Facility: **WATERFORD 3**	Date of Examination: **October 4, 2010**
Examination Level: **SRO**	Operating Test Number: **NRC**

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
A1 Conduct of Operations K/A Importance: 4.4	S, N	2.1.23, Ability to perform specific system and integrated plant procedures during all modes of plant operation. Review and approve completed OP-903-117, Emergency Diesel Generator Fuel Oil Transfer Pump Operability Check, Attachment 10.1, Fuel Oil Transfer Pump A IST Data.
A2 Conduct of Operations K/A Importance: 3.0	S, M	2.1.20, Ability to interpret and execute procedure steps. Review COLSS constant calculation in accordance with OP-004-005, Core Operating Limits Supervisory System Operation
A3 Equipment Control K/A Importance: 4.7	S, N	2.2.40, Ability to apply Technical Specifications for a system. Evaluate Safety Injection System voiding in accordance with OP-903-026, Emergency Core Cooling System Valve Lineup Verification.
A4 Radiation Control K/A Importance: 3.8	S, D, P	2.3.6, Ability to approve release permits. Review and approve a liquid release permit in accordance with OP-007-001, Boron Management.
A5 Emergency Plan K/A Importance: 4.6	S, M	2.4.41, Knowledge of the emergency action level thresholds and classifications. Determine appropriate Emergency Plan action level in accordance with EP-001-001, Recognition and Classification of Emergency Conditions.

NOTE: All items (5 total are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when 5 are required.

* 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)

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

A1

Review Completed Surveillance for Approval

EXAMINER REVIEW COMMENTS IN RED

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review and approve surveillance OP-903-117, Emergency Diesel Generator Fuel Oil Transfer Pump Operability Check.

Task Standard: Applicant's review discovered **three** error**s** ~~as identified in the key.~~**, and** ~~Applicant also~~ **the applicant correctly** evaluated Tech Specs ~~in accordance with~~ **as identified in** the key.

References: OP-903-117, Emergency Diesel Generator Fuel Oil Transfer Pump Operability Check

Time Critical: No Validation Time: 15 mins.

K/A 2.1.23, Ability to perform specific system and integrated plant procedures during all modes of plant operation. Importance Rating 4.4

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-117, Emergency Diesel Generator Fuel Oil Transfer Pump Operability Check

Description:
This JPM is performed in the simulator, but use of the simulator is not required. The applicant will be given a completed OP-903-117, Attachment 1 for EDG Fuel Oil Transfer Pump A. The key ~~identifies~~ **indicates the** error**s** that the applicant must identify. One of the error**s** will make EDG Fuel Oil Transfer Pump A inoperable. The applicant will be required to identify the correct Tech Spec.

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 Attachment 10.1 for accuracy.	The following errors must be identified: • The vibration meter and probe are past their calibration dates. • Pump differential pressure was calculated incorrectly. The corrected pressure is below the low limit of 70.7 PSID. • The flow calculation for EGF-109 A, Fuel Oil Transfer Pump A Discharge Check, was performed incorrectly. The corrected flow is greater than the required 30 gpm.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
Determine applicable Tech Spec associated with EDG Fuel Oil Transfer Pump A being inoperable.	Tech Spec 3.8.1.1 b and d must be entered. Actions include: • Restore EDG A within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. • Restoration within 72 hours may be extended to 10 days if a temporary emergency diesel generator is verified available. • Complete OP-903-066, Electrical Breaker Alignment Check, within 1 hour, and at least every 8 hours thereafter. The following must be satisfied within 2 hours: • All required systems, subsystems, trains, components, and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power must be OPERABLE • Emergency Feedwater Pump AB must be OPERABLE.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

APPLICANT CUE SHEET

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

INITIAL CONDITIONS:

- Emergency Diesel Generator A Fuel Oil Transfer Pump IST has been completed in accordance with OP-903-117, Emergency Diesel Generator Fuel Oil Transfer Pump Operability Check.
- The completed attachment **for the surveillance** has been reviewed and is ready for SM/CRS review.

INITIATING CUES:

- Review ~~the provided surveillance~~**the attachment**~~. Mark~~ **and provide** any comments on this sheet**.**

A1 key

10.1 FUEL OIL TRANSFER PUMP A IST DATA

STEP		
7.1.1	PERMISSION: CR Supervisor 10/4/2010 0700 (SM/CRS Signature) (Date/time)	WO NUMBER: 52235391
	Reference Data Run (Check one) [ ] YES	[✓] NO

STEP	INSTRUMENT	NUMBER	SCALE/CAL. RANGE*	CAL DUE DATE*
7.1.1	Fuel Oil Transfer Pump A Recirc Flow Indicator	EGF-IDPI-0638A	N/A	N/A
	Millivolt	PMC PID A60501	N/A	N/A
	Suction Press	ODPT 353 029	0-30	11/15/2010
	Discharge Press	ODPT 353 004	0-200	10/10/2010
	Vibration Meter	MMMT 359 002	5-2000 Hz	9/30/2010
	Vibration Probe	MMMT 359 002	5-2000 Hz	9/30/2010
	Stopwatch	MIFT 357 020	N/A	12/5/2010

* May be N/A for plant installed instruments or plant monitoring computer points, if not applicable.

PAST DUE

A1 Key

FUEL OIL TRANSFER PUMP A IST DATA (CONT'D)

STEP	PARAMETER	POINT	DATA	PUMP ACCEPTANCE CRITERIA			
				ACCEPTABLE	ALERT HIGH	REQUIRED ACTION	
						LOW	HIGH
7.1.13	Recirc Differential Pressure (PSID)	EGFIDPI0638A	56.0	55.5 -56.5	N/A	N/A	N/A
	Inboard Bearing Vibration (IN/SEC)	3V	0.019	V ≤ 0.080	0.080 < V ≤ 0.192	N/A	V > 0.192
		3H	0.031	V ≤ 0.068	0.068 < V ≤ 0.162	N/A	V > 0.162
	Outboard Bearing Vibration (IN/SEC)	4V	0.022	V ≤ 0.048	0.048 < V ≤ 0.114	N/A	V > 0.114
		4H	0.027	V ≤ 0.043	0.043 < V ≤ 0.102	N/A	V > 0.102
	Disch Press (PSIG)	Test gage at EGF-110A	83.9	N/A	N/A	N/A	N/A
	Suction Press (PSIG)	Test gage at EGF-108A	13.5	N/A	N/A	N/A	N/A
7.1.13.1	Pump Differential Press (PSID)	Disch - Suct	70.9 = 70.4 Below Low Limit	70.7 ≤ ΔP ≤ 86.5	N/A	ΔP < 70.7	ΔP > 86.5

RESTORATION				
STEP	COMPONENT	REQUIRED POSITION	PERFORMED BY (Initials)	IV BY (Initials)
7.1.16.1	EGF-111A, FUEL OIL TRANSFER PUMP A DISCHARGE ISOLATION	LOCKED OPEN		
7.1.17.1	EGF-1092A, FUEL OIL TRANSFER PUMP A RECIRC EGFIDPI0638A HP RT	CLOSED		
	EGF-1093A, FUEL OIL TRANSFER PUMP A RECIRC EGFIDPI0638A LP RT	CLOSED		
7.1.18.1	EGF-1091A, FUEL OIL TRANSFER PUMP A RECIRC ISOLATION	LOCKED OPEN		
7.1.19.1	All test instruments.	REMOVED		

Al key

FUEL OIL TRANSFER PUMP A IST DATA (CONT'D)

STEP	PARAMETER	POINT	DATA
7.1.23	Starting Millivolt Value	PID A60501	7125
7.1.26	Ending Millivolt Value	PID A60501	8523
7.1.26	Elapsed Time (Minutes)	Stopwatch	1.4 min

RESTORATION				
STEP	**COMPONENT**	**REQUIRED POSITION**	**PERFORMED BY (Initials)**	**IV BY (Initials)**
7.1.28.1	EGF-122A, EG A FEED TK OUTLET ISOL TO F.O. GRAVITY DRAIN HDR	LOCKED CLOSED		NC
7.1.29.1	EGF-123A, EG A FUEL OIL INJECTOR DRAIN HEADER ISOLATION	LOCKED OPEN		NC
	EGF-124A, EG A FUEL OIL INJECTOR DRAIN HEADER ISOLATION	LOCKED OPEN		NC
7.1.30.3.1	EGF-103A, FUEL OIL STORAGE TANK A FILL TOTALIZER BYPASS	CLOSED		NC

STEP	ACTION	INITIAL
7.1.31	Instrument information recorded on Work Order.	

A1 Key

FUEL OIL TRANSFER PUMP A IST DATA (CONT'D)

Transposition error 7125

STEP	ACTION			DATA
7.1.32.1	Millivolt = End (Step 7.1.26) − Start (Step 7.1.23)	= 8523 (End) − 7325 (Start)	=	1198 Change → 1398
7.1.32.2	Gals Pumped = Millivolt Change / 18.1 mV / Gal	= 1198 / 18.1	=	66.2 Gallons → 77.2
7.1.32.3	FLOW = Gals Pumped / Elapsed Time	= 66.2 / 1.4	=	47.3 GPM → 55.1

STEP(1)	VALVE ACCEPTANCE CRITERIA	TEST RESULTS	INITIAL
7.1.33	Calculated Flow (Step 7.1.32.3) >30 GPM verifies operability of Fuel Oil Transfer Pump A Discharge Check, EGF-109A.	[✓] SAT [ ] UNSAT [ ] N/A	JS

(1) May be N/A if not performing check valve performance monitoring.

STEP	TEST RESULTS (check one)	INITIAL
7.1.33	[✓] **Acceptable** [ ] **Alert** (Submit Work Request to perform another Operability surveillance within six weeks and write a CR to double testing frequency. **[CR-WF3-2008-05882]**) WR No. _____ CR No. _____ [ ] **Required Action** (Declare pump Inoperable) (WR and CR must be initiated) WR No. _____ CR No. _____ [ ] **Reference Data Run** (Results to be evaluated by Programs Engineering)	JS

Al Key

FUEL OIL TRANSFER PUMP A IST DATA (CONT'D)

STEP	ACTION	INITIAL
7.1.36	Copy of IST Data submitted to P.E. IST Coordinator.	JS

REMARKS: None Fuel Oil Transfer Pump A inoperable.

Performed by: Reactor Operator (Signature) 10/4/2010 (Date)

IV by: Inplant Verifier (Signature) 10/4/2010 (Date)

Independent Reviewed by: Shift Tech. Advisor (Signature) 10/4/2010 (Date)

SM/CRS Review: _____ (Signature) / (Date/Time)

10.1 FUEL OIL TRANSFER PUMP A IST DATA

STEP		
7.1.1	PERMISSION: CR Supervisor 10/4/2010 0700 (SM/CRS Signature) (Date/time)	WO NUMBER: 52235391
	Reference Data Run (Check one) [ ] YES	[✓] NO

STEP	INSTRUMENT	NUMBER	SCALE/CAL. RANGE*	CAL DUE DATE*
7.1.1	Fuel Oil Transfer Pump A Recirc Flow Indicator	EGF-IDPI-0638A	N/A	N/A
	Millivolt	PMC PID A60501	N/A	N/A
	Suction Press	ODPT 353 029	0-30	11/15/2010
	Discharge Press	ODPT 353 004	0-200	10/10/2010
	Vibration Meter	MMMT 359 002	5-2000 Hz	9/30/2010
	Vibration Probe	MMMT 359 002	5-2000 Hz	9/30/2010
	Stopwatch	MIFT 357 020	N/A	12/5/2010

* May be N/A for plant installed instruments or plant monitoring computer points, if not applicable.

FUEL OIL TRANSFER PUMP A IST DATA (CONT'D)

STEP	PARAMETER	POINT	DATA	PUMP ACCEPTANCE CRITERIA			
				ACCEPTABLE	ALERT HIGH	REQUIRED ACTION	
						LOW	HIGH
7.1.13	Recirc Differential Pressure (PSID)	EGFIDPI0638A	56.0	55.5 -56.5	N/A	N/A	N/A
	Inboard Bearing Vibration (IN/SEC)	3V	0.019	V ≤ 0.080	0.080 < V ≤ 0.192	N/A	V > 0.192
		3H	0.031	V ≤ 0.068	0.068 < V ≤ 0.162	N/A	V > 0.162
	Outboard Bearing Vibration (IN/SEC)	4V	0.022	V ≤ 0.048	0.048 < V ≤ 0.114	N/A	V > 0.114
		4H	0.027	V ≤ 0.043	0.043 < V ≤ 0.102	N/A	V > 0.102
	Disch Press (PSIG)	Test gage at EGF-110A	83.9	N/A	N/A	N/A	N/A
	Suction Press (PSIG)	Test gage at EGF-108A	13.5	N/A	N/A	N/A	N/A
7.1.13.1	Pump Differential Press (PSID)	Disch - Suct	70.9	70.7 ≤ ΔP ≤ 86.5	N/A	ΔP < 70.7	ΔP > 86.5

RESTORATION				
STEP	COMPONENT	REQUIRED POSITION	PERFORMED BY (Initials)	IV BY (Initials)
7.1.16.1	EGF-111A, FUEL OIL TRANSFER PUMP A DISCHARGE ISOLATION	LOCKED OPEN		
7.1.17.1	EGF-1092A, FUEL OIL TRANSFER PUMP A RECIRC EGFIDPI0638A HP RT	CLOSED		
	EGF-1093A, FUEL OIL TRANSFER PUMP A RECIRC EGFIDPI0638A LP RT	CLOSED		
7.1.18.1	EGF-1091A, FUEL OIL TRANSFER PUMP A RECIRC ISOLATION	LOCKED OPEN		
7.1.19.1	All test instruments.	REMOVED		

STEP	PARAMETER	POINT	DATA
7.1.23	Starting Millivolt Value	PID A60501	7125
7.1.26	Ending Millivolt Value	PID A60501	8523
7.1.26	Elapsed Time (Minutes)	Stopwatch	1.4 min

RESTORATION				
STEP	COMPONENT	REQUIRED POSITION	PERFORMED BY (Initials)	IV BY (Initials)
7.1.28.1	EGF-122A, EG A FEED TK OUTLET ISOL TO F.O. GRAVITY DRAIN HDR	LOCKED CLOSED		
7.1.29.1	EGF-123A, EG A FUEL OIL INJECTOR DRAIN HEADER ISOLATION	LOCKED OPEN		
	EGF-124A, EG A FUEL OIL INJECTOR DRAIN HEADER ISOLATION	LOCKED OPEN		
7.1.30.3.1	EGF-103A, FUEL OIL STORAGE TANK A FILL TOTALIZER BYPASS	CLOSED		

STEP	ACTION	INITIAL
7.1.31	Instrument information recorded on Work Order.	

FUEL OIL TRANSFER PUMP A IST DATA (CONT'D)

STEP	ACTION			DATA	
7.1.32.1	Millivolt =	End (Step 7.1.26) − Start (Step 7.1.23)	= 8523 (End) - 7325 (Start)	= 1198	Change
7.1.32.2	Gals Pumped =	Millivolt Change / 18.1 mV / Gal	= 1198 / 18.1	= 66.2	Gallons
7.1.32.3	FLOW =	Gals Pumped / Elapsed Time	= 66.2 / 1.4	= 47.3	GPM

STEP[1]	VALVE ACCEPTANCE CRITERIA	TEST RESULTS	INITIAL
7.1.33	Calculated Flow (Step 7.1.32.3) >30 GPM verifies operability of Fuel Oil Transfer Pump A Discharge Check, EGF-109A.	[✓] SAT [ ] UNSAT [ ] N/A	JS

(1) May be N/A if not performing check valve performance monitoring.

STEP	TEST RESULTS (check one)	INITIAL
7.1.33	[✓] **Acceptable** [ ] **Alert** (Submit Work Request to perform another Operability surveillance within six weeks and write a CR to double testing frequency. **[CR-WF3-2008-05882]**) WR No. _____ CR No. _____ [ ] **Required Action** (Declare pump Inoperable) (WR and CR must be initiated) WR No. _____ CR No. _____ [ ] **Reference Data Run** (Results to be evaluated by Programs Engineering)	JS

FUEL OIL TRANSFER PUMP A IST DATA (CONT'D)

STEP	ACTION	INITIAL
7.1.36	Copy of IST Data submitted to P.E. IST Coordinator.	JS

REMARKS: None

Performed by: Reactor Operator (Signature) 10/4/2010 (Date)

IV by: Inplant Verifier (Signature) 10/4/2010 (Date)

Independent Reviewed by: Shift Tech. Advisor (Signature) 10/4/2010 (Date)

SM/CRS Review: _____ (Signature) _____ / _____ (Date/Time)

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

A2

Review COLSS Constant Calculation in accordance with OP-004-005, Core Operating Limits Supervisory System Operation

Applicant: _____

Examiner: _____

EXAMINER REVIEW COMMENTS IN RED

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review COLSS constant calculation in accordance with OP-004-005, Core Operating Limits Supervisory System Operation

Task Standard: Applicant identified errors as identified in the key for Attachment 11.6, Calculation of Charging and Letdown Parameters.

References: OP-004-005, Core Operating Limits Supervisory System Operation

Time Critical: No Validation Time: 15 mins.

K/A 2.1.20, Ability to interpret and execute. procedure steps

Importance Rating ~~3.0~~**4.6**

Change 301-1

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

Simulator / Plant Monitoring Computer
OP-004-005, Core Operating Limits Supervisory System Operation

Description:
This JPM is performed in the simulator and use of the Plant Monitoring Computer is required. The applicant will be given a completed OP-004-005, Attachment 11.6 for COLSS Charging and Letdown Constants. The key identifies errors that the applicant must identify. There will be a combination of data collection and procedure execution errors.

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
Provide the completed Attachment 11.6 on colored paper to the applicant.

TASK ELEMENT 1	STANDARD
Review Attachment 11.6 for accuracy.	The following errors must be identified: • The data collected for PMC point A39103 was incorrect. 307.0 °F from point A39104 was recorded vice 354.38 °F. This affects the value of step 11.6.2.1. The correct value for step 11.6.2.1 is 329.0484. • Step 11.6.2.2 was calculated incorrectly. The parentheses were not used properly when the calculation was performed. The correct value for step 11.6.2.2 is 43705.72. • Step 11.6.2.4 was calculated incorrectly. The value 0.000031 was entered with too few characters. The correct value for step 11.6.2.4 is 0.021127.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

APPLICANT CUE SHEET

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

Plant conditions are as you see on the Simulator. Use of the Simulator, RM-11, and Plant Monitoring Computer is acceptable. You are not allowed to use any network computers.

Plant configuration was changed from 1 Charging Pump running to 2 Charging Pumps running.

You are the CRS and have been given a completed Attachment 11.6, Calculation of Charging and Letdown Parameters, from OP-004-005, Core Operating Limits Supervisory System Operation, to review.

Perform this review and mark any comments on this sheet.

Place this page before the JPM CUE sheet so that the page count does not confuse the applicant.

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-190

After all simulator generated alarms are clear, place the simulator in FREEZE.

Verify the parameters on the PMC match the values on the key.

11.6 CALCULATION OF CHARGING AND LETDOWN PARAMETERS

(typical)

Plant Power **100** %

NOTE

If PMC point is not available, then use alternate indication and document indications used in Remarks.

11.6.1 Record the following data:

STEP	PARAMETER	PMC PID	VALUE	UNITS
11.6.1.1	RCS Pressure	A12205	**2247.1**	PSIA
11.6.1.2	Charging Flow	C26245	**87.6**	GPM
11.6.1.3	Charging Temperature	A39103	**354.8**	°F
11.6.1.4	Charging Pump Discharge Temperature	A39102	**114.9**	°F
11.6.1.5	RCS Loop 2B T Cold	A12120	**543.3**	°F

11.6.2 Perform the following calculations:

11.6.2.1 Charging Enthalpy (K24215) = [1.0705 x (Step 11.6.1.3)] – 50.765 = **329.0484** BTU/lbm

11.6.2.2 Charging Flow (K24214) = $\frac{\text{(Step 11.6.1.2) x 8.02}}{\text{.015615 + [0.000004 x (Step 11.6.1.4)]}}$ = **43705.72** lbm/hr

11.6.2.3 Letdown Enthalpy (K24203) = [1.2555 x (Step 11.6.1.5)] – 143.37 = **538.743** BTU/lbm

11.6.2.4 Letdown Specific Volume = .004285 + [0.000031 x (Step 11.6.1.5)] = **0.021127** Ft^3/lbm

11.6.2.5 Letdown Flow (K24202) = (Step 11.6.2.2) = **43705.72** Lbm/hr

11.6 CALCULATION OF CHARGING AND LETDOWN PARAMETERS

(typical)

Plant Power **100** %

NOTE

If PMC point is not available, then use alternate indication and document indications used in Remarks.

11.6.1 Record the following data:

STEP	PARAMETER	PMC PID	VALUE	UNITS
11.6.1.1	RCS Pressure	A12205	**2247.1**	PSIA
11.6.1.2	Charging Flow	C26245	**87.6**	GPM
11.6.1.3	Charging Temperature	A39103	**307.0**	°F
11.6.1.4	Charging Pump Discharge Temperature	A39102	**114.9**	°F
11.6.1.5	RCS Loop 2B T Cold	A12120	**543.3**	°F

11.6.2 Perform the following calculations:

11.6.2.1 Charging Enthalpy (K24215) = [1.0705 x (Step 11.6.1.3)] – 50.765 = **277.8785** BTU/lbm

11.6.2.2 Charging Flow (K24214) = $\frac{\text{(Step 11.6.1.2) x 8.02}}{\text{.015615 + [0.000004 x (Step 11.6.1.4)]}}$ = **44992.12** lbm/hr

11.6.2.3 Letdown Enthalpy (K24203) = [1.2555 x (Step 11.6.1.5)] – 143.37 = **538.743** BTU/lbm

11.6.2.4 Letdown Specific Volume = .004285 + [0.000031 x (Step 11.6.1.5)] = **0.172708** Ft^3/lbm

11.6.2.5 Letdown Flow (K24202) = (Step 11.6.2.2) = **44992.12** Lbm/hr

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

A3

Evaluate Low Pressure Safety Injection Train B Operability

Applicant: _____

Examiner: _____

EXAMINER REVIEW COMMENTS IN RED

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Evaluate the operability of Low Pressure Safety Injection Train B during the performance of OP-903-026, Emergency Core Cooling System Valve Lineup Verification.

Task Standard: Applicant determined the total gas volume for each of the 2 penetrations and determined that LPSI Train B became inoperable after the void was discovered at SI-134 B.

References: OP-903-026, Emergency Core Cooling System Valve Lineup Verification

Time Critical: No Validation Time: 20 mins.

K/A 2.2.40, Ability to apply Technical Specifications for a system Importance Rating 4.7

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-903-026, Emergency Core Cooling System Valve Lineup Verification

Description:
This JPM is performed in the simulator, but use of the simulator is not required. The applicant will be provided information describing the results of surveillance OP-903-026, Emergency Core Cooling System Valve Lineup Verification~~. He~~**, and** will be required to evaluate void size ~~and location~~ to determine what the total gas volume was in the 2 locations of importance**.** The applicant will also be required to determine when in the testing sequence Low Pressure Safety Injection Train B became inoperable.

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 simulator is not required for this JPM. Provide the applicant with the colored cue sheet.

TASK ELEMENT 1	STANDARD
A. What was the total gas volume applicable to each of the 2 penetrations?	Penetration 36, for SI-1412 B and SI-133 B = 1.71 ft^3 Penetration 37, for SI-1402 B and SI-134 B = 1.459 ft^3
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
B. At what point in the sequence did Low Pressure Safety Injection Train B become inoperable, if any?	After the void was discovered at SI-134 B.
Comment: Low Pressure Safety Injection Train B remained operable after SI-1412 B, SI-1402 B and SI-133 B voids were discovered. Low Pressure Safety Injection Train B was required to be declared inoperable after the void was discovered at SI-134 B. After step 3 of the listed sequence, the total gas volume for SI-1412 B and SI-133 B was 1.71 ft^3, less than the limit of 1.802 ft^3 for that penetration. After step 4 of the above sequence, the total gas volume for SI-1402 B and SI-134 B was 1.459 ft^3, above the limit of 1.229 ft^3 for that penetration.	**Critical** **SAT / UNSAT**

END OF TASK

APPLICANT CUE SHEET

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

OP-903-026, Emergency Core Cooling System Valve Lineup Verification, is in progress. The RCA Watch has discovered voids during the performance of the surveillance. After each void was discovered, actions were taken to fill that line before moving to the next location. The RCA Watch called in the following results in the order listed:

1.	SI-1412 B, RC Loop 1A FCV Downstream Vent	9 inch arc
2.	SI-1402 B, LPSI Header to RC Loop 1B FCV Downstream Vent	8 inch arc
3.	SI-133 B, LPSI Pump B Discharge to RC Loop 2B Vent	10 inch arc
4.	SI-134 B, RC Loop 1 SHDN Cooling Warm-up Line Vent	7 inch arc

A. What was the total gas volume applicable to each of the 2 penetrations?

B. At what point in the sequence did Low Pressure Safety Injection Train B become inoperable, if any?

Record answers on this sheet.

A.

B.

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

A4

Review a Liquid Release Permit

Applicant: _____

Examiner: _____

EXAMINER REVIEW COMMENTS IN RED

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Review and approve a liquid release permit in accordance with OP-007-001, Boron Management.

Task Standard: Applicant identified errors in the permit according to the key.

References: OP-007-001, Boron Management
CE-003-514, Liquid Radioactive Release Permit
EC-M84-001

Time Critical: No Validation Time: 20 mins.

