

Admin

JPMs

**TMI-1 OPERATOR TRAINING**

**JOB PERFORMANCE MEASURE**

**A.1-1**

**PERFORM ESTIMATED CRITICAL BORON CONCENTRATION CALCULATION**

**TASK TITLE:**           **PERFORM ESTIMATED CRITICAL BORON CONCENTRATION CALCULATIONS**

**TASK NUMBER:**       001C030101           TIF: 3.05

**K/A REFERENCE:**    System:            NA  
                          K/A:               2.1.25  
                          Rating (RO/SRO):   2.8/3.1

**POSITION:**           SRO ☒ RO ☒ NLO ☐

**EVALUATION METHOD:**    PERFORM ☒           SIMULATE ☐

**EVALUATION LOCATION:**   SIMULATOR ☐       IN-PLANT ☐   CONTROL ROOM ☐   OTHER ☒

**TASK STANDARDS:**

Examinee calculates RCS boron concentration required to achieve criticality at the desired critical rod position, within the tolerances described within this JPM.

**APPROXIMATE COMPLETION TIME:** 30 minutes

**TIME-CRITICAL TASK COMPLETION TIME:** NA minutes

**REQUIRED TOOLS OR MATERIALS:**

Calculator.  
Straight Edge.  
OP 1103-15B, Estimated Critical Conditions, Revision 34.

**REFERENCES:**

OP 1103-15B, Estimated Critical Conditions, Revision 34.  
HU-AA-104-101, Procedure Use and Adherence, Revision 0.

**ALTERNATE PATH JPM? NO**

**SIMULATOR SETUP: NA**

**INITIALIZATION:** NA  
**EVENT TRIGGERS:** N/A  
**MALFUNCTIONS:** N/A  
**REMOTE FUNCTIONS:** N/A  
**OVERRIDES:** N/A  
**MONITOR:** N/A

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**READ TO STUDENT**

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When I tell you to begin, you are to **CALCULATE THE RCS BORON CONCENTRATION REQUIRED TO ACHIEVE CRITICALITY AT THE DESIRED CRITICAL ROD POSITION**. Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps as if you were actually performing the task.

**INITIAL CONDITIONS:**

The reactor was manually tripped from full power, equilibrium conditions, 8 hours ago.

Prior to the reactor trip, power was constant at 100% for the past 3 months.

Current conditions:

Reactor is at Hot Shutdown.

Preparations are in progress to go critical

Reactor trip is reset.

- CRD Groups 1-4 are fully withdrawn.
- CRD Groups 5, 6, and 7 are fully inserted.
- Group 8 APSR positions: 30% withdrawn.

RCS T-ave is 534°F.

RCS Pressure is 2155 psig.

Core Burnup is 600 EFPD.

Reactor startup (achieving criticality) is scheduled to occur 4 hour from this time.

RCS Boron Concentration is 190 ppm.

Mixed Boron Depletion Correction Factor = 0.99.

PPC and Nuclear Engineering are unavailable to provide value for Xenon reactivity.

**INITIATING CUE:**

The Shift Manager directs you to calculate the RCS boron concentration required to achieve criticality at the desired control rod positions described in Enclosure 1 of OP 1103-15B, Estimated Critical Conditions (provided).

**ARE THERE ANY QUESTIONS?**

**TIME CRITICAL: NO**

## **JPM INSTRUCTION SHEET**

### **DIRECTIONS TO STUDENT:**

When I tell you to begin, you are to **CALCULATE THE RCS BORON CONCENTRATION REQUIRED TO ACHIEVE CRITICALITY AT THE DESIRED CRITICAL ROD POSITION** described in enclosure 1 of OP 1103-15B, Estimated Critical Conditions (provided). Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps as if you were actually performing the task.

### **INITIAL CONDITIONS:**

The reactor was manually tripped from full power, equilibrium conditions, 8 hours ago.

Prior to the reactor trip, power was constant at 100% for the past 3 months.

Current conditions:

Reactor is at Hot Shutdown.

Preparations are in progress to go critical

Reactor trip is reset.

- CRD Groups 1-4 are fully withdrawn.
- CRD Groups 5, 6, and 7 are fully inserted.
- Group 8 APSR positions: 30% withdrawn.

RCS T-ave is 534°F.

RCS Pressure is 2155 psig.

Core Burnup is 600 EFPD.

Reactor startup (achieving criticality) is scheduled to occur 4 hours from this time.

RCS Boron Concentration is 190 ppm.

Mixed Boron Depletion Correction Factor = 0.99.

PPC and Nuclear Engineering are unavailable to provide value for Xenon reactivity.

### **INITIATING CUE:**

The Shift Manager directs you to calculate the RCS boron concentration required to achieve criticality at the desired control rod positions described in Enclosure 1 of OP 1103-15B, Estimated Critical Conditions (provided).

**TIME CRITICAL: NO**

\*Denotes Critical Elements  
#Denotes Sequential Step

#	STEP	STANDARD	S/U
1	Examinee obtains a copy of OP 1103-15B, Estimated Critical Conditions, to calculate the ECB in accordance with guidance provided in Section 3.1, using Enclosure 1.	<ul style="list-style-type: none"> <li>OP 1103-15B, Estimated Critical Conditions, is a Level 2 procedure.</li> <li>HU-AA-101-101, Procedure Use and Adherence, Section 2.1.2 defines Level 2 as Reference Use: referring to a procedure periodically during the performance of an activity to confirm that all procedure segments of an activity have been performed, performing each step in the sequence specified, and where required, signing appropriate blocks to certify that all segments have been completed. The procedure should be at the work location.</li> </ul>	
2	Examinee reviews procedure Section 2.0, Limits And Precautions.	<ul style="list-style-type: none"> <li>HU-AA-101-101, Procedure Use and Adherence, Section 4.1.6 requires the Procedure User to observe all Precautions, Limitations and applicable Prerequisites.</li> </ul>	
3	Examinee begins implementation of Section 3.1, Estimated Critical Boron Concentration.		
4	Examinee verifies data included on Enclosure 1 is correct, in accordance with Initial Conditions.		
5	Using Figure 1, the examinee determines fuel excess reactivity.	Expected value = +6.9% $\Delta K/K$ .	
6	Using Figure 6, the examinee determines reactivity worth of Control Rod Groups 5-7 at the desired critical position.	<p>Interpolation between curves for 400 and 693 EFPD is required in order to determine value for 600 EFPD.</p> <p>Expected value for 600 EFPD = -1.5% <math>\Delta K/K</math>.</p>	
7	Using Figure 2, the examinee determines reactivity worth of Control Rod Group 8 at the desired critical position.	<p>Interpolation between curves for 400 and 672 EFPD is required in order to determine value for 600 EFPD.</p> <p>Expected value = -0.136% <math>\Delta K/K</math>.</p>	
8	Using Figure 4, the examinee determines Xenon reactivity at the time of startup.	<p>Correct time (hours after shutdown) is 12 hours.</p> <p>Expected value = -3.6% <math>\Delta K/K</math>.</p>	
9	Using Figure 5, the examinee determines reactivity associated with samarium and plutonium buildup after shutdown.	<p>Interpolation between curves for 400 and 693 EFPD is required in order to determine value for 600 EFPD.</p> <p>Expected value = -0.033% <math>\Delta K/K</math>.</p>	
10	Examinee calculates boron reactivity worth required for criticality at the desired critical rod position.	Expected value = -1.631% $\Delta K/K$ .	
11	Using Figure 3, the examinee determines Hot Zero Power inverse boron reactivity worth.	Expected value = 127.5 ppm B/% $\Delta K/K$ .	

