JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: SP 2602B Transient Temperature, Pressure Verification

JPM Number: JPM-290-R-4B   Revision: 0

Initiated:

David J. Jacobs   05/24/2016

Developer   Date

Reviewed:

Robert L. Cimmino, Jr.   07/13/2016

Technical Reviewer   Date

Approved:

Supervisor, Nuclear Training   Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
05/24/2016	New JPM for NRC ILT Exam 2016	0

JPM WORKSHEET

Facility: **MP-2** Examinee: __________

JPM Number: **JPM-290-R-4B** Revision: **0**

Task Title: **SP 2602B Transient Temperature, Pressure Verification**

System: 005 RHR

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 30

Task Number(s): 121-01-167

Applicable To: SRO **X** STA ____ RO **X** PEO ____

K/A Number: 005 A1.01 / 2.2.42 K/A Rating: 3.5 / 3.6 3.9 /4.6

Method of Testing: Simulated Performance: ____ Actual Performance: X

Location: Classroom: X Simulator: ____ In-Plant: ____

Task Standards: At the completion of the JPM the Examinee has reviewed the Computer Printout and referred to SP 2602B to determined cooldown rates are NOT within the Tech. Spec Limits

Required Materials: (procedures, equipment, etc.)
SP 2602B Transient Temperature, Pressure Verification
SP 2602B-001 Transient Temperature, Pressure Verification Data Sheet
PPC SP 2602B Printout

General References: SP 2602B Transient Temperature, Pressure Verification

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-290-R-4B** Revision : **0**

Initial Conditions:	The Plant has completed a cooldown to 125°F in accordance with OP 2207 "Cooldown" using "A" and "B" RCPs concurrently with SDC. • SDC was placed in service at 0105 • RCPs secured at 0300. The Crew has concerns that the Administrative Cooldown limits were exceeded.
Initiating Cues:	The Unit Supervisor has directed you to use the computer data from the cooldown and perform SP 2602B "Transient Temperature, Pressure Verification" to check if the Tech. Spec. Cooldown Limits were exceeded.
Simulator Requirements:	N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-290-R-4B** Revision: **0**

Task Title: **SP 2602B Transient Temperature, Pressure Verification**

START TIME: __________

STEP #1	Performance: Refers to SP 2602B Transient Temperature, Pressure Verification 4.1 Heatup and Cooldown Initial and Conditional Actions 4.1.2 IF available, DESIGNATE a person not involved in controlling the Heatup or cooldown to perform the following: • DETERMINE and RECORD required data on SP 2602B-001. • MONITOR parameters, limits, and Heatup or cooldown rates between entries.	Standard: Examinee refers to OP 2602B, the Computer Print outs performs the following: • Records the Cooldown starting at 0000 • Uses T115 (refer to Stem A&B RCPs Loop #1) • Uses T351Y at 0330 when RCPs are secured	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #2	Performance: 4.1.3 IF PPC data points are available, PERFORM the following: • ESTABLISH trend(s) of selected parameters for trending and data gathering during Heatup or cooldown. • OBTAIN required 30 minute data sheets from PPC printer, and Go To step 4.1.10.	Standard: Examinee records and determines Hourly Cooldown Rates recording parameters every half hour	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-290-R-4B** Revision: **0**

Task Title: **SP 2602B Transient Temperature, Pressure Verification**

S T E P # 3	Performance: 4.1.10 IF at any time, any administrative limit (except pressurizer spray line differential temperature between 200°F and 350°F) or any TS/TRM acceptance criteria is not met, PERFORM the following: • Immediately NOTIFY Shift Manager.	Standard: Examine determines during the transition from RCPs to SDC when securing the RCPs the Technical Specification was exceeded at 51°F per hour below 220°F and informs the Unit Supervisor	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-290-R-4B** Revision: **0**

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**30**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-290-R-4B** Revision: **0**

Initial Conditions:

The Plant has completed a cooldown to 125°F in accordance with OP 2207 “Cooldown” using “A” and “B” RCPs concurrently with SDC.

- SDC was placed in service at 0105
- RCPs secured at 0300.

The Crew has concerns that the Administrative Cooldown limits were exceeded.

Initiating Cues:

The Unit Supervisor has directed you to use the computer data from the cooldown and perform SP 2602B “Transient Temperature, Pressure Verification” to check if the Tech. Spec. Cooldown Limits were exceeded.

Circle

Technical Specification Limits Exceeded: YES NO

If “YES” TIME(S): ____________________

SP 2602B Report Transient Temperature, Pressure Verification Data Sheet

TIME	**T351Y**	**T115**	**T125**	**PZR Pressure**
0000		369°	370°	595
0005		358°	361°	592
0010		350°	352°	589
0015		343°	345°	585
0020		333°	336°	581
0025		326°	329°	587
0030		319°	323°	600
0035		312°	318°	535
0040		303°	307°	462
0045		292°	301°	354
0050		287°	282°	281
0055		279°	275°	256
0100		270°	272°	236
0105	262°	268°	270°	234
0110	258°	259°	266°	232
0115	247°	250°	254°	231

SP 2602B Report Transient Temperature, Pressure Verification Data Sheet

TIME	**T351Y**	**T115**	**T125**	**PZR Pressure**
0120	235°	241°	248°	233
0125	220°	230°	232°	234
0130	210°	220°	225°	232
0135	205°	216°	217°	233
0140	202°	210°	211°	234
0145	198°	204°	205°	235
0150	194°	199°	199°	234
0155	190°	194°	200°	232
0200	185°	189°	201°	231
0205	181°	186°	188°	230
0210	179°	180°	180°	231
0215	176°	176°	176°	232
0220	172°	174°	175°	234
0225	168°	173°	172°	235
0230	165°	172°	173°	233
0235	160°	168°	171°	232

SP 2602B Report Transient Temperature, Pressure Verification Data Sheet

TIME	**T351Y**	**T115**	**T125**	**PZR Pressure**
0240	158°	164°	167°	233
0245	155°	159°	160°	232
0250	150°	154°	157°	230
0255	148°	153°	152°	234
0300	150°	152°	151°	235
0305	145°	149°	150°	234
0310	141°	148°	149°	235
0315	137°	146°	147°	233
0320	133°	144°	145°	232
0325	128°	142°	143°	234
0330	121°	140°	141°	233
0335	122°	138°	139°	235
0340	123°	135°	136°	234
0345	122°	135°	136°	232
0350	123°	133°	135°	233
0355	122°	133°	135°	234

MILLSTONE POWER STATION
SURVEILLANCE PROCEDURE

Transient Temperature, Pressure Verification

SP 2602B
Rev. 013−02

STOP THINK ACT REVIEW

Approval Date: 09/10/08

Effective Date: 09/23/08

Level of Use
Reference

Millstone Unit 2
Surveillance Procedure

Transient Temperature, Pressure Verification

TABLE OF CONTENTS

1. PURPOSE

1.1 Objective

This procedure provides instructions for verifying heatup and cooldown (planned changes of 10°F or greater OR 100 psi or greater) limits of the RCS and pressurizer are *not* exceeded and monitors subcooling, as stated in the following LCOs:

- TS 3.4.9.1, "Reactor Coolant System–Pressure/Temperature Limits"
- TRM 3.4.9.2, "Pressurizer–Pressure/Temperature Limits"
- TS 3.4.1.2, "Coolant Loops and Coolant Circulation–Hot Standby"
- TS 3.4.1.3, "Coolant Loops and Coolant Circulation–Hot Shutdown"
- TS 3.4.1.4, "Coolant Loops and Coolant Circulation–RCS Loops Filled"
- TS 3.4.1.5, "Coolant Loops and Coolant Circulation–RCS Loops Not Filled"

1.2 Discussion

The TS Surveillance Requirement states that temperatures will be determined to be within the specified limits at least once every 30 minutes. This procedure instructs the user to utilize the PPC and attach printouts of the required data at a minimum of 30 minute intervals.

With the PPC operating as specified in OP 2349B, "Plant Process Computer," the parameters of SP 2602B–001 are monitored at all times and a 30 minute printout of the required data is used to satisfy TSSR 4.4.9.1a and TRMSR 4.4.9.2, RCS and pressurizer data are recorded every 30 minutes on SP 2602B–001. If the PPC is *not* operating, to satisfy TSSR 4.4.9.1a and TRMSR 4.4.9.2, RCS and pressurizer data are recorded manually at least every 30 minutes on SP 2602B–001

The Unit 2 PPC provides displays, both graphically and numerically, of plant parameters required to perform a successful plant heat–up or cooldown. The PPC has features that change the monitored parameters' colors to an orange then red color, as limits are being approached or exceeded. For plant parameters that are approached or exceeded, there are PPC annunciators (main control board) to warn the operators of their approach to these limits. These annunciators need to be acknowledged and reported to the Senior Reactor Operator. The PPC also provides operators with the historical data needed to trend heat–up/cooldown rates over the past one hour to ensure limits are *not* exceeded.

Hourly heatup and cooldown rates are calculated using SP 2602B−001 data. The rates are compared to the acceptance criteria to determine TS compliance and preclude operation outside the LCOs. These limits ensure reactor component structural integrity is *not* challenged.

This surveillance also satisfies the monitoring of core outlet temperature subcooled margin as required by TS 3.4.1.2, 3.4.1.3, 3.4.1.4, and 3.4.1.5 when *no* RCPs or LPSI pumps are operating.

The TS Surveillance Requirement states that temperatures will be determined to be within the specified limits at least once every 30 minutes. This procedure instructs the user to record data at a minimum of 30 minute intervals.

Temperature changes resulting from normal power changes do *not* constitute a temperature transient since these changes are slow and limited in range.

Pressurizer water to steam space ΔT temperature is used to detect non−condensible gas which could affect pressurizer pressure response. If T109 minus T101 is greater than *minus* 25°F or *plus* 75°F than Plant Heatup Conditional Actions of OP 2201 and Plant Heatup Conditional Actions of OP 2207 requires forcing pressurizer spray and maximizing venting of the pressurizer steam space to the VCT. If T101 or T109 is inoperable, forcing sprays and venting of the pressurizer steam space to the VCT should be initiated prior to initiating a plant heatup or cooldown to preclude the formation of a hard bubble [♣ Ref. 6.5].

T101 or T109 can be used to determine pressurizer spray line delta temperature, $T_{STM} = T_{LIQ}$.

RCS temperature and pressure monitoring requirements of this surveillance apply at *all* times.

When tracking RCS heatup and cooldown rates and SDC is *not* in service, RCS loop T_{COLD} temperatures, “T115” and “T125,” must both be monitored. The heatup and cooldown rate for *each* sensor must meet acceptance criteria as different loops may cause a different change in temperature of the downcomer region of the vessel [♣ Ref. 6.4].

If the temperature of the RCS is within the range of the narrow range loop TCOLD detectors (515°F to 615°F), T111Y and T121Y may be used instead of T115 and T125.

During concurrent SDC/RCP operation, the non−operating Loop T_{HOT} can be lower than T_{COLD} in both loops and operating Loop T_{HOT}. This is normal when running pumps in only one Loop due to reverse flow. This difference is exaggerated when steaming the non−operating loop steam generator.

With RCPs stopped and SDC flow fully initiated (e.g. flow greater than 1,000 gpm) and SDC to RCS temperature, T351Y has been lowered to below the *lowest* RCS T_{COLD} temperature, *only* SDC to RCS temperature, T351Y shall be used to monitor cooldown rate. During heatup, SDC to RCS temperature, T351Y shall be used to monitor heatup rate until RCPs are started or SDC flow is less than or equal to 1,000 gpm. These sensors best indicate the temperature changes seen by the downcomer region of the reactor vessel [✤ Ref. 6.4].

The initiation of SDC without concurrent RCP operation presents the following indications for the SDC System and reactor vessel:

- Upon initiation, a slug of water equal in temperature to the warmup of SDC will pass by SDC to RCS temperature, T351Y
- The reactor vessel wall will see the Containment ambient temperature water downstream of the LPSI injection valves, then water equal in temperature to the warmup of SDC
- Following the slug of SDC warmup water will be a slug of water equal in temperature to the Enclosure Building ambient temperature. This is water from the SDC suction line starting at the RCS connection to the LPSI pump suctions
- The SDC System will then see water equal in temperature to T_{HOT}

At least once every 30 minutes during system heatup, cooldown, and inservice hydrostatic and leak testing operations. As desired, this data may be recorded more frequently.

Pressurizer temperature monitoring requirements of this surveillance apply during MODEs 1 through 5, however, are typically performed at all times in conjunction with RCS monitoring.

1.3 Applicability

This surveillance is performed in all MODEs.

1.4 Frequency

Once every 30 minutes during heatup, cooldown, and inservice hydrostatic and leak testing.

2. PREREQUISITES

NOTE

Sections 4.2, 4.3 and 4.3 of this procedure may be performed independently and in any order.

2.1 General

____________ 2.1.1 The SM/US has authorized performance of SP 2602B−001.

2.2 Documents

____________ 2.2.1 OP 2387G, “Inadequate Core Cooling System”

____________ 2.2.2 SP 2602D, “Steam Generator Primary and Secondary Pressure, Temperature Verification”

2.3 Definitions

____________ 2.3.1 RCS *heatup* and *cooldown* is defined as any change (raising or lowering), in RCS temperature of 10°F or greater OR RCS pressure of 100 psi or greater.

____________ 2.3.2 Pressurizer *heatup* and *cooldown* is defined as any change in pressurizer temperature 10°F or greater (e.g., drawing a bubble or raising or lowering RCS pressure).

____________ 2.3.3 Forced circulation is defined as having at least one RCP in operation or SDC system aligned to the RCS with flow greater than 1,000 gpm.

____________ 2.3.4 RCS temperature [✣ Ref. 6.4]:

- If the temperature of the RCS is within the range of the narrow range loop T_{COLD} detectors (515°F to 615°F), T111Y and T121Y may be used instead of T115 and T125.
- When RCPs are operating, RCS temperature is defined as *eac*h of the two wide range loop T_{COLD}s [T115, T111Y (loop 1) and T125, T121Y (loop 2)]
- When *no* RCPs are operating and SDC flow is less than 1,000 gpm or “SDC to RCS temperature, T351Y” is greater than T_{COLD}, RCS temperature is defined as *each* of the two wide range loop T_{COLD}s (T115 and T125)
- When *no* RCPs are operating AND *both* of the following conditions exist, RCS temperature is defined as “SDC to RCS temperature, T351Y”:
  - SDC flow is equal to or greater than 1,000 gpm
  - “SDC to RCS temperature, T351Y” is less than T_{COLD} (T115 and T125)

3. PRECAUTIONS

____________3.1 During *heatup* and *cooldown*, RCS (except pressurizer) temperature and pressure must remain in accordance with the limit lines shown on TS 3.4.9.1, Figures 3.4−2a and 3.4−2b, AND the following:

- NRC letter A14085 for application of leak before break analysis to pressurizer surge line, dated 5/4/99 [♣Ref. 6.3]
- Maximum *heatup*:
  - 60°F in any 1 hour period with T_{COLD} between 70 and 200°F
  - 80°F in any 1 hour period with T_{COLD} between 200 and 275°F
  - 100°F in any 1 hour period with T_{COLD} between 275 and 563°F
- Maximum *cooldown*:
  - 100°F in any 1 hour period with T_{COLD} between 220 and 563°F
  - 50°F in any 1 hour period with T_{COLD} between 70 and 220°F

____________3.2 The following *pressurizer* limits must *not* be exceeded (TRM, 3.4.9.2):

- Maximum *heatup* of 100°F in any 1 hour period
- Maximum *cooldown* of 200°F in any 1 hour period
- Maximum spray water temperature differential of 350°F

____________3.3 A pressurizer *water to steam* differential temperature of *minus* 25°F (T109 is *cooler* than T101 by more than 25°F) indicates a possible non−condensible gas bubble. If this condition occurs, the Shift Manager and Unit Supervisor must be notified immediately [♣ Ref. 6.5].

____________3.4 During concurrent RCP/SDC operation, flow in the non−operating loop will be in the reverse direction. This means that the non−operating loop instrument (T115 or T125) will be inaccurate. Therefore, only the operating loop instrument (T115 or T125) should be used for calculating heatup or cooldown rates.

____________3.5 Temperature of both the primary and secondary coolants in the SGs shall be determined to be greater than 70°F when *either* has a pressure greater than 200 psig and T_{AVG} is less than 200°F.

4. INSTRUCTIONS

4.1 Heatup and Cooldown Initial and Conditional Actions

____________ 4.1.1 IF at any time RCS or SG pressure is greater than 200 psig AND T_{AVG} is less than 200°F, Refer To SP 2602D, “Steam Generator Primary and Secondary Pressure, Temperature Verification,” and PERFORM concurrently with this procedure.

____________ 4.1.2 IF available, DESIGNATE a person *not* involved in controlling the heatup or cooldown to perform the following:

____________ a. DETERMINE and RECORD required data on SP 2602B−001.

____________ b. MONITOR parameters, limits, and *heatup* or *cooldown* rates between entries.

____________ c. PROVIDE frequent RCS and pressurizer rate and limit information to the operator(s) controlling heatup or cooldown evolution.

4.1.3 IF PPC data points are available, PERFORM the following:

____________ • ESTABLISH trend(s) of selected parameters for trending and data gathering during heatup or cooldown.

____________ • OBTAIN required 30 minute data sheets from PPC printer, and Go To step 4.1.10.

____________ 4.1.4 IF PPC data point is *not* available, OBTAIN required data at least once every 30 minutes using available Control Room indications only.

____________ 4.1.5 IF more than one sensor is specified for computing heatup or cooldown rate and *both* sensors are available, RECORD *both* temperatures and CALCULATE rates for *both* sensors on SP 2602B−001.

____________ 4.1.6 IF more than one sensor is specified for computing heatup or cooldown rate and any sensor is *not* available, RECORD available temperature and INDICATE “N/A” for bad sensor on SP 2602B−001.

4.1.7 <u>IF</u> T109, Pressurizer (Pzr) steam Phase temperature indication is *not* reliable as determined by SM/US, PERFORM the following:

a. To prevent formation of hard bubble, PERFORM the following:

- ALIGN Pzr steam phase vent path to VCT. ①
- FORCE Pzr Sprays, if desired.

b. PLACE N/A in data entry fields requiring T109 tracking on SP 2602B−001.

c. NOTIFY System Engineer.

NOTE

"SDC to RCS temperature, T351Y" should *not* be recorded when RCPs are operating [♣ Ref. 6.4].

4.1.8 <u>WHEN</u> RCPs are in service, PERFORM the following:

a. RECORD T_{COLD} temperatures [T115, T111Y (loop 1) and T125, T121Y (loop 2)] on SP 2602B−001.

b. DETERMINE RCS *heat−up* or *cooldown* rates using T_{COLD} temperature in each operating RCS loop [T115 (loop 1) and T125 (loop 2)].

NOTE

The SDC System is considered *not* removing heat if any of the following conditions exist:

- SDC total flow is less than 1,000 gpm
- *No* RBCCW flow to SDC HXs aligned for use
- *No* SDC flow to SDC HXs aligned for use (i.e., 2−SI−657 closed)

4.1.9 IF at any time RCPs are stopped and SDC is *not* removing heat, PERFORM the following:

____________ a. RECORD T_{COLD} temperatures [T115 (loop 1) and T125 (loop 2)] on SP 2602B−001.

____________ b. DETERMINE *heat−up* or *cooldown* rates using T_{COLD} temperatures [T115 (loop 1) and T125 (loop 2)].

____________ c. CONTINUE monitoring “SDC to RCS temperature, T351Y.”

4.1.10 IF at any time, *any* administrative limit (except pressurizer s*pray line* differential temperature between 200°F and 350°F) or *any* TS/TRM acceptance criteria is *not* met, PERFORM the following:

____________ a. *Immediately* NOTIFY Shift Manager.

____________ b. IF applicable, COMPLY with TS 3.4.9.1 and TRM 3.4.9.2 ACTION Statement(s).

____________ c. NOTIFY Technical Support.

____________ 4.1.11 IF at any time, pressurizer s*pray line* differential temperature is between 200°F and 350°F, PERFORM the following [Ref. 6.6]:

a. *Immediately* NOTIFY Shift Manager.

b. NOTIFY Site Engineering.

____________ 4.1.12 IF at any time *no* RCPs or LPSI pumps are operating, Refer To Section 4.4 and CALCULATE and RECORD core outlet temperature subcooled margin.

NOTE

All *heatup* or *cooldown* data is recorded at least once every 30 minutes on SP 2602B−001.

4.1.13 IF performing plant *heat−up*, PERFORM one of the following:

____________ - IF PPC is operating, Go To step 4.2.6.

____________ - IF PPC is *not* operating, Go To Section 4.2.

4.1.14 IF performing plant *cooldown*, PERFORM *one* of the following:

____________ - IF PPC is operating, Go To step 4.3.6.

____________ - IF PPC is *not* operating, Go To Section 4.3.

− End of Section 4.1 −

4.2 Heatup Actions

____________ 4.2.1 VERIFY *heatup* rates are recorded as *positive* numbers.

4.2.2 To determine RCS *heat−up* parameters, PERFORM the following:

____________ a. RECORD time and required RCS data on SP 2602B−001.

____________ b. WHEN 30 minutes have elapsed, DETERMINE *heat−up* rate ("ΔT/HR") using one of the following and RECORD on SP 2602B−001:

____
- IF first calculation, SUBTRACT initial temperature recorded from current temperature and multiply by two.

____
- After first calculation SUBTRACT temperature recorded one hour ago from current temperature.

NOTE

"SDC to RCS temperature, T351Y" should *not* be recorded when RCPs are operating [♣ Ref. 6.4].

____________ c. WHEN RCPs are placed in−service during *heat−up*, INITIATE recording T_{COLD} temperatures [T115 (loop 1) and T125 (loop 2)].

d. WHEN transitioning from "SDC to RCS temperature, T351Y" to T_{COLD} temperature [T115 (loop 1) and T125 (loop 2)] during *heat−up*, PERFORM the following to determine "ΔT/HR" rates [♣ Ref. 6.4]:

____________ 1) SUBTRACT "SDC to RCS temperature, T351Y" temperature recorded 1 hour ago from the current *highest* T_{COLD} temperature [T115 (loop 1) and T125 (loop 2)].

____________ 2) RECORD "ΔT/HR" in applicable T_{COLD} column on SP 2602B−001.

____________ 3) WHEN *no* longer required to record transition phase "ΔT/HR" rate, CONTINUE to record "ΔT/HR" on *both* T115 (loop 1) and T125 (loop 2).

____________ e. Refer To Attachment 1 and VERIFY pressurizer pressure and RCS temperature [T115, T111Y (loop 1) and T125, T121Y (loop 2) or T351Y, as applicable], are within the acceptable region.

f. IF pressurizer pressure and RCS temperature are within the acceptable region AND RCS *heat−up* rate is within TS acceptance criteria, INITIAL SP 2602B−001.

4.2.3 PROVIDE RCS *heatup* information to operator(s) controlling evolution.

4.2.4 To determine pressurizer *heat−up* parameters, PERFORM the following:

a. RECORD time and required pressurizer data for each of the following on SP 2602B−001:

- Pressurizer steam space, T109
- Pressurizer water space, T101

b. WHEN 30 minutes have elapsed, DETERMINE *heatup* rate ("ΔT/HR") using *one* of the following and RECORD on SP 2602B−001:

- IF first calculation, SUBTRACT initial temperature recorded from current temperature and multiply by two
- After first calculation SUBTRACT temperature recorded one hour ago from current temperature

c. DETERMINE pressurizer *water to steam* differential temperature (T109 minus T101) and RECORD on SP 2602B−001.

d. IF at any time, *either* of the following conditions are observed, *immediately* NOTIFY Shift Manager and Unit Supervisor:

- Pressurizer *water to steam* differential temperature indicates *minus* 25°F (T109 is *cooler* than T101 by more than 25°F) (indicates possible non−condensible gas bubble) [♣ Ref. 6.5].
- Pressurizer *water to steam* differential temperature indicates 75°F (T109 is *hotter* than T101 by more than 75°F) (indicates need for pressurizer heaters).

NOTE

Pressurizer spray line differential temperature is still monitored even though pressurizer spray (main or auxiliary), may *not* be initiated at the time of data recording. Location of temperature monitoring depends on RCP status:

- If RCPs are operating, the *lowest* of TI−103 or TI−104 (spray line temperatures), is used to calculate differential temperature
- If RCPs are *not* operating, T229 (charging header temperature) is used to calculate differential temperature after spray flow is established
- If RCPs are *not* operating, Containment average temperature, “CVCONTEMP” or positions 5 and 6 of “TEMP SEL SW” (C−01) is used to calculate differential temperature when spray flow is initiated

____________ e. DETERMINE pressurizer *spray line* differential temperature and RECORD on SP 2602B−001.

____________ f. <u>IF</u> at any time, pressurizer *spray line* differential temperature is greater than 350°F, Refer To step 4.1.10 and PERFORM additional actions.

____________ g. <u>IF</u> at any time, pressurizer *spray line* differential temperature is between 200°F and 350°F, Refer To step 4.1.11 and PERFORM additional actions.

____________ h. <u>IF</u> pressurizer *heat−up* rate and *spray line* differential temperature are within TS acceptance criteria, INITIAL SP 2602B−001.

____________ 4.2.5 PROVIDE pressurizer *heat−up*, sprayline, and water to steam differential temperature information to operator(s) controlling evolution.

____________ 4.2.6 As necessary, ATTACH additional copies of applicable page(s) to approved SP 2602B−001, for each day’s accumulated data.

____________ 4.2.7 <u>WHEN</u> plant *heat−up* and inservice hydrostatic and leak testing is terminated, STOP recording data on SP 2602B−001.

− End of Section 4.2 −

4.3 Cooldown Actions

NOTE

During plant cooldowns, when the *maximum* allowable rate changes in any hour, the most restrictive of these limits shall apply in that hour that the change occurred.

<u>Example</u>: If at 0100 during a cooldown the temperature is 270 °F, temperature *cannot* be reduced below 220°F for the remainder of that hour because the maximum cooldown of 50°F/hr applies when temperature is less than 220°F, even though an 100°F/hr rate applies when temperature is greater than 220°F.

02

____________ 4.3.1 VERIFY *cooldown* rates are recorded as *negative* numbers..

____________ 4.3.2 To determine RCS *cooldown* parameters, PERFORM the following:

____________ a. RECORD time and required RCS data

____________ b. <u>WHEN</u> 30 minutes have elapsed, DETERMINE *cooldown* rate ("ΔT/HR") using *one* of the following and RECORD on SP 2602B−001:

- ____________ <u>IF</u> first calculation, SUBTRACT initial temperature recorded from current temperature and multiply by two.
- ____________ After first calculation SUBTRACT temperature recorded one hour ago from current temperature.

c. <u>WHEN</u> transitioning from T_{COLD} temperature [T115 (loop 1) and T125 (loop 2)] to "SDC to RCS temperature, T351Y" during *cooldown*, PERFORM the following to determine "ΔT/HR" rates [✤ Ref. 6.4]:

____________ 1) SUBTRACT the *highest* T_{COLD} temperature [T115 (loop 1) and T125 (loop 2)] recorded 1 hour ago from the current "SDC to RCS temperature, T351Y" temperature.

____________ 2) RECORD "ΔT/HR" in T351Y column.

NOTE

If SDC is initiated *without* concurrent RCP operation, a slug of cold water moves through the SDC system. “SDC to RCS temperature, T351Y” first drops and then rises to RCS temperatures. After SDC and RCS temperatures are equalized, SDC is cooled by RBCCW. After “SDC to RCS temperature, T351Y” falls below T_{COLD} temperatures, (T115 and T125), “SDC to RCS temperature, T351Y” should be used to determine RCS cooldown rates for the remainder of time SDC is in service [♣ Ref. 6.4].

____________ d. During *cooldown*, MONITOR for the following conditions:

- SDC total flow greater than 1,000 gpm (SDC removing heat)
- RCPs *not* running
- “SDC to RCS temperature, T351Y” lowers *below* T_{COLD} temperatures [T115 (loop 1) and T125 (loop 2)]

e. WHEN *all* of the conditions of step 4.3.2d. exist, PERFORM the following [♣ Ref. 6.4]:

____________ 1) INITIATE recording “SDC to RCS temperature, T351Y.”

____________ 2) For the remainder of the time SDC is in service, DETERMINE rates using “SDC to RCS temperature, T351Y.”

____________ 3) As desired, STOP recording T_{COLD} temperatures [T115 (loop 1) and T125 (loop 2)].

____________ f. Refer To Attachment 2 and VERIFY pressurizer pressure and RCS temperature [(T115 and T125) or T351Y, as applicable], are within the acceptable region.

____________ g. IF pressurizer pressure and RCS temperature are within the acceptable region AND RCS *cooldown* rate is within TS acceptance criteria, INITIAL SP 2602B−001.

____________ 4.3.3 PROVIDE RCS *cooldown* information to operator(s) controlling evolution.

4.3.4 To determine pressurizer *cooldown* parameters, PERFORM the following:

a. RECORD time and required pressurizer data.

- Pressurizer steam space, T109
- Pressurizer water space, T101

b. <u>WHEN</u> 30 minutes have elapsed, DETERMINE *cooldown* rate (“ΔT/HR”) using *one* of the following and RECORD on SP 2602B−001:

- <u>IF</u> first calculation, SUBTRACT initial temperature recorded from current temperature and multiply by two
- After first calculation SUBTRACT temperature recorded one hour ago from current temperature

c. DETERMINE pressurizer *water to steam* differential temperature (T109 minus T101) and RECORD.

d. <u>IF</u> at any time, *either* of the following conditions are observed, *immediately* NOTIFY Shift Manager and Unit Supervisor:

- Pressurizer *water to steam* differential temperature indicates *minus* 25°F (T109 is *cooler* than T101 by more than 25°F) (indicates possible non−condensible gas bubble) [♣ Ref. 6.5].
- Pressurizer *water to steam* differential temperature indicates 75°F (T109 is *hotter* than T101 by more than 75°F) (indicates need for pressurizer heaters).

NOTE

Pressurizer spray line differential temperature is still monitored even though pressurizer spray (main or auxiliary), may *not* be initiated at the time of data recording. Location of temperature monitoring depends on RCP status:

- If RCPs are operating, the *lowest* of TI−103 or TI−104 (spray line temperatures), is used to calculate differential temperature
- If RCPs are *not* operating, T229 (charging header temperature) is used to calculate differential temperature after spray flow is established
- If RCPs are *not* operating, Containment average temperature, “CVCONTEMP” or positions 5 and 6 of “TEMP SEL SW” (C−01) is used to calculate differential temperature when spray flow is initiated

____________ e. DETERMINE pressurizer *spray line* differential temperature and RECORD.

____________ f. <u>IF</u> at any time, pressurizer *spray line* differential temperature is greater than 350°F, Refer To step 4.1.10 and PERFORM additional actions.

____________ g. <u>IF</u> at any time, pressurizer *spray line* differential temperature is between 200°F and 350°F, Refer To step 4.1.11 and PERFORM additional actions.

____________ h. <u>IF</u> pressurizer *cooldown* rate and *spray line* differential temperature are within TS acceptance criteria, INITIAL SP 2602B−001.

____________ 4.3.5 PROVIDE pressurizer *cooldown*, sprayline, and water to steam differential temperature information to operator(s) controlling evolution.

____________ 4.3.6 As necessary, ATTACH additional copies of applicable page(s) to approved SP 2602B−001, for each day’s accumulated data.

____________ 4.3.7 <u>WHEN</u> plant *cooldown*, inservice hydrostatic and leak testing is terminated, STOP recording data on SP 2602B−001.

− End of Section 4.3 −

4.4 Monitoring Core Outlet Temperature Subcooled Margin

NOTE

This section is used when *no* RCPs or LPSI pumps are operating to satisfy, in part, requirements of TS 3.4.1.2, 3.4.1.3, 3.4.1.4, and 3.4.1.5.

____________ 4.4.1 CHECK *no* RCPs or LPSI pumps operating (C−03, C−01).

4.4.2 IF PPC is available, PERFORM the following for core outlet temperature subcooled margin at least once every 30 minutes:

____________ a. OBSERVE ICC Summary display (“ICCSUM”) and RECORD *highest* “SAT TEMP.”

____________ b. Refer To Shutdown RCS Level display (“ICCSDL”) and RECORD core exit temperatures from −31″ and −41″ levels of *unheated* junction thermocouples.

____________ c. SUBTRACT the *highest* core exit temperature of either −31″ or −41″ levels of *unheated* junction thermocouples from *highest* “SAT TEMP” and RECORD on SP 2602B−001.

____________ d. CHECK subcooled margin greater than or equal to 10°F and INITIAL.

____________ e. IF subcooled margin is *not* greater than or equal to 10°F, *immediately* NOTIFY Shift Manager.

4.4.3 IF PPC is *not* available, PERFORM the following for core outlet temperature subcooled margin at least once every 30 minutes:

____________ a. Refer To OP 2387G, “Inadequate Core Cooling System” and OBTAIN values for the following:

- *Highest* core exit saturation temperature
- *Highest* core exit temperature from −31″ and −41″ levels

____________ b. SUBTRACT the *highest* core exit temperature of either −31″ or −41″ levels of *unheated* junction thermocouples from *highest* core exit saturation temperature and RECORD on SP 2602B−001.

____________ c. CHECK subcooled margin greater than or equal to 10°F and INITIAL.

____________ d. IF subcooled margin is *not* greater than or equal to 10°F, *immediately* NOTIFY Shift Manager.

− End of Section 4.4 −

5. REVIEW AND SIGNOFF

5.1 Review and signoff is accomplished on SP 2602B−001.

6. REFERENCES

6.1 Technical Specifications:

- 3.4.9.1, “Pressure/Temperature Limits, Reactor Coolant System”
- 3.4.1.2, “Coolant Loops and Coolant Circulation−Hot Standby”
- 3.4.1.3, “Coolant Loops and Coolant Circulation−Hot Shutdown”
- 3.4.1.4, “Coolant Loops and Coolant Circulation−RCS Loops Filled”
- 3.4.1.5, “Coolant Loops and Coolant Circulation−RCS Loops Not Filled”
- 4.4.9.1a

6.2 TRM:

- 3/4.9.2, “Pressure/Temperature Limits, Pressurizer”

6.3 RCR 42751, Leak Before Break of Pressurizer Surge Line Limitations. NRC Letter A14085 dated 5/4/99; NU letter B17682 dated 02/26/1999.

6.4 RCR−28500, commitment number 2−96−011−00.01, letter B15614 dated 3/25/96: “Changes to the plant operating and surveillance procedures will be implemented to allow operators to properly monitor and control the RCS heatup / cooldown rate.”

6.5 RCR−28493, commitment number B15653.05, NU letter B15653 dated 4/9/96: “B14653−5 NNECO hereby commits to revise the operating procedures to include appropriate caution steps to assist the operator in recognition and handling of the non−condensible gasses.”

6.6 Memo TS 2−99−63, “Pressurizer Auxiliary Spray Use,” dated March 8, 1999.

7. SUMMARY OF CHANGES

Summary of Changes, Revision 013−02

7.1 AR 08004937, CR−08−08805, Changed example note at beginning of section 4.3 to incorporate newest cooldown rate restrictions when passing through 220°F. Added basis note for new heat up and cooldown rates.

Summary of Changes, Revision 013−01

7.2 Added a new step at 4.1.7 to allow the Shift Manager to perform actions if T109 is not reliable, including the prevention of a hard bubble.

Summary of Changes, Revision 013

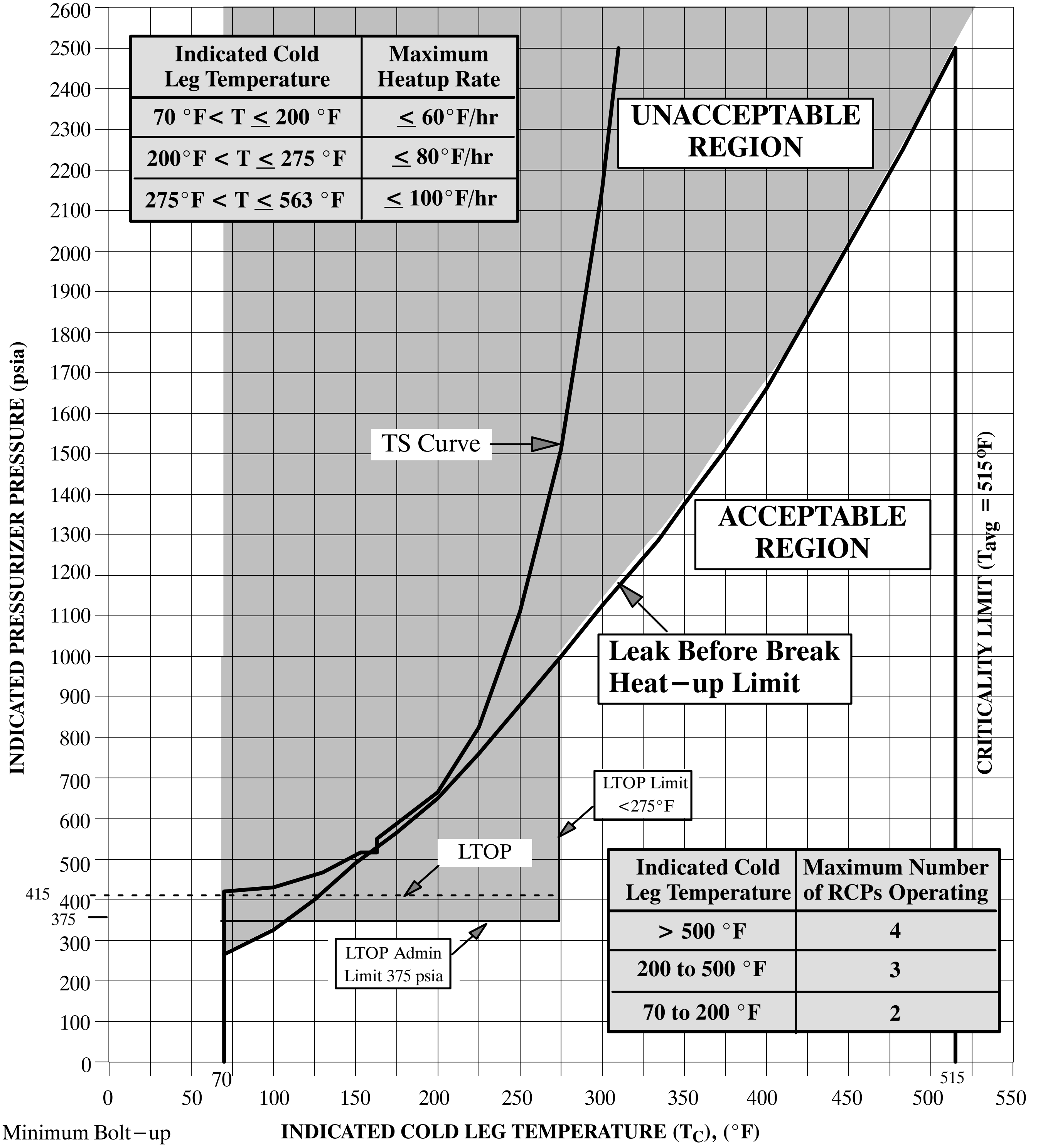
7.3 AR 07006766, CR−07−12379, added explanation for use of T101 and T109.

Attachment 1

Heatup Limitations for 54 Full Power Years [♣Ref. 6.3]

(Sheet 1 of 1)

Adapted from Millstone Unit 2 TS LCO, 3.4.9.1, Figure 3.4−2a



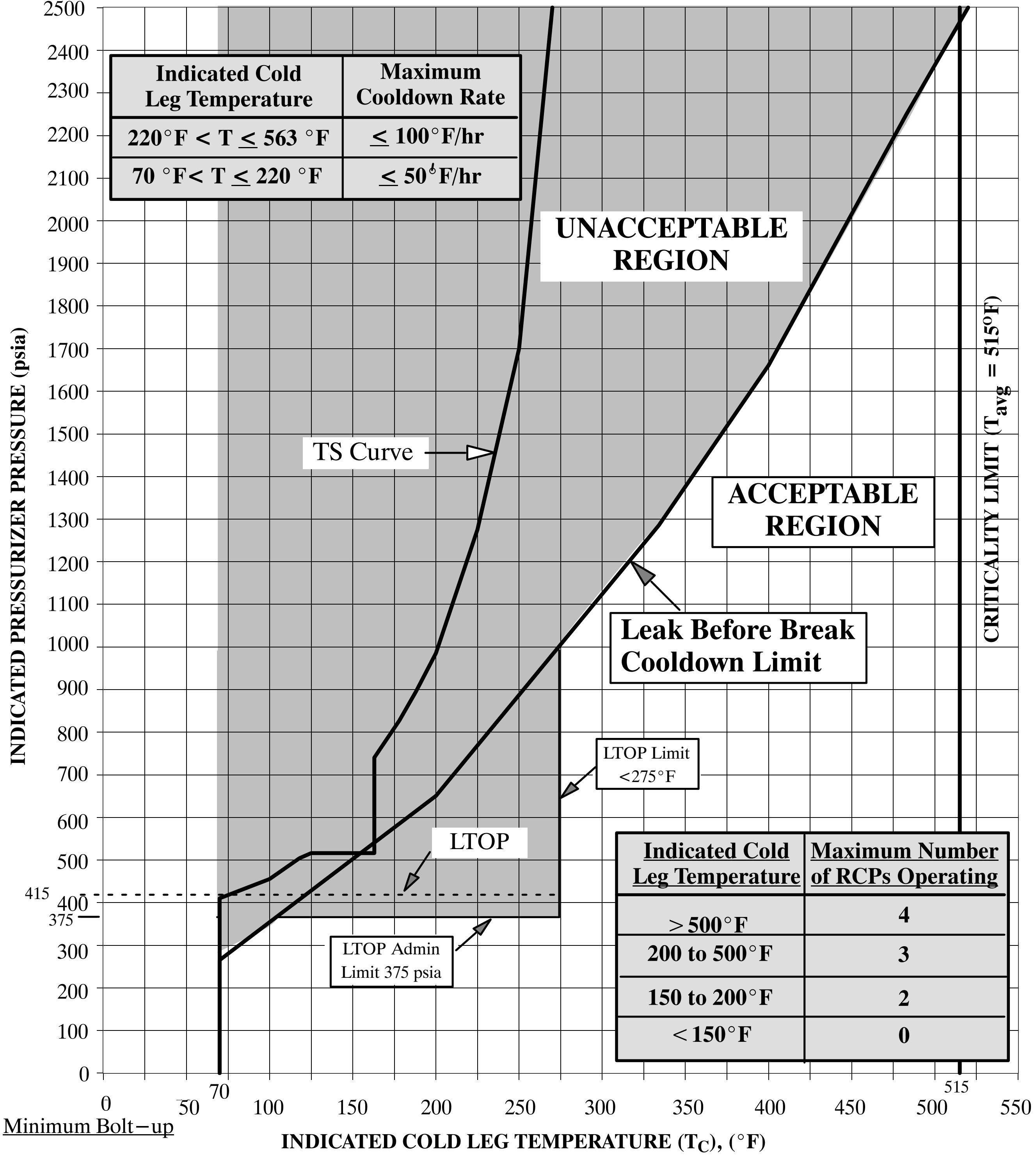
Indicated Cold Leg Temperature	Maximum Heatup Rate
70 °F< T ≤ 200 °F	≤ 60°F/hr
200°F < T ≤ 275 °F	≤ 80°F/hr
275°F < T ≤ 563 °F	≤ 100°F/hr

Indicated Cold Leg Temperature	Maximum Number of RCPs Operating
> 500 °F	4
200 to 500 °F	3
70 to 200 °F	2

Minimum Bolt−up
Temperature = 70°F

Attachment 2
Cooldown Limitations for 54 Full Power Years [♣Ref. 6.3]
(Sheet 1 of 1)

Adapted from Millstone Unit 2 TS LCO, 3.4.9.1, Figure 3.4−2b



Indicated Cold Leg Temperature	Maximum Cooldown Rate
220°F < T ≤ 563 °F	≤ 100°F/hr
70 °F< T ≤ 220 °F	≤ 50°F/hr

Indicated Cold Leg Temperature	Maximum Number of RCPs Operating
> 500°F	4
200 to 500°F	3
150 to 200°F	2
< 150°F	0

Minimum Bolt−up Temperature = 70°F

Form Approval

Approval Date 4/2/08	Effective Date 4/4/08

Surveillance Form

Generic Information

Form Title **Transient Temperature, Pressure Verification Data Sheet**	Rev. No. 014−04

Reference Procedure	Applicable TS/TRM	Applicability (TS/TRM)	Frequency
SP 2602B	TS 4.4.9.1a, TRM 4.4.9.2, TS LCO 3.4.1.2, 3.4.1.3, 3.4.1.4 & 3.4.1.5 (in part)	At All Times	Once every 30 minutes during heatup or cooldown

Specific Information

Schedule Start Date		AWO Number	Mntc Restoration
Performance Modes All	Prerequisites Completed (Initials)	Precautions Noted (Initials)	☐ Yes ☐ No
Test Authorized By		Date	Partial Surveillance
Performed By		Date	☐ Yes ☐ No
Accepted By		Date	Acceptance Criteria Satisfied
Approved By (Department Head or Designee)		Date	☐ Yes ☐ No

Surveillance Information

Test Equipment Type	QA Number	Cal Due Date

Comments

CR# ________________

Refer To attached pages. As necessary, additional copies of applicable pages may be added for each day’s accumulated data.

Transient Temperature, Pressure Verification Data Sheet

Page ___ of ___

RCS Heatup/Cooldown Parameters

TS Acceptance Criteria

RCS temperature and pressurizer pressure within the limit lines of TS 3.4.9.1, Figure 3.4−2a. or 3.4−2b. AND the following:

Maximum heatup rates:
60°F in any 1 hour period with T_{COLD} between 70 and 200°F
80°F in any 1 hour period with T_{COLD} between 200 and 275°F
100°F in any 1 hour period with T_{COLD} between 275 and 563°F

Maximum cooldown rates:
100°F in any 1 hour period with T_{COLD} between 220 and 563°F
50°F in any 1 hour period with T_{COLD} between 70 and 220°F

②

Time	RCS Temperature(s) (°F)									Pzr Pressure (psia)	Within P/T Curve Initials	
	T351Y			T115 or T111Y (See note below)			T125 or T121Y (See note below)					
	Value		ΔT/HR	Value		ΔT/HR	Value		ΔT/HR		Yes	No
		▨			▨			▨				
	▨			▨			▨					
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③

* − Indicates pressurizer pressure and RCS temperature are verified to be within the acceptable region of applicable curve AND RCS *heatup* or *cooldown* rate is within TS acceptance criteria for the time interval data is recorded.

Note − If temperature of the RCS is within the range of the narrow range loop T_{COLD} detectors (515°F to 615°F), T111Y and T121Y may be used in place of T115 and T125.

Transient Temperature, Pressure Verification Data Sheet

Page ___ of ___

Pressurizer Heatup/Cooldown Parameters

TRM Acceptance Criteria

Maximum pressurizer *heatup* of 100°F in any 1 hour period

Maximum pressurizer *cooldown* of 200°F in any 1 hour period

Maximum pressurizer *spray line* differential temperature of 350°F

Time	**Pressurizer Temperatures** (°F)						**Pzr Water to Steam ΔT ***	**Pressurizer Spray Line Temperatures** (°F)				**Initials *****
	T109		**ΔT/HR**	**T101**		**ΔT/HR**		**TI-103**	**TI-104**	**T229**	**ΔT ****	
		▨			▨							
	▨			▨								
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	▨			▨								

* – Pressurizer water to steam ΔT = T109 minus T101 (If ΔT is 75°F OR minus 25°F, SM and US must be notified immediately).

** – Pressurizer spray line ΔT= *one* of the following:

- T101 or T109 minus the *lowest* of TI−103 or TI−104 (RCPs operating)
- T101 or T109 minus "CVCONTEMP" or positions 5 and 6 of "TEMP SEL SW" (RCPs *not* operating) when spray flow is initiated.
- T101 or T109 minus T229 (RCPs *not* operating) after spray flow is established

(If ΔT is ≥ 200°F, SM and US must be notified immediately). ④

*** – Indicates pressurizer *heatup* or *cooldown* rate AND pressurizer spray line ΔT are within T/S acceptance criteria for the time interval data is recorded.

Transient Temperature, Pressure Verification Data Sheet

Page ___ of ___

Core Outlet Temperature Subcooled Margin Monitoring

T/S Acceptance Criteria

When *no* RCPs or LPSI pumps are operating, core outlet temperature subcooled margin is greater than or equal to 10°F.

Time	**Highest (Core Exit) Saturation Temperature *** (°F)	**Unheated Junction Thermocouples**		**Subcooled Margin **** (°F)	**Initials (criteria met)**
		−31″ level (°F)	**−41″ level** (°F)		

* − As obtained from PPC ICC summary display ("ICCSUM") OR core exit saturation temperature from ICC cabinet(s)

** − Subcooled Margin = [*highest* (core exit) saturation temperature] − [*highest* unheated junction thermocouple indication]

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: OP 2304C Batch Makeup to VCT calculation

JPM Number: JPM-291-R-RO Revision: 0

Initiated:

David Jacobs 05/20/2016

Developer Date

Reviewed:

Robert L. Cimmino, Jr. 07/12/2016

Technical Reviewer Date

Approved:

Supervisor, Nuclear Training Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
05/20/2016	Modified for ILT NRC Exam	0/0

JPM WORKSHEET

Facility: ______________ Examinee: ______________________________

JPM Number: **JPM-291-R-RO** Revision: **0**

Task Title: **OP 2304C Batch Makeup to VCT Calculation**

System: CVCS 004

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 30

Task Number(s): 004-01-191

Applicable To: SRO ______ STA ______ RO **X** PEO ______

K/A Number: A4.12 K/A Rating: 3.8 / 3.3

Method of Testing: Simulated Performance: ______ Actual Performance: X

Location: Classroom: X Simulator: ______ In-Plant: ______

Task Standards: At the completion of this JPM the Examinee will perform a calculation for a Batch Make Up to the Volume Control Tank

Required Materials: (procedures, equipment, etc.)	MP-PROC-OPS-OP 2208[r015]	Reactivity Calculations
	MP-PROC-OPS-OP 2304C[r026.00]	Make UP Portion of CVCS
General References:	MP-PROC-OPS-OP 2208[r015]	Reactivity Calculations
	MP-PROC-OPS-OP 2304C[r026.00]	Make UP Portion of CVCS

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-291-R-RO** Revision : **0**

Initial Conditions: The plant is currently at 100% reactor power with the following conditions:

- RCS boron concentration is 605 ppm boron
- "C" Charging pump in service
- "A" BAST is in service with a boron concentration of 5445 ppm
- Makeup Reactivity Correction Factor = 1
- The PPC is currently unavailable

Initiating Cues: The Unit Supervisor has directed you to perform the following:

- Calculate a Neutral blend to raise VCT level from 75% to 85%
- Determine Total Gallons
- Determine Gallons of PMW
- Determine Gallons of "A" BAST Boric Acid

Using OP 2304C "Makeup (Boration & Dilution) Portion of CVCS" section 4.6 Batch Make Up to VCT.

Simulator Requirements: N/A

*** * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * ***

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-291-R-RO** Revision: **0**

Task Title: **OP 2304C Batch Makeup to VCT Calculation**

START TIME: __________

STEP # 1	Performance: Using OP 2304C "Makeup (Boration & Dilution) Portion of CVCS" **Section 4.6** Batch Make Up to VCT. **4.6.3** Determine desired VCT level change in %	Standard: Examinee refers to the Initial Conditions and determines 10%	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP # 2	Performance: **4.6.4** DETERMINE total gallons required to make desired level change as follows: *Desired level change* in desired level change = $\frac{\text{\% x 34 gallons}}{\text{1\% level}}$ = *Total gallons for make up*	Standard: Examinee calculates: $\frac{\textbf{10\% x 34 gallons}}{\textbf{1\% level}}$ **= 340 gallons total**	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-291-R-RO** Revision: **0**

Task Title: **OP 2304C Batch Makeup to VCT Calculation**

STEP # 3	Performance: **4.6.5** Refer To OP 2208, “Reactivity Calculations,” or PPC and DETERMINE required ratio of boric acid flow to PMW flow, corrected for Boron-10 depletion. **Attachment 4** **Blended Makeup Flowrate Determination Formula:** flowrate = *[K* x *(boric acid flowrate)] ÷ CF* Where, $K = \frac{\text{(ppm boron in BAST) - (ppm boron in makeup)}}{\text{ppm boron in makeup}}$ CF= *Makeup Reactivity Correction Factor* (From Att 5. “Reactivity Thumb Rules,” sheet OR Reactor Engineer)	Standard: Examinee refers to OP 2208 Reactivity Calculations **PMW flowrate = [8 x (1)] ÷ 1 = 8** **Where,** $8 = \frac{(5445) - (605)}{605}$ **CF = 1 from initial conditions**	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP # 4	Performance: **4.6.6** DETERMINE total gallons of boric acid required to make desired level change as follows: (BA = boric acid) $\text{Total gallons for makeup} \times \frac{\text{BA flowrate}}{\text{BA + PMW flow rate}} = \text{Total boric acid volume}$	Standard: Examinee determines: **340 gallons total x** $\frac{1}{(1 + 8)}$ **= 37.7777777 (38 gallons)**	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-291-R-RO** Revision: **0**

Task Title: **OP 2304C Batch Makeup to VCT Calculation**

<table>
<tr><td rowspan="3">STEP
#5</td><td>Performance:
4.6.7 DETERMINE total gallons of PMW required to make desired level change as follows: (BA = boric acid):
$\textit{Total gallons for makeup} \times \frac{\text{PMW flowrate}}{\text{BA+ PMW flow rate}} = \textit{Total PMW volume}$</td><td>Standard:
Examinee determines:
$340 \text{ gallons total} \times \frac{8}{(8+1)}$
= 302.22222222 (302 gallons)</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-291-R-RO** Revision: **0**

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**30**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-291-R-RO** Revision: **0**

Initial Conditions: The plant is currently at 100% reactor power with the following conditions:

- RCS boron concentration is 605 ppm boron
- “C” Charging pump in service
- “A” BAST is in service with a boron concentration of 5445 ppm
- Makeup Reactivity Correction Factor = 1
- The PPC is currently unavailable

Initiating Cues: The Unit Supervisor has directed you to perform the following:

- Calculate a Neutral blend to raise VCT level from 75% to 85%
- Determine Total Gallons
- Determine Gallons of PMW
- Determine Gallons of “A” BAST Boric Acid

Using OP 2304C “Makeup (Boration & Dilution) Portion of CVCS” section 4.6 Batch Make Up to VCT.

ANSWER:

Total Gallons	
“A” BAST Gallons	
PMW Gallons	

Attachment 4
Manual Calculations With PPC Not Available

(Sheet 1 of 1)

Blended Makeup Flowrate Determination Formula:

PMW flowrate = *[K* x *(boric acid flowrate)]* ÷ *CF*

Where, *K*= $\frac{\text{(ppm boron in BAST)} - \text{(ppm boron in makeup)}}{\text{ppm boron in makeup}}$

CF= *Makeup Reactivity Correction Factor*
(From Att 5. "Reactivity Thumb Rules," sheet OR Reactor Engineer)

Boration and Dilution Formulas:

> **NOTE**
>
> The boration and dilution formulas used in this worksheet assume the RCS is at 532°F, 2,250 psia and pressurizer level is at 40%.

BAST Boron Concentration (C_{BAST}) ppm	Initial RCS Boron Concentration (C_I) ppm
RCS T_{AVG} °F	Desired Final RCS Boron Concentration (C_F) ppm

Boration Formula ($C_F > C_I$):

$$\text{Volume of boric acid (gal)} = 62{,}\ 490 \text{ x } Ln\left[\frac{(C_I - C_{BAST})}{(C_F - C_{BAST})}\right]$$

Dilution Formula ($C_F < C_I$):

$$\text{Volume of PMW (gal)} = 62{,}490 \text{ x } Ln \frac{(C_I)}{(C_F)}$$

Natural Logarithmic Values for Selected Points

Ln 1.0 = 0.000
Ln 1.1 = 0.095
Ln 1.2 = 0.182
Ln 1.3 = 0.262
Ln 1.4 = 0.336

Ln 1.5 = 0.405
Ln 1.6 = 0.470
Ln 1.7 = 0.531
Ln 1.8 = 0.588
Ln 1.9 = 0.642

Ln 2.0 = 0.693
Ln 2.1 = 0.742
Ln 2.2 = 0.788
Ln 2.3 = 0.833
Ln 2.4 = 0.875

4.6 Batch Make Up to VCT

4.6.1 As required, Refer To Section 4.20, “Maintaining VCT Level and Pressure During Normal Operation,” and PERFORM applicable actions.

CAUTION

1. If at power and there is a delay in adding the PMW batch, a power reduction must be anticipated. The response of the reactor shall be closely monitored and key parameters maintained in their prescribed bands.
2. When calculating blended makeup flow rates, limitations due to the minimum increments for set points of PMW flow controller FC−210X (0.1 GPM), and BA flow controller FC−210Y (0.01 GPM), should be considered.

4.6.2 ENSURE the following:

a. PMW is available (indicating lights for PMW transfer pumps on C−02)

b. <u>WHEN</u> blend will be added to RCS, at least *one* RCP operating (C−03) <u>OR</u> *one* LPSI pump operating on SDC providing a flow of greater than or equal to 1,000 gpm through the core.

4.6.3 DETERMINE desired VCT level change in % level.

4.6.4 DETERMINE total gallons required to make desired level change as follows:

$$\textit{Desired level change} \text{ in \% x } \frac{\textit{34 gallons}}{\textit{1\% level}} = \textit{Total gallons for make up}$$

4.6.5 Refer To OP 2208, “Reactivity Calculations,” or PPC and DETERMINE required ratio of boric acid flow to PMW flow, corrected for Boron−10 depletion.

4.6.6 DETERMINE total gallons of boric acid required to make desired level change as follows: (BA = boric acid)

$$\textit{Total gallons for make up} \text{ x } \frac{\text{BA flow rate}}{\text{BA + PMW flow rate}} = \textit{Total boric acid volume}$$

4.6.7 DETERMINE total gallons of PMW required to make desired level change as follows: (BA = boric acid):

$$\textit{Total gallons for make up} \times \frac{\text{PMW flow rate}}{\text{BA + PMW flow rate}} = \textit{Total PMW volume}$$

<u>OR</u>

$$\textit{Total gallons for make up} - \textit{Total BA volume} = \textit{Total PMW volume}$$

4.6.8 Refer to Attachment 3 as required and RESET the following to 0 total gallons (C−04):

a. “PRI MAKEUP WTR FLOW CONTROLLER FC−210X”

b. “BORIC ACID FLOW CONTROLLER FC−210Y”

4.6.9 ENSURE the following are closed:

- CH−512, “MAKEUP VLV STOP,” (C−04)
- CH−196, “VCT MAKEUP BYPASS,” (C−02)
- CH−192, “RWST ISOL,” (C−02)

4.6.10 ENSURE the following (C−04):

- “MAKEUP MODE SEL” in “DILUTE”
- “PRI MAKEUP WATER” totalizer, FQIS−210X indicates 0 gallons

NOTE

Boric acid flow rates of less than 3 gpm and greater than 30 gpm are achievable, but are *not* to be exceeded.

4.6.11 ADJUST automatic setpoint of “BORIC ACID FLOW CONTROLLER FC−210Y” as follows (C−04):

a. ENSURE “AM” is lit.

b. PRESS “SEL” button until cursor appears above setpoint (left hand bar graph).

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: Shutdown Safety Assessment Decay Heat Removal

JPM Number: JPM-292-R-RO Revision: 0

Initiated:

David J. Jacobs	05/18/2016
Developer	Date

Reviewed:

Robert L. Cimmino, Jr.	07/05/2016
Technical Reviewer	Date

Approved:

Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
05/18/2016	New JPM for I LT	0/0

JPM WORKSHEET

Facility: **MP-2** Examinee: ____________

JPM Number: **JPM-292-R-RO** Revision: **0/0**

Task Title: **Shutdown Safety Assessment Decay Heat Removal**

System: Conduct of Operations

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 20

Task Number(s): 119-01-044

Applicable To: SRO **X** STA ____ RO **X** PEO ____

K/A Number: 2.1.18 K/A Rating: 3.6/3.8

Method of Testing: Simulated Performance: ____ Actual Performance: X

Location: Classroom: X Simulator: ____ In-Plant: ____

Task Standards: At the completion of this JPM the examinee has determined the appropriate color code for the predicted Decay Heat Removal Key Safety Function when in Reduced Inventory.

Required Materials: MP-PROC-000-OU-M2-201[r018.00] Shutdown Safety Assessment Checklist
(procedures, equipment, etc.)

General References: MP-PROC-000-OU-M2-201[r018.00] Shutdown Safety Assessment Checklist

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-292-R-RO** Revision : **0/0**

Initial Conditions: The plant is in MODE 5 day 2 of a scheduled 28 day refueling outage. Reactor disassembly is in progress and the Reactor Head is expected to be removed within the next 12 hours.

The following additional conditions presently exist:

- “A” Train is protected.
- “B” EDG tagged for Maintenance
- Back Feeding from the NSST
- No Off-Site GRID Risk Penalty Factors
- RCS Boron concentration is 2200 ppm.
- RCS temperature is 105°F.
- PZR level is 20%
- PZR Vent Port Removed

Initiating Cues: The US has directed you to review the Actual Conditions Shutdown Safety Assessment and perform a predicted SSA when the RCS is in Reduce Inventory for the following Sections only:

- Section 3 Decay Heat Removal (DHR)
- Section 7 Power Availability

Simulator Requirements: N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking “Y”. For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-292-R-RO** Revision: **0/0**

Task Title: **Shutdown Safety Assessment Decay Heat Removal**

START TIME: __________

STEP #1	Performance: Refers to MP-PROC-000-OU-M2-201 Shutdown Safety Assessment Checklist And Current Condition SSA	Standard: Examinee reviews Current Condition SSA	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #2	Performance: **3.1 Key Safety Functions** **3.1.1 ASSESS** and **MANAGE** the following KSFs for risk during shutdown conditions: • Decay Heat Removal (DHR) • Power Availability	Standard: Examinee Assess the following Key Safety Functions: • Decay Heat Removal • Power Availability	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-292-R-RO** Revision: **0/0**

Task Title: **Shutdown Safety Assessment Decay Heat Removal**

STEP #3	Performance:	Standard:	Critical:	Grade
	3.3 Shutdown Safety Assessment (SSA) Checklist Preparation **3.3.1** Using the following detailed information for each KSF, COMPLETE Attachment 1: **f.** Section 3 - Decay Heat Removal (DHR) **1**. RCS Decay Heat Removal (DHR) • REFER to Attachment 4 for background information of each element associated with the Decay Heat Removal KSF. • CHECK appropriate boxes for conditions supporting "Key Safety Function" of RCS decay heat removal. • TOTAL score and ENTER value in RCS DHR Total box. • CIRCLE Condition color corresponding to point total.	Examinee refers to the following: • ATTACHMENT 4 Decay Heat Removal Requirements and performs Attachment 1Section 3 Decay Heat Removal • **Subtracts 1 point** for Reduced Inventory Operations • Change Total Condition to 2 points • Circles **ORANGE**	Y ☒ N ☐	S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-292-R-RO** Revision: **0/0**

Task Title: **Shutdown Safety Assessment Decay Heat Removal**

STEP # 4	Performance: **3.3** Shutdown Safety Assessment (SSA) Checklist Preparation **3.3.1** Using the following detailed information for each KSF, COMPLETE Attachment 1: **j**. Section 7 - Power Availability 1. REFER to Attachment 8 for background information for each element associated with Power Availability KSF. **2**. CHECK appropriate boxes for conditions supporting "Key Safety Function" of Power Availability. **3**. IF required, THEN RECORD applicable Off-Site GRID Risk Penalty Factor and SUBTRACT from Power Availability subtotal to determine Power Availability Total. **4**. TOTAL score and ENTER the value in Power Availability Total box. **5**. CIRCLE Condition color corresponding to point total.	Standard: Examinee refers to the following: 1. ATTACHMENT 8 background information Power Availability Requirements and performs 2. Attachment 1Section 7 Power Availability • **Reviews Required Equipment** and does not meet 2 EDG available **= RED** 3. No GRID Penalty 4. Total Score remains 4 5. Circle Condition **RED** for not meeting Minimum Equipment	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-292-R-RO** Revision: **0/0**

Task Title: **Shutdown Safety Assessment Decay Heat Removal**

<table>
<tr><td rowspan="3">STEP
5</td><td>Performance:
3.4.6 DOCUMENT notification to OMOC and Maintenance Rule Coordinator for any unplanned RED or ORANGE conditions.
a. IF OCC is staffed, THEN NOTIFY the SOM and OOM to ensure OMOC notifications are made.</td><td>Standard:
Examinee Reports going to Reduce Inventory will cause a RED Condition for Power Availability</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-292-R-RO** Revision: **0/0**

Date Performed: ____________________

Student: ____________________

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**30**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____________________
Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-292-R-RO** Revision: **0/0**

Initial Conditions: The plant is in MODE 5 day 2 of a scheduled 28 day refueling outage. Reactor disassembly is in progress and the Reactor Head is expected to be removed within the next 12 hours.

The following additional conditions presently exist:

- “A” Train is protected.
- “B” EDG tagged for Maintenance
- Back Feeding from the NSST
- No Off-Site GRID Risk Penalty Factors
- RCS Boron concentration is 2200 ppm.
- RCS temperature is 105°F.
- PZR level is 20%
- PZR Vent Port Removed

Initiating Cues: The US has directed you to review the Actual Conditions Shutdown Safety Assessment and perform a predicted SSA when the RCS is in Reduce Inventory for the following Sections only:

- Section 3 Decay Heat Removal (DHR)
- Section 7 Power Availability

	Total Score and Condition Color
Section 3 Decay Heat Removal (DHR)	
Section 7 Power Availability	
Required Report (If Any)	

Dominion

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

OU-M2-201 – Attachment 1 **Page 1 of 9**

Section 1

Protected Train A ☑ / **B** ☐ *(Check one or both)* ☐ with exception

Date/Time Performed: Today / 0000

Date/Time of Shutdown: 2 Days ago 0000

☑ Actual Conditions

Days Shutdown: 2

☐ Predicted Conditions for ______

Reason for Shutdown Safety Assessment: 00:00

(00:00 hour, mode change, configuration changes)

Section 2 Heatup Data

Time To Core Boil

☑ Bubble does not exist in pressurizer AND fuel is in the vessel, THEN complete the following:

- RCS Temp: 105 °F
- RCS Level: 11 feet above flange
- RCS Time to Boil: 44.6 mins

☐ **NA if DEFUELED**

Time to 200°F (EA2 criterion): 39 mins

☐ **NA if DEFUELED**

Time to Heatup 10°F (EU1 criterion, uncontrolled heatup): 8.7 mins

☐ **NA if DEFUELED**

RBCCW HX Outlet Temp: 80 °F

Refuel Boron C_b per TS: 2100 ppm

RCS Boron C_b: 2200 ppm

SFP Boron C_b: 2200 ppm

Spent Fuel Pool Heatup Time

- SFP Temp: 95 °F
- SFP Level: 36 feet 10 inches
- SFP Time to 150°F

  ☑ NA if NO freshly discharged fuel assemblies transferred to SFP or fuel assemblies are reloaded into reactor vessel

  or

  ____ hrs ____ mins

- SFP Time to 200°F 23 hrs 10 mins

Shutdown Risk Color is:
- ☐ GREEN
- ☑ YELLOW
- ☐ ORANGE
- ☐ RED

Limiting Safety Function
- ☑ RCS or ☐ SFP Decay Heat Removal
- ☐ RCS or ☐ SFP Inventory Control
- ☐ Reactivity Control
- ☐ Containment
- ☐ Power Availability

SDC Responder phone: x4335

Comments: ______

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

OU-M2-201 – Attachment 1 **Page 2 of 9**

Section 3 Decay Heat Removal

RCS Decay Heat Removal

Check boxes for available equipment	Point Value	Score
☑ 'A' SDC with associated RBCCW and SW pump	(1)	1
☑ 'B' SDC with associated RBCCW and SW pump	(1)	1
☐ 'A' CS with associated RBCCW and SW pump(3)	(1)	
☐ 'B' CS with associated RBCCW and SW pump(3)	(1)	
☐ Both SGs(1)	(1)	
☐ Refuel Pool ≥ 35'6"(4) or Notes (2)(4)	(1)	
Reduced Inventory Operation (RIO) Penalty	(-1)	

Total	Condition
	(Circle)
0	RED
1	ORANGE
[✓ 2]	[✓ YELLOW]
3	GREEN

RCS Decay Heat Removal Total 2

NA if DEFUELED

Required Equipment *(minimum)*: *(Check)*

☐ If only one train of SDC available ensure: A ☐ B ☐
  ☐ Associated train EDG available A ☐ B ☐
  ☐ One U2 controlled offsite power source associated with available SDC train RSST ☐ NSST ☐

☐ During Reduced Inventory Operation (RIO) ensure:
  ☐ Both trains of SDC available with one train in service that is energized from a bus powered from an offsite source Yes ☐ No ☐ Required Equipment NOT met RED
  AND
  ☐ One RBCCW pump powered from independent power supplies for each credited SDC train A ☐ B ☐ C ☐
  AND
  ☐ One SW pump powered from independent power supplies for each credited SDC train A ☐ B ☐ C ☐

---

(1) Maintain all of the following satisfied to ensure two steam generators available and proper RCS conditions are established to support natural circulation:

- Both available SG NR levels greater than 10%
- Capability to feed available SGs with a MD AFW pump
- Capability to release steam from available SGs
- RCS loops associated with the available SGs; filled and unisolated
- Pressurizer pressure ≥ 50 psia AND a steam bubble is established in the pressurizer

(2) When refuel pool level is reduced to 31'6" to lift and set the UGS.

(3) CS can be credited to backup LPSI for DHR in MODES 6 and Defueled per calculation ENG-04223M2, Rev. 0, Addendum 9. If CS is placed in service, no Core Alterations are allowed per Tech Specs.

(4) In Modes 5 and 6, IF RCS is vented AND Refuel Pool is less than full (< 35′6″), an Operator must be stationed in the vicinity of the SW/Fire Water Supply valves to the EDG to be ready to take action to shift cooling water to Fire Water if directed by the SM.

Section 3 Decay Heat Removal (Continued)

BEYOND DESIGN BASIS

NA for Mode 0

Mode 5:

Steam Generator available for Decay Heat Removal:

☐ 1 ☐ 2

AC Independent Aux Feedwater Pump:

☐ TDAFW Pump ☑ BDB AFW Pump

OR

☑ Pressurizer Vent Port Removed

☐ BDB AFW Pump Available for RCS Injection

Mode 6:

☑ BDB AFW Pump pre-staged for injection into the RCS

Section 3 Decay Heat Removal (Continued)

SFP Decay Heat Removal

	Point Value	Score
☑ SFP level ≥ 35'6"	(1)	1
☑ 'A' SFPC pump & HX with SFP level ≥ 36'4" ***	(0,½, 1)*	1
☑ 'B' SFPC pump & HX with SFP level ≥ 36'4" ***	(0, ½, 1)*	1
☐ 'A' LPSI pump and SFP level ≥ 36'10" ***	(1)	
☐ 'B' LPSI pump and SFP level ≥ 36'10" ***	(1)	
☐ 'A' CS pump and SFP level ≥ 36'10" ***	(1)**	
☐ 'B' CS pump and SFP level ≥ 36'10" ***	(1)**	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥ 3]	[✓ GREEN]

SFP Decay Heat Removal Total 3

*Count each available SFPC pump as 1 point prior to fuel movement. With ≤ 80 fuel assemblies transferred to the SFP, each available SFPC pump should be counted as ½ point. With > 80 fuel assemblies transferred to the SFP, each available SFPC pump should be counted as 0 points unless a cycle specific analysis demonstrates both SFPC pumps are one viable source of decay heat removal (i.e., each SFPC pump should be counted as ½ point). For 2R23, Calculation ENG-04223M2, Rev. 0, Addendum 9, demonstrates that both SFPC pumps together can be credited as one viable means of SFPC provided the reactor has been shutdown ≥ 8.3 days and RBCCW temperature is maintained at < 80° F. Following the core reload, each available SFPC pump should be counted as 1 point if requirements of TRM 3.9.3.3 are met. For 2R23, PM-1701, Rev. 0, demonstrates that TRM 3.9.3.3 will be met at ≥ 17 days following shutdown, since 85 fuel assemblies will be discharged during 2R23.

** A cycle specific analysis is required for counting each available CS pump as 1 point for SFPC. For 2R23, Calculation ENG-04223M2, Rev 0, Addendum 9, supports each CS pump being counted as 1 point provided that fuel movement begins ≥ 150 hours and RBCCW temperature is maintained at < 80° F. The UHS must be <70℉, with excursions allowed for <3 hours, if the moving average is <70℉.

***≥ 36'10" if two SFP cooling pumps are operating or EITHER LPSI or CS supplying SFP cooling independent of Shutdown Cooling. Level restriction is not applicable if SFP is cooled via Shutdown Cooling with 2-RW-280 open, since SDC suction is via the hot leg and 2-SI-651 and 2-SI-652.

Required Equipment *(minimum)*:

	(Check)				
☑ One RBCCW pump	A ☑	B ☐	C ☑	Required Equipment NOT met	RED
☑ One SW pump	A ☑	B ☐	C ☑		
☑ One RBCCW heat exchanger	A ☑	B ☐	C ☑		
☑ One SFPC or ☐ SDC heat exchanger	A SFPC HX ☑ A SDC HX ☐	B SFPC HX ☑ B SDC HX ☐			

NOTE: To maintain defense in depth for SFP cooling after the 81st fuel assembly is in the SFP during offload, additional equipment is required. TRM 3.9.3.3b requirements will be met for the 85 fuel assemblies discharged for Cycle 24 ≥ 17 days shutdown and core reload is complete.

Fuel Offload (81 to 217 Fuel Assemblies) Required Equipment *(minimum, until reload complete)*:

	(Check)				
☐ Two RBCCW pumps	A ☐	B ☐	C ☐	Required Equipment NOT met	ORANGE
☐ Two SW pumps	A ☐	B ☐	C ☐		
☐ One RBCCW heat exchanger	A ☐	B ☐	C ☐		
☐ Either of the following:					
☐ Two SFPC heat exchangers	A ☐	B ☐			
☐ One SDC heat exchanger	A ☐	B ☐			

Section 4 Inventory Control

RCS Inventory Control

Check boxes for available equipment:	Point Value	Score
☑ 'A' HPSI pump	(1)	1
☑ 'B' HPSI pump	(1)	1
☑ 'C' HPSI pump	(1)	1
☑ 'A' Charging pump via ☑ RWST or ☐ BAST(1,2)	($^1/_2$, 1)(3)	1/2
☑ 'B' Charging pump via ☑ RWST or ☐ BAST(1,2)	($^1/_2$, 1)(3)	1/2
☐ 'C' Charging pump via ☐ RWST or ☐ BAST(1,2)	($^1/_2$, 1)(3)	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥3]	[✓ GREEN]

☐ RCS Inventory Control not required if DEFUELED AND RCS isolated from SFP by one of the following:
- ☐ 2-RW-280 CLOSED
  OR
- ☐ West SFP Gate INSTALLED

RCS Inventory Control Total 4

NA if DEFUELED *AND* RCS isolated from SFP

Required during RIO *(minimum)*:
☐ One HPSI pump

Required Equipment NOT met RED

SFP Inventory Control

Check boxes for available equipment:	Point Value	Score
☐ One AFW pump aligned to CST	(1)	
☐ One Refuel Purification pump	(1)	
☐ One PMW pump	(1)	
☐ Makeup available from Fire Protection System (e.g., hoses)	(1)	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
≥3	GREEN

SFP Inventory Control Total N/A

NA if MODE 5, 6, or Refuel Pool ≥ 36'4"

Requirements for RCS drain down conditions:

☐ SFP Cooling System vent and drain paths, which could affect SFP inventory, are identified and safety tagged *prior to* release of impacting work. Tagout Number: ____________________

☐ Controls are in place to ensure safety tags are in place *during* RCS drain down. Tagout Number: ____________________

---

(1) T.S. 3.1.1.3.b. allows only two charging pumps capable of injecting when RCS is less than 300°F (boron dilution).

(2) RWST ≥ 57,300 gallons (12%) or BAST > 3,750 gallons (65.8%) to be available per TRM 4.1.2.7a and SP 2601F, "Borated Water Sources Verification, MODE 5 or 6."

(3) If ≤ 384 hrs (16 days) since shutdown, at least two Charging pumps with suction from the RWST or BAST and aligned to RCS to be credited as ONE viable makeup source.

Section 5 Reactivity Control

Reactivity Control while in MODEs 5 or 6

Check boxes for available equipment and conditions:

	Point Value	Score
☑ RCS AND SFP boron concentrations greater than required by applicable Tech Specs	(1)	1
☑ Dilution flowpaths identified (procedurally controlled *or* tagged) Tagout Number: 2207X99-0007	(1)	1
☑ Inventory Flow Paths	(0-2)	2
☑ 'A' HPSI pump		
☐ 'B' HPSI pump		
☑ 'C' HPSI pump		
☑ 'A' Charging pump aligned to ☑ RWST or ☐ BAST(1,2)		
☑ 'B' Charging pump aligned to ☑ RWST or ☐ BAST(1,2)		
☐ 'C' Charging pump aligned to ☐ RWST or ☐ BAST(1,2)		
☑ ≥ 2 Source Range Monitor	(1)	1

Total	Condition
	(Circle)
0-2	RED
3	ORANGE
4	YELLOW
[✓ 5]	[✓ GREEN]

RCS Reactivity Control while in MODE 5 or 6 Total 5 **NA if DEFUELED**

<u>Required Equipment *(minimum)*</u>:

☑ ≥ 2 Source Range Monitors
☑ Inventory Flow Paths
☑ RCS AND SFP Boron concentrations greater than required by applicable Tech Specs

(Check)					
A	B	C	D		
☑	☑	☑	☑	Required Equipment NOT met	RED

Reactivity Control while DEFUELED

Check boxes for available equipment and conditions

	Point Value	Score
☐ RCS AND SFP boron concentrations greater than required by applicable Tech Specs	(1)	____
☐ Dilution flowpaths identified (procedurally controlled or Safety Tagging) Tagout Number: 2207X99-0007	(1)	____

Total	Condition
	(Circle)
0	RED
1	YELLOW
2	GREEN

RCS Reactivity Control while DEFUELED Total N/A **NA if in MODE 5 or 6**

---

[1] Only two charging pumps must be capable of injecting based on T.S. 3.1.1.3.b., "Boron Dilution."

[2] RWST ≥ 57,300 gallons (12%) or BAST > 3,750 gallons (65.8%) to be available per TRM 4.1.2.7a and SP 2601F, "Borated Water Sources Verification, MODE 5 or 6."

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

OU-M2-201 – Attachment 1 **Page 7 of 9**

Section 6 Containment

NOTE: See OP 2264, Attachment 5, Containment Penetration Work Activities Affecting Containment Closure, and Attachment 9, Containment Penetration Tracking Sheet, for status of containment penetrations.

Check boxes that apply for current conditions	Point Value	Score
☑ Containment Closure Capability(1)	(0,2,3)	2
☐ Containment Closure Set (3 points)		
OR		
☑ Containment Closure Set with exceptions tracked and capable of being closed prior to the lesser of:		
☑ Time to Core Boil (2 points)		
OR		
☐ 4 hours (Loss of RCS DHR, TS 3.9.8.1, action c.) (2 points)		
OR		
☐ Containment Closure Set with administrative controls of OP 2209A during fuel movement within the containment building (2 points)		
☑ No significant fuel failures indicated(2)	(1)	1
☑ No Core Alterations in progress in Containment(3)	(1)	1
☐ RCS Pressure Boundary intact(4)	(1)	
☐ Low Decay Heat (>8 days shutdown)(5)	(1)	
☑ Decay Heat, Inventory Control, Power Availability Functions **NOT** Orange/Red(6)	(1)	1

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥ 3]	[✓ GREEN]

Containment Total 5

NA if DEFUELED

---

(1) Closure capability is scored based on all penetrations closed by at least one isolation valve or exceptions tracked and managed in accordance with OP 2264, "Conduct of Outages."

(2) This item is scored a "1" if no significant fuel failures are indicated by radiochemistry sampling. For the purposes of the SDR assessment, identification from radiochemistry samples and confirmation from NAF of significant fuel rod/pin failures is necessary to score this item as "0."

(3) No Core Alterations in progress in Containment is an indicator of the susceptibility to a fuel handling event. This item is scored a "1" if no Core Alterations are in progress or a "0" if Core Alterations are in progress.

(4) This item is scored a "1" if the RCS is intact or a "0" if any RCS opening exists.

(5) After 8 days (from the start of the outage), it is assumed that the short-lived, volatile isotopes that are principally responsible for early health effects have decayed sufficiently such that the event would not contribute to Large Early Release Frequency (LERF).

(6) No Activities are in progress to preclude mitigation to a fuel handling accident. This item is scored a "1" if Decay Heat Removal, Inventory Control, and Power Availability are **NOT** Orange/Red. This item is scored a "0" if Decay Heat Removal, Inventory Control, and Power Availability are Orange/Red.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

OU-M2-201 – Attachment 1 **Page 8 of 9**

Section 7 Power Availability

Check boxes for available equipment and conditions:	Point Value	Score
☑ **Power Availability**		
☑ Bus 24E aligned to: ☑ 24C ☐ 24D		
On-site Power Source:		
☑ ‘A’ EDG with ‘A’ SW pump *or* ‘B’ SW pump supplied by the ‘A’ EDG	(1)	1
☐ ‘B’ EDG with ‘C’ SW pump *or* ‘B’ SW pump supplied by the ‘B’ EDG	(1)	
☐ SBO Diesel via 24E (Time to Boil > 60 min)	(1)	
Off-site Power Source:		
☑ Unit 2 RSST	(1)	1
☑ Unit 2 NSST	(1)	1
☑ Unit 3 ☑ RSST or ☐ NSST via 34A/B	(1)	1
Power Source Sub-Total		4

Total	**Condition**
	(Circle)
0-1	RED
2	ORANGE
3	YELLOW
[✓ ≥ 4]	[✓ GREEN]

Required Equipment:

☑ One EDG + One Unit 2 Controlled Off-site Source

☐ IF in RIO at least one additional on site power source:

- SBO Diesel and Calculated Time to Boil > 60 minutes
- Additional Unit 2 EDG

Required Equipment NOT met RED

Off-Site GRID Risk Penalty Factor

Environmental Conditions(1)

☐ Avg sustained wind speed ≥ 75 mph

☐ Salt contamination buildup or arcing in the 345 kV switchyard

OR

Switchyard Activities(1)

☐ Trip Testing affecting more than one 345 kV line

☐ Two 345 kV lines out of service

OR

ISO-NE/CONVEX Alerts(1)

☐ Abnormal transmission network conditions with potential for loss of grid

OR

Planned Maintenance or Projects(2)

☐ ______________________

SUBTRACT from Power Sub-Total(1) - (   ) Penalty

Power Availability Total 4

---

(1) Apply offsite power source sub-total

(2) If 345 kV or main transformer switchyard work is in progress which jeopardizes off-site sources, then deduct points equivalent to the number of offsite sources that could be affected.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

Assessment Completion		
Conflicts between the availability reflected in the outage schedule and this checklist have been brought to the attention of the SM.	Conflicts? YES ☐ / NO ☐	Initial
Remarks:		
Shutdown Safety Assessment (SSA) Checklist Performed By:	Signature (Licensed Operator or STA)	
SSA Equipment Status Board(s) / PPC Programs Updated.	Initials	
OMOC and Maintenance Rule Coordinator Notifications made for *unplanned* RED or ORANGE.	Initials	
CR written to address unplanned entries into RED or ORANGE conditions	CR Number: ______________________	
The SSA Checklist items have been reviewed and the Protected Equipment signs are in place based on SSA.	Signature (Licensed Operator or STA)	
Shift Manager Review	Signature	
Completed SSA Checklist maintained with the Shift Turnover Report.	Initials	

ATTACHMENT 2
Millstone Unit 2 RCS Heatup Calculations
(Page 1 of 5)

RCS Time to Boil Calculation

NOTE: RCS temperature should be obtained from RCS to SDC temperature, T-351X. Otherwise unheated junction thermocouples or CETs may be used (if either is available). If RCS temperature is expected to increase, an RCS temperature of up to 5°F greater than the current RCS temperature can be used to bound expected conditions.

Instructions:

1. Record time after reactor shutdown (in days), current RCS temperature (ºF) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 (“RCS Filled” condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to Boil.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

RCS Time to Boil Calculation:

RCS Time to Boil = MULT1 x MULT2 x {(212°F - RCS Temperature (°F)) / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Temperature (°F)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to Boil	Performed by	Checked by
Day 1/0000	1	105	11	7.5	1.0	2.529	36	RO	STA
Day 2/0000	2	105	11	6.062	1.0	2.529	44. 6	RO	STA
Day 3/0000	3	105	11	5.271	1.0	2.529	51.3	RO	STA

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 2 of 5)

RCS Time to 200°F

NOTE: RCS temperature should be obtained from RCS to SDC temperature, T-351X. Otherwise unheated junction thermocouples or CETs may be used (if either is available).

NOTE: This calculation is performed to determine the time to reach EAL EA2, Inability to Maintain Cold Shutdown, MODEs 5 and 6, after a loss of cooling event.

Instructions:

1. Record time after reactor shutdown (in days), current RCS temperature (ºF) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 (“RCS Filled” condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to 200°F.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

RCS Time to 200°F Calculation:

RCS Time to 200°F = MULT1 x MULT2 x {(200°F - RCS Temperature (°F)) / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Temperature (°F)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to 200°F	Performed by	Checked by
Day 1	1	105	11	7.5	1.00	2.529	32 min		
Day 2	2	105	11	6.062	1.00	2.529	39.6 min		
Day 3	3	105	11	5.271	1.00	2.529	45.6 min		

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 3 of 5)

Time to Heatup 10°F

NOTE: This calculation is performed to determine the time to reach EAL EU1, Loss of Cold Shutdown Function, MODEs 5 and 6, after a loss of cooling event.

Instructions:

1. Record time after reactor shutdown (in days) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 ("RCS Filled" condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to Heatup 10°F.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

Time to Heatup 10°F Calculation:

RCS Time to Heatup 10°F = MULT1 x MULT2 x {10°F / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to Heatup 10°F	Performed by	Checked by
Day 1 0000	1	11	7.5	1.00	2.529	3.4 min	RO	STA
Day 2 0000	2	11	6.062	1.00	2.529	8.7 min	RO	STA

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 4 of 5)

Table 1

RCS Heatup Rates

NOTE: When using this table, the more conservative value should be used, so interpolation is not necessary (i.e., on the 23rd day shutdown, use day 20 heatup rate).

Time Following Shutdown (days)	Heatup Rate (F/min)
0.25	10.96
0.50	9.101
0.75	8.140
1.00	7.500
1.25	7.022
1.50	6.642
1.75	6.332
2.00	6.062
2.25	5.829
2.50	5.622
2.75	5.437
3.00	5.271
3.25	5.119
3.50	4.980
3.75	4.852
4.00	4.734
4.25	4.623
4.50	4.520
4.75	4.424
5.00	4.334
5.25	4.249
5.50	4.169
5.75	4.094
6.00	4.022
6.25	3.954
6.50	3.889
6.75	3.827
7.00	3.768
7.25	3.712
7.50	3.659
7.75	3.608
8.00	3.559
8.25	3.512
8.50	3.467
8.75	3.423
9.00	3.382
9.25	3.342
9.50	3.304
9.75	3.267
10.00	3.232
12.00	2.989
14.00	2.797
16.00	2.639
18.00	2.507
20.00	2.393
25.00	2.161
30.00	1.980
35.00	1.833
40.00	1.711
45.00	1.608
50.00	1.521
55.00	1.446
60.00	1.380
70.00	1.267
80.00	1.176
90.00	1.098
100.00	1.030
110.00	0.9701
120.00	0.9166
130.00	0.8684
140.00	0.8246
150.00	0.7845
160.00	0.7478
170.00	0.7141
180.00	0.6831

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 5 of 5)

Table 2

Water Level Multiplier, MULT2

NOTE: When using this table, the more conservative value should be used, so interpolation is not necessary (i.e., when the refuel pool is filled 3.5' above the flange, use the 3' above the flange correction factor).

NOTE: NOTE: For Initial Draindown use “RCS Filled” condition (MULT2=2.529) until L-112 indicates 78" above centerline of hot leg (at the reactor vessel flange). The reactor vessel upper plenum and the steam generator U-tubes are not voided until this level is reached. After this level is reached, use MULT2 based on the RCS level above the mid loop reference point.

Water Level Relative to RV Flange (ft)	Water Level Relative to Sea Level (ft)	Comments	Time to Boil Multiplier MULT 2	Pzr Level Cold Cal LI-103 (%)	RCS Wide Range LI-112 (inches)	RCS Narrow Range LI-122 (inches)
24	36.5		16.717	63.3		
23	35.5	T.S. 3.9.11 Level	15.189	60.0		
22	34.5		13.764	56.7		
21	33.5		12.439	53.3		
20	32.5		11.210	50.0		
19	31.5		10.074	46.7		
18	30.5		9.027	43.3		
17	29.5		8.065	40.0		
16	28.5		7.184	36.7		
15	27.5		6.382	33.3		
14	26.5		5.654	30.0		
13	25.5		4.996	26.7		
12	24.5		4.407	23.3		
11	23.5		3.880	20.0		
10	22.5		3.414	16.7		
9	21.5		3.003	13.3		
8	20.5		2.646	10.0		
7.64	20.1	RCS Filled (SG U-tubes full)	2.529	8.8		
7	19.5		2.338	6.7		
6	18.5		2.075	3.3		
5	17.5		1.853	0.0		
4	16.5		1.670			
3	15.5		1.522			
2	14.5		1.405			
1	13.5		1.315		90	
0	12.5	RV Flange	1.248		78	
-1	11.5		1.210		66	
-2	10.5		1.172		54	
-3	9.5	RIO	1.134		42	
-4	8.5		1.095		30	
-5	7.5		1.057		18	18
-6	6.5		1.019		6	6
-6.5	6.0	Mid-loop (Centerline Hot Leg)	1.000		0	0

ATTACHMENT 3

Millstone Unit 2 SFP Heatup Calculations

(Page 1 of 3)

SFP Time to 150°F

NOTE: If either of the conditions are met, RE-G-16 applies and the Time to 150°F is “N/A”:

- No fresh fuel assemblies have been transferred to the SFP.
- Core reload is complete.

