS SHOULD NOT BE RUN FOR NON-EMERGENCY PURPOSES

(3) GUIDANCE CONTAINED IN PRECAUTION 3.1.3 OF THIS PROCEDURE LISTS COMPONENTS SUCH AS DOORS AND FLOOR PLUGS THAT AFFECT OPERABILITY OF FHB EMERGENCY FILTRATION UNITS.

6.3.1 Notify Radiation Protection of Placing FHB Emergency Filtration Unit in Service.

6.3.2 Remove FHB Normal HVAC from Service in accordance with Section 7.1, Removing FHB Normal HVAC from Service.

6.3.3 Place both FHB Isol Damper control switches to CLOSE and verify the following dampers Close:

- HVF-105 Spent Fuel Handling HVAC Upstream Supply Damper
- HVF-106 Spent Fuel Handling HVAC Downstream Supply Damper
- HVF-107 Spent Fuel Handling HVAC Upstream Return Damper
- HVF-108 Spent Fuel Handling HVAC Downstream Return Damper

6.3.4 Place both FHB Vent Mode Select control switches to Bypass, and perform the following:

6.3.4.1 Verify the following dampers Closed:

- HVF-103 FP Cool & Purif HVAC Supply Damper
- HVF-104 FP Cool & Purif HVAC Supply Damper

6.3.4.2 Verify the following Open:

- HVF-109 FP Cool & Purif HVAC Return Damper
- HVF-110 FP Cool & Purif HVAC Return Damper

6.3.5 Denote which FHB Emergency Fltr Unit(s) is being started (circle one):

A B

6.3.5.1 Place control switch for desired FHB Emergency Fltr Unit(s), HVF-0005A(B), to START.

CAUTION

IF REQUIRED FHB EMERGENCY FILTRATION UNIT DIFFERENTIAL PRESSURE CANNOT BE ACHIEVED, EVEN THROUGH THE USE OF MANUAL ADJUSTMENTS TO THE INLET DAMPER HVFMVAAA202A(B), THEN A WORK REQUEST SHOULD BE GENERATED IN ACCORDANCE WITH WM-100, WORK ORDER GENERATION, SCREENING AND CLASSIFICATION.

6.3.6 Verify FHB Emergency Fltr Unit DP 8.7 to 9.2 INWC.

6.3.7 Denote which FHB H&V Exhaust Fan is being started (circle one):

A B

6.3.7.1 Place control switch for FHB H&V Exhaust Fan A(B), HVF-0006A(B), to START.

6.3.8 Verify FHB H&V Room Exhaust Fan A(B) Intake Damper Open:

- HVF-301A PID D53664 .... OPEN
  PID D53665.. NT CLSD

or

- HVF-301B PID D53666.. OPEN
  PID D53667.. NT CLSD

6.3.9 Verify Sample Pump running for FHB Emergency Exhaust WRGM, PRM-IRI-3032, at either CP-6 or CP-52.

6.3.10 Monitor applicable Range and Effluent Level for FHB Emergency Exhaust WRGM, PRM-IRI-3032, at either CP-6 or CP-52.

6.3.11 If radiation levels permit, then Place FHB Normal HVAC in Service in accordance with Section 6.1, Placing FHB Normal HVAC in Service.

6.3.12 If temporary FHB air conditioning is installed, then the following dampers, may be reopened to facilitate cooling of the +46 elevation of the Fuel Handling Building:

- HVF-105 Spent Fuel Handling HVAC Upstream Supply Damper
- HVF-106 Spent Fuel Handling HVAC Downstream Supply Damper
- HVF-107 Spent Fuel Handling HVAC Upstream Return Damper
- HVF-108 Spent Fuel Handling HVAC Downstream Return Damper

7.0 SYSTEM SHUTDOWN

7.1 Removing FHB Normal HVAC from Service

> **NOTE**
>
> Fire detection instruments FPDEDETFHB-26R and FPDEDETFHB-26T may initiate alarms when FHB HVAC is secured for extended periods of time due to increase in humidity. Fire detection should be impaired in accordance with FP-001-015 and disarmed at the FDMCP if this occurs.

7.1.1 Notify Radiation Protection of Removing FHB Normal HVAC from Service.

7.1.2 If FHB Normal Exhaust Fan will be secured for an extended period of time (> 1 hr), then Notify Maintenance Support to secure the Temporary Chiller.

7.1.3 Denote which FHB Normal Exhaust Fan is being stopped (circle one):

A B

7.1.3.1 Place control switch for the running FHB Normal Exhaust Fan, HVF-0003A(B), to STOP.

7.1.4 Verify FHB Exhaust Fan A(B) Inlet Damper CLOSED:

- HVF-111A (PID D53642)

  or

- HVF-111B (PID D53643)

7.1.5 Place control switch for FHB Normal Supply Fan, HVF-0002, to STOP.

7.1.6 Verify FHB Normal Supply Fan Inlet and Outlet Dampers CLOSED:

- HVF-101 (PID D53641)
- HVF-102 (PID D53668)

Waterford 3

2015 NRC RO/SRO Exam

JOB PERFORMANCE MEASURE

P1

Start an Air Side Seal Oil Pump following a Loss of a Single Train of Offsite Power

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Start an Air Side Seal Oil Pump following a Loss of Offsite Power to the Train A Electrical busses and then secure the Air Side Seal Oil Backup Pump (DC) in accordance with OP-902-009 Attachment 33-C: Generator Auxiliary Operations-Loss of Single Train Off-Site Power.

Task Standard: Applicant energizes and starts the Air Side Seal Oil Pump from MCC-215B and then secures the Air Side Seal Oil Backup Pump (DC).

References: OP-902-009 Attachment-33, Generator Auxiliary Operations-Loss of Single Train Off-Site Power

Alternate Path: No Time Critical: No Validation Time: 10 mins.

K/A G2.4.6 Knowledge of EOP mitigation strategies Importance Rating 3.7 / 4.7 RO/SRO

Applicant: ______________________________

Time Start: __________________ Time Finish: __________________

Performance Time: __________________ minutes
Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____

____

____

Examiner: ________________________________ Date: ______________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-902-009 Attachment 33-C: Generator Auxiliary Operations-Loss of Single Train Off-Site Power

Description:
This task is performed on the TGB +40 Elevation (east side)

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All steps for this JPM will be simulated, do not manipulate any plant components. Make all necessary communications to me. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

NOTE for JPM Validation Only

When performing JPM validation, actions are necessary to ensure exam security is maintained. Prior to commencing in plant JPM validation, contact Health Physics and direct them to disable all cameras in the CAA in a manner that prevents anyone from viewing any of the CAA cameras.

After all in plant JPMs are complete, contact Health Physics to restore the disabled cameras.

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- A loss of offsite power to Train A Electrical busses has occurred.

INITIATING CUE:

The CRS has directed you to start the Air Side Seal Oil Pump on the MCC-215B electrical bus in accordance with OP-902-009, Attachment 33-C: Generator Auxiliary Operations-Loss of Single Train Off-Site Power

Evaluator Note
1. This JPM will take place on the TGB +40 East side.

TASK ELEMENT 1	STANDARD
1. Check Air Side Seal Oil Pump operating.	Verified Air Side Seal Oil Pump is not operating.
Comment: The applicant may verify Air Side Seal Oil Pump not running locally at the pump or using light indications at the Hydrogen Control Panel. Comment: There is one Air Side Seal Oil Pump but two control switches at the Hydrogen Control Panel. The proper C/S to verify depends on what MCC 215 bus is powering the ASSO pump. Examiner Cue: Inform the applicant that the Air Side Seal Oil Pump is not running if local verification is used. If applicant uses light indication at the Hydrogen Control Panel, cue the applicant that the “B” Air Side Seal Oil Pump C/S green light is on and the red light is off. If asked, the status of “A” Air Side Seal Oil Pump C/S is that the green and red light are not illuminated.	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
2. IF Air Side Seal Oil pump is de-energized, THEN perform the following to transfer power source: a. Check status of Air Side Seal Oil Pump Transfer Switch Source Available and Load Connected lights.	Verified status of Air Side Seal Oil Pump Transfer Switch Source Available and Load Connected lights.
Comment: Examiner Cue: Cue the applicant that the Emergency Source Available light is illuminated and the Normal Source Available light is not illuminated. Examiner Cue: Cue the applicant that the Load Connected to Normal and Load Connected to Emergency lights are extinguished.	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
b. If Emergency Source (MCC-215B) Available light is illuminated, then <u>perform</u> the following: 1) Toggle the Transfer Control Switch to TRANSFER TO EMERGENCY and THEN <u>release</u> the switch to neutral position.	Transferred the Control Switch to TRANSFER TO EMERGENCY position.
Comment:	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
2) <u>Check</u> both of the following: • Load Connected to Emergency light illuminated. • Load Connected to Normal light extinguished.	Proper light configuration is verified.
Comment: Examiner Cue: Notify the applicant that the Load Connected to Emergency light is illuminated and that the Load Connected to Normal light is extinguished.	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
d. <u>Verify</u> Air Side Seal Oil pump operating.	Verified Air Side Seal Oil pump is operating.
Comment: The applicant may verify Air Side Seal Oil Pump running locally at the pump or using light indications at the Hydrogen Control Panel. Examiner Cue: Inform the applicant that the Air Side Seal Oil Pump is running if local verification is used. If applicant uses light indication at the Hydrogen Control Panel, cue the applicant that the "B" Air Side Seal Oil Pump C/S green light is <u>off</u> and the red light is <u>on</u>.	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
e. <u>Stop</u> the Air Side Seal Oil Backup Pump (DC) at Hydrogen Control panel.	Air Side Seal Oil Backup Pump is stopped.
Comment: Examiner Cue: Notify the applicant that the Air Side Seal Oil Backup Pump is stopped after the switch is taken to stop.	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
3. Check Seal Oil DP 10 to 14 psid.	Seal Oil DP is verified.
Comment: Examiner Cue: Notify the applicant that Seal Oil DP is 13 psid.	**SAT / UNSAT**

END OF TASK

Generator Auxiliary Operations

Attachment 33-C: Generator Auxiliary Operations - Loss of Single Train Off-Site Power

INSTRUCTIONS

1. Check Air Side Seal Oil pump operating.

2. **IF** Air Side Seal Oil pump is de-energized,
THEN perform the following to transfer power source:

    a. Check status of Air Side Seal Oil Pump Transfer Switch Source Available and Load Connected lights.

    b. **IF** Emergency Source (MCC 215B) Available light is illuminated,
    THEN perform the following:

        1) Toggle the Transfer Control switch to TRANSFER TO EMERGENCY and THEN release the switch to neutral position.

        2) Check **BOTH** of the following:

            - Load Connected to Emergency light illuminated.
            - Load Connected to Normal light extinguished.

    c. **IF** Normal Source (MCC 215A) Available light is illuminated,
    THEN perform the following:

        1) Toggle the Transfer Control switch to TRANSFER TO NORMAL and THEN release the switch to neutral position.

        2) Check **BOTH** of the following:

            - Load Connected to Normal light illuminated.
            - Load Connected to Emergency light extinguished.

    d. Verify Air Side Seal Oil pump operating.

    e. Stop the Air Side Seal Oil Backup Pump (DC) at Hydrogen Control panel.

3. Check Seal Oil DP 10 to 14 psid.

Generator Auxiliary Operations

Attachment 33-C: Generator Auxiliary Operations - Loss of Single Train Off-Site Power

INSTRUCTIONS

1. Check Air Side Seal Oil pump operating.

2. **IF** Air Side Seal Oil pump is de-energized,
THEN perform the following to transfer power source:

    a. Check status of Air Side Seal Oil Pump Transfer Switch Source Available and Load Connected lights.

    b. **IF** Emergency Source (MCC 215B) Available light is illuminated,
    THEN perform the following:

        1) Toggle the Transfer Control switch to TRANSFER TO EMERGENCY and THEN release the switch to neutral position.

        2) Check **BOTH** of the following:

            - Load Connected to Emergency light illuminated.
            - Load Connected to Normal light extinguished.

    c. **IF** Normal Source (MCC 215A) Available light is illuminated,
    THEN perform the following:

        1) Toggle the Transfer Control switch to TRANSFER TO NORMAL and THEN release the switch to neutral position.

        2) Check **BOTH** of the following:

            - Load Connected to Normal light illuminated.
            - Load Connected to Emergency light extinguished.

    d. Verify Air Side Seal Oil pump operating.

    e. Stop the Air Side Seal Oil Backup Pump (DC) at Hydrogen Control panel.

3. Check Seal Oil DP 10 to 14 psid.

INSTRUCTIONS

4. Verify Generator Bearing Drain Vapor Extractor A(B) is operating. (+69 TGB Roof)

---------------------------**NOTE**---------------------------

AB Safety buses are preferably powered from Off-Site Power since the EDG fuel oil calculation does not support fully loaded AB Non-Safety related buses on an EDG.

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5. Transfer AB Safety buses to Off-Site power at SM/CRS discretion. REFER TO applicable attachment:
   - Attachment 12-E: Energize AB Safety Buses from the A Side
   - Attachment 12-F: Energize AB Safety Buses from the B Side

6. **IF** AB Safety buses energized from Off-Site Power, **THEN** verify the following:

   a. Close SSD-EBKR-31AB-3A, MCC 313AB Supply breaker to restore power to MCC 313AB.

   b. Verify AC Bearing Oil pump and HP Seal Oil pump operating at CP-1.

   c. Stop Emergency Bearing Oil pump at CP-1.

   d. Stop Air Side Seal Oil Backup pump at Hydrogen Control panel.

   e. Check Air Side Seal Oil DP at least 7 psid.

   f. GO TO Step 10.

INSTRUCTIONS

* 7. **IF** AB Safety buses are energized on the EDG,
AND the TSC is operational,
THEN request the TSC to evaluate EDG fuel load for full restoration of MCC 313AB on the EDG.

8. **IF** the TSC is **NOT** operational,
OR TSC approval for full restoration of MCC 313AB within 30 minutes of LOOP is **NOT** obtained,
THEN operate AC Bearing Oil pump for one hour as follows:

   a. Open **ALL** breakers on MCC 313AB
   EXCEPT LOG-EBKR-313AB-2M, Main Turbine AC Bearing Oil Pump breaker.

   b. Verify LOG-EBKR-313AB-2M, Main Turbine AC Bearing Oil Pump breaker closed.

   c. Close SSD-EBKR-31AB-3A, MCC 313AB Supply breaker to restore power to MCC 313AB.

   d. At CP-1, start AC Bearing Oil pump. Time: _____________

   e. At CP-1, stop DC Emergency pump.

   f. **WHEN ONE** hour has elapsed since start of AC Bearing Oil pump,
   THEN perform the following:

      1) Open LOG-EBKR-313AB-2M, Main Turbine AC Bearing Oil Pump breaker.

      2) GO TO Step 10.

9. **IF** TSC approves full restoration of MCC 313AB on the EDG,
THEN perform the following:

   a. Close SSD-EBKR-31AB-3A, MCC 313AB Supply breaker to restore power to MCC-313AB.

   b. Verify AC Bearing Oil pump and HP Seal Oil pump operating at CP-1.

   c. Stop Emergency Bearing Oil pump at CP-1.

   d. Stop Air Side Seal Oil Backup pump at Hydrogen Control panel.

   e. Verify Air Side Seal Oil DP at least 7 PSID.

INSTRUCTIONS

10. **WHEN** Main Turbine speed is 0 RPM,
THEN open LOG EBKRTGB 2, Turb Lube Oil Emergency Bearing Oil Pump (DC) breaker.

11. Secure Main Feed Pump DC Oil pumps as follows:

    a. Verify **AT LEAST ONE** Main Feed Pump Main Oil pump operating on **EACH** Main Feed pump:

    - Main Feed Pump A Main Oil Pump
    - Main Feed Pump B Main Oil Pump

    b. Stop DC Emergency Oil Pump for associated operating Main Oil pump:

    - Main Feed Pump A Emergency Oil Pump
    - Main Feed Pump B Emergency Oil Pump

--- **NOTE** ---

Continue at Control Room discretion. As time and resources allow perform the following steps to shutdown and recover Turbine Auxiliary systems.

----

12. **IF** Turbine Lube Oil or Turbine Cooling Water **NOT** in service,
THEN request TSC to evaluate operation of Generator Auxiliaries.
REFER TO OP-003-023, “Seal Oil.”

End of Attachment 33-C

End of Appendix 33

Appendix 33 Generator Auxiliary Operations (cont'd)

Attachment 33-C: Generator Auxiliary Operations – Loss of a single train Off-Site Power

This attachment is created to assist the operator in generator auxiliary operations in the loss of a single train of off-site power resulting in the loss of both the associated 1 and 2 buses. This procedure section is written for one power train, including all associated buses, to be energized from off-site power. In addition the procedure direction also encompasses the opposite train EDG which may or may not be providing power to the opposite train 3 bus. This procedure section secures the major DC motor loads operating on the TGB Battery to preserve the TGB battery in the event that the TGB Battery charger, on the power train energized by off-site power, is not functioning. The steps are presented in a preferred or anticipated order but many of the steps are not cascading and can be performed in tandem or out of sequence by operator discretion.

Step 1 verifies the Air Side Seal Oil pump is operating. This is the normal air side seal oil pump that is powered from MCC 215A or MCC 215B. If the pump is aligned to the power train that is energized from off-site power the pump should be operating. Also if the pump is operating then the air side seal oil backup pump has not started. The Air Side Seal Oil pump would be the first choice for replacing the air side seal oil backup pump if it has started and so this step has been placed first in the attachment. This step starts the NAO performing an important task while the control room can prepare to energize the AB buses if necessary. This procedure section starts from the assumption that the air side seal oil pump control switches are aligned normally (both CS-1 and CS-2 are aligned to START). The alignment of these switches to start is what energizes (illuminates) the associated power available light on the MBT.

Step 2 provides direction to energize the air side seal oil pump if it is not operating due to a loss of power. The pump is transferred the opposite train (energized train) MCC 215. When the transfer is complete the air side seal oil pump should be operating. If the Air side seal oil backup pump (DC) is operating then stop the backup pump at the hydrogen control panel and verify seal oil DP is maintained in normal band. The Air Side Seal Oil Pump Transfer Switch in between MCC 215A and MCC 215B indicates normal and emergency source available and indicates load connected to normal or emergency. The air side seal oil pump would be the first choice replacement for the air side seal oil backup pump.

Step 3 checks that air side seal oil DP is operating in the normal band.

Appendix 33 Generator Auxiliary Operations (cont'd)

Attachment 33-C: Generator Auxiliary Operations – Loss of a single train Off-Site Power (cont'd)

Step 4 verifies that a Generator Bearing Vapor Extractor is operating. Operation of the seal oil vapor extractor prevents hydrogen from migrating to the main lube oil system and collecting in the generator bearing housings and the main lube oil reservoir. Also prevents oil leakage from the turbine shafts. Loss of vapor extractors may result in unsafe accumulation of hydrogen in main generator bearing cavities and main lube oil reservoir and oil leakage from the main generator shaft seals.

The note identifies that it is preferable to have the AB safety buses energized from off-site power since the EDG fuel loading calculation does not support the full loading of the AB safety buses. There is no loading limitation for non-safety loads if the buses are connected to off-site power. This note provides information to the operator and is not direction to swap energized AB safety buses from an EDG to off-site power. Transferring the AB safety buses to off-site power is at the discretion of the control room staff.

Step 5 is to verify the AB safety buses are energized. While it is preferable that the AB buses are energized from off-site power transferring the AB safety buses from an operating EDG to off-site power may not be prudent if the AB buses are carrying safety related critical loads associated with the operating EDG such as CCW or Essential Chill Water. Transferring the AB buses is performed at the operating crew's discretion. If the AB buses are de-energized because the EDG is not operating then they should be energized from off-site power expeditiously.

Step 6 identifies if the AB Safety Buses are energized from off-site power then energize MCC 313AB by closing the supply breaker. Full loading of MCC 313AB is allowed when on off-site power and all turbine auxiliaries should be functioning. The step provides direction similar to Appendix 12G for starting the AC bearing oil pump and generator seal oil backup pump from CP-1, stopping the DC emergency oil pump securing the air side seal oil backup pump and verifying air side seal oil DP. Steps one and two should have restored the air side seal oil pump and securing the air side seal oil backup pump should not be necessary. Should the air side seal oil pump not be available and the HP seal oil pump is providing air side seal oil then the DP is likely to be lower than normal and only 8 PSID is specified. A DP of at least 7 PSID is a reasonable value for the following reasons. By maintaining DP greater than 5 PSID ensures that the air side seal oil backup pump does not auto start. If the HP seal oil pump is maintaining air side seal oil, the normal setting of SO-308 is established to maintain 7.5 to 8.5 PSID. If the normal air side seal oil pump (10 to 14 PSID) is maintaining Seal Oil DP then greater than 7 PSID is acceptable also. This step then directs the operator to go to step 10.

Appendix 33 Generator Auxiliary Operations (cont'd)

Attachment 33-C: Generator Auxiliary Operations – Loss of a single train Off-Site Power (cont'd)

Step 7 identifies if the AB buses are energized on the EDG then contact the TSC to evaluate the EDG fuel loading for placing the MCC 3131AB fully on the AB Safety Bus. The EDG fuel loading calculation does not support fully loading the MCC-313AB bus on an EDG. If the TSC is available they can assist the operations staff in evaluating the fuel oil loading.

The EDG Fuel Oil Calculation is a conservative calculation that supports the technical specification 7 day fuel oil requirement. Evaluating EDG Fuel Oil Loading should consider the following: Are both EDGs operating? The limiting case for fuel oil consumption is with both EDGs operating to mitigate the consequences of an event. The calculation considers both EDGs operating with the AB Safety Buses connected to each EDG. What is the amount of fuel available in each tank? Can the tanks be cross connected if one EDG has failed? What are the weather conditions? Can additional fuel oil be easily delivered? Are all of the fans on the UHS in operation? The calculation assumes worst case summertime conditions. The calculation also assumes that manual loads such as the Spent Fuel Pool pump will be loaded on both EDGs. Also to be considered is the amount of MWs loaded on any operating EDG. The calculation considers the limiting conditions of a LOCA with LOOP, a MSLB in containment with a LOOP, and shutdown with a LOOP. Therefore also to be considered is events in progress.

Step 8 should be performed to operate the AC bearing oil pump if the EDG is carrying the AB safety buses and timely approval from the TSC is not obtained. The step meets the requirements of the EDG fuel oil loading calculation. This step allows energizing the AC bearing oil pump for one hour on MCC 313AB. One hour of operation of the AC bearing oil pump is supported by the EDG fuel oil loading calculation. All other loads on MCC 313 AB are de-energized by opening breakers. This allows for the emergency bearing oil pump to be stopped early and conserving TGB battery power. When the AC Bearing Oil Pump is stopped seal oil will still be maintained by the air side seal oil pump. The step kicks over step 9 TSC approval to step 10 once the step has been started. The assumption is to proceed with the design basis path once started and if approval comes to energize 313AB that can be utilized for restoration once the auxiliaries for the main generator have been shut down.

Appendix 33 Generator Auxiliary Operations (cont'd)

Attachment 33-C: Generator Auxiliary Operations – Loss of a single train Off-Site Power (cont'd)

Step 9 provides direction on how to fully energize MCC 313AB on the AB safety bus and subsequent actions if the TSC approves the full restoration of the MCC 313AB bus on the EDG. This step is performed similarly to restoring MCC-313AB with off-site power available and is similar to Attachment 12-G. This step is skipped once the crew has started Step 8; the reason for this is to avoid extra communications and complications once a path has been chosen.

Step 10 provides direction is provided to secure the DC emergency lube oil pump by opening the breaker if the main turbine is at 0 rpm. Opening the breaker of the pump prevents the pump from auto restarting when the AC bearing oil pump is secured. This step should be performed when the main turbine reaches 0 RPM. It is acceptable to pull this step forward if the main turbine reaches 0 rpm and the AC bearing oil pump is still operating. By completing this action additional loading of TGB Battery is prevented.

Step 11 provides direction to verify a Main Oil pump is operating on each main feed pump and then to secure the associated Emergency Oil pump for each main feed pump. The main feed pump A(B) main oil pumps are powered from MCC 211A(B) and MCC 212B(A) respectively. The step verifies that an AC Bearing Oil pump is operating and then secures the DC pump. Since there is an AC bearing oil pump powered from each train of off-site power it is not expected that the DC powered pump will be operating. However if the DC pump is operating then this step should be pulled forward and completed when resources are available.

A note is provided at this point in the procedure to continue at control room discretion as time and resources allow. This note is a breaking point incorporated into all of the Generator Auxiliary attachments as a stopping point for the NAO. At this point the task of protecting the main generator and preserving the TGB batteries is completed. Following this point secondary plant cleanup actions are provided as a convenience to the operator to ensure that the operator has control of these systems when power is restored to the site.

Step 12 requests that the TSC evaluate seal oil operation if turbine lube oil or turbine cooling water is not available. In the event of a single loss of off-site power train it is possible that one or the other of these systems is not operating and the seal oil procedure provides limitations for these conditions. The normal operating procedure has limitations for operating seal oil if these systems are not in service.

Appendix 33 Generator Auxiliary Operations (cont'd)

Contingency Actions

Several contingency actions have been built into the instruction steps. Direction is provided on how to energize the AB Safety buses if they are not energized. Direction is provided on how to energize the AC powered air side seal oil pump if it is not energized. Direction is provided on how to deal with MCC 313AB depending on whether the AB safety buses are energized from off-site power or an EDG.

Deviations

The CEN-152 EPG does not provide direction for venting the main generator or securing TGB loads. These actions are undertaken to reduce the risk of a hydrogen explosion and to preserve functions that are maintained by the turbine building battery. Preserving the TGB Battery preserves remote operation of the 2 bus feeder breakers and the 1 and 2 bus load breakers which allows for off-site power to be more efficiently and safely restored. Off-site power is restored to the 4.16 KV safety buses through the non-safety 2 buses. Also TGB Battery DC power supports the automatic operation of the instrument air compressors. Instrument air compressors are energized through the 4.16 KV safety buses. Incorporation of these actions into the EOPs is a result of INPO IER 2-12-27.

Waterford 3

2015 RO NRC Exam

JOB PERFORMANCE MEASURE

P2

Trip Emergency Diesel Generator B Locally

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Trip Emergency Diesel Generator B locally.

Task Standard: Applicant trips EDG B after initial efforts to trip the diesel fail.

References: OP-009-002, Emergency Diesel Generator, Attachment 8.7 Performing an Emergency Shutdown of the Emergency Diesel Generator. Revision 325

Alternate Path: Yes Time Critical: No Validation Time: 5 mins.

K/A 064 K4.02 Trips for EDG while operating (normal or emergency) Importance Rating 3.9 / 4.2 RO / SRO

Applicant: ______________________________

Time Start: __________________ Time Finish: __________________

Performance Time: __________________ minutes

Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ____

____

____

Examiner: _________________________________ Date: ________________

Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-009-002, Emergency Diesel Generator

Description:
The applicant will be directed to trip EDG B locally. This JPM will require entry into the RCA, +21 level. The first method the applicant uses to trip the diesel will not function and the applicant will be required to trip the diesel using another method. The reason for tripping EDG B will be due to a fuel oil leak, so depressing the System Reset pushbutton on the local control panel is required.

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All steps for this JPM will be simulated, do not manipulate any plant components. Make all necessary communications to me. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

NOTE for JPM Validation Only

When performing JPM validation, actions are necessary to ensure exam security is maintained. Prior to commencing in plant JPM validation, contact Health Physics and direct them to disable all cameras in the CAA in a manner that prevents anyone from viewing any of the CAA cameras.

After all in plant JPMs are complete, contact Health Physics to restore the disabled cameras.

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Emergency Diesel Generator B is running in Emergency Mode
- A fuel oil leak has developed on the EDG B.

INITIATING CUE:

The CRS directs you to locally trip EDG B in accordance with OP-009-002, Emergency Diesel Generator, section 8.7 Performing an Emergency Shutdown of the EDG.

TASK ELEMENT 1	STANDARD
NOTE If control air is lost during any EDG run, then the Fuel Rack Override lever must be used to shutdown the EDG.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
CAUTION SUBSECTION 8.7 IS FOR EMERGENCY CONDITIONS, WHEN NORMAL SHUTDOWN IS INOPERATIVE OR IT IS NECESSARY TO RAPIDLY STOP THE EMERGENCY DIESEL GENERATOR.	Caution reviewed.
Comment:	**SAT / UNSAT**

Evaluator Note
Step 8.7.1 is not applicable since Emergency Diesel Generator B is running in Emergency Mode.

TASK ELEMENT 3	STANDARD
NOTE Two Operators are required to secure the EDG in Emergency Mode using method 2 of step 8.7.2.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
CAUTION THE EDG WILL RESTART IF THE FUEL RACK OVERRIDE LEVER IS RELEASED AND THE UNDERVOLTAGE OR SIAS SIGNAL IS PRESENT PRIOR TO COMPLETING STEP 8.7.2.2.2.	Caution reviewed.
Comment:	**SAT / UNSAT**

Evaluator Note
There are 2 acceptable methods to trip an EDG running in emergency mode. The applicant could choose either method to perform first. Which ever method used first will fail, requiring the applicant to exercise the other method.

8.7.2 With the Emergency Diesel Generator B in Emergency Mode, Stop the Emergency Diesel Generator B by performing one of the following methods:

TASK ELEMENT 5	STANDARD
8.7.2.1 Method 1: Pull the manual Fuel Oil Overspeed Trip on the Overspeed Governor.	Overspeed pulled.
Comment: This plunger is located on the upper level of the EDG. If this is attempted first, cue that the EDG B is still running.	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
8.7.2.2 Method 2: 8.7.2.2.1 Pull down and hold the Fuel Rack Override Lever on the North side of the Emergency Diesel Generator A(B) engine.	Handle is held down.
Comment: If this is attempted first, cue the applicant that the lever did not move and that the EDG B is still running.	**Critical** **SAT / UNSAT**

Evaluator Note
If the applicant uses the fuel lever second, cue him that another operator has arrived to assist. After the applicant is holding the fuel rack lever, cue that another operator is now holding the lever.

TASK ELEMENT 7	STANDARD
8.7.2.2.2 To prevent the Emergency Diesel Generator A(B) from Starting, Unlock and Close the following valves: • EGA-152A(B) A(B) Air Receiver A2(B2) Outlet Isolation • EGA-153A(B) A(B) Air Receiver A1(B1) Outlet Isolation	Valves are closed.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
8.7.2.2.3 Release Fuel Rack Override Lever.	Lever released.
Comment:	**SAT / UNSAT**

TASK ELEMENT 9	STANDARD
8.7.2.2.4 Place the EDG A(B) Fuel Rack Override Lever in the Vertical and Latched position. 8.7.2.2.4.1 Document on Attachment 11.18, Performing an Emergency Shutdown of the Emergency Diesel Generator Valve Restoration or other, appropriate document.	Lever in the Vertical and latched position
Comment: Examiner Cue: Inform the applicant that the control room is preparing the attachment and he may continue on.	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
NOTE Depressing the System Reset pushbutton after the EDG has stopped will secure the Standby Fuel Oil Booster Pump, which may help mitigate the fuel oil leak.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 11	STANDARD
8.7.3 If a fuel oil leak is in progress, when the Emergency Diesel Generator A(B) has stopped then depress the System Reset pushbutton.	Pushbutton depressed.
Comment: Cue the applicant that EDG B has stopped rotating after the second trip is used.	**<u>Critical</u>** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
8.7.4 Verify steps applicable or directed by the SM/CRS in Subsection 6.5, Unloading, Stopping and Returning EDG A(B) to Standby, are completed.	Control Room informed.
Comment:	**SAT / UNSAT**

END OF TASK

8.7 PERFORMING AN EMERGENCY SHUTDOWN OF THE EMERGENCY DIESEL GENERATOR

NOTE

If control air is lost during any EDG run, then the Fuel Rack Override lever must be used to shutdown the EDG.

CAUTION

SUBSECTION 8.7 IS FOR EMERGENCY CONDITIONS, WHEN NORMAL SHUTDOWN IS INOPERATIVE OR IT IS NECESSARY TO RAPIDLY STOP THE EMERGENCY DIESEL GENERATOR.

8.7.1 With Emergency Diesel Generator A(B) in Test Mode:

8.7.1.1 For no Cooldown cycle, then perform one of the following:

- Depress Emergency Stop Pushbutton on CP-1.
- Depress the Emergency Stop pushbutton on Emergency Diesel Generator A(B) Control Panel.
- Pull manual Fuel Oil Overspeed Trip on Overspeed Governor.
- Pull down and hold Fuel Rack Override Lever on North side of Emergency Diesel Generator A(B) engine until the engine comes to a complete Stop. (Once released, ensure the the EDG A(B) Fuel Rack Override Lever is Vertical & Latched and document on Attachment 11.18, Performing an Emergency Shutdown of the Emergency Diesel Generator Valve Restoration, or other, appropriate document)

8.7.1.2 For a 5 minute Cooldown cycle, then perform one of the following:

- Position Diesel Cranking Control Switch at CP-1 to STOP.
- Position Control Switch on Emergency Diesel Generator A(B) Control Panel to STOP.

NOTE

Two Operators are required to secure the EDG in Emergency Mode using method 2 of step 8.7.2.

CAUTION

THE EDG WILL RESTART IF THE FUEL RACK OVERRIDE LEVER IS RELEASED AND THE UNDERVOLTAGE OR SIAS SIGNAL IS PRESENT PRIOR TO COMPLETING STEP 8.7.2.2.2.

8.7.2 With the Emergency Diesel Generator A(B) in Emergency Mode, Stop the Emergency Diesel Generator A(B) by performing one of the following methods:

8.7.2.1 Method 1: Pull the manual Fuel Oil Overspeed Trip on the Overspeed Governor.

Or

8.7.2.2 Method 2:

8.7.2.2.1 Pull down and hold the EDG A(B) Fuel Rack Override Lever on the North side of the Emergency Diesel Generator A(B) engine.

8.7.2.2.2 To prevent the Emergency Diesel Generator A(B) from Starting, Unlock and Close the following valves:

- EGA-152A(B) A(B) Air Receiver A2(B2) Outlet Isolation
- EGA-153A(B) A(B) Air Receiver A1(B1) Outlet Isolation

8.7.2.2.3 Release Fuel Rack Override Lever.

8.7.2.2.4 Place the EDG A(B) Fuel Rack Override Lever in the Vertical and Latched position.

8.7.2.2.4.1 Document on Attachment 11.18, Performing an Emergency Shutdown of the Emergency Diesel Generator Valve Restoration, or other, appropriate document.

NOTE

Depressing the System Reset pushbutton after the EDG has stopped will secure the Standby Fuel Oil Booster Pump, which may help mitigate the fuel oil leak.

8.7.3 If a fuel oil leak is in progress, when the Emergency Diesel Generator A(B) has stopped then depress the System Reset pushbutton.

8.7.4 Verify steps applicable or directed by the SM/CRS in Subsection 6.5, Unloading, Stopping and Returning EDG A(B) to Standby, are completed.

8.7.5 When conditions allow, then Open and lock the valves closed in Step 8.7.2.2.2

- EGA-152A(B) A(B) Air Receiver A2(B2) Outlet Isolation
- EGA-153A(B) A(B) Air Receiver A1(B1) Outlet Isolation

8.7.5.1 Document on Attachment 11.18, Performing an Emergency Shutdown of the Emergency Diesel Generator Valve Restoration, or other, appropriate document.