#	STEP	STANDARD	S/U
12	Using the inverse boron reactivity worth, and the required boron reactivity, the examinee calculates the corrected Critical Boron Concentration	Expected value = 208 ppm.	
*13	Using the mixed boron depletion correction factor (provided in the Initial Conditions), the examinee calculates the Estimated measured Critical Boron Concentration.	<p>Lower Acceptance Limit = 107 ppm.  <b>Expected Value = 210 ppm.</b>  Upper Acceptance Limit = 313 ppm.</p> <p>Basis for acceptance range:  Reference OP 1103-15B, Estimated Critical Conditions, Enclosure 2 Section 4.3, for Critical Rod Position Tolerance Band:</p> <p><b>Transient Xenon Startup (if Xenon is MORE negative than <math>-0.5\% \Delta K/K</math>):</b></p> <ul style="list-style-type: none"> <li>• Critical Rod Position Tolerance Band is <math>\pm 0.8\% \Delta K/K</math> from desired critical rod position.</li> <li>• <math>(\pm 0.8)(127.5/0.99) = 210 \pm 103</math> ppm.</li> <li>• Lower Acceptance Limit = 107 ppm.</li> <li>• Upper Acceptance Limit = 313 ppm.</li> </ul> <p>Xenon Free Startup (if Xenon is LESS negative than <math>-0.5\% \Delta K/K</math>):</p> <ul style="list-style-type: none"> <li>• Critical Rod Position Tolerance Band is <math>\pm 0.5\% \Delta K/K</math> from desired critical rod position.</li> </ul>	

END TASK

JPM CHANGE HISTORY PAGE

REVISION	DATE	REFERENCE TITLE	DESCRIPTION (Include AI # if Appropriate)
3	05/12/2003	OP 1103-15B Rev. 34, dated 10/28/02.	Modified Bank JPM 11.2.05.122.



## **TMI-1 OPERATOR TRAINING**

### **JOB PERFORMANCE MEASURE**

#### **A.1-2**

**TASK TITLE:** MAINTAIN MINIMUM SHIFT STAFFING, CONTROL OVERTIME

**TASK NUMBER:** 343006060303 TIF: 2.6

**K/A REFERENCE:** System: NA  
K/A: 2.1.4  
Rating(RO/SRO): 2.3/3.4  
Knowledge of shift staffing requirements.

**POSITION:** SRO ☒ RO ☐ NLO ☐

**EVALUATION METHOD:** PERFORM ☒ SIMULATE ☐

**EVALUATION LOCATION:** SIMULATOR ☐ IN-PLANT ☐ CONTROL ROOM ☐ OTHER ☒

**TASK STANDARDS:**

Examinee identifies required actions to restore minimum staffing, and selects personnel in accordance with requirements to control overtime.

**APPROXIMATE COMPLETION TIME:** 30 minutes

**TIME-CRITICAL TASK COMPLETION TIME:** NA minutes

**REQUIRED TOOLS OR MATERIALS:**

OP-TM-101-111-1001, Shift Manning Requirements, Rev. 2.  
Tech Spec 6.2.2 and Table 6.2-1, Amendment 219.  
LS-AA-119, Overtime Controls, Rev. 1  
Overtime Callout List (Prepared)  
Shift Manning Log (Prepared)  
Daily Attendance Form (Prepared)  
308 Weekly Schedule (Prepared, OT assignments highlighted)

**REFERENCES:**

OP-TM-101-111-1001, Shift Manning Requirements, Rev. 2.  
Tech Spec 6.2.2 and Table 6.2-1, Amendment 219.  
OP-AA-101-111, Roles And Responsibilities Of On-Shift Personnel, Rev. 0.  
LS-AA-119, Overtime Controls, Rev. 1

**ALTERNATE PATH JPM? NO**

**SIMULATOR SETUP:** NA

**INITIALIZATION:** NA

**EVENT TRIGGERS:** N/A

**MALFUNCTIONS:** N/A

**REMOTE FUNCTIONS:** N/A

**OVERRIDES:** N/A

**MONITOR:** N/A

### **READ TO STUDENT**

When I tell you to begin, as the Unit Supervisor, you are to **PERFORM THE STEPS NECESSARY TO ENSURE THAT YOUR SHIFT IS APPROPRIATELY STAFFED**. Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps as if you were actually performing the task.

#### **INITIAL CONDITIONS:**

Reactor power is 100%, with ICS in automatic.

The time is 2355 on a SUNDAY Night.

The shift is staffed as indicated on the **provided** Shift Manning Log.

- Unit reactor Operator (URO) GORSE reports that his contact lenses have just popped out and are lost. He reminds you that he has a license restriction that requires him to wear corrective lenses. His backup eyeglasses are missing and cannot be located.
- Third CRO John Doe is NOT licensed. He is in the Auxiliary Building performing an Independent Verification of a valve lineup change.

#### **INITIATING CUE:**

When I tell you to begin, as the Unit Supervisor, you are to **PERFORM THE STEPS NECESSARY TO ENSURE THAT YOUR SHIFT IS APPROPRIATELY STAFFED**.

**ARE THERE ANY QUESTIONS?**

**TIME CRITICAL: NO**

## **JPM INSTRUCTION SHEET**

### **DIRECTIONS TO STUDENT:**

When I tell you to begin, as the Unit Supervisor, you are to **PERFORM THE STEPS NECESSARY TO ENSURE THAT YOUR SHIFT IS APPROPRIATELY STAFFED**. Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps as if you were actually performing the task.

### **INITIAL CONDITIONS:**

Reactor power is 100%, with ICS in automatic.

The time is 2355 on a SUNDAY Night.

The shift is staffed as indicated on the **provided** Shift Manning Log.

- Unit reactor Operator (URO) GORSE reports that his contact lenses have just popped out and are lost. He reminds you that he has a license restriction that requires him to wear corrective lenses. His backup eyeglasses are missing and cannot be located.
- Third CRO John Doe is NOT licensed. He is in the Auxiliary Building performing an Independent Verification of a valve lineup change.

### **INITIATING CUE:**

When I tell you to begin, as the Unit Supervisor, you are to **PERFORM THE STEPS NECESSARY TO ENSURE THAT YOUR SHIFT IS APPROPRIATELY STAFFED**.

**TIME CRITICAL: NO**

\*Denotes Critical Elements

#Denotes Sequential Step

#	STEP	STANDARD	S/U
<b>CUE: Provide Examinee with Shift Manning Log</b>			
1	Examinee references Shift Manning Log to determine current shift manning status.	Examinee references Shift Manning Log and determines that current staffing is acceptable.	
<b>CUE: If asked, report that there are no other licensed CROs on site.</b>			
<b>CUE: In step 4 below, only WHEN examinee indicates need to obtain each document, THEN hand examinee JPM-prepared documents.</b> <ul style="list-style-type: none"> <li>• 308 Weekly Schedule list</li> <li>• Daily Attendance Form</li> <li>• Overtime Callout List.</li> </ul>			
<b>CUE: If examinee indicates need to obtain these references, provide copies:</b> <ul style="list-style-type: none"> <li>• Technical Specifications pages 6-1 and 6-2.</li> <li>• OP-TM-101-111-1001, Shift Manning Requirements.</li> <li>• LS-AA-119, Overtime Controls.</li> </ul>			
2	<p>Examinee references Technical Specifications and/or OP-TM-101-111-1001, Shift Manning Requirements, to determine minimum shift manning requirements for current conditions.</p> <p>Technical Specifications: TS 6.2.2.2.a requirement:</p> <ul style="list-style-type: none"> <li>• Each on-duty shift shall be composed of at least the minimum shift crew composition shown on Table 6.201.</li> </ul> <p>TS 6.2.2.2.b requirement:</p> <ul style="list-style-type: none"> <li>• At least one licensed Reactor Operator shall be present in the control room when fuel is in the core.</li> </ul> <p>Table 6.2-1 requirement:</p> <ul style="list-style-type: none"> <li>• Two licensed CROs must be on shift when Tave &gt;200°F.</li> </ul> <p>TS 6.2.2.2.c requirement:</p> <ul style="list-style-type: none"> <li>• Two licensed CROs are required to be in the Control Room during scheduled reactor shutdown.</li> </ul> <p><b>OP-TM-101-111-1001, Shift Manning Requirement:</b></p> <ul style="list-style-type: none"> <li>• Three CROs (at least 2 RO) must be on shift when RCS Temperature &gt;200°F.</li> </ul>	Examinee determines three CROs are required, two of which must be RO licensed. One licensed CRO is required to be in the Control Room.	
*3	Examinee initiates action to comply with Tech Spec requirement for two licensed ROs.	Examinee initiates action to comply with Tech Spec requirement for two licensed ROs.	