Instructions:

1. IF NO fuel assemblies have been transferred to the SFP OR core reload is complete, go to SFP Time to 200°F.
2. Record time after reactor shutdown (in days), and current SFP temperature (ºF).
3. Record SFP Heatup Rate from Table 1 based on SFP Offload Condition.
4. Calculate and record SFP Time to 150ºF
5. Sign Performed by (STA or Licensed Operator).
6. Obtain Independent Check (SRO).

Calculation:
SFP Time to 150°F = {(150°F - SFP Temperature (°F)) / SFP Heatup Rate (°F/hour)}

Date/Time	Time From Shutdown (Days)	SFP Temperature (°F)	SFP Heatup Rate (°F/hour)	SFP Time to 150°F	Performed by	Checked by

ATTACHMENT 3

Millstone Unit 2 SFP Heatup Calculations

(Page 2 of 3)

SFP Time to 200°F

Instructions:

1. Record time after reactor shutdown (in days), and current SFP temperature (ºF).
2. IF NO fresh fuel assemblies have been transferred to the SFP, using RE-G-16, determine the Time to 200°F and record SFP heatup Time to 200°F.
3. IF core reload is complete, using RE-G-16, determine the Time to 200°F and record SFP heatup Time to 200°F.
4. IF fresh fuel assemblies have been transferred to the SFP AND core reload is NOT complete, perform the following:
   a. Record SFP Heatup Rate from Table 1 based on SFP Offload Condition.
   b. Calculate and record SFP Time to 150ºF.
5. Sign Performed by (STA or Licensed Operator).
6. Obtain Independent Check (SRO).

Calculation:

SFP Time to 200°F = {(200°F - SFP Temperature (°F)) / SFP Heatup Rate (°F/hour)}

Date/Time	Time From Shutdown (Days)	SFP Temperature (°F)	SFP Heatup Rate (°F/hour)	SFP Time to 200°F	Performed by	Checked by

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

Section 3 Decay Heat Removal

RCS Decay Heat Removal

Check boxes for available equipment	Point Value	Score
☐ ‘A’ SDC with associated RBCCW and SW pump	(1)	____
☐ ‘B’ SDC with associated RBCCW and SW pump	(1)	____
☐ ‘A’ CS with associated RBCCW and SW pump[3]	(1)	____
☐ ‘B’ CS with associated RBCCW and SW pump[3]	(1)	____
☐ Both SGs[1]	(1)	____
☐ Refuel Pool ≥ 35’6”[4] or Notes [2][4]	(1)	____
Reduced Inventory Operation (RIO) Penalty	(-1)	____

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
3	GREEN

RCS Decay Heat Removal Total ☐

NA if DEFUELED

Required Equipment *(minimum)*: *(Check)*

☐ If only one train of SDC available ensure: A ☐ B ☐
  ☐ Associated train EDG available A ☐ B ☐
  ☐ One U2 controlled offsite power source associated with available SDC train RSST ☐ NSST ☐

☐ During Reduced Inventory Operation (RIO) ensure:
  ☐ Both trains of SDC available with one train in service that is energized from a bus powered from an offsite source Yes ☐ No ☐ Required Equipment NOT met RED
  AND
  ☐ One RBCCW pump powered from independent power supplies for each credited SDC train A ☐ B ☐ C ☐
  AND
  ☐ One SW pump powered from independent power supplies for each credited SDC train A ☐ B ☐ C ☐

---

[1] Maintain all of the following satisfied to ensure two steam generators available and proper RCS conditions are established to support natural circulation:

- Both available SG NR levels greater than 10%
- Capability to feed available SGs with a MD AFW pump
- Capability to release steam from available SGs
- RCS loops associated with the available SGs; filled and unisolated
- Pressurizer pressure ≥ 50 psia AND a steam bubble is established in the pressurizer

[2] When refuel pool level is reduced to 31’6” to lift and set the UGS.

[3] CS can be credited to backup LPSI for DHR in MODES 6 and Defueled per calculation ENG-04223M2, Rev. 0, Addendum 9. If CS is placed in service, no Core Alterations are allowed per Tech Specs.

[4] In Modes 5 and 6, IF RCS is vented AND Refuel Pool is less than full (< 35′6″), an Operator must be stationed in the vicinity of the SW/Fire Water Supply valves to the EDG to be ready to take action to shift cooling water to Fire Water if directed by the SM.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

Section 3 Decay Heat Removal (Continued)

BEYOND DESIGN BASIS

NA for Mode 0

Mode 5:

Steam Generator available for Decay Heat Removal:

☐ 1 ☐ 2

AC Independent Aux Feedwater Pump:

☐ TDAFW Pump ☐ BDB AFW Pump

OR

☐ Pressurizer Vent Port Removed

☐ BDB AFW Pump Available for RCS Injection

Mode 6:

☐ BDB AFW Pump pre-staged for injection into the RCS

Section 7 Power Availability

Check boxes for available equipment and conditions:	Point Value	Score
☐ **Power Availability**		
☐ Bus 24E aligned to: ☐ 24C ☐ 24D		
On-site Power Source:		
☐ 'A' EDG with 'A' SW pump *or* 'B' SW pump supplied by the 'A' EDG	(1)	_____
☐ 'B' EDG with 'C' SW pump *or* 'B' SW pump supplied by the 'B' EDG	(1)	_____
☐ SBO Diesel via 24E (Time to Boil > 60 min)	(1)	_____
Off-site Power Source:		
☐ Unit 2 RSST	(1)	_____
☐ Unit 2 NSST	(1)	_____
☐ Unit 3 ☐ RSST or ☐ NSST via 34A/B	(1)	_____

Total	Condition
	(Circle)
0-1	RED
2	ORANGE
3	YELLOW
≥ 4	GREEN

Power Source Sub-Total ☐

Required Equipment:

☐ One EDG + One Unit 2 Controlled Off-site Source

☐ IF in RIO at least one additional on site power source:

- SBO Diesel and Calculated Time to Boil > 60 minutes
- Additional Unit 2 EDG

Required Equipment NOT met	RED

Off-Site GRID Risk Penalty Factor

Environmental Conditions(1)

☐ Avg sustained wind speed ≥ 75 mph _____

☐ Salt contamination buildup or arcing in the 345 kV switchyard

OR

Switchyard Activities(1)

☐ Trip Testing affecting more than one 345 kV line _____

☐ Two 345 kV lines out of service

OR

ISO-NE/CONVEX Alerts(1)

☐ Abnormal transmission network conditions with potential for loss of grid _____

OR

Planned Maintenance or Projects(2)

☐ ________________________________ _____

SUBTRACT from Power Sub-Total(1) - (   ) Penalty

Power Availability Total ☐

---

(1) Apply offsite power source sub-total

(2) If 345 kV or main transformer switchyard work is in progress which jeopardizes off-site sources, then deduct points equivalent to the number of offsite sources that could be affected.

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: **Review RWP and Survey Map**

JPM Number: JPM-293-R-RO   Revision: 2

Initiated:

R.J. Ashey   12.29/2008
Developer   Date

Reviewed:

David Jacobs   06/02/2016
Technical Reviewer   Date

Approved:

Supervisor, Nuclear Training   Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
10/23/08	Revised JPM for LOIT 2008 NRC Exam	1/0
12/29/08	Incorporated NRC Post-Validation comments	1/0
06/02/2016	Up dated for ILT NRC Exam 2016	2/0

JPM WORKSHEET

Facility: **MP2** Examinee: __________

JPM Number: **JPM-293-R-RO** Revision: **2/0**

Task Title: Review RWP and Survey Map

System: Radiation Control

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 15

Task Number(s): 404-01-004

Applicable To: SRO **X** STA ____ RO **X** PEO ____

K/A Number: 2.3.7 K/A Rating: 3.5 / 3.6

Method of Testing: Simulated Performance: ____ Actual Performance: X

Location: Classroom: X Simulator: ____ In-Plant: ____

Task Standards:	At the completion of this JPM the examinee has reviewed the applicable RWP and survey map to determine the radiological requirements to perform the assigned task.
Required Materials: (procedures, equipment, etc.)	Operations blanket RWP No. 5. Survey map for -5’ 6” West Piping Penetration Room
General References:	MP-PROC-HP-RPM 5.2.2[r016] Basic Radiation Worker Responsibilities

***** READ TO THE EXAMINEE *****

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-293-R-RO** Revision : **2/0**

Initial Conditions:

- You have been directed to isolate Letdown Flow Control Valve, 2-CH-110Q.
- Based on previous experience, you estimate that this task will take 20 minutes.
- Your available dose is 1,000 mR.
- State the radiological requirements for entering this area. Include in your discussion:
  1. Which RWP task (job step) is appropriate for this assignment
  2. Highest radiation level in the work area (including units of measure)
  3. Highest contamination level in the immediate work area (including units of measure)
  4. Protective clothing required in the immediate work area (including transition to and from the area)
  5. Expected dose for this assignment area (including units of measure)
  6. Dose rate alarm for this area (including units of measure)
  7. Assuming significant difficulties are encountered, the longest possible stay time for this area, (including units of measure)

The examiner will act as Health Physics (HP) for any related questions.

Initiating Cues:

- The crew is performing a plant heat up in accordance with OP 2201, Plant Heatup
- The plant is in MODE 3 with pressurizer pressure at 1400 psia.
  Two Charging Pumps are in operation.

Simulator Requirements: N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-293-R-RO** Revision: **2/0**

Task Title: **Review RWP and Survey Map**

START TIME: __________

<table>
<tr><td rowspan="3">STEP
#1</td><td>Performance:
Review Operations Blanket RWP No. 5 and Radiation Survey Figure 21A</td><td>Standard:
<i>Examinee reviews Operations Blanket RWP No. 5 and Radiation Survey Figure 21A and answers the following questions:</i></td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
• Provide examinee with Operations Blanket RWP No. 205 and Radiation Survey map.</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#2</td><td>Performance:
1. Determine which RWP task (job step) is appropriate for this assignment.</td><td>Standard:
<i>Examinee states that task (job step) No. 2 is appropriate for this task.</i></td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:
2-CH-110Q is located in a Locked High Radiation Area (400 mr/hr hot spot in area), therefore Task No. 2</td></tr>
<tr><td rowspan="3">STEP
#3</td><td>Performance:
2. Determine the highest radiation level in the immediate work area.</td><td>Standard:
<i>Examinee states that the highest radiation level in immediate work area is 45 mr/hr (400mr/hr contact not Critical Step)</i></td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:
The examinee may point out the 400 mr/hr hot spot near 2-SI-709, but that the assigned task does NOT require him/her to approach that area.</td></tr>
<tr><td rowspan="3">STEP
#4</td><td>Performance:
3. Determine the highest contamination level in the work area.</td><td>Standard:
<i>Examinee states that the highest contamination level in this area is 2,000 DPM/100cm</i>^{2}<i>.</i></td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-293-R-RO** Revision: **2/0**

Task Title: **Review RWP and Survey Map**

<table>
<tr><td rowspan="3">STEP
#5</td><td>Performance:
4. Determine what protective clothing is required in the area.</td><td>Standard:
<i>Examinee states that contamination levels require full PCs (with modesty garments underneath).</i></td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:
Examinee may state the individual items that make up “full PCs” (Cotton liners, Booties, Coveralls, Shoe covers, Rubber gloves, Modesty garments)</td></tr>
<tr><td rowspan="3">STEP
#6</td><td>Performance:
5. Determine the expected dose for this assignment.</td><td>Standard:
<i>Examinee states that the expected dose is approximately 15mr. (14-16 mr).</i></td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:
45 mrem/hr Dose Rate X 1/3 hrs. (i.e.; 20 min.) ≅ 15 mr</td></tr>
<tr><td rowspan="3">STEP
#7</td><td>Performance:
6. Determine the expected dose rate alarm for this assignment.</td><td>Standard:
<i>Examinee states that the expected dose alarm is 50 mrem dose and 300 mr/hr dose rate alarm</i></td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#8</td><td>Performance:
7. Determine the longest possible stay time for this assignment.</td><td>Standard:
<i>Examinee states that the longest possible stay time is one hour six minutes</i></td><td>Critical:
Y ☐ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:
45 mrem Dose Limit Alarm / 50 mrem/hr Dose Rate = 1.111 hr. or 66 minutes (60 minutes[1 hr] to 72 minutes [1 hr 12 minutes])</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-293-R-RO** Revision: **2/0**

Date Performed: ____________

Student: ____________

> For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
> If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**15**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____________
Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-293-R-RO** Revision: **2/0**

Initial Conditions:

- You have been directed to isolate Letdown Flow Control Valve, 2-CH-110Q.
- Based on previous experience, you estimate that this task will take 20 minutes.
- Your available dose is 1,000 mR.
- State the radiological requirements for entering this area. Include in your discussion:
  1. Which RWP task (job step) is appropriate for this assignment
  2. Highest radiation level in the work area (including units of measure)
  3. Highest contamination level in the immediate work area (including units of measure)
  4. Protective clothing required in the immediate work area (including transition to and from the area)
  5. Expected dose for this assignment area (including units of measure)
  6. Dose rate alarm for this area (including units of measure)
  7. Assuming significant difficulties are encountered, the longest possible stay time for this area, (including units of measure)

The examiner will act as Health Physics (HP) for any related questions.

Initiating Cues:

- The crew is performing a plant heat up in accordance with OP 2201, Plant Heatup
- The plant is in MODE 3 with pressurizer pressure at 1400 psia.
  Two Charging Pumps are in operation.

N/A

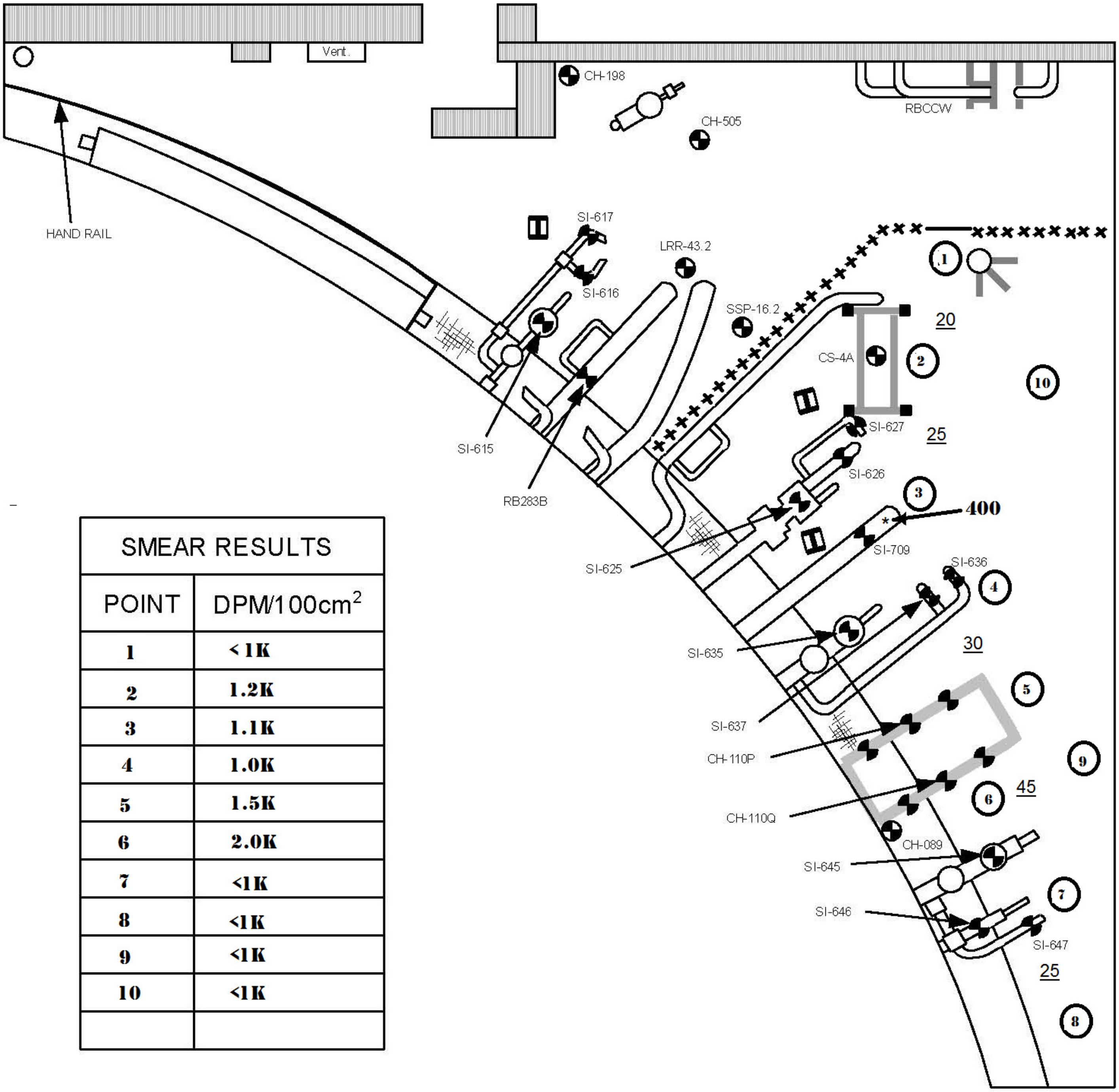
MILLSTONE NUCLEAR POWER STATION - RADIATION SURVEY FIGURE NO. 21A

UNIT 2

Date *TODAY*	Survey by *HP TECH*	Reviewed by *HP SUPERVISOR*	Type of Survey ☒ Routine ☐ Special
Time *0000*	Print Name *HP TECH*	% Reactor Power *0%*	☐ RWP# ________

Type	Instrument Type	Serial Number	1/Effeciency	Background	Calibration Due Date
γ			N/A	N/A	
η			N/A	N/A	
α					
β, γ					

-5 WEST PENETRATION ROOM



SMEAR RESULTS	
POINT	DPM/100cm^2
1	< 1K
2	1.2K
3	1.1K
4	1.0K
5	1.5K
6	2.0K
7	<1K
8	<1K
9	<1K
10	<1K

100 - gamma (g) at waist level in mrem/hr 2 - contamination survey point	100* - gamma (g) contact in mrem/hr 50 mrad - beta (b) reading in mrad/hr	25 h - neutron in mrem/hr

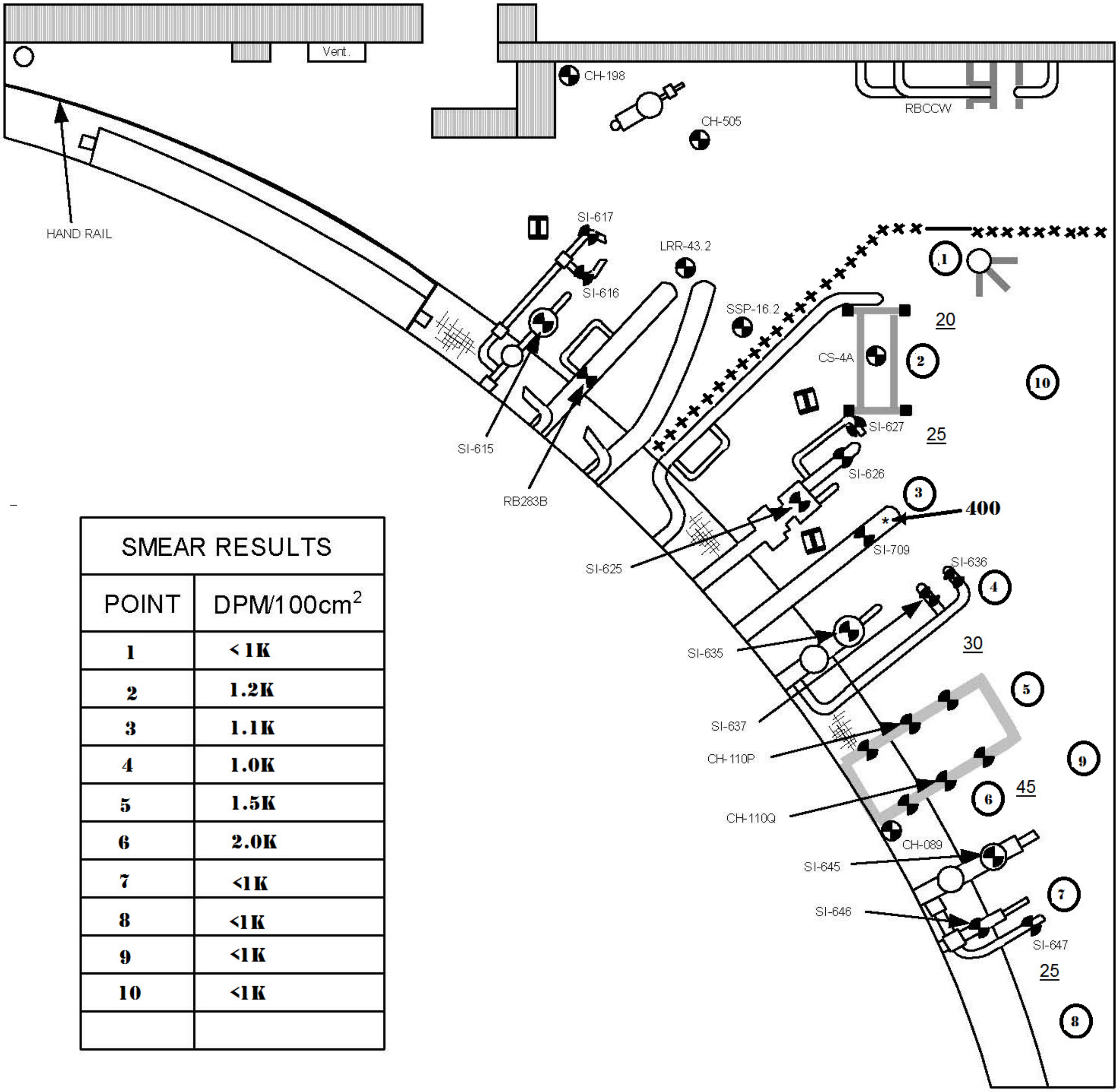
MILLSTONE NUCLEAR POWER STATION - RADIATION SURVEY FIGURE NO. 21A

UNIT 2

Date TODAY	Survey by HP TECH	Reviewed by HP SUPERVISOR	Type of Survey ☒ Routine ☐ Special ☐ RWP# ______
Time 0000	Print Name HP TECH	% Reactor Power 0%	

Type	Instrument Type	Serial Number	1/Effeciency	Background	Calibration Due Date
γ			N/A	N/A	
η			N/A	N/A	
α					
β, γ					

-5 WEST PENETRATION ROOM



SMEAR RESULTS	
POINT	DPM/100cm^2
1	< 1K
2	1.2K
3	1.1K
4	1.0K
5	1.5K
6	2.0K
7	<1K
8	<1K
9	<1K
10	<1K

100 - gamma (g) at waist level in mrem/hr 2 - contamination survey point	100* - gamma (g) contact in mrem/hr 50 mrad - beta (b) reading in mrad/hr	25 h - neutron in mrem/hr

RADIATION WORK PERMIT SUMMARY 2160205

Millstone Station

PLANT CODE	YEAR	RWP NUMBER	REV.	RWP START	TYPE	CATEGORY	RWP EXPIRATION
2	16	2160205	0	15-MAR-2016 00:00	S	RO	31-DEC-2016 23:59

RWP DESCRIPTION

Operations Department

TASK SUMMARY

		DOSE ALARM	DOSE RATE ALARM	TIME INTERVAL
1	(RA) Operations activities in RCAs and Radiation Areas. Tagging, rounds, surveillances, system line-ups and restoration, LLRT, and necessary support activities.	25	50	
2	(HRA) Operations activities in High Radiation Areas. Tagging, rounds, surveillances, system line-ups and restoration, LLRT, and necessary support activities.	50	300	
3	(LHRA) Operations activities in Locked High Radiation Areas. Tagging, rounds, surveillances, system line-ups and restoration, LLRT, and necessary support activities.	75	500	

ALARA INFORMATION

ALARA Review No.	Hours-Estimated	Person-mrem
	5300	3450

SPECIAL INSTRUCTIONS:

Activities may include, but are not limited to:
- Routine and special rounds
- Tagging
- Inspections
- Surveillances
- LLRT
- Venting or draining of plant systems
- System restoration(s)
- System line-ups

Entry on this RWP requires the worker to understand and comply with the following:
- Be knowledgeable of radiological conditions of the work area
- Adhere to the requirements of the RWP
- Notify HP before entering overhead areas
- Modesty garments will be worn whenever PCs are worn

Immediately stop work (place in a safe condition), exit the work area, and notify HP Supervision for any of the following:
- Changes in radiological conditions that were not anticipated
- ED DOSE Alarm
- Unexpected ED DOSE RATE Alarm
- Failure of electronic dosimetry

No reductions of protective clothing and/or radiological engineering controls on this RWP are allowed without RP Second Line Supervisor review and documented approval.

Supervisor:

DATE:
DATE: 3/28/16

DATE:
DATE:

VALID FROM	15-MAR-2016 00:00	TO	31-DEC-2016 23:59	RWP	2160205-1	REV. NO	0

DOSE RATE ALARM:	50 mrem/Hr	BUDGETED DOSE:	300 mrem
DOSE LIMIT ALARM:	25 mrem	ALARA EVALUATION NO:	

JOB LOCATIONS:

JOB DESCRIPTION: (RA) Operations activities in RCAs and Radiation Areas. Tagging, rounds, surveillances, system line-ups and restoration, LLRT, and necessary support activities.

THE MAXIMUM POSTED AREA THAT CAN BE ENTERED:
Radiation Area

RADIOLOGICAL CONDITIONS: *Indicates estimated value for RWP Preparation. See survey forms for details

GENERAL AREA RADIATION LEVELS (mrem/hr):
Review posted survey maps

CONTACT/HOT SPOT RADIATION LEVELS (mrem/hr):

CONTAMINATION LEVELS (dpm/100cm2):

AIRBORNE RADIOACTIVITY (DAC):
<0.3 DAC

DOSIMETRY REQUIREMENTS:
ED TLD

DOSIMETRY COMMENTS:

PROTECTIVE CLOTHING REQUIREMENTS:
Protective clothing required when inside contaminated areas.

* Coveralls * Rubber gloves * Glove liners * Booties * Shoe covers * Hood * Hard hat cover * Modesty garments *

Lab coats may be worn for inspection-related tasks ONLY; no physical work in posted Contaminated Areas may be performed in lab coats.

At a minimum, lab coats and gloves shall be worn when clearing tools and materials across a contaminated area boundary.

Lab coats are not allowed inside Containment.

WORKER INSTRUCTIONS:

NO entry into High Radiation Areas or Locked High Radiation Areas permitted using this Job Step.

A briefing from HP is required before venting or draining any contaminated systems, to ensure proper drainage is established and that adequate radiological controls are used.

Ends of hoses shall be capped or bagged when disconnecting from contaminated systems.

Notify HP if performing any activities in contaminated areas while working above your head. Additional protection may be required. i.e. face shield.

*************************** DOSIMETRY ***************************

Check ED approximately every 15-20 minutes unless a more frequent check is specified by the HP Technician due to higher dose rates.

Exit the RCA when you have reached 80% of your DOSE alarm setpoint.

Upon receiving an ED DOSE alarm, place work in a safe condition, promptly leave the RCA, and report to the HP Office.

NOTE: ED DOSE RATE alarm setpoints are set conservatively at a low, yet feasible value ALARA purposes. When ED DOSE RATE alarm setpoints are set below 100 mR/hr, it is expected that some ED DOSE RATE alarms may be received (such as during work in areas with localized high dose rate gradients, or when momentarily passing through an elevated radiation field en route to their work location).

Upon receiving an ED DOSE RATE alarm, reposition yourself such that the alarm clears. If the ED DOSE RATE alarm continues, or if three consecutive ED DOSE RATE alarms occur, place work in a safe condition, promptly leave the RCA, and report to the HP Office.

If electronic dosimeter malfunctions, notify HP BEFORE logging out.

HEALTH PHYSICS INSTRUCTIONS:

Ensure radiological evaluation has been performed of work locations prior to allowing work.

Monitor around floor drains, sumps, and vent & drain connections after OPS drains or vents contaminated systems. Monitoring shall include (as a minimimum) beta-gamma contamination and DRP's.

Monitor dose rates on drain hoses, around drains, and in areas when large componets are drained.

*************************** HP COVERAGE ***************************

Routine Coverage: Work activities under this RWP Step are expected to be low risk and do not typically require direct or indirect oversight in the field from HP.

Intermittent or Periodic Coverage:
 * HP coverage to be provided to monitor dose rates and contamination levels in conjunction with system venting/draining as specified in the section above.

*************************** ALPHA CONTROLS ***************************

Level 2 Alpha Area. Count 10% of smears for alpha. Calculate and document individual beta-gamma to alpha ratio for any smear which has >20dpm alpha activity.

If any beta-gamma to alpha ratio <300:1 is discovered, THEN NOTIFY HP Supervision, post as "Alpha Controls Required", and implement controls for a level 3 alpha area in accordance with RP-AA-226.

IF air samples are to be analyzed for gross alpha, THEN ENSURE adequate air sample volume is obtained. If required minimum sample volume is unknown, obtain at least 61 ft3. If not feasible to obtain a adequate volume air sample, a count time can be calculated.

VALID FROM 15-MAR-2016 00:00 TO 31-DEC-2016 23:59 RWP 2160205-2 REV. NO 0

DOSE RATE ALARM:	300	mrem/Hr	BUDGETED DOSE:	2800	mrem
DOSE LIMIT ALARM:	50	mrem	ALARA EVALUATION NO:		

JOB LOCATIONS:

JOB DESCRIPTION: (HRA) Operations activities in High Radiation Areas. Tagging, rounds, surveillances, system line-ups and restoration, LLRT, and necessary support activities.

RADIOLOGICAL CONDITIONS: *Indicates estimated value for RWP Preparation. See survey forms for details

GENERAL AREA RADIATION LEVELS (mrem/hr):
Review posted survey maps

CONTACT/HOT SPOT RADIATION LEVELS (mrem/hr):

CONTAMINATION LEVELS (dpm/100cm2):

AIRBORNE RADIOACTIVITY (DAC):
<0.3 DAC

DOSIMETRY REQUIREMENTS:
ED TELEDOSIMETRY TLD

DOSIMETRY COMMENTS:
**************************** TELEMETRY ****************************

Check with HP after teledosimetry has been issued, to ensure that it is transmitting properly.

Teledosimetry required in High Radiation Areas inside Containment.

HP Supervision may change teledosimetry requirements based on equipment status, radiological conditions, or required coverage.

PROTECTIVE CLOTHING REQUIREMENTS:
Protective clothing required when inside contaminated areas.

* Coveralls * Rubber gloves * Glove liners * Booties * Shoe covers * Hood * Hard hat cover * Modesty garments *

Lab coats may be worn for inspection-related tasks ONLY; no physical work in posted Contaminated Areas may be performed in lab coats.

At a minimum, lab coats and gloves shall be worn when clearing tools and materials across a contaminated area boundary.

Lab coats are not allowed inside Containment.

A RWP PRE-JOB BRIEFING IS REQUIRED:
HIGH RADIATION AREA

WORKER INSTRUCTIONS:

A briefing from HP is required before venting or draining any contaminated systems, to ensure proper drainage is established and that adequate radiological controls are used.

Ends of hoses shall be capped or bagged when disconnecting from contaminated systems.

Notify HP if performing any activities in contaminated areas while working above your head. Additional protection may be required. i.e. face shield.

****************** HIGH RADIATION AREA CONTROLS ******************

NO entry to Locked High Radiation Areas permitted using this Job Step.

Requirements for High Radiation Area entries:
* Notify Health Physics PRIOR to entering the High Radiation Area
* Documented Health Physics briefing for High Radiation Areas
* Follow instructions indicated in this RWP step and perform ONLY tasks which are authorized by this step
* If you are going to be in the High Radiation Area LONGER than expected, then notify HP
* If you are working in a High Radiation Area and get redirected to a different High Radiation Area (or any portion of the HRA which you have not been briefed to), then notify HP
* Alarming dosimeter AND knowledge of area dose rates required, OR continuous HP coverage required
* If requested by HP to leave the work area, then place work in a safe condition and leave the area immediately

*************************** DOSIMETRY ***************************

Check ED approximately every 15-20 minutes unless a more frequent check is specified by the HP Technician due to higher dose rates.

Exit the RCA when you have reached 80% of your DOSE alarm setpoint.

Upon receiving an ED DOSE alarm, place work in a safe condition, promptly leave the RCA, and report to the HP Office.

If an ED DOSE RATE alarm occurs, back away from area immediately, place work in a safe condition, promptly leave the RCA, and report to the HP Office (unless briefed on proper responses AND authorized by HP Supervisor).

If electronic dosimeter malfunctions, notify HP BEFORE logging out.

HEALTH PHYSICS INSTRUCTIONS:

Ensure radiological evaluation has been performed of work locations prior to allowing work.

Monitor around floor drains, sumps, and vent & drain connections after OPS drains or vents contaminated systems. Monitoring shall include (as a minimimum) beta-gamma contamination and DRP's.

Monitor dose rates on drain hoses, around drains, and in areas when large componets are drained.

*************************** HP COVERAGE ***************************

Routine Coverage: Work activities under this RWP Step are expected to be low risk and do not typically require direct or indirect oversight in the field from HP.

Intermittent or Periodic Coverage:
* HP coverage to be provided to monitor dose rates and contamination levels in conjunction with system venting/draining as specified in the section above.

************************** ALPHA CONTROLS **************************

Level 2 Alpha Area. Count 10% of smears for alpha. Calculate and document individual beta-gamma to alpha ratio for any smear which has >20dpm alpha activity.

If any beta-gamma to alpha ratio <300:1 is discovered, THEN NOTIFY HP Supervision, post as

"Alpha Controls Required", and implement controls for a level 3 alpha area in accordance with RP-AA-226.

IF air samples are to be analyzed for gross alpha, THEN ENSURE adequate air sample volume is obtained. If required minimum sample volume is unknown, obtain at least 61 ft3. If not feasible to obtain a adequate volume air sample, a count time can be calculated.

VALID FROM	15-MAR-2016 00:00	TO	31-DEC-2016 23:59	RWP	2160205-3	REV. NO	0

DOSE RATE ALARM: 500 mrem/Hr	BUDGETED DOSE: 350 mrem
DOSE LIMIT ALARM: 75 mrem	ALARA EVALUATION NO:

JOB LOCATIONS:

JOB DESCRIPTION: (LHRA) Operations activities in Locked High Radiation Areas. Tagging, rounds, surveillances, system line-ups and restoration, LLRT, and necessary support activities.

RADIOLOGICAL CONDITIONS: *Indicates estimated value for RWP Preparation. See survey forms for details

GENERAL AREA RADIATION LEVELS (mrem/hr):
Review posted survey maps

CONTACT/HOT SPOT RADIATION LEVELS (mrem/hr):

CONTAMINATION LEVELS (dpm/100cm2):

AIRBORNE RADIOACTIVITY (DAC):
<0.3 DAC

DOSIMETRY REQUIREMENTS:

ED	TELEDOSIMETRY	TLD

DOSIMETRY COMMENTS:

*************************** TELEMETRY ****************************

Check with HP after teledosimetry has been issued, to ensure that it is transmitting properly.

Teledosimetry required in High Radiation Areas and Locked High Radiation Areas inside Containment.

HP Supervision may change teledosimetry requirements based on equipment status, radiological conditions, or required coverage.

PROTECTIVE CLOTHING REQUIREMENTS:

Protective clothing required when inside contaminated areas.

* Coveralls * Rubber gloves * Glove liners * Booties * Shoe covers * Hood * Hard hat cover * Modesty garments *

Lab coats may be worn for inspection-related tasks ONLY; no physical work in posted Contaminated Areas may be performed in lab coats.

At a minimum, lab coats and gloves shall be worn when clearing tools and materials across a contaminated area boundary.

Lab coats are not allowed inside Containment.

A RWP PRE-JOB BRIEFING IS REQUIRED:
LOCKED HIGH RADIATION AREA

WORKER INSTRUCTIONS:

A briefing from HP is required before venting or draining any contaminated systems, to ensure proper drainage is established and that adequate radiological controls are used.

Ends of hoses shall be capped or bagged when disconnecting from contaminated systems.

Notify HP if performing any activities in contaminated areas while working above your head. Additional protection may be required. i.e. face shield.

************** LOCKED HIGH RADIATION AREA CONTROLS **************

This job step allows Locked High Radiation Area entry. Only personnel familiar with intended tasks should be granted access to work area.

Requirements for Locked High Radiation Area entry:

- Notify Health Physics PRIOR to entering the Locked High Radiation Area
- Documented Health Physics briefing for Locked High Radiation Areas
- Follow instructions indicated in this RWP step and perform ONLY tasks which are authorized by this step
- If you are going to be in the Locked High Radiation Area LONGER than expected, then notify HP
- If you are working in a Locked High Radiation Area and get redirected to a different Locked High Radiation Area (or any portion of the LHRA which you have not been briefed to), then notify HP
- Do not allow any other workers into the Locked High Radiation Area; only HP can allow additional workers into the LHRA
- Alarming dosimeter AND knowledge of area dose rates required, OR continuous HP coverage required
- Discuss your entry with the Locked High Radiation Area Access Control Guard prior to entry
- If requested by HP to leave the work area, then place work in a safe condition and leave the area immediately
- Area MUST be locked or guarded at ALL times. Secure the door upon exit and immediately notify HP or the Locked High Radiation Area Access Control Guard. Peer check the door when requested by HP
- If dose rate fields in work area are > 1000 mrem/hr OR dose per entry is > 500 mrem, continuous HP coverage and Stay Time are required

*************************** DOSIMETRY ***************************

Check ED approximately every 15-20 minutes unless a more frequent check is specified by the HP Technician due to higher dose rates.

Exit the RCA when you have reached 80% of your DOSE alarm setpoint.

Upon receiving an ED DOSE alarm, place work in a safe condition, promptly leave the RCA, and report to the HP Office.

If an ED DOSE RATE alarm occurs, back away from area immediately, place work in a safe condition, promptly leave the RCA, and report to the HP Office (unless briefed on proper responses AND authorized by HP Supervisor).

If electronic dosimeter malfunctions, notify HP BEFORE logging out.

HEALTH PHYSICS INSTRUCTIONS:

Ensure radiological evaluation has been performed of work locations prior to allowing work.

Monitor around floor drains, sumps, and vent & drain connections after OPS drains or vents contaminated systems. Monitoring shall include (as a minimimum) beta-gamma contamination and DRP's.

Monitor dose rates on drain hoses, around drains, and in areas when large componets are drained.

*************************** HP COVERAGE ***************************

Routine Coverage: Work activities under this RWP Step are expected to be low risk and do not typically require direct or indirect oversight in the field from HP.

Intermittent or Periodic Coverage:

- HP coverage to be provided to monitor dose rates and contamination levels in conjunction with system venting/draining as specified in the section above.

************************** LHRA CONTROLS **************************

Stop Work dose rate for work performed under this task = 1500mR/hr. If Stop Work dose rate is exceeded in the job area, order workers to stop work and place in a safe condition, move workers out of the area, and notify RP Supervision per RP-AA-270 Section 5.3.

Stay Time tracking is required if ANY of the following are met:

- Working in whole body dose rates >1000mR/hr.
- Expected exposure >500mR per individual per entry.
- When directed by RP Supervision.

************************** ALPHA CONTROLS **************************

Level 2 Alpha Area. Count 10% of smears for alpha. Calculate and document individual beta-gamma to alpha ratio for any smear which has >20dpm alpha activity.

If any beta-gamma to alpha ratio <300:1 is discovered, THEN NOTIFY HP Supervision, post as "Alpha Controls Required", and implement controls for a level 3 alpha area in accordance with RP-AA-226.

IF air samples are to be analyzed for gross alpha, THEN ENSURE adequate air sample volume is obtained. If required minimum sample volume is unknown, obtain at least 61 ft3. If not feasible to obtain a adequate volume air sample, a count time can be calculated.

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: TECH SPEC Evaluation LTOP

JPM Number: JPM-294-R-SRO Revision: 0

Initiated:

David Jacobs	07/12/2016
Developer	Date

Reviewed:

Robert L. Cimmino, Jr.	07/13/2016
Technical Reviewer	Date

Approved:

Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
06/01/2016	New JPM developed for NRC exam 2016	0

JPM WORKSHEET

Facility: **MP2** Examinee: ____________

JPM Number: **JPM-294-R-SRO** Revision: **0**

Task Title: **TECH SPEC Evaluation LTOP**

System: Generic Equipment Control

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 20

Task Number(s): *MP2* 119-029-01-02

Applicable To: SRO **X** STA ____ RO ____ PEO ____

K/A Number: 2.2.40 K/A Rating: 3.4 / 4.7

Method of Testing: Simulated Performance: ____ Actual Performance: X

Location: Classroom: X Simulator: ____ In-Plant: ____

Task Standards:	Examinee has determined that both PORVs are NOT OPERABLE for MODE 4 requiring entering Tech. Spec. Action Statement and suspending the cooldown.	
Required Materials: (procedures, equipment, etc.)	MP-PROC-OPS-U2-14-OPS-BAP05	Tech. Specs.
	MP-PROC-OPS-OP 2207[r039]	Plant Cooldown
General References:	MP-PROC-OPS-U2-14-OPS-BAP05	Tech. Specs.
	MP-PROC-OPS-OP 2207[r039]	Plant Cooldown
	MP-PROC-OPS-ARP 2590B-209	Alarm Response C02/03 A-37 LT/OP T115

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-294-R-SRO** Revision : **0**

Initial Conditions: OP 2207 cooldown is in progress with the following conditions:

- RCS temperature at 275°F
- Pressure at 375# P-103-1 and P-103
- 2 PORVs with "LT/OP SETPOINT SELECTOR" in "HIGH"
- 2 Charging pump available to inject
- 1 HPSI pump available to inject

Initiating Cues: Determine any required actions and or Tech Spec applicability for the current condition

Simulator Requirements: N/A

*** * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * ***

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-293-R-SRO** Revision: **0**

Task Title: **TECH SPEC Evaluation LTOP**

START TIME: __________

STEP #1	Performance: After reviewing the Initial Conditions the SRO determines the applicable action required by OP 2207 Cooldown.	Standard: SRO determines the need to SUSPEND the COOLDOWN OP 2207 **Section 4.14** Establishing LTOP Protection **Step 4.18.8**	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #2	Performance: After reviewing the Initial Conditions the SRO determines applicable Tech. Spec. Action required for the conditions.	Standard: Technical Specification Actions of **3.4.9.3a** action "**c**" Declare BOTH Channels of LTOP not OPERABLE Perform either of the following: • Depressurize and vent the RCS through a ≥ 2.2 square inch vent within 8 hours. • Place **BOTH** PORVs selector switches to **LOW**	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-294-R-SRO** Revision: **0**

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**20**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____
Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	What action in the Plant Cooldown cannot be accomplished if P103, "PZR PRES LO RGE" and P103-1, "PZR PRES LO RGE" are not within 30 psi of each other?
Answer #1:	Concurrent RCP and SDC operations
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	In MODE 6 when is Low Temperature Over Pressure protection no longer required?
Answer #2:	Reactor vessel head has been removed or a vent of sufficient size has been established such that RCS pressurization is not possible. (T.S. Basis)
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-294-R-SRO** Revision: **0**

Initial Conditions: OP 2207 cooldown is in progress with the following conditions:

- RCS temperature at 275°F
- Pressure at 375# P-103-1 and P-103
- 2 PORVs with “LT/OP SETPOINT SELECTOR” in “HIGH”
- 2 Charging pump available to inject
- 1 HPSI pump available to inject

Initiating Cues:

Determine any required actions and or Tech Spec applicability for the current conditions.

Examinee Response:	

Setpoint: RCS temp less than 275°F
RCS press greater than 375 psia

A−37

LT/OP
T115/P−103−1
LO/HI

AUTOMATIC FUNCTIONS

1. None

CORRECTIVE ACTIONS

1. CHECK "PZR PRES, P−103−1 and P−103" (C−03).
2. IF RCS is being filled OR is filled AND pressurizer is solid, PERFORM the following:
   - STOP charging pumps
   - STOP high pressure safety injection pump
   - DE−ENERGIZE pressurizer heaters

   2.1 REDUCE pressure to less than 375 psia.

   2.2 VERIFY annunciator resets.

   2.3 IF RCS pressure rises above 415 psia, VERIFY "PORV, RC−402," operates to reduce pressure.

   2.4 WHEN RCS pressure lowers to less than 410 psia, VERIFY "PORV, RC−402," reseats and RCS pressure stabilizes.

   2.5 IF "PORV, RC−402," does *not* reseat, as indicated by pressurizer pressure continuing to lower below approximately 400 psia, CLOSE "PORV ISOL VLV, RC−403" as follows:

      2.5.1 PLACE associated "LT/OP SETPOINT SELECTOR" in "HIGH" (C−03).

      2.5.2 PLACE "PORV ISOL VLV, RC−403" in "CLOSE" (C−03).

      2.5.3 VERIFY "PORV ISOL VLV, RC−403" closes by observing the following:
      - Closed indication light status (green only)
      - RCS pressure stabilizes
      - Quench tank parameters stable

3. IF Plant is in a cooldown or a heat−up evolution with a bubble in pressurizer, manually OPEN either RC−100E or RC−100F to lower pressure until alarm clears.

   3.1 DE−ENERGIZE pressurizer heaters (C−03).

   3.2 VERIFY RCS pressure stabilizes (C−03).

   3.3 OPERATE pressurizer sprays and heaters as necessary to maintain desired RCS pressure.

3.4 IF RCS pressure rises above 415 psia, VERIFY "PORV, RC−402" operates to reduce pressure.

3.5 WHEN RCS pressure lowers to less than 410 psia, VERIFY "PORV, RC−402," reseats AND RCS pressure stabilizes.

3.6 IF "PORV, RC−402," does *not* reseat, as indicated by pressurizer pressure continuing to lower below approximately 400 psia, CLOSE "PORV ISOL VLV, RC−403" as follows:

3.6.1 PLACE associated "LT/OP SETPOINT SELECTOR" in "HIGH" (C−03).

3.6.2 PLACE "PORV ISOL VLV, RC−403" in "CLOSE" (C−03).

3.6.3 VERIFY "PORV ISOL VLV, RC−403" closes by observing the following:

- Closed indication light status (green only)
- RCS pressure stabilizes
- Quench tank parameters stable

4. IF PORV lifted to mitigate a pressure transient, SUBMIT special report to NRC as specified in Technical Specifications ACTION Statement 3.4.9.3 ACTION e.

5. REFER to Technical Specification LCO, 3.4.9.1, Figure 3.4.2.

5.1 IF limits of Technical Specification Figure 3.4.2 have been exceeded, immediately NOTIFY Operations Manager or OMOC (Duty Officer).

SUPPORTING INFORMATION

1. Initiating Devices
   - TA−115−1A
   - P−103−1
2. Computer Points
   - T115
   - P103−1
3. Possible Causes
   - Instrument malfunction
4. Technical Specifications LCOs: 3.4.9.1 and 3.4.9.3
5. Procedures
   - OP 2304A, "Volume Control Portion of CVCS"
6. Control Room Drawings
   - 25203−32007, sh. 40
   - 25203−28500, sh. 75C
7. Annunciator Card Location: TB10−J9

4.14 **Establishing LTOP Protection and Reducing RCS Pressure**

CAUTION

The following information is applicable to T/S LCO, 3.4.9.3:

- When RCS temperature is below 275°F, to provide LTOP protection, at least 2 PORVs must be OPERABLE with their associated selector switch in "LOW" and isolation valve open, unless the provisions of T/S LCO, 3.4.9.3 are met.
- Prior to reducing RCS temperature below 275°F, RCS pressure must be less than 375 psia.
- Loss of power to pressurizer pressure narrow range instrument, P−103 or P−103−1, causes associated PORV to be *not* OPERABLE.

NOTE

1. Since the operating limits account for instrument inaccuracy, it is acceptable to rely on only *one* pressure instrument for maintaining pressure in the required band, provided the instrument accuracy is verified by channel check. When available, this indication should be obtained from the PPC.
    - During concurrent RCP/SDC operation, the lower indicating PI should be used for compliance with the required band.
    - During non−concurrent RCP/SDC operation, the higher indicating PI should be used for compliance with the required band.
2. Due to the small pressure band available when placing LTOP in service, the following annunciators may alarm:
    - "LT/OP T−115/P−103−1 LO/HI" (C−03, window A−37)
    - "LT/OP T−125/P−103 LO/HI" (C−03, window B−37)

____/____ 4.14.1 ENSURE the *spare* HPSI pump breaker has been racked down AND *one* HPSI train has been disabled, as specified in Section 4.6 (C−01).

____/____ 4.14.2 Refer To Attachments 1, 3, 4, and 5, or applicable PPC displays, and REDUCE RCS pressure to between RCP MNPSH and 375 psia (PPC).

____/____ 4.14.3 Prior to providing LTOP protection, ENSURE SP 2610M, "PORV Hot Functional Test," is complete.

____/____ 4.14.4 CHECK the following low range pressurizer pressure instruments are within 30 psia of each other:

- Either PPC:
  - ____/____ P103, "PZR PRES LO RGE"
  - ____/____ P103−1, "PZR PRES LO RGE"
- Or C−03:
  - ____/____ PI−103
  - ____/____ PI−103−1

____/____ 4.14.5 IF low range pressurizer pressure instruments are *not* within 30 psia of each other, PERFORM *one* of the following:

- ____/____ REQUEST I&C to recalibrate the pressure loops.
- ____/____ Do *not* RUN RCPs and SDC concurrently.

____/____ 4.14.6 Prior to T_{COLD} reaching 280°F, ESTABLISH an RCS cooldown rate of 10 to 40°F per hour.

____/____ 4.14.7 IF previously requested by Chemistry to sweep the VCT with N2, Refer To Attachment 19, Section B "Purging the VCT During Cooldown."

____/____ 4.14.8 IF both LTOP circuits are *not* in service *prior* to the lowest T_{COLD} (T115 or T125) reaching 275°F, PERFORM the following:

____/____ a. STOP RCS cooldown.

____/____ b. MAINTAIN both T115 and T125 between 275 and 290°F.

____/____ c. NOTIFY I&C to investigate.

NOTE

LCO 3.4.9.3, LTOP, applies when any T_{COLD} is less than 275 degrees.

____/____ 4.14.9 WHEN annunciator "RESET LT/OP 2−RC−402 SELECTOR SW TO LOW," is lit (window B16), to place Z1 LTOP in service, PERFORM the following:

____/____ a. PLACE RC−402, "LT/OP 2−RC−402 SETPOINT SELECTOR" to "LOW."

____/____ b. CHECK annunciator "RESET LT/OP 2−RC−402 SELECTOR SW TO LOW," clears.

_____/_____ 4.14.10 <u>WHEN</u> annunciator “RESET LT/OP 2−RC−404 SELECTOR SW TO LOW,” is lit, to place Z2 LTOP in service, PERFORM the following:

_____/_____ a. PLACE RC−404, “LT/OP 2−RC−404 SETPOINT SELECTOR” to “LOW.”

_____/_____ b. CHECK annunciator “RESET LT/OP 2−RC−404 SELECTOR SW TO LOW,” clears.

CAUTION

During plant cooldown, when maximum cooldown limit will change in any one hour, the most limiting cooldown limit shall apply in that hour the change occurred.

_____/_____ 4.14.11 <u>WHEN</u> both LTOP circuits are in service, CONTINUE RCS cooldown at a rate within the administrative limit of 40°F/hr.

_____/_____ 4.14.12 NOTIFY HP that SDC will be placed into operation, and to expect changing radiological conditions.

NOTE

When concurrent SDC/RCP operations will *not* be performed, RCPs should be operated for as long as plant conditions allow, to maximize pressurizer cooldown and facilitate preparations for SDC initiation.

_____/_____ 4.14.13 <u>IF</u> *not* initiating SDC with concurrent RCP operation, PERFORM the following:

_____/_____ a. ENSURE that Section 4.15, “Initial SDC Preparations (Boron Equalization), *Without* Concurrent RCP Operation,” is complete.

_____/_____ b. ENSURE that Section 4.16, “Initial SDC Preparations (Warmup), *Without* Concurrent RCP Operation,” is complete.

_____/_____ c. Go To Section 4.17.

____/____ 4.14.14 IF initiating SDC with concurrent RCP operation, PERFORM the following:

____/____ a. ENSURE SDC is ready for operation.

____/____ b. Refer To Attachment 1 and, 4 or 5 or applicable PPC displays and REDUCE RCS pressure to between 230 and 235 psia.

____/____ c. As necessary, ADJUST, "RCP BLD OFF PRES CNTL, PIC−215" to maintain between 20 and 30 psi (C−02).

____/____ d. Go To Section 4.18.

− End of Section 4.14 −

OVERPRESSURE PROTECTION SYSTEMS

LIMITING CONDITION FOR OPERATION

3.4.9.3 A Low Temperature Overpressure Protection (LTOP) System, as specified below, shall be OPERABLE.

a. MODE 4, and MODE 5 with all RCS cold leg temperature > 190°F:

1. Maximum of two charging pumps and one HPSI pump may be capable of injecting into the RCS; and

2. Two OPERABLE PORVs with a lift setpoint of ≤ 415 psia.

b. MODE 5 with any RCS cold leg temperature ≤ 190 °F, and MODE 6 either:

1. Maximum of one charging pump may be capable of injecting into the RCS; and

2. Two OPERABLE PORVs with a lift setpoint of ≤ 415 psia.

OR

3. Maximum of two charging pumps and one HPSI pump may be capable of injecting into the RCS; and

4. The RCS is depressurized and an RCS vent of ≥ 2.2 sq. inches.

APPLICABILITY: MODE 4 when the temperature of any RCS cold leg is less than or equal to 275°F, MODE 5, and MODE 6 when the head is on the reactor vessel.

ACTION:

a. With one required PORV inoperable in MODE 4, restore the inoperable PORV to OPERABLE status within 7 days or depressurize and vent the RCS through a ≥ 2.2 square inch vent within the next 8 hours.

b. With one required PORV inoperable in MODES 5 or 6, either restore inoperable PORV to OPERABLE status within 24 hours or depressurize and vent the RCS through a ≥ 2.2 square inch vent within the next 8 hours.

c. With both required PORVs inoperable, depressurize and vent the RCS through a ≥ 2.2 square inch vent within 8 hours.

d. With more than the maximum allowed pumps capable of injecting into the RCS, take immediate action to comply with 3.4.9.3.

e. In the event either the PORVs or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence.

f. The provisions of Specification 3.0.4 are not applicable.

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: Shutdown Safety Assessment Review for RIO conditions

JPM Number: JPM-295-R-SRO

Revision: 0

Initiated:

David Jacobs — 06/14/2016

Developer — Date

Reviewed:

Robert L. Cimmino, Jr. — 07/05/2016

Technical Reviewer — Date

Approved:

Supervisor, Nuclear Training — Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
06/14/2016	Newly Created for NRC ILT Exam 2016	0

JPM WORKSHEET

Facility: **MP2** Examinee: ______

JPM Number: **JPM-295-R-SRO** Revision: **0**

Task Title: **Shutdown Safety Assessment Review for RIO conditions**

System: Conduct of Operations

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 20

Task Number(s): 119-01-044

Applicable To: SRO **X** STA ______ RO ______ PEO ______

K/A Number: 2.1.23 K/A Rating: 4.3 / 4.4

Method of Testing: Simulated Performance: ______ Actual Performance: X

Location: Classroom: X Simulator: ______ In-Plant: ______

Task Standards: At the completion of this JPM the examinee has reviewed the SSA for the predicted condition of the Key Safety Functions when in Reduced Inventory.

Required Materials: (procedures, equipment, etc.)
MP-PROC-000-OU-M2-201[r018.00] Shutdown Safety Assessment Checklist
Handout SSA Actual Conditions pdf format
Handout SSA Predicted Conditions pdf format
Handout CTMT pen closure plan pdf format

General References: MP-PROC-000-OU-M2-201[r018.00] Shutdown Safety Assessment Checklist

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-295-R-SRO** Revision : **0**

Initial Conditions:	The plant is in MODE 5 day 1 of a scheduled 28 day refueling outage. Reactor disassembly is in progress and the RCS is expected to be in Reduced Inventory within the next 12 hours. The following additional conditions presently exist: • PZR level is 20% • PZR Vent Port Removed • No Equipment out of service required for Mode 5 • Containment Closure is set with 1 exception Penetration #48 with a closure time of 30 minutes. (See attached Closure Plan) Assume no change in Equipment Status from the current condition to when the plant is in Reduced Inventory.
Initiating Cues:	Review the Predicted changes to the Shutdown Safety Assessment for the RCS in Reduce Inventory that was completed by the RO with the exception of Time To Boil.
Simulator Requirements:	N/A

*** * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * ***

1. Critical steps for this JPM are indicated by checking “Y”. For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-295-R-SRO** Revision: **0**

Task Title: **Shutdown Safety Assessment Review for RIO conditions**

START TIME: __________

STEP # 1	Performance: Reviews Section 2 Heatup Data: • Time to Core Boil • Shutdown Risk Color	Standard: Examinee should note the following: • Shutdown risk Color should be ORANGE	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP # 2	Performance: Reviews Section 3 Decay Heat Removal Data: • Reduced Inventory Operation (RIO) Penalty • RCS Decay Heat Removal Total • DHR Color Condition	Standard: Examinee should note the following: • The RIO Penalty was not subtracted • RCS Decay Heat Removal Total was not calculated correctly and should be **1** • SF Color ORANGE should be circled	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP # 3	Performance: Reviews Section 4 Inventory Control Data: • No Discrepancies	Standard: Examinee should note No Discrepancies	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-295-R-SRO** Revision: **0**

Task Title: **Shutdown Safety Assessment Review for RIO conditions**

<table>
<tr><td rowspan="3">STEP
#4</td><td>Performance:
Reviews Section 5 Reactivity Control Data:
• No Discrepancies</td><td>Standard:
Examinee should note No Discrepancies</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#5</td><td>Performance:
Reviews Section 6 Containment Data:
• Containment Closure Capability
  ○ Containment Closure Set with exceptions tracked and capable of being closed prior to the lesser of:
    ▪ Time to Core Boil
• Decay Heat, Inventory Control, Power Availability Functions NOT Orange/Red(6)
• Containment Total Score
• CTMT Color Condition</td><td>Standard:
Examinee should note the following:
• Containment Closure Capability
  ○ Set with Exception Tracked, no longer Qualifies due to the change in Time to Core Boil is less than the closure time for the penetration
• Decay Heat, Inventory Control, Power Availability Functions NOT Orange/Red(6) should not be checked due to the discrepancy in the DHR SF changing to ORANGE (Error carried forward)
• Containment Total Score should be 1
• CTMT Color ORANGE should be circled</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#6</td><td>Performance:
Reviews Section 7 Power Availability Data:</td><td>Standard:
Examinee should note No Discrepancies</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-295-R-SRO** Revision: **0**

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**20**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-295-R-SRO** Revision: **0**

Initial Conditions:

The plant is in MODE 5 day 1 of a scheduled 28 day refueling outage. Reactor disassembly is in progress and the RCS is expected to be in Reduced Inventory within the next 12 hours.

The following additional conditions presently exist:

- PZR level is 20%
- PZR Vent Port Removed
- No Equipment out of service required for Mode 5
- Containment Closure is set with 1 exception Penetration #48 with a closure time of 30 minutes. (See attached Closure Plan)

Assume no change in Equipment Status from the current condition to when the plant is in Reduced Inventory.

Initiating Cues:

Review the Predicted changes to the Shutdown Safety Assessment for the RCS in Reduce Inventory that was completed by the RO with the exception of Time To Boil.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

OU-M2-201 – Attachment 1 **Page 1 of 9**

Section 1

Protected Train A ☑/ **B** ☐ *(Check one or both)* ☐ with exception

Date/Time Performed: Today / 0000

☑ Actual Conditions

☐ Predicted Conditions for ________________

Date/Time of Shutdown: Yesterday 0000

Days Shutdown: 1

Reason for Shutdown Safety Assessment: 00:00

(00:00 hour, mode change, configuration changes)

Section 2 Heatup Data

Time To Core Boil

☑ Bubble does not exist in pressurizer <u>AND</u> fuel is in the vessel, <u>THEN</u> complete the following:

- RCS Temp: 105 °F
- RCS Level: 11 feet above flange
- RCS Time to Boil: 36 mins

☐ **NA if DEFUELED**

Time to 200°F (EA2 criterion): 32.8 mins

☐ **NA if DEFUELED**

Time to Heatup 10°F (EU1 criterion, uncontrolled heatup): 3.4 mins

☐ **NA if DEFUELED**

RBCCW HX Outlet Temp: 80 °F

Refuel Boron C_b per TS: 2100 ppm

RCS Boron C_b: 2200 ppm

SFP Boron C_b: 2200 ppm

Spent Fuel Pool Heatup Time

- SFP Temp: 95 °F
- SFP Level: 36 feet 10 inches
- SFP Time to 150°F

  ☑ NA if <u>NO</u> freshly discharged fuel assemblies transferred to SFP or fuel assemblies are reloaded into reactor vessel

  or

  _____ hrs _____ mins
- SFP Time to 200°F 23 hrs 10 mins

Shutdown Risk Color is:
☐ GREEN
☑ YELLOW
☐ ORANGE
☐ RED

Limiting Safety Function
☑ RCS or ☐ SFP Decay Heat Removal
☐ RCS or ☐ SFP Inventory Control
☐ Reactivity Control
☐ Containment
☐ Power Availability

SDC Responder phone: x4335

Comments: ________________________

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

OU-M2-201 – Attachment 1 **Page 2 of 9**

Section 3 Decay Heat Removal

RCS Decay Heat Removal

Check boxes for available equipment	Point Value	Score
☑ 'A' SDC with associated RBCCW and SW pump	(1)	1
☑ 'B' SDC with associated RBCCW and SW pump	(1)	1
☐ 'A' CS with associated RBCCW and SW pump[3]	(1)	
☐ 'B' CS with associated RBCCW and SW pump[3]	(1)	
☐ Both SGs[1]	(1)	
☐ Refuel Pool $\geq$ 35'6"[4] or Notes [2][4]	(1)	
Reduced Inventory Operation (RIO) Penalty	(-1)	

Total	Condition
	(Circle)
0	RED
1	ORANGE
[✓ 2]	[✓ YELLOW]
3	GREEN

RCS Decay Heat Removal Total 2

NA if DEFUELED

Required Equipment *(minimum)*: *(Check)*

☐ If only one train of SDC available ensure: A ☐ B ☐
  ☐ Associated train EDG available A ☐ B ☐
  ☐ One U2 controlled offsite power source associated with available SDC train RSST ☐ NSST ☐

☐ During Reduced Inventory Operation (RIO) ensure:
  ☐ Both trains of SDC available with one train in service that is energized from a bus powered from an offsite source Yes ☐ No ☐ Required Equipment NOT met RED
  AND
  ☐ One RBCCW pump powered from independent power supplies for each credited SDC train A ☐ B ☐ C ☐
  AND
  ☐ One SW pump powered from independent power supplies for each credited SDC train A ☐ B ☐ C ☐

---

[1] Maintain all of the following satisfied to ensure two steam generators available and proper RCS conditions are established to support natural circulation:

- Both available SG NR levels greater than 10%
- Capability to feed available SGs with a MD AFW pump
- Capability to release steam from available SGs
- RCS loops associated with the available SGs; filled and unisolated
- Pressurizer pressure $\geq$ 50 psia AND a steam bubble is established in the pressurizer

[2] When refuel pool level is reduced to 31'6" to lift and set the UGS.

[3] CS can be credited to backup LPSI for DHR in MODES 6 and Defueled per calculation ENG-04223M2, Rev. 0, Addendum 9. If CS is placed in service, no Core Alterations are allowed per Tech Specs.

[4] In Modes 5 and 6, IF RCS is vented AND Refuel Pool is less than full (< 35′6″), an Operator must be stationed in the vicinity of the SW/Fire Water Supply valves to the EDG to be ready to take action to shift cooling water to Fire Water if directed by the SM.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

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Section 3 Decay Heat Removal (Continued)

BEYOND DESIGN BASIS

Mode 5:

NA for Mode 0

Steam Generator available for Decay Heat Removal:

☐ 1 ☐ 2

AC Independent Aux Feedwater Pump:

☐ TDAFW Pump ☑ BDB AFW Pump

OR

☑ Pressurizer Vent Port Removed

☐ BDB AFW Pump Available for RCS Injection

Mode 6:

☐ BDB AFW Pump pre-staged for injection into the RCS

Section 3 Decay Heat Removal (Continued)

SFP Decay Heat Removal

	Point Value	Score
☑ SFP level ≥ 35’6”	(1)	1
☑ ‘A’ SFPC pump & HX with SFP level ≥ 36’4” ***	(0,½, 1)*	1
☑ ‘B’ SFPC pump & HX with SFP level ≥ 36’4” ***	(0, ½, 1)*	1
☐ ‘A’ LPSI pump and SFP level ≥ 36’10” ***	(1)	
☐ ‘B’ LPSI pump and SFP level ≥ 36’10” ***	(1)	
☐ ‘A’ CS pump and SFP level ≥ 36’10” ***	(1)**	
☐ ‘B’ CS pump and SFP level ≥ 36’10” ***	(1)**	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥ 3]	[✓ GREEN]

SFP Decay Heat Removal Total 3

*Count each available SFPC pump as 1 point prior to fuel movement. With ≤ 80 fuel assemblies transferred to the SFP, each available SFPC pump should be counted as ½ point. With > 80 fuel assemblies transferred to the SFP, each available SFPC pump should be counted as 0 points unless a cycle specific analysis demonstrates both SFPC pumps are one viable source of decay heat removal (i.e., each SFPC pump should be counted as ½ point). For 2R23, Calculation ENG-04223M2, Rev. 0, Addendum 9, demonstrates that both SFPC pumps together can be credited as one viable means of SFPC provided the reactor has been shutdown ≥ 8.3 days and RBCCW temperature is maintained at < 80° F. Following the core reload, each available SFPC pump should be counted as 1 point if requirements of TRM 3.9.3.3 are met. For 2R23, PM-1701, Rev. 0, demonstrates that TRM 3.9.3.3 will be met at ≥ 17 days following shutdown, since 85 fuel assemblies will be discharged during 2R23.

** A cycle specific analysis is required for counting each available CS pump as 1 point for SFPC. For 2R23, Calculation ENG-04223M2, Rev 0, Addendum 9, supports each CS pump being counted as 1 point provided that fuel movement begins ≥ 150 hours and RBCCW temperature is maintained at < 80° F. The UHS must be <70°F, with excursions allowed for <3 hours, if the moving average is <70°F.

***≥ 36’10” if two SFP cooling pumps are operating or EITHER LPSI or CS supplying SFP cooling independent of Shutdown Cooling. Level restriction is not applicable if SFP is cooled via Shutdown Cooling with 2-RW-280 open, since SDC suction is via the hot leg and 2-SI-651 and 2-SI-652.

Required Equipment *(minimum)*: *(Check)*

☑ One RBCCW pump	A ☑	B ☐	C ☑	Required Equipment NOT met RED
☑ One SW pump	A ☑	B ☐	C ☑	
☑ One RBCCW heat exchanger	A ☑	B ☐	C ☑	
☑ One SFPC or ☐ SDC heat exchanger	A SFPC HX ☑ A SDC HX ☐	B SFPC HX ☑ B SDC HX ☐		

NOTE: To maintain defense in depth for SFP cooling after the 81st fuel assembly is in the SFP during offload, additional equipment is required. TRM 3.9.3.3b requirements will be met for the 85 fuel assemblies discharged for Cycle 24 ≥ 17 days shutdown and core reload is complete.

Fuel Offload (81 to 217 Fuel Assemblies) Required Equipment *(minimum, until reload complete)*: *(Check)*

☐ Two RBCCW pumps	A ☐	B ☐	C ☐	Required Equipment NOT met ORANGE
☐ Two SW pumps	A ☐	B ☐	C ☐	
☐ One RBCCW heat exchanger	A ☐	B ☐	C ☐	
☐ Either of the following:				
☐ Two SFPC heat exchangers	A ☐	B ☐		
☐ One SDC heat exchanger	A ☐	B ☐		

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

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Section 4 Inventory Control

RCS Inventory Control

Check boxes for available equipment:	Point Value	Score
☑ ‘A’ HPSI pump	(1)	1
☑ ‘B’ HPSI pump	(1)	1
☑ ‘C’ HPSI pump	(1)	1
☑ ‘A’ Charging pump via ☑ RWST or ☐ BAST[1,2]	($^1/_2$, 1)[3]	1/2
☑ ‘B’ Charging pump via ☑ RWST or ☐ BAST[1,2]	($^1/_2$, 1)[3]	1/2
☐ ‘C’ Charging pump via ☐ RWST or ☐ BAST[1,2]	($^1/_2$, 1)[3]	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥3]	[✓ GREEN]

☐ RCS Inventory Control not required if DEFUELED AND RCS isolated from SFP by one of the following:
  - ☐ 2-RW-280 CLOSED
    OR
  - ☐ West SFP Gate INSTALLED

RCS Inventory Control Total 4

NA if DEFUELED
AND
RCS isolated from SFP

Required during RIO *(minimum)*:
☐ One HPSI pump

Required Equipment NOT met RED

SFP Inventory Control

Check boxes for available equipment:	Point Value	Score
☑ One AFW pump aligned to CST	(1)	1
☑ One Refuel Purification pump	(1)	1
☑ One PMW pump	(1)	1
☐ Makeup available from Fire Protection System (e.g., hoses)	(1)	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥3]	[✓ GREEN]

SFP Inventory Control Total 3

NA if MODE 5, 6, or Refuel Pool ≥ 36’4”

Requirements for RCS drain down conditions:

☐ SFP Cooling System vent and drain paths, which could affect SFP inventory, are identified and safety tagged *prior to* release of impacting work. Tagout Number: ____________________

☐ Controls are in place to ensure safety tags are in place *during* RCS drain down. Tagout Number: ____________________

[1] T.S. 3.1.1.3.b. allows only two charging pumps capable of injecting when RCS is less than 300°F (boron dilution).

[2] RWST ≥ 57,300 gallons (12%) or BAST > 3,750 gallons (65.8%) to be available per TRM 4.1.2.7a and SP 2601F, “Borated Water Sources Verification, MODE 5 or 6.”

[3] If ≤ 384 hrs (16 days) since shutdown, at least two Charging pumps with suction from the RWST or BAST and aligned to RCS to be credited as ONE viable makeup source.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

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Section 5 Reactivity Control

Reactivity Control while in MODEs 5 or 6

Check boxes for available equipment and conditions:	Point Value	Score
☑ RCS AND SFP boron concentrations greater than required by applicable Tech Specs	(1)	1
☑ Dilution flowpaths identified (procedurally controlled *or* tagged) Tagout Number: 2207X99-0007	(1)	1
☑ Inventory Flow Paths	(0-2)	2
☑ 'A' HPSI pump		
☐ 'B' HPSI pump		
☑ 'C' HPSI pump		
☑ 'A' Charging pump aligned to ☑ RWST or ☐ BAST$^{(1,2)}$		
☑ 'B' Charging pump aligned to ☑ RWST or ☐ BAST$^{(1,2)}$		
☐ 'C' Charging pump aligned to ☐ RWST or ☐ BAST$^{(1,2)}$		
☑ ≥ 2 Source Range Monitor	(1)	1

Total	Condition
	(Circle)
0-2	RED
3	ORANGE
4	YELLOW
[✓ 5]	[✓ GREEN]

RCS Reactivity Control while in MODE 5 or 6 Total 5 **NA if DEFUELED**

Required Equipment *(minimum)*:

☑ ≥ 2 Source Range Monitors
☑ Inventory Flow Paths
☑ RCS AND SFP Boron concentrations greater than required by applicable Tech Specs

(Check)					
A	B	C	D		
☑	☑	☑	☑	Required Equipment NOT met	RED

Reactivity Control while DEFUELED

Check boxes for available equipment and conditions	Point Value	Score
☐ RCS AND SFP boron concentrations greater than required by applicable Tech Specs	(1)	
☐ Dilution flowpaths identified (procedurally controlled or Safety Tagging) Tagout Number: 2207X99-0007	(1)	

Total	Condition
	(Circle)
0	RED
1	YELLOW
2	GREEN

RCS Reactivity Control while DEFUELED Total N/A **NA if in MODE 5 or 6**

---

(1) Only two charging pumps must be capable of injecting based on T.S. 3.1.1.3.b., "Boron Dilution."

(2) RWST ≥ 57,300 gallons (12%) or BAST > 3,750 gallons (65.8%) to be available per TRM 4.1.2.7a and SP 2601F, "Borated Water Sources Verification, MODE 5 or 6."

Section 6 Containment

NOTE: See OP 2264, Attachment 5, Containment Penetration Work Activities Affecting Containment Closure, and Attachment 9, Containment Penetration Tracking Sheet, for status of containment penetrations.

Check boxes that apply for current conditions	**Point Value**	**Score**
☑ Containment Closure Capability[1]	(0,2,3)	2
☐ Containment Closure Set (3 points)		
OR		
☑ Containment Closure Set with exceptions tracked and capable of being closed prior to the lesser of:		
☑ Time to Core Boil (2 points)		
OR		
☐ 4 hours (Loss of RCS DHR, TS 3.9.8.1, action c.) (2 points)		
OR		
☐ Containment Closure Set with administrative controls of OP 2209A during fuel movement within the containment building (2 points)		
☐ No significant fuel failures indicated[2]	(1)	
☑ No Core Alterations in progress in Containment[3]	(1)	1
☐ RCS Pressure Boundary intact[4]	(1)	
☐ Low Decay Heat (>8 days shutdown)[5]	(1)	
☑ Decay Heat, Inventory Control, Power Availability Functions **NOT** Orange/Red[6]	(1)	1

Total	**Condition**
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥ 3]	[✓ GREEN]

Containment Total 4

NA if DEFUELED

---

[1] Closure capability is scored based on all penetrations closed by at least one isolation valve or exceptions tracked and managed in accordance with OP 2264, "Conduct of Outages."

[2] This item is scored a "1" if no significant fuel failures are indicated by radiochemistry sampling. For the purposes of the SDR assessment, identification from radiochemistry samples and confirmation from NAF of significant fuel rod/pin failures is necessary to score this item as "0."

[3] No Core Alterations in progress in Containment is an indicator of the susceptibility to a fuel handling event. This item is scored a "1" if no Core Alterations are in progress or a "0" if Core Alterations are in progress.

[4] This item is scored a "1" if the RCS is intact or a "0" if any RCS opening exists.

[5] After 8 days (from the start of the outage), it is assumed that the short-lived, volatile isotopes that are principally responsible for early health effects have decayed sufficiently such that the event would not contribute to Large Early Release Frequency (LERF).

[6] No Activities are in progress to preclude mitigation to a fuel handling accident. This item is scored a "1" if Decay Heat Removal, Inventory Control, and Power Availability are **NOT** Orange/Red. This item is scored a "0" if Decay Heat Removal, Inventory Control, and Power Availability are Orange/Red.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

Section 7 Power Availability

Check boxes for available equipment and conditions:	Point Value	Score
☑ **Power Availability**		
☑ Bus 24E aligned to: ☑ 24C ☐ 24D		
On-site Power Source:		
☑ 'A' EDG with 'A' SW pump *or* 'B' SW pump supplied by the 'A' EDG	(1)	1
☑ 'B' EDG with 'C' SW pump *or* 'B' SW pump supplied by the 'B' EDG	(1)	1
☐ SBO Diesel via 24E (Time to Boil > 60 min)	(1)	
Off-site Power Source:		
☑ Unit 2 RSST	(1)	1
☐ Unit 2 NSST	(1)	
☑ Unit 3 ☑ RSST or ☐ NSST via 34A/B	(1)	1
Power Source Sub-Total		4

Total	Condition
	(Circle)
0-1	RED
2	ORANGE
3	YELLOW
[✓ ≥ 4]	[✓ GREEN]

Required Equipment:

☑ One EDG + One Unit 2 Controlled Off-site Source

☐ IF in RIO at least one additional on site power source:
- SBO Diesel and Calculated Time to Boil > 60 minutes
- Additional Unit 2 EDG

Required Equipment NOT met RED

Off-Site GRID Risk Penalty Factor

Environmental Conditions[1]

☐ Avg sustained wind speed ≥ 75 mph ______

☐ Salt contamination buildup or arcing in the 345 kV switchyard

OR

Switchyard Activities[1]

☐ Trip Testing affecting more than one 345 kV line ______

☐ Two 345 kV lines out of service

OR

ISO-NE/CONVEX Alerts[1]

☐ Abnormal transmission network conditions with potential for loss of grid ______

OR

Planned Maintenance or Projects[2]

☐ ________________________________ ______

SUBTRACT from Power Sub-Total[1] - (   ) Penalty

Power Availability Total 4

---

[1] Apply offsite power source sub-total

[2] If 345 kV or main transformer switchyard work is in progress which jeopardizes off-site sources, then deduct points equivalent to the number of offsite sources that could be affected.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

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Assessment Completion		
Conflicts between the availability reflected in the outage schedule and this checklist have been brought to the attention of the SM.	Conflicts? YES ☐ / NO ☐	<u>Initial</u>
Remarks:		
Shutdown Safety Assessment (SSA) Checklist Performed By:	______________________ Signature (Licensed Operator or STA)	
SSA Equipment Status Board(s) / PPC Programs Updated.	________ Initials	
OMOC and Maintenance Rule Coordinator Notifications made for *unplanned* RED or ORANGE.	________ Initials	
CR written to address unplanned entries into RED or ORANGE conditions	CR Number: ______________	
The SSA Checklist items have been reviewed and the Protected Equipment signs are in place based on SSA.	______________________ Signature (Licensed Operator or STA)	
Shift Manager Review	______________________ Signature	
Completed SSA Checklist maintained with the Shift Turnover Report.	________ Initials	

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 1 of 5)

RCS Time to Boil Calculation

> **NOTE:** RCS temperature should be obtained from RCS to SDC temperature, T-351X. Otherwise unheated junction thermocouples or CETs may be used (if either is available). If RCS temperature is expected to increase, an RCS temperature of up to 5°F greater than the current RCS temperature can be used to bound expected conditions.

Instructions:

1. Record time after reactor shutdown (in days), current RCS temperature (ºF) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 (“RCS Filled” condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to Boil.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

RCS Time to Boil Calculation:

RCS Time to Boil = MULT1 x MULT2 x {(212°F - RCS Temperature (°F)) / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Temperature (°F)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to Boil	Performed by	Checked by
Now/0000	1	105	11	7.5	1.0	2.529	36.084	RO	STA

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 2 of 5)

RCS Time to 200°F

NOTE: RCS temperature should be obtained from RCS to SDC temperature, T-351X. Otherwise unheated junction thermocouples or CETs may be used (if either is available).

NOTE: This calculation is performed to determine the time to reach EAL EA2, Inability to Maintain Cold Shutdown, MODEs 5 and 6, after a loss of cooling event.

Instructions:

1. Record time after reactor shutdown (in days), current RCS temperature (ºF) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 ("RCS Filled" condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to 200°F.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

RCS Time to 200°F Calculation:

RCS Time to 200°F = MULT1 x MULT2 x {(200°F - RCS Temperature (°F)) / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Temperature (°F)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to 200°F	Performed by	Checked by
Now/0000	1	105	11	7.5	1.00	2.529	32.8	RO	STA

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 3 of 5)

Time to Heatup 10°F

NOTE: This calculation is performed to determine the time to reach EAL EU1, Loss of Cold Shutdown Function, MODEs 5 and 6, after a loss of cooling event.

Instructions:

1. Record time after reactor shutdown (in days) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 ("RCS Filled" condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to Heatup 10°F.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

Time to Heatup 10°F Calculation:

RCS Time to Heatup 10°F = MULT1 x MULT2 x {10°F / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to Heatup 10°F	Performed by	Checked by
Now/0000	1	11	7.5	1.00	2.529	3.372	RO	STA

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

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Table 1

RCS Heatup Rates

NOTE: When using this table, the more conservative value should be used, so interpolation is not necessary (i.e., on the 23rd day shutdown, use day 20 heatup rate).

Time Following Shutdown (days)	Heatup Rate (F/min)
0.25	10.96
0.50	9.101
0.75	8.140
1.00	7.500
1.25	7.022
1.50	6.642
1.75	6.332
2.00	6.062
2.25	5.829
2.50	5.622
2.75	5.437
3.00	5.271
3.25	5.119
3.50	4.980
3.75	4.852
4.00	4.734
4.25	4.623
4.50	4.520
4.75	4.424
5.00	4.334
5.25	4.249
5.50	4.169
5.75	4.094
6.00	4.022
6.25	3.954
6.50	3.889
6.75	3.827
7.00	3.768
7.25	3.712
7.50	3.659
7.75	3.608
8.00	3.559
8.25	3.512
8.50	3.467
8.75	3.423
9.00	3.382
9.25	3.342
9.50	3.304
9.75	3.267
10.00	3.232
12.00	2.989
14.00	2.797
16.00	2.639
18.00	2.507
20.00	2.393
25.00	2.161
30.00	1.980
35.00	1.833
40.00	1.711
45.00	1.608
50.00	1.521
55.00	1.446
60.00	1.380
70.00	1.267
80.00	1.176
90.00	1.098
100.00	1.030
110.00	0.9701
120.00	0.9166
130.00	0.8684
140.00	0.8246
150.00	0.7845
160.00	0.7478
170.00	0.7141
180.00	0.6831

ATTACHMENT 2
Millstone Unit 2 RCS Heatup Calculations
(Page 5 of 5)

Table 2
Water Level Multiplier, MULT2

NOTE: When using this table, the more conservative value should be used, so interpolation is not necessary (i.e., when the refuel pool is filled 3.5' above the flange, use the 3' above the flange correction factor).

NOTE: NOTE: For Initial Draindown use “RCS Filled” condition (MULT2=2.529) until L-112 indicates 78" above centerline of hot leg (at the reactor vessel flange). The reactor vessel upper plenum and the steam generator U-tubes are not voided until this level is reached. After this level is reached, use MULT2 based on the RCS level above the mid loop reference point.

Water Level Relative to RV Flange (ft)	Water Level Relative to Sea Level (ft)	Comments	Time to Boil Multiplier MULT 2	Pzr Level Cold Cal LI-103 (%)	RCS Wide Range LI-112 (inches)	RCS Narrow Range LI-122 (inches)
24	36.5		16.717	63.3		
23	35.5	T.S. 3.9.11 Level	15.189	60.0		
22	34.5		13.764	56.7		
21	33.5		12.439	53.3		
20	32.5		11.210	50.0		
19	31.5		10.074	46.7		
18	30.5		9.027	43.3		
17	29.5		8.065	40.0		
16	28.5		7.184	36.7		
15	27.5		6.382	33.3		
14	26.5		5.654	30.0		
13	25.5		4.996	26.7		
12	24.5		4.407	23.3		
11	23.5		3.880	20.0		
10	22.5		3.414	16.7		
9	21.5		3.003	13.3		
8	20.5		2.646	10.0		
7.64	20.1	RCS Filled (SG U-tubes full)	2.529	8.8		
7	19.5		2.338	6.7		
6	18.5		2.075	3.3		
5	17.5		1.853	0.0		
4	16.5		1.670			
3	15.5		1.522			
2	14.5		1.405			
1	13.5		1.315		90	
0	12.5	RV Flange	1.248		78	
-1	11.5		1.210		66	
-2	10.5		1.172		54	
-3	9.5	RIO	1.134		42	
-4	8.5		1.095		30	
-5	7.5		1.057		18	18
-6	6.5		1.019		6	6
-6.5	6.0	Mid-loop (Centerline Hot Leg)	1.000		0	0

ATTACHMENT 3

Millstone Unit 2 SFP Heatup Calculations

(Page 1 of 3)

SFP Time to 150°F

NOTE: If either of the conditions are met, RE-G-16 applies and the Time to 150°F is "N/A":

- No fresh fuel assemblies have been transferred to the SFP.
- Core reload is complete.

Instructions:

1. IF NO fuel assemblies have been transferred to the SFP OR core reload is complete, go to SFP Time to 200°F.
2. Record time after reactor shutdown (in days), and current SFP temperature (ºF).
3. Record SFP Heatup Rate from Table 1 based on SFP Offload Condition.
4. Calculate and record SFP Time to 150ºF
5. Sign Performed by (STA or Licensed Operator).
6. Obtain Independent Check (SRO).

Calculation:
SFP Time to 150°F = {(150°F - SFP Temperature (°F)) / SFP Heatup Rate (°F/hour)}

Date/Time	Time From Shutdown (Days)	SFP Temperature (°F)	SFP Heatup Rate (°F/hour)	SFP Time to 150°F	Performed by	Checked by

ATTACHMENT 3

Millstone Unit 2 SFP Heatup Calculations

(Page 2 of 3)

SFP Time to 200°F

Instructions:

1. Record time after reactor shutdown (in days), and current SFP temperature (ºF).
2. IF NO fresh fuel assemblies have been transferred to the SFP, using RE-G-16, determine the Time to 200°F and record SFP heatup Time to 200°F.
3. IF core reload is complete, using RE-G-16, determine the Time to 200°F and record SFP heatup Time to 200°F.
4. IF fresh fuel assemblies have been transferred to the SFP AND core reload is NOT complete, perform the following:
   - a. Record SFP Heatup Rate from Table 1 based on SFP Offload Condition.
   - b. Calculate and record SFP Time to 150ºF.
5. Sign Performed by (STA or Licensed Operator).
6. Obtain Independent Check (SRO).

Calculation:

SFP Time to 200°F = {(200°F - SFP Temperature (°F)) / SFP Heatup Rate (°F/hour)}

Date/Time	Time From Shutdown (Days)	SFP Temperature (°F)	SFP Heatup Rate (°F/hour)	SFP Time to 200°F	Performed by	Checked by

Dominion

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

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Section 1

Protected Train A ☑ / **B** ☐ *(Check one or both)* ☐ with exception

Date/Time Performed: Today / 0000

☐ Actual Conditions

☑ Predicted Conditions for reduced inventory

Date/Time of Shutdown: 3 DAYS AGO 0000

Days Shutdown: 3

Reason for Shutdown Safety Assessment: Configuration Change

(00:00 hour, mode change, configuration changes)

Section 2 Heatup Data

Time To Core Boil

☑ Bubble does not exist in pressurizer AND fuel is in the vessel, THEN complete the following:

- RCS Temp: 105 °F
- RCS Level: -3 feet above flange
- RCS Time to Boil: 12.77 mins

☐ **NA if DEFUELED**

Time to 200°F (EA2 criterion): 11.34 mins

☐ **NA if DEFUELED**

Time to Heatup 10°F (EU1 criterion, uncontrolled heatup): 2.15 mins

☐ **NA if DEFUELED**

RBCCW HX Outlet Temp: 80 °F

Refuel Boron C_b per TS: 2100 ppm

RCS Boron C_b: 2200 ppm

SFP Boron C_b: 2200 ppm

Spent Fuel Pool Heatup Time

- SFP Temp: 95 °F
- SFP Level: 36 feet 10 inches
- SFP Time to 150°F

  ☑ NA if NO freshly discharged fuel assemblies transferred to SFP or fuel assemblies are reloaded into reactor vessel

  or

  _____ hrs _____ mins
- SFP Time to 200°F 23 hrs 10 mins

Shutdown Risk Color is:
☐ GREEN
☑ YELLOW
☐ ORANGE
☐ RED

Limiting Safety Function
☑ RCS or ☐ SFP Decay Heat Removal
☐ RCS or ☐ SFP Inventory Control
☐ Reactivity Control
☐ Containment
☐ Power Availability

SDC Responder phone: x4335

Comments: ____________________

Section 3 Decay Heat Removal

RCS Decay Heat Removal

Check boxes for available equipment	Point Value	Score
☑ 'A' SDC with associated RBCCW and SW pump	(1)	1
☑ 'B' SDC with associated RBCCW and SW pump	(1)	1
☐ 'A' CS with associated RBCCW and SW pump[3]	(1)	
☐ 'B' CS with associated RBCCW and SW pump[3]	(1)	
☐ Both SGs[1]	(1)	
☐ Refuel Pool ≥ 35'6"[4] or Notes [2][4]	(1)	
Reduced Inventory Operation (RIO) Penalty	(-1)	

Total	Condition
	(Circle)
0	RED
1	ORANGE
[✓ 2]	[✓ YELLOW]
3	GREEN

RCS Decay Heat Removal Total 2

NA if DEFUELED

Required Equipment *(minimum)*: *(Check)*

☐ If only one train of SDC available ensure: A ☐ B ☐
  ☐ Associated train EDG available A ☐ B ☐
  ☐ One U2 controlled offsite power source associated with available SDC train RSST ☐ NSST ☐

☑ During Reduced Inventory Operation (RIO) ensure:
  ☑ Both trains of SDC available with one train in service that is energized from a bus powered from an offsite source Yes ☑ No ☐ Required Equipment NOT met RED

AND

  ☑ One RBCCW pump powered from independent power supplies for each credited SDC train A ☑ B ☐ C ☑

AND

  ☑ One SW pump powered from independent power supplies for each credited SDC train A ☑ B ☐ C ☑

---

[1] Maintain all of the following satisfied to ensure two steam generators available and proper RCS conditions are established to support natural circulation:

- Both available SG NR levels greater than 10%
- Capability to feed available SGs with a MD AFW pump
- Capability to release steam from available SGs
- RCS loops associated with the available SGs; filled and unisolated
- Pressurizer pressure ≥ 50 psia AND a steam bubble is established in the pressurizer

[2] When refuel pool level is reduced to 31'6" to lift and set the UGS.