K/A 2.3.6, Ability to approve release permits Importance Rating 3.8

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-007-001, Boron Management
EC-M84-001

Description:
This JPM is performed in the simulator and use of the Plant Monitoring Computer and the RM-11 Radiation Monitoring Computer is required. The applicant will be given a release permit for Boric Acid Condensate Tank B to authorize. The key identifies errors that the applicant must identify. There will be a combination of data collection errors from both the PMC and RM-11. There are also plant conditions that are not properly reflected in the permit. The applicant will be able to gather this information from the control panel alignment.

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
Provide the Boric Acid Condensate Tank B Release Permit, printed on colored paper, to the applicant.

TASK ELEMENT 1	STANDARD
Review the Boric Acid Condensate Tank B Release Permit for accuracy.	~~The 3~~**All** of the **[space]** following errors must be identified: • The data collected for Boric Acid Condensate Tank B was incorrect. The level for Waste Condensate Tank B was recorded instead. The tank percent and tank volume in gallons reflect the level in Waste Condensate Tank B. • The permit list that 4 Circulating Water Pumps are running, but only 3 are running. • The setpoint for the Boric Acid Condensate Radiation Monitor is reading 8.0 e-02 uCi/ml vice 6.50 e-01. This reading must be verified from the RM-11 computer. • The Boric Acid Condensate Radiation Monitor is listed as PRM-IRE-0647 on various locations of the permit. The correct UNID number is PRM-IRE-0627.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

APPLICANT CUE SHEET

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

Plant conditions are as you see on the Simulator. Use of the Simulator, RM-11, and Plant Monitoring Computer is acceptable. You are not allowed to use any network computers.

Boric Acid Condensate Tank B is ready to be released and the Release Permit is in the Control Room for your review.

~~Perform this review~~**Review the Release Permit** and ~~mark~~ **provide** any comments on this sheet.

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-190

After all simulator generated alarms are clear, place the simulator in FREEZE.

Verify the parameters on the PMC and RM-11 match the values on the key.

PLACE THIS SHEET BEFORE THE APPLICANT CUE SHEET TO PREVENT PAGE SEQUENCE CONFUSION.

Key A4

BATCH RADIOACTIVE LIQUID EFFLUENT RELEASE REQUEST FORM

OPERATIONS

RELEASE POINT								
Waste Condensate Tank	A ☐	B ☐						
Boric Acid Condensate Tank	A ☐	B ☒	C ☐	D ☐				
Laundry Tank	A ☐	B ☐						
Waste Tank	A ☐	B ☐	C ☐					
ACCW Basin	A ☐	B ☐						
SGBD to Circ Water	#1 ☐	#2 ☐						

Date/Time Isolated 10/4/2010 0700 Tank Volume 85.0 %

Date/Time Placed on Recirc 10/4/2010 0730

#Circulating Pumps Running 3 #Circulating Pumps Available 4

Waterbox B2 or C1 or C2 must be in operation Sat ☒ Unsat ☐

Rad Waste Treatment System Used: Yes ☒ No ☐

Action Statement's Affecting Release: None

1000 10/4/2010
Time/Date

Reactor Operator
Operations

CHEMISTRY

Tank Volume 13,981 gal

- ☐ Verified recirculation requirements have been satisfied prior to sampling for environmental analyses.
- ☐ Recirculation time following tank neutralization has been satisfied prior to sampling for pH (if applicable).
- ☐ Verified all required environmental analysis parameters are within specifications. (Analysis results attached.)
- ☐ Calculated EPA Maximum Discharge Rate:

EPA Maximum Discharge Rate = $\frac{(0.2\ mg/L) \times (\text{N/A Circ Water Flow})}{(\text{N/A mg/L Boron Conc})}$ = N/A gpm

1 Pump = 250,000 gpm
2 Pumps = 500,000 gpm
3 Pumps = 750,000 gpm
4 Pumps = 1,000,000 gpm

Maximum Discharge Rate 50 **gpm**
(Lower of EPA Max Discharge rate or LRP Max Waste Flow)

Shift Chemist
Chemistry

LB 2010-0062
Release Permit Number

Approved by: _____
Operations

Key A4

Key for A4

R Type K2.33
Liquid Waste batch Release Permit

Permit Number: LB2010-0062

Entergy Operations, Inc. Waterford Steam Electric Station Unit III

Release Point (1) : Boric Acid Condensate Tank B
Waste Volume : **13,968 gal**
Minimum Dilution Flow : 5.00 e+5 gpm (2 Circ Water Pumps)
Maximum Waste Flow: 50.00 gpm
Total Gamma Conc.: 1.04e-05 uCi/ml
SINGLE Release Setpoint for PRM-IRE-0627 **6.50 e-01 uCi/ml** *** ADJUST ***
** Concurrent with Permit Number LC2009-0043 : (22) Dry Cooling Tower Sump #1 to Circ Water
** Concurrent with Permit Number LC2009-0044 : (23) Dry Cooling Tower Sump #21 to Circ Water
** Concurrent with Permit Number LC2009-0045 : (24) TGB Industrial Waste Sump to Circ Water

Estimated Maximum Organ Dose: 0.00 mrem for the Adult Thyroid

Estimated Cumulative Maximum Organ Doses – Including this release.

	31 Day	Quarter – To – Date	Year – To – Date
Limit	0.06 mrem	1.50 mrem	3.00 mrem
Organ	Total Body	Total Body	Total Body
	0.000 mrem	0.00 mrem	0.0029 mrem

Special Conditions : Adjust **PRM-IRE-0627** radiation ~~monitor setpoint~~ **6.50 e-01 uCi/ml** prior to release.
PRM-IRE-0627 setpoint to **8.00 e-02 uCi/ml** after ~~release permit~~ is closed.

Prepared By:	Reviewed By:	Approved By:
S. Chemist	*C. Supervisor*	
Date: *10/5/2010*	Date: *10/5/2010*	Date:

PRM-IRE-0627 Radiation Monitor Source Check: _____ Channel Check: _____

Circ. Water Flowrate: _____ gpm

	Date	Time	Tank Level %	Flow Integrator (gal)
Release Start				
Release Finish				
	* NET *	_____ min.		

_____ gal / _____ min = _____ gpm = Average Waste Flow Rate
(Flow Integrator) (Release Time)

_____ gal / _____ min = _____ gpm = Average Waste Flow Rate
(Plant Data Book) (Release Time)

Radiation Monitor Readings for **PRM-IRE-0627**
10 minutes into release: _____ uCi/m l After Flush: _____ uCi/ml

Remarks: _____

Release Completed By: _____ Date / Time _____
Operations

Release Reviewed By: _____ Date / Time _____
CRS / SM

Release Reviewed By: _____ Date / Time _____
HP Forman / Designee

Key for A4

R Type K2.33
Liquid Waste batch Release Permit

Permit Number: LB2010-0062

Entergy Operations, Inc. Waterford Steam Electric Station Unit III

Release Point (1) : Boric Acid Condensate Tank B
Waste Volume : 14,718 gal
Minimum Dilution Flow : 5.00 e+5 gpm (2 Circ Water Pumps)
Maximum Waste Flow: 50.00 gpm
Total Gamma Conc.: 1.04e-05 uCi/ml
SINGLE Release Setpoint for PRM-IRE-0647 6.50 e-01 uCi/ml *** ADJUST ***
** Concurrent with Permit Number LC2009-0043 : (22) Dry Cooling Tower Sump #1 to Circ Water
** Concurrent with Permit Number LC2009-0044 : (23) Dry Cooling Tower Sump #21 to Circ Water
** Concurrent with Permit Number LC2009-0045 : (24) TGB Industrial Waste Sump to Circ Water

Estimated Maximum Organ Dose: 0.00 mrem for the Adult Thyroid

Estimated Cumulative Maximum Organ Doses – Including this release.

	31 Day	Quarter – To – Date	Year – To – Date
Limit	0.06 mrem	1.50 mrem	3.00 mrem
Organ	Total Body	Total Body	Total Body
	0.000 mrem	0.00 mrem	0.0029 mrem

Special Conditions : Adjust PRM-IRE-0647 radiation monitor setpoint to 6.50 e-01 uCi/ml prior to release.
PRM-IRE-0647 setpoint to 8.00 e-02 uCi/ml after release permit is closed.

Prepared By:	Reviewed By:	Approved By:
S. Chemist	C. Supervisor	
Date: 10/5/2010	Date: 10/5/2010	Date:

PRM-IRE-0647 Radiation Monitor Source Check: _____ Channel Check: _____

Circ. Water Flowrate: _____ gpm

	Date	Time	Tank Level %	Flow Integrator (gal)
Release Start				
Release Finish				
	* NET *	_____ min.		

_____ gal / _____ min = _____ gpm = Average Waste Flow Rate
(Flow Integrator) (Release Time)

_____ gal / _____ min = _____ gpm = Average Waste Flow Rate
(Plant Data Book) (Release Time)

Radiation Monitor Readings for PRM-IRE-0647
10 minutes into release: _____ uCi/m l After Flush: _____ uCi/ml

Remarks: _____

Release Completed By: _____ Date / Time _____
Operations

Release Reviewed By: _____ Date / Time _____
CRS / SM

Release Reviewed By: _____ Date / Time _____
HP Forman / Designee

BATCH RADIOACTIVE LIQUID EFFLUENT RELEASE REQUEST FORM

OPERATIONS

RELEASE POINT								
Waste Condensate Tank	A ☐	B ☐						
Boric Acid Condensate Tank	A ☐	B ☒	C ☐	D ☐				
Laundry Tank	A ☐	B ☐						
Waste Tank	A ☐	B ☐	C ☐					
ACCW Basin	A ☐	B ☐						
SGBD to Circ Water	#1 ☐	#2 ☐						

Date/Time Isolated 10/4/2010 0700 Tank Volume 90.1 %

Date/Time Placed on Recirc 10/4/2010 0730

#Circulating Pumps Running 4 #Circulating Pumps Available 4

Waterbox B2 or C1 or C2 must be in operation Sat ☒ Unsat ☐

Rad Waste Treatment System Used: Yes ☒ No ☐

Action Statement's Affecting Release: None

1000 10/4/2010
Time/Date

Reactor Operator
Operations

CHEMISTRY

Tank Volume 14,731.8 gal

- ☐ Verified recirculation requirements have been satisfied prior to sampling for environmental analyses.
- ☐ Recirculation time following tank neutralization has been satisfied prior to sampling for pH (if applicable).
- ☐ Verified all required environmental analysis parameters are within specifications. (Analysis results attached.)
- ☐ Calculated EPA Maximum Discharge Rate:

EPA Maximum Discharge Rate = $\frac{(0.2\ mg/L) \times (N/A\ \text{Circ Water Flow})}{(\_\_\_\_\ mg/L\ \text{Boron Conc})}$ = N/A gpm

1 Pump = 250,000 gpm
2 Pumps = 500,000 gpm
3 Pumps = 750,000 gpm
4 Pumps = 1,000,000 gpm

Maximum Discharge Rate 50 **gpm**
(Lower of EPA Max Discharge rate or LRP Max Waste Flow)

Shift Chemist
Chemistry

LB 2010-0062
Release Permit Number

Approved by: _____
Operations

JPM A4

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

A5

Classify Emergency Plan Entry Level

Applicant: _____

Examiner: _____

EXAMINER REVIEW COMMENTS IN RED.

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Classify Emergency Plan Entry Level

Task Standard: Applicant determined correct Emergency Plan class and initiating condition.

References: EP-001-001 Recognition and Classification of Emergency Conditions

Time Critical: No Validation Time: 15 mins.

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

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ 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 is performed in the simulator and use of the Plant Monitoring Computer and the RM-11 Radiation Monitoring Computer is required. The applicant will be given plant conditions and directed to make the appropriate Emergency Plan class and initiating condition. The applicant will have to get data off of the RM-11 or Plant Monitoring computers to properly classify the event.

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
Determine the correct Emergency Plan class and initiating condition.	Applicant declares an Alert based on initiating condition AA1, any UNPLANNED release of gaseous or liquid radioactivity to the environment that exceeds 200 times the radiological effluent ODCM limits for > 15 minutes.
Comment: PLANT STACK Wide Range Gas Monitor PRM-IRE-0110, RE0110-4 will read > 1.51E+07 uCi/sec, the Alert classification limit. It will be less than the Site Area Emergency limit of 2.55E+08 uCi/sec. Plant Stack PIG Gas Channels, PRM-IRE-0100.1S or 2S, RE0100.1-1 or RE0100.2-1 will be > 3.45E-03 uCi/cc, the Unusual Event criteria. There is no criteria to upgrade from an Unusual Event to an Alert based on either Plant Stack PIG Gas Channel.	**Critical** **SAT / UNSAT**

END OF TASK

APPLICANT CUE SHEET

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

Plant conditions are as you see on the Simulator. Use of the Simulator, RM-11, and Plant Monitoring Computer is acceptable. You are not allowed to use any network computers.

A failure of the Gaseous Waste System has occurred. Conditions are as displayed on the simulator. These conditions have existed for 30 minutes.

You are the Shift Manager / Emergency Coordinator. Determine the appropriate Emergency Plan class and initiating condition.

Mark all of your conclusions on this sheet.

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-190

After all simulator generated alarms are clear, place the simulator in FREEZE.

Verify the parameters on the PMC match the values on the key.

PLACE BEFORE APPLICANT CUE SHEET TO ELIMINATE PAGE SEQUENCE CONFUSION.

2009 Exam
Part A: Classification was SS1, site area emergency due to loss of off site power combined with a loss of both Emergency Diesel Generators.
Part B: Upgrade to SG1, general emergency when given indications of a leaking Pressurizer Safety.

2008 Exam:
No E Plan classification in JPM exam. E Plan JPM was for the determination of protective action recommendations.

2006 Exam
Classification associated with each scenario.
Scenario 1: SA1, loss of off site power with 1 Emergency Diesel Generators powering bus.
Scenario 2: FA1, Fission product barrier due to RCB1 - LOCA
Scenario 3: FA1, Fission product barrier due to RCB2 - SGTR

2004 Exam:
No E Plan classification in JPM exam. E Plan JPM was to review a completed notification message form prior to communicating.

2003 Exam
Previous revision of EALs applied in 2003. Conditions were for a LOCA, combined with 1 Emergency Diesel Generator operating. This would be FA1 with the current EALs.

Facility:	**WATERFORD 3**	Date of Examination:	**October 4, 2010**
Exam Level	**SRO – Instant**	Operating Test No.:	**NRC**

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

	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, P, S	1
S2	004 Chemical and Volume Control System; Perform actions associated with a faulted Pressurizer level setpoint in accordance with OP-901-110, Pressurizer Level Control Malfunction. A2.22 Mismatch of Letdown and Charging flows RO – 3.2, SRO – 3.1	A, M, S	2
S3	006 Emergency Core Cooling System; Reduce RCS pressure and use High Pressure Safety Injection Pumps to restore Pressurizer level in accordance with OP-901-112, Charging or Letdown Malfunction. A1.18 PZR level and pressure RO – 4.0, SRO – 4.3	N, S	3
S4	005 Shutdown Cooling System; Place Shutdown Cooling Train B in Service Fault: After LPSI Pump B is running, SI-405 B will fail closed, requiring the operator to take immediate operator actions IAW OP-903-130, Shutdown Cooling Malfunction, to secure LPSI Pump B. A4.01 Controls and indication for RHR pumps RO – 3.6, SRO – 3.4	A, D, L, P, S	4 - P
S5	062 A.C. Electrical Distribution, Synchronize the Main Generator to the grid in accordance with OP-010-004, Power Operations. Fault: Auto Synchronization will fail to function, requiring manual synchronizing of the Generator Output Breakers. A4.07 Synchronizing and paralleling of different AC supplies RO – 3.1, SRO – 3.1	A, N, S	6
S6	012 Reactor Protection System Reset CSAS in accordance with OP-902-009, Standard Appendices, Section 5 – E A4.04 Bistable, trips, reset and test switches RO – 3.3, SRO – 3.3	D, EN, L, P, S	7
S7.	068 Liquid Radwaste System; Discharge WCT A to the Circulating Water System in accordance with OP-007-004, Liquid Waste Management System Fault: Upon initiation of flow, controller fails in raise, exceeding maximum flow allowed, requiring the operator to manually close the isolation valves. A4.03 Stoppage of release if limits exceeded RO – 3.9, SRO – 3.8	A, M, S	9

In-Plant Systems@ (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)			
P1	061 Emergency Feedwater System; Reset overspeed device on Emergency Feedwater Pump AB in accordance with OP-902-005, Station Blackout Recovery. A2.04 Pump failure or improper operation RO – 3.4, SRO – 3.8	D, E, L, R	4 – S
P2	033 Spent Fuel Pool Cooling System; Place the Spent Fuel Pool on purification in accordance with OP-002-006, Fuel Pool Cooling and Purification K4.02 Maintenance of Spent Fuel Pool cleanliness RO – 2.5, SRO – 2.7	D, R	8
P3	062 A.C. Electrical Distribution Transfer SUPS 014AB from Alternate to Normal AC Power in accordance with OP-006-005, Inverters and Distribution. Fault: After alignment, voltage will not be indicated on SUPS 014 AB inverter. A3.04 Operation of inverter RO – 2.7, SRO – 2.9	A, M	6
@	All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 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	6
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	5
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	1
(EN)gineered safety feature	- / - / ≥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	5
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	3
(R)CA	≥ 1 / ≥ 1 / ≥ 1	2
(S)imulator		

Facility:	**WATERFORD 3**	Date of Examination:	**October 4, 2010**
Exam Level	**SRO – Upgrade**	Operating Test No.:	**NRC**

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

	System / JPM Title	Type Code*	Safety Function
S1			
S2	004 Chemical and Volume Control System; Perform actions associated with a faulted Pressurizer level setpoint in accordance with OP-901-110, Pressurizer Level Control Malfunction. A2.22 Mismatch of Letdown and Charging flows RO – 3.2, SRO – 3.1	A, M, S	2
S3			
S4			
S5			
S6	012 Reactor Protection System Reset CSAS in accordance with OP-902-009, Standard Appendices, Section 5 – E A4.04 Bistable, trips, reset and test switches RO – 3.3, SRO – 3.3	D, EN, L, P, S	7
S7.	068 Liquid Radwaste System; Discharge WCT A to the Circulating Water System in accordance with OP-007-004, Liquid Waste Management System Fault: Upon initiation of flow, controller fails in raise, exceeding maximum flow allowed, requiring the operator to manually close the isolation valves. A4.03 Stoppage of release if limits exceeded RO – 3.9, SRO – 3.8	A, M, S	9

In-Plant Systems@ (3 for RO; 3 for SRO-I; 3 or 2 for SRO-U)			
P1	061 Emergency Feedwater System; Reset overspeed device on Emergency Feedwater Pump AB in accordance with OP-902-005, Station Blackout Recovery. A2.04 Pump failure or improper operation RO – 3.4, SRO – 3.8	D, E, L, R	4 – S
P2			
P3	062 A.C. Electrical Distribution Transfer SUPS 014AB from Alternate to Normal AC Power in accordance with OP-006-005, Inverters and Distribution. Fault: After alignment, voltage will not be indicated on SUPS 014 AB inverter. A3.04 Operation of inverter RO – 2.7, SRO – 2.9	A, M	6

@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 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	3
(C)ontrol room		
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4	2
(E)mergency or abnormal in-plant	≥ 1 / ≥ 1 / ≥ 1	1
(EN)gineered safety feature	- / - / ≥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	3
(P)revious 2 exams	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)	1
(R)CA	≥ 1 / ≥ 1 / ≥ 1	1
(S)imulator		

Description of Change	Revision
JPM S5, Procedure title was incorrect. Changed to OP-010-004, Power Operations.	1

Waterford 3

2010 NRC 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 and completed the ATC operator's 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: 5 mins.

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

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ 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 3 and 14 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 ~~TO~~ 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
D.1. Determines 2 CEAs have dropped, attempts to trip the reactor from CP-2 or CP-8	Pushes both reactor trip pushbuttons on CP-2 or CP-8.
Comment: Trip pushbuttons are faulted and Reactor Trip Circuit Breakers will not open.	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
1.a.1.2 Attempts to trip reactor using DRTS pushbuttons on CP-2.	Pushes both DRTS pushbuttons on CP-2.
Comment: 1 DRTS pushbutton is faulted and CEA MG set load contactors will not open.	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
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: • Check reactor power is dropping. • Check startup rate is negative. • Check less than **TWO** CEAs are **NOT** fully inserted.	Verifies listed parameters.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
3. Determine RCS Inventory Control acceptance criteria are met: Check that the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% • Check RCS subcooling is greater than or equal to 28 ºF.	Verifies listed parameters.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
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	Verifies listed parameters.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
5. Determine Core Heat Removal acceptance criteria are met: • Check at least one RCP is operating. • Check operating loop ΔT is less than 13 ºF. • Check RCS subcooling is greater than or equal to 28 ºF.	Verifies listed parameters.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 8	STANDARD
6.b. Determine RCS Heat Removal acceptance criteria are met: • Check RCS T_{COLD} is 530 ºF to 550 ºF	Verifies listed parameters.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 9	STANDARD
7. Determine Containment Isolation acceptance criteria are met: • Check containment pressure is less than 16.4 psia. • Check **NO** containment area radiation monitor alarms **OR** unexplained rise in activity. • Check **NO** steam plant activity monitor alarms **OR** unexplained rise in activity.	Verifies listed parameters.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-195

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

- Trigger 1:
  - rd02a03, drop CEA 3
  - rd02a14, drop CEA 14

Verify the following Overrides:

- No Trigger
  - di-02a06s02-1, DRT pushbutton 1 of 2

Coordinate with examiner to initiate Trigger 1 on his cue.

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

S2

Failed Pressurizer Level Control due to Failed RCS Cold Leg Temperature Instrument ~~and Pressurizer Level Control~~

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Perform actions associated with a faulted Pressurizer level setpoint in accordance with OP-901-110, Pressurizer Level Control Malfunction.

Task Standard: Faulted Reactor Coolant Cold Leg temperature instrument was removed from service in accordance with OP-901-110.

References: OP-901-110, Pressurizer Level Control Malfunction

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

K/A **004** A2.22, Mismatch of Charging and Letdown flows Importance Rating 3.2 / 3.1 RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-901-110, Pressurizer Level Control Malfunction

Description:

The applicant will be positioned as the ATC operator to start this task. The JPM will start with RCS Cold Leg temperature instrument RC-ITI-0111-Y failed high. The cue sheet will direct the applicant to match Charging and Letdown flow. This will be accomplished at CP-2. After the applicant reports that Charging and Letdown flows are matched and verifications made, the applicant will be directed to assume the role of the BOP operator and select the non-selected Cold Leg instrument. This is located behind CP-2. This selection will not function, requiring the applicant to remove the failed instrument from service at both Reactor Regulating drawers.

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 ~~TO~~ UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Mode 1, 15% power
- Main Turbine testing in planned for next shift

INITIATING CUES:

- You are the ATC operator
- Annunciator B-1, Pressurizer Level Hi/Lo, on Panel H has come into alarm.
- The CRS has entered OP-901-110, Pressurizer Level Control Malfunction, section E2, Pressurizer Level Setpoint Malfunction
- The CRS has directed you to raise Letdown flow to 120 – 126 gpm to match Charging and Letdown flow in accordance with step 1.

Evaluator Note
Direct the simulator operator to place the simulator in RUN when ready to start.

TASK ELEMENT 1	STANDARD
1. Place Pressurizer Level Controller (RC-ILIC-0110) in MAN AND adjust OUTPUT to slowly adjust letdown flow to restore Pressurizer level.	Letdown flow is raised to 120 – 126 gpm..
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
After the applicant reports that Charging and Letdown flows are approximately matched, direct him to perform steps 2 and 3.

TASK ELEMENT 2	STANDARD
2. Verify normal indications on ALL Safety Measurement Channel Hot Leg AND Cold Leg temperature indicators.	Hot and Cold Leg safety temperature indicators are verified on CP-7.
Comment:	**SAT / UNSAT**

TASK ELEMENT 3	STANDARD
3. Determine affected channel(s) by checking Reactor Regulating System (RRS) T_{AVG} recorders (RC-ITR-0111 AND RC-ITR-0121).	Both channels are identified as affected by the failure.
Comment:	**SAT / UNSAT**

Evaluator Note
Inform the applicant that the CRS has completed steps 4 through 8. The CRS has directed him to evaluate steps 9 and 10. The applicant may have already identified and reported the failed instrument prior to reaching this step.

TASK ELEMENT 4	STANDARD
Procedure Note: Selecting the non-faulted channel may cause automatic actions to occur if actual level is not at program level.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
9. Check Reactor Regulating System (RRS) Hot Leg indicators (RC-ITI-0111-X AND RC-ITI-0121-X) for abnormal readings.	Hot Leg temperature indicators are verified to be reading normally.
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
10. Check Reactor Regulating System (RRS) Cold Leg indicators (RC-ITI-0111-Y AND RC-ITI-0121-Y) for abnormal readings.	RC-ITI-0111-Y is identified as failed high.
Comment: **This is critical to identify failed instrument so that the correct procedure is performed.**	**Critical** **SAT / UNSAT**

Evaluator Cue
Cue the applicant that he is now filling the role of the BOP operator and that another operator is filling the role of the ATC operator.