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE	Normal Review Class (check one): ☐ **OSRC** ☑ **QUALIFIED REVIEWER**

PROCEDURE NUMBER: OP-009-002		REVISION: 325
TITLE: Emergency Diesel Generator		
PROCEDURE OWNER (Position Title): Operations Manager - Support		

TERM (check one): ☑ **Permanent** ☐ **Temporary**

Effective Date / Milestone (if applicable): 4/8/15

Expiration Date / Milestone (if applicable): N/A

PROCEDURE ACTION (Check one):

☑ **Revision** ☐ **Deletion** ☐ **New Procedure**

DESCRIPTION AND JUSTIFICATION:

(i) Updated sections 6.1.4 and 6.5.5 to provide additional guidance on checking and draining water from the Diesel Fuel Oil System. These changes clarify how the samples are drawn from the Diesel oil Feed Tank and provides an additional point, from the bottom of the in service fuel oil strainer. These sample times are being revised to be performed before operation of the Emergency Diesel Generator, and after operation to further check for presence of water intrusion. These changes were incorporated from findings from condition report, CR-WF3-2015-01615. Added CR-WF3-2015-01615 to the references section (step 10.2.30).

☑ Request/Approval Page Continuation Sheet(s) attached.

REVIEW PROCESS (CHECK ONE): ☑ **Normal** ☐ **Editorial Correction** (Revisions Only) ☐ **Technical Verification** (Revisions Only)

REVIEW AND APPROVAL ACTIVITIES			PRINT NAME OR SIGNATURE	DATE
PREPARER			Jacob MacArthur	3/25/2015
EC SUPERVISOR	Administrative Review and Approval		(sign) N/A	
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups, Functions, Positions, etc.)	Operations [Licensed Operator Peer Review]		Scott Cooper	3/26/2015
	Engineering		Michelle Groome	3/30/2015
	N/A		N/A	
	N/A		N/A	
	N/A		N/A	
PROCESS APPLICABILITY DETERMINATION	Performed ☑	PA Exclusion ☐	Leah Milster	4/8/2015
TECHNICAL	Review ☑	Verification ☐	David F. Litolff	3/25/2015
QUALIFIED REVIEWER	Review ☑		Brett Griffith	4/8/2015
GROUP/DEPT. HEAD	Review ☐	Approval ☑	(sign) [signature]	4/8/15
GM, PLANT OPERATIONS	Review ☐	Approval ☐	(sign) N/A	
VICE PRESIDENT, OPERATIONS		Approval ☐	(sign) N/A	

8.7 PERFORMING AN EMERGENCY SHUTDOWN OF THE EMERGENCY DIESEL GENERATOR

NOTE

If control air is lost during any EDG run, then the Fuel Rack Override lever must be used to shutdown the EDG.

CAUTION

SUBSECTION 8.7 IS FOR EMERGENCY CONDITIONS, WHEN NORMAL SHUTDOWN IS INOPERATIVE OR IT IS NECESSARY TO RAPIDLY STOP THE EMERGENCY DIESEL GENERATOR.

8.7.1 With Emergency Diesel Generator A(B) in Test Mode:

8.7.1.1 For no Cooldown cycle, then perform one of the following:

- Depress Emergency Stop Pushbutton on CP-1.
- Depress the Emergency Stop pushbutton on Emergency Diesel Generator A(B) Control Panel.
- Pull manual Fuel Oil Overspeed Trip on Overspeed Governor.
- Pull down and hold Fuel Rack Override Lever on North side of Emergency Diesel Generator A(B) engine until the engine comes to a complete Stop. (Once released, ensure the the EDG A(B) Fuel Rack Override Lever is Vertical & Latched and document on Attachment 11.18, Performing an Emergency Shutdown of the Emergency Diesel Generator Valve Restoration, or other, appropriate document)

8.7.1.2 For a 5 minute Cooldown cycle, then perform one of the following:

- Position Diesel Cranking Control Switch at CP-1 to STOP.
- Position Control Switch on Emergency Diesel Generator A(B) Control Panel to STOP.

NOTE

Two Operators are required to secure the EDG in Emergency Mode using method 2 of step 8.7.2.

CAUTION

THE EDG WILL RESTART IF THE FUEL RACK OVERRIDE LEVER IS RELEASED AND THE UNDERVOLTAGE OR SIAS SIGNAL IS PRESENT PRIOR TO COMPLETING STEP 8.7.2.2.2.

8.7.2 With the Emergency Diesel Generator A(B) in Emergency Mode, Stop the Emergency Diesel Generator A(B) by performing one of the following methods:

8.7.2.1 Method 1: Pull the manual Fuel Oil Overspeed Trip on the Overspeed Governor.

Or

8.7.2.2 Method 2:

8.7.2.2.1 Pull down and hold the EDG A(B) Fuel Rack Override Lever on the North side of the Emergency Diesel Generator A(B) engine.

8.7.2.2.2 To prevent the Emergency Diesel Generator A(B) from Starting, Unlock and Close the following valves:

- EGA-152A(B) A(B) Air Receiver A2(B2) Outlet Isolation
- EGA-153A(B) A(B) Air Receiver A1(B1) Outlet Isolation

8.7.2.2.3 Release Fuel Rack Override Lever.

8.7.2.2.4 Place the EDG A(B) Fuel Rack Override Lever in the Vertical and Latched position.

8.7.2.2.4.1 Document on Attachment 11.18, Performing an Emergency Shutdown of the Emergency Diesel Generator Valve Restoration, or other, appropriate document.

NOTE

Depressing the System Reset pushbutton after the EDG has stopped will secure the Standby Fuel Oil Booster Pump, which may help mitigate the fuel oil leak.

8.7.3 If a fuel oil leak is in progress, when the Emergency Diesel Generator A(B) has stopped then depress the System Reset pushbutton.

8.7.4 Verify steps applicable or directed by the SM/CRS in Subsection 6.5, Unloading, Stopping and Returning EDG A(B) to Standby, are completed.

8.7.5 When conditions allow, then Open and lock the valves closed in Step 8.7.2.2.2

- EGA-152A(B) A(B) Air Receiver A2(B2) Outlet Isolation
- EGA-153A(B) A(B) Air Receiver A1(B1) Outlet Isolation

8.7.5.1 Document on Attachment 11.18, Performing an Emergency Shutdown of the Emergency Diesel Generator Valve Restoration, or other, appropriate document.

Waterford 3

2015 NRC Exam

JOB PERFORMANCE MEASURE

P3

Restore Power to the DCT Sump Pumps Following a Loss of Off Site Power

Applicant: ______________________________

Examiner: ______________________________

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Restore power to the DCT Sump Pumps following a Loss of Off Site Power.

Task Standard: Dry Cooling Tower Sump 1 and 2 Sump Pumps are energized.

References: OP-902-009, Standard Appendices, Appendix 20, Operation of DCT Sump Pumps

Alternate Path: No Time Critical: No Validation Time: 10 Mins.

K/A G2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects.

Importance Rating 4.2 / 4.1
RO / SRO

Applicant: ______________________________

Time Start: __________________ Time Finish: __________________

Performance Time: __________________ minutes
Critical Time: N/A minutes

Performance Rating: SAT UNSAT

Comments: ______________________________

____

____

Examiner: ______________________________ Date: ______________
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

- OP-902-009, Standard Appendices, Appendix 20, Operation of DCT Sump Pumps

Description:
Applicant will strip non-safety loads from MCC 314 A and 314 B. The safety to non-safety bus tie breaker will then be closed. The task is complete after the breakers are closed to all 4 DCT Sump pumps. All elements of this JPM are performed at the 314 A/B Switchgear area on the +1 level of the Fuel Handling Building.

READ TO APPLICANT

DIRECTION TO APPLICANT:

I will explain the initial conditions, and state the task to be performed. All steps for this JPM will be simulated, do not manipulate any plant components. Make all necessary communications to me. I will provide initiating cues and reports on other actions when directed by you. Indicate to me when you understand your assigned task.

(Read the Initial Condition and Cues from the colored Applicant Cue Sheet, and then give the cue sheet to the applicant.)

NOTE for JPM Validation Only

When performing JPM validation, actions are necessary to ensure exam security is maintained. Prior to commencing in plant JPM validation, contact Health Physics and direct them to disable all cameras in the CAA in a manner that prevents anyone from viewing any of the CAA cameras.

After all in plant JPMs are complete, contact Health Physics to restore the disabled cameras.

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

(TO BE RETURNED TO EXAMINER UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The Plant has experienced a Loss of Offsite Power and recovery actions of OP-902-003 are being performed.
- Emergency Diesel Generators A and B are supplying power to Train A and Train B Safety Buses with both Sequencers timed out.

INITIATING CUE:

The CRS has directed you to restore power to the DCT Sump Pumps 1A, 2A, 1B, and 2B in accordance with OP-902-009, Appendix 20.

<table>
<tr><th>TASK ELEMENT 1</th><th>STANDARD</th></tr>
<tr><td>Procedure Note:
This attachment should be performed following any power interruption to either the 3A or 3B Safety Bus (as directed from EOPs)
If a Probable Maximum Precipitation (PMP) event is in progress and any Dry Cooling Tower (DCT) Motor Driven Sump pump is unavailable, then both of the following shall be performed for the affected DCT sump pump to prevent flooding of associated 315A(B) Motor Control Center and Transformer within time frames as listed:
One DCT Motor Driven Sump pump is aligned for operation within 30 minutes of the PMP event.
The DCT Portable Sump pump (diesel driven) is aligned for operation within three hours of the PMP event.</td><td>Note reviewed</td></tr>
<tr><td>Comment:
EVALUATOR CUE: If the applicant should asks, inform the applicant that a PMP event is <u>not</u> in progress.</td><td>SAT / UNSAT</td></tr>
</table>

<table>
<tr><th>TASK ELEMENT 2</th><th>STANDARD</th></tr>
<tr><td>1. At MCC-314A, <u>place</u> BOTH of the following switches to “BYPASS”:
DCT #1 Sump Pump A Radiation Monitor Bypass switch
DCT #2 Sump Pump A Radiation Monitor Bypass switch</td><td>Both Radiation Monitor Bypass Switches in BYPASS on MCC-314A</td></tr>
<tr><td>Comment:
EVALUATOR CUE: The names listed in the procedure do not exactly match the label posted on each breaker. If the candidate calls to inform the CRS, acknowledge the communication and inform the candidate to proceed.</td><td><u>CRITICAL</u>

SAT / UNSAT</td></tr>
</table>

<table>
<tr><th>TASK ELEMENT 3</th><th>STANDARD</th></tr>
<tr><td>2. At MCC-314B, <u>place</u> BOTH of the following switches to “BYPASS”:
DCT #1 Sump Pump B Radiation Monitor Bypass switch
DCT #2 Sump Pump B Radiation Monitor Bypass switch</td><td>Both Radiation Monitor Bypass Switches in BYPASS on MCC-314B</td></tr>
<tr><td>Comment:
EVALUATOR CUE: The names listed in the procedure do not exactly match the label posted on each breaker. If the candidate calls to inform the CRS, acknowledge the communication and inform the candidate to proceed.</td><td><u>CRITICAL</u>

SAT / UNSAT</td></tr>
</table>

TASK ELEMENT 4	STANDARD
3. **IF** MCC-314A is energized, **AND** breaker SSD-EBKR-314A-2M, MCC-314A Safety to Non-Safety Tie is open, **THEN** perform the following: a. Verify EDG A SEQUENCER is timed out.	Sequencer timed out is given in Initial Conditions
Comment: **EVALUATOR CUE:** If asked, inform the applicant that the breaker SSD-EBKR-314A-2M, MCC-314A Safety to Non-Safety Tie is open.	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
b. Open **ALL** MCC-314A Non-Safety Load breakers.	All breakers on the non-safety side of MCC-314A are open.
Comment: **EVALUATOR CUE:** The non-safety side of MCC 314A will be the right side of the tie breaker, where all of the breaker cubicle numbers are > 2.	**CRITICAL** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
c. Close SSD-EBKR-314A-2M, MCC 314A Safety to Non-safety Tie.	SSD-EBKR314A-2M is closed.
Comment: **EVALUATOR CUE:** The candidate must lift the CLOSE lever on the face of the tie breaker or depress the CLOSE pushbutton above the CLOSE lever for at least 3 seconds (allows closing springs to charge) to close this breaker. If the candidate performs either of these actions report the breaker is closed. **EVALUATOR CUE:** If a candidate attempts to Close a Safety to Non-Safety Tie using the electrical pushbuttons at the mid level of the cubicle, report that the breaker is still open. These switches (by the red and green lights) are not tied into the circuit.	**CRITICAL** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
d. Close BOTH of the following Supply breakers: • SP-EBKR-314A-4F, West Dry Cooling Tower Sump Pump A • SP-EBKR-314A-5F, East Dry Cooling Tower Sump Pump A	Both breakers are closed.
Comment:	**CRITICAL** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
IF MCC-314B is energized **AND** breaker SSD-EBKR-314B-2M, MCC-314B Safety to Non-Safety Tie is open, **THEN** perform the following: a. Verify EDG B SEQUENCER is timed out.	Sequencer timed out is given in Initial Conditions
Comment: **EVALUATOR CUE:** If asked, inform the applicant that the breaker SSD-EBKR-314B-2M, MCC-314B Safety to Non-Safety Tie is open	**SAT / UNSAT**

TASK ELEMENT 9	STANDARD
b. Open **ALL** MCC-314B Non-Safety Load breakers.	All breakers on the non-safety side of MCC-314B are open.
Comment: Evaluator: The non-safety side of MCC 314B will be the right side of the tie breaker, where all of the breaker cubicle numbers are > 2.	**CRITICAL** **SAT / UNSAT**

TASK ELEMENT 10	STANDARD
c. Close SSD-EBKR-314B-2M, MCC 314B Safety to Nonsafety Tie.	SSD-EBKR314B-2M is closed.
Comment: **EVALUATOR CUE:** The candidate must lift the CLOSE lever on the face of the tie breaker or depress the CLOSE pushbutton above the CLOSE lever for at least 3 seconds (allows closing springs to charge) to close this breaker. If the candidate performs either of these actions report the breaker is closed. **EVALUATOR CUE:** If a candidate attempts to Close a Safety to Non-Safety Tie using the electrical pushbuttons at the mid level of the cubicle, report that the breaker is still open. These switches (by the red and green lights) are not tied into the circuit.	**CRITICAL** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
d. Close **BOTH** of the following Supply breakers: • SP-EBKR-314B-4F, West Dry Cooling Tower Sump Pump B • SP-EBKR-314B-5F, East Dry Cooling Tower Sump Pump B	Both breakers are closed.
Comment: **EVALUATOR CUE:** If the candidate asks about a PMP event, inform him that there is no PMP event.	**CRITICAL** **SAT / UNSAT**

END OF TASK

20.0 Operation of DCT Sump Pumps

INSTRUCTIONS

-- **NOTE** --

- This attachment should be performed following any power interruption to either the 3A or 3B Safety bus (as directed from EOPs).
- If a Probable Maximum Precipitation (PMP) event is in progress and any Dry Cooling Tower (DCT) Motor Driven Sump pump is unavailable, then both of the following shall be performed for the affected DCT sump to prevent flooding of associated 315A(B) Motor Control Center and Transformer within time frames as listed:
  - ♦ One DCT Motor Driven Sump pump is aligned for operation within 30 minutes of the PMP event.
  - ♦ The DCT Portable Sump pump (diesel driven) is aligned for operation within three hours of the PMP event.

----

1. At MCC-314A, <u>place</u> **BOTH** of the following switches to “BYPASS:”
   - DCT #1 Sump Pump A Radiation Monitor Bypass switch
   - DCT #2 Sump Pump A Radiation Monitor Bypass switch
2. At MCC-314B, <u>place</u> **BOTH** of the following switches to “BYPASS:”
   - DCT #1 Sump Pump B Radiation Monitor Bypass switch
   - DCT #2 Sump Pump B Radiation Monitor Bypass switch

INSTRUCTIONS

3. **IF** MCC-314A is energized,
   AND breaker SSD-EBKR-314A-2M, MCC-314A Safety to Non-Safety Tie is open,
   THEN perform the following:

   a. Verify EDG A SEQUENCER has timed out.

   b. Open **ALL** MCC-314A Non-Safety Load breakers.

   c. Close SSD-EBKR-314A-2M, MCC-314A Safety to Non-Safety Tie.

   d. Close **BOTH** of the following Supply breakers:

      - SP-EBKR-314A-4F, West Dry Cooling Tower Sump Pump A
      - SP-EBKR-314A-5F, East Dry Cooling Tower Sump Pump A

4. **IF** MCC-314B is energized,
   AND breaker SSD-EBKR-314B-2M, MCC-314B Safety to Non-Safety Tie is open,
   THEN perform the following:

   a. Verify EDG B SEQUENCER has timed out.

   b. Open **ALL** MCC-314B Non-Safety Load breakers.

   c. Close SSD-EBKR-314B-2M, MCC-314B Safety to Non-Safety Tie.

   d. Close **BOTH** of the following Supply breakers:

      - SP-EBKR-314B-4F, West Dry Cooling Tower Sump Pump B
      - SP-EBKR-314B-5F, East Dry Cooling Tower Sump Pump B

5. **IF** a PMP event is in progress,
   THEN align DCT Portable Sump Pump A(B) using OP-003-024, “Sump Pump Operation.”

End of Appendix 20

20.0 Operation of DCT Sump Pumps

INSTRUCTIONS

--------------------------- **NOTE** ---------------------------

- This attachment should be performed following any power interruption to either the 3A or 3B Safety bus (as directed from EOPs).
- If a Probable Maximum Precipitation (PMP) event is in progress and any Dry Cooling Tower (DCT) Motor Driven Sump pump is unavailable, then both of the following shall be performed for the affected DCT sump to prevent flooding of associated 315A(B) Motor Control Center and Transformer within time frames as listed:
  - ♦ One DCT Motor Driven Sump pump is aligned for operation within 30 minutes of the PMP event.
  - ♦ The DCT Portable Sump pump (diesel driven) is aligned for operation within three hours of the PMP event.

----

1. At MCC-314A, <u>place</u> **BOTH** of the following switches to “BYPASS:”
   - DCT #1 Sump Pump A Radiation Monitor Bypass switch
   - DCT #2 Sump Pump A Radiation Monitor Bypass switch
2. At MCC-314B, <u>place</u> **BOTH** of the following switches to “BYPASS:”
   - DCT #1 Sump Pump B Radiation Monitor Bypass switch
   - DCT #2 Sump Pump B Radiation Monitor Bypass switch

INSTRUCTIONS

3. **IF** MCC-314A is energized,
AND breaker SSD-EBKR-314A-2M, MCC-314A Safety to Non-Safety Tie is open,
THEN perform the following:

   a. Verify EDG A SEQUENCER has timed out.

   b. Open **ALL** MCC-314A Non-Safety Load breakers.

   c. Close SSD-EBKR-314A-2M, MCC-314A Safety to Non-Safety Tie.

   d. Close **BOTH** of the following Supply breakers:

      - SP-EBKR-314A-4F, West Dry Cooling Tower Sump Pump A
      - SP-EBKR-314A-5F, East Dry Cooling Tower Sump Pump A

4. **IF** MCC-314B is energized,
AND breaker SSD-EBKR-314B-2M, MCC-314B Safety to Non-Safety Tie is open,
THEN perform the following:

   a. Verify EDG B SEQUENCER has timed out.

   b. Open **ALL** MCC-314B Non-Safety Load breakers.

   c. Close SSD-EBKR-314B-2M, MCC-314B Safety to Non-Safety Tie.

   d. Close **BOTH** of the following Supply breakers:

      - SP-EBKR-314B-4F, West Dry Cooling Tower Sump Pump B
      - SP-EBKR-314B-5F, East Dry Cooling Tower Sump Pump B

5. **IF** a PMP event is in progress,
THEN align DCT Portable Sump Pump A(B) using OP-003-024, “Sump Pump Operation.”

End of Appendix 20

Appendix 20 Restore Operation of DCT Sump Pumps

Objective

The intent of this step is to protect the safety related MCCs 315A and 315B and associated transformers, located in the Cooling Tower area, from potential flooding.

Instructions

The operator is directed to restore operation of the Dry Cooling Tower (DCT) sump pumps if power is interrupted to either 3A or 3B safety buses. The specific directions for this are included in a Standard Appendix.

Contingency Actions

None

Justification for Deviations

The EPG does not include a step to restore operation of the DCT Sump Pumps after a power interruption to the 3A or 3B safety buses. A power interruption to either of these buses would result in the associated MCC 314A(B) safety to nonsafety tie breaker opening. The DCT Sump Pumps are powered from the nonsafety sides of these buses and manual actions are required to restore power.

Waterford 3 has committed that if a Probable Maximum Precipitation (PMP) event (30.7 inches of rain in 6 hours) was to occur, and any DCT Motor Driven Sump Pump was unavailable, to restore a minimum of one DCT Motor Driven Sump Pump within 30 minutes of the PMP event and to align the DCT Portable Sump Pump (diesel driven) within 3 hours of the PMP event. This protects the safety related MCCs 315A and 315B and associated transformers, located in the Cooling Tower area, from potential flooding.

ECM99-010, Dry Cooling Tower Ponding Analysis, does not credit the DCT Sump volume. Therefore, the “Dry Clng Tower Sump 1 (2) Level Hi” annunciators would be an early initial indication of a PMP event. Additional indications to the Control Room include the notification from the National Weather Service of the potential for flooding conditions to occur and precipitation as monitored by the PMC Environmental Monitoring Group.

References

1. FSAR 2.4.2.3.d
2. Letter W3282-0652
3. Commitment P 4392
4. ECM99-010
5. EC 4301

Facility: Waterford Scenario No.: 1 Op Test No.: 1

Examiners: ______ Operators: ______

Initial Conditions: Reactor power is 100%, MOC

Turnover:

Protected Train is B, AB Bus is aligned to Train B, Low Press Safety Injection (LPSI) pump A is tagged out. Perform a down power to ~90% for Heater Drain Pump planned maintenance.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – ATC N – BOP N – SRO	Initiate a normal plant down power.
2	CH08E1	I – BOP I – SRO TS – SRO	Plant Protection System Channel D Containment Pressure (CIAS), CB-IPI-6701SMD, fails high requiring Technical Specification entry and bypass of channel trip bistables. (TS 3.3.1 & 3.3.2)
3	FW26A	I – BOP I – SRO TS – SRO	Steam Generator #1 Feedwater flow instrument FW-IFR-1111 fails low. OP-901-201, Steam Generator Level Control Malfunction. (TRM 3.3.5)
4	RC15A1	I – ATC I – SRO TS – SRO	Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high requiring implementation of OP-901-110, Pressurizer Level Control Malfunction. (TS 3.3.3.5 & 3.3.3.6)
5	L_L10 L_M10 ED01A,B,C,D TU06 RD11A32 RD11A47	M – All	A seismic event causes a loss of offsite power and main turbine trip (auto reactor trip). Two CEAs fail to insert. (**Critical Task 1, Emergency Borate using CVCS**). The crew will enter OP-902-000, Standard Post Trip Actions and diagnose into OP-902-003, Loss of Offsite Power/Forced Circulation.
6	RC23A	M – All	Large RCS Cold Leg break will cause the crew to re-diagnose and enter OP-902-002, Loss of Coolant Accident Recovery Procedure.
7	RP05A3 RP05B3 RP05C3 RP05D3	I – ATC I – SRO	Containment Spray (CS) fails to AUTO Actuate requiring manual actuation. (**Critical Task 2, Manually Initiate Containment Spray**)
8	SI01E	C – BOP C – SRO	LPSI pump B trips requiring implementation of OP-902-008, Functional Recovery Procedure. The crew will align CS pump B to replace LPSI pump B in accordance with OP-902-009, Standard Appendices, Att. 27.

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

The crew assumes the shift at 100% power with instructions to perform a plant down power to ~90% in preparation for planned Heater Drain Pump maintenance. The SRO should direct the plant down power in accordance with OP-010-005, Plant Shutdown and the provided reactivity plan.

At lead examiner’s discretion, CB-IPI-6701SMD, Containment Pressure (CIAS) fails high. The SRO should review Technical Specifications 3.3.1 and 3.3.2. Per Table 3.3-1 under Containment Pressure – High (Functional Unit 6) the SRO should enter Technical Specification 3.3.1 action 2. Per Table 3.3-3 under Functional Units 1b (Safety Injection, Containment Pressure-High), 3b (Containment Isolation, Containment Pressure-High), and 4c (Main Steam Line Isolation, Containment Pressure High) the SRO should enter Tech 3.3.2 action 13. The SRO should direct the BOP to bypass the Containment Pressure High (RPS) and Containment Pressure High (ESF) trip bistables (13&16) in PPS Channel D within 1 hour. The BOP should bypass the trip bistables in accordance with OP-009-007, Plant Protection System.

After the trip bistables have been placed in bypass, Steam Generator #1 Feedwater flow instrument FW-IFR-1111 fails low. The Feedwater Control System will respond by increasing Feedwater flow to Steam Generator #1. The SRO should enter OP-901-201, Steam Generator Level Control Malfunction. The BOP will be required to take manual control and match Feedwater and Main Steam flow. The Ultrasonic Flow Meter will fail as a result of the instrument failure and require entry into TRM 3.3.5. Feedwater controls for Steam Generator #1 may remain in manual as a result of this failure requiring manual positioning of the valves on a Reactor Trip.

After the crew has restored Steam Generator 1 to between 50% and 70% Narrow Range, Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high. The SRO should enter OP-901-110, Pressurizer Level Control Malfunction and implement Section E1. The crew should take manual control of the Pressurizer Level Controller and/or operate Charging Pumps to restore Pressurizer level, swap control to the Channel Y level channel, and return the Pressurizer Level Controller back to AUTO. The SRO should review Technical Specifications 3.3.3.5 and 3.3.3.6 and OP-903-013, Monthly Channel Checks. The SRO should determine that TS 3.3.3.6 requirements are met, but enter TS 3.3.3.5 Action a.

After Pressurizer Level Control is in AUTO, a seismic event causes a loss of offsite power, a main turbine trip and a reactor trip. Two CEAs fail to insert on the reactor trip. The ATC should commence Emergency Boration in accordance with OP-901-103, Emergency Boration (**CRITICAL TASK 1**). The SRO should implement OP-902-000, Standard Post Trip Actions (SPTA) and verify that the ATC has commenced emergency boration. The crew will diagnose into OP-902-003, Loss of Offsite Power/Forced Circulation.

Once the crew diagnoses OP-902-003, Loss of Offsite Power/Forced Circulation, an RCS leak occurs on RCS Cold Leg 1A that progresses to a Large Break Loss of Coolant Accident. When Containment Pressure exceeds the Containment Spray (CSAS) setpoint, Containment Spray fails to actuate. The ATC should manually initiate Containment Spray **(CRITICAL TASK 2**). The crew should re-diagnose to OP-902-002, Loss of Coolant Accident Recovery Procedure.

After the crew verifies proper operation of Component Cooling Water or at lead examiners discretion, Low Pressure Safety Injection (LPSI) pump B will trip on overcurrent. The crew should recognize that OP-902-002 safety functions are not met and the SRO should go to OP-902-008, Functional Recovery. When the SRO performs prioritization, Inventory Control (IC-2) should be the highest priority. The SRO should request TSC/Shift Manager permission and direct the BOP to align Containment Spray pump B to replace LPSI pump B and re-establish LPSI flow.

The scenario can be terminated after the crew has re-established low pressure safety injection flow or at the lead examiner’s discretion.

CRITICAL TASKS

1. ESTABLISH REACTIVITY CONTROL

This task is satisfied by establishing emergency boration prior to exiting OP-902-000, Standard Post Trip Actions. This task becomes applicable after the reactor trips. OP-902-000, Standard Post Trip Actions, directs this as a contingency action to satisfy the Reactivity Control safety function. OP-901-103, Emergency Boration, contains the immediate operator actions required to be taken.

2. ESTABLISH CONTAINMENT TEMPERATURE AND PRESSURE CONTROL

This task is satisfied by manually initiating Containment Spray Actuation Signal prior to exiting step 15 (Verify Containment Spray Actuation) of OP-902-002, Loss of Coolant Accident Recovery Procedure, or Containment pressure exceeding 44 PSIG (59 PSIA). This task becomes applicable after Containment Pressure rises above 17.7 PSIA. OP-902-000, Standard Post Trip Actions, directs this activity to satisfy the Containment Pressure and Temperature Control safety function.

Scenario Quantitative Attributes

1. Malfunctions after EOP entry (1–2)	2
2. Abnormal events (2–4)	2
3. Major transients (1–2)	2
4. EOPs entered/requiring substantive actions (1–2)	2
5. EOP contingencies requiring substantive actions (0–2)	1
6. EOP based Critical tasks (2–3)	2

SCENARIO SETUP

A. Reset Simulator to IC-161

B. Verify Scenario Malfunctions and Remotes are loaded, as listed in the Scenario Timeline.

C. Place LPSI pump A control switch in 'OFF' with a Danger tag.

D. Ensure Protected Train B sign is placed in SM office window.

E. Verify EOOS is 10.0 Green with LPSI Pump A removed.

F. Complete the simulator setup checklist.

G. Start Insight, open file Crew Performance.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Plant Down Power

1. If the Senior Line Manager/Duty Plant Manager is called, acknowledge the report and inform the Control Room that you will remain in the protected area for the down power.
2. If Woodlands (Load Dispatcher) is called, acknowledge the report.

Event 2 Containment Pressure PPS Channel D (CIAS) CB-IPI-6701SMD Fails High

1. On Lead Examiner's cue, initiate Event **Trigger 2**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 3 Steam Generator #1 Feedwater Flow Instrument FW-IFR-1111 Fails Low

1. On Lead Examiner's cue, initiate Event **Trigger 3**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 4 Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, Fails High

1. On Lead Examiner's cue, initiate Event **Trigger 4**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.
3. If sent to LCP-43, wait 3 minutes and report indicator RC-ILI-0110-X1 appears to be failed high. If asked to report Ch. 'Y', report value as read on Extreme View.

Event 5 Seismic Event / Loss of Offsite power / Turbine Trip / 2 Stuck CEAs

1. On Lead Examiner's cue, initiate Event **Trigger 5.**
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If requested to check Emergency Diesel Generators (EDG), wait 3 minutes and report EDGs are operating properly. Initiate event triggers 20&21 to acknowledge local annunciator panels.
4. If called as an NAO to locally close MSR temperature control valves, wait 5 minutes, initiate event trigger 22 and report all MSR temperature valves are closed.
5. If called as an NAO to align power to the DCT sump pumps, wait 5 minutes, run schedule file "Re-energize A(B) Powered DCT Sump Pumps.sch" as appropriate and make report to the Control Room after the schedule file completes all actions.
6. If called as an NAO to align Potable Water to Instrument Air compressors, wait 5 minutes, run schedule file "IA Comp A(B) Align to PW.sch" as appropriate and make report to the Control Room after the schedule file completes all actions.

Event 6/7 Large RCS Cold Leg break / Containment Spray Fails to AUTO Actuate

1. On Lead Examiner's cue, initiate Event **Trigger 6.**
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If Chemistry is called to perform samples acknowledge the request.

<u>Event 8</u> **<u>Low Pressure Safety Injection Pump B Trips / Align CS to replace LPSI</u>**

1. On Lead Examiner's cue, initiate Event **Trigger 7**.
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If Chemistry is called to perform samples acknowledge the request.
4. If called as an NAO to investigate the trip at the breaker, report overcurrent flags on all 3 phases.
5. If called as an NAO to investigate the trip at the pump, report that there is no oil visible on the motor bearing sightglass and oil is dripping from the motor housing.
6. If called as an NAO to rack out LPSI pump B breaker or open the knife switch, wait 2 minutes and report that you will be opening the knife switch for LPSI pump B, then initiate event trigger 8 (SIR33). Make report to the Control Room that you have done so.
7. If called as an NAO to place CS-125B override keyswitch in "Override", wait 2 minutes and then initiate event trigger 9 (CSR13B) to place CS-125B in override. Make report to the Control Room that you have done so.
8. If called as an NAO to locally close SI-129B, wait 3 minutes and then initiate event trigger 23 (SIR50 & SIR51) to close SI-129B. Pull up Extreme View - LP Safety Injection to check position and make report to the Control Room that you have done so.
9. **At the end of the scenario, before resetting, complete data collection by saving the file as <u>2015 Scenario 1-(start-end time).tid.</u> Export to .csv file. Save the file into the folder for the appropriate crew.**

SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
N/A	**SIR32**	**LPSI PUMP A BREAKER RACKED OUT (Not listed in Summary)**	**N/A**	**N/A**	**N/A**	**RKOUT**
LOW PRESS SAFETY INJECTION PUMP A TAGGED OUT						
1	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
PLANT DOWN POWER						
2	**CH08E1**	**CNTMT PRESS TRANSMITTER 6701 SMD FAILS HI**	**2**	**00:00:00**	**00:00:00**	**ACTIVE**
CONTAINMENT PRESSURE PPS CHANNEL D (CIAS) CB-IPI-6701SMD FAILS HIGH						
3	**FW26A**	**SG1 FEED FLOW INST FAILS LOW TO 17%**	**3**	**00:00:00**	**00:00:10**	**17%**
STEAM GENERATOR #1 FEEDWATER FLOW INSTRUMENT FW-IFR-1111 FAILS LOW						
4	**RC15A1**	**PZR LEVEL CONTROL CHANNEL, RC-ILT-0110X, FAILS HIGH**	**4**	**00:00:00**	**00:00:00**	**ACTIVE**
PRESSURIZER LEVEL CONTROL CHANNEL LEVEL TRANSMITTER, RC-ILT-0110X, FAILS HIGH						
5	**L_L10**	**SEISMIC RECORDERS IN OPERATION (Delete after 30 Seconds)**	**5**	**00:00:00**	**00:00:00**	**FAIL_ON**
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	**L_M10**	**SEISMIC EVENT**	**5**	**00:00:00**	**00:00:00**	**FAIL_ON**
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	**ED01A**	**LOSS OF OFFSITE POWER (LINE A)**	**5**	**00:00:03**	**00:00:00**	**ACTIVE**
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	**ED01B**	**LOSS OF OFFSITE POWER (LINE A)**	**5**	**00:00:03**	**00:00:00**	**ACTIVE**
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	**ED01C**	**LOSS OF OFFSITE POWER (LINE B)**	**5**	**00:00:07**	**00:00:00**	**ACTIVE**
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	**ED01D**	**LOSS OF OFFSITE POWER (LINE B)**	**5**	**00:00:07**	**00:00:00**	**ACTIVE**
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
5	TU06	TURBINE TRIP	5	00:00:07	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	RD11A32	CEA 32 MECHANICALLY STUCK	N/A	00:00:00	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
5	RD11A47	CEA 47 MECHANICALLY STUCK	N/A	00:00:00	00:00:00	ACTIVE
SEISMIC EVENT / LOSS OF OFFSITE POWER / TURBINE TRIP / 2 STUCK CEAS						
6	RC23A	RCS COLD LEG 1A RUPTURE	6	00:00:00	00:03:00	14%
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
7	RP05A3	FAILS TO TRIP CH A HI-HI CONT. PRESS (CSAS)	N/A	00:00:00	00:00:00	ACTIVE
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
7	RP05B3	FAILS TO TRIP CH B HI-HI CONT. PRESS (CSAS)	N/A	00:00:00	00:00:00	ACTIVE
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
7	RP05C3	FAILS TO TRIP CH C HI-HI CONT. PRESS (CSAS)	N/A	00:00:00	00:00:00	ACTIVE
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
7	RP05D3	FAILS TO TRIP CH D HI-HI CONT. PRESS (CSAS)	N/A	00:00:00	00:00:00	ACTIVE
LARGE RCS COLD LEG BREAK / CONTAINMENT SPRAY FAILS TO AUTO ACTUATE						
8	SI01E	LOSS OF LOW PRESS SAFETY INJECTION PUMP B	7	00:00:00	00:00:00	ACTIVE
LOW PRESS SAFETY INJECTION PUMP B TRIPS / ALIGN CS PUMP B TO REPLACE LPSI PUMP B						
8	SIR33	LPSI PUMP B BREAKER RACKED OUT	8	N/A	N/A	RKOUT
LOW PRESS SAFETY INJECTION PUMP B TRIPS / ALIGN CS PUMP B TO REPLACE LPSI PUMP B						
8	CSR13B	CS-125B OVERRIDE KEYSWITCH	9	N/A	N/A	OVRD
LOW PRESS SAFETY INJECTION PUMP B TRIPS / ALIGN CS PUMP B TO REPLACE LPSI PUMP B						

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
N/A	**EGR26**	**EDG A LOCAL ANNUN ACK**	**20**	**N/A**	**N/A**	**ACKN**
EDG A LOCAL ANNUNCIATOR PANEL						
N/A	**EGR27**	**EDG B LOCAL ANNUN ACK**	**21**	**N/A**	**N/A**	**ACKN**
EDG B LOCAL ANNUNCIATOR PANEL						
N/A	**MSR43**	**CLOSE MSR TEMPERATURE CNTRL VALVES**	**22**	**N/A**	**N/A**	**CLSD**
CLOSE MSR TEMPERATURE CNTRL VALVES						
N/A	**SIR50**	**SI-129B - SDC B FCV CONTROL**	**23**	**N/A**	**N/A**	**LOCAL**
SI-129B - SDC B FCV CONTROL						
N/A	**SIR51**	**SI-129B - SDC B FCV POSITION**	**23**	**00:00:05**	**00:00:00**	**0%**
SI-129B - SDC B FCV POSITION						

REFERENCES

Event	Procedures
1	OP-010-005, Plant Shutdown, Rev. 326 OP-002-005, Chemical and Volume Control, Rev. 47 OP-005-007, Main Turbine and Generator, Rev. 303 OP-004-004, Control Element Drive, Rev. 19
2	OP-009-007, Plant Protection System, Rev. 16 OP-903-013, Monthly Channel Checks, Rev. 18 Technical Specification 3.3.1 Technical Specification 3.3.2
3	OP-901-201, Steam Generator Level Control Malfunction, Rev. 6 EN-OP-115, Conduct of Operations, Rev. 15 Tech Requirement Manual 3.3.5
4	OP-901-110, Pressurizer Level Control Malfunction, Rev. 8 OP-903-013, Monthly Channel Checks, Rev. 18 Technical Specification 3.3.3.5 Technical Specification 3.3.3.6
5	OP-902-000, Standard Post Trip Actions, Rev. 15 OP-901-103, Emergency Boration, Rev. 3 OP-902-009, Standard Appendices, Rev. 310, Appendix 1 (Diagnostic Flow Chart), Appendix 2 (Figures)
6	OP-902-002, Loss of Coolant Accident Recovery Procedure, Rev. 19 OP-902-009, Standard Appendices, Rev. 310, Appendix 1 (Diagnostic Flow Chart), Appendix 2 (Figures)
7	EN-OP-115, Conduct of Operations, Rev. 15
8	OP-902-008, Functional Recovery Procedure, Rev. 23 OP-902-009, Standard Appendices, Rev. 310, Appendix 27 (Aligning CS to replace LPSI), and Appendix 21 (Overrides for Containment Isolation)

Op Test No.: NRC Scenario # 1 Event # 1 Page 1 of 34

Event Description: Normal Plant Down Power

Time	Position	Applicant's Actions or Behavior

Examiner Note

Event 1 is a normal plant evolution. The crew will be pre-briefed and ready to start the down power once they take the shift.