#	STEP	STANDARD	S/U
4	<p>Examinee seeks a replacement for the second licensed CRO position left vacant by Gorse's situation.</p> <p>Examinee calls the Operations Scheduler or directly references the Overtime Callout List to identify a replacement CRO to be called.</p> <p><b>CUE:</b> If examinee tries to call scheduler, inform examinee Ops Scheduler is UNAVAILABLE,</p> <p><b>CUE: Provide Examinee with</b></p> <ul style="list-style-type: none"> <li>• <b>308 Weekly Schedule</b></li> <li>• <b>Daily Attendance Form</b></li> <li>• <b>Overtime Callout List.</b></li> </ul>	<p>Examinee references OT callout and OT worked lists.</p> <p>Examinee may select (CRO X) low man on overtime list for callout.</p>	
*5	<p>Examinee references LS-AA-119, Overtime Controls, to evaluate callout restrictions.</p> <p>NOTE: CRO is limited to working 72 hours in 7 consecutive days.</p>	<p><b>**The Examinee cancels the callout to CRO X, even though he is low man on the cumulative overtime list (due to 72 hours worked in last 6 days)</b></p>	
*6	<p>Examinee identifies next individual to be called to replace the CRO.</p>	<p>Examinee selects <b>CRO Y</b> for callout due to overtime restrictions on CRO X.</p>	
<p><b>NOTE: **Examinee MAY use CRO X if Attachment 1 of LS-AA-119 is completed, authorizing deviation from Generic Letter GL 82-12 guidelines.</b></p>			

**END TASK**

JPM CHANGE HISTORY PAGE

REVISION	DATE	REFERENCE TITLE	DESCRIPTION (Include AI # if Appropriate)
0	04/12/2003	OP-TM-101-111-1001, Shift Manning Requirements. Tech Spec 6.2.2.2. Tech Spec Table 6.2-1. LS-AA-119, Overtime Controls.	Original issue.
1	05/12/2003		changed per NRC validation

Title	Revision No.
<b>CRO – SWITCHING AND TAGGING LOG</b>	<b>33</b>

### SHIFT MANNING LOG

Complete this log by indicating by name those **qualified** individuals fulfilling the listed Shift Manning Duties. The CRO signature on the cover page indicates that the qualification requirements of the minimum shift manning has been verified and that personnel listed on the Fire Brigade are on the Fire Brigade Qualified Listing.

		Night Shift	Day Shift
1	Shift Manager (SM) required at all times	Wynne	
1	In-Plant Supervisor/STA	Coughlin	
1	Control Room Supervisor – May be waived <200°F by Director, Operations	Wilson	
3	Control Room Operators >200°F <ul style="list-style-type: none"> <li>At least 2 must have RO license if &gt;200°F</li> <li>Only 2 CRO's with minimum of 1 RO license required if &lt;200°F</li> <li>Designate resp. person for E-Plan notifications &amp; Fire Brigade (3rd CRO or I&amp;C), if 3rd RO is not available, then designate and notify I&amp;C or other qualified individual.</li> </ul>	URO	Barnes
		ARO	Masters
		FIRE BRIGADE/ E-PLAN	CRO Trainee John Doe
4	Auxiliary Operators required at all times.  (When >200 4 AO's required to satisfy AP 1029)	• Sec Rdgs	Althouse
		* Sec/Pri Floater (Fire Brigade)	Kohl
		* Pri Rdgs	Flowers
		• OB – EOP20 – Minimum Manning (Fire Brigade)	Lutz
		Extra (Fire Brigade)	Murray
		Extra	Feldenzer
	Fire Brigade – Minimum of 5 members per AP 1029 (suggested manning)  1 Maintenance Foreman 2 Maintenance (Electrical or Mechanical Discipline) 2 "A" Auxiliary Operators 1 Rad Tech  (Fire Brigade must have 2 qualified AO's as a minimum. AO's if available (must be extra) may fill Maint. slots if not also assigned as safe shutdown AO)	SCBA	Murray
		Ansul	Kohl
		SCBA	Esworthy
		Ansul	Cobaugh
		Rad Tech	Barth
		Fire Brigade Leader	Baumbach



## FIRE BRIGADE LIST

### MEMBERS

ACON, KENNETH B.	3211
ALHOUSE, DAVID E.	3211
BARONE, JOSEPH A.	3211
BARRY, JAMES R.	3211
BOOKS II, RICHARD C.	3211
BUCHTER, DENNIS A.	3211
DEMMY, MICHAEL D.	3211
DOUGHERTY, DAN R.	3211
ENDERS, JAMES C.	3211
FELDENZER, RICHARD J.	3211
FLOWERS, GREGORY S.	3211
FUHRMAN, SCOTT M.	3211
GINGRICH, RICHARD A.	3211
HAHN, ROBERT E.	3211
HOFFMAN, BRAD E.	3211
KILBY, RONALD G.	3211
KLEINFELTER, THOMAS K.	3211
KNERR, DAVID C.	3211
KOHL, HENRY M.	3211
LEVENGOOD, JOHN P.	3211
LUTZ, KEVIN E.	3211
MULL, STEVEN L.	3211
MURRAY, ROBERT J.	3211
NOWAK, BRIAN	3211
RANDISI, JAMES W.	3211
RIGANATI, PAUL A.	3211
RINKER, CARL F.	3211
WOLFORD, MICHAEL P.	3211

BAIR, DARREN K	3222
BENNETT SR, TIMOTHY J.	3222
BRIGHTBILL, CRAIG A.	3224
BROWN, LONNIE C.	3223
COBAUGH, LARRY R.	3224
CRAWFORD, ANDY M.	3224
CRAWFORD, RICKY L.	3224
DARRAH, WILLIAM A.	3224
DUPES, JEFFREY K.	3222
EPPINGER, KERRY A.	3224
ESWORTHY, KATHY L.	3224
FENNER, RANDY A.	3222
FREY, BONNIE L.	3222
GARMAN, COREY R.	3224
GEARY, JAMES A.	3223
HARMAN, KENNETH M.	3222
HARPER, RICHARD R.	3224
HENRY, RALPH H.	3224
KILLEN, DAVID A.	3224
MENSER, MICHAEL S.	3223
MOORE, MICHAEL W.	3224
ORNER, JACKIE	3224
PRICE, KEENAN D.	3224
PUCCIO, ANTHONY Y	3222
RANK, EUGENE B.	3224
REBER, ROY E.	3224
REBO, RAY M.	3222
SHEEHAN, JOSEPH F.	3224
STAUFFER, KENNETH D.	3223
TAFT, DAVID H	3223
TATEM, MELINDA D.	3224
VIA, RICHARD C.	3224
VULATIC, MICHAEL A.	3224
WALMER, RAYMON O	3223
WEGRZYNIAK, JAMES	3222
WEIMER, TIMOTHY D.	3222
WELSH, KEVIN	3222
WESTHAFFER, EVELYN	3224
YOUNG, JACK R.	3224
YOUNG, TROY D.	3222

### LEADERS

BAUMBACH, NED W.	3223
BEAVER, JEFFREY A	3223
BOWMAN, GARY L.	3222
DAVIS, BRETT A	3222
DEINER II, CARL E.	3222
DI LELLO, STEVEN T.	3223
DUNLAP JR, NORMAN F	3223
DURAN, RAFAEL A.	3223
EAGLE, RICHARD E.	3222
KLICK, MARK S.	3223
KOLVA, JOHN J.	3223
LEWIS, RICHARD W.	3223
MARINKOV, MILTON	3222
MATEER, KEITH R.	3222
MENSER, BARRIE L.	3223
MUNZ, JOHN B.	3223
RIDLEY, MICHAEL C.	3223
ROETING, CHARLES J.	3223
STEIN, JOHN G	3222
WELSH, GARY J.	3223
WOLFE, GORDON R	3222

NO ADDITIONS UNLESS AUTHORIZED BY THE STATION FIRE MARSHAL.  
THIS LIST IS EFFECTIVE AS OF 01/01/2003 AND REMAINS IN EFFECT  
UNTIL NEW LIST IS ISSUED.

**Overtime Callout List**  
**Overtime Charged This Quarter**  
(Updated 7 days ago)

<b>Rank</b>	<b>Name</b>	<b>Overtime Hours Charged</b>	<b>Phone</b>
Lowest	CRO X	9	948-1234
Middle	CRO Y	12	948-5678
Highest	CRO Z	14.5	948-6543

**TMI-1 OPERATOR TRAINING**

**JOB PERFORMANCE MEASURE**

**A.2**

**USE STATION DRAWINGS TO PREDICT IMPACT OF INSTRUMENT FAILURE**

**TASK TITLE:** USE STATION DRAWINGS TO PREDICT IMPACT OF INSTRUMENT FAILURE

**TASK NUMBER:** 3420070303 TIF: 2.2

**K/A REFERENCE:** System: NA  
K/A: 2.1.24  
Rating (RO/SRO): 2.8/3.1

**POSITION:** SRO ☒ RO ☐ NLO ☐

**EVALUATION METHOD:** PERFORM ☒ SIMULATE ☐

**EVALUATION LOCATION:** SIMULATOR ☐ IN-PLANT ☐ CONTROL ROOM ☐ OTHER ☒

**TASK STANDARDS:**

- Examinee identifies impact of isolating MU-42-FS on RC-P-1D.
- RC-P-1D cannot be started from the Control Room.