[3] CS can be credited to backup LPSI for DHR in MODES 6 and Defueled per calculation ENG-04223M2, Rev. 0, Addendum 9. If CS is placed in service, no Core Alterations are allowed per Tech Specs.

[4] In Modes 5 and 6, IF RCS is vented AND Refuel Pool is less than full (< 35′6″), an Operator must be stationed in the vicinity of the SW/Fire Water Supply valves to the EDG to be ready to take action to shift cooling water to Fire Water if directed by the SM.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

Section 3 Decay Heat Removal (Continued)

BEYOND DESIGN BASIS

Mode 5:

NA for Mode 0

Steam Generator available for Decay Heat Removal:

☐ 1 ☐ 2

AC Independent Aux Feedwater Pump:

☐ TDAFW Pump ☑ BDB AFW Pump

OR

☑ Pressurizer Vent Port Removed

☐ BDB AFW Pump Available for RCS Injection

Mode 6:

☐ BDB AFW Pump pre-staged for injection into the RCS

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

Section 3 Decay Heat Removal (Continued)

SFP Decay Heat Removal

	Point Value	Score
☑ SFP level ≥ 35'6"	(1)	1
☑ 'A' SFPC pump & HX with SFP level ≥ 36'4" ***	(0,½, 1)*	1
☑ 'B' SFPC pump & HX with SFP level ≥ 36'4" ***	(0, ½, 1)*	1
☐ 'A' LPSI pump and SFP level ≥ 36'10" ***	(1)	
☐ 'B' LPSI pump and SFP level ≥ 36'10" ***	(1)	
☐ 'A' CS pump and SFP level ≥ 36'10" ***	(1)**	
☐ 'B' CS pump and SFP level ≥ 36'10" ***	(1)**	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥ 3]	[✓ GREEN]

SFP Decay Heat Removal Total 3

*Count each available SFPC pump as 1 point prior to fuel movement. With ≤ 80 fuel assemblies transferred to the SFP, each available SFPC pump should be counted as ½ point. With > 80 fuel assemblies transferred to the SFP, each available SFPC pump should be counted as 0 points unless a cycle specific analysis demonstrates both SFPC pumps are one viable source of decay heat removal (i.e., each SFPC pump should be counted as ½ point). For 2R23, Calculation ENG-04223M2, Rev. 0, Addendum 9, demonstrates that both SFPC pumps together can be credited as one viable means of SFPC provided the reactor has been shutdown ≥ 8.3 days and RBCCW temperature is maintained at < 80° F. Following the core reload, each available SFPC pump should be counted as 1 point if requirements of TRM 3.9.3.3 are met. For 2R23, PM-1701, Rev. 0, demonstrates that TRM 3.9.3.3 will be met at ≥ 17 days following shutdown, since 85 fuel assemblies will be discharged during 2R23.

** A cycle specific analysis is required for counting each available CS pump as 1 point for SFPC. For 2R23, Calculation ENG-04223M2, Rev 0, Addendum 9, supports each CS pump being counted as 1 point provided that fuel movement begins ≥ 150 hours and RBCCW temperature is maintained at < 80° F. The UHS must be <70°F, with excursions allowed for <3 hours, if the moving average is <70°F.

***≥ 36'10" if two SFP cooling pumps are operating or EITHER LPSI or CS supplying SFP cooling independent of Shutdown Cooling. Level restriction is not applicable if SFP is cooled via Shutdown Cooling with 2-RW-280 open, since SDC suction is via the hot leg and 2-SI-651 and 2-SI-652.

Required Equipment *(minimum)*: *(Check)*

☑ One RBCCW pump	A ☑	B ☐	C ☑	Required Equipment NOT met	RED
☑ One SW pump	A ☑	B ☐	C ☑		
☑ One RBCCW heat exchanger	A ☑	B ☐	C ☑		
☑ One SFPC or ☐ SDC heat exchanger	A SFPC HX ☑ A SDC HX ☐	B SFPC HX ☑ B SDC HX ☐			

NOTE: To maintain defense in depth for SFP cooling after the 81st fuel assembly is in the SFP during offload, additional equipment is required. TRM 3.9.3.3b requirements will be met for the 85 fuel assemblies discharged for Cycle 24 ≥ 17 days shutdown and core reload is complete.

Fuel Offload (81 to 217 Fuel Assemblies) Required Equipment *(minimum, until reload complete)*: *(Check)*

☐ Two RBCCW pumps	A ☐	B ☐	C ☐	Required Equipment NOT met	ORANGE
☐ Two SW pumps	A ☐	B ☐	C ☐		
☐ One RBCCW heat exchanger	A ☐	B ☐	C ☐		
☐ Either of the following:					
☐ Two SFPC heat exchangers	A ☐	B ☐			
☐ One SDC heat exchanger	A ☐	B ☐			

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

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Section 4 Inventory Control

RCS Inventory Control

Check boxes for available equipment:	Point Value	Score
☑ 'A' HPSI pump	(1)	1
☑ 'B' HPSI pump	(1)	1
☑ 'C' HPSI pump	(1)	1
☑ 'A' Charging pump via ☑ RWST or ☐ BAST[(1,2)]	($^1/_2$, 1)[(3)]	1/2
☑ 'B' Charging pump via ☑ RWST or ☐ BAST[(1,2)]	($^1/_2$, 1)[(3)]	1/2
☐ 'C' Charging pump via ☐ RWST or ☐ BAST[(1,2)]	($^1/_2$, 1)[(3)]	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥3]	[✓ GREEN]

☐ RCS Inventory Control not required if DEFUELED <u>AND</u> RCS isolated from SFP by one of the following:

- ☐ 2-RW-280 CLOSED
  <u>OR</u>
- ☐ West SFP Gate INSTALLED

RCS Inventory Control Total 4

NA if DEFUELED
<u>AND</u>
RCS isolated from SFP

<u>Required during RIO *(minimum)*</u>:

☑ One HPSI pump

Required Equipment NOT met RED

SFP Inventory Control

Check boxes for available equipment:	Point Value	Score
☐ One AFW pump aligned to CST	(1)	
☐ One Refuel Purification pump	(1)	
☐ One PMW pump	(1)	
☐ Makeup available from Fire Protection System (e.g., hoses)	(1)	

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
≥3	GREEN

SFP Inventory Control Total N/A

NA if MODE 5, 6, or Refuel Pool ≥ 36'4"

<u>Requirements for RCS drain down conditions</u>:

☐ SFP Cooling System vent and drain paths, which could affect SFP inventory, are identified and safety tagged *prior to* release of impacting work. Tagout Number: ____________________

☐ Controls are in place to ensure safety tags are in place *during* RCS drain down. Tagout Number: ____________________

---

(1) T.S. 3.1.1.3.b. allows only two charging pumps capable of injecting when RCS is less than 300°F (boron dilution).

(2) RWST ≥ 57,300 gallons (12%) or BAST > 3,750 gallons (65.8%) to be available per TRM 4.1.2.7a and SP 2601F, "Borated Water Sources Verification, MODE 5 or 6."

(3) If ≤ 384 hrs (16 days) since shutdown, at least two Charging pumps with suction from the RWST or BAST and aligned to RCS to be credited as ONE viable makeup source.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

Section 5 Reactivity Control

Reactivity Control while in MODEs 5 or 6

Check boxes for available equipment and conditions:	Point Value	Score
☑ RCS AND SFP boron concentrations greater than required by applicable Tech Specs	(1)	1
☑ Dilution flowpaths identified (procedurally controlled *or* tagged) Tagout Number: 2207X99-0007	(1)	1
☑ Inventory Flow Paths	(0-2)	2
☑ 'A' HPSI pump		
☐ 'B' HPSI pump		
☑ 'C' HPSI pump		
☑ 'A' Charging pump aligned to ☑ RWST or ☐ BAST[1,2]		
☑ 'B' Charging pump aligned to ☑ RWST or ☐ BAST[1,2]		
☐ 'C' Charging pump aligned to ☐ RWST or ☐ BAST[1,2]		
☑ ≥ 2 Source Range Monitor	(1)	1

Total	Condition
	(Circle)
0-2	RED
3	ORANGE
4	YELLOW
[✓ 5]	[✓ GREEN]

RCS Reactivity Control while in MODE 5 or 6 Total 5 **NA if DEFUELED**

Required Equipment *(minimum)*:	A	B	C	D		
	(Check)					
☑ ≥ 2 Source Range Monitors	☑	☑	☑	☑	Required Equipment NOT met	RED
☑ Inventory Flow Paths						
☑ RCS AND SFP Boron concentrations greater than required by applicable Tech Specs						

Reactivity Control while DEFUELED

Check boxes for available equipment and conditions	Point Value	Score
☐ RCS AND SFP boron concentrations greater than required by applicable Tech Specs	(1)	
☐ Dilution flowpaths identified (procedurally controlled or Safety Tagging) Tagout Number: 2207X99-0007	(1)	

Total	Condition
	(Circle)
0	RED
1	YELLOW
2	GREEN

RCS Reactivity Control while DEFUELED Total N/A **NA if in MODE 5 or 6**

---

[1] Only two charging pumps must be capable of injecting based on T.S. 3.1.1.3.b., "Boron Dilution."

[2] RWST ≥ 57,300 gallons (12%) or BAST > 3,750 gallons (65.8%) to be available per TRM 4.1.2.7a and SP 2601F, "Borated Water Sources Verification, MODE 5 or 6."

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

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Section 6 Containment

NOTE: See OP 2264, Attachment 5, Containment Penetration Work Activities Affecting Containment Closure, and Attachment 9, Containment Penetration Tracking Sheet, for status of containment penetrations.

Check boxes that apply for current conditions	Point Value	Score
☑ Containment Closure Capability(1)	(0,2,3)	2
☐ Containment Closure Set (3 points)		
OR		
☑ Containment Closure Set with exceptions tracked and capable of being closed prior to the lesser of:		
☑ Time to Core Boil (2 points)		
OR		
☐ 4 hours (Loss of RCS DHR, TS 3.9.8.1, action c.) (2 points)		
OR		
☐ Containment Closure Set with administrative controls of OP 2209A during fuel movement within the containment building (2 points)		
☐ No significant fuel failures indicated(2)	(1)	
☑ No Core Alterations in progress in Containment(3)	(1)	1
☐ RCS Pressure Boundary intact(4)	(1)	
☐ Low Decay Heat (>8 days shutdown)(5)	(1)	
☑ Decay Heat, Inventory Control, Power Availability Functions **NOT** Orange/Red(6)	(1)	1

Total	Condition
	(Circle)
0	RED
1	ORANGE
2	YELLOW
[✓ ≥ 3]	[✓ GREEN]

Containment Total 4

NA if DEFUELED

---

(1) Closure capability is scored based on all penetrations closed by at least one isolation valve or exceptions tracked and managed in accordance with OP 2264, "Conduct of Outages."

(2) This item is scored a "1" if no significant fuel failures are indicated by radiochemistry sampling. For the purposes of the SDR assessment, identification from radiochemistry samples and confirmation from NAF of significant fuel rod/pin failures is necessary to score this item as "0."

(3) No Core Alterations in progress in Containment is an indicator of the susceptibility to a fuel handling event. This item is scored a "1" if no Core Alterations are in progress or a "0" if Core Alterations are in progress.

(4) This item is scored a "1" if the RCS is intact or a "0" if any RCS opening exists.

(5) After 8 days (from the start of the outage), it is assumed that the short-lived, volatile isotopes that are principally responsible for early health effects have decayed sufficiently such that the event would not contribute to Large Early Release Frequency (LERF).

(6) No Activities are in progress to preclude mitigation to a fuel handling accident. This item is scored a "1" if Decay Heat Removal, Inventory Control, and Power Availability are **NOT** Orange/Red. This item is scored a "0" if Decay Heat Removal, Inventory Control, and Power Availability are Orange/Red.

Section 7 Power Availability

Check boxes for available equipment and conditions:	Point Value	Score
☑ **Power Availability**		
☑ Bus 24E aligned to: ☑ 24C ☐ 24D		
On-site Power Source:		
☑ 'A' EDG with 'A' SW pump *or* 'B' SW pump supplied by the 'A' EDG	(1)	1
☑ 'B' EDG with 'C' SW pump *or* 'B' SW pump supplied by the 'B' EDG	(1)	1
☐ SBO Diesel via 24E (Time to Boil > 60 min)	(1)	
Off-site Power Source:		
☑ Unit 2 RSST	(1)	1
☐ Unit 2 NSST	(1)	
☑ Unit 3 ☑ RSST or ☐ NSST via 34A/B	(1)	1
Power Source Sub-Total		4

Total	**Condition**
	(Circle)
0-1	RED
2	ORANGE
3	YELLOW
[✓ ≥ 4]	[✓ GREEN]

Required Equipment:

☑ One EDG + One Unit 2 Controlled Off-site Source

☑ IF in RIO at least one additional on site power source:
- SBO Diesel and Calculated Time to Boil > 60 minutes
- Additional Unit 2 EDG

Required Equipment NOT met	RED

Off-Site GRID Risk Penalty Factor

Environmental Conditions(1)

☐ Avg sustained wind speed ≥ 75 mph ______

☐ Salt contamination buildup or arcing in the 345 kV switchyard

OR

Switchyard Activities(1)

☐ Trip Testing affecting more than one 345 kV line ______

☐ Two 345 kV lines out of service

OR

ISO-NE/CONVEX Alerts(1)

☐ Abnormal transmission network conditions with potential for loss of grid ______

OR

Planned Maintenance or Projects(2)

☐ ______________________ ______

SUBTRACT from Power Sub-Total(1) - (   ) Penalty

Power Availability Total 4

---

(1) Apply offsite power source sub-total

(2) If 345 kV or main transformer switchyard work is in progress which jeopardizes off-site sources, then deduct points equivalent to the number of offsite sources that could be affected.

Millstone Unit 2 Shutdown Safety Assessment (SSA) Checklist

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Assessment Completion		
Conflicts between the availability reflected in the outage schedule and this checklist have been brought to the attention of the SM.	Conflicts? YES ☐ / NO ☒	Initial RO
Remarks:		
Shutdown Safety Assessment (SSA) Checklist Performed By:	Reactor Operator Signature (Licensed Operator or STA)	
SSA Equipment Status Board(s) / PPC Programs Updated.	RO Initials	
OMOC and Maintenance Rule Coordinator Notifications made for *unplanned* RED or ORANGE.	N/A Initials	
CR written to address unplanned entries into RED or ORANGE conditions	CR Number: N/A	
The SSA Checklist items have been reviewed and the Protected Equipment signs are in place based on SSA.	Shift Technical Advisor Signature (Licensed Operator or STA)	
Shift Manager Review	Signature	
Completed SSA Checklist maintained with the Shift Turnover Report.	Initials	

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 1 of 5)

RCS Time to Boil Calculation

> **NOTE:** RCS temperature should be obtained from RCS to SDC temperature, T-351X. Otherwise unheated junction thermocouples or CETs may be used (if either is available). If RCS temperature is expected to increase, an RCS temperature of up to 5°F greater than the current RCS temperature can be used to bound expected conditions.

Instructions:

1. Record time after reactor shutdown (in days), current RCS temperature (ºF) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 (“RCS Filled” condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to Boil.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

RCS Time to Boil Calculation:

RCS Time to Boil = MULT1 x MULT2 x {(212°F - RCS Temperature (°F)) / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Temperature (°F)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to Boil	Performed by	Checked by
Now/0000	1	105	11	7.5	1.0	2.529	36	RO	STA
+3 days/0000	3	105	-3	5.271	1.0	1.134	12.77	RO	STA

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 2 of 5)

RCS Time to 200°F

NOTE: RCS temperature should be obtained from RCS to SDC temperature, T-351X. Otherwise unheated junction thermocouples or CETs may be used (if either is available).

NOTE: This calculation is performed to determine the time to reach EAL EA2, Inability to Maintain Cold Shutdown, MODEs 5 and 6, after a loss of cooling event.

Instructions:

1. Record time after reactor shutdown (in days), current RCS temperature (ºF) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 ("RCS Filled" condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to 200°F.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

RCS Time to 200°F Calculation:

RCS Time to 200°F = MULT1 x MULT2 x {(200°F - RCS Temperature (°F)) / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Temperature (°F)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to 200°F	Performed by	Checked by
Now/0000	1	105	11	7.5	1.0	2.529	32	RO	STA
+3 days/0000	3	105	-3	5.271	1.0	1.134	11.34	RO	STA

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 3 of 5)

Time to Heatup 10°F

NOTE: This calculation is performed to determine the time to reach EAL EU1, Loss of Cold Shutdown Function, MODEs 5 and 6, after a loss of cooling event.

Instructions:

1. Record time after reactor shutdown (in days) and RCS Water Level (Feet from reactor vessel flange).
2. Record RCS Heatup Rate from Table 1.
3. Determine Core Condition Multiplier, MULT1 using one of the following and Record below:
   - Before Core Offload = 1.000
   - Before Fuel Shuffle Complete = 1.000
   - After start of Core Reload = 1.182
   - After completion of Fuel Shuffle = 1.182
4. Determine Water Level Multiplier, MULT2, using one of the following and record below:
   - IF reactor vessel level is > 78 inches above Hot Leg centerline AND steam generator U-tubes are NOT voided, MULT2 = 2.529 ("RCS Filled" condition at 7.64 feet); otherwise use MULT2 consistent with RCS level above mid loop reference point from Table 2.
   - IF reactor vessel level has been raised to support Refueling Operations, use MULT2 consistent with RCS level above mid loop reference point from Table 2.
5. Calculate and record RCS Time to Heatup 10°F.
6. Sign Performed by (STA or Licensed Operator).
7. Obtain Independent Check (SRO).

Time to Heatup 10°F Calculation:

RCS Time to Heatup 10°F = MULT1 x MULT2 x {10°F / RCS Heatup Rate (°F/min)}

Date/Time	Time From Shutdown (Days)	RCS Level (ft)	RCS Heatup Rate (°F/min)	MULT1 1.000 *or* 1.182	MULT2	RCS Time to Heatup 10°F	Performed by	Checked by
Now/0000	1	11	7.5	1.0	2.529	3.4 mins	RO	STA
+3days/0000	3	-3	5.271	1.0	1.134	2.15 mins	RO	STA

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

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Table 1

RCS Heatup Rates

NOTE: When using this table, the more conservative value should be used, so interpolation is not necessary (i.e., on the 23rd day shutdown, use day 20 heatup rate).

Time Following Shutdown (days)	Heatup Rate (F/min)
0.25	10.96
0.50	9.101
0.75	8.140
1.00	7.500
1.25	7.022
1.50	6.642
1.75	6.332
2.00	6.062
2.25	5.829
2.50	5.622
2.75	5.437
3.00	5.271
3.25	5.119
3.50	4.980
3.75	4.852
4.00	4.734
4.25	4.623
4.50	4.520
4.75	4.424
5.00	4.334
5.25	4.249
5.50	4.169
5.75	4.094
6.00	4.022
6.25	3.954
6.50	3.889
6.75	3.827
7.00	3.768
7.25	3.712
7.50	3.659
7.75	3.608
8.00	3.559
8.25	3.512
8.50	3.467
8.75	3.423
9.00	3.382
9.25	3.342
9.50	3.304
9.75	3.267
10.00	3.232
12.00	2.989
14.00	2.797
16.00	2.639
18.00	2.507
20.00	2.393
25.00	2.161
30.00	1.980
35.00	1.833
40.00	1.711
45.00	1.608
50.00	1.521
55.00	1.446
60.00	1.380
70.00	1.267
80.00	1.176
90.00	1.098
100.00	1.030
110.00	0.9701
120.00	0.9166
130.00	0.8684
140.00	0.8246
150.00	0.7845
160.00	0.7478
170.00	0.7141
180.00	0.6831

ATTACHMENT 2

Millstone Unit 2 RCS Heatup Calculations

(Page 5 of 5)

Table 2

Water Level Multiplier, MULT2

NOTE: When using this table, the more conservative value should be used, so interpolation is not necessary (i.e., when the refuel pool is filled 3.5' above the flange, use the 3' above the flange correction factor).

NOTE: NOTE: For Initial Draindown use “RCS Filled” condition (MULT2=2.529) until L-112 indicates 78" above centerline of hot leg (at the reactor vessel flange). The reactor vessel upper plenum and the steam generator U-tubes are not voided until this level is reached. After this level is reached, use MULT2 based on the RCS level above the mid loop reference point.

Water Level Relative to RV Flange (ft)	Water Level Relative to Sea Level (ft)	Comments	Time to Boil Multiplier MULT 2	Pzr Level Cold Cal LI-103 (%)	RCS Wide Range LI-112 (inches)	RCS Narrow Range LI-122 (inches)
24	36.5		16.717	63.3		
23	35.5	T.S. 3.9.11 Level	15.189	60.0		
22	34.5		13.764	56.7		
21	33.5		12.439	53.3		
20	32.5		11.210	50.0		
19	31.5		10.074	46.7		
18	30.5		9.027	43.3		
17	29.5		8.065	40.0		
16	28.5		7.184	36.7		
15	27.5		6.382	33.3		
14	26.5		5.654	30.0		
13	25.5		4.996	26.7		
12	24.5		4.407	23.3		
11	23.5		3.880	20.0		
10	22.5		3.414	16.7		
9	21.5		3.003	13.3		
8	20.5		2.646	10.0		
7.64	20.1	RCS Filled (SG U-tubes full)	2.529	8.8		
7	19.5		2.338	6.7		
6	18.5		2.075	3.3		
5	17.5		1.853	0.0		
4	16.5		1.670			
3	15.5		1.522			
2	14.5		1.405			
1	13.5		1.315		90	
0	12.5	RV Flange	1.248		78	
-1	11.5		1.210		66	
-2	10.5		1.172		54	
-3	9.5	RIO	1.134		42	
-4	8.5		1.095		30	
-5	7.5		1.057		18	18
-6	6.5		1.019		6	6
-6.5	6.0	Mid-loop (Centerline Hot Leg)	1.000		0	0

ATTACHMENT 3

Millstone Unit 2 SFP Heatup Calculations

(Page 1 of 3)

SFP Time to 150°F

NOTE: If either of the conditions are met, RE-G-16 applies and the Time to 150°F is "N/A":

- No fresh fuel assemblies have been transferred to the SFP.
- Core reload is complete.

Instructions:

1. IF NO fuel assemblies have been transferred to the SFP OR core reload is complete, go to SFP Time to 200°F.
2. Record time after reactor shutdown (in days), and current SFP temperature (ºF).
3. Record SFP Heatup Rate from Table 1 based on SFP Offload Condition.
4. Calculate and record SFP Time to 150ºF
5. Sign Performed by (STA or Licensed Operator).
6. Obtain Independent Check (SRO).

Calculation:

SFP Time to 150°F = {(150°F - SFP Temperature (°F)) / SFP Heatup Rate (°F/hour)}

Date/Time	Time From Shutdown (Days)	SFP Temperature (°F)	SFP Heatup Rate (°F/hour)	SFP Time to 150°F	Performed by	Checked by

ATTACHMENT 3

Millstone Unit 2 SFP Heatup Calculations

(Page 2 of 3)

SFP Time to 200°F

Instructions:

1. Record time after reactor shutdown (in days), and current SFP temperature (ºF).
2. IF NO fresh fuel assemblies have been transferred to the SFP, using RE-G-16, determine the Time to 200°F and record SFP heatup Time to 200°F.
3. IF core reload is complete, using RE-G-16, determine the Time to 200°F and record SFP heatup Time to 200°F.
4. IF fresh fuel assemblies have been transferred to the SFP AND core reload is NOT complete, perform the following:
   a. Record SFP Heatup Rate from Table 1 based on SFP Offload Condition.
   b. Calculate and record SFP Time to 150ºF.
5. Sign Performed by (STA or Licensed Operator).
6. Obtain Independent Check (SRO).

Calculation:

SFP Time to 200°F = {(200°F - SFP Temperature (°F)) / SFP Heatup Rate (°F/hour)}

Date/Time	Time From Shutdown (Days)	SFP Temperature (°F)	SFP Heatup Rate (°F/hour)	SFP Time to 200°F	Performed by	Checked by

Attachment 2
Personnel Designated for Containment Closure

(Sheet 1 of 1)

Date and Time: +2 Days 0000

Department: Maintenance

Beeper No.	Individual Assigned	Hours Available	Assigned Penetration (Penetration Name & No.)
x4576	Scott Getman	1800-0600	#48

Operations personnel required? ☐ Yes ☑ No

Approved and sent to Operations: Guy Blackburn

Applicable Department Manager or designee

Note: Operations Department's retention of this Attachment is only required until *ALL* associated work has been completed or until a new Attachment is provided containing any on–going work previously listed and any new work to be started.

Attachment 3
Closure Plan for Containment Penetration Work Activities
(Sheet 1 of 1)

WO #(s) or Procedure #(s): 53102126453

Penetration #: 48

Penetration Name: Pressure Test Boundary Spare

Penetration Location:

Closure Plan: Re-bolt flange after removing temporary instrumentation

Estimated Time to Establish Containment Closure (min): 30 minutes

Prepared By: Scott Getman Department: Maintenance
Job Supervisor

Approved By: Gerry Baker
Shift Manager/OCC Shift Manager

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: **Radiological Assessment and Task Supervision**

JPM Number: JPM-296-R-SRO Revision: 1

Initiated:

David Jacobs 06/02/2016

Developer Date

Reviewed:

Robert L. Cimmino, Jr. 07/06/2016

Technical Reviewer Date

Approved:

Supervisor, Nuclear Training Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
12/07/10	Created JPM for LOIT 2011 NRC Exam	0/0
06/02/2016	Revised and modified for ILT 2016 NRC Exam	1/0

JPM WORKSHEET

Facility: **MP2** Examinee: ____________

JPM Number: **JPM-296-R-SRO** Revision: **1**

Task Title: **Radiological Assessment and Task Supervision**

System: Radiation Control 2.3

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 20

Task Number(s): ____________

Applicable To: SRO **X** STA ____ RO ____ PEO ____

K/A Number: 2.3.4 K/A Rating: 3.3 / 3.7

Method of Testing: Simulated Performance: ____ Actual Performance: ____

Location: Classroom: X Simulator: ____ In-Plant: ____

Task Standards: At the completion of this JPM, the SRO should analyze the given conditions and designate which PEO should perform each of the two specified tasks, based on the radiological concerns of each.

Required Materials: (procedures, equipment, etc.)
- RPM 5.2.2 Basic Radiation Worker Responsibilities

General References:
- RPM 5.2.2 Basic Radiation Worker Responsibilities
- MP-PROC-EP-MP-26-EPI-FAP09[r004] Radiation Exposure Controls

***** READ TO THE EXAMINEE *****

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-296-R-SRO** Revision : **1**

Initial Conditions: You are the Unit Supervisor currently mitigating a medium size LOCA and directing steps in EOP 2532 with the following conditions:

- Shift Manager has declared an SITE AREA CHARLIE 2
- 2-RB-30.1A has failed to Close remotely
- RBCCW Surge Tank is slowly Rising
- PEO #1 current year to date exposure is 875 millirem
- PEO #2 current year to date exposure is 203 millirem
- PEO #1 can restore the charging pump in 44 minutes
- PEO #2 can restore the charging pump in 50 minutes
- PEO #1 can manually close RB MOV in 18 minutes
- PEO #2 can manually close RB MOV in 20 minutes

Task #1 restore the "B" charging pump with general area dose rate of 5 rem/hr.

Task #2 manually close MOV 2-RB-30.1A "RBCCW CTMT ISOL HDR A SPLY" with general area dose rate of 12 rem/hr.

Initiating Cues: Determine the allowable Exposure for PEO #1 and PEO #2 for the given event.

Determine the dose each PEO will receive for each task.

Determine which PEO will perform the individual tasks based on the Radiological requirements for the PEOs.

Simulator Requirements: N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-296-R-SRO** Revision: **1**

Task Title: **Radiological Assessment and Task Supervision**

START TIME: __________

<table>
<tr><td rowspan="3">STEP #1</td><td>Performance:
Review the Initial Conditions and Initiating Cue.
Using Emergency Exposure Control Guidance limits and the expected exposure rate in the area, calculate the maximum dose available for each PEO.</td><td>Standard:
Using Emergency Exposure Control Guidance at an ALERT level and higher classification dose limits are automatically extended to 4.5 Rem minus their current dose.
• PEO #1 = 4.5R – 0.875R = 3.625R
• PEO #2 = 4.5R – 0.203R = 4.297R</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP #2</td><td>Performance:
Determine the expected Dose each PEO will receive for the stated task, the dose rates and times required to accomplish the tasks.</td><td>Standard:
• PEO #1 task #1 = 3.667R
• PEO #1 task #2 = 3.600R
• PEO #2 task #1 = 4.167R
• PEO #2 task #2 = 4.000R</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP #3</td><td>Performance:
Based on available Dose, decide which PEO must perform each task.</td><td>Standard:
• PEO #1 task #2 = 3.600R
• PEO #2 task #1 = 4.167R</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-296-R-SRO** Revision: **1**

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**20**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-296-R-SRO** Revision: **1**

Initial Conditions: You are the Unit Supervisor currently mitigating a medium size LOCA and directing steps in EOP 2532 with the following conditions:

- Shift Manager has declared an SITE AREA CHARLIE 2
- 2-RB-30.1A has failed to Close remotely
- RBCCW Surge Tank is slowly Rising
- PEO #1 current year to date exposure is 875 millirem
- PEO #2 current year to date exposure is 203 millirem
- PEO #1 can restore the charging pump in 44 minutes
- PEO #2 can restore the charging pump in 50 minutes
- PEO #1 can manually close RB MOV in 18 minutes
- PEO #2 can manually close RB MOV in 20 minutes

Task #1 restore the "B" charging pump with general area dose rate of 5 rem/hr.

Task #2 manually close MOV 2-RB-30.1A "RBCCW CTMT ISOL HDR A SPLY" with general area dose rate of 12 rem/hr.

Initiating Cues:

Determine the allowable Exposure for PEO #1 and PEO #2 for the given event.

Determine the dose each PEO will receive for each task.

Determine which PEO will perform the individual tasks based on the Radiological requirements for the PEOs.

	Exposure Limit	Task #1 Dose	Task #2 Dose	Task to perform
PEO #1				
PEO #2				

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: AEAS Broken Boundary Door

JPM Number: JPM-297-R-SRO

Revision: 0

Initiated:

David Jacobs — 06/01/2016

Developer — Date

Reviewed:

Robert L. Cimmino, Jr. — 07/12/2016

Technical Reviewer — Date

Approved:

Supervisor, Nuclear Training — Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
06/01/2016	Modified from JPM-218 for 2016 ILT NRC Exam	0

JPM WORKSHEET

Facility: **MP2** Examinee: __________

JPM Number: **JPM-297-R-SRO** Revision: **0**

Task Title: **AEAS Broken Boundary Door**

System: Conduct of Operations / Fuel Handling

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 25

Task Number(s): 119-01-086

Applicable To: SRO X STA ____ RO ____ PEO ____

K/A Number: 2.1.42 K/A Rating: 2.5 / 3.4

Method of Testing: Simulated Performance: ____ Actual Performance: X

Location: Classroom: X Simulator: ____ In-Plant: ____

Task Standards: At the completion of this JPM, examinee will have determined the type of door affected and state the required actions for suspending fuel movement.

Required Materials: (procedures, equipment, etc.)	MP-PROC-OPS-OP 2356[r004.00]	Doors
	MP-PROC-OPS-OPS-FH 216[r006.00]	Spent Fuel Handling Operations
General References:	MP-PROC-OPS-OP 2356[r004.00]	Doors
	MP-PROC-OPS-OPS-FH 216[r006.00]	Spent Fuel Handling Operations

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-297-R-SRO** Revision : **0**

Initial Conditions: You are currently on watch as the Control Room Unit Supervisor during a refueling outage that's in its 10th day with a Core Offload in progress.

Initiating Cues: The Aux Building Watch reports that Door 205-14-007 Double Door Access From Aux. bldg. to Railway Access has been knocked off its hinges and will not close.

Record any procedural actions required to respond to the Aux Building Watch's report.

Simulator Requirements: N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-297-R-SRO** Revision: **0**

Task Title: **AEAS Broken Boundary Door**

START TIME: ________

STEP #1	Performance: Examinee refers to OP 2356 Doors: Section 4.1 Door Class Determination: 4.1.1 WHEN any Unit 2 Door is, or will be, *not* OPERABLE, or *not* FUNCTIONAL, PERFORM the following: a. OBTAIN the following information for each affected door: • Door ID number and location • Nature of inoperability (blocked open, does *not* latch, etc.) • If door is being blocked open, AWO/clearance number/activity • If known, expected duration of inoperability b. SUBMIT a CR.	Standard: Examinee determines the following: ID Door 205-14-007 AB 14’ 6” RR Access Not Operable does not Latch Submits a CR	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #2	4.1.2 Refer To Attachment 1, “Unit 2 Door Attributes,” and DETERMINE whether affected door is classified as *any* of the following: • Spent Fuel Pool Ventilation Boundary	Standard: Examinee refers OP 2356 Doors Attachment 1 page 7 of 15 and notes the following Attributes: • Non TRM Fire Door • SFP Ventilation Boundary (AEAS)	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-297-R-SRO** Revision: **0**

Task Title: **AEAS Broken Boundary Door**

STEP #3	Performance: Examinee refers to OP 2356 Doors: Section 4.7 Spent Fuel Pool Ventilation Boundary (AEAS) (A): 4.7.1 IF a SFP boundary door *cannot* be closed and latched, PERFORM the following: a. SUBMIT a CR. b. DEVELOP a closure plan and TRACK as specified in OPS-FH 216 section “Maintaining SFP Boundary Integrity,” until door is repaired.	Standard: Examinee determines the following for the Door: • Will not latch • CR is submitted • Refers to OPS-FH 216 section 4.10 Maintaining SFP Boundary Integrity	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #4	Performance: Examinee refers to OPS-FH 216 Section 4.10 Maintaining SFP Boundary Integrity 4.10.2 IF an unplanned breach in the SFP area boundary is identified, PERFORM the following: a. STOP any movement of irradiated fuel or Cask operation in the SFP.	Standard: Examinee directs the Stopping of Fuel Movement in the Spent Fuel Pool Ventilation Boundary Area	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-297-R-SRO** Revision: **2**

Date Performed: ____________

Student: ____________________________

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**25**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____________________________

Print / Sign

~~Areas for Improvement / Comments:~~

~~JPM QUESTIONS~~

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-297-R-SRO** Revision: **2**

Initial Conditions: You are currently on watch as the Control Room Unit Supervisor during a refueling outage that's in its 10th day with a Core Offload in progress.

Initiating Cues:

The Aux Building Watch reports that Door 205-14-007 Double Door Access From Aux. bldg. to Railway Access has been knocked off its hinges and will not close.

Record any procedural actions required to respond to the Aux Building Watch's report.

Procedure #	Requirement

MILLSTONE POWER STATION
GENERAL OPERATING PROCEDURE

Doors

OP 2356
Rev. 004

STOP THINK ACT REVIEW

Approval Date: 10/24/15

/Effective Date: 10/28/15

Level of Use
Reference

Millstone Unit 2
General Operating Procedure

Doors

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

1. PURPOSE

1.1 Objective

This procedure provides guidance to on–shift supervision regarding activities involving doors at Unit 1 and Unit 2.

1.2 Discussion

This procedure applies to all activities performed on doors at Unit 1 and Unit 2 that could prevent them from carrying out their intended function. The on–shift supervision is responsible for ensuring the application of this procedure when any activity which causes a door *not* to be able to perform its intended function is in progress.

Site personnel are responsible for ensuring doors are closed and latched after passage to maintain barrier integrity.

Site personnel are responsible for ensuring on–shift supervision is notified of discrepancies found on plant doors and for *not* blocking open doors or performing work on a door unless specific authorization from SM/US is granted.

The SRO in charge of tagging is responsible to the Shift Manager for ensuring the application of this procedure, when an AWO being issued will cause a door *not* to be able to perform its intended function.

Unit 2 Spent Fuel Pool (SFP) boundary (AEAS) doors are required to be closed or capable of closing whenever movement of Irradiated Fuel or Shielded Cask is in progress in the Spent Fuel Pool. The doors may be opened under Administrative Control, as long as they are capable of being closed per an approved closure plan. With the doors *not* OPERABLE or *not* capable of being closed, Irradiated Fuel movement or Shielded Cask movement is restricted.

Unit 2 Control Room Air Conditioning (CRAC) Boundary Doors are required to be shut to maintain the Control Room Ventilation System boundary. These doors minimize air in–leakage into the control room in the event of a control room emergency recirculation system actuation. Special requirements are that the doors do *not* allow excessive air in–leakage during a control room recirculation. Additionally, these doors must meet FPQA requirements. There are operational requirements for these doors when work is performed on them. These special requirements are described in OP 2315A, “Control Room Air Conditioning System.”

Enclosure Building Filtration System Boundary (EBFS) Doors are tied to operating Mode requirements. These doors provide a Technical Specification safety function by maintaining Enclosure Building integrity in the event of an EBFS actuation.

Doors (CRAC/Halon) designed to self close that do *not* provide this capability, must be closed and latched after each passage through the door to maintain barrier integrity. [Ref. 6.1.3]

Functionality of HELB doors is maintained when the door is closed, with the following exception:

> For those doors identified as H(1) or HS(1) in Attachment 1, the HELB functionality is met when the door is *both* closed and latched.

EBFS doors designed to automatically or self close and latch that do *not* provide this capability must be maintained closed and latched by personnel continuously stationed at the affected door to ensure the door is closed and latched after each transit through the door. [Ref. 6.1.1]

Doors designed to automatically close and latch that do *not* provide this capability must be maintained as stated in TRM 3.7.10.1 to ensure the fire barrier integrity following transit through the door. Doors with self−closing devices that do *not* close are considered FUNCTIONAL provided the door is capable of being closed and latched after passage through door to maintain barrier integrity.

Fire doors are required to maintain the functional integrity of TRM penetration fire barriers. These barriers ensure that fires will be confined or adequately retarded from spreading to adjacent portions of the facility. Fire door design features minimize the possibility of a single fire from rapidly involving several fire areas prior to detection and extinguishment. Attributes for TRM fire doors are outlined in C SP 600.25, “Fire Door Inspection.”

When a door has to be blocked open for interference passage, checking the appropriate attachments for notifications and permissions are required prior to blocking the door. Blocking a door open should be done with a method that does *not* use a wedge. Wedging can cause misalignment and seal problems.

The DC Switchgear Room Fan Assemblies (F54A/B) have several HELB inspection panels (HIP) in the associated ductwork. The fan assembly, High Energy Line Break (HELB) inspection panels and associated ductwork act as a HELB barrier, which prevents a harsh environment (Aux Building) from entering a mild environment (DC Switchgear rooms).

These doors are engineered to maintain structural integrity in the event of a HELB. Attachment 3, “Compensatory HELB Opening Time Guidelines,” is a list of doors and hatches in the Auxiliary Building and Turbine Building which serve as compensatory measures for protecting SSE from the environmental effects of a high energy line break or limit the HELB effects to a single train. The allowed outage time on this attachment is *not* to be used as the time a door can be *not* OPERABLE before entering applicable TSAS. The allowed outage time is given as information only to help assess the risk associated with a particular door *not* being OPERABLE.

For HELB boundary doors which open into a potential HELB environment, the doors seat against the door frame such that the loading is uniformly transmitted to the frame and subsequently the door frame bolts. The high pressure in the room caused by a HELB maintains the door closed against the door frame, and the door integrity prevents the door from “blowing open.” For HELB boundary doors which open outward from a potential HELB environment, the hinges and latch(es) are credited to maintain the door in its closed position. For doors within this latter category, a note has been added to the Attachment 1 door description to indicate the reliance on the hinges and latch(es) for these doors.

HELB requirements for these doors can be relaxed during Modes of operation when the high energy line fluid is *not* operating on high energy side of the door. An evaluation would be performed on a case–by–case basis to determine any necessary exemptions. Once the plant has reached Mode 3, “Hot Standby,” the Unit has attained ‘safe shutdown’ for a HELB event on Unit 2. Therefore, HELB constraints do *not* apply in MODEs 4, 5, 6, and DEFUELED.

Two categories of doors which are credited by the HELB program but *not* considered HELB boundary doors (i.e., doors normally relied upon to provide separation between a HELB harsh environment and a mild plant region containing safety related components) are HELB Blowout (HBO) Doors, Hatches, and Panels and HELB Separation (HS) Doors. HBO doors, hatches, and panels have been engineered to blowout at a predetermined pressure to provide an external vent path for relief of HELB−related temperature and pressure effects within plant structures. HS doors are supplemental barriers, which may be temporarily credited with limiting the spread of a HELB related event, within the Enclosure Building from entering the more design limited harsh environmental zones within the Auxiliary Building. HS doors are *not* labeled by the HELB program due to the more stringent requirements placed on these doors as Enclosure Building Filtration System (EBFS) doors governed by TS 3.6.5.2.

All High Energy Line Break Separation (HS) doors are Enclosure Building Filtration System (EBFS) doors, which is their primary function. HS doors are controlled to the same extent as HELB boundary doors during those periods when they are temporarily credited as part of the HELB barrier, in lieu of the normally credited HELB boundary door, that is *not* OPERABLE. (HS doors are *not* locally labeled as HS.)
(See Attachment 1 Category, and Attachment 3).

Radiation gates and doors are controlled by Health Physics and are posted as to the Radiation levels within the room. Control of the keys for these doors is through the Health Physics department for Unit 1 or Unit 2 respectively.

Water flood doors are required to protect MP2 from excessive high waters in the event of a flood. These doors protect the plant from water that would rise as high as 22 feet above normal mean sea level. This door system consists of structural steel angle brackets and ship−lap planks that must be installed in exterior channels.

Water−tight doors provide train separation protection for common mode failure due to internal flooding events. Attachment 4 provides door−specific functions.

2. PREREQUISITES

2.1 General

N/A

2.2 Documents

2.2.1 C SP 600.25, “Fire Door Inspections”

2.2.2 OA 7, “Installation and Maintenance of Signs”

2.2.3 OPS–FH 216, “Spent Fuel Handling Operations”

2.2.4 RP–AA–201, “Access Control for High and Very High Radiation Areas”

2.2.5 TRM 3/4.7.9.4, “Halon Fire Suppression System”

2.2.6 TRM 3/4.7.10, “Penetration Fire Barriers”

2.2.7 TRM 3/4.8.2.1.b, “Electrical Switch Gear Room Ventilation”

2.2.8 T/S LCO 3.6.5.2, “Enclosure Building”

2.2.9 T/S LCO 3.7.6.1, “Control Room Emergency Ventilation Train”

2.2.10 U1–DTRM–06, “Technical Requirements Manual – Fire Protection”

2.2.11 U1–DTRM–07, “Unit 1 SSCs That Interface With Units 2 or 3”

3. PRECAUTIONS

3.1 Blocking a door open can be used with a “Wedge–It”. These devices have been approved by Fire Engineering and the Site Fire Marshall.

4. INSTRUCTIONS

NOTE

1. This section lists necessary actions to be taken when a particular category of door is *not* capable of performing its intended function.
2. Doors may be included in more than one category.

4.1 Door Class Determination

4.1.1 WHEN any Unit 2 Door is, or will be, *not* OPERABLE, or *not* FUNCTIONAL, PERFORM the following:

a. OBTAIN the following information for each affected door:

- Door ID number and location
- Nature of inoperability (blocked open, does *not* latch, etc.)
- If door is being blocked open, AWO/clearance number/activity
- If known, expected duration of inoperability

b. SUBMIT a CR.

4.1.2 Refer To Attachment 1, “Unit 2 Door Attributes,” and DETERMINE whether affected door is classified as *any* of the following:

- TRM Fire Door (TFD)
- Non–TRM Fire Door (NTFD)
- Smoke Boundary Door (S)
- High Energy Line Break Boundary Door (H)
- High Energy Line Break Boundary Door that credits latches/hinges (H_1)
- High Energy Line Break Blowout Door (HBO)
- High Energy Line Break Separation Door (HS)
- High Energy Line Break Inspection Panels (HIP)
- Spent Fuel Pool Ventilation Boundary (AEAS) (A)
- Security Door
- Control Room Air Conditioning Boundary (C)
- Enclosure Building Filtration System Boundary (E)
- Radiation or High Radiation Gate/Door (R)
- Water Tight Door (WTD) or Water Flood Door (WFD)
- Halon Boundary Door (F)

Attachment 1
Unit 2 Door Attributes

(Page 7 of 15)

Door ID	Description	Security ID	TRM ID	Non–TRM Fire	Category (see below)
AUXILIARY / ENCLOSURE BUILDING (cont.)					
205–(–5)–005	Gate For Boric Acid Evap Pump Area				R
205–(–5)–006	Gate For VCT				R
205–(–5)–007	Gate For Letdown Heat Exchanger				R
205–(–5)–008	Stairwell Access on North Wall		A–(–)5–2		TFD
205–(–5)–009	West Piping Penetration Room Access		A–(–)5–13		TFD, E, R, HS
NA	Removable Hatch Cover at Elev. 14'6" (Column lines H–2 and 18–1)				
205–14–001	Enclosure MCC B61		205–14–001		TFD, H
205–14–002	North Stairwell Access		A–14–8		TFD
205–14–003	West Electrical Penetration Room		A–14–11		TFD, E, HS
205–14–004	Gate for SFP Skimmer Pumps				R
205–14–005	Outer Access to East Electrical Penetration Room				E
205–14–006	Inner Access to East Electrical Penetration Room		205–14–006		TFD, E, HS
205–14–007	Double Door Access From Aux. bldg. to Railway Access			205–14–007	NTFD, A
205–14–008	West access to A Emergency Diesel Generator Room	294	A–14–2		TFD, H, A
205–14–009	A D/G Access to Outside	205			
205–14–009A	Outer Security Gate to D/G Room				
205–14–010	A D/G Flood Door				WFD

A – SFP Ventilation Boundary (AEAS)
C – Control Room A/C Boundary
E – EBFS Boundary
F – Halon Door
H – HELB Boundary
H(1)/HS(1) – HELB/SEP Door credits latches/hinges
HBO – HELB Blowout Door
HS/HIP – HELB Separation/Inspection Panel
R – Radiation Boundary Gate/Door
S – Smoke Boundary
TFD–TRM Fire Door
NTFD–Non-TRM Fire Door
WTD – Water Tight Door
WFD – Water Flood Door

4.1.3 WHEN any Unit 1 Door is, or will be, *not* FUNCTIONAL Refer To Attachment 2, "Unit 1 Door Attributes," and DETERMINE whether affected door is classified as *any* of the following:

- DTRM Fire Door
- Non−DTRM Fire Door
- Radiation Door
- Security Door
- Smoke Boundary Door

4.1.4 IF affected door does *not* fall within any of the above classifications OR is *not* listed, EXIT procedure.

4.1.5 Refer To appropriate Section(s), as needed and PERFORM the actions required for each applicable classification.

NOTE

Emergent or unplanned activities may constitute a "Loss of Safety Function" and should be evaluated and reported accordingly. Even though SLCRS and Control Room Envelope Boundaries are single train systems, it is *not* necessary to report boundary breaches for planned maintenance and surveillance testing to the NRC:

- In assessing whether this reporting threshold is met, the licensee should evaluate if: "the inoperability is due to one or more personnel errors, including procedure violations; equipment failures; inadequate maintenance; or design, analysis, fabrication, equipment qualification construction or procedure deficiencies" (NUREG 1022, Rev. 3, pg. 39, paragraph 3)
- "As a result, reports are *not* required when systems are declared inoperable as part of a planned evolution for maintenance or surveillance testing when done in accordance with an approved procedure and the plant's TS (unless a condition is discovered that would have resulted in the system being inoperable)." (NUREG 1022, Rev. 3, pg 39, paragraph 4).

4.1.6 REVIEW reporting requirements of NUREG 1022 Rev. 3, for a "loss of safety function" in accordance with 10 CFR 50.72(b)(3).

Millstone Unit 2
General Operating Procedure

Doors

TABLE OF CONTENTS

4.7 Spent Fuel Pool Ventilation Boundary (AEAS) (A)

NOTE

Spent Fuel Pool boundary doors can be open during Irradiated Fuel movement or Shielded Cask movement if proper Administrative controls are in place. (Ref 6.1.8)

4.7.1 IF a SFP boundary door *cannot* be closed and latched, PERFORM the following:

a. SUBMIT a CR.

b. DEVELOP a closure plan and TRACK as specified in OPS−FH 216 section "Maintaining SFP Boundary Integrity," until door is repaired.

– End of Section 4.7 –

MILLSTONE POWER STATION
FUEL HANDLING PROCEDURE

Spent Fuel Handling Operations

OPS−FH 216
Rev. 006−00

Multiple Level of Use

Section 4.2 through 4.8, and Section 4.10 through 4.13 of this procedure are <u>not</u> "**C**ontinuous" Level of Use and may be used as "**R**eference" Level of Use.

Approval Date: 02/01/2016

Effective Date: 02/08/2016

Level of Use
Continuous

Millstone Unit 2
FUEL HANDLING PROCEDURE

Spent Fuel Handling Operations

TABLE OF CONTENTS

4.10 Maintaining SFP Boundary Integrity

Level of Use: **R**eference

4.10.1 For work activities affecting SFP area boundary, ENSURE the following:

> **NOTE**
>
> 1. *Designated personnel* assigned for SFP area boundary penetrations are on–call and on–site. If *designated personnel* are not on–site, the penetration must be left in a condition to maintain SFP area boundary.
> 2. The analysis for a fuel handling accident in the SFP used alternate source term and assumed that all of the activity is released and enters the environment with two hours of the event. Based on this, the analysis concludes that the dose consequences are within the allowed limits. Therefore, "Best Efforts" should be made to establish SFP Integrity; and any response time less than the two hours will reduce the dose consequences.
> 3. Attachment 4, "Closure Plan for Spent Fuel Pool Integrity Work Activities is used to document plans for closure of Spent Fuel Pool area boundary penetrations. Attachment 4 must be completed if work is to be performed during movement of irradiated fuel or shielded cask in SFP.
> 4. During fuel movement, all Spent Fuel pool Boundary (AEAS) doors, as listed in OP 2356, "Doors," (Att 1), are verified to be closed except for normal access and egress, unless open under Administrative Control of OP 2356. Doors may be opened during fuel movement, providing the requirements of RPM 2.2.13 are satisfied.

Job Supervisors

a. IF work is being performed WHEN there is no movement of shielded cask OR irradiated fuel, Refer To Attachment 4 and RECORD the following information:

- WO / Procedure Numbers
- Penetration Name
- Penetration Location
- Penetration Number

b. IF work is being performed during movement of shielded cask OR irradiated fuel, Refer To Attachment 4 and RECORD required information including SFP Integrity.

c. WHEN complete, SEND Attachment 4 to Shift Manager.

Dept Mgrs

d. Refer To Attachment 3, “Personnel Designated for Spent Fuel Pool Area Boundary Integrity,” and INDICATE designated personnel assigned for SFP Integrity.

e. SIGN and SEND completed Attachment 3 to Shift Manager or OMOC Shift Manager.

f. <u>IF</u>, at any time, designated personnel assigned for SFP closure change, ENSURE a qualified replacement is assigned and RECORD on Attachment 3.

SM, US or OCCSM

g. RETAIN most recent copy of Attachment 3 in Penetration Work Log Book.

h. At all times, MAINTAIN awareness of the cumulative effect of actions being assigned to the operating shift and, where possible, to minimize any burden (e.g., requesting change in Closure Plan or obtaining committed assistance from other departments).

i. <u>IF</u> work activity includes cables or hoses which pass through a penetration, Refer To Attachment 5, “Spent Fuel Pool Penetration Cable and Hose Tag Verification,” and PERFORM the following:

   1) ENSURE each cable, cable group, and hose is identified with the required information from Attachment 5.

   2) DOCUMENT required information and SEND completed attachment to Operations for verification.

Operations Personnel

   3) ENSURE each tag identified and DOCUMENT.

Job Supervisors

   4) <u>WHEN</u> each cable, cable group, and hose is removed, NOTIFY Operations Department (Control Room).

Operations Personnel

   5) ENSURE each cable, cable group, or hose, passing through a penetration and <u>not</u> identified, is removed and DOCUMENT.

SM, US or OCCSM

j. RETAIN all completed Attachment 4 and 5 for on−going work activities in a Penetration Work Log Book.

k. Refer To Attachment 6, and MAINTAIN index of all applicable work activities in a Penetration Work Log Book.

4.10.2 IF an unplanned breach in the SFP area boundary is identified, PERFORM the following:

a. STOP any movement of irradiated fuel or Cask operation in the SFP.

b. INITIATE a CR to document the issue.

c. IF breach will remain past shift turnover, ENSURE the Shift Turnover Log is updated to reflect that no fuel movement OR cask operations are allowed in the SFP.

d. WHEN either of the following conditions are met, CONTINUE with movement of SFP activities:

- The boundary breach is repaired (temporarily or permanently)
- A closure plan has been developed and is being tracked as specified in step 4.10.1.

– End of Section 4.10 –

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: Emergency Classification

JPM Number: JPM-296-R-SRO Revision: 0

Initiated:

Robert L.Cimmino	6 /14/2016
Developer	Date

Reviewed:

David Jacobs	07/05/2016
Technical Reviewer	Date

Approved:

Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE

JPM WORKSHEET

Facility: **Millstone 2** Examinee: ______________________

JPM Number: **JPM-298-R-SRO** Revision: **0**

Task Title: **Emergency Classification**

System: ______________________

Time Critical Task: ☒ YES ☐ NO

Validated Time (minutes): __________

Task Number(s): ______________________

Applicable To: SRO **X** RO ______

K/A Number: GEN.2.4.41 K/A Rating: 2.9 / 4.6

Method of Testing: Simulated Performance: X Actual Performance: ______

Location: Classroom: X Simulator: ______ In-Plant: ______

Task Standards: At the completion of this JPM, the examinee has correctly classified the proposed event and provided the appropriate Protective Action Recommendation.

Required Materials: (procedures, equipment, etc.)

- MP-26-EPI-FAP06-002, Millstone Unit 2 Emergency Action Levels
- MP-26-EPI-FAP06-005, Control Room Protective Action Recommendations.
- MP-26-EPI-FAP06, Classification and PARs

General References:

- MP-26-EPI-FAP06-002, Millstone Unit 2 Emergency Action Levels
- MP-26-EPI-FAP06-005, Control Room Protective Action Recommendations.

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-298-R-SRO** Revision : **0**

Initial Conditions:

- The plant is operating at 100% power.
- Bus 24E is aligned to Bus 24C.
- The "B" LPSI Pump is OOS.
- Wind at the site is from 15 degrees at 3 mph**.**

Time = 0 Minutes: The following sequence of events occurs:

- The Reactor trips,
- The Turbine trips,
- The crew enters EOP 2525, *Standard Post Trip Actions*.

Time + 17 Minutes:

- EOP 2525 is complete
- The BOP reports secondary conditions as follows:
  - Buses 25A/B, 24A/B, and 24C de-energized
  - Bus 24D energized by the 'B' D/G
  - S/G press: #1 is 745 psia, #2 is 740 psia, both slowly lowering
  - T_{hot} is 289°F, T_{cold} is 262°F, both slowly lowering
  - S/G levels: #1 is 18%, #2 is 16%, both rising slowly
  - "B" AFP supplying both S/Gs

Time + 19 Minutes:

- RO reports primary conditions as follows:
  - Pressurizer level is 0%
  - Reactor vessel level (RVLMS) is 0%. (Both #8 string HJTCs are inoperable)
  - Pressurizer pressure is 53 psia and slowly lowering
  - CETS are 847°F and slowly rising
  - Subcooling (CET) indicates -478°F and becoming more negative
  - Facility 2 SIAS, CIAS, EBFS have actuated; however, Letdown Isolation Valves, CH-515, 516, and 089, indicate open and will NOT close from C-02
  - CTMT pressure is 42 psig, rising slowly
  - CTMT temperature is not available

Time + 22 Minutes:

- STA reports the following:
  - Main Steam Line RM-4299A and B indicate 1.6 R/hr, RM-4299C indicates 1.8 R/hr, all rising
  - CTMT Hi Range, RM-8240 / 8241 is 20,000R/hr / 21,000 R/hr, both rising
  - CTMT Personnel Access Area, RM-7890, off scale high
  - Facility 2 CTMT atmosphere, RM-8262A/B show pre CIAS spikes and alarm
  - The Kaman Rad Monitor, RM-8168 is reading 5E+02µCi/cc, rising, and in ALARM.
  - All other RMs outside CTMT are elevated, but NOT in alarm
  - Main Steam Line RM-4299A/B were reading 0.7 R/hr, RM-4299C was reading 0.9 R/hr, 15 minutes ago
  - CTMT Hi Range, RM-8240 / 8241 were reading 350R/hr / 370 R/hr, 15 minutes ago
  - The Kaman Rad Monitor, RM-8168 was reading 1.2E+01µCi/cc 15 minutes ago
  - All other Rad Monitors outside of CTMT started rising about 15 minutes ago.

Time + 25 Minutes: Crew transitions to EOP 2532, *Loss of Coolant Accident*

Initiating Cues: You are the on-duty SM.

Your task is to determine the NRC and state posture code classification for this event, and as required, provide any additional recommendations.

* * * * **NOTES TO TASK PERFORMANCE EVALUATOR** * * * *

1. Critical steps for this JPM are indicated by checking “Y”. For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-298-R-SRO** Revision: **0**

Task Title: **Emergency Classification**

START TIME: _________

S T E P # 1	Performance: Obtain Millstone 2 Emergency Action Levels, MP -26-EPI-FAP06-002.	Standard: The examinee reads the student Handout and obtains Millstone 2 Emergency Action Levels, MP -26-EPI-FAP06-002.	Critical: Y [ ] N [X]	Grade S [ ] U [ ]
	Cue: When requested, provide Millstone 2 Emergency Action Levels, MP-26-EPI-FAP06-002 and MP-26-EPI-FAP06, Classification and PARs, to the examinee. The CRDSEO book with EALs may be provided at the start of the JPM.			
	Comments: The 15 minute clock starts when the examinee obtains Millstone 2 Emergency Action Levels, MP -26-EPI-FAP06-002, and ends when the classification is made.			
S T E P # 2	Performance: Classify the event as a GENERAL EMERGENCY, State Posture Code, ALPHA, within 15 minutes, based on Barrier Failure, BG1, any three barriers failed.	Standard: Using the barrier reference table, examinee determines the event as a GENERAL EMERGENCY, State Posture Code, ALPHA, based on; • Fuel Clad Barrier failed FCB3 (L) • RCS Barrier failed RCB2 (L), • CTMT Barrier, CNB3(P) or CNB4 (P) Could also arrive at the same classification from Off Site Releases OG1 or In-Plant Radiation RG1. • OG1 MP2 Kaman Vent Monitor (RM-8168) reading ≥ 2µci/cc for > 15 minutes. Current reading 5E +02 µci/cc (500 µci/cc) and was 1.2 E+01 µci/cc (12 µci/cc) 15 minutes ago. • RG1 RM-8240/8241 reading > 1,200 R/hr. Currently reading 20,000 R/hr and 21,000 R/hr.	Critical: Y [X] N [ ]	Grade S [ ] U [ ]
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-298-R-SRO** Revision: **0**

Task Title: **Emergency Classification**

STEP #3	Performance:
	For Control Room PARs, Refer to EPI-FAP06-005, "Control Room Protective Action recommendations" and determines the PAR recommendation as;
	• Evacuate Zones A and B and Plum Island.
	• Shelter all other zones.
		Standard:
		Using the Control Room PAR Process Flowchart, determine that the present wind direction (between 340° - 029°) requires the examinee to recommend an evacuation of Zones A, B, and Plum Island, and to shelter all other zones.
		• General Emergency – <u>Yes</u>
		• General Emergency – Alpha – <u>Yes</u>
		• Rapidly Progressing Event – <u>No</u> (Clad <1200°F)
		• Does CTMT Radiation Exceed Table 1 Values – <u>Yes</u> (20,000 and 21,000 R/hr are >19,000R)
		• GE-ALPHA PAR
		  • Evacuate 5 mile radius
		  • Evacuate 10 miles downwind: Sector 340-029: Zones to evacuate to 10 miles; A and B and Plum Island.
		  • Shelter all other zones.
			Critical:
			Y [X] N [ ]
				Grade
				S [ ] U [ ]

	Cue: When requested, provide MP-26-EPI-FAP06-05, Control Room Protective Action Recommendations.			
	Comments: Thyroid CDE is NOT known; therefore, issuance of KI tablets should not be recommended.			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-298-R-SRO** Revision: **0**

Date Performed: ____________________

Candidate: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☒ Yes ☐ No	
Validated Time (minutes):	15 minutes for EAL PAR within 15 minutes after Classification	Actual Time to Complete (minutes):	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____
Print / Sign

Areas for Improvement / Comments:

JPM HANDOUT

JPM Number: **JPM-298-R-SRO** Revision: **0**

Initial Conditions:

- The plant is operating at 100% power.
- Bus 24E is aligned to Bus 24C.
- The "B" LPSI Pump is OOS.
- Wind at the site is from 15 degrees at 3 mph**.**

Time = 0 Minutes: The following sequence of events occurs:

- The Reactor trips,
- The Turbine trips,
- The crew enters EOP 2525, *Standard Post Trip Actions*.

Time + 17 Minutes:

- EOP 2525 is complete
- The BOP reports secondary conditions as follows:
  - Buses 25A/B, 24A/B, and 24C de-energized
  - Bus 24D energized by the 'B' D/G
  - S/G press: #1 is 745 psia, #2 is 740 psia, both slowly lowering
  - T_{hot} is 289°F, T_{cold} is 262°F, both slowly lowering
  - S/G levels: #1 is 18%, #2 is 16%, both rising slowly
  - "B" AFP supplying both S/Gs

Time + 19 Minutes:

- RO reports primary conditions as follows:
  - Pressurizer level is 0%
  - Reactor vessel level (RVLMS) is 0%. (Both #8 string HJTCs are inoperable)
  - Pressurizer pressure is 53 psia and slowly lowering
  - CETS are 847°F and slowly rising
  - Subcooling (CET) indicates -478°F and becoming more negative
  - Facility 2 SIAS, CIAS, EBFS have actuated; however, Letdown Isolation Valves, CH-515, 516, and 089, indicate open and will NOT close from C-02
  - CTMT pressure is 42 psig, rising slowly
  - CTMT temperature is not available

Time + 22 Minutes:

- STA reports the following:
  - Main Steam Line RM-4299A and B indicate 1.6 R/hr, RM-4299C indicates 1.8 R/hr, all rising
  - CTMT Hi Range, RM-8240 / 8241 is 20,000R/hr / 21,000 R/hr, both rising
  - CTMT Personnel Access Area, RM-7890, off scale high
  - Facility 2 CTMT atmosphere, RM-8262A/B show pre CIAS spikes and alarm
  - The Kaman Rad Monitor, RM-8168 is reading 5E+02µCi/cc, rising, and in ALARM.
  - All other RMs outside CTMT are elevated, but NOT in alarm
  - Main Steam Line RM-4299A/B were reading 0.7 R/hr, RM-4299C was reading 0.9 R/hr, 15 minutes ago
  - CTMT Hi Range, RM-8240 / 8241 were reading 350R/hr / 370 R/hr, 15 minutes ago
  - The Kaman Rad Monitor, RM-8168 was reading 1.2E+01µCi/cc 15 minutes ago
  - All other Rad Monitors outside of CTMT started rising about 15 minutes ago.

Time + 25 Minutes: Crew transitions to EOP 2532, *Loss of Coolant Accident*

<u>Initiating Cues</u>: You are the on-duty SM.

Your task is to determine the NRC and state posture code classification for this event, and as required, provide any additional recommendations.

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: Evaluate RCP Seal Problem

JPM Number: JPM-011 Revision: 9

Initiated:

Robert L. Cimmino, Jr. 05/03/2016
Developer Date

Reviewed:

David J. Jacobs 07/05/2016
Technical Reviewer Date

Approved:

Supervisor, Nuclear Training Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
06/27/2003	Updated to reflect changes to OP 2301C and new 1500 psid criteria.	8
05/03/2016	Updated to reflect new format and procedure changes.	9

JPM WORKSHEET

Facility: **MP2** Examinee: ____________________

JPM Number: **JPM-011** Revision: **9**

Task Title: Evaluate RCP Seal Problem

System: RCP

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 20

Task Number(s): NUTIMS #003-01-033

Applicable To: SRO ______ STA ______ RO **X** PEO ______

K/A Number: 003/A2.01 K/A Rating: 3.5/3.9

K/A Number: 003/A4.04 K/A Rating: 3.1/3.0

Method of Testing: Simulated Performance: ______ Actual Performance: X

Location: Classroom: ______ Simulator: X In-Plant: ______

Task Standards: At the completion of this JPM, examinee has evaluated "A" RCP indications and reported that the lower seal is failed and the upper seal is degrading. The examinee also recommends, based on the above findings, that a controlled shutdown should be initiated while trending and/or increasing observation of pump parameters (especially third seal stage).

Required Materials: (procedures, equipment, etc.)
OP 2301C
ARP 2590B-068 (BB-17), 2590B-075 (BA-18), 2590-078 (CB-18)
Calculator

General References:
OP 2301C
ARP 2590B

***** READ TO THE EXAMINEE *****

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-011** Revision : **9**

Initial Conditions:

- Several alarms have annunciated for the "A" RCP.
- It was determined that the seal pressure rate of change was approximately 3 psid/hr.
- The PPC application for RCP Monitoring has failed and is unusable.

Initiating Cues:

- You are the PPO.
- The Unit Supervisor has directed you to evaluate the operation of the "A" RCP.
- Report any abnormal conditions and make recommendations concerning the continued operation of the "A" RCP.
- Subsequent trending of RCP data will be performed by other operators. Therefore, only the initial set of data need be recorded.

Simulator Requirements:

- Initialize in a 100% power IC and enter the following:
  - Malfunction RC07A @ 100% to fail the "A" RCP lower seal.
  - Malfunction RC09A @ 2.5% so that "A" RCP upper seal D/P will be < 500 psid
- When examinee is ready, place simulator in run

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-011** Revision: **9**

Task Title: **Evaluate RCP Seal Problem**

START TIME: __________

STEP	Performance:	Standard:	Critical:	Grade
STEP # 1	**ARP 2590B-068** Respond to "RCP A BLEEDOFF FLOW HI" annunciator (BB-17 on C-02/3). **Automatic Functions** 1. None **NOTE**: Alarm may be indicative of seal stage failure. One seal failure can cause high bleedoff flow alarm. RCP operation may continue with this alarm present, if seal bleedoff temperature is within limits and seal differential pressures indicates only one of three lower seal stages failed. A vapor stage failure will require a plant trip. If seal flow reaches 10 gpm, "A" RCP controlled bleedoff excess flow check valve closes to prevent blockage of bleedoff flow from other RCPs.	Examinee refers to ARP 2590B, BB-17 and performs the following: • Reads and acknowledges the Note.	Y ☐ N ☒	S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-011** Revision: **9**

Task Title: **Evaluate RCP Seal Problem**

S T E P # 2	Performance: **Corrective Actions** **NOTE** Low backpressure could result in high bleedoff flow. 1. IF "RCP SEAL HDR PRESS, PI-215" is *not* between 40 and 75 psig, ADJUST "RCP BLD OFF PRESS CNTL, PIC-215" to 40 to 75 psig (C---02). 2. Go To AOP 2586, "RCP Malfunctions."	Standard: Examinee refers to ARP 2590B, BB-17 and performs the following: • Checks seal pressures and controlled bleedoff flow, if not already done, and determines that they are *not* within their normal range. • Checks lower seal and bleedoff temperatures are within normal range. • Checks RCP SEAL HDR PRESS, PI-215, is between 60-160 psig. • Transitions to AOP 2586, RCP Malfunctions.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments: It is not necessary for the Examinee to address all alarming annunciators. It is only Critical that the Examinee refer to AOP 2586 and may get there through any one of the alarming annunciators.			
S T E P # 3	Performance: **ARP 2590B-078** Respond to "RCP A UPPER SEAL PRES LO" annunciator (CB-18 on C-02/3). **Automatic Functions** 1. None **NOTE**: Low upper seal pressure could indicate any of the following: • Failed or failing upper seal stage • Combination of excessive leakage of lower and upper seal stages • Combination of excessive leakage of middle and upper seal stages	Standard: Examinee refers to ARP 2590B, CB-18 and performs the following: • Reads and acknowledges the Note.	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-011** Revision: **9**

Task Title: **Evaluate RCP Seal Problem**

STEP	Performance:	Standard:	Critical:	Grade
# 4	**ARP 2590B-078** Respond to "RCP A UPPER SEAL PRES LO" annunciator (CB-18 on C-02/3). **Corrective Actions** 1. IF "RCP SEAL HDR PRESS, PI---215" is *not* between 40 and 75 psig, ADJUST "RCP BLD OFF PRESS CNTL, PIC---215" to 40 to 75 psig (C---02). 2. IF alarm is intermittent AND D/P for one or more seal stages is cycling, PERFORM the following: 2.1. MONITOR RCP controlled bleedoff temperature. 2.2. DETERMINE if alarm is caused by changing RBCCW temperature. 2.3. IF changing RBCCW header temperature is possible cause, Refer To OP 2330A, "RBCCW System" and ADJUST associated RBCCW heat exchanger temperature. 3. IF alarm remains lit, Go To AOP 2586, "RCP Malfunctions."	Examinee refers to ARP 2590B, CB-18 and performs the following: 1. Checks RCP SEAL HDR PRESS, PI-215, is between 60-160 psig. 2. Recognizes alarm is not intermittent and *not* caused by RBCCW system temperature fluctuations 3. Transitions to AOP 2586, "RCP Malfunctions."	Y ☒ N ☐	S ☐ U ☐
	Cue:			
	Comments: It is not necessary for the Examinee to address all alarming annunciators. It is only Critical that the Examinee refer to AOP 2586 and may get there through any one of the alarming annunciators.			

PERFORMANCE INFORMATION

JPM Number: **JPM-011** Revision: **9**

Task Title: **Evaluate RCP Seal Problem**

STEP #5	Performance:	Standard:	Critical:	Grade
	ARP 2590B-075 Respond to “RCP A MID SEAL PRES HI" annunciator (BA-18 on C-02/3). **Automatic Functions** 1. None **NOTE**: High middle seal pressure could indicate any of the following: • Failed or failing lower seal stage • Combination of excessive leakage of lower and middle seal stages • Combination of excessive leakage of lower and upper seal stages	Examinee refers to ARP 2590B, BA-18 and performs the following: 1. Reads and acknowledges the Note.	Y ☐ N ☒	S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-011** Revision: **9**

Task Title: **Evaluate RCP Seal Problem**

STEP #6	Performance:	Standard:	Critical:	Grade
	ARP 2590B-075 Respond to "RCP A MID SEAL PRES HI" annunciator (BA-18 on C-02/3). **Corrective Actions** 1. IF "RCP SEAL HDR PRESS, PI---215" is *not* between 40 and 75 psig, ADJUST "RCP BLD OFF PRESS CNTL, PIC---215" to 40 to 75 psig (C---02). 2. IF alarm is intermittent AND D/P for one or more seal stages is cycling, PERFORM the following: 2.1. MONITOR RCP controlled bleedoff temperature. 2.2. DETERMINE if alarm is caused by changing RBCCW temperature. 2.3. IF changing RBCCW header temperature is possible cause, Refer To OP 2330A, "RBCCW System" and ADJUST associated RBCCW heat exchanger temperature. 3. IF alarm remains lit, Go To AOP 2586, "RCP Malfunctions."	Examinee refers to ARP 2590B, BA-18 and performs the following: 1. Checks RCP SEAL HDR PRESS, PI-215, is between 60-160 psig. 2. Recognizes alarm is not intermittent and *not* caused by RBCCW system temperature fluctuations 3. Transitions to AOP 2586, "RCP Malfunctions."	Y ☒ N ☐	S ☐ U ☐
	Cue:			
	Comments: It is not necessary for the Examinee to address all alarming annunciators. It is only Critical that the Examinee refer to AOP 2586 and may get there through any one of the alarming annunciators.			

PERFORMANCE INFORMATION

JPM Number: **JPM-011** Revision: **9**

Task Title: **Evaluate RCP Seal Problem**

STEP #7	Performance: **AOP 2586, RCP Malfunctions Action/Expected Response** NOTE: Foldout page shall be monitored throughout this procedure.	Standard: Examinee transitions to AOP 2586 and performs the following: Examinee opens "foldout page" for monitoring.	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #8	Performance: 1. **Check RCP Trip Criteria Met.**	Standard: Examinee reviews step one and acknowledges RCP trip criteria is *not* met.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: When asked about RCP vibration data, inform Examinee that another operator is continuously monitoring this data and it is presently within limits.			
	Comments:			
STEP #9	Performance: **2. Trend RCP Data** a. **CHECK** PPC available **RNO** **PERFORM** the following: 1. Using appropriate ATTACHMENT A through ATTACHMENT D, **RECORD** the affected RCP data parameters at an interval determined by SM/US **AND REFER** to ATTACHMENT E. 2. **PROCEED TO** step 2.c.	Standard: Examinee notes PPC is not available and refers to the RNO Step a. 1. Examinee notes problem is with "A" RCP and refers to Attachment A. Examinee also notes US directed only one set of data be taken for evaluation and that "trending" of any problem will be done by others at a later time. After data is recorded on Attachment A, Examinee refers to Attachment E 2. Examinee proceeds to Step 2.c.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: IF solicited for a time intervals, remind Examinee that RCP performance data will be trended by another operator.			
	Comments: Examinee may finish ANO actions by proceeding to Step 2.c. prior to stating any issues noted with the recorded RCP data.			

PERFORMANCE INFORMATION

JPM Number: **JPM-011** Revision: **9**

Task Title: **Evaluate RCP Seal Problem**

<table>
<tr><td rowspan="3">STEP #10</td><td>Performance:
3. TREND the following RCP vibration data from CONV PC A in new computer room:
• RCP Pump proximitor X and Y
• RCP Motor velomitor X and Y</td><td>Standard:
Examinees reviews Step 2.c. and notes previous direction that another operator was monitoring RCP vibration data.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: If necessary, remind Examinee that another operator is monitoring RCP vibration data.</td></tr>
<tr><td colspan="4">Comments Examinee may finish ANO actions by proceeding to Step 2.c. prior to stating any issues noted with the recorded RCP data.</td></tr>
<tr><td rowspan="3">STEP #11</td><td>Performance:
Report Attachment A and Attachment E findings to the US</td><td>Standard:
Examinee’s report on the A RCP data:
Lower seal is failed
Upper seal is degrading.
Examinee recommends, based on the above findings, that a controlled shutdown should be initiated while trending and/or increasing observation of pump parameters (especially third seal stage).</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: Acknowledge any report given to the US.</td></tr>
<tr><td colspan="4">Comments: Both the report of the RCP seal status and a recommendation of plant/RCP shutdown are required.
If one is missing, as the US solicit the missing item:
• For a missing recommendation on plant/RCP operation, ask if there is any additional information in the procedure.
• For a missing report of the failed seals, ask the reason for the recommendation.
• A recommendation of increased trending is <i>not</i> required as the Examinee was initially told that others would perform this task.</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-011** Revision: **9**

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**20**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☒ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____
Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-011** Revision: **9**

Initial Conditions:

- Several alarms have annunciated for the “A” RCP.
- It was determined that the seal pressure rate of change was approximately 3 psid/hr.
- The PPC application for RCP Monitoring has failed and is unusable.

Initiating Cues:

- You are the PPO.
- The Unit Supervisor has directed you to evaluate the operation of the “A” RCP.
- Report any abnormal conditions and make recommendations concerning the continued operation of the “A” RCP.
- Subsequent trending of RCP data will be performed by other operators. Therefore, only the initial set of data need be recorded.

Dominion

MILLSTONE POWER STATION

PROCEDURE NO:

AOP 2586

REVISION NO:

001

PROCEDURE TYPE:

ABNORMAL OPERATING PROCEDURE

PROCEDURE TITLE:

RCP Malfunctions

			System Number **2301C**			

REVISION SUMMARY:

- Formatted and changed steps to be in accordance with Dual Column writers guide AD-MP-101-1003 philosophy.
- Changed Entry Condition of various ARPs and listed the ARPS. In accordance with level of detail standards.
- Moved second note in previous revision and added new step 1.4 Discussion. Information placed there
- Changed foldout page. Added additional criteria and separated criteria based on priority. Remove Trip Turbine. Normal practice is Trip Reactor.
- Changed step to check for trip criteria. Highest priority.
- Step 2 and reworded step for trending criteria.
- Step 3 reworded to provide plant shutdown criteria vs. plant trip. Third priority.
- Remaining steps were re-worded as follow-up criteria.
- Added RNO steps for using Attachments A through D if PPC is out of service.
- Added new Attachments A through D for RCP data monitoring, incorporated information from old attachments A through D into the new.
- Added new attachment E for information related to seal degradation and failures.
- Added Continuous Action page as last page of procedure to identify continuous action steps.
- Over 50 percent of document changed, therefore no revision bars were used.

CONTINUOUS USE

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1.0 PURPOSE

1.1 This procedure provides the operators steps to evaluate the magnitude of RCP seal failures and for continuing RCP and plant operation.

1.2 This procedure provides the operators steps to evaluate RCP seal, oil, and bearing temperature excursions before annunciator actuation.

1.3 Applicability

This procedure is applicable when RCPs are operating.

1.4 Discussion

If RCP vibration probe is **NOT** within the upper and lower limits of normal transducer operation, vibration on the affected channel is clamped to zero. When this occurs, it is possible to have one of the two vibration channels (X or Y) on an RCP, display zero vibration while the other channel displays high or over-ranged vibration. If both probes clamp to zero, vibration monitoring or alarms for associated pump will **NOT** occur.

Abnormal vibration may be caused by or may cause changes in other pump parameters such as seal and bearing temperatures and pressures.

RCP seal stages are considered failed when D/P across that stage is less than or equal to 200 psid and RCS pressure is between 2200 and 2300 psia.

2.0 ENTRY CONDITIONS

2.1 AOP 2586, RCP Malfunctions, is entered from the following ARPs

- ARP 2590B-068, RCP A BLEED-OFF FLOW HI BB-17
- ARP 2590B-069, RCP A BLEED-OFF FLOW LO CA-17
- ARP 2590B-070, RCP A BLEED-OFF TEMP HI CB-17
- ARP 2590B-075, RCP A MID SEAL PRES HI BA-18
- ARP 2590B-076, RCP A MID SEAL PRES LO BB-18
- ARP 2590B-077, RCP A UPPER SEAL PRES HI CA-18
- ARP 2590B-078, RCP A UPPER SEAL PRES LO CB-18
- ARP 2590B-080, RCP A VAPOR SEAL PRES HI DB-18
- ARP 2590B-082, RCP A UPR OIL RSVR LEVEL HI AB-19

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- ARP 2590B-083, RCP A UPR OIL RSVR LEVEL LO BA-19
- ARP 2590B-084, RCP A LWR OIL RSVR LEVEL HI BB-19
- ARP 2590B-085, RCP A LWR OIL RSVR LEVEL LO CA-19

- ARP 2590B-100, RCP B BLEED-OFF FLOW HI BB-21
- ARP 2590B-101, RCP B BLEED-OFF FLOW LO CA-21
- ARP 2590B-102, RCP B BLEED-OFF TEMP HI CB-21
- ARP 2590B-107, RCP B MID SEAL PRES HI BA-22
- ARP 2590B-108, RCP B MID SEAL PRES LO BB-22
- ARP 2590B-109, RCP B UPPER SEAL PRES HI CA-22
- ARP 2590B-110, RCP B UPPER SEAL PRES LO CB-22
- ARP 2590B-112, RCP B VAPOR SEAL PRES HI DB-22
- ARP 2590B-114, RCP B UPR OIL RSVR LEVEL HI AB-23
- ARP 2590B-115, RCP B UPR OIL RSVR LEVEL LO BA-23
- ARP 2590B-116, RCP B LWR OIL RSVR LEVEL HI BB-23
- ARP 2590B-117, RCP B LWR OIL RSVR LEVEL LO CA-23

- ARP 2590B-132, RCP C BLEED-OFF FLOW HI BB-25
- ARP 2590B-133, RCP C BLEED-OFF FLOW LO CA-25
- ARP 2590B-134, RCP C BLEED-OFF TEMP HI CB-25
- ARP 2590B-139, RCP C MID SEAL PRES HI BA-26
- ARP 2590B-140, RCP C MID SEAL PRES LO BB-26
- ARP 2590B-141, RCP C UPPER SEAL PRES HI CA-26
- ARP 2590B-142, RCP C UPPER SEAL PRES LO CB-26
- ARP 2590B-144, RCP C VAPOR SEAL PRES HI DB-26
- ARP 2590B-146, RCP C UPR RSVR LEVEL HI AB-27
- ARP 2590B-147, RCP C UPR OIL RSVR LEVEL LO BA-27

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- ARP 2590B-148, RCP C LWR OIL RSVR LEVEL HI BB-27
- ARP 2590B-149, RCP C LWR OIL RSVR LEVEL LO CA-27

- ARP 2590B-164, RCP D BLEED-OFF FLOW HI BB-29
- ARP 2590B-165, RCP D BLEED-OFF FLOW LO CA-29
- ARP 2590B-166, RCP D BLEED-OFF TEMP HI CB-29
- ARP 2590B-171, RCP D MID SEAL PRES HI BA-30
- ARP 2590B-172, RCP D MID SEAL PRES LO BB-30
- ARP 2590B-173, RCP D UPPER SEAL PRES HI CA-30
- ARP 2590B-174, RCP D UPPER SEAL PRES LO CB-30
- ARP 2590B-176, RCP D VAPOR SEAL PRES HI DB-30
- ARP 2590B-178, RCP D UPR OIL RSVR LEVEL HI AB-31
- ARP 2590B-179, RCP D UPR OIL RSVR LEVEL LO BA-31
- ARP 2590B-180, RCP D LWR OIL RSVR LEVEL HI BB-31
- ARP 2590B-181, RCP D LWR OIL RSVR LEVEL LO CA-31

- ARP 2590C-054, RCP HIGH VIBRATION CB-7
- **OR**
  when any PPC point on ATTACHMENT A through ATTACHMENT D, alarms.

3.0 REFERENCES

3.1 OP 2301C, Reactor Coolant Pump Operation

3.2 EOP 2541 Appendix 22, RCS Operation Parameters

3.3 AOP 2564, Loss Of RBCCW

3.4 RCP ARPs

FOLDOUT AND CONTINUOUS ACTION PAGE FOR AOP 2586
Revision 001

FOLDOUT PAGE ITEMS

1. **RCP AND REACTOR TRIP CRITERIA**

IF any of the following conditions occur:

RCP SEAL CRITERIA

- Any vapor seal failure is indicated or suspected
- Any RCP has two failed stages, and the remaining seal stage integrity is degraded
- RCP Lower Seal temperature GREATER THAN 170 °F
- RCP Bleedoff temperature GREATER THAN 195 °F
- RCP controlled bleedoff excess flow check valve is closed

RCP VIBRATION CRITERIA

- One RCP vibration reading is GREATER THAN 28 mils **AND** the other vibration reading is GREATER THAN 15 mils

RCP OIL LEVEL AND TEMPERATURE CRITERIA

- ANY RCP oil level is trending outside normal band of 75% to 85%

  AND

  bearing temperature is INCREASING

- RCP Upper/Lower Thrust Bearing temperature GREATER THAN 194 °F
- RCP Upper/Lower Guide Bearing temperature GREATER THAN 194 °F
- RCP Anti-Reverse Device temperature GREATER THAN 250 °F
- RCP Stator temperature GREATER THAN 260 °F

THEN PERFORM the following:

a. **TRIP** Reactor

b. **TRIP** affected RCP

c. **GO TO** EOP 2525, Standard Post Trip Actions.

CONTINUOUS ACTION PAGE FOR AOP 2586

REFER to last page of procedure

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE: Foldout page shall be monitored throughout this procedure.

1___ **Check RCP Trip Criteria Met**

a. **CHECK** RCP Trip Criteria based on a change of the following parameters:

- Change in RCS Mass flow balance parameters:
  - ☐ Pressurizer Level DECREASE
  - ☐ Letdown Flow DECREASE
- ☐ RCP Seal Criteria
- ☐ RCP Vibration Criteria
- ☐ RCP Oil Level and Temperature Criteria

b. **PERFORM** the following:

☐ 1. **TRIP** the Reactor

☐ 2. **TRIP** associated RCP

☐ 3. **GO TO** EOP 2525, Standard Post Trip Actions
AND
CONTINUE with actions of this procedure beginning with step 7

PROCEED TO step 2.

FOLDOUT AND CONTINUOUS ACTION PAGE FOR AOP 2586
Revision 001

FOLDOUT PAGE ITEMS

1. RCP AND REACTOR TRIP CRITERIA

IF any of the following conditions occur:

RCP SEAL CRITERIA

- Any vapor seal failure is indicated or suspected
- Any RCP has two failed stages, and the remaining seal stage integrity is degraded
- RCP Lower Seal temperature GREATER THAN 170 °F
- RCP Bleedoff temperature GREATER THAN 195 °F
- RCP controlled bleedoff excess flow check valve is closed

RCP VIBRATION CRITERIA

- One RCP vibration reading is GREATER THAN 28 mils **AND** the other vibration reading is GREATER THAN 15 mils

RCP OIL LEVEL AND TEMPERATURE CRITERIA

- ANY RCP oil level is trending outside normal band of 75% to 85%

  AND

  bearing temperature is INCREASING

- RCP Upper/Lower Thrust Bearing temperature GREATER THAN 194 °F
- RCP Upper/Lower Guide Bearing temperature GREATER THAN 194 °F
- RCP Anti-Reverse Device temperature GREATER THAN 250 °F
- RCP Stator temperature GREATER THAN 260 °F

THEN PERFORM the following:

a. **TRIP** Reactor

b. **TRIP** affected RCP

c. **GO TO** EOP 2525, Standard Post Trip Actions.

CONTINUOUS ACTION PAGE FOR AOP 2586

REFER to last page of procedure

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
***2___**	**Trend RCP Data**	
☐	a. **CHECK** PPC available	a. **PERFORM** the following:
		☐ 1. Using appropriate ATTACHMENT A through ATTACHMENT D, **RECORD** the affected RCP data parameters at an interval determined by SM/US **AND** **REFER** to ATTACHMENT E.
		☐ 2. **PROCEED TO** step 2.c.
	b. **TREND** RCP data from PPC by performing the following:	
☐	1. ON RCP Seal Arrangement/Vibs screen, **SELECT** RCP X Trend **AND** **REFER** to ATTACHMENT E	
☐	2. **PROCEED TO** step 3	
	c. **TREND** the following RCP vibration data from CONV PC A in new computer room:	
☐	• RCP Pump proximitor X and Y	
☐	• RCP Motor velomitor X and Y	

FOLDOUT AND CONTINUOUS ACTION PAGE FOR AOP 2586
Revision 001

FOLDOUT PAGE ITEMS

1. RCP AND REACTOR TRIP CRITERIA

IF any of the following conditions occur:

RCP SEAL CRITERIA

- Any vapor seal failure is indicated or suspected
- Any RCP has two failed stages, and the remaining seal stage integrity is degraded
- RCP Lower Seal temperature GREATER THAN 170 °F
- RCP Bleedoff temperature GREATER THAN 195 °F
- RCP controlled bleedoff excess flow check valve is closed

RCP VIBRATION CRITERIA

- One RCP vibration reading is GREATER THAN 28 mils **AND** the other vibration reading is GREATER THAN 15 mils

RCP OIL LEVEL AND TEMPERATURE CRITERIA

- ANY RCP oil level is trending outside normal band of 75% to 85%

  AND

  bearing temperature is INCREASING

- RCP Upper/Lower Thrust Bearing temperature GREATER THAN 194 °F
- RCP Upper/Lower Guide Bearing temperature GREATER THAN 194 °F
- RCP Anti-Reverse Device temperature GREATER THAN 250 °F
- RCP Stator temperature GREATER THAN 260 °F

THEN PERFORM the following:

a. **TRIP** Reactor

b. **TRIP** affected RCP

c. **GO TO** EOP 2525, Standard Post Trip Actions.

CONTINUOUS ACTION PAGE FOR AOP 2586

REFER to last page of procedure

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*3___	**Check RCP For Plant Shutdown Required**	
	a. **CHECK** affected RCP for the following:	☐ a. <u>**PROCEED**</u> <u>**TO**</u> step 4.
☐	• Any RCP seal stage D/P is GREATER THAN 1500 psid <u>**OR**</u>	
☐	• RCP has one RCP seal stage failed and another seal stage LESS THAN 650 psid <u>**OR**</u>	
☐	• RCP upper or lower oil reservoir level trending out of normal range (normal 75 to 85%) <u>**OR**</u>	
☐	• Any RCP seal temperature or bearing oil temperature increasing trend and evaluation indicates alarm setpoint will be reached	
	b. **PERFORM** the following:	
☐	1. <u>**GO**</u> <u>**TO**</u> OP 2204, Load Changes <u>**AND**</u> **INITIATE** a plant shutdown <u>**AND**</u> **CONTINUE** with actions of this procedure beginning with step 3.c	
☐	c. <u>**WHEN**</u> Reactor is sub-critical, <u>**THEN**</u> **STOP** affected RCP	

FOLDOUT AND CONTINUOUS ACTION PAGE FOR AOP 2586
Revision 001

FOLDOUT PAGE ITEMS

1. **RCP AND REACTOR TRIP CRITERIA**

IF any of the following conditions occur:

RCP SEAL CRITERIA

- Any vapor seal failure is indicated or suspected
- Any RCP has two failed stages, and the remaining seal stage integrity is degraded
- RCP Lower Seal temperature GREATER THAN 170 °F
- RCP Bleedoff temperature GREATER THAN 195 °F
- RCP controlled bleedoff excess flow check valve is closed

RCP VIBRATION CRITERIA

- One RCP vibration reading is GREATER THAN 28 mils **AND** the other vibration reading is GREATER THAN 15 mils

RCP OIL LEVEL AND TEMPERATURE CRITERIA

- ANY RCP oil level is trending outside normal band of 75% to 85%

  AND

  bearing temperature is INCREASING

- RCP Upper/Lower Thrust Bearing temperature GREATER THAN 194 °F
- RCP Upper/Lower Guide Bearing temperature GREATER THAN 194 °F
- RCP Anti-Reverse Device temperature GREATER THAN 250 °F
- RCP Stator temperature GREATER THAN 260 °F

THEN PERFORM the following:

a. **TRIP** Reactor

b. **TRIP** affected RCP

c. **GO TO** EOP 2525, Standard Post Trip Actions.