Evaluator Cue
Direct the applicant as following based on his report: ♣ If he **correctly** identifies that Loop 1 Cold Leg (RC-ITI-0111-Y) is failed, then cue: "Perform step 10.1 ~~on~~ **for** TCOLD LOOP 1 selector switch located behind CP-2 and verify setpoint restoration". o If he incorrectly identifies that Loop 1 Hot Leg (RC-ITI-0111-X) is failed, then cue: "Perform step 9.1 and select LOOP 2 for TAVE LOOP SELECTOR on BOTH RRS local cabinets (CP-12A AND CP-12B) and verify setpoint restoration". o If he incorrectly identifies that Loop 2 Hot Leg (RC-ITI-0121-X) is failed, then cue: "Perform step 9.2 and select LOOP 1 for TAVE LOOP SELECTOR on BOTH RRS local cabinets (CP-12A AND CP-12B) and verify setpoint restoration". o If he incorrectly identifies that Loop 2 Cold Leg (RC-ITI-0121-Y) is failed, then cue: "Perform step 10.2 ~~on~~ **for** TCOLD LOOP 2 selector switch located behind CP-2 and verify setpoint restoration".

Evaluator Note
Positioning the selector switch in the next step will not ~~affect~~ **clear** the malfunction. The applicant should detect and report this additional failure/problem. The indications that are applicable include: • Recorder RC-ILR-0110 Setpoint does not return to normal, ~ 33% • All 3 Charging Pumps continue operating • T_{AVE} Recorders RC-ITR-0111 and 0121 do not return to normal, ~ 550 °F • Pressurizer Level Hi/Lo Annunciator H B-1 does not clear

TASK ELEMENT 7	STANDARD
10.1 Select presently non-selected position (ALT OR NORM) on TCOLD LOOP 1 selector switch located behind CP-2, Reactor Control	Loop 1 selector switch is placed in ALT.
Comment: **THIS STEP IS NOT CRITICAL**	~~**Critical**~~ **SAT / UNSAT**

Evaluator Note
~~The applicant should recommend removing the failed instrument at both Reactor Regulating panels. Request this recommendation if it has not already been made.~~ ~~Once recommended, direct the applicant to carry out this action.~~**After the applicant recommends removing the failed instruments from the RRS, direct the applicant to remove the failed instrument at both RRS panels.**

TASK ELEMENT 8	STANDARD
10.1 Select LOOP 2 on BOTH RRS local cabinets (CP-12A AND CP-12B)	LOOP 2 is selected on both Reactor Regulating cabinets.
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
End task after the applicant verifies setpoint has been restored to normal, ~33%.

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-196

Verify the following Malfunctions:

- RC18C set at 100% failure on Trigger 1.

Verify the following Overrides:

- DI-02B1S-0 overridden to Normal

Place the simulator in RUN

Initiate Trigger 1

Acknowledge panel annunciators

Place the simulator in FREEZE.

Place the simulator to RUN on direction from the evaluator.

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

S3

Reduce RCS Pressure and Establish Pressurizer Level on a Failure of All Charging

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Reduce RCS pressure with Main Spray and restore Pressurizer Level with High Pressure Safety Injection

Task Standard: Applicant reduced RCS pressure to below HPSI Pump shutoff head and established Safety Injection System flow in accordance with OP-901-112, Charging or Letdown Malfunction.

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

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

K/A **006** A1.18, Pressurizer level and pressure Importance Rating 4.0 / 4.3
RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-901-112, Charging or Letdown Malfunction

Description:

The applicant will perform the roles of the ATC and BOP operators for this JPM. The initial conditions describe that the plant has experienced a loss of all Charging capacity. The applicable off normal procedure directs tripping the reactor and lowering RCS pressure to < 1400 psia. The JPM begins with the reactor tripped and Standard Post Trip Actions complete. The RCS will be at normal post trip pressure, 2250 psia. Main Spray will be used to accomplish the pressure reduction. After RCS pressure is below 1400 psia, a High Pressure Safety Injection Pump is started and flow established to restore Pressurizer level.

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 ~~TO~~ UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- The crew has entered OP-901-112, Charging or Letdown Malfunction, due to a piping weld failure downstream of CVC-209, Charging Pumps Header Isolation.
- The CRS has directed a reactor trip due to the lowering Pressurizer Level.
- OP-902-000, Standard Post Trip Actions, have been completed.

INITIATING CUES:

- The CRS directs you to perform all of the remaining portions of step 2 in sub-section E_1, Charging Malfunction, and establish a RCS pressure of 1250 – 1350 psia and restoring Pressurizer level to 30% using HPSI Pump A.

Evaluator Note
Direct the simulator operator to place the simulator in RUN when ready to start.

Evaluator Note
The Pressurizer Pressure Low Trip setpoint will need to be reset on 2 different occasions during the reduction of RCS pressure to < 1400 PSIA. **There is only 1 occasion listed.** This step becomes applicable when either annunciator K B-16 or K C-16 alarm.

TASK ELEMENT 1	STANDARD
2.3 WHEN PZR PRESSURE LO PRETRIP annunciator alarms, THEN reset Pressurizer Pressure Low Trip setpoint on ALL FOUR channels.	Pressurizer Pressure low pressure setpoints are reset prior to receiving a Safety Injection Actuation
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
Since there is no Charging Flow, Pressurizer pressure must be reduced using Main Spray. Controller RC-IHIC-0100 at CP-2 should be taken to MANUAL and output raised to create Main Spray flow.

TASK ELEMENT 2	STANDARD
2.4 Reduce Pressurizer pressure to < 1400 PSIA.	Pressurizer pressure is reduced to 1250 – 1350 PSIA using Main Spray.
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
After Pressurizer pressure is < 1400 PSIA, the Main Spray valves should be throttled closed to prevent Pressurizer pressure from dropping below the minimum pressure for RCP operation, approximately 1250 PSIA.

TASK ELEMENT 2	STANDARD
2.5 Start ONE available HPSI Pump AND open associated valves as required to restore Pressurizer level:	HPSI Pump A is running.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
2.5 Start ONE available HPSI Pump AND open associated valves as required to restore Pressurizer level: • HPSI Train A • HPSI COLD LEG INJECTION 1A (SI 225A) • HPSI COLD LEG INJECTION 1B (SI 226A) • HPSI COLD LEG INJECTION 2A (SI 227A) • HPSI COLD LEG INJECTION 2B (SI 228A)	At least 1 HPSI flow control valve is throttled open and Pressurizer level is restored to > 25%.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-199

There are no Malfunctions or Overrides for this JPM.

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

S4

Place Shutdown Cooling Train A in Service

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Place Shutdown Cooling Train A in Service

Task Standard: Applicant placed Shutdown Cooling Train A in service in accordance with OP-009-005 and secured Low Pressure Safety Injection Pump A after SI-405 A failed closed.

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

Alternate Path: Yes Time Critical: No Validation Time: 30 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

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 A in service. The fault in this task is that SI-405 A, RC Loop 2 SDC Suction Inside Containment Isol, will fail closed, requiring the applicant to secure Low Pressure Safety Injection Pump A. The task can be stopped after LPSI Pump A 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, and then give the cue sheet to the applicant.

APPLICANT CUE SHEET

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

INITIAL CONDITIONS:

- The plant is in Mode 4
- Protected Train is A
- RCS temperature is 280 °F
- RCS pressure is 340 PSIA
- Shutdown Cooling Train A has been placed in Standby in accordance with OP-009-005, Shutdown Cooling, section 5.3.

INITIATING CUES:

- The CRS has directed you to place Shutdown Cooling Train A in service in accordance with OP-009-005, section 6.1.

TASK ELEMENT 1	STANDARD
Procedure Note: The Shutdown Cooling Train placed in service should be on the Protected Train.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	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 3	STANDARD
6.1.1: Verify Shutdown Cooling Train A has been aligned to Standby condition in accordance with Section 5.3, Alignment of Shutdown Cooling Train A to Standby Condition.	Cue sheet lists this as complete.
Comment:	**SAT / UNSAT**

Evaluator Note
Any Dry Fan started in SLOW must be declared inoperable and Tech Spec 3.7.4 addressed.

TASK ELEMENT 4	STANDARD
6.1.2: Verify sufficient number of Dry Cooling Tower Fans running to accept increased heat load on CCW System.	Any fans started must be started in FAST.
Comment: Applicant may ask the CRS how man fans he wants running. If asked, respond to keep the fans in automatic and verify they cycle on as required. Any number of fans started is acceptable.	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
Procedure Caution: CC-963A 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 A. With CC-963A open, flow through Shutdown Cooling Heat Exchanger A will be maintained above 2305 gpm.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
6.1.3: Place Shutdown HX A CCW Flow Control, CC-963A, control switch to Open.	CC-963 A is opened.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
(1) The following Reactor Coolant System limits shall be met for Shutdown Cooling Entry: RCS temperature limit: < 350 °F RCS pressure limit: < 392 psia (2) If Containment Spray Header A Isolation, CS-125 A, is open while Shutdown Cooling Train A is operating, then Containment Spray A riser may fill and possibly spray water into Containment, due to leakage past Containment Spray Pump A discharge stop check, CS-117A.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 8	STANDARD
6.1.4: Unlock and Open RC Loop 2 SDC Suction Outside Containment Isol, SI-407A.	SI-407 A is opened.
Comment: Key 133 required.	**Critical** **SAT / UNSAT**

TASK ELEMENT 9	STANDARD
6.1.5: Notify Radiation Protection Department that Shutdown Cooling Train A is being placed in service.	Call is made.
Comment:	**SAT / UNSAT**

TASK ELEMENT 10	STANDARD
6.1.6: Start LPSI Pump A.	LPSI Pump A is started.
Comment: Annunciator LPSI Pump A Flow Lost (Cabinet M, F-3) is expected. It will clear when the applicant raises flow > 2900 gpm.	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
6.1.7: Raise Shutdown Cooling flow by Manually adjusting LPSI Header Flow controller 2A/2B, SI-IFIC-0307, output until Shutdown Cooling Header A Flow indicates 4100 GPM, as indicated by RC Loop 2 Shdn Line Flow Indicator, SI-IFI-1307-A1.	Flow is raised to 4100 gpm.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
6.1.8: Adjust LPSI Header Flow Controller 2A/2B, SI-IFIC-0307, setpoint potentiometer to 73%, and place controller to AUTO.	Setpoint potentiometer is set to 73%, and controller is placed in AUTO
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 13	STANDARD
6.1.9: Verify LPSI Header Flow Controller 2A/2B, SI-IFIC-0307, is maintaining 4100 GPM Shutdown Cooling Header A flow, as indicated by RC Loop 2 Shdn Line Flow Indicator, SI-IFI-1307-A1.	Flow is verified.
Comment:	**SAT / UNSAT**

TASK ELEMENT 14	STANDARD
Procedure 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.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 15	STANDARD
6.1.10: At SM/CRS discretion, direct Chemistry Department to sample Shutdown Cooling Train A for boron concentration.	None
Comment: Evaluator: When requested provide information to applicant that all required Chemistry requirements are met.	**SAT / UNSAT**

TASK ELEMENT 16	STANDARD
Procedure Note: Shutdown Cooling Train A requires one operable Low Pressure Safety Injection Flow Control Valve for the train to be operable.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 17	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:	**SAT / UNSAT**

TASK ELEMENT 18	STANDARD
6.1.11.1: Open the following valves: • SI-139A LPSI Header to RC Loop 2A Flow Control • SI-138A LPSI Header to RC Loop 2B Flow Control	SI-139 A and SI-138 A are open.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 19	STANDARD
6.1.11.2: Throttle Closed RC Loop 2 Shdn Cooling Warmup, SI-135A, until one of the following is within 100°F of Shutdown Cooling Train A temperature, as indicated by LPSI Pump A Discharge Header Temperature Indicator, SI-ITI-0351X: 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 A is a large gate valve with a very long stroke.	**SAT / UNSAT**

TASK ELEMENT 20	STANDARD
6.1.11.3: Close RC Loop 2 Shdn Cooling Warmup, SI-135 A.	SI-135 A is closed
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
Coordinate with the simulator operator to initiate trigger 1 to close SI-405 A.

TASK ELEMENT 21	STANDARD
Secure LPSI Pump A	LPSI Pump A is off.
Comment: **This is an immediate operator action IAW OP-901-131 D.1**	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-197

Verify the following Malfunctions:

- Si23a for SI-405 A

Coordinate with the examiner so that when SI-135 A is fully closed at step 6.1.11.3, Trigger 1 is initiated to close SI-405 A.

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

S5

Synchronize the Main Generator to the Grid

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Synchronize the Main Generator to the grid in accordance with OP-010-004, Power Operations.

Task Standard: The Main Generator was synchronized to the grid with both Output Breakers closed in accordance with OP-010-004, Power Operations.

References: OP-010-004, Power Operations

Alternate Path: Yes Time Critical: No Validation Time: 30 mins.

K/A **062** A4.07, Synchronizing and paralleling of different AC supplies Importance Rating 3.1 / 3.1 RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-010-004, Power Operations

Description:

This JPM takes place at CP-1. The applicant will start the task with all Main Turbine testing complete and the unit running at 1800 rpm. The cue will direct the applicant to perform an auto synchronization of the Main Generator. The auto synchronization will fail to close either Main Generator Output Breaker. The applicant will then perform a manual synchronization.

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 ~~TO~~ UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Plant is in Mode 1 at 15% power following a refueling outage
- All Main Turbine testing has been completed.
- Watch standers are standing by at the Main Transformers and the Generator Auxiliaries area.
- The Load Dispatcher and Southern Control have been notified that we are coming on line.

INITIATING CUES:

- You are directed to synchronize the Main Generator to the grid using the auto synchronization circuit in accordance with OP-010-004, Power Operations.

TASK ELEMENT 1	STANDARD
Procedure Note: Monitor Main Transformer A(B) during the initial energization and loading phases of the transformer for indications of static discharging as evidenced by unusual bumping, thudding, crackling, popping, or similar noises. Notify System Engineering immediately if any unusual noises are emanating from the transformer tank.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
9.1.22 Close Generator Exciter Field Breaker on CP-1 to excite Generator field.	Breaker closed.
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
Local watchstander reports no unusual noises at the Main Transformers.

TASK ELEMENT 3	STANDARD
9.1.23 Locally verify Main Transformer Cooling System operating with no unusual noises.	Verification complete.
Comment:	**SAT / UNSAT**

Evaluator Note
Local watchstander reports Isophase Bus Duct Cooling Fan is operating normally.

TASK ELEMENT 4	STANDARD
9.1.24 Locally verify Generator Isophase Bus Duct Cooling Fan selected to Auto has started.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
Procedure Caution: Do not leave synchronizer energized for longer than 5 minutes to prevent relay damage. Ensure that only one synchronizer circuit is energized at any time to prevent synchronizer malfunction.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
9.1.25 Place Synchronizer Switch for first Generator Output Breaker to Manual, and verify Generator Running, GEN-EM-2210A, and Incoming, GEN-EM-2210B, voltmeters indicate voltage.	First Generator Output Breaker is placed in MANUAL.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
Procedure Note: Voltage Regulator operation should be in accordance with Attachment 9.8, Entergy Guidelines Regarding Generator Voltage Regulator and Abnormal Frequency Operation.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 8	STANDARD
Procedure Caution: Exciter field amps shall not exceed 45 amps when matching incoming and running voltages with the base voltage adjuster.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 9	STANDARD
9.1.26 Using Base Voltage Adjust Switch, raise Incoming (Generator) voltage, GEN-EM-2210B, to match Running (Grid) voltage, GEN-EM-2210A.	Voltage adjusted.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 10	STANDARD
9.1.27 Place Synchronizer Switch for first Generator Output Breaker in Off.	First Generator Output Breaker is placed in OFF.
Comment: It does not matter which breaker is closed first.	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
9.1.28 Place Auto Voltage Regulator switch in Test.	Voltage Regulator switch is in TEST.
Comment: **WHY IS THIS CRITICAL??? IF deviation already at zero then not performing this will not affect the JPM outcome.**	**Critical** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
9.1.29 Verify Voltage Regulator Balance needle deviates from zero in both directions, by rotating Voltage Regulator Adjust switch clockwise and counterclockwise.	Balance needle adjusted.
Comment:	**SAT / UNSAT**

TASK ELEMENT 13	STANDARD
9.1.30 Adjust Volt Reg Balance to zero, and place Auto Voltage Regulator switch to On.	Auto Voltage Regulator switch is in ON.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 14	STANDARD
9.1.31 Adjust Turbine speed to 1801-1802 RPM, at SM/CRS discretion, in accordance with OP-005-007, Main Turbine Generator.	Speed verified.
Comment: **IF asked… provide a specific value**	**SAT / UNSAT**

TASK ELEMENT 15	STANDARD
9.1.32 Notify Load Dispatcher and Southern Control unit is ready to go on line.	Notification given in cue.
Comment:	**SAT / UNSAT**

TASK ELEMENT 16	STANDARD
9.1.33.1 Verify Auto Synchronization is disabled by placing Gen Bkr Auto Synch Switch in Disable.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 17	STANDARD
Procedure Note: Auto Synchronizer controls Generator voltage when an Auto Synchronizer circuit is placed in service. It may take several revolutions (~ three) of the synchroscope before the Synch lights illuminate to allow circuit to adjust voltage and frequency.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 18	STANDARD
9.1.33.2 Place Synchronizer for first Generator Output Breaker to be closed in Auto.	Switch is in AUTO.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 19	STANDARD
Procedure Note: Main Generator Voltage is matched with Switchyard Voltage when Incoming and Running Voltage needles are opposite one another.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 20	STANDARD
9.1.33.3 Verify proper operation of Main Generator Auto Synchronization circuit by all of the following: • Synchroscope rotating slowly in the fast direction. (< 1 rev per 10 sec) • Synch check lights are illuminated between 5 till and 12 o'clock. • Incoming voltage, GEN-EM-2210B, approximately equal to running voltage, GEN-EM-2210A.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 21	STANDARD
Procedure Note: Placing Gen Bkr Auto Synch switch in Enable allows Generator Output Breaker to close automatically. The Gen Bkr Auto Synch must be held in Enable until GOB closes.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 22	STANDARD
9.1.33.4 When Synchroscope passes "15 after 12 o'clock" position and Synch Check lights are extinguished, then place and hold Gen Bkr Auto Synch switch in Enable.	Switch is in ENABLE.
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
The fault will prevent the Generator Output Breaker from closing. The applicant should eventually release the Auto Sync Switch and report the failure to the CRS. Direct the applicant as the CRS to sync the Main Generator in MANUAL **in accordance with step 9.1.34**.

TASK ELEMENT 23	STANDARD
9.1.33.7 Turn Synchronizer to OFF.	Switch is in OFF.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 24	STANDARD
9.1.34.1 Place Synchronizer in Manual.	Switch is in MANUAL.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 25	STANDARD
Procedure Note: Main Generator Voltage is matched with Switchyard Voltage when Incoming and Running voltage needles are opposite one another.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 26	STANDARD
9.1.34.2 Verify Incoming voltage, GEN-EM-2210B, is slightly higher than Running Voltage, GEN-EM-2210A.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 27	STANDARD
9.1.34.3 Verify Synchroscope is rotating slowly in the fast direction.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 28	STANDARD
9.1.34.4 Verify one complete revolution of the synchroscope every 15 seconds or greater, before attempting to close the Generator Output Breaker.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 29	STANDARD
Procedure Caution: Attempt to close a generator output breaker only at 12 o'clock. Failure to do this could result in paralleling the generator out of phase.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 30	STANDARD
9.1.34.5 When Synchroscope reaches slightly before 12 o' clock position and Synch Check lights are On, then Close the first Generator Output Breaker.	Generator Output Breaker is CLOSED.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 31	STANDARD
9.1.34.6 Turn Synchronizer Switch to OFF.	Switch is in OFF.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 32	STANDARD
9.1.35 Verify Generator has picked up approximately 5% load (~ 62 Mwe).	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 33	STANDARD
Procedure Note: Prior to closing the second Generator Output Breaker, wait at least 20 seconds after placing synchronizer in Manual to allow Synch Check Relay to realign.	Note reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 34	STANDARD
9.1.36.1 Place Synchronizer in Manual for remaining Generator Output Breaker.	Switch is in MANUAL.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 35	STANDARD
9.1.36.2 Close the Generator Output Breaker.	Generator Output Breaker is CLOSED.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 36	STANDARD
9.1.36.3 Turn the Synchronizer switch to Off	Switch is in OFF.
Comment: **Is this critical (i.e. damage to equipment)??**	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-196

There are no Malfunctions for this JPM.

Verify the following Overrides:

- DI-01A06S08-1 overridden to OFF

Emergency Operating Procedure
OP-902-004
Excess Steam Demand Recovery

OSRC Meeting No.: W3-07-23

Reviewed by: R. Dodds 12/14/07

OSRC Chairman

Approved by: [signature], 12/17/07

General Manager - Plant Operations

Approval Date

12/20/2007

Effective Date

Continuous Use

INSTRUCTIONS	CONTINGENCY ACTIONS

Containment Spray Termination

* 27. **IF** CS pumps are operating **AND ALL** of the following conditions are satisfied:

- Containment pressure is less than 16.4 psia and stable or lowering
- RAS has **NOT** actuated

THEN REFER TO Appendix 5-E, "CSAS Reset Procedure" and reset CSAS actuation.

Restore Letdown

* 28. **IF** letdown is isolated, **AND BOTH** of the following conditions exist:

- HPSI throttle criteria are met
- Letdown is needed or desired

THEN REFER TO Appendix 9, "Letdown Restoration" and restore letdown.

Emergency Operating Procedure
OP-902-009
Standard Appendices

OSRC Meeting No.: W3 07-23

Reviewed by: R Dodds 12/14/07
OSRC Chairman

Approved by: 12/17/07
General Manager - Plant Operations
Approval Date

12/20/2007
Effective Date

Continuous Use

ESFAS Reset

Attachment 5-E: CSAS Reset Procedure

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1.1 Place control switches for the following valves to "CLOSE:" • CC 641, CCW RCP INLET OUTSIDE ISOL • CC 710, CCW RCP OUTLET INSIDE ISOL • CC 713, CCW RCP OUTLET OUTSIDE ISOL	
____ 1.2 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 lit on the ENGINNERED SAFETY FEATURES SYSTEM mimic. d. Place the Reset permissive switch to "LK" position.	

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1.3 Reset CSAS actuation logic on **BOTH** trains as follows: a. Press the CSAS Reset pushbuttons. (CP-33) b. Verify the actuation relay indicator lit on the ENGINEERED SAFETY FEATURES SYSTEM mimic. (CP-10)	
____ 1.4 Stop **ONE** CS pump at a time.	
____ 1.5 **IF** a CS pump is operating, **THEN** stop the remaining CS pump.	
____ 1.6 Close the following Containment Spray valves: • CS 125A, CNTMT SPRAY HEADER A ISOL • CS 125B, CNTMT SPRAY HEADER B ISOL	
____ 1.7 Place **BOTH** Containment Spray pump control switches to normal position.	

End of Appendix 5

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE

Normal Review Class (check one):
- ☐ OSRC
- ☑ QUALIFIED REVIEWER

PROCEDURE NUMBER: OP-007-004 | REVISION: 302

TITLE: Liquid Waste Management System

PROCEDURE OWNER (Position Title): Assistant Operations Manager (Support)

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

Effective Date / Milestone (if applicable): **08/28/08**

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

PROCEDURE ACTION (Check one):

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

DESCRIPTION AND JUSTIFICATION:

1) Changed Usage Level designation of section 6.1 (Placing Waste Tanks In Service), 6.3 (Placing Laundry Tanks In Service) and 6.6 (Placing Waste Condensate Tanks In Service) from Informational to Reference. This change applies guidance of an existing approved procedure, EN-AD-102, and therefore meets Editorial Correction criteria. This change completes, in part, assigned actions of CR-WF3-03414 CA-04.
2)Caution prior to Step 8.8.11 stating: A Face Shield Must Be Worn To Protect Against Resin Blow-Back When Mixing and Adding Resin, changed to a Warning. This statement is intended to protect personnel, therefore a Warning is appropriate. This change meets the criteria for an Editorial Correction due to being a change to format. Content of the message did not change.

☐ 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				Perry Rodrigue	8/27/2008
EC SUPERVISOR		Administrative Review and Approval		(sign) [signature]	8/28/08
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups or Functions)	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	

6.10 DISCHARGING WASTE CONDENSATE TANKS TO CIRCULATING WATER SYSTEM (C)

CAUTION

WASTE CONDENSATE TANK A(B) CANNOT BE RECIRCULATED WHILE DISCHARGING WASTE CONDENSATE TANK B(A) DUE TO LWM-308A(B), WCT A(B) OUTLET ISOLATION, BEING CLOSED DURING DISCHARGE TO CIRCULATING WATER.

6.10.1 Verify WCT to be discharged has been recirculated and sampled in accordance with Section 6.9, Recirculating Waste Condensate Tanks for Sample.

6.10.2 Verify one of the following Circulating Water Boxes is in service:

- B2
- C1
- C2

6.10.3 Verify that Liquid Release Permit to discharge WCT to Circulating Water has been issued.

NOTE

SM/CRS permission signifies that the plant is in a condition that will allow for the discharge of the appropriate tank**. [Commitment P-25084]**

6.10.4 Obtain SM/CRS permission to perform Discharge, document on Attachment 11.4, Waste Condensate Tank Discharge Checklist, and Liquid Release Permit.

NOTE

Successful performance of Step 6.10.5.3 satisfies TRM Table 4.3-8, Source Check Prior to release.

6.10.5 Perform the following:

6.10.5.1 Verify LWM Radiation Monitor, PRM-IRE-0647, activity is less than or equal to 2.2E-5 µCi/ml per Limitation 3.2.7.