**APPROXIMATE COMPLETION TIME:** 30 minutes

**TIME-CRITICAL TASK COMPLETION TIME:** NA minutes

**REQUIRED TOOLS OR MATERIALS:**

- 208-113 Rev. 15.  
SS-209-065, Rev. 9.  
Marker to identify electrical contacts affected.

**REFERENCES:**

- 302-661, Rev.52.  
208-113 Rev. 15.  
SS-209-065, Rev. 9.

**ALTERNATE PATH JPM?** NO

**SIMULATOR SETUP:** NA

**INITIALIZATION:** NA

**EVENT TRIGGERS:** N/A

**MALFUNCTIONS:** N/A

**REMOTE FUNCTIONS:** N/A

**OVERRIDES:** N/A

**MONITOR:** N/A

**READ TO STUDENT**

When I tell you to begin, you are to **USE ELECTRICAL PRINTS TO PREDICT THE IMPACT THE CLEARANCE REQUEST (TO MECHANICALLY ISOLATE MU-42-FS, Total Seal Injection Flow Switch) ON OPERATION OF RC-P-1D.**

**INITIAL CONDITIONS:**

RCS heatup is in progress.  
RC-P-1A and RC-P-1B are operating.  
RC-P-1C and RC-P-1D are not operating.  
Intermediate Closed Cooling Pump IC-P-1A is operating.  
Operators are prepared to start RC-P-1D.  
A piping leak has identified at MU-42-FS.

Maintenance has submitted a Clearance Request that **MECHANICALLY** isolates MU-42-FS in order to terminate and repair the leak.

**INITIATING CUE:**

When I tell you to begin, you are to use electrical prints (208-113, Rev. 15, and 209-065, Rev. 9) to predict the impact of the clearance request on operation of RC-P-1D. The clearance mechanically isolates MU-42-FS, Total Seal Injection Flow Switch. Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions.

**ARE THERE ANY QUESTIONS?**

**TIME CRITICAL: NO**

## **JPM INSTRUCTION SHEET**

### **Directions to Student:**

When I tell you to begin, you are to **USE ELECTRICAL PRINTS TO PREDICT THE IMPACT THE CLEARANCE REQUEST (TO MECHANICALLY ISOLATE MU-42-FS, Total Seal Injection Flow Switch) ON OPERATION OF RC-P-1D.**

### **INITIAL CONDITIONS:**

RCS heatup is in progress.

RC-P-1A and RC-P-1B are operating.

RC-P-1C and RC-P-1D are not operating.

Intermediate Closed Cooling Pump IC-P-1A is operating.

Operators are prepared to start RC-P-1D.

A piping leak has identified at MU-42-FS.

Maintenance has submitted a Clearance Request that MECHANICALLY isolates MU-42-FS in order to terminate and repair the leak.

### **INITIATING CUE:**

When I tell you to begin, you are to use electrical prints (208-113, Rev. 15, and 209-065, Rev. 9) to predict the impact of the clearance request on operation of RC-P-1D. The clearance mechanically isolates MU-42-FS, Total Seal Injection Flow Switch. Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions.

**TIME CRITICAL: NO**

\*Denotes Critical Elements  
#Denotes Sequential Step

#	STEP	STANDARD	S/U
<b>NOTE: Steps may be performed in any sequence.</b>			
<b>CUE: Provide Examinee with the following tools:</b> <ul style="list-style-type: none"> <li>• <b>Print 208-113 Rev. 15.</b></li> <li>• <b>Print 209-065, Rev. 9.</b></li> <li>• <b>Marker</b></li> </ul>			
1	Examinee obtains a copy of print 209-065 Auxiliary Relays of MU42-FS (LOW RC PP. TOTAL SEAL INJECTION FLOW).	Examinee obtains a copy of 209-065 Auxiliary Relays of MU42-FS (LOW RC PP. TOTAL SEAL INJECTION FLOW).	
2	Examinee circles affected flow switch and auxiliary relay contacts on print 209-065, in accordance with the initiating cue.	Examinee circles the following three contacts (associated with impact on RC-P-1D) on print 209-065 affected by low flow condition at MU24-FS following isolation by Maintenance: <ul style="list-style-type: none"> <li>• Examinee circles one contact operated directly from MU42-FS (labeled 86/1FS, low setpoint) in the center of the print.</li> <li>• Examinee circles two contacts operated by auxiliary relay 80X/MU42-FS2 associated with RC-P-1D (at bottom of the print).</li> </ul> <b>NOTE:</b> Examinee may circle additional contacts associated with the other three RCPs.	
3	Examinee determines impact of low flow condition following isolation of the flow switch.	Examinee may verbalize the following description of impact on print 209-065: <ol style="list-style-type: none"> <li>1.) MU42-FS low flow condition energizes auxiliary relays 80X/MU42-FS1 and 80X/MU42-FS2.</li> <li>2.) When auxiliary relay 80X/MU42-FS2 energizes:               <ul style="list-style-type: none"> <li>• RC-P-1D start circuit contact (C31 to C3) opens.</li> <li>• RC-P-1D trip circuit contact (PT to T1) closes.</li> </ul> </li> </ol>	
4	Examinee obtains a copy of print 208-110, RC Pump 1D.	Examinee obtains a copy of print 208-113 RC Pump 1D.	
5	Examinee circles contacts affected by low flow condition following isolation of MU24-FS, in accordance with the initiating cue.	Examinee circles the following two contacts on print 208-113: <ul style="list-style-type: none"> <li>• Examinee circles one MU42-FS contact in RC-P-1D start circuit.</li> <li>• Examinee may circle one additional MU42-FS contact in RC-P-1D trip circuit.</li> </ul>	
*6	Examinee determines impact of low flow condition following mechanical isolation of the flow switch on RC-P-1D operation.	Examinee describes impact of low flow condition following mechanical isolation of the flow switch on RC-P-1D operation: <ul style="list-style-type: none"> <li>• RC-P-1D can not be started from the control room, due to failure of the low seal injection flow starting interlock.</li> </ul>	

**END TASK**

JPM CHANGE HISTORY PAGE

REVISION	DATE	REFERENCE TITLE	DESCRIPTION (Include AI # if Appropriate)
0	04/12/2003	302-661, Rev. 52. 208-113 Rev. 15. SS-209-065, Rev. 9.	Original issue.
1	05/12/03		incorporated NRC validation comments



**TMI-1 OPERATOR TRAINING**

**JOB PERFORMANCE MEASURE**

**A.3**

**LIQUID RELEASE PERMIT APPROVAL**

**TASK TITLE: LIQUID RELEASE PERMIT APPROVAL**

**TASK NUMBER:** 068C010101

Initiate, make and complete a liquid waste release.

**TIF:** 2.5

**K/A REFERENCE:** System: Generic  
K/A: 2.3.6  
Rating: 2.1/3.1

**POSITION:** SRO ☒ RO ☐ NLO ☐

**EVALUATION METHOD:** PERFORM ☒ SIMULATE ☐

**EVALUATION LOCATION:** SIMULATOR ☐ IN-PLANT ☐ CONTROL ROOM ☐ OTHER ☒

**TASK STANDARDS:** Examinee does NOT approve the liquid release, due to exceeding ODCM Calendar Quarter cumulative organ (Liver) dose limit of 1.5 Mrem.

**APPROXIMATE COMPLETION TIME:** 30 minutes

**TIME-CRITICAL TASK COMPLETION TIME:** NA

**REQUIRED TOOLS OR MATERIALS:**

Releasing Radioactive Liquid Waste, 6610-ADM-4250.01, Rev. 16.  
Offsite Dose Calculation Manual, 6610-PLN-4200.01, Rev 23.

**REFERENCES:**

Releasing Radioactive Liquid Waste, 6610-ADM-4250.01, Rev. 16.  
Offsite Dose Calculation Manual, 6610-PLN-4200.01, Rev 23.