CONTINUOUS ACTION PAGE FOR AOP 2586

REFER to last page of procedure

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*4___	**Check For Additional Seal Degradation**	☐ **CONSULT** OMOC/EMOC to determine if RCP should remain in service.
	☐ a. **CHECK** Bleedoff flow **NOT** in alarm	
	☐ b. **CHECK** Bleedoff temperature **NOT** in alarm	
	☐ c. **CONTINUE** to monitor affected RCP parameters for second degraded RCP seal	
*5___	**Check RCP Bleedoff Flow**	
	a. **CHECK** RCP Bleedoff flow path by the following:	☐ a. **PERFORM** the following:
	☐ • RCP BLD OFF ISOL, CH-506 OPEN-(red light lit)	☐ 1. **PLACE** RCP BLD OFF ISOL, CH-506, to OPEN.
	☐ • RCP BLD OFF PRESS CNTL, PIC-215 maintaining 40 to 75 psig in REMOTE	☐ 2. **PLACE** RCP BLD OFF PRESS CNTL, PIC-215 to LOCAL **AND** **ADJUST** to 40 to 75 psig.
	• Bleedoff flow path by ONE of the following:	3. **THROTTLE OPEN** ONE of the following to establish bleedoff flow:
	☐ • RCP BLD OFF TO VCT, CH-198 OPEN (red and green light lit)	☐ • RCP BLD OFF TO VCT, CH-198 (red and green light lit).
	OR	**OR**
	☐ • RCP BLD OFF TO EQUIP DRN, CH-505 OPEN (red and green light lit)	☐ • RCP BLD OFF TO EQUIP DRN, CH-505 (red and green light lit).
	☐ b. **CHECK** RCP BLD OFF PRESS CNTL (PIC-215) is 40 to 75 psig and CONTROLLABLE	b. **PERFORM** the following: ☐ 1. **TRIP** the Reactor. ☐ 2. **TRIP** the affected RCP. ☐ 3. **GO TO** EOP 2525, Standard Post Trip Actions.

FOLDOUT AND CONTINUOUS ACTION PAGE FOR AOP 2586
Revision 001

FOLDOUT PAGE ITEMS

1. **RCP AND REACTOR TRIP CRITERIA**

IF any of the following conditions occur:

RCP SEAL CRITERIA

- Any vapor seal failure is indicated or suspected
- Any RCP has two failed stages, and the remaining seal stage integrity is degraded
- RCP Lower Seal temperature GREATER THAN 170 °F
- RCP Bleedoff temperature GREATER THAN 195 °F
- RCP controlled bleedoff excess flow check valve is closed

RCP VIBRATION CRITERIA

- One RCP vibration reading is GREATER THAN 28 mils **AND** the other vibration reading is GREATER THAN 15 mils

RCP OIL LEVEL AND TEMPERATURE CRITERIA

- ANY RCP oil level is trending outside normal band of 75% to 85%

  AND

  bearing temperature is INCREASING

- RCP Upper/Lower Thrust Bearing temperature GREATER THAN 194 °F
- RCP Upper/Lower Guide Bearing temperature GREATER THAN 194 °F
- RCP Anti-Reverse Device temperature GREATER THAN 250 °F
- RCP Stator temperature GREATER THAN 260 °F

THEN PERFORM the following:

a. **TRIP** Reactor

b. **TRIP** affected RCP

c. **GO TO** EOP 2525, Standard Post Trip Actions.

CONTINUOUS ACTION PAGE FOR AOP 2586

REFER to last page of procedure

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6___	**CHECK RBCCW Heat Exchanger Outlet Temperature - STABLE**	☐ **REFER** to OP 2330A, RBCCW System **AND** **ADJUST** affected RBCCW Heat Exchanger temperature
7___	**Isolate RCP Bleedoff**	
	a. **CHECK** RCP bleedoff isolation required as indicated by one of the following:	☐ a. **PROCEED TO** step 8.
☐	• Containment sump level rising	
☐	• Containment particulate radiation monitor trend consistent with an RCS leak in Containment	
☐	• RCP Bleedoff flow high alarm annunciates, followed by a low bleedoff flow on RCP with vapor seal failure	
☐	• RCP BLD OFF PRESS CNTL, PIC-215, output is low and **NOT** able to increase pressure	
☐	b. **CHECK** Containment access permitted	☐ b. **WHEN** Containment access permitted **THEN PROCEED TO** step 7.c.
☐	c. Using C OP 200.14, Containment Entry **PERFORM** Containment Entry	

CONTINUED

FOLDOUT AND CONTINUOUS ACTION PAGE FOR AOP 2586
Revision 001

FOLDOUT PAGE ITEMS

1. <u>RCP AND REACTOR TRIP CRITERIA</u>

<u>IF</u> any of the following conditions occur:

RCP SEAL CRITERIA

- Any vapor seal failure is indicated or suspected
- Any RCP has two failed stages, and the remaining seal stage integrity is degraded
- RCP Lower Seal temperature GREATER THAN 170 °F
- RCP Bleedoff temperature GREATER THAN 195 °F
- RCP controlled bleedoff excess flow check valve is closed

RCP VIBRATION CRITERIA

- One RCP vibration reading is GREATER THAN 28 mils **AND** the other vibration reading is GREATER THAN 15 mils

RCP OIL LEVEL AND TEMPERATURE CRITERIA

- ANY RCP oil level is trending outside normal band of 75% to 85%

  AND

  bearing temperature is INCREASING

- RCP Upper/Lower Thrust Bearing temperature GREATER THAN 194 °F
- RCP Upper/Lower Guide Bearing temperature GREATER THAN 194 °F
- RCP Anti-Reverse Device temperature GREATER THAN 250 °F
- RCP Stator temperature GREATER THAN 260 °F

THEN PERFORM the following:

a. **TRIP** Reactor

b. **TRIP** affected RCP

c. **GO TO** EOP 2525, Standard Post Trip Actions.

CONTINUOUS ACTION PAGE FOR AOP 2586

REFER to last page of procedure

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

(STEP 7 CONTINUED)

d. **PERFORM** the following to isolate bleedoff header for affected RCP:

A RCP

☐ 1. Locally **CLOSE** 2-RC-332, A RCP Controlled Bleedoff Hdr Isolation (CTMT, A RCP area)

B RCP

☐ 2. Locally **CLOSE** 2-RC-334, B RCP Controlled Bleedoff Hdr Isolation (CTMT, B RCP area)

C RCP

☐ 3. Locally **CLOSE** 2-RC-333, C RCP Controlled Bleedoff Hdr Isolation (CTMT, C RCP area)

D RCP

☐ 4. Locally **CLOSE** 2-RC-335, D RCP Controlled Bleedoff Hdr Isolation (CTMT, D RCP area)

8___ REFER To Technical Specification 3.4.6.2, Reactor Coolant System Operational Leakage, For Applicability

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4.0 REMARKS AND SIGNOFF

4.1 Remarks

Remarks: ____

____

____

____

____

____

Condition Report Initiated? ☐ Yes ☐ No CR# ____________________

4.2 Performance Signatures

Performed by:

Performed by:	Signature	Initial	Print	Date
	Signature	Initial	Print	Date
	Signature	Initial	Print	Date
Shift Manager:	Signature	Initial	Print	Date

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ATTACHMENT A
A RCP Seal Data
(Page 1 of 1)

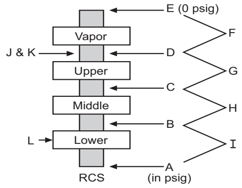

TABLE 1

(D ________ -E ________ =F ________)

(C ________ -D ________ =G ________)

(B ________ -C ________ =H ________)

(A ________ -B ________ =I ________)

NOTE: RCP seals are four stage sealing devices. When operating properly, the first three seal stages reduce pressure by approximately one third (1/3) of the total pressure across the pump seal.

NOTE: With RCS at rated pressure (2200 to 2300 psia), alarms actuate when seal stage pressures deviate from nominal values by 150 psig. This indicates a degraded or failing operation of a particular seal stage.

NOTE: RCP seal stages are considered failed when d/p across stage is less than 200 psid and RCS pressure is at rated pressure (2200 to 2300 psia).

NOTE: The increased d/p in the remaining intact seal stages is equal to the decrease in d/p of the degraded or failed seal stage. For short periods of time, each seal stage is designed to safely function with full RCS pressure d/p across the seal stage to allow for plant shutdown. Operation with d/p less than 1500 psid across a seal stage is acceptable indefinitely.

Parameter	PPC Point	Expected Value	PPC Alarm	Data Location	(Graphic Designator)	Data (Time Acquired)					
(C-04R, HS-150-1) Temperature (°F)											
Lower Seal	T151	90 to 110°F	120°F	1	(L)						
Lube Oil Cooler Outlet	T152	100 to 120°F	120°F	2							
Lube Oil Cooler Inlet	T153	120 to 140°F	140°F	3							
Controlled Bleedoff	T154	110 to 150°F	150°F	4	(J)						
Motor Stator Winding	T155	160 to 180°F	200°F	5							
Upper Guide Bearing	T156	140 to 160°F	160°F	6							
Lower Guide Bearing	T157	140 to 160°F	160°F	7							
Upper Thrust Bearing	T158	110 to 140°F	160°F	8							
Lower Thrust Bearing	T159	110 to 140°F	160°F	9							
Anti-reverse Bearing	T190	150 to 170°F	175°F	10							
Lower Bearing Oil	T194	100 to 125°F	125°F	11							
(C-04R, HS-150-2) Pressure (psig)											
Middle Seal	P151	1400 to 1600 psig	1625# (High) 1290# (Low)	1	(B)						
Upper Seal	P152	600 to 800 psig	945# (High) 545# (Low)	2	(C)						
Vapor Seal	P153	40 to 100 psig	125# (High) 20# (Low)	3	(D)						
(C-04R, HS-150-3) Level (%)											
Upper Oil Reservoir	L156	78 to 84%	85% (High) 70% (Low)	1							
Lower Oil Reservoir	L157	78 to 84%	85% (High) 77% (Low)	2							
Additional Data (gpm / psia / psig / psid)											
Bleedoff Flow	F150	0.9 to 1.3 pgm	1.5 gpm (High) 0.85 gpm (Low)	C-04R PR-150A (#9)	(K)						
RCS Pressure RCS (psia) - 15 = A (psig)	PZRPR	2240 to 2260 psia (2225 to 2245 psig)	2350# (High) 1900# (Low)	C-02/3 PR-100	(A)						
Containment Pressure	CTMTPR	0 psig	1 psig	N/A	(E)	0	0	0	0	0	0
Vapor Seal d/p (F=D-E)	CVAVAPDP	40 to 100 psid	N/A	Table 1	(F)						
Upper Seal d/p (G=C-D)	CVAUPRDP	600 to 850 psid	N/A	Table 1	(G)						
Middle Seal d/p (H=B-C)	CVAMIDDP	600 to 850 psid	N/A	Table 1	(H)						
Lower Seal d/p (I=A-B)	CVALWRDP	600 to 850 psid	N/A	Table 1	(I)						

ATTACHMENT A - 'A' RCP SEAL DATA

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ATTACHMENT B

B RCP Seal Data

(Page 1 of 1)

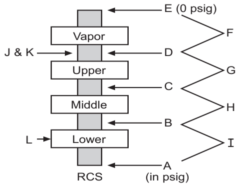

TABLE 1

(D __________ -E __________ =F __________)

(C __________ -D __________ =G __________)

(B __________ -C __________ =H __________)

(A __________ -B __________ =I __________)

NOTE: RCP seals are four stage sealing devices. When operating properly, the first three seal stages reduce pressure by approximately one third (1/3) of the total pressure across the pump seal.

NOTE: With RCS at rated pressure (2200 to 2300 psia), alarms actuate when seal stage pressures deviate from nominal values by 150 psig. This indicates a degraded or failing operation of a particular seal stage.

NOTE: RCP seal stages are considered failed when d/p across stage is less than 200 psid and RCS pressure is at rated pressure (2200 to 2300 psia).

NOTE: The increased d/p in the remaining intact seal stages is equal to the decrease in d/p of the degraded or failed seal stage. For short periods of time, each seal stage is designed to safely function with full RCS pressure d/p across the seal stage to allow for plant shutdown. Operation with d/p less than 1500 psid across a seal stage is acceptable indefinitely.

Parameter	PPC Point	Expected Value	PPC Alarm	Data Location	(Graphic Designator)	Data (Time Acquired)					
(C-04R, HS-170-1) Temperature (°F)											
Lower Seal	T171	90 to 110°F	120°F	1	(L)						
Lube Oil Cooler Outlet	T172	100 to 120°F	120°F	2							
Lube Oil Cooler Inlet	T173	120 to 140°F	140°F	3							
Controlled Bleedoff	T174	110 to 150°F	150°F	4	(J)						
Motor Stator Winding	T175	160 to 180°F	200°F	5							
Upper Guide Bearing	T176	140 to 160°F	160°F	6							
Lower Guide Bearing	T177	140 to 160°F	160°F	7							
Upper Thrust Bearing	T178	110 to 140°F	160°F	8							
Lower Thrust Bearing	T179	110 to 140°F	160°F	9							
Anti-reverse Bearing	T192	150 to 170°F	175°F	10							
Lower Bearing Oil	T196	100 to 125°F	125°F	11							
(C-04R, HS-170-2) Pressure (psig)											
Middle Seal	P171	1400 to 1600 psig	1625# (High) 1290# (Low)	1	(B)						
Upper Seal	P172	600 to 800 psig	945# (High) 545# (Low)	2	(C)						
Vapor Seal	P173	40 to 100 psig	125# (High) 20# (Low)	3	(D)						
(C-04R, HS-170-3) Level (%)											
Upper Oil Reservoir	L176	78 to 84%	85% (High) 70% (Low)	1							
Lower Oil Reservoir	L177	78 to 84%	85% (High) 77% (Low)	2							
Additional Data (gpm / psia / psig / psid)											
Bleedoff Flow	F170	0.9 to 1.3 pgm	1.5 gpm (High) 0.85 gpm (Low)	C-04R PR-150B (#9)	(K)						
RCS Pressure RCS (psia) - 15 = A (psig)	PZRPR	2240 to 2260 psia (2225 to 2245 psig)	2350# (High) 1900# (Low)	C-02/3 PR-100	(A)						
Containment Pressure	CTMTPR	0 psig	1 psig	N/A	(E)	0	0	0	0	0	0
Vapor Seal d/p (F=D-E)	CVBVAPDP	40 to 100 psid	N/A	Table 1	(F)						
Upper Seal d/p (G=C-D)	CVBUPRDP	600 to 850 psid	N/A	Table 1	(G)						
Middle Seal d/p (H=B-C)	CVBMIDDP	600 to 850 psid	N/A	Table 1	(H)						
Lower Seal d/p (I=A-B)	CVBLWRDP	600 to 850 psid	N/A	Table 1	(I)						

ATTACHMENT B - 'B' RCP SEAL DATA

Graphics No. CS8325

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ATTACHMENT C
C RCP Seal Data
(Page 1 of 1)

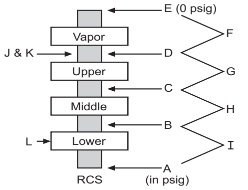

TABLE 1

(D ________ -E ________ =F ________)

(C ________ -D ________ =G ________)

(B ________ -C ________ =H ________)

(A ________ -B ________ =I ________)

NOTE: RCP seals are four stage sealing devices. When operating properly, the first three seal stages reduce pressure by approximately one third (1/3) of the total pressure across the pump seal.

NOTE: With RCS at rated pressure (2200 to 2300 psia), alarms actuate when seal stage pressures deviate from nominal values by 150 psig. This indicates a degraded or failing operation of a particular seal stage.

NOTE: RCP seal stages are considered failed when d/p across stage is less than 200 psid and RCS pressure is at rated pressure (2200 to 2300 psia).

NOTE: The increased d/p in the remaining intact seal stages is equal to the decrease in d/p of the degraded or failed seal stage. For short periods of time, each seal stage is designed to safely function with full RCS pressure d/p across the seal stage to allow for plant shutdown. Operation with d/p less than 1500 psid across a seal stage is acceptable indefinitely.

Parameter	PPC Point	Expected Value	PPC Alarm	Data Location	(Graphic Designator)	Data (Time Acquired)					
(C-04R, HS-160-1) Temperature (°F)											
Lower Seal	T161	90 to 110°F	120°F	1	(L)						
Lube Oil Cooler Outlet	T162	100 to 120°F	120°F	2							
Lube Oil Cooler Inlet	T163	120 to 140°F	140°F	3							
Controlled Bleedoff	T164	110 to 150°F	150°F	4	(J)						
Motor Stator Winding	T165	160 to 180°F	200°F	5							
Upper Guide Bearing	T166	140 to 160°F	160°F	6							
Lower Guide Bearing	T167	140 to 160°F	160°F	7							
Upper Thrust Bearing	T168	110 to 140°F	160°F	8							
Lower Thrust Bearing	T169	110 to 140°F	160°F	9							
Anti-reverse Bearing	T191	150 to 170°F	175°F	10							
Lower Bearing Oil	T195	100 to 125°F	125°F	11							
(C-04R, HS-160-2) Pressure (psig)											
Middle Seal	P161	1400 to 1600 psig	1625# (High) 1290# (Low)	1	(B)						
Upper Seal	P162	600 to 800 psig	945# (High) 545# (Low)	2	(C)						
Vapor Seal	P163	40 to 100 psig	125# (High) 20# (Low)	3	(D)						
(C-04R, HS-160-3) Level (%)											
Upper Oil Reservoir	L166	78 to 84%	85% (High) 70% (Low)	1							
Lower Oil Reservoir	L167	78 to 84%	85% (High) 77% (Low)	2							
Additional Data (gpm / psia / psig / psid)											
Bleedoff Flow	F160	**0.9 to 1.3 pgm**	1.5 gpm (High) 0.85 gpm (Low)	C-04R PR-150A (#10)	(K)						
RCS Pressure RCS (psia) - 15 = A (psig)	PZRPR	2240 to 2260 psia (2225 to 2245 psig)	2350# (High) 1900# (Low)	C-02/3 PR-100	(A)						
Containment Pressure	CTMTPR	0 psig	1 psig	N/A	(E)	0	0	0	0	0	0
Vapor Seal d/p (F=D-E)	CVCVAPDP	40 to 100 psid	N/A	Table 1	(F)						
Upper Seal d/p (G=C-D)	CVCUPRDP	600 to 850 psid	N/A	Table 1	(G)						
Middle Seal d/p (H=B-C)	CVCMIDDP	600 to 850 psid	N/A	Table 1	(H)						
Lower Seal d/p (I=A-B)	CVCLWRDP	600 to 850 psid	N/A	Table 1	(I)						

Graphics No. CS8326

ATTACHMENT C - 'C' RCP SEAL DATA

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ATTACHMENT D
D RCP Seal Data
(Page 1 of 1)

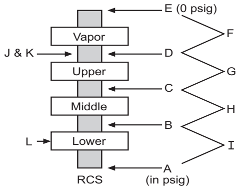

TABLE 1

(D ________ -E ________ =F ________)

(C ________ -D ________ =G ________)

(B ________ -C ________ =H ________)

(A ________ -B ________ =I ________)

NOTE: RCP seals are four stage sealing devices. When operating properly, the first three seal stages reduce pressure by approximately one third (1/3) of the total pressure across the pump seal.

NOTE: With RCS at rated pressure (2200 to 2300 psia), alarms actuate when seal stage pressures deviate from nominal values by 150 psig. This indicates a degraded or failing operation of a particular seal stage.

NOTE: RCP seal stages are considered failed when d/p across stage is less than 200 psid and RCS pressure is at rated pressure (2200 to 2300 psia).

NOTE: The increased d/p in the remaining intact seal stages is equal to the decrease in d/p of the degraded or failed seal stage. For short periods of time, each seal stage is designed to safely function with full RCS pressure d/p across the seal stage to allow for plant shutdown. Operation with d/p less than 1500 psid across a seal stage is acceptable indefinitely.

Parameter	PPC Point	Expected Value	PPC Alarm	Data Location	(Graphic Designator)	Data (Time Acquired)					
(C-04R, HS-180-1) Temperature (°F)											
Lower Seal	T181	90 to 110°F	120°F	1	(L)						
Lube Oil Cooler Outlet	T182	100 to 120°F	120°F	2							
Lube Oil Cooler Inlet	T183	120 to 140°F	140°F	3							
Controlled Bleedoff	T184	110 to 150°F	150°F	4	(J)						
Motor Stator Winding	T185	160 to 180°F	200°F	5							
Upper Guide Bearing	T186	140 to 160°F	160°F	6							
Lower Guide Bearing	T187	140 to 160°F	160°F	7							
Upper Thrust Bearing	T188	110 to 140°F	160°F	8							
Lower Thrust Bearing	T189	110 to 140°F	160°F	9							
Anti-reverse Bearing	T193	150 to 170°F	175°F	10							
Lower Bearing Oil	T197	100 to 125°F	125°F	11							
(C-04R, HS-180-2) Pressure (psig)											
Middle Seal	P181	1400 to 1600 psig	1625# (High) 1290# (Low)	1	(B)						
Upper Seal	P182	600 to 800 psig	945# (High) 545# (Low)	2	(C)						
Vapor Seal	P183	40 to 100 psig	125# (High) 20# (Low)	3	(D)						
(C-04R, HS-180-3) Level (%)											
Upper Oil Reservoir	L186	78 to 84%	85% (High) 70% (Low)	1							
Lower Oil Reservoir	L187	78 to 84%	85% (High) 77% (Low)	2							
Additional Data (gpm / psia / psig / psid)											
Bleedoff Flow	F180	0.9 to 1.3 pgm	1.5 gpm (High) 0.85 gpm (Low)	C-04R PR-150B (#10)	(K)						
RCS Pressure RCS (psia) - 15 = A (psig)	PZRPR	2240 to 2260 psia (2225 to 2245 psig)	2350# (High) 1900# (Low)	C-02/3 PR-100	(A)						
Containment Pressure	CTMTPR	0 psig	1 psig	N/A	(E)	0	0	0	0	0	0
Vapor Seal d/p (F=D-E)	CVDVAPDP	40 to 100 psid	N/A	Table 1	(F)						
Upper Seal d/p (G=C-D)	CVDUPRDP	600 to 850 psid	N/A	Table 1	(G)						
Middle Seal d/p (H=B-C)	CVDMIDDP	600 to 850 psid	N/A	Table 1	(H)						
Lower Seal d/p (I=A-B)	CVDLWRDP	600 to 850 psid	N/A	Table 1	(I)						

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ATTACHMENT D - 'D' RCP SEAL DATA

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ATTACHMENT E

RCP Seal Failure Indication Significance

(Page 1 of 1)

Indication	Possible Causes:
RCP Lower, Mid, Upper seal D/P high/low • Any seal greater than 1500 psid • D/P is less than or equal to 200 psid	Single RCP Seal Failure
RCP Lower, Mid, Upper seal D/P rate of change • 10 psid/hr	Single RCP Seal Failure
RCP Bleedoff Temperature High • Bleedoff temperature greater than 195.0 °F	Single RCP Seal Failure
RCP Bleedoff Flow High • Bleedoff Flow greater than 2.0 gpm	Single RCP Seal Failure
Vapor Seal Pressure low (any of the following) • Increasing Containment Sump level of equal to or greater than 1 gpm • less than 25 psid • Controlled Bleedoff pressure (P215) is low and NOT able to be increased using PIC-215. • Stator temperature on the affected RCP is increasing and DOES NOT stabilize. • Increased upward trend Containment radiation monitors.	Failed or Failing Vapor Seal Stage
Vapor Seal Pressure High • greater than 115 psid	Interruption of RCP Bleedoff Flow Path

Operation with D/P less than or equal to 1500 psid across a seal stage is acceptable indefinitely.

RCP seal stages are considered failed when D/P across that stage is less than or equal to 200 psid AND RCS pressure is between 2,200 and 2,300 psia

IF one seal stage fails (D/P is less than or equal to 200 psid), OR is degrading AND the following are NOT in alarm or trending toward alarm limits,
THEN allow affected RCP to remain in service:

- Controlled Bleedoff Flow
- Controlled Bleedoff Temperature

With RCS pressure at 2200 to 2300 psia, alarms are actuated when seal stage pressures deviate from nominal values by 150 psig, indicating degraded or failing operation of a particular seal stage.

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PERFORM the associated procedure step after it is first encountered **AND** when the required criteria are met unless the step has been successfully completed.

STEP 2 - TREND RCP DATA

- **TREND** RCP data

STEP 3 - CHECK RCP FOR PLANT SHUTDOWN CONDITION

- **CHECK** affected RCP seal stage
  - Any RCP seal stage D/P is greater than 1500 psid
  - RCP has one RCP seal stage failed
    AND
    another seal stage less than 650 psid
  - RCP upper or lower oil reservoir level trending out of normal range (normal 75 to 85%)

STEP 4 - CHECK ADDITIONAL RCP SEAL DEGRADATION

a. **CHECK** Bleedoff Flow **NOT** in alarm

b. **CHECK** Bleedoff Temperature **NOT** in alarm

c. **CONTINUE** to monitor affected RCP parameters for second failed or degraded RCP seal

STEP 5 - CHECK RCP BLEEDOFF FLOW

- **CHECK** RCP BLD OFF PRESS CNTL, PIC-215 maintaining 40 to 75 psig in AUTO

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: Pumping the Containment Sump – Faulted

JPM Number: JPM-211

Revision: 1

Initiated:

Robert L. Cimmino, Jr.
Developer

03/22/2016
Date

Reviewed:

David J. Jacobs
Technical Reviewer

07/05/2016
Date

Approved:

Supervisor, Nuclear Training

Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
03/22/2016	Updated to the latest format	1/0

JPM WORKSHEET

Facility: **MP2** Examinee: ____________________

JPM Number: **JPM-211** Revision: **1**

Task Title: **Pumping the Containment Sump - Faulted**

System: **Station Sumps and Drains**

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 15

Task Number(s): NUTIMS # 092-01-021

Applicable To: SRO ______ STA ______ RO **X** PEO ______

K/A Number: 103-K1.02 K/A Rating: 3.9/4.1

Method of Testing: Simulated Performance: ______ Actual Performance: X

Location: Classroom: ______ Simulator: X In-Plant: ______

Task Standards: At the completion of this JPM, the examinee has pumped the containment sump until receipt of the "CTMT NORM SUMP DIS PRESS HI" annunciator and then stop the pump(s) and report the outboard isolation valve failed to close.

Required Materials: (procedures, equipment, etc.)
OP 2336, Station Sumps and Drains
ARP 2590E-108, (BB-21) "CTMT NORM SUMP DIS PRESS HI"

General References: OP 2336, Section 4.2, Operation of the Containment Sump

***** READ TO THE EXAMINEE *****

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-211** Revision : **1**

Initial Conditions:	The containment sump level has slowly risen due to a possible secondary system leak. All other operating conditions are normal.
Initiating Cues:	The Unit Supervisor has directed you to pump the Containment sump for chemistry sampling. The US will notify you when Chemistry has obtained the required sample and the sump pumps should then be secured.
Simulator Requirements:	Initialize to any IC with: Containment sump at > 30% Malfunction **WD02B** to fail SSP-16.2 open. Malfunction **WD04** (100%, 20 sec.) to clog the CTMT Sump Strainer. No SIAS or CIAS in progress When directed after JPM step 2 Actions, trigger the malfunction WD04 (100%, 30 sec. ramp).

* * * * **NOTES TO TASK PERFORMANCE EVALUATOR** * * * *

1. Critical steps for this JPM are indicated by checking “Y”. For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-211** Revision: **1**

Task Title: **Pumping the Containment Sump – Faulted**

START TIME: __________

<table>
<tr><td rowspan="3">S T E P
1</td><td>Performance:
OP 2336, “Station Sumps and Drains”
Section 4.2
CAUTION.
1. CTMT sump should be treated as contaminated liquid.
2. Note the frequency of pumping.</td><td>Standard:
Examinee obtains a copy of OP 2336, “Station Sumps and Drains”, proceeds to Section 4.2 and reads the Caution.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: As necessary, acknowledge the Chemist has been briefed on the need to treat that sampled liquid as contaminated and you (“US”) are tracking the frequency of pumping the CTMT sump.</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">S T E P
2</td><td>Performance:
NOTE
1. Sump pumps must be manually stopped.
2. Pumping time > 3 minutes could indicate a clogged strainer basket.
3. Normal full range of pumping CTMT sump raises AWDT 6 – 7%.</td><td>Standard:
Examinee reads and acknowledges the Note.</td><td>Critical:
Y ☐ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: If questioned, Rad. Waste PEO has stated the in-service AWDT has sufficient room to receive the entire contents of the CTMT sump.</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-211** Revision: **1**

Task Title: **Pumping the Containment Sump – Faulted**

<table>
<tr><td rowspan="3">**STEP
3**</td><td>Performance:
4.2.1 IF desired, START containment sump pump “A” or “B” as follows (C-06):
a. PLACE “CTMT SUMP PP A” OR “CTMT SUMP PP B,” control switch(es) to “START.”</td><td>Standard:
Examinee starts one of the CTMT sump pumps.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: **Wait until both CTMT isolation valves are full open and sump level begins to decrease, then trigger malfunctions WD02B to fail SSP-16.2 open and WD04 (100%, 30 sec. ramp), “CTMT Sump Filter Clogged”.**</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">**STEP
4**</td><td>Performance:
4.2.1 [START containment sump pump]:
b. ENSURE the following open:
• “CTMT SUMP ISOL INBOARD, SSP-16.1”
• “CTMT SUMP ISOL OUTBOARD, SSP-16.2”
ENSURE associated sump pump starts.</td><td>Standard:
Examinee verifies SSP-16.1 and SSP-16.2 open.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">**STEP
5**</td><td>Performance:
4.2.1 [START containment sump pump]:
c. ENSURE associated sump pump starts.</td><td>Standard:
Examinee verifies applicable sump pump starts.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-211** Revision: **1**

Task Title: **Pumping the Containment Sump – Faulted**

<table>
<tr><td rowspan="3">STEP
#6</td><td>Performance:
Annunciator alarm C06/7 BB-21, “CTMT NORM SUMP DIS PRESS HI”
ARP 2590E-108:
Corrective Actions:
1. IF alarm is in for greater than one minute OR sump level is not lowering as expected PERFORM the following:
1.1. PLACE P33A, “CTMT SUMP PP A,” and P33B, “CTMT SUMP PP B" switches to “STOP” (C_06).</td><td>Standard:
Examinee observes annunciator C06/7 BB-21 and takes action to stop the containment sump pump(s). The examinee may take immediate action to stop the pump [<i>when level stops going down</i>] and then refer to the ARP or may refer to the ARP and then stop the pump.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments: The critical part of this step is to secure the CTMT sump pumps. It is not important that the subsequent steps in the ARP be performed as they do not involve the board operators. However, after taking the action to stop the running sump pump, the examinee should return to OP2336A and complete the step for ensuring the sump isolation valves close. If examinee does not state this, question as to what they are monitoring when the pumps are secured.</td></tr>
<tr><td rowspan="3">STEP
#7</td><td>Performance:
4.2.2 IF desired, STOP containment sump pump “A” or “B” as follows(C---06):
a. WHEN CTMT sump level has lowered to 10 percent, PLACE “CTMT SUMP PP A” OR “CTMT SUMP PP B,” control switch(es) to “STOP.”
b. ENSURE the following closed:
• “CTMT SUMP ISOL INBOARD, SSP-16.1”
• “CTMT SUMP ISOL OUTBOARD, SSP-16.2”</td><td>Standard:
Examinee performs the following:
1. Any running sump pump has been stopped.
2. SSP-16.1 is verified closed by its green light only lit.
3. SSP-16.2 is verified to NOT have closed by its red light only lit.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-211** Revision: **1**

Task Title: **Pumping the Containment Sump – Faulted**

STEP # 8	Performance: Examinee reports the status of SSP-16.2 to the US.	Standard: The failure of SSP-16.2 to close is reported to the US.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: As the US, acknowledge the report and state that the applicable Tech. Spec. required actions will be taken.			
	Comments: **After this step is completed, the JPM is considered complete.**			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-211** Revision: **1**

Date Performed: ____________________

Student: ____

> For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
> If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**15**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-211** Revision: **1**

Initial Conditions: The containment sump level has slowly risen due to a possible secondary system leak.

All other operating conditions are normal.

Initiating Cues: The Unit Supervisor has directed you to pump the Containment sump for chemistry sampling.

The US will notify you when Chemistry has obtained the required sample and the sump pumps should then be secured.

4.2 Operation of the Containment Sump

CAUTION

1. Effluent from Containment Sump must be treated as contaminated liquid.
2. The Operator should be aware of the pumping frequency of the Containment Sump. A rise in pumping frequency is indicative of leakage within Containment.

NOTE

1. The Containment Sump pumps will *not* automatically stop on low sump level and must be manually stopped.
2. The normal pumping time of the CTMT Sump is three minutes, any longer could indicate a clogged strainer basket.
3. Containment Sump pumps discharge to the AWDTs. Normal pumping range, from 78% to 10% CTMT sump level, will raise the level of the on−service AWDT by approximately 6−7%.

4.2.1 IF desired, START containment sump pump "A" or "B" as follows (C−06):

a. PLACE "CTMT SUMP PP A" OR "CTMT SUMP PP B," control switch(es) to "START."

b. ENSURE the following open:

- "CTMT SUMP ISOL INBOARD, SSP−16.1"
- "CTMT SUMP ISOL OUTBOARD, SSP−16.2"

c. ENSURE associated sump pump starts.

4.2.2 IF desired, STOP containment sump pump "A" or "B" as follows (C−06):

a. WHEN CTMT sump level has lowered to 10 percent, PLACE "CTMT SUMP PP A" OR "CTMT SUMP PP B," control switch(es) to "STOP."

b. ENSURE the following closed:

- "CTMT SUMP ISOL INBOARD, SSP−16.1"
- "CTMT SUMP ISOL OUTBOARD, SSP−16.2"

− End of Section 4.2 −

Approval Date 1/13/09 Effective Date 1/21/09

Setpoint: 18.5 psig

BB−21

CTMT NORM SUMP DIS PRESS HI

AUTOMATIC FUNCTIONS

1. None

CORRECTIVE ACTIONS

1. IF alarm is in for greater than one minute OR sump level is *not* lowering as expected PERFORM the following: ①
   1.1 PLACE P33A,“CTMT SUMP PP A,” and P33B,“CTMT SUMP PP B” switches to “STOP” (C-06).
   1.2 VERIFY proper valve alignment per OPS Form 2336A-1, “Station Sumps and Drains.”
   1.3 PERFORM Containment entry.
   1.4 Refer To OP 2336A, “Station Sumps and Drains” and SHIFT containment sump pump discharge strainer basket.

SUPPORTING INFORMATION

1. Initiating Devices
   - PS−9183
2. Computer Points
   - L9155
3. Procedures
   - OP 2336A, “Station Sumps and Drains”
4. Control Room Drawings
   - 25203−32030, sheet 21
5. Annunciator Card Location: TB20−J6

Level of Use
Reference

①

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: Respond to LPSI Pump failure to trip on SRAS Actuation

JPM Number: JPM-230 Revision: 2/0

Initiated:

John W. Riley	08/21/12
Developer	Date

Reviewed:

Ken Truesdale	08/22/12
Technical Reviewer	Date

Approved:

James V. Grogan	08/23/2012
Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
N/A, 08/04/2008	New JPM with new malfunction for LPSI Pump breaker failed closed alternate path. New malfunction validated on 08/11/2008 with IC-98. PSS.	0
N/A	Revised for new Trex system and selection of new IC #289 for set up.	1
JWR 08/21/2012	Revised JPM to new format. Modified JPM in response to NRC feedback for alternate path JPMs. Added steps in the beginning of JPM to take action to align charging pump suction to the RWST prior to checking SRAS. Per NRC feedback during the 2010 71111.11 inspection a good alternate path JPM has the operator perform actions prior to taking contingency action.	2/0

JPM WORKSHEET

Facility: MP 2 Examinee: ______

JPM Number: JPM-230 Revision: 2/0

Task Title: Respond to LPSI Pump failure to trip on SRAS Actuation

System: ECCS/ESAS

Time Critical Task: ( ) YES (X) NO

Validated Time (minutes): 15

Task Number(s): NUTIMS #000-05-222

Applicable To: SRO X RO X PEO ______

K/A Number: 013-A4.01 K/A Rating: 4.5/4.8

Method of Testing: Simulated Performance: ______ Actual Performance: X

Location: Classroom: ______ Simulator: X In-Plant: ______

Task Standards: At the completion of this JPM, the examinee has recognized the failure of the LPSI Pump to trip on SRAS and implemented the appropriate contingency measures from EOP-2532, LOCA.

Required Materials: EOP 2532, Loss of Coolant Accident, steps 46 through 48 (Revision 29 change 01)
(procedures, equipment, etc.)

General References: EOP 2532; Loss of Coolant Accident.

***** READ TO THE EXAMINEE *****

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: JPM-230 Revision : 2/0

Initiating Cues:

- You are the RO.
- The Unit Supervisor has directed you to perform steps 46 through 48 of EOP 2532. Step 46 aligns the charging pump suction to the RWST, step 47 ensures adequate suction for SI pumps, and step 48 monitors for and ensures SRAS initiation.
- The examiner will act as the PEO or US, as required.

Initial Conditions:

- The plant experienced a large-break LOCA.
- EOP 2525 was completed and the crew transitioned to EOP 2532.
- BAST levels are lowering and are at approximately 9%.
- SRAS initiation is expected to occur shortly (RWST level at ~ 14% and lowering with full ECCS flow).
- All RCPs are off.

Simulator Requirements: Initialize simulator with the following conditions:

- Reset to IC-289: post-large break LOCA conditions; RWST at ~14% with RWST lowering due to SI flow and BASTs at ~9% and lowering.
- IC-289 inserts malfunction RH14A for the "A" LPSI Pump breaker failure to trip
- Steps of EOP 2532 are complete up to step 46, aligning charging pump suction to the RWST (BAST levels at ~ 9%) with SRAS initiation imminent
- RCPs off
- 2-SI-659/660 are in "OPER"
- CETs are < 345 degrees F
- Rx vessel level < 43%
- Pressurizer level < 20%
- RWST at ~14% (RWST Mass "RHMRWST")
- BAST levels at ~ 9% (CVLBAT8A, CVLBAT8B)
- SRAS Annunciators C01 C-35 and D-35 not lit.

When examinee is ready, place simulator in "Run."

* * * * <u>NOTES TO TASK PERFORMANCE EVALUATOR</u> * * * *

1. Critical steps for this JPM are indicated by checking “Y”. For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: JPM-230 Revision: 2/0

Task Title: Respond to LPSI Pump Failure to Trip on SRAS Actuation

START TIME: __________

STEP #1	Performance:	Standard:	Critical:	Grade
	46. IF BAST levels are less than 10% OR boration from the BASTs is not required, PERFORM the following: a. OPEN CH-192, RWST isolation. b. ENSURE CH-504, RWST to charging suction is open. c. STOP BOTH boric acid pumps.	BAST levels are < 10% and the following actions must be taken to shift the charging pump suction from the BASTs to the RWST. a. Examinee opens CH-192, RWST isolation. Verifies red light lit and green light not lit. b. Examinee ensures CH-504, RWST to charging suction is open. Verifies red light lit and green light not lit c. Examinee stops both boric acid pumps by taking hand switches to "start" and then to "stop". Verifies green light lit, red light not lit. Discharge pressure may also be checked to verify pumps are off.	Y [X] N [ ]	S [ ] U [ ]
	Cue:			
	Comments: Pages 38 and 39 of EOP 2532 should be provided to the examinee. Allow the examinee to walk down the boards prior to taking the simulator to run.			

PERFORMANCE INFORMATION

JPM Number: JPM-230 Revision: 2/0

Task Title: Respond to LPSI Pump Failure to Trip on SRAS Actuation

<table>
<tr><td rowspan="3">STEP
#2</td><td>Performance:
46. <u>IF</u> BAST levels are less than 10% <u>OR</u> boration from the BASTs is not required, PERFORM the following (Cont):
d. ENSURE ALL of the following valves are closed:
• CH-514, boric acid isolation.
• CH-509, gravity feed isolation from BAST A.
• CH-508, gravity feed isolation from BAST B.
• CH-501, VCT outlet isolation.
• CH-196, VCT makeup bypass.</td><td>Standard:
d. Examinee closes or verifies closed the following valves and verifies their green lights are lit and red lights are not lit:
• CH-514, boric acid isolation.
• CH-509, gravity feed isolation from BAST A.
• CH-508, gravity feed isolation from BAST B.
• CH-501, VCT outlet isolation.
• CH-196, VCT makeup bypass.</td><td>Critical:
Y [X] N [ ]</td><td>Grade
S [ ] U [ ]</td></tr>
<tr><td colspan="4">Cue: The Charging pump suction has been transferred from the BASTs to the RWST.</td></tr>
<tr><td colspan="4">Comments: The examinee should be monitoring the RWST level to be ready to ensure SRAS initiation.</td></tr>
<tr><td rowspan="3">STEP
#3</td><td>Performance:
47. Check containment sump wide range level rising.</td><td>Standard:
Examinee checks containment sump wide range level rising. Uses level indicator on C101 (L8242)</td><td>Critical:
Y [ ] N [X]</td><td>Grade
S [ ] U [ ]</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: JPM-230 Revision: 2/0

Task Title: Respond to LPSI Pump Failure to Trip on SRAS Actuation

STEP #4	Performance:	Standard:	Critical:	Grade
	48. IF break is inside containment AND RWST level is less than or equal to 9%, ENSURE the following: a. SRAS has actuated. (C01) b. BOTH LPSI pumps are stopped.	Examinee identifies SRAS has actuated by SRAS annunciators on C01 (C-35 and D-35).	Y [X] N [ ]	S [ ] U [ ]
		Examinee checks that both LPSI pumps have stopped. Examinee should use pump amp meters and red and green hand switch lights to determine status. Examinee identifies that the "B" LPSI pump has stopped and the "A" LPSI pump is still running.	Y [X] N [ ]	S [ ] U [ ]
		Examinee takes action to stop the "A" LPSI pump by taking it's hand switch to start and then to stop. This will not stop the "A" LPSI pump but should be attempted. If stopping the "A" LPSI pump is not attempted it does not constitute a failure of the JPM but should be identified as a weakness.	Y [ ] N [X]	S [ ] U [ ]
	Cue: At this point, the examinee may dispatch a PEO to open the "A" LPSI Pump breaker locally. Wait 2-3 minutes and report the breaker did not open when attempted locally			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: JPM-230 Revision: 2/0

Task Title: Respond to LPSI Pump Failure to Trip on SRAS Actuation

STEP	Performance:	Standard:	Critical:	Grade
#5	48.b.1 IF LPSI pumps cannot be stopped, PERFORM the following:	Examinee determines that BOTH LPSI pumps are not stopped and goes to contingency action 48.b.1.	Y [ ] N [X]	S [ ] U [ ]
	1. CLOSE SI-635, LPSI injection valve.	Examinee closes SI-635, LPSI injection valve. Verifies valve closed by green light lit and red light not lit. Should also verify flow at zero gpm on associated flow meter.	Y [X] N [ ]	S [ ] U [ ]
	2. ENSURE TWO of the following valves are fully closed and only ONE of the valves is fully open: • SI-615, LPSI injection valve • SI-625, LPSI injection valve • SI-645, LPSI injection valve	Examinee closes TWO of the other three LPSI injection valves. Closes two of the following: SI-615, SI-625, and/or SI-645. Verifies valves closed by green light lit and red light not lit.	Y [X] N [ ]	S [ ] U [ ]
	Cue:			
	Comments:			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: JPM-230 Revision: 2/0

Date Performed: ____________________

Student: ____________________

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.
As necessary, refer to TIG-04 for additional Pass/Fail criteria.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	15	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____________________
Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: JPM-230 Revision: 2/0

Initiating Cues:

- You are the RO.
- The Unit Supervisor has directed you to perform steps 46 through 48 of EOP 2532. Step 46 aligns the charging pump suction to the RWST, step 47 ensures adequate suction for SI pumps, and step 48 monitors for and ensures SRAS initiation.
- The examiner will act as the PEO or US, as required.

Initial Conditions:

- The plant experienced a large-break LOCA.
- EOP 2525 was completed and the crew transitioned to EOP 2532.
- BAST levels are lowering and are at approximately 9%.
- SRAS initiation is expected to occur shortly (RWST level at ~ 14% and lowering with full ECCS flow).
- All RCPs are off.

INSTRUCTIONS	CONTINGENCY ACTIONS
Align Charging Pump Suction to RWST	
*46. IF BAST levels are less than 10 % OR boration from the BASTs is *not* required, PERFORM the following: a. OPEN CH–192, RWST isolation. b. ENSURE CH–504, RWST to charging suction is open. c. STOP **BOTH** boric acid pumps. d. ENSURE **ALL** of the following valves are closed: • CH–514, boric acid isolation • CH–509, gravity feed isolation from BAST A • CH–508, gravity feed isolation from BAST B • CH–501, VCT outlet isolation • CH–196, VCT makeup bypass	
Ensure Adequate Suction for SI Pumps	
*47. CHECK containment sump wide range level rising.	47.1 PERFORM **ALL** of the following: • ENSURE CIAS has actuated. (C01) • CONTACT the TSC to develop plan to restore or maintain RWST level.

INSTRUCTIONS | CONTINGENCY ACTIONS

SRAS Initiation Criteria

*48. <u>IF</u> break is inside containment <u>AND</u> RWST level is less than or equal to 9%, ENSURE the following:

a. SRAS has actuated. (C01)

b. **BOTH** LPSI pumps are stopped.

b.1 <u>IF</u> LPSI pumps cannot be stopped, PERFORM the following:

1) CLOSE SI−635, LPSI injection valve.

2) ENSURE **TWO** of the following valves are fully closed and only **ONE** of the valves is fully open:

- SI−615, LPSI injection valve
- SI−625, LPSI injection valve
- SI−645, LPSI injection valve

c. **BOTH** ctmt sump outlet isolation valves are open:

- CS−16.1A
- CS−16.1B

d. **BOTH** RBCCW outlet valves from the shutdown cooling heat exchangers are open:

- RB−13.1A
- RB−13.1B

e. **BOTH** SI/CS miniflow valves are closed:

- SI−659
- SI−660

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: **Actuation Tests of Various ESF Components**

JPM Number: JPM 243

Revision: 0

Initiated:

David J. Jacobs 07/14/2014

Developer Date

Reviewed:

Doug M. Funk 07/14/2014

Technical Reviewer Date

Approved:

Mike J. Cote 07/17/2014

Supervisor, Nuclear Training Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
07/14/2014	New JPM for Audit Exam ILT 2013-2014	0

JPM WORKSHEET

Facility: **Millstone Unit 2** Examinee: ______________________

JPM Number: **JPM 243** Revision: **0**

Task Title: **Actuation Test ESF Components**

System: Engineered Safety Features Actuation System

Time Critical Task: ( ) YES (**X**) NO

Validated Time (minutes): 30

Task Number(s): NUTIMS 013-01-002

Applicable To: SRO **X** STA ____ RO **X** PEO ____

K/A Number: 013 A4.03 K/A Rating: 4.5 / 4.7

Method of Testing: Simulated Performance: ____ Actual Performance: **X**

Location: Classroom: ____ Simulator: X In-Plant: ____

Task Standards: At the completion of the JPM the Examinee will have Tested an Engineered Safety Features Actuation System Actuation Module AM518 per SP 2604T "Actuation Tests of Various ESF Components"

Required Materials: (procedures, equipment, etc.) SP 2604T "Actuation Tests of Various ESF Components" Section 4.2 AM518

General References: SP 2604T "Actuation Tests of Various ESF Components"

Technical Specifications

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM 243** Revision : **0**

Initial Conditions: The Plant is operating at 100% power with the following conditions:

- Chilled Water System is in service and aligned per OP 2330C
- Chiller X-169A and X-169B aligned for Standby Operations

Initiating Cues: The Unit Supervisor has directed you to perform a test of Actuation Module AM518.

Perform SP 2604T Section 4.2 for Actuation Module AM518

Record data on SP 2604T-001

All Alarms for this activity will be addressed by the Reactor Operator

Simulator Requirements: 100% IC

Following Overrides for F-54A DC Switchgear Room Fan to OFF:

- CHHS8871_1 --- INSERT NR (Not Red Light)
- CHHS8871_2 --- INSERT G (Green Light Lit)
- 11A1S5 DC SWGR Fan-54A STOP

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM 243** Revision: **0**

Task Title: **Actuation Tests of Various ESF Components**

START TIME: __________

<table>
<tr><td rowspan="3">STEP
#1</td><td>Performance:
1. Refer To OP 2330C, “Chilled Water System,” and ENSURE vital chiller, X-169A is aligned for standby operation AND X-169B is <i>not</i> in operation.</td><td>Standard:
Examinee reads the NOTE and refers to the initial conditions for the Chilled Water System status.</td><td>Critical:
Y [ ] N [X]</td><td>Grade
S [ ] U [ ]</td></tr>
<tr><td colspan="4">Cue:
System is aligned per OP 2330C and ALL Alarms will addressed by the Reactor Operator</td></tr>
<tr><td colspan="4">Comments:
Normal alignment Chiller X169A and X169B is not normally running “No Red Light” , but in Standby</td></tr>
<tr><td rowspan="3">STEP
#2</td><td>Performance:
2. STOP “F-54A, A DC SWGR RM A/C FAN,” (C-80).</td><td>Standard:
Examinee locates panel C-80 and the Handswitch for F-54A and places it to OFF and allows it to spring return to AUTO</td><td>Critical:
Y [X] N [ ]</td><td>Grade
S [ ] U [ ]</td></tr>
<tr><td colspan="4">Cue:
Insert following Override Digital Outputs for F54A fail to Start after the Handswitch for F-54A is placed in STOP
• CHHS8871_1 --- INSERT NR (Not Red Light)
• CHHS8871_2 --- INSERT G (Green Light Lit)
• 11A1S5 DC SWGR Fan-54A STOP</td></tr>
<tr><td colspan="4">Comments:
PPC Alarm will come in when the Handswitch for F-54A is place in OFF and PPC Alarm may clear when the Actuation Module is triggered.</td></tr>
</table>

STEP #3	Performance: 3. Depending on current condition, PERFORM applicable action: • IF SIAS is *not* “Blocked” (*PZR pressure greater than or equal to 1,850 psia), CHECK all “1/5” lights or bistable “TRIP” lights *not* lit for SIAS, CIAS, EBFAS, CSAS, or SG on Facility 1 and Facility 2 ESAS actuation and sensor cabinets.	Standard: Examinee checks RCS pressure > 1800 psi and SIAS is not Blocked on C01 or ESF Cabinets. Verifies no 1/5 lights lit on ESF actuation modules.	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue:			
	Comments:			
STEP #4	Performance: 4. PLACE “S-501, TEST PERMISSIVE SWITCH” in “TEST SIAS.” (ESAS actuation cabinet 5)	Standard: Examinee locates S-501 and places in test SIAS	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue:			
	Comments:			
STEP #5	Performance: 5. PLACE “S-502, TEST GROUP SWITCH” in “GROUP 5.” (ESAS actuation cabinet 5)	Standard: Examinee locates S-502 and places in test Group 5	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue:			
	Comments:			
STEP #6	Performance: 6. PLACE “S-102, TRIP TEST” switch, in “CONT PRESS SIAS/CIAS/EBFAS/MSI.” (ESAS Sensor Cabinet ‘A’)	Standard: Examinee locates S-102 and places in Containment Pressure SIAS/CIAS/EBFAS/MSI	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue:			
	Comments:			

STEP #7	Performance: **NOTE** *When the next step is performed, many "1/5" lights illuminate on the actuation modules.* 7. PRESS and HOLD "TRIP TEST" button on bistable, BA101. (ESAS Sensor Cabinet 'A')	Standard: Examinee locates and <u>Presses</u> and <u>Holds</u> the trip test button on the correct Bistable.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue:			
	Comments: Most Operators will find and place flag on the correct Actuation Module prior to this step so you are not searching for the AM while holding the trip test button.			
STEP #8	Performance: 8. CHECK *lower* "1/5" light lit on actuation module, AM518. (ESAS actuation cabinet 5)	Standard:	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue:			
	Comments: There is a difference in 1/5 lights and Trip Test Buttons between the Simulator and the Plant. In the plant the 1/5 lights and Trip Test Buttons are next to each other. The Simulator has the both 1/5 lights above the two Trip Test Buttons. The procedure Steps as written work for both the Simulator and the Plant.			
STEP #9	Performance: 9. To initiate start signal, PRESS *lower* "1/5" "TEST" button on actuation module, AM518. (ESAS actuation cabinet 5)	Standard: Examinee presses the Test Button to initiate equipment	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue:			
	Comments: There is a difference in 1/5 lights and Trip Test Buttons between the Simulator and the Plant. In the plant the 1/5 lights and Trip Test Buttons are next to each other. The Simulator has the both 1/5 lights above the two Trip Test Buttons. The procedure Steps as written work for both the Simulator and the Plant.			
STEP #10	Performance: 10. RELEASE "TRIP TEST" button on bistable BA101. (ESAS Sensor Cabinet 'A')	Standard:	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue:			
	Comments:			

<table>
<tr><td rowspan="3">STEP #11</td><td>Performance:
11. OBSERVE the following and INITIAL for the “Results” on SP 2604T-001:
• Actuation module, AM518, red “TRIP” light is lit (ESAS actuation cabinet 5)
• “F-54A, A DC SWGR RM A/C FAN,” started (C-80)
• “P-122A, VITAL CHILL WTR PP,” started (C-80)
• “X-169A, VITAL CHILLER,” red indicating light is lit (C-80)
• “CHW-3, CHIL WTR SPLY TO DC SWGR A/C X-84A,” is open (C-80)
• “CHW-11, CHIL WTR PPS P-122A/123 SPLY HDRS X-TIE,” is closed (C-80)
• “CHW-13, CHILL WATER PUMPS (P122A/P123) RETURN HEADER CROSSTIE,” is closed (C-80)</td><td>Standard:
Examinee should locate and observe all the listed equipment running with the exception of
F-54A “A DC SWGR RM A/C FAN”
Examinee should make a report to the Unit Supervisor of the discrepancy.

Critical action of this step is that the Examinee recognizes F-54A “A DC SWGR RM A/C FAN” fails to Start.

Examinee should also identify the LCO for DC Switchgear Operability.</td><td>Critical:
Y [X] N [ ]</td><td>Grade
S [ ] U [ ]</td></tr>
<tr><td colspan="4">Cue:
As the Unit Supervisor acknowledge the Report from the Examinee.</td></tr>
<tr><td colspan="4">Comments:
Ask the Examinee for any recommendations regarding the Fan and if any LCO should be entered and any T.S.A.S. required. Examinee should recommend continuing with the procedure to restore cooling to the DC Switch gear Room by Starting the Fan and that the DC Switch gear maybe considered in-operable.</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM 243** Revision: **0**

Date Performed: ____________

Student: ____________

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.
As necessary, refer to TIG-04 for additional Pass/Fail criteria.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**30**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____________

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number:	**JPM 243**	Revision:	**0**

Initiating Cues:

The Unit Supervisor has directed you to perform a test of Actuation Module AM518.

Perform SP 2604T Section 4.2 for Actuation Module AM518

Record data on SP 2604T-001

All Alarms for this activity will be addressed by the Reactor Operator

Initial Conditions:

The Plant is operating at 100% power with the following conditions:

- Chilled Water System is in service and aligned per OP 2330C
- Chiller X-169A and X-169B aligned for Standby Operations

MILLSTONE POWER STATION
SURVEILLANCE PROCEDURE

Actuation Tests of Various ESF Components

SP 2604T
Rev. 005

Approval Date: 04/14/16

Effective Date: 04/19/16

Level of Use
Continuous

Millstone Unit 2
Surveillance Procedure

Actuation Tests of Various ESF Components

TABLE OF CONTENTS

1. PURPOSE

1.1 Objective

This procedure provides instructions for testing the actuation and OPERABILITY of various ESF components *not* tested by ATI to partially satisfy Technical Specifications Surveillance Requirement, 4.3.2.1.1, Table 4.3−2, item 1d.

1.2 Discussion

The objective of this procedure is satisfied by initiating automatic actuation test signals from ESAS to selected components and observing they position as required following initiation. Checking actuation module, red “TRIP” light lit tests the OPERABILITY of ESAS trip logic.

To satisfy Technical Specifications LCO, 3.3.2.1, this surveillance is required to be met when the plant is in OPERATIONAL MODE 1, 2, or 3.

The system engineer recommends that the chiller is run for 24 hours.

The CAR fans running amperage is dependent on various factors, which includes their manufacture and design efficiency. The ‘C’ CAR fans high and low speeds running amperages do not indicate much difference, as compared to the other CAR fans different running speeds amperages.

1.3 Applicability

This procedure is performed in all MODES.

1.4 Frequency

This surveillance is required to be performed at least once every 31 days.

2. PREREQUISITES

2.1 General

2.1.1 The SM or US has reviewed plant conditions and authorized the performance of this test on SP 2604T−001, “Actuation Tests of Various ESF Components, Facility 1,” or SP 2604T−002, “Actuation Tests of Various ESF Components, Facility 2.”

2.2 **Documents**

2.2.1 OP 2313A, “Containment Air Recirculation and Cooling System”

2.2.2 OP 2330C, “Chilled Water System”

2.3 **Definitions**

2.3.1 ATI – Automatic Test Inserter

3. PRECAUTIONS

N/A

4.2 Testing Actuation Module, AM518

NOTE

The following alarms may be received during the performance of this section:

- "ESAS COMPONENT UNDER TEST FAILURE" (C−01 B41)
- "SIAS OR UV ACTUATION SIG CH 1 TRIP" (C−01 A34)
- "CONT PRESS HI A" (C−01 A21)
- "SIAS CH 1 TROUBLE" (C−01X AA5)
- "DC SWGR FAN A F54A − OP2315L" (PPC)

4.2.1 Refer To OP 2330C, "Chilled Water System," and ENSURE vital chiller, X−169A is aligned for standby operation AND X−169B is *not* in operation.

4.2.2 STOP "F−54A, A DC SWGR RM A/C FAN" (C−80).

4.2.3 Depending on current condition, PERFORM applicable action:

- IF SIAS is *not* "Blocked" (*pzr pressure greater than or equal to 1,850 psia), CHECK all "$^1/_5$" lights or bistable "TRIP" lights *not* lit for SIAS, CIAS, EBFAS, CSAS, or SG on Facility 1 and Facility 2 ESAS actuation and sensor cabinets

- IF SIAS is "Blocked" (pressurizer pressure less than 1,850 psia) CHECK all lower "$^1/_5$" lights (from containment pressure input) *not* lit for SIAS, CIAS, EBFAS, CSAS, or SG on Facility 1 and Facility 2 ESAS actuation and sensor cabinets

- IF MSI is "Blocked" (SG pressure less than 700 psia) all lower "$^1/_5$" lights (from containment pressure input) *not* lit for SIAS, CIAS, EBFAS, CSAS, or SG on Facility 1 and Facility 2 ESAS actuation and sensor cabinets

4.2.4 PLACE "S−501, TEST PERMISSIVE SWITCH" in "TEST SIAS" (ESAS actuation cabinet 5).

4.2.5 PLACE "S−502, TEST GROUP SWITCH" in "GROUP 5" (ESAS actuation cabinet 5).

4.2.6 PLACE “S−102, TRIP TEST” switch, in “CONT PRESS SIAS/CIAS/EBFAS/MSI” (ESAS Sensor Cabinet ‘A’).

NOTE

When the next step is performed, many “$^1/_5$” lights illuminate on the actuation modules.

4.2.7 PRESS and HOLD “TRIP TEST” button on bistable BA101 (ESAS Sensor Cabinet ‘A’).

4.2.8 CHECK *lower* “$^1/_5$” light lit on actuation module AM518 (ESAS actuation cabinet 5).

4.2.9 PRESS “TEST 2” button on actuation module AM518 to initiate start signal (ESAS actuation cabinet 5).

4.2.10 RELEASE “TRIP TEST” button on bistable BA101 (ESAS Sensor Cabinet ‘A’).

4.2.11 OBSERVE the following and INITIAL for the “Results” on SP 2604T−001:

- Actuation module, AM518, red “TRIP” light is lit (ESAS actuation cabinet 5)
- “F−54A, A DC SWGR RM A/C FAN,” started (C−80)
- “P−122A, VITAL CHILL WTR PP,” started (C−80)
- “X−169A, VITAL CHILLER,” red indicating light is lit (C−80)
- “CHW−3, CHIL WTR SPLY TO DC SWGR A/C X−84A,” is open (C−80)
- “CHW−11, CHIL WTR PPS P−122A/123 SPLY HDRS X−TIE,” is closed (C−80)
- “CHW−13, CHILL WATER PUMPS (P122A/P123) RETURN HEADER CROSSTIE,” is closed (C−80)

4.2.12 CHECK “CHILLER SYSTEM A, X−169A,” blue indicating light, lit (C−01X).

4.2.13 PLACE the following to "START" and RELEASE (C−80):

- "F−54A, A DC SWGR RM A/C FAN"
- "P−122A, VITAL CHILL WTR PP"

4.2.14 PLACE "CHW−3, CHIL WTR SPLY TO DC SWGR A/C X−84A" switch to "OPEN" (C−80).

4.2.15 PLACE "CHW−11, CHIL WTR PPS P−122A/123 SPLY HDRS X−TIE" switch to "CLOSE" (C−80).

4.2.16 PLACE "CHW−13, CHIL WTR PPS P−122A/123 RETURN HDRS X−TIE" switch to "CLOSE" (C−80).

4.2.17 PRESS "ACTUATION RESET SIAS" button (ESAS actuation cabinet 5).

4.2.18 PRESS red "TRIP" light on bistable, BA101 (ESAS Sensor Cabinet 'A').

4.2.19 PLACE "S−102, TRIP TEST" switch in "OPERATE" (ESAS Sensor Cabinet 'A').

4.2.20 PLACE "S−501, TEST PERMISSIVE SWITCH" in "OPERATE" (ESAS actuation cabinet 5).

4.2.21 PLACE "S−502, TEST GROUP SWITCH" in "GROUP 1" (ESAS actuation cabinet 5).

4.2.22 PRESS red "ATI FAULT PRESS TO RESET" light (ESAS actuation cabinet 5).

4.2.23 Refer To OP 2330C, "Chilled Water System," and PERFORM applicable actions to allow vital chiller to continue to supply "A" DC Switchgear Room for at least four hours.

4.2.24 <u>WHEN</u> at least four hours have elapsed, INITIAL SP 2604T−001 for "X−169A, Vital Chiller," being in service for at least four hours.

4.2.25 <u>WHEN</u> required chiller run time has lapsed (24 hrs) <u>OR</u> as directed, Refer To OP 2330C, "Chilled Water System," and PERFORM application actions to return X−169A to standby.

− End of Section 4.2 −

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: **Placing CAR RBCCW Valve In Manual Local Operation**

JPM Number: JPM-245

Revision: 1

Initiated:

Robert L. Cimmino, Jr.

Developer

05/04/2016

Date

Reviewed:

David J. Jacobs

Technical Reviewer

07/05/2016

Date

Approved:

Supervisor, Nuclear Training

Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
05/04/2016	Updated to latest template and procedure revision	1/0

JPM WORKSHEET

Facility: **MP2** Examinee: ____________

JPM Number: **JPM-245** Revision: **1**

Task Title: **Placing CAR RBCCW Valve In Manual Local Operation.**

System: RBCCW

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 15

Task Number(s): NUTIMS #

Applicable To: SRO **X** STA ____ RO **X** PEO **X**

K/A Number: 022/A4.04 K/A Rating: 3.1/3.2

Method of Testing: Simulated Performance: X Actual Performance: ____

Location: Classroom: ____ Simulator: ____ In-Plant: X

Task Standards: At the completion of this JPM, the examinee will have simulated placing an RBCCW valve in manual local operation, and open.

Required Materials: OP 2330A, RBCCW System
(procedures, equipment, etc.)

General References: OP 2330A, Section 4.9

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-245** Revision : **1**

Initial Conditions:	• The plant has experienced an Excess Steam Demand event in the Containment. • Facility 2 is de-energized due to faults on the bus. • Valve 2-RB-28.3A (CAR Cooler "A" emergency outlet) failed to operate from the Control Room.
Initiating Cues:	• The US has directed you to place 2-RB-28.3A in manual local control and standby for directions. • Where necessary the examiner will act as the Unit Supervisor. • All other actions will be handled by others.
Simulator Requirements:	N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-245** Revision: **1**

Task Title: Placing CAR RBCCW Valve In Manual Local Ops.

START TIME: __________

<table>
<tr><td rowspan="3">STEP
#1</td><td>Performance:
Refer to OP 2330A ‘RBCCW System’ step 4.6 “Manual Operation of RBCCW CAR cooler valves”.</td><td>Standard:
Examinee obtains procedure OP 2330A and finds step 4.6 “Manual operation of RBCCW CAR Cooler valves”.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
When asked, provide Examinee with a copy of OP 2330A</td></tr>
<tr><td colspan="4">Comments:
For purposes of this JPM the examinee will be performing the steps for 2-RB-28.3A. Some of the steps will be done at the valve (in the RCA), and in areas where access is limited. The required exam topic should be performed by standing near the valve and describing the operation.</td></tr>
<tr><td rowspan="3">STEP
#2</td><td>Performance:
Close instrument air isolation to 2-RB-28.3A</td><td>Standard:
Examinee points to the “Whitey” air isolation valve and indicates that he would turn it in the clockwise direction to close.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Upon successful completion of step, state the “Whitey” valve is closed</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#3</td><td>Performance:
Refer to Table 1 and determine applicable fuseblock to remove. Examinee should request that Control Room personnel remove the fuse.</td><td>Standard:
Examinee refers to Table 1 and identifies that fuse “CFD” in C-01R should be removed. Also, the examinee may state that the valve should fail open when the fuse is removed.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Examiner states that the fuse has been removed by Control Room personnel, and that the sound of air release is heard, and the valve is moving to the open position.</td></tr>
<tr><td colspan="4">Comments:
The fuse block is located <i>inside</i> the main control boards, which have very limited access while at power.</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-245** Revision: **1**

Task Title: Placing CAR RBCCW Valve In Manual Local Ops.

STEP #4	Performance: Loosen allen head screw on lever arm of “air cylinder” operating shaft.	Standard: Examinee indicates that he would use the attached allen wrench to loosen the screw.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: Examiner states that the allen screw is loose.			
	Comments:			
STEP #5	Performance: Operate the manual handwheel to align the manual operator shaft to valve stem for the lever arm insertion.	Standard: Examinee states that he would move the manual handwheel to align the shaft.	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Examiner states that the shafts are now aligned.			
	Comments:			
STEP #6	Performance: Loosen allen screw on lever arm of “Manual” operating shaft and Engage arm.	Standard: Examinee states that he must access the area under the valve and loosen the allen screw. He then would engage the lever arm for the manual operator.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: Examiner states that the lever arm is engaged.			
	Comments:			
STEP #7	Performance: Tighten the allen screw for the manual lever arm.	Standard: Examinee states that he would turn allen screw to tighten the lever arm for the manual handwheel.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: Examiner states that the allen screw is tight.			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-245** Revision: **1**

Task Title: Placing CAR RBCCW Valve In Manual Local Ops.

<table>
<tr><td rowspan="3">STEP #8</td><td>Performance:
Disengage the lever arm from the "air cylinder" operating shaft and tighten the allen screw to prevent the lever arm from becoming engaged again.</td><td>Standard:
Examinee states that he would move the lever arm out of the way and that he may need to move the manual handwheel to relieve the tension on the arm to allow this. Also states that he would then tighten the allen screw (clockwise) to prevent the movement of the lever arm.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Examiner states that the lever arm is disengaged and allen screw is tight.</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP #9</td><td>Performance:
Position valve as directed by the SM/US.</td><td>Standard:
Examinee may state that he would ensure Tech. Specs. were referred to and open the valve by direction of the SM/US.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:
After this step is completed, the JPM is considered complete.</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: ______________________ Revision: ________

Date Performed: ______________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**15**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

~~JPM Number~~: **JPM-245** ~~Revision~~: **1**

~~Initial Conditions~~:

- The plant has experienced an Excess Steam Demand event in the Containment.
- Facility 2 is de-energized due to faults on the bus.
- Valve 2-RB-28.3A (CAR Cooler "A" emergency outlet) failed to operate from the Control Room.

~~Initiating Cues~~:

- The US has directed you to place 2-RB-28.3A in manual local control and standby for directions.
- Where necessary the examiner will act as the Unit Supervisor.
- All other actions will be handled by others.

4.9 Manual Operation of RBCCW CAR Cooler Valves

Table 3.

Valve Number	Function
2−RB−28.1A	“‘A’ CAR COOLER RBCCW INLET ISOLATION”
2−RB−28.1B	“‘B’ CAR COOLER RBCCW INLET ISOLATION”
2−RB−28.1C	“‘C’ CAR COOLER RBCCW INLET ISOLATION”
2−RB−28.1D	“‘D’ CAR COOLER RBCCW INLET ISOLATION”
2−RB−28.2A	“‘A’ CAR COOLER RBCCW NORMAL OUTLET ISOLATION”
2−RB−28.2B	“‘B’ CAR COOLER RBCCW NORMAL OUTLET ISOLATION”
2−RB−28.2C	“‘C’ CAR COOLER RBCCW NORMAL OUTLET ISOLATION”
2−RB−28.2D	“‘D’ CAR COOLER RBCCW NORMAL OUTLET ISOLATION”
2−RB−28.3A	“‘A’ CAR COOLER RBCCW EMERG OUTLET ISOLATION”
2−RB−28.3B	“‘B’ CAR COOLER RBCCW EMERG OUTLET ISOLATION”
2−RB−28.3C	“‘C’ CAR COOLER RBCCW EMERG OUTLET ISOLATION”
2−RB−28.3D	“‘D’ CAR COOLER RBCCW EMERG OUTLET ISOLATION”
2-RB-29A	“‘A’ CAR COOLER RBCCW OUTLET ISOLATION”
2-RB-29B	“‘B’ CAR COOLER RBCCW OUTLET ISOLATION”
2-RB-29C	“CAR COOLER ′C ′ RBCCW OUTLET ISOLATION”
2-RB-29D	“‘D’ CAR COOLER RBCCW OUTLET ISOLATION”

4.9.1 PERFORM the following to place any valve in “MANUAL”:

a. Using Attachment 3, PERFORM applicable actions for the valve to be placed in manual.

b. INITIATE a new Attachment 3 and PERFORM applicable actions for each additional valve to be placed in manual.

c. RETAIN each Attachment 3 until applicable valve restored to automatic.

4.9.2 Using Attachment 3, PERFORM applicable actions to restore any valve to “AUTOMATIC.”

− End of Section 4.9 −

Attachment 3

Manual Operation of RBCCW CAR Cooler Valves

(Sheet 1 of 4)

Valve Number	Function

CAUTION

1. RBCCW flow through each CAR cooler should not exceed 2,250 gpm during normal or shutdown operation. Flow rates up to 2,400 gpm are allowed for short durations (one to two days) while aligning components, surveillance testing, or performing maintenance. [Ref. 6.17, 6.29]
2. Care should be used when manually operating CAR cooler valves listed in Table 5 (Attachment 3). In manual, the valve is easily positioned. Once the valve contacts the seat, *no* additional closing force is required to close the valve. Forcing operator onto its seat may cause operator damage. Valve travel stops are set in the actuator and not in the valve.
3. Forcing lever arm insertion after manual alignment of the manual operator shaft or the pneumatic actuator shaft to valve stem could result in actuator damage. The 6″ normal supply outlet valves (2−RB−28.2A, 2B, 2C, and 2D) are most susceptible to damage (the shear pin, connecting the actuator and valve at the lever arm coupling, is much smaller than the 10″ valves' shear pins). The open travel stop the 6″ normal supply valves are set between 5 to 15% open.

NOTE

1. Two allen wrenches are located locally at *each* valve.
2. The manual actuator is *reverse* operating on RBCCW CAR cooler valves.
3. Loss of electrical power (removing the fuse) or loss of air pressure will cause the valve to fail open.

3. PERFORM the following to place *any* CAR cooler valve to "MANUAL:"

   3.1 DOCUMENT valve number and function on top of Attachment.

   3.2 IF CAR cooler valve is to be repositioned, ENSURE adequate RBCCW header margin available.

   3.3 ENSURE CAR cooler valve, open.

Attachment 3
Manual Operation of RBCCW CAR Cooler Valves
(Sheet 2 of 4)

3.4 IF in MODE 1, 2, 3, or 4 LOG entry into the following:

3.4.1 TSAS 3.6.3.1

3.4.2 TRM 3.6.3.1

3.5 IF in MODE 1, 2, or 3 (greater than or equal to 1,750 psia), AND valve to be positioned is a CAR cooler inlet valve or a CAR cooler emergency outlet valve, LOG ENTRY in TSAS 3.6.2.1.

3.6 CLOSE instrument air isolation to air operator.

3.7 Refer To Table 5. and DETERMINE applicable fuseblock.

Table 5.

Valve Number	Function	Fuseblock (C–01R)
2–RB–28.1A	"'A' CAR COOLER RBCCW INLET ISOLATION"	CFM
2–RB–28.1B	"'B' CAR COOLER RBCCW INLET ISOLATION"	DFM
2–RB–28.1C	"'C' CAR COOLER RBCCW INLET ISOLATION"	CFN
2–RB–28.1D	"'D' CAR COOLER RBCCW INLET ISOLATION"	DFN
2–RB–28.2A	"'A' CAR COOLER RBCCW NORMAL OUTLET ISOLATION"	CFXG
2–RB–28.2B	"'B' CAR COOLER RBCCW NORMAL OUTLET ISOLATION"	DFXH
2–RB–28.2C	"'C' CAR COOLER RBCCW NORMAL OUTLET ISOLATION"	CFXH
2–RB–28.2D	"'D' CAR COOLER RBCCW NORMAL OUTLET ISOLATION"	DFXG
2–RB–28.3A	"'A' CAR COOLER RBCCW EMERG OUTLET ISOLATION"	CFD
2–RB–28.3B	"'B' CAR COOLER RBCCW EMERG OUTLET ISOLATION"	DFA
2–RB–28.3C	"'C' CAR COOLER RBCCW EMERG OUTLET ISOLATION"	CFJ
2–RB–28.3D	"'D' CAR COOLER RBCCW EMERG OUTLET ISOLATION"	DFB

3.8 LOOSEN allen head screw (lever arm of air cylinder operating shaft).

3.9 REMOVE fuseblock for valve being placed in "MANUAL" (C–01R).

Attachment 3
Manual Operation of RBCCW CAR Cooler Valves

(Sheet 3 of 4)

3.10 To align manual operator shaft to valve stem for lever arm insertion, OPERATE “MANUAL” handwheel.

3.11 LOOSEN allen head screw (lever arm of manual operating shaft) and ENGAGE lever arm.

3.12 TIGHTEN allen head screw (lever arm of manual operating shaft).

NOTE

Slight movement of “MANUAL” handwheel may be required to relieve tension.

3.13 To prevent inadvertent engagement of lever arm and air operating shaft, PERFORM the following:

3.13.1 DISENGAGE lever arm from air cylinder shaft and HOLD in “DISENGAGED” position.

3.13.2 ROTATE allen head screw *clockwise* until it maintains lever arm in “DISENGAGED” position.

3.13.3 RELEASE lever arm.

3.13.4 OPERATE handwheel to position valve as directed by SM or US.

4. PERFORM the following to restore CAR cooler valve to “AUTOMATIC:”

NOTE

Open position is “FAIL” position.

4.1 IF CAR cooler valve is to be repositioned, ENSURE adequate RBCCW header flow margin available.

4.2 ENSURE valve manually open.

NOTE

Slight movement of handwheel may be required for proper alignment.

4.3 LOOSEN allen head screw (lever arm of air cylinder operating shaft) and ENGAGE lever arm.

4.4 TIGHTEN allen head screw (lever arm of air cylinder operating shaft).

4.5 LOOSEN allen head screw (lever arm of manual operating shaft).

4.6 PERFORM the following to prevent inadvertent engagement of level arm and manual operating shaft:

4.6.1 DISENGAGE lever arm from manual shaft and HOLD in "DISENGAGED" position.

4.6.2 ROTATE allen head screw *clockwise* until it maintains level arm in "DISENGAGED" position.

4.6.3 RELEASE lever arm.

4.7 Refer To Table 5. and INSTALL applicable fuseblock, for valve being placed in "AUTOMATIC" operation.

4.8 OPEN instrument air isolation to air operator.

4.9 <u>IF</u> in MODEs 1, 2, or 3 (greater than or equal to 1,750 psia), <u>AND</u> valve positioned is a CAR cooler inlet valve, or a CAR cooler emergency outlet valve, LOG out of TSAS 3.6.2.1.

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: EOP 2541 Appendix 34 Turbine Building Sump Alignment

JPM Number: JPM-265 Revision: 0/1

Initiated:

David J. Jacobs 02/14/2012

Developer Date

Reviewed:

Joseph M. Amarello 02/14/2012

Technical Reviewer Date

Approved:

Mike J. Cote 02/24/2012

Supervisor, Nuclear Training Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
06/26/2014 djj	Updated to new format	0/1

JPM WORKSHEET

Facility: **Millstone Unit 2** Examinee: ______

JPM Number: **JPM-265** Revision: 0/1

Task Title: EOP 2541 Appendix 34 Turbine Building Sump Alignment

System: 2336 Station Sumps and Drains

Time Critical Task: ( ) YES (**X**) NO

Validated Time (minutes): 15

Task Number(s): NUTIMS 092-01-006

Applicable To: SRO **X** STA ______ RO **X** PEO ______

K/A Number: 2.3.11 K/A Rating: 3.8 / 4.3

Method of Testing: Simulated Performance: **X** Actual Performance: ______

Location: Classroom: ______ Simulator: ______ In-Plant: **X**

Task Standards: At the completion of this JPM, the examinee has simulated realigning Turbine Building Sumps to CPF.

Required Materials: (procedures, equipment, etc.)
- MP-PROC-OPS-EOP 2541-APP34 Turbine Building Sump Alignment

General References:
- MP-PROC-OPS-EOP 2541-APP34 REV. 000

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-265** Revision : 0/1

Initial Conditions:
- The Unit has been Manually Tripped due to a Steam Generator Tube Rupture approximately 1 hour ago.
- The Balance of Plant Operator has directed you to perform EOP 2541 Appendix 34 and realign Turbine Building Sump to CPF.

Initiating Cues:
- The plant was tripped due to a Steam Generator Tube Rupture currently in EOP 2534.
- Turbine Building sumps are aligned normally per OP 2336A.

Simulator Requirements: N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking “Y”. For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-265** Revision: 0/1

Task Title: EOP 2541 Appendix 34 Turbine Building Sump Alignment

START TIME: __________

STEP #1	Performance: 1. ENSURE BOTH of the following for the in-service CPF tank: (TK-10 or TK-11) • Adequate tank volume exists to receive influent. • The tank is not being discharged	Standard: The examinee Verifies the following: • TK-10 or TK-11 volume on panel "2CND-PNLCDX". • Verifies no Discharge Placard for the TK in service to receive TB Sump effluent.	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue: Tank level for TK in service is 20%			
	Comments: Indication for TK-10 and TK-11 on "CPF Condensate Demineralizer Waste Treating Panel", 2CND-PNLCDX			
STEP #2	Performance: 2. UNLOCK and OPEN ONE of the following valves to the in-service CPF tank: • "AR-81A, CONDENSER PIT SUMP TO TK 10"(CPF) • "AR-81B, CONDENSER PIT SUMP TO TK 11" (CPF)	Standard: Examinee states they would UNLOCK and OPEN either • "AR-81A, CONDENSER PIT SUMP TO TK 10"(CPF) • "AR-81B, CONDENSER PIT SUMP TO TK 11" (CPF) by rotating the handwheel in the counter clockwise direction.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: Valve Stem rising the Valve is OPEN			
	Comments: Located by Acid and Caustic Tanks lower level CPF			

STEP #3	Performance: 3. PLACE ALL of the following Turbine Building Sump Pump handswitches in “STOP”: • Condenser Pit A, “P73A” (West) • Condenser Pit A, “P73B” (West) • Condenser Pit B, “P39A” (East) • Condenser Pit B, “P39B” (East) • Motor Driven Auxiliary SGFP Room, “P125” • Turbine Driven Auxiliary SGFP Room, “P72A” • Turbine Driven Auxiliary SGFP Room, “P72B	Standard: Examinee locates and states, they would position the local Handswitches to OFF.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: Switch is in OFF			
	Comments: For Safety concerns the Examinee and Examiner do not have to climb down the ladder to simulate West Condenser Pit sumps as long as the Examinee states that the switches are similar to the East Pit Sump Pump Handswitches			
STEP #4	Performance: 4. CLOSE “SS-25, CONDENSER PIT AND AFW SUMPS TO OIL SEPARATOR #2". (Northeast corner of condenser)	Standard: Examinee locates SS-25, and closes by rotating handwheel in clockwise direction.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: Valve is Closed			
	Comments: Located Northeast corner of condenser in the Turbine Building overhead			
STEP #5	Performance: 5. OPEN “AR-80, TURBINE BUILDING SUMPS TO CPF TK 10/11”. (Northeast corner of condenser)	Standard: Examinee locates AR-80, and open by rotating handwheel in counter clockwise direction.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: Valve is Closed			
	Comments: Located Northeast corner of condenser in the Turbine Building overhead			

STEP #6	Performance: 6. PERFORM the following to align Turbine Building Sumps for automatic operation: a. OBTAIN approval to operate the Turbine Building Sump Pumps in automatic.	Standard: Examinee call the Control Room to Obtain permission to PLACE Turbine Building Sumps to AUTOMATIC Operation	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue: Inform the Examinee to manually control Turbine Sump Levels			
	Comments:			
STEP #7	Performance: <u>CONTINGENCY ACTIONS</u> a. 1 START Turbine Building Sump Pumps manually, as necessary to avoid sump overflow.	Standard: Examinee refers to contingency STEP 6.a.1 States they would monitor Turbine Building Sumps and START Sumps pumps as necessary to maintain levels	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue:			
	Comments: When the examinee reports that they are monitoring Turbine Building Sumps, the JPM is complete			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-265** Revision: 0/1

Date Performed: ____________________

Student: ____________________

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.
As necessary, refer to TIG-04 for additional Pass/Fail criteria.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**15**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____________________

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	What would be the Major consequence if the Turbine Building Sumps were to over flow and fill the Condenser Pit? **Ref.** CWS-00-C.R9Chg1
Answer #1:	**Circulating Water pumps would trip causing a Reactor Trip if water level exceeded 10" inches above the Floor of the Condenser Pit**
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	What guidelines are used to minimize water inputs to the Condenser pit sumps during a Steam Generator Tube Leak event in progress? **Ref.** AOP 2569 Steam Generator Tube Leak Step 4.4
Answer #2:	**a. ENSURE the SJAE after cooler drains are aligned to the condenser.** **b. AVOID the use of mechanical vacuum pumps.** **c. AVOID draining any tanks or lines to the condenser pit sumps.**
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-265** Revision: 0/1

Initiating Cues:

- The plant was tripped due to a Steam Generator Tube Rupture currently in EOP 2534.
- Turbine Building sumps are aligned normally per OP 2336A.

Initial Conditions:

- The Unit has been Manually Tripped due to a Steam Generator Tube Rupture approximately 1 hour ago.
- The Balance of Plant Operator has directed you to perform EOP 2541 Appendix 34 and realign Turbine Building Sump to CPF.

MILLSTONE NUCLEAR POWER STATION
EMERGENCY OPERATING PROCEDURE

STOP THINK ACT REVIEW

Turbine Building Sump Alignment

EOP 2541, Appendix 34
Rev. 000

Approval Date: 10/2/03

Effective Date: 10/3/03

Level of Use
Continuous

INSTRUCTIONS

CONTINGENCY ACTIONS

___1.. ENSURE **BOTH** of the following for the in−service CPF tank:
(TK−10 or TK−11)

- Adequate tank volume exist to receive influent.
- The tank is *not* being discharged.

___2.. UNLOCK and OPEN **ONE** of the following valves to the in−service CPF tank:

- "AR−81A, CONDENSER PIT SUMP TO TK 10" (CPF)
- "AR−81B, CONDENSER PIT SUMP TO TK 11" (CPF)

___3.. PLACE **ALL** of the following Turbine Building Sump Pump handswitches in "STOP":

- Condenser Pit A, "P73A" (West)
- Condenser Pit A, "P73B" (West)
- Condenser Pit B, "P39A" (East)
- Condenser Pit B, "P39B" (East)
- Motor Driven Auxiliary SGFP Room, "P125"
- Turbine Driven Auxiliary SGFP Room, "P72A"
- Turbine Driven Auxiliary SGFP Room, "P72B"

___4.. CLOSE "SS−25, CONDENSER PIT AND AFW SUMPS TO OIL SEPARATOR #2".
(Northeast corner of condenser)

Level of Use
Continuous

INSTRUCTIONS	CONTINGENCY ACTIONS
___5.. OPEN "AR−80, TURBINE BUILDING SUMPS TO CPF TK 10/11". (Northeast corner of condenser)	
___6.. PERFORM the following to align Turbine Building Sumps for automatic operation:	
a. OBTAIN approval to operate the Turbine Building Sump Pumps in automatic.	a.1 START Turbine Building Sump Pumps manually, as necessary to avoid sump overflow.
b. PLACE **ALL** of the following sump pumps in "AUTO": • Condenser Pit A, "P73A" (West) • Condenser Pit A, "P73B" (West) • Condenser Pit B, "P39A" (East) • Condenser Pit B, "P39B" (East) • Motor Driven Auxiliary SGFP Room, "P125" • Turbine Driven Auxiliary SGFP Room, "P72A" • Turbine Driven Auxiliary SGFP Room, "P72B"	

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: LOCA Cooldown “A” Steam Dump lose Vacuum go to ADVs (ALT PATH)

JPM Number: JPM-270 Revision: 0

Initiated:

David J. Jacobs	07/15/2014
Developer	Date

Reviewed:

Lenny E. Mausteller	07/15/2014
Technical Reviewer	Date

Approved:

Mike J. Cote	07/17/2014
Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
07/15/2014	New JPM for 2013-2014 ILT Audit Exam	0

JPM WORKSHEET

Facility: **Millstone Unit 2** Examinee: ____________

JPM Number: JPM-270 Revision: **0**

Task Title: LOCA Cooldown “A” Steam Dump lose Vacuum go to ADVs

System: **039 Main and Reheat Steam System**

Time Critical Task: ( ) YES (**X**) NO

Validated Time (minutes): 30

Task Number(s): 599-05-011

Applicable To: SRO **X** STA ____ RO **X** PEO ____

K/A Number: **A2.01** K/A Rating: 3.1 / 3.2

Method of Testing: Simulated Performance: ____ Actual Performance: **X**

Location: Classroom: ____ Simulator: **X** In-Plant: ____

Task Standards: At the completion of the JPM the Examinee will have recognized a loss of Condenser Vacuum and transferred Cooling down for the “A” Steam Dump to both ADVs while maintaining > 40 degree per hour

Required Materials: MP-PROC-OPS-EOP 2532
(procedures, equipment, etc.)

General References: Ensure S/G levels > 50%

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: JPM-270 Revision : **0**

Initial Conditions: The Plant was manually tripped due to a Loss of Primary Coolant Accident.

All actions from EOP 2525 SPTA have been completed and EOP 2532 Loss of Coolant Accident up to Step #17

Initiating Cues: The Unit Supervisor has directed you to comply with the NOTES proceeding Step #17 of EOP 2532 Loss of Coolant Accident and perform Step #17 commence a cooldown using the "A" Steam Dump Valve in compliance with the NOTES.