OP-010-005, Section 9.1, Plant Shutdown to Hot Standby

NOTE

(1) BSCAL is not a good indication of instantaneous power during power maneuvers. Additionally, once the smoothing factor is applied at approximately 98% MSBSRAW (PMC PID C24631), BSCAL becomes a time weighted average of power recorded over approximately 20 minutes. The following tables list COLSS calculated powers available during power maneuvering to monitor instantaneous power: **[CR-WF3-2005-03985]**

(2) During power ascension PMC PID C24649 COLSS ASCENDING PWR TRACK (DUMOUT 18) will automatically select and display the correct power indication. During power reduction PMC PID C24650 COLSS DESCENDING PWR TRACK (DUMOUT19) will automatically select and display the correct power indication.

UFM not in service	
Reactor Power ≥ 95%	MSBSRAW PMC PID C24631
Reactor Power <95% and ≥ 35%	FWBSRAW PMC PID C24630
Reactor Power <35%	BDELT PMC PID C24104

UFM in service	
Reactor Power ≥ 95%	MSBSRAW PMC PID C24631
Reactor Power <95% and ≥ 40%	USBSRAW PMC PID C24629
Reactor Power <40% and ≥ 35%	FWBSRAW PMC PID C24630
Reactor Power <35%	BDELT PMC PID C24104

Time	Position	Applicant's Actions or Behavior
	SRO	9.1.6 Begin RCS boration in accordance with OP-002-005, Chemical and Volume Control to reduce Reactor power.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 2	of 34
Event Description:	Normal Plant Down Power			

Time	Position	Applicant's Actions or Behavior
	(note)	**The SRO directs the ATC to coordinate with the BOP and perform a plant down power to ~90%. The SRO will direct the ATC to initiate RCS boration in accordance with OP-002-005. SRO direction should include an RCS temperature band and instructions on how to maintain ASI using CEAs.**
		CAUTION CONTROL RODS SHOULD NEVER BE WITHDRAWN OR MANUALLY INSERTED EXCEPT IN A DELIBERATE CAREFULLY CONTROLLED MANNER WHILE CLOSELY MONITORING THE REACTOR'S RESPONSE.
	SRO	9.1.7 Maintain ASI using CEA Reg. Group 5, 6 or Group P Control Element Assemblies in accordance with Attachment 9.10, Axial Shape Control Guidelines. (Refer to T.S. 3.1.3.6).
	SRO	9.1.8 When Average Reactor Coolant Temperature (Tavg) begins to drop, then reduce Generator load to match Tavg and Reference Temperature (Tref) in accordance with OP-005-007, Main Turbine and Generator.
		NOTE (1) If USBSCAL is not in service, the COLSS Steam Calorimetric will be automatically disabled when MSBSCAL (PMC PID C24246) drops below 95% Power, and will revert back to FWBSCAL (PMC PID C24235). (2) If USBSCAL is not in service, there may be a step change in COLSS indicated Plant Power of 1.0%, when COLSS Steam Calorimetric is disabled.
	SRO	9.1.9 When reactor power consistently indicates less than 98% power, as indicated on computer point C24631, MAIN STEAM RAW POWER (MSBSRAW), or an alternate point provided by Reactor Engineering, then verify the value of C24648, BSCAL SMOOTHING VAL. APPLD (DUMOUT17), automatically changes to 1. 9.1.9.1 If C24648 does not automatically change to 1, then inform Reactor Engineering and set the value of 1 for COLSS power smoothing constant K24250, [ADDRSSBL SMOOTHING FOR BSCAL (ALPHA)] in accordance with OP-004-005, Core Operating Limits Supervisory System.
		OP-002-005, Section 6.7, Direct Boration to RCS
		CAUTION THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 3 of 34				
Event Description:	Normal Plant Down Power						

Time	Position	Applicant's Actions or Behavior

CAUTION

(1) THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSSCHECKED AND COMPLETED PRIOR TO LEAVING CP-4.

(2) AT LEAST ONE REACTOR COOLANT PUMP IN EACH LOOP SHOULD BE OPERATING PRIOR TO PERFORMING DIRECT BORATION OPERATIONS TO ENSURE PROPER CHEMICAL MIXING.

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.1 Inform SM/CRS that this Section is being performed.

NOTE

When performing a Plant down power where final RCS Boron Concentration needs to be determined, the following Plant Data Book figure(s) will assist the Operator in determining the required RCS Boron PPM change.

- 1.2.1.1 Power Defect Vs Power Level
- 1.4.3.1 Inverse Boron Worth Vs. Tmod at BOC (<30 EFPD)
- 1.4.4.1 Inverse Boron Worth Vs. Tmod at Peak Boron (30 EFPD up to 170 EFPD)
- 1.4.5.1 Inverse Boron Worth Vs. Tmod at MOC (170 EFPD up to 340 EFPD)
- 1.4.6.1 Inverse Boron Worth Vs. Tmod at EOC (≥340 EFPD)

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.2 At SM/CRS discretion, calculate volume of Boric Acid to be added on Attachment 11.6, Calculation of Boric Acid Volume for Direct Boration or VCT Borate Makeup Mode.
	ATC	6.7.3 Set Boric Acid Makeup Batch Counter to volume of Boric Acid desired.
	(note)	**Procedure does not give specific steps to set the counter. 155 gal of acid on the counter is set by pressing:** • UP arrow button • ENTER button • the side arrow button to move the cursor • the raise button to **enter 155** (per reactivity plan) • ENTER • RESET
	ATC	6.7.4 Verify Boric Acid Makeup Pumps selector switch aligned to desired Boric Acid Makeup Pump A(B).
	ATC	6.7.5 Place Direct Boration Valve, BAM-143, control switch to AUTO.
	ATC	6.7.6 Place Makeup Mode selector switch to BORATE.

Op Test No.: NRC	Scenario # 1	Event # 1	Page 4 of 34
Event Description:	Normal Plant Down Power		

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.7 Verify selected Boric Acid Makeup Pump A(B) Starts.
	ATC	6.7.8 Verify Direct Boration Valve, BAM-143, Opens.

NOTE

The Boric Acid Flow Totalizer will not register below 3 GPM. The Boric Acid Flow Totalizer is most accurate in the range of 10 - 25 GPM.

Time	Position	Applicant's Actions or Behavior
	(note)	**ATC will likely use manual boric acid flow control. "CVCS Boric Acid Makeup Flow Hi/Lo" on CP-4 is an expected annunciator.**
	ATC	6.7.9 If manual control of Boric Acid flow is desired, then perform the following: 6.7.9.1 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual. 6.7.9.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, output to >3 GPM flow rate.
	ATC	6.7.10 If automatic control of Boric Acid flow is desired, then perform the following: 6.7.10.1 Place Boric Acid Flow controller, BAM-IFIC-0210Y, in Auto. 6.7.10.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, setpoint potentiometer to >3 GPM flow rate.
	ATC	6.7.11 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate or Open.
	ATC	6.7.12 Observe Boric Acid flow rate for proper indication.
	ATC	6.7.13 When Boric Acid Makeup Batch Counter has counted down to desired value, then verify Boric Acid Makeup Control Valve, BAM-141, Closed.

NOTE

Step 6.7.14 may be repeated as necessary to achieve desired total boron addition for plant conditions.

Op Test No.:	NRC	Scenario #	1	Event #	1	Page	5	of 34
Event Description:	Normal Plant Down Power							

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.14 If additional boric acid addition is required and with SM/CRS permission, then perform the following: 6.7.14.1 Reset Boric Acid Makeup Batch Counter. 6.7.14.2 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate or Open. 6.7.14.3 Observe Boric Acid flow rate for proper indication. 6.7.14.4 When Boric Acid Makeup Batch Counter has counted down to desired value, then verify Boric Acid Makeup Control Valve, BAM-141, Closed.
	(note)	**The ATC, with the SRO's direction, may secure boric acid addition at any time by lowering the output on the acid flow controller to zero or by closing BAM-143. Steps 6.7.15-6.7.20 secure the full acid addition lineup.**
	ATC	6.7.15 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual.
	ATC	6.7.16 Verify both Boric Acid Flow controller, BAM-IFIC-0210Y, output and setpoint potentiometer set to zero.
	ATC	6.7.17 Place Makeup Mode selector switch to MANUAL.
	ATC	6.7.18 Verify Selected Boric Acid Makeup Pump A(B) Stops.
	ATC	6.7.19 Verify Direct Boration Valve, BAM-143, Closed.
	ATC	6.7.20 Place Direct Boration Valve, BAM-143, control switch to CLOSE.
OP-005-007, Section 6.2, Main Turbine & Generator Operation		
CAUTION THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY. REACTOR POWER, RCS TEMPERATURE, AND MAIN GENERATOR MW LOAD SHOULD BE CLOSELY MONITORED DURING PERFORMANCE OF THIS SECTION. [INPO 06-006]		
	BOP	6.2.1 To change Load/Rate perform the following: 6.2.1.1 Depress LOAD/RATE MW/MIN pushbutton. 6.2.1.2 Depress appropriate numerical pushbuttons for desired load rate. 6.2.1.3 Depress ENTER pushbutton.
NOTE Prior to changing Reference Demand, Main Turbine load must not be changing.		

Op Test No.:	NRC	Scenario #	1	Event #	1	Page	6	of	34
Event Description:	Normal Plant Down Power								

Time	Position	Applicant's Actions or Behavior
	BOP	6.2.2 To change Main Turbine load, perform the following: 6.2.2.1 Depress REF pushbutton. 6.2.2.2 Depress appropriate numerical pushbuttons for desired MW load. 6.2.2.3 Depress ENTER pushbutton. 6.2.2.4 Depress GO pushbutton. 6.2.2.5 Verify Turbine load change stops at the desired MW load.
OP-004-004, Section 6.7, Operation of CEAs in Manual Group (MG) Mode		
CAUTION (1) CRITICALITY <u>SHALL</u> BE ANTICIPATED <u>ANY</u> TIME CEAS ARE WITHDRAWN <u>AND</u> THE REACTOR IS <u>NOT</u> CRITICAL. (2) OBSERVE APPLICABLE GROUP INSERTION LIMITS IN ACCORDANCE WITH TECHNICAL SPECIFICATION 3.1.3.6 (REG GROUP), <u>AND</u> TECHNICAL SPECIFICATION 3.1.3.5 (SHUTDOWN BANKS). (3) IMPROPER OPERATION OF CEAS IN MANUAL GROUP MODE MAY CAUSE A REACTOR TRIP BASED ON AN OUT-OF-SEQUENCE CONDITION. (4) CEA INITIALIZATION PROGRAM MUST BE RUNNING IN THE PLANT MONITORING COMPUTER TO HAVE GROUP STOPS <u>AND</u> SEQUENTIAL PERMISSIVES AVAILABLE.		
CAUTION THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY. [INPO 06-006]		
	ATC	6.7.1 Verify Plant Monitoring Computer operable in accordance with OP-004-012, Plant Monitoring Computer.
	ATC	6.7.2 Position Group Select switch to desired group.
	ATC	6.7.3 Place Mode Select switch to MG <u>and</u> verify the following: • White lights Illuminated on Group Selection Matrix for selected group • MG light Illuminates

	ATC	6.7.4 Operate CEA Manual Shim switch to WITHDRAW or INSERT group to desired height while monitoring the following:
		• CEA Position Indicator selected CEA group is moving in desired direction
		• <u>If</u> Reactor is critical, <u>then</u> monitor the following:
		  • Reactor Power
		  • Reactor Coolant System (RCS) temperature
		  • Axial Shape Index (ASI)

Op Test No.: NRC	Scenario # 1	Event # 1	Page 7 of 34
Event Description:	Normal Plant Down Power		

Time	Position	Applicant's Actions or Behavior
NOTE The Operator should remain in the area in front of the CEA Drive Mechanism Control Panel when the Mode Select switch is not in OFF.		
	ATC	6.7.5 When desired set of moves have been completed, then place Mode Select switch to OFF.
Examiner Note **This event is complete when both the ATC and BOP have performed actions to commence a plant down power and the reactivity manipulation is performed** **OR** **As directed by the Lead Evaluator**		
Examiner Note **Cue the Simulator Operator when ready for Event 2**		

Op Test No.:	NRC	Scenario #	1	Event #	2	Page	8	of	34
Event Description:	Containment Pressure PPS Channel D (CIAS), CB-IPI-6701SMD, fails high								

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Recognizes and reports indications of failed channel.
		Alarms:
		• RPS CHANNEL TRIP CNTMT PRESSURE HI (Cabinet K, A-17)
		• CNTMT PRESSURE HI PRETRIP B/D (Cabinet K, C-17)
		• RPS CHANNEL D TROUBLE (Cabinet K, H-18)
		• ESFAS CHANNEL TRIP CNTMT PRESSURE HI (Cabinet K, L-17)
		• CNTMT PRESSURE HI ESFAS PRETRIP B/D (Cabinet K, N-17)
		Indications:
		• PPS Channel D Containment Pressure (CIAS), CB-IPI-6701SMD failed high on CP-7
		• All other Containment Pressure instruments reading normal on CP-7
		• Pretrip and Trip Bistable Lights illuminated for Containment Pressure HI CNT PRESS (RPS and ESF) on Channel D CP-7 ROM.
OP-009-007, Plant Protection System ,Section 6.2, Trip Channel Bypass Operation		
	(note)	**All BOP manipulations for OP-009-007 are located at CP-10 (back panel) except as noted.**
	SRO	6.2.1 Refer to Attachment 11.11, PPS Bistable Bypass Chart to assist in determination of Trip Channels requiring placement in bypass.
	(note)	**SRO determines the following bistables are affected and need to be bypassed:** • **13 - HI CNT PRESS (RPS)** • **16 - HI CNT PRESS (SIAS/CIAS/MSIS)**
	SRO	Directs BOP to bypass the HI CNT PRESS (RPS) and HI CNT PRESS (SIAS/CIAS/MSIS) bistables in PPS Channel D within 1 hour in accordance with OP-009-007, Plant Protection System.
	BOP	6.2.2 To place a bistable in or remove a bistable from bypass, go to Attachment 11.10, Trip Channel Bypass Operation.
	BOP	11.10.1 To Bypass a Trip Channel, perform the following: 11.10.1.1 Circle the bistable numbers selected for bypass under Step 11.10.1.4.
	(note)	**BOP circles bistable numbers 13 and 16 in Step 11.10.1.4 table**

Op Test No.: NRC	Scenario # 1	Event # 2		Page 9	of 34		

Event Description: Containment Pressure PPS Channel D (CIAS), CB-IPI-6701SMD, fails high

Time	Position	Applicant's Actions or Behavior
	BOP	11.10.1.2 Check desired Trip Channel is not Bypassed on another PPS Channel.
	BOP	11.10.1.3 Open key-locked portion of BCP in desired PPS Channel.
	BOP	11.10.1.4 Depress Bypass push buttons for the desired Trip Channels
	BOP	11.10.1.5 Check all selected bistable Bypass push buttons remain in a Depressed state.
	BOP	11.10.1.6 Check all selected bistable Bypass lights Illuminate on BCP for the desired Trip Channels.
	CREW	11.10.1.7 Check all selected bistable Bypass lights Illuminate on ROM for the desired Trip Channels.
	(note)	**Crew verifies correct bistables lit on CP-7 PPS Channel D Remote Operator Module.**
	SRO	Reviews the following Technical Specifications and determines applicable actions: • 3.3.1 action 2 • 3.3.2 actions 13 • 3.3.3.5 – no actions required • 3.3.3.6 – no actions required

Examiner Note

This event is complete when bistables are bypassed and Technical Specifications have been addressed

OR

As directed by the Lead Evaluator

Examiner Note

Cue the Simulator Operator when ready for Event 3

Op Test No.:	NRC	Scenario #	1	Event #	3	Page	10	of	34

Event Description: Steam Generator #1 Feedwater flow instrument FW-IFR-1111 fails low

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of Feedwater flow instrument failure.
		Alarms:
		• Steam Generator 1 Steam/FW Flow Signal Dev (Cabinet F, T-17)
		• Steam Generator 2 Steam/FW Flow Signal Dev (Cabinet F, U-17)
		• SG 1 Level Hi/Lo (Cabinet F, U-14)
		• COLSS MASTER (Cabinet L, A-6)
		Indications:
		• Feedwater Flow indicator FW-IFR-1111 fails low
		• Steam Generator 1 Level Rising (SG-ILR1-1105 and 1111)
		• Deviation between steam flow AND feedwater flow on SG 1
	(note)	**The Ultrasonic Flow Meter quality goes to BAD on this malfunction. The ATC should not disrupt the CRS and the BOP when trying to stabilize S/G #1 level. The ATC should inform the CRS after the plant is stable and the flow chart is complete. TRM 3.3.5 entry is required on a failure of the UFM.**
Examiner Note **When a control system is not operating properly in automatic, it is acceptable for the SRO to direct taking manual control prior to entering the appropriate procedure.**		
	SRO	Directs BOP to take manual control of Feedwater Control System 1 (FWCS) and match Feedwater flow and Steam flow on Steam Generator 1 and restore level to 50-70% NR.
	BOP	Will take manual control of FWCS 1 and Match Feedwater Flow and Steam Flow.
	SRO	Enters and directs the implementation of OP-901-201, Steam Generator Level Malfunction
OP-901-201, Steam Generator Level Malfunction, E0, General		
	SRO	1. Go to Attachment 1, General Actions.
OP-901-201, Steam Generator Level Malfunction, Attachment 1, General Actions		
	SRO	Did a Reactor Trip occur? **NO - continue with flowchart**

Op Test No.: NRC Scenario # 1 Event # 3 Page 11 of 34

Event Description: Steam Generator #1 Feedwater flow instrument FW-IFR-1111 fails low

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	Observe the affected Steam Generator FWCS controllers **AND** note **ANY** controllers that are behaving erratically. **Steam Generator 1** FW IFIC 1111 , S/G 1 FWCS Master Controller FW IHIC 1111 , S/G 1 Main FRV Controller FW IHIC 1105 , S/G 1 S / U FRV Controller FW IHIC 1107 , SGFP A Speed Controller **Steam Generator 2** FW IFIC 1121 , S/G 2 FWCS Master Controller FW IHIC 1121 , S/G 2 Main FRV Controller FW IHIC 1106 , S/G 2 S / U FRV Controller FW IHIC 1108 , SGFP B Speed Controller
	(note)	**BOP should determine that no controllers are malfunctioning.**
	N/A	Place appropriate controllers for the affected FWCS in manual **AND** establish control of S/G level.
	(note)	**Controllers already in MANUAL (prior order)**
	SRO/BOP	Is the output of the affected FWCS Master Controller behaving erratically?
	(note)	**NO - continue with flowchart**
	SRO/BOP	**Verify** SGFP Discharge pressure for BOTH SGFP ' s is matched **AND** is greater than S / G pressures.
	(note)	**BOP verifies - continue with flowchart**
	SRO	Stop turbine load changes except to match Tave and Tref.
	(note)	**SRO should direct ATC/BOP to stop downpower and stabilize the plant. ATC will secure adding boric acid to the RCS and the BOP will stop turbine load reduction. After stopping the downpower, Turbine load adjustment is allowed to match Tave and Tref.**

Op Test No.:	NRC	Scenario #	1	Event #	3	Page	12	of 34
Event Description:	Steam Generator #1 Feedwater flow instrument FW-IFR-1111 fails low							

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	Review the following guidelines **AND** restore S /G level to 50-70% NR: 1. **IF** one SGFP Speed controller is in auto, **THEN** use its output to help set the SGFP Speed controller that is in manual. 2. Momentary taps on the raise **AND** lower buttons of the Main Feedwater Reg Valve Controller have a noticeable impact on associated Steam Generator level. 3. Use the Startup Feedwater Reg Valve Controller to control Steam Generator level at low power levels. 4. Use indications on the unaffected FWCS controllers to help set affected FWCS controllers.
	(note)	**SRO & BOP review guidance**
	SRO/BOP	Check the following Control Channel indicators to determine if a Control Channel has failed: (See Note 3) • FW IFR 1111, Steam Generator 1 Feedwater Flow (green pen) • FW IFR 1011, Steam Generator 1 Steam Flow (red pen) • FW IFR 1121, Steam Generator 2 Feedwater Flow (green pen) • FW IFR 1021, Steam Generator 2 Steam Flow (red pen) • SG ILR1111, Steam Generator 1 Downcomer Level (green pen) • SG ILR1105, Steam Generator 1 Downcomer Level (red pen) • SG ILR1121, Steam Generator 2 Downcomer Level (green pen) • SG ILR1106, Steam Generator 2 Downcomer Level (red pen)
	(note)	**BOP should determine FW IFR 1111, Steam Generator 1 Feedwater Flow (green pen) is failed low.**
	SRO	Control Channel level deviation of > 7%?
	(note)	**NO - continue with flowchart**
	SRO	Main Feedwater Pump Speed Controller malfunction?
	(note)	**NO - continue with flowchart**
	SRO	Is feedwater flow for the affected SG abnormally high?
	(note)	**NO - continue with flowchart**
	SRO/BOP	Determine **AND** correct the cause of the malfunction.
	(note)	**BOP should report which controllers are still in MANUAL. SRO and BOP should discuss contingency actions for FWCS 1 being in MANUAL. SRO will conduct a brief at this point.**

Op Test No.:	NRC	Scenario #	1	Event #	3	Page	13	of	34
Event Description:	Steam Generator #1 Feedwater flow instrument FW-IFR-1111 fails low								

Time	Position	Applicant's Actions or Behavior

Examiner Note

This event is complete after the SRO has completed the flowchart and Steam Generator 1 level is being controlled

OR

As directed by the Lead Evaluator.

Examiner Note

Cue the Simulator Operator when ready for Event 4

Op Test No.: NRC	Scenario # 1	Event # 4		Page 14	of 34		
Event Description:	Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high						

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed instrument.
		Alarms:
		• PRESSURIZER LEVEL HI/LO (Cabinet H, B-1)
		• PRESSURIZER LEVEL HI-HI (Cabinet H, A-1)
		• LETDOWN FLOW HI/LO (Cabinet G, C-1)
		• LETDOWN HX OUTLET PRESS HI (Cabinet G, A-2)
		Indications
		• Mismatch between Charging (CVC-IFI-0212) AND Letdown (CVC-IFI-0202) flow indications. Letdown rises to maximum, with 1 charging pump running
		• Deviation between indicated level AND programmed level as indicated on Pressurizer level recorder (RC-ILR-0110).
		• RC-ILI-0110X reading ~ 100%
		• Actual Pressurizer level RC-ILI-0110Y slowly lowering.
		• Pressurizer Backup Heaters energize
	(note)	**SRO may direct the ATC to take manual control of Pressurizer Level Controller, RC-ILIC-0110 and match Letdown flow and Charging flow prior to entering procedure.**
	SRO	Enter and direct the implementation of OP-901-110, Pressurizer Level Control Malfunction.
OP-901-110, Section E0, General Actions		
	SRO	1. Stop Turbine load changes.
	(note)	**If not already performed in the previous event, the SRO should direct ATC/BOP to stop downpower. ATC will secure adding boric acid to the RCS and the BOP will stop turbine load reduction. After stopping the downpower, Turbine load adjustment is allowed to match Tave and Tref.**
	N/A	2. IF malfunction is due to failure of Letdown Flow Control valve, THEN go to OP-901-112, CHARGING/LETDOWN MALFUNCTION.
	SRO	3. IF malfunction is due to failure of Pressurizer Level Control Channel (incorrect readings on either RC-ILI-0110X OR RC-ILI-0110Y), then go to Subsection E_1, Pressurizer Level Control Channel Malfunction.
OP-901-110, Section E1, Pressurizer Level Control Channel Malfunction		

Op Test No.: NRC	Scenario # 1	Event # 4	Page 15 of 34

Event Description: Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high

Time	Position	Applicant's Actions or Behavior
		NOTE Selecting the non-faulted channel may cause automatic actions to occur if actual level is not at program level.
	ATC	1. Place Pressurizer Level Controller (RC-ILIC-0110) in MAN and adjust OUTPUT to slowly adjust letdown flow to restore Pressurizer level.
	ATC	2. Transfer Pressurizer Level Control CHANNEL SELECT switch to non-faulted channel.
	ATC	3. Transfer Pressurizer CHANNEL SELECT LO LEVEL HEATER CUTOFF switch to non-faulted channel.
	ATC	4. Verify desired backup Charging pumps in AUTO.
	ATC	5. Verify all PROPORTIONAL and BACKUP HEATER BANKS reset.
	ATC	6. Place Pressurizer Level Controller (RC-ILIC-0110) in AUTO and verify Pressurizer Level is being restored to setpoint.
	ATC	7. Verify Pressurizer level controlling at program setpoint in accordance with Attachment 1, Pressurizer Level Versus Tave Curve.
	SRO	8. Refer to the following Technical Specifications for Operability determination. • 3.2.8, Power Distribution Systems, Pressurizer Pressure • 3.3.3.5, Instrumentation, Remote Shutdown Instrumentation • 3.3.3.6, Instrumentation, Accident Monitoring Instrumentation • 3.4.3.1, Reactor Coolant System, Pressurizer
	(note)	**The SRO should review Technical Specifications 3.3.3.5 and 3.3.3.6 and OP-903-013, Monthly Channel Checks. The SRO should determine that TS 3.3.3.6 requirements are met, but enter TS 3.3.3.5 Action a.**

Examiner Note

This event is complete after Pressurizer Level Control System is selected to non-faulted channel and returned to automatic operation and Technical Specifications have been addressed

OR

As directed by the Lead Evaluator

Op Test No.: NRC	Scenario # 1	Event # 4	Page 16 of 34
Event Description:	Pressurizer Level Control Channel Level Transmitter, RC-ILT-0110X, fails high		

Time	Position	Applicant's Actions or Behavior

Examiner Note

Cue the Simulator Operator when ready for Event 5

Event **Trigger 5** will initiate seismic event alarms, loss of offsite power, and a turbine trip. All will occur in less than 10 seconds and will result in an automatic reactor trip.

Op Test No.: NRC	Scenario # 1	Event # 5	Page 17 of 34
Event Description:	Seismic Event / Loss of Offsite Power / Turbine Trip / 2 Stuck CEAs		

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	Recognize and report indications of Seismic Event / Loss of Offsite Power / Turbine Trip / Reactor Trip / 2 stuck CEAs
		Alarms:
		• SEISMIC RECORDERS IN OPERATION (Cabinet L, L-10) • SEISMIC EVENT (Cabinet L, M-10) • SWITCHING STATION TROUBLE(Cabinet D, T-7) • 230 KV LINE A VOLTAGE LOST (Cabinet D, U-7) • 230 KV LINE B VOLTAGE LOST (Cabinet D, U-8)
		Indications:
		• Turbine Tripped (All Turbine Valves closed on CP-1 mimic) • Reactor Tripped (All except two rod bottom lights illuminated) • CEA 32 and 47 Rod Bottom Lights NOT illuminated and their Upper Electrical Limit (red) lights remain illuminated • Lights in the Control Room dim and re-energize when EDGs tie to their respective safety buses
	SRO	Directs ATC and BOP to carry out Standard Post trip Actions.
OP-902-000, Standard Post Trip Actions (STPAs)		
CRITICAL TASK 1 **ESTABLISH REACTIVITY CONTROL** **This task is satisfied by establishing emergency boration prior to exiting OP-902-000, Standard Post Trip Actions.** **This task becomes applicable after the reactor trips.**		
	ATC	1. Determine **Reactivity Control** acceptance criteria are met: a. Check reactor power is dropping. b. Check startup rate is negative. c. Check less than **TWO** CEAs are **NOT** fully inserted.
Examiner Note **ATC is required to emergency borate due to criteria 1.c NOT met.**		
Emergency Boration steps:		
	ATC	1. If Charging is available, then perform the following:

Op Test No.: NRC Scenario # 1 Event # 5 Page 18 of 34

Event Description: Seismic Event / Loss of Offsite Power / Turbine Trip / 2 Stuck CEAs

Time	Position	Applicant's Actions or Behavior
	ATC	1.1 Place Makeup Mode selector switch to MANUAL. (**CRITICAL**)
	ATC	1.2 Align borated water source by performing <u>one</u> of the following (a <u>or</u> b):
		a. Initiate Emergency Boration using Boric Acid Pump as follows: • Open Emergency Boration Valve, BAM-133. (**CRITICAL**) • Start <u>one</u> Boric Acid Pump. (**CRITICAL**) • Close recirc valve for Boric Acid Pump started: • BAM-126A Boric Acid Makeup Pump Recirc Valve A (**CRITICAL**) <u>or</u> • BAM-126B Boric Acid Makeup Pump Recirc Valve B (**CRITICAL**)
		<u>OR</u>
		b. Initiate Emergency Boration using Gravity Feed as follows: • Open the following Boric Acid Makeup Gravity Feed valves: • BAM-113A Boric Acid Makeup Gravity Feed Valve A (**CRITICAL**) • BAM-113B Boric Acid Makeup Gravity Feed Valve B (**CRITICAL**)
	ATC	1.3 Close VCT Disch Valve, CVC-183. (**CRITICAL**)
	ATC	1.4 Verify at least one Charging Pump operating and Charging Header flow greater than or equal to 40 GPM. (**CRITICAL**)
OP-902-000, Standard Post Trip Actions (continued)		
	BOP	2. <u>Determine</u> **Maintenance of Vital Auxiliaries** acceptance criteria are met: a. <u>Check</u> the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	b. <u>Check</u> the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped

Op Test No.:	NRC	Scenario #	1	Event #	5	Page	19	of 34
Event Description:	Seismic Event / Loss of Offsite Power / Turbine Trip / 2 Stuck CEAs							

Time	Position	Applicant's Actions or Behavior
	BOP	c. <u>Check</u> station loads are energized from offsite electrical power as follows: **<u>Train A</u>** • A1, 6.9 KV non safety bus • A2, 4.16 KV non safety bus • A3, 4.16 KV safety bus • A-DC electrical bus • A or C vital AC Instrument Channel **<u>Train B</u>** • B1, 6.9 KV non safety bus • B2, 4.16 KV non safety bus • B3, 4.16 KV safety bus • B-DC electrical bus • B or D vital AC Instrument Channel
	BOP	c.1 **IF ANY** 4.16 KV safety bus is **NOT** powered from offsite, **THEN**: 1) Verify associated EDG has started **AND** EDG output breaker closed. 2) **IF** EDG output breaker is **NOT** closed **THEN**: • Verify stable EDG Voltage 3920 - 4350 AC Volts. • Verify 3-2 Breaker open. • Check Sequencer LOCKOUT **NOT** illuminated. 3) **IF** EDG output breaker is **NOT** closed **AND** Step c.1.2) is met **THEN** locally close EDG output breaker. 4) Verify CCW cooling available to EDG.
	(note)	**BOP should verify Component Cooling Water pumps running on CP-8**
	ATC	3. <u>Determine</u> **RCS Inventory Control** acceptance criteria are met: a. <u>Check</u> that **BOTH** the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% b. <u>Check</u> RCS subcooling is greater than or equal to 28ºF.
	(note)	**The ATC should use CET subcooling on QSPDS or CP-7 to determine RCS subcooling due to the loss of RCPs.**

Op Test No.: NRC	Scenario # 1	Event # 5	Page 20 of 34
Event Description:	Seismic Event / Loss of Offsite Power / Turbine Trip / 2 Stuck CEAs		

Time	Position	Applicant's Actions or Behavior
	ATC	4. Determine **RCS Pressure Control** acceptance criteria are met by checking that **BOTH** of the following conditions exist: • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia
	ATC	5. Determine **Core Heat Removal** acceptance criteria are met: a. Check at least one RCP is operating. b. Check operating loop ΔT is less than 13ºF. c. Check RCS subcooling is greater than or equal to 28ºF.
	(note)	**Core Heat Removal safety function will not be met. All Reactor Coolant Pumps (RCPs) will be stopped due to loss of power; Operators should monitor for natural circulation conditions 5-15 minutes after the loss of RCPs.**
	BOP	6. Determine **RCS Heat Removal** acceptance criteria are met: a. Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 10% to 76% NR • Main Feedwater is available to restore level within 55%-70% NR. **[60-80% NR]**.
	BOP	a2. Verify Emergency Feedwater is available to restore level in at least one steam generator within 55%-70% NR **[60-80% NR]**.
	(note)	**Main Feedwater will not be available. BOP should perform contingency action a2.**
	ATC	b. Check RCS TC is 530 ºF to 550 ºF
	BOP	c. Check steam generator pressure is 885 psia to 1040 psia.
	BOP	d. Check Feedwater Control in Reactor Trip Override: • MAIN FW REG valves are closed • STARTUP FW REG valves are 13% to 21% open • Operating main Feedwater pumps are 3800 rpm to 4000 rpm
	(note)	**If FWCS 1 controllers were in manual prior to the reactor trip, the BOP should manually place affected components (i.e. Main & Startup FW REG valves) in there required positions. The Feedwater pumps may be tripped due to the loss of power.**

Op Test No.:	NRC	Scenario #	1	Event #	5	Page	21	of 34
Event Description:	Seismic Event / Loss of Offsite Power / Turbine Trip / 2 Stuck CEAs							

Time	Position	Applicant's Actions or Behavior
	BOP	e. Reset moisture separator reheaters, and check the temperature control valves closed.
	(note)	**MSR temperature control valve indication will be lost. The BOP should request an NAO to verify the valves are closed locally.**
	ATC	7. Determine **Containment Isolation** acceptance criteria are met: a. Check containment pressure is less than 16.4 psia. b. Check NO containment area radiation monitor alarms OR unexplained rise in activity. c. Check NO steam plant activity monitor alarms OR unexplained rise in activity.
	ATC/BOP	8 Determine **Containment Temperature and Pressure Control** acceptance criteria are met: a. Check containment temperature is less than or equal to 120ºF. b. Check containment pressure is less than 16.4 psia.
	N/A	9. **IF ALL** safety function acceptance criteria are met, **AND NO** contingency actions were performed, **THEN** GO TO OP-902-001, "Reactor Trip Recovery" procedure.
	SRO	10. **IF ANY** safety function acceptance criteria are **NOT** met, **OR ANY** contingency action was taken, **THEN** GO TO Appendix 1, "Diagnostic Flowchart.
OP-902-009, Standard Appendices, Appendix 1 Diagnostic Flow Chart		
Examiner Note **Appendix 1 is a flow chart used to diagnose to the correct recovery procedure for the event in progress. The steps below will be followed by a YES or NO to indicate proper flow path.**		
	ATC	Rx Pwr dropping, SUR negative, and < two CEAs NOT fully inserted or Emergency Boration in progress (**YES**)
	ATC	Pressurizer pressure dropping rapidly and Pressurizer level changing (**NO**)
	BOP	At least one 7KV non-safety bus and one 4KV safety bus powered from offsite (same train) (**NO**)
	BOP	At least one 4KV safety bus and one 125VDC bus energized (same train) (**YES**)

Op Test No.:	NRC	Scenario #	1	Event #	5	Page	22	of 34

Event Description: Seismic Event / Loss of Offsite Power / Turbine Trip / 2 Stuck CEAs

Time	Position	Applicant's Actions or Behavior
	SRO	Go To OP-902-003, Loss of Offsite/Forced Circulation Recovery
OP-902-003, Loss of Offsite Power/Forced Circulation Recovery		
	SRO	1. Confirm diagnosis of a LOOP/LOFC by checking Safety Function Status Check Acceptance criteria are satisfied.
	CREW	2. Announce a Loss of Offsite Power or a Loss of Forced Circulation is in progress using the plant page.
Examiner Note **This event is complete after the crew diagnoses OP-902-003, Loss of Offsite Power/Forced Circulation** **Or** **As directed by the Lead Evaluator.**		
Examiner Note **Cue the Simulator Operator when ready for Events 6 & 7** Event **Trigger 6** will initiate the RCS leak on cold leg 1A.		