**ALTERNATE PATH JPM?** NO

**SIMULATOR SETUP:**

**INITIALIZATION:** NA

**EVENT TRIGGERS:** NA

**MALFUNCTIONS:** NA

**REMOTE FUNCTIONS:** NA

**OVERRIDES:** NA

**MONITOR:** NA

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**READ TO STUDENT**

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When I tell you to begin, you are to **(AS SHIFT MANAGER) REVIEW AND APPROVE A LIQUID RELEASE PERMIT IN ACCORDANCE WITH 6610-ADM-4250.01, RELEASING RADIOACTIVE LIQUID WASTE.** Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps and make notifications as if you were actually performing the task.

**INITIAL CONDITIONS:**

The plant is stable at 100% power.

WDL-T-11A, Waste Evaporator Condensate Storage Tank, is isolated and "DO NOT OPERATE" tagged.

A Liquid Release Permit has been initiated for WDL-T11A.

WDL-T11A level is 5.8 feet.

The current time is 2000.

**INITIATING CUE:**

Review and approve the Liquid Release Permit for WDL-T11A in accordance with 6610-ADM-4250.01, Releasing Radioactive Liquid Waste.

**ARE THERE ANY QUESTIONS?**

**TIME CRITICAL: NO**

## **JPM INSTRUCTION SHEET**

### **DIRECTIONS TO STUDENT:**

When I tell you to begin, you are to **(AS SHIFT MANAGER) REVIEW AND APPROVE A LIQUID RELEASE PERMIT IN ACCORDANCE WITH 6610-ADM-4250.01, RELEASING RADIOACTIVE LIQUID WASTE**. Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps and make notifications as if you were actually performing the task.

### **INITIAL CONDITIONS:**

The plant is stable at 100% power.

WDL-T-11A, Waste Evaporator Condensate Storage Tank, is isolated and "DO NOT OPERATE" tagged.

A Liquid Release Permit has been initiated for WDL-T11A.

WDL-T11A level is 5.8 feet.

The current time is 2000.

### **INITIATING CUE:**

As Shift Manager, review and approve the Liquid Release Permit for WDL-T11A, in accordance with 6610-ADM-4250.01, releasing Radioactive Liquid Waste.

**TIME CRITICAL: NO**

\*Denotes Critical Elements  
#Denotes Sequential Step

#	STEP	STANDARD	S/U
<b>INITIATING CUE: (AS SHIFT MANAGER) REVIEW AND APPROVE THIS LIQUID RELEASE PERMIT IN ACCORDANCE WITH 6610-ADM-4250.01, RELEASING RADIOACTIVE LIQUID WASTE.</b>			
<b>Accompanying documents are:</b> <ul style="list-style-type: none"> <li>• Dose Summary Report – Year-to-Date.</li> <li>• Dose Summary Report – Calendar Quarter to-Date.</li> <li>• Dose Summary Report – Month-to-Date.</li> <li>• Dose Summary Report for this release.</li> <li>• Forms 1621-1, 1621-2, 1621-3, 1621-4, and 1621-5.</li> </ul>			
1	Examinee ascertains Shift Manager signature responsibilities and dose limits for liquid releases by referencing 6610-ADM-4250.01, Releasing Radioactive Liquid Waste.  <b>NOTE:</b> Offsite Dose Calculation Manual, 6610-PLN-4200.01, may be referenced to ascertain dose limits for releasing radioactive liquid waste.	6610-ADM-4250.01, Releasing Radioactive Liquid Waste, section 4.10.4, describes Shift Manager responsibilities.  6610-ADM-4250.01, Releasing Radioactive Liquid Waste, section 3.2, describes quarterly and yearly dose limits for releasing radioactive liquid.  6610-PLN-4200.01, Offsite Dose Calculation Manual, section 2.2.1.1, describes quarterly and yearly dose limits for releasing radioactive liquid.	
2	Examinee reviews Cumulative Dose Summary for the current year to verify projected doses for this release will not cause the station to exceed individual dose limits from radioactive materials in liquid effluents released to the site boundary.	In accordance with 6610-ADM-4250.01, Releasing Radioactive Waste, section 3.2.b, during any calendar year, dose will be: <ul style="list-style-type: none"> <li>• <math>\leq 3</math> mrem to the whole body.</li> <li>• Dose will be <math>\leq 10</math> mrem to any organ.</li> </ul> Examinee determines that the calendar year dose limits will not be exceeded.	
*3	Examinee reviews Cumulative Dose Summary for the current quarter to verify projected doses for this release will not cause the station to exceed individual dose limits from radioactive materials in liquid effluents released to the site boundary.	In accordance with 6610-ADM-4250.01, Releasing Radioactive Waste, section 3.2.a, during any Calendar Quarter, dose will be: <ul style="list-style-type: none"> <li>• <math>\leq 1.5</math> mrem to the whole body.</li> <li>• Dose will be <math>\leq 5</math> mrem to any organ.</li> </ul> Examinee determines that the projected whole body dose (1.67 mrem) <b>WILL EXCEED</b> the quarterly whole body dose limit (1.5 mrem).	
*4	Examinee signs Form 1621-3 (line 30) to approve the release IAW 6610-ADM-4250.01 step 4.10.4.	The examinee <b>DOES NOT SIGN</b> Form 1621-3 to approve this release, due to exceeding total Offsite Dose Calculation Manual (ODCM) allowable dose for the calendar quarter.	

**END TASK**

JPM CHANGE HISTORY PAGE

REVISION	DATE	REFERENCE TITLE	DESCRIPTION (Include AI # if Appropriate)
0	5/12/2003	NA	Initial issue.

# DOSE SUMMARY REPORT

## 10CFR50 DOSE REPORT FOR ADULT (MREM)

Release # 200XXX035

GENERATED: Today

Nuclide	Total Body	Liver	Bone	Thyroid	Kidney	Lung	GI-LLI
CS137	1.80E-01	2.76E-01	2.02E-01	0.00E+00	9.35E-02	3.11E-02	5.34E-03
FE55	1.63E-03	6.99E-03	1.01E-02	0.00E+00	0.00E+00	3.91E-03	4.02E-03
H3	7.04E-02	7.04E-02	0.00E+00	7.04E-02	7.04E-02	7.04E-02	7.04E-02
SR89	4.54E-05	0.00E+00	1.58E-03	0.00E+00	0.00E+00	0.00E+00	2.54E-04
SR90	2.24E-03	0.00E+00	9.08E-03	0.00E+00	0.00E+00	0.00E+00	2.62E-04
<b>Cumulative Dose</b>	<b>2.55E-01</b>	<b>3.53E-01</b>	<b>2.23E-01</b>	<b>7.04E-02</b>	<b>1.64E-01</b>	<b>1.06E-01</b>	<b>8.14E-02</b>

**CUMULATIVE DOSE  
SUMMARY**  
Month (This Month) to Date

GENERATED  
Today

**Dose Due to Noble Gas Releases (MRAD)**

	Gamma Air	Beta Air
Cum. Dose		

Includes Batch Releases 0 thru 0 & Cont. Releases 0 thru 0

**Dose Due to Liquid Releases (MREM)**

	Tot. Body	Liver	Bone	Thyroid	Kidney	Lung	GI - LLI
Cum. Dose	5.1E-01	1.36E+00	1.39E+00	5.38E-01	1.11E+00	7.59E-01	6.05E-01

Includes Batch Releases 029 thru 035 & Cont. Releases 540-542

**Dose Due Part./Iodine/Tritium Releases (MREM)**

	Inhalation	Meat	Gr. Plane	Cow/Mk/I	Vegetation	Tot. Dose
Cum. Dose (Bound.)	4.91E-01	1.19E-01	0.00E+00	1.58E-03	2.68E-03	5.37E-03
Cum. Dose (Cr. Rec.)	9.24E-04	2.23E-04	00.00E+00	1.64E-03	2.77E-03	5.56E-03

Includes Batch Releases 0 thru 0 & Cont. Releases 533 thru 536



**CUMULATIVE DOSE  
SUMMARY  
This Quarter – 2003**

GENERATED  
Today

**Dose Due to Noble Gas Releases (MRAD)**

	Gamma Air	Beta Air
Cum. Dose		

Includes Batch Releases 0 thru 0 & Cont. Releases 0 thru 0

**Dose Due to Liquid Releases (MREM)**

	Tot. Body	Liver	Bone	Thyroid	Kidney	Lung	GI – LLI
Cum. Dose	1.67E+00	1.63E+00	1.39E+00	5.38E-01	1.11E+00	7.59E-01	6.05E-01