Simulator Requirements: Reset to IC 290 password "2013>loit"

Insert Malfunction RC04 at 500 gpm

Trigger #1 Malfunction FW33 at 7.5 BP@ 10 mins

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: JPM-270 Revision: **0**

Task Title: LOCA Cooldown “A” Steam Dump lose Vacuum go to ADVs

START TIME: __________

S T E P # 1	Performance:	Standard:	Critical:	Grade
	NOTE 1. RCS cooldown should be initiated within one hour after the event to conserve condensate inventory and comply with the Long Term Cooling Analysis. 2. RCS cooldown rate greater than 40_F/hr should be maintained until the steam dump/bypass valves or atmospheric dump valves are full open. 3. The starting point for the RCS cooldown should be the TC or CET temperatures where RCS has stabilized. 4. TC should be used for monitoring RCS cooldown if in forced or natural circulation. CETs should be used for all other cases.	Examinee reads NOTE and understands the requirements for RCS Cooldown	Y [ ] N [**X**]	S [ ] U [ ]
	Cue:			
	Comments:			

S T E P # 2	Performance: **NOTE** Technical Specification cooldown rates should be observed during the cooldown. The cooldown rates are as follows: 1. RCS TC greater than 220^{0}F the cooldown rate is 100^{0}F/hr. 2. RCS TC less than or equal to 220^{0}F the cooldown rate is 50^{0}F/hr.	Standard: Examinee reads and complies with Tech. Spec. Limits	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue:			
	Comments:			
S T E P # 3	Performance: **Perform Controlled Cooldown** *17.INITIATE a controlled cooldown using the steam dumps to establish shutdown cooling entry conditions.	Standard: Examinee Locates and Places "A" Steam Dump to Manual, increases the Output approximately by 10% then monitors Cooldown Rate.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: After the Examinee establishes a control Cooldown rate > 40^{0}F per hour and less then TS limit INSERT Malfunction FW33 at 7.5 BP@ 10 minutes			
	Comments:			
S T E P # 4	Performance: C06/07 A-37 "COND VACUUM LO" alarms, the Examinee refers to the Alarm Response 2590E-185 Confirms loss of the Main Condenser.	Standard: Examinee uses diverse indications to confirm a loss of the Main Condenser. Examinee understands that the "A" Steam Dump Valve will close when Condenser Vacuum rises to 10"	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue:			
	Comments:			

<table>
<tr><td rowspan="3">S T E P
5</td><td>Performance:
Perform Controlled Cooldown
*17.1 INITIATE a controlled cooldown using the ADVs to establish shutdown cooling entry conditions.</td><td>Standard:
Examinee refers back to EOP 2532 Loss of Coolant Accident Step 17.1 Contingency Actions and transfers Cooldown to the ADVs</td><td>Critical:
Y [X] N [ ]</td><td>Grade
S [ ] U [ ]</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: JPM-270 Revision: **0**

Date Performed: ____________

Student: ____________

> For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
> If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.
> As necessary, refer to TIG-04 for additional Pass/Fail criteria.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**30**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____________

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

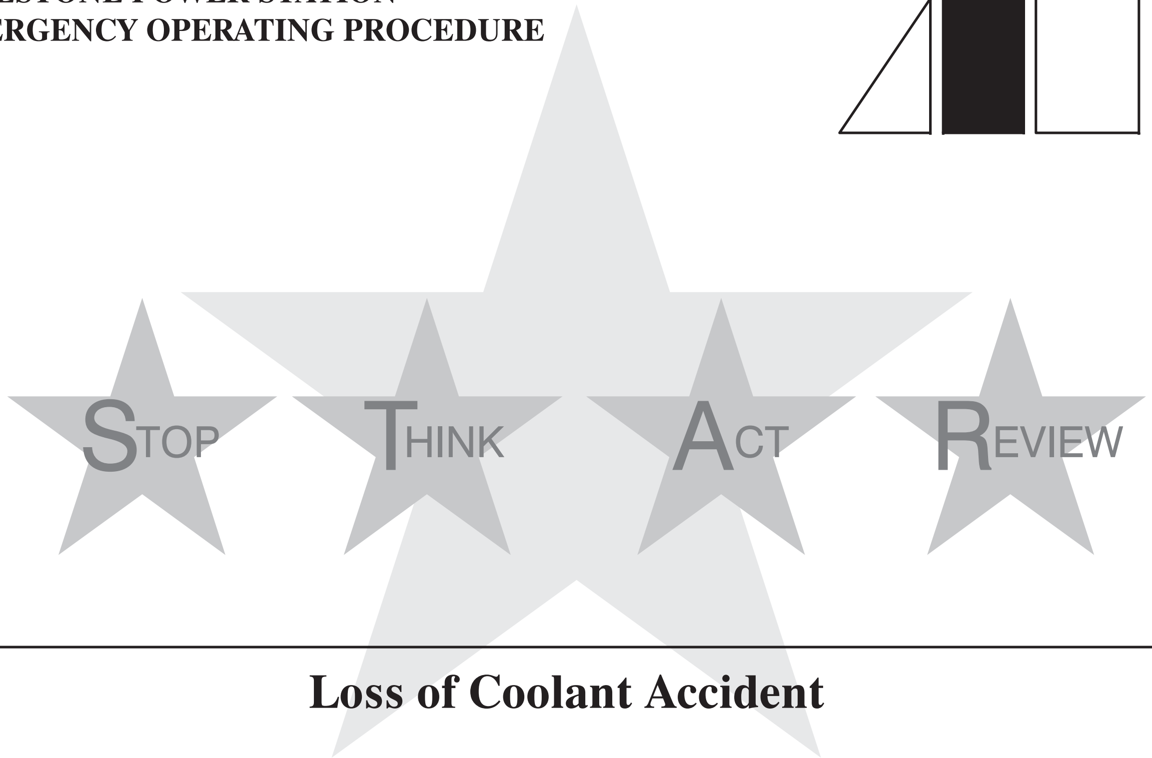
JPM Number: JPM-270 Revision: **0**

Initiating Cues: The Unit Supervisor has directed you to comply with the NOTES proceeding Step #17 of EOP 2532 Loss of Coolant Accident and perform Step #17 commence a cooldown using the "A" Steam Dump Valve in compliance with the NOTES.

Initial Conditions: The Plant was manually tripped due to a Loss of Primary Coolant Accident.

All actions from EOP 2525 SPTA have been completed and EOP 2532 Loss of Coolant Accident up to Step #17

MILLSTONE POWER STATION
EMERGENCY OPERATING PROCEDURE



Loss of Coolant Accident

EOP 2532
Rev. 032–00

Approval Date: **03/31/2016**

Effective Date: **03/31/2016**

Level of Use
Continuous

1.0 ENTRY CONDITIONS

1.1 The Standard Post Trip Actions have been performed.

OR

BOTH of the following conditions exist:

- Event initiated from Mode 3 or Mode 4.
- SIAS has *not* been blocked.

1.2 Plant conditions indicate that a Loss of Coolant Accident has occurred. **ANY** of the following may be present:

- Pressurizer level low (for a break in the pressurizer, the level may be high).
- Safety injection system actuated automatically.
- Rise in containment pressure, temperature, radiation, and containment sump level.
- High quench tank level, temperature, or pressure.

2.0 EXIT CONDITIONS

2.1 The diagnosis of a Loss of Coolant Accident is *not* confirmed.

<u>OR</u>

2.2 **ANY** of the Loss of Coolant Accident Safety Function Status Check acceptance criteria are *not* satisfied.

<u>OR</u>

2.3 The Loss of Coolant Accident EOP has accomplished its purpose by satisfying **ALL** of the following:

- **ALL** Safety Function Status Check acceptance criteria are being satisfied.
- Shutdown Cooling entry conditions are satisfied.

  <u>OR</u>

  The break has been isolated.

  <u>OR</u>

  The RCS is in long term core cooling.
- An appropriate procedure to implement has been provided and administratively approved.

3.0 INSTRUCTIONS/CONTINGENCY ACTIONS

STOP **WARNING** **STOP**

1. ALL Personnel are required to use ice vests for all tasks associated with a Loss of Coolant Accident (LOCA) and performed in Unit 2 Aux. Building and or Enclosure Building.
2. Ice vests can be found in Unit One Control Room area.

NOTE

Harsh Containment values are designated with brackets [ ]. These values should be used anytime CIAS has actuated on high containment pressure greater than 4.42 psig.

Confirm Diagnosis

INSTRUCTIONS	CONTINGENCY ACTIONS
*1. CONFIRM diagnosis of a Loss of Coolant Accident by performing the following: a. CHECK Safety Function Status Check Acceptance Criteria are satisfied.	1.1 PERFORM **BOTH** of the following: a. DIAGNOSE the event. Refer To Appendix 1, "Diagnostic Flowchart." b. Go To **ONE** of the following: • The appropriate Optimal Recovery Procedure • EOP 2540, "Functional Recovery"

INSTRUCTIONS	CONTINGENCY ACTIONS
*1. (continued)	
b. CHECK steam generators for primary to secondary leakage by performing the following:	b.1 MONITOR for other indications of a steam generator tube rupture.
1) CHECK “B” train RBCCW in service.	
2) OPEN the steam generator sample valves: • MS−191A • MS−191B	
3) DIRECT Chemistry to perform the following: • Sample both steam generators • Frisk the samples • Report frisk results • Analyze samples for boron and activity	
4) <u>WHEN</u> Chemistry reports that samples have been taken, CLOSE the steam generator sample valves: • MS−191A • MS−191B	
5) <u>IF</u> SIAS has actuated, <u>AND</u> no other sampling is in progress, CLOSE 2−RB−210, “Degasifier Effluent Cooler Return Outlet”	

INSTRUCTIONS CONTINGENCY ACTIONS

Classify the Event

*2. Refer To MP-26-EPI-FAP06, “Classification and PARs,” and CLASSIFY the event.

- IF classification requires RCS sampling, Refer To Appendix 46, “Sampling for EAL Determination” and DIRECT Chemistry as required.

Implement Placekeeping

3. PERFORM **ALL** of the following:
   - OPEN the placekeeper and ENTER the EOP entry time.
   - ENSURE the master alarm silence switch is in “NORMAL.”

INSTRUCTIONS

CONTINGENCY ACTIONS

Check SIAS Actuation

*4. IF pressurizer pressure is less than 1714 psia,
PERFORM **ALL** of the following:

a. ENSURE SIAS, CIAS and EBFAS have actuated. (C01)

b. ENSURE **ONE** complete facility of CRACS is operating in the recirc mode: (C25)

Facility 1

- HV−203A, Fan F−21A exhaust damper is open.
- Fan F−21A, supply fan is running.
- HV−206A, Fan F−31A exhaust damper is open.
- Fan F−31A, exhaust fan is running.
- HV−212A, Fan F−32A exhaust damper is open.
- Fan F−32A, filter fan is running.
- HV−202, minimum fresh air damper is closed.
- HV−207, cable vault exhaust damper is closed.
- HV−208, exhaust air damper is closed.

(continue)

INSTRUCTIONS

CONTINGENCY ACTIONS

*4. (continued)

Facility 2

- HV−203B, Fan F−21B exhaust damper is open.
- Fan F−21B, supply fan is running.
- HV−206B, Fan F−31B exhaust damper is open.
- Fan F−31B, exhaust fan is running.
- HV−212B, Fan F−32B exhaust damper is open.
- Fan F−32B, filter fan is running.
- HV−495, fresh air damper is closed.
- HV−496, exhaust air damper is closed.
- HV−497, cable vault exhaust damper is closed.

INSTRUCTIONS	CONTINGENCY ACTIONS
Optimize Safety Injection	
*5. IF SIAS has initiated, PERFORM the following:	
a. CHECK at least one train of SIAS, CIAS and EBFAS has properly actuated. (C01X)	a.1 IF **ANY** component is *not* in its required position, manually ALIGN the applicable component.
b. CHECK that safety injection flow is adequate. Refer To Appendix 2, “Figures.”	b.1 PERFORM **ANY** of the following to restore safety injection flow within the SI Flow Curve: 1) ENSURE electrical power to safety injection pumps and valves. 2) ENSURE correct safety injection valve lineup. 3) ENSURE operation of necessary auxiliary systems: • RBCCW • ESF Room Coolers 4) START additional safety injection pumps as needed until safety injection flow is within the SI Flow Curve.
c. ENSURE **ALL** available charging pumps are operating.	
(continue)	

INSTRUCTIONS	CONTINGENCY ACTIONS

*5. (continued)

d. ENSURE vital switchgear cooling is operating for each operating ECCS train as follows:

Facility 1

- Fan F−51 is running.
- Fan F−134 is running.
- SW−178A, service water supply is open.
- SW−178B, service water supply is open.

Facility 2

- Fan F−52 is running.
- Fan F−142 is running.
- Fan F−133 is running.
- SW−178C, service water supply is open.

INSTRUCTIONS CONTINGENCY ACTIONS

RCP Trip Strategy

*6. IF pressurizer pressure is less than 1714 psia
AND SIAS has initiated,
PERFORM the following:

a. ENSURE **ONE** RCP in each loop is stopped.

b. PLACE associated pressurizer spray valve controller RC−100E or RC−100F in manual and CLOSE the valve.

c. IF pressurizer pressure lowers to less than the minimum RCP NPSH limit,
PERFORM the following:

1) STOP **ALL** RCPs.

2) PLACE TIC−4165, steam dump T_{AVG} controller, in manual and closed.

3) PLACE pressurizer spray valve controllers RC−100E and RC−100F in manual and CLOSE the valves.

<u>INSTRUCTIONS</u>	<u>CONTINGENCY ACTIONS</u>
Isolate the LOCA	
7. PERFORM the following to isolate the leak:	
a. <u>IF</u> pressurizer pressure is less than 2250 psia, CHECK PORVs closed.	a.1 CLOSE the associated PORV Block Valve: • RC–403 • RC–405 a.2 <u>IF</u> associated PORV Block Valve does not close, <u>THEN</u> PLACE Bottle–Up Panel isolation switch for open PORV to "ISOL": • "PORV, 2–RC–402" (Bottle–Up Panel C70A) • "PORV, 2–RC–404" (Bottle–Up Panel C70B)
b. ENSURE **BOTH** of the following letdown isolation valves are closed: • CH–515 • CH–516	
c. ENSURE at least one facility of the following RCS sample line isolation valves are closed: **Facility 1** • RC–45, RC combined sample isolation valve **Facility 2** • RC–001, RC hot leg isolation valve • RC–002, pressurizer surge sample isolation valve • RC–003, pressurizer steam sample isolation valve	
(continue)	(continue)

INSTRUCTIONS

7. (continued)

   d. CHECK *no* leakage in the RBCCW system by **BOTH** of the following:

      - CHECK RM–6038, "RBCCW Radiation Monitor," is *not* alarming or trending to alarm.
      - CHECK RBCCW Surge Tank level *not* rising.

CONTINGENCY ACTIONS

d.1 IF **ANY** RCPs are operating, PERFORM the following:

1) STOP the operating RCPs.
2) PLACE associated pressurizer spray valve controller RC–100E or RC–100F in manual and CLOSE the valve.
3) IF **ALL** RCPs are stopped, PLACE TIC–4165, steam dump T_{AVG} controller, in manual and closed.

d.2 CLOSE **ALL** of the following RBCCW CTMT header isolation valves:

Facility 1

- RB–30.1A
- RB–37.2A

Facility 2

- RB–30.1B
- RB–37.2B

INSTRUCTIONS

Check LOCA NOT Outside of Containment

8. CHECK that the LOCA is *not* occurring outside of containment:
    a. CHECK that **NONE** of the following Radiation Monitors Outside Containment have an unexplained alarm or indicate an unexplained rise in activity:
        - RM−7894, Charging Pump Area
        - RM−7895, Primary Sample Sink
        - RM−7896, −25 ft 6 in Waste Process Area
        - RM−7897, −45 ft 6 in Waste Process Area
        - RM−8169, Millstone Stack WR
        - RM−8168, Unit 2 WR Stack

(continue)

CONTINGENCY ACTIONS

8.1 IF the LOCA is outside containment, PERFORM the following:

   a. LOCATE and ISOLATE the leak.

   b. ENSURE CIAS has actuated. (C01)

   c. CONTACT the TSC to develop plan to restore or maintain RWST level.

(continue)

INSTRUCTIONS

CONTINGENCY ACTIONS

8. (continued)

   b. CHECK that **ALL** of the following annunciators are *not* in alarm:

   - "AUX BLDG SUMP LEVEL HI" (C06, AA–21)
   - "RBCCW RM SUMP LEVEL HI" (C06, AB–21)
   - "SI RM A SUMP LEVEL HI" (C06, CA–21)
   - "SI RM B SUMP LEVEL HI" (C06, CB–21)
   - "SI RM C SUMP LEVEL HI" (C06, DA–21)

   c. MONITOR Aerated Waste Tank levels for abnormal rise.

Place Hydrogen Analyzers in Service

9. PLACE the hydrogen analyzers in service. Refer To Appendix 19, "Hydrogen Analyzer Operation."

Ensure CIAS

*10. IF **ANY** of the following exists:

- Containment pressure is greater than or equal to 4.42 psig
- Radiation monitors inside containment are greater than their alarm setpoint

PERFORM the following:

a. ENSURE SIAS, CIAS, EBFAS and MSI have actuated. (C01)

b. CHECK that at least one train of SIAS, CIAS, EBFAS and MSI has properly actuated. (C01X)

b.1 IF **ANY** component is *not* in its required position, manually ALIGN the applicable component.

(continue)

INSTRUCTIONS

CONTINGENCY ACTIONS

*10. (continued)

c. ENSURE **ONE** complete facility of CRACS is operating in the recirc mode: (C25)

Facility 1

- HV−203A, Fan F−21A exhaust damper is open.
- Fan F−21A, supply fan is running.
- HV−206A, Fan F−31A exhaust damper is open.
- Fan F−31A, exhaust fan is running.
- HV−212A, Fan F−32A exhaust damper is open.
- Fan F−32A, filter fan is running.
- HV−202, minimum fresh air damper is closed.
- HV−207, cable vault exhaust damper is closed.
- HV−208, exhaust air damper is closed.

(continue)

INSTRUCTIONS

CONTINGENCY ACTIONS

*10. (continued)

Facility 2

- HV−203B, Fan F−21B exhaust damper is open.
- Fan F−21B, supply fan is running.
- HV−206B, Fan F−31B exhaust damper is open.
- Fan F−31B, exhaust fan is running.
- HV−212B, Fan F−32B exhaust damper is open.
- Fan F−32B, filter fan is running.
- HV−495, fresh air damper is closed.
- HV−496, exhaust air damper is closed.
- HV−497, cable vault exhaust damper is closed.

d. ENSURE **ALL** available CAR fans are operating:

- CAR fans operating in slow speed
- CAR emergency outlet valves open:
  - RB−28.3A
  - RB−28.3B
  - RB−28.3C
  - RB−28.3D

(continue)

INSTRUCTIONS

CONTINGENCY ACTIONS

*10. (continued)

- e. IF 24C or 24D is energized from offsite power, ENSURE no more than **TWO** CEDM cooling fans are operating.
- f. START **ALL** available containment auxiliary circulation fans in low speed.
- g. START **ALL** available post–incident recirculation fans.

Ensure CSAS

*11. IF containment pressure is greater than or equal to 9.48 psig, PERFORM the following:

- a. ENSURE CSAS actuated. (C01)
- b. ENSURE **ALL** available containment spray headers are providing flow greater than or equal to 1300 gpm.

Close MSIVs on Loss of Offsite Power

*12. IF offsite power has been lost
OR the condenser is *not* available,
PERFORM the following:

- a. CLOSE **BOTH** MSIVs.
- b. ENSURE **BOTH** MSIV bypass valves are closed.
- c. OPEN AR–17, condenser vacuum breaker.

INSTRUCTIONS

CONTINGENCY ACTIONS

Place RBCCW Pump in Pull to Lock

*13. IF **ANY** of the following conditions exist:

- Service water pump is *not* operating AND the associated RBCCW pump is operating
- RBCCW pump is *not* operating AND containment pressure is greater than or equal to 20 psig

PERFORM **ALL** of the following:

a. PLACE the associated RBCCW pump in "PULL TO LOCK."

b. IF RBCCW cooling is lost to an RCP,
PERFORM the following:

1) STOP affected RCPs.

2) PLACE associated pressurizer spray valve controller RC−100E or RC−100F in manual and CLOSE the valve.

3) IF **ALL** RCPs are stopped, PLACE TIC−4165, steam dump T_{AVG} controller, in manual and closed.

INSTRUCTIONS	CONTINGENCY ACTIONS
Align Instrument Air	
*14. CHECK instrument air pressure greater than 90 psig and stable.	___14.1 <u>IF</u> SIAS with UV actuation has *not* occured, START available IAC as follows: a. ENSURE "READY TO START" message displayed. b. PRESS green start button. ___14.2 <u>IF</u> Unit 2 IAC is *not* available, ALIGN instrument air from Unit 3 by performing the following: a. CHECK that Unit 3 is available to supply air. b. ENSURE SA−10.1, station air to instrument air cross−tie is open. c. DIRECT a PEO to perform the following: • ENSURE SA−26, SA−11.1 outlet bypass is open. • OPEN SA−12, SA−11.1 inlet bypass. • OPEN SAS−379, bypass valve for SAS−EFV−20. • OPEN SAS−6, station air cross tie to Unit 3. • Slowly OPEN 3−SAS−V900, service air cross−tie to Unit 2. d. <u>IF</u> instrument air is *not* available, ENSURE backup air is aligned as necessary. Refer To Appendix 40, "Aligning Backup Instrument Air."

INSTRUCTIONS	CONTINGENCY ACTIONS

Align Condenser Air Removal to Unit 2 Stack

*15. IF EBFAS has initiated
AND the condenser is available,
ALIGN the condenser air removal system to Unit 2 stack:

a. ENSURE condenser air removal fan, MF−55A or MF−55B is running.

b. IF condenser air removal fan MF−55A is operating, ENSURE makeup damper, EB−171, is open.

c. OPEN EB−57, condenser air removal to Unit 2 stack.

d. ENSURE AC−11, Purge exhaust filter outlet damper is closed.

e. OPEN AC−59, Outside air makeup damper.

f. START **ONE** main exhaust fan.

g. ENSURE HV−118, Radwaste exhaust damper is closed.

h. START F−20, Fuel handling area supply fan.

i. ENSURE HV−173, Exhaust mod discharge damper is in “MOD” position.

j. PLACE AC−59, Outside air makeup damper to “MID” position.

INSTRUCTIONS	CONTINGENCY ACTIONS
Go To Isolated LOCA Section	
*16. IF the LOCA has been isolated, Go To Step 65.	

NOTE

1. RCS cooldown should be initiated within one hour after the event to conserve condensate inventory and comply with the Long Term Cooling Analysis.
2. RCS cooldown rate greater than 40°F/hr should be maintained until the steam dump/bypass valves or atmospheric dump valves are full open.
3. The starting point for the RCS cooldown should be the T_C or CET temperatures where RCS has stabilized.
4. T_C should be used for monitoring RCS cooldown if in forced or natural circulation. CETs should be used for all other cases.

INSTRUCTIONS	CONTINGENCY ACTIONS
Perform Controlled Cooldown	
*17. INITIATE a controlled cooldown using the steam dumps to establish shutdown cooling entry conditions.	17.1 INITIATE a controlled cooldown using the ADVs to establish shutdown cooling entry conditions.
a. INITIATE a controlled cooldown using the steam dumps.	a. INITIATE a controlled cooldown using the ADVs.
• IF RCS Tc is greater than 200 ° F, ENSURE cooldown does *not* EXCEED a rate of 100 ° F/hr.	• IF RCS Tc is greater than 200 ° F, ENSURE cooldown does *not* EXCEED a rate of 100 ° F/hr.
• IF RCS Tc is less than 200 ° F, ENSURE cooldown does *not* EXCEED a rate of 50 ° F/hr.	• IF RCS Tc is less than 200 ° F, ENSURE cooldown does *not* EXCEED a rate of 50 ° F/hr.

INSTRUCTIONS

Depressurize RCS to SDC Entry Conditions

*18. INITIATE a controlled depressurization of the RCS to less than or equal to 230 psia [190 psia] using **ANY** of the following:

- Main or auxiliary pressurizer spray
- <u>IF</u> HPSI throttle/stop criteria are met,
  DEPRESSURIZE the RCS using **ANY** of the following:
  - Charging and letdown
  - HPSI flow

Block SIAS Initiation

*19. <u>IF</u> SIAS is *not* present
<u>AND</u> SIAS Block is permitted,
BLOCK the automatic initiation as the cooldown and depressurization proceeds.

CONTINGENCY ACTIONS

INSTRUCTIONS | CONTINGENCY ACTIONS

Block MSI Initiation

*20. IF MSI is *not* present
AND MSI Block is permitted
(SG Pressure ≤ 700 psia),
BLOCK the automatic initiation as the cooldown and depressurization proceeds by performing the following (as applicable):

- WHEN annunciator “SG PRES CH 1 MANUAL BLOCK PERMITTED” is lit (C–01, A–25),
  PERFORM the following (C–01):
  1) PRESS the Facility 1 “MSI BLOCK” button.
  2) CHECK “SG CH 1 LO LO PRES MANUALLY BLOCKED” lit (C–01, window B–25).
- WHEN annunciator “SG PRES CH 2 MANUAL BLOCK PERMITTED” is lit (C–01, C–25),
  PERFORM the following (C–01):
  1) PRESS the Facility 2 “MSI BLOCK” button.
  2) CHECK the “SG CH 2 LO LO PRES MANUALLY BLOCKED” lit (C–01, window D–25).

Position SI/CS Miniflows on Low RWST Level

*21. IF RWST level lowers to 20%,
POSITION SI/CS pump miniflow bypass key switches to OPER for valves SI–659 and SI–660.
(key 43 and 44)

INSTRUCTIONS

CONTINGENCY ACTIONS

HPSI Throttle/Stop Criteria

*22. IF HPSI pumps are operating AND **ALL** of the following conditions are satisfied,

- RCS subcooling is above the minimum operating limit of the RCS P/T curve based on CETs or T_H. Refer To Appendix 2, “Figures.”
- Pressurizer level is greater than 20% and *not* dropping.
- At least one steam generator is available for RCS heat removal and steam generator level meets **ONE** of the following conditions:
  - SG level is 40 to 70%
  - SG level is being restored by main or aux feedwater
- Reactor vessel level is greater than or equal to 43%.

THROTTLE HPSI flow or STOP **ONE** HPSI pump at a time:

HPSI Pump Restart Criteria

*23. IF **ANY** of the HPSI throttle/stop criteria can *not* be maintained, RAISE HPSI flow or START HPSI pumps as necessary.

LPSI Pump Stop Criteria

*24. IF LPSI pumps are operating AND pressurizer pressure is greater than 360 psia and controlled, STOP the LPSI pumps.

Approval Date 2/18/14 Effective Date 3/26/14

Setpoint: 25 inches of mercury

A–37

COND VACUUM LO

AUTOMATIC FUNCTIONS

1. None

CORRECTIVE ACTIONS

1. IF condenser pressure rise is due to slow fouling of the condenser due to seasonal changes, Refer To OP 2204, "Load Changes," and REDUCE Reactor power and turbine load to clear "COND VACUUM LO" annunciator.
2. IF degraded condenser vacuum is being directed during performance of a power ramp, PERFORM the following: ①
   - 2.1 NOTIFY personnel controlling condenser pressure of the alarm, the value, and trend of condenser pressure.
   - 2.2 DIRECT personnel controlling condenser pressure to recover vacuum to the applicable control band.
3. IF steps 1. or 2. recover condenser vacuum, EXIT this ARP.
4. Go To AOP 2574, "Loss of Condenser Vacuum."

SUPPORTING INFORMATION

1. Initiating Devices
   - PS–5494A (PS–24) or PS–5494B (PS–25)
2. Computer Points
   - P5127
3. Procedures
   - OP 2204, "Load Changes"
   - AOP 2574 "Loss of Condenser Vacuum"
4. Control Room Drawings
   - 25203–32006, Sheet 8
5. Annunciator Card Location: TB21–J21

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: Respond to a 10 Step CEA Misalignment

JPM Number: JPM-284-S-1 Revision: 0

Initiated:

Robert L. Cimmino, Jr. 03/15/2016

Developer Date

Reviewed:

David J. Jacobs 07/05/2016

Technical Reviewer Date

Approved:

Supervisor, Nuclear Training Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
03/15/2016	New JPM for 2015-16 NRC License Exam	0

JPM WORKSHEET

Facility: **Millstone Unit 2** Examinee: ______

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

System: **CEDS**

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 20

Task Number(s): 000-04-097

Applicable To: SRO ______ STA ______ RO **X** PEO ______

K/A Number: 001/A2.03 K/A Rating: 3.5/4.2

Method of Testing: Simulated Performance: ______ Actual Performance: X

Location: Classroom: ______ Simulator: X In-Plant: ______

Task Standards: The Examinee will attempt to insert Group 7 CEAs to start the downpower, recognize CEA #1 in Group 7 has slipped 10 steps to 170 steps withdrawn, and then perform the required actions to realign CEA #1 with the group.

Required Materials: (procedures, equipment, etc.)
MP-PROC-OPS-AOP 2575, Rapid Downpower
MP-PROC-OPS-ARP 2590C-111, ACTM TROUBLE
MP-PROC-OPS-ARP 2590C-140, CEA GP DEV BK/UP
MP-PROC-OPS-OP 2302A, Control Element Drive System

General References:
MP-PROC-OPS-OP 2302A, Control Element Drive System
Reactivity Plan for ~ 30%/hr power reduction

***** READ TO THE EXAMINEE *****

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-284-S-1** Revision : **0**

Initial Conditions:	The plant is stable at 100 % power, about to commence a shutdown to 55% to allow maintenance work on the "A" S/G Main Feed Pump. The crew has entered AOP 2575, Rapid Downpower, and has completed steps up to 3.3, Forcing Pressurizer Sprays.
Initiating Cues:	You are to relieve the RO and continue implementing AOP 2575, Rapid Downpower, starting with the CAUTION proceeding step 3.4 and perform step 3.4 to initiate the downpower by inserting Group 7 CEAs 10 ± 2 steps.
Simulator Requirements:	100% power, steady state, ARO, forcing PZR sprays. Insert Malfunction RD0301 (10) to slip CEA #1 10 steps when Group 7 is given an insert command. {Consider creating a Boolean trigger based on CEA #1 being < 180 steps. [**RDCEAPOS(01) < 180**]}

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

START TIME: __________

<table>
<tr><td rowspan="3">STEP
#1</td><td>Performance:
<u>AOP 2575</u>
CAUTION
In the case of a dropped CEA, rod motion is <i>not</i> used to initiate downpower.</td><td>Standard:
Examinee obtains a copy of AOP 2575.
• Examinee turns to the Caution statement proceeding step 3.4 on page 8.
• Examinee reads and acknowledges the Caution.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#2</td><td>Performance:
3.4. IF <i>not</i> downpowering due to a dropped rod, AND Reactor power is greater than 99% (2673 MWTh) INSERT Group 7 CEAs 10 ± 2 steps to initiate downpower.</td><td>Standard:
Examinee performs the following to insert CEAs:
• CEA position noted on CEAPDS and PPC
• Manual Sequential mode selected by pressing MS button and observing light lit.
• CEA control switch is moved to the “INSERT” position.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: Ensure malfunction RD0301 triggers (causing CEA #1 to slip to 170 steps) when Group 7 CEAs begin to insert.</td></tr>
<tr><td colspan="4">Comments: The specific steps required for CEA insertion as directed by an AOP are considered “Skill Of The Craft” and, as such, do not need to be performed using OP 2302A at this time.</td></tr>
<tr><td rowspan="3">STEP
#3</td><td>Performance:
CEA #1 slips to 170 steps withdrawn.
C-04 Annunciators in alarm:
• C-04/DA-18, CEA GP DEV BK/UP
• C-04/BA-18, CEA MOTION INHIBIT</td><td>Standard:
Examinee performs the following:
• CEA control switch released.
• C-04 alarms acknowledged.
• US notified of CEA misalignment.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

<table>
<tr><td rowspan="3">STEP
#4</td><td>Performance:
<u>ARP 2590C-136</u> CEA Motion Inhibit (BA-18)
1. VERIFY CEA motion has stopped (C-04, PPC).
2. To determine cause of alarm, OBSERVE any associated CEDS annunciators lit (C-04).
3. IF other associated CEDS annunciators are lit, Refer To applicable alarm response section and PERFORM necessary corrective actions.
4. IF necessary, SUBMIT Trouble Report to I&C Department.</td><td>Standard:
Examinee references ARP 2590C-136 and notes the need to reference additional ARPs pertaining to the actual cause of the alarm.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: If Examinee expresses the need to have I&C and/or a PEO investigate CEA #1, state that you have already made the calls and both are enroute to the East DC switchgear room.
Acknowledge any suggestion to submit a Trouble Report and state another operator will submit one.</td></tr>
<tr><td colspan="4">Comments: Examinee may not reference this ARP as the cause is known based on C-04 annunciator DA-18 and the actions are to simply verify CEA motion has stopped and then reference the applicable ARP that caused the CMI.</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

<table>
<tr>
<td rowspan="3">**S T E P
5**</td>
<td>Performance:
ARP 2590C-111 ACTM Trouble (AB-15)
1. STOP all CEA motion.
2. REQUEST I&C Department investigate ACTM trouble condition.
3. IF alarm is momentary, PERFORM the following:
3.1. MONITOR all ACTMs and REPORT all abnormal red lights (East DC switchgear room).
3.2. OPEN the “ACTM TROUBLE ALARMS” display on CEAPDS.
3.3. RESET ACTMs.
3.4. IF ACTM alarm on CEAPDS display clears (is *not* flashing or steady red), CEA motion may be resumed.
3.5. IF ACTM alarm on CEAPDS display does *not* clear, NOTIFY SM.</td>
<td>Standard:
Examinee references ARP 2590C-136 and notes the need to reference additional ARPs pertaining to the actual cause of the alarm.</td>
<td>Critical:
Y ☐ N ☒</td>
<td>Grade
S ☐ U ☐</td>
</tr>
<tr>
<td colspan="4">Cue: If Examinee expresses the need to have I&C and/or a PEO investigate CEA #1, state that you have already made the calls and both are enroute to the East DC switchgear room.</td>
</tr>
<tr>
<td colspan="4">Comments: Examinee may not reference this ARP as the cause is known based on the other C-04 annunciators, the alarm is momentary and the actions are not critical at this time.</td>
</tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

STEP # 6	Performance:	Standard:	Critical:	Grade
	ARP 2590C-140 (DA-18) 1. IDENTIFY misaligned CEA and DETERMINE actual steps misaligned. 2. IF deviation is greater than 10 steps, Go To AOP 2556, "CEA Malfunctions." 3. IF deviation is less than or equal to 10 steps, Refer To OP 2302A, "Control Element Drive System" and PERFORM applicable actions to align all CEAs in affected group to within one step of each other, using manual individual mode in conjunction with bypassing CMI. 4. IF necessary, RESET affected group CEA positions on PPC as follows: 4.1. SELECT "CEA POSITION" on PPC. 4.2. SELECT "CEA POSITION EDITOR." 4.3. PERFORM directions as indicated on PPC. 5. IF an instrument malfunction is indicated, SUBMIT Trouble Report to I&C Department.	Examinee references ARP 2590C-140 and performs the following: 1. Identifies CEA #1 as being misaligned with Group 7 by (less than or equal to) 10 steps. 2. Informs US of the need to realign CEA #1 with Group 7 using OP 2302A (based on magnitude of CEA misalignment).	Y ☒ N ☐	S ☐ U ☐
	Cue: If Examinee expresses the need to have I&C and/or a PEO investigate CEA #1, state that you have already made the calls and both are enroute to the East DC switchgear room. When later questioned by the Examinee about the status of CEA #1, state that I&C is on station and that they believe they have addressed the cause of the slipped CEA. I&C and a PEO will remain on station in the East DC switchgear room to ensure proper operation of the CEDS during subsequent CEA motion. **The Examinee has permission to proceed with the actions to correct the CEA misalignment.**			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

STEP #7	Performance: **OP 2302A** **Section 4.2** CEA Operation in Manual Individual Mode **NOTE:** When operating in this mode, any individual CEA in any group can be moved using CEA control switch and is primarily used for trimming CEAs and testing.	Standard: Examinee obtains a copy of OP 2302A, turns to Section 4.2, reads and acknowledges the Note.	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #8	Performance: 4.2.1 IF at any time it is necessary to bypass CMI during CEA movement, using Section 4.5 PERFORM applicable actions in conjunction with this section.	Standard: Examinee reads and acknowledges the need to use Section 4.5 of OP 2032A to realign CEA #1.	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

<table>
<tr><td rowspan="3">STEP
#9</td><td>Performance:
<u>Section 4.5</u> Bypass CMI Interlocks
NOTE
1. This Section may be used to move CEAs in order to clear alarms or continue operations when malfunctions in the alarm or control circuitry exists.
2. When CMI relay actuates, CEDM raise, lower, and lift signals to CPPs are overridden. If this happens during CEA movement, the CEA could slip and result in misalignment.
3. When CMI is bypassed, PDIL alarm circuit and CEA Deviation circuit are both inoperable.
4. Prior to bypassing any interlock, permission must be obtained from SM/US.</td><td>Standard:
Examinee refers to Section 4.5, reads and acknowledges the Note.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: When asked, state that Examinee has permission to bypass the CMI for the purpose of realigning CEA #1 with Group 7.</td></tr>
<tr><td colspan="4">Comments: Examinee may review Section 4.5 up to step 4.5.7, or in its entirety to be prepared to utilize it in concert with Section 4.2 when withdrawing CEA #1. Either way is acceptable as long as the applicable actions of section 4.5 required to bypass the CMI are executed.</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

STEP #10	Performance:	Standard:	Critical:	Grade
	4.5.1 REQUEST SM/US authorization to bypass CMI. 4.5.2 CHECK annunciator C-04, window BA-18, "CEA MOTION INHIBIT," lit. 4.5.3 Refer To the following and LOG entry in Shift Turnover Log (CMI bypassed): • TSAS 3.1.3.1, ACTION b • TSAS 3.1.3.1, ACTION c • TSAS 3.1.3.6, ACTION d 4.5.4 PRESS appropriate *group* "INHIBIT BYPASS" pushbutton and CHECK the following: • Appropriate group red "INHIBIT BYPASS" pushbutton, lit • Annunciator C-04, window BA-19, "CEA MOTION INHIBIT BYP," lit 4.5.5 PRESS and HOLD *system* "CEA MOTION INHIBIT BYPASS" pushbutton. 4.5.6 CHECK *system* red "CEA MOTION INHIBIT BYPASS," lit.	Examinee refers to Section 4.5 and performs the following: 1. US authorization to bypass CMI is obtained. 2. Annunciator C-04/BA-18 is verified in alarm. (**Not** a "critical step". Examinee acknowledged the annunciator when it first alarmed.) 3. TSAS entries for bypassing the CMI are suggested to the US. 4. "Inhibit Bypass" pushbutton for Group 7 is pressed and verified lit, and annunciator C-04/BA-19 alarm is acknowledged. 5. "CEA Motion Inhibit Bypass" button is pressed and held, button verified lit. *Note: When the CMI for Group 7 is bypassed, the CEA MOTION INHIBIT annunciator will "reset". This is a quirk in the system design and totally expected. The Examinee may or may not explain.*	Y ☒ N ☐	S ☐ U ☐
	Cue: If not already done, state that Examinee has permission to bypass the CMI for the purpose of realigning CEA #1 with Group 7.			
	Comments: It is not necessary for the RO to personally address the applicable TSAS that are affected when bypassing the CMI. If the Examinee attempts to do so, state that the US will address them and the RO is to focus on correcting the CEA misalignment.			

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

<table>
<tr>
<td rowspan="3">STEP
#11</td>
<td>Performance:
4.5.7 Using applicable Section and PERFORM necessary actions to operate CEA(s):
• IF operating in Manual Individual mode, Section 4.2
• IF operating in Manual Group mode, Section 4.3
• IF operating in Manual Sequential mode, Section 4.4
NOTE
CMI should remain bypassed for at least three seconds after CEA motion
is stopped to allow CPP operations to be completed.
4.5.8 WHEN CEA motion has been stopped for at least three seconds, RELEASE <i>system</i> “CEA MOTION INHIBIT BYPASS” pushbutton.</td>
<td>Standard:
Based on the guidance of step 4.5.7, Examinee returns to Section 4.2 of OP 2302A, if not being used in concert with Section 4.5.
Examinee may review the Note proceeding step 4.5.8 at this time, or wait until returning to this section of the procedure after the CEA is realigned.</td>
<td>Critical:
Y ☒ N ☐</td>
<td>Grade
S ☐ U ☐</td>
</tr>
<tr>
<td colspan="4">Cue:</td>
</tr>
<tr>
<td colspan="4">Comments:</td>
</tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

STEP #12	Performance:	Standard:	Critical:	Grade
	Section 4.2 CEA Operation in Manual Individual Mode 4.2.2 PRESS "MANUAL INDIVIDUAL, MI" pushbutton and CHECK light, lit. 4.2.3 SELECT applicable group for CEA to be moved on one of the following scales ("CEAPDS MONITOR"): • "FULL RANGE" • "+/- 15" 4.2.4 PRESS applicable "GROUP SELECTION" pushbutton for CEA to be moved and CHECK light, lit. 4.2.5 PRESS "INDIVIDUAL CEA SELECTION" pushbutton for CEA to be moved and CHECK light, lit. 4.2.6 MONITOR CEA movement on the following: • "CEAPDS MONITOR" • PPC (desired display) • Core mimic	Using OP 2302A, Section 4.2, Examinee performs the following: 1. "MI" button pressed and light verified lit. 2. CEAPDS screen set to Group 7 full range or ± 15 steps. 3. Group 7 "Group Select" button pressed and verified lit. 4. CEA #1 button pressed and verified lit. 5. CEAPDS, PPC and the Core Mimic are monitored when CEA motion is demanded.	Y ☒ N ☐	S ☐ U ☐
	Cue:			
	Comments: It is not critical to monitor the Core Mimic for CEA motion until the CEA reaches the fully withdrawn position.			

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

<table>
<tr><td rowspan="3">STEP
#13</td><td>Performance:
4.2.7 WHEN desired to initiate CEA movement, PERFORM applicable action:
• IF desired to insert CEA, PLACE and HOLD CEAcontrol switch to “INSERT.”
• IF desired to withdraw CEA, PLACE and HOLD CEA control switch to “WITHDRAW.”
4.2.8 WHEN movement of selected CEA is <i>no</i> longer desired, <i>slowly</i> RELEASE CEA control switch and CHECK CEA movement has stopped.</td><td>Standard:
1. Examinee moves the CEA control switch to the “withdraw” position and monitors CEA movement.
2. CEA motion is stopped when CEA #1 is aligned with the rest of Group 7 CEAs.
3. The US is notified of CEA #1 realignment.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: If stated, US acknowledges the restoration of CEA alignment.</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#14</td><td>Performance:
<u>Section 4.5</u> Bypass CMI Interlocks
NOTE
CMI should remain bypassed for at least three seconds after CEA motion
is stopped to allow CPP operations to be completed.
4.5.8 WHEN CEA motion has been stopped for at least three seconds, RELEASE <i>system</i> “CEA MOTION INHIBIT BYPASS” pushbutton.</td><td>Standard:
Examinee may have already reviewed this Note and step 4.5.8, performing it immediately after releasing the CEA control switch.
Examinee <i>may</i> verify the CEA Motion Inhibit Bypass button light goes out at this time.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-284-S-1** Revision: **0**

Task Title: **Respond to a 10 Step CEA Misalignment**

STEP #15	Performance:	Standard:	Critical:	Grade
	4.5.9 CHECK sy*stem* red “CEA MOTION INHIBIT BYPASS,” light *not* lit. 4.5.10 PRESS appropriate *group* “INHIBIT BYPASS” pushbutton and CHECK the following: • Appropriate *group* red “INHIBIT BYPASS” button, *not* lit • Annunciator C---04, window BA---19, “CEA MOTION INHIBIT BYP,” *not* lit 4.5.11 IF CMI is *no* longer required to be bypassed, LOG exit of the following in Shift Turnover Log (CMI *not* bypassed): • TSAS 3.1.3.1, ACTION b • TSAS 3.1.3.1, ACTION c • TSAS 3.1.3.6, ACTION d	Examinee performs the following: 1. Verifies CEA Motion Inhibit Bypass button not lit when released. 2. Inhibit Bypass button is pressed, button is verified not lit and annunciator C-04/BA-19 is verified cleared. 3. US is informed of ability to log out of TSAS: • 3.1.3.1, ACTION b • 3.1.3.1, ACTION c • 3.1.3.6, ACTION d	Y ☐ N ☒	S ☐ U ☐
	Cue:			
	Comments: The JPM is complete once CEA #1 has been realigned with the rest of Group 7 and the CMI circuit is no longer bypassed.			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-284-S-1** Revision: **0**

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**20**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-284-S-1** Revision: **0**

Initial Conditions:	The plant is stable at 100 % power, about to commence a shutdown to 55% to allow maintenance work on the “A” S/G Main Feed Pump. The crew has entered AOP 2575, Rapid Downpower, and has completed steps up to 3.3, Forcing Pressurizer Sprays.
Initiating Cues:	You are to relieve the RO and continue implementing AOP 2575, Rapid Downpower, starting with the CAUTION proceeding step 3.4 and perform step 3.4 to initiate the downpower by inserting Group 7 CEAs 10 ± 2 steps.

INSTRUCTIONS	CONTINGENCY ACTIONS

CAUTION

In the case of a dropped CEA, rod motion is *not* used to initiate downpower.

INSTRUCTIONS	CONTINGENCY ACTIONS
___3.4 IF *not* downpowering due to a dropped rod, AND Reactor power is greater than 99% (2673 MWTh) INSERT Group 7 CEAs 10 ± 2 steps to initiate downpower.	
___3.5 Using the "Load Speed Control" switch, REDUCE turbine load to maintain Tc on program (± 2 deg).	
___3.6 Refer To PPC or Reactor Engineering Curve and Data Book and OBTAIN reactivity plan for the initial reactor power condition and desired load reduction.	3.6.1 IF reactor is *not* at the reactivity plan initial conditions, Refer To Attachment 7, and DETERMINE desired rate of load reduction for time in core life.

NOTE

Attachment 11 "Approximate Load Demand vs. Reactor Power," can be used to correlate the desired power level to a turbine load demand setpoint.

INSTRUCTIONS	CONTINGENCY ACTIONS
___3.7 Refer To Attachment 10, "Main Turbine Load Set Control," REDUCE turbine load and MAINTAIN Tc on program (± 2 deg).	3.7.1 Using the "Load Speed Control," REDUCE turbine load to maintain Tc .(± 2 deg)
___3.8 Based on required rate of downpower, START additional charging pumps as necessary and balance charging and letdown	

Approval Date 05/01/04 Effective Date 05/28/04

Setpoint:

- Out of Sequence
- Group Deviation
- PDIL
- Violation of shutdown group insert OR regulating group withdrawal permissive
- Overlap

BA−18

CEA MOTION INHIBIT

AUTOMATIC FUNCTIONS

1. All CEA motion stops.

CORRECTIVE ACTIONS

1. VERIFY CEA motion has stopped (C−04, PPC).
2. To determine cause of alarm, OBSERVE any associated CEDS annunciators lit (C−04).
3. IF other associated CEDS annunciators are lit, Refer To applicable alarm response section and PERFORM necessary corrective actions.
4. IF necessary, SUBMIT Trouble Report to I&C Department.

SUPPORTING INFORMATION

1. Initiating Devices
   - CEAPDS
2. Computer Points
   - "Z1579"
3. Procedures
   - OP 2302A, "Control Element Drive System"
4. Control Room Drawings
   - 25203−37005, Sheet 13
5. Annunciator Card Location: TB13−J22

Approval Date 2/21/14 Effective Date 4/21/14

Setpoint: ACTM Trouble

- (1 or more of 61 ACTMs)

AB−15

ACTM
TROUBLE

(02)

AUTOMATIC FUNCTIONS

1. None

> **NOTE**
>
> Each ACTM trouble alarm may be a momentary signal and this alarm may clear immediately upon window acknowledge.

CORRECTIVE ACTIONS

1. STOP all CEA motion.
2. REQUEST I&C Department investigate ACTM trouble condition.
3. <u>IF</u> alarm is momentary, PERFORM the following:
   - 3.1 MONITOR all ACTMs and REPORT all abnormal red lights (East DC switchgear room).
   - 3.2 OPEN the "ACTM TROUBLE ALARMS" display on CEAPDS.
   - 3.3 RESET ACTMs.
   - 3.4 <u>IF</u> ACTM alarm on CEAPDS display clears (is *not* flashing or steady red), CEA motion may be resumed.
   - 3.5 <u>IF</u> ACTM alarm on CEAPDS display does *not* clear, NOTIFY SM.

(02)

7/26/04
Approval Date

8/3/04
Effective Date

Setpoint: Highest CEA minus the lowest CEA in any CEA group, greater than 8 steps

DA−18

CEA GP
DEV BK/UP

AUTOMATIC FUNCTIONS

1. CMI is generated.
2. Affected CEA is indicated on "CEAPDS MONITOR" (C−04).

CORRECTIVE ACTIONS

1. IDENTIFY misaligned CEA and DETERMINE actual steps misaligned.
2. IF deviation is greater than 10 steps, Go To AOP 2556, "CEA Malfunctions." ②
3. IF deviation is less than or equal to 10 steps, Refer To OP 2302A, "Control Element Drive System" and PERFORM applicable actions to align all CEAs in affected group to within one step of each other, using manual individual mode in conjunction with bypassing CMI.
4. IF necessary, RESET affected group CEA positions on PPC as follows:
   - 4.1 SELECT "CEA POSITION" on PPC.
   - 4.2 SELECT "CEA POSITION EDITOR."
   - 4.3 PERFORM directions as indicated on PPC.
5. IF an instrument malfunction is indicated, SUBMIT Trouble Report to I&C Department.

SUPPORTING INFORMATION

1. Initiating Devices
   - CEAPDS
2. Computer Points
   - "Z1580"
3. Procedures
   - OP 2302A, "Control Element Drive System"
   - AOP 2556, "CEA Malfunctions"
4. Control Room Drawings
   - 25203−39105, Sheet 5
5. Annunciator Card Location: TB13−J24

4.2 CEA Operation in Manual Individual Mode

NOTE

When operating in this mode, any individual CEA in any group can be moved using CEA control switch and is primarily used for trimming CEAs and testing.

4.2.1 IF at any time it is necessary to bypass CMI during CEA movement, using Section 4.5 PERFORM applicable actions in conjunction with this section.

4.2.2 PRESS "MANUAL INDIVIDUAL, MI" pushbutton and CHECK light, lit.

4.2.3 SELECT applicable group for CEA to be moved on one of the following scales ("CEAPDS MONITOR"):

- "FULL RANGE"
- "+/– 15"

08

4.2.4 PRESS applicable "GROUP SELECTION" pushbutton for CEA to be moved and CHECK light, lit.

4.2.5 PRESS "INDIVIDUAL CEA SELECTION" pushbutton for CEA to be moved and CHECK light, lit.

4.2.6 MONITOR CEA movement on the following:

- "CEAPDS MONITOR"
- PPC (desired display) 08
- Core mimic

4.2.7 WHEN desired to initiate CEA movement, PERFORM applicable action:

- IF desired to insert CEA, PLACE and HOLD CEA control switch to "INSERT."
- IF desired to withdraw CEA, PLACE and HOLD CEA control switch to "WITHDRAW."

4.2.8 WHEN movement of selected CEA is *no* longer desired, *slowly* RELEASE CEA control switch and CHECK CEA movement has stopped.

4.2.9 IF other CEAs are required to be individually moved, Go To step 4.2.3.

4.2.10 WHEN *no* longer desired to operate in this mode, PERFORM the following:

a. PRESS CEDS “OFF” pushbutton and CHECK light, lit.

b. PRESS “GROUP SELECTION” pushbutton corresponding to controlling group and CHECK light, lit.

c. SELECT desired scale on “CEAPDS MONITOR.”

– End of Section 4.2 –

4.5 **Bypass CMI Interlocks**

NOTE

1. This Section may be used to move CEAs in order to clear alarms or continue operations when malfunctions in the alarm or control circuitry exists.
2. When CMI relay actuates, CEDM raise, lower, and lift signals to CPPs are overridden. If this happens during CEA movement, the CEA could slip and result in misalignment.
3. When CMI is bypassed, PDIL alarm circuit and CEA Deviation circuit are both inoperable.
4. Prior to bypassing any interlock, permission **must** be obtained from SM/US.

4.5.1 REQUEST SM/US authorization to bypass CMI.

4.5.2 CHECK annunciator C−04, window BA−18, “CEA MOTION INHIBIT,” lit.

4.5.3 Refer To the following and LOG entry in Shift Turnover Log (CMI bypassed):

- TSAS 3.1.3.1, ACTION b
- TSAS 3.1.3.1, ACTION c
- TSAS 3.1.3.6, ACTION d

4.5.4 PRESS appropriate *group* “INHIBIT BYPASS” pushbutton and CHECK the following:

- Appropriate *group* red “INHIBIT BYPASS” pushbutton, lit
- Annunciator C−04, window BA−19, “CEA MOTION INHIBIT BYP,” lit

4.5.5 PRESS and HOLD *system* “CEA MOTION INHIBIT BYPASS” pushbutton.

4.5.6 CHECK *system* red “CEA MOTION INHIBIT BYPASS,” lit.

4.5.7 Using applicable Section and PERFORM necessary actions to operate CEA(s):

- IF operating in Manual Individual mode, Section 4.2
- IF operating in Manual Group mode, Section 4.3
- IF operating in Manual Sequential mode, Section 4.4

NOTE

CMI should remain bypassed for at least three seconds after CEA motion is stopped to allow CPP operations to be completed.

4.5.8 WHEN CEA motion has been stopped for at least three seconds, RELEASE *system* “CEA MOTION INHIBIT BYPASS” pushbutton.

4.5.9 CHECK *system* red “CEA MOTION INHIBIT BYPASS,” light *not* lit.

4.5.10 PRESS appropriate *group* “INHIBIT BYPASS” pushbutton and CHECK the following:

- Appropriate *group* red “INHIBIT BYPASS” button, *not* lit
- Annunciator C–04, window BA–19, “CEA MOTION INHIBIT BYP,” *not* lit

4.5.11 IF CMI is *no* longer required to be bypassed, LOG exit of the following in Shift Turnover Log (CMI *not* bypassed):

- TSAS 3.1.3.1, ACTION b
- TSAS 3.1.3.1, ACTION c
- TSAS 3.1.3.6, ACTION d

– End of Section 4.5 –

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: EOP 2541 Appendix 23-N Energizing Bus 24E from Unit 3

JPM Number: JPM-285-S-6 Revision: 0

Initiated:

Robert L. Cimmino, Jr. 07/12/2016
Developer Date

Reviewed:

Dave Jacobs 07/12/2016
Technical Reviewer Date

Approved:

Supervisor, Nuclear Training Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
03/17/2016	Created from JPM-158 for the 2016 NRC License Exam	0

JPM WORKSHEET

Facility: **MP2** Examinee: ______

JPM Number: **JPM-285-S-6** Revision: **0**

Task Title: EOP 2541 Appendix 23-N Energizing Bus 24E from Unit 3

System: 4,160 Volt AC

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 30

Task Number(s): 062-01-356

Applicable To: SRO ______ STA ______ RO **X** PEO ______

K/A Number: 062-A2.12 K/A Rating: 3.2/3.6

Method of Testing: Simulated Performance: ______ Actual Performance: X

Location: Classroom: ______ Simulator: X In-Plant: ______

Task Standards: Upon energizing bus 24E from Unit 3, the examinee has recognized a fault exists on bus 24E and then de-energizes the bus.

Required Materials: (procedures, equipment, etc.) EOP 2541 Appendix 23,

- Attachment 23-N “Energizing 4.16 kV Bus 24E From Unit 3
- Attachment 23-U “3 MVA Electrical Limit on Bus 34A/34B"

General References: EOP 2541 Appendix 23

***** READ TO THE EXAMINEE *****

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-285-S-6** Revision : **0**

Initial Conditions: The Unit Supervisor has directed you to refer to Appendix 23, "Restoring Electrical Power" and reenergize bus 24E from Unit 3.

Initiating Cues:

- The unit tripped from 100% power due to an EHC failure that tripped the Main Turbine.
- 24C failed to transfer to the RSST
- The 'A' EDG failed to start
- All other equipment has responded as expected
- The operating crew has completed EOP 2525 and is currently in EOP 2526 "Reactor Trip Recovery"

Simulator Requirements:

- Trip unit complete 2525 and applicable Follow-up Actions
- Open 24G/24E (A305)
- EDA/2/2153-24E-2 500 amps 60 second ramp
- C08-A09 (ON) "4KV BUS 24E/34B TIE BKR A505 TRIP"

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-285-S-6** Revision: **0**

Task Title: **EOP 2541 Appendix 23-N Energizing Bus 24E from Unit 3**

START TIME: __________

<table>
<tr><td rowspan="3">STEP
1</td><td>Performance:
<u>EOP 2541, Attachment 23-N</u>
Energizing 4.16 kV Bus 24E From Unit 3
NOTE: The following may indicate a fault on 4.16 kV Bus 24E:
• Annunciator “4KV BUS 24E/34B TIE BKR A505 TRIP" lit (A-9, C08)
• Annunciator “4KV BUS 24C/E TIE BKR A305 TRIP" lit (B-10, C08)
• Annunciator “4KV BUS 24D/E TIE BKR A408 TRIP" lit (D-10, C08)
1. CHECK that no fault indications are present for 4.16 kV Bus 24E.</td><td>Standard:
Examinee reads and acknowledges the Note.
Checks that no fault indications are present for 4.16 kV bus 24E by verifying associated annunciators are not lit.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
2</td><td>Performance:
2. ENSURE 4.16 kV Bus 24E “SPLY VOLTS" voltage is indicated.</td><td>Standard:
Checks bus 24E voltage indicated. (C-08)</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-285-S-6** Revision: **0**

Task Title: **EOP 2541 Appendix 23-N Energizing Bus 24E from Unit 3**

<table>
<tr><td rowspan="3">STEP
#3</td><td>Performance:
3. ENSURE ALL of the following load breakers on 4.16 kV Bus 24E are open:
• A502, Service Water Pump B
• A503, HPSI Pump B
• A504, RBCCW Pump B</td><td>Standard:
Ensures all of the following load breakers on 4.16 kV Bus 24E are open:
• A502, Service Water Pump B
• A503, RBCCW Pump B
• A504, HPSI Pump B</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#4</td><td>Performance:
4. ENSURE ALL of the following breakers are open:
• A305, “24C/24E TIE BKR, 24C-2T-2"
• A408, “24D/24E TIE BKR, 24D-2T-2"</td><td>Standard:
• Opens breaker A305, “24C/24E TIE BKR, 24C-2T-2" by placing switch to trip, green light on, red light off.
• Verifies breaker A408, “24D/24E TIE BKR, 24D-2T-2" racked down (open), green light off, red light off. {<i>Not</i> “Critical Step”}</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#5</td><td>Performance:
5. REQUEST permission from Unit 3 Shift Manager or Unit Supervisor to energize Unit 2 4.16 kV Bus 24E from Unit 3 4.16 kV Bus 34A/34B.</td><td>Standard:
Contacts Unit 3 Shift Manager or Unit Supervisor for permission to energize Unit 2 Bus 24E from Unit 3 Bus 34A/34B.</td><td>Critical:
Y ☐ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: Respond as Unit 3 SM/US; “You have permission to energize Bus 24E from Unit 3, Bus 34B”.</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-285-S-6** Revision: **0**

Task Title: **EOP 2541 Appendix 23-N Energizing Bus 24E from Unit 3**

<table>
<tr><td rowspan="3">STEP
#6</td><td>Performance:
NOTE: Due to the “Dead Bus" state of 4.16 kV Bus 24E, the synchroscope will not move.
6. PLACE “SYN SEL SW, 34B-24E-2 (A505)" to “ON" and CHECK “INCOMING" voltage indicated.</td><td>Standard:
Examinee reads and acknowledges the Note.
Places “SYN SEL SW, 34B-24E-2 (A505)" to “ON" and checks “INCOMING" voltage indicated. (C-08).</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments: If timed out, acknowledges alarm for “Sync Selector Switch On”.</td></tr>
<tr><td rowspan="3">STEP
#7</td><td>Performance:
7. CLOSE A505, “24E/34B TIE BKR, 34B-24E-2".</td><td>Standard:
Closes A505, “24E/34B TIE BKR,34B-24E-2" by placing to close and releasing after red light on, green light off.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: When A505 is closed, trigger the I/O that raises 24E bus amp indication, followed in ~ 10 seconds by the malfunction to alarm annunciator C-08/A-9, “4KV Bus 24E/34B Tie Bkr A505 Trip”.</td></tr>
<tr><td colspan="4">Comments: The Examinee may or may not get to steps #8 and #9 before the alarm for breaker A505 is addressed. It is irrelevant if these steps are skipped to address the malfunction.</td></tr>
<tr><td rowspan="3">STEP
#8</td><td>Performance:
8. CHECK voltage indicated on “RUNNING" voltmeter.
9. PLACE “SYN SEL SW, 34B-24E-2 (A505)" to “OFF".</td><td>Standard:
Checks voltage indicated on “RUNNING" voltmeter (C-08).
Places “SYN SEL SW, 34B-24E-2 (A505)" to “OFF".</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-285-S-6** Revision: **0**

Task Title: **EOP 2541 Appendix 23-N Energizing Bus 24E from Unit 3**

<table>
<tr><td rowspan="3">STEP
#9</td><td>Performance:
10. Refer To Attachment 23-U, “3 MVA Electrical Limit on Bus 34A/34B," and ENSURE that 3 MVA is not exceeded as loads are restored to service.</td><td>Standard:
Examinee, in any order:
• Notes 24E/34B bus amps are rising (C-08).
• Acknowledges alarm C-08/A-9, notifies US.
• Notes A505 <i>not</i> tripped, notifies US.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: Acknowledge alarm receipt. Ask for status of A505 if not reported. If necessary, ask for recommended action. Acknowledge any suggestion to refer to the applicable ARP. If at any time Examinee suggests tripping A505, concur and/or direct.</td></tr>
<tr><td colspan="4">Comments: Step #10 is listed only because the Examinee may use it when addressing the indications of a problem with 24E. However, its use is <i>not</i> relevant.
The JPM is completed when breaker A505 is manually tripped from C-08.</td></tr>
<tr><td rowspan="3">STEP
#10</td><td>Performance:
<u>ARP-2590F-003</u>
4KV Bus 24E/34B Tie Bkr A505 Trip
Alarm is triggered by the trip of breaker A505</td><td>Standard:
If A505 has not been tripped and the ARP is referenced, Examinee should do the following:
• Note A505 is <i>not</i> tripped (if not done earlier)
• Notes loads lost on loss of 24E
• Notes breakers A305 and A408 are open
• Notes probable loss of 24C, 24D or both
• Suggests TS LCOs 3.8.1.1 and 3.8.2.1 review
• Notes breakers A305 and A408 are open
• Notes refer of AOP 2565 and AOP 2564
• Opens A505 by placing handswitch in “TRIP”
• Notes to US A505 is now open</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: If at any time Examinee suggests tripping A505, concur and/or direct.</td></tr>
<tr><td colspan="4">Comments: The only critical part of this step is opening breaker A505.
The JPM is completed when breaker A505 is manually tripped from C-08.</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-285-S-6** Revision: **0**

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**30**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☒ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____
Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-285-S-6** Revision: **0**

Initial Conditions: The Unit Supervisor has directed you to refer to Appendix 23, "Restoring Electrical Power" and reenergize bus 24E from Unit 3.

Initiating Cues:

- The unit tripped from 100% power due to an EHC failure that tripped the Main Turbine.
- 24C failed to transfer to the RSST
- The ‘A’ EDG failed to start
- All other equipment has responded as expected
- The operating crew has completed EOP 2525 and is currently in EOP 2528 “Loss Of Offsite Power/Loss of Forced Circulation”

Attachment 23–N Energizing 4.16 kV Bus 24E From Unit 3 Page 1 of 2

INSTRUCTIONS	CONTINGENCY ACTIONS

NOTE

The following may indicate a fault on 4.16 kV Bus 24E:

- Annunciator “4KV BUS 24E/34B TIE BKR A505 TRIP” lit (A–9, C08)
- Annunciator “4KV BUS 24C/E TIE BKR A305 TRIP” lit (B–10, C08)
- Annunciator “4KV BUS 24D/E TIE BKR A408 TRIP” lit (D–10, C08)

___1. CHECK that *no* fault indications are present for 4.16 kV Bus 24E.

1.1 DISCONTINUE this attachment and INITIATE investigation into the reason for the fault.

___2. ENSURE 4.16 kV Bus 24E “SPLY VOLTS” voltage is indicated.

___3. ENSURE **ALL** of the following load breakers on 4.16 kV Bus 24E are open:

- A502, “SERVICE WTR PUMP B”
- A503, “HPSI PUMP B”
- A504, “RBCCW PUMP B”

___4. ENSURE **ALL** of the following breakers are open:

- A305, “24C/24E TIE BKR, 24C–2T–2”
- A408, “24D/24E TIE BKR, 24D–2T–2”

Attachment 23–N Energizing 4.16 kV Bus 24E From Unit 3 Page 2 of 2

INSTRUCTIONS	CONTINGENCY ACTIONS
___5. REQUEST permission from Unit 3 Shift Manager or Unit Supervisor to energize Unit 2 4.16 kV Bus 24E from Unit 3 4.16 kV Bus 34A/34B.	

NOTE

Due to the "Dead Bus" state of 4.16 kV Bus 24E, the synchroscope will *not* move.

___6. PLACE "SYN SEL SW, 34B–24E–2 (A505)" to "ON" and CHECK "INCOMING" voltage indicated.	
___7. CLOSE A505, "24E/34B TIE BKR, 34B–24E–2".	
___8. CHECK voltage indicated on "RUNNING" voltmeter.	
___9. PLACE "SYN SEL SW, 34B–24E–2 (A505)" to "OFF".	
___10. Refer To Attachment 23–U, "3 MVA Electrical Limit on Bus 34A/34B," and ENSURE that 3 MVA is *not* exceeded as loads are restored to service.	10.1 At the direction of the US, REMOVE loads from service to restore Bus 34A/34B to less than 3 MVA.
___11. At the direction of the US, REALIGN as necessary for the applicable facility and PLACE the following pumps in service: • Service Water Pump B • HPSI Pump B • RBCCW Pump B	

Attachment 23−N Energizing 4.16 kV Bus 24E From Unit 3

INSTRUCTIONS	CONTINGENCY ACTIONS
___12. IF desired to restore power to 4.16 kV Bus 24C from 4.16 kV Bus 24E, Refer To Attachment 23−D, "Energizing 4.16 kV Bus 24C From 4.16 kV Bus 24E."	
___13. IF desired to restore power to 4.16 kV Bus 24D from 4.16 kV Bus 24E, Refer To Attachment 23−G, "Energizing 4.16 kV Bus 24D From 4.16 kV Bus 24E."	

Setpoint: Trip of 4KV bus 24E/34B tie breaker A505

A−9

4KV BUS 24E/34B TIE BKR A505 TRIP

AUTOMATIC FUNCTIONS

1. Loss of bus 24E and its loads:
    1.1 "B" HPSI pump
    1.2 "B" RBCCW pump
    1.3 "B" service water pump
2. Trip of one *or both* of the following breakers:
    2.1 "24C/24E TIE BKR, 24C−2T−2 (A305)"
    2.2 "24D/24E TIE BKR, 24D−2T−2 (A408)"
3. Loss of buses 24C or 24D *or both*.

CORRECTIVE ACTIONS

1. Refer To T/S LCO 3.8.1.1 and 3.8.2.1 and EVALUATE applicability.
2. VERIFY trip of "24C/24E TIE BKR, 24C−2T−2 (A305)," or "24D/24E TIE BKR, 24D−2T−2 (A408)," *or both* (C−08).
3. Refer To AOP 2565, "Loss of Service Water," and AOP 2564, "Loss of RBCCW," and PERFORM applicable actions.
4. PLACE "24E/34B TIE BKR, 34B−24E−2 (A505)," control switch in "TRIP" (C−08).
5. DETERMINE cause of trip by relay operation and relay targets, located at "24E/34B TIE BKR, 34B−24E−2 (A505)," cubicle.
6. RECORD and RESET relays.
7. Refer To AOP 2502C, "Loss of Vital 4.16 KV Bus 24C," or AOP 2502D, "Loss of Vital 4.16KV Bus 24D."

SUPPORTING INFORMATION

1. Initiating Devices
    - 86−2 relay
    - Ground Fault − 50GS
    - Overcurrent − 51 phase A, phase B, phase C

Level of Use
Reference

2. Technical Specifications
   - T/S LCO 3.8.1.1
   - T/S LCO 3.8.2.1
3. Procedures
   - OP 2343, “4160 Volt Electrical System”
   - AOP 2564, “Loss of RBCCW”
   - AOP 2565, “Loss of Service Water”
   - AOP 2502C, “Loss of Vital 4.16KV Bus 24C”
   - AOP 2502D, “Loss of Vital 4.16KV Bus 24D”
4. Control Room Drawings
   - 25202−30001
   - 25203−30001
   - 25203−30009
   - 25203−32002, sheet 15
5. Annunciator Card Location: TB24−J17

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: **AOP 2551 SD from Outside the Control Room C21 PZR LVL**

JPM Number: **JPM-288-S-2** Revision: 0

Initiated:

David J. Jacobs	04/13/2016
Developer	Date

Reviewed:

Robert L. Cimmino	07/05/2016
Technical Reviewer	Date

Approved:

Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
04-13-2016	New JPM ILT Exam 2016	0

JPM WORKSHEET

Facility: **MP Unit 2** Examinee: ____________

JPM Number: **JPM-288-S-2** Revision: **0**

Task Title: **AOP 2551 SD from Outside the Control Room C21 PZR LVL**

System: 011 Pressurizer Level Control System

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 10

Task Number(s): 000-04-155

Applicable To: SRO **X** STA ____ RO **X** PEO ____

K/A Number: 011 A1.01 K/A Rating: 3.2/3.1

Method of Testing: Simulated Performance: ____ Actual Performance: X

Location: Classroom: ____ Simulator: X In-Plant: ____

Task Standards: Operator restores and maintains PZR Pressure 2225-2300 psia and Level 35% to 70% from C-21 "Remote Shutdown Panel with a fault on the Controlling Channel of Pressurizer Level.

Required Materials: MP-PROC-OPS-AOP 2551[r009.03] Shutdown from Outside the Control Room
(procedures, equipment, etc.)

General References: MP-PROC-OPS-AOP 2551[r009.03] Shutdown from Outside the Control Room

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-288-S-2** Revision : **0**

Initial Conditions: The Unit was tripped from 100% and the Crew has evacuated the Control Room.

The Unit Supervisor has entered AOP 2551 "Shutdown from Outside the Control Room"

The Shift Manager has Classified the Event.

All steps up to and including 3.10 have been completed.

Initiating Cues: The Unit Supervisor has directed you to perform Steps 3.11 and 3.12

- Maintain Pressurizer Level 35% to 70%
- Maintain Pressurizer Pressure 2225 psia to 2300 psia

Simulator Requirements: RCS at NOP/NOT

All Charging Pump H/S in NORM after START

Malfunction for PZR Level RX04A (X Ch.) or RX04B (Y Ch.) to 100% with a 60 second Ramp

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-288-S-2** Revision: **0**

Task Title: **AOP 2551 SD from Outside the Control Room C21 PZR LVL**

START TIME: __________

STEP #1	Performance: Examinee refers to AOP 2551 Shutdown from outside the Control Room Step 3.11 DETERMINE that RCS Inventory Control acceptance criteria are met by performing **ALL** of the following: a. CHECK that **BOTH** of the following conditions exist: • Pressurizer level is 20 to 80%. • Pressurizer level is trending to 35 to 70%.	Standard: Examinee should review the controllers that are available at C-21 to control PZR level. • Letdown flow controller HIC-110 manual • Charging Pumps in and out of PTL	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Provide a copy of AOP 2551 to the Examinee to review.			
	Comments:			
STEP #2	Performance: 3.12 DETERMINE RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • CHECK that PZR pressure is 1900 to 2350 psia. • CHECK that PZR pressure is trending to 2225 to2300 psia.	Standard: Examinee should review the controllers that are available at C-21 to control PZR pressure. • PZR backup Heaters in or out of PTL • Spray Valves in manual	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-288-S-2** Revision: **0**

Task Title: **AOP 2551 SD from Outside the Control Room C21 PZR LVL**

S T E P # 3	Performance: Examinee monitors Pressurizer Level and RCS pressure using the indicators on C-21	Standard: Locates and Monitors PZR level and RCS Pressure on C-21	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Direct the Examinee to maintain PZR level between 35 and 70% And PZR pressure 2225 to 2300 psia When the Examinee is ready inform Booth Operator to insert RX04A or RX04B for the controlling channel of PZR level on a 60 second ramp to 100% level			
	Comments:			
S T E P # 4	Performance: Examinee observes the following: • PZR Level Slowly rising on the Controlling CH. • PZR Level slowly lowering on the NON Controlling CH. • RCS Pressure slowly rising. (BU HTRS ON) • @4% PZR level above program level all Backup Heaters energizing • IF 2 charging pumps were operating 1 shuts off (BU SIG OFF) • Letdown Flow rising HIC-110	Standard: Examinee States the following: • PZR level and Trend • RCS pressure and Trend Examinee performs the following: • Takes manual control of HIC-110 and matches Charging and Letdown Flow. • Takes manual control of Spray valves and Initiates Spray to maintain RCS pressure. OR • Places PZR BU Heaters in PTL to maintain RCS pressure.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-288-S-2** Revision: **0**

Task Title: **AOP 2551 SD from Outside the Control Room C21 PZR LVL**

STEP # 5	Performance: Examinee Reports RCS Pressure and PZR level in manual control maintaining the following: • PZR level 35 to 70% • RCS pressure 2225 to 2300 psia	Standard: Examinee manually controls Pressure and Level with in the procedural guidance.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue:			
	Comments:			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-288-S-2** Revision: **0**

Date Performed: __________

Student: __________

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**10**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: __________

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-288-S-2** Revision: **0**

Initial Conditions:

The Unit was tripped from 100% and the Crew has evacuated the Control Room.

The Unit Supervisor has entered AOP 2551 "Shutdown from Outside the Control Room"

The Shift Manager has Classified the Event.

All steps up to and including 3.10 have been completed.

Initiating Cues:

The Unit Supervisor has directed you to perform Steps 3.11 and 3.12

- Maintain Pressurizer Level 35% to 70%
- Maintain Pressurizer Pressure 2225 psia to 2300 psia

NOTE

Step 3.10 is considered the point at which control is established at the remote shutdown panel for EAL classification purposes.

INSTRUCTIONS	CONTINGENCY ACTIONS
___3.10 Refer To MP-26-EPI-FAP06, “Classification and PARs,” and CLASSIFY the event.	
___3.11 DETERMINE that RCS Inventory Control acceptance criteria are met by performing **ALL** of the following:	
a. CHECK that **BOTH** of the following conditions exist: • Pressurizer level is 20 to 80%. • Pressurizer level is trending to 35 to 70%.	a.1 <u>IF</u> the pressurizer level control system is *not* operating properly in automatic, RESTORE and MAINTAIN pressurizer level 35 to 70% by performing **ANY** of the following: ① • OPERATE pressurizer level control system • Manually OPERATE charging and letdown
___3.12 DETERMINE RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • CHECK that pressurizer pressure is 1900 to 2350 psia. • CHECK that pressurizer pressure is trending to 2225 to 2300 psia.	3.12.1 <u>IF</u> pressurizer pressure control system is *not* operating properly in automatic, RESTORE and MAINTAIN pressurizer pressure 2225 to 2300 psia by performing **ANY** of the following: • OPERATE the Pressurizer Pressure Control System. • Manually OPERATE pressurizer heaters and spray valves. • <u>IF</u> **ANY** pressurizer spray valve will *not* close, STOP RCPs as necessary.

9.0 Pressurizer Level Control Malfunctions

INSTRUCTIONS

CONTINGENCY ACTIONS

[9.1] SHIFT “LTDN FLOW CNTL, HIC- 110” to “MAN” (C- 02).

[9.2] ADJUST “LTDN FLOW CNTL, HIC- 110” to stabilize Pressurizer level (C- 02).

___9.3 IF affected Pressurizer Level control is channel PRESSURIZER CH X, Go To ARP 2590B- 213, “PRESSURIZER CH X LEVEL HI/LO” (C- 02/3, window A- 38).

___9.4 IF affected Pressurizer Level control is channel PRESSURIZER CH Y, Go To ARP 2590B- 217, “PRESSURIZER CH Y LEVEL HI/LO” (C- 02/3, window A- 39).

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: EOP 2541 App. 26 EDG Operations Low Oil pressure

JPM Number: JPM-287-C-6 Revision: 0

Initiated:

David J. Jacobs 04/29/2016

Developer Date

Reviewed:

Robert L. Cimmino 07/05/2016

Technical Reviewer Date

Approved:

Supervisor, Nuclear Training Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
04/29/2016	New JPM for 2016 NRC ILT Exam	0

JPM WORKSHEET

Facility: **MP Unit 2** Examinee: ____________

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

System: 064 Emergency Diesel Generators

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 25

Task Number(s): 064-010-075

Applicable To: SRO **X** STA ____ RO **X** PEO **X**

K/A Number: A 1.01 K/A Rating: 3.0 / 3.1

Method of Testing: Simulated Performance: X Actual Performance: ____

Location: Classroom: ____ Simulator: ____ In-Plant: X

Task Standards:	Monitor EDG during operations during Emergency Conditions, Examinee notes the low lube oil pressures and either recommends or trips the EDG
Simulator Requirements:	None
General References:	MP-PROC-OPS-EOP 2541-APP26[r001.00] EDG Operations MP-PROC-OPS-ARP 2591A-002[r001.00] C-38 Alarm Response MP-PROC-OPS-ARP 2591B-002[r006.00] C-39 Alarm Response

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-287-C-6** Revision : **0**

Initial Conditions:

The Reactor Tripped from 100% power due to a loss of the Grid.

Both Emergency Diesels are running aligned to their respective Buses.

The Crew is performing EOP 2528 Loss of Offsite Power.

Initiating Cues:

You have been directed to perform EOP 2541 Standard Appendix 26 “Emergency Diesel Operation” and locally check diesel operation.

Required Materials:
(procedures, equipment, etc.)

MP-PROC-OPS-EOP 2541-APP26[r001.00] EDG Operations

MP-PROC-OPS-ARP 2591A-033[r001.04] C-38 Alarm Response

MP-PROC-OPS-ARP 2591B-002[r006.00] C-39 Alarm Response

*** * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * ***

1. Critical steps for this JPM are indicated by checking “Y”. For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

START TIME: __________

STEP #1	Performance: EOP 2541-APP26 Step #1 OBSERVE EDG alarms. (C-38, C-39)	Standard: Examinee Reviews the Appendix	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Provide Examinee with a copy of EOP 2541-APP26			
	Comments:			
STEP #2	Performance: EOP 2541-APP26 Step #2 RESET and ACKNOWLEDGE the alarms.	Standard: The Examinee presses the Reset then Acknowledge button on C-38 or C-39 NOTEs that the C-38 / C-39 B-1 “LUBE OIL PRESSURE LOW” Alarm remains lit	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: After the Examinee states that they press the Acknowledge Button, Provide feedback that “LUBE OIL PRESSURE LOW” B-1 Alarm remains lit.			
	Comments:			
STEP #3	Performance: EOP 2541-APP26 Step #3 NOTIFY the Control Room of alarm panel status.	Standard: The Examinee call the Control Room and reports C-38 or C-39 B-1 “LUBE OIL PRESSURE LOW” Alarm remains lit	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Acknowledges as Control room “Understand Low Lube Oil Pressure Alarm is in, Perform local Alarm Response Panel Procedure”.			
	Comments:			
STEP #4	Performance: Reviews the Alarm Response for B-1 ARP 2591A/B-002	Standard: Examinee removes and obtains the ARP for the Low Lube Oil Pressure Alarm	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Hand the Examinee a copy of ARP 2591A or B -002 for the corresponding EDG			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

STEP #5	Performance: Reviews the ARP for Set Points, Automatic Functions and Corrective Actions	Standard: Examinee notes the Lube Oil Pressure Setpoints and the Automatic Functions	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #6	Performance: CHECK oil sump level meets one of the following: IF DG is operating, between "ADD OIL" and "FULL" mark on dipstick	Standard: Examinee goes to the north side of the EDG and locates the Dipstick and states they would unscrew counter clockwise and remove the dipstick checking oil level	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Inform the Examinee oil level is half way between the "ADD" and "FULL" mark on the dipstick			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

<table>
<tr><td rowspan="3">STEP #7</td><td>Performance:
IF DG is operating, OBSERVE the following:
• Pressure indicated on PI-8755 (engine skid) (normally 30 to 40 psig).
• Upstream and downstream lube oil filter pressure indicated on PI-8759 (normally 62 to 72 psig)
• Upstream and downstream lube oil strainer pressure indicated on PI-8765 (normally 45 to 60 psig)</td><td>Standard:
Examinee goes to the EDG Gage Board northeast side of the EDG and observes the following:
• PI-8755 reads 10 psig
• PI-8759 reads upstream 10 psig and downstream 8 psig
• PI-8765 reads upstream 8 psig and downstream 8 psig</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
When the Examinee examines the lube oil gages provide the following:
• PI-8755 reads 10 psig
• PI-8759 reads upstream 10 psig and downstream 8 psig
• PI-8765 reads upstream 8 psig and downstream 8 psig</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP #8</td><td>Performance:
The Examinee NOTEs that pressure indications read less than 10 psig and are less than require for operations.</td><td>Standard:
Examinee recommends to the Control Room the need to trip the EDG or Manually Trips the EDG by Depressing the Fuel Rack Trip or removing the gage glass for Emergency Trip Button on C-38 / C-39 and pressing the button.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Acknowledge as Control room “Examinee’s report and direct carry out your actions”. IF the Examinee Trips the EDG inform them that the EDG Trip and the RPMS are reducing.</td></tr>
<tr><td colspan="4">Comments:
If the Examinee Trips the EDG or Tells the Control Room to Trip the EDG continue to JPM step #11
The Examinee may continue to perform the remaining steps of the Alarm Response Procedure</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

<table>
<tr><td rowspan="3">STEP #9</td><td>Performance:
Visually INSPECT system for oil leakage or broken oil lines.</td><td>Standard:
Examinee walks around the EDG looking for oil leaks.</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
No Oil Leaking</td></tr>
<tr><td colspan="4">Comments:
Reason for the Low Lube Oil pressure is the Engine Driven Oil Pump shaft sheared.</td></tr>
<tr><td rowspan="3">STEP #10</td><td>Performance:
WHEN alarming condition is clear, PRESS “ALARM RESET” button (engine skid).</td><td>Standard:
Examinee attempts to reset alarms on C-38 / C-39</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue: Alarms do not reset</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP #11</td><td>Performance:
SUBMIT CR.</td><td>Standard:
Examinee state they would submit a CR</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP #12</td><td>Performance:
Refer To Technical Specification LCOs, 3.8.1.1 and 3.8.1.2, and DETERMINE applicability.</td><td>Standard:
States that the EDG is NOT OPERABLE</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-287-C-6** Revision: **0**

Date Performed: ____________________

Student: ____________________

> For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
> If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**25**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____________________

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	If the Emergency Diesel was started due to a loss of normal power signal, how many lube oil low pressure switches must actuate to trip the diesel?
Answer #1:	**If an emergency start signal is present, two of three pressure switches must actuate to trip diesel. ARP 2591A-002 / ARP 2591B-002 "Automatic Functions"**
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	When the diesel engine is running what supplies lube oil pressure?
Answer #2:	**Engine driven lube oil pump**
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-287-C-6** Revision: **0**

Initial Conditions:

The Reactor Tripped from 100% power due to a loss of the Grid.

Both Emergency Diesels are running aligned to their respective Buses.

The Crew is performing EOP 2528 Loss of Offsite Power.

Initiating Cues:

You have been directed to perform EOP 2541 Standard Appendix 26 “Emergency Diesel Operation” and locally check diesel operation.

MILLSTONE POWER STATION
EMERGENCY OPERATING PROCEDURE

STOP THINK ACT REVIEW

Emergency Diesel Generator Operation

EOP 2541, Appendix 26

Rev. 001–00

Approval Date: 02/03/15

Effective Date: 02/04/15

Level of Use
Continuous

Millstone Unit 2
Emergency Diesel Generator Operation

EOP 2541, Appendix 26 **Revision 001–00**

Page 1 of 2

INSTRUCTIONS	CONTINGENCY ACTIONS
___1. OBSERVE EDG alarms. (C–38, C–39)	
___2. RESET and ACKNOWLEDGE the alarms.	
___3. NOTIFY the Control Room of alarm panel status.	
___4. CHECK EDG and EDG room for abnormal conditions.	4.1 NOTIFY the Control Room of **ANY** abnormalities.
___5. Refer To the following, and PERFORM on running EDGs (frequency based on SM/US discretion): • OP2346A-004, “A” DG Data Sheet • OP 2346C-002, “B” DG Data Sheet	

Level of Use
Continuous

INSTRUCTIONS | CONTINGENCY ACTIONS

NOTE

Power to Clean Oil Transfer Pumps is lost if the associated vital 4.16kV bus is *not* energized. This may cause the Clean Fuel Oil Tanks to overflow into the Diesel Generator Room.

___6. IF necessary to prevent the Clean Oil Tanks from overflowing, UNLOCK and CLOSE **ALL** of the following valves for the associated diesel generator:

Emergency Diesel Generator A

- FO−17, "FUEL OIL HEADER STOP TO 15G−12U"
- DG−30A, "DG 12U AIR START HEADER A ISOLATION"
- DG−30B, "DG 12U AIR START HEADER B ISOLATION"

Emergency Diesel Generator B

- FO−33, "FUEL OIL HEADER STOP TO 15G−13U"
- DG−30C, "DG 13U AIR START HEADER C ISOLATION"
- DG−30D, "DG 13U AIR START HEADER D ISOLATION"

10/3/05
Approval Date

10/13/05
Effective Date

Setpoint: 16, 18, and 20 psig decreasing

B−1

LUBE OIL PRESSURE LOW

AUTOMATIC FUNCTIONS

1. If *no* emergency start signal is present, one pressure switch actuating trips diesel. If an emergency start signal is present, two of three pressure switches must actuate to trip diesel.

CORRECTIVE ACTIONS

1. CHECK oil sump level meets one of the following:
   - IF DG is operating, between "ADD OIL" and "FULL" mark on dipstick
   - IF DG is *not* operating, between "ADD OIL" and 12 inches above "FULL" mark on dipstick
2. IF DG is operating, OBSERVE the following:
   - Pressure indicated on PI−8755 (engine skid) (normally 30 to 40 psig).
   - Upstream and downstream lube oil filter pressure indicated on PI−8759 (normally 62 to 72 psig)
   - Upstream and downstream lube oil strainer pressure indicated on PI−8765 (normally 45 to 60 psig)
3. Visually INSPECT system for oil leakage or broken oil lines.
4. IF low pressure is due to leakage, Refer To C OP 200.5, "Oil, Hazardous Material, Hazardous Waste, and Mixed Waste Contingency Plan," and PERFORM actions for an oil spill.
5. IF necessary, REQUEST Maintenance Department add oil.
6. WHEN alarming condition is clear, PRESS "ALARM RESET" button (engine skid).
7. SUBMIT CR.
8. Refer To Technical Specification LCOs, 3.8.1.1 and 3.8.1.2, and DETERMINE applicability.

SUPPORTING INFORMATION

1. Initiating Devices
   - PS−8783 (20 psig), PS−8784 (18 psig) or PS−8785 (16 psig).

2. Technical Specifications LCOs, 3.8.1.1 and 3.8.1.2
3. Procedures
    - OP 2346A, "“A” Emergency Diesel Generator"
    - C OP 200.5, "Oil, Hazardous Material, Hazardous Waste, and Mixed Waste Contingency Plan"
4. Control Room Drawings
    - 25203−26018, Sheet 2
    - 25203−32041, Sheets 7 and 12

10/5/05
Approval Date

10/13/05
Effective Date

Setpoint: 16, 18, and 20 psig decreasing

B−1

LUBE OIL PRESSURE LOW

AUTOMATIC FUNCTIONS

1. If *no* emergency start signal is present, one pressure switch actuating trips diesel.
2. If an emergency start signal is present, two of three pressure switches must actuate to trip diesel.

CORRECTIVE ACTIONS

1. CHECK oil sump level meets one of the following:
    - IF DG is operating, between "ADD OIL" and "FULL" mark on dipstick
    - IF DG is *not* operating, between "ADD OIL" and 12 inches above "FULL" mark on dipstick
2. IF DG is operating, OBSERVE the following:
    - Pressure indicated on PI−8757 (engine skid) (normally 30 to 40 psig).
    - Upstream and downstream lube oil filter pressure indicated on PI−8760 (engine skid) (normally 62 to 72 psig)
    - Upstream and downstream lube oil strainer pressure indicated on PI−8766 (engine skid) (normally 45 to 60 psig)
3. Visually INSPECT system for oil leakage or broken oil lines.
4. IF low pressure is due to leakage, Refer To C OP 200.5, "Oil, Hazardous Material, Hazardous Waste, and Mixed Waste Contingency Plan," and PERFORM actions for an oil spill.
5. IF necessary, REQUEST Maintenance Department add oil.
6. WHEN alarming condition is clear, PRESS "ALARM RESET" button (engine skid).
7. SUBMIT CR.
8. Refer To Technical Specifications LCOs, 3.8.1.1 and 3.8.1.2, and DETERMINE applicability.

SUPPORTING INFORMATION

1. Initiating Devices
    - PS−8786 (20 psig), PS−8787 (18 psig), or PS−8788 (16 psig)

2. Technical Specifications LCOs, 3.8.1.1 and 3.8.1.2
3. Procedures
    - OP 2346C, ““B” Emergency Diesel Gnerator”
    - C OP 200.5, “Oil, Hazardous Material, Hazardous Waste, and Mixed Waste Contingency Plan”
4. Control Room Drawings
    - 25203−26018, Sheet 3
    - 25203−32041, Sheets 19 and 24

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: **Placing CAR RBCCW Valve In Manual Local Operation**

JPM Number: JPM-245 Revision: 1

Initiated:

Robert L. Cimmino, Jr.	05/04/2016
Developer	Date

Reviewed:

David J. Jacobs	07/05/2016
Technical Reviewer	Date

Approved:

Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
05/04/2016	Updated to latest template and procedure revision	1/0

JPM WORKSHEET

Facility: **MP2** Examinee: ____________

JPM Number: **JPM-245** Revision: **1**

Task Title: **Placing CAR RBCCW Valve In Manual Local Operation.**

System: RBCCW

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 15

Task Number(s): NUTIMS #

Applicable To: SRO **X** STA ____ RO **X** PEO **X**

K/A Number: 022/A4.04 K/A Rating: 3.1/3.2

Method of Testing: Simulated Performance: X Actual Performance: ____

Location: Classroom: ____ Simulator: ____ In-Plant: X

Task Standards: At the completion of this JPM, the examinee will have simulated placing an RBCCW valve in manual local operation, and open.

Required Materials: OP 2330A, RBCCW System
(procedures, equipment, etc.)