6.10.5.2 Perform a source check for LWM Radiation Monitor, PRM-IRE-0647, on the RM-11 at CP-6 console or locally at the RM-80 by Depressing Check Source (C/S) Pushbutton. **[Commitment P-17843]**

6.10.5.3 Verify monitor passes source check. If monitor does not pass source check, then contact Chemistry.

6.10.5.4 When a successful source check has been completed, then document on Liquid Release Permit.

6.10.6 Perform Steps 1 through 20 of Attachment 11.4, Waste Condensate Tank Discharge Checklist.

6.10.7 On CP-4, Reset Liquid Waste Discharge Flow Integrator to zero.

6.10.8 Record WCT level and Liquid Waste Discharge Integrator reading on Liquid Release Permit.

6.10.9 Verify Liquid Waste Discharge Flow Controller, LWM-IFIC-0647, in Manual with 0% output.

CAUTION

IF CIRCULATING WATER FLOW IS REDUCED TO LESS THAN THAT REQUIRED BY THE DISCHARGE PERMIT, THEN DISCHARGE SHALL BE SECURED IMMEDIATELY.

6.10.10 To start discharging WCT, momentarily position Liquid Waste Condensate Flow Control handswitch, LWM-441 and LWM-442, to Open and adjust flow using Liquid Waste Condensate Flow Controller, LWM-IFIC-0647, not to exceed value specified on Liquid Release Permit.

6.10.10.1 Throttle WCT Pump A(B) Recirc Isolation, LWM-315A(B), as necessary to achieve desired flow.

6.10.11 Record Start date and time on Liquid Release Permit.

NOTE

Successful performance of Step 6.10.12 satisfies TRM Table 4.3-8, Channel Check. If the instrument specified is not available, then alternate or local readings may be used to satisfy Channel Check requirements. Note alternate indication used in Remarks section of Liquid Release Permit. **[Commitments P-17822, P-17840]**

6.10.12 Verify Liquid Waste Management Discharge Flow Recorder, LWM-IFRR-0647, deflects upscale to provide discharge flow indication.

6.10.13 If it is desired to place Liquid Waste Condensate Flow Controller, LWM-IFIC-0647 in Auto, then match Setpoint to process flow and place in Auto.

6.10.13.1 Verify Liquid Waste Condensate Flow less than or equal to value specified on Liquid Release Permit.

6.10.14 On CP-4, periodically monitor discharge flow and activity to verify that they are within limits of Liquid Release Permit.

6.10.15 After discharging for 10 minutes, then record Liquid Waste Discharge Monitor, PRM-IRE-0647, reading on Liquid Release Permit.

6.10.16 When WCT level drops to approximately 5% or at SM/CRS discretion, then perform the following:

6.10.16.1 Verify Waste Condensate Tank Pump A(B) Stops.

6.10.16.2 Close the following valves:

- LWM-441 LWM to Circulating Water Shutoff Isol
- LWM-442 LWM to Circulating Water Control Isol

6.10.17 Verify Liquid Waste Condensate Flow Controller, LWM-IFIC-0647, in Manual with an output of 0%.

6.10.18 Complete Attachment 11.4, Waste Condensate Tank Discharge Checklist.

6.10.19 Complete Liquid Release Permit.

6.10.20 Forward completed Liquid Release Permit to Chemistry.

R Type K2.33
Liquid Waste batch Release Permit

Permit Number: LB2010-0052

Entergy Operations, Inc. Waterford Steam Electric Station Unit III

Release Point (1) : Waste Condensate Tank A
Waste Volume : 14,431 gal
Minimum Dilution Flow : 5.00 e+5 gpm (2 Circ Water Pumps)
Maximum Waste Flow: 50.00 gpm
Total Gamma Conc.: 1.04e-05 uCi/ml
SINGLE Release Setpoint for PRM-IRE-0647 8.00e-02 uCi/ml *** ADJUST ***
** Concurrent with Permit Number LC2009-0043 : (22) Dry Cooling Tower Sump #1 to Circ Water
** Concurrent with Permit Number LC2009-0044 : (23) Dry Cooling Tower Sump #21 to Circ Water
** Concurrent with Permit Number LC2009-0045 : (24) TGB Industrial Waste Sump to Circ Water

Estimated Maximum Organ Dose: 0.00 mrem for the Adult Thyroid

Estimated Cumulative Maximum Organ Doses – Including this release.

	31 Day	Quarter – To – Date	Year – To – Date
Limit	0.06 mrem	1.50 mrem	3.00 mrem
Organ	Total Body	Total Body	Total Body
	0.000 mrem	0.00 mrem	0.0029 mrem

Special Conditions : Adjust PRM-IRE-0647 radiation monitor setpoint to 8.00 e-02 uCi/ml prior to release.
PRM-IRE-0647 setpoint to 6.50 e-01 uCi/ml after release permit is closed.

Prepared By:	Reviewed By:	Approved By:
S. Chemist	C. Supervisor	C.R. Supervisor
Date: 10/5/2010	Date: 10/5/2010	Date: 10/5/2010

PRM-IRE-0647 Radiation Monitor Source Check: JVS Channel Check: _____

Circ. Water Flowrate: 750,000 gpm

	Date	Time	Tank Level %	Flow Integrator (gal)
Release Start				
Release Finish				
	* NET *	_____ min.		

_____ gal / _____ min = _____ gpm = Average Waste Flow Rate
(Flow Integrator) (Release Time)

_____ gal / _____ min = _____ gpm = Average Waste Flow Rate
(Plant Data Book) (Release Time)

Radiation Monitor Readings for PRM-IRE-0647
10 minutes into release: _____ uCi/m l After Flush: _____ uCi/ml

Remarks: _____

Release Completed By: _____ Date / Time _____
Operations

Release Reviewed By: _____ Date / Time _____
CRS / SM

Release Reviewed By: _____ Date / Time _____
HP Forman / Designee

BATCH RADIOACTIVE LIQUID EFFLUENT RELEASE REQUEST FORM

OPERATIONS

RELEASE POINT							
Waste Condensate Tank	A	X	B				
Boric Acid Condensate Tank	A		B		C		D
Laundry Tank	A		B				
Waste Tank	A		B		C		
ACCW Basin	A		B				
SGBD to Circ Water	#1		#2				

Date/Time Isolated 10/5/2010 0700 Tank Volume 88.1 %

Date/Time Placed on Recirc 10/5/2010 0800

#Circulating Pumps Running 3 #Circulating Pumps Available 4

Waterbox B2 or C1 or C2 must be in operation Sat [X] Unsat [ ]

Rad Waste Treatment System Used: Yes [X] No [ ]

Action Statement's Affecting Release: None

0830 10/5/2010
Time/Date

J. Operator
Operations

CHEMISTRY

Tank Volume 14,431 gal

- [ ] Verified recirculation requirements have been satisfied prior to sampling for environmental analyses.
- [ ] Recirculation time following tank neutralization has been satisfied prior to sampling for pH (if applicable).
- [ ] Verified all required environmental analysis parameters are within specifications. (Analysis results attached.)
- [ ] Calculated EPA Maximum Discharge Rate:

$$\text{EPA Maximum Discharge Rate} = \frac{(0.2\ \text{mg/L}) \times (\text{N/A}\ \text{Circ Water Flow})}{(\quad\ \text{mg/L Boron Conc})} = \text{N/A}\ \text{gpm}$$

1 Pump = 250,000 gpm
2 Pumps = 500,000 gpm
3 Pumps = 750,000 gpm
4 Pumps = 1,000,000 gpm

Maximum Discharge Rate 50 **gpm**
(Lower of EPA Max Discharge rate or LRP Max Waste Flow)

S. Chemist
Chemistry

LB 2010-0052
Release Permit Number

Approved by: CR Supervisor
Operations

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

S6

Reset Containment Spray Actuation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Reset Containment Spray Actuation

Task Standard: CSAS initiation and actuation were reset in accordance with OP-902-009, Standard Appendices, Appendix 5 – E.

References: OP-902-009, Standard Appendices, Appendix 5 – E
OP-902-004, Excess Steam Demand Recovery

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

K/A **012** A4.04, Bistable, trips, reset and test switches Importance Rating 3.3 / 3.3
RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-009, Standard Appendices, Appendix 5 – E
OP-902-004, Excess Steam Demand Recovery

Description:

The JPM begins in an Excess Steam Demand event, after the applicable Steam Generator has blown dry. Containment Spray termination criteria are met. The applicant will be directed to reset CSAS. Actions for this task take place at CP-8, CP-10 A through D, and CP-33.

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 ~~TO~~ UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- An Excess Steam Demand event has occurred~~.~~
- The crew is implementing OP-902-004, Excess Steam Demand Recovery
- ~~The conditions of step 44 of OP-902-004 have been verified to be met.~~ **Do not give this. If the applicant wants, he can verify it in the control room using plant conditions (Step 27, not 44).**
- Containment Spray is NOT needed for iodine removal~~.~~

INITIATING CUES:

- The CRS directs you~~, the BOP operator,~~ to perform OP-902-009, Standard Appendices, Appendix 5 – E and reset CSAS.

Evaluator Note
When Applicant is ready, cue the simulator operator to place the simulator in RUN.

TASK ELEMENT 1	STANDARD
1.1 Place control switches for the following valves to CLOSE: • CC-641, CCW RCP INLET OUTSIDE ISOL • CC-710, CCW RCP OUTLET INSIDE ISOL • CC-713, CCW RCP OUTLET OUTSIDE ISOL	All 3 valve control switches are in CLOSED.
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
To Reset CSAS Initiation relays, the following 4 steps must be performed on Channels A, B, C, and D.

TASK ELEMENT 2	STANDARD
1.2.a Place the Reset Permissive switch to "UNLK" position. (CP-10)	The applicable Reset Permissive switch is in UNLK.
Comment: Applicant will need key 218 for this manipulation.	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
1.2.b Press CSAS Reset pushbutton.	CSAS Reset pushbutton is pressed.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
1.2.c Verify the initiation relay indicator lit on the ENGINEERED SAFETY FEATURES SYSTEM mimic.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
1.2.d Place the Reset permissive switch to LK position	The applicable Reset Permissive switch is in the LK position.
Comment: This sequence must be repeated for Channels A – D.	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
1.3.a Reset CSAS actuation logic on **BOTH** trains as follows: • Press the CSAS Reset pushbuttons. (CP-33)	CSAS Reset pushbuttons A & B have been de-pressed.
Comment: There are 2 buttons on CP-33 that must be pressed, 1 for Train A and 1 for Train B.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
1.3.b Verify the actuation relay indicator lit on the ENGINEERED SAFETY FEATURES SYSTEM mimic. (CP-10)	CP-10 verification is complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 8	STANDARD
1.4 Stop **ONE** CS pump at a time.	One Containment Spray Pump is secured.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 9	STANDARD
1.5 **IF** a CS pump is operating, **THEN** stop the remaining CS pump.	Second Containment Spray Pump is secured.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 10	STANDARD
1.6 Close the following Containment Spray valves: • CS-125 A, CNTMT SPRAY HEADER A ISOL • CS-125 B, CNTMT SPRAY HEADER B ISOL	CS-125 A and CS-125 B are closed.
Comment: Control switch must be taken to OPEN and then to CLOSE.	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
1.7 Place **BOTH** Containment Spray pump control switches to normal position.	Both Containment Spray pump control switches are in the normal position.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-198

Verify the following Malfunctions:

- o Ms11b 25%
- o Ch09 50%

Place the Simulator in Run on the lead examiner's cue.

Emergency Operating Procedure
OP-902-004
Excess Steam Demand Recovery

OSRC Meeting No.: W3-07-23

Reviewed by: R. Dodds 12/14/07

OSRC Chairman

Approved by: [signature], 12/17/07

General Manager - Plant Operations

Approval Date

12/20/2007

Effective Date

Continuous Use

INSTRUCTIONS	CONTINGENCY ACTIONS

Containment Spray Termination

* 27. **IF** CS pumps are operating **AND ALL** of the following conditions are satisfied:

- Containment pressure is less than 16.4 psia and stable or lowering
- RAS has **NOT** actuated

THEN REFER TO Appendix 5-E, "CSAS Reset Procedure" and reset CSAS actuation.

Restore Letdown

* 28. **IF** letdown is isolated, **AND BOTH** of the following conditions exist:

- HPSI throttle criteria are met
- Letdown is needed or desired

THEN REFER TO Appendix 9, "Letdown Restoration" and restore letdown.

Emergency Operating Procedure
OP-902-009
Standard Appendices

OSRC Meeting No.: W3 07-23

Reviewed by: R Dodds 12/14/07
OSRC Chairman

Approved by: 12/17/07
General Manager - Plant Operations
Approval Date

12/20/2007
Effective Date

Continuous Use

ESFAS Reset

Attachment 5-E: CSAS Reset Procedure

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1.1 Place control switches for the following valves to "CLOSE:" • CC 641, CCW RCP INLET OUTSIDE ISOL • CC 710, CCW RCP OUTLET INSIDE ISOL • CC 713, CCW RCP OUTLET OUTSIDE ISOL	
____ 1.2 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 lit on the ENGINNERED SAFETY FEATURES SYSTEM mimic. d. Place the Reset permissive switch to "LK" position.	

INSTRUCTIONS	CONTINGENCY ACTIONS
____ 1.3 Reset CSAS actuation logic on **BOTH** trains as follows: a. Press the CSAS Reset pushbuttons. (CP-33) b. Verify the actuation relay indicator lit on the ENGINEERED SAFETY FEATURES SYSTEM mimic. (CP-10)	
____ 1.4 Stop **ONE** CS pump at a time.	
____ 1.5 **IF** a CS pump is operating, **THEN** stop the remaining CS pump.	
____ 1.6 Close the following Containment Spray valves: • CS 125A, CNTMT SPRAY HEADER A ISOL • CS 125B, CNTMT SPRAY HEADER B ISOL	
____ 1.7 Place **BOTH** Containment Spray pump control switches to normal position.	

End of Appendix 5

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

S7

Waste Condensate Tank Discharge

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Waste Condensate Tank Discharge

Task Standard: Applicant initiated Waste Condensate Tank release in accordance with OP-007-004, Liquid Waste Management System, and secured the release after the flow controller failed to maximum output.

References: OP-007-004, Liquid Waste Management System
CE-003-514, Liquid Radioactive Waste Release Permit (Computer)

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

K/A **068** A4.03, Stoppage of releases if limits exceeded Importance Rating 3.9 / 3.8
RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-007-004, Liquid Waste Management System
Discharge Permit for Waste Condensate Tank A

Description:

The applicant will be tasked with initiating a discharge of Waste Condensate Tank A. The cue will ~~provide~~ **indicate** that the operator in the field has completed all required lineups and is standing by. When the applicant initiates flow, the flow controller output will fail high, causing discharge flow to exceed the 50 gpm permit flow limit. The flow controller will not be capable of securing flow. The applicant will stop discharge flow by closing the discharge isolation valves.

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 ~~TO~~ UPON COMPLETION OF TASK)

INITIAL CONDITIONS:

- Waste Condensate Tank A has been prepared for discharge.
- **The RCA Watch reports that he has completed step 6.10.6 of OP-007-004, Liquid Waste Management System, and that Attachment 11.4, Waste Condensate Tank Discharge Checklist, is complete.**

INITIATING CUES:

- ~~The RCA Watch reports that he has completed step 6.10.6 in OP-007-004, Liquid Waste Management System, and that Attachment 11.4, Waste Condensate Tank Discharge Checklist, is complete.~~
- The Control Room Supervisor directs you to commence discharging Waste Condensate Tank A**, starting at step 6.10.7 of OP-007-004 LWMS**.

TASK ELEMENT 1	STANDARD
6.10.7 On CP-4, Reset Liquid Waste Discharge Flow Integrator to zero.	Integrator is reset to zero.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
6.10.8 Record WCT level and Liquid Waste Discharge Integrator reading on Liquid Release Permit.	Reading is recorded on the Release Permit.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
6.10.9 Verify Liquid Waste Discharge Flow Controller, LWM-IFIC-0647, in Manual with 0% output.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 4	STANDARD
Procedure Caution: If Circulating Water flow is reduced to less than that required by the discharge permit, then discharge shall be secured immediately.	Caution reviewed.
Comment:	**SAT / UNSAT**

Evaluator Note
The combined control switch on CP-4 will open LWM-441 and give an open permissive to LWM-442. LWM-442 is operated using controller LWM-IFIC-0647, also on CP-4. **What about LWM-315 A(B) in the procedure step 6.10.10.1??**

Evaluator Note
When flow rises above the trigger setpoint, the output of the controller will fail in the raise position. Flow will rise above the Permit limit of 50 gpm. The applicant will not be able to secure flow with the controller. The applicant will be required to secure flow by closing LWM-441 and LWM-442 using the control switch.

TASK ELEMENT 5	STANDARD
6.10.10 To start discharging WCT, momentarily position Liquid Waste Condensate Flow Control handswitch, LWM-441 and LWM-442, to Open and adjust flow using Liquid Waste Condensate Flow Controller, LWM-IFIC-0647, not to exceed value specified on Liquid Release Permit.	LWM-441 is opened using control switch. LWM-442 is throttled open using controller.**??** **Procedure states: use LWM-315 A(B) as necessary to achieve desired flow.**
Comment: **The following step is the alternate path.**	**Critical** **SAT / UNSAT**

Additional step: Attempt to stop flow using IFIC-0647

TASK ELEMENT 6	STANDARD
Position Liquid Waste Condensate Flow Control Switch for LWM-441 and LWM-442 to Closed and verify LWM-441 and LWM-442 are closed.	LWM-441 and LWM-442 are closed.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

SIMULATOR OPERATOR INSTRUCTIONS

Reset to IC-197

There are no Malfunctions for this JPM.

Verify the following Overrides:

- DI-04A3A12C-3 is overridden to PUSH

Verify the following Event Trigger settings:

Trigger 7 is set as zaowdlwmifif0647(1)>0.2

REQUEST/APPROVAL PAGE

SAFETY RELATED PROCEDURE

Normal Review Class (check one):
- ☐ OSRC
- ☑ QUALIFIED REVIEWER

PROCEDURE NUMBER: OP-007-004 | REVISION: 302

TITLE: Liquid Waste Management System

PROCEDURE OWNER (Position Title): Assistant Operations Manager (Support)

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

Effective Date / Milestone (if applicable): **08/28/08**

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

PROCEDURE ACTION (Check one):

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

DESCRIPTION AND JUSTIFICATION:

1) Changed Usage Level designation of section 6.1 (Placing Waste Tanks In Service), 6.3 (Placing Laundry Tanks In Service) and 6.6 (Placing Waste Condensate Tanks In Service) from Informational to Reference. This change applies guidance of an existing approved procedure, EN-AD-102, and therefore meets Editorial Correction criteria. This change completes, in part, assigned actions of CR-WF3-03414 CA-04.
2)Caution prior to Step 8.8.11 stating: A Face Shield Must Be Worn To Protect Against Resin Blow-Back When Mixing and Adding Resin, changed to a Warning. This statement is intended to protect personnel, therefore a Warning is appropriate. This change meets the criteria for an Editorial Correction due to being a change to format. Content of the message did not change.

☐ 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				Perry Rodrigue	8/27/2008
EC SUPERVISOR		Administrative Review and Approval		(sign) [signature]	8/28/08
CROSS-DISCIPLINE and INTERNAL REVIEWS (List Groups or Functions)	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	

6.10 DISCHARGING WASTE CONDENSATE TANKS TO CIRCULATING WATER SYSTEM (C)

CAUTION

WASTE CONDENSATE TANK A(B) CANNOT BE RECIRCULATED WHILE DISCHARGING WASTE CONDENSATE TANK B(A) DUE TO LWM-308A(B), WCT A(B) OUTLET ISOLATION, BEING CLOSED DURING DISCHARGE TO CIRCULATING WATER.

6.10.1 Verify WCT to be discharged has been recirculated and sampled in accordance with Section 6.9, Recirculating Waste Condensate Tanks for Sample.

6.10.2 Verify one of the following Circulating Water Boxes is in service:

- B2
- C1
- C2

6.10.3 Verify that Liquid Release Permit to discharge WCT to Circulating Water has been issued.

NOTE

SM/CRS permission signifies that the plant is in a condition that will allow for the discharge of the appropriate tank**. [Commitment P-25084]**

6.10.4 Obtain SM/CRS permission to perform Discharge, document on Attachment 11.4, Waste Condensate Tank Discharge Checklist, and Liquid Release Permit.

NOTE

Successful performance of Step 6.10.5.3 satisfies TRM Table 4.3-8, Source Check Prior to release.

6.10.5 Perform the following:

6.10.5.1 Verify LWM Radiation Monitor, PRM-IRE-0647, activity is less than or equal to 2.2E-5 µCi/ml per Limitation 3.2.7.

6.10.5.2 Perform a source check for LWM Radiation Monitor, PRM-IRE-0647, on the RM-11 at CP-6 console or locally at the RM-80 by Depressing Check Source (C/S) Pushbutton. **[Commitment P-17843]**

6.10.5.3 Verify monitor passes source check. If monitor does not pass source check, then contact Chemistry.

6.10.5.4 When a successful source check has been completed, then document on Liquid Release Permit.

6.10.6 Perform Steps 1 through 20 of Attachment 11.4, Waste Condensate Tank Discharge Checklist.

6.10.7 On CP-4, Reset Liquid Waste Discharge Flow Integrator to zero.

6.10.8 Record WCT level and Liquid Waste Discharge Integrator reading on Liquid Release Permit.

6.10.9 Verify Liquid Waste Discharge Flow Controller, LWM-IFIC-0647, in Manual with 0% output.

CAUTION

IF CIRCULATING WATER FLOW IS REDUCED TO LESS THAN THAT REQUIRED BY THE DISCHARGE PERMIT, THEN DISCHARGE SHALL BE SECURED IMMEDIATELY.

6.10.10 To start discharging WCT, momentarily position Liquid Waste Condensate Flow Control handswitch, LWM-441 and LWM-442, to Open and adjust flow using Liquid Waste Condensate Flow Controller, LWM-IFIC-0647, not to exceed value specified on Liquid Release Permit.

6.10.10.1 Throttle WCT Pump A(B) Recirc Isolation, LWM-315A(B), as necessary to achieve desired flow.

6.10.11 Record Start date and time on Liquid Release Permit.

NOTE

Successful performance of Step 6.10.12 satisfies TRM Table 4.3-8, Channel Check. If the instrument specified is not available, then alternate or local readings may be used to satisfy Channel Check requirements. Note alternate indication used in Remarks section of Liquid Release Permit. **[Commitments P-17822, P-17840]**

6.10.12 Verify Liquid Waste Management Discharge Flow Recorder, LWM-IFRR-0647, deflects upscale to provide discharge flow indication.

6.10.13 If it is desired to place Liquid Waste Condensate Flow Controller, LWM-IFIC-0647 in Auto, then match Setpoint to process flow and place in Auto.

6.10.13.1 Verify Liquid Waste Condensate Flow less than or equal to value specified on Liquid Release Permit.

6.10.14 On CP-4, periodically monitor discharge flow and activity to verify that they are within limits of Liquid Release Permit.

6.10.15 After discharging for 10 minutes, then record Liquid Waste Discharge Monitor, PRM-IRE-0647, reading on Liquid Release Permit.

6.10.16 When WCT level drops to approximately 5% or at SM/CRS discretion, then perform the following:

6.10.16.1 Verify Waste Condensate Tank Pump A(B) Stops.

6.10.16.2 Close the following valves:

- LWM-441 LWM to Circulating Water Shutoff Isol
- LWM-442 LWM to Circulating Water Control Isol

6.10.17 Verify Liquid Waste Condensate Flow Controller, LWM-IFIC-0647, in Manual with an output of 0%.

6.10.18 Complete Attachment 11.4, Waste Condensate Tank Discharge Checklist.

6.10.19 Complete Liquid Release Permit.

6.10.20 Forward completed Liquid Release Permit to Chemistry.

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

P1

Reset Emergency Feedwater Pump AB

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Reset overspeed device on Emergency Feedwater Pump AB during a Station Blackout.

Task Standard: The overspeed device on Emergency Feedwater Pump AB was reset in accordance with OP-902-005, Station Blackout Recovery.

References: OP-902-005, Station Blackout Recovery

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

K/A **061** A2.04, Pump failure or improper operation Importance Rating 3.4 / 3.8
RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-902-005, Station Blackout Recovery

Description:

This task takes place in the RCA. The task takes place during a simulated Station Blackout. This requires the applicant to simulate manual operation of MS-416, Emergency Feedwater Pump AB Trip Valve. All components are located on the -35 elevation. This JPM takes place in a location with numerous pipes and supports that are bump hazards, but no special PPE will be required for this task. There are no special radiological requirements to perform this task.

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.

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

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

INITIAL CONDITIONS:

- A Station Blackout event is in progress
- Emergency Feedwater Pump AB has tripped on an overspeed condition
- The Control Room has closed MS-401 A and MS-401 B.
- The Control Room has cycled MS-407 Open and Closed to depressurize the steam header. **Remove this bullet if this step is done locally per 10.1.b.**

INITIATING CUES:

- The CRS directs you to reset Emergency Feedwater Pump AB **in accordance with OP-902-005, Step 10 RNO.**

TASK ELEMENT 1	STANDARD
10.1.a. Close **BOTH** PUMP AB TURB STM SUPPLY valves: MS-401 A and MS-401 B.	Provided in the cue.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
10.1.b. Locally verify the steam supply header depressurized using MS-407, EFW Pump AB Drip Pot Normal Drain Bypass.	Provided in cue.
Comment: **10.1.b states locally. Should this be done locally by the applicant?? Provide examiner cue…**	**SAT / UNSAT**

Evaluator Note
MS-416 trips closed on an overpseed. In a Station Blackout, MS-416 MOV must be manually operated in the closed direction to position the valve for reset. The physical indication as this operation is performed would be the trip bar moving from a low, tripped position up to the trip latch.