Includes Batch Releases 029 thru 035 & Cont. Releases 540 thru 542

**Dose Due Part./Iodine/Tritium Releases (MREM)**

	Inhalation	Meat	Gr. Plane	Cow/Mk/I	Vegetation	Tot. Dose
Cum. Dose (Bound.)	8.91E-04	2.16E-04	0.00E+00	1.58E-03	2.68E-03	5.37E-03
Cum. Dose (Cr. Rec.)	9.24E-04	2.23E-04	0.00E+00	1.64E-03	2.77E-03	5.56E-03

Includes Batch Releases 0 thru 0 & Cont. Releases 533 thru 536

**CUMULATIVE DOSE  
SUMMARY  
2003**

GENERATED  
Today

**Dose Due to Noble Gas Releases (MRAD)**

	Gamma Air	Beta Air
<b>Cum. Dose</b>	5.03E-04	3.23E-04

Includes Batch Releases 001 thru 014 & Cont. Releases 0 thru 0

**Dose Due to Liquid Releases (MREM)**

	Tot. Body	Liver	Bone	Thyroid	Kidney	Lung	GI - LLI
<b>Cum. Dose</b>	2.91E+00	2.79E+00	2.65E+00	1.88E+00	1.24E+00	2.95E+00	2.15E+00

Includes Batch Releases 001 thru 035 & Cont. Releases 501 thru 624

**Dose Due Part./Iodine/Tritium Releases (MREM)**

	Inhalation	Meat	Gr. Plane	Cow/Mk/I	Vegetation	Tot. Dose
<b>Cum. Dose (Bound.)</b>	1.88E+00	4.77E-01	4.43E-08	3.51E+00	5.94E+00	1.91E+00
<b>Cum. Dose (Cr. Rec.)</b>	1.89E+00	4.82E-01	2.83E-08	3.54E+00	5.99E+00	1.91E+00

Includes Batch Releases 001 thru 014 & Cont. Releases 501 thru 614

	TMI - Unit 1 Radiological Controls Procedure	Number <b>6610-ADM-4250.01</b>
Title <b>Releasing Radioactive Liquid Waste</b>		Revision No. <b>16</b>

**EXHIBIT 4**  
**Form 1621-1**  
(Example)

Page 1 of 5

OPERATIONS INPUT TO LIQUID RELEASE PERMIT			
<b>(4) Release Number</b>		<b>L200XXX035</b>	
<b>(1) Date/Time: 2 Days Ago/1100</b> Requester (Signature): <b>Shift Manager / (signed)</b> (Shift Mgr.)			
<b>(2) X WDL-T-11A Tank A</b>	<b>(3) Tank Put on Recirculation (min. of 8 hours)</b>	Time: <b>1000</b>	Date: <b>4 Days Ago</b>
	Tank Isolated and "Do Not Operate" Tagged:	Time: <b>1100</b>	Date: <b>2 Days Ago</b>
<del>WDL-T-11B Tank B</del>	Tank Volume Ft. <b>5.8</b> gallons <b>4044</b>	Recirc Time	<b>&gt;40 Hours</b> ①
Signed/Date <b>Shift Manager/(Signed)/ Dated Yesterday</b>			
<b>(32)</b> (Record all start and stop date times)	Tank Level at Start of Release	_____ ft.	_____ gal. ①
Time Release Stopped _____	Tank Level at End of Release	_____ ft.	_____ gal. ①
Time _____ Date _____	Tank Volume Released (Actual)	_____ gal.	
Time Release Started _____	MDCT Effluent Totalizer at Stop	_____ gal.	
Time _____ Date _____	MDCT Effluent Totalizer at Start	_____ gal.	
Total Time of Release _____	Total Dilution Flow	_____ gal.	
Minutes			
<b>(33)</b> Actual Release Rate = <u>Actual Gallons Released</u> = _____ gpm minutes			
<b>(34)</b> Cancelled or Partial Release State reason this release was cancelled or only partially released: _____ _____ _____			
<b>(35)</b> Release data completed and chemistry notified of actual gallons released:  _____ Signature Date/Time  All data required on this form has been completed. _____ Shift Manager Date/Time  Completed Release Permit has been forwarded to Rad Eng. _____ Shift Manager Date/Time			

① Tank level is read on WDL-LI-132 for WDL-T-11A or WDL-LI -133 for WDL-T-11B. WDL-LR-126 may be used if primary instruments are not available.

	TMI - Unit 1 Radiological Controls Procedure	Number <b>6610-ADM-4250.01</b>
Title <b>Releasing Radioactive Liquid Waste</b>		Revision No. <b>16</b>

Form 1621-2  
(Example)

Page 2 of 5

**Chemistry Data Sheet for Releasing Radioactive Liquid Waste**

**(4) RELEASE NUMBER**

**L200XXX035**

**NOTE**

AFTER COMPLETION FORWARD THIS DATA SHEET ALONG WITH COPIES OF THE GAMMA AND TRITIUM ANALYSIS TO RADIOLOGICAL CONTROLS FOR INCLUSION IN THE RELEASE PERMIT.

SIGNATURE (PRINT/SIGN)

**(5)** TANK RECIRCULATED  $\geq$  8 HRS. BY: **RM Pugliese / (signed)** DATE/TIME **Today / 0005**

**(6)** RELEASE SAMPLE(S) COLLECTED BY: **RM Pugliese / (signed)** DATE/TIME **Today / 0010**

**(7)** RELEASE GAMMA SCAN BY: **RM Pugliese / (signed)** DATE/TIME **Today / 0018**

RELEASE TRITIUM ANALYSIS BY: **RM Pugliese / (signed)** DATE/TIME **Today / 0050**

WEEKLY COMPOSITE SAMPLES BY: **RM Pugliese / (signed)** DATE/TIME **Today / 0100**

	RESULT	LIMIT
pH	<b>5.39</b>	4.5 - 9.5 (NOTE 1)
CONDUCTIVITY	<b>2.22</b>	<10 uMHO (NOTE 2)
BORON	<b>26</b>	PPM

**NOTE**

1. The limit of 4.5 - 9.5 will ensure that the NPDES limit of 6 - 9 is not exceeded at the main station discharge to the Susquehanna River.
2. Must be <10 uMHO to consider water with pH less than 6 or greater than 9. If conductivity is >10 uMHO and pH is less than 6.0 or greater than 9.0, release must be approved by Chemistry Supervisor or his designee with a written evaluation attached to release form.

TMI - Unit 1 Radiological Controls Procedure		Number <b>6610-ADM-4250.01</b>
Title <b>Releasing Radioactive Liquid Waste</b>		Revision No. <b>16</b>

Form 1621-3 (Example)

Page 3 of 5

**Radiological Controls Input to Liquid Release Permit**

**(4)** Release Number

**L200XXX035**

**(24)** Minimum Estimated  
Time for Release

**150**

Minutes

**(30)** Release Information Completed By **S. Edelman / (signed)** Rad. Controls Tech. A (Sign)  
Release Recommended By **D. Viola / (signed)** Group Rad. Controls Supervisor (Sign)  
Release Approved By \_\_\_\_\_ Shift Manager (Final Approval)

**(31)** Release Data:

WDL-V-257/RM-L6 Hi Radiation Interlock Test Sat.

\_\_\_\_\_ initials

**(19)** FR-146 Alarm Setpoint at **7.2E+03** gpm  
FR-146 (Low MDCT Flow) Test Sat.

\_\_\_\_\_ initials

\_\_\_\_\_ initials

**(22)** FR-84 Alarm Setpoint at **3.00E+01** gpm  
FR-84 (Hi Liq. Release Flow) Test Sat.

\_\_\_\_\_ initials

\_\_\_\_\_ initials

RM-L6 Operable per SP 1301-1 (Check Source)

\_\_\_\_\_ initials

**(23)** Valve WDL-V124 \_\_\_\_\_ or WDL-V125 \_\_\_\_\_ loaded to \_\_\_\_\_ gpm  
Release Rate \_\_\_\_\_ initials

Instrument Readings: Expected Reading	Reading at Start	Reading After 1/4 Complete	Reading After 1/2 Complete	Reading After 3/4 Complete	Reading After Release Comp.
<b>(23)</b> FR-84 <b>2.7E+01</b> gpm					
<b>(25)</b> RM-L6 <b>1.06E+03</b> cpm					
<b>(19)</b> FR-146 <b>7.2E+03</b> gpm					
<b>(26)</b> RM-L7 <b>1.0E+02</b> cpm					

Form 1621-4

Release Number

**L200XXX035**

**{8}** Radiological Analyses Review by: (GRCS) **D. Viola / (signed)** .

Date/Time **Today / AM** .