General References: OP 2330A, Section 4.9

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-245** Revision : **1**

Initial Conditions:

- The plant has experienced an Excess Steam Demand event in the Containment.
- Facility 2 is de-energized due to faults on the bus.
- Valve 2-RB-28.3A (CAR Cooler "A" emergency outlet) failed to operate from the Control Room.

Initiating Cues:

- The US has directed you to place 2-RB-28.3A in manual local control and standby for directions.
- Where necessary the examiner will act as the Unit Supervisor.
- All other actions will be handled by others.

Simulator Requirements: N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-245** Revision: **1**

Task Title: Placing CAR RBCCW Valve In Manual Local Ops.

START TIME: __________

<table>
<tr><td rowspan="3">STEP
#1</td><td>Performance:
Refer to OP 2330A ‘RBCCW System’ step 4.6 “Manual Operation of RBCCW CAR cooler valves”.</td><td>Standard:
Examinee obtains procedure OP 2330A and finds step 4.6 “Manual operation of RBCCW CAR Cooler valves”.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
When asked, provide Examinee with a copy of OP 2330A</td></tr>
<tr><td colspan="4">Comments:
For purposes of this JPM the examinee will be performing the steps for 2-RB-28.3A. Some of the steps will be done at the valve (in the RCA), and in areas where access is limited. The required exam topic should be performed by standing near the valve and describing the operation.</td></tr>
<tr><td rowspan="3">STEP
#2</td><td>Performance:
Close instrument air isolation to 2-RB-28.3A</td><td>Standard:
Examinee points to the “Whitey” air isolation valve and indicates that he would turn it in the clockwise direction to close.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Upon successful completion of step, state the “Whitey” valve is closed</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#3</td><td>Performance:
Refer to Table 1 and determine applicable fuseblock to remove. Examinee should request that Control Room personnel remove the fuse.</td><td>Standard:
Examinee refers to Table 1 and identifies that fuse “CFD” in C-01R should be removed. Also, the examinee may state that the valve should fail open when the fuse is removed.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Examiner states that the fuse has been removed by Control Room personnel, and that the sound of air release is heard, and the valve is moving to the open position.</td></tr>
<tr><td colspan="4">Comments:
The fuse block is located <i>inside</i> the main control boards, which have very limited access while at power.</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-245** Revision: **1**

Task Title: Placing CAR RBCCW Valve In Manual Local Ops.

STEP #4	Performance: Loosen allen head screw on lever arm of “air cylinder” operating shaft.	Standard: Examinee indicates that he would use the attached allen wrench to loosen the screw.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: Examiner states that the allen screw is loose.			
	Comments:			
STEP #5	Performance: Operate the manual handwheel to align the manual operator shaft to valve stem for the lever arm insertion.	Standard: Examinee states that he would move the manual handwheel to align the shaft.	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Examiner states that the shafts are now aligned.			
	Comments:			
STEP #6	Performance: Loosen allen screw on lever arm of “Manual” operating shaft and Engage arm.	Standard: Examinee states that he must access the area under the valve and loosen the allen screw. He then would engage the lever arm for the manual operator.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: Examiner states that the lever arm is engaged.			
	Comments:			
STEP #7	Performance: Tighten the allen screw for the manual lever arm.	Standard: Examinee states that he would turn allen screw to tighten the lever arm for the manual handwheel.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: Examiner states that the allen screw is tight.			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-245** Revision: **1**

Task Title: Placing CAR RBCCW Valve In Manual Local Ops.

STEP #8	Performance: Disengage the lever arm from the "air cylinder" operating shaft and tighten the allen screw to prevent the lever arm from becoming engaged again.	Standard: Examinee states that he would move the lever arm out of the way and that he may need to move the manual handwheel to relieve the tension on the arm to allow this. Also states that he would then tighten the allen screw (clockwise) to prevent the movement of the lever arm.	Critical: Y ☒ N ☐	Grade S ☐ U ☐
	Cue: Examiner states that the lever arm is disengaged and allen screw is tight.			
	Comments:			
STEP #9	Performance: Position valve as directed by the SM/US.	Standard: Examinee may state that he would ensure Tech. Specs. were referred to and open the valve by direction of the SM/US.	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments: **After this step is completed, the JPM is considered complete.**			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: ______________________________ Revision: ________

Date Performed: __________________

Student: ____

> For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
> If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**15**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	
Answer #1:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	
Answer #2:	
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

~~JPM Number~~: JPM-245 ~~Revision~~: 1

~~Initial Conditions~~:

- The plant has experienced an Excess Steam Demand event in the Containment.
- Facility 2 is de-energized due to faults on the bus.
- Valve 2-RB-28.3A (CAR Cooler “A” emergency outlet) failed to operate from the Control Room.

~~Initiating Cues~~:

- The US has directed you to place 2-RB-28.3A in manual local control and standby for directions.
- Where necessary the examiner will act as the Unit Supervisor.
- All other actions will be handled by others.

4.9 Manual Operation of RBCCW CAR Cooler Valves

Table 3.

Valve Number	Function
2−RB−28.1A	“‘A’ CAR COOLER RBCCW INLET ISOLATION”
2−RB−28.1B	“‘B’ CAR COOLER RBCCW INLET ISOLATION”
2−RB−28.1C	“‘C’ CAR COOLER RBCCW INLET ISOLATION”
2−RB−28.1D	“‘D’ CAR COOLER RBCCW INLET ISOLATION”
2−RB−28.2A	“‘A’ CAR COOLER RBCCW NORMAL OUTLET ISOLATION”
2−RB−28.2B	“‘B’ CAR COOLER RBCCW NORMAL OUTLET ISOLATION”
2−RB−28.2C	“‘C’ CAR COOLER RBCCW NORMAL OUTLET ISOLATION”
2−RB−28.2D	“‘D’ CAR COOLER RBCCW NORMAL OUTLET ISOLATION”
2−RB−28.3A	“‘A’ CAR COOLER RBCCW EMERG OUTLET ISOLATION”
2−RB−28.3B	“‘B’ CAR COOLER RBCCW EMERG OUTLET ISOLATION”
2−RB−28.3C	“‘C’ CAR COOLER RBCCW EMERG OUTLET ISOLATION”
2−RB−28.3D	“‘D’ CAR COOLER RBCCW EMERG OUTLET ISOLATION”
2-RB-29A	“‘A’ CAR COOLER RBCCW OUTLET ISOLATION”
2-RB-29B	“‘B’ CAR COOLER RBCCW OUTLET ISOLATION”
2-RB-29C	“CAR COOLER ′C ′ RBCCW OUTLET ISOLATION”
2-RB-29D	“‘D’ CAR COOLER RBCCW OUTLET ISOLATION”

4.9.1 PERFORM the following to place any valve in “MANUAL”:

a. Using Attachment 3, PERFORM applicable actions for the valve to be placed in manual.

b. INITIATE a new Attachment 3 and PERFORM applicable actions for each additional valve to be placed in manual.

c. RETAIN each Attachment 3 until applicable valve restored to automatic.

4.9.2 Using Attachment 3, PERFORM applicable actions to restore any valve to “AUTOMATIC.”

− End of Section 4.9 −

Attachment 3

Manual Operation of RBCCW CAR Cooler Valves

(Sheet 1 of 4)

Valve Number	Function

C A U T I O N

1. RBCCW flow through each CAR cooler should not exceed 2,250 gpm during normal or shutdown operation. Flow rates up to 2,400 gpm are allowed for short durations (one to two days) while aligning components, surveillance testing, or performing maintenance. [Ref. 6.17, 6.29]
2. Care should be used when manually operating CAR cooler valves listed in Table 5 (Attachment 3). In manual, the valve is easily positioned. Once the valve contacts the seat, *no* additional closing force is required to close the valve. Forcing operator onto its seat may cause operator damage. Valve travel stops are set in the actuator and not in the valve.
3. Forcing lever arm insertion after manual alignment of the manual operator shaft or the pneumatic actuator shaft to valve stem could result in actuator damage. The 6″ normal supply outlet valves (2−RB−28.2A, 2B, 2C, and 2D) are most susceptible to damage (the shear pin, connecting the actuator and valve at the lever arm coupling, is much smaller than the 10″ valves' shear pins). The open travel stop the 6″ normal supply valves are set between 5 to 15% open.

NOTE

1. Two allen wrenches are located locally at *each* valve.
2. The manual actuator is *reverse* operating on RBCCW CAR cooler valves.
3. Loss of electrical power (removing the fuse) or loss of air pressure will cause the valve to fail open.

3. PERFORM the following to place *any* CAR cooler valve to "MANUAL:"

    3.1 DOCUMENT valve number and function on top of Attachment.

    3.2 IF CAR cooler valve is to be repositioned, ENSURE adequate RBCCW header margin available.

    3.3 ENSURE CAR cooler valve, open.

Attachment 3
Manual Operation of RBCCW CAR Cooler Valves
(Sheet 2 of 4)

3.4 IF in MODE 1, 2, 3, or 4 LOG entry into the following:

3.4.1 TSAS 3.6.3.1

3.4.2 TRM 3.6.3.1

3.5 IF in MODE 1, 2, or 3 (greater than or equal to 1,750 psia), AND valve to be positioned is a CAR cooler inlet valve or a CAR cooler emergency outlet valve, LOG ENTRY in TSAS 3.6.2.1.

3.6 CLOSE instrument air isolation to air operator.

3.7 Refer To Table 5. and DETERMINE applicable fuseblock.

Table 5.

Valve Number	Function	Fuseblock (C–01R)
2–RB–28.1A	"'A' CAR COOLER RBCCW INLET ISOLATION"	CFM
2–RB–28.1B	"'B' CAR COOLER RBCCW INLET ISOLATION"	DFM
2–RB–28.1C	"'C' CAR COOLER RBCCW INLET ISOLATION"	CFN
2–RB–28.1D	"'D' CAR COOLER RBCCW INLET ISOLATION"	DFN
2–RB–28.2A	"'A' CAR COOLER RBCCW NORMAL OUTLET ISOLATION"	CFXG
2–RB–28.2B	"'B' CAR COOLER RBCCW NORMAL OUTLET ISOLATION"	DFXH
2–RB–28.2C	"'C' CAR COOLER RBCCW NORMAL OUTLET ISOLATION"	CFXH
2–RB–28.2D	"'D' CAR COOLER RBCCW NORMAL OUTLET ISOLATION"	DFXG
2–RB–28.3A	"'A' CAR COOLER RBCCW EMERG OUTLET ISOLATION"	CFD
2–RB–28.3B	"'B' CAR COOLER RBCCW EMERG OUTLET ISOLATION"	DFA
2–RB–28.3C	"'C' CAR COOLER RBCCW EMERG OUTLET ISOLATION"	CFJ
2–RB–28.3D	"'D' CAR COOLER RBCCW EMERG OUTLET ISOLATION"	DFB

3.8 LOOSEN allen head screw (lever arm of air cylinder operating shaft).

3.9 REMOVE fuseblock for valve being placed in "MANUAL" (C–01R).

Attachment 3
Manual Operation of RBCCW CAR Cooler Valves
(Sheet 3 of 4)

3.10 To align manual operator shaft to valve stem for lever arm insertion, OPERATE “MANUAL” handwheel.

3.11 LOOSEN allen head screw (lever arm of manual operating shaft) and ENGAGE lever arm.

3.12 TIGHTEN allen head screw (lever arm of manual operating shaft).

NOTE

Slight movement of “MANUAL” handwheel may be required to relieve tension.

3.13 To prevent inadvertent engagement of lever arm and air operating shaft, PERFORM the following:

3.13.1 DISENGAGE lever arm from air cylinder shaft and HOLD in “DISENGAGED” position.

3.13.2 ROTATE allen head screw *clockwise* until it maintains lever arm in “DISENGAGED” position.

3.13.3 RELEASE lever arm.

3.13.4 OPERATE handwheel to position valve as directed by SM or US.

4. PERFORM the following to restore CAR cooler valve to “AUTOMATIC:”

NOTE

Open position is “FAIL” position.

4.1 IF CAR cooler valve is to be repositioned, ENSURE adequate RBCCW header flow margin available.

4.2 ENSURE valve manually open.

Attachment 3
Manual Operation of RBCCW CAR Cooler Valves
(Sheet 4 of 4)

NOTE

Slight movement of handwheel may be required for proper alignment.

4.3 LOOSEN allen head screw (lever arm of air cylinder operating shaft) and ENGAGE lever arm.

4.4 TIGHTEN allen head screw (lever arm of air cylinder operating shaft).

4.5 LOOSEN allen head screw (lever arm of manual operating shaft).

4.6 PERFORM the following to prevent inadvertent engagement of level arm and manual operating shaft:

  4.6.1 DISENGAGE lever arm from manual shaft and HOLD in “DISENGAGED” position.

  4.6.2 ROTATE allen head screw *clockwise* until it maintains level arm in “DISENGAGED” position.

  4.6.3 RELEASE lever arm.

4.7 Refer To Table 5. and INSTALL applicable fuseblock, for valve being placed in “AUTOMATIC” operation.

4.8 OPEN instrument air isolation to air operator.

4.9 <u>IF</u> in MODEs 1, 2, or 3 (greater than or equal to 1,750 psia), <u>AND</u> valve positioned is a CAR cooler inlet valve, or a CAR cooler emergency outlet valve, LOG out of TSAS 3.6.2.1.

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: EOP 2541 Appendix 34 Turbine Building Sump Alignment

JPM Number: JPM-265 Revision: 0/1

Initiated:

David J. Jacobs	02/14/2012
Developer	Date

Reviewed:

Joseph M. Amarello	02/14/2012
Technical Reviewer	Date

Approved:

Mike J. Cote	02/24/2012
Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
06/26/2014 djj	Updated to new format	0/1

JPM WORKSHEET

Facility: **Millstone Unit 2** Examinee: ______________________

JPM Number: **JPM-265** Revision: 0/1

Task Title: EOP 2541 Appendix 34 Turbine Building Sump Alignment

System: 2336 Station Sumps and Drains

Time Critical Task: ( ) YES (**X**) NO

Validated Time (minutes): 15

Task Number(s): NUTIMS 092-01-006

Applicable To: SRO **X** STA ____ RO **X** PEO ____

K/A Number: 2.3.11 K/A Rating: 3.8 / 4.3

Method of Testing: Simulated Performance: **X** Actual Performance: ____

Location: Classroom: ____ Simulator: ____ In-Plant: **X**

Task Standards: At the completion of this JPM, the examinee has simulated realigning Turbine Building Sumps to CPF.

Required Materials: (procedures, equipment, etc.)

- MP-PROC-OPS-EOP 2541-APP34 Turbine Building Sump Alignment

General References:

- MP-PROC-OPS-EOP 2541-APP34 REV. 000

*** READ TO THE EXAMINEE ***

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-265** Revision : 0/1

Initial Conditions:

- The Unit has been Manually Tripped due to a Steam Generator Tube Rupture approximately 1 hour ago.
- The Balance of Plant Operator has directed you to perform EOP 2541 Appendix 34 and realign Turbine Building Sump to CPF.

Initiating Cues:

- The plant was tripped due to a Steam Generator Tube Rupture currently in EOP 2534.
- Turbine Building sumps are aligned normally per OP 2336A.

Simulator Requirements: N/A

* * * * NOTES TO TASK PERFORMANCE EVALUATOR * * * *

1. Critical steps for this JPM are indicated by checking "Y". For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **NO** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-265** Revision: 0/1

Task Title: EOP 2541 Appendix 34 Turbine Building Sump Alignment

START TIME: __________

S T E P # 1	Performance: 1. ENSURE BOTH of the following for the in-service CPF tank: (TK-10 or TK-11) • Adequate tank volume exists to receive influent. • The tank is not being discharged	Standard: The examinee Verifies the following: • TK-10 or TK-11 volume on panel "2CND-PNLCDX". • Verifies no Discharge Placard for the TK in service to receive TB Sump effluent.	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue: Tank level for TK in service is 20%			
	Comments: Indication for TK-10 and TK-11 on "CPF Condensate Demineralizer Waste Treating Panel", 2CND-PNLCDX			
S T E P # 2	Performance: 2. UNLOCK and OPEN ONE of the following valves to the in-service CPF tank: • "AR-81A, CONDENSER PIT SUMP TO TK 10"(CPF) • "AR-81B, CONDENSER PIT SUMP TO TK 11" (CPF)	Standard: Examinee states they would UNLOCK and OPEN either • "AR-81A, CONDENSER PIT SUMP TO TK 10"(CPF) • "AR-81B, CONDENSER PIT SUMP TO TK 11" (CPF) by rotating the handwheel in the counter clockwise direction.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: Valve Stem rising the Valve is OPEN			
	Comments: Located by Acid and Caustic Tanks lower level CPF			

STEP #3	Performance: 3. PLACE ALL of the following Turbine Building Sump Pump handswitches in "STOP": • Condenser Pit A, "P73A" (West) • Condenser Pit A, "P73B" (West) • Condenser Pit B, "P39A" (East) • Condenser Pit B, "P39B" (East) • Motor Driven Auxiliary SGFP Room, "P125" • Turbine Driven Auxiliary SGFP Room, "P72A" • Turbine Driven Auxiliary SGFP Room, "P72B	Standard: Examinee locates and states, they would position the local Handswitches to OFF.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: Switch is in OFF			
	Comments: For Safety concerns the Examinee and Examiner do not have to climb down the ladder to simulate West Condenser Pit sumps as long as the Examinee states that the switches are similar to the East Pit Sump Pump Handswitches			
STEP #4	Performance: 4. CLOSE "SS-25, CONDENSER PIT AND AFW SUMPS TO OIL SEPARATOR #2". (Northeast corner of condenser)	Standard: Examinee locates SS-25, and closes by rotating handwheel in clockwise direction.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: Valve is Closed			
	Comments: Located Northeast corner of condenser in the Turbine Building overhead			
STEP #5	Performance: 5. OPEN "AR-80, TURBINE BUILDING SUMPS TO CPF TK 10/11". (Northeast corner of condenser)	Standard: Examinee locates AR-80, and open by rotating handwheel in counter clockwise direction.	Critical: Y [**X**] N [ ]	Grade S [ ] U [ ]
	Cue: Valve is Closed			
	Comments: Located Northeast corner of condenser in the Turbine Building overhead			

STEP #6	Performance: 6. PERFORM the following to align Turbine Building Sumps for automatic operation: a. OBTAIN approval to operate the Turbine Building Sump Pumps in automatic.	Standard: Examinee call the Control Room to Obtain permission to PLACE Turbine Building Sumps to AUTOMATIC Operation	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue: Inform the Examinee to manually control Turbine Sump Levels			
	Comments:			
STEP #7	Performance: <u>CONTINGENCY ACTIONS</u> a. 1 START Turbine Building Sump Pumps manually, as necessary to avoid sump overflow.	Standard: Examinee refers to contingency STEP 6.a.1 States they would monitor Turbine Building Sumps and START Sumps pumps as necessary to maintain levels	Critical: Y [ ] N [**X**]	Grade S [ ] U [ ]
	Cue:			
	Comments: When the examinee reports that they are monitoring Turbine Building Sumps, the JPM is complete			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-265** Revision: 0/1

Date Performed: ____________________

Student: ____

For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.
As necessary, refer to TIG-04 for additional Pass/Fail criteria.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**15**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	What would be the Major consequence if the Turbine Building Sumps were to over flow and fill the Condenser Pit? **Ref.** CWS-00-C.R9Chg1
Answer #1:	**Circulating Water pumps would trip causing a Reactor Trip if water level exceeded 10" inches above the Floor of the Condenser Pit**
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	What guidelines are used to minimize water inputs to the Condenser pit sumps during a Steam Generator Tube Leak event in progress? **Ref.** AOP 2569 Steam Generator Tube Leak Step 4.4
Answer #2:	**a. ENSURE the SJAE after cooler drains are aligned to the condenser.** **b. AVOID the use of mechanical vacuum pumps.** **c. AVOID draining any tanks or lines to the condenser pit sumps.**
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-265** Revision: 0/1

Initiating Cues:

- The plant was tripped due to a Steam Generator Tube Rupture currently in EOP 2534.
- Turbine Building sumps are aligned normally per OP 2336A.

Initial Conditions:

- The Unit has been Manually Tripped due to a Steam Generator Tube Rupture approximately 1 hour ago.
- The Balance of Plant Operator has directed you to perform EOP 2541 Appendix 34 and realign Turbine Building Sump to CPF.

MILLSTONE NUCLEAR POWER STATION
EMERGENCY OPERATING PROCEDURE

STOP THINK ACT REVIEW

Turbine Building Sump Alignment

EOP 2541, Appendix 34
Rev. 000

Approval Date: 10/2/03

Effective Date: 10/3/03

Level of Use
Continuous

Millstone Unit 2
Turbine Building Sump Alignment

INSTRUCTIONS

___1.. ENSURE **BOTH** of the following for the in−service CPF tank:
(TK−10 or TK−11)

- Adequate tank volume exist to receive influent.
- The tank is *not* being discharged.

___2.. UNLOCK and OPEN **ONE** of the following valves to the in−service CPF tank:

- “AR−81A, CONDENSER PIT SUMP TO TK 10” (CPF)
- “AR−81B, CONDENSER PIT SUMP TO TK 11” (CPF)

___3.. PLACE **ALL** of the following Turbine Building Sump Pump handswitches in “STOP”:

- Condenser Pit A, “P73A” (West)
- Condenser Pit A, “P73B” (West)
- Condenser Pit B, “P39A” (East)
- Condenser Pit B, “P39B” (East)
- Motor Driven Auxiliary SGFP Room, “P125”
- Turbine Driven Auxiliary SGFP Room, “P72A”
- Turbine Driven Auxiliary SGFP Room, “P72B”

___4.. CLOSE “SS−25, CONDENSER PIT AND AFW SUMPS TO OIL SEPARATOR #2”.
(Northeast corner of condenser)

CONTINGENCY ACTIONS

Level of Use
Continuous

INSTRUCTIONS	CONTINGENCY ACTIONS
___5.. OPEN "AR−80, TURBINE BUILDING SUMPS TO CPF TK 10/11". (Northeast corner of condenser)	
___6.. PERFORM the following to align Turbine Building Sumps for automatic operation:	
a. OBTAIN approval to operate the Turbine Building Sump Pumps in automatic.	a.1 START Turbine Building Sump Pumps manually, as necessary to avoid sump overflow.
b. PLACE **ALL** of the following sump pumps in "AUTO": • Condenser Pit A, "P73A" (West) • Condenser Pit A, "P73B" (West) • Condenser Pit B, "P39A" (East) • Condenser Pit B, "P39B" (East) • Motor Driven Auxiliary SGFP Room, "P125" • Turbine Driven Auxiliary SGFP Room, "P72A" • Turbine Driven Auxiliary SGFP Room, "P72B"	

JOB PERFORMANCE MEASURE APPROVAL SHEET

JPM Title: EOP 2541 App. 26 EDG Operations Low Oil pressure

JPM Number: JPM-287-C-6 Revision: 0

Initiated:

David J. Jacobs	04/29/2016
Developer	Date

Reviewed:

Robert L. Cimmino	07/05/2016
Technical Reviewer	Date

Approved:

Supervisor, Nuclear Training	Date

SUMMARY OF CHANGES

DATE	DESCRIPTION	REV/CHANGE
04/29/2016	New JPM for 2016 NRC ILT Exam	0

JPM WORKSHEET

Facility: **MP Unit 2** Examinee: ______________________

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

System: 064 Emergency Diesel Generators

Time Critical Task: ☐ YES ☒ NO

Validated Time (minutes): 25

Task Number(s): 064-010-075

Applicable To: SRO **X** STA ____ RO **X** PEO **X**

K/A Number: A 1.01 K/A Rating: 3.0 / 3.1

Method of Testing: Simulated Performance: X Actual Performance: ____

Location: Classroom: ____ Simulator: ____ In-Plant: X

Task Standards: Monitor EDG during operations during Emergency Conditions, Examinee notes the low lube oil pressures and either recommends or trips the EDG

Simulator Requirements: None

General References:

MP-PROC-OPS-EOP 2541-APP26[r001.00] EDG Operations
MP-PROC-OPS-ARP 2591A-002[r001.00] C-38 Alarm Response
MP-PROC-OPS-ARP 2591B-002[r006.00] C-39 Alarm Response

***** READ TO THE EXAMINEE *****

I will explain the initial conditions, which step(s) to simulate or discuss, and provide initiating cues. When you complete the task successfully, the objective for this JPM will be satisfied. With the exception of the questions at the end, you may use any approved reference material normally available in the Control Room, including logs. Make all written reports, oral reports, alarm acknowledgements, and log entries as if the evolution was actually being performed.

JPM WORKSHEET

JPM Number: **JPM-287-C-6** Revision : **0**

Initial Conditions:

The Reactor Tripped from 100% power due to a loss of the Grid.

Both Emergency Diesels are running aligned to their respective Buses.

The Crew is performing EOP 2528 Loss of Offsite Power.

Initiating Cues:

You have been directed to perform EOP 2541 Standard Appendix 26 “Emergency Diesel Operation” and locally check diesel operation.

Required Materials:
(procedures, equipment, etc.)

MP-PROC-OPS-EOP 2541-APP26[r001.00] EDG Operations

MP-PROC-OPS-ARP 2591A-033[r001.04] C-38 Alarm Response

MP-PROC-OPS-ARP 2591B-002[r006.00] C-39 Alarm Response

*** * * * <u>NOTES TO TASK PERFORMANCE EVALUATOR</u> * * * ***

1. Critical steps for this JPM are indicated by checking “Y”. For the student to achieve a satisfactory grade, **<u>ALL</u>** critical steps must be completed correctly.
2. When the student states what his/her simulated action/observation would be, read the appropriate "Cue".
3. If necessary, question student for details of simulated actions/observations (i.e. "What are you looking at?" or "What are you observing?").
4. Under **<u>NO</u>** circumstances must the student be allowed to manipulate any devices during the performance of this JPM (in-plant only).

PERFORMANCE INFORMATION

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

START TIME: __________

<table>
<tr><td rowspan="3">STEP
#1</td><td>Performance:
EOP 2541-APP26 Step #1
OBSERVE EDG alarms. (C-38, C-39)</td><td>Standard:
Examinee Reviews the Appendix</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Provide Examinee with a copy of EOP 2541-APP26</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#2</td><td>Performance:
EOP 2541-APP26 Step #2
RESET and ACKNOWLEDGE the alarms.</td><td>Standard:
The Examinee presses the Reset then Acknowledge button on C-38 or C-39
NOTEs that the C-38 / C-39 B-1 “LUBE OIL PRESSURE LOW” Alarm remains lit</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
After the Examinee states that they press the Acknowledge Button, Provide feedback that “LUBE OIL PRESSURE LOW” B-1 Alarm remains lit.</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#3</td><td>Performance:
EOP 2541-APP26 Step #3
NOTIFY the Control Room of alarm panel status.</td><td>Standard:
The Examinee call the Control Room and reports C-38 or C-39 B-1 “LUBE OIL PRESSURE LOW” Alarm remains lit</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Acknowledges as Control room “Understand Low Lube Oil Pressure Alarm is in, Perform local Alarm Response Panel Procedure”.</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP
#4</td><td>Performance:
Reviews the Alarm Response for B-1 ARP 2591A/B-002</td><td>Standard:
Examinee removes and obtains the ARP for the Low Lube Oil Pressure Alarm</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Hand the Examinee a copy of ARP 2591A or B -002 for the corresponding EDG</td></tr>
<tr><td colspan="4">Comments:</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

STEP #5	Performance: Reviews the ARP for Set Points, Automatic Functions and Corrective Actions	Standard: Examinee notes the Lube Oil Pressure Setpoints and the Automatic Functions	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #6	Performance: CHECK oil sump level meets one of the following: IF DG is operating, between “ADD OIL” and “FULL” mark on dipstick	Standard: Examinee goes to the north side of the EDG and locates the Dipstick and states they would unscrew counter clockwise and remove the dipstick checking oil level	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Inform the Examinee oil level is half way between the “ADD” and “FULL” mark on the dipstick			
	Comments:			

PERFORMANCE INFORMATION

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

<table>
<tr><td rowspan="3">STEP #7</td><td>Performance:
IF DG is operating, OBSERVE the following:
• Pressure indicated on PI-8755 (engine skid) (normally 30 to 40 psig).
• Upstream and downstream lube oil filter pressure indicated on PI-8759 (normally 62 to 72 psig)
• Upstream and downstream lube oil strainer pressure indicated on PI-8765 (normally 45 to 60 psig)</td><td>Standard:
Examinee goes to the EDG Gage Board northeast side of the EDG and observes the following:
• PI-8755 reads 10 psig
• PI-8759 reads upstream 10 psig and downstream 8 psig
• PI-8765 reads upstream 8 psig and downstream 8 psig</td><td>Critical:
Y ☐ N ☒</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
When the Examinee examines the lube oil gages provide the following:
• PI-8755 reads 10 psig
• PI-8759 reads upstream 10 psig and downstream 8 psig
• PI-8765 reads upstream 8 psig and downstream 8 psig</td></tr>
<tr><td colspan="4">Comments:</td></tr>
<tr><td rowspan="3">STEP #8</td><td>Performance:
The Examinee NOTEs that pressure indications read less than 10 psig and are less than require for operations.</td><td>Standard:
Examinee recommends to the Control Room the need to trip the EDG or Manually Trips the EDG by Depressing the Fuel Rack Trip or removing the gage glass for Emergency Trip Button on C-38 / C-39 and pressing the button.</td><td>Critical:
Y ☒ N ☐</td><td>Grade
S ☐ U ☐</td></tr>
<tr><td colspan="4">Cue:
Acknowledge as Control room "Examinee's report and direct carry out your actions". IF the Examinee Trips the EDG inform them that the EDG Trip and the RPMS are reducing.</td></tr>
<tr><td colspan="4">Comments:
If the Examinee Trips the EDG or Tells the Control Room to Trip the EDG continue to JPM step #11
The Examinee may continue to perform the remaining steps of the Alarm Response Procedure</td></tr>
</table>

PERFORMANCE INFORMATION

JPM Number: **JPM-287-C-6** Revision: **0**

Task Title: **EOP 2541 App. 26 EDG Operations Low Oil pressure**

STEP #9	Performance: Visually INSPECT system for oil leakage or broken oil lines.	Standard: Examinee walks around the EDG looking for oil leaks.	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: No Oil Leaking			
	Comments: Reason for the Low Lube Oil pressure is the Engine Driven Oil Pump shaft sheared.			
STEP #10	Performance: WHEN alarming condition is clear, PRESS “ALARM RESET” button (engine skid).	Standard: Examinee attempts to reset alarms on C-38 / C-39	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue: Alarms do not reset			
	Comments:			
STEP #11	Performance: SUBMIT CR.	Standard: Examinee state they would submit a CR	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			
STEP #12	Performance: Refer To Technical Specification LCOs, 3.8.1.1 and 3.8.1.2, and DETERMINE applicability.	Standard: States that the EDG is NOT OPERABLE	Critical: Y ☐ N ☒	Grade S ☐ U ☐
	Cue:			
	Comments:			

TERMINATION CUE: The evaluation for this JPM is concluded.

STOP TIME: _________

VERIFICATION OF JPM COMPLETION

JPM Number: **JPM-287-C-6** Revision: **0**

Date Performed: ____________________

Student: ____

> For the student to achieve a satisfactory grade, **ALL** critical steps must be completed correctly.
> If task is Time Critical, it **MUST** be completed within the specified time to achieve a satisfactory grade.

EVALUATION SECTION:

Time Critical Task?		☐ Yes ☒ No	
Validated Time (minutes):	**25**	Actual Time to Complete (minutes):	
Work Practice Performance:		☐ SAT ☐ UNSAT	
Operator Fundamentals:		☐ SAT ☐ UNSAT	
JPM Question Portion Overall [*NLO only*]:		☐ SAT ☐ UNSAT ☐ N/A	
Attached Question #1		☐ SAT ☐ UNSAT	
Attached Question #2		☐ SAT ☐ UNSAT	
Overall Result of JPM:		☐ SAT ☐ UNSAT	

Evaluator: ____

Print / Sign

Areas for Improvement / Comments:

JPM QUESTIONS

Question #1:	If the Emergency Diesel was started due to a loss of normal power signal, how many lube oil low pressure switches must actuate to trip the diesel?
Answer #1:	**If an emergency start signal is present, two of three pressure switches must actuate to trip diesel. ARP 2591A-002 / ARP 2591B-002 "Automatic Functions"**
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

Question #2:	When the diesel engine is running what supplies lube oil pressure?
Answer #2:	**Engine driven lube oil pump**
Examinee Response:	
Grade:	☐ SAT ☐ UNSAT

STUDENT HANDOUT

JPM Number: **JPM-287-C-6** Revision: **0**

Initial Conditions:

The Reactor Tripped from 100% power due to a loss of the Grid.

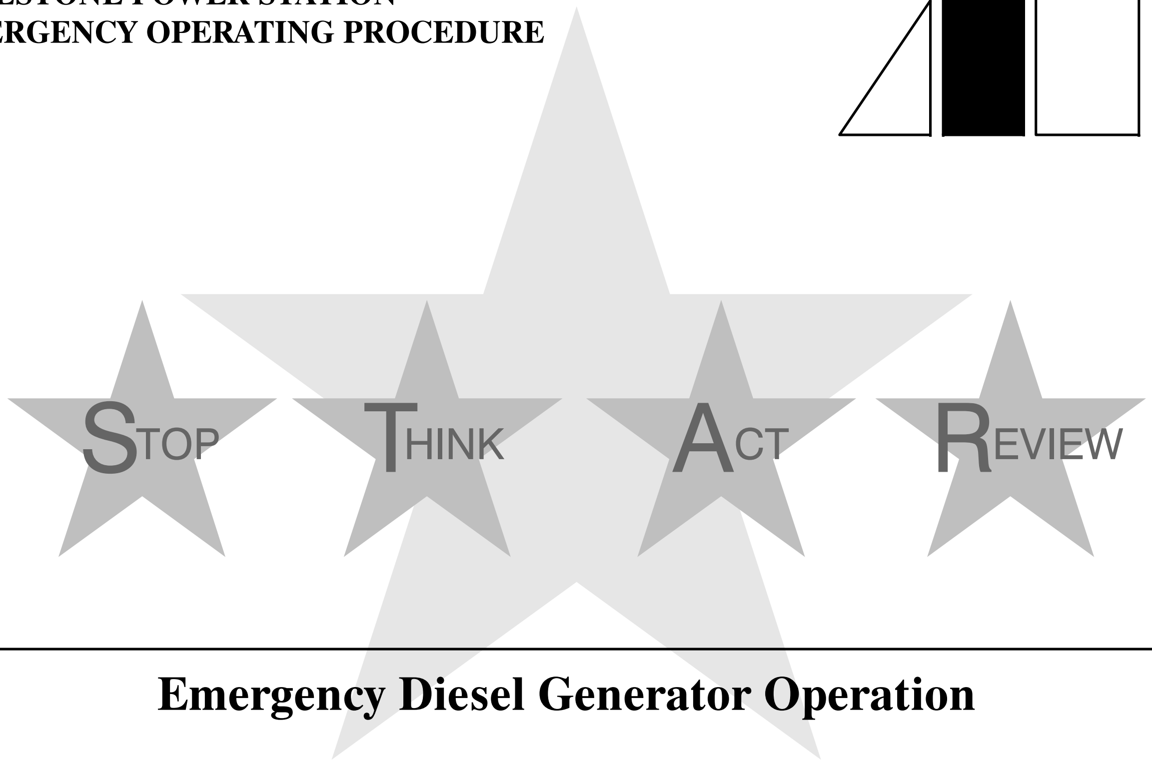
Both Emergency Diesels are running aligned to their respective Buses.

The Crew is performing EOP 2528 Loss of Offsite Power.

Initiating Cues:

You have been directed to perform EOP 2541 Standard Appendix 26 "Emergency Diesel Operation" and locally check diesel operation.

MILLSTONE POWER STATION
EMERGENCY OPERATING PROCEDURE



Emergency Diesel Generator Operation

EOP 2541, Appendix 26
Rev. 001 – 00

Approval Date: 02/03/15

Effective Date: 02/04/15

Level of Use
Continuous

Millstone Unit 2
Emergency Diesel Generator Operation

EOP 2541, Appendix 26 **Revision 001–00**

Page 1 of 2

INSTRUCTIONS	CONTINGENCY ACTIONS
___1. OBSERVE EDG alarms. (C–38, C–39)	
___2. RESET and ACKNOWLEDGE the alarms.	
___3. NOTIFY the Control Room of alarm panel status.	
___4. CHECK EDG and EDG room for abnormal conditions.	4.1 NOTIFY the Control Room of **ANY** abnormalities.
___5. Refer To the following, and PERFORM on running EDGs (frequency based on SM/US discretion): • OP2346A-004, “A” DG Data Sheet • OP 2346C-002, “B” DG Data Sheet	

Level of Use
Continuous

INSTRUCTIONS CONTINGENCY ACTIONS

NOTE

Power to Clean Oil Transfer Pumps is lost if the associated vital 4.16kV bus is *not* energized. This may cause the Clean Fuel Oil Tanks to overflow into the Diesel Generator Room.

___6. IF necessary to prevent the Clean Oil Tanks from overflowing, UNLOCK and CLOSE **ALL** of the following valves for the associated diesel generator:

Emergency Diesel Generator A

- FO−17, “FUEL OIL HEADER STOP TO 15G−12U”
- DG−30A, “DG 12U AIR START HEADER A ISOLATION”
- DG−30B, “DG 12U AIR START HEADER B ISOLATION”

Emergency Diesel Generator B

- FO−33, “FUEL OIL HEADER STOP TO 15G−13U”
- DG−30C, “DG 13U AIR START HEADER C ISOLATION”
- DG−30D, “DG 13U AIR START HEADER D ISOLATION”

10/3/05
Approval Date

10/13/05
Effective Date

Setpoint: 16, 18, and 20 psig decreasing

B−1

LUBE OIL PRESSURE LOW

AUTOMATIC FUNCTIONS

1. If *no* emergency start signal is present, one pressure switch actuating trips diesel. If an emergency start signal is present, two of three pressure switches must actuate to trip diesel.

CORRECTIVE ACTIONS

1. CHECK oil sump level meets one of the following:
   - IF DG is operating, between “ADD OIL” and “FULL” mark on dipstick
   - IF DG is *not* operating, between “ADD OIL” and 12 inches above “FULL” mark on dipstick
2. IF DG is operating, OBSERVE the following:
   - Pressure indicated on PI−8755 (engine skid) (normally 30 to 40 psig).
   - Upstream and downstream lube oil filter pressure indicated on PI−8759 (normally 62 to 72 psig)
   - Upstream and downstream lube oil strainer pressure indicated on PI−8765 (normally 45 to 60 psig)
3. Visually INSPECT system for oil leakage or broken oil lines.
4. IF low pressure is due to leakage, Refer To C OP 200.5, “Oil, Hazardous Material, Hazardous Waste, and Mixed Waste Contingency Plan,” and PERFORM actions for an oil spill.
5. IF necessary, REQUEST Maintenance Department add oil.
6. WHEN alarming condition is clear, PRESS “ALARM RESET” button (engine skid).
7. SUBMIT CR.
8. Refer To Technical Specification LCOs, 3.8.1.1 and 3.8.1.2, and DETERMINE applicability.

SUPPORTING INFORMATION

1. Initiating Devices
   - PS−8783 (20 psig), PS−8784 (18 psig) or PS−8785 (16 psig).

2. Technical Specifications LCOs, 3.8.1.1 and 3.8.1.2
3. Procedures
    - OP 2346A, "“A” Emergency Diesel Generator"
    - C OP 200.5, "Oil, Hazardous Material, Hazardous Waste, and Mixed Waste Contingency Plan"
4. Control Room Drawings
    - 25203−26018, Sheet 2
    - 25203−32041, Sheets 7 and 12

10/5/05
Approval Date

10/13/05
Effective Date

Setpoint: 16, 18, and 20 psig decreasing

B−1

LUBE OIL PRESSURE LOW

AUTOMATIC FUNCTIONS

1. If *no* emergency start signal is present, one pressure switch actuating trips diesel.
2. If an emergency start signal is present, two of three pressure switches must actuate to trip diesel.

CORRECTIVE ACTIONS

1. CHECK oil sump level meets one of the following:
   - IF DG is operating, between “ADD OIL” and “FULL” mark on dipstick
   - IF DG is *not* operating, between “ADD OIL” and 12 inches above “FULL” mark on dipstick
2. IF DG is operating, OBSERVE the following:
   - Pressure indicated on PI−8757 (engine skid) (normally 30 to 40 psig).
   - Upstream and downstream lube oil filter pressure indicated on PI−8760 (engine skid) (normally 62 to 72 psig)
   - Upstream and downstream lube oil strainer pressure indicated on PI−8766 (engine skid) (normally 45 to 60 psig)
3. Visually INSPECT system for oil leakage or broken oil lines.
4. IF low pressure is due to leakage, Refer To C OP 200.5, “Oil, Hazardous Material, Hazardous Waste, and Mixed Waste Contingency Plan,” and PERFORM actions for an oil spill.
5. IF necessary, REQUEST Maintenance Department add oil.
6. WHEN alarming condition is clear, PRESS “ALARM RESET” button (engine skid).
7. SUBMIT CR.
8. Refer To Technical Specifications LCOs, 3.8.1.1 and 3.8.1.2, and DETERMINE applicability.

SUPPORTING INFORMATION

1. Initiating Devices
   - PS−8786 (20 psig), PS−8787 (18 psig), or PS−8788 (16 psig)

2. Technical Specifications LCOs, 3.8.1.1 and 3.8.1.2
3. Procedures
   - OP 2346C, ““B” Emergency Diesel Gnerator”
   - C OP 200.5, “Oil, Hazardous Material, Hazardous Waste, and Mixed Waste Contingency Plan”
4. Control Room Drawings
   - 25203−26018, Sheet 3
   - 25203−32041, Sheets 19 and 24

SIMULATOR SCENARIO #1

Facility: Millstone Unit 2 Scenario No.: 1 Op-Test No.: ES16LI1

Examiners: ____________________ Operators: ____________________ SRO

____________________ ____________________ ATC

____________________ ____________________ BOP

Initial Conditions: 100% Power IC, No Equipment OOS, Ch-Y PZR Level in service.

Turnover: 100% Power, steady state, no equipment OOS. 24E is aligned to 24C.

Critical Tasks:

SPTA-5; Manually shutdown the reactor. The operator is observed taking action to insert CEAs or borate the RCS.

2260 - 2525 TCOA-3; Start the TDAFP within 10 minutes following a loss of normal feedwater.

LOAF-4; Establish a primary to secondary heat sink.

Event No.	**Malf. No.**	**Event Type***	**Event Description**
1 (0 min)	N/A	N (BOP/S)	Start "B" TBCCW Pump, Secure "A" TBCCW Pmp.
2 (+? min)	03A1A5S2 C04L-B11B	C (ATC/S)	Trip "A" CEDM Cool Fan.
3 (+? min)	RP10A	I (ATC/S)	Ch. “A” PZR Pressure fails low (TS)
4 (+? min)	RX04A	I (ATC/S)	Ch-X PZR Level (LT110X) (non-selected) fails to 0% level. (TS)
5 (+? min)	FW01	C (BOP/S)	Main Condenser Vacuum leak.
6 (+? min)	N/A	R (All)	Downpower due to vacuum leak.
7 (+? min)	RC11A, RP04A-D, RP27B	M (All)	“A” RCP seizes and trips, TCBs fail to open (ATWS), manual Rx trip pushbuttons fail, manually trip by opening MG set breakers.
8 (+? min)	FW33, ES01A, ES01B	C (BOP/S)	Rapid loss of condenser vacuum and failure of AFAS to trigger.
9 (+? min)	FW36A, FW36B	C (BOP/S) TS (S)	AFW pipe rupture at FW-44, inops both headers, results in LOAF.

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	**Actual**
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
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)	3

NRC 2016, Scenario 1 Summary:

The crew will take the shift with the unit at 100% power, steady state, with no equipment out of service (IC-30). TBCCW Pumps: “A” and “C” running, “B” in standby and ready to be started. The crew has been instructed to start the “B” TBCCW pump (Standby Equipment) and secure the “A” TBCCW pump.

Event 1: Upon taking the shift, the crew has been instructed to swap a running TBCCW with the Standby pump. The BOP will be directed to start the “B” TBCCW pump (Standby Equipment) and secure the “A” TBCCW pump, verifying no change in TBCCW flow. Once this is accomplished, Event 2 will be triggered.

Event 2: The “A” CEDM Cooling Fan will trip, triggering the CEDM Cooling Fan Trip annunciator. The crew will respond per ARP 2590C-082 and the ATC will be directed to start the standby (“B”) CEDM cooling fan.
Once this is accomplished, Event 3 will be triggered.

Event 3: The “A” Safety Channel of Pressurizer Pressure will fail low as a Tech. Spec. only event. The US should address the applicable Tech. Specs. and ARP, which directs all systems affected by the transmitter failure be “bypassed”. Once the crew has bypassed Ch. “A” on RPS, ESAS and AFAS, Event 4 is triggered.

Event 4: The Non-Selected (Ch. “X”) pressurizer level detector (LT-110X) will fail to 0%, causing all pressurizer heaters to trip. The crew will respond per ARP 2590B-215, de-select the failed channel and reset all pressurizer heaters. Once the crew has restored normal RCS pressure control, Event 5 will be triggered.

Event 5: Main Condenser Vacuum will begin to degrade. The crew should enter AOP 2574 for Loss Of Condenser Vacuum, and take the applicable actions to increase condenser air removal capacity. Once this proves ineffective, the US will enter AOP 2575, Rapid Downpower, and commence a plant shutdown.

Event 6: The crew will commence a plant shutdown using AOP 2575, Rapid Downpower, in an attempt to stabilize condenser vacuum by lower the energy load on the main condenser. The crew will insert CEAs to start the power reduction and then continue the downpower by boric acid injection into the RCS. This will be accomplished by aligning charging pump suction directly to the RWST (instead of the VCT).
When the power change evaluation is completed, Event 7 will be triggered.

Event 7: "A" RCP will seize and trip, but the TCBs will fail to open (ATSW). The crew should recognize the ATWS and immediately trip the reactor manually by pressing the four TCB manual trip buttons. These will also fail to open the TCBs, requiring the opening of the MG Set supply breakers. The crew should then verify all CEAs are inserting (reactor trip successful), the main turbine has tripped and commence Standard Post Trip Actions per EOP 2525.

Event 8: During the performance of SPTA, Main Condenser vacuum will degrade rapidly, causing the loss of Main Feedwater Pumps and Condenser Steam Dumps. This will require the use of the Auxiliary Feedwater System to feed the S/Gs. The AFAS will fail to automatically start AFW flow to the S/Gs, requiring manual actuation of AFW flow. Once Aux. Feedwater is manually aligned to feed both S/Gs, Event 9 is triggered.

Event 9: Shortly after the feed flow has been established to the S/Gs using Auxiliary Feedwater, a rupture will occur on both sides of 2-FW-44 (normally open x-tie between AFW headers), resulting in the loss of both Auxiliary Feedwater headers. Once STPA are completed, and the LOAF is diagnosed, the crew will transition to EOP 2537, Loss Of All Feed, and discus using a Condensate Pump to feed the S/Gs. This will require a plant cooldown using the available SG inventory, to lower SG pressure below the shutoff head of the condensate pumps.

The scenario will ended when the crew has recovered SG feed flow using a Condensate Pump, or at the Examiners discretion.

INPUT SUMMARY							
Either INPUT or VERIFY the following functions:							
ID Num	Description	Delay Time	Ramp Time	Event Time	Sev or Value	Final Value	Rel Order
MALFUNCTIONS							
RP04A-RP04D	Failure of all four Manual Trip Buttons			N/A			0
RP27B	Failure of ALL RPS trip functions			N/A			0
ES01A, ES01B	AFAS Failure, both Facilities			N/A			0
C04L-B11B	F-13A Trip Alarm			E-2		ON	2
RP10A	Ch. "A" PZR Pressure fails low			E-3	100%		3
RX04A	Ch. "X" PZR Level Cont. fails low			E-4	0%		4
FW01	Main Condenser Vacuum Loss			E-5	4%		5
RC11A	"A" RCP Seizes and tirps			E-7			7
FW33	Rapid loss of Condenser Vacuum			E-30	100%		8
FW36A FW36B	Rupture Aux Feedwater, both headers			E-9	100%		9
REMOTE FUNCTIONS							
TPR02	"A" TBCCW Pump discharge valve			E-10	CLOSED		1
TPR02	"A" TBCCW Pump discharge valve			E-11	OPEN		1

OVERRIDES							
03A1A5 S2	Trip the “A” CEDM Cooling Fan, F-13A						2

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 1

Event Description: Start the “B” TBCCW Pump, Secure the “A” TBCCW Pump

Time	Position	Applicant’s Actions or Behavior
Examiner Note: The crew has been instructed to brief the starting of the Standby (“B”) TBCCW Pump and secure the “A” TBCCW pump prior to taking the watch. **The following steps are from OP 2330B. OP procedure is marked up with “N/A” and Unit Supervisor signatures for applicable steps.**		
	BOP/PEO	4.1.1 ESTABLISH communications between Operators at TBCCW pumps and Control Room.
<u>Simulator Operator</u>: Establish communications with the control room as the PEO on station at the TBCCW pumps. If asked, local conditions appear ready for starting the “B” TBCCW pump.		
	BOP/PEO	4.1.2 To start standby TBCCW Pump, PERFORM the following: a. PLACE selected “TBCCW PUMP” switch to “START” (C-06). b. CHECK the following for running pump: • *No* abnormal noise or vibration (local) • Normal motor amperage (C-06) • Maintains normal system pressure (C-06) • Normal system flow as indicated on FI-6272 (TBCCW HX area)
<u>Simulator Operator</u>: Report as the PEO on station, “B” TBCCW pump is running no abnormal noise.		
	BOP	4.1.3 IF desired to stop ‘A’ TBCCW Pump, PERFORM the following: a. CLOSE 2-TB-3A, “TBCCW PUMP ‘A’ DISCHARGE STOP” (TBCCW HX area). b. PLACE P-7A, ‘A’ “TBCCW PUMP” switch to “STOP” OR “PULL-TO-LOCK”(C-06). c. OPEN 2-TB-3A, “TBCCW PUMP ‘A’ DISCHARGE STOP” (TBCCW HX area).
<u>Simulator Operator</u>: As the PEO on station, operate TB-3A [TPR02 CLOSED/OPEN] as directed.		
	BOP	4.1.4 IF desired to stop ‘B’ TBCCW Pump, PERFORM the following: a. CLOSE 2-TB-3B, “TBCCW PUMP ‘B’ DISCHARGE STOP” (TBCCW HX area). b. PLACE P-7B, ‘B’ “TBCCW PUMP” switch to “STOP” OR “PULL-TO-LOCK”(C-06). c. OPEN 2-TB-3B, “TBCCW PUMP ‘B’ DISCHARGE STOP” (TBCCW HX area). **Examiner Note: This step is N/A**
	BOP	4.1.5 IF desired to stop ‘C’ TBCCW Pump, PERFORM the following: a. CLOSE 2-TB-3C, “TBCCW PUMP ‘C’ DISCHARGE STOP” (TBCCW HX area). b. PLACE P-7C, ‘C’ “TBCCW PUMP” switch to “STOP” OR “PULL-TO-LOCK”(C-06). c. OPEN 2-TB-3C, “TBCCW PUMP ‘C’ DISCHARGE STOP” (TBCCW HX area). **Examiner Note: This step is N/A**
Examiner Note: When “B” TBCCW Pump has been started and the “A” TBCCW Pump has been secured, or at the lead examiner’s direction, proceed to Event #2, Trip of “A” CEDM Cooling Fan.		

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 2

Event Description: "A" CEDM Cooler Fan Trip

Time	Position	Applicant's Actions or Behavior

Simulator Operator: When directed, initiate Event #2, "A" CEDM Cooling Fan trip.

Indications Available:

- **CEDM COOLER FAN TRIP (C-04, BB-11).**

Examiner Note: The following steps are from ARP 2590C-082.

	ATC	1. Start idle CEDM cooling fan (C-04). 2. MONITOR the following: • "A" CEDM fan air discharge temperature on computer point, "T8102" • "B" CEDM fan air discharge temperature on computer point, "T8106" • "C" CEDM fan air discharge temperature on computer point, "T8101" • If all three CEDM cooling units fail, Go To OP 2204, "Load Changes", and PERFORM applicable actions to initiate a plant and reactor shutdown. 3. SUBMIT CR to Electrical Maintenance Department to investigate cause of fan trip.

CUE: If asked to investigate and determine the status of "A" CEDM Fan breaker, report back that breaker has tripped on over current.

Examiner Note: When the CEDM fan trip has been mitigated or at lead examiner's direction, go to Event 3 Ch. "A" RCS Pressure failure.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 3

Event Description: Failure of Safety Ch. “A” PZR Pressure (low)

Time	Position	Applicant’s Actions or Behavior

Simulator Operator: When directed, initiate Event 3, Failure of Ch. “A” RCS Pressure (PT-102A).

Indications Available:

- **PPC alarm Ch. “A” RCS Pressure.**
- **TM-LP TRIP CH A (C-04, CA-3)**
- **RPS PRE TRIP (C-04, AA-7)**
- **PZR PRES CH 1 SIAS MANUAL BLOCK PERMITTED (C-01, A-19)**
- **PZR PRESS LO LO A (C-01, A-20)**

Examiner Note: The following steps are from ARP 2590C-021, “TM-LP TRIP CH A”.

	ATC	AUTOMATIC FUNCTIONS 1. If 2 RPS channels actuate, reactor trips. **NOTE** 1. TMLP Trip may be manually bypassed when power is less than 1 x 10-4%. However, if power increases above 1 x 10-4%, bypass is automatically removed. 2. Pressurizer pressure is an input to ATWS logic circuitry.
	ATC	CORRECTIVE ACTIONS 1. IF reactor trips, Go To EOP 2525, “Standard Post Trip Actions" and PERFORM necessary corrective actions. 2. OBSERVE channel “A" pressurizer pressure indication and TMLP setpoint and COMPARE to other safety channel indications (C-03, PPC, ESAS). 3. OBSERVE channel “A" TH and TC instruments indicating properly for present conditions (C-03, PPC, RPS). 4. IF pressurizer pressure or RCS temperature is abnormal AND no automatic reactor trip has occurred, manually TRIP reactor and Go To EOP 2525, “Standard Post Trip Actions." **Examiner Note: Applicant observes that Ch. “A” PZR Pressure failed low by comparing the four Pressure Safety Channels on C-02/3 PZR mimic.**

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 3

Event Description: Failure of Safety Ch. “A” PZR Pressure (low)

Time	Position	Applicant’s Actions or Behavior
	ATC/BOP	5. <u>IF</u> alarm is due to any instrument malfunction, PERFORM the following: 5.1. <u>IF</u> *pressure* instrument malfunctioned, OBTAIN necessary keys and PERFORM applicable actions to bypass the following channel “A" pressurizer pressure outputs: • TMLP Trip (RPS) • High Pressurizer Pressure Trip (RPS) • ESAS pressurizer pressure bistable • ATWS (C-100) **Examiner Note: The US may chose to have either the ATC or the BOP carry out the above step to bypass the affected safety channels.**
	ATC/SRO	5.2. <u>IF</u> temperature instrument malfunctioned, OBTAIN necessary keys and PERFORM applicable actions to bypass the following channel “A" temperature outputs: • TMLP Trip (RPS) • High Power Trip (RPS) • Local Power Density Trip (RPS) 5.3. Refer To the following Technical Specifications LCOs and DETERMINE applicability: • 3.3.1.1, Table 3.3-1 • 3.3.2.1, Table 3.3-3 • 3.3.3.5, Table 3.3-9 (PI-102A only) • 3.3.3.8, Table 3.3-11 (PI-102B only) 5.4. Refer To the following TRM LCOs and DETERMINE applicability: • 3.3.1.1.1 5.5. SUBMIT Trouble Report to I&C Department.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 3

Event Description: Failure of Safety Ch. “A” PZR Pressure (low)

Time	Position	Applicant’s Actions or Behavior
	SRO	**Review Tech. Specs. and TRM**: **LCO 3.3.1.1 (RPS):** As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE. **APPLICABILITY**: As shown in Table 3.3-1. **ACTION**: As shown in Table 3.3-1. Per TS Table 3.3-1: FUNCTIONAL UNIT #4 Pressurizer Pressure - High; Total Number of Channels = 4, Minimum Channels Operable = 3, App. Modes = 1&2, **Action = 2** **Action 2** - With the number of OPERABLE channels one less than the Total Number of Channels, operation may continue provided the following conditions are satisfied: a. The inoperable channel is placed in either the bypassed or tripped condition within 1 hour. The inoperable channel shall either be restored to OPERABLE status, or placed in the tripped condition, within 48 hours. b. Within 1 hour, all functional units receiving an input from the inoperable channel are also declared inoperable, and the appropriate actions are taken for the affected functional units. c. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be removed from service for up to 48 hours, provided one of the inoperable channels is placed in the tripped condition. **Examiner Note:** SRO should note TSAS 3.3.1, Action 2 applies and is presently being met by the actions taken per the ARP to bypass the affected channels. **LCO 3.3.2.1 (ESAS):** The engineered safety feature actuation system instrumentation channels and bypasses shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4. **APPLICABILITY**: As shown in Table 3.3-3. **ACTION**: a. With an engineered safety feature actuation system instrumentation channel trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3-4, either adjust the trip setpoint to be consistent with the value specified in the Trip Setpoint column of Table 3.3-4 within 2 hours or declare the channel inoperable and take the ACTION shown in Table 3.3-3. b. With an engineered safety feature actuation system instrumentation channel inoperable, take the ACTION shown in Table 3.3-3. Per TS Table 3.3-3: FUNCTIONAL UNIT #1c, Pressurizer Pressure - Low; Total Number of Channels = 4, Minimum Channels Operable = 3, App. Modes = 1,2,3a, **Action = 2**

SRO

Action 2 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may continue provided the following conditions are satisfied:

a. The inoperable channel is placed in either the bypassed or tripped condition within 1 hour. The inoperable channel shall either be restored to OPERABLE status, or placed in the tripped condition, within 48 hours.

b. Within 1 hour, all functional units receiving an input from the inoperable channel are also declared inoperable, and the appropriate actions are taken for the affected functional units.

c. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be removed from service for up to 48 hours, provided one of the inoperable channels is placed in the tripped condition.

Examiner Note: SRO should note TSAS 3.3.2.1b, Action 2 applies and is presently being met by the actions taken to bypass the affected channels.

TS 3.3.3.5 (PI-102A - High Range): The remote shutdown monitoring instrumentation channels shown in Table 3.3-9 shall be OPERABLE with readouts displayed external to the control room.

APPLICABILITY: MODES 1, 2 and 3.

ACTION:

With the number of OPERABLE remote shutdown monitoring instrumentation channels less than required by Table 3.3-9, either:

a. Restore the inoperable channel to OPERABLE status within 7 days, or

b. Be in HOT SHUTDOWN within the next 24 hours.

Examiner Note: SRO should note that one of the two channels of PZR Pressure on C-21 is *not* OPERABLE. However, Table 3.3-9 only requires one channel be OPERABLE, which there still is (PI-102B). Therefore, the TS is still met

TS 3.3.3.8 (Acc. Monitoring): SRO should note that this TS is Not Applicable.

TRM 3.3.1.1.1: All pressurizer high pressure reactor protection channels shall be FUNCTIONAL.

APPLICABILITY:

In accordance with Technical Specification LCO 3.3.1.1 Applicability.

ACTION:

Restore any nonfunctional pressurizer high pressure reactor protection channel to FUNCTIONAL status within 30 days of placing the channel in the tripped condition, or be in MODE 3 within the next 6 hours with the failed channel in the bypassed condition.

Examiner Note: SRO should note that the Action Requirements of this TRM applies while the instrument channel is not OPERABLE per TS 3.3.1.1.

Examiner Note: When the instrument failure has been evaluated and mitigated, or at the lead examiner’s direction, proceed to Event 4, Ch. “X” PZR Level failure.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 4

Event Description: : Failure of Control Ch. “X” PZR Level (low)

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td colspan="3">Simulator Operator: When directed, initiate Event 4, Failure of the Non-Selected Channel (“X”) of PZR Level to 0%.</td></tr>
<tr><td colspan="3">Indications:
• PRESSUREIZER CH X LEVEL LO LO (C-02/3, C-38)
• PRESSUREIZER CH X LEVEL HI/LO (C-02/3, A-38)</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from ARP 2590B-215, PRESSURIZER CH X LEVEL LO LO.
If the steps from PRESSURIZER CH X LEVEL HI/LO (ARP 2590B-213) are used, skip to the next page.</td></tr>
<tr><td></td><td>ATC</td><td><u>AUTOMATIC FUNCTIONS</u>
1. <u>IF</u> “SEL SW” is in “X+Y” position, <i>all</i> heaters de-energize.</td></tr>
<tr><td></td><td>ATC</td><td><u>CORRECTIVE ACTIONS</u>
1. OBSERVE actual level on pressurizer level recorder, LR---110, pressurizer level controllers (C---03) and PPC.
2. <u>IF</u> annunciator is <i>not</i> valid, SHIFT pressurizer level control to channel “Y.”
2.1. SHIFT pressurizer heater control “SEL SW” to channel Y.
2.2. As necessary, RESET the following Pressurizer heater breakers:
• “PROP HTR GROUP 1”
• “PROP HTR GROUP 2”
• “BACKUP HTRS GROUP 1”
• “BACKUP HTRS GROUP 2”
• “BACKUP HTRS GROUP 3”
• “BACKUP HTRS GROUP 4”
Examiner Note: Because this is an <i>instrument</i> failure of the Non-Controlling channel, and does not reflect an actual change in PZR level, the only affect is the PZR Heater Breakers tripping open. Therefore, steps 3 – 8 of this ARP are not applicable.
9. <u>IF</u> alarm was caused by channel X malfunctioning, SUBMIT Trouble Report to I&C Department.
10. Refer To Technical Specifications LCOs 3.3.3.5 and 3.3.3.8 to determine ACTION Statement requirements.</td></tr>
</table>

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 4

Event Description: : Failure of Control Ch. “X” PZR Level (low)

Time	Position	Applicant’s Actions or Behavior

Examiner Note: The following steps are from ARP 2590B-213, PRESSURIZER CH X LEVEL HI/LO.

	ATC	AUTOMATIC FUNCTIONS 1. IF level is high: • *All* backup heater energize • *All* proportional heaters go to maximum output. • Backup charging pumps stop. • If level is low, backup signal is generated to start *both* backup charging pumps.
	ATC	CORRECTIVE ACTIONS **CAUTION** While restoring Pressurizer level, Pressurizer pressure must be closely monitored to prevent exceeding DNB limits, or effects on reactivity due to pressure changes. **NOTE** Actual Pressurizer level response should track with pressure response. 1. OBSERVE Pressurizer levels on all channels (C-03). 2. OBSERVE Pressurizer pressure on all channels (C-03). **NOTE** Failure of the non-controlling Channel X low, will de-energize pressure heaters if heater “SEL SW” is in “X+Y” position.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 4

Event Description: : Failure of Control Ch. “X” PZR Level (low)

Time	Position	Applicant’s Actions or Behavior
	ATC	3. IF L110X is the non---controlling channel, and a controller or transmitter failure is indicated in the low direction, PERFORM the following: 3.1. SHIFT pressurizer heater control “SEL SW” to “Y” 3.2. As necessary, RESET the following Pressurizer heater breakers: • “PROP HTR GROUP 1” • “PROP HTR GROUP 2” • “BACKUP HTRS GROUP 1” • “BACKUP HTRS GROUP 2” • “BACKUP HTRS GROUP 3” • “BACKUP HTRS GROUP 4” 3.3. IF desired, COMMENCE forcing Pressurizer sprays. 3.4. Go To Step [**13**] **{Note: a typographical error exists in the procedure at this step, in that the words “NO TAG” appear in place of “13”.}**
	ATC	13. IF alarm was caused by a controller or transmitter malfunction, DETERMINE appropriate channel, and SUBMIT Trouble Report to Instrumentation & Control Department. 14. To determine ACTION Statement requirements, Refer To the following LCOs: • TS 3.2.6 (for DNB) • TS 3.3.3.5 (for HSD or C-21) • TS 3.3.3.8 (for Acc Monitoring) • TS 3.4.4 (LT110X Only) • TRM 7.1.4 (LT110X Only)

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 4

Event Description: : Failure of Control Ch. “X” PZR Level (low)

Time	Position	Applicant’s Actions or Behavior
	SRO	**Review Technical Specifications**: **LCO 3.2.6 (DNB):** The DNB margin shall be preserved by maintaining the cold leg temperature, pressurizer pressure, reactor coolant flow rate, and AXIAL SHAPE INDEX within the limits specified in the CORE OPERATING LIMITS REPORT. **ACTION:** With any of the above parameters exceeding its specified limits, restore the parameter to within its above specified limits within 2 hours or reduce THERMAL POWER to ≤ 5% of RATED THERMAL POWER within the next 4 hours. **Examiner Note:** Impacted only if RCS pressure dropped below 2225 psia. **TS 3.3.3.5 (HSD):** The remote shutdown monitoring instrumentation channels shown in Table 3.3-9 shall be OPERABLE with readouts displayed external to the control room. **APPLICABILITY**: MODES 1, 2 and 3. **ACTION**: With the number of OPERABLE remote shutdown monitoring instrumentation channels less than required by Table 3.3-9, either: c. Restore the inoperable channel to OPERABLE status within 7 days, or d. Be in HOT SHUTDOWN within the next 24 hours. **Examiner Note:** **T**he SRO should note that one of the two channels of PZR Level on C-21 is *not* OPERABLE. However, Table 3.3-9 only requires one channel be OPERABLE, which there still is (L110Y). Therefore, the TS is still met. **TS 3.3.3.8 (Acc. Monitoring):** SRO should note that this TS is Not Applicable. **TS 3.4.4 (PZR):** The pressurizer shall be OPERABLE with: a. Pressurizer water level ≤ 70%, and b. At least two groups of pressurizer heaters each having a capacity of at least 130 kW. **APPLICABILITY**: MODES 1, 2 and 3. **ACTION**: a. With only one group of pressurizer heaters OPERABLE, restore at least two groups to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 12 hours. b. With the pressurizer otherwise inoperable, be in at least HOT STANDBY with the reactor trip breakers open within 6 hours and in HOT SHUTDOWN within the following 6 hours. **Examiner Note:** **T**he SRO should note the need to log into TSAS “a” at the approximate time the Proportional Heater breakers tripped, and log out at the approximate time they were reclosed.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 4

Event Description: : Failure of Control Ch. “X” PZR Level (low)

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td></td><td>SRO</td><td>
TRM 7.1.4 (App R Safe Shutdown): The Appendix R Safe Shutdown Related (ARSR) equipment listed in the TRM Table 7.1.4-1 shall be FUNCTIONAL.
APPLICABILITY: MODES 1, 2, 3, and 4.
Examiner Note: SRO should note the need to reference the TRM when time allows, as the requirements for these actions are not applicable unless the component is not functional for 14 days.
ACTION:
With an ARSR component listed in the above referenced component table nonfunctional (unable to meet its intended Appendix R shutdown function), take the ACTION as specified in the above table under Compensatory Measures.
Examiner Note: Only applicable part of the Table 7.1.4-1 is included.
<table>
<tr><th>TR Item</th><th>Comp ID</th><th>FUNCTIONALITY Description</th><th>Compensatory Measures if Component Not Restored in 14 days</th></tr>
<tr><td>E</td><td>LT-110X</td><td>Loop LT-110X must be FUNCTIONAL from Control Room.</td><td>With loop LT-110X nonfunctional from Control Room, perform ACTIONS b.1, b.2 for fire area R-2, R-10, and R-15.</td></tr>
</table>
Examiner Note: The above Compensatory Measures, contained on TRM page 7.1-1, can be discussed at the Examiners discretion, or following the completion of the scenario.
</td></tr>
</table>

Examiner Note: When all Pressurizer heater breakers have been reclosed and the SRO has finished evaluating Technical Specifications and the TRM, or at lead examiner’s direction, proceed to Event 5, Main Condenser Vacuum Leak.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 5, 6

Event Description: Main Condenser Vacuum Leak

Time	Position	Applicant's Actions or Behavior

<u>Simulator Operator</u>: When directed, initiate Event 5, Main Condenser Vacuum Leak.

Indications:

- **"COND VACUUM LO" {PPC, C-06/7, A-37}**
- **Condensate pressure indicator and recorder show an unexplained rise in condenser pressure. {PPC, C-05}**
- **Indicating lights, ammeters and annunciators indicate that one or more circulating water pumps have tripped. {C-06/7} (AOP 2517, "Circulating Water Malfunction" includes guidance for trip of one or more circulating water pumps)**
- **Unexplained drop in electric megawatts.**

Examiner Note: The following steps are from ARP 2590E-185, "COND VACUUM LO", C-06/7, A-37 annunciator.

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	<u>AUTOMATIC FUNTIONS</u> 1. None <u>CORRECTIVE ACTIONS</u> 1. IF condenser pressure rise is due to slow fouling of the condenser due to seasonal changes, Refer To OP 2204, "Load Changes," and REDUCE Reactor power and turbine load to clear "COND VACUUM LO" annunciator. 2. <u>IF</u> degraded condenser vacuum is being directed during performance of a power ramp, PERFORM the following: 2.1. NOTIFY personnel controlling condenser pressure of the alarm, the value, and trend of condenser pressure. 2.2. DIRECT personnel controlling condenser pressure to recover vacuum to the applicable control band. 3. IF steps 1. or 2. recover condenser vacuum, EXIT this ARP. 4. Go To AOP 2574, "Loss of Condenser Vacuum."

Examiner Note: Operators should enter AOP 2574, Loss of Condenser Vacuum, prior to beginning a plant downpower, as there was no reason given to suspect condenser fouling.

Examiner Note: The following steps are from AOP 2574, Loss of Condenser Vacuum.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 5, 6

Event Description: Main Condenser Vacuum Leak

Time	Position	Applicant’s Actions or Behavior
	SRO	3.1 SRO Focus brief on reactor trip criteria: • Rx/Turbine lowered to 30% and condenser pressure > 5” Hg. • Condenser pressure approaching 7.5” Hg with Rx power >/= 15%. PERFORM the following: a. Manually TRIP the reactor and turbine. b. Go To EOP 2525, “Standard Post Trip Actions.” 3.2 SRO states turbine trip criteria (Backpressure approaching 7.5” Hg with Rx power < 15%. 3.3 IF condenser pressure is rising to 10 inches of mercury absolute, PERFORM the following: a. ENSURE reactor power less than 3%. b. Refer To OP 2322, “Auxiliary Feedwater System,” and INITIATE AFW flow to SGs. c. TRIP running SGFPs. 3.4 IF, at any time, efforts to restore vacuum are not successful, Refer To AOP 2575, “Rapid Downpower,” and LOWER reactor power and turbine load at the maximum attainable rate until pressure stabilizes.
		3.5 NOTIFY ISO New England of the loss or imminent loss of unit.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 5, 6

Event Description: Main Condenser Vacuum Leak

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td></td><td>BOP</td><td>4.1 VERIFY performance of condenser air removal as follows:
a. VERIFY F55A or F55B operating
b. VERIFY condenser air removal fan discharge path is aligned per ONE of the following:
1) EB-55 AND EB-56, condenser air removal to Millstone stack, are open
2) EB-57, condenser air removal to Unit #2 stack, is open
c. VERIFY the operating SJAE steam supply pressure is 200- 220 psig.
d. Refer To OP 2329, “Condenser Air Removal,” and VERIFY both sets of SJAE’s in service.
4.2 IF condenser backpressure is greater than 4 inches Hg absolute, PERFORM the following:
a. START mechanical vacuum pumps “A” and “B.”
b. VERIFY local vacuum gage is 27 inches Hg or greater.
c. OPEN 2- AR- 11, “MECHANICAL VACUUM PUMP COMBINED SUCTION”.
d. OPEN 2- AR- 12A, “PUMP ’A’ SUCTION STOP”.
e. OPEN 2- AR- 12B, “PUMP ’B’ SUCTION STOP”.
f. IF condenser air removal fan, F55A, is available, THEN PERFORM the following:
1) START condenser air removal fan, F55A.
2) STOP condenser air removal fan, F55B.
3) ENSURE EB- 171, MAKE- UP DMPR”, is closed.</td></tr>
<tr><td colspan="3"><u>Simulator operator</u>: When asked, SJAE supply pressure is ~210 psig and both sets of SJAE’s are in service (do NOT put the second set in service).
If BOP directs a PEO to align the mechanical vacuum pumps, wait a couple minutes and then say the pumps have been aligned per Step 4.2 (do NOT actually perform the alignment).</td></tr>
<tr><td colspan="3">Examiner Note: At some point the Unit Supervisor should determine that efforts to restore vacuum are not being successful, enter AOP 2575, “Rapid Downpower”, and direct a reactor and turbine shutdown in an attempt to lower the main condenser heat loading.</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from AOP 2575, Rapid Downpower, Section 3.0 Rapid Downpower.</td></tr>
<tr><td></td><td>SRO</td><td>Enters AOP 2575, Rapid Downpower</td></tr>
</table>

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 5, 6

Event Description: Main Condenser Vacuum Leak

Time	Position	Applicant's Actions or Behavior
	SRO	3.1 PERFORM focus brief on the following: REACTOR TRIP CRITERIA • Parameters associated with automatic reactor or turbine trips are challenged • RCS T cold *not* within 10°F of temperature program and efforts to regain control are unsuccessful RCS TEMPERATURE CONTROL • RCS T cold to be maintained within 10°F of Attachment 5, "Temperature vs. Power program" using Attachment 10, "Main Turbine Load Set Control." • To avoid uncontrolled cooldowns or power transients, sudden changes in RCS temperature or boron concentration should be avoided. 3.2 REQUEST SM/STA to Refer To Attachment 8, "Required Notifications," and PERFORM notifications.
	ATC	3.3 INITIATE forcing pressurizer sprays.
		CAUTION In the case of a dropped CEA, rod motion is *not* used to initiate downpower.
	ATC	3.4 IF *not* downpowering due to a dropped rod, INSERT Group 7 CEAs 10 ± 2 steps to initiate downpower.
	BOP	3.5 Using the "Load Speed Control" switch, REDUCE turbine load to maintain Tc on program (+/-2 deg).
	SRO	3.6 Refer To PPC or Reactor Engineering Curve and Data Book and OBTAIN reactivity plan for the initial reactor power condition and desired load reduction.

Examiner Note: The crew should refer to Reactivity Plan for downpower parameters.

		NOTE Attachment 10 "Approximate Load Demand vs. Reactor Power," can be used to correlate the desired power level to a turbine load demand setpoint.
	BOP	3.7 Refer To Attachment 9, "Main Turbine Load Set Control," REDUCE turbine load and MAINTAIN Tc on program (+/-2 deg).
Examiner Note: The following steps are from AOP 2575 Rapid Downpower Attachment 9 Main Turbine Load Set Control:		
	BOP	CAUTION Operation of the "Load/Speed CONTROL" switch will change turbine NOTE Steps provided in this attachment are dependent on plant conditions
	BOP	1. <u>IF</u> desired to commence or modify a turbine load ramp, PERFORM the following (HMI "Load" screen): a. <u>IF</u> previous ramp has stopped, SELECT "Load Hold." b. SELECT "Load Setpt" and ENTER desired value. c. SELECT "Rate setpt" and ENTER desired value. d. <u>WHEN</u> ready to commence load reduction, SELECT "Load Resume."

	BOP	2. IF desired to adjust the "Load Ramp Rate," PERFORM *any* of the following: • SELECT "Rate setpt" and ENTER new value. • SELECT "5% / hour," OR "10% / hour," OR "20% / hour." • SELECT "Raise" or "Lower" (0.25% / hour change). a. IF Tavg and Tc are high off program, PERFORM the following: a. SELECT "Load Hold" to stop ramp. b. WHEN Tavg and Tc are trending back to program, SELECT "Load Resume." b. IF Tavg and Tc are low off program, PERFORM the following: a. JOG the "Load/Speed CONTROL" switch to "Lower." b. WHEN Tavg and Tc are back on program, SELECT Load Setpt" and ENTER desired value. c. IF desired, Go To Step 1 and RESUME turbine load ramp. c. IF desired load has been reached SELECT "Load Hold." **Examiner Note: operator should select x load setpoint, x load rate. Program band for Tavg and Tc is x (+/- 2 deg for Tc).**
Examiner Note: The following steps are from AOP 2575 Rapid Downpower Section 3.0 Rapid Downpower.		
	ATC	3.8 Based on required rate of downpower, START additional charging pumps as necessary and balance charging and letdown.

Time	Position	Applicant's Actions or Behavior
	ATC	3.9 IF desired to borate from the RWST (preferred method) PERFORM the following: a. ENSURE at least one charging pump operating. b. ENSURE CH-196, VCT makeup bypass, closed. c. ENSURE CH-504, RWST to charging suction, open. d. OPEN CH-192, RWST isolation. e. CLOSE CH-501, VCT outlet isolation. f. CHECK charging flow at desired rate. g. Go To step 3.11 **Examiner Note: Crew should borate from the RWST.**
	SRO/ATC/ BOP	3.11 During the downpower, Refer To Attachment 1,"Rapid Downpower Parameters," and MAINTAIN parameters as specified throughout downpower: **Examiner note: Attachment 1 Rapid Downpower Parameters:** • Condensate and heater drain flows and pressures: sufficient to maintain adequate SGFP suction pressure • FRV D/P: greater than 40 psid • Turbine load: responding to changes in load demand, with control valves operating together • Steam generator levels 55 to 70%. • MSR parameters tracking together • Turbine Generator MVARs: as specified by CONVEX • Reactor power: being monitored using delta T power indication • ASI: In accordance with reactivity plan or within 0.01 of ESI or per COLR. • CEA position: greater than PDIL • Tc: less than or equal to 549 deg • Pressurizer level: between 35 and 70% Pressurizer pressure: between 2,225 and 2,300 psia (DNB margin)

	SRO/ATC	NOTE 1. Xenon rate of change should be considered when terminating boration. 2. During rapid downpower, the PPC calorimetric may be inaccurate due to SG level transients. The most accurate available indication of reactor power is RPS delta T power.
Examiner Note: Once power has dropped at least 5%, or at the lead examiner's direction, proceed to Event 7, RCP trip and ATWS		

Op-Test No.: __ES16LI1___ Scenario No.: __1__ Event No.: _7, 8__

Event Description: RCP trip, ATWS and total loss of condenser vacuum.

Time	Position	Applicant's Actions or Behavior

Simulator Operator: When directed, initiate Event 7 & 8, "A" RCP seize and trip, ATWS, Loss of MFW.

Indications:

- **"RCP A MOTOR TRIP" {C-02/3, AA-17}**
- **"RCP LO SPEED TRIP CH A" {C-04, AA-4}**
- **"RC LO FLOW TRIP CH *" {* = All four Channels, A – D; C-04: CA-2, CB-2, DA-2, DB-2}**

Examiner Note: An operator should attempt to trip the reactor using the manual pushbuttons. The reactor will not trip because the pushbuttons fail. An operator will open the CEDMS output breakers to trip the reactor manually.

CRITICAL TASK: Manually Shutdown the reactor. The reactor must be manually tripped using the CEDM output breakers immediately (within 1 minute) when an automatic reactor trip fails and/or the manual push buttons do NOT work. (CT-1/SPTA-5)

Time that manual pushbuttons attempted: ___________
Time of reactor trip:___________

	ATC	• Reports alarms on "A" RCP, RCP tripped • Reactor failure to auto trip, tripping the reactor manually by push buttons • Failure of TCBs to manually open, opening MG Set supply breakers • Reactor trip successful, CEAs inserting.
	SRO	Acknowledge need to trip, directs (or acknowledges) reactor trip

Examiner Note: The following steps are from EOP 2525, Standard Post Trip Actions, modified slightly to improve clarity.

	ATC	**Determine Status of Reactivity Control – Reactor Trip** 1. DETERMINE that Reactivity Control acceptance criteria are met for the reactor by performing ALL of the following steps: • CHECK that **all** CEAs are fully inserted. • CHECK that reactor power is dropping. • CHECK that SUR is negative.

Time	Position	Applicant's Actions or Behavior
	BOP	**Determine Status of Reactivity Control – Turbine Trip** 2. DETERMINE that Reactivity Control acceptance criteria are met for the turbine by performing ALL of the following steps : a. CHECK that the main turbine is tripped by BOTH of the following: • ALL main stop valves are closed. • Generator megawatts indicate zero. • Turbine speed is lowering. b. IF 15G-2XI-4, motor operated disconnect, is closed, CHECK that the main Generator output breakers 8T and 9T are open.
	BOP	**Determine Status of Maintenance of Vital Auxiliaries** 3. DETERMINE that Maintenance of Vital Auxiliaries acceptance criteria are met by performing ALL of the following steps: a. CHECK that ALL Facility 1 and 2 electrical buses are energized: • 6.9kV Electrical Buses 25A, 25B • 4.16kV Non-Vital Electrical Buses 24A, 24B • 4.16vV Vital Electrical Buses 24C, 24D • Vital DC Buses 201A, 201B, DV-10, DV-20 • Vital AC Instrument Buses VA-10, VA-20 b. CHECK that BOTH facilities of service water are operating. c. CHECK that BOTH facilities of RBCCW are operating with service water cooling.

Time	Position	Applicant's Actions or Behavior
	ATC	**Determine Status of RCS Inventory Control** 4. DETERMINE that RCS Inventory Control acceptance criteria are met by performing **ALL** of the following: a. CHECK that **BOTH** of the following conditions exist: • Pressurizer level is 20 to 80% • Pressurizer level is trending to 35 to 70% a.1 IF the Pressurizer Level Control System is not operating properly in automatic, RESTORE and MAINTAIN pressurizer level 35 to 70% by performing ANY of the following: 1) OPERATE the Pressurizer Level Control System. 2) Manually OPERATE charging and letdown. b. CHECK that RCS subcooling is greater than or equal to 30°F
	ATC	**Determine Status of RCS Pressure Control** 5. DETERMINE RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • CHECK that pressurizer pressure is 1900 to 2350 psia. • CHECK that pressurizer pressure is trending to 2225 to 2300 psia.
	ATC	**Determine Status of Core Heat Removal** 6. DETERMINE that Core Heat Removal acceptance criteria are met by performing **ALL** of the following: a. CHECK that at least one RCP is operating and that loop delta T is less than 10°F b. CHECK that Th subcooling is greater than or equal to 30°F.

Op-Test No.: __ES16LI1___ Scenario No.: __1__ Event No.: _7, 8__

Event Description: RCP trip, ATWS and total loss of condenser vacuum.

Time	Position	Applicant's Actions or Behavior
CRITICAL TASK: Start the TDAFP (or Motor Driven) within 10 minutes following a loss of normal feedwater.. (CT-2/TCOA-3) **Time from trip of Main Feed Pumps on low vacuum (approx. time of trip): ___________** **Time that Aux Feedwater flow was initiated with >/= 2 pumps: ___________**		
	BOP	**Determine Status of RCS Heat Removal** 7. DETERMINE that RCS Heat Removal acceptance criteria are met by ALL of the following conditions: a. CHECK that at least one steam generator has **BOTH** of the following conditions met: • Level is 10 to 80%. • Main feedwater or TWO auxiliary feedwater pumps are operating to restore level 40 to 70%. b. CHECK that RCS Tc is being maintained between 530°F to 535"F. c. CHECK that **BOTH** steam generators pressure are 880 to 920 psia.
Examiner Note: Once the BOP has established AFW flow to each SG, or at the lead examiner's direction, proceed to Event 9, Loss Of All Feedwater		

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 9

Event Description: Rupture of Auxiliary Feedwater Headers resulting in Loss Of All Feedwater flow

Time	Position	Applicant's Actions or Behavior

Simulator Operator: When directed, initiate Event 9, Rupture of both AFW Headers, LOAF.

Indications:

- **Aux Feed flow indication to both SGs will be < 300 gpm (minimum required).**
- **"EAST COND PIT SUMP LVL HI" {C-06/7, CA-22)**

	BOP	7. a. RNO a.1 RESTORE level to 40 to 70% in at least one steam generator using ANY of the following: • Motor- driven auxiliary feedwater pump. • TDAFW Pump. Refer To Appendix 6, "TDAFW Pump Normal Startup."

Examiner Note: The BOP should report the loss of all feed to the SGs, due to loss of Aux. Feedwater flow, prior to the transition to an event specific EOP.

Examiner Note: The AFW rupture is simulated as a severe break in the body of FW-44, the cross-connect valve for the two AFW headers and closing the valve will have no effect on the loss of the two headers. The Simulator Operator will report this as a PEO sent to investigate the problem.

Simulator Operator: When a PEO is sent to investigate the problem, inform the crew that the body of FW-44 has a large crack and is leaking badly. Also, due to the nature of the break, you doubt that closing FW-44 will have any effect on the leak.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 9

Event Description: Rupture of Auxiliary Feedwater Headers resulting in Loss Of All Feedwater flow

Time	Position	Applicant's Actions or Behavior
	ATC	**Determine Status of Containment Isolation** 8. DETERMINE that Containment Isolation acceptance criteria are met by **ALL** of the following: a. CHECK that containment pressure is less than 1.0 psig. b. CHECK that **NONE** of the following primary plant radiation monitors have an unexplained alarm or indicate an unexplained rise in activity: **Radiation Monitors Inside Containment** RM-7890, Personnel Access Area RM-7891, Ctmt Refuel Floor Area RM-8240, High Range RM-8241, High Range RM-8123 A and B, Ctmt Atmosphere RM-8262 A and B, Ctmt Atmosphere c. CHECK that NONE of the following steam plant radiation monitors have an unexplained alarm or indicate an unexplained rise in activity: **Steam Plant Radiation Monitors** RM-5099, Steam Jet Air Ejector RM-4262, SG Blowdown RM-4299A and B, Main Steam Line 1 RM-4299C, Main Steam Line 2
	ATC	**Determine Status of Containment Temperature and Pressure Control** 9. DETERMINE that Containment Temperature and Pressure Control acceptance criteria are met by **BOTH** of the following steps: a. CHECK that containment temperature is less than 120°F. (PPC or avg. of Points 5 and 6) b. CHECK that containment pressure is less than 1.0psig.
	SRO	10. PERFORM the following: a. DIAGNOSE the event. Refer To Appendix 1, "Diagnostic Flowchart." b. INITIATE Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions." c. Go To the appropriate EOP

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 9

Event Description: Rupture of Auxiliary Feedwater Headers resulting in Loss Of All Feedwater flow

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td></td><td>ATC/BOP</td><td>{Step 10.b above}
Perform Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions".
Examiner Note: EOP Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions." are attached to guide.</td></tr>
<tr><td colspan="3">Examiner Note: The Unit Supervisor refers to EOP 2541 Appendix 1, Diagnostic Flowchart to diagnose the event.</td></tr>
<tr><td></td><td>SRO</td><td>Enters EOP 2537, Loss Of All Feed.</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from EOP 2537 Loss Of All Feedwater. Asterisked steps, within the ORP or selected FRPs being implemented, may be brought forward to restore or preserve a Safety Function. Asterisked steps are “Continuously Applicable,” and may be performed out of order after they have been accomplished once.</td></tr>
<tr><td></td><td>SRO</td><td>*1. CONFIRM diagnosis of a Loss of All Feedwater by performing the following.
Examiner Note: SRO checks EOP 2537-001 LOAF Safety Function Status Checks and confirms that all Safety Criteria are satisfied.</td></tr>
<tr><td></td><td>SRO</td><td>*2. CLASSIFY the event. Refer To MP-26-EPI-FAP06, “Classification and PARs”
IF classification requires RCS sampling, Refer To Appendix 46, “Sampling for EAL Determination” and DIRECT Chemistry as required.</td></tr>
<tr><td></td><td>SRO</td><td>*3. PERFORM ALL of the following:
• OPEN the placekeeper and ENTER the EOP entry time.
• ENSURE the master alarm silence switch is in “NORMAL”.</td></tr>
<tr><td></td><td>ATC</td><td>*4. PERFORM the following:
a. STOP ALL RCPs.
b. PLACE HIC- 4165, steam dump TAVG controller, in manual AND closed.
c. PLACE the following pressurizer spray valve controllers in manual and CLOSE the valves:
• HIC- 100E
• HIC- 100F</td></tr>
</table>

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 9

Event Description: Rupture of Auxiliary Feedwater Headers resulting in Loss Of All Feedwater flow

Time	Position	Applicant's Actions or Behavior
	BOP	*5. PERFORM ALL of the following to conserve steam generator inventory: a. ENSURE MS- 220A, blowdown isolation valve is closed. b. ENSURE MS- 2206, blowdown isolation valve is closed. c. CLOSE BOTH steam generator sample isolation valves: • MS- 191A • MS- 1918
	BOP	NOTE OTC should be initiated prior to ONE steam generator wide range level reaching 70 inches, AND ONE steam generator wide range level reaching 165 inches if ANY of the following exist: 1. Main or auxiliary feedwater is *not* expected to be restored. 2. Less than TWO trains of HPSI, PORVs and ADVs are available. 3. Less than THREE charging pumps are available. *6. CHECK for adequate RCS heat removal via the steam generators by BOTH of the following: • BOTH steam generator wide range levels are greater than 70 inches • RCS Tc stable or controlled within 5°F or less

CRITICAL TASK: If SG feed is not restoring with SG levels </= 70" & </= 165", OTC must be initiated.

Steam Generator Level when feed flow was restored:

Steam Generator 1 Level: ___________

Steam Generator 2 Level: ___________

Examiner Note: The US may decide to use the Once-Through-Cooling success path if all three condensate pumps were secured in error or he feels conditions warrant. In that instance, RNO 6.1 is used for that path. Once complete, the crew will transition to EOP 2540 and the scenario is complete.