Evaluator Note
MS-416 in the tripped position before and after MOV is manually operated:

TASK ELEMENT 3	STANDARD
10.1.c. Locally close MS 416, EFW Pump AB Turbine Stop Valve.	MS-416 is operated in the closed direction.
EXAMINER CUE: Valve latching mechanism is full up.	
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
The overspeed device is reset by moving the trip bar towards MS-416.

TASK ELEMENT 4	STANDARD
10.1.d. Verify mechanical Overspeed reset.	Overspeed device is reset.
EXAMINER CUE: A cue to give to applicant for this task. OR A PICTURE.	
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 5	STANDARD
10.1.e. Locally open MS 416, EFW Pump AB Turbine Stop Valve.	MS-416 is manually opened.
EXAMINER CUE: Valve is fully CCW and valve stem is up.	
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
10.1.f. Open **BOTH** PUMP AB TURB STM SUPPLY valves. • MS 401A • MS 401B	Communication made to the Control Room.
Comment:	**SAT / UNSAT**

END OF TASK

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

P2

Aligning Spent Fuel Pool Purification

Applicant: _____

Examiner: _____

THIS JPM DOES NOT SEEM DISCRIMINATING AND HAS A LOW IR. PLEASE HAVE ANOTHER JPM AVAILABLE TO REPLACE THIS (SECURE FROM RWSP PURIFICATION OR PLACE FPC IN RWSP PURIFICATION). WE WILL RUN THIS AND THE REPLACEMENT DURING VALIDATION.

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Place the Spent Fuel Pool on purification in accordance with OP-002-006, Fuel Pool Cooling and Purification

Task Standard: The Spent Fuel Pool was aligned for purification in accordance with OP-002-006, Fuel Pool Cooling and Purification.

References: OP-002-006, Fuel Pool Cooling and Purification

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

K/A **033** K4.02, Maintenance of Spent Fuel Pool cleanliness Importance Rating 2.5 / 2.7 RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-002-006, Fuel Pool Cooling and Purification

Description:

This task takes place in the RCA, specific to the Fuel Handling Building. All components are located on the +1 elevation of the Fuel Handling Building. No special PPE will be required for this task. There are no special radiological requirements to perform this task.

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.

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

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

INITIAL CONDITIONS:

- Refueling Water Storage Pool Purification has been in service for 2 days.
- Refueling Water Storage Pool Purification was secured 1 hour ago.

INITIATING CUES:

- The CRS directs you to place the Spent Fuel Pool on purification.
- No system venting is required.

TASK ELEMENT 1	STANDARD
6.4.1 Verify Refueling Water Storage Pool Purification is secured in accordance with Section 6.7, Securing RWSP Purification.	Provided in cue.
Comment:	**SAT / UNSAT**

TASK ELEMENT 2	STANDARD
6.4.2 Throttle Fuel Pool Purif Pump Discharge Isolation, FS-318, to 2 turns Open.	FS-318 is throttled 2 turns open.
EXAMINER CUE: Valve fully clockwise and then CCW 2 turns.	
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
6.4.3 Close Fuel Pool Purification Pump breaker, FS-EBKR-314A-5D.	Breaker is closed.
EXAMINER CUE: Breaker ON (or up etc.)	
Comment: The 314 A Bus is located on the +1 elevation of the Fuel Handling Building.	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
Procedure Note. (1) Fuel Pool Purification Pump will not start if Fuel Pool level is <41' 6". (2) Fuel Pool Purification components should be bypassed as necessary to maintain differential pressures less than or equal to the Maximum DP limit listed below. Chemistry Department should be notified when any of these components are bypassed (refer to Limitation 3.2.6 for applicable bypass valves): • Fuel Pool Purification Filter DP: 25 PSID • Fuel Pool Ion Exchanger Outlet Header Strainer DP: 10 PSID • Combined DP of Fuel Pool Ion Exchanger and Fuel Pool Ion Exchanger Outlet Header Strainer (aligned to sense differential pressure across both): 25 PSID	Note reviewed.

Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
Procedure caution. If the Spent Fuel Pool temperature (PMC PIDs A47004 and A47005) rises to ≥ 135 °F at any time during purification, then the Fuel Pool Purification Pump must be stopped or Fuel Pool ion exchanger resin damage may occur.	Caution reviewed.
Comment:	**SAT / UNSAT**

TASK ELEMENT 6	STANDARD
6.4.4 Start the Fuel Pool Purification Pump.	Pump started.
EXAMINER CUE: Red light ON, pump amps, flow, noise etc.	
Comment: The control switch for the Fuel Pool Purification Pump is located in the Fuel Pool Purification cubicle.	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
6.4.5 If venting is required, then vent from the following valves: • FS-319 Fuel Pool Purif Pump Discharge Header Vent • FS-324 Fuel Pool Purif Filter Vent • FS-344 Fuel Pool Ion Exchanger Outlet Header Vent	Provided in the cue.
Comment:	**SAT / UNSAT**

TASK ELEMENT 8	STANDARD
6.4.6 Open Fuel Pool Purif Pump Discharge Isolation, FS-318.	FS-318 is full open.
EXAMINER CUE: Fully clockwise	
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

Waterford 3

2010 NRC SRO Exam

JOB PERFORMANCE MEASURE

P3

SUPS 014 AB Operation

Applicant: _____

Examiner: _____

JOB PERFORMANCE MEASURE
DATA PAGE

Task: Transfer SUPS 014 AB from Alternate to Normal AC power

Task Standard: SUPS 014 AB was transferred from Alternate to Normal AC alignment in accordance with OP-006-005, Inverters and Distribution.

References: OP-006-005, Inverters and Distribution

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

K/A **062** A3.04, Operation of inverter Importance Rating 2.7 / 2.9
RO / SRO

Applicant: _____

Time Start: _____ Time Finish: _____

Performance Time: _____ minutes

Performance Rating: SAT UNSAT

Comments: _____

Examiner: _____ Date: _____
Signature

EXAMINER COPY ONLY

Tools/Equipment/Procedures Needed:

OP-006-005, Inverters and Distribution

Description:

SUPS 014 AB will be simulated in the Alternate AC power alignment. Applicant will transfer SUPS 014 AB to the Normal AC alignment. All steps will be simulated in Switchgear Room A. No special PPE will be required for this task.

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.

APPLICANT CUE SHEET

Do Not Manipulate Any Plant Components

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

INITIAL CONDITIONS:

- SUPS 014 AB is in the Alternate AC alignment
- The inverter was isolated in accordance with **OP-006-005, Inverters and Distribution,** ~~steps~~ **Step** 6.5.2.7.

INITIATING CUES:

- The CRS directs you to place SUPS 014 AB in the Normal AC alignment in accordance with OP-006-005, Inverters and Distribution, section 6.5.3.

PLACE THIS SHEET AT END OF JPM

TASK ELEMENT 1	STANDARD
6.5.3.1.1 Place Normal Feeder breaker to ON.	Breaker is ON.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 2	STANDARD
6.5.3.1.2 Verify Inverter Input Voltage > 121 VDC, then place Emergency Feeder breaker to ON.	Breaker is ON.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 3	STANDARD
6.5.3.1.3 Depress and release Inverter Operate pushbutton.	Pushbutton is pressed and released.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 4	STANDARD
6.5.3.2 Verify SUPS 014AB Static Switch Retransfer toggle switch in INHIBIT.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 5	STANDARD
6.5.3.3 Place SUPS 014AB Alternate Feeder breaker to ON.	Breaker is ON.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 6	STANDARD
6.5.3.4 Depress and release SUPS 014AB Static Switch Transfer Test pushbutton.	Test pushbutton depressed and released.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 7	STANDARD
6.5.3.4.1 Verify Static Switch On Reserve light Illuminates.	Verification complete.
Comment:	**SAT / UNSAT**

TASK ELEMENT 8	STANDARD
6.5.3.5 Depress and release SUPS 014AB Lamp Test/Reset pushbutton.	Pushbutton depressed and released.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 9	STANDARD
6.5.3.5.1 Verify Static Switch On Reserve light remains Illuminated.	Verification complete.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 10	STANDARD
6.5.3.6 Place SUPS 014AB Output To PDP014AB breaker to ON.	Breaker is ON.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 11	STANDARD
6.5.3.7 Place SUPS 014AB Bypass breaker to OFF.	Breaker is OFF.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 12	STANDARD
6.5.3.8 Place SUPS 014AB AC Voltage Select Switch to INVERTER.	Select Switch is in INVERTER.
Comment:	**Critical** **SAT / UNSAT**

Evaluator Note
When applicant observes the SUPS Output Voltage meter, provide indication of zero volts. If the applicant presses the Operate pushbutton, provide the indications provided in Task Element 13. If the applicant does not press the Operate pushbutton, then provide the indication that the Static Switch On Reserve light is still illuminated at Task Element 16.

TASK ELEMENT 13	STANDARD
6.5.3.9 If no voltage is indicated, then depress and release SUPS 014AB Inverter Operate pushbutton, and verify the following: • Inverter Phase Locked light Illuminated • Inverter Output voltage CN ~120 VAC (118.8 to 121.2 VAC) • Inverter Output voltage AN ~120 VAC (118.8 to 121.2 VAC) • Inverter Output voltage BN ~120 VAC (118.8 to 121.2 VAC) • Inverter Output frequency ~60 Hz (59.97 to 60.03 Hz)	Observes no voltage and presses and releases the Operate pushbutton.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 14	STANDARD
6.5.3.10 Place SUPS 014AB Static Switch Retransfer toggle switch to AUTO.	Toggle Switch is in Auto.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 15	STANDARD
6.5.3.11 After approximately 30 seconds, depress and release SUPS 014AB Lamp Test/Reset pushbutton.	Pushbutton pressed and released.
Comment:	**Critical** **SAT / UNSAT**

TASK ELEMENT 16	STANDARD
6.5.3.11.1 Verify Static Switch On Reserve light Extinguished.	Verification complete.
Comment:	**Critical** **SAT / UNSAT**

END OF TASK

Facility: WATERFORD 3 Scenario No.: 1 Op Test No.: **NRC**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
- 100%, 125 EFPD, AB buses aligned to Train B
- Protected Train is B
- Emergency Diesel Generator A is out of service.

Turnover:
- Maintain 100 % power

Event No.	Malf. No.	Event Type*	Event Description
1	H_105	I – ATC I – SRO	Remove Reactor Power Cutback from service in accordance with OP-004-015.
2	RC22F2	TS – SRO I – SRO	Pressurizer pressure instrument RC-IPI-0102 B fails low.
3	SG01B CV02C	TS – SRO C – SRO C – ATC	Steam Generator 2 tube leakage Charging Pump AB fails to auto start
4	N/A	R- ATC N-BOP N-SRO	Rapid Plant Power Reduction due to Steam Generator tube leakage.
5	RC08A RC09A RC10A	C – ATC C – SRO	Reactor Coolant Pump 1A seal failure, manual reactor trip
6	SG01B	M-All	Steam Generator Tube Rupture
7	RP08C	C – ATC C – SRO	Containment Isolation CVC-401 fails to auto close on CIAS
8	MS11B	M – All	Main Steam line break on Steam Generator 2 inside Containment.

* (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 assuming the shift, annunciator H1005, Reactor Power Cutback Single Channel Trouble, alarms and Reactor Power Cutback auto actuation fails. The crew will be contacted by I&C maintenance after reviewing the annunciator response procedure describing a failure of Reactor Power Cutback, requiring Reactor Power Cutback be removed from service in accordance with OP-004-015, Reactor Power Cutback. This manipulation is performed by the ATC operator at CP-2 and CP-7.

After Reactor Power Cutback is removed from service, Pressurizer pressure instrument RC-IPI-0102 B 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 3.3.2 and determine that Plant Protection System bistable 6 for low Pressurizer pressure 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. Plant Monitoring Computer group SPDS indication of Pressurizer pressure is affected by this failure.

After the CRS evaluates Tech Specs but before bistable 6 is bypassed, a Steam Generator tube leak develops in Steam Generator 2. Charging Pump AB will be aligned as the first backup Charging Pump and it will fail to auto start on the lowering Pressurizer level. The ATC operator should make this diagnosis and start Charging Pump AB. The CRS should enter OP-901-202, Steam Generator Tube Leakage or High Activity. The size of the leak will require entering OP-901-212, Rapid Plant Power Reduction. For the power reduction, the ATC will perform Direct Boration to the RCS as well as Pressurizer boron equalization and ASI control with CEAs. The BOP will manipulate the controls to reduce Main Turbine load. The CRS should enter Tech Spec 3.4.5.2 for Steam Generator 2 leakage. The CRS may consider declaring Charging Pump AB inoperable due to it's failure to auto start, but no Tech Spec entry is required.

Once the crew has commenced the power reduction and lowered power to ~ 90%, or at the lead examiner's cue, RCP 1a will develop multiple seal failures. The second and third seal failures will be timed to occur 3 minutes after the initial seal failure. The crew should have time to get out off normal procedure OP-901-130, Reactor Coolant Pump Malfunction, before the subsequent seals fail. With the second and third seals failing, the crew will be required to trip the reactor.

When the reactor is tripped, the Steam Generator tube leak will degrade to a rupture. The CRS should direct the ATC to initiate Safety Injection and Containment Isolation. Containment Isolation valve CVC-401 at CP-4 will fail to close on the CIAS, requiring the ATC operator to close the valve.

After the crew completes OP-902-000, Standard Post Trip Actions and the CRS diagnoses into OP-902-007, Steam Generator Tube Rupture Recovery, the CRS should direct a rapid RCS cooldown to less than 520 °F T_{HOT}. After this direction is given, a Main Steam Line break will develop on Steam Generator 2 inside Containment. The CRS should exit OP-902-007 and enter OP-902-008, Functional Recovery Procedure. Prioritization in OP-902-008 should result in Containment Isolation being priority 1. The crew should address Containment Isolation by using the steps in the Heat Removal section to isolate Steam Generator 2.

The scenario can be terminated after Steam Generator 2 is isolated, or at the lead examiners discretion.

Critical Tasks

1. Trip any RCP not satisfying RCP operating limits.

This task is satisfied by securing all RCPs within 3 minutes of loss of CCW flow. The required task becomes applicable after Containment Spray has been actuated. The time requirement of 3 minutes is based on the RCP operating limit of 3 minutes without CCW cooling.

2. Prevent Opening the Main Steam Safety Valves.

This task is satisfied by the crew taking action to maintain Steam Generator #2 pressure below the safety valve setpoint by taking action to reduce RCS pressure to < 945 psia.

Scenario Quantitative Attributes

1. Total malfunctions (5–8)	8
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	3
4. Major transients (1–2)	2
5. EOPs entered/requiring substantive actions (1–2)	2
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	2

Scenario Notes:

A. Reset Simulator to IC-191.

B. Verify the following Scenario Malfunctions are loaded:
   1. rc22f2 for Pressurizer level instrument RC-ILI-0102 B
   2. sg01B for Steam Generator #2 tube leak
   3. cv02c for Charging Pump AB
   4. rc08a, 09a, and 10a for RCP 1A
   5. rp08c for CVC-401
   6. ms11b for Steam Generator #2 steam line break
   7. eg10a for EDG A overspeed device

C. Verify the following remotes
   1. egr27 for EDG B local alarm acknowledgement

D. Verify the following overrides
   1. di-08a05s14-1 for closing FP-601 A set to trigger 9
   2. di-08a05s19-1 for closing IA-909 set to trigger 9
   3. di-04a04s10-1 for closing CVC-109 set to trigger 9
   4. di-02a05a2s34-0 for Reactor Power Cutback out of service set to trigger 1.
   5. di-02a05a2s30-0 for Reactor Power Cutback lamp test.

E. Verify the following under Event Triggers:
   1. zdirpciastrp(4).eq.1 is set on trigger 9

F. Verify the following Control Board Conditions:
   1. Danger tag placed on EDG A control switch
   2. Danger tag placed on EDG A Output Breaker

G. Verify EDG A output breaker is racked out and place danger tags on EDG A and its output breaker.

H. Ensure Protected Train B sign is placed in SM office window.

I. Verify EOOS is 8.5 Yellow

J. Complete the simulator setup checklist.

Simulator Booth Instructions

Event 1 Reactor Power Cutback Failure

1. On Lead Examiner's cue, initiate Event Trigger 1.
2. After the annunciator response procedure is referenced, call the CRS as the on shift I&C technician. Report that during planned data collection, the Reactor Power Cutback Channel A has locked up and will not respond to any commands or signals.
3. If Work Week Manager is called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 2 Pressurizer Pressure Instrument RC-IPI-0102 B Fails Low

1. On Lead Examiner's cue, initiate Event Trigger 2.
2. If Work Week Manager or I&C is 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, report RCS pressure indications are reading normal on all channels except for Channel B.

Event 3 / 4 Steam Generator #2 Tube Leak / Charging Pump AB Fails to Start / Rapid Plant Power Reduction

1. On Lead Examiner's cue, initiate Event Trigger 3.
2. If Chemistry or HP is called, acknowledge S/G tube leak and need to carry out the actions of UNT-005-032, Steam Generator Primary to Secondary Leakage.
3. If called as TGB watch to monitor Condensate System Polisher pressure, acknowledge and remove Polisher Vessel from service if necessary.
4. If called as the RCA Watch to check Charging Pump AB, report that it looks normal locally.

Event 5 Reactor Coolant Pump 1A seal failure

1. On Lead Examiner's cue, initiate Event Trigger 5.
2. If Engineering is called, acknowledge communication and report that engineering will investigate the RCP 1A failure.
3. If called as the RAB Watch to check RCP vibration in Switchgear room B, acknowledge communication, no report is necessary.

Event 4 Steam Generator #2 Tube Rupture

1. On Lead Examiner's cue, initiate change the severity of malfunction SG01B to 7% and ramp it in over a 1 minute period.
2. If called as RAB watch to check Emergency Diesel Generator B, initiate Trigger 16, after EDG B Trouble alarm clear, report it is running satisfactorily.

Event 5 Steam Generator #2 Steam Line Break

1. After the crew has entered OP-902-007 and commenced the rapid cooldown and on the Lead Examiner's cue, initiate Event Trigger 7.

Event 6 High Pressure Safety Injection Pump A fails to start

1. If called to check the HPSI Pump A breaker, report all indications are normal.
2. If called to check the HPSI Pump A locally, report all indications are normal.

Scenario Timeline:

Event	Malfunction		Severity	Ramp HH:MM:SS	Delay	Trigger
1	H_L05		N/A	N/A	N/A	1
	Remove Reactor Power Cutback from service					
1	DI-02A05A2S34-0		N/A	N/A	N/A	1
	Reactor Power Cutback Auto Actuate					
1	DI-02A05A2S30-0		N/A	N/A	N/A	1
	Remove Reactor Power Cutback Lamp Test					
2	RC22F2		N/A	N/A	N/A	2
	Pressurizer pressure instrument RC-IPI-0102 B fails low					
3	SG01	B	0.6 %	00:3:00	NA	3
	Steam Generator #2 Tube Leak					
4	CV02C		N/A	N/A	N/A	N/A
	Charging Pump AB fails to auto start					
5	RC08	A	100 %	00:30	N/A	5
	RC09			00:30	03:00	
	RC10			00:30	03:15	
	Reactor Coolant Pump 1A seal failures					
6	SG01	B	7.0 %	00:01:00	N/A	N/A
	Steam Generator #2 Tube Rupture					
7	RP08C		N/A	N/A	N/A	N/A
	CVC-401 fails to close on CIAS					
8	MS11B		12 %	03:00	N/A	8
	Main Steam Line Break S/G 2					

REFERENCES:

Event	Procedures
1	OP-004-015, Reactor Power Cutback System
2	OP-009-007, Plant Protection System Tech Spec 3.3.1 and 3.3.2
3	OP-901-202, Steam Generator Tube Leakage or High Activity Tech Spec 3.4.5.2
4	OP-901-212, Rapid Plant Power Reduction Tech Spec 3.1.3.6 Regulating and Group P CEA Insertion Limits
5	OP-901-130, Reactor Coolant Pump Malfunction
6	OP-902-000, Standard Post Trip Actions OP-902-007, Steam Generator Tube Rupture Recovery OP-902-009, Standard Appendices, Appendix 1, Diagnostic Flow Chart
8	OP-902-008, Safety Function Recovery Procedure OP-902-009, Standard Appendices, Appendix 13, Stabilize RCS Temperature

Op Test No.: NRC Scenario # 1 Event # 1 Page 1 of 23

Event Description: Remove Reactor Power Cutback from Service

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed Cutback Channel.
		Alarms:
		• Reactor Pwr Cutback Single Chnl Trouble (Cabinet H, L-5)
		Indications:
		• Reactor Power Cutback AUTO ACTUATE OUT OF SERVICE pushbutton illuminated on CP-2
	CRS	After receiving phone call from I&C Maintenance, directs ATC to remove Reactor Power Cutback from service.
	BOP	Step 8.1.2.1 Verify 65% bistable lamps on all four Nuclear Instrumentation Test Drawers Illuminated.
		• Lamps are located behind the main panels on CP-10 A – D.
	ATC	Step 8.1.2.2 On CP-7, verify all four LOSS OF TURB BYPASS keyswitches in BYPASS and all four red BYPASS lamps Illuminated.
	ATC	Step 8.1.2.3 On CP-2, place LOSS OF TURBINE TRIP keyswitch to ENABLE.
	ATC	Step 8.1.2.4 On CP-7, place all four LOSS OF TURB BYPASS keyswitches to OFF and verify all four green OFF lamps Illuminate.
	BOP	Step 8.1.2.5 On Steam Bypass Control System Cabinet (IC-ECP-05), verify Reactor Power Cutback lamps Extinguished.
		• Lamps are located behind the main panels on CP-05, which is not modeled. Coach surrogate on this report.
	ATC	Step 8.1.2.6 On CP-2, place LOSS OF LOAD keyswitch to TURBINE TRIP.
	CRS	Step 8.1.2.7 Notify the Duty Plant Manager that Loss of Turbine Trip has been placed in service.

Examiner Note

This event is complete after the ATC operator addresses the AUTO ACTUATE OUT OF SERVICE pushbutton at step 7.1.2

Or

As directed by the Lead Evaluator

Op Test No.: NRC Scenario # 1 Event # 2 Page 2 of 23

Event Description: Pressurizer Pressure Instrument Failure **Match title with D-1**

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed channel.
		Alarms:
		• RPS CHANNEL TRIP PZR PRESSURE LOW (Cabinet K, A-16)
		• PZR PRESSURE LO PRETRIP B/D (Cabinet K, C-16)
		• RPS CHANNEL B TROUBLE (Cabinet K, F-18)
		Indications
		• Pressurizer pressure instrument RC-IPI-0102 B on CP-7 indicates pegged low.
		• Pressurizer pressure indication on the Plant Monitoring Computer mimic SPDS averages the failed indicator with valid pressure indication.
		• Pressurizer Pressure Lo trip and pre-trip lamps lit on CP-7 Channel B.
	CRS	Review Tech Specs based on the failed instrument.
		• Refer to Tech Spec 3.3.3.5 and 3.3.3.6.
		• Enter Tech Spec 3.3.1 (item 5) and 3.3.2 (items 1 and 3)
		• Direct bypassing Channel B bistable 6 for Lo Pressurizer Pressure. This is a 1 hour action.
	Note	OP-903-013, Monthly Channel Checks, does list this instrument for Tech Spec 3.3.3.5 and 3.3.3.6 applicability. Entry is not required, however, because the minimum channel requirements will still be met after the failure.

Examiner Note

This event is complete after the CRS evaluates Tech Specs

Or

As directed by the Lead Evaluator

Op Test No.: NRC Scenario # 1 Event # 3 / 4 Page 3 of 23

Event Description: Steam Generator Tube Leakage / Charging Pump AB Fails to start / Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of Steam Generator Tube Leakage.
		Alarms:
		• RAD MONITORING SYS ACTIVITY HI-HI (Cabinet L, A-9)
		• VACUUM PUMPS EXHAUST ACTIVITY HI (Cabinet E, C-3)
		Indications
		• RM-11 Rad Monitor indication will display rising activity on Main Steam Rad Monitor #2, Steam Generator #2 N-16 Rad Monitor, Main Condenser Vacuum Pumps WRGM, and the Blowdown radiation monitor. • Steam Generator tube leakage indication rising as indicated on PMC Group PSLR (PMC PID C48304).
	CRS	Enter and direct the implementation of OP-901-202, Steam Generator Tube Leakage or High Activity.
Examiner Note The following steps are from OP-901-202, Steam Generator Tube Leakage or High Activity.		
	CRS	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.
	CRS	**Procedure 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.

Op Test No.: NRC Scenario # 1 Event # 3 / 4 Page 4 of 23

Event Description: Steam Generator Tube Leakage / Charging Pump AB Fails to start / Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	CRS	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
	CRS	**Procedure NOTE** Any rise >30 GPD/HR followed by a subsequent lowering of the rate of change would indicate a spike and a rapid power reduction is not required.
	CRS	3. IF Primary to Secondary Leakage in any Steam Generator is ≥75 GPD (~0.05 GPM) AND the rate of change is rising by ≥30 GPD/HR (~0.02 GPM/HR), THEN perform the following: 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 1 hour. 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.
		• These conditions will be met. The CRS should enter OP-901-212 and perform it concurrently with OP-901-202. • Steps 1 through 15 of Steam Generator Tube Leakage or High Activity are listed here. The CRS should begin the steps of Rapid Plant Power Reduction before working these steps. The steps of OP-901-212, Rapid Plant Power Reduction follow step 15 of OP-901-202.