<b>{9}</b> Nuclides	<b>{10}</b> Specific Activity $\mu\text{Ci/ml}$	<b>{11}</b> Controlling Effluent Conc. $\mu\text{Ci/ml}$	<b>{12}</b> Specific Activity Controlling Conc.	<b>{14}</b> Sensitivity of RM-L6 to each Nuclide	<b>{15}</b> <b>{10}</b> x <b>{14}</b> Monitor Response (cpm)
H-3	<b>3.12E-01</b>	2E-3.	<b>1.56E+02</b>		
Ce-141		3E-5.		5.8E7	
Ce-144		3E-6.		1.1E7	
Co-58		2E-5.		1.2E8	
Co-60		3E-6.		1.9E8	
Cs-134		9E-7.		2.5E8	
Cs-137	<b>5.70E-07</b>	1E-6.	<b>5.70E-01</b>	1.05E8	<b>5.99E+01</b>
Fe-59		1E-5.		1.1E8	
I-131		1E-6.		1.1E8	
Mn-54		3E-5.		1.1E8	
Mo-99		2E-5.		1.5E7	
Zn-65		5E-6.		5.4E7	
Cr-51		5E-4.		1.3E7	
Ag-110M		6E-6.		3.2E8	
Sb-125		3E-5.		8.3E7	
Xe-133		3E-4.		3.7E6	
Xe-133m		3E-4.		1.3E7	
Xe-135		3E-4.		1.2E8	
Kr-85m		3E-4.		1.2E8	
Nb-95		3E-5.		1.2E8	
Zr-95		2E-5.		1.2E8	
Zr-97		9E-6.		1.8E7	
Ru-106		3E-6.		3.9E7	
Xe-131m		3E-4.			
Co-57		6E-5.		9.5E7	
			<b>{13}</b> Required D.F.		<b>{16}</b> Monitored Response of RM-L6 Above Bkgd.

**{17}** Dilution Factor Required Based on Boron = 26 PPM = 3.71E+01 .  
Record Results in Step **{20}** 0.7 PPM

	TMI - Unit 1 Radiological Controls Procedure	Number <b>6610-ADM-4250.01</b>
Title <b>Releasing Radioactive Liquid Waste</b>		Revision No. <b>16</b>

Form 1621-5

Page 5 of 5

- 【18】 Contact Control Room Operator for following data **Gorse D.** Name of CRO contacted
- a. MDCT Flow **8.00E+03** gpm (must be >5000 gpm)
- 【19】 MINIMUM MDCT FLOW (0.9 x usable MDCT Flow from 【18】 a) = **7.20E+03** . Record on Step 【19】 on Form 1621-3, (must be > 5000 GPM).
- 【20】 Radionuclide D.F. From 【13】 **1.57E+02**
- Boron D.F. From 【17】 **3.71E+01**
- MAXIMUM = **1.57E+02**  
DF
- 【21】 RR max =  $\frac{\text{Min MDCT from 【19】}}{\text{Required D.F. from 【20】}} = \frac{\underline{\mathbf{7.20E+03}}}{\underline{\mathbf{1.57E+02}}} = \underline{\mathbf{3.00E+01}}$  R. R. MAX (5.55 to 30 gpm)
- 【22】 FR-84 ALARM SETPOINT = RR Max. Record this value at 【22】 on Form 1621-3.
- 【23】 RR Actual = 0.9 x RR max (**3.0E+01**) = **2.7E+01** gpm Record this value at (5 to 27 gpm) 【23】 on Form 1621-3.
- 【24】 Estimated time of release =  $\frac{\text{Est. Vol. to be released } \mathbf{4044} \text{ gal}}{\text{RR Actual (from 【23】) } \underline{\mathbf{2.70E+01}} \text{ gpm}} = \underline{\mathbf{150}} \text{ MIN}$
- Record this value at 【24】 on Form 1621-3.
- 【25】 Estimated Reading of RM-L6:
- 5.99E+01** cpm (From 【16】) + **1.00E+03** cpm (RM-L6 Background) = **1.06E+03** cpm
- Record this value on Step 【25】 on Form 1621-3.
- 【26】 Estimated Reading of RM-L7:
- 5.99E+01** cpm (From 【16】)
- 1.57E+02** + **1.00E+02** cpm (RM-L7 Background) = **1.00E+02** cpm
- Dilution Factor (From 【20】)
- Record this value on Step 【26】 on Form 1621-3.

**TMI-1 OPERATOR TRAINING**

**JOB PERFORMANCE MEASURE**

**A.4**

**DAY 1**



**TASK TITLE: EMERGENCY ACTION LEVEL IDENTIFICATION AND EVENT DECLARATION.**

**TASK NUMBER:** 5001045001 TIF: 3.35

**K/A REFERENCE:** System: Generic  
K/A: 2.4.41  
Rating: 2.3/4.1

**POSITION:** SRO ☒ RO ☐ NLO ☐

**EVALUATION METHOD:** PERFORM ☒ SIMULATE ☐

**EVALUATION LOCATION:** SIMULATOR ☒ IN-PLANT ☐ CONTROL ROOM ☐ OTHER ☒

**TASK STANDARDS:** Examinee classifies the event as an ALERT under HA4, due to Non-Bomb Explosion inside the Vital Area, within 15 minutes of direction to classify the event, and then completes EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form) to support initial off-site notifications.

**APPROXIMATE COMPLETION TIME:** 20 minutes.

**TIME-CRITICAL TASK COMPLETION TIME:** Classification: 15 minutes.

**REQUIRED TOOLS OR MATERIALS:**

- EP-AA-111 Emergency Classification and Protective Action Recommendations, Rev. 5.
- Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station.
- Table TMI 3-1, Emergency Action Level (EAL) Matrix.
- EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form)

**REFERENCES:**

- EP-AA-111 Emergency Classification and Protective Action Recommendations, Rev. 5.
- Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station.
- Table TMI 3-1, Emergency Action Level (EAL) Matrix.
- EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form)

**ALTERNATE PATH JPM?** NO

**SIMULATOR SETUP:**

**INITIALIZATION:** NA

**EVENT TRIGGERS:** NA

**MALFUNCTIONS:** NA

**REMOTE FUNCTIONS:** NA

**OVERRIDES:** NA

**MONITOR:** NA

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**READ TO STUDENT**

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When I tell you to begin, you are to **CLASSIFY THE EVENT, AND COMPLETE THE MAROG NOTIFICATIONS FORM, ATTACHMENT 1 (PA/MD NOTIFICATION FORM) TO SUPPORT INITIAL OFF-SITE NOTIFICATIONS.** Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps to identify the EAL, classify the event, and complete the initial notifications form as if you were actually performing the task.

**INITIAL CONDITIONS:**

The plant was stable at 100% power with only one operating Feedwater Pump. ICS was in manual mode.

**SEQUENCE OF EVENTS:**

1. Selected RCS T-Hot instrument failed high, affecting ICS T-Ave indication and control.
2. A hydrogen gas leak reduced Main Generator gas pressure, requiring a forced load reduction to protect the generator. Because of an Integrated Control System malfunction the load reduction had to be performed manually.
3. Following the load reduction, protective relay operation transferred loads off the 1A Auxiliary Transformer to 1B Auxiliary Transformer and Emergency Generator EG-Y-1B.
4. A major steam line rupture inside the Containment Building caused the reactor to trip.
5. Excessive OTSG heat transfer results in a core overcooling event, and ESAS actuation.
6. Following isolation of feedwater sources to the affected OTSG, crew members were required take actions to prevent RCS reheat and re-pressurization.
7. "A" and "B" OTSG steam line RMS indications and surveys were at background levels.
8. All Emergency Feedwater Pumps started.
9. Control and termination of HPI flow was complicated by a stuck open High Pressure Injection valve.