Time	Position	Applicant's Actions or Behavior
	ATC	**RNO (CONTINGENCY ACTIONS)** 6.1 IF steam generator level is not restoring AND ANY of the following conditions exists: • ONE steam generator wide range level less than or equal to 70 inches AND the REMAINING steam generator wide range level is less than or equal to 165 inches • RCS TC rises uncontrollably by 5°F or more ESTABLISH heat removal via once- through- cooling by performing ALL of the following: 6.1 ENSURE ALL proportional heaters are tripped. a. ENSURE ALL backup heaters in "PULL- TO- LOCK". b. IF main condenser is available, THEN OPEN ALL steam dump valves. c. OPEN BOTH ADVs. d. ENSURE SIAS actuated. e. ENSURE BOTH HPSI pumps have started.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 9

Event Description: Rupture of Auxiliary Feedwater Headers resulting in Loss Of All Feedwater flow

Time	Position	Applicant's Actions or Behavior
	ATC	**RNO (CONTINGENCY ACTIONS)** 6.1 (continued) f. ENSURE that ALL HPSI loop injection valves are open. g. ENSURE that ALL available charging pumps are running. h. ENSURE that BOTH PORV block valves are open. i. WHEN at least ONE HPSI pump has started, THEN OPEN BOTH PORVs. (Key # 187) j. Go To EOP 2540, "Functional Recovery."
Examiner Note: If the crew uses the Once-Through-Cooling success path, once it is implemented and the US transitions to EOP 2540, the remainder of EOP 2537 is N/A and the scenario is complete.		
	BOP	*7. WHEN feedwater source becomes available, THEN RESTORE feedwater to the affected steam generators as follows: a. CHECK steam generator level is less than 33%. a.1 FEED affected steam generators at any desired flow rate to restore and maintain level within 40% to 70%. b. FEED each affected steam generator by raising feedwater flow rate in increments of 50 gpm within BOTH of the following limits: • Flow limited to wi thin the capacity of the available feedwater source • Maximum flow rate of less than, or equal to 650 gpm, (325 klbm/hr). c. WHEN ANY of the following conditions are met: • Steam generator shows a rising trend • Feedwater flow rate has been established within the capacity of the available feedwater source, with a maximum flow rate of less than, or equal to 650 gpm, (325 klbm/hr). • Steam generator level is greater than 33% <u>THEN</u> FEED affected steam generators at any desired flow rate, within the capacity of the available feedwater source, to restore and maintain level within 40% to 70%.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 9

Event Description: Rupture of Auxiliary Feedwater Headers resulting in Loss Of All Feedwater flow

Time	Position	Applicant's Actions or Behavior
	BOP	*8. IF a main feedwater line break is indicated, ISOLATE the affected portion of the main feedwater system by performing the following: a. PLACE applicable main feed isolation air assisted check valve, to "CLOSE": • FW- 5A • FW- 5B b. ENSURE applicable main feedwater block valve, is closed: • FW- 42A • FW- 42B c. CLOSE applicable main feedwater regulating bypass valve: • LIC- 5215 • LIC- 5216 d. IF leak is in common section of feedwater piping, SECURE BOTH main feedwater pumps. e. ESTABLISH feedwater to the unaffected header. f. SECURE steaming the steam generator with feedwater isolated.
	BOP	*9. IF a auxiliary feedwater line break is indicated, ISOLATE the affected portion of the auxiliary feedwater system by performing the following: a. CLOSE FW - 44, auxiliary feedwater cross- connect valve. b. STOP ANY auxiliary feedwater pumps on the side with the affected header. c. ESTABLISH feedwater to the unaffected header. d. SECURE steaming the steam generator with feedwater isolated.
Examiner Note: The simulated AFW rupture cannot be isolated; therefore, all AFW pumps must be secured.		
	SRO	*10. IF offsite power has been lost, OR the condenser is *not* available, PERFORM the following: a. CLOSE BOTH MSIVs: • MS - 64A • MS- 648 b. ENSURE BOTH MSIV bypass valves are closed: • MS - 65A • MS – 658 c. OPEN AR- 17, condenser vacuum breaker.
	SRO	*11. RESTORE feedwater flow to at least ONE steam generator using the motor-driven AFW pumps as follows: **Examiner Note: Step 11 is N/A due to the actions taken in Step 9 to isolate the AFW rupture.**
	SRO	*12. IF auxiliary feedwater flow is restored, Go To step 23. **Examiner Note: Step 12 is N/A**

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 9

Event Description: Rupture of Auxiliary Feedwater Headers resulting in Loss Of All Feedwater flow

Time	Position	Applicant's Actions or Behavior
	SRO	*13. RESTORE feedwater flow to at least one steam generator using the TDAFW pump as follows **Examiner Note: Step 13 is N/A**
	SRO	*14. <u>IF</u> auxiliary feedwater flow is restored, Go To step 23. **Examiner Note: Step 14 is N/A**
	SRO	*15. START ONE SG feedwater pump by performing the following for the pump to be started: **Examiner Note: Step 15 is N/A due to the loss of condenser vacuum.**
	SRO	*16. <u>IF</u> SG feedwater flow is restored, Go To step 23. **Examiner Note: Step 16 is N/A**

Examiner Note: The SRO may quickly proceed to Step 17 once the nature of the feedwater loss is understood.

Time	Position	Applicant's Actions or Behavior
	BOP	*17. ENSURE at least ONE condensate pump is running.
	BOP	*18. ESTABLISH a flowpath from the hotwell to at least **ONE** steam generator as follows: a. ENSURE **BOTH** SGFP discharge valves are open: • FW- 38A • FW- 38B b. CLOSE **BOTH** SGFP "MIN FLOW RECIRC": • FIC- 5237 • FIC- 5240 c. OPEN CNM-2, CPF bypass valve. d. OPEN **BOTH** main feed reg bypass valves: • LIC-5215 • LIC-5216 e. ENSURE **BOTH** main feed isolation air assisted check valves are open: • FW-5A • FW-5B
	BOP	*19. <u>IF</u> SIAS is *not* present <u>AND</u> SIAS Block is permitted, <u>THEN</u> BLOCK the automatic initiation as the cooldown and depressurization proceeds.

Examiner Note: The crew should block SIAS as the event does not warrant its actuation.

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 9

Event Description: Rupture of Auxiliary Feedwater Headers resulting in Loss Of All Feedwater flow

Time	Position	Applicant's Actions or Behavior
	BOP	*20. IF MSI is *not* present AND MSI Block is permitted, THEN BLOCK the automatic initiation as the cool down and depressurization proceeds.
Examiner Note: The crew should block MSI as its actuation will delay feed flow restoration.		
	BOP	*21. IF a flowpath from the hotwell to a steam generator is established, THEN DEPRESSURIZE at least ONE steam generator at the maximum controllable rate, until adequate feed flow is obtained from the condensate pump to restore steam generator level.
	ATC	*22. COMMENCE emergency boration. Refer To Appendix 3, "Emergency Boration."
	BOP	*23. IF feed flow is restored, RESTORE and MAINTAIN 40 to 70% level in at least one steam generator.
Scenario Termination: When crew has restored feedwater flow to one SG, or at the lead examiner's direction, the scenario is complete.		

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 7

Event Description: **EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions**

Time	Position	Applicant's Actions or Behavior

Examiner Note: The following steps are from EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions.

	ATC	1. <u>IF</u> charging pumps suction is aligned to the VCT, <u>THEN</u> CHECK VCT level is between 72% to 86%: a. IF VCT level is less than 72%, THEN ALIGN charging pump suction to RWST as follows: 1) OPEN CH- 192, RWST isolation. 2) ENSURE CH- 504, RWST to charging suction is open. 3) CLOSE CH- 501, VCT outlet isolation. 4) ENSURE CH- 196, VCT makeup bypass is closed. b. IF VCT level is greater than 88%, THEN PLACE CH- 500, letdown divert handswitch, to the "RWS" position, and divert as required to maintain VCT level 72% to 86%.
	ATC	2. TCOA: <u>IF</u> SIAS actuated, <u>THEN</u> ENSURE **ONE** complete facility of CRAC operating, in RECIRC mode, as follows: (C25A/B) **Facility 1** • HV- 203A, Fan F- 21A exhaust damper open • Fan F- 21A, supply fan running • HV- 206A, Fan F- 31A exhaust damper open • Fan F- 31A, exhaust fan running • HV- 212A, Fan F- 32A exhaust damper, open • Fan F- 32A, filter fan, running • HV- 202, minimum fresh air damper, closed • HV- 207, cable vault exhaust damper, closed • HV- 208, exhaust air damper, closed **Facility 2** • HV- 203B, Fan F- 21B exhaust damper open • Fan F- 21B, supply fan running • HV- 206B, Fan F- 31B exhaust damper open • Fan F- 31B, exhaust fan running • HV- 212B, Fan F- 32B exhaust damper, open • Fan F- 32B, filter fan, running • HV- 495, fresh air damper, closed • HV- 496, exhaust air damper, closed • HV- 497, cable vault exhaust damper, closed

Op-Test No.: ES16LI1 Scenario No.: 1 Event No.: 7

Event Description: **EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions**

Time	Position	Applicant's Actions or Behavior
	ATC	3. TCOA: IF SIAS not actuated, THEN CHECK ONE facility of CRAC operating, in NORMAL mode, as follows: (C25A/B) **Facility 1** • HV- 203A, Fan F- 21A exhaust damper is open • Fan F- 21A, supply fan running • HV- 206A, Fan F- 31A exhaust damper open • Fan F- 31A, exhaust fan running **Facility 2** • HV- 203B, Fan F- 21B exhaust damper open • Fan F- 21B, supply fan running • HV- 206B, Fan F- 31B exhaust damper open • Fan F- 31B, exhaust fan running
	ATC	4. IF charging pumps suction aligned to the RWST AND boration not required, THEN RESTORE charging pump suction to VCT as follows: a. CHECK BOTH of the following: 1) VCT level between 72% and 86% 2) VCT pressure greater than 15 psig b. CHECK letdown is in service. c. OPEN CH- 501, VCT outlet isolation. d. CLOSE CH- 192, RWST isolation.
	BOP	5. CHECK instrument air pressure greater than 90 psig and stable.
	BOP	6. IF AFAS has actuated, WHEN **BOTH** steam generators are restored to greater than 33%, THEN PERFORM the following: a. PLACE the following switches in "M" (Manual) and ADJUST to obtain desired flow (C- 05): 1) FW- 43A, "AFW- FCV, HIC- 5276A" 2) FW- 43B, "AFW- FCV, HIC- 5279A" b. PLACE **BOTH** of the following switches to "RESET" and ALLOW to spring return to neutral (C- 05): 1) "OVERRIDE/MAN/START RESET" (Facility 1) 2) "OVERRIDE/MAN/START RESET" (Facility 2) c. ADJUST the following switches to obtain desired flow (C- 05): 1) FW- 43A, "AFW- FCV, HIC- 5276A" 2) FW- 43B, "AFW- FCV, HIC- 5279A" d. IF main feedwater pump is supplying steam generators, THEN STOP **BOTH** auxiliary feedwater pumps. **Examiner Note: BOP may place both facilities in override (Pull-To-Lock) once the AFW rupture is discovered and the SRO directs AFW be secured.**

Time	Position	Applicant's Actions or Behavior
	BOP	7. CHECK Main Condenser is available, as indicated by ALL of the following: • At least ONE MSIV open • Condenser vacuum better than 15 inches HG - ABS (0 to 15 inches) • At least ONE condensate pump operating • At least ONE Circ Water pump operating **RNO** 7.1 IF Main Condenser is not available, PERFORM the following: • CLOSE BOTH MSIVs. • ENSURE BOTH MSIV bypass valves are closed. • OPEN AR-17, condenser vacuum breaker. **Examiner Note: Not available due to the loss of condenser vacuum.**
	BOP	8. OPEN HD-106, subcooling valve.
	BOP	9. ENSURE BOTH heater drain pumps stopped.
	BOP	10. IF MFW is supplying feed to the steam generators, THEN PERFORM the following: a. ENSURE that only **ONE** main feedwater pump is operating. b. ENSURE that **BOTH** main feed block valves are closed: 1) FW- 42A 2) FW- 42B c. ADJUST the operating main feedwater pump pressure to 50 to 150 psi greater than SG pressure. d. ENSURE BOTH main feed reg bypass valves are throttled to control SG level: 1) LIC- 5215 2) LIC- 5216 e. IF Main Feedwater Pump A is secured, THEN CLOSE the following: 1) FW- 38A, main feedwater pump discharge valve 2) FIC- 5237, main feedwater pump mini flow recirc valve f. IF Main Feedwater Pump B is secured, THEN CLOSE the following: 1) FW- 38B, main feedwater pump discharge valve 2) FIC- 5240, main feedwater pump mini flow recirc valve **Examiner Note: Loss of condenser vacuum secures both MFW pumps.**
	BOP	11. IF **BOTH** MFW pumps are secured, THEN PERFORM the following: a. CLOSE BOTH main feedwater pump mini flow recirc valves. • FIC- 5237 • FIC- 5240

Time	Position	Applicant's Actions or Behavior
	BOP	12. <u>IF</u> 25A OR 25B is energized, <u>THEN</u> ALIGN condensate pumps as follows: a. ENSURE **ONE** pump is running. b. ENSURE **ONE** pump is in "PULL TO LOCK." c. ENSURE **ONE** pump is in "AUTO."

Examiner Note: it is important that at least one condensate pump remain running. If all three are mistakenly secured, the only success path available will be Once-Through-Cooling.

Examiner Note: End of Attachment 4- A

SIMULATOR SCENARIO #2

Facility: Millstone Unit 2 Scenario No.: 2 Op-Test No.: ES16LI2

Examiners: ____________________ Operators: ____________________ SRO

____________________ ____________________ ATC

____________________ ____________________ BOP

Initial Conditions: 90% Power IC, No Equipment OOS, Ch-Y PZR Level in service, Fac. 2 CRAC in service.

Turnover: 90% Power, Xenon building in, no equipment OOS. 24E is aligned to 24C. Raise Power IAW OP2204 to 100%.

Critical Tasks:

1. SGTR-7; Perform a Plant cooldown. The Crew is observed coordinating action to cooldown the RCS to less than 515°F by T_{COLD} to isolate the affected S/G.
2. SGTR-2; Establish RCS pressure control. The ATC is observed maintain RCS pressure within the applicable curves and lowering RCS and S/G D/P.
3. SGTR-6; Manually establish the minimum design Safety Injection System flow. The ATC is observed reducing SI injection flow IAW HPSI Stop and Throttle conditions.

Event No.	**Malf. No.**	**Event Type***	**Event Description**
1 (0 min)	N/A	R, N (ATC/S) (BOP/S)	Raise Reactor Power to 100%.
2 (+? min)	RP19C	I, TS (ATC/S)	‘C’ RPS Lower NI Fails low.
3 (+? min)	CW02D	C (BOP/S)	“D” Traveling Screen D/P high, requires securing "D" Circ. Pump.
4 (+? min)	RM01P CH08D	I, TS (ATC/S)	CRAC Radiation Monitor, RM-9799B, fails high and “B” CRAC Filter Fan, F-32B, Trips (TS).
5 (+?min)	SG01A	C, TS (BOP/S)	SGTL in #1 SG (TS).
6 (+? min)	N/A	R (All)	Down power due to SGTL.
7 (+? min)	SG02B	M (All)	SG Tube Rupture. Manual plant trip.
8 (+? min)	ES03J / SI05A	C (ATC/S)	“C” HPSI pump fails to start on SIAS. “A” HPSI pump is degraded (100%)

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual
1. Total malfunctions (5–8)	6
2. Malfunctions after EOP entry (1–2)	1
3. Abnormal events (2–4)	4
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)	3

NRC 2016, Scenario 2 Summary:

The crew will take the shift with the unit at 90% Xenon slowly building in, with no equipment out of service (IC-30). The crew will begin the shift by raising power to 100%.

Event 1: The crew takes the shift and begins the power ascension to 100% power. Xenon concentration will be slowly rising requiring the Crew to initiate a dilution or reduce Turbine load to maintain RCS temperature. The Crew will be referring to OP 2204, OP 2302A, OP 2304C and OP 2208 to dilute, with draw CEAs and raise Turbine load.

Event 2: After the dilutions to raise power and at the discretion of the Examiners “C” RPS Nuclear Instrument fails requiring ARP actions to bypass the affected Reactor Trip Modules on Channel “C” and the U.S. will enter the applicable Tech. Spec.

Event 3: At the discretion of the Examiners the malfunction for the “D” Traveling Screen DP will be initiated causing the Traveling Screen for “D” Water box to ramp in above high setpoint requiring the securing of "D" Circ. Pump. The Crew will enter AOP 2517 for Circulating Water Malfunction and take actions to cross-tie “C” and “D” Water boxes by closing the “D” Water box inlet valve and place the tripped Circ Pump handswitch in PTL and lastly the Crew will verify Condenser vacuum <4.5” Hg.

Event 4: At the discretion of the Examiners, the Control Room Air Conditioning (CRAC) Radiation Monitor will fail high, causing the ventilation system to shift into recirculation mode. Five seconds after starting, the “B” Filter Fan, F32B, will trip due to a broken belt. Per ARP 2590A-159, the crew should verify proper operation of the CRAC system and note the loss of the filter fan. This will require the crew to secure Facility 2 CRAC and ensure Facility 1 CRAC is operating as required per ARP 2590A-159. The US will enter TSAS 3.7.6.1a for an inoperable train of CRAC, TSAS 3.3.3.1 for the failed rad monitor, and call Maintenance/Work Planning for the needed equipment repairs.

Event 5: At the discretion of the Examiners the malfunction for a S/G tube leak is inserted. The Crew will be alerted to a SGTL by C06/07 Alarm for N-16 HIGH and carry out the actions for the ARP and will enter AOP 2569 SGTL. The Crew will verify Reactor Trip Criteria is not exceeded but the Tech. Spec. of 75 gpd will be exceeded requiring a Reactor down power. The Crew will transition to AOP 2575 Rapid Downpower.

Event 6: The crew will enter AOP 2575 Rapid Downpower. The first action for the rapid down power will require the Crew to force PZR sprays then insert Group 7 Rods 10 steps while reducing Turbine load to maintain RCS T_{COLD}. The Crew will then align for boration from the RWST requiring the ATC operator to start an additional Charging pump if not already started and the BOP to setup the Turbine HMI to lower load to maintain RCS T_{COLD}.

Event 7: During the Rapid Downpower at the discretion of the Examiner an S/G tube rupture will be inserted requiring the Crew to verify actual rupture using plant parameters and the Main Steam Line Hi alarm and direct a manually trip the Reactor.

Event 8: After the completion of EOP 2525 SPTA the crew will enter EOP 2534 SGTR and upon SIAS the “C” HPSI pump will fail to start and the “A” HPSI will be fully degraded requiring the ATC to manually start the “C” HPSI pump and or start the “B” HPSI pump to meet SI flow criteria.

INPUT SUMMARY							
Either INPUT or VERIFY the following functions:							
ID Num	Description	Delay Time	Ramp Time	Event Time	Sev or Value	Final Value	Rel Order
MALFUNCTIONS							
RP19C	“C” Channel Power Range RPS fail				0%	E-2	2
CW02D	“D” Traveling Screen D/P		180 sec		65%	E-3	3
RM01P	RM-9799A CNTRL RM Radmon				100%	E-4	4
CH08D	“B” CRAC Filter Fan, F32B, trip	5 sec			N/A	E-4	4
SG01A	#1 S/G tube leak		120 sec		50%	E-5	5
SG02B	#1 S/G tube rupture		60 sec		15%	E-7	7
ES03J	“C” HPSI start fail on SIAS				N/A	E-30	8
SI05A	“A” HPSI pump degradation		60 sec		100%	E-27	8
REMOTE FUNCTIONS							
OVERRIDES							

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 1

Event Description: Raise Power to 100%

Time	Position	Applicant's Actions or Behavior

Examiner Note: The crew has been instructed to brief the up power prior to taking the watch. The

The following steps are from OP 2204 Load Changes. OP 2204 Load Changes procedure is marked up with "N/A" and Unit Supervisor signatures for applicable steps.

		Up power in accordance with OP 2204 and Reactivity Plan. Method: dilution and CEAs Rate: 15%/hour • Crew will dilute to the charging pump suction and raise power to ~100%. • Turbine load will be increased to maintain RCS Tavg on program.

Examiner Note: When reactor power is 5% higher than initial power or at the lead examiner's direction, proceed to Event #2, Trip of "C" Channel of NI power instrument.

Simulator Operator: When directed, initiate Event #2, “C” RPS Lower NI Fails Low.

Indications Available:

- **NIS CHANNEL DEVIATION HI (C-04, BA-12).**
- **RX POWER ΔT CH DEVIATION (C-04, AA-8).**

Examiner Note: The following steps are from ARP 2590C-089.

Examiner Note: Crew may or may not secure dilution in progress from Event #1.

Time	Position	Applicant’s Actions or Behavior
	ATC	**AUTOMATIC FUNCTIONS** 1. None **CORRECTIVE ACTIONS** 1. To determine the cause of alarm, OBSERVE the following: • ASI (C-04, PPC, RPS) • Linear power channel indications (C-04, PPC, RPS) **NOTE** This alarm may be indicative of one or more of the following: • One RPS linear power channel (4 total), deviating from the grand average signal generated by comparator average hi or hi-hi deviation setpoint • Axial offset condition • Failure of one *power range monitor* channel 2. IF *power range monitor* has failed, PERFORM the following: 2.1 OBTAIN necessary keys and PERFORM applicable actions to bypass the following power outputs for applicable RPS channel causing alarm: • TM/LP Trip • High Power Trip • Local Power Density Trip • Turbine Trip (RPS) 2.2 LOG entry into applicable ACTION Statement(s) of T/S, 3.3.1.1. 2.3 As necessary, Refer To OP 2380, “RPS and NI Safety Channel Operation,” and PERFORM applicable actions to remove affected channels input to comparator averager.

	ATC	**CORRECTIVE ACTIONS (cont.)** 3. IF power range *control* channel has failed, PLACE applicable power ration calculator input switch to “OUT” (rc-05e): • IF channel “X,” “CH 9” • IF channel “Y,” “CH 10” 4. IF any axial offset condition exists for an unknown reason, NOTIFY Reactor Engineering. 5. Refer To T/S LCO 3.2.4 and DETERMINE applicable and additional actions. 6. WHEN alarm conditions clears, to reset “HI DEV” and “HI-HI DEV” alarms, *Power range monitor*, TOGGLE “LED RESET” momentarily 7. IF ALL of the following alarms are coincident with this annunciator, REQUEST I&C Department to refer to 25203-39069 sh. 23C and check ruses for interposing relay circuit in RC22:
Examiner Note: Step 3 - 7 are N/A. SRO Should Review T/S for applicability and required action.		
	SRO	**Refer to Tech. Spec. 3.3.1.1**: **LCO 3.3.1.1 (RPS):** As a minimum, the reactor protective instrumentation channels and bypasses of Table 3.3-1 shall be OPERABLE. **APPLICABILITY**: As shown in Table 3.3-1. **ACTION**: As shown in Table 3.3-1.
	SRO	Per TS Table 3.3-1: FUNCTIONAL UNIT #2 Power Level - High; Total Number of Channels = 4, Minimum Channels Operable = 3, App. Modes = 1, 2, 3(d) **Action = 2** **Action 2** - With the number of OPERABLE channels one less than the Total Number of Channels, operation may continue provided the following conditions are satisfied: a. The inoperable channel is placed in either the bypassed or tripped condition within 1 hour. The inoperable channel shall either be restored to OPERABLE status, or placed in the tripped condition, within 48 hours. b. Within 1 hour, all functional units receiving an input from the inoperable channel are also declared inoperable, and the appropriate actions are taken for the affected functional units. c. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be removed from service for up to 48 hours, provided one of the inoperable channels is placed in the tripped condition.
Examiner Note: SRO should note TSAS 3.3.1, Action 2 applies and is presently being met by the actions taken per the ARP to bypass the affected channels.		

Time	Position	Applicant’s Actions or Behavior
	SRO	**Review LCO 3.2.4 for applicability**: **LCO 3.2.4 (T_Q):** The AZIMUTHAL POWER TILT (T_q) shall be ≤ 0.02. **APPLICABILITY**: MODE 1 with THERMAL POWER > 50% of RATED THERMAL POWER$^{(1)*}$. **ACTION**: a. With the indicated $T_q > 0.02$ but ≤ 0.10, either restore T_q to ≤ 0.02 within 2 hours or verify the TOTAL UNRODDED INTRGRATED RADIAL PEAKING FACTOR (F^Tr) is within the limit of Specification 3.2.3 within 2 hours; and .

Examiner Note: SRO should note TSAS 3.2.4 does not apply because power tilt indication is due to an instrument faiilure and not an actual uneven power distribution.

Examiner Note: When the actions of ARP 2590C-089 have been addressed and the applicable Technical Specifications have been evaluated, or at lead examiner’s direction, proceed to Event 3 Failure of the “D” Traveling Screen ΔP High.

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 3

Event Description: **"D" Traveling Screen ΔP Fails High**

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td colspan="3">Simulator Operator: When directed, initiate Event 3, Failure of the "D" Traveling Screen ΔP High.</td></tr>
<tr><td colspan="3">Indications Available:
• TRAVELING SCREEN ΔP HI (C-06/7, D-10)
• "D" Screen Differential Pressure indication on C-06/7 rising</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from ARP 2590E-056, "TRAVELING SCREEN ΔP HI" (C-06/7, D-10).</td></tr>
<tr><td></td><td>BOP</td><td>AUTOMATIC FUNCTIONS
1. None
CORRECTIVE ACTIONS
1. Go To AOP 2517, "Circulating Water Malfunctions."</td></tr>
<tr><td></td><td>SRO</td><td>Enter AOP 2517, "Circulating Water Malfunctions."</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from AOP 2517, "Circulating Water Malfunctions."</td></tr>
<tr><td></td><td>BOP</td><td>NOTE
When power is less than 15% AND linear power bistable light clears (<i>not</i> lit), on at least 3 RPS channels, the turbine trip is inhibited and turbine trip will <i>not</i> result in an automatic reactor trip.
3.1 IF ANY of the following conditions exist:
• "A" AND "B" circulating water pumps <i>not</i> operating
• "C" AND "D" circulating water pumps <i>not</i> operating
CHECK status of turbine trip bypass and PERFORM the following:</td></tr>
<tr><td colspan="3">Examiner Note: Step 3.1 is N/A</td></tr>
<tr><td></td><td>BOP</td><td>3.2 IF ONE circulating water pump has tripped, PERFORM the following:
a. ENSURE BOTH of the following exist:
• "A" OR "B" circulating water pump operating
• "C" OR "D" circulating water pump operating
b. Go To Section 5.0, "Trip of One Circulating Water Pump."</td></tr>
</table>

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 3

Event Description: **“D” Traveling Screen ΔP Fails High**

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td></td><td></td><td>3.3 <u>IF</u> “CIRC WATER PP LUBE WATER PRES LO” (C-06/7, A-10) annunciator in alarm, Go TO Section 6.0, “Circulating Water Pump Lube Water Pressure Low.”
3.4 <u>IF</u> “HI COND D/T” (C-06/7, DA-37) annunciator in alarm, Go TO Section 7.0, “High Condenser Differential Temperature.”
3.5 <u>IF</u> “HI COND DIS TEMP” (C-06/7, DB-37) annunciator in alarm, Go TO Section 8.0, “High Condenser Discharge Temperature.”
3.6 <u>IF</u> “TRAVELING SCREEN ΔP HI” (C-06/7, D-10) annunciator in alarm, Go TO Section 9.0, “Traveling Screen Differential Pressure High.”</td></tr>
<tr><td colspan="3">Examiner Note: SRO should transition to Section 9.0 of AOP 2517 and the following is from Sec. 9.0.</td></tr>
<tr><td></td><td>BOP</td><td>9.1 <u>IF</u> “TRAVELING SCREEN ΔP HI” (C-06/7, D-10) annunciator in alarm, PERFORM the following:
a. PLACE BOTH screen wash pump switches “START:”
• “A” SCREENWASH PP, P8A, HS 6493”
• “B SCREENWASH PP, P8B, HS 6498”
b. PLACE ALL available traveling screens in “RUN FAST.”</td></tr>
<tr><td></td><td>BOP</td><td>CAUTION
Circulating water pumps may be unstable when operating near 50% speed; therefore circulating water pump operation below 60% speed is limited to pump starting and stopping only.
c. LOWER circulating water pump speed while monitoring condenser backpressure to lower traveling screen differential pressure.
d. CHECK ALL screens rotating.
d.1 <u>IF</u> ANY traveling screen motor is operating <u>AND</u> associated traveling screen is <i>not</i> rotating, PERFORM the following:
1) PLACE affected traveling screen control switch in “STOP” (C-47).
2) STOP Circulating Water Pump for the affected traveling screen.
3) Refer To Section 5.0 and PERFORM applicabel steps to cross-tie water boxes.
4) Submit TR to Maintenance Department to replace shear pin on affected traveling screen.</td></tr>
<tr><td colspan="3">Examiner Note: Crew may secure “D” Circ. Pump at any time, based on rising screen dP. When pump is secured, AOP 2517, Section 5.0 should be referenced (Section 5.0 follows).</td></tr>
</table>

Time	Position	Applicant’s Actions or Behavior
	BOP	5.1 <u>IF</u> any Circulating Water Pumps are in the VFD MODE, PERFORM the following: a. RAISE speed of all VFD mode operating circulating water pumps to 100%. b. <u>IF</u> TRAVELING SCREEN HI, (C06/7, D10) annunciator in alarm, Refer To section 9.0 of this procedure. 5.2 STOP any in progress liquid waste discharges. 5.3 ENSURE sodium hypochlorite shocking of bays *not* in progress. NOTE A 15 to 20 second pause is required after receiving the full closed position indication to allow for full closure prior to opening the crosstie valve. 5.4 CLOSE applicable water box inlet valve for tripped pump: • CW-11H, “A” water box inlet • CW-11G, “B” water box inlet • CW-11F, “C” water box inlet • CW-11E, “D” water box inlet CAUTION Supplying two condenser waterboxes from one circulating water pump increases traveling screen differential pressure. During periods of actual or predicted severe weather, where fouling is a concern, waterboxes should not be cross- connected. Water boxes may be cross- connected with SM permission. **Steps 5.5 – 5.10 apply to CW pumps “A”, “B” & “C” and are N/A.** 1. IF “D” circulating water pump tripped, <u>AND</u> cross tying water boxes is required to maintain turbine load, PERFORM the following: a. PLACE “P- 6D Breaker” in Pull-To-Lock. b. ENSURE CW-11D, “D” water box outlet, is open. c. OPEN CW-12C, condenser 1B inlet cross-tie
	BOP/PEO	2. IF “D” circulating water pump tripped, <u>AND</u> isolation of water box is required <u>THEN</u> PERFORM the following: {The remaining steps involve isolating the vacuum priming system and venting of the water box, closing CW-11D (water box outlet), notifing Security and monitoring condenser vacuum. None of these actions have any bearing on the scenario.}

Examiner Note: When the actions of ARP 2590C-089 have been addressed and the applicable Technical Specifications have been evaluated, or at lead examiner’s direction, proceed to Event 4, CRAC Rad Monitor Failure high.

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 4

Event Description: CRAC Rad Monitor and Filter Fan Failure

Time	Position	Applicant's Actions or Behavior

<table>
<tr><td colspan="3">Simulator Operator: When directed, initiate Event 4, CRAC Rad Monitor, and Filter Fan Failure.</td></tr>
<tr><td colspan="3">Indications:
• "C.R.A.C.S. IN AUTO RECIRC MODE" (C-01, C-40)
• Fac. 2 CRAC has shifted to recirc. mode.</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are form ARP 2590A-159 "C.R.A.C.S. IN AUTO RECIRC MODE".</td></tr>
<tr><td></td><td>ATC</td><td><u>AUTOMATIC FUNCTOINS</u>
1. CRACS transfers to recircualtion mode.
CAUTION
To ensure proper cleanup of Control Room atmosphere, one complete <i>facility related train</i> of Control Room ventilation (i.e. supply, exhaust, and filter fans), must be in operation.
<u>CORRECTIVE ACTIONS</u>
a. PLACE "NORM/RECIRC MODE, HS-8346" AND "NORM/RECIRC MODE, HS-8359" switches in "RECIR" (C-25A and C-25B).
b. Check damper positions.
c. VERIFY "CRACS FLTR FAN, F32A, HS-8006" <u>OR</u> "CRACS FLTR FAN, F32B, HS-8007," or both, operating (C-25A and C-25B).</td></tr>
<tr><td></td><td>ATC</td><td>9. MONITOR system operation and VERIFY <i>one</i> complete CRACS train remains in operation.
9.1. IF sudden change in Control Room pressure occurs, VERIFY proper supply and exhaust fan operation (local).
9.2. IF fan belt failure occurs, STOP affected train AND START other train.</td></tr>
<tr><td></td><td>ATC</td><td>Crew may elect to use OP 2315A for specific guidance in starting Fac. 1 CRAC or use step 9.2 above to start it.</td></tr>
<tr><td colspan="3">Examiner Note: The following are the key steps from OP 2315A for starting of "A" CRACS.</td></tr>
</table>

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 4

Event Description: CRAC Rad Monitor and Filter Fan Failure

Time	Position	Applicant's Actions or Behavior
		4.1.3 ENSURE the following: a. "EMERG FRESH AIR INTAKE RECIRC OVERRIDE, HS-8004C" in "NORM." b. "EMERG FRESH AIR INTAKE RECIRC OVERRIDE, HS-8004D" in "NORM." c. "FRESH AIR MU DMPR, HV-211," green "CLOSE" position indication light, lit. 4.1.4 ENSURE the following: a. "NORM/RECIRC MODE, HS-8346" in "O.A." b. "MIN FRESH AIR DMPR, HV-202," red "OPEN" position indication light lit. c. "CABLE VAULT EXH DMPR, HV-207," red "OPEN" position indication light lit. 4.1.5 ENSURE the following: a. "NORM/RECIRC MODE, HS-8359" in "O.A." b. "FRESH AIR DMPR, HV-495," red "OPEN" position indication light lit. c. "CABLE VAULT EXH DMPR, HV-497," red "OPEN" position indication light lit. 4.1.8 PERFORM the following simultaneously (C-25A): • START "CRACS EXH FAN, F-31A, HS-8001" • START "CRACS SPLY FAN, F-21A, HS-8009" 4.1.9 ENSURE the following: • "CRACS EXH FAN, F-31A, HS-8001" red run light lit • "F-31A, EXH DMPR, HV-206A," red "OPEN" light lit • "CRACS SPLY FAN, F-21A, HS-8009" red run light lit • "F-21A, EXH DMPR, HV-203A," red "OPEN" light lit
	SRO	12. IF radiation monitor alarm is a result of a failure (Green "OPERATE" light is out), SUBMIT a CR to I&C Dept. and Refer To Tech Spec LCO 3.3.3.1.
Examiner Note: The following is from TS 3.3.3.1		
	SRO	3.3.3.1 The radiation monitoring instrumentation channels shown in Table 3.3-6 shall be OPERABLE with their alarm/trip setpoints within the specified limits. **APPLICABILITY**: As shown in Table 3.3-6. **ACTION**: a. With a radiation monitoring channel alarm/trip setpoint exceeding the value shown in Table 3.3-6, adjust the setpoint to within the limit within 2 hours or declare the channel inoperable. b. With the number of OPERABLE channels less than the number of MINIMUM CHANNELS OPERABLE in Table 3.3-6, take the ACTION shown in Table 3.3-6. The provisions of Specification 3.0.3 are not applicable. TABLE 3.3-6, #1.b. Control Room Isolation: Minimum Channels Operable = 2, Action 16 Action 16-1: with the number of OPERABLE channels one less than required, restore within 7 days…
Examiner Note: SRO logs into TSAS 3.3.3.1b, Action 16-1		

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 4

Event Description: CRAC Rad Monitor and Filter Fan Failure

Time	Position	Applicant's Actions or Behavior
	SRO	Refers to TS 3.7.6.1a for CRACS fan inoperable. **Examiner Note: The following is from TS 3.7.6.1**
	SRO	Review Technical Specifications: LCO 3.7.6.1: Two independent Control Room Emergency Ventilation Trains shall be OPERABLE.* APPLICABILITY: MODES 1, 2, 3, 4, 5 and 6. ACTION: MODES 1, 2, 3, and 4: a. One Control Room Emergency Ventilation Train Required ACTION: Restore the inoperable ventillation train to OPERABLE status within 7 days or shutdown.

Examiner Note: SRO enters TSAS "3.7.6.1a."

Examiner Note: When the CRACS malfunction has been mitigated and the SRO has finished evaluating Technical Specifications, or at lead examiner's direction, proceed to Event 5, SGTL #1 SG.

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 5

Event Description: Steam Generator Tube Leak #1 SG

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td colspan="3">Simulator Operator: When directed, initiate Event 5, Steam Generator Tube Leak #1 SG.</td></tr>
<tr><td colspan="3">Indications:
• S/G N16 monitor on PPC rising leakage for No. 1 Steam Generator
• N16 Alert Alarm (C-06/7 CB-19)
• N16 High Alarm (C-06/7 CA-19)
• SJAE Discharge RIT-5099 level rising</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from ARP 2590E-094, CB-19 N16 Alert.</td></tr>
<tr><td></td><td>SRO/BOP</td><td><u>AUTOMATIC FUNTIONS</u>
1. None
<u>CORRECTIVE ACTIONS</u>
1. OBSERVE radiation monitor indication (RC-14A, PPC N16 screen).
2. COMPARE with trends from RIT-4262, S/G blowdown gross activity and RI-5099, steam jet air ejector.
3. REQUEST Chemistry to perform SP 2833, •Secondary Coolant Analysis for Primary to Secondary Leak Rate and Dose Equivalent Iodine Concentration" to aid in accomplishing the following:
3.1. DETERMINE the presence of primary to secondary leakage.
3.2. DETERMINE primary to secondary leak rate.
3.3. IDENTIFY the leaking Steam Generator.
4. IF primary to secondary leak is confirmed by chemistry analysis or independent radiation monitor indications, Refer To AOP 2569 Steam Generator Tube Leak and perform applicable actions.</td></tr>
<tr><td colspan="3">CUE: Chemistry acknowledges request to perform secondary samples for a primary to secondary leak. Wait appropriate time and report back that frisk results indicate activity in No. 1 Steam Generator.</td></tr>
<tr><td></td><td>SRO/BOP</td><td>Enters AOP 2569, Steam Generator Leak.</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from AOP 2569 Steam Generator Tube Leak. Steps marked with an * are performed continuously or once specified conditions are met.</td></tr>
</table>

	SRO/BOP	3.1 <u>IF</u> leakage exceeds capability of available charging pumps to maintain pressurizer level, PERFORM the following: a. IF in MODE 1 or 2, PERFORM the following: • TRIP the reactor. • Go To EOP 2525, "Standard Post Trip Actions." b. IF in MODE 3 or lower, PERFORM the following: • ENSURE SIAS is actuated. • Go To EOP 2541, Appendix 1, "Diagnostic Flowchart" 3.2 <u>IF</u> "MAIN STEAM LINE HI RAD / INST. FAIL" (C-01 A-30) is received AND is verified to be valid based on other changing RCS indications, PERFORM the following: a. TRIP the reactor. b. Go To EOP 2525, "Standard Post Trip Actions."
Examiner Note: Due to the initial size of the SGTL, steps 3.1 and 3.2 are not applicable at this time.		
	SRO/BOP	3.3 <u>IF</u> leakage exceeds capability of available charging pumps to maintain pressurizer level, PERFORM the following: a. IF in MODE 1 or 2, PERFORM the following: • TRIP the reactor. • Go To EOP 2525, "Standard Post Trip Actions." b. IF in MODE 3 or lower, PERFORM the following: • ENSURE SIAS is actuated. • Go To EOP 2541, Appendix 1, "Diagnostic Flowchart" 3.4 <u>IF</u> "MAIN STEAM LINE HI RAD / INST. FAIL" (C-01 A-30) is received AND is verified to be valid based on other changing RCS indications, PERFORM the following: a. TRIP the reactor. b. Go To EOP 2525, "Standard Post Trip Actions."
	SRO/BOP	3.3 <u>IF</u> a SJAE ORSGBD Radiation Monitor alarm is received, ENSURE ALL of the following automatic actions occur: • MS-220A and MS-220B, blowdown isolation, close. • MS-15, blowdown tank discharge isolation, closes. • MS-135, blowdown quench tank discharge isolation, closes. • HV-4287 and HV-4288, SG blowdown sample discharge to secondary sample sink, close (secondary sample panel). • Blowdown values in PPC reset to "0."

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	3.4 IF "N-16 HIGH" (C-06/7 CA---19) is received AND is verified to be valid based on other indications, Refer To PPC "N16" screen to determine primary to secondary leak rate and PERFORM the following: a. IF primary to secondary leak rate is greater than or equal to 75 gpd AND is increasing by greater than or equal to 15 gpd / 30 minutes, Refer To AOP 2575, "Rapid Downpower," LOWER reactor power to less than 50% within one hour, and be in Hot Standby within the following two hours. b. Refer To MP-26-EPI-FAP06, "Classification and PARs," and DETERMINE reportability requirements. c. Refer To Technical Specification 3.4.6.2, "Reactor Coolant System Operational Leakage" and PERFORM applicable actions.

Examiner Note: A rapid power reduction is required by this step if primary to secondary leak rate is >75 gpd AND increasing by > 15 gpd/30minutes.
The US should enter AOP 2575, Rapid Downpower at this time.

Time	Position	Applicant's Actions or Behavior
	SRO	Enter AOP 2575, Rapid Downpower.
Examiner Note: The following steps are from AOP 2575, Rapid Downpower, Section 3.0 Rapid Downpower.		
	SRO	3.1 PERFORM focus brief on the following: REACTOR TRIP CRITERIA • Parameters associated with automatic reactor or turbine trips are challenged • RCS T cold *not* within 10°F of temperature program and efforts to regain control are unsuccessful RCS TEMPERATURE CONTROL • RCS T cold to be maintained within 10°F of Attachment 5, "Temperature vs. Power program" using Attachment 10, "Main Turbine Load Set Control." • To avoid uncontrolled cooldowns or power transients, sudden changes in RCS temperature or boron concentration should be avoided. 3.2 REQUEST SM/STA to Refer To Attachment 8, "Required Notifications," and PERFORM notifications.
	ATC	3.3 INITIATE forcing pressurizer sprays.
	SRO	CAUTION: In the case of a dropped CEA, rod motion is *not* used to initiate downpower. **Examiner Note: Caution is N/A**
	ATC	3.4 IF *not* downpowering due to a dropped rod, INSERT Group 7 CEAs 10 ± 2 steps to initiate downpower.
	BOP	3.5 Using the "Load Speed Control" switch, REDUCE turbine load to maintain Tc on program (+/-2 deg).
	SRO	3.6 Refer To PPC or Reactor Engineering Curve and Data Book and OBTAIN reactivity plan for the initial reactor power condition and desired load reduction.
Examiner Note: The crew should refer to Reactivity Plan RE-G-14.		

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 6

Event Description: Rapid Downpower due to Excessive Steam Generator Tube Leak

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td></td><td>BOP</td><td>NOTE
Attachment 10 “Approximate Load Demand vs. Reactor Power,” can be used to correlate the desired power level to a turbine load demand setpoint.</td></tr>
<tr><td></td><td>BOP</td><td>3.7 Refer To Attachment 9, “Main Turbine Load Set Control,” REDUCE turbine load and MAINTAIN Tc on program (+/-2 deg).</td></tr>
<tr><td colspan="3">**Examiner Note: The following steps are from AOP 2575 Rapid Downpower Attachment 9 Main Turbine Load Set Control:**</td></tr>
<tr><td></td><td>BOP</td><td>CAUTION
Operation of the “Load/Speed CONTROL” switch will change turbine
NOTE
Steps provided in this attachment are dependent on plant conditions</td></tr>
<tr><td></td><td>BOP</td><td>1. IF desired to commence or modify a turbine load ramp, PERFORM the following (HMI “Load” screen):
a. IF previous ramp has stopped, SELECT “Load Hold.”
b. SELECT “Load Setpt” and ENTER desired value.
c. SELECT “Rate setpt” and ENTER desired value.
d. WHEN ready to commence load reduction, SELECT “Load Resume.”</td></tr>
<tr><td></td><td>BOP</td><td>2. IF desired to adjust the “Load Ramp Rate,” PERFORM *any* of the following:
• SELECT “Rate setpt” and ENTER new value.
• SELECT “5% / hour,” OR “10% / hour,” OR “20% / hour.”
• SELECT “Raise” or “Lower” (0.25% / hour change).
3. IF Tavg and Tc are high off program, PERFORM the following:
a. SELECT “Load Hold” to stop ramp.
b. WHEN Tavg and Tc are trending back to program, SELECT “Load Resume.”</td></tr>
</table>

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 6

Event Description: Rapid Downpower due to Excessive Steam Generator Tube Leak

Time	Position	Applicant's Actions or Behavior
	BOP	4. IF Tavg and Tc are low off program, PERFORM the following: a. JOG the "Load/Speed CONTROL" switch to "Lower." b. WHEN Tavg and Tc are back on program, SELECT Load Setpt" and ENTER desired value. c. IF desired, Go To Step 1 and RESUME turbine load ramp. 5. IF desired load has been reached SELECT "Load Hold."

Examiner Note: The following steps are from AOP 2575 Rapid Downpower Section 3.0 Rapid Downpower.

	ATC	3.8 Based on required rate of downpower, START additional charging pumps as necessary and balance charging and letdown.
	ATC	3.9 IF desired to borate from the RWST (preferred method) PERFORM the following: a. ENSURE at least one charging pump operating. b. ENSURE CH-196, VCT makeup bypass, closed. c. ENSURE CH-504, RWST to charging suction, open. d. OPEN CH-192, RWST isolation. e. CLOSE CH-501, VCT outlet isolation. f. CHECK charging flow at desired rate. g. Go To step 3.11 **Examiner Note: Crew should borate from the RWST.**

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 6

Event Description: Rapid Downpower due to Excessive Steam Generator Tube Leak

Time	Position	Applicant's Actions or Behavior
	SRO/ATC/ BOP	3.11 During the downpower, Refer To Attachment 1,"Rapid Downpower Parameters," and MAINTAIN parameters as specified throughout downpower: **Examiner note: Attachment 1 Rapid Downpower Parameters:** • Condensate and heater drain flows and pressures: sufficient to maintain adequate SGFP suction pressure • FRV D/P: greater than 40 psid • Turbine load: responding to changes in load demand, with control valves operating together • Steam generator levels 55 to 70%. • MSR parameters tracking together • Turbine Generator MVARs: as specified by CONVEX • Reactor power: being monitored using delta T power indication • ASI: In accordance with reactivity plan or within 0.01 of ESI or per COLR. • CEA position: greater than PDIL • Tc: less than or equal to 549 deg • Pressurizer level: between 35 and 70% Pressurizer pressure: between 2,225 and 2,300 psia (DNB margin)
	SRO/ATC	NOTE 1. Xenon rate of change should be considered when terminating boration. 2. During rapid downpower, the PPC calorimetric may be inaccurate due to SG level transients. The most accurate available indication of reactor power is RPS delta T power.

Examiner Note: Once power has dropped at least 5%, or at the lead examiner's direction, proceed to Event 7, Steam Generator Tube Rupture, Manual Plant Trip.

<table>
<tr><td colspan="3">Simulator Operator: When directed, initiate Event 7, Steam Generator Tube Rupture in #1 SG.</td></tr>
<tr><td colspan="3">Indications:
• Steam Line Radiation Monitor Alarm (C-01, A30)
• PROCESS RAD MON HI/HI FAIL (C-06, DA-24)
• Letdown lowers
• Pressurizer Level Lowering</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from EOP 2525, Standard Post Trip Actions.</td></tr>
<tr><td></td><td>ATC</td><td>Determine Status of Reactivity Control – Reactor Trip
1. DETERMINE that Reactivity Control acceptance criteria are met for the reactor by performing ALL of the following steps:
• CHECK that all CEAs are fully inserted.
• CHECK that reactor power is dropping.
• CHECK that SUR is negative.</td></tr>
<tr><td></td><td>BOP</td><td>Determine Status of Reactivity Control – Turbine Trip
2. DETERMINE that Reactivity Control acceptance criteria are met for the turbine by performing ALL of the following steps :
a. CHECK that the main turbine is tripped by BOTH of the following:
• ALL main stop valves are closed.
• Generator megawatts indicate zero.
• Turbine speed is lowering.
b. <u>IF</u> 15G-2XI-4, motor operated disconnect, is closed, CHECK that the main Generator output breakers 8T and 9T are open.</td></tr>
<tr><td></td><td>BOP</td><td>Determine Status of Maintenance of Vital Auxiliaries
3. DETERMINE that Maintenance of Vital Auxiliaries acceptance criteria are met by performing ALL of the following steps:
3.1. CHECK that ALL Facility 1 and 2 electrical buses are energized:
• 6.9kV Electrical Buses 25A, 25B
• 4.16kV Non-Vital Electrical Buses 24A, 24B
• 4.16vV Vital Electrical Buses 24C, 24D
• Vital DC Buses 201A, 201B, DV-10, DV-20
• Vital AC Instrument Buses VA-10, VA-20
3.2. CHECK that BOTH facilities of service water are operating.
3.3. CHECK that BOTH facilities of RBCCW are operating with service water cooling.</td></tr>
</table>

Time	Position	Applicant's Actions or Behavior
	ATC	**Determine Status of RCS Inventory Control** 4. DETERMINE that RCS Inventory Control acceptance criteria are met by performing **ALL** of the following: 4.1. CHECK that **BOTH** of the following conditions exist: • Pressurizer level is 20 to 80% • Pressurizer level is trending to 35 to 70% a.1 IF the Pressurizer Level Control System is not operating properly in automatic, RESTORE and MAINTAIN pressurizer level 35 to 70% by performing ANY of the following: 1) OPERATE the Pressurizer Level Control System. 2) Manually OPERATE charging and letdown. 4.2. CHECK that RCS subcooling is greater than or equal to 30°F

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 7, 8

Event Description: Steam Generator Tube Rupture, Manual Plant Trip, Loss of Safety Injection Flow

Time	Position	Applicant's Actions or Behavior
	ATC	**Determine Status of RCS Pressure Control** 5. DETERMINE RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • CHECK that pressurizer pressure is 1900 to 2350 psia. • CHECK that pressurizer pressure is trending to 2225 to 2300 psia. 5.1. IF the Pressurizer Pressure Control System is *not* operating properly in automatic, THEN RESTORE and MAINTAIN pressurizer pressure between 2225 to 2300 psia by performing **ANY** of the following: • OPERATE the Pressurizer Pressure Control System. • Manually OPERATE pressurizer heaters and spray valves. 5.2. IF **ANY** pressurizer spray valve will *not* close, THEN STOP RCPs as necessary. 5.3. IF any PORV is open AND pressurizer pressure is less than 2250 psia, THEN CLOSE the associated PORV block valve. 5.4. IF pressurizer pressure is less than 1714 psia, THEN ENSURE **ALL** of the following: • SIAS actuated. (C01) • CIAS actuated. (C01) • EBFAS actuated. (C01) 5.5. IF pressurizer pressure is less than 1714 psia AND SIAS actuated, THEN ENSURE ONE RCP in each loop is stopped. 5.6. TCOA: IF Pressurizer pressure lowers to less than the minimum of Fig. 2 "RCP NPSH Curve" THEN STOP ALL RCPs
	ATC	**Determine Status of Core Heat Removal** 6. DETERMINE that Core Heat Removal acceptance criteria are met by performing **ALL** of the following: a. CHECK that at least one RCP is operating and that loop delta T is less than 10°F a.1 IF RCPs are *not* operating, OR loop _T is greater than 10° F, THEN PERFORM the following: 1) PLACE TIC- 4165, steam dump TAVG controller, in manual and closed. 2) PLACE BOTH pressurizer spray valve controllers in manual and CLOSE the valves. • HIC- 100E • HIC- 100F b. CHECK that Th subcooling is greater than or equal to 30°F.

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 7, 8

Event Description: Steam Generator Tube Rupture, Manual Plant Trip, Loss of Safety Injection Flow

Time	Position	Applicant's Actions or Behavior
	BOP	**Determine Status of RCS Heat Removal** 7. DETERMINE that RCS Heat Removal acceptance criteria are met by ALL of the following conditions: a. CHECK that at least one steam generator has **BOTH** of the following conditions met: a. Level is 10 to 80%. b. Main feedwater or TWO auxiliary feedwater pumps are operating to restore level 40 to 70%. b. CHECK that RCS Tc is being maintained between 530°F to 535°F. c. CHECK that **BOTH** steam generators pressure are 880 to 920 psia.
	ATC	**Determine Status of Containment Isolation** 8. DETERMINE that Containment Isolation acceptance criteria are met by **ALL** of the following: a. CHECK that containment pressure is less than 1.0 psig. b. CHECK that **NONE** of the following primary plant radiation monitors have an unexplained alarm or indicate an unexplained rise in activity: **Radiation Monitors Inside Containment** • RM-7890, Personnel Access Area • RM-7891, Ctmt Refuel Floor Area • RM-8240, High Range • RM-8241, High Range • RM-8123 A and B, Ctmt Atmosphere • RM-8262 A and B, Ctmt Atmosphere c. CHECK that NONE of the following steam plant radiation monitors have an unexplained alarm or indicate an unexplained rise in activity: **Steam Plant Radiation Monitors** • RM-5099, Steam Jet Air Ejector • RM-4262, SG Blowdown • RM-4299A and B, Main Steam Line 1 • RM-4299C, Main Steam Line 2 c.1 IF feed is available to **BOTH** steam generators, THEN THROTTLE feed to the steam generator with the highest radiation readings to maintain level 40 to 45%.

Time	Position	Applicant's Actions or Behavior
	ATC	**Determine Status of Containment Temperature and Pressure Control** 9. DETERMINE that Containment Temperature and Pressure Control acceptance criteria are met by **BOTH** of the following steps: a. CHECK that containment temperature is less than 120°F. (PPC or avg. of Points 5 and 6) b. CHECK that containment pressure is less than 1.0psig.
	SRO	10. PERFORM the following: a. DIAGNOSE the event. Refer To Appendix 1, "Diagnostic Flowchart." b. INITIATE Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions." c. Go To the appropriate EOP
	ATC/BOP	{Step 10.b above} Perform Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions". **Examiner Note: EOP Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions." are attached to guide.**
Examiner Note: The Unit Supervisor refers to EOP 2541 Appendix 1, Diagnostic Flowchart to diagnose the event.		
	SRO	Enters EOP 2534, Steam Generator Tube Rupture.
Examiner Note: The following steps are from EOP 2534 Steam Generator Tube Rupture. Asterisked steps, within the ORP or selected FRPs being implemented, may be brought forward to restore or preserve a Safety Function. Asterisked steps are "Continuously Applicable," and may be performed out of order after they have been accomplished once.		
	SRO	*1. CONFIRM diagnosis of Steam Generator Tube Rupture by performing the following: a. CHECK Safety Function Status Check Acceptance Criteria are satisfied. **Examiner Note: SRO checks EOP 2534-001 SGTR Safety Function Status Checks and confirms that all Safety Criteria are satisfied.**

	BOP	b. CHECK for steam generator tube rupture by performing the following: 1) CHECK "B" train RBCCW in service. 2) ENSURE 2-RB-210 "Degasifier Effluent Cooler Return Outlet" is open. 3) OPEN the steam generator sample valves: • MS-191A • MS-191B 4) DIRECT Chemistry to perform the following: • Sample both steam generators • Frisk the samples • Report frisk results • Analyze samples for boron and activity 5) <u>WHEN</u> Chemistry reports that samples have been taken, PERFORM the following: • CLOSE the steam generator sample valves • <u>IF</u> SIAS has actuated, <u>AND</u> no other sampling is in progress, CLOSE 2-RB-210, "Degasifier Effluent Cooler Return Outlet"
CUE: When directed to sample Steam Generators, respond 20 minutes later that samples have been taken. Report that frisk results show indication of activity in No. 1 Steam Generator.		
	SRO	*2. CLASSIFY the event. Refer To MP-26-EPI-FAP06, "Classification and PARs" • IF classification requires RCS sampling, Refer To Appendix 46, "Sampling for EAL Determination" and DIRECT Chemistry as required.
	SRO	*3. PERFORM ALL of the following: • OPEN the placekeeper and ENTER the EOP entry time. • ENSURE the master alarm silence switch is in "NORMAL".
	ATC	*4. <u>IF</u> pressurizer pressure is less than 1714 psia, PERFORM **ALL** of the following: a. ENSURE SIAS, CIAS and EBFAS have actuated. (C01) b. ENSURE **ONE** complete facility of CRACS is operating in the recirc mode: (C25) **Facility 1** • HV-203A, Fan F-21A exhaust damper is open. • Fan F-21A, supply fan is running. • HV-206A, Fan F-31A exhaust damper is open. • Fan F-31A, exhaust fan is running. • HV-212A, Fan F-32A exhaust damper is open. • Fan F-32A, filter fan is running. • HV-202, minimum fresh air damper is closed. • HV-207, cable vault exhaust damper is closed. • HV-208, exhaust air damper is closed

Time	Position	Applicant's Actions or Behavior
	ATC	**Facility 2** - HV-203B, Fan F-21B exhaust damper is open. - Fan F-21B, supply fan is running. - HV-206B, Fan F-31B exhaust damper is open. - Fan F-31B, exhaust fan is running. - HV-212B, Fan F-32B exhaust damper is open. - Fan F-32B, filter fan is running. - HV-495, fresh air damper is closed. - HV-496, exhaust air damper is closed. - HV-497, cable vault exhaust damper is closed.
	ATC	*5. IF SIAS has initiated, PERFORM the following: a. CHECK at least one train of SIAS, CIAS and EBFAS has properly actuated. (C01X) a.1 IF **ANY** component is *not* in its required position, manually ALIGN the applicable component. b. CHECK that safety injection flow is adequate. Refer To Appendix 2, "Figures." b.1 PERFORM **ANY** of the following to restore safety injection flow within the SI Flow Curve: 1) ENSURE electrical power to safety injection pumps and valves. 2) ENSURE correct safety injection valve lineup. 3) ENSURE operation of necessary auxiliary systems: 1) RBCCW 2) ESF Room Coolers 4) START additional safety injection pumps as needed until safety injection flow is within the SI Flow Curve. **Examiners Note: The "C" HPSI pump must be manually started using the control switch on C-01.** c. ENSURE **ALL** available charging pumps are operating.

CRITICAL TASK: Manually establish the minimum design Safety Injection System flow (CT-1/SGTR-6)

Time that "C" HPSI pump was started: ___________
Time SIAS of actuation (manual or auto):___________

	ATC	d. ENSURE vital switchgear cooling is operating for each operating ECCS train as follows: **Facility 1** • Fan F-51 is running. • Fan F-134 is running. • SW-178A, service water supply is open. • SW-178B, service water supply is open. **Facility 2** • Fan F-52 is running. • Fan F-142 is running. • Fan F-133 is running. • SW-178C, service water supply is open.
	ATC	*6. <u>IF</u> pressurizer pressure is less than 1714 psia AND SIAS has initiated, PERFORM the following: a. ENSURE **ONE** RCP in each loop is stopped. b. PLACE associated pressurizer spray valve controller RC-100E or RC-100F in manual and CLOSE the valve. c. <u>IF</u> pressurizer pressure lowers to less than the minimum RCP NPSH limit, PERFORM the following: 1) STOP **ALL** RCPs. 2) PLACE TIC-4165, steam dump TAVG controller, in manual and closed. **3)** PLACE pressurizer spray valve controllers RC-100E and RC-100F in manual and CLOSE the valves.
	ATC/BOP	*7. <u>IF</u> EBFAS has initiated AND the condenser is available, ALIGN the condenser air removal system to Unit 2 stack: a. ENSURE condenser air removal fan, MF---55A or MF-55B, is running. b. <u>IF</u> condenser air removal fan MF-55A is operating, ENSURE makeup damper, EB-171, is open. c. OPEN EB-57, condenser air removal to Unit 2 stack. d. ENSURE AC-11, Purge exhaust filter outlet damper is closed. e. OPEN AC-59, Outside air makeup damper. f. START **ONE** main exhaust fan. g. ENSURE HV-118, Radwaste exhaust damper is closed. h. START F-20, Fuel handling area supply fan. i. ENSURE HV-173, Exhaust mod discharge damper is in "MOD" position. j. PLACE AC-59, Outside air makeup damper to "MID" position.
	SRO/BOP	*8. COMMENCE an RCS cooldown at the maximum controllable rate to a T_H of less than 515 °F in both loops using the steam dumps.

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 7, 8

Event Description: Steam Generator Tube Rupture, Manual Plant Trip, Loss of Safety Injection Flow

<table>
<tr><th>Time</th><th>Position</th><th>Applicant’s Actions or Behavior</th></tr>
<tr><td colspan="3">CRITICAL TASK: Perform a plant cooldown (CT-2/SGTR-7)

Time Cooldown was started: ___________
Time T_H dropped below 515 °F:___________</td></tr>
<tr><td></td><td>ATC</td><td>*9. DEPRESSURIZE the RCS by performing the following:
a. MAINTAIN pressurizer pressure within ALL of the following criteria:
• IF RCPs are operating, MAINTAIN RCS pressure above the NPSH curve. Refer to Appendix 2, “Figures.”
• Less than 920 psia
• Within 50 psi of the most affected steam generator pressure
• Within the RCS P/T curve limits. Refer to Appendix 2, “Figures.”
b. OPERATE main or auxiliary spray.</td></tr>
<tr><td colspan="3">CRITICAL TASK: Establish RCS Pressure Control (CT-3/SGTR-2)

RCS Pressure when Cooldown was started: ___________
RCS Pressure when T_H dropped below 515 °F:___________</td></tr>
<tr><td></td><td>ATC</td><td>c. IF HPSI throttle/stop criteria are met, PERFORM ANY of the following to lower RCS pressure:
• CONTROL charging and letdown.
• THROTTLE or STOP HPSI flow.</td></tr>
<tr><td></td><td>BOP/ATC</td><td>*10. IF the main condenser is available, MAINTAIN steaming to the condenser by performing the following:
a. IF MSI is <i>not</i> present AND MSI Block is permitted, BLOCK the automatic initiation as the cooldown and depressurization proceeds.
b. IF MSI has actuated AND the following conditions exists:
1) Steam dumps are available
2) Steaming to the condenser is desired PERFORM the following to open the MSIV for the unisolated steam generator:
1) UNLOCK and CLOSE the disconnect as applicable for MSIV bypass valves:
1) MS---65A (B5207)
2) MS---65B (B6208)
2) CLOSE the steam dump valves.
3) OPEN the MSIV bypass valves.
4) THROTTLE the ADV as necessary to achieve less than 100 psid.
5) WHEN differential pressure across the MSIVs is less than 100 psid, OPEN the MSIVs.
6) CLOSE the MSIV bypass valves.</td></tr>
</table>

Time	Position	Applicant's Actions or Behavior
	SRO/ATC/ BOP	c. IF MSI will actuate following the isolation of the most affected steam generator AND the following conditions exists: • Steam dumps are available • Steaming to the condenser is desired PERFORM the following to ensure steaming to the main condenser is maintained: 1) CLOSE the steam dump valves. 2) Manually initiate MSI. 3) IF differential pressure across the MSIV for the least affected steam generator is less than 100 psid, OPEN the MSIV. c.1 IF differential pressure across the MSIV for the least affected steam generator is greater than 100 psid, PERFORM the following: 1) UNLOCK and CLOSE the disconnect, as applicable, for least affected steam generator MSIV bypass valve: • MS-65A (B5207) • MS-65B (B6208) 2) ENSURE the steam dump valves are closed. 3) OPEN the MSIV bypass valve for the least affected steam generator. 4) THROTTLE the ADV as necessary to achieve less than 100 psid. 5) WHEN differential pressure across the MSIV for the least affected steam generator is less than 100 psid, OPEN the MSIV. 6) CLOSE the MSIV bypass valve.
	SRO/ATC	*11. IF SIAS is *not* present AND SIAS Block is permitted, BLOCK the automatic initiation as the cooldown and depressurization proceeds.
	BOP	*12. IF offsite power has been lost OR the condenser is *not* available, PERFORM the following: a. CLOSE **BOTH** MSIVs. b. ENSURE **BOTH** MSIV bypass valves are closed. c. OPEN AR-17, condenser vacuum breaker.

Time	Position	Applicant's Actions or Behavior
		*13. DETERMINE the most affected steam generator by considering **ALL** of the following: • Steam generator activities • Main steam piping radiation levels • Steam generator level change when *not* feeding • Steam generator blowdown activities • Steam generator mismatch in level with essentially the same feed and steaming rate for both steam generators • Feed flow mismatch between steam generators • Steam flow versus feed flow mismatch in a steam generator prior to the trip
	SRO/BOP	*14. WHEN BOTH RCS hot leg temperatures are less than 515° F, ISOLATE the most affected steam generator by performing the following: **Number 1 Steam Generator** a. RECORD in the placekeeper, time and TC of the operating loop. b. ENSURE **ALL** of the following for the associated ADV: • ADV is in AUTO, PIC-4223 • ADV setpoint at 920 psia • ADV is closed c. ENSURE the MSIV, MS-64A, is closed. d. ENSURE the MSIV bypass valve, MS-65A, is closed. e. CLOSE the main feedwater regulating bypass valve,FW-41A. f. ENSURE the main feedwater block valve, FW-42A is closed. g. PLACE main feed isolation air assisted check valve, FW-5A to "CLOSE." h. ENSURE the steam generator blowdown isolation valve, MS-220A is closed. i. PLACE **BOTH** auxiliary feed "OVERRIDE/MAN/START/RESET" handswitches in "PULL TO LOCK". j. CLOSE the aux feedwater regulating valve, FW-43A.

***POTENTIAL* CRITICAL TASK: Isolate the affected SG (CT-4/SGTR-5)**
[Within 60 minutes of the tube rupturing, per OP 2260]

Time SG Tube Rupture occurred: ___________
Time Affected SG Isolated (Step #14 complete):___________

Once the affected SG is isolated, or at the lead examiner's direction, the scenario is completed.

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 7

Event Description: **EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions**

Examiner Note: The following steps are from EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions.

Time	**Position**	**Applicant's Actions or Behavior**
	ATC	1. <u>IF</u> charging pumps suction is aligned to the VCT, <u>THEN</u> CHECK VCT level is between 72% to 86%: a. IF VCT level is less than 72%, THEN ALIGN charging pump suction to RWST as follows: 1) OPEN CH- 192, RWST isolation. 2) ENSURE CH- 504, RWST to charging suction is open. 3) CLOSE CH- 501, VCT outlet isolation. 4) ENSURE CH- 196, VCT makeup bypass is closed. b. IF VCT level is greater than 88%, THEN PLACE CH- 500, letdown divert handswitch, to the "RWS" position, and divert as required to maintain VCT level 72% to 86%.
	ATC	2. TCOA: <u>IF</u> SIAS actuated, <u>THEN</u> ENSURE **ONE** complete facility of CRAC operating, in RECIRC mode, as follows: (C25A/B) **Facility 1** • HV- 203A, Fan F- 21A exhaust damper open • Fan F- 21A, supply fan running • HV- 206A, Fan F- 31A exhaust damper open • Fan F- 31A, exhaust fan running • HV- 212A, Fan F- 32A exhaust damper, open • Fan F- 32A, filter fan, running • HV- 202, minimum fresh air damper, closed • HV- 207, cable vault exhaust damper, closed • HV- 208, exhaust air damper, closed **Facility 2** • HV- 203B, Fan F- 21B exhaust damper open • Fan F- 21B, supply fan running • HV- 206B, Fan F- 31B exhaust damper open • Fan F- 31B, exhaust fan running • HV- 212B, Fan F- 32B exhaust damper, open • Fan F- 32B, filter fan, running • HV- 495, fresh air damper, closed • HV- 496, exhaust air damper, closed • HV- 497, cable vault exhaust damper, closed

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 7

Event Description: **EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions**

Time	Position	Applicant's Actions or Behavior
	ATC	3. TCOA: IF SIAS not actuated, THEN CHECK ONE facility of CRAC operating, in NORMAL mode, as follows: (C25A/B) **Facility 1** • HV- 203A, Fan F- 21A exhaust damper is open • Fan F- 21A, supply fan running • HV- 206A, Fan F- 31A exhaust damper open • Fan F- 31A, exhaust fan running **Facility 2** • HV- 203B, Fan F- 21B exhaust damper open • Fan F- 21B, supply fan running • HV- 206B, Fan F- 31B exhaust damper open • Fan F- 31B, exhaust fan running
	ATC	4. IF charging pumps suction aligned to the RWST AND boration not required, THEN RESTORE charging pump suction to VCT as follows: a. CHECK BOTH of the following: 1) VCT level between 72% and 86% 2) VCT pressure greater than 15 psig b. CHECK letdown is in service. c. OPEN CH- 501, VCT outlet isolation. d. CLOSE CH- 192, RWST isolation.
	BOP	5. CHECK instrument air pressure greater than 90 psig and stable.
	BOP	6. IF AFAS has actuated, WHEN **BOTH** steam generators are restored to greater than 33%, THEN PERFORM the following: a. PLACE the following switches in "M" (Manual) and ADJUST to obtain desired flow (C- 05): 1) FW- 43A, "AFW- FCV, HIC- 5276A" 2) FW- 43B, "AFW- FCV, HIC- 5279A" b. PLACE **BOTH** of the following switches to "RESET" and ALLOW to spring return to neutral (C- 05): 1) "OVERRIDE/MAN/START RESET" (Facility 1) 2) "OVERRIDE/MAN/START RESET" (Facility 2) c. ADJUST the following switches to obtain desired flow (C- 05): 1) FW- 43A, "AFW- FCV, HIC- 5276A" 2) FW- 43B, "AFW- FCV, HIC- 5279A" d. IF main feedwater pump is supplying steam generators, THEN STOP **BOTH** auxiliary feedwater pumps. **Examiner Note: BOP may place both facilities in override (Pull-To-Lock) once the SG Tube Rupture is identified and AFW flow is under control.**

Op-Test No.: ES16LI2 Scenario No.: 2 Event No.: 7

Event Description: **EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions**

Time	Position	Applicant's Actions or Behavior
	BOP	7. CHECK Main Condenser is available, as indicated by ALL of the following: • At least ONE MSIV open • Condenser vacuum better than 15 inches HG - ABS (0 to 15 inches) • At least ONE condensate pump operating • At least ONE Circ Water pump operating
	BOP	8. OPEN HD- 106, subcooling valve.
	BOP	9. ENSURE BOTH heater drain pumps stopped.
	BOP	10. <u>IF</u> MFW is supplying feed to the steam generators, <u>THEN</u> PERFORM the following: a. ENSURE that only **ONE** main feedwater pump is operating. b. ENSURE that **BOTH** main feed block valves are closed: 1) FW- 42A 2) FW- 42B c. ADJUST the operating main feedwater pump pressure to 50 to 150 psi greater than SG pressure. d. ENSURE BOTH main feed reg bypass valves are throttled to control SG level: 1) LIC- 5215 2) LIC- 5216 e. <u>IF</u> Main Feedwater Pump A is secured, <u>THEN</u> CLOSE the following: 1) FW- 38A, main feedwater pump discharge valve 2) FIC- 5237, main feedwater pump mini flow recirc valve f. <u>IF</u> Main Feedwater Pump B is secured, <u>THEN</u> CLOSE the following: 1) FW- 38B, main feedwater pump discharge valve 2) FIC- 5240, main feedwater pump mini flow recirc valve
	BOP	11. <u>IF</u> **BOTH** MFW pumps are secured, <u>THEN</u> PERFORM the following: a. CLOSE BOTH main feedwater pump mini flow recirc valves. • FIC- 5237 • FIC- 5240
	BOP	12. <u>IF</u> 25A OR 25B is energized, <u>THEN</u> ALIGN condensate pumps as follows: a. ENSURE **ONE** pump is running. b. ENSURE **ONE** pump is in "PULL TO LOCK." c. ENSURE **ONE** pump is in "AUTO."
Examiner Note: End of Attachment 4- A		

SIMULATOR SCENARIO #3

Facility: Millstone Unit 2 Scenario No.: 3 Op-Test No.: ES16LI3

Examiners: ______________ Operators: ______________ SRO

______________ ______________ ATC

______________ ______________ BOP

Initial Conditions: 100% Power IC.

Turnover: 100% Power, steady state, No out of service. 24E is aligned to 24C.

Critical Tasks:

1. LOCA-13 Trip two RCPs with SIAS actuation and a LOCA in progress.
2. LOCA-12 (TCOA) Trip ALL RCPs within 5 minutes of NPSH limits not being met.
3. 2260 2536 TCOA (ESDE-6); Isolate Aux Feed Water to the affected SG within 30 minutes following an MSI actuation.
4. LOCA-2; Start the TDAFP.

Event No.	Malf. No.	Event Type*	Event Description
1	RHLI-3004 C01-A16 C01-D17 ESLT-3004 ESBA405_1	TS (S)	"D" Ch. RWST Level fails to zero (0%)
2	C03-A18B	C (ATC/S)	"A" RCP Anti Rev Rot Flow Low
3	RC20A	C,TS (ATC/S)	"A" RCP Seal Cooler Leak of 5-8 gpm
4	N/A	R (ALL)	Plant shutdown due to RCS leak
5	RC20A (1005)	M (ALL)	"A" RCP Seal Cooler Rupture resulting in an Inter-System SB-LOCA of 550 gpm
6	MS02B	C (ALL)	ESD outside CTMT (4.75E06 lbm/hr), upstream of #2 MSIV on the trip. 30 second time delay following the Reactor Trip
7	FW30A FW20B	C (BOP/S)	“A” AFW Pump degraded performance and "B" AFW pump trips. Start the TDAFW pump.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	**Actual**
1. Total malfunctions (5–8)	5
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)	1
7. Critical tasks (2–3)	3

NRC 2016, Scenario 3 Summary:

The crew will take the shift with the unit at 100% power, steady state, “A” MDAFW out of service. (IC-30).

Event 1: The crew takes the shift then at the discretion of the Examiner malfunction for “D” RWST level channel fails to 0. Crew will refer to an ARP 2590A-068 and bypass the level indicator then log into a T.S.A.S.

Event 2: At the discretion of the Examiner a malfunction for “A” RCP Anti Reverse Rotation flow alarm will annunciate providing the prelude to the “A” RCP Seal Cooler leak. The Crew will refer to ARP 2590B-074 and start the “A” RCP Lift pump, evaluate the need for a Reactor Trip and then submit a CR.

Event 3: At the discretion of the Examiner a malfunction for RCP “A” seal cooler leak into RBCCW of 5-8 gpm. The Crew will enter AOP 2568 Reactor Coolant System Leak and validate by stabilizing PZR level, may start an additional Charging Pump and manually adjusting the bias on letdown. The U.S. will enter a Shutdown T.S.A.S and monitor for EAL Classification threshold. U.S. will direct a shutdown and transition to AOP 2575.

Event 4: The crew will enter AOP 2575 Rapid Downpower per the RCS Leak T.S.A.S. and commence a downpower. ATC will insert Group 7 Rods 10 steps while BOP reduces Turbine load to maintain RCS T_{COLD}. The Crew will then align for boration from the RWST requiring the ATC operator to start an additional Charging pump if not already started and the BOP to setup the Turbine HMI to lower load to maintain RCS T_{COLD}.

Event 5: At the discretion of the Examiner the malfunction for “A” RCP Seal Cooler rupture will causing a small break LOCA of approximately 550 gpm requiring the crew will validate using RCS parameter imitate and initiate a Reactor Trip and transition to perform EOP 2525 SPTA.

Event 6: On the Reactor trip during the performance of EOP 2525 an Excess Steam Demand Event will be initiated outside of CTMT, upstream of #2 S/G MSIV (Non-Isolable) requiring the BOP stop steaming to the condenser by closing both MSIVs and to secure feed the #2 S/G. When the S/G blows dry the BOP will stabilize RCS temperature using the unaffected S/G ADV. The U.S. will diagnose 2 events and enter EOP 2540 and implement the Resource Assessment Trees.

Event 7: Five minutes after the plant trip, the “A” Motor driven Aux Feedwater Pump performance will degrade and the “B” Motor driven Aux Feedwater pump will trip, requiring the BOP to start the Turbine driven Aux Feedwater Pump, if not previously already started.

The US should transition to the Functional Recovery Procedure, EOP 2540, and the Crew will begin addressing the CTMT Isolation Safety Function.

The crew is required to isolate the RCS leak into RBCCW and Isolate the #2 S/G while stabilizing RCS temperature after the #2 S/G blowdown.

INPUT SUMMARY							
Either INPUT or VERIFY the following functions:							
ID Num	Description	Delay Time	Ramp Time	Event Time	Sev or Value	Final Value	Rel Order
MALFUNCTIONS							
C01-A16	RWST Level Hi/Lo				ON	ON	1
C01-D17	RWST Ch “D” Level Lo Lo				ON	ON	1
C03-A18B	"A" RCP Anti Rev Rot Flow Low				ON	ON	2
RC20A	"A" RCP Seal Cooler Leak of 28 gpm		2 min		8 gpm	8 gpm	3
RC20A (1005)	"A" RCP Seal Cooler Rupture of 550 gpm				550 gpm	550 gpm	5
MS02B	ESD outside CTMT, upstream of #2 MSIV		1 min		4.75E06	4.75E06	6
FW30A	"A" AFW pump degraded performance.	5 min.			100%	100%	7
FW20B	"B" AFW pump trip.	5 min.			N/A	N/A	7
FW20A	"A" AFW pump trip.				N/A	N/A	8
C03-A18B	"A" RCP Anti Rev Rot Flow Low				NORMAL	NORMAL	9
REMOTE FUNCTIONS							
CCR35	RBCCW pump “A” Rad Mon isolation				CLOSE	CLOSE	10
CCR35	RBCCW pump “A” Rad Mon isolation				OPEN	OPEN	11
CCR36	RBCCW pump “B” Rad Mon isolation				CLOSE	CLOSE	12
CCR36	RBCCW pump “B” Rad Mon isolation				OPEN	OPEN	13
CCR37	RBCCW pump “C” Rad Mon isolation				CLOSE	CLOSE	14
CCR37	RBCCW pump “C” Rad Mon isolation				OPEN	OPEN	15
OVERRIDES							
RHLI-3004	"D" Ch. RWST Level fails to zero (0%)				0%	0%	1
ESLT-3004	ESAS Sensor Cabinet “D” RWST Level				0%	0%	1
ESBA405_1	ESAS Sensor BA405 Trip Light				S2 RED	S2 RED	1

Op-Test No.: ES16LI3 Scenario No.: 3 Event No.: 1

Event Description: "A" Ch. RWST Level Failure

Time	Position	Applicant's Actions or Behavior

Examiner Note:

The following steps are from ARP 2590A-068 "RWST CH D LEVEL LO/LO"

	ATC	**<u>AUTOMATIC FUNCTIONS</u>** 1. Tripping two or more RWST level switches initiates SRAS. **<u>CORRECTIVE ACTIONS</u>** 1. OBSERVE RWST level to determine if signal was spurious or if an actual signal exists (C-01). 2. <u>IF</u> actual signal exists, CHECK sump recirculation actuation signal initiated. 3. <u>IF</u> actual signal exists, <u>AND</u> sump recirculation actuation signal is not initiated, manually PRESS both Facility 1 and 2 "SRAS ACTUATE" buttons (C-01). 4. ENSURE HPSI and CS pumps taking suction from containment sump (C-01). 5. <u>IF</u> signal was spurious or inaccurate in setpoint, SUBMIT Trouble Report to I&C Department. 6. <u>IF</u> channel is not OPERABLE, PLACE SRAS logic in 2 out of 3 logic on ESAS. 6.1 Refer To Technical Specifications LCO, 3.3.2.1 and DETERMINE applicability.
	SRO	3.3.2.1 The engineered safety feature actuation system instrumentation channels and bypasses shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4. TOTAL TRIP MIN MODE ACTION b. Refueling Water Storage Tank – Low 4 2 3 1, 2, 3 4 4b) ≥ 1850 psia, operation may continue with the inoperable channel in the bypassed condition, provided the following condition is satisfied: 1. The Minimum Channels OPERABLE requirement is met; however, one additional channel may be removed from service for up to 2 hours for surveillance testing per Specification 4.3.2.1.1 provided BOTH of the inoperable channels are placed in the bypassed condition.

Examiner Note: SRO should note that performing the actions of the ARP and bypassing channel "D" on ESAS meets the action for the LCO 3.3.2.1.

Examiner Note: Once the actions of TS 3.3.2.1 have been completed, or at lead examiner's direction, proceed to Event 2, "A" RCP Anti Rev Rot Flow Low.

Op-Test No.: ES16LI3 Scenario No.: 3 Event No.: 2

Event Description: **"A" RCP Anti Rev Rot Flow Low**

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td colspan="3">Simulator Operator: When directed, initiate Event #2, "A" RCP Anti Rev Rot Flow Low.</td></tr>
<tr><td colspan="3">Indications Available:
• "RCP A ANTIREV ROT FLOW LO" C02/3 AB-18</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from ARP 2590B-074 (C02/3 AB-18).</td></tr>
<tr><td></td><td>ATC</td><td><u>AUTOMATIC FUNCTIONS</u>
1. None
<u>CORRECTIVE ACTIONS</u>
<i>NOTE:</i>
<i>Oil lift pump may be operated indefinitely.</i>
1. START "RCP-A LIFT PPS, P-51A/53A" (C-03).</td></tr>
<tr><td colspan="3">Simulator Operator: ~1 minute after the lift pump is started, trigger Event 9 to clear alarm AB-18.</td></tr>
<tr><td></td><td>SRO</td><td>2. NOTIFY OMOC (Duty Officer).</td></tr>
<tr><td colspan="3">Cue: OMOC is notified.</td></tr>
<tr><td></td><td>ATC</td><td>3. MONITOR <i>all</i> "A" RCP bearing temperatures (C-04R or PPC).
4. CHECK the following alarm windows <i>not</i> lit (C-02/3):
• "RCP A ANTIREV BRG TEMP HI" (AA-19)
• "RCP A UPPER GUIDE TEMP HI" (BB-20)
• "RCP A UPPER THRUS TEMP HI" (CB-20)
5. <u>IF</u> alarm does <i>not</i> clear <u>AND</u> <i>any</i> alarm listed in step 4. is valid, PERFORM the following:
5.1 TRIP reactor and turbine.
5.2 STOP "A" RCP.
5.3 Refer To EOP 2525, "Standard Post Trip Actions" and PERFORM required actions.
SUBMIT Trouble Report</td></tr>
<tr><td colspan="3">Examiner Note: Because none of the annunciators listed in Step 4 are in alarm, Step 5 is N/A.
Examiner Note: Once the actions of ARP 2590B-074 have been completed, or at lead examiner's direction, proceed to Event 3, "A" RCP Seal Cooler Leak.</td></tr>
</table>

Op-Test No.: __ES16LI3___ Scenario No.: __3__ Event No.: _3__

Event Description: “A” RCP Seal Cooler Leak

Time	Position	Applicant’s Actions or Behavior

Simulator Operator: When directed, initiate Event 3, “A” RCP Seal Cooler Leak of 5-8 gpm

Indications Available:

- **PPC Alarm for RCS Leakage**
- **LI-6001 RB Surge TK level rise C06**
- **“RCP A CLG WTR TEMP HI” C-02/3 DB-17 (<u>no</u> alarm, but may be referenced for trip criteria)**
- **“PROCESS MON RAD HI HI/FAIL” C-06/7 DA-24**

Examiner Note: The following steps are from ARP 2590B-072 (C-02/3 DB-17).

	ATC	<u>AUTOMATIC FUNCTIONS</u> 1. None <u>CORRECTIVE ACTIONS</u> 1. IF “A” RCP RBCCW outlet temperature is above 125°F, PERFORM the following: 1.1. TRIP Reactor. 1.2. TRIP Turbine. 1.3. STOP “A” RCP. 1.4. Go To EOP 2525, “Standard Post Trip Actions.”

Examiner Note: ARP 2590B-072 (C-02/3 DB-17) may be referenced for trip criteria. However, the actual temperature should stabilize far enough below 125°F to not require a plant trip/RCP shutdown.

Examiner Note: The following steps are from ARP 2590E-135 (C-06/7 DA-24).

	SRO	<u>AUTOMATIC FUNCTIONS</u> 1. None <u>CORRECTIVE ACTIONS</u> ***NOTE:*** *1. When the “PROCESS MON RAD HI/HI FAIL” alarm is received, all TS and REMODCM radiation monitors associated with this alarm are considered to be INOPERABLE until the alarm is cleared.* *2. If the 12 hour maintenance window is applied and the “PROCESS MON RAD HI/HI FAIL” alarm will remain longer than 12 hours, then log into appropriate action statements. Track 12 hour maintenance window using LCO Module.*

	SRO	1. Refer To the following LCOs and DETERMINE applicability: • TS 3.4.6.1 (RM-8123A, RM-8262A - applies only if alarm windows C-01, A-28, CH "A" CTMT AIR PARTICULATE RADIATION HI and B-28, CH "B" CTMT AIR PARTICULATE RADIATION HI are *not* OPERABLE). • TS 3.3.3.1 (RM-8123A, RM-8262A - applies only if alarm windows C-01, A-28, CH "A" CTMT AIR PARTICULATE RADIATION HI and B-28, CH "B" CTMT AIR PARTICULATE RADIATION HI are *not* OPERABLE). • REMODCM IV.C.1 TABLE IV.C-1 (RM-6038, RM-4262- REMODCM allows use of 12 hr Maintenance Window) • REMODCM IV.C.2 TABLE IV.C-3 (RM-8132A/B- REMODCM allows use of 12 hr Maintenance Window), (RM-9095 applies only if performing a Waste Gas discharge)
	BOP	2. OBSERVE which process radiation monitor is alarming (RC-14).
Examiner Note: RBCCW rad monitor RM-6038 is in alarm, therefore the SRO should note that *REMODCM IV.C.1 TABLE IV.C-1* applies in Step #1 above.		
	BOP	3. IF no "ALARM" OR "INSTRUMENT FAIL" lights lit, PERFORM the following (RC---14):
Examiner Note: Step #3 is N/A due to RBCCW rad monitor RM-6038 being in alarm.		
	SRO/BOP	4. Refer To ARP 2590H, "Alarm Response for Control Room Radiation Monitor Panels," and PERFORM applicable corrective actions for alarming radiation monitor.
Examiner Note: The SRO should refer to ARP 2590H for additional guidance and direct the BOP to either continue with the guidance of ARP 2590-135 C-06/7 DA-24, or shift to performing ARP 2590H. **Upon referring to ARP 2590H, the SRO should select "RBCCW GROSS ACTIVITY RIC-2300B", RC-14D, ARP 2590H-041A. The following are the applicable steps from ARP 2590H-041A.**		
	SRO/BOP	**<u>AUTOMATIC FUNCTIONS</u>** 1. None **<u>CORRECTIVE ACTIONS</u>** 1. OBSERVE radiation monitor indication (RC-14D, PPC). 2. COMPARE indication to setpoint indicated on "SETPOINT" sticker on module. 3. CHECK "PROCESS RADIATION, RJR-9373" (Channel 5) for trend data RC-14D).