Op Test No.: NRC Scenario # 1 Event # 3 / 4 Page 5 of 23

Event Description: Steam Generator Tube Leakage / Charging Pump AB Fails to start / Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	CRS	7. Notify Chemistry Department to perform the following: 7.1 Provide current Plant status including the following: • Primary to Secondary Leakrate • Primary to Secondary Leakage Rate of Change • Plant action(s) Operations is OR will be implementing (example: plant shutdown, rapid plant shutdown, monitoring) 7.2 Carry out actions in accordance with UNT-005-032, STEAM GENERATOR PRIMARY-TO-SECONDARY LEAKAGE. 7.3 Begin sampling Steam Generators for activity. 7.4 Quantify Steam Generator Tube leakage.
	CRS	8. Notify Radiation Protection to carry out the actions of UNT-005-032, STEAM GENERATOR PRIMARY-TO-SECONDARY LEAKAGE.
	CRS / BOP	9. Verify BD-303, DISCHARGE TO WASTE, Locked Closed.
	CRS / BOP	10. Verify BD-1162, BD FLASH TANK VENT, Closed.
	CRS / BOP	11. Verify CD-145, CD DUMP TO WASTE POND, Closed. 11.1 Notify Chemistry prior to dumping Condensate from the Condenser Hotwell to the CST.
	Crew	12. Establish AND monitor a PMC Trend of the following PMC points: • C48304 PRI TO SEC LEAKAGE • C48305 PRI TO SEC LEAK RATE CHANGE (GPD/HR) • C48251 RE5501 CH1 LEAK RATE • C48252 RE5501 CH2 LEAK RATE
	CRS	**Procedure NOTE** Until arrangements are made for disposal of radioactively contaminated resin, Condensate Polisher Vessels should NOT be placed in service with resin loaded in the vessel.

Op Test No.: NRC Scenario # 1 Event # 3 / 4 Page 6 of 23

Event Description: Steam Generator Tube Leakage / Charging Pump AB Fails to start / Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	CRS	15. Remove from service ANY Condensate Polisher Vessels which are loaded with resin in accordance with OP-003-031, CONDENSATE POLISHER/BACKWASH TREATMENT. 15.1 Do not place in service any condensate polisher vessel loaded with resin without the coordination of Chemistry.
Examiner Note For the failure of Charging Pump AB failing to auto start on lowering level, this malfunction may occur before or after the Rapid Power Reduction is started, depending on the pace of the crew. Charging Pump AB would have auto started at ~ 53%, depending on power level.		
	ATC	Recognize and report indications of Charging Pump AB Auto Start Failure.
		Alarm (This alarm only comes in if Pressurizer Level drops to 3.9% below the Pressurizer Level Setpoint. If the ATC starts Charging Pump AB before this level, this alarm will not come in):
		• PRESSURIZER LEVEL HI/LO (Cabinet H, B-1)
		Indications
		• Pressurizer level drops more than 2.5% below Pressurizer Level Setpoint and Charging Pump AB does not start.
	ATC	Start Charging Pump AB by taking the control switch on CP-2 to ON.
Examiner Note The following steps are from OP-901-212, Rapid Plant Power Reduction.		
	CRS	**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.

Op Test No.: NRC Scenario # 1 Event # 3 / 4 Page 7 of 23

Event Description: Steam Generator Tube Leakage / Charging Pump AB Fails to start / Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	ATC	Begin RCS Boration by either of the following methods as directed by the CRS: • Direct Boration • Emergency Boration using one Charging Pump
	CRS	Step 1: Begin RCS Boration by one of the following methods: up to 340 EFPD: Direct Boration or Emergency Boration using one Charging Pump
	ATC	Steps for Direct Boration:
		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.
		• 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)
		• 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. • Should use Reactor Engineering Reactivity Worksheet
		• 6.7.3 Set Boric Acid Makeup Batch Counter to volume of Boric Acid desired.
		• 6.7.4 Verify Boric Acid Makeup Pumps selector switch aligned to desired Boric Acid Makeup Pump A(B).

Op Test No.: NRC Scenario # 1 Event # 3 / 4 Page 8 of 23

Event Description: Steam Generator Tube Leakage / Charging Pump AB Fails to start / Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
		• 6.7.5 Place Direct Boration Valve, BAM-143, control switch to AUTO.
		• 6.7.6 Place Makeup Mode selector switch to BORATE.
		• 6.7.7 Verify selected Boric Acid Makeup Pump A(B) Starts.
		• 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.
		• 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.
		• 6.7.11 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate or Open.
		• 6.7.12 Observe Boric Acid flow rate for proper indication.
	Note	This manipulation is performed at CP-4. The ATC should use the Reactivity Worksheet to recommend a boron quantity to the CRS.
	ATC	Perform Boron Equalization as follows:
		• Place available Pressurizer Pressure Backup Heater Control Switches to ON.
		• Reduce Pressurizer Spray Valve Controller (RC-IHIC-0100) setpoint potentiometer to establish spray flow and maintain RCS pressure 2250 PSIA (2175 – 2265).
		This manipulation is performed at CP-2.
	ATC	Operate CEAs to maintain ASI using CEA Reg. Group 6 or Group P Control Element Assemblies. Operate CEAs in Manual Group mode as follows:
		• 6.7.1 Verify Plant Monitoring Computer operable in accordance with OP-004-012, Plant Monitoring Computer.

Op Test No.: NRC Scenario # 1 Event # 3 / 4 Page 9 of 23

Event Description: Steam Generator Tube Leakage / Charging Pump AB Fails to start / Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
		• 6.7.2 Position Group Select switch to desired group.
		• 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
		• 6.7.4 Operate CEA Manual Shim switch to 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.
		6.7.5 When desired set of moves have been completed, then place Mode Select switch to OFF.
	Note	CEA Group P should be used first to a low limit of 120 inches, followed by CEA Group 6 to a low limit of 120 inches to comply with Tech Spec 3.1.3.6.
		• This manipulation is performed at CP-2.
	CRS	Notify the Load Dispatcher (Woodlands) that a rapid power reduction is in progress.
	CRS	Announce to Station Personnel over the Plant Paging System that a rapid plant power reduction is in progress.
	Crew	Maintain RCS Cold Leg Temperature 536°F to 549°F.

Op Test No.: NRC Scenario # 1 Event # 3 / 4 Page 10 of 23

Event Description: Steam Generator Tube Leakage / Charging Pump AB Fails to start / Rapid Plant Power Reduction

Time	Position	Applicant's Actions or Behavior
	BOP	Commence Turbine load reduction by performing the following:
		• Depress LOAD RATE MW/MIN pushbutton.
		• Set selected rate in Display Demand Window.
		• Depress ENTER pushbutton.
		• Depress REFERENCE pushbutton.
		• Set desired load in Reference Demand Window.
		• Depress ENTER pushbutton.
		• Depress GO pushbutton.
		This manipulation is performed at CP-1. The BOP will set up the Main Turbine controls. The ATC will direct the BOP when to commence unloading the Main Turbine based on the drop in RCS Cold Leg temperature.
	CRS	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.
Examiner Note This event is complete after power has been reduced to the satisfaction of the Lead Evaluator.		

Op Test No.: NRC	Scenario # 1	Event # 5	Page 11	of 23
Event Description:	Reactor Coolant Pump 1A Seal Failure			

Time	Position	Applicant's Actions or Behavior
	ATC / BOP	Recognize and report indications of RCP 1A seal failure.
		Indications
		• RCP 1A seal bleed off flow and temperature rising on the Plant Monitoring Computer and CP-2.
		• RCP 1A seal pressures rising on the Plant Monitoring Computer and CP-2.
	CRS	Enter and direct the implementation of OP-901-130, Reactor Coolant Pump Malfunction.
	CRS	IF Reactor Coolant Pump Seal has failed, THEN GO TO section E1, Seal Failure.
	Crew	Procedure Note 1. RCP Seal pressure and Control Bleedoff temperature and flow are normally as follows (assuming normal operating RCS temperature and pressure): • Vapor Seal pressure: 25 to 45 PSIG • Upper Seal pressure: 585 to 915 PSIG • Middle Seal pressure: 1237 to 1815 PSIG • CBO temperature: 135° to 190°F • CBO flow: 1.2 to 1.8 GPM 2. (If only one Reactor Coolant Pump Seal has failed on a Reactor Coolant Pump, THEN pump operation may continue provided the seal package is monitored for further degradation.
	Crew	1. Inform System Engineer of Reactor Coolant Pump Seal failure.
	Crew	Procedure Caution (1) CCW TEMPERATURES OF <75□ F COULD LEAD TO ESSENTIAL CHILLER TRIPS ON EVAPORATOR LOW REFRIGERANT PRESSURE. (2) CCW TEMPERATURE SHOULD BE CHANGED AT A RATE OF ≤ 10 °F IN ONE HOUR TO PREVENT DEGREDATION OF THE REACTOR COOLANT PUMP SEALS.

Op Test No.: NRC Scenario # 1 Event # 5 Page 12 of 23

Event Description: Reactor Coolant Pump 1A Seal Failure

Time	Position	Applicant's Actions or Behavior
	CRS / BOP	2. IF Controlled Bleedoff temperature is rising, THEN lower Component Cooling Water temperature by ANY of the following: • Start Dry Cooling Tower Fans. • Start Auxiliary Component Cooling Water Pump(s) AND associated Wet Cooling Tower Fans. • Start Auxiliary Component Cooling Water Pump(s) AND lower ACC-126A(B) setpoint.
Examiner Note Seals are timed such that the second seal will fail 3 minutes after the first.		
		3. IF TWO OR MORE seals fail in rapid succession, (within 12 hours) THEN perform the following:
	ATC	3.1 Trip the Reactor.
	ATC	3.2 Secure affected Reactor Coolant Pump.
		• Control switch is on CP-2.
	Crew	3.3 GO TO OP-902-000, STANDARD POST TRIP ACTIONS.
Examiner Note This event is complete after the ATC operator trips the reactor. The severity of the SGTL should be updated upon reactor trip.		

Op Test No.: NRC Scenario # 1 Event # 6 / 7 Page 13 of 23

Event Description: Steam Generator Tube Rupture / CVC-401 Fails to Close

Time	Position	Applicant's Actions or Behavior
	ATC / BOP	Recognize and report indications of Steam Generator Tube Rupture.
		Alarms
		• PRESSURIZER LEVEL HI/LO (Cabinet H, B-1)
		Indications
		• Pressurizer level lowering > Charging Pump capacity.
		• Lowering Pressurizer pressure.
		• Charging Pump A auto-starts if not already started.
	ATC	If directed by CRS, trip Reactor using 2 Reactor Trip pushbuttons at CP-2.
	ATC	If directed by CRS, initiate Safety Injection Actuation (SIAS) and Containment Isolation Actuation (CIAS) at CP-7.
	ATC	Close CVC-401 after Containment isolation
		• This component is on CP-4 and receives a CIAS closure signal. This step becomes applicable after the CIAS is actuated.
	BOP	Start High Pressure Safety Injection Pump A
		This component is on CP-8 and receives a SIAS start signal. This step becomes applicable after the SIAS is actuated.
	CRS	Direct ATC and BOP to carry out Standard Post trip Actions.
	ATC	Determine **Reactivity Control** acceptance criteria are met: • Check reactor power is dropping. • Check startup rate is negative. • Check less than **TWO** CEAs are **NOT** fully inserted.

Op Test No.: NRC Scenario # 1 Event # 6 / 7 Page 14 of 23

Event Description: Steam Generator Tube Rupture / CVC-401 Fails to Close

Time	Position	Applicant's Actions or Behavior
	BOP	Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped
	BOP	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	Determine **RCS Inventory Control** acceptance criteria are met: Check that the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% • Check RCS subcooling is greater than or equal to 28ºF.

Op Test No.: NRC Scenario # 1 Event # 6 / 7 Page 15 of 23

Event Description: Steam Generator Tube Rupture / CVC-401 Fails to Close

Time	Position	Applicant's Actions or Behavior
	ATC	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
		IF pressurizer pressure is less than 1684 psia, **THEN** verify the following have initiated. • SIAS • CIAS
	ATC	Determine **Core Heat Removal** acceptance criteria are met: • Check at least one RCP is operating. • Check operating loop ΔT is less than 13ºF. • Check RCS subcooling is greater than or equal to 28ºF.
	BOP	Determine **RCS Heat Removal** acceptance criteria are met: Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 5% to 80% NR • Main Feedwater is available to restore level within 50%-70% NR.
	ATC	Check RCS TC is 530 ºF to 550 ºF
	BOP	Check steam generator pressure is 885 psia to 1040 psia.
	BOP	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	Reset moisture separator reheaters, and check the temperature control valves closed.

Op Test No.: NRC	Scenario # 1	Event # 6 / 7	Page 16	of 23
Event Description:	Steam Generator Tube Rupture / CVC-401 Fails to Close			

Time	Position	Applicant's Actions or Behavior
	ATC	Determine **Containment Isolation** acceptance criteria are met: • Check containment pressure is less than 16.4 psia. • Check **NO** containment area radiation monitor alarms **OR** unexplained rise in activity. • Check **NO** steam plant activity monitor alarms **OR** unexplained rise in activity.
	BOP	Determine **Containment Temperature and Pressure Control** acceptance criteria are met: • Check containment temperature is less than or equal to 120ºF. • Check containment pressure is less than 16.4 psia.
	BOP	Secure AH-12 A or B on CRS direction after initiation of SIAS at CP-18.
	CRS	After review of Standard Post Trip Actions, use Appendix 1, Diagnostic Flow Chart of OP-902-009 to select appropriate optimal recovery procedure. • Proper use of chart will result in use of OP-902-007, Steam Generator Tube Rupture Recovery
	CRS	Enter and direct the implementation of OP-902-007, Steam Generator Tube Rupture Recovery.
	CRS	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.
	Crew	2. Announce a Steam Generator Tube Rupture is in progress using the plant page.
	CRS	3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition", and implement the Emergency Plan.

Op Test No.: NRC Scenario # 1 Event # 6 / 7 Page 17 of 23

Event Description: Steam Generator Tube Rupture / CVC-401 Fails to Close

Time	Position	Applicant's Actions or Behavior
	CRS	4. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
		• Step is not applicable.
	CRS	5. REFER TO Section 6.0, "Placekeeper", and record the time of the reactor trip.
	CRS	6. **IF** Pressurizer pressure is less than 1684 psia, **THEN** verify SIAS has initiated.
	CRS	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.
	CRS / 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.
		• Step is not applicable.
	CRS / BOP	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.

Op Test No.: NRC Scenario # 1 Event # 6 / 7 Page 18 of 23

Event Description: Steam Generator Tube Rupture / CVC-401 Fails to Close

Time	Position	Applicant's Actions or Behavior
	BOP	10. Check a CCW pump is operating for each energized 4.16 KV safety bus.
	CRS / BOP	11. Commence a rapid RCS cooldown to less than 520 °F T_{Hot} using the steam bypass valves.
		• Since the Main Condenser is available at this point in the scenario, the CRS should direct the BOP to open Steam Bypass Valve #1 50% open to commence this rapid cooldown. • If the crew initiated a Main Steam Isolation Signal prior to this point, the rapid cooldown would be initiated by opening both Atmospheric Dump Valves 100% open.
	ATC	13. **IF** MSIS is **NOT** present, **THEN** lower the automatic initiation setpoints as the cooldown and depressurization proceed for MSIS (low SG Pressure).
		• The CRS should direct the ATC to perform this action during the rapid cooldown to < 520 $T_{HOT.}$ • Reset MSIS setpoints on all 4 channels at CP-7.
Examiner Note This event is complete after commencing the rapid cooldown.		

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Event Description: Main Steam Line Break / Function Recovery Procedure

Time	Position	Applicant's Actions or Behavior
	ATC / BOP	Recognize and report indications of Main Steam Line Break.
		Alarms
		• Containment Water Leakage Hi (Cabinet N, L-20)
		• Containment Water Leakage Hi-Hi (Cabinet N, K-20)
		• Containment Pressure Hi / Lo (Cabinet M, H-4)
		• Containment Pressure Hi / Lo (Cabinet N, H-14)
		Indications
		• Lowering Pressurizer level.
		• Lowering Pressurizer pressure.
		• Rising Containment pressure.
		• Lowering Steam Generator #2 pressure.
	CRS	Recognize the second event in progress. Exit OP-902-007 and enter OP-902-008, Functional Recovery procedure.
	Crew	1. Announce that the Functional Recovery Procedure is in progress using the plant page.
	CRS	2. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition" and implement the Emergency Plan.
	CRS	3. REFER TO the "Placekeeper" and record the time of the reactor trip.
	ATC	4. **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.
	ATC	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.

Op Test No.: NRC	Scenario # 1	Event # 8	Page 20 of 23
Event Description:	Main Steam Line Break / Function Recovery Procedure		

Time	Position	Applicant's Actions or Behavior
		Critical Task Trip any RCP not satisfying RCP operating limits. This task is satisfied by securing all RCPs within 3 minutes of loss of CCW flow / CSAS.
	ATC	Following initiation of CSAS (auto or manual) secure all running Reactor Coolant Pumps as follows: • Place each RCP control switch to stop at CP-2
	CRS	6. Direct Chemistry to sample **BOTH** steam generators for activity and boron.
	CRS	7. **IF** power is lost to both 3A and 3B safety buses and **NOT** expected to be restored within 30 minutes, **THEN** perform the following:
		• This step is not applicable due to no power loss.
	CRS	8. **IF** power is lost to both 3A and 3B safety buses and **NOT** expected to be restored within 30 minutes, **THEN** perform the following to reduce unnecessary station loads:
		• This step is not applicable due to no power loss.
	CRS	9. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps".
		• This step is not applicable due to no power loss.
	BOP	10. Place Hydrogen Analyzers in service as follows:
		• **Train A**
		o Place Train A H2 ANALYZER CNTMT ISOL VALVE keyswitch to OPEN.
		o Place H2 ANALYZER A POWER to ON.
		o Check H2 ANALYZER A Pumps indicate ON.
		• **Train B**
		o Place Train B H2 ANALYZER CNTMT ISOL VALVE keyswitch to OPEN.
		o Place H2 ANALYZER B POWER to ON.
		o Check H2 ANALYZER B Pumps indicate ON.

Op Test No.: NRC	Scenario # 1	Event # 8	Page 21	of 23
Event Description:	Main Steam Line Break / Function Recovery Procedure			

Time	Position	Applicant's Actions or Behavior
	CRS	11. Identify success paths to be used to satisfy each safety function using **BOTH** of the following: • Resource Assessment Trees • Safety Function Tracking Sheet
	Note	• The CRS will perform the prioritization using the Resource Assessment Trees. The STA would use the Safety Function Tracking Sheets.
		Proper prioritization will result in Containment Isolation being priority 1 and RCS Inventory Control being priority 2. • The CRS may request plant data from the ATC and BOP operators during his prioritization. The CRS may ask for the BOP to verify Safety Injection Pumps are meeting the flow curves of OP-902-009, Appendix 2. Both High and Low Pressure Safety Injection Pumps are meeting their flow curves. • The Containment Isolation section of OP-902-008 will direct the CRS to carry out the actions in the Heat Removal section, **HR-2, steps 16-28**. These steps will direct reducing RCS pressure and Isolating S/G #2.
	BOP	16.1 Commence a rapid RCS cooldown to less than 520 °F T_{HOT} using Steam Bypass valves.
		• The CRS should have already ordered this step in OP-902-007. Since the Main Steam Line Break is inside Containment, the Main Steam Isolation valves will now be closed. The CRS should now order the BOP to open both Atmospheric Dump Valves 100% to re-commence the rapid cooldown. • RCS temperature may already be < 520 °F due to the Excess Steam Demand. In that case, this step is not applicable.

Op Test No.: NRC	Scenario # 1	Event # 8	Page 22	of 23
Event Description:	Main Steam Line Break / Function Recovery Procedure			

Time	Position	Applicant's Actions or Behavior
		Critical Task Prevent opening the Main Steam Safety Valves This task is satisfied by taking action to lower RCS pressure in accordance with step 17.
	ATC	17. Depressurize the RCS by performing **ALL** of the following: a. Maintain pressurizer pressure within **ALL** of the following criteria: • Less than 945 psia **[915 psia]** • Within 50 psi of the most affected steam generator pressure • Within Appendix 2A-D, "RCS Pressure and Temperature Limits" • **IF** RCPs are operating, greater than the minimum RCP NPSH of Appendix 2A-D, "RCS Pressure and Temperature Limits" b. Operate main or auxiliary pressurizer spray. c. **IF** HPSI throttle criteria are met, **THEN** perform **ANY** of the following: • Control charging and letdown flow • Throttle HPSI flow
	Note	• The ATC operator should receive direction from the CRS to perform this step. He should evaluate plant conditions and decide on a minimum RCS pressure. The critical task is satisfied when the applicant takes action to start reducing RCS pressure (< 945 PSIA does not need to be reached in the scenario). • Auxiliary Spray will be required since all RCPs will be secured. • HPSI throttle criteria will not be met at this point.
	BOP	**IF** RCS T_{HOT} is less than 520 °F, **THEN** isolate the most affected SG:
	BOP	a. Place the ADV setpoint to 980 psig and verify controller in AUTO.

Op Test No.: NRC	Scenario # 1	Event # 8	Page 23	of 23
Event Description: Main Steam Line Break / Function Recovery Procedure				

Time	Position	Applicant's Actions or Behavior
	BOP	b. Verify the MSIV is closed.
	BOP	c. Verify the MFIV is closed.
	BOP	d. **IF** EFAS-2 is **NOT** initiated, **THEN** close EFW Isolation Valves: • EFW 228B (SG 2 PRIMARY) • EFW 229B (SG 2 BACKUP)
	BOP	e. Place EFW Flow Control Valves in MAN and close: • EFW 224B, SG 2 PRIMARY • EFW 223B, SG 2 BACKUP
	BOP	f. Close MS 401B, PUMP AB TURB STM SUPPLY SG 2.
	BOP	g. Close Main Steam Line 2 Drains: • MS 120B NORMAL • MS 119B BYPASS
	BOP	h. Close Steam Generator Blowdown isolation valves: • BD 103B STM GEN 2 (OUT) • BD 102B STM GEN 2 (IN)
	BOP	i. Check main steam safety valves are closed.

Examiner Note

This event is complete after the CRS has directed Steam Generator #2 to be isolated

AND

The ATC operator has commenced reducing RCS pressure

Or

As directed by the Lead Evaluator.

Facility: WATERFORD 3 Scenario No.: 2 Op Test No.: **NRC**

Examiners: _____ Operators: _____

_____ _____

_____ _____

Initial Conditions:
- 100%, 125 EFPD, AB buses aligned to Train B.
- Protected Train is B
- Emergency Diesel Generator A is tagged out for planned maintenance.

Turnover:
- Maintain 100 % power
- Severe Thunderstorm Warning and Tornado Watch and in effect

Event No.	Malf. No.	Event Type*	Event Description
1	CV01B	TS – SRO C – ATC C – SRO	Charging Pump B trips
2	N/A	TS – SRO	Dry Cooling Tower Fan 8A reported with no oil in sight glass.
3	FW27M FW28M	R – ATC N – BOP N – SRO	Heater 5 and 6 A isolate on high level. Normal plant power reduction to < 72%.
4	RC04C RD24 A,B,E,F	M – All I – ATC I – SRO	RCP 2A Shaft Shear with automatic trip initiated but correct alignment of trip breakers do not open. Manual reactor trip.
5	RD11A-44 RD11A-74 RD11A-68	C-ATC C - SRO	3 CEAs stick out on trip requiring Emergency Boration
6	ED01 A, B, C, D	M-All	Loss of Off Site Power
7	EG08B	C- BOP C - SRO	EDG B fails to auto-start

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

The crew assumes the shift at 100% power with instructions to maintain 100% power. Emergency Diesel Generator A is out of service due to a cracked lube oil strainer valve. Tech Spec 3.8.1.1 b and d have been entered. The turnover will include that the site is under a Severe Thunderstorm Warning and a Tornado Watch. All of the necessary actions of OP-901-521, Severe Weather and Flooding, have been accomplished.

After taking the shift, Charging Pump B will trip on motor overload. The crew should start Charging Pump AB or A and enter OP-901-112, Charging or Letdown Malfunction. The CRS should enter Tech Spec 3.1.2.4 and TRM 3.1.2.4. Additionally, the crew will no longer be in compliance with Tech Spec 3.8.1.1 d, requiring action within 2 hours. The CRS should direct the ATC to align Charging Pump AB to replace Charging Pump B and exit Tech Spec 3.1.2.4, comply with Tech Spec 3.8.1.1.b, and remain in TRM 3.1.2.4.

After the ATC aligns Charging Pump AB or at the lead examiners direction, the Outside Watch will call and report that during his rounds in the Dry Cooling Tower Area, he has discovered Dry Cooling Tower Fan 8A has a cracked oil housing and no oil is visible in the sight glass. The CRS should declare Dry Cooling Tower Fan 8A inoperable and enter Tech Spec 3.7.4 action c, which, due to the tornado watch, requires a shutdown if not restored in 1 hour.

After the CRS identifies the correct Tech Spec, Heater 5A Normal Level Control Valve will fail closed. The rising level will cause Heaters 5A and 6A to isolate. Based on guidance from OP-003-034, Feed Heater Vents and Drains, the crew should determine the need to commence a normal plant shutdown in accordance with OP-010-005, Plant Shutdown, to lower Main Generator load to less than 893 MWe, 72% power. The ATC will perform Pressurizer boron equalization, direct Boration to the RCS, as well as ASI control with CEAs. The BOP will manipulate the Main Turbine controls to reduce load.