Op Test No.: NRC	Scenario # 1	Event # 6 & 7	Page 23	of 34
Event Description:	Large RCS Cold Leg Break / Containment Spray Fails to Auto actuate			

Time	Position	Applicant's Actions or Behavior
		Examiner Note **Step 15 directs the operators to verify Containment Spray Actuation initiated if containment pressure is 17.7 psia or greater. This step is critical task 2 and has been pulled up since containment pressure will be rising rapidly.**
	ATC/BOP	Recognize and report indications of Loss of Coolant Accident.
		Alarms: • Pressurizer Pressure Hi/Lo (Cabinet H, E-1) • Pressurizer Level Hi/Lo (Cabinet H, B-1) • Containment Pressure Hi/Lo (Cabinet M, H-4, Cabinet N, H-14) • Containment Water Leakage Hi (Cabinet N, L-20) • Containment Water Leakage Hi-Hi (Cabinet N, K-20) • Rad Monitoring Sys Activity Hi-Hi (Cabinet L, A-9)
		Indications: • RCS pressure dropping (CP-7, CP-2) • Pressurizer level lowering (CP-2, CP-8, QSPDS 1) • Backup Charging Pump starts (CP-4) • Letdown flow goes to minimum (CP-4) • Rising radiation levels in containment (RM-11, CP-6)
	(note)	**If not already automatically initiated, the SRO may direct a preemptive manual initiation of Safety Injection Actuation Signal (SIAS) and Containment Isolation Actuation Signal (CIAS). Containment Spray Actuation Signal (CSAS) is <u>not</u> normally preemptively initiated.** **The SRO will then direct the ATC and the BOP back to the diagnostic flow chart.**
		CRITICAL TASK 2 **ESTABLISH CONTAINMENT TEMPERATURE AND PRESSURE CONTROL** **This task is satisfied by manually initiating Containment Spray Actuation Signal prior to exiting step 15 (Verify Containment Spray Actuation) of OP-902-002, Loss of Coolant Accident Recovery Procedure, or Containment pressure exceeding 44 PSIG (59 PSIA).** **This task becomes applicable after Containment Pressure rises above 17.7 PSIA.**

Op Test No.: NRC	Scenario # 1	Event # 6 & 7	Page 24 of 34				
Event Description:	Large RCS Cold Leg Break / Containment Spray Fails to Auto actuate						

Time	Position	Applicant's Actions or Behavior
	ATC	**Verify Containment Spray Actuation** *15. **IF** containment pressure is greater than or equal to 17.7 psia, **THEN**: a. Verify CSAS is initiated. (**CRITICAL**) b. Verify **ALL** operating Containment Spray pumps are delivering flow greater than 1750 gpm.
	(note)	**The ATC will manually initiate CSAS at CP-7 by pressing both CSAS push buttons.**
OP-902-009, Standard Appendices, Appendix 1 Diagnostic Flow Chart		
	ATC	Rx Pwr dropping, SUR negative, and < two CEAs NOT fully inserted or Emergency Boration in progress (**YES**)
	ATC	Pressurizer pressure dropping rapidly and Pressurizer level changing (**YES**)
	BOP	Steam Generator Pressure Abnormally Low (**NO**)
	N/A	Primary Break
	ATC	Containment Pressure and Temperature Abnormally High (**YES**)
	ATC	Activity in the Steam Plant (**NO**)
	N/A	LOCA Inside Containment
	BOP	At least one 4KV safety bus energized (**YES**)
	SRO	Go To OP-902-002, Loss of Coolant Accident Recovery
OP-902-002, Loss of Coolant Accident Recovery		
	SRO	*1. Confirm diagnosis of a LOCA: a. <u>Check</u> Safety Function Status Check Acceptance criteria are satisfied. b. **IF** Steam Generator sample path is available, **THEN** <u>direct</u> Chemistry to sample **BOTH** Steam Generators for activity.
	(note)	**If asked to perform step 1.a as the STA, simply acknowledge the request.**
	CREW	2. Announce a Loss of Coolant Accident is in progress using the plant page.

Op Test No.:	NRC	Scenario #	1	Event #	6 & 7	Page	25	of	34

Event Description: Large RCS Cold Leg Break / Containment Spray Fails to Auto actuate

Time	Position	Applicant's Actions or Behavior
	SRO	*3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition" and implement the Emergency Plan.
	(note)	**If asked to perform step 3 as the SM, simply acknowledge the request.**
	SRO	*4. REFER TO Section 6.0, "Placekeeper" and record the time of the reactor trip.
	CREW	*5. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
	(note)	**Crew should send an NAO to restore DCT Sump Pumps on both safety buses.**
	ATC	*6. **IF** PZR pressure is less than 1684 psia, **THEN** check SIAS has initiated.
	ATC	6.1 Verify SIAS is initiated.
	ATC/BOP	*7. **IF** SIAS has initiated, **THEN**: a. Verify Safety Injection pumps have started. b. Check Safety Injection flow is within the following: • Attachment 2-E, "HPSI Flow Curve" • Attachment 2-F, "LPSI Flow Curve" c. Verify **ALL** available Charging pumps are operating.

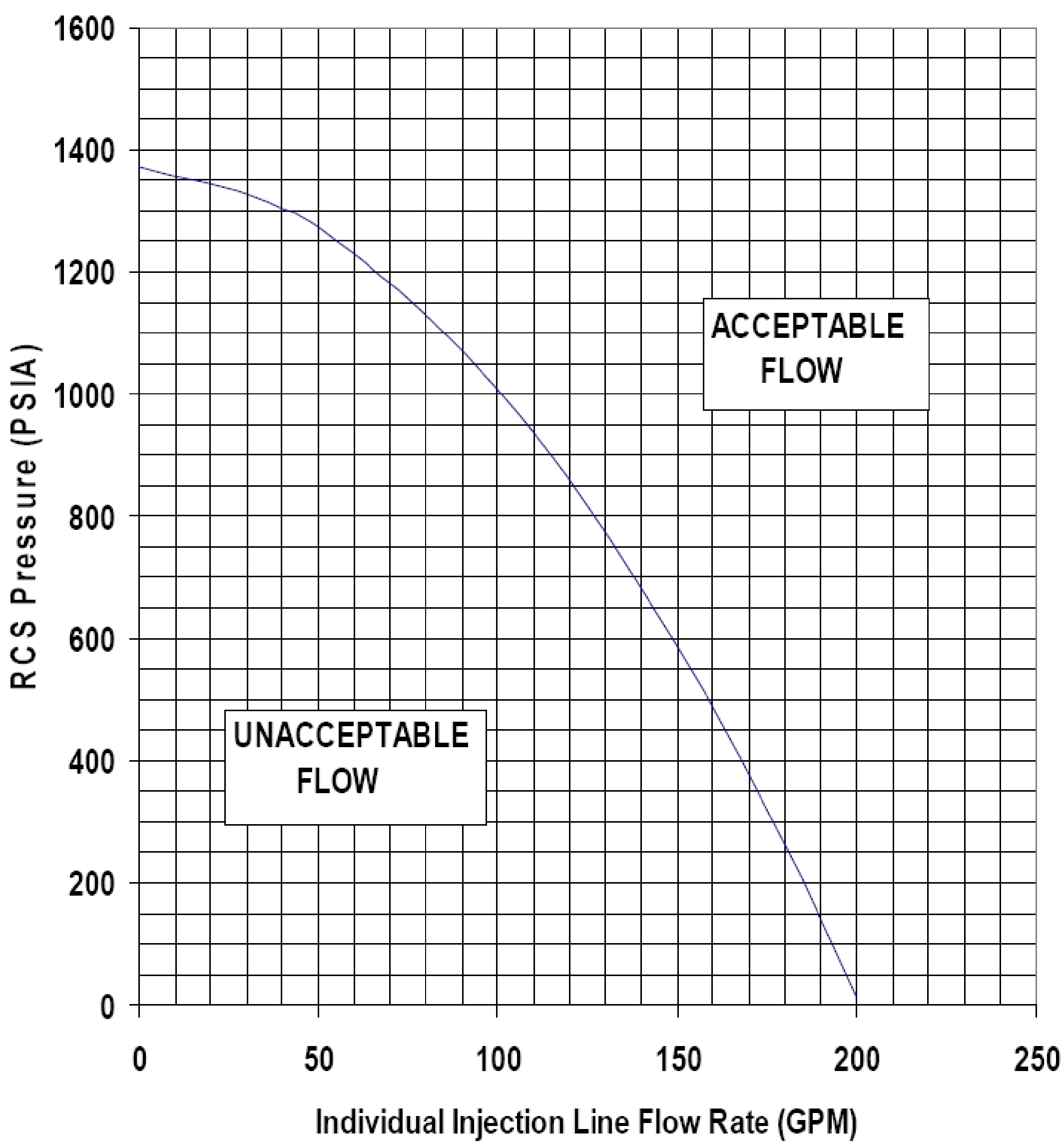
Examiner Note

Appendix 2-E and Appendix 2-F are contained on the next 2 pages. Injection flow will be meeting all requirements.

Op Test No.: NRC	Scenario # 1	Event # 6 & 7	Page 26 of 34
Event Description:	Large RCS Cold Leg Break / Containment Spray Fails to Auto actuate		

Time	Position	Applicant's Actions or Behavior

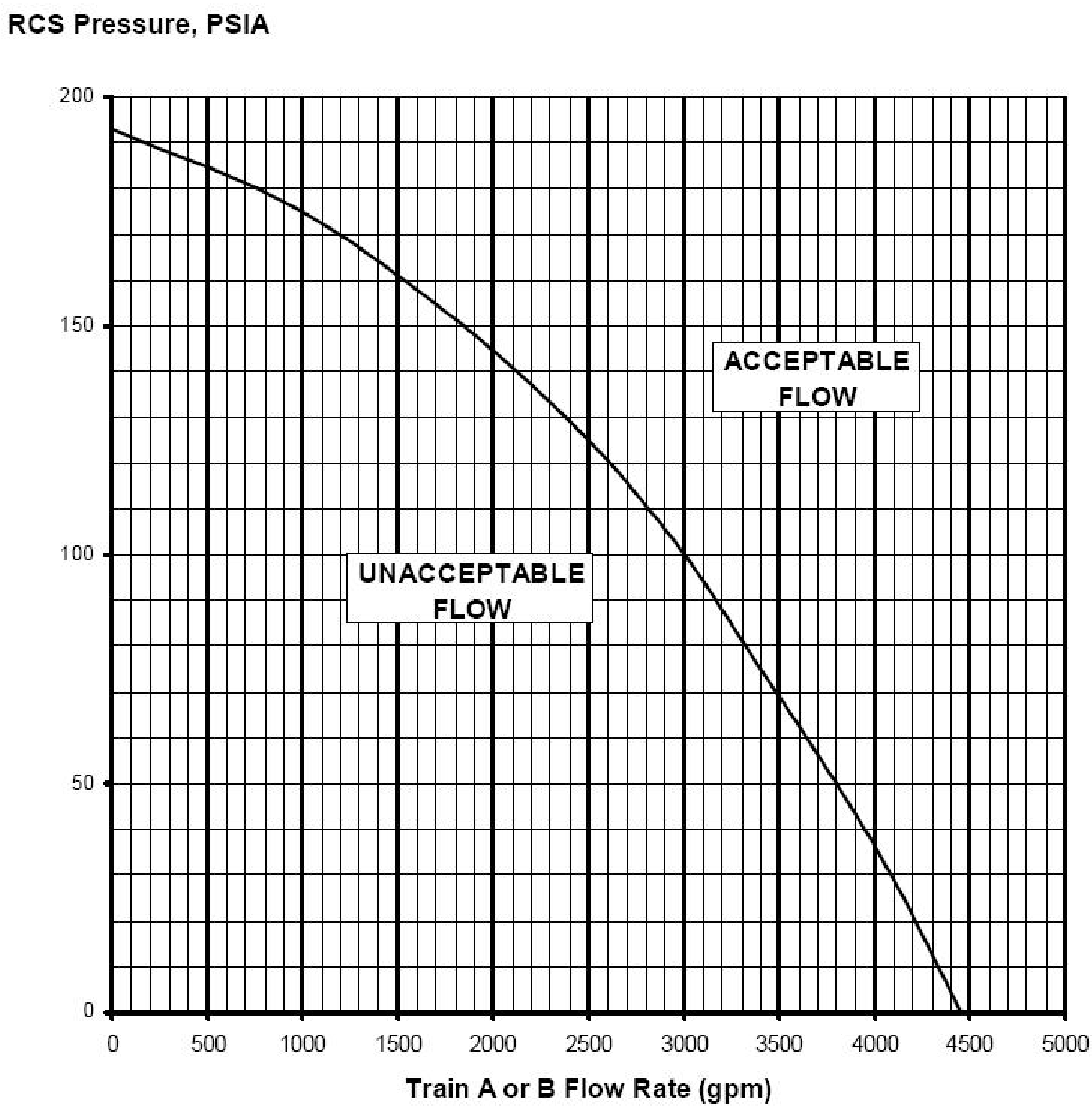
Attachment 2-E: HPSI Flow Curve



Op Test No.: NRC	Scenario # 1	Event # 6 & 7	Page 27 of 34
Event Description:	Large RCS Cold Leg Break / Containment Spray Fails to Auto actuate		

Time	Position	Applicant's Actions or Behavior

Attachment 2-F: LPSI Flow Curve



Time	Position	Applicant's Actions or Behavior
	ATC	*8. **IF** PZR pressure is less than 1621 psia, **AND** SIAS is actuated, **THEN**: a. Verify no more than two RCPs are operating. b. **IF** Pressurizer pressure is less than the minimum RCP NPSH of Attachment 2A-D, "RCS Pressure and Temperature Limits," **THEN** stop **ALL** RCPs.

Op Test No.:	NRC	Scenario #	1	Event #	6 & 7	Page	28	of	34

Event Description: Large RCS Cold Leg Break / Containment Spray Fails to Auto actuate

Time	Position	Applicant's Actions or Behavior
	N/A	9. **IF** RCPs are operating, **THEN**: a. Verify CCW available to RCPs. b. IF a CSAS is initiated, THEN stop ALL RCPs. c. **IF** RCS TC is less than 382ºF **[384ºF]**, **THEN** verify no more than two RCPs are operating.
	BOP	*10. Check a CCW pump is operating for each energized 4.16 KV Safety bus.

Examiner Note

This event is complete after the crew completes Critical Task 2 and steps 1-10 in OP-902-002.

Or

As directed by the Lead Evaluator.

Examiner Note

Cue the Simulator Operator when ready for Event 8

Event **Trigger 7** will initiate **Event 8** (loss of LPSI pump B)

Op Test No.: NRC	Scenario # 1	Event # 8	Page 29 of 34
Event Description:	Low Pressure Safety Injection Pump B Trips / Functional Recovery Procedure		

Time	Position	Applicant's Actions or Behavior

Examiner Note

Event **Trigger 7** will initiate **Event 8** (loss of LPSI pump B)

This will cause a loss of low pressure safety injection and require the crew to enter the Functional Recovery Procedure (OP-902-008) to align a Containment Spray pump to re-establish low pressure safety injection.

Time	Position	Applicant's Actions or Behavior
	BOP	Recognizes and reports indications of LPSI pump B trip
		Alarms
		• LPSI PUMP B TRIP/TROUBLE (Cabinet N, E-13)
		Indications
		• LPSI pump B control switch Amber Light (CP-8) • Ammeter above control switch - zero amps (CP-8) • LPSI pump B flow - zero (CP-8)
	CREW	Recognizes that safety functions for OP-902-002, Loss of Coolant Accident, are not being met. SRO directs going directly to OP-902-008, Functional Recovery.
OP-902-008, Functional Recovery		
	CREW	1. Announce that the Functional Recovery Procedure is in progress using the plant page.
	SRO	2. <u>Advise</u> the Shift Manager to <u>REFER TO</u> EP-001-001, "Recognition & Classification of Emergency Condition" and <u>implement</u> the Emergency Plan.
	SRO	3. <u>REFER TO</u> the "Placekeeper" and <u>record</u> the time of the reactor trip.
	N/A	4. **IF** pressurizer pressure is less than 1621 psia, **AND** SIAS is actuated, **THEN** a. <u>Verify</u> no more than two RCPs are operating. b. **IF** pressurizer pressure is less than the minimum RCP NPSH of Appendix 2A-D, "RCS Pressure and Temperature Limits", **THEN** <u>stop</u> **ALL** RCPs.

Op Test No.:	NRC	Scenario #	1	Event #	8	Page	30	of 34
Event Description:	Low Pressure Safety Injection Pump B Trips / Functional Recovery Procedure							

Time	Position	Applicant's Actions or Behavior
	N/A	5. **IF** RCPs are operating, **THEN**: a. **IF** a CSAS is initiated, **THEN** stop ALL RCPs. b. Verify CCW available to RCPs. c. **IF** RCS TC is less than 382ºF [384ºF], **THEN** verify no more than two RCPs are operating.
NOTE The Shift Chemist should be notified if a SIAS or CIAS has occurred. The secondary sampling containment isolation valves should not be opened following an SIAS or CIAS until directed by the Shift Chemist.		
	SRO	6. Direct Chemistry to sample **BOTH** steam generators for activity and boron.
NOTE • If a Temporary Diesel Generator is the source of AC power, the Verify Equipment Ventilation step must still be performed. • Door Stops and Ceiling Access Panel tool located in Shift Manager Office. • Portable emergency lighting is available in Appendix R lockers located at LCP-43, Remote Shutdown Panel and +35 RAB Relay Room and Shift Manager Office.		
		Verify Equipment Ventilation
	N/A	7. **IF** AC power is lost to **BOTH** 3A and 3B Safety buses, **THEN** perform the following within 30 minutes from the onset of SBO:
	N/A	a. Perform the following behind Control panels: • REFER TO Attachment 7-D, "Process Analog Control Cabinet Doors" and open cabinet doors. • Open Door 259, Secondary Access (southwest corner)
	N/A	b. Open the following Lighting Panel breakers: • LTN-EPNL-322: (behind CP-8) o LTN-EBKR-322-1 o LTN-EBKR-322-2 o LTN-EBKR-322-3 • LTN-EPNL-323: (near main Control Room entrance) o LTN-EBKR-323-2 o LTN-EBKR-323-3 o LTN-EBKR-323-4

Op Test No.:	NRC	Scenario #	1	Event #	8	Page	31	of 34
Event Description:	Low Pressure Safety Injection Pump B Trips / Functional Recovery Procedure							

Time	Position	Applicant's Actions or Behavior
	N/A	c. Open doors in front of Control panels: • Door 84, Equipment Access (north wall double doors) • Door 293, Sound Partition (between west wall and CP-53) • Door 292, Sound Partition (between CP-53 and CP-8) • Door 291,Sound Partition (between CP-18 and CP-15) • Door 77, Main Entrance (northeast corner)
	N/A	d. Open six Ceiling Access panels, (Control Room proper area).
NOTE • If a Temporary Diesel Generator is available and ready to load within 30 minutes of SBO onset, then load stripping via the associated Attachment 7-A or 7-B should not be necessary. • Performing Attachment 7-A and 7-B will remove DC control power from the EDGs including loss of EDG Annunciator Panels and CP-1 indicating lights. An EDG will not start with control power removed.		
	N/A	8. **IF** AC power is lost to **BOTH** 3A and 3B Safety buses, **THEN** direct NAOs to perform **ALL** of the following within 30 minutes from the onset of SBO: • Attachment 7-A, "Switchgear Room A Removable Loads" • Attachment 7-B, "Switchgear Room B Removable Loads" • Attachment 7-C, "Switchgear Room AB Removable Loads"
	CREW	9. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
	(note)	**If not already done, the crew should send an NAO to restore DCT Sump Pumps on both safety buses.**
	BOP	10. Place Hydrogen Analyzers in service as follows:
		Train A
		a. Place Train A H2 ANALYZER CNTMT ISOL VALVE keyswitch to OPEN. (Key 216)
		b. Place H2 ANALYZER A POWER to ON.
		c. Check H2 ANALYZER A Pumps indicate ON.
		Train B
		a. Place Train B H2 ANALYZER CNTMT ISOL VALVE keyswitch to OPEN. (Key 217)
		b. Place H2 ANALYZER B POWER to ON.
		c. Check H2 ANALYZER B Pumps indicate ON.

Op Test No.:	NRC	Scenario #	1	Event #	8	Page	32	of 34
Event Description:	Low Pressure Safety Injection Pump B Trips / Functional Recovery Procedure							

Time	Position	Applicant's Actions or Behavior
	SRO	11. <u>Identify</u> success paths to be used to satisfy each safety function using **BOTH** of the following: • Resource Assessment Trees • Safety Function Tracking Sheet
	(note)	**SRO should determine priorities and paths as follows on the Safety Function Tracking Sheet: (Priorities may vary depending on time parameters checked; however, Priority 1 should be IC-2)** • Reactivity Control, RC-1 = **4** • Maintenance of Vital Auxiliaries (DC), MVA-DC-1 = **7** • Maintenance of Vital Auxiliaries (AC), MVA-AC-2 = **5** • RCS Inventory Control, IC-2 = **1** • RCS Pressure Control, PC-2 = **2** • RCS and Core Heat Removal, HR-2 = **3** • Containment Isolation, CI-1 = **8** • Containment Temperature and Pressure Control, CTPC-2 = **6**
RCS Inventory Control, IC-2		
	SRO/ATC	1. <u>Verify</u> SIAS is initiated.
	BOP	2. <u>Optimize</u> Safety injection: a. <u>Verify</u> Safety Injection pumps have started. b. <u>Check</u> Safety Injection flow is within ALL of the following: • Attachment 2-E, "HPSI Flow Curve" • Attachment 2-F, "LPSI Flow Curve" c. <u>Verify</u> ALL available Charging pumps are operating.
	(note)	**The crew will determine that step 2.b is <u>not</u> met. The contingency actions for this step do not provide the guidance needed to align a CS pump to replace a LPSI pump. The SRO will need to pull up step 15 (below) and follow contingency step 15.1 to find the required procedural guidance.**
	SRO	15. <u>Check</u> IC-2, Safety Injection is satisfied by **ALL** of the following: a. **IF** RAS has **NOT** initiated, **THEN** at least **ONE** Charging pump is operating. b. **IF** RAS has **NOT** initiated, **AND** LPSI pump stop criteria are **NOT** met, **THEN** LPSI flow within Attachment 2-F, "LPSI Flow Curve." c. **IF** HPSI throttle criteria are **NOT** met, **THEN** HPSI flow within Attachment 2-E, "HPSI Flow Curve." d. RVLMS LEVEL PLENUM indicates greater than or equal to 20%.

Op Test No.:	NRC	Scenario #	1	Event #	8	Page	33	of 34
Event Description:	Low Pressure Safety Injection Pump B Trips / Functional Recovery Procedure							

Time	Position	Applicant's Actions or Behavior
	SRO	15.1 **IF** the RCS Inventory Control safety function is still **NOT** met, **THEN** GO TO RCS Inventory Control Continuing Actions.
RCS Inventory Control Continuing Actions		
	SRO	3. Restore the RCS Inventory safety function to a success path by performing **ANY** of the following: a. Restore the vital auxiliaries necessary to operate components or systems in the success path. b. Manually operate alternate components to implement a success path. c. **IF BOTH** LPSI pumps are **NOT** available, **AND** the TSC concurs, **THEN** REFER TO Appendix 27, "Aligning CS to Replace LPSI" and align a CS Pump.
Attachment 27-B: CS Pump B to Replace LPSI Pump B		
	SRO	1. Obtain TSC concurrence prior to performing this evolution.
	(note)	**The SRO should communicate step 1 to the Lead Examiner as if to the Shift Manager. If asked, simply reply, "TSC concurs". The SRO should select train B since LPSI pump A is tagged out.**
	BOP	2. Verify LPSI Pump B Control switch in "OFF."
	BOP	3. Open the Breaker knifeswitch for LPSI Pump B.
	(note)	**The Crew will direct an NAO to open the breaker knifeswitch.**
	BOP	4. Verify Containment Spray Pump B Control switch in "OFF."
	BOP	5. Place SI 129B, LPSI FLOW CONTROL VALVE to "AUTO." (Key 146)
	BOP	6. Place SI-IFIC-0306, LPSI FLOW CONTROLLER HEADERS 1A/1B in "MAN."
	BOP	7. Adjust SI-IFIC-0306, LPSI FLOW CONTROLLERS HEADER 1A/1B to 0% output.

Op Test No.:	NRC	Scenario #	1	Event #	8	Page	34	of	34
Event Description:	Low Pressure Safety Injection Pump B Trips / Functional Recovery Procedure								

Time	Position	Applicant's Actions or Behavior
	(note)	**The Crew may direct an NAO to locally close SI-129B since loss of Instrument Air will cause SI-129B to fail open. The position of SI-129B (open or closed) will not affect injection flow to the core. It is preferred to have SI-129B closed so that the discharge from the Containment Spray pump will be directed through the Shutdown Cooling (SDC) Heat Exchanger instead of bypassing around it. In a normal lineup, LPSI flow does not go through the SDC Heat Exchanger.**
	BOP	8. REFER TO Appendix 21 "Overrides for Containment Isolation" and close CS 125B, CNTMT SPRAY HEADER B ISOL.
	BOP	9. Open SI 125B/SI 412B, SHDN HX B ISOL valves. (Key 145)
	BOP	10. Start Containment Spray Pump B.
	BOP	11. Open SI 415B, LPSI SHUTDOWN TEMP CONTROL valve. (Key 147)
	BOP	12. Verify LPSI Header B flow exists.
Attachment 21-A CS-125B Override		
		2. Override CS 125B, CNTMT Spray HDR B Isolation as follows:
	BOP	a. Place CNTMT Spray Pump B Control switch to "OFF."
	NAO	b. Obtain key 76 from SM office.
	NAO	c. Place keyswitch, Containment Spray 125B Override, to "OVERRIDE." (located on the side of Auxiliary Panel 2, +35 Relay Rm)
	BOP	d. Place CS 125B, CNTMT SPRAY HEADER B ISOL valve to "OPEN" and THEN to "CLOSE."

Examiner Note

This event is complete after the crew re-establishes Low Pressure Safety Injection flow

Or

As directed by the Lead Evaluator.

Facility: Waterford 3 Scenario No.: 2 Op Test No.: 1

Examiners: ____ Operators: ____

Initial Conditions: Reactor power is 100%, MOC.

Turnover:

Protected Train is B, AB Busses are aligned to Train B. No major equipment OOS. Maintain 100%.

Event No.	Malf. No.	Event Type*	Event Description
1	NI01H	I – BOP I – SRO TS – SRO	Channel D Excore Nuclear Instrument Safety Channel, ENI-IJI-0001D, middle detector fails low. (TS 3.3.1 & 3.3.3.6)
2	CV01B	C – ATC C – SRO TS – SRO	Charging Pump B trips on overcurrent requiring implementation of OP-901-112, Charging or Letdown malfunction. (TS 3.1.2.4; TRM 3.1.2.4)
3	SG01A	R – ATC N – BOP N – SRO TS – SRO	Steam Generator #1 tube leakage occurs requiring implementation of OP-901-202, Steam Generator tube leakage or High Activity and a rapid downpower in accordance with OP-901-212, Rapid Plant Downpower. (TS 3.4.5.2)
4	TP01A TP08B	C – BOP C – SRO	Running Turbine Cooling Water Pump A trips and the standby pump does not auto start resulting in manual action to start in accordance with OP-901-512, Loss of Turbine Cooling Water
5	SG01A	M - All	Steam Generator tube leakage worsens leading to Reactor Trip and Safety Injection (**Critical Task 1, isolate SG not before T_{HOT} reduced below 520°F) (Critical Task 3, commence RCS depressurization to 930 PSIA prior to lifting ADV (auto) or MSSV**) (**#3 Dominant Accident Sequence**)
6	RP09D	I – ATC I – BOP	Relay K202 failure, RC-606, Control Bleed off Containment Isolation and FP-601B, Fire Water B Containment Isolation fail to auto close.
7	CC12E2	I-ATC I-SRO	Component Cooling Water Surge Tank level Switch CC-ILS-7013A fails low, isolating Component Cooling Water to the Reactor Coolant Pumps, requiring the crew to secure all running Reactor Coolant Pumps. (**Critical Task 2, trip running RCPs prior to exceeding 3 minutes without CCW flow**)

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

The crew assumes the shift at 100% power with instructions to maintain 100% power.

After taking the shift, ENI Channel D Log Power Instrument (ENI-IJI-0001-D), (middle channel), fails low. The SRO should review and enter Technical Specification 3.3.1 action 2 and bypass Hi Linear Power, Hi LPD, Lo DNBR (1, 3 & 4) within 1 hour in accordance with OP-009-007, Plant Protection System. Bypassing High Log Power and Reactor Coolant Flow-Low (2 & 14) on PPS D is not required in Mode 1, but may be performed. The SRO should also evaluate and enter Technical Specification 3.3.3.6 action 29 which is to restore the channel within 30 days.

After Technical Specifications are addressed, Charging Pump B trips on overcurrent. The SRO should implement OP-901-112, Charging or Letdown Malfunction, Section E_1, Charging Malfunction. The SRO should direct the ATC to start a standby charging pump after verifying a suction path available or isolate Letdown using CVC-101, Letdown Stop Valve. If Letdown is isolated, Charging and Letdown will be re-initiated using Attachment 2 of OP-901-112. The SRO should review and enter Technical Specification 3.1.2.4 and Technical Requirement Manual 3.1.2.4. Technical Specification 3.1.2.4 may be exited after aligning Charging Pump AB to replace Charging Pump B. However, Technical Requirement Manual 3.1.2.4 should not be exited while Charging Pump B remains inoperable.

After the crew addresses the Charging pump malfunction, Steam Generator 1 develops a tube leak at ~ 3 gpm. The SRO should implement OP-901-202, Steam Generator Tube Leakage or High Activity. The SRO should determine that based on leak indications, Technical Specification 3.4.5.2 is not met for Primary-to-Secondary Leakage or Identified Leakage and enter TS 3.4.5.2 Action a to be in Mode 3 within 6 hours. The SRO should also determine that the current leakage requires implementation of OP-901-212, Rapid Plant Power Reduction.

After the reactivity manipulation has been satisfied, the running Turbine Cooling Water Pump A will trip and the standby pump will fail to start automatically. The CRS should direct the BOP to start the standby pump in accordance with OP-901-512, Loss of Turbine Cooling Water and monitor affected loads.

After the crew has restored Turbine Cooling Water, the Steam Generator tube leakage will worsen to a Steam Generator tube rupture with leakage greater than Charging Pump capacity. The SRO should direct a manual Reactor Trip and Safety Injection/Containment Isolation actuation. The crew should proceed through OP-902-000, Standard Post Trip Actions and diagnose to OP-902-007, Steam Generator Tube Rupture Recovery. After the Containment Isolation Signal is initiated, Relay K202 fails and RC-606, Control Bleed off Containment Isolation and FP-601B, Fire Water B Containment Isolation fail to auto close requiring manual action by the ATC and BOP.

The crew will perform steps of OP-902-007, Steam Generator Tube Rupture Recovery to perform a rapid cooldown of the RCS to T_{HOT} less than 520°F and isolate the #1 Steam Generator **(CRITICAL TASK 1)**. While the crew is performing the rapid plant cooldown, Component Cooling Water Surge Tank level switch, CC-ILS-7013A fails low isolating Component Cooling Water to the Reactor Coolant Pumps. The ATC will have to take action and stop all running RCPs within 3 minutes of isolation of flow **(CRITICAL TASK 2)**. The SRO may implement OP-901-510, CCW System Malfunction. Once the crew has stopped RCPs and isolated #1 Steam Generator, the crew should then take action to commence depressurizing the RCS in accordance with OP-902-007 **(CRITICAL TASK 3)**. In Waterford 3 Probalistic Risk Analysis, the #3 Dominant Accident Sequence that would lead to core damage is a “SGTR with a failure to depressurize This is mitigated by performing Critical Task 3.

The scenario can be terminated once the crew commences the RCS depressurization in accordance with OP-902-007, Steam Generator Tube Rupture Recovery or at the lead examiner’s discretion.

CRITICAL TASKS

1. ISOLATE MOST AFFECTED STEAM GENERATOR

This task is satisfied by closing Main Steam isolation valve, Main Feedwater isolation valve, Emergency Feedwater flow control and isolation valves, steam supply to EFW pump AB, steam line drains, and Blowdown isolation valves for #1 Steam Generator after T_{HOT} reduced below 520°F and prior to exiting the step to Isolate the Most Affected Steam Generator (step 17) of OP-902-007. This task becomes applicable when the crew enters OP-902-007, Steam Generator Tube Rupture Recovery.