Op-Test No.: ES16LI3 Scenario No.: 3 Event No.: 3

Event Description: "A" RCP Seal Cooler Leak

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>SRO/BOP</td><td>4. <u>IF</u> alarm is high, PERFORM the following:
4.1. One at a time, UNLOCK and CLOSE the following valves and MONITOR instrument response for determination of which header has in-leakage:
• "A" RBCCW pump radiation element flow stop, 2-RB-43
• "B" RBCCW pump radiation element flow stop, 2-RB-41
• "C" RBCCW pump radiation element flow stop, 2-RB-39</td></tr>
<tr><td colspan="3">Simulator Operator: When directed, trigger the applicable Event to close the requested RBCCW valve:
• "A" RBCCW pump, 2-RB-43 – Event #10 to CLOSE, Event #11 to RE-OPEN.
• "B" RBCCW pump, 2-RB-41 – Event #12 to CLOSE, Event #13 to RE-OPEN.
• "A" RBCCW pump, 2-RB-43 – Event #14 to CLOSE, Event #15 to RE-OPEN.</td></tr>
<tr><td></td><td>SRO/BOP</td><td>4.2. REQUEST Chemistry Department sample the following for gamma activity:
• Both RBCCW headers
• Service water effluent per SP 2854, Reactor Building Closed Cooling Water (RBCCW) Radiation Monitor RM 6038 Inoperative"
4.3. Refer To OP 2383C, Radiation Monitor Alarm Setpoint Control" and EVALUATE need to adjust alarm setpoint.
4.4. <u>IF</u> Chemistry results indicate short-lived activity, Go To AOP 2568, "RCS Leak."</td></tr>
<tr><td colspan="3">Cue: Ten minutes after sample request, report short-lived activity detected in "A" RBCCW header.</td></tr>
<tr><td colspan="3">Examiner Note: The remaining steps of ARP 2590H-041A are not applicable and the SRO should enter AOP 2568, "RCS Leak" at this time.
The applicable steps from AOP 2568 follow the remaining applicable steps of ARP 2590E-135.
The following steps continue from ARP 2590E-135 (C-06/7 DA-24), if they are addressed, but have no bearing on the scenario or crew actions.</td></tr>
<tr><td></td><td>SRO/BOP</td><td>5. <u>IF</u> RM-8123A/B or RM-8262A/B, alarms, Refer To the following for additional guidance (C-01):
6. CHECK "DIGITAL COMPARATOR STACK PARTICULATE, RI---8132A" (RC---14C), "ALARM" relay light <i>lit</i>.</td></tr>
<tr><td colspan="3">Examiner Note: Step #5 and #6 are N/A due to RBCCW rad monitor RM-6038 being in alarm.</td></tr>
</table>

Time	Position	Applicant's Actions or Behavior
	SRO/BOP	7. DETERMINE cause of alarm and TRY to reset. ***NOTE:*** *The "Latch/Reset" pushbutton on RIC-2300A, RIC-2300B, RIC-8123, and RIC-8262 is used to reset a "latched", or locked-in alarm.* 8. ATTEMPT to reset module by pushing "RESET" button. 9. IF alarm does *not* reset, to allow other alarms to annunciate, PERFORM applicable action: 9.1. IF RM-6038 alarms, OBTAIN key and place "NORMAL BYPASS CH.1 BYPASS, HS-6038B," switch to "BYPASS" (RC-14D).
Examiner Note: The remaining steps from ARP 2590E-135 (C-06/7 DA-24) are not key to the scenario.		
Examiner Note: The following steps are from AOP-2568.		
	ATC	1. **Check Pressurizer Level – DECREASING** a. **ADJUST** the bias on HIC-110, LTDN FLOW CNTL b. **CHECK** Pressurizer Level – DECREASING
	ATC	2. **Increase Charging Flow** a. **START** second Charging Pump b. **STABILIZE** Pressurizer Level by performing the following: 1. On HIC-110, LTDN FLOW CNTL, **ADJUST** the bias to obtain Pressurizer level to Program level a. **CHECK** Pressurizer Level - STABLE or INCREASING
	ATC	3. **INITIATE Forcing Pressurizer Sprays**
	ATC	4. **Check Reactor Power and RCS Temperature** a. **CHECK** Reactor Power – STABLE b. **CHECK** RCS temperature - STABLE or INCREASING ***NOTE:*** ***Pumping the Containment Sump with an RCS leak should be avoided.***

	SRO/ATC/ BOP	5. **Determine RCS Leak Rate By Any Of The Following:** a. **ACCOUNT** for RCP Bleedoff flow **AND CALCULATE** the difference in Charging and Letdown flow b. **REFER** to ATTACHMENT B, Thumbrules, **AND PERFORM** a mass balance c. **OBTAIN** SPDS Sump leak rate
	SRO	6. **CHECK RCS Leakage Within Limits Of T/S LCO 3.4.6.2, Reactor Coolant System Operational Leakage:** • **NO** Pressure Boundary Leakage • 1 gpm Unidentified Leakage • 10 gpm Identified Leakage • 75 gpd Primary to Secondary Leakage through any one steam generator
	ATC	7. **CHECK VCT Level - STABLE**
	SRO/ATC/ BOP	8. **CHECK For Activities That Could Affect Primary Plant Leakage - NONE IN PROGRESS** • Valve alignment • Periodic Testing • Maintenance
	SRO/ATC/ BOP	9. **Check for Potential Leakage Paths** a. Using ATTACHMENT D, Potential Leakage Paths, **LOCATE** **AND** **ISOLATE** leaks while continuing with this procedure
	SRO	**NOTE:** **Steps 11 through 20 may be performed in any order.**

Examiner Note: SRO should note TSAS **3.4.6.2 a.**No PRESSURE BOUNDARY LEAKAGE **ACTION**:With ACTION and associated completion time of ACTION a. not met, or PRESSURE BOUNDARY LEAKAGE exists, or primary to secondary LEAKAGE not within limits, be in HOT STANDBY within 6 hours and be in COLD SHUTDOWN within 36 hours.

EAL Classification:

BARRIER FAILURE
BU2 RCS LEAKAGE (Barrier Unusual Event)
1. Pressure Boundary Leakage > 10 GPM
2. Unidentified Leakage > 10 GPM

Time	Position	Applicant's Actions or Behavior
	SRO	10. **USE Table 1 to determine the order for dealing with leak identification and isolation.**

Table 1

Event	Step	Completed
Steam Generator Tubes Intact	11	
RCS Leakage In Auxiliary Building	12	
Actions to Locate Leak-Containment	13	
RBCCW System	14	

Time	Position	Applicant's Actions or Behavior
	SRO	**NOTE:** **Any of the following are possible RCS leakage paths to RBCCW System:** • **RCP Thermal Barrier** • **Letdown HX** • **Primary Sample Sink Coolers**

Time	Position	Applicant's Actions or Behavior
	BOP	14. **Check NO RCS Leakage Into RBCCW System** a. **CHECK** the following parameters: • RBCCW Surge Tank level – NORMAL • RM-6038, RBCCW System Radiation Monitor - NORMAL b. **RETURN TO** step 10
	SRO	**RNO Step 14** **a. PERFORM** the following: **1. REQUEST** Chemistry Department to sample the RBCCW System using CP 2802G, Sampling Closed Cooling Water Systems. **2. ATTEMPT** to isolate the leak using ATTACHMENT D, Potential Leakage Paths, while continuing with this procedure starting with step 15 **3. PROCEED TO step 21.**

Attachment D Table 10

RCS to RBCCW Leakage Paths

Item Description	Equipment Numbers	Isolated Initials
A and C RCP Seal Coolers	**RB-30.1A** RBCCW CTMT ISOL HDR A SUPPLY	__________
	RB-37.2A RBCCW CTMT ISOL HDR A RTN	__________

Examiner Note: Current plant conditions does not allow isolation, requires plant trip and Securing A and B RCP prior to isolation following actions should be carried out in EOP 2540

Cue: Chemistry acknowledges request to sample the RBCCW for a primary leak. Wait appropriate time and report back RBCCW Sample results.

Time	Position	Applicant's Actions or Behavior
	SRO	***21 Check RCS Leakage Has Been Reduced To Within Tech Spec 3.4.6.2 Limits**
	SRO	**RNO Step 21** **PERFORM ONE of the following to place the plant in MODE 5:** **• GO TO AOP 2575, Rapid Downpower** **OR** **• GO TO OP 2207, Plant Cooldown**

Op-Test No.: __ES16LI3___ Scenario No.: __3__ Event No.: _3__

Event Description: "A" RCP Seal Cooler Leak

Time	Position	Applicant's Actions or Behavior

Examiner Note: SRO should note TSAS 3.4.6.2

a.No PRESSURE BOUNDARY LEAKAGE ACTION:

With ACTION and associated completion time of ACTION a. not met, or PRESSURE BOUNDARY LEAKAGE exists, or primary to secondary LEAKAGE not within limits, be in HOT STANDBY within 6 hours and be in COLD SHUTDOWN within 36 hours.

Examiner Note: Based on the RCS Leak administrative guidance, the SRO should proceed to Event 4, Plant Shutdown.

Examiner Note: The SRO should initiate Event 4, Plant Shutdown Due to RCS Leak.		
Indications: • **RBCCW Surge Tank level – Rising** • **RM-6038, RBCCW System Radiation Monitor - Rising** • **Letdown Flow – Several gpm Less than Charging Flow**		
Examiner Note: The following steps are from AOP-2575, Rapid Downpower, Section 3.0 Rapid Downpower.		
	SRO	Enters AOP 2575, Rapid Downpower.
	SRO	3.1 PERFORM focus brief on the following: REACTOR TRIP CRITERIA • Parameters associated with automatic reactor or turbine trips are challenged • RCS T cold *not* within 10°F of temperature program and efforts to regain control are unsuccessful RCS TEMPERATURE CONTROL • RCS T cold to be maintained within 10°F of Attachment 5, "Temperature vs. Power program" using Attachment 10, "Main Turbine Load Set Control." • To avoid uncontrolled cooldowns or power transients, sudden changes in RCS temperature or boron concentration should be avoided. 3.2 REQUEST SM/STA to Refer To Attachment 8, "Required Notifications," and PERFORM notifications.
	ATC	3.3 INITIATE forcing pressurizer sprays.

	SRO	CAUTION In the case of a dropped CEA, rod motion is *not* used to initiate downpower.
	ATC	3.4 IF *not* down powering due to a dropped rod, INSERT Group 7 CEAs 10 ± 2 steps to initiate downpower.
	BOP	3.5 Using the "Load Speed Control" switch, REDUCE turbine load to maintain Tc on program (+/-2 deg).
	SRO	3.6 Refer To PPC or Reactor Engineering Curve and Data Book and OBTAIN reactivity plan for the initial reactor power condition and desired load reduction.

Examiner Note: The crew should refer to Reactivity Plan for downpower parameters.

	SRO	NOTE Attachment 10 "Approximate Load Demand vs. Reactor Power," can be used to correlate the desired power level to a turbine load demand setpoint.
	BOP	3.7 Refer To Attachment 9, "Main Turbine Load Set Control," REDUCE turbine load and MAINTAIN Tc on program (+/-2 deg).

Examiner Note: The following steps are from AOP 2575 Rapid Downpower Attachment 9 Main Turbine Load Set Control:

Op-Test No.: ES16LI3 Scenario No.: 3 Event No.: 4

Event Description: Plant Shutdown Due to RCS Leak

Time	Position	Applicant's Actions or Behavior
	BOP	CAUTION Operation of the "Load/Speed CONTROL" switch will change turbine load at 600%/hour, and cancel any previous load setpoint. NOTE Steps provided in this attachment are dependent on plant conditions and may be performed in any sequence, and repeated as necessary.
	BOP	1. IF desired to commence or modify a turbine load ramp, PERFORM the following (HMI "Load" screen): a. IF previous ramp has stopped, SELECT "Load Hold." b. SELECT "Load Setpt" and ENTER desired value. c. SELECT "Rate setpt" and ENTER desired value. d. WHEN ready to commence load reduction, SELECT "Load Resume."
	BOP	2. IF desired to adjust the "Load Ramp Rate," PERFORM *any* of the following: • SELECT "Rate setpt" and ENTER new value. • SELECT "5% / hour," OR "10% / hour," OR "20% / hour." • SELECT "Raise" or "Lower" (0.25% / hour change). a. IF Tavg and Tc are high off program, PERFORM the following: a. SELECT "Load Hold" to stop ramp. b. WHEN Tavg and Tc are trending back to program, SELECT "Load Resume." b. IF Tavg and Tc are low off program, PERFORM the following: a. JOG the "Load/Speed CONTROL" switch to "Lower." b. WHEN Tavg and Tc are back on program, SELECT Load Setpt" and ENTER desired value. c. IF desired, Go To Step 1 and RESUME turbine load ramp. c. IF desired load has been reached SELECT "Load Hold." **Examiner Note: operator should select x load setpoint, x load rate. Program band for Tavg and Tc is x (+/- 2 deg for Tc).**

Op-Test No.: __ES16LI3___ Scenario No.: __3__ Event No.: _4__

Event Description: Plant Shutdown Due to RCS Leak

Time	Position	Applicant's Actions or Behavior

Examiner Note: The following steps are from AOP 2575 Rapid Downpower Section 3.0 Rapid Downpower.

	ATC	3.8 Based on required rate of downpower, START additional charging pumps as necessary and balance charging and letdown.
	ATC	3.9 IF desired to borate from the RWST (preferred method) PERFORM the following: a. ENSURE at least one charging pump operating. b. ENSURE CH-196, VCT makeup bypass, closed. c. ENSURE CH-504, RWST to charging suction, open. d. OPEN CH-192, RWST isolation. e. CLOSE CH-501, VCT outlet isolation. f. CHECK charging flow at desired rate. g. Go To step 3.11 **Examiner Note: Crew should borate from the RWST.**

Op-Test No.: ES16LI3 Scenario No.: 3 Event No.: 4

Event Description: Plant Shutdown Due to RCS Leak

Time	Position	Applicant's Actions or Behavior
	SRO/ATC/ BOP	3.11 During the downpower, Refer To Attachment 1,"Rapid Downpower Parameters," and MAINTAIN parameters as specified throughout downpower: **Examiner note: Attachment 1 Rapid Downpower Parameters:** • Condensate and heater drain flows and pressures: sufficient to maintain adequate SGFP suction pressure • FRV D/P: greater than 40 psid • Turbine load: responding to changes in load demand, with control valves operating together • Steam generator levels 55 to 70%. • MSR parameters tracking together • Turbine Generator MVARs: as specified by CONVEX • Reactor power: being monitored using delta T power indication • ASI: In accordance with reactivity plan or within 0.01 of ESI or per COLR. • CEA position: greater than PDIL • Tc: less than or equal to 549 deg • Pressurizer level: between 35 and 70% Pressurizer pressure: between 2,225 and 2,300 psia (DNB margin)
	SRO/ATC	NOTE 1. Xenon rate of change should be considered when terminating boration. 2. During rapid downpower, the PPC calorimetric may be inaccurate due to SG level transients. The most accurate available indication of reactor power is RPS delta T power.

Examiner Note: Once power has dropped at least 5%, or at the lead examiner's direction, proceed to Event 5, "A" RCP Seal Cooler Rupture, Manual Plant Trip.

Op-Test No.: ES16LI3 Scenario No.: 3 Event No.: 5

Event Description: “A” RCP Seal Cooler Rupture of 550 gpm (Inter-System SB-LOCA)

Time	Position	Applicant’s Actions or Behavior

Simulator Operator: When directed, initiate Event 5, “A” RCP Seal Cooler Rupture (550 gpm) Resulting in an Inter-System SB-LOCA of 550 gpm.

Indications:

- **RCS Pressure - Dropping**
- **Pressurizer Level - Dropping**

Examiner Note: The following steps are from EOP 2525, Standard Post Trip Actions, modified slightly to improve clarity.

	ATC	**Determine Status of Reactivity Control – Reactor Trip** 1. DETERMINE that Reactivity Control acceptance criteria are met for the reactor by performing ALL of the following steps: • CHECK that **all** CEAs are fully inserted. • CHECK that reactor power is dropping. • CHECK that SUR is negative.
	BOP	**Determine Status of Reactivity Control – Turbine Trip** 2. DETERMINE that Reactivity Control acceptance criteria are met for the turbine by performing ALL of the following steps: a. CHECK that the main turbine is tripped by BOTH of the following: • ALL main stop valves are closed. • Generator megawatts indicate zero. • Turbine speed is lowering. b. IF 15G-2XI-4, motor operated disconnect, is closed, CHECK that the main Generator output breakers 8T and 9T are open.

Time	Position	Applicant’s Actions or Behavior
	BOP	**Determine Status of Maintenance of Vital Auxiliaries** 3. DETERMINE that Maintenance of Vital Auxiliaries acceptance criteria are met by performing ALL of the following steps: a. CHECK that ALL Facility 1 and 2 electrical buses are energized: • 6.9kV Electrical Buses 25A, 25B • 4.16kV Non-Vital Electrical Buses 24A, 24B • 4.16vV Vital Electrical Buses 24C, 24D • Vital DC Buses 201A, 201B, DV-10, DV-20 • Vital AC Instrument Buses VA-10, VA-20 b. CHECK that BOTH facilities of service water are operating. c. CHECK that BOTH facilities of RBCCW are operating with service water cooling.
	ATC	**Determine Status of RCS Inventory Control** 4. DETERMINE that RCS Inventory Control acceptance criteria are met by performing **ALL** of the following: a. CHECK that **BOTH** of the following conditions exist: • Pressurizer level is 20 to 80% • Pressurizer level is trending to 35 to 70% b. CHECK that RCS subcooling is greater than or equal to 30°F
	ATC	**<u>RNO</u>** a.1 <u>IF</u> the Pressurizer Level Control System is not operating properly in automatic, RESTORE and MAINTAIN pressurizer level 35 to 70% by performing ANY of the following: 1) OPERATE the Pressurizer Level Control System. 2) Manually OPERATE charging and letdown. **(Starts all avialable Charging pumps and isolates letdown when PZR level <20% ref:OP2260)**
	ATC	**Determine Status of RCS Pressure Control** 5. DETERMINE RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • CHECK that pressurizer pressure is 1900 to 2350 psia. • CHECK that pressurizer pressure is trending to 2225 to 2300 psia.

Time	Position	Applicant's Actions or Behavior
	ATC	**RNO** **5.1** IF the Pressurizer Pressure Control System is not operating properly in automatic, THEN RESTORE and MAINTAIN between 2225 to 2300 psia by performing ANY of the following: a. OPERATE the Pressurizer Pressure Control System. b. Manually OPERATE pressurizer heaters and spray valves. **(NOTE PZR Heaters will trip PZR level <20%)** **5.2** PZR Spray valves (Verifies Closed) **5.3** PORVs (Verifies Closed) **5.4** RCS Pressure <1750 psia SIAS CIAS EBFAS on C01 annuciators. **5.5** <1714 psia w/SIAS Secure ONE RCP in each loop (at 1800 psia manually initiates SIAS trips 2 RCP preferably "A" and "C" due to "A" RCP seal Leak) 5.6 **TCOA**: RCS pressure < NPSH SECURE ALL RCPs
CRITICAL TASK: LOCA-13 Trip two RCPs with SIAS actuation and a LOCA in progress.		
CRITICAL TASK: TCOA: RCP < NPSH Curve - 5 minutes to STOP ALL RCPs **(NOTE: RCS conditions may not go below RCP NPSH due to the Crews actions)**		
	ATC	**Determine Status of Core Heat Removal** 6. DETERMINE that Core Heat Removal acceptance criteria are met by performing **ALL** of the following: a. CHECK that at least one RCP is operating and that loop delta T is less than 10°F b. CHECK that Th subcooling is greater than or equal to 30°F.
	ATC	**RNO** **a.1** IF RCPs are not operating, OR loop ΔT is greater than 10° F, THEN PERFORM the following: 1) PLACE TIC- 4165, steam dump TAVG controller, in manual and closed. 2) PLACE BOTH pressurizer spray valve controllers in manual and CLOSE the valves. • HIC- 100E • HIC- 100F

Simulator Operator:

Verify Event 6 triggers 30 seconds post-trip, ESD Outside CTMT, Upstream of #2 MSIV

Verify Event 7 triggers five minutes post-trip; "A" AFW pump degraded performance and "B" Motor Driven AFW pump trip. Standby to trigger Event 8 if necessary.

Examiner Note: Once Event 6 ESDE is initiated the BOP will re-perform Step 7 of EOP 2525 if the OPERATOR has already completed the Step.

	BOP	**Determine Status of RCS Heat Removal** 7. DETERMINE that RCS Heat Removal acceptance criteria are met by ALL of the following conditions: a. CHECK that at least one steam generator has **BOTH** of the following conditions met: • Level is 10 to 80%. • Main feedwater or TWO auxiliary feedwater pumps are operating to restore level 40 to 70%.
	BOP	**RNO** **a.1** RESTORE level to between 40% to 70% in at least ONE steam generator using ANY of the following: • Main feedwater • Motor- driven auxiliary feedwater pump • TDAFW Pump. Refer To Appendix 6, "TDAFW Pump Normal Startup." • TDAFW Pump. Refer To Appendix 7, "TDAFW Pump Abnormal Startup." (**EVENT 7** Operator notes that "A" AFW Pump has degraded performance and the "B" AFW Pump has tripped, refers to Appendix 7 to start the TDAFW pump)

Simulator Operator: If "A" AFW pump malfunction is not enough to cause unacceptable loss of feed flow such that the TDAFW pump is not needed, trigger Event 8, "A" AFW Pump trip.

CRITICAL TASK: LOCA-2; Start the TDAFP (Ensure RCS Heat Sink is maintained).

	BOP	b. CHECK that RCS Tc is being maintained between 530°F to 535"F.

	BOP	**RNO** **b.2** IF RCS TC is less than 530°F, THEN CONFIRM steam generator steam and feed rates are NOT excessive:
	BOP	c. CHECK that **BOTH** steam generators pressure are 880 to 920 psia.

CRITICAL TASK: Main Steam Line Break (SFRM 2.8.2.8.2) INITIATING EVENT:

Excess steam demand event resulting in a Main Steam Isolation Signal (MSIS)

Isolate AFW flow to the affected S/G from control room or local Within 30 minutes of a Main Steam Isolation Signal **TIME Main Steam Isolation Signal (MSIS):_______________**

TIME AFW Isolated EOP 2525 RNO Step 7c2:____________

	BOP	**RNO (CRITICAL TASK START TIME)** **c.1** IF ANY SG pressure is less than 572 psia, THEN ENSURE MSI actuated. (C01)
	BOP	**RNO** **c.2 TCOA:** IF ANY SG pressure is less than 572 psia AND an ESDE is in progress, THEN PERFORM the following to isolate AFW to the most affected SG 1) PLACE BOTH auxiliary feed "OVERRIDE/ MAN/START/ RESET" handswitches in "PULL TO LOCK." 2) CLOSE applicable Aux Feed Reg valve: • 2- FW- 43A • 2- FW- 43B 3) IF necessary, CONSIDER use of 2- FW- 44: • IF #1 SG faulted, THEN CLOSE 2- FW- 44 and STOP the motor driven AFW pumps • IF #2 SG faulted, THEN CLOSE 2- FW- 44 and STOP the TDAFW pump 4) IF necessary, DISPATCH operator to to close applicable AFRV manual isolation valve: • 2- FW- 11A • 2- FW- 11B **(CRITICAL TASK STOP TIME)**

	BOP	**RNO** **c.3** IF ANY steam generator pressure is less than 572 psia AND an excess steam demand event is in progress, THEN PERFORM the following: 1) CLOSE the ADV for the most affected steam generator. 2) IF the most affected steam generator has boiled dry, as indicated by CET temperature rising, THEN OPERATE the ADV for the least affected steam generator to stabilize CET temperature. 3) Proceed To Step 8
	BOP	**c.4** IF ANY steam generator pressure is less than 800 psia AND lowering, THEN PERFORM the following: 1) CLOSE BOTH MSIVs. 2) ENSURE BOTH MSIV bypass valves are closed. 3) **NOT APPLICABLE FOR THIS SCENARIO**
	BOP	**c.5 IF ANY steam generator pressure is less than 880 psia, THEN PERFORM the following:** 1) **NOT APPLICABLE FOR THIS SCENARIO** 2) **NOT APPLICABLE FOR THIS SCENARIO** 3) CHECK main steam safety valves are closed. **c.6 NOT APPLICABLE FOR THIS SCENARIO**

Op-Test No.: ES16LI3 Scenario No.: 3 Event No.: 6&7

Event Description: **ESD Outside CTMT, Upstream of #2 MSIV and Loss of AFW Flow**

Time	**Position**	**Applicant's Actions or Behavior**
	ATC	**Containment Isolation** 8. ENSURE Containment Isolation met by ALL of the following: a. CHECK Containment pressure is less than 1.0 psig. b. CHECK NONE of the following primary plant radiation monitors have an unexplained alarm or indicate an unexplained rise in activity: Radiation Monitors Inside Containment • RM- 7890, Personnel Access Area • RM- 7891, Ctmt Refuel Floor Area • RM- 8240, High Range • RM- 8241, High Range • RM- 8123 A and B, Ctmt Atmosphere • RM- 8262 A and B, Ctmt Atmosphere • c. CHECK NONE of the following primary plant radiation monitors have an unexplained alarm or indicate an unexplained rise in activity: Steam Plant Radiation Monitors • RM- 5099, Steam Jet Air Ejector • RM- 4262, SG Blowdown • RM- 4299A and B, Main Steam Line 1 • RM- 4299C, Main Steam Line 2
	ATC	**Containment Temperature and Pressure Control** 9. ENSURE Containment Temperature and Pressure Control met by BOTH of the following conditions: a. CHECK Containment temperature is less than 120°F. (PPC or avg of Points 5 and 6) b. CHECK Containment pressure is less than 1.0 psig
	SRO	**Event Diagnosis** 10. PERFORM the following: a. DIAGNOSE the event. Refer To Appendix 1, "Diagnostic Flowchart." b. INITIATE Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions." c. Go To the appropriate EOP.

Examiner Note: The Unit Supervisor refers to EOP 2541 Appendix 1, Diagnostic Flowchart to diagnose the event.

Time	Position	Applicant's Actions or Behavior
	ATC/BOP	{Step 10.b above} Perform Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions". **Examiner Note: EOP Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions." are attached to guide.**

Examiner Note: The following steps are from EOP 2540, Functional Recovery.

Indications:

- **#2 S/G Pressure**
- **RCS Cold Leg Temperature**
- **Sub Cool Margin**

Time	Position	Applicant's Actions or Behavior
	SRO	1. CLASSIFY the event. Refer To MP-26-EPI-FAP06, "Classification and PARs" • IF classification requires RCS sampling, Refer To Appendix 46, "Sampling for EAL Determination" and DIRECT Chemistry as required.

Examiner Note:

RCS BARRIER	**CTMT BARRIER**
RCB2 LOSS	CNB3
L RCS Subcooling < 30°F	
RCB4 POTENTIAL LOSS	POTENTIAL LOSS
P Reactor Coolant Leak > CVCS Capacity AND Entry Into EOP-2525, Standard Post Trip Actions	P Entry Into EOP-2532, Loss of Primary Coolant, AND Leakage Exists Outside CTMT Requiring Isolation From Inside the Control Room

Time	Position	Applicant's Actions or Behavior
	SRO	2. PERFORM **ALL** of the following: • OPEN the Safety Function Tracking Page and ENTER the EOP entry time. • ENSURE the master alarm silence switch is in "NORMAL".
	ATC	3. IF pressurizer pressure is less than 1714 psia AND SIAS has initiated, PERFORM the following: a. ENSURE **ONE** RCP in each loop is stopped. b. PLACE associated pressurizer spray valve controller RC-100E or RC-100F in manual and CLOSE the valve. c. IF pressurizer pressure lowers to less than the minimum RCP NPSH limit, PERFORM the following: 1) STOP **ALL** RCPs. 2) PLACE TIC-4165, steam dump TAVG controller, in manual and closed. 3) PLACE pressurizer spray valve controllers RC-100E and RC-100F in manual and CLOSE the valves.

Time	**Position**	**Applicant's Actions or Behavior**
	BOP	4. SAMPLE steam generators that are available for RCS heat removal as follows: a. CHECK "B" train RBCCW in service. b. ENSURE 2-RB-210 "Degasifier Effluent Cooler Return Outlet" is open. c. OPEN appropriate steam generator sample valves: • MS-191A • MS-191B d. DIRECT Chemistry to perform **ALL** of the following: • Sample **ANY** steam generator that is available for RCS Heat Removal • Frisk the samples • Report frisk results • Analyze samples for boron and activity e. <u>**WHEN**</u> Chemistry reports that samples have been taken, PERFORM the following: • CLOSE the steam generator sample valves • <u>IF</u> SIAS has actuated, <u>AND</u> no other sampling is in progress, CLOSE 2-RB-210, "Degasifier Effluent Cooler Return Outlet"
CUE: When directed to sample Steam Generators, respond 20 minutes later that samples have been taken. Report that frisk results show all background levels.		
	BOP	5. PLACE the hydrogen analyzers in service. Refer To Appendix 19, "Hydrogen Analyzer Operation."
	SRO	**NOTE** If the Safety Function Status Checklist is *not* satisfied for the selected success path, the US may commence the operator actions for safety functions which are *not* met based on Safety Function hierarchy. The remaining Safety Functions should be prioritized as time permits.
	SRO	6. IDENTIFY success paths to be used to satisfy each safety function using **BOTH** of the following: • Resource Assessment Trees • Safety Function Tracking Page

	SRO	7. PRIORITIZE safety functions to be addressed first based on **ALL** of the following: a. Safety functions which do *not* meet the Safety Function Status Checklist for the selected success path. b. Safety functions for which the equipment to support the success path is *not* operating. c. Safety functions for which success path three has been selected. d. Safety functions for which success path two has been selected. e. Safety functions for which success path one has been selected.

NOTE: SRO will direct the Board Operators through the Resource Assessment Trees and query plant status to determine the correct Functional Procedure to use.

SRO

4.0 SAFETY FUNCTION STATUS CHECKLIST

SAFETY FUNCTION TRACKING PAGE EOP ENTRY TIME ___________

Safety Function	**Success Path**		**Procedure**	**SFSC Met**	**Priority**
Reactivity Control	RC-1	CEA Insertion	EOP 2540A	**Y**	**5**
	RC-2	Boration CVCS			
	RC-3	Boration SI			
Maintenance of Vital DC Power	MVA-DC-1	Battery Chargers/ Station Batteries	EOP 2540B	**Y**	**6**
Maintenance of Vital AC Power	MVA-AC-1	RSST	EOP 2540B	**Y**	**7**
	MVA-AC-2	EDG			
	MVA-AC-3	BUS 34A/34B			
RCS Inventory Control	IC-1	CVCS	EOP 2540C1		**2**
	IC-2	Safety Injection		**Y**	
RCS Pressure Control	PC-1	Subcooled	EOP 2540C2	**Y**	NOTE MAYBE Sub or Sat depending on crew actions **7,3**
	PC-2	Saturated		**Y**	
	PC-3	PORVs			
RCS Core Heat Removal	HR-1	SI no operating	EOP 2540D		**3,4**
	HR-2	SI operating		**Y**	
	HR-3	O-T-C			
Containment Isolation	CI-1	Automatic/Manual	EOP 2540E	**N**	**1**
Containment Temperature and Pressure Control	CTPC-1	CARs (Normal)	EOP 2540F	**Y**	**8**
	CTPC-1	CARs (Emerg)			
	CTPC-1	CTMT Spray			

SRO

	SRO	8. DIRECT the STA to check that Safety Function Status Checklist Criteria are satisfied for chosen success paths.
		9. PERFORM operator actions for chosen success paths based on priority assigned. TRANSITION to EOP 2540E Functional Recovery Containment Isolation
Examiner Note: The following steps are from EOP 2540E, Functional Recovery Containment Isolation.		
		Check SIAS/CIAS Actuation * 1. IF ANY of the following conditions exist: • Containment pressure is greater than or equal to 4.42 psig • Radiation monitors inside containment are greater than their alarm setpoint • An unexplained rise in containment radiation level or activity **NOT APPLICABLE FOR THIS SCENARIO previously checked**
		Identify and Isolate SGTR * 2. IF a SGTR is indicated by ANY of the following: **NOT APPLICABLE FOR THIS SCENARIO no SGTR**
		Isolate RCS to RBCCW Leakage * 3. CHECK no leakage in the RBCCW system by BOTH of the following: • CHECK RM-6038, RBCCW Radiation Monitor, is not alarming or trending to alarm. • CHECK that the RBCCW surge tank level is not rising.
		RNO **3.1** IF ANY RCPs are operating, PERFORM the following: a. STOP the operating RCPs. b. PLACE the associated pressurizer spray valve controller, RC-100E or RC-100F, in manual and CLOSE the valve. c. IF ALL RCPs are stopped, PLACE TIC-4165, steam dump TAVG controller, in manual and closed.
Examiner Note: Completed in previously step for SIAS actuation		

Time	Position	Applicant's Actions or Behavior
		RNO **3.2** CLOSE ALL of the following RBCCW CTMT header isolation valves: **Facility 1** • RB-30.1A • RB-37.2A **Facility 2** • RB-30.1B • RB-37.2B
Examiner Note: Closing Facility 1 isolation satisfies Safety Function for CTMT Isolation		
		4. CHECK that CI-1 (Automatic/Manual Isolation) is satisfied by ALL of Condition 1 or ALL of Condition 2 is met: **Condition 2** • Each containment penetration required to be closed for current plant conditions has an isolation valve closed • ONE of the following: o No steam plant radiation monitors have an unexplained alarm or unexplained rises in activity o ALL release paths from the most affected SG to the environment isolated unless a planned release is in progress • IF SGTR is present, steam generator pressure is less than 920 psia
Examiner Note: Condition 2 is Satisfied SRO should transition to the next priority Safety Function for Inventory EOP 2540C1(IC-2Safety Injection).		
Examiner Note: The following steps are from EOP 2540C1 IC-2, Functional Recovery Safety Injection		
		2.0 SUCCESS PATH: IC-2: SAFETY INJECTION
	ATC	**Ensure SIAS Initiated** * 1. PERFORM ALL of the following: Completed in EOP 2525 or 2540

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>ATC</td><td>Optimize Safety Injection
* 2. PERFORM the following to optimize safety injection flow:
a. CHECK at least one train of SIAS, CIAS and EBFAS has properly actuated. (C01X)
b. CHECK that safety injection flow is adequate. Refer To Appendix 2, “Figures.”
c. ENSURE ALL available charging pumps are operating.
d. ENSURE vital switchgear cooling is operating for each operating ECCS train as follows:
(Completed previously)</td></tr>
<tr><td colspan="3">Examiner Note: Once the SRO meets the SI Injection flow curve the SRO should handoff the rest of the procedure to the ATC and Transition to RCS Core Heat Removal to isolate the #2 S/G EOP 2540D</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from EOP 2540D HR-2, Functional Recovery Heat Removal</td></tr>
<tr><td></td><td>SRO</td><td>2.0 SUCCESS PATH: HR- 2: SG HEAT SINK WITH SI OPERATING
Pulls Forward Step 14</td></tr>
<tr><td></td><td>SRO</td><td>Determine Presence of ESDE
* 14. DETERMINE if an ESDE is in progress by considering ALL of the following:
• Steam generator pressures
• Steam generator levels
• RCS cold leg temperatures
(Determined #2 S/G)</td></tr>
<tr><td></td><td></td><td>NOTE
If there is a conflict between isolating a SG and maintaining adequate heat removal, at least one SG should be maintained for heat removal whenever possible.</td></tr>
<tr><td></td><td>SRO</td><td>Perform ESDE Response
* 15. IF indications of an ESDE exist, PERFORM ESDE actions.
Refer To Appendix 11, “ESDE Response.”
(SRO Directs the BOP to perform Appendix 11 isolate the #2 S/G)</td></tr>
<tr><td></td><td></td><td>EOP 2541, Appendix 11 ESDE Response</td></tr>
<tr><td></td><td></td><td>1. PERFORM the following to isolate the leak:
a. ENSURE MSI has actuated. (C01)
b. CHECK at least one train of MSI has properly actuated. (C01X)
c. OPEN AR-17, condenser vacuum breaker.</td></tr>
</table>

		2. DETERMINE the most affected steam generator by considering **ALL** of the following: • High steam flow from steam generator • Lowering steam generator pressures • Lowering steam generator levels • Lowering RCS cold leg temperatures
		*3. IF the leak has *not* been isolated, ISOLATE the most affected steam generator by performing the following: **Number 2 Steam Generator** a. ENSURE MS-64B, MSIV, is closed. b. ENSURE MS-65B, MSIV bypass valve, is closed. c. ENSURE **ALL** of the following for the associated ADV: • PIC-4224, ADV controller, is in manual. • ADV is closed. d. PLACE ADV Quick Open Permissive switch to "OFF". e. CLOSE LIC-5216, main feedwater regulating bypass valve. f. ENSURE FW-42B, main feedwater block valve, is closed. g. PLACE FW-5B, main feed isolation air assisted check valve, to "CLOSE". h. UNLOCK and CLOSE "DISC FOR 2-MS-202" (NS6202). i. CLOSE MS-202, steam to turbine driven aux feed pump supply valve. j. ENSURE MS-220B, steam generator blowdown isolation valve, is closed. k.PLACE **BOTH** auxiliary feed "OVERRIDE/MAN/START/ RESET" handswitches in "PULL-TO-LOCK". l. CLOSE FW-43B, aux feedwater regulating valve. m. PLACE FW-12B, aux feed isolation air assisted check valve, to "CLOSE". n. CLOSE MS-266B, main steam low point drain. o. CHECK main steam safety valves are closed.

Examiner discretion the objectives for the scenario are complete and can terminate the session

SIMULATOR SCENARIO #4

Facility: Millstone Unit 2 Scenario No.: 4 Op-Test No.: ES16LI4

Examiners: ______________ Operators: ______________ SRO
______________ ______________ ATC
______________ ______________ BOP

Initial Conditions: 45% Power IC, “A” Main Feed pump in service. “A” & “B” Condensate pumps and “A” & “C” TBCCW pumps operating, “B” Charging Pump aligned to Facility 2.

Turnover: 45% Power, steady state, no equipment OOS. 24E is aligned to 24C. Raise Reactor power to 60% IAW OP2321 and OP2204.

Critical Tasks:

1. LOOP-1; Establish RCS Inventory Control.
2. 2260 2536 TCOA (ESDE-6); Isolate Aux Feed Water to the affected SG within 30 minutes following an MSI actuation.
3. ESDE-7; Maintain Containment Temperature and Pressure Control.

Event No.	**Malf. No.**	**Event Type***	**Event Description**
1		R.N (ATC/S) (BOP/S)	Raise power to 60%.
2	CV19	I (ATC/S)	PMW Addition Valve, CH-210X, fails open.
3	RX12C	I BOP/S	#2 S/G “Main” Level Control Channel failure
4	WD03	TS S	CTMT Sump Level Detector Failure
5	C06-D01A 05A1A2S23 TPHS-6282A_3	C BOP/S	"A" TBCCW Pump trip (start "B" TBCCW pump).
6	ED16A	C All (TS/S)	Loss of Vital Instrument Bus, VA-10 (TS).
7	ED03A- ED03D	M All	Loss Of Offsite Power (LOOP), plant trip.
8	MS01A	C (BOP/S)	ESD in CTMT on #1 S/G.
9	ES03L	C (ATC/S)	ESAS Failure of Facility 2 CTMT Spray Actuation.

Target Quantitative Attributes (Per Scenario; See Section D.5.d)	Actual
1. Total malfunctions (5–8)	7
2. Malfunctions after EOP entry (1–2)	2
3. Abnormal events (2–4)	4
4. Major transients (1–2)	1
5. EOPs entered/requiring substantive actions (1–2)	2
6. EOP contingencies requiring substantive actions (0–2)	1
7. Critical tasks (2–3)	3

NRC 2016, Scenario 4 Summary:

The crew will take the shift with the unit at ~45% power, 24E aligned to 24C, “A” & “B” Condensate Pumps operating and the “A” Main Feed Pump in service. A plant startup is in progress using OP 2204, Load Changes, with the intent of raising power to approximately 60%, awaiting the return of the “B” MFW pump.

Event 1: The crew takes the shift and raises power to 60%, or until terminated at the discretion of the Examiners by triggering Event 2.

Event 2: Before completion of the power ascension, at the discretion of the Examiner, the PMW Addition Valve, CH-210X, will fail to close when the selected amount of PMW has been added to the RCS. This will require the crew to terminate the positive reactivity addition by closing one of two other valves in the CVCS flow path. Once power is stabilized, Event 3 is triggered.

Event 3: The #2 S/G “Main” Level Control Channel will fail low, requiring operator action to stabilize SG levels. After level control is recovered manually, the failed transmitter input into SGWLC is deselected and S/G water level control is returned to automatic mode. After SGWLC is returned to normal, Event 4 is triggered.

Event 4: The CTMT normal sump level detector will fail high, requiring RCS Leak Detection System TS entry. There are no board operator actions (other than verification of indications) and Event 5 is triggered by Examiner direction.

Event 5: The “A” TBCCW pump will trip, requiring the crew to start the standby TBCCW pump before the Main Turbine trips on high Stator Water Cooling temperature. Once TBCCW system flow is restored to normal, Event 6 is triggered.

Event 6: VIAC bus VA-10 will de-energize, requiring the crew to immediately secure charging and letdown flow IAW AOP 2585, Immediate Operator Actions. Once the crew verifies the actions taken per AOP 2585, AOP 2504C, Loss of 120 VAC Instrument Panel VA-10, will be entered. When the crew has completed the initial actions of AOP 2504C, or at the Examiners discretion, trigger Event 7.

Event 7: A Loss Of Offsite Power will occur, causing a plant trip and transition to EOP 2525, SPTA where charging flow should be reestablished to maintain the RCS Inventory Safety Function. During the performance of EOP 2525, the “A” Main Steam Header will rupture in CTMT (Event 8).

Event 8: The “A” Main Steam Header will rupture in CTMT requires the crew to transition to EOP 2536, Excess Steam Demand Event. The mitigating strategy and required actions will be complicated by the previous loss of VA-10. AFW Reg. Valve to the affected SG will fail open due to the loss of VA-10, requiring the crew to manually isolate the flow path. In addition, the loss of VA-10 will prevent Facility 1 of ESAS from automatically restoring power to Facility 1 (if the crew attempts to restore Facility 1 power manually, a fault on the “A” EDG breaker, A312, will prevent it from closing and re-energizing 24C).

Event 9: On CSAS, Facility 2 CS will fail to actuate, requiring the “B” CS pump to be manually started and 2-CS-4B to be manually opened. The loss of VA-10 pre-trip will prevent the re-energizing of all Facility 1 equipment on the LOOP, requiring use of Facility 2 CS to mitigate the rising CTMT pressure.

The crew is required to isolate all feed to the #1 S/G, stabilizing RCS temperature after the #1 S/G blows down and start the “B” CS pump. Procedural driven complete isolation of the #1 S/G is at the Examiners discretion.

INPUT SUMMARY

Either INPUT or VERIFY the following functions:

ID Num	Description	Delay Time	Ramp Time	Event Time	Sev or Value	Final Value	Rel Order
MALFUNCTIONS							
CV19	CH-210X Failure				As-Is	As-Is	2
RX12C	#2 SG Main Level Failure		1 min		50%	50%	3
WD03	CTMT Normal Sump Level Failure				100%	100%	4
C06-D01A	TBCCW PP OVERLOAD/TRIP (C-06/7, DA-1)				N/A	ON	5
ED16A	Loss of VA-10				N/A	N/A	6
ED03A	Loss of 348 Line				N/A	N/A	7
ED03B	Loss of 310 Line				N/A	N/A	7
ED03C	Loss of 371 Line				N/A	N/A	7
ED03D	Loss of 383 Line				N/A	N/A	7
MS01A	“A” Main Stm. Hdr. Rupture in CTMT		5 min		4.75	4.75	30
ES03L	ESAS failure to actuate Fac. 2 CS				N/A	N/A	30
EG08A	DG 12U Output Brkr Failure				N/A	N/A	30
REMOTE FUNCTIONS							
IAR10	MP3 IA To/From MP2				OPEN	OPEN	10
IAR28	Unit 3 SA to SA Valve SAS-6				OPEN	OPEN	10
OVERRIDES							
05A1A2S23	“A” TBCCW Handswitch in “STOP”				STOP **(1st one)**	STOP **(1st one)**	5
TPHS-6282A_3	“A” TBCCW “Amber” light lit				A	A	5

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 1

Event Description: Raise Power to 60%

Time	Position	Applicant's Actions or Behavior

Examiner Note: The crew has been instructed to brief the up power prior to taking the watch. The

The following steps are from OP 2204 Load Changes. OP 2204 Load Changes procedure is marked up with "N/A" and Unit Supervisor signatures for applicable steps.

		Up power in accordance with OP 2204 and Reactivity Plan. Method: dilution and CEAs Rate: 15%/hour 4.1.37 WHEN either of the following conditions are met, Go To step 4.1.38 to start a third condensate pump: • Condensate pump discharge pressure is less than 425 psig • Condensate header flow is greater than 15,500 gpm (does not apply to short term exceedances while placing the second SGFP in service). Crew should not reach the power level applicable to start "C" condensate pump.

Examiner Note: When reactor power is 5% higher than initial power and before the power ascension is completed, or at the lead examiner's direction, proceed to Event #2, Failure of CH-210X to close.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 2

Event Description: **Failure of CH-210X to Automatically Close**

Time	Position	Applicant's Actions or Behavior

Simulator Operator: When directed, initiate Event #2, Failure of CH-210X to automatically close.

Indications Available:

- **PMW FLOW HI/LO (C-04, BB-8) [May not alarm].**
- **FC-210X Process indicates flow.**
- **FR-210 indicates PMW flow.**

Examiner Note: Crew may or may not secure the Main Turbine ramp in progress from Event #1.

Examiner Note: The following steps are from ARP 2590C-060, "PMW FLOW HI/LO". This annunciator may not alarm, however, the crew may refer to this ARP for information on possible actions.

	ATC	<u>AUTOMATIC FUNCTIONS</u> 1. None <u>CORRECTIVE ACTIONS</u> 1. CHECK flow rate on "PRI MAKEUP WTR FLOW, FC-210X," within 10 gpm of setpoint (C-04). 2. <u>IF</u> desired to terminate PMW flow, PERFORM the following: 2.1. PLACE "PRI MAKEUP WTR FLOW, FC-210X," to "MANUAL." 2.2. ADJUST "PRI MAKEUP WTR FLOW, FC-210X," to zero output. 2.3. VERIFY 2-CH-196, "VCT MAKEUP BYPASS," closed. 2.4. VERIFY 2-CH-512, "MAKEUP VLV STOP," closed. 3. <u>IF</u> desired to continue PMW flow, PERFORM the following: (C-04) **Examiner Note: Step 3 is N/A as the scenario should progress to the next event before the crew restarts the power ascension.**

CUE: <u>PEO</u>; if sent to locally check CH-210X, report there is no visible indication of any malfunction.

Cue: <u>Maintenance or I&C</u>; if requested, respond when possible but delay any report of findings through end of scenario.

CUE: Charging pump suction stabilizer heater indicator switch (amber color) is lit. Operating charging pumps running as expected.

Examiner Note: Once the crew has mitigated the effects of CH-210X failure, or at lead examiner's direction, go to Event 3 Failure of No. 1 Steam Generator (SG) Level Main Control Channel.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 3

Event Description: **No. 2 Steam Generator (SG) Level Main Control Channel Fails Low**

Time	**Position**	**Applicant's Actions or Behavior**
Simulator Operator: When directed, initiate Event 3, Failure of No. 2 SG Level Main Control Channel.		
Indications Available: • **PPC alarm No. 2 SG Feed Flow (possible)** • **Steam flow and feed flow mismatch on No. 2 SG Flow Yokogawa** • **No. 2 SG FRV opening, No. 2 SG level rising on Safety Channels** • **SG LEVEL SETPOINT DEVIATION HI/LO (C-05, D-16)**		
	SRO	Enter AOP 2585, Immediate Actions
Examiner Note: The following steps are from AOP 2585, Immediate Actions Section 4.0 Abnormal Steam Generator Level. Step in [ ] are expected to be performed from memory.		
	BOP	[4.1] PLACE both SGFPs in manual: • PRESS "A" SGFP "CONTROL" "MANUAL" pushbutton and ENSURE "MANUAL" pushbutton, lit. • PRESS "B" SGFP "CONTROL" "MANUAL" pushbutton and ENSURE "MANUAL" pushbutton, lit. [4.2] SHIFT affected SG Feedwater Flow Control to MANUAL (C-05): No. 2 SG • "REG VLV, LIC-5269," controller in manual (red light lit) [4.3] RESTORE SGFP speeds to normal value (100% Power: 4400 to 4600 rpm). [4.4] STABILIZE affected SG level (Steam Flow and Feed Flow matched). **Examiner Note: Steam Generator Level is normally 65%.** **At 85% level the Main Feed Reg. Valve will ramp closed and lock-up, resulting in a plant trip on low SG level.** **At 55% level and dropping the crew should manually trip the unit as SG level will rapidly drop from that point to the RPS trip setpoint of ~50%.**
	SRO/BOP	4.5 Go To ARP 2590D-064, "SG LEVEL SETPOINT DEVIATION HI/LO" (C-05, window D-16).

Time	Position	Applicant's Actions or Behavior

Examiner Note: The following steps are from ARP 2590D-064.

	BOP	CORRECTIVE ACTIONS 1. DETERMINE which SG has the level deviation (C-05). 2. OBSERVE PPC S/G transient display to determine if level, steam flow, or feed flow transmitter failure has caused the deviation. 3. PLACE SGFP controller(s) in "MANUAL" and RESTORE SGFP speeds to pre-event values (normal 100% value is 4,400 to 4,600 rpm) (C-05). 4. SHIFT affected SG Feedwater Flow Control to Manual (C-05): No. 1 SG • "REG VLV, LIC-5268" (red light, lit) • "MSTR, LIC-5272" (red light, lit) 5. STABILIZE affected SG level at 60 to 75%. 6. Using "SPEED" "LOWER" or "RAISE" buttons, MAINTAIN affected FRV D/P at 40 to 150 psid. 7. OBSERVE the affected side green transmitter lights to determine if any of the following has caused the deviation (C-05): **Examiner Note: Applicant observes that No. 1 SG Main Level Transmitter failed low as indicated by PPC.** **Steps 1 – 6 will have been performed during immediate actions.** **Step 7 does not apply because the magnitude of the failure is *NOT* severe enough to extinguish the green LED.**
	BOP	CAUTION SG level is auctioneered low, therefore, when selecting "MAIN" or "ALT" level transmitter, caution must be observed. Selecting "HIGH" could cause a plant trip.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 3

Event Description: **No. 2 Steam Generator (SG) Level Main Control Channel Fails Low**

Time	Position	Applicant's Actions or Behavior
	BOP	8. IF transmitter failure has occurred (indicated by its green LED *not* lit) OR suspected, TURN associated transmitter control switch from "BOTH" position to position for transmitter that is *not* failed or suspected ("MAIN" or "ALT") (C-05). 9. DETERMINE cause of abnormal SG level and CORRECT. 10. RESTORE affected SG level to normal band. 11. IF deviation is due to a failed feedwater flow instrument, Refer To EN 21002, "Core Heat Balance," and PERFORM actions to deselect affected transmitter input to calorimetric program (cause false indicated calorimetric). 12. IF desired, Refer To OP 2385, "Feedwater Control System Operation," and PLACE Feedwater Control System in Automatic. 13. IF desired, Refer To OP 2321, "Main Feedwater System," and PLACE SGFP controller(s) in "AUTO." **Examiner Note: The MAIN Transmitter failed. BOP should transfer No. 2 SG level transmitter control switch from BOTH to ALTERNATE and then place Feedwater Control System in Automatic using OP 2385.** **Step 10 was perfomred during immediate actions and Step 11 does not apply.**
Examiner Note: The following steps are from OP 2385 Feedwater Control System Section 4.4, Operation of No. 2 FW Control System During Normal Operation		
	BOP	4.4.3 IF No. 2 FRV controller is in manual operation and manual operation is no longer required, PLACE 2 FRV controller in "Master Manual" as follows (C-05): a. ADJUST "MSTR, LIC-5274," as necessary to match red and black/white needles on "REG VLV, LIC-5269." b. PRESS "REG VLV, LIC-5269," controller "A" button and ENSURE green light, lit. c. ADJUST "MSTR, LIC-5274," as necessary to maintain S/G level in band

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 3

Event Description: **No. 2 Steam Generator (SG) Level Main Control Channel Fails Low**

Time	**Position**	**Applicant's Actions or Behavior**
	BOP	4.4.4 IF desired to place No. 2 FRV controllers in automatic control, PERFORM the following: d. ENSURE the following: 1) No.2 FRV control is in "Master Manual" control 2) S/G level is at desired setpoint e. CHECK the following: 1) "REG VLV, LIC-5269," controller in "AUTO" (green light, lit) 2) "BYPASS LIC-5216," controller in "AUTO" (green light, lit) f. ENSURE the following: 1) "MSTR, LIC-5274," controller level setpoint equal to actual SG level by adjust thumbwheel on "MSTR, LIC-5274," controller as necessary 2) Feed flow and steam flow are matched g. PRESS "MSTR, LIC-5274," controller "A" button and ENSURE green light, lit. h. IF steam flow greater than 945,000 lbm/hr (about 15% power), CHECK yellow "3E" light below "M" button on "MSTR, LIC-5274," controller, lit (3 element control). h. As necessary, ADJUST "MSTR, LIC-5272," controller level setpoint and MAINTAIN No. 2 SG level within desired operating band with No. 1 FRV. **Examiner Note: Steps 4.4.4f and 4.4.4g are not applicable.**

Examiner Note: The following steps are from OP 2321 Main Feedwater System Section 4.7, Shifting SGFP Speed Control Mode (returning SGFPs to automatic mode). Steps 4.7.1 and 4.7.2 are not applicable. Step 4.7.3 is for the "A" SGFP and Step 4.7.4 is for the "B" SGFP. Only 4.7.3 is shown.

		4.7.3 IF desired to place "A" SGFP in automatic speed control, PERFORM the following (C-05 SGFP A insert):
		NOTE Attachment 1 may be used to determine the "Minimum Discharge Pressure Setpoint."

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 3

Event Description: **No. 2 Steam Generator (SG) Level Main Control Channel Fails Low**

Time	**Position**	**Applicant's Actions or Behavior**
		a. ADJUST speed as necessary to achieve *one* of the following by using the "SPEED" "LOWER" or "RAISE" pushbuttons: • Difference between actual speed and auto speed setpoint less than or equal to 100 rpm AND discharge pressure greater than the "Minimum Discharge Pressure Setpoint" • Actual pump discharge pressure within 25 psig of the "Minimum Discharge Pressure Setpoint" AND actual speed greater than "Auto Speed Setpoint" b. PRESS "CONTROL" "AUTO" pushbutton and ENSURE "AUTO" pushbutton, lit. **Examiner Note: The above actions are duplicated in Step 4.7.4 to place the "B" SGFP in automatic mode.**

Examiner Note: When Feedwater Control System has been restored to automatic control, or at the lead examiner's direction, proceed to Event 4, CTMT Normal Sump Level Detector Failure.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 4

Event Description: **CTMT Normal Sump Level Detector Failure**

Time	**Position**	**Applicant's Actions or Behavior**

<table>
<tr><td colspan="3">Simulator Operator: When directed, initiate Event 4, CTMT Normal Sump Level Detector Failure.</td></tr>
<tr><td colspan="3">Indications:
• CTMT NORM SUMP LEVEL HI/LO (C-06/7, BA-21)
• CTMT Normal Sump Level indication on C-06/7 suddenly reading 100%</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are form ARP 2590E-107, “CTMT NORM SUMP LEVEL HI/LO”.</td></tr>
<tr><td></td><td>SRO/BOP</td><td>NOTE
On a sump high level alarm due to a high influent flow, the operator should immediately attempt to determine the source of influent.</td></tr>
<tr><td></td><td>SRO/BOP</td><td><u>CORRECTIVE ACTIONS</u>
1. <u>IF</u> level is high, PERFORM the following:
1.1. <u>IF</u> level is high, due to high influent flow, Refer To AOP 2568, “Reactor Coolant System Leak.”
1.2. Refer To TSAS 3.3.3.8 and 3.4.6.1, and DETERMINE applicability.
1.3. Refer To OP 2336A, “Station Sumps and Drains," and PUMP the sump.
1.4. <u>IF</u> pumps can not be started, VERIFY the following supply breakers, “ON”:
• B31B04, “CONTAINMENT SUMP PUMP A (P33A)”
• B41B08, “CONTAINMENT SUMP PUMP B (P33B)”
2. <u>IF</u> level is low <u>AND</u> pump is running, STOP pump.</td></tr>
<tr><td colspan="3">Examiner Note: SRO/BOP should diagnose the event as an insturment failure due to the sudden rise in indication. Based on this diagnoses, only Step 1.2 above (TSAS determination) is applicable.</td></tr>
</table>

	SRO	**TS 3.3.3.8** The accident monitoring instrumentation channels shown in Table 3.3-11 shall be OPERABLE. **APPLICABILITY:** Modes 1, 2, and 3. **ACTION:** a. ACTIONS per Table 3.3-11 **ACTION 7:** Restore the inoperable system to OPERABLE status within 7 days or be in COLD SHUTDOWN within the next 36 hours. (See the ACTION statement in Technical Specification 3.4.6.1.).
	SRO	**TS 3.4.6.1** The following Reactor Coolant System leakage detection systems shall be OPERABLE: a. One of two containment atmosphere particulate radioactivity monitoring channels, and b. The containment sump level monitoring system. **APPLICABILITY:** Modes 1, 2, 3 and 4. **ACTION:** 3.1 With both of the containment atmosphere particulate radioactivity monitoring channels inoperable, operation may continue for up to 30 days provided: a. Appropriate grab samples of the containment atmosphere are obtained and analyzed for particulate radioactivity at least once per 24 hours, or b. A Reactor Coolant System water inventory balance is performed at least once per 24 hours during steady state operation. Otherwise, be in COLD SHUTDOWN within the next 36 hours. 3.2 With the containment sump level monitoring system inoperable, operation may continue for up to 30 days provided: a. A Reactor Coolant System water inventory balance is performed at least once per 24 hours during steady state operation. Otherwise, be in COLD SHUTDOWN within the next 36 hours. 3.3 With both the containment atmosphere particulate radioactivity monitoring channels inoperable and the containment sump level monitoring system inoperable, operation may continue for up to 72 hours provided:

Examiner Note: SRO should log into TS 3.3.3.8a., Action 7 and TS 3.4.6.1b., Action b.

Examiner Note: When the SRO has finished evaluating Technical Specifications, or at lead examiner's direction, proceed to Event 5, "B" TBCCW Pump Trip.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 5

Event Description: **"B" TBCCW pump trip**

Time	Position	Applicant's Actions or Behavior

<table>
<tr><td colspan="3">Simulator Operator: When directed, initiate Event 5,"A" TBCCW pump trip.</td></tr>
<tr><td colspan="3">Indications:
• TBCCW PP OVERLOAD/TRIP (C-06/7, DA-1)</td></tr>
<tr><td colspan="3">Examiner Note: The following steps are from ARP 2590E-007, Overload Trip of a TBCCW Pump.</td></tr>
<tr><td></td><td>SRO/BOP</td><td><u>AUTOMATIC FUNTIONS</u>
1. Standby pump starts automatically
Examiner Note: The Standby pump ("C") will fail to start automatically due to the simulated malfunction (see Corrective Actions below).
<u>CORRECTIVE ACTIONS</u>
1. DETERMINE if standby TBCCW pump is operating (C-06).
2. <u>IF</u> standby TBCCW pump is <i>not</i> operating, START TBCCW pump (C-06).
3. <u>IF</u> standby TBCCW pump does <i>not</i> start, Go To OP 2330B, "TBCCW System" and review for single TBCCW pump operation.
4. SEND operator to check TBCCW surge tank level.
5. <u>IF</u> TBCCW surge tank level is lowering, PERFORM the following:
5.1. OPEN TBCCW surge tank make up valve, 2-PMW-219.
5.2. RESTORE TBCCW surge tank level to 3/4 full in local sightglass.
5.3. <u>WHEN</u> level is at 3/4 full, CLOSE TBCCW surge tank make up valve, 2-PMW-219.
6. SUBMIT Trouble Report to Maintenance Department for pump trip.</td></tr>
<tr><td colspan="3">Simulator Operator: If directed to investigate the TBCCW Pump, it's breaker or the surge tank, in approximately five minutes report all components appear normal, no indication of any malfunctions.</td></tr>
<tr><td colspan="3">Examiner Note: Steps 1 and 2 must be performed, steps 3 and 5 should be N/A, steps 4 and 6 are not consequential to the scenario.</td></tr>
<tr><td colspan="3">Examiner Note: When the SRO/BOP have finished mitigating the TBCCW pump trip, or at lead examiner's direction, proceed to Event 6, Loss of 120 VAC Vital Instrument Panel VA-10.</td></tr>
</table>

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 6

Event Description: **Loss of 120 VAC Vital Instrument Panel VA-10**

Time	Position	Applicant’s Actions or Behavior

Simulator Operator: When directed, initiate Event 6, Loss of 120 VAC Vital Instrument Panel VA-10.

Indications:

- **Loss of power to all Safety Channel “A” indications (except RWST Level on C-01).**
- **Loss of power to RPS channel “A”.**
- **Four TCBs trip open (RPS Mimic and C-04 Apron).**
- **Charging pump suction transfers from the VCT to the RWST.**
- **#1 MFW Reg Valve “locks-up” at existing position (100% feed flow).**
- **Numerous control panel annunciators in alarm, specifically:**
  - **“INVERTER INV-1 TROUBLE” (C-08, A-25)**
  - **“VA-10 ON ALTERNATE SUPPLY INV-5” (C-08, A-26)**
  - **“INVERTER INV-5 TROUBLE” (C-08, A-27)**

Examiner Note: Although AOP 2504C specifically covers the Loss of VA-10, AOP 2585, Immediate Actions, contains actions that must be immediately performed to mitigate a plant trip due to the effects of the control power loss.

Examiner Note: The following steps are from AOP 2585, Immediate Actions Section 11.0 Loss of VA-10, VA-20, VR-11, VR-21. Steps in [ ] are expected to be performed from memory.

	ATC	[11.1] SECURE Letdown and Charging as follows: a. CLOSE CH 515, “LTDN ISOL.” b. PLACE all charging pumps in “PULL TO LOCK.”
	SRO	[11.2] Go To applicable procedure for the lost power supply: • AOP 2504C, “Loss of 120 VAC Vital Instrument Panel VA- 10,” • AOP 2504D, “Loss of 120 VAC Vital Instrument Panel VA- 20,” • AOP 2504A, “Loss of Non- Vital Instrument Panel VR- 11” • AOP 2504B, “Loss of Non- Vital Instrument Panel VR- 21

Examiner Note: The following steps are from AOP 2504C, Loss of 120 VAC Vital Instr. Panel VA-10.

	SRO/ATC	**CAUTION** Charging and letdown must be isolated due to loss of LC-227 which will swap charging pump suction to the RWST. 3.1 PERFORM the following to secure charging and letdown: a. CLOSE CH-515, “LTDN ISOL.” b. PLACE all charging pumps in “PULL TO LOCK.”

Examiner Note: Step 3.1 performed in AOP 2585, Immediate Actions.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 6

Event Description: **Loss of 120 VAC Vital Instrument Panel VA-10**

Time	**Position**	**Applicant's Actions or Behavior**
	SRO/ATC	**C A U T I O N** Due to the loss of SPEC 200 power, pressurizer spray control is in "MANUAL" only.
	ATC	3.2 <u>IF</u> forcing sprays, STOP forcing sprays. 3.3 PERFORM the following: a. ENSURE the following: • Pressurizer pressure controller on channel "Y" • Pressurizer level control on channel "Y" • Pressurizer heater selector switch on channel "Y" b. Manually CONTROL pressure by ANY of the following: • CYCLE pressurizer heaters • PLACE HIC-100F in manual and ADJUST pressurizer spray
	SRO/BOP	**C A U T I O N** The #1 SG AFW reg valve is failed open. If AFW is in service a SG level transient will occur.
	BOP	3.4 <u>IF</u> AFW is in service, PERFORM the following: a. DISPATCH an operator to take manual control of FW-43A, "AFW-FCV." b. ESTABLISH communication between local operator and Control Room and direct operator to manually position valve as required to control #1 SG level c. CONTROL #2 SG level from C-05. d. Go To step 3.8.
	SRO/BOP	**C A U T I O N** FW-51A, "#1 SG FRV," has failed "as is" which may cause a SG level transient. The valve will *not* close on a Reactor trip.
	BOP	3.5 To control #1 SG level, PERFORM the following: a. PRESS "A" or "B" SGFP manual pushbutton. b. PRESS "RAISE" or "LOWER" as necessary to change feed flow.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 6

Event Description: **Loss of 120 VAC Vital Instrument Panel VA-10**

Time	**Position**	**Applicant's Actions or Behavior**
	SRO/BOP/ PEO	3.6 DISPATCH an operator to FW-51A, "#1 SG FRV," and PERFORM the following: a. ESTABLISH continuous communications between FW-51A, "#1 SG FRV," and Control Room. b. Refer To OP 2385, "Feedwater Control System Operation," and PLACE FW-51A, "#1 SG FRV," in local manual control.
Examiner Note: The status of #1 MFRV control has *no* impact on the scenario.		
Simulator Operator: When directed as a PEO to take Local-Manual control of #1 MFRV, delay reporting from the field as ready to perform the task until after the plant trip.		
		CAUTION Facility 1 ESAS and AFAS functionality is *not* available.
		3.7 PERFORM the following: a. TRIP the reactor. b. Go To EOP 2525, "Standard Post Trip Actions."
		3.8 DISPATCH an operator to VA-10 to (asses a potential cause of the power loss and strip the bus in preparation to re-energize it.)
Simulator Operator: When dispatched as a PEO to evaluate the loss of VA-10, wait 10 minutes and report back that the panel's main breaker appears tripped open with no visible cause.		
	SRO	3.9 REQUEST Electrical Maintenance to troubleshoot the bus.
Examiner Note: When actions have completed to control and mitigate the loss of VA-10, or at lead examiner's direction, proceed to Event 7 & 8, Loss Of Offsite Power, ESD in CTMT with Loss of CS.		

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 7,8,9

Event Description: **Loss Of Offsite Power, ESD in CTMT with Loss of CTMT Spray**

Simulator Operator: When directed, initiate Event 7 & 8, LOOP, ESD in CTMT with Loss of CS

Indications:

- **All normal control room lighting goes out for about 12 seconds, then half reenergize.**
- **At least half of the all control board annunciators in alarm.**
- **Various Plant trip indications.**
- **Post-trip rise in CTMT pressure and temperature.**
- **RCS post-trip temperatures turn at slightly lower values than normal and trend slower than normal toward 0% power, NOP/NOT values.**
- **SIAS, CIAS, EBFAS and MSI on high CTMT pressure and/or low RCS/SG pressure.**

Examiner Note: The following steps are from EOP 2525, Standard Post Trip Actions, modified slightly to improve clarity.

Time	Position	Applicant's Actions or Behavior
	ATC	**Determine Status of Reactivity Control – Reactor Trip** 1. DETERMINE that Reactivity Control acceptance criteria are met for the reactor by performing ALL of the following steps: a. CHECK that **all** CEAs are fully inserted. b. CHECK that reactor power is dropping. c. CHECK that SUR is negative.
	BOP	**Determine Status of Reactivity Control – Turbine Trip** 2. DETERMINE that Reactivity Control acceptance criteria are met for the turbine by performing ALL of the following steps: a. CHECK that the main turbine is tripped by BOTH of the following: • ALL main stop valves are closed. • Generator megawatts indicate zero. • Turbine speed is lowering. b. <u>IF</u> 15G-2XI-4, motor operated disconnect, is closed, CHECK that the main Generator output breakers 8T and 9T are open.

	BOP	**Determine Status of Maintenance of Vital Auxiliaries** 3. DETERMINE that Maintenance of Vital Auxiliaries acceptance criteria are met by performing ALL of the following steps: a. CHECK that ALL Facility 1 and 2 electrical buses are energized: • 6.9kV Electrical Buses 25A, 25B • 4.16kV Non-Vital Electrical Buses 24A, 24B • 4.16vV Vital Electrical Buses 24C, 24D • Vital DC Buses 201A, 201B, DV-10, DV-20 • Vital AC Instrument Buses VA-10, VA-20
Examiner Note: On a LOOP, ESAS should automatically start the EDGs and restore power to the Vital 4160 busses 24C & 24D. However, the loss of VA-10 will prevent Facility 1 of ESAS from automatically restoring power to Facility 1 (if the crew attempts to restore Facility 1 power manually, a fault on the "A" EDG breaker, A312, will prevent it from closing and re-energizing 24C).		
	BOP	**RNO** a.1 IF EITHER bus 24C or 24D is not energized THEN PERFORM ALL of the following for associated bus 1) IF containment pressure is greater than or equal to 20 psig, THEN PLACE the RBCCW pump in "PULL TO LOCK." 2) ENSURE diesel generator has started. 3) ENSURE bus vital to non- vital tie breaker is open. 4) ENSURE the diesel generator output breaker Synchronizing switch is "ON". 5) ENSURE the diesel generator output breaker is closed. 6) IF the diesel generator output breaker can not be closed, THEN TRIP the Diesel Generator.
	BOP	b. CHECK that BOTH facilities of service water are operating.
	BOP	**RNO** b.1 CHECK service water pump electrically aligned to facility. 1) Mechanically ALIGN SW pump. 2) START aligned SW pump b.2 IF service water can not be supplied to a running diesel, THEN TRIP the affected diesel generator.

	BOP	c. CHECK that BOTH facilities of RBCCW are operating with service water cooling.
	BOP	**<u>RNO</u>** c.1 <u>IF</u> a service water pump is not running, <u>THEN</u> PLACE the associated RBCCW pump in "PULL TO LOCK". c.2 <u>IF</u> a RBCCW pump is not running AND BOTH of the following conditions are met: • Associated service water pump is running. • Containment pressure is less than 20 psig. <u>THEN</u> CHECK RBCCW pump is electrically aligned to facility 1) Mechanically ALIGN RBCCW pump. 2) START aligned RBCCW pump
	BOP/ATC	c.3 <u>IF</u> RBCCW cooling is lost to an RCP, <u>THEN</u> STOP RCPs not supplied with RBCCW.
	ATC	**Determine Status of RCS Inventory Control** 4. DETERMINE that RCS Inventory Control acceptance criteria are met by performing **ALL** of the following: a. CHECK that **BOTH** of the following conditions exist: • Pressurizer level is 20 to 80% • Pressurizer level is trending to 35 to 70% b. CHECK that RCS subcooling is greater than or equal to 30°F
	ATC	**<u>RNO</u>** a.1 <u>IF</u> the Pressurizer Level Control System is not operating properly in automatic, RESTORE and MAINTAIN pressurizer level 35 to 70% by performing ANY of the following: 1) OPERATE the Pressurizer Level Control System. 2) Manually OPERATE charging and letdown. **(Takes "B" charging pump out of P-T-L and, if necessary, directs a PEO to swap "B" charging pump to Facility 2 power)**

CRITICAL TASK: LOOP-1; Establish RCS Inventory Control [Start *ALL* available Charging Pumps].

<u>Charging Pump Status</u>:

"A" Charging Pump : Running Secured

"B" Charging Pump : Running Secured

"C" Charging Pump : Running Secured

Time	**Position**	**Applicant's Actions or Behavior**
	ATC	**Determine Status of RCS Pressure Control** 5. DETERMINE RCS Pressure Control acceptance criteria are met by **BOTH** of the following: • CHECK that pressurizer pressure is 1900 to 2350 psia. • CHECK that pressurizer pressure is trending to 2225 to 2300 psia.
	ATC	**RNO** **5.1** IF the Pressurizer Pressure Control System is *not* operating properly in automatic, THEN RESTORE and MAINTAIN between 2225 to 2300 psia by performing ANY of the following: a. OPERATE the Pressurizer Pressure Control System. b. Manually OPERATE pressurizer heaters and spray valves. **(NOTE: PZR Heaters will trip with PZR level <20%)** **5.2** PZR Spray valves (Verifies Closed) **5.3** PORVs (Verifies Closed) **5.4** IF RCS Pressure <1714 psia, Ensures SIAS. CIAS, EBFAS actuation alarms on C01 annunciators. **5.5** <1714 psia w/SIAS Secure ONE RCP in each loop (possibly "A" and "C" due to loss of Fac.1 RBCCW) 5.6 **TCOA**: IF RCS pressure < NPSH THEN STOP **ALL** RCPs
	ATC	**Determine Status of Core Heat Removal** 6. DETERMINE that Core Heat Removal acceptance criteria are met by performing **ALL** of the following: a. CHECK that at least one RCP is operating and that loop delta T is less than 10°F b. CHECK that Th subcooling is greater than or equal to 30°F.

Time	Position	Applicant's Actions or Behavior
	ATC	**RNO** **a.1** <u>IF</u> RCPs are not operating, OR loop ΔT is greater than 10° F, THEN PERFORM the following: 1) PLACE TIC- 4165, steam dump TAVG controller, in manual and closed. 2) PLACE BOTH pressurizer spray valve controllers in manual and CLOSE the valves. • HIC- 100E • HIC- 100F
	BOP	**Determine Status of RCS Heat Removal** 7. DETERMINE that RCS Heat Removal acceptance criteria are met by ALL of the following conditions: a. CHECK that at least one steam generator has **BOTH** of the following conditions met: • Level is 10 to 80%. • Main feedwater or TWO auxiliary feedwater pumps are operating to restore level 40 to 70%.
	BOP	**RNO** **a.1** RESTORE level to between 40% to 70% in at least ONE steam generator using ANY of the following: • Main feedwater • Motor- driven auxiliary feedwater pump • TDAFW Pump. Refer To Appendix 6, "TDAFW Pump Normal Startup." • TDAFW Pump. Refer To Appendix 7, "TDAFW Pump Abnormal Startup." **NOTE:** Operator notes "A" AFP not running (due to loss of VA-10) and either starts it or refers to Appendix 6/7 to start the TDAFW pump.
	BOP	b. CHECK that RCS Tc is being maintained between 530°F to 535"F.

Time	**Position**	**Applicant's Actions or Behavior**
	BOP	**RNO** **b.2** IF RCS TC is less than 530°F, THEN CONFIRM steam generator steam and feed rates are NOT excessive: 1) Notes #1 AFRV failed open (loss of VA-10) and either directs a PEO to manually isolate or closes FW-44 and feeds #2 SG only using TDAFW pump. 2) When #1 SG boils dry and T_C starts to rise, opens #2 ADV to stabilize T_C. **NOTE: These critical tasks may be performed here, or per RNO for Step c.**
	BOP	c. CHECK that **BOTH** steam generators pressure are 880 to 920 psia.
CRITICAL TASK: 2260 2536 TCOA (ESDE-6); Isolate Aux Feed Water to the affected SG within 30 minutes following an MSI actuation. **Time of MSI Actuation: ___________** **Time AFW Isolated to #1 SG: ___________**		
	BOP	**RNO** **c.1** IF ANY SG pressure is less than 572 psia, THEN ENSURE MSI actuated. (C01) **(CRITICAL TASK START TIME)**
	BOP	**RNO** **c.2** **TCOA:** IF ANY SG pressure is less than 572 psia AND an ESDE is in progress, THEN PERFORM the following to isolate AFW to the most affected SG 1) PLACE BOTH auxiliary feed "OVERRIDE/ MAN/START/ RESET" handswitches in "PULL TO LOCK." 2) CLOSE applicable Aux Feed Reg valve: • 2- FW- 43A • 2- FW- 43B 3) IF necessary, CONSIDER use of 2- FW- 44: • IF #1 SG faulted, THEN CLOSE 2- FW- 44 and STOP the motor driven AFW pumps 4) IF necessary, DISPATCH operator to close #1 AFRV manual isolation valve: • 2- FW- 11A **(CRITICAL TASK STOP TIME)**

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 7,8,9

Event Description: **Loss Of Offsite Power, ESD in CTMT with Loss of CTMT Spray**

Time	Position	Applicant's Actions or Behavior
	BOP	**RNO** **c.3** <u>IF</u> ANY steam generator pressure is less than 572 psia AND an excess steam demand event is in progress, <u>THEN</u> PERFORM the following: 1) CLOSE the ADV for the most affected steam generator **[#1 SG]**. 2) <u>IF</u> the most affected steam generator has boiled dry, as indicated by CET temperature rising, THEN OPERATE the ADV for the least affected steam generator to stabilize CET temperature. 3) Proceed To Step 8
	BOP	**c.4** <u>IF</u> ANY steam generator pressure is less than 800 psia AND lowering, THEN PERFORM the following: 1) CLOSE BOTH MSIVs. 2) ENSURE BOTH MSIV bypass valves are closed. 3) **NOT APPLICABLE FOR THIS SCENARIO**
	BOP	**c.5** <u>IF</u> ANY steam generator pressure is less than 880 psia, THEN PERFORM the following: 1) NOT APPLICABLE FOR THIS SCENARIO 2) NOT APPLICABLE FOR THIS SCENARIO 3) CHECK main steam safety valves are closed. **c.6** NOT APPLICABLE FOR THIS SCENARIO
	ATC	**Containment Isolation** 8. ENSURE Containment Isolation met by ALL of the following: a. CHECK Containment pressure is less than 1.0 psig.
	ATC	**RNO** **a.1** <u>IF</u> CTMT pressure >/= 4.42 psig, <u>THEN</u> ensure SIAS, CIAS, EBFAS, MSI actuated. (C-01 alarms)

	ATC	**Containment Isolation** b. CHECK NONE of the following primary plant radiation monitors have an unexplained alarm or indicate an unexplained rise in activity: Radiation Monitors Inside Containment • RM- 7890, Personnel Access Area • RM- 7891, Ctmt Refuel Floor Area • RM- 8240, High Range • RM- 8241, High Range • RM- 8123 A and B, Ctmt Atmosphere • RM- 8262 A and B, Ctmt Atmosphere c. CHECK NONE of the following primary plant radiation monitors have an unexplained alarm or indicate an unexplained rise in activity: Steam Plant Radiation Monitors • RM- 5099, Steam Jet Air Ejector • RM- 4262, SG Blowdown • RM- 4299A and B, Main Steam Line 1 • RM- 4299C, Main Steam Line 2
	ATC	**Containment Temperature and Pressure Control** 9. ENSURE Containment Temperature and Pressure Control met by BOTH of the following conditions: a. CHECK Containment temperature is less than 120°F. (PPC or avg of Points 5 and 6)
	ATC	**RNO** **a.1** Ensure **ALL** CAR fans operating on facility with RBCCW and start CTMT Aux Circ fans.
	ATC	b. CHECK Containment pressure is less than 1.0 psig

Examiner Note: Event 9; Failure of Facility 2 CS to auto actuate, combined with the loss of power to Fac. 1 (LOOP with VA-10 loss), will require manually starting the "B" CS pump and opening CS-4.1B. This may be done at this time if the ATC recognizes CTMT Spray should be running but is not.
[See the following Critical Task]

CRITICAL TASK: ESDE-7; Maintain Containment Temperature and Pressure Control.

CTMT pressure when CTMT Spray was established: ___________

Time	Position	Applicant's Actions or Behavior
	ATC	**RNO** b.1 IF CTMT pressure >/= 4.42 psig, THEN ensure SIAS, CIAS, EBFAS, MSI actuated. (C-01 alarms) 1) Place all CTMT Aux Circ fans in slow speed. 2) Start all CTMT PIR fans. b.1 IF CTMT pressure >/= 9.48 psig, THEN ensure the following: • CSAS actuated • ALL CS pumps delivering >/= 1300 gpm each.
	SRO	**Event Diagnosis** 10. PERFORM the following: a. DIAGNOSE the event. Refer To Appendix 1, "Diagnostic Flowchart." b. INITIATE Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions." c. Go To the appropriate EOP.
Examiner Note: The Unit Supervisor refers to EOP 2541 Appendix 1, Diagnostic Flowchart to diagnose the event.		
	ATC/BOP	{Step 10.b above} Perform Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions". **Examiner Note: EOP Appendix 4, Attachment 4A "Reactor Trip Subsequent Actions." are attached to guide.**
Indications: • **#1 S/G Pressure** • **RCS Cold Leg Temperature** • **Sub Cool Margin**		
	SRO	Enters EOP 2536, Excess Steam Demand Event.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 7,8,9

Event Description: **Loss Of Offsite Power, ESD in CTMT with Loss of CTMT Spray**

Time	**Position**	**Applicant's Actions or Behavior**

Examiner Note: The following steps are from EOP 2536, Excess Steam Demand Event. Asterisked steps, within the ORP or selected FRPs being implemented, may be brought forward to restore or preserve a Safety Function. Asterisked steps are "Continuously Applicable," and may be performed out of order after they have been accomplished once.

Examiners Note: All Facility 1 components are de-energized due to the loss of VA-10 combined with the LOOP (and cannot be restored, if attempted, due to a failure of the "A" EDG breaker).

	SRO	*1. CONFIRM diagnosis of a Loss of All Feedwater by performing the following. • Check SFSC Acceptance Criteria are satisfied. **Examiner Note: SRO checks EOP 2536-001 ESD Safety Function Status Checks and confirms that all Safety Criteria are satisfied.** • Verify no primary-to-secondary leakage by having Chemistry sample both SGs. [#1 SG may have dried out by now.]
	SRO	*2. CLASSIFY the event. Refer To MP-26-EPI-FAP06, "Classification and PARs" • IF classification requires RCS sampling, Refer To Appendix 46, "Sampling for EAL Determination" and DIRECT Chemistry as required.
	SRO	*3. PERFORM ALL of the following: • OPEN the placekeeper and ENTER the EOP entry time. • ENSURE the master alarm silence switch is in "NORMAL".
	ATC	*4. IF PZR pressure < 1714 psia, verify the following: • SIAS, CIAS, EBFAS actuated. (C-01) • ENSURE **ONE** complete facility of CRACS is operating in the recirc mode: (C25) **Facility 1(Facility 2)** • HV-203A(B), Fan F-21A(B) exhaust damper is open. • Fan F-21A(B), supply fan is running. • HV-206A(B), Fan F-31A(B) exhaust damper is open. • Fan F-31A(B), exhaust fan is running. • HV-212A(B), Fan F-32A(B) exhaust damper is open. • Fan F-32A(B), filter fan is running. • HV-202(495), minimum fresh air damper is closed. • HV-207(497), cable vault exhaust damper is closed. • HV-208(496), exhaust air damper is closed

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 7,8,9

Event Description: **Loss Of Offsite Power, ESD in CTMT with Loss of CTMT Spray**

Time	Position	Applicant's Actions or Behavior
	ATC	*5. IF SIAS has initiated, PERFORM the following: a. CHECK at least one train of SIAS, CIAS and EBFAS has properly actuated. (C01X) a.1 IF **ANY** component is *not* in its required position, manually ALIGN the applicable component. b. CHECK that safety injection flow is adequate. Refer To Appendix 2, "Figures." b.1 PERFORM **ANY** of the following to restore safety injection flow within the SI Flow Curve: 1) ENSURE electrical power to safety injection pumps and valves. 2) ENSURE correct safety injection valve lineup. 3) ENSURE operation of necessary auxiliary systems: 1) RBCCW 2) ESF Room Coolers 4) START additional safety injection pumps as needed until safety injection flow is within the SI Flow Curve. c. ENSURE **ALL** available charging pumps are operating.
	ATC	d. ENSURE vital switchgear cooling is operating for each operating ECCS train as follows: **Facility 1** • Fan F-51 is running. • Fan F-134 is running. • SW-178A, service water supply is open. • SW-178B, service water supply is open. **Facility 2** • Fan F-52 is running. • Fan F-142 is running. • Fan F-133 is running. • SW-178C, service water supply is open.
	BOP	*6. Perform the following to isolate the leak: • Ensure MSI has actuated. (C-01) **RNO** a.1 Manually align any component not in required position. • Check at least one train of MSI has properly actuated. (C-01X) • Open AR-17, condenser vacuum breaker.

Time	**Position**	**Applicant's Actions or Behavior**
	ATC	*7. IF PZR pressure <1714 psia and SIAS actuated, perform the following: • Stop one RCP in each loop. • Place associated spray controller in manual/close. • IF pressure lowers to less than NPSH: 1) Stop all RCPs. 2) Place TIC-4165 in manual/closed. 3) Place all spray valve controllers in manula/closed.
	SRO	*8. DETERMINE the most affected steam generator by considering **ALL** of the following: • High steam flow from steam generator • Lowering steam generator pressures • Lowering steam generator levels • Lowering RCS cold leg temperatures
	SRO/BOP	*9. IF the leak has *not* been isolated, ISOLATE the most affected steam generator by performing the following: **Number 1 Steam Generator** a. ENSURE MS-64A, MSIV, is closed. b. ENSURE MS-65A, MSIV bypass valve, is closed. c. ENSURE **ALL** of the following for the associated ADV: • ADV controller is in manual, PIC-4223 • ADV is closed. d. PLACE ADV Quick Open Permissive switch to "OFF".
	SRO/BOP	e. CLOSE LIC-5215, main feedwater regulating bypass valve. f. ENSURE FW-42A, main feedwater block valve, is closed. **NOTE: deenergized due to LOOP** **RNO** f.1 ENSURE LIC-5268, MFW Reg valve, is closed. **[Local isolation required due to VA-10 loss and LOOP]** g. PLACE FW-5A, main feed isolation air assisted check valve, to "CLOSE". h. CLOSE MS-201, steam to turbine driven aux feed pump supply valve. i. ENSURE MS-220A, steam generator blowdown isolation valve, is closed. j. Place both AFAS "OVERRIDE/MAN/START RESET" handswitches in "PULL---TO---LOCK." k. Close FW-43A, AFW Reg Valve. **Examiner Note: Accomplished by manual isolation or by closing FW-44.**

Scenario Termination: Once the crew has isolated the #1 SG, or at the lead examiner's direction, the scenario is complete.

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 7

Event Description: **EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions**

Time	Position	Applicant's Actions or Behavior

Examiner Note: The following steps are from EOP 2525 Standard Post Trip Actions, Subsequent Actions.

Time	Position	Applicant's Actions or Behavior
	ATC	1. IF charging pumps suction is aligned to the VCT, THEN CHECK VCT level is between 72% to 86%: a. IF VCT level is less than 72%, THEN ALIGN charging pump suction to RWST as follows: 1) OPEN CH- 192, RWST isolation. 2) ENSURE CH- 504, RWST to charging suction is open. 3) CLOSE CH- 501, VCT outlet isolation. 4) ENSURE CH- 196, VCT makeup bypass is closed. b. IF VCT level is greater than 88%, THEN PLACE CH- 500, letdown divert handswitch, to the "RWS" position, and divert as required to maintain VCT level 72% to 86%. **Examiner Note: These actions would ordinarily have already been performed automatically by ESAS actuation. However, the loss of VA-10 will require manual positioning of Facility 1 components.**
	ATC	2. TCOA: IF SIAS actuated, THEN ENSURE **ONE** complete facility of CRAC operating, in RECIRC mode, as follows: (C25A/B) **Facility 1** • HV- 203A, Fan F- 21A exhaust damper open • Fan F- 21A, supply fan running • HV- 206A, Fan F- 31A exhaust damper open • Fan F- 31A, exhaust fan running • HV- 212A, Fan F- 32A exhaust damper, open • Fan F- 32A, filter fan, running • HV- 202, minimum fresh air damper, closed • HV- 207, cable vault exhaust damper, closed • HV- 208, exhaust air damper, closed **Facility 2** • HV- 203B, Fan F- 21B exhaust damper open • Fan F- 21B, supply fan running • HV- 206B, Fan F- 31B exhaust damper open • Fan F- 31B, exhaust fan running • HV- 212B, Fan F- 32B exhaust damper, open • Fan F- 32B, filter fan, running • HV- 495, fresh air damper, closed • HV- 496, exhaust air damper, closed • HV- 497, cable vault exhaust damper, closed

	ATC	3. TCOA: IF SIAS not actuated, THEN CHECK ONE facility of CRAC operating, in NORMAL mode, as follows: (C25A/B) **Facility 1** • HV- 203A, Fan F- 21A exhaust damper is open • Fan F- 21A, supply fan running • HV- 206A, Fan F- 31A exhaust damper open • Fan F- 31A, exhaust fan running **Facility 2** • HV- 203B, Fan F- 21B exhaust damper open • Fan F- 21B, supply fan running • HV- 206B, Fan F- 31B exhaust damper open • Fan F- 31B, exhaust fan running
	ATC	4. IF charging pumps suction aligned to the RWST AND boration not required, THEN RESTORE charging pump suction to VCT as follows: a. CHECK BOTH of the following: 1) VCT level between 72% and 86% 2) VCT pressure greater than 15 psig b. CHECK letdown is in service. c. OPEN CH- 501, VCT outlet isolation. d. CLOSE CH- 192, RWST isolation.
	BOP	5. CHECK instrument air pressure greater than 90 psig and stable.
Simulator Operator: When directed as a PEO to take align IA t Unit 3, trigger Event #10 and report action taken.		
	BOP	6. IF AFAS has actuated, WHEN **BOTH** steam generators are restored to greater than 33%, THEN PERFORM the following: a. PLACE the following switches in "M" (Manual) and ADJUST to obtain desired flow (C- 05): 1) FW- 43A, "AFW- FCV, HIC- 5276A" 2) FW- 43B, "AFW- FCV, HIC- 5279A" b. PLACE **BOTH** of the following switches to "RESET" and ALLOW to spring return to neutral (C- 05): 1) "OVERRIDE/MAN/START RESET" (Facility 1) 2) "OVERRIDE/MAN/START RESET" (Facility 2) c. ADJUST the following switches to obtain desired flow (C- 05): 1) FW- 43A, "AFW- FCV, HIC- 5276A" 2) FW- 43B, "AFW- FCV, HIC- 5279A" d. IF main feedwater pump is supplying steam generators, THEN STOP **BOTH** auxiliary feedwater pumps. **Examiner Note: BOP may place both facilities in override (Pull-To-Lock) once the ESD is discovered and the SRO directs AFW be secured.**

Op-Test No.: ES16LI4 Scenario No.: 4 Event No.: 7

Event Description: **EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions**

Time	**Position**	**Applicant's Actions or Behavior**
	BOP	7. CHECK Main Condenser is available, as indicated by ALL of the following: • At least one MSIV open • Condenser vacuum better than15 inches HG-ABS (0 to 15 inches) • At least one condensate pump operating • At least one Circ Water pump operating **RNO** 10.1 IF Main Condenser is not available, PERFORM the following: • CLOSE BOTH MSIVs. • ENSURE BOTH MSIV bypass valves are closed. • OPEN AR-17, condenser vacuum breaker.
	BOP	8. OPEN HD-106, subcooling valve.
	BOP	9. ENSURE BOTH heater drain pumps are stopped.
	BOP	10. IF MFW is supplying feed to the steam generators, PERFORM the following: a. ENSURE that only **ONE** main feedwater pump is running. b. ENSURE that **BOTH** main feed block valves are closed: • FW-42A • FW-42B c. ADJUST the running main feedwater pump pressure to 50 to 150 psi greater than SG pressure. d. ENSURE that **BOTH** main feed reg bypass valves are throttled to control SG level: • FW-41A • FW-41B e. IF Main Feedwater Pump A is secured, CLOSE the following: 1) FW-38A, main feedwater pump discharge valve 2) FW-36A, main feedwater pump mini flow recirc valve f. IF Main Feedwater Pump B is secured, CLOSE the following: 1) FW-38B, main feedwater pump discharge valve 2) FW-36B, main feedwater pump mini flow recirc valve **Examiner Note: Main Feedwater Pump A and B are secured.** **FW-38A/B have no power due to the LOOP.**

Op-Test No.: __ES16LI4___ Scenario No.: __4__ Event No.: _7_

Event Description: **EOP 2541, Followup Actions, Appendix 4A, Reactor Trip Subsequent Actions**

Time	Position	Applicant's Actions or Behavior
	BOP	11. IF **BOTH** MFW pumps are secured, THEN PERFORM the following: a. CLOSE BOTH main feedwater pump mini flow recirc valves. • FW-36A • FW-36B **Examiner Note: Main Feedwater is not supply feed to the Steam Generators.**
	BOP	12. IF 25A OR 25B is energized, THEN ALIGN condensate pumps as follows: a. ENSURE **ONE** pump is running. b. ENSURE **ONE** pump is in "PULL TO LOCK." c. ENSURE **ONE** pump is in "AUTO." **Examiner Note: Buses 25A and 25B are de-energized.**
Examiner Note: End of Attachment 4- A		