Once the crew has commenced the power reduction and lowered power to ~ 90%, or at the lead examiner's discretion, Reactor Coolant Pump 2A will have a sheared shaft failure. The Plant Protection System will actuate, but 4 Reactor Trip Breakers will fail to open automatically. The crew should manually trip the reactor using the Diverse Reactor Trip System. After the reactor trip, 3 CEAs will fail to insert. The ATC should commence Emergency Boration in accordance with OP-901-103, Emergency Boration. The crew will carry out the immediate operator actions of OP-902-000, Standard Post Trip Actions.

During the review of Standard Post Trip Actions, a Loss of Off Site Power will occur. EDG B will fail to automatically start and have to be started manually by the BOP operator. The CRS should enter OP-902-003, Loss of Off Site Power/Loss of Forced Circulation Recovery. Once in OP-902-003, the CRS should direct the performance of OP-902-009, Standard Appendices, Appendix 20, Operation of DCT Sump Pumps. The scenario can be terminated after the CRS orders the performance of OP-902-009 Appendix 20 or at the lead examiners discretion.

Critical Tasks

1. Manually trip the Reactor.

This task is satisfied by manually tripping the reactor within 1 minute of the failure of the automatic trip. The required task becomes applicable after the annunciators are received associated with the RCP 2A sheared shaft.

2. Establish reactivity control.

This task is satisfied by establishing Emergency Boration prior to completing Standard Post Trip Actions Reactivity Control verification. The required task becomes applicable after the Reactor is tripped and 2 CEAs remain stuck out following event 5.

3. Energize at least one vital electrical AC bus.

This task is satisfied by starting Emergency Diesel Generator B. This task becomes applicable following the loss of off site power triggered in event 7.

Scenario Quantitative Attributes

1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	2
4. Major transients (1–2)	2
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	3

Scenario Notes:

A. Reset Simulator to IC-192.

B. Verify the following Scenario Malfunctions:
   1. cv01b for Charging Pump B trip
   2. rc04c for RCP 2A sheared shaft
   3. rd24a for Reactor Trip Circuit Breaker 1 fail to open
   4. rd24b for Reactor Trip Circuit Breaker 2 fail to open
   5. rd24efor Reactor Trip Circuit Breaker 5 fail to open
   6. rd24f for Reactor Trip Circuit Breaker 6 fail to open
   7. rd11a44 for CEA 44 stuck
   8. rd11a68 for CEA 68 stuck
   9. ed01a for Off Site Feeder Breaker 7172 trip
   10. ed01b for Off Site Feeder Breaker 7176 trip
   11. ed01c for Off Site Feeder Breaker 7182 trip
   12. ed01d for Off Site Feeder Breaker 7186 trip
   13. eg10a for EDG A overspeed device
   14. eg08b for EDG B fail to auto start
   15. fw27m for Heater 5A NLCV
   16. fw28m for Heater 5A ALCV

C. Verify the following Annunciators
   1. b_e07 for Dry Cooling Tower 1 level high
   2. b_e08 for Dry Cooling Tower 2 level high

D. Verify the following Overrides
   1. egr27 for EDG B local alarm acknowledgement

E. Verify the following Control Board Conditions:
   1. Danger tag placed on EDG A control switch
   2. Danger tag placed on EDG A Output Breaker

F. Verify EDG A output breaker is racked out and place danger tags on EDG A and its output breaker.

G. Ensure Protected Train B sign is placed in SM office window.

H. Complete the simulator setup checklist.

Simulator Booth Instructions

Event 1 Charging Pump A Trips

1. On Lead Examiner's cue, initiate Event Trigger 1.
2. If called, the RCA should report a scent of burnt electrical components at Charging Pump B.
3. If Work Week Manager is called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 2 Dry Cooling Tower Fan 8A Failure

1. On Lead Examiner's cue, call 4100 and report indication of a cracked oil housing on DCT Fan 8A reduction gear and that there is no oil visible in the sight glass.
2. If Work Week Manager is called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 3 Heater 5A NLCV Failure / Normal Plant Power Reduction

1. On Lead Examiner's cue, initiate Event Trigger 3.
2. When called, have the TGB Watch report that Heater 5A NLCV is closed and that you do not know why. You will investigate and report back.
3. If Work Week Manager or I&C is called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 4 Reactor Coolant Pump 2A Sheared Shaft / Trip Failure

1. On Lead Examiner's cue, initiate Event Trigger 4.
2. If the Work Week Manager or Duty Plant Manager is called, inform the caller that they will make the necessary calls.

Event 5 CEA 74 and 68 Fail to Insert / Emergency Boration

1. No calls for this malfunction should occur.

Event 6 Loss of Off Site Power

1. After the crew has completed Standard Post Tip Actions and on the Lead Examiner's cue, initiate Event Trigger 6.
2. If called as OSW watch report that a steady rain has been falling all shift.
3. If called to come to the Control Room to get a copy of OP-902-009, Appendix 20 for aligning the DCT Sump Pumps, report that you have a copy at the 314 Bus.

Event 8 Emergency Diesel Generator B fails to start

1. If called as RAB watch to check EDG B, initiate Trigger 9, and when the EDG B Trouble alarm is clear, report that it is running satisfactorily.

Scenario Timeline:

Event	Malfunction		Severity	Ramp HH:MM:SS	Delay	Trigger
	EPR09	A	1.5	N/A	N/A	N/A
	Precipitation at 1.5 inches per hour					
	EGR29	A	N/A	NA	NA	N/A
	EDG A output breaker racked out					
	EG10	A	N/A	NA	NA	N/A
	EDG A overspeed device pulled					
1	CV01	B	N/A	N/A	N/A	1
	Charging Pump B trip					
2	N/A		N/A	N/A	N/A	N/A
	Dry Cooling Tower Fan 8A failure					
3	FW27	M	0%	N/A	N/A	3
	FW28	M	35%			
	Isophase Bus Fan failure					
4	RC04	C	N/A	N/A	N/A	4
	RCP 2A Sheared Shaft					
4	RD24	A, B, E, F	N/A	N/A	N/A	N/A
	Reactor Trip Breakers 1, 2, 5, & 6 fail to open					
5	RD11A	44	N/A	N/A	N/A	N/A
	CEA 44 stuck out after reactor trip					
5	RD11A	68	N/A	N/A	N/A	N/A
	CEA 68 stuck out after trip					
6	ED01	A, B, C, D	N/A	N/A	N/A	6
	Loss of Off Site Power					
7	EG08	B	N/A	N/A	N/A	N/A
	EDG B Fail to Auto-start					
	B_E07		N/A	N/A	00:02:30	6
	B_E08				00:04:00	
	Dry Cooling Tower 1 & 2 high level alarm					

REFERENCES:

Event	Procedures
1	OP-901-112, Charging or Letdown Malfunction Tech Spec 3.1.2.4, 3.8.1.1 TRM 3.1.2.4
2	Tech Spec 3.7.4
3	OP-003-034, Feed Heater Vents and Drains OP-500-001, Annunciator Response for Control Room Cabinet A OP-010-005, Plant Shutdown
4	OP-902-000, Standard Post Trip Actions OP-902-009, Standard Appendices, Appendix 1, Diagnostic Flow Chart
5	OP-901-103, Emergency Boration
6	OP-902-003, Loss of Off Site Power/Loss of Forced Flow OP-902-009, Standard Appendices, Appendix 20, Operation of Dry Cooling Tower Sump Pumps

Op Test No.: NRC Scenario # 2 Event # 1 Page 1 of 16

Event Description: Charging Pump B Trip

Time	Position	Applicant's Actions or Behavior
	Note	All controls for the Charging manipulations are on CP-4
	ATC	Recognize and report indications of Charging Pump B trip.
		Alarms:
		• Charging Pump B Trip/Trouble (Cabinet G, B-6)
		• Charging Pumps Header Flow Lo (Cabinet G, H-5)
		• Charging Pump B Not Available (Cabinet G, A-6)
		Indications:
		• Charging flow and Charging Header pressure drop
		• Charging Pump B control switch indicates stop
Examiner Note There are steps in off normal OP-901-112, Charging or Letdown Malfunction, to manually start a standby Charging Pump after verifying a suction path. It is acceptable for the CRS to direct this action prior to entering OP-901-112 to avoid isolating the Charging and Letdown system on high temperature. If this is directed, the CRS should still enter OP-901-112 even after a Charging Pump is running.		
	CRS	Enter and direct the implementation of OP-901-112, Charging or Letdown Malfunction.
	CRS	1. Stop turbine load changes.
	CRS	3. IF a Charging Malfunction is indicated, THEN go to Subsection E_1, Charging Malfunction.
		CRS should evaluate E_0 and go to sub-section E_1.
	CRS	Procedure Note If all Charging Pumps are secured, then LETDOWN STOP VALVE (CVC 101) will close on high REGEN HX TUBE OUTLET temperature if RCS is ≥470°F.
		This condition is applicable to the plant conditions. Regen Heat Exchanger temperature will rise to the 470 °F setpoint. Time is available for the crew to take action prior to isolation.

Op Test No.: NRC	Scenario # 2	Event # 1	Page 2	of 16
Event Description: Charging Pump B Trip				

Time	Position	Applicant's Actions or Behavior
	CRS	Procedure Caution THE REACTOR COOLANT SYSTEM WILL BE BORATED IF A CHARGING PUMP IS STARTED WITH THE RWSP AS THE MAKEUP WATER SOURCE.
	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 OP-002-005, CHEMICAL AND VOLUME CONTROL.
		• The ATC operator should verify a Charging Pump suction path via CVC-183 prior to starting another Charging Pump. Either Charging Pump A or AB can be started. This action is typically directed by the CRS.
		• If the crew does not start another Charging Pump prior to Letdown isolating at 470 °F, then the crew should reestablish Charging and Letdown in accordance with OP-002-005.
	CRS	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:
		This step should not be applicable due to the duration of the malfunction.
	Crew	3. IF the PMC is available, THEN display PMC Group CVCS and monitor Charging System parameters to determine cause of Charging malfunction.
		This data can be retrieved by any member of the crew. PMC point D39704, CVCS CHG PMP MTR B OVLD TRIP and D39702, CVCS CHG PMP MTR B TRP/TRBL will provide indication of the electrical failure of Charging Pump B.

Op Test No.: NRC Scenario # 2 Event # 1 Page 3 of 16

Event Description: Charging Pump B Trip

Time	Position	Applicant's Actions or Behavior
	CRS	Evaluates Tech Spec and TRM 3.1.2.4 and enters both. Additionally, with Emergency Diesel A out of service, the crew will no longer be in compliance with Tech Spec 3.8.1.1.d. Tech Spec 3.1.2.4 can be exited and 3.8.1.1.d complied with by aligning Charging Pump AB to replace B for SIAS. The CRS should remain in TRM 3.1.2.4 after this operation.
	ATC	Align Charging Pump AB to replace B on SIAS by aligning the Pump AB Assignment switch to the B position on CP-4.
	CRS	Exit Tech Spec 3.1.2.4 and determine compliance with Tech Spec 3.8.1.1.d. Crew must remain in TRM 3.1.2.4.
Examiner Note This event is complete after Charging Pump AB is aligned to replace Charging Pump B Or As directed by the Lead Evaluator		

Op Test No.: NRC Scenario # 2 Event # 2 Page 4 of 16

Event Description: Dry Cooling Tower Dry Fan 8A failure

Time	Position	Applicant's Actions or Behavior
		This failure is called in by the Outside Watch for the purpose of evaluating Tech Spec 3.7.4. The simulator operator will call the CRS on cue from the Lead Examiner.
	CRS	On receiving information regarding DCT Fan 8A, evaluates Tech Spec 3.7.4.
	Crew	A member of the crew should determine that DCT Fan 8A is under the missile shield.
	CRS	Determine that with a fan under the missile shield inoperable during a tornado watch (provided during the turnover), entry into Tech Spec 3.7.4.c is required.
		This is a 1 hour shutdown action. The tornado watch will not expire before this action is required. The crew will not perform a shutdown before the next malfunction is inserted.

Examiner Note

This event is complete when the CRS has completed addressing Tech Specs

Or

As directed by the Lead Evaluator

Op Test No.: NRC Scenario # 2 Event # 3 Page 5 of 16

Event Description: 5A Normal Level Control Valve Failure / Plant shutdown

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of Heater 5A Normal Level Control Valve failure.
		Alarms:
		• Heater 5A Level Hi-Hi (Cabinet A, B-8)
		• Heater 5A Level Hi/Lo (Cabinet A, C-8)
		• Heater 5A Alt Drain Vlv Open (Cabinet A, D-8)
		Indications:
		• Heater 5A level rising on the Plant Monitoring Computer
		• Heater 5A & 6A isolate when CD-189 A and CD-175 A close on CP-13
Examiner Note The annunciator response refers to OP-003-034, Feed Heater Vents and Drains. It directs a power reduction to 893 MWe, 72% power.		
	BOP	Report guidance from OP-500-001, Annunciator Response for Control Room Panel A: 1.4 Review OP-003-034, Feed Heater Vents and Drains, for Power Limitations associated with FHD Heater Strings out of service.
	CRS	Refer to OP-003-034, Feed Heater Vents and Drains.
	CRS	Limitation 3.2.1 Utilize the following table to determine the maximum allowed power level with the listed FW Heater(s) out of service. OOS Condition / Bypass Open / Bypass Closed Any Single IP or LP Heater (Note 1) / 893 MWe (72%) / 893 MWe (72%)
		CRS should conclude a power reduction to 72% is required.

Op Test No.: NRC	Scenario # 2	Event # 3	Page 6	of 16
Event Description:	5A Normal Level Control Valve Failure / Plant shutdown			

Time	Position	Applicant's Actions or Behavior
	CRS	Enters OP-010-005, Plant Shutdown.
	CRS	Procedure Note (1) Because of the absence of adequate airflow across the installed thermocouples while in this alignment, computer points A58010, A58011, and A58012 should not be used to monitor Isophase Bus return air for temperature. Utilize a Pyrometer or equivalent to measure Isophase Bus Air exhaust temperature. (2) Isophase Bus return air temperature should not be allowed to rise above 158 °F.
	Note	The CRS should direct the TGB Watch to perform steps 1.2 through 1.6. The watch will acknowledge the order and reply that he will get the procedure and start walking down the evolution. This task will not get accomplished during the scenario.
	Crew	9.1.2 Prior to commencing power reduction, notify Load Dispatcher.
	Crew	9.1.3 Announce to Station Personnel that a power reduction is in progress over the Plant Paging System.
	Crew	9.1.4 Maintain RCS Cold Leg Temperature 536 °F to 549 °F.
	ATC	9.1.5 Perform Boron Equalization as follows:
		• Place available Pressurizer Pressure Backup Heater Control Switches to ON.
		• Reduce Pressurizer Spray Valve Controller (RC-IHIC-0100) setpoint potentiometer to establish spray flow and maintain RCS pressure 2250 PSIA (2175 – 2265).
		This manipulation is performed at CP-2.
	Note	There is a procedure note describing what power indications are preferred for certain power ranges. The CRS should review this note, but the power reduction will not be carried out long enough to see this exercised.

Op Test No.: NRC	Scenario # 2	Event # 3	Page 7	of 16
Event Description:	5A Normal Level Control Valve Failure / Plant shutdown			

Time	Position	Applicant's Actions or Behavior
	ATC	Begin Direct Boration as follows:
		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.
		These manipulations are performed at CP-4. The ATC should use the Reactivity Worksheet to recommend a boron quantity to the CRS.
		6.7.3 Set Boric Acid Makeup Batch Counter to volume of Boric Acid desired.
		The steps for setting the Boric Acid counter are not contained in this step. The ATC operator should press the UP arrow button, the ENTER button, enter the quantity of acid desired, press the ENTER button, and press the RESET button.
		6.7.4 Verify Boric Acid Makeup Pumps selector switch aligned to desired Boric Acid Makeup Pump A(B).
		6.7.5 Place Direct Boration Valve, BAM-143, control switch to AUTO.
		6.7.6 Place Makeup Mode selector switch to BORATE.
		6.7.7 Verify selected Boric Acid Makeup Pump A(B) Starts.
		6.7.8 Verify Direct Boration Valve, BAM-143, Opens.
		Procedure 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.
		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.
		6.7.11 Verify Boric Acid Makeup Control Valve, BAM-141, Intermediate or Open.
		6.7.12 Observe Boric Acid flow rate for proper indication.
	BOP	Commence Turbine load reduction by performing 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.

Op Test No.: NRC Scenario # 2 Event # 3 Page 8 of 16

Event Description: 5A Normal Level Control Valve Failure / Plant shutdown

Time	Position	Applicant's Actions or Behavior
		Procedure Note Prior to changing Reference Demand, Main Turbine load must not be changing.
		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.
		This manipulation is performed at CP-1. These steps are from OP-005-007, Main Turbine and Generator. The BOP will set up the Main Turbine controls. The ATC will direct the BOP when to commence unloading the Main Turbine based on the drop in RCS Cold Leg temperature.
	CRS / ATC	Procedure Caution CONTROL RODS SHOULD NEVER BE WITHDRAWN OR MANUALLY INSERTED EXCEPT IN A DELIBERATE CAREFULLY CONTROLLED MANNER WHILE CLOSELY MONITORING THE REACTOR'S RESPONSE.
	ATC	Operate CEAs to maintain ASI using CEA Reg. Group 6 or Group P Control Element Assemblies.
		Steps are contained in OP-004-005, Control Element Drive. Group P should be used first to a low limit of 120 inches, followed by CEA Group 6 to a low limit of 120 inches to comply with Tech Spec 3.1.3.6. This manipulation is performed at CP-2.

Op Test No.: NRC	Scenario # 2	Event # 3	Page 9	of 16
Event Description:	5A Normal Level Control Valve Failure / Plant shutdown			

Time	Position	Applicant's Actions or Behavior
		Operate CEAs in Manual Group mode as follows:
		6.7.1 Verify Plant Monitoring Computer operable in accordance with OP-004-012, Plant Monitoring Computer.
		6.7.2 Position Group Select switch to desired group.
		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
		6.7.4 Operate CEA Manual Shim switch to 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)
		Procedure 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.
		6.7.5 When desired set of moves have been completed, then place Mode Select switch to OFF.
	Crew	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.
Examiner Note This event is complete when the desired power reduction has been accomplished Or As directed by the Lead Evaluator		

Op Test No.: NRC Scenario # 2 Event # 4 / 5 Page 10 of 16

Event Description: RCP Shaft Shear with ATWS / Manual Reactor Trip / 2 CEAs Fail to Insert on Trip

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of Reactor Coolant Pump 2A shaft shear and failure of the automatic trip.
		Alarms:
		• RCP 2A Vibration Hi (Cabinet H, A-8)
		• RCP 2A Lube Oil Pressure Lo (Cabinet H, E-7)
		• RPS Channel Trip Local Power Density Hi (Cabinet K, A-11)
		• RPS Channel Trip DNBR Lo (Cabinet K, A-12)
		• RPS Channel Trip Coolant Flow Lost (Cabinet K, D-12)
		Indications:
		• RCP 2A Δ pressure and amps dropping
		• All CEAs withdrawn
		• 4 Reactor Trip Circuit Breakers closed
Critical Task Manually trip the Reactor. This task is satisfied by ~~establishing~~ manually tripping the reactor within 1 minute of the failure of the automatic trip.~~.~~		
	ATC	Trip the Reactor using Diverse Reactor Trip pushbuttons at CP-2
		The CRS may direct this operation, but the ATC operator should not request permission or wait for direction to perform this action.
	ATC	Recognize and report indications of 2 CEAs failure to insert.
		Indications:
		• CEA 74 and CEA 68 rod bottom lights not illuminated
		• CEA 74 and CEA 68 upper electrical limit lights illuminated

Op Test No.: NRC Scenario # 2 Event # 4 / 5 Page 11 of 16

Event Description: RCP Shaft Shear with ATWS / Manual Reactor Trip / 2 CEAs Fail to Insert on Trip

Time	Position	Applicant's Actions or Behavior
	CRS	Direct direct ATC and BOP to carry out Standard Post trip Actions.
	ATC	Determine **Reactivity Control** acceptance criteria are met: • Check reactor power is dropping. • Check startup rate is negative. • Check less than **TWO** CEAs are **NOT** fully inserted.
Critical Task Establish reactivity control. This task is satisfied by establishing Emergency Boration prior to completing Standard Post Trip Actions Reactivity Control verification.		
	ATC	Determine 2 CEAs are stuck out and commence Emergency Boration:
		1. Place Makeup Mode selector switch to MANUAL.
		2. Align borated water source by performing one of the following:
		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:
		o BAM-126A Boric Acid Makeup Pump Recirc Valve A
		o BAM-126B Boric Acid Makeup Pump Recirc Valve B
		OR
		b. Initiate Emergency Boration using Gravity Feed as follows:
		• Open the following Boric Acid Makeup Gravity Feed valves:
		o BAM-113A Boric Acid Makeup Gravity Feed Valve A
		o BAM-113B Boric Acid Makeup Gravity Feed Valve B
		3. Close VCT Disch Valve, CVC-183.
		4. Verify at least one Charging Pump operating and Charging Header flow ≥ 40 GPM.

Op Test No.: NRC	Scenario # 2	Event # 4 / 5	Page 12	of 16
Event Description:	RCP Shaft Shear with ATWS / Manual Reactor Trip / 2 CEAs Fail to Insert on Trip			

Time	Position	Applicant's Actions or Behavior
	BOP	Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	Check the Main Generator is tripped: • GENERATOR BREAKER A tripped • GENERATOR BREAKER B tripped • EXCITER FIELD BREAKER tripped
	BOP	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	Determine **RCS Inventory Control** acceptance criteria are met: Check that the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% • Check RCS subcooling is greater than or equal to 28ºF.

Op Test No.: NRC Scenario # 2 Event # 4 / 5 Page 13 of 16

Event Description: RCP Shaft Shear with ATWS / Manual Reactor Trip / 2 CEAs Fail to Insert on Trip

Time	Position	Applicant's Actions or Behavior
	ATC	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	Determine **Core Heat Removal** acceptance criteria are met: • Check at least one RCP is operating. • Check operating loop ΔT is less than 13ºF. • Check RCS subcooling is greater than or equal to 28ºF.
	BOP	Determine **RCS Heat Removal** acceptance criteria are met: Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 5% to 80% NR • Main Feedwater is available to restore level within 50%-70% NR.
	ATC	Check RCS TC is 530ºF to 550ºF
	BOP	Check steam generator pressure is 885 psia to 1040 psia.
	BOP	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	Reset moisture separator reheaters, and check the temperature control valves closed.

Op Test No.: NRC Scenario # 2 Event # 4 / 5 Page 14 of 16

Event Description: RCP Shaft Shear with ATWS / Manual Reactor Trip / 2 CEAs Fail to Insert on Trip

Time	Position	Applicant's Actions or Behavior
	ATC	Determine **Containment Isolation** acceptance criteria are met: • Check containment pressure is less than 16.4 psia. • Check **NO** containment area radiation monitor alarms **OR** unexplained rise in activity. • Check **NO** steam plant activity monitor alarms **OR** unexplained rise in activity.
	BOP	Determine **Containment Temperature and Pressure Control** acceptance criteria are met: • Check containment temperature is less than or equal to 120ºF. • Check containment pressure is less than 16.4 psia.
	CRS	After review of Standard Post Trip Actions, use Diagnostic Flow Chart of OP-902-009 to select appropriate optimal recovery procedure. • Proper use of chart will result in use of OP-902-001
Examiner Note This event is complete when the ATC and BOP operators report that they have completed Standard Post Trip Actions and when the CRS commences the review Or As directed by the Lead Evaluator.		

Op Test No.: NRC Scenario # 2 Event # 6 / 7 Page 15 of 16

Event Description: Loss of Off Site Power / Failure of Emergency Diesel Generator B to Auto Start

Time	Position	Applicant's Actions or Behavior
	Crew	Alarms
		• Multiple alarms associated with Loss of Off Site Power
		Indications
		• Numerous alarms come in, all lights go off except for Control Room emergency lighting.
		• Emergency Diesel Generator B control switch remains green.
Critical Task Energize at least one vital electrical AC bus. This task is satisfied by starting Emergency Diesel Generator B.		
	BOP	Start Emergency Diesel Generator B at CP-1.
	CRS	Complete OP-902-009, Attachment 1, Diagnostic Flowchart. • Proper use of chart will result in use of OP-902-003, Loss of Off Site Power/Loss of Forced Flow Recovery.
	Crew	1. Confirm diagnosis of a Loss of Offsite Power or a Loss of Forced Circulation 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.
	CRS	3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition" and implement the Emergency Plan.
	CRS	4. **IF** power has been interrupted to either 3A or 3B safety buses, **THEN** perform Appendix 20, "Operation of DCT Sump Pumps"
		CRS should direct this action to a non-licensed operator.

Op Test No.: NRC	Scenario # 2	Event # 6 / 7	Page 16	of 16
Event Description:	Loss of Off Site Power / Failure of Emergency Diesel Generator B to Auto Start			

Time	Position	Applicant's Actions or Behavior
	BOP	6. **IF** offsite power has been lost, **THEN** verify the sequencer has timed out for at least one 4.16KV safety bus.
	BOP	7. Check a CCW pump is operating for each energized 4.16KV safety bus.
	CRS / BOP	8. **IF** offsite power has been lost, **THEN**: a. Verify MSIVs are closed. b. Verify following steam generator blowdown isolation valves are closed: • BD 102A, SG BLOWDOWN ISOL STM GEN 1 (IN) • BD 102B, SG BLOWDOWN ISOL STM GEN 2 (IN) • BD 103A, SG BLOWDOWN ISOL STM GEN 1 (OUT) • BD 103B, SG BLOWDOWN ISOL STM GEN 2 (OUT)
		This step is marked such that the CRS can move this forward at his discretion. This step could be performed prior to directing the restoration of the Dry Cooling Tower Sump Pumps.