2. TRIP ANY RCP EXCEEDING OPERATING LIMITS

This task is satisfied by stopping all running Reactor Coolant Pumps prior to exceeding 3 minutes without Component Cooling Water flow to the RCPs. This task becomes applicable after all RCP CCW flow lost annunciators actuate. The alarms indicate the possibility for additional Reactor Coolant System pressure boundary degradation through the Reactor Coolant Pumps. The time requirement of 3 minutes is based on the Reactor Coolant Pump operating limit of 3 minutes without CCW cooling.

3. PREVENT LIFTING AFFECTED SG SAFETY VALVES

This task is satisfied by commencing an RCS depressurization to less than 930 PSIA using auxiliary spray valves and charging pumps prior to lifting atmospheric dump valve in automatic or main steam safety valves on affected Steam Generator. This task becomes applicable after the RCS has been cooled down to RCS T_{HOT} less than 520°F and Steam generator #1 is isolated (Critical Task 1).

Scenario Quantitative Attributes

1. Malfunctions after EOP entry (1–2)	2
2. Abnormal events (2–4)	3
3. Major transients (1–2)	1
4. EOPs entered/requiring substantive actions (1–2)	1
5. EOP contingencies requiring substantive actions (0–2)	0
6. EOP based Critical tasks (2–3)	3

SCENARIO SETUP

A. Reset Simulator to IC-162.

B. Verify Scenario Malfunctions, Remotes, and overrides are loaded, as listed in the Scenario Timeline.

C. Ensure Protected Train B sign is placed in SM office window.

D. Verify EOOS is 10.0 Green with nothing out of service

E. Complete the simulator setup checklist.

F. Start Insight, open file Crew Performance.tis.

SIMULATOR BOOTH INSTRUCTIONS

Event 1 Channel D Excore NI Safety Channel, ENI-IJI-0001D, middle detector fails low

1. On Lead Examiner's cue, initiate Event **Trigger 1**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.
3. If sent to LCP-43, wait 3 minutes and report channel ENI-IJI-0001-D1 appears to be failed downscale. All other power channels read approximately 100%.

Event 2 Charging Pump B Trip

1. On Lead Examiner's cue, initiate Event **Trigger 2**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Charging Pump room and breaker.
3. If called as NAO to investigate the breaker, wait 3 minutes and report overcurrent flags are dropped for all 3 phases for Charging Pump B
4. If called as NAO to investigate the pump, wait 3 minutes and report that there are some indications of charring at the motor vent area, and an acrid odor is present but there is no fire.
5. If directed to perform prestart checks for the A or AB Charging pump, wait 2 minutes and report the following for directed pump:
    a. Suction and discharge valves are open
    b. Proper oil level exists
    c. Motor vents unobstructed
    d. All personnel clear of the pump
6. If directed to check a started Charging pump for proper operation following start, wait 1 minute and report the following:
    a. Suction and discharge valves are open
    b. Proper oil pressure and seal water flow exist
    c. No abnormal vibrations or noises present

Event 3 Steam Generator Tube Leakage #1 Steam Generator / Rapid Plant Downpower

1. On Lead Examiner's cue, initiate Event **Trigger 3**.
1. If Chemistry is called to sample the Steam Generators for activity, acknowledge and wait 30 minutes and report leakage into Steam Generator 1 is ~ 10 GPM.
2. If called as DPM or Duty OPS Manager, acknowledge the communication and tell contact person that you will make the additional communications per OI-035-000, Attachment 1.
3. If requested as Programs & Components Engineering to monitor for loose parts in the Stay Cavity Area of Steam Generator, acknowledge the request and inform the caller that will monitor and evaluate data as necessary.
4. If Chemistry is called to sample the RCS for Dose Equivalent Iodine due to the down power, acknowledge and report that samples will be taken 2-6 hours from notification time and if asked tell the caller your name is Dustan Milam.
5. If notified as Load Dispatcher (Woodlands) acknowledge the communications and inform the caller that the grid will remain stable with available backup generation.
6. If requested to remove polisher vessels from service, inform the caller that you will monitor Polisher D/P and remove vessels as necessary.

<u>Event 4</u> **<u>Turbine Cooling Water Pump A Trip</u>**

1. On Lead Examiner's cue, initiate Event **Trigger 4**.
2. If Work Week Manager, Computer Technician, or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.
3. If called as NAO to investigate the breaker for the tripped TCCW Pump, wait 3 minutes and report that the breaker is tripped, with overcurrent indications at the breaker.
4. If called as NAO to investigate the TCCW pump locally, wait 3 minutes and report no obvious reason why the pump has tripped.

<u>Event 5</u> **<u>Steam Generator Tube Rupture</u>**

1. On Lead Examiner's cue, initiate Event **Trigger 5**.
2. If called as NAO to verify proper operation of unloaded Emergency Diesel Generators, then wait 2 minutes and manually initiate Event **Trigger 15**. Wait an additional minute and manually initiate Event **Trigger 25** to acknowledge local EDG panels. Report that both A and B EDGs are running properly unloaded.

<u>Event 6</u> **<u>Relay K202 Failure (RC-606 and FP-601B no auto closure)</u>**

1. No actions for this event

<u>Event 7</u> **<u>Component Cooling water Surge Tank level switch, CC-ILS-7013A fails low</u>**

1. After the crew has commenced the RCS cooldown and on Lead Examiner's cue, initiate Event **Trigger 7**.
2. **At the end of the scenario, before resetting, end data collection and save the file as <u>2015 Scenario 2-(start-end time).tid.</u> Export to .csv file. Save the file into the folder for the appropriate crew.**

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SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
6	**RP09D**	**RELAY K202 FAILED, CIAS TRAIN B (CVC/RC/FP)**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
RC-606 AND FP-601B NO AUTO CLOSURE						
4	**TP08B**	**TCCW PUMP B AUTO START DISABLE**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
TURBINE COOLING WATER PUMP NO AUTO START						
1	**NI01H**	**MIDDLE DETECTOR (D2) SAFETY CHANNEL D FAIL (0-100%)**	**1**	**00:00:00**	**00:00:00**	**0**
LOG CHANNEL MIDDLE DETECTOR FAILURE						
2	**CV01B**	**CHARGING PUMP B TRIPPED**	**2**	**00:00:00**	**00:00:00**	**ACTIVE**
CHARGING PUMP B TRIP						
3	**SG01A**	**SG1 TUBE LEAK (100% = 3200 GPM)**	**3**	**00:00:00**	**00:00:00**	**0.3**
STEAM GENERATOR TUBE LEAK OF ~10 GPM						
4	**TP01A**	**TCCW PUMP A TRIP**	**4**	**00:00:00**	**00:00:00**	**ACTIVE**
TCCW PUMP A TRIP						
5	**SG01A**	**SG1 TUBE LEAK (100% = 3200 GPM)**	**5**	**00:00:00**	**00:00:00**	**8**
STEAM GENERATOR TUBE LEAK OF ~250 GPM						
7	**CC12E2**	**CCW SURGE TNK LVL 7013AS FAILS LO**	**7**	**00:00:00**	**00:00:00**	**ACTIVE**
CCW SURGE TNK LVL 7013AS FAILS LO						
5	**EGR26**	**EDG A LOCAL ANNUN ACK**	**15**	**00:00:00**	**00:00:00**	**ACKN**
LOCAL EDG ANNUNCIATOR ACKNOWLEDGE						
5	**EGR27**	**EDG B LOCAL ANNUN ACK**	**25**	**00:00:00**	**00:00:00**	**ACKN**
LOCAL EDG ANNUNCIATOR ACKNOWLEDGE						

REFERENCES

Event	Procedures
1	OP-009-007, Plant Protection System, Rev. 16 OP-903-013, Monthly Channel Checks, Rev. 18 Technical Specification 3.3.1 Technical Specification 3.3.3.6
2	OP-901-112, Charging or Letdown Malfunction, Rev. 6 OP-002-005, Chemical Volume Control, Rev. 47 Technical Specification 3.1.2.4 Technical Requirements Manual 3.1.2.4
3	OP-901-202, Steam Generator Tube Leakage or High Activity, Rev. 15 OP-002-005, Chemical Volume Control, Rev. 47 OP-004-004, Control Element Drive, Rev. 19 OP-901-212, Rapid Plant Power Reduction, Rev. 7 Technical Specification 3.4.5.2
4	OP-901-512, Loss of Turbine Cooling Water, Rev. 3
5	OP-902-000, Standard Post Trip Actions, Rev. 15 OP-902-007, Steam Generator Tube Rupture Recovery, Rev. 16 OP-902-009, Standard Appendices, Rev. 310, Appendix 2, Figures OP-902-009, Standard Appendices, Rev. 310, Appendix 1, Diagnostic Flow Chart
6	OP-902-007, Steam Generator Tube Rupture Recovery, Rev. 16
7	OP-902-007, Steam Generator Tube Rupture Recovery, Rev. 16

Op Test No.:	NRC	Scenario #	2	Event #	1	Page	1	of	35
Event Description:	Channel D Excore Nuclear Instrument middle detector fails low								

Time	Position	Applicant's Actions or Behavior
		Examiner Note **Cue the Simulator Operator when ready for Event 1**
	ATC	Recognizes and reports indications of failed channel.
		Alarms:
		• RPS CHANNEL TRIP LOCAL PWR DENSITY HI (Cabinet K, A-11)
		• LOCAL PWR DENSITY HI PRETRIP B/D (Cabinet K, C-11)
		• DNBR LO PRETRIP B/D (Cabinet K, C-12)
		• EXCORE/CPC CHNL D POWER DEVIATION (Cabinet K, K-14)
		• RPS CHANNEL D TROUBLE (Cabinet K, H-18)
		Indications:
		• ENI-IJR-0001, Log Power indication fails downscale
		• ENI-IJI-001D, Log Power Safety Channel D indication fails downscale
		• Pre-Trip indication Channel D HI LOCAL POWER bistable
		• Trip indication Channel D HI LOCAL POWER bistable
		• Pre-Trip indication Channel D LOW DNBR bistable
		Examiner Note **All BOP manipulations for OP-009-007 are located at CP-10 except as noted. The CRS may bypass bistable 2 – HI LOG POWER, but is not required.**
		OP-009-007, Plant Protection System ,Section 6.2, Trip Channel Bypass Operation
	SRO	6.2.1 Refer to Attachment 11.11, PPS Bistable Bypass Chart to assist in determination of Trip Channels requiring placement in bypass.
	(note)	**SRO determines the following bistables are affected and need to be bypassed:** • **1 - HI LN POWER** • **3 - HI LOCAL POWER** • **4 – LO DNBR**
	(note)	**SRO directs BOP to bypass the HI LN POWER, HI LOCAL POWER, and LO DNBR bistables in PPS Channel D within 1 hour in accordance with OP-009-007, Plant Protection System.**
	BOP	6.2.2 To place a bistable in or remove a bistable from bypass, go to Attachment 11.10, Trip Channel Bypass Operation.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 2 of 35
Event Description:	Channel D Excore Nuclear Instrument middle detector fails low		

Time	Position	Applicant's Actions or Behavior

OP-009-007, Plant Protection System ,Attachment 11.10, Trip Channel Bypass Operation

CAUTION

(1) ATTEMPTING TO PLACE MORE THAN ONE TRIP CHANNEL IN BYPASS REMOVES BOTH TRIP CHANNELS FROM BYPASS.

(2) PRIOR TO PLACING ANY TRIP CHANNEL IN BYPASS, VERIFY BYPASS PUSH BUTTONS ON DE-ENERGIZED PPS BAY NOT DEPRESSED.

Time	Position	Applicant's Actions or Behavior
	BOP	11.10.1 To Bypass a Trip Channel, perform the following: 11.10.1.1 Circle the bistable numbers selected for bypass under Step 11.10.1.4.
	(note)	**BOP circles bistable numbers 1, 3 and 4 in Step 11.10.1.4 table**
	BOP	11.10.1.2 Check desired Trip Channel is not Bypassed on another PPS Channel.
	BOP	11.10.1.3 Open key-locked portion of BCP in desired PPS Channel.
	BOP	11.10.1.4 Depress Bypass push buttons for the desired Trip Channels
	BOP	11.10.1.5 Check all selected bistable Bypass push buttons remain in a Depressed state.
	BOP	11.10.1.6 Check all selected bistable Bypass lights Illuminate on BCP for the desired Trip Channels.
	CREW	11.10.1.7 Check all selected bistable Bypass lights Illuminate on ROM for the desired Trip Channels.
	(note)	**Crew verifies correct bistables lit on CP-7 PPS Channel D Remote Operator Module.**
	SRO	Reviews the following Technical Specifications and determines applicable actions: • 3.3.1 action 2 • 3.3.3.5 – no actions required • 3.3.3.6 – action 29

Op Test No.: NRC	Scenario # 2	Event # 1			Page 3	of 35		
Event Description:	Channel D Excore Nuclear Instrument middle detector fails low							

Time	Position	Applicant's Actions or Behavior

Examiner Note **This event is complete when bistables are bypassed and Technical Specifications have been addressed** **or** **At Lead Examiner's Discretion**
Examiner Note **Cue the Simulator Operator when ready for Event 2**

Op Test No.: NRC	Scenario # 2	Event # 2 Page 4 of 35
Event Description:	Charging Pump B Trips	
Time	Position	Applicant's Actions or Behavior

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of Charging Pump B trip.
		Alarms:
		• CHARGING PUMPS HEADER FLOW LO (Cabinet G, H-5)
		• CHARGING PUMP B TRIP/TROUBLE (Cabinet G, B-6)
		Indications:
		• Charging Pump B indicates OFF
		• Charging flow lowering
		• PZR level lowering
		• Letdown flow lowering
Examiner Note **The SRO may direct the BOP to verify a suction source and start a Charging Pump upon the initial report, prior to entering the off normal.**		
	SRO	Enter and direct the implementation of OP-901-112, Charging or Letdown Malfunction.
OP-901-112, Charging or Letdown Malfunction, E_0 – General		
	N/A	1. Stop turbine load changes.
	N/A	2. <u>IF</u> malfunction is due to failure of the Pressurizer Level Control System, <u>THEN</u> go to OP-901-110, PRESSURIZER LEVEL CONTROL MALFUNCTION.
	SRO	3. <u>IF</u> a Charging Malfunction is indicated, <u>THEN</u> go to Subsection E1, Charging Malfunction.
OP-901-112, Charging or Letdown Malfunction, E_1 – Charging Malfunction		
<u>NOTE</u> <u>If</u> all Charging Pumps are secured, <u>then</u> LETDOWN STOP VALVE (CVC 101) will close on high REGEN HX TUBE OUTLET temperature if RCS is ≥470°F.		
<u>CAUTION</u> THE REACTOR COOLANT SYSTEM WILL BE BORATED IF A CHARGING PUMP IS STARTED WITH THE RWSP AS THE MAKEUP WATER SOURCE.		

Op Test No.:	NRC	Scenario #	2	Event #	2	Page	5	of 35
Event Description:	Charging Pump B Trips							

Time	Position	Applicant's Actions or Behavior
	ATC	1. IF Charging Pumps have tripped, THEN perform the following: 1.1 Verify open EITHER VCT DISCH VALVE (CVC 183) OR RWSP TO CHARGING PUMP (CVC 507). 1.2 IF Letdown has NOT isolated, THEN attempt to restart Charging Pump(s). 1.3 IF the Charging Pump can NOT be restarted, THEN verify closed LETDOWN STOP VALVE (CVC 101). 1.4 IF the reason for the Charging pump trip is corrected AND Pressurizer level is in normal operating band, THEN place Charging and Letdown in service in accordance with Attachment 2.
	N/A	2. IF normal Charging flow can NOT be established AND Pressurizer level falls below minimum Pressurizer level for operation in accordance with Attachment 1, Pressurizer Level Versus Tave Curve, THEN perform the following:
	BOP	3. IF the PMC is available, THEN display PMC Group CVCS and monitor Charging System parameters to determine cause of Charging malfunction.
	SRO	4. Inspect Charging System for possible cause of malfunction.
	N/A	5. IF a Charging Line rupture has occurred, THEN perform the following:
CAUTION IF HPSI PUMPS ARE OPERATING, THEN CHARGING PUMPS SHOULD NOT BE ALIGNED TO HPSI HEADER.		
NOTE Aligning Charging to HPSI Train A renders HPSI train A INOPERABLE and Charging Pumps INOPERABLE. Enter TS 3.5.2 and 3.1.2.4. Refer to TS 3.5.3.		
	N/A	6. IF flow can NOT be established through the normal Charging Pump discharge path, THEN align Charging Pumps to discharge through HPSI Header A as follows:
	N/A	7. WHEN repairs have been completed to the Charging Header, THEN restore Charging Pumps discharge alignment to normal as follows:

Op Test No.: NRC	Scenario # 2	Event # 2		Page 6 of 35			
Event Description:	Charging Pump B Trips						

Time	Position	Applicant's Actions or Behavior
	SRO	Reviews and enters the following Technical Specifications and Technical Requirements Manual actions: • 3.1.2.4 (Technical Specification) • 3.1.2.4 (Technical Requirements Manual)

Examiner Note

The SRO may align the AB Charging pump to replace the B Charging pump to allow exit of Technical Specification 3.1.2.4. The crew will remain in TRM 3.1.2.4 even if they align the AB pump.

OP-002-005, Section 6.2, Charging Pump Operations

NOTE

<u>If</u> there is an Inoperable Charging Pump, <u>then</u> at SM/CRS discretion the Standby Charging Pumps selector switch may be aligned so that the Operable Backup Charging Pump will be the first one selected for auto starting capability.

Time	Position	Applicant's Actions or Behavior
	ATC	6.2.8 Verify Standby Charging Pumps selector switch in the appropriate Position for the Charging Pump started (Pump in Lead) per Table 6.2.8.
	(note)	**Position "AB-A" is preferred if Charging Pump A is started due to inoperable pump B.**

TABLE 6.2.8

PUMP IN LEAD	POSITION
B	**AB - A**
A	B - AB
AB	A - B

Time	Position	Applicant's Actions or Behavior
	ATC	6.2.9 Place control switch(es) for Standby Charging Pump A(B)(**AB**) to AUTO.
	ATC	6.2.10 Place Pump AB Assignment switch to the appropriate Position for the Charging Pump A(**B**)(AB) to be Assigned to Trip on SIAS, per Table 6.2.10.
	(note)	**Position 'B' will be selected due to inoperable pump B.**

Op Test No.: NRC	Scenario # 2	Event # 2	Page 7 of 35
Event Description:	Charging Pump B Trips		

Time	Position	Applicant's Actions or Behavior

TABLE 6.2.10

ASSIGNED TO TRIP ON SIAS	POSITION
A	A
AB	NORM
B	**B**

Examiner Note

This event is complete after the ATC aligns the AB Charging pump to replace the B Charging pump and the SRO has evaluated Technical Specifications/Technical Requirements Manual

or

At Lead Examiner's Discretion

Examiner Note

Cue the Simulator Operator when ready for Event 3

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	8	of 35
Event Description:	Steam Generator Tube Leakage #1 SG							

Time	Position	Applicant's Actions or Behavior
	ATC / BOP	Recognize and report indications of SGTL
		Alarms
		• PMC alarm for Primary to Secondary Leakage
		• BLOWDOWN ACTIVITY HI/MONITOR TROUBLE (Cabinet E, B-19)
		• VACUUM PUMPS EXHAUST ACTIVITY HI/MONITOR TROUBLE (Cabinet E, C-3)
		Indications
		• Primary to Secondary Leakage indicated on RM-11
		• Letdown flow lowering
	SRO	Enter and direct the implementation of OP-901-202, Steam Generator Tube Leakage or High Activity.
OP-901-202, Steam Generator Tube Leakage or High Activity		
	N/A	1. IF Pressurizer level CANNOT be maintained with available Charging Pumps, THEN perform the following: 1.1 Manually trip Reactor. 1.2 Manually initiate Safety Injection Actuation (SIAS) AND Containment Isolation Actuation (CIAS). 1.3 GO TO OP-902-000, STANDARD POST TRIP ACTIONS.
	(note)	**Step 1 (above) will not be performed at this time, but will be implemented during Event 5.**

NOTE

(1) The calculated Primary to Secondary Leak Rate values must be considered valid, unless the reading can be quickly diagnosed as incorrect due to an obvious malfunction of the PMC or AE Discharge Rad Monitor.

(2) The AE Discharge Rad Monitor is considered the primary Rad Monitor which has the sensitivity to measure small Primary to Secondary Leakage. The AE Discharge Rad Monitor reading inputs into the Primary to Secondary Leak Calculation on PMC Group PLSR. The MS Line N16 Rad Monitors may be used as verification of AE Discharge Rad Monitor or as primary indication if the AE Discharge Rad Monitor is OOS.

(3) If Primary to Secondary leakage will result in a backup Charging Pump cycling to maintain Pressurizer level, starting and continuously running an additional Charging Pump will allow for a more accurate leakrate determination.

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	9	of 35
Event Description:	Steam Generator Tube Leakage #1 SG							

Time	Position	Applicant's Actions or Behavior
	BOP	2. Determine RCS leak rate using ANY of the following: ▪ Calculated Steam Generator leakage displayed on PMC Group PSLR (PMC PID C48304) ▪ Calculated Steam Generator leakage displayed on PMC PID C48251 (RE5501 CH1 LEAK RATE) and C48252 (RE5501 CH2 LEAK RATE) ▪ Approximate RCS leak rate by subtracting total of Letdown flow AND RCP CBO flow from Charging Flow ▪ Calculated Charging / Letdown Mismatch displayed on PMC Group Leakrate (PMC PID S13001) ▪ RCS Leak Rate calculation in accordance with OP-903-024, REACTOR COOLANT SYSTEM WATER INVENTORY BALANCE ▪ Calculated steam generator leakage based upon chemistry sample, per CE-003-705, DETERMINATION OF PRIMARY-TO-SECONDARY LEAK RATE
	ATC	2.1 If necessary, then start an additional Charging Pump.
	SRO	3. IF primary to secondary leakage in any Steam Generator is ≥75 gpd (~0.05 gpm), then:
	SRO	3.1 Commence a rapid plant shutdown in accordance with OP-901-212, RAPID PLANT POWER REDUCTION, AND concurrently with this Procedure, reduce Plant Power to ≤50% within 1hour.
	SRO	3.2 WHEN Plant Power is ≤50%, THEN in accordance with OP-901-212, RAPID PLANT POWER REDUCTION, AND concurrently with this Procedure, be in Mode 3 within 2 hours AND Mode 5 in the following 30 hours.

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	10	of	35
Event Description:	Steam Generator Tube Leakage #1 SG								

Time	Position	Applicant's Actions or Behavior

OP-901-212, Rapid Plant Power Reduction, E_0, General Actions

Examiner Note

A Rapid downpower does not have to be started at 30MW/min, but should attempt to eventually reach that value. The crew will likely not start the load reduction at that high of a rate.

NOTE

(1) A rapid power reduction is defined as approximately 30 MW/minute load reduction on the main turbine.

(2) Power Reduction may be stopped at any point.

(3) Some Steps of this procedure may not be applicable due to plant conditions. In these cases SM/CRS may NA the step.

(4) Steps within this procedure may be performed concurrently or out of sequence with SM/CRS concurrence.

(5) During power reduction PMC PID C24650, COLSS DESCENDING PWR TRACK (DUMOUT19), will automatically select and display the correct power indication.
OP-010-003, Plant Startup, provides greater detail on which power indications are displayed by PID C24650 based on power level and whether or not the UFM is in service.

(6) Volume Control Tank (VCT) level may lower during the down power. Charging pump suction swaps to the RWSP at 8% VCT level. Makeup to the VCT in accordance with OP-002-005, Chemical and Volume Control, may be necessary if boration from the RWSP is not desired.

Time	Position	Applicant's Actions or Behavior
	ATC	1. Begin RCS Boration by one of the following methods: 1.1 Direct Boration or 1.2 Borate from the RWSP using one or two Charging Pump as follows: 1.2.1 Open RWSP to Charging Pumps Suction Isolation, CVC-507. 1.2.2 Close Volume Control Tank Outlet Isolation, CVC-183. 1.2.3 If necessary, then start another Charging pump

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	11	of 35
Event Description:	Steam Generator Tube Leakage #1 SG							

Time	Position	Applicant's Actions or Behavior

OP-002-005, Section 6.7, Direct Boration to RCS

CAUTION

(1) THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSS-CHECKED AND COMPLETED PRIOR TO LEAVING CP-4.

(2) AT LEAST ONE REACTOR COOLANT PUMP IN EACH LOOP SHOULD BE OPERATING PRIOR TO PERFORMING DIRECT BORATION OPERATIONS TO ENSURE PROPER CHEMICAL MIXING.

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.1 Inform SM/CRS that this Section is being performed.

NOTE

When performing a Plant down power where final RCS Boron Concentration needs to be determined, the following Plant Data Book figure(s) will assist the Operator in determining the required RCS Boron PPM change.

- 1.2.1.1 Power Defect Vs Power Level
- 1.4.3.1 Inverse Boron Worth Vs. T_{mod} at BOC (<30 EFPD)
- 1.4.4.1 Inverse Boron Worth Vs. T_{mod} at Peak Boron (30 EFPD up to 170 EFPD)
- 1.4.5.1 Inverse Boron Worth Vs. T_{mod} at MOC (170 EFPD up to 340 EFPD)
- 1.4.6.1 Inverse Boron Worth Vs. T_{mod} at EOC (≥340 EFPD)

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.2 At SM/CRS discretion, calculate volume of Boric Acid to be added on Attachment 11.6, Calculation of Boric Acid Volume for Direct Boration or VCT Borate Makeup Mode.
	ATC	6.7.3 Set Boric Acid Makeup Batch Counter to volume of Boric Acid desired.
	ATC	6.7.4 Verify Boric Acid Makeup Pumps selector switch aligned to desired Boric Acid Makeup Pump A(B).
	ATC	6.7.5 Place Direct Boration Valve, BAM-143, control switch to AUTO.
	ATC	6.7.6 Place Makeup Mode selector switch to BORATE.
	ATC	6.7.7 Verify selected Boric Acid Makeup Pump A(B) Starts.
	ATC	6.7.8 Verify Direct Boration Valve, BAM-143, Opens.

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	12	of	35
Event Description:	Steam Generator Tube Leakage #1 SG								

Time	Position	Applicant's Actions or Behavior
		NOTE The Boric Acid Flow Totalizer will not register below 3 GPM. The Boric Acid Flow Totalizer is most accurate in the range of 10 - 25 GPM.
	(note)	**ATC will likely use manual boric acid flow control. "CVCS Boric Acid Makeup Flow Hi/Lo" on CP-4 is an expected annunciator.**
	ATC	6.7.9 If manual control of Boric Acid flow is desired, then perform the following: 6.7.9.1 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual. 6.7.9.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, output to >3 GPM flow rate.
	ATC	6.7.10 If automatic control of Boric Acid flow is desired, then perform the following: 6.7.10.1 Place Boric Acid Flow controller, BAM-IFIC-0210Y, in Auto. 6.7.10.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, setpoint potentiometer to >3 GPM flow rate.
	ATC	6.7.11 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate or Open.
	ATC	6.7.12 Observe Boric Acid flow rate for proper indication.
	ATC	6.7.13 When Boric Acid Makeup Batch Counter has counted down to desired value, then verify Boric Acid Makeup Control Valve, BAM-141, Closed.

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	13	of	35
Event Description:	Steam Generator Tube Leakage #1 SG								

Time	Position	Applicant's Actions or Behavior

NOTE

Step 6.7.14 may be repeated as necessary to achieve desired total boron addition for plant conditions.

	ATC	6.7.14 If additional boric acid addition is required and with SM/CRS permission, then perform the following: 6.7.14.1 Reset Boric Acid Makeup Batch Counter. 6.7.14.2 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate or Open. 6.7.14.3 Observe Boric Acid flow rate for proper indication. 6.7.14.4 When Boric Acid Makeup Batch Counter has counted down to desired value, then verify Boric Acid Makeup Control Valve, BAM-141, Closed.
	ATC	6.7.15 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual.
	ATC	6.7.16 Verify both Boric Acid Flow controller, BAM-IFIC-0210Y, output and setpoint potentiometer set to zero.
	ATC	6.7.17 Place Makeup Mode selector switch to MANUAL.
	ATC	6.7.18 Verify Selected Boric Acid Makeup Pump A (B) Stops.
	ATC	6.7.19 Verify Direct Boration Valve, BAM-143, Closed.
	ATC	6.7.20 Place Direct Boration Valve, BAM-143, control switch to CLOSE.

Op Test No.: NRC	Scenario # 2	Event # 3		Page 14	of 35
Event Description:	Steam Generator Tube Leakage #1 SG				

Time	Position	Applicant's Actions or Behavior
OP-901-212, Rapid Plant Power Reduction, E_0, General Actions (cont.)		
NOTE To prevent Pressurizer heater cutout, avoid operating with Pressurizer pressure near the heater cutout pressure of 2270 PSIA while on Boron Equalization.		
	ATC	2. Perform Boron Equalization as follows: 2.1 Place available Pressurizer Pressure Backup Heater Control Switches to ON. 2.2 Reduce Pressurizer Spray Valve Controller (RC-IHIC-0100) setpoint potentiometer to establish spray flow and maintain RCS pressure 2250 PSIA (2175 – 2265).
CAUTION REFER TO TECHNICAL SPECIFICATION 3.1.3.6 FOR TRANSIENT INSERTION LIMITS.		
	ATC	3. Operate CEAs in accordance with OP-004-004, Control Element Drive, to maintain ASI using CEA Reg. Group 5, 6 or Group P Control Element Assemblies in accordance with OP-010-005, Plant Shutdown, Attachment 9.10, Axial Shape Control Guidelines.
OP-004-004, Section 6.7, Operation of CEAs in Manual Group (MG) Mode		
CAUTION (1) CRITICALITY SHALL BE ANTICIPATED ANY TIME CEAS ARE WITHDRAWN AND THE REACTOR IS NOT CRITICAL. (2) OBSERVE APPLICABLE GROUP INSERTION LIMITS IN ACCORDANCE WITH TECHNICAL SPECIFICATION 3.1.3.6 (REG GROUP), AND TECHNICAL SPECIFICATION 3.1.3.5 (SHUTDOWN BANKS). (3) IMPROPER OPERATION OF CEAS IN MANUAL GROUP MODE MAY CAUSE A REACTOR TRIP BASED ON AN OUT-OF-SEQUENCE CONDITION. (4) CEA INITIALIZATION PROGRAM MUST BE RUNNING IN THE PLANT MONITORING COMPUTER TO HAVE GROUP STOPS AND SEQUENTIAL PERMISSIVES AVAILABLE.		
CAUTION THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY. [INPO 06-006]		
	ATC	6.7.1 Verify Plant Monitoring Computer operable in accordance with OP-004-012, Plant Monitoring Computer.
	ATC	6.7.2 Position Group Select switch to desired group.

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	15	of 35
Event Description:	Steam Generator Tube Leakage #1 SG							

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.3 Place Mode Select switch to MG <u>and</u> verify the following: • White lights Illuminated on Group Selection Matrix for selected group • MG light Illuminates

	ATC	6.7.4 Operate CEA Manual Shim switch to WITHDRAW or INSERT group to desired height while monitoring the following:
		• CEA Position Indicator selected CEA group is moving in desired direction
		• <u>If</u> Reactor is critical, <u>then</u> monitor the following:
		  • Reactor Power
		  • Reactor Coolant System (RCS) temperature
		  • Axial Shape Index (ASI)

NOTE The Operator should remain in the area in front of the CEA Drive Mechanism Control Panel when the Mode Select switch is <u>not</u> in OFF.		
	ATC	6.7.5 <u>When</u> desired set of moves have been completed, <u>then</u> place Mode Select switch to OFF.
OP-901-212, Rapid Plant Power Reduction, E_0, General Actions (cont.)		
	SRO	4. Notify the Woodlands System Load Dispatcher that a rapid power reduction is in progress.
	BOP	5. Announce to Station Personnel over the Plant Paging System that a rapid plant power reduction is in progress.
	ATC	6. Maintain RCS Cold Leg Temperature 536°F to 549°F.
	BOP	7. Commence Turbine load reduction by performing the following: 7.1 Depress LOAD RATE MW/MIN pushbutton. 7.2 Set selected rate in Display Demand Window. 7.3 Depress ENTER pushbutton. 7.4 Depress REFERENCE pushbutton. 7.5 Set desired load in Reference Demand Window. 7.6 Depress ENTER pushbutton. 7.7 Depress GO pushbutton.

Op Test No.:	NRC	Scenario #	2	Event #	3	Page	16	of 35
Event Description:	Steam Generator Tube Leakage #1 SG							

Time	Position	Applicant's Actions or Behavior
		NOTE If USBSCAL is not in service, the COLSS Steam Calorimetric will be automatically disabled when MSBSCAL, PMC PID C24246, drops below 95% Power, and will revert back to FWBSCAL, PMC PID C24235. This may result in a step change in COLSS indicated Plant Power (BSCAL) of up to 1.0% when this occurs.
	SRO/ATC	8. When Reactor Power consistently indicates less than 98% power, as indicated on PMC PID C24631 [MAIN STEAM RAW POWER (MSBSRAW)], or an alternate point provided by Reactor Engineering, then verify the value of C24648 [BSCAL SMOOTHING VAL. APPLD (DUMOUT17)] automatically changes to 1.
	N/A	9. If C24648 does not automatically change to 1, then inform Reactor Engineering and set the value of 1 for COLSS power smoothing constant K24250, [ADDRSSBL SMOOTHING FOR BSCAL (ALPHA)] in accordance with OP-004-005, Core Operating Limits Supervisory System.
	SRO/BOP	10. Following a Reactor Power change of >15% within a one hour period, direct Chemistry Department to sample Reactor Coolant System (RCS) for an isotopic iodine analysis two to six hours later.
	BOP	11. When Condensate flow is <18,000 gpm, verify Gland Steam Condenser Bypass, CD-154, Closed (PMC PID D02404).
	BOP	12. Monitor Condensate Polisher differential pressure and remove Polishers from service to maintain system pressure in accordance with OP-003-031, Condensate Polisher/Backwash Treatment.
	N/A	13. When Reactor Power is approximately 70% or Heater Drain Pump flow is unstable, then remove Heater Drain Pumps from service by taking pump control switches to Stop.
	SRO	Reviews the following Technical Specifications and determines applicable actions: • 3.4.5.2 action a

Examiner Note

This event is complete after the Reactivity Manipulation is satisfied and the SRO has evaluated Technical Specifications

OR

At Lead Examiner's Discretion

Op Test No.: NRC	Scenario # 2	Event # 3 Page 17 of 35
Event Description:	Steam Generator Tube Leakage #1 SG	

Time	Position	Applicant's Actions or Behavior

Examiner Note
Cue the Simulator Operator when ready for Event 4

Op Test No.: NRC	Scenario # 2	Event # 4	Page 18 of 35
Event Description:	Turbine Cooling Water Pump A Trips	
Time	Position	Applicant's Actions or Behavior

	ATC / BOP	Recognize and report indications of Turbine Cooling water Pump A Trip
		Alarms
		• TURBINE CLNG WATER DISCH HDR PRESS LO (Cabinet E, E-9)
		• TURBINE CLNG WTR PUMP A TRIP/TROUBLE (Cabinet E, F-9)
		• HYDROGEN TEMPERATURE HI (Cabinet D, H-8)
		• FWPT A OIL COOLER OIL DISCH TEMP HI (Cabinet F, Q-15)
		• FWPT B OIL COOLER OIL DISCH TEMP HI (Cabinet F, Q-19)
		Indications
		• TCCW Pump A indication STOP and Yellow Lights
		• TCCW Pump B indication STOP light
Examiner Note **If the crew neglects to start the B TCCW pump, the turbine will trip due to high vibration resulting in a Reactor Power Cutback.**		
Examiner Note **The BOP may start the B TCCW Pump upon indications of it failing to auto start, prior to entering the off normal.**		
	SRO	Enter and direct the implementation of OP-901-512, Loss of Turbine Cooling Water.
OP-901-512, Loss of Turbine Cooling Water, E_0, General Actions		
	SRO	1. IF loss of Turbine Cooling Water is due to loss of Turbine Cooling Water Pumps, THEN go to Subsection E1, Loss of Turbine Cooling Water Pumps.
OP-901-512, Loss of Turbine Cooling Water, E_1, Loss of Turbine Cooling Water Pumps		
	BOP	1. IF EITHER Turbine Cooling Water Pump is available, THEN attempt to start Turbine Cooling Water Pump to restore system flow.

Op Test No.: NRC	Scenario # 2	Event # 4	Page 19 of 35
Event Description:	Turbine Cooling Water Pump A Trips		

Time	Position	Applicant's Actions or Behavior
	BOP	2. IF ANY of the following equipment is in operation, THEN monitor the associated Turbine Cooling Water temperatures AND secure ANY unnecessary loads: ▪ Condenser Vacuum Pumps ▪ Steam Generator Feed Pump Turbines ▪ Heater Drain Pumps ▪ Turbine EH System ▪ Condensate Pumps ▪ Main Turbine Lube Oil Coolers ▪ Generator Exciter Coolers ▪ Generator Hydrogen Coolers ▪ Instrument Air Compressors ▪ Station Air Compressors ▪ Stator Coil Water System ▪ Hydrogen Seal Oil Coolers ▪ Isophase Bus Coolers ▪ Hydrogen Dryers
CAUTION AT 100% POWER A TOTAL LOSS OF TURBINE COOLING WATER WILL RESULT IN SIGNIFICANT MAIN TURBINE DAMAGE IN 2-3 MINUTES WITH THE GENERATOR AS THE MOST LIMITING COMPONENT.		
	N/A	3. IF BOTH Turbine Cooling Water pumps are unavailable AND flow can NOT be restored, THEN perform the following:
	N/A	4. Align Potable Water to Instrument Air and Station Air Compressors as follows:
Examiner Note **This event is complete after the BOP has started the A TCCW Pump** **OR** **At Lead Examiner's Discretion**		
Examiner Note **Cue the Simulator Operator when ready for Event 5**		

Op Test No.:	NRC	Scenario #	2	Event #	5	Page	20	of	35
Event Description:	Steam Generator Tube Rupture								

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of Steam Generator Tube Rupture
		Alarms:
		• PRESSURIZER LEVEL HI/LO (Cabinet H, B-1)
		Indications:
		• PZR level lowering
		• PZR pressure lowering
		• All Pressurizer Heaters Energized
		• Volume Control tank lowering
OP-901-202, Steam Generator Tube Leakage or High Activity		
	ATC	1. IF Pressurizer level CANNOT be maintained with available Charging Pumps, THEN perform the following: 1.1 Manually trip Reactor. 1.2 Manually initiate Safety Injection Actuation (SIAS) AND Containment Isolation Actuation (CIAS). 1.3 GO TO OP-902-000, STANDARD POST TRIP ACTIONS.
OP-902-000, Standard Post Trip Actions		
	ATC	1. Determine **Reactivity Control** acceptance criteria are met: a. Check reactor power is dropping. b. Check startup rate is negative. c. Check less than **TWO** CEAs are **NOT** fully inserted.
	BOP	2. Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: a. Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	b. Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped

Op Test No.:	NRC	Scenario #	2	Event #	5	Page	21	of 35
Event Description:	Steam Generator Tube Rupture							

Time	Position	Applicant's Actions or Behavior
	BOP	c. Check station loads are energized from offsite electrical power as follows: **Train A** • A1, 6.9 KV non safety bus • A2, 4.16 KV non safety bus • A3, 4.16 KV safety bus • A-DC electrical bus • A or C vital AC Instrument Channel **Train B** • B1, 6.9 KV non safety bus • B2, 4.16 KV non safety bus • B3, 4.16 KV safety bus • B-DC electrical bus • B or D vital AC Instrument Channel
Examiner Note **The Pressurizer will empty during this event and will not be able to be maintained using Charging and Letdown flow.**		
	ATC	3. Determine **RCS Inventory Control** acceptance criteria are met: a. Check that **BOTH** the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% b. Check RCS subcooling is greater than or equal to 28ºF.
	ATC	a.1 Restore and maintain pressurizer level 33% to 60% by performing **ANY** of the following: 1) Operate Pressurizer Level Control System. 2) Manually operate charging pumps and letdown control valves.
	ATC	4. Determine **RCS Pressure Control** acceptance criteria are met by checking that **BOTH** of the following conditions exist: • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia
	ATC	4.1 Restore and maintain pressurizer pressure 2125 psia to 2275 psia by performing **ANY** of the following: a. Operate Pressurizer Pressure Control System. b. Manually operate heaters and spray.

Op Test No.:	NRC	Scenario #	2	Event #	5	Page	22	of	35
Event Description:	Steam Generator Tube Rupture								

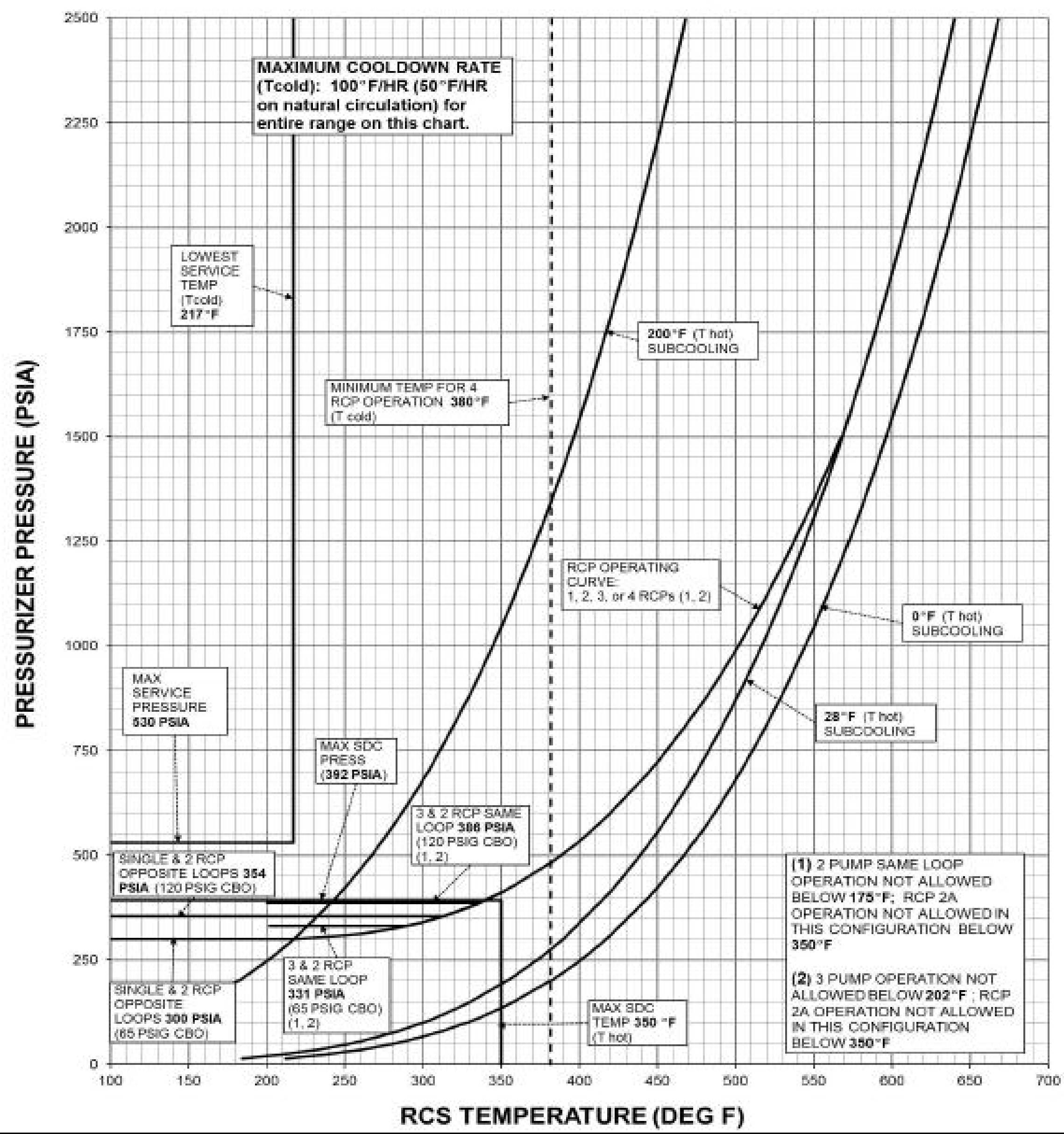
Time	Position	Applicant's Actions or Behavior
Examiner Note **Pressurizer pressure will eventually lower below the 2 thresholds (1684; 1621 PSIA) after the Pressurizer empties.**		
	ATC	4.2 **IF** pressurizer pressure is less than 1684 psia, **THEN** verify the following have initiated. • SIAS • CIAS
	ATC	4.3 **IF** pressurizer pressure is less than 1621 psia, **THEN** verify no more than two RCPs are operating.
	ATC	4.4 **IF** pressurizer pressure is less than the minimum RCP NPSH of Appendix 2-A, "RCS Pressure and Temperature Limits", **THEN** stop **ALL** RCPs.
Examiner Note **Appendix 2-A is contained on the next page. Conditions should allow for 2 RCPs to remain running.**		

Op Test No.: NRC	Scenario # 2	Event # 5	Page 23 of 35
Event Description:	Steam Generator Tube Rupture		

Time	Position	Applicant's Actions or Behavior

Attachment 2-A: RCS Pressure and Temperature Limits

RCS PRESSURE AND TEMPERATURE LIMITS (NON-HARSH)



	ATC	5. Determine **Core Heat Removal** acceptance criteria are met: a. <u>Check</u> at least one RCP is operating. b. <u>Check</u> operating loop ΔT is less than 13ºF. c. <u>Check</u> RCS subcooling is greater than or equal to 28ºF.

Op Test No.: NRC	Scenario # 2	Event # 5		Page 24	of 35		
Event Description:	Steam Generator Tube Rupture						

Time	Position	Applicant's Actions or Behavior
	BOP	6. Determine **RCS Heat Removal** acceptance criteria are met: a. Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 10% to 76% NR • Main Feedwater is available to restore level within 55%-70% NR.[60% to 80% NR]
	ATC	b. Check RCS TC is 530 ºF to 550 ºF
	BOP	c. Check steam generator pressure is 885 psia to 1040 psia.
	BOP	d. Check Feedwater Control in Reactor Trip Override: • MAIN FW REG valves are closed • STARTUP FW REG valves are 13% to 21% open • Operating main Feedwater pumps are 3800 rpm to 4000 rpm
	BOP	e. Reset moisture separator reheaters, and check the temperature control valves closed.
	ATC	7. Determine **Containment Isolation** acceptance criteria are met: a. Check containment pressure is less than 16.4 psia. b. Check NO containment area radiation monitor alarms OR unexplained rise in activity. c. Check NO steam plant activity monitor alarms OR unexplained rise in activity.

Examiner Note

Event 6 is contained on the next page and thereafter Event 5 is recommenced. It is possible that the applicants perform the actions of Event 6 either before or after this step in OP-902-000, Standard Post Trip Actions.

Op Test No.: NRC	Scenario # 2	Event # 6	Page 25 of 35					
Event Description:	Relay K202 failure, RC-606 and FP-601B fail to auto close							

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize indications of RC-606 and FP-601B Failure to close
		Alarms
		• N/A
		Indications
		• RC-606 position indicates OPEN (Red) (CP-4)
		• FP-601B position indicates OPEN (Red) (CP-8)
Examiner Note **These valves may have been noticed and closed earlier in the scenario.**		
	ATC	Closes RC-606, Controlled Bleedoff Inside Containment Isolation
	BOP	Closes FP-601B, Firewater to Containment Isolation
Examiner Note **The next section returns to actions contained in Event 5.**		
Examiner Note **This event is complete after the RC-606 and FP-601B are closed**		

Op Test No.:	NRC	Scenario #	2	Event #	5	Page	26	of 35
Event Description:	Steam Generator Tube Rupture							

Time	Position	Applicant's Actions or Behavior
OP-902-000, Standard Post Trip Actions (cont.)		
	BOP	8 Determine **Containment Temperature and Pressure Control** acceptance criteria are met: a. Check containment temperature is less than or equal to 120ºF. b. Check containment pressure is less than 16.4 psia.
	N/A	9. **IF ALL** safety function acceptance criteria are met, **AND NO** contingency actions were performed, **THEN** GO TO OP-902-001, "Reactor Trip Recovery" procedure.
	SRO	10. **IF ANY** safety function acceptance criteria are **NOT** met, **OR ANY** contingency action was taken, **THEN** GO TO Appendix 1, "Diagnostic Flowchart.
OP-902-009, Standard Appendices, Appendix 1 Diagnostic Flow Chart		
Examiner Note **Appendix 1 is a flow chart used to diagnose to the correct recovery procedure for the event in progress. The steps below will be followed by a YES or NO to indicate proper flow path.**		
	ATC	Rx Pwr dropping, SUR negative, and < two CEAs NOT fully inserted or Emergency Boration in progress (**YES**)
	ATC	Pressurizer pressure dropping rapidly and Pressurizer level changing (**YES**)
	BOP	Steam Generator Pressure Abnormally Low (**NO**)
	N/A	Primary Break
	ATC	Containment Pressure and Temperature Abnormally High (**NO**)
	ATC	Activity in the Steam Plant (**YES**)
	N/A	Steam Generator Tube Rupture
	BOP	At least one 4KV safety bus energized (**YES**)
	SRO	Go To OP-902-007, Steam Generator Tube Rupture Recovery

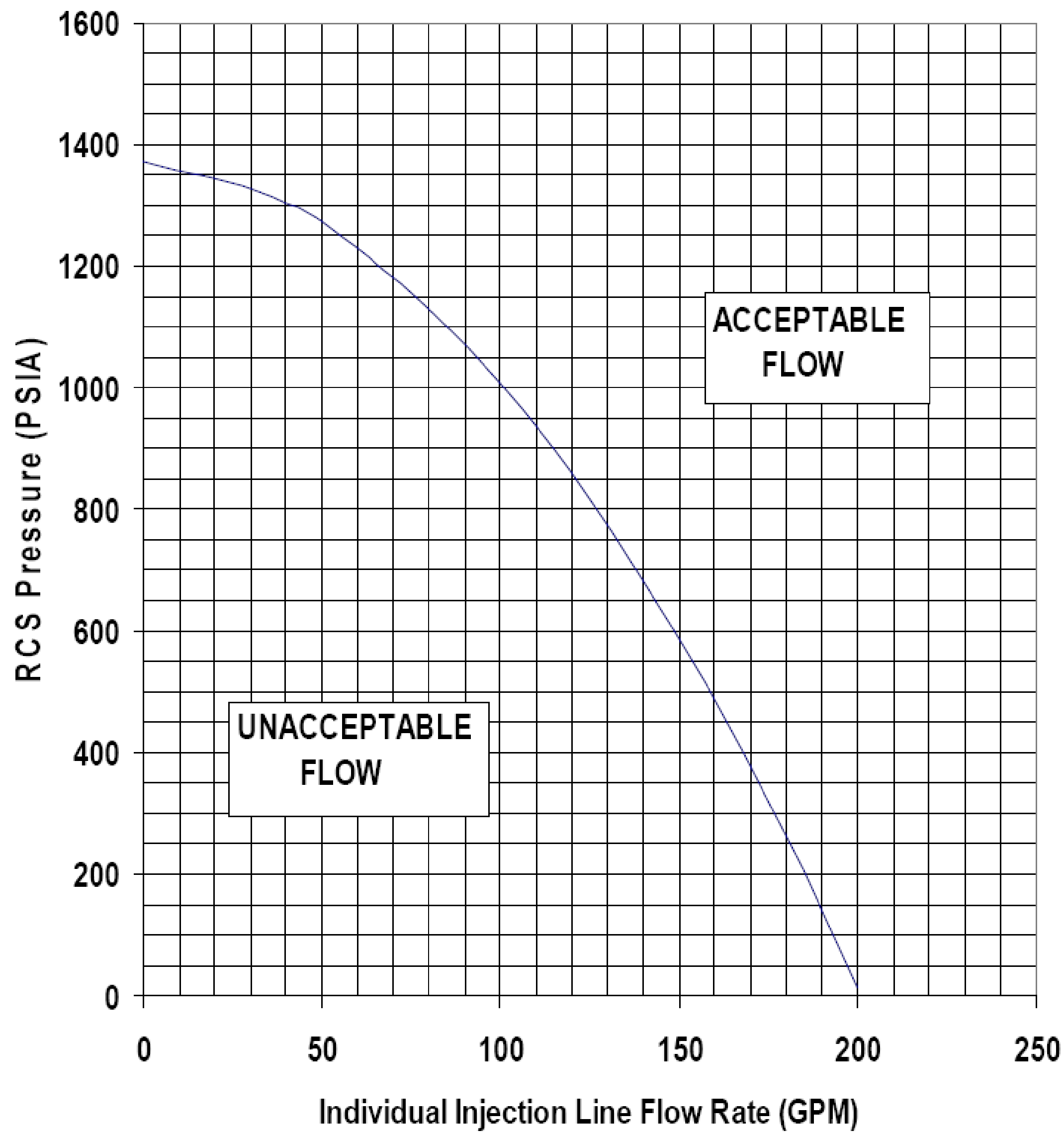
Op Test No.: NRC	Scenario # 2	Event # 5 Page 27 of 35
Event Description:	Steam Generator Tube Rupture	
Time	Position	Applicant's Actions or Behavior

Time	Position	Applicant's Actions or Behavior
OP-902-007, Steam Generator Tube Rupture Recovery		
NOTE The Shift Chemist should be notified if a SIAS or CIAS has occurred. The secondary sampling containment isolation valves should not be opened following an SIAS or CIAS until directed by the Shift Chemist.		
	BOP	*1. Confirm diagnosis of a SGTR: a. Check Safety Function Status Check acceptance criteria are satisfied. b. **IF** steam generator sample path is available, **THEN** direct Chemistry to sample **BOTH** steam generators for activity.
	(note)	**If asked to perform step 1.a as the STA, simply acknowledge the request.**
	BOP	2. Announce a Steam Generator Tube Rupture is in progress using the plant page.
	SRO	*3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition", and implement the Emergency Plan.
	(note)	**If asked to perform step 3 as the SM, simply acknowledge the request.**
	SRO	*4. REFER TO Section 6.0, "Placekeeper", and record the time of the reactor trip.
	N/A	*5. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
	ATC	*6. **IF** pressurizer pressure is less than 1684 psia, **THEN** verify SIAS has initiated.
	BOP	*7. **IF** SIAS has initiated, **THEN**: a. Verify safety injection pumps have started. b. Check safety injection flow is within the following: ▪ Appendix 2-E, "HPSI Flow Curve" ▪ Appendix 2-F, "LPSI Flow Curve" c. Verify **ALL** available charging pumps are operating.
Examiner Note **Appendix 2-E and Appendix 2-F are contained below. Injection flow will be meeting all requirements.**		

Op Test No.: NRC	Scenario # 2	Event # 5	Page 28 of 35
Event Description:	Steam Generator Tube Rupture		

Time	Position	Applicant's Actions or Behavior

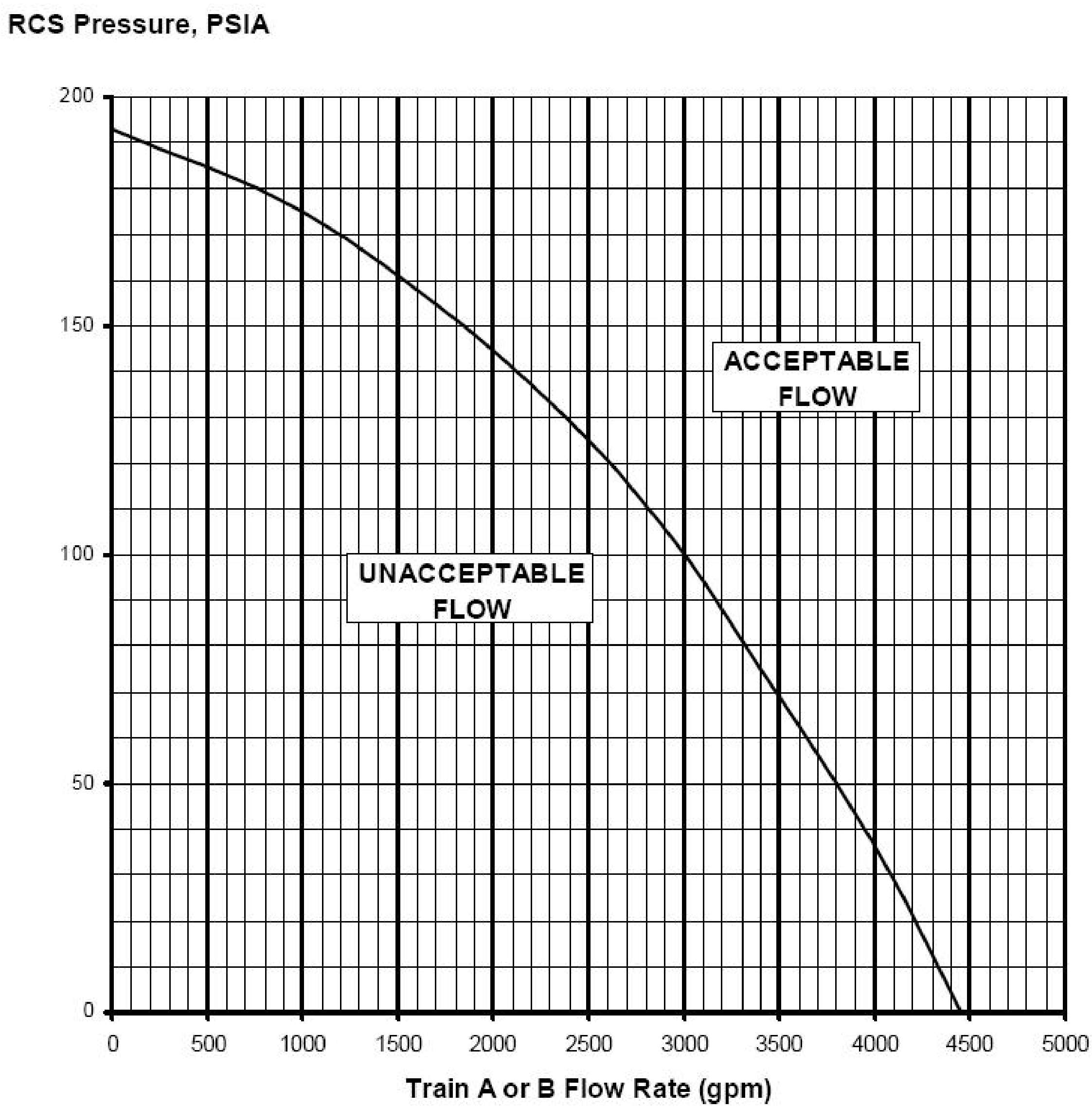
Attachment 2-E: HPSI Flow Curve



Op Test No.:	NRC	Scenario #	2	Event #	5	Page	29	of	35
Event Description:	Steam Generator Tube Rupture								

Time	Position	Applicant's Actions or Behavior

Attachment 2-F: LPSI Flow Curve



Time	Position	Applicant's Actions or Behavior
	ATC	*8. **IF** pressurizer pressure is less than 1621 psia, **AND** SIAS is actuated, **THEN**: a. Verify no more than two RCPs are operating. b. **IF** pressurizer pressure is less than the minimum RCP NPSH of Appendix 2A-D, "RCS Pressure and Temperature Limits", **THEN** stop **ALL** RCPs.

Op Test No.: NRC	Scenario # 2	Event # 5 Page 30 of 35
Event Description:	Steam Generator Tube Rupture	

Time	Position	Applicant's Actions or Behavior
	(note)	**Appendix 2A is contained earlier in this guide.**
	ATC	*9. **IF** RCPs are operating, **THEN**: a. Verify CCW available to RCPs. b. **IF** a CSAS is initiated, **THEN** stop **ALL** RCPs. c. **IF** RCS TC is less than 382ºF, **THEN** verify no more than two RCPs are operating.
	BOP	*10. Check a CCW pump is operating for each energized 4.16 KV safety bus.
	BOP	11. Commence a rapid RCS cooldown to less than 520°F T_H using the steam bypass valves.
	(note)	**BOP will:** • **Place 1 Steam Dump permissive switch to Manual [MS-319A(B)(C) MS-320A(B)(C)]** • **Place controller for valve permissive switch placed in manual above to Manual [MS-IHIC-0319-A(B)(C) MS-IHIC-0320-A(B)(C)]** • **Raise output on controller to ~50%**

Examiner Note

Cue the simulator operator to initiate Event 7 once the cooldown has started. Event 7 is contained on the next page and thereafter Event 5 is recommenced.

Op Test No.:	NRC	Scenario #	2	Event #	7	Page	31	of 35

Event Description: CCW Surge Tank level switch CC-ILS-7013A fails low

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of CCW Surge Tank level switch failure
		Alarms
		• CCW A SURGE TANK LVL LOST(Cabinet SA, B-5)
	start 3 min	• RCP 1A(B) 2A(B) CCW FLOW LOST (Cabinet SA, A-1(2)(3)(4)
	start 3 min	• RCP 1A(B) 2A(B) CCW FLOW LOST (Cabinet SB, A-6(7)(8)(9)
		• RCP 1A(B) 2A(B) CCW PRESSURE LO (Cabinet H, G-3(5)(7)(9)
		• RCP 1A(B) 2A(B) CCW FLOW LO (Cabinet H, H-3(5)(7)(10)
		• CCW MAKEUP PUMP A RUNNING/POWER LOST (Cabinet M, G-2)
		• SHUTDOWN HX A CCW FLOW LO (Cabinet M, H-2)
		Indications
		• CC-200A/CC-727 position indicates closed (GREEN)
		• CC-963A position indicates closed (GREEN)
		• CCW Surge Tank levels indicate constant level
		• CCW A header pressure and flow rising
Examiner Note **The step below is a continuous action step in OP-902-007 to verify CCW flow to the RCPs.**		
	ATC	*9. **IF** RCPs are operating, **THEN**: a. Verify CCW available to RCPs. b. **IF** a CSAS is initiated, **THEN** stop **ALL** RCPs. c. **IF** RCS TC is less than 382ºF, **THEN** verify no more than two RCPs are operating.
<u>CRITICAL TASK</u> **TRIP ANY RCP EXCEEDING OPERATING LIMITS** **This task is satisfied by stopping all running Reactor Coolant Pumps prior to exceeding 3 minutes without Component Cooling Water flow to the RCPs.** **This task becomes applicable after all RCP CCW flow lost annunciators actuate**		
	ATC	a.1 **IF** CCW is lost to RCPs **AND** is **NOT** restored within 3 minutes, **THEN** stop the affected pumps. (**CRITICAL**)
Examiner Note **The next section returns to actions contained in Event 5.**		

Op Test No.:	NRC	Scenario #	2	Event #	7	Page	32	of	35
Event Description:	CCW Surge Tank level switch CC-ILS-7013A fails low								

Time	Position	Applicant's Actions or Behavior

Examiner Note
This event is complete after the ATC has stopped all running RCPs
OR
Critical task Performance Criteria has been exceeded

Op Test No.:	NRC	Scenario #	2	Event #	5	Page	33	of 35
Event Description:	Steam Generator Tube Rupture							

Time	Position	Applicant's Actions or Behavior
		Examiner Note **After Event 7 has been completed and all RCPs have been turned off, the RCS will shift to Natural Circulation mode. During the transition with steady steam flow the ΔT will increase. This will give the appearance of RCS temperature stable or rising as indicated T_{HOT} will stabilize or slightly rise as T_{COLD} lowers during the buildup to establish the thermal driving head necessary to establish Natural Circulation.**
		Examiner Note **Appendix 2A is contained earlier in this guide.**
		CRITICAL TASK **PREVENT LIFTING AFFECTED SG SAFETY VALVES** **This task is satisfied by commencing an RCS depressurization to less than 930 PSIA using auxiliary spray valves and charging pumps prior to lifting atmospheric dump valve in automatic or main steam safety valves on affected Steam Generator.** **This task becomes applicable after the RCS has been cooled down to RCS T_{HOT} less than 520°F and Steam Generator #1 is isolated.**
	ATC	*12. Depressurize the RCS: a. Maintain pressurizer pressure within **ALL** of the following criteria: • Within Appendix 2A-D, "RCS Pressure and Temperature Limits" • Less than 930 psia • Within 50 psi of the most affected steam generator pressure • **IF** RCPs are operating, greater than the minimum RCP NPSH of Appendix 2A-D, "RCS Pressure and Temperature Limits"
	ATC	b. Operate main or **auxiliary** pressurizer spray. (**CRITICAL**)
	BOP	c. **IF** HPSI throttle criteria are met, **THEN** perform **ANY** of the following: • Control charging and letdown flow • Throttle HPSI flow
	BOP	*13. **IF** MSIS is **NOT** present, **THEN** lower the automatic initiation setpoints as the cooldown and depressurization proceed for MSIS (low SG Pressure).
	N/A	14. **IF** SIAS is **NOT** present, **THEN** lower the automatic initiation setpoints as the cooldown and depressurization proceed for SIAS (low PZR Pressure).
	N/A	15. **IF** offsite power has been lost, **THEN**:

Op Test No.:	NRC	Scenario #	2	Event #	5	Page	34	of	35
Event Description:	Steam Generator Tube Rupture								

Time	Position	Applicant's Actions or Behavior
	BOP	16. Determine the most affected steam generator by considering **ALL** of the following: • Steam generator activities • Main steam line radiation levels • Steam generator Blowdown radiation monitor readings • Steam generator level rise when **NOT** feeding • One steam generator level rising faster than the other with feed and steaming rates being essentially the same for both • Feed flow mismatch between steam generators • Steam flow vs. feed flow mismatch in a steam generator prior to the reactor trip
<u>CRITICAL TASK</u> **ISOLATE MOST AFFECTED STEAM GENERATOR** **This task is satisfied by closing Main Steam isolation valve, Main Feedwater isolation valve, Emergency Feedwater flow control and isolation valves, steam supply to EFW pump AB, steam line drains, and Blowdown isolation valves for #1 Steam Generator after T_{HOT} reduced below 520°F and prior to exiting the step to Isolate the Most Affected Steam Generator (step 17) of OP-902-007.** **This task becomes applicable when the crew enters OP-902-007, Steam Generator Tube Rupture Recovery**		
	BOP	17. **When** the RCS TH is less than 520°F, **THEN** isolate the most affected steam generator: **Steam Generator 1** a. Place the ADV setpoint to 980 psig and verify the controller in AUTO.
	BOP	b. Verify the MSIV is closed. (**CRITICAL**)
	BOP	c. Verify the MFIV is closed. (**CRITICAL**)
	N/A	d. **IF** EFAS-1 is **NOT** initiated, **THEN** close EFW Isolation Valves: • EFW 228A SG 1 PRIMARY • EFW 229A SG 1 BACKUP
	BOP	e. Place EFW Flow Control Valves in MAN and close: • EFW 224A SG 1 PRIMARY (**CRITICAL**) • EFW 223A SG 1 BACKUP (**CRITICAL**)
	BOP	f. Close MS 401A, PUMP AB TURB STM SUPPLY SG 1. (**CRITICAL**)

Op Test No.: NRC	Scenario # 2	Event # 5	Page 35 of 35
Event Description:	Steam Generator Tube Rupture		

Time	Position	Applicant's Actions or Behavior
	BOP	g. Close Main Steam Line 1 Drains: • MS 120A NORMAL • MS 119A BYPASS
	BOP	h. Close Steam Generator Blowdown isolation valves: • BD 103A STM GEN 1 (OUT) • BD 102A STM GEN 1 (IN)
	BOP	i. Check the Main Steam Safety valves are closed.
	(note)	**The crew will send an NAO to verify Main Steam Safety valves are not lifting on SG1.**

Examiner Note

This event is complete after the crew has isolated the #1 Steam Generator and commenced depressurization of the RCS

OR

At Lead Examiner's Discretion

Facility: Waterford Scenario No.: 3 Op Test No.: 1

Examiners: ______ Operators: ______

Initial Conditions: Mode 2, Reactor Power ~1%. Two Charging Pumps in operation.

Turnover:

Protected Train is B. AB Bus is aligned to Train B. Dilute to 5-10% power.

Event No.	Malf. No.	Event Type*	Event Description
1	N/A	R – ATC N – SRO	Dilute to 5-10% power, perform 100 gallon PMU addition.
2	RC22B2	I – BOP I – SRO TS – SRO	Narrow Range Safety Pressure Instrument, RC-IPT-0101B, fails low requiring TS 3.3.1 entry and bypassing of affected trip bistables.
3	CV35A CVR101	C – ATC C – BOP C – SRO	During dilution, PMU counter fails to secure flow OP-901-104, Inadvertent Positive Reactivity Addition.
4	CC01A	C – BOP C – SRO TS – SRO	Component Cooling Water Pump A trips requiring entry into OP-901-510, Component Cooling Water System Malfunction (TS 3.7.3 & Cascading).
5	RX14A	I – ATC I – SRO	Pressurizer Pressure RC-IPR-0100 X fails high, Main Spray Valves open requiring entry into OP-901-120, Pressurizer Pressure Malfunction.
6	MS13A	M – All	Main Steam Line Break outside Containment, SG 1, OP-902-004, Excess Steam Demand Recovery. (**Critical Task 1, stabilize RCS temperature within P/T limits prior to lifting a PZR safety or SG safety)** **(Critical Task 2, stabilize RCS pressure within P/T limits and within 1500-1600 psid of the faulted SG prior to RCS pressure exceeding 2500 PSIA**)
7	RP08G	C – BOP C – SRO	Main Feedwater Isolation Valve Steam Generator 1, FW-184A fails to AUTO close on MSIS.

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

The crew assumes the shift with the reactor at 1% power following a forced outage. The turnover will include instructions to perform RCS dilution to 5 – 10% power.

The reactivity plan will include instructions to dilute in multiple PMU batches. The initial batch will be 100 gallons of PMU. Each subsequent batch will be 50 gallons of PMU. This will allow for an observable power rise without concern for a reactor trip on the PMU failure.

After the first 100 gallons of PMU are added, Pressurizer pressure instrument, RC-IPI-0101B fails low. The ATC operator will receive the annunciators for this failure. The CRS should evaluate Tech Specs and enter Tech Spec 3.3.1 and determine that the Plant Protection System bistables for high LPD, low DNBR and high Pressurizer pressure (3, 4, & 5) must be bypassed within 1 hour on Channel B. Tech Spec 3.3.3.5 and 3.3.3.6 should be referenced but not entered.

During the second dilution, the Primary Water counter will fail to secure dilution. The ATC should attempt to secure Primary Water Flow by operating PMU-144 and CVC-510. Neither of these actions will secure flow. The CRS should enter OP-901-104, Inadvertent Positive Reactivity Addition, and secure Primary Makeup Pump A.

After these actions are completed, Component Cooling Water Pump A trips on overcurrent. The SRO should enter OP-901-510, Component Cooling Water System Malfunction, and direct the start of Component Cooling Water Pump AB to replace Component Cooling Water Pump A. The SRO should enter Technical Specification 3.7.3, TRM 3.7.3, and cascading Technical Specifications per OP-100-014, Technical Specification and Technical Requirements Compliance.