Examiner Note

This event is complete after directing performance of Appendix 20 to restore the Dry Cooing Tower Sump Pumps

Or

As directed by the Lead Evaluator.

Facility: WATERFORD 3 Scenario No.: 3 Op Test No.: **NRC**

Examiners: _____ Operators: _____

Initial Conditions:
- Mode 2 with 2 Charging Pumps in operation
- Protected Train is B
- AB Bus is aligned to Train B
- Reactor power is 6 $x10^{-4}$%

Turnover:
- 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	CB08B1	TS – SRO	Containment pressure instrument CB-IPI-6702-SMC C fails high.
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	CC02A	TS – SRO	Auxiliary Component Cooling Water Pump A trip
5	RX14A	I – ATC I - SRO	Pressurizer Pressure RC-IPR-0100 X fails high, Main Spray Valves open
6	RC23A	M – ALL	Small break loss of coolant accident
7	RP05 A3, B3, C3, D3	I – ATC I – SRO	Containment Spray fails to actuate

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

The crew assumes the shift with the reactor at 6 $x10^{-4}$% 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, Containment pressure instrument CB-IPI-6702-SMC Channel C input to Containment Spray Actuation fails high. The CRS should enter Tech Spec 3.3.2 and direct bypassing high Containment Pressure – Hi Hi bistable on Channel C.

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, Auxiliary Component Cooling Water Pump A will trip. The crew should verify Component Cooling Water temperature is being controlled by Dry Cooling Tower Fans. The SRO should declare ACCW Pump A inoperable and enter a 72 hour action for Tech Spec 3.7.3 as well as cascading Tech Specs. The SRO should address the need to accomplish surveillance OP-903-066, Electrical Breaker Alignment Checks, within 1 hour to comply with Tech Spec 3.8.1.1.b. They must also address the need to accomplish the requirements of Tech Spec 3.8.1.1.d within 2 hours.

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 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 small break LOCA event will occur. Containment Spray Actuation will fail requiring manual actuation. All Reactor Coolant Pumps will be required to be secured after the CSAS.

After the crew has completed OP-902-000, Standard Post Trip Actions, the CRS should diagnose into OP-902-002, Loss of Coolant Accident Recovery. The scenario can be terminated after the crew has commenced an RCS cooldown using Atmospheric Dump Valves.

Critical Tasks

1. Establish Containment temperature and pressure control

This task is satisfied by manually actuating Containment Spray prior to exiting OP-902-000, Standard Post Trip Actions, or before completing the Safety Function Status Review in OP-902-002, Loss of Coolant Accident Recovery, if OP-902-000 is exited before Containment pressure exceeds 17.7 psia.

2. Trip any RCP not satisfying RCP operating limits.

This task is satisfied by securing all RCPs within 3 minutes of loss of CCW flow. The required task becomes applicable after Containment Spray has been actuated. The time requirement of 3 minutes is based on the RCP operating limit of 3 minutes without CCW cooling.

Scenario Quantitative Attributes

1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	1
3. Abnormal events (2–4)	2
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	1
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)	2

Scenario Notes:

A. Reset Simulator to IC-193.
    1. Use keys 165 – 168 for S/G high level bypass setup.

B. Verify the following Scenario Malfunctions:
    1. cv35a for the PMU Dilution counter
    2. rx14-A for Pressurizer pressure instrument RC-IPT-0100 X
    3. cb08b1 for Containment Pressure instrument CB-IPI-6702-SMC
    4. cc02a for Auxiliary Component Cooling Water Pump A
    5. rc23a for RCS break
    6. rp05a3, b3, c3, d3 for Containment Spray failure

C. Verify the following Remotes:
    1. cvr101 set at 2% for PMU-140
    2. anr04h for EDG A local alarm acknowledgement.
    3. anr04i for EDG B local alarm acknowledgement.

D. Ensure Protected Train B sign is placed in SM office window.

E. Verify EOOS is 10.0 Green

F. Complete the simulator setup checklist.

G. Remove Caution Tag from PMU-141.

H. Remove PMC point D39502 from scan.

Simulator Booth Instructions

Event 1 Dilute to 5-10% power, Perform 100 gallon PMU addition

1. No communications should occur for this evolution.

Event 2 Containment pressure instrument CB-IPi-6702 SMC fails high

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 I&C is called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 3 PMU flow malfunction

1. After the Containment Pressure instrument has failed, the crew should make their second PMU addition. Insert Event Trigger 3 **after** the ATC has established PMU flow.
2. If called to operate valves listed in OP-901-104, acknowledge communication and report that you will work on valve list.

Event 4 Auxiliary Component Cooling Water Pump A trip

1. After PMU Pump A is secured and on the Lead Examiner's cue, initiate Event Trigger 4.
2. If called as the watchstander and sent to ACCW Pump A, report that the pump looks normal locally.
3. If called as the watchstander and sent to ACCW Pump A breaker, 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 I&C is called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 5 Pressurizer pressure instrument RC-IPR-0100 X fails high

1. After Tech Specs for Event 4 are addressed, or on Lead Examiner's cue, initiate Event Trigger 5.
2. If Work Week Manager or I&C is called, inform the caller that a work package will be assembled and a team will be sent to the Control Room.

Event 6 Loss of Coolant Accident

1. After the actions in OP-901-120 are complete and on the Lead Examiner's cue, initiate Event Trigger 6.
2. If called as RAB watch to check EDG A & B, initiate Trigger 10, and when the EDG A & B Trouble alarms are clear, report that they are running satisfactorily.

Event 7 Containment Spray fails to actuate

1. No communications should occur for this malfunction.

Scenario Timeline:

Event	Malfunction		Severity	Ramp HH:MM:SS	Delay	Trigger
1	N/A		N/A	N/A	N/A	N/A
	Dilute to critical boron concentration					
2	CH08	B1	N/A	N/A	N/A	2
	Containment Pressure Instrument CB-IPI-6702-SMC fails high					
3	CVR101		2%	N/A	N/A	3
	PMU – 140 throttled open					
3	CV35	A	N/A	N/A	N/A	3
	PMU counter fails to secure dilution					
4	CC02	A	N/A	N/A	N/A	4
	Auxiliary Component Cooling Water Pump A trips					
5	RX14	A	100%	N/A	N/A	5
	Pressurizer pressure instrument RC-IPR-0100 X fails high					
6	RC23	A	0.05%	5:00	N/A	6
	Small Break LOCA					
7	RP05	A3, B3, C3, D3	N/A	N/A	N/A	N/A
	Containment Spray fails to actuate					

REFERENCES:

Event	Procedures
1	OP-010-003, Plant Startup OP-002-005, Chemical and Volume Control
2	OP-009-007, Plant Protection System OP-903-013, Monthly Channel Checks Tech Spec 3.3.2
3	OP-901-104, Inadvertent Positive Reactivity Addition
4	Tech Spec 3.7.3 OP-100-014
5	OP-901-120, Pressurizer Pressure Control Malfunction Tech Spec 3.2.8
6	OP-902-000, Standard Post Trip Actions OP-902-009, Standard Appendices, Appendix 1, Diagnostic Flow Chart OP-902-002, Loss of Coolant Accident Recovery
7	OP-902-000, Standard Post Trip Actions OI-038-000, Emergency Operating Procedures Operations Expectations / Guidance
8	OP-902-000, Standard Post Trip Actions OI-038-000, Emergency Operating Procedures Operations Expectations / Guidance

Op Test No.: NRC Scenario # 3 Event # 1 Page 1 of 15

Event Description: Dilute from 5x10 -4% to 5 – 10% Power

Time	Position	Applicant's Actions or Behavior
	ATC	Aligns for 100 gallon Primary Makeup Water Addition in accordance with OP-002-005, Chemical and Volume Control.
		Procedure Caution THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSSCHECKED AND COMPLETED PRIOR TO LEAVING CP-4.
		6.9.1 Inform SM/CRS that this Section is being performed.
		Procedure 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)
		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.
		Not applicable, reactivity plan gives required volume.
		6.9.3 Set Primary Makeup Water Batch Counter to volume of Primary Makeup water desired.
		Procedure does not give specific steps to set the counter. Counter is set by pressing the: • UP arrow button • ENTER button • the side arrow button to move the cursor • the raise button to enter 10 since the counter counts in multiple of 10 gallons • ENTER • RESET.

Op Test No.: NRC	Scenario # 3	Event # 1	Page 2	of 15
Event Description:	Dilute from 5x10 -4% to 5 – 10% Power			

Time	Position	Applicant's Actions or Behavior
		6.9.4 Place Makeup Mode selector switch to DILUTE.
		6.9.5 Open VCT Makeup Valve, CVC-510.
		Procedure Note The Dilution Flow Totalizer will not register below 5 GPM. The Dilution Flow Totalizer is most accurate at >10 GPM.
		Procedure 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.
		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.
		6.9.8 Verify Primary Makeup Water Control Valve, PMU-144, Intermediate or Open.
		6.9.9 Observe Primary Makeup water flow rate for proper indication.
		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.
		Procedure 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 3	of 15
Event Description:	Dilute from 5x10 -4% to 5 – 10% Power			

Time	Position	Applicant's Actions or Behavior
		6.9.12 If additional Primary Makeup Water addition is required and with SM/CRS permission, then perform the following:
		The reactivity plan describes that additional PMU additions will be required. The CRS may or may not use this option. It is acceptable if the crew chooses to leave this aligned.
		6.9.13 Verify Primary Makeup Water Flow controller, PMU-IFIC-0210X, in Manual.
		6.9.14 Verify both Primary Makeup Water Flow controller, PMU-IFIC-0210X, output and setpoint potentiometer set to zero.
		6.9.15 Close VCT Makeup Valve, CVC-510.
		6.9.16 Place Makeup Mode selector switch to MANUAL.
		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		

Op Test No.: NRC Scenario # 3 Event # 2 Page 4 of 15

Event Description: Containment Pressure Instrument Fails High

Time	Position	Applicant's Actions or Behavior
	ATC	Recognize and report indications of failed channel.
		Alarms:
		• ESFAS CHANNEL TRIP CNTMT PRESS HI-HI (Cabinet K, L-18)
		• CNTMT PRESS HI-HI ESFAS PRETRIP A/C (Cabinet K, M-18)
		• RPS CHANNEL C TROUBLE (Cabinet K, G-18)
		Indications
		• Containment pressure instrument CB-IPI-6702 SMC on CP-7 indicates pegged high.
		• Containment pressure Hi Hi bistable on Channel C pre-trip and trip indication illuminated.
	CRS	Review Tech Specs based on the failed instrument.
		• Enter Tech Spec 3.3.2.
		• Review OP-903-013, Monthly Channel Checks, and determine Tech Spec 3.3.3.5 and 3.3.3.6 are not applicable.
		• Direct bypassing Channel B bistables 17 for Hi Hi Containment Pressure ESFAS. This is a 1 hour action.

Examiner Note

This event is complete when Tech Spec 3.3.2 has been addressed

Or

As directed by the Lead Evaluator

Op Test No.: NRC	Scenario # 3	Event # 3	Page 5	of 15
Event Description: PMU Failure / Inadvertent Dilution				

Time	Position	Applicant's Actions or Behavior
	ATC	Aligns for 50 gallon Primary Makeup Water Addition in accordance with OP-002-005, Chemical and Volume Control.
		Procedure Caution THIS SECTION AFFECTS REACTIVITY. THIS EVOLUTION SHOULD BE CROSSCHECKED AND COMPLETED PRIOR TO LEAVING CP-4.
		6.9.1 Inform SM/CRS that this Section is being performed.
		Procedure 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)
		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.
		Not applicable, reactivity plan gives required volume.
		6.9.3 Set Primary Makeup Water Batch Counter to volume of Primary Makeup water desired.
		Procedure does not give specific steps to set the counter. Counter is set by pressing the: • UP arrow button • ENTER button • the side arrow button to move the cursor • the raise button to enter 5 since the counter counts in multiple of 10 gallons • ENTER • RESET.
		6.9.4 Place Makeup Mode selector switch to DILUTE.

Op Test No.: NRC Scenario # 3 Event # 3 Page 6 of 15

Event Description: PMU Failure / Inadvertent Dilution

Time	Position	Applicant's Actions or Behavior
		6.9.5 Open VCT Makeup Valve, CVC-510.
		Procedure Note The Dilution Flow Totalizer will not register below 5 GPM. The Dilution Flow Totalizer is most accurate at >10 GPM.
		Procedure 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.
		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.
		6.9.8 Verify Primary Makeup Water Control Valve, PMU-144, Intermediate or Open.
		6.9.9 Observe Primary Makeup water flow rate for proper indication.
		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.
		On this 50 gallon water addition, the PMU Batch Counter will fail to secure PMU flow.
		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

Op Test No.: NRC Scenario # 3 Event # 3 Page 7 of 15

Event Description: PMU Failure / Inadvertent Dilution

Time	Position	Applicant's Actions or Behavior
	ATC	Adjust Primary Makeup Water Flow controller, PMU-IFIC-0210X, output to 0% output.
		This action 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
	ATC	1. Verify REACTOR MAKE UP PRI WTR CONTR VA (PMU 144) Closed.
	BOP	2. Stop both Primary Makeup Water Pumps A and B.
	CRS / ATC	3. Verify only one Charging Pump operating.
	ATC	4. Bypass or secure Purification Ion Exchangers as follows: 4.1 Place LETDOWN TO ION EXCHANGER BYPASS valve (CVC 140) to BYPASS.
	CRS	5. If dilution still in progress, then Close PMU Hdr to Dilution Tee and Chem Add Tank Isol, PMU 135 (RAB-4 5A&J).
		PMU flow will go to 0 gpm after PMU Pump A is secured.
		6. Borate as necessary to maintain stable plant conditions.
		Crew may wait to see the effect of the extra PMU prior to performing boration. Move to the next event prior to any boration is performed.

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

Op Test No.: NRC Scenario # 3 Event # 4 Page 8 of 15

Event Description: Auxiliary Component Cooling Water Pump A Trip

Time	Position	Applicant's Actions or Behavior
	BOP	Recognize and report indications of failed channel.
		Alarms:
		• AUX CCW PUMP A TRIP/TROUBLE (Cabinet B, H-9)
		• AUX CCW SYS A PRESS LO JOCKEY PUMP TRIP/TROUBLE (Cabinet B, K-9)
		Indications
		• Amber light on ACCW Pump A control Switch.
		• Dry Cooling Tower Fans sequencing on as CCW temperature rises.
	CRS	Review Tech Specs based on the pump failure.
		• Enter Tech Spec 3.7.4 and cascading Tech Specs.
		• Review OP-100-014, Technical Specification and Technical Requirements Compliance.
		• Direct performing OP-903-066, Electrical Breaker Alignment Check, to comply with 3.8.1.1.b. This is a 1 hour action.
		• Direct verification of Train B safety equipment and EFW Pump AB in accordance with 3.8.1.1.d. This is a 2 hour action.
Examiner Note This event is complete when Tech Specs have been addressed Or As directed by the Lead Evaluator		

Op Test No.: NRC Scenario # 3 Event # 5 Page 9 of 15

Event Description: Pressurizer Pressure Instrument Fails High

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.
		This action is not in 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.
	CRS	Procedure Caution Steam Generator pressures dropping concurrently with dropping Pressurizer level may be indicative of an excess steam demand.
	CRS	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.
	CRS	2. 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.
	ATC	1. Verify control channel instrument failure by checking PRESSURIZER PRESSURE CHANNEL X/Y recorder (RC-IPR-0100).

Op Test No.: NRC	Scenario # 3	Event # 5	Page 10	of 15
Event Description: Pressurizer Pressure Instrument Fails High				

Time	Position	Applicant's Actions or Behavior
	ATC	2. Transfer Pressurizer pressure control to operable channel using Pressurizer Pressure Channel Selector control switch.
		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.
	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 Technical Specification 3.2.8.
		• Entry required if RCS pressure drops below 2125 PSIA
		• Pressure should drop below 2125 PSIA. Pressure will recover to > 2125 PSIA after Channel Y is selected and Pressurizer Heaters are energized.
	ATC	Place Pressurizer Spray Controller RC-IHIC-0100 to Auto.
		The CRS should direct this after Channel Y has been selected for Pressurizer pressure control.

Examiner Note

This event is complete when Pressurizer Pressure Control has been transferred to Channel Y.

Or

As directed by the Lead Evaluator.

Op Test No.: NRC Scenario # 3 Event # 6 / 7 Page 11 of 15

Event Description: Loss of Coolant Accident / Failure of Containment Spray to Actuate

Time	Position	Applicant's Actions or Behavior
	ATC / BOP	Recognize and report indications of Loss of Coolant Accident
		Alarms
		• Containment Water Leakage Hi (Cabinet N, L-20)
		• Containment Water Leakage Hi-Hi (Cabinet N, K-20)
		• Class 1E Rad Monitoring Sys Activity Hi-Hi (Cabinet SA, K-4)
		Indications
		• Lowering Pressurizer level.
		• Lowering Pressurizer pressure.
		• Backup Charging Pumps auto-start until all 3 Charging Pumps are running.
	ATC	If directed by CRS, trip Reactor using 2 Reactor Trip pushbuttons at CP-2.
	ATC	If directed by CRS, initiate Safety Injection Actuation (SIAS) and Containment Isolation Actuation (CIAS) at CP-7.
	CRS	Direct ATC and BOP to carry out Standard Post trip Actions.
	ATC	Determine **Reactivity Control** acceptance criteria are met: • Check reactor power is dropping. • Check startup rate is negative. • Check less than **TWO** CEAs are **NOT** fully inserted.
	BOP	Determine **Maintenance of Vital Auxiliaries** acceptance criteria are met: Check the Main Turbine is tripped: • Governor valves closed • Throttle valves closed
	BOP	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 12 of 15

Event Description: Loss of Coolant Accident / Failure of Containment Spray to Actuate

Time	Position	Applicant's Actions or Behavior
	BOP	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	Determine **RCS Inventory Control** acceptance criteria are met: Check that the following conditions exist: • Pressurizer level is 7% to 60% • Pressurizer level is trending to 33% to 60% • Check RCS subcooling is greater than or equal to 28ºF.
	ATC	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
		IF pressurizer pressure is less than 1684 psia, **THEN** verify the following have initiated. • SIAS • CIAS
	ATC	Determine **Core Heat Removal** acceptance criteria are met: • Check at least one RCP is operating. • Check operating loop ΔT is less than 13ºF. • Check RCS subcooling is greater than or equal to 28ºF.

Op Test No.: NRC Scenario # 3 Event # 6 / 7 Page 13 of 15

Event Description: Loss of Coolant Accident / Failure of Containment Spray to Actuate

Time	Position	Applicant's Actions or Behavior
	BOP	Determine **RCS Heat Removal** acceptance criteria are met: Check that at least one steam generator has **BOTH** of the following: • Steam generator level is 5% to 80% NR • Main Feedwater is available to restore level within 50%-70% NR.
	ATC	Check RCS TC is 530ºF to 550ºF
	BOP	Check steam generator pressure is 885 psia to 1040 psia.
	BOP	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	With MSIS in, MAIN FW REG valves and STARTUP FW REG valves will be closed.
	BOP	Reset moisture separator reheaters, and check the temperature control valves closed.
	ATC	Determine **Containment Isolation** acceptance criteria are met: • Check containment pressure is less than 16.4 psia. • Check **NO** containment area radiation monitor alarms **OR** unexplained rise in activity. • Check **NO** steam plant activity monitor alarms **OR** unexplained rise in activity.
		IF containment pressure is greater than or equal to 17.1 psia, **THEN** verify the following: • CIAS is initiated • SIAS is initiated • MSIS is initiated
	BOP	Determine **Containment Temperature and Pressure Control** acceptance criteria are met: • Check containment temperature is less than or equal to 120ºF. • Check containment pressure is less than 16.4 psia.

Op Test No.: NRC Scenario # 3 Event # 6 / 7 Page 14 of 15

Event Description: Loss of Coolant Accident / Failure of Containment Spray to Actuate

Time	Position	Applicant's Actions or Behavior
		IF containment pressure is greater than or equal to 17.7 psia, **THEN** verify **ALL** of the following: • CSAS is initiated • **ALL** available containment spray pumps are delivering flow greater than 1750 gpm • **ALL** RCPs are secured
		Critical Task Establish Containment temperature and pressure control. This task is satisfied by manually initiating Containment Spray prior to completing the review of the Containment Temperature and Pressure Control Safety Function of OP-902-000, Standard Post Trip Actions, or prior to completing the Safety Function Status review of OP-902-002, Loss of Coolant Accident Recovery, if Containment pressure exceeds 17.7 PSIA after the crew transitions to OP-902-002.
	ATC	Manually initiate CSAS from CP-7. • The setpoint for CSAS is Containment pressure ≥ 17.7 PSIA.
		Critical Task Trip any RCP not satisfying RCP operating limits. This task is satisfied by securing all RCPs within 3 minutes of loss of CCW flow.
	ATC	Following initiation of CSAS, secure all running Reactor Coolant Pumps as follows: • Place each RCP control switch at CP-2 to stop.
	BOP	Secure AH-12 A or B on CRS direction after initiation of SIAS at CP-18.
	CRS	After review of Standard Post Trip Actions, use Appendix 1, Diagnostic Flow Chart of OP-902-009 to select appropriate optimal recovery procedure. • Proper use of chart will result in use of OP-902-002, Loss of Coolant Accident Recovery
	Crew	When Containment Temperature rises above 200 F, update crew on need to use bracketed parameters due to harsh environment in Containment.

Op Test No.: NRC Scenario # 3 Event # 6 / 7 Page 15 of 15

Event Description: Loss of Coolant Accident / Failure of Containment Spray to Actuate

Time	Position	Applicant's Actions or Behavior
	CRS	During brief in OP-902-002, should discuss necessary strategy of using Steam Generators to cool RCS.
	CRS	1. Confirm diagnosis of a LOCA: 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.
	Crew	2. Announce a Loss of Coolant Accident is in progress using the plant page.
	CRS	3. Advise the Shift Manager to REFER TO EP-001-001, "Recognition & Classification of Emergency Condition" and implement the Emergency Plan.
	CRS	5. REFER TO Section 6.0, "Placekeeper" and record the time of the reactor trip.
		This is the location most appropriate for a Shift Brief. In the brief, the CRS should discuss the need to perform a RCS cooldown with the Atmospheric Dump Valves.
	CRS	19.1 Cooldown the RCS to less than 350ºF T_{Hot} or CET temperature using the Atmospheric Dump Valves.
		This step can be pulled forward by the CRS.

Examiner Note

This event is complete after the crew addresses the RCS cooldown

Or

As directed by the Lead Evaluator.

Facility: Waterford 3		Date of Exam: October 4, 2010										Operating Test No. NRC								
APPLICANT	EVENT TYPE	Scenarios													TOTAL	MINIMUM(*)		
		1			2			3										
		CREW POSITION			CREW POSITION			CREW POSITION			CREW POSITION							
		SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP	SRO	ATC	BOP		R	I	U
SRO-I 1 Name	RX		4											**1**	1	1	0
	NOR				3									**1**	1	1	1
	I/C		1,3,5,7		1,4,5,7									**8**	4	4	2
	MAJ		6,8		4,6									**4**	2	2	1
	TS				1,2									**2**	0	2	2
SRO-I 2 Name	RX		4											**1**	1	1	0
	NOR				3									**1**	1	1	1
	I/C		1,3,5,7		1,4,5,7									**8**	4	4	2
	MAJ		6,8		4,6									**4**	2	2	1
	TS				1,2									**2**	0	2	2
SRO-I 3 Name	RX					3								**1**	1	1	0
	NOR	4												**1**	1	1	1
	I/C	1,3,5,7				1,4,5								**7**	4	4	2
	MAJ	6,8				4,6								**4**	2	2	1
	TS	2,3												**2**	0	2	2
SRO-U Name	RX					3								**1**	1	1	0
	NOR	4												**1**	1	1	1
	I/C	1,3,5,7				1,4,5								**7**	4	4	2
	MAJ	6,8				4,6								**4**	2	2	1
	TS	2,3												**2**	0	2	2
Spare	RX								1								
	NOR							1									
	I/C							3,5,7	3,5,7								
	MAJ							6	6								
	TS							2,4									

Instructions:

1. Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
2. Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
3. Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

ES-301 **Competencies Checklist** **Form ES-301-6**

Facility:	**Waterford 3**	Date of Exam:	**October 4, 2010**	Operating Test No.:	**NRC**

Competencies	APPLICANTS											
	CRS				**ATC**							
	SCENARIO				SCENARIO				SCENARIO			
	1	2	3		1	2	3					
Interpret/Diagnose Events and Conditions	1, 2, 3, 5, 6, 8	1, 2, 3, 4, 5, 6, 7	2, 3, 4, 5, 6, 7		1, 3, 5, 6, 7, 8	1, 4, 5, 6	3, 5, 6, 7					
Comply With and Use Procedures (1)	All				1, 3, 4, 5, 6, 8	1, 3, 4, 5, 6	1, 3, 5, 6, 7					
Operate Control Boards (2)	N/A				1, 3, 4, 5, 6, 7	1, 3, 4, 5	1, 3, 5, 6, 4					
Communicate and Interact	All				1, 2, 3, 4, 5, 6, 7, 8	1, 3, 4, 5, 6	1, 2, 3, 5, 6, 7					
Demonstrate Supervisory Ability (3)	All				N/A				N/A			
Comply With and Use Tech. Specs. (3)	2,3	1,2	2,4		N/A				N/A			

Notes:
(1) Includes Technical Specification compliance for an RO.
(2) Optional for an SRO-U.
(3) Only applicable to SROs.

Instructions:

Check the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.