After the Tech Specs are evaluated, Pressurizer pressure instrument RC-IPR-0100 X fails high. This causes both Main Spray valves to open. The SRO should direct the ATC to take manual control and close the spray valves and enter OP-901-120, Pressurizer Pressure Malfunction. The ATC will align the non-faulted Pressurizer pressure channel.

After the Pressurizer Pressure Control Channel Y is selected, a non-isolable Main Steam line break outside Containment occurs on Main Steam Line 1, resulting in a reactor trip, Safety Injection Actuation Signal (SIAS), Containment Isolation Actuation Signal (CIAS) and Main Steam Isolation Signal (MSIS). FW-184A, Feedwater Isolation Valve A fails to close automatically on the MSIS requiring the BOP to manually close the valve. The SRO should diagnose to OP-902-004, Excess Steam Demand Recovery Procedure. The crew should take action to stabilize Reactor Coolant System temperature **(CRITICAL TASK 1**) and pressure **(CRITICAL TASK 2)** when Reactor Coolant System pressure **<u>AND</u>** Core Exit Thermocouple temperatures start to rise.

The scenario can be terminated after the crew has isolated Steam Generator 1 or at the lead examiner's discretion.

CRITICAL TASKS

1. ESTABLISH REACTOR COOLANT SYSTEM TEMPERATURE CONTROL

This task is satisfied by taking action to stabilize Reactor Coolant System temperature within the limits of the Reactor Coolant System Pressure/Temperature Limits curve using Atmospheric Dump Valve 2 and establishing EFW flow to Steam Generator 2 prior to lifting a Pressurizer safety (2500 psia) or Steam Generator safety (1070 psig). This task becomes applicable once CET temperature and PZR pressure begin to rise following the Main Steam Line Break. Either OP-902-000, Standard Post Trip Actions or OP-902-004, Excess Steam Demand Recovery direct actions to satisfy this task.

2. ESTABLISH REACTOR COOLANT SYSTEM PRESSURE CONTROL

This task is satisfied by taking actions to stabilize RCS pressure within the limits of the Reactor Coolant System P/T curve and actions are taken to maintain Reactor Coolant System pressure within 1500-1600 psid of the faulted steam generator. Action to address this task should commence prior to RCS pressure exceeding 2500 PSIA. This task becomes applicable once CET temperature and PZR pressure begin to rise following the Main Steam Line Break. Either OP-902-000, Standard Post Trip Actions or OP-902-004, Excess Steam Demand Recovery direct actions to satisfy this task.

Scenario Quantitative Attributes

1. Malfunctions after EOP entry (1–2)	1
2. Abnormal events (2–4)	3
3. Major transients (1–2)	1
4. EOPs entered/requiring substantive actions (1–2)	1
5. EOP contingencies requiring substantive actions (0–2)	0
6. EOP based Critical tasks (2–3)	2

SCENARIO SETUP

A. Reset Simulator to IC-163.
   1. Use keys 165 – 168 for S/G high level bypass setup.
B. Verify Scenario Malfunctions and Remotes are loaded, as listed in the Scenario Timeline.
C. Ensure Event Trigger 10 is inserted as follows (Should be loaded in IC):
   1. Event - PMU Pump A to STOP
   2. Code is ZDIFWPMUECS1357(1) == 1
D. Ensure Protected Train B sign is placed in SM office window.
E. Verify EOOS is 10.0 Green
F. Place a copy of OP-010-003, Plant Startup, on CRS's desk with step 9.4.54 (raise power to 5%) circled and several of the previous steps circle-slashed to show progress. Fill in initials (and circle-slash) steps 9.4.59 (mode 1 Tech Spec logs) and 9.4.60 (Chemistry contacted) as complete. Sign step 9.4.61 (SM permission to enter mode 1).
G. Complete the simulator setup checklist.
H. Remove PMC point D39502 from scan (DFP).
I. Start Insight, open file Crew Performance.tis.

<u>SIMULATOR BOOTH INSTRUCTIONS</u>

<u>Event 1</u> **<u>Dilute to 5-10% power, Perform 100 gallon PMU addition</u>**

1. If called as Chemistry to verify SG chemistry is within specification, inform the caller that SG chemistry is satisfactory. If asked for your name, say Joe Chemist.
2. If called as an NAO to open or throttle open MS-148, acknowledge the communication. Wait 5 minutes, report that you will be slowly opening/throttling MS-148, MS Supply to Gland Seal Isolation. Initiate Event **Trigger 1.** After MS-148 completes ramping, report that MS-148 is open/throttled open. If you are directed to further throttle open MS-148, simply acknowledge the request, wait ~30 seconds and report the new throttled position. Repeat as necessary until it is reported that MS-148 is fully open.
3. If called as an NAO to transfer Auxiliary Steam from Aux Boiler Steam to Main Steam, acknowledge the communication. Wait 15 minutes, and then report that Auxiliary Steam has been transferred to Main Steam (no remote necessary).
4. If called as an NAO to secure the Portable Auxiliary Boiler, acknowledge the communication. Wait 5 minutes, initiate Event **Trigger 17** and report that the Portable Aux Boiler is secured.

<u>Event 2</u> **<u>Narrow Range Safety Pressure Instrument, RC-IPT-0101B, fails Low</u>**

1. After the first 100 gallon addition is completed or on Lead Examiner's cue, initiate Event **Trigger 2**.
2. If Work Week Manager or PMI are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

<u>Event 3</u> **<u>PMU flow malfunction</u>**

1. On Lead Examiner's cue, insert Event **Trigger 3** **<u>after</u>** the ATC has established PMU flow (second addition).
2. If called to operate valves listed in OP-901-104, acknowledge communication and report that you will work on valve list.

<u>Event 4</u> **<u>Component Cooling Water Pump A Trips</u>**

1. On Lead Examiner's cue, initiate Event **Trigger 4**.
2. If called as the watchstander and sent to CCW Pump A, wait 3 minutes, report that the pump looks normal locally.
3. If called as the watchstander and sent to CCW Pump A breaker, wait 3 minutes, report that the breaker indicates open and that there are various breaker parts on the floor of the cubicle.
4. If Work Week Manager or PME are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

<u>Event 5</u> **<u>Pressurizer pressure instrument RC-IPR-0100 X fails High</u>**

1. On Lead Examiner's cue, initiate Event **Trigger 5.**
2. If Work Week Manager or I&C are called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 6 Main Steam Line Break outside Containment, SG 1

1. On Lead Examiner's cue, initiate Event **Trigger 6.**
2. If the Duty Plant Manager is called, inform the caller that you will make the necessary calls.
3. If Chemistry is called to perform samples acknowledge the request.
4. If requested to check Emergency Diesel Generators (EDG), wait 3 minutes and report EDGs are operating properly. Initiate event triggers 15 & 16 to acknowledge local annunciator panels.
5. If called as an NAO to check for steam outside, wait 2 minutes, report that a large amount of steam is issuing from the west MSIV area.

Event 7 Main Feedwater Isol Valve SG1, FW-184A, fails to AUTO close on MSIS

1. No communications should occur for this evolution.
2. **At the end of the scenario, before resetting, complete data collection by saving the file as 2015 Scenario 3-(start-end time).tid. Export to .csv file. Save the file into the folder for the appropriate crew. Restore PMC point D39502 (RTP).**
3. After the simulator is reset, verify PMC point D39502 is in service by displaying and then escaping from the display.

SCENARIO TIMELINE

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
1	**MSR09**	**MS-148 MS to GS ISOL VALVE**	**1**	**00:00:00**	**00:01:00**	**12%**
DILUTE TO RAISE POWER						
2	**RC22B2**	**PZR CPC SAFETY, RC-IPT-0101B, FAILS LOW**	**2**	**00:00:00**	**00:00:00**	**ACTIVE**
NR SAFETY PRESSURE INSTRUMENT, RC-IPT-0101B, FAILS LOW						
3	**CV35A**	**MAKUP CTRLR FAILS TO ISSUE VLV CLSR WHEN BATCH COMP**	**3**	**00:00:00**	**00:00:00**	**ACTIVE**
DURING DILUTION, PMU COUNTER FAILS TO SECURE FLOW						
3	**CVR101**	**PMU-140 DILUTION TO CVCS PUMP SUCTION (0-100%)**	**3**	**00:00:00**	**00:00:00**	**2%**
DURING DILUTION, PMU COUNTER FAILS TO SECURE FLOW						
3	**CVR101**	**PMU-140 DILUTION TO CVCS PUMP SUCTION (0-100%)**	**10**	**00:00:00**	**00:00:00**	**0%**
DURING DILUTION, PMU COUNTER FAILS TO SECURE FLOW						
4	**CC01A**	**CCW PUMP A TRIP**	**4**	**00:00:00**	**00:00:00**	**ACTIVE**
COMPONENT COOLING WATER PUMP A TRIP						
5	**RX14A**	**PZR PRESSURE CNTL CHL 100 X FAIL (0-100%) (1500-2500 PSIA)**	**5**	**00:00:00**	**00:00:00**	**100%**
PRESSURIZER PRESSURE RC-IPR-0100 X FAILS HIGH						
6	**MS13A**	**MS A BREAK OUTSIDE CNTMT BEFORE MSIV (0-100%)**	**6**	**00:00:00**	**00:00:00**	**6%**
NON-ISOLABLE MAIN STEAM LINE A BREAK OUTSIDE CONTAINMENT						
7	**RP08G**	**RELAY K305 FAILED, MSIS TRAIN A (MS/FW)**	**N/A**	**00:00:00**	**00:00:00**	**ACTIVE**
FW-184A (SG1 FW ISOL VLV) FAILS TO AUTO CLOSE ON MSIS						
N/A	**EGR26**	**EDG A LOCAL ANNUN ACK**	**15**	**N/A**	**N/A**	**ACKN**
EDG A LOCAL ANNUNCIATOR PANEL						
N/A	**EGR27**	**EDG B LOCAL ANNUN ACK**	**16**	**N/A**	**N/A**	**ACKN**
EDG B LOCAL ANNUNCIATOR PANEL						

EVENT	KEY	DESCRIPTION	TRIGGER	DELAY HH:MM:SS	RAMP HH:MM:SS	FINAL
EVENT DESCRIPTION						
N/A	**MSR32**	**TEMPORARY AUX BOILER**	**17**	**N/A**	**N/A**	**OFFLINE**
TEMPORARY AUX BOILER (16 MIN TILL RATED PRESS)						

REFERENCES

Event	Procedures
1	OP-010-003, Plant Startup, Rev. 335 OP-002-005, Chemical and Volume Control, Rev. 47
2	OP-009-007, Plant Protection System, Rev. 16 OP-903-013, Monthly Channel Checks, Rev. 18 Technical Specification 3.3.1
3	OP-901-104, Inadvertent Positive Reactivity Addition, Rev. 302
4	OP-901-510, Component Cooling Water Malfunction, Rev. 303 OP-100-014, TS & TRM Compliance, Rev. 328 Technical Specification 3.7.3 & Cascading Tech Requirement Manual 3.7.3
5	OP-901-120, Pressurizer Pressure Control Malfunction, Rev. 302 Technical Specification 3.2.8
6	OP-902-000, Standard Post Trip Actions, Rev. 15 OP-902-004, Excess Steam Demand Recovery Procedure, Rev. 15 OP-902-009, Standard Appendices, Rev. 310, Appendix 1 (Diagnostic Flow Chart), Appendix 2 (Figures)
7	OP-902-004, Excess Steam Demand Recovery Procedure, Rev. 15 OI-038-000, EOP Operations Expectations/Guidance, Rev. 10 EN-OP-115, Conduct of Operations, Rev. 15

Op Test No.: NRC Scenario # 3 Event # 1

Event Description: Dilute to 5-10% power

Time	Position	Applicant's Actions or Behavior

Examiner Note

Event 1 is a normal plant evolution. The crew will be pre-briefed and ready to start raising power once they take the shift. Per the reactivity plan the crew will add 100 gallons of Primary Makeup Water (PMU) on the first batch followed by 50 gallons batches.

OP-010-003, Section 9.4, Plant Startup to 10% Power

Time	Position	Applicant's Actions or Behavior
	SRO	9.4.54 Begin raising Reactor power by CEA withdrawal <u>or</u> boron dilution to ≤5% full power.
	(note)	**The SRO directs the ATC to coordinate with the BOP and raise power to 5-10%. The SRO will direct the ATC to initiate RCS dilution in accordance with OP-002-005 and the approved reactivity plan.**

OP-002-005, Section 6.9, VCT Makeup using the Dilute Makeup Mode (C)

NOTE

VCT makeup and RWSP makeup utilize the same supply header. VCT makeup <u>cannot</u> be performed while performing the following procedure sections:

- Section 6.12 RWSP Blended Makeup
- Section 6.13 RWSP Boration.

CAUTION

THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY

CAUTION

THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSS-CHECKED AND COMPLETED PRIOR TO LEAVING CP-4.

Time	Position	Applicant's Actions or Behavior
	ATC	6.9.1 Inform SM/CRS that this Section is being performed.

Op Test No.:	NRC	Scenario #	3	Event #	1	Page	2	of 30
Event Description:	Dilute to 5-10% power							

NOTE

When performing a Plant down power where final RCS Boron Concentration needs to be determined, the following Plant Data Book figure(s) will assist the Operator in determining the required RCS Boron PPM change.

- 1.2.1.1 Power Defect Vs Power Level
- 1.4.3.1 Inverse Boron Worth Vs. T_{mod} at BOC (<30 EFPD)
- 1.4.4.1 Inverse Boron Worth Vs. T_{mod} at Peak Boron (30 EFPD up to 170 EFPD)
- 1.4.5.1 Inverse Boron Worth Vs. T_{mod} at MOC (170 EFPD up to 340 EFPD)
- 1.4.6.1 Inverse Boron Worth Vs. T_{mod} at EOC (≥340 EFPD)

Time	Position	Applicant's Actions or Behavior
	N/A	6.9.2 At SM/CRS discretion, calculate volume of Primary Makeup water to be added on Attachment 11.7, Calculation of Primary Makeup Water Volume for Direct Dilution or VCT Dilute Makeup Mode.
	(note)	**Not applicable, reactivity plan gives required volume.**
	ATC	6.9.3 Set Primary Makeup Water Batch Counter to volume of Primary Makeup water desired.
	(note)	**Procedure does not give specific steps to set the counter. 100 gal of water on the counter is set by pressing:** • UP arrow button • ENTER button • the side arrow button to move the cursor • the raise button to **enter 10** (counter reading is multiplied by 10) • ENTER • RESET
	ATC	6.9.4 Place Makeup Mode selector switch to DILUTE.
	ATC	6.9.5 Open VCT Makeup Valve, CVC-510.

NOTE

The Dilution Flow Totalizer will <u>not</u> register below 5 GPM. The Dilution Flow Totalizer is most accurate at >10 GPM.

Op Test No.:	NRC	Scenario #	3	Event #	1	Page	3 of 30
Event Description:	Dilute to 5-10% power						

Time	Position	Applicant's Actions or Behavior

CAUTION

DILUTION SHALL IMMEDIATELY BE STOPPED IF PRE-POWER DEPENDENT INSERTION LIMIT (H-9, CABINET H) ALARM IS INITIATED OR ANY UNEXPECTED REACTIVITY CHANGE OCCURS.

Time	Position	Applicant's Actions or Behavior
	(note)	**ATC will likely use manual Primary Makeup Water flow control. "CVCS Rx Makeup Wtr Flow Hi/Lo" on CP-4 is an expected annunciator.**
	ATC	6.9.6 If manual control of Primary Makeup Water flow is desired, then perform the following: 6.9.6.1 Verify Primary Makeup Water Flow controller, PMU-IFIC-0210X, in Manual. 6.9.6.2 Adjust Primary Makeup Water Flow controller, PMU-IFIC-0210X, output to >5 GPM flow rate.
	ATC	6.9.7 If automatic control of Primary Makeup Water flow is desired, then perform the following: 6.9.7.1 Verify Primary Makeup Water Flow controller, PMU-IFIC-0210X, in Auto. 6.9.7.2 Adjust Primary Makeup Water Flow controller, PMU-IFIC-0210X, setpoint potentiometer to >5 GPM flow rate.
	ATC	6.9.8 Verify Primary Makeup Water Control Valve, PMU-144, Intermediate or Open
	ATC	6.9.9 Observe Primary Makeup water flow rate for proper indication
	ATC	6.9.10 Operate VCT Inlet/Bypass to Holdup Tanks, CVC-169 Control Switch to BMS/Auto positions as necessary to maintain VCT pressure and level within normal operating bands.
	ATC	6.9.11 When Primary Makeup Water Batch Counter has counted down to desired value, then verify Primary Makeup Water Control Valve, PMU-144, Closed.

NOTE

Step 6.9.12 may be repeated as necessary to achieve desired total Primary Makeup Water addition for plant conditions.

Op Test No.: NRC	Scenario # 3	Event # 1				Page 4	of 30

Event Description: Dilute to 5-10% power

Time	Position	Applicant's Actions or Behavior
	ATC	6.9.12 If additional Primary Makeup Water addition is required and with SM/CRS permission, then perform the following: 6.9.12.1 Reset Primary Makeup Water Batch Counter. 6.9.12.2 Verify Primary Makeup Water Control Valve, PMU-144, Intermediate or Open. 6.9.12.3 Observe Primary Makeup Water flow rate for proper indication. 6.9.12.4 When Primary Makeup Water Batch Counter has counted down to desired value, then verify Primary Makeup Water Control Valve, PMU-144, Closed.
	(note)	**The reactivity plan describes that additional PMU additions will be required. The SRO may or may not use this option. It is acceptable if the crew chooses to leave this aligned.**
	ATC	6.9.13 Verify Primary Makeup Water Flow controller, PMU-IFIC-0210X, in Manual.
	ATC	6.9.14 Verify both Primary Makeup Water Flow controller, PMU-IFIC-0210X, output and setpoint potentiometer set to zero.
	ATC	6.9.15 Close VCT Makeup Valve, CVC-510.
	ATC	6.9.16 Place Makeup Mode selector switch to MANUAL.
	ATC	6.9.17 Verify VCT Inlet/Bypass To Holdup Tanks, CVC-169, aligned to the VCT and control switch in AUTO.

Examiner Note

This event is complete after the crew has added 100 gallons of Primary Makeup

Or

As directed by the Lead Evaluator

Examiner Note

Cue the Simulator Operator when ready for Event 2

Op Test No.: NRC Scenario # 3 Event # 2 Page 5 of 30

Event Description: Narrow Range Safety Pressure Instrument, RC-IPT-0101B fails low

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed channel.
		Alarms:
		• RPS CHANNEL TRIP LOCAL PWR DENSITY HI (Cabinet K, A-11)
		• RPS CHANNEL TRIP DNBR LO (Cabinet K, A-12)
		• RPS CHANNEL B TROUBLE (Cabinet K, F-18)
		• CORE PROTECT CHNL B CALCULATOR TROUBLE (Cabinet K, N-12)
		Indications:
		• Pressurizer pressure instrument RC-IPI-0101B on CP-7 indicates low
		• DNBR and LPD trip and pre-trip lamps lit on CP-7 Channel B
		• CPC Channel B on CP-7 'Sensor Fail' lamp lit
Examiner Note **Crew may continue with OP-010-003, Plant Startup. The step to establish Main Steam to Gland Seals is included in this section for your reference.**		
OP-009-007, Plant Protection System ,Section 6.2, Trip Channel Bypass Operation		
	(note)	**All BOP manipulations for OP-009-007 are located at CP-10 (back panel) except as noted.**
	SRO	6.2.1 Refer to Attachment 11.11, PPS Bistable Bypass Chart to assist in determination of Trip Channels requiring placement in bypass.
	(note)	**SRO determines the following bistables are affected and need to be bypassed:** • **3 - HI LOCAL POWER** • **4 - LO DNBR** • **5 - HI PZR PRESS**
	SRO	Directs BOP to bypass the HI LOCAL POWER, LO DNBR, and HI PZR PRESS bistables in PPS Channel B within 1 hour in accordance with OP-009-007, Plant Protection System.
	BOP	6.2.2 To place a bistable in or remove a bistable from bypass, go to Attachment 11.10, Trip Channel Bypass Operation.
	BOP	11.10.1 To Bypass a Trip Channel, perform the following: 11.10.1.1 Circle the bistable numbers selected for bypass under Step 11.10.1.4.

Op Test No.:	NRC	Scenario #	3	Event #	2	Page	6	of 30
Event Description:	Narrow Range Safety Pressure Instrument, RC-IPT-0101B fails low							

Time	Position	Applicant's Actions or Behavior
	(note)	**BOP circles bistable numbers 3, 4 and 5 in Step 11.10.1.4 table**
	BOP	11.10.1.2 Check desired Trip Channel is not Bypassed on another PPS Channel.
	BOP	11.10.1.3 Open key-locked portion of BCP in desired PPS Channel.
	BOP	11.10.1.4 Depress Bypass push buttons for the desired Trip Channels
	BOP	11.10.1.5 Check all selected bistable Bypass push buttons remain in a Depressed state.
	BOP	11.10.1.6 Check all selected bistable Bypass lights Illuminate on BCP for the desired Trip Channels.
	CREW	11.10.1.7 Check all selected bistable Bypass lights Illuminate on ROM for the desired Trip Channels.
	(note)	**Crew verifies correct bistables lit on CP-7 PPS Channel B Remote Operator Module.**
	SRO	Reviews the following Technical Specifications and determines applicable actions: • 3.3.1 action 2 • 3.3.3.5 – no actions required • 3.3.3.6 – no actions required
	(note)	**OP-903-013, Monthly Channel Checks, does not list this instrument for Tech Spec 3.3.3.5 and 3.3.3.6 applicability.**
Examiner Note **The step to establish Main Steam to Gland Seals is included below for your reference. It is not necessary to complete this step prior to advancing with the scenario.**		
OP-010-003, Section 9.4, Plant Startup to 10% Power (cont.)		
	BOP	9.4.55 Prior to exceeding 5% power, verify Linear Power Channels are on scale.

Op Test No.:	NRC	Scenario #	3	Event #	2	Page	7	of	30
Event Description:	Narrow Range Safety Pressure Instrument, RC-IPT-0101B fails low								

Time	Position	Applicant's Actions or Behavior	
NOTE GS PCV Bypass Valve, GS-104, will normally be Closed, when Main Steam is supplying the Gland Seal System.			
CAUTION ATC OPERATOR SHOULD BE NOTIFIED PRIOR TO TRANSFERRING GLAND SEAL STEAM (GS) SUPPLY TO MAIN STEAM, AS THE CHANGE IN STEAM FLOW MAY CAUSE A CHANGE IN RCS TEMPERATURE AND REACTIVITY.			
	BOP	9.4.56	Establish Main Steam to Gland Seals as follows:
	BOP	9.4.56.1	Adjust GS PCV Bypass Valve, GS-104, to maintain 100 to 140 PSIG on the Gland Steam Header Pressure Recorder (GS-IPR-1801).
	NAO	9.4.56.2	Slowly Open Main Steam Supply Valve to Gland Seal Isolation, MS-148.
	BOP	9.4.56.3	Close Auxiliary Boiler Steam to Gland Steam, ABS-314.
	BOP/NAO	9.4.56.4	Verify HP and LP Turbine Seals are maintaining approximately 1.5 to 3 PSIG.
	BOP/NAO	9.4.56.5	Verify Main Feedwater Pump Seals are maintaining approximately 3 to 5 PSIG.
	NAO	9.4.57	Transfer Auxiliary Steam supply from Auxiliary Boiler Steam to Main Steam in accordance with OP-005-002, Auxiliary Steam.
	NAO	9.4.58	Secure Auxiliary Boiler in accordance with OP-005-001, Auxiliary Boiler.
Examiner Note **This event is complete after the SRO has addressed Technical Specifications and PPS Channel B trip bistables are bypassed** **OR** **As directed by the Lead Evaluator**			
Examiner Note **Cue the Simulator Operator when ready for Event 3.** **Event 3 must be triggered while PMU is actively flowing to the VCT during the second PMU addition.**			

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	8	of 30
Event Description:	PMU Failure / Inadvertent Dilution							

Time	Position	Applicant's Actions or Behavior
Examiner Note **On this 50 gallon water addition, the PMU Batch Counter will fail to secure PMU flow.** **Event 3 must be triggered while PMU is actively flowing to the VCT during the second PMU addition.**		
	(note)	**ATC aligns for second PMU add (50 gallons) in accordance with OP-002-005, Chemical and Volume Control.**
OP-002-005, Section 6.9, VCT Makeup using the Dilute Makeup Mode (C)		
NOTE VCT makeup and RWSP makeup utilize the same supply header. VCT makeup <u>cannot</u> be performed while performing the following procedure sections: • Section 6.12 RWSP Blended Makeup • Section 6.13 RWSP Boration.		
CAUTION THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY		
CAUTION THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSS-CHECKED AND COMPLETED PRIOR TO LEAVING CP-4.		
	ATC	6.9.1 Inform SM/CRS that this Section is being performed.
NOTE When performing a Plant down power where final RCS Boron Concentration needs to be determined, the following Plant Data Book figure(s) will assist the Operator in determining the required RCS Boron PPM change. • 1.2.1.1 Power Defect Vs Power Level • 1.4.3.1 Inverse Boron Worth Vs. T_{mod} at BOC (<30 EFPD) • 1.4.4.1 Inverse Boron Worth Vs. T_{mod} at Peak Boron (30 EFPD up to 170 EFPD) • 1.4.5.1 Inverse Boron Worth Vs. T_{mod} at MOC (170 EFPD up to 340 EFPD) • 1.4.6.1 Inverse Boron Worth Vs. T_{mod} at EOC (≥340 EFPD)		

Op Test No.: NRC	Scenario # 3	Event # 3	Page 9 of 30				
Event Description:	PMU Failure / Inadvertent Dilution						

Time	Position	Applicant's Actions or Behavior
	N/A	6.9.2 At SM/CRS discretion, calculate volume of Primary Makeup water to be added on Attachment 11.7, Calculation of Primary Makeup Water Volume for Direct Dilution or VCT Dilute Makeup Mode.
	(note)	**Not applicable, reactivity plan gives required volume.**
	ATC	6.9.3 Set Primary Makeup Water Batch Counter to volume of Primary Makeup water desired.
	(note)	**Procedure does not give specific steps to set the counter. 50 gal of water on the counter is set by pressing:** • UP arrow button • ENTER button • the side arrow button to move the cursor • the raise button to **enter 5** (counter reading is multiplied by 10) • ENTER • RESET
	ATC	6.9.4 Place Makeup Mode selector switch to DILUTE.
	ATC	6.9.5 Open VCT Makeup Valve, CVC-510.
NOTE The Dilution Flow Totalizer will <u>not</u> register below 5 GPM. The Dilution Flow Totalizer is most accurate at >10 GPM.		
CAUTION DILUTION <u>SHALL</u> <u>IMMEDIATELY</u> BE STOPPED IF PRE-POWER DEPENDENT INSERTION LIMIT (H-9, CABINET H) ALARM IS INITIATED <u>OR</u> ANY UNEXPECTED REACTIVITY CHANGE OCCURS.		
	ATC	6.9.6.1 Verify Primary Makeup Water Flow controller, PMU-IFIC-0210X, in Manual.
	ATC	6.9.6.2 Adjust Primary Makeup Water Flow controller, PMU-IFIC-0210X, output to >5 GPM flow rate.
	ATC	6.9.8 Verify Primary Makeup Water Control Valve, PMU-144, Intermediate or Open.
	ATC	6.9.9 Observe Primary Makeup water flow rate for proper indication.

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	10	of	30
Event Description:	PMU Failure / Inadvertent Dilution								

Time	Position	Applicant's Actions or Behavior
	ATC	6.9.10 Operate VCT Inlet/Bypass to Holdup Tanks, CVC-169 Control Switch to BMS/Auto positions as necessary to maintain VCT pressure and level within normal operating bands.
		6.9.11 When Primary Makeup Water Batch Counter has counted down to desired value, then verify Primary Makeup Water Control Valve, PMU-144, Closed.
Examiner Note **PMU Batch Counter will fail to secure PMU flow.**		
	ATC	Recognize and report indications of PMU failure.
		Indications:
		• PMU flow does not change as the PMU Batch Counter reaches 0 gallons
		• PMU Batch Counter counts through 0 and continues counting with negative numbers.
		• Dilution Flow Totalizer continues counting up
	ATC	• Adjust Primary Makeup Water Flow controller, PMU-IFIC-0210X, output to 0% output. • Close CVC-510, VCT Makeup valve.
	(note)	**These actions will reduce flow, but flow will continue at ~ 7 gpm.**
	CRS	Enter and direct the implementation of OP-901-104, Inadvertent Positive Reactivity Addition, section E_1, Actions During Startup, Power Operation, and Shutdown
OP-901-104 Section E1, Actions During Startup, Power Operations, and Shutdown		
	ATC	1. Verify REACTOR MAKE UP PRI WTR CONTR VA (PMU 144) Closed.
	BOP	2. Stop both Primary Makeup Water Pumps A <u>and</u> B.
	(note)	**PMU flow will go to 0 gpm after PMU Pump A is secured.**
	SRO/ATC	3. Verify only one Charging Pump operating.
	ATC	4. Bypass or secure Purification Ion Exchangers as follows:

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	11	of 30
Event Description:	PMU Failure / Inadvertent Dilution							

Time	Position	Applicant's Actions or Behavior
	ATC	4.1 Place LETDOWN TO ION EXCHANGER BYPASS valve (CVC 140) to BYPASS.
	N/A	4.2 If Shutdown Cooling Purification is in service, then at SM/CRS discretion, secure SDC Purification in accordance with OP-009-005, Shutdown Cooling System.
	SRO	5. If dilution still in progress, then Close PMU Hdr to Dilution Tee and Chem Add Tank Isol, PMU 135 (RAB-4 5A&J).
		6. Borate as necessary to maintain stable plant conditions.

Examiner Note

Crew may wait to see the effect of the extra PMU prior to performing boration. The steps for Direct Boration and CEA insertion are included in this section. It is not necessary to hold at this point for either action

OP-002-005, Section 6.7, Direct Boration to RCS

CAUTION

THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY.

CAUTION

(1) THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSSCHECKED AND COMPLETED PRIOR TO LEAVING CP-4.

(2) AT LEAST ONE REACTOR COOLANT PUMP IN EACH LOOP SHOULD BE OPERATING PRIOR TO PERFORMING DIRECT BORATION OPERATIONS TO ENSURE PROPER CHEMICAL MIXING.

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.1 Inform SM/CRS that this Section is being performed.

NOTE

When performing a Plant down power where final RCS Boron Concentration needs to be determined, the following Plant Data Book figure(s) will assist the Operator in determining the required RCS Boron PPM change.

- 1.2.1.1 Power Defect Vs Power Level
- 1.4.3.1 Inverse Boron Worth Vs. Tmod at BOC (<30 EFPD)
- 1.4.4.1 Inverse Boron Worth Vs. Tmod at Peak Boron (30 EFPD up to 170 EFPD)
- 1.4.5.1 Inverse Boron Worth Vs. Tmod at MOC (170 EFPD up to 340 EFPD)
- 1.4.6.1 Inverse Boron Worth Vs. Tmod at EOC (≥340 EFPD)

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	12 of 30
Event Description:	PMU Failure / Inadvertent Dilution						

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.2 At SM/CRS discretion, calculate volume of Boric Acid to be added on Attachment 11.6, Calculation of Boric Acid Volume for Direct Boration or VCT Borate Makeup Mode.
	ATC	6.7.3 Set Boric Acid Makeup Batch Counter to volume of Boric Acid desired.
	(note)	**Procedure does not give specific steps to set the counter. Desired amount of acid on the counter is set by pressing:** • UP arrow button • ENTER button • the side arrow button to move the cursor • the raise button to desired amount • ENTER • RESET
	ATC	6.7.4 Verify Boric Acid Makeup Pumps selector switch aligned to desired Boric Acid Makeup Pump A(B).
	ATC	6.7.5 Place Direct Boration Valve, BAM-143, control switch to AUTO.
	ATC	6.7.6 Place Makeup Mode selector switch to BORATE.
	ATC	6.7.7 Verify selected Boric Acid Makeup Pump A(B) Starts.
	ATC	6.7.8 Verify Direct Boration Valve, BAM-143, Opens.

NOTE

The Boric Acid Flow Totalizer will not register below 3 GPM. The Boric Acid Flow Totalizer is most accurate in the range of 10 - 25 GPM.

	(note)	**ATC will likely use manual boric acid flow control. "CVCS Boric Acid Makeup Flow Hi/Lo" on CP-4 is an expected annunciator.**
	ATC	6.7.9 If manual control of Boric Acid flow is desired, then perform the following: 6.7.9.1 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual. 6.7.9.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, output to >3 GPM flow rate.

Op Test No.: NRC	Scenario # 3	Event # 3	Page 13 of 30
Event Description:	PMU Failure / Inadvertent Dilution		

Time	Position	Applicant's Actions or Behavior
	ATC	6.7.10 If automatic control of Boric Acid flow is desired, then perform the following: 6.7.10.1 Place Boric Acid Flow controller, BAM-IFIC-0210Y, in Auto. 6.7.10.2 Adjust Boric Acid Flow controller, BAM-IFIC-0210Y, setpoint potentiometer to >3 GPM flow rate.
	ATC	6.7.11 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate or Open.
	ATC	6.7.12 Observe Boric Acid flow rate for proper indication.
	ATC	6.7.13 When Boric Acid Makeup Batch Counter has counted down to desired value, then verify Boric Acid Makeup Control Valve, BAM-141, Closed.
NOTE Step 6.7.14 may be repeated as necessary to achieve desired total boron addition for plant conditions.		
	ATC	6.7.14 If additional boric acid addition is required and with SM/CRS permission, then perform the following: 6.7.14.1 Reset Boric Acid Makeup Batch Counter. 6.7.14.2 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate or Open. 6.7.14.3 Observe Boric Acid flow rate for proper indication. 6.7.14.4 When Boric Acid Makeup Batch Counter has counted down to desired value, then verify Boric Acid Makeup Control Valve, BAM-141, Closed.
	ATC	6.7.15 Verify Boric Acid Flow controller, BAM-IFIC-0210Y, in Manual.
	ATC	6.7.16 Verify both Boric Acid Flow controller, BAM-IFIC-0210Y, output and setpoint potentiometer set to zero.
	ATC	6.7.17 Place Makeup Mode selector switch to MANUAL.
	ATC	6.7.18 Verify Selected Boric Acid Makeup Pump A(B) Stops.
	ATC	6.7.19 Verify Direct Boration Valve, BAM-143, Closed.
	ATC	6.7.20 Place Direct Boration Valve, BAM-143, control switch to CLOSE.

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	14	of 30
Event Description:	PMU Failure / Inadvertent Dilution							

Time	Position	Applicant's Actions or Behavior
OP-004-004, Section 6.7, Operation of CEAs in Manual Group (MG) Mode		
CAUTION (1) CRITICALITY SHALL BE ANTICIPATED ANY TIME CEAS ARE WITHDRAWN AND THE REACTOR IS NOT CRITICAL. (2) OBSERVE APPLICABLE GROUP INSERTION LIMITS IN ACCORDANCE WITH TECHNICAL SPECIFICATION 3.1.3.6 (REG GROUP), AND TECHNICAL SPECIFICATION 3.1.3.5 (SHUTDOWN BANKS). (3) IMPROPER OPERATION OF CEAS IN MANUAL GROUP MODE MAY CAUSE A REACTOR TRIP BASED ON AN OUT-OF-SEQUENCE CONDITION. (4) CEA INITIALIZATION PROGRAM MUST BE RUNNING IN THE PLANT MONITORING COMPUTER TO HAVE GROUP STOPS AND SEQUENTIAL PERMISSIVES AVAILABLE.		
CAUTION THE FOLLOWING SECTION HAS THE POTENTIAL TO AFFECT CORE REACTIVITY. [INPO 06-006]		
	ATC	6.7.1 Verify Plant Monitoring Computer operable in accordance with OP-004-012, Plant Monitoring Computer.
	ATC	6.7.2 Position Group Select switch to desired group.
	ATC	6.7.3 Place Mode Select switch to MG and verify the following: • White lights Illuminated on Group Selection Matrix for selected group • MG light Illuminates

	ATC	6.7.4 Operate CEA Manual Shim switch to WITHDRAW or INSERT group to desired height while monitoring the following:
		• CEA Position Indicator selected CEA group is moving in desired direction
		• If Reactor is critical, then monitor the following:
		  • Reactor Power
		  • Reactor Coolant System (RCS) temperature
		  • Axial Shape Index (ASI)

NOTE The Operator should remain in the area in front of the CEA Drive Mechanism Control Panel when the Mode Select switch is not in OFF.		
	ATC	6.7.5 When desired set of moves have been completed, then place Mode Select switch to OFF.

Op Test No.:	NRC	Scenario #	3	Event #	3	Page	15	of	30
Event Description:	PMU Failure / Inadvertent Dilution								

Time	Position	Applicant's Actions or Behavior

Examiner Note

This event is complete after the crew has entered OP-901-104 and secured PMU Pump A

Or

As directed by the Lead Evaluator

Examiner Note

Cue the Simulator Operator when ready for Event 4.

Op Test No.: NRC	Scenario # 3	Event # 4	Page 16 of 30				

Event Description: Component Cooling Water Pump A trips

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of tripped CCW Pump.
		Alarms:
		• CCW PUMP A TRIP/TROUBLE (Cabinet M, B-2)
		• RCP 1A CCW FLOW LO (Cabinet H, H-3)
		• RCP 1B CCW FLOW LO (Cabinet H, H-5)
		• RCP 2A CCW FLOW LO (Cabinet H, H-7)
		• RCP 2B CCW FLOW LO (Cabinet H, H-10)
		Indications
		• Amber trip/trouble light on CCW Pump A control switch
		• CCW System pressure abnormally low and dropping
		• CCW System and component flows abnormally low
	(note)	**Based on how long the crew takes to align CCW Pump AB, red RCP Low Flow alarms may come in on CP-2. This should be called out by the ATC.**
	SRO	Enter and direct the implementation of OP-901-510, Component Cooling Water System Malfunction.
OP-901-510 Section E0, General		
	N/A	1. IF ANY of the following occur, THEN GO TO Subsection E_1, System Leakage:
		• CCW Surge Tank level dropping
		• CCW Dry Cooling Towers isolated due to low CCW Surge Tank level
		• CMU-226, WATER STORAGE MAKEUP CCW SURGE TANK, cycling frequently
		• CCW header isolates due to low CCW Surge Tank level
		• Local observation of CCW leak reported to Control Room
	SRO	2. IF ANY of the following occur, THEN GO TO Subsection E_2, Loss of CCW Pump(s):
		• CCW system OR component flows low
		• Amber trip/trouble light on CCW PUMP A(B)(AB) Control Switch

Op Test No.:	NRC	Scenario #	3	Event #	4	Page	17 of 30
Event Description:	Component Cooling Water Pump A trips						

Time	Position	Applicant's Actions or Behavior
OP-901-510 Section E2, Loss of CCW Pump(s)		
	N/A	1. IF CCW is lost to in-service Shutdown Cooling train, THEN implement OP-901-131, SHUTDOWN COOLING MALFUNCTION, AND perform concurrently with this procedure.
	N/A	2. IF Component Cooling Water Pump AB has tripped, THEN Start standby CCW Pump.
		2.1 PLACE CCW ASSIGNMENT SWITCH TO NORM POSITION.
	BOP	3. IF Component Cooling Water Pump A has tripped, THEN align CCW Pump AB for Operation as follows:
	BOP	3.1 Position CCW ASSIGNMENT switch to position A.
	BOP	3.2 Verify Open the following valves: • CC-126A/CC-114A CCW SUCT & DISCH HEADER TIE VALVES AB TO A • CC-127A/CC-115A CCW SUCT & DISCH HEADER TIE VALVES AB TO A
	BOP	3.3 Start CC-0001AB, Component Cooling Water Pump AB.
	SRO	3.4 Evaluate AB Electrical Bus alignment for Technical Specification Operability requirements.
	(note)	• **With the AB Safety Bus aligned to Train B, credit cannot be taken for CCW Pump AB** • **The SRO should enter Tech Spec 3.7.3, TRM 3.7.3 and Cascading Tech Specs per OP-100-014.** • **This includes a 1 hour requirement to verify off site electrical power. The CRS should vocalize this requirement and assign the OP-903-066 surveillance to either the BOP or ATC operator. The BOP is preferred.** • **Cascading Tech Specs also includes a 2 hour requirement to verify components that rely on Train B safety power operable per 3.8.1.1.d.**

Op Test No.: NRC Scenario # 3 Event # 4 Page 18 of 30		
Event Description: Component Cooling Water Pump A trips		
Time	Position	Applicant's Actions or Behavior

Examiner Note

This event is complete after CCW pump A is started and the SRO has addressed Technical Specifications

OR

As directed by the Lead Evaluator

Examiner Note

Cue the Simulator Operator when ready for Event 5.

Op Test No.: NRC Scenario # 3 Event # 5 Page 19 of 30

Event Description: Pressurizer Pressure Control Channel RC-IPR-0100X fails Hi

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed pressure instrument.
		Alarms
		• PRESSURIZER PRESSURE HI/LO (Cabinet H, E-1)
		• PRESSURIZER PRESS SIGNAL DEVIATION (Cabinet H, F-1)
		Indications
		• Recorder RC-IPR-0100 red pen fails Hi.
		• Controller RC-IPIC-0100 process fails Hi.
		• Controller RC-IPIC-0100 output goes to 100%.
		• All Pressurizer Proportional and Backup Heaters secure.
		• Both Pressurizer Main Spray Valves go full open.
		• Pressurizer Pressure drops rapidly due to the full Main Spray.
	ATC	Place Pressurizer Spray Controller RC-IHIC-0100 to MAN and close the Main Spray Valves.
	(note)	**This action may be taken before the crew enters OP-901-120. Operations procedures include allowances for taking manual control of components when their automatic function is not controlling. The CRS should direct this action prior to entering off normal procedure OP-901-120.**
	CRS	Enter and direct the implementation of OP-901-120, Pressurizer Pressure Malfunction, and use sub-section E1, Pressurizer Pressure Control Channel Instrument Failure.
OP-901-120 Section E0, General		
Caution Steam Generator pressures dropping concurrently with dropping Pressurizer level may be indicative of an excess steam demand.		
	N/A	1. IF Pressurizer Pressure and Level are dropping concurrently, OR RCS leakage is otherwise indicated, THEN GO TO OP-901-111, Reactor Coolant System Leak.
	ATC	2. If Pressurizer Pressure is dropping and any of the following have occurred, then place Pressurizer Spray Controller (RC-IHIC-0100) to MAN and adjust output to 0%:
		• Pressurizer Pressure Channel X/Y recorder (RC-IPR-0100) indicates in-service Pressurizer Pressure Control Channel instrument has failed high
		• Pressurizer Pressure controller (RC-IPIC-0100) output has failed high

Op Test No.:	NRC	Scenario #	3	Event #	5	Page	20	of	30

Event Description: Pressurizer Pressure Control Channel RC-IPR-0100X fails Hi

Time	Position	Applicant's Actions or Behavior
		• Any Pressurizer Spray Valve (RC-301A or RC-301B) has failed open
		• Pressurizer Spray Controller (RC-IHIC-0100) output has failed high.
	N/A	2.1 If any Pressurizer spray valve remains failed open, then Place Pressurizer Spray Valves selector switch to select operable Spray Valve.
	CRS	3. IF PRESSURIZER PRESSURE CHANNEL X/Y recorder (RC-IPR-0100) indicates a Pressurizer Pressure Control Channel instrument has failed, THEN GO TO Subsection E1, Pressurizer Pressure Control Channel Instrument Failure.
OP-901-510 Subsection E1, Pressurizer Pressure Control Channel Instrument Failure.		
	ATC	1. Verify control channel instrument failure by checking PRESSURIZER PRESSURE CHANNEL X/Y recorder (RC-IPR-0100).
	ATC	2. Transfer Pressurizer pressure control to operable channel using Pressurizer Pressure Channel Selector control switch.
	(note)	**Position Y should be selected.**
	ATC	3. IF Pressurizer Pressure control channel is failed high, THEN perform the following: a. Transfer Pressurizer Lo Level Heater Cutout selector switch to the Operable Pressurizer Pressure control channel. b. Reset Proportional Heater Banks #1 & #2. c. Place Pressurizer Spray Controller (RC-IHIC-0100) to AUTO.
	ATC	4. Verify proper operation of Pressurizer Pressure controller (RC-IPIC-0100) AND Pressurizer Pressure controlling OR being restored to 2250 PSIA.
	CRS	Refer to the following Technical Specifications and Technical Requirements: • TS 3.2.8 • TS 3.4.3.1 • TRM 3.4.3.1

Op Test No.:	NRC	Scenario #	3	Event #	5	Page	21	of	30
Event Description:	Pressurizer Pressure Control Channel RC-IPR-0100X fails Hi								

Time	Position	Applicant's Actions or Behavior
	(note)	• **Pressure should drop below 2125 PSIA. Pressure will recover to >2125 PSIA after Channel Y is selected and Pressurizer Heaters are energized.** • **TS 3.2.8 entry required if RCS pressure drops below 2125 PSIA, but the Tech Spec is only applicable in Mode 1. Power may still be <5% at this point.**

Examiner Note

This event is complete when Pressurizer Pressure Control has been transferred to Channel Y.

Or

As directed by the Lead Evaluator.

Examiner Note

Cue the Simulator Operator when ready for Event 5.

Op Test No.: NRC	Scenario # 3	Event # 6&7 Page 22 of 30
Event Description:	Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS	

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed pressure instrument.
		Alarms
		• EXCORE /CPC CHNL D POWER DEVIATION (Cabinet K, K-14)
		• EXCORE /CPC CHNL B POWER DEVIATION (Cabinet K, K-12)
		• EXCORE /CPC CHNL C POWER DEVIATION (Cabinet K, K-13)
		• EXCORE /CPC CHNL A POWER DEVIATION (Cabinet K, K-11)
		• LOCAL POWER DENSITY HI PRETRIP B/D (Cabinet K, C-11)
		Indications
		• Lowering Steam Generator Pressure CP-1, CP-8
		• Lowering Steam Generator Level CP-1, CP-8
		• Lowering RCS temperatures Tavg, Th, Tc CP-2, CP-7
		• Reactor Power Rising CP-2, CP-7
	SRO	Directs a manual reactor trip.
	(note)	**The SRO may also direct a manual actuation of SIAS and CIAS. If not the SRO should direct Emergency Boration per OP-901-103, Emergency Boration due to the uncontrolled cooldown. The following steps are applicable after the reactor is tripped and the crew is performing Standard Post Trip Actions.**
Emergency Boration steps:		
	ATC	1. If Charging is available, then perform the following:
	ATC	1.1 Place Makeup Mode selector switch to MANUAL.
	ATC	1.2 Align borated water source by performing one of the following (a or b):
		a. Initiate Emergency Boration using Boric Acid Pump as follows: • Open Emergency Boration Valve, BAM-133. • Start one Boric Acid Pump. • Close recirc valve for Boric Acid Pump started: • BAM-126A Boric Acid Makeup Pump Recirc Valve A or • BAM-126B Boric Acid Makeup Pump Recirc Valve B
		OR

Op Test No.: NRC	Scenario # 3	Event # 6&7 Page 23 of 30
Event Description:	Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS	
Time	Position	Applicant's Actions or Behavior

Time	Position	Applicant's Actions or Behavior
		b. Initiate Emergency Boration using Gravity Feed as follows: • Open the following Boric Acid Makeup Gravity Feed valves: • BAM-113A Boric Acid Makeup Gravity Feed Valve A • BAM-113B Boric Acid Makeup Gravity Feed Valve B
	ATC	1.3 Close VCT Disch Valve, CVC-183.
	ATC	1.4 Verify at least one Charging Pump operating and Charging Header flow greater than or equal to 40 GPM.
OP-902-000, Standard Post Trip Actions (STPAs)		
	ATC	1. Determine **Reactivity Control** acceptance criteria are met: a. Check reactor power is dropping. b. Check startup rate is negative. c. Check less than **TWO** CEAs are **NOT** fully inserted.
	BOP	2. Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: a. Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	b. Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped

Op Test No.:	NRC	Scenario #	3	Event #	6&7	Page	24	of 30

Event Description: Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS

Time	Position	Applicant's Actions or Behavior
	BOP	c. Check station loads are energized from offsite electrical power as follows: **Train A** • A1, 6.9 KV non safety bus • A2, 4.16 KV non safety bus • A3, 4.16 KV safety bus • A-DC electrical bus • A or C vital AC Instrument Channel **Train B** • B1, 6.9 KV non safety bus • B2, 4.16 KV non safety bus • B3, 4.16 KV safety bus • B-DC electrical bus • B or D vital AC Instrument Channel
	ATC	3. Determine **RCS Inventory Control** acceptance criteria are met: a. Check that **BOTH** the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% b. Check RCS subcooling is greater than or equal to 28ºF.
	(note)	**This safety function may or may not be met, depending on the speed the crew is working Standard Post Trip Actions. Either way, there are no contingencies necessary for this step.**
	ATC	4. Determine **RCS Pressure Control** acceptance criteria are met by checking that **BOTH** of the following conditions exist: • Pressurizer pressure is 1750 psia to 2300 psia • Pressurizer pressure is trending to 2125 psia to 2275 psia
Examiner Note **Pressurizer pressure will eventually lower below the 2 thresholds (1684; 1621 PSIA) after the Pressurizer empties.**		
	SRO/ATC	4.2 **IF** pressurizer pressure is less than 1684 psia, **THEN** verify the following have initiated. • SIAS • CIAS
	ATC	If directed by SRO, initiate Safety Injection Actuation (SIAS), Main Steam Isolation (MSIS) and Containment Isolation Actuation (CIAS) at CP-7.

Op Test No.: NRC	Scenario # 3	Event # 6&7	Page 25 of 30

Event Description: Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS

Time	Position	Applicant's Actions or Behavior
	ATC	4.3 **IF** pressurizer pressure is less than 1621 psia, **THEN** verify no more than two RCPs are operating
	ATC	4.4 **IF** pressurizer pressure is less than the minimum RCP NPSH of Appendix 2-A, "RCS Pressure and Temperature Limits", **THEN** stop **ALL** RCPs.

Examiner Note

Appendix 2-A is contained on the next page. Conditions should allow for 2 RCPs to remain running.

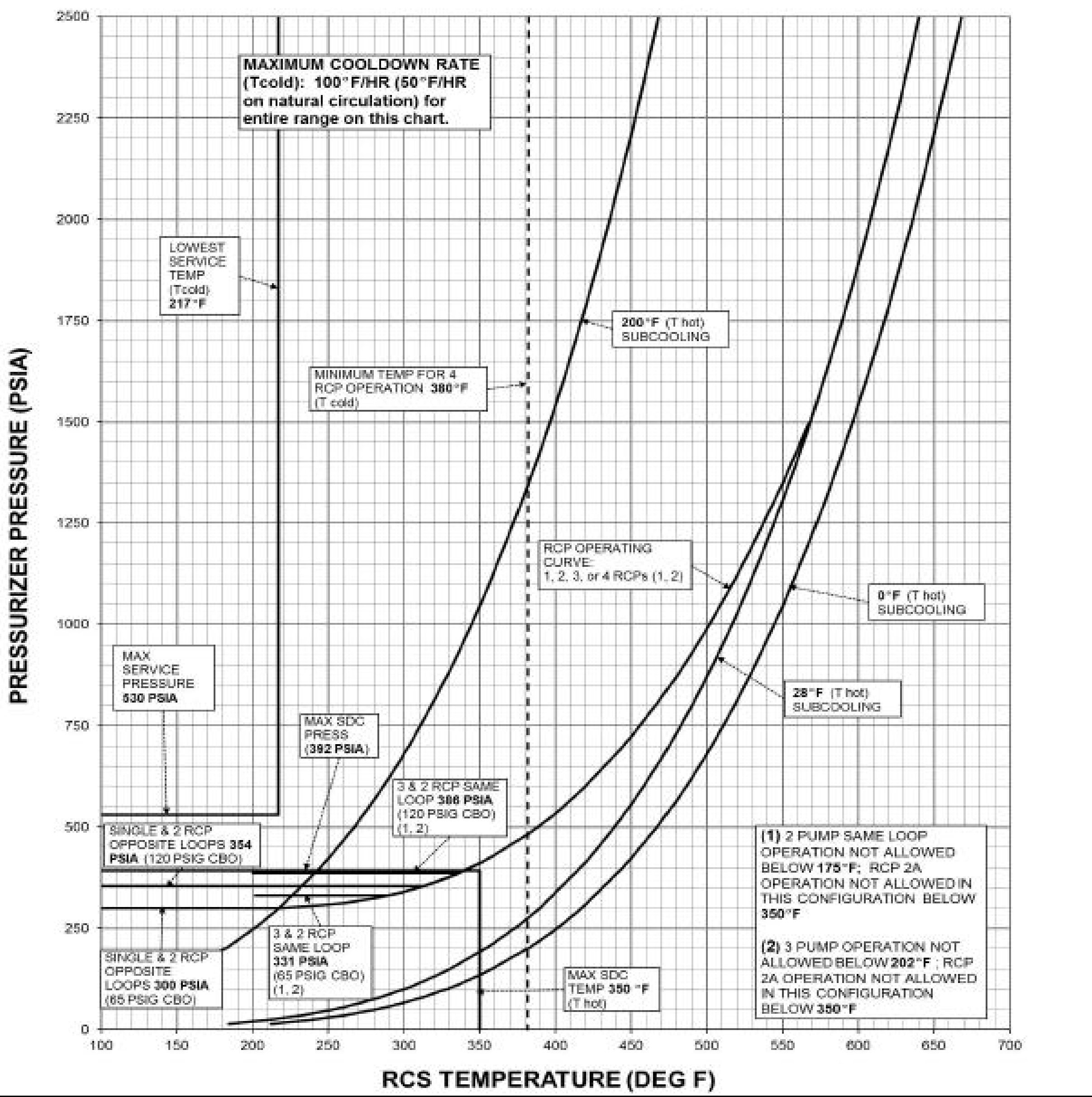
Op Test No.:	NRC	Scenario #	3	Event #	6&7	Page	26	of	30

Event Description: Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS

Time	Position	Applicant's Actions or Behavior

Attachment 2-A: RCS Pressure and Temperature Limits

RCS PRESSURE AND TEMPERATURE LIMITS (NON-HARSH)



	ATC	5. Determine **Core Heat Removal** acceptance criteria are met: a. <u>Check</u> at least one RCP is operating. b. <u>Check</u> operating loop ΔT is less than 13ºF. c. <u>Check</u> RCS subcooling is greater than or equal to 28ºF.

Op Test No.:	NRC	Scenario #	3	Event #	6&7	Page	27	of	30

Event Description: Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS

Time	Position	Applicant's Actions or Behavior
	BOP	6. Determine **RCS Heat Removal** acceptance criteria are met: a. Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 10% to 76% NR • Main Feedwater is available to restore level within 55%-70% NR. **[60-80% NR]**.
	BOP	a2. Verify Emergency Feedwater is available to restore level in at least one steam generator within 55%-70% NR **[60-80% NR]**.
	(note)	**Main Feedwater will not be available. BOP should perform contingency action a2.**
	ATC	b. Check RCS TC is 530 ºF to 550 ºF
	SRO	b2. **IF** RCS TC is less than 530 ºF, **THEN** perform the following: • **IF** RCS TC is being controlled by an ESD, **THEN** REFER TO Appendix 13, "Stabilize RCS Temperature" and stabilize RCS temperature using the least affected steam generator.
	(note)	**Appendix 13 directs steps to address PTS after Representative CET temperature and Pressurizer pressure have both started to rise. The steps are also contained in the excess steam demand recovery procedure.**
	BOP	c. Check steam generator pressure is 885 psia to 1040 psia.
	BOP	c1. **IF** steam generator pressure is less than 885 psia, **THEN** perform **ALL** of the following: 1) Verify steam bypass valves are closed. 2) Verify ADVs are closed. c2. **IF** steam generator pressure is less than or equal to 666 psia, **THEN** verify MSIS is initiated.
	(note)	**When MSIS has initiated the BOP should verify that both MSIVs and both MFIVs, FW-184 A(B) close. FW-184A does not close automatically requiring BOP action to close FW-184A.**
	BOP	d. Check Feedwater Control in Reactor Trip Override: • MAIN FW REG valves are closed • STARTUP FW REG valves are 13% to 21% open • Operating main Feedwater pumps are 3800 rpm to 4000 rpm

Op Test No.:	NRC	Scenario #	3	Event #	6&7	Page	28	of	30

Event Description: Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS

Time	Position	Applicant's Actions or Behavior
	(note)	**With a MSIS, MAIN FW REG valves and STARTUP FW REG valves will be closed. Both MFW Pumps will be coasting down.**
	BOP	e. <u>Reset</u> moisture separator reheaters, and <u>check</u> the temperature control valves closed.
	ATC	7. <u>Determine</u> **Containment Isolation** acceptance criteria are met: a. <u>Check</u> containment pressure is less than 16.4 psia. b. <u>Check</u> NO containment area radiation monitor alarms OR unexplained rise in activity. c. <u>Check</u> NO steam plant activity monitor alarms OR unexplained rise in activity.
	ATC/BOP	8 <u>Determine</u> **Containment Temperature and Pressure Control** acceptance criteria are met: a. <u>Check</u> containment temperature is less than or equal to 120ºF. b. <u>Check</u> containment pressure is less than 16.4 psia.
	N/A	9. **IF ALL** safety function acceptance criteria are met, **AND NO** contingency actions were performed, **THEN** <u>GO TO</u> OP-902-001, "Reactor Trip Recovery" procedure.
	SRO	10. **IF ANY** safety function acceptance criteria are **NOT** met, **OR ANY** contingency action was taken, **THEN** <u>GO TO</u> Appendix 1, "Diagnostic Flowchart.
OP-902-009, Standard Appendices, Appendix 1 Diagnostic Flow Chart		
Examiner Note **Appendix 1 is a flow chart used to diagnose to the correct recovery procedure for the event in progress. The steps below will be followed by a YES or NO to indicate proper flow path.**		
	ATC	Rx Pwr dropping, SUR negative, and < two CEAs NOT fully inserted or Emergency Boration in progress (**YES**)
	ATC	Pressurizer pressure dropping rapidly and Pressurizer level changing (**YES**)
	BOP	Steam Generator Pressure Abnormally Low (**YES**)
	ATC	Activity in the Steam Plant (**NO**)

Op Test No.:	NRC	Scenario #	3	Event #	6&7	Page	29	of	30

Event Description: Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS

Time	Position	Applicant's Actions or Behavior
	N/A	Secondary Break
	ATC	Containment Pressure and Temperature Abnormally High (**NO**)
	N/A	Secondary Break Outside Containment
	ATC	Activity in Containment (**NO**)
	BOP	At least one 4KV safety bus energized (**YES**)
	SRO	Go To OP-902-004, Excess Steam Demand Recovery
	SRO	After Excess Steam Demand is identified, direct ATC and BOP to monitor for the trigger points for the need to stabilize Reactor Coolant System temperature. Critical parameters are Pressurizer pressure rising and Reactor Coolant System Representative CET temperature rising. Steps for stabilizing Reactor Coolant System temperature following an excess steam demand are contained in 2 procedures. • Appendix 13 is used if the critical parameters are both rising before the SRO has entered OP-902-004, Excess Steam Demand Recovery. • Step 16 of OP-902-004 is used if both parameters start rising after the crew has entered OP-902-004.

<u>CRITICAL TASK</u>

ESTABLISH REACTOR COOLANT SYSTEM TEMPERATURE CONTROL

This task is satisfied by taking action to stabilize Reactor Coolant System temperature within the limits of the Reactor Coolant System Pressure/Temperature Limits curve using Atmospheric Dump Valve 2 and establishing EFW flow to Steam Generator 2 prior to lifting a Pressurizer safety (2500 psia) or Steam Generator safety (1070 psig). This task becomes applicable once CET temperature and PZR pressure begin to rise following the Main Steam Line Break.

	BOP	When directed by the SRO to take action to stabilize Reactor Coolant System temperature:
		• Place the Atmospheric Dump Valve for Steam Generator 2 to manual and fully open Atmospheric Dump Valve 2.

Op Test No.:	NRC	Scenario #	3	Event #	6&7	Page	30	of 30
Event Description:	Main Steam line break outside Containment (SG 1); FW-184A fails to AUTO close on MSIS							

Time	Position	Applicant's Actions or Behavior
		• Manually initiate Emergency Feedwater Actuation Signal for Steam Generator 2.
		• Place Emergency Feedwater Flow Control Valve to manual and commence feeding Steam Generator 2.

CRITICAL TASK

ESTABLISH REACTOR COOLANT SYSTEM PRESSURE CONTROL

This task is satisfied by taking actions to stabilize RCS pressure within the limits of the Reactor Coolant System P/T curve and actions are taken to maintain Reactor Coolant System pressure within 1500-1600 psid of the faulted steam generator. Action to address this task should commence prior to RCS pressure exceeding 2500 PSIA. This task becomes applicable once CET temperature and PZR pressure begin to rise following the Main Steam Line Break.

Time	Position	Applicant's Actions or Behavior
	ATC	When directed by the SRO to take action to stabilize Reactor Coolant System pressure:
		• **IF** Reactor Coolant System pressure is ≥ 1500 psia, **THEN** stabilize Reactor Coolant System pressure at a value not to exceed 1600 psid between the Reactor Coolant System and the lowest SG pressure.
		• **IF** Reactor Coolant System pressure is < 1500 psia, **THEN** stabilize Reactor Coolant System pressure at > HPSI shutoff head (1500-1600 psia).

Examiner Note

This scenario is complete after Reactor Coolant System temperature and pressure have been stabilized

OR

As directed by the Lead Evaluator.

Facility: **Waterford 3**	Date of Examination: **9/14/2015**
Examination Level: RO ☒ SRO ☐	Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A1 Conduct of Operations K/A Importance: 3.9	N, R	2.1.25, Ability to interpret reference materials, such as graphs, curves, tables, etc. Determine Spent Fuel Pool (SFP) level by alternate monitoring and calculate time to boil in the SFP per OP-901-513, SFP Cooling Malfunction.
A2 Conduct of Operations K/A Importance: 3.6	D,R	2.1.18, Ability to make accurate, clear, and concise logs, records, status boards, and reports. Perform OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data.
A3 Equipment Control K/A Importance: 3.7	P,D,R	2.2.12, Knowledge of surveillance procedures. Determine Acceptability of Containment Temperature in accordance with OP-903-001, Technical Specification Surveillance Logs, Attachments 11.1 and 11.20. **(From 2012 NRC Exam)**
A4 Radiation Control K/A Importance: 3.2	D,R	2.3.4, Knowledge of radiation exposure limits under normal and emergency conditions. Calculate stay time to perform a tagout verification. Room dose rate and operator's yearly dose provided
Emergency Plan		Not Selected

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: **Waterford 3**	Date of Examination: **9/14/2015**
Examination Level: RO ☐ SRO ☒	Operating Test Number: 1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A5 Conduct of Operations K/A Importance: 4.6	D,R	2.1.20, Ability to interpret and execute procedure steps. Perform SM/CRS review of OP-901-501, PMC or Core Operating Limit Supervisory System Malfunction, Attachments 1, 2 and 3 following a PMC failure.
A6 Conduct of Operations K/A Importance: 3.8	D,R	2.1.18, Ability to make accurate, clear, and concise logs, records, status boards, and reports. Review and approve OP-903-001, Technical Specification Surveillance Logs, Attachment 11.18, Adjustment of CPC and Excore Nuclear Instrumentation Data.
A7 Equipment Control K/A Importance: 4.1	P,D,R	2.2.12, Knowledge of Surveillance Procedures Review a completed Containment Pressure calculation in accordance with OP-903-001, Technical Specification Surveillance Logs, Attachment 11.5, Containment Pressure Calculation. **(From 2012 NRC Exam)**
A8 Radiation Control K/A Importance: 3.7	M,R	2.3.4, Knowledge of radiation exposure limits under normal or emergency conditions. Authorize Emergency Exposure as the Emergency Director in accordance with EP-002-030, Emergency Radiation Exposure Guidelines and Controls.
A9 Emergency Plan K/A Importance: 4.6	N,R	2.4.41, Knowledge of the emergency action level thresholds and classifications. Determine appropriate Emergency Plan EAL.

NOTE: All items (five total) are required for SROs. RO applicants require only four items unless they are retaking only the administrative topics (which would require all five items).

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Waterford 3		Date of Examination:	9/14/2015
Exam Level RO ☒ SRO-I ☐ SRO-U ☐		Operating Test No.:	1

Control Room Systems* 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U

	System / JPM Title	Type Code*	Safety Function
S1	001 Control Rod Drive; ATC Operator Immediate Operator Actions on 2 Dropped CEAs from OP-901-102, CEA or CEDMCS Malfunction Fault: The first and second reactor trip options do not function, requires performance of the final reactor trip contingency from EOP OP-902-000, Standard Post Trip Actions. A2.13 ATWS RO – 4.4, SRO – 4.6	A, D, S	1
S2	004 Chemical and Volume Control System, Align Charging Pumps to discharge through HPSI Header A in accordance with OP-902-009 Appendix 30, Charging to the RCS via the HPSI Header A4.08, Charging RO – 3.8, SRO – 3.4	N,S	2
S3	005 Shutdown Cooling System; Place Shutdown Cooling Train A in Service Fault: After LPSI Pump A is running, SI-405A will fail closed, requiring the operator to take immediate operator actions IAW OP-901-131, Shutdown Cooling Malfunction, to secure LPSI Pump A. **(Repeat from 2012 NRC Exam)** A4.01 Controls and indication for RHR pumps RO – 3.6, SRO – 3.4	A,D,L,P,S	4P
S4	039 Main and Reheat Steam System; BOP operator immediate operator actions on evacuation of the Control Room in accordance with OP-901-502, Control Room Evacuation Fault: Atmospheric Dump Valve B will spuriously open, requiring the applicant to take contingency actions to control Steam Generator pressure. A4.01 Main steam supply. Valves RO – 2.9, SRO – 2.8	A,D,S	4S
S5	026 Containment Spray System Reset CSAS in accordance with OP-902-009, Standard Appendices, Section 5 – E **(Repeat from 2014 NRC Exam)** A4.01 CSS Controls RO – 4.5, SRO – 4.3	D,EN,P,L,S	5
S6	064 Emergency Diesel Generators Restore Power to Safety Bus 3B in accordance with OP-902-000, Standard Post Trip Actions. Fault: EDG B voltage is low out of the band preventing auto closure of the EDG B output breaker. (**WF3 OE**) A4.02 Adjustment of exciter voltage (using voltage control switch) RO – 3.3, SRO – 3.4	A,M,S	6

S7	015 Nuclear Instrumentation System Perform Range Check functional test of startup Channels in accordance with OP-903-101, Startup Channel Functional Test 015 A3.03, Verification of proper functioning/operability RO – 3.9, SRO – 3.9	L,D,S	7
S8	034 Fuel Handling Equipment Place the FHB Emergency Filtration Unit in service in accordance with OP-002-009, Fuel Handling Building HVAC A4.01 Radiation levels RO – 3.3, SRO – 3.7	N, S	8

In-Plant Systems* (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
P1	045 Main Turbine Generator System Start an Air Side Seal Oil Pump following a loss of single train of offsite power per OP-902-009 Attachment 33-C. G2.4.6 Knowledge of EOP mitigation strategies RO – 3.7, SRO – 4.7	N,E,L	4S
P2	064 Emergency Diesel Generator (ED/G) System; Trip Emergency Diesel Generator B locally. Fault: The first method the applicant performs to trip the EDG B will fail, requiring contingency actions to secure EDG B. K4.02 Trips for ED/G while operating (normal or emergency) RO – 3.9, SRO – 4.2	A,D,R	6
P3	008 Component Cooling Water System; Restore Power to the DCT Sump Pumps Following a Loss of Off Site Power in accordance with OP-902-009, Standard Appendices G2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. RO – 4.2, SRO – 4.1	D,R,E,L	8

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for **<u>RO</u>** / SRO-I / SRO-U	
(A)lternate path	4-6 / 4-6 / 2-3	5
(C)ontrol room		0
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	7
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	2
(EN)gineered safety feature	≥1 / ≥1 / ≥1 (control room system)	1
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	5
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	4
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	2
(R)CA	≥ 1 / ≥ 1 / ≥ 1	2
(S)imulator		8

Facility: Waterford 3	Date of Examination: 9/14/2015
Exam Level RO ☐ SRO-I ☐ SRO-U ☒	Operating Test No.: 1

Control Room Systems: * 8 for RO; 7 for SRO-I; 2 or 3 for SRO-U

	System / JPM Title	Type Code*	Safety Function
S1	001 Control Rod Drive; ATC Operator Immediate Operator Actions on 2 Dropped CEAs from OP-901-102, CEA or CEDMCS Malfunction Fault: The first and second reactor trip options do not function, requires performance of the final reactor trip contingency from EOP OP-902-000, Standard Post Trip Actions. A2.13 ATWS RO – 4.4, SRO – 4.6	A,D,S	1
S2			
S3			
S4			
S5	026 Containment Spray System Reset CSAS in accordance with OP-902-009, Standard Appendices, Section 5 – E **(Repeat from 2014 NRC Exam)** A4.01 CSS Controls RO – 4.5, SRO – 4.3	D,EN,P,L,S	5
S6	064 Emergency Diesel Generators Restore Power to Safety Bus 3B in accordance with OP-902-000, Standard Post Trip Actions. Fault: EDG B voltage is low out of the band preventing auto closure of the EDG B output breaker. (**WF3 OE**) A4.02 Adjustment of exciter voltage (using voltage control switch) RO – 3.3, SRO – 3.4	A,M,S	6
S7.			
S8.			

In-Plant Systems* (3 for RO);(3 for SRO-I); (3 or 2 for SRO-U)			
P1	045 Main Turbine Generator System Start an Air Side Seal Oil Pump following a loss of single train of offsite power per OP-902-009 Attachment 33-C. G2.4.6 Knowledge of EOP mitigation strategies RO – 3.7, SRO – 4.7	N,E,L	4S
P2			
P3	008 Component Cooling Water System; Restore Power to the DCT Sump Pumps Following a Loss of Off Site Power in accordance with OP-902-009, Standard Appendices G2.4.34 Knowledge of RO tasks performed outside the main control room during an emergency and the resultant operational effects. RO – 4.2, SRO – 4.1	D,R,E,L	8

* All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all five SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.

* Type Codes	Criteria for RO / SRO-I / **SRO-U**	
(A)lternate path	4-6 / 4-6 / 2-3	2
(C)ontrol room		0
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	3
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	2
(EN)gineered safety feature	≥1 / ≥1 / ≥1 (control room system)	1
(L)ow-Power / Shutdown	≥ 1 / ≥ 1 / ≥ 1	3
(N)ew or (M)odified from bank including 1(A)	≥ 2 / ≥ 2 / ≥ 1	2
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	1
(R)CA	≥ 1 / ≥ 1 / ≥ 1	1
(S)imulator		3