**Current Conditions:**

Reactor is shutdown.  
RCS is 45°F subcooled.  
RB pressure peaked at 36 psig and is now at 6 psig.  
OTSG 1A is isolated and depressurized.  
HPI flow has been terminated.  
Steam line RMS indications remain at background levels.  
RCS pressure and temperature have been stabilized.  
All Emergency feedwater Pumps are operating (on recirculation).  
The current time is 1605.  
Wind Speed 8 mph.  
Wind direction is from 270 degrees.  
The EOF is NOT activated.

**INITIATING CUE:**

Based on these conditions, classify this event and complete EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form) to support initial off-site notifications.

**ARE THERE ANY QUESTIONS?**

**TIME CRITICAL: YES**

## **JPM INSTRUCTION SHEET**

### **DIRECTIONS TO STUDENT:**

When I tell you to begin, you are to **CLASSIFY THE EVENT, AND COMPLETE THE MAROG NOTIFICATIONS FORM, ATTACHMENT 1 (PA/MD NOTIFICATION FORM) TO SUPPORT INITIAL OFF-SITE NOTIFICATIONS.** Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps to identify the EAL, classify the event, and complete the initial notifications form as if you were actually performing the task.

### **INITIAL CONDITIONS:**

The plant was stable at 100% power with only one operating Feedwater Pump. ICS was in manual mode.

### **SEQUENCE OF EVENTS:**

1. Selected RCS T-Hot instrument failed high, affecting ICS T-Ave indication and control.
2. A hydrogen gas leak reduced Main Generator gas pressure, requiring a forced load reduction to protect the generator. Because of an Integrated Control System malfunction the load reduction had to be performed manually.
3. Following the load reduction, protective relay operation transferred loads off the 1A Auxiliary Transformer to 1B Auxiliary Transformer and Emergency Generator EG-Y-1B.
4. A major steam line rupture inside the Containment Building caused the reactor to trip.
5. Excessive OTSG heat transfer results in a core overcooling event, and ESAS actuation.
6. Following isolation of feedwater sources to the affected OTSG, crew members were required take actions to prevent RCS reheat and re-pressurization.
7. "A" and "B" OTSG steam line RMS indications and surveys were at background levels.
8. All Emergency Feedwater Pumps started.
9. Control and termination of HPI flow was complicated by a stuck open High Pressure Injection valve.

### **Current Conditions:**

Reactor is shutdown.  
RCS is 45°F subcooled.  
RB pressure peaked at 36 psig and is now at 6 psig.  
OTSG 1A is isolated and depressurized.  
Steam line RMS indications remain at background levels.  
HPI flow has been terminated.  
RCS pressure and temperature have been stabilized.  
All Emergency feedwater Pumps are operating (on recirculation).  
The current time is 1605.  
Wind Speed 8 mph.  
Wind direction is from 270 degrees.  
The EOF is NOT activated.

### **INITIATING CUE:**

Based on these conditions, classify this event and complete EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form) to support initial off-site notifications.

### **ARE THERE ANY QUESTIONS?**

**TIME CRITICAL: YES**

\*Denotes Critical Elements

#Denotes Sequential Step

#	STEP	STANDARD	S/U
<b>INITIATING CUE: Identify the EAL and classify the event based on current plant conditions as required.</b>			
<b>NOTE: Record time that direction to classify the event is given. _____</b>			
*1	Examinee obtains a copy of Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station and/or Table TMI 3-1, Emergency Action Level (EAL) Matrix, to identify the specific EAL(s) applicable to current conditions, and to classify the event.	<p>The examinee determines that an ALERT condition exists, specifically:</p> <ul style="list-style-type: none"> <li>ALERT HA4, due to Non-Bomb Explosion inside the Vital Area.</li> </ul>	
*2	The examinee declares the event and identifies himself as the ED. (Examinee may indicate to the examiner that they would make the announcement.)	<p>The examinee declares the event and identifies himself as the ED. (Examinee may indicate to the examiner that they would make the announcement.)</p> <p><b>NOTE: This declaration is required to be completed within 15 minutes from the time the examiner provides direction to classify the event.</b></p> <p>Time of Declaration: _____</p>	
3	Examinee completes MAROG Notifications form, Attachment 1 (PA/MD Notification Form) to support initial off-site notifications.	<p>Examinee completes MAROG Notifications form, Attachment 1 (PA/MD Notification Form) to support initial off-site notifications.</p> <p>Fields to be completed:</p> <p>2 – Classification, Affected Unit, Initial Declaration</p> <p>3 – Brief Non-Technical Description</p> <p>4 – Non-Routine Radiological Release Status:</p> <ul style="list-style-type: none"> <li>NO non-routine radiological release in progress (RMS normal)</li> </ul> <p>5 – PAR, not applicable</p> <p>6 – Meteorology:</p> <p>Wind from 270 degrees at 8 miles per hour.</p>	

**END TASK**

JPM CHANGE HISTORY PAGE

REVISION	DATE	REFERENCE TITLE	DESCRIPTION (Include AI # if Appropriate)
0	4/12/2003	NA	Initial issue.
1	5/12/2003		per NRC validation added RMS indications to support NO non-routine release call.

## **TMI-1 OPERATOR TRAINING**

### **JOB PERFORMANCE MEASURE**

#### **A.4**

#### **Day 2**

**TASK TITLE:** EMERGENCY ACTION LEVEL IDENTIFICATION AND EVENT DECLARATION.

**TASK NUMBER:** 5001045001 TIF: 3.35

**K/A REFERENCE:** System: Generic  
K/A: 2.4.41  
Rating: 2.3/4.1

**POSITION:** SRO ☒ RO ☐ NLO ☐

**EVALUATION METHOD:** PERFORM ☒ SIMULATE ☐

**EVALUATION LOCATION:** SIMULATOR ☒ IN-PLANT ☐ CONTROL ROOM ☐ OTHER ☒

**TASK STANDARDS:** Examinee classifies the event as an ALERT under FA1 within 15 minutes of direction to classify the event, and then completes EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form) to support initial off-site notifications.

**APPROXIMATE COMPLETION TIME:** 20 minutes.

**TIME-CRITICAL TASK COMPLETION TIME:** Classification: 15 minutes.

**REQUIRED TOOLS OR MATERIALS:**

- EP-AA-111 Emergency Classification and Protective Action Recommendations, Rev. 5.
- Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station.
- Table TMI 3-1, Emergency Action Level (EAL) Matrix.
- EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form)

**REFERENCES:**

- EP-AA-111 Emergency Classification and Protective Action Recommendations, Rev. 5.
- Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station.
- Table TMI 3-1, Emergency Action Level (EAL) Matrix.
- EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form)

**ALTERNATE PATH JPM?** NO

**SIMULATOR SETUP:**

**INITIALIZATION:** NA

**EVENT TRIGGERS:** NA

**MALFUNCTIONS:** NA

**REMOTE FUNCTIONS:** NA

**OVERRIDES:** NA

**MONITOR:** NA

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**READ TO STUDENT**

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When I tell you to begin, you are to **CLASSIFY THE EVENT, AND COMPLETE THE MAROG NOTIFICATIONS FORM, ATTACHMENT 1 (PA/MD NOTIFICATION FORM) TO SUPPORT INITIAL OFF-SITE NOTIFICATIONS.** Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps to identify the EAL, classify the event, and complete the initial notifications form as if you were actually performing the task.

**INITIAL CONDITIONS:**

The plant was stable at 30% power with only one operating Feedwater Pump. EF-P-2A was OOS for bearing replacement. ICS was in AUTO mode.

**SEQUENCE OF EVENTS:**

1. Pressurizer level instrument failed low, requiring alternate input selection to return to auto makeup control.
2. The crew shifted operating MU pumps IAW procedures.
3. Seal injection valve MU-V-32 failed in auto, requiring manual mode to control seal injection flow.
4. Greater than 1 GPM OTSG tube leak occurs, and crew commences plant shutdown IAW EOP-005.
5. CRD Diamond station fails to respond in auto, requiring ICS to be placed in manual for power reduction.
6. Large break OTSG tube rupture occurs, requiring HPI and Rx trip.
7. One train of ESAS fails to actuate, requiring component level manual actuation.
8. Crew performs post trip response IAW the EOPs.
9. Crew minimizes SCM to between 30 and 70 degrees F, and commences plant cooldown.
10. All steam line RMS indications and surveys are elevated **>2 times** background levels, but below any alarm.

**Current Conditions:**

Reactor is shutdown.  
RCS is 45°F subcooled.  
The current time is 1710.  
Wind Speed 11 mph.  
Wind direction is from 285.  
The EOF is NOT activated.

**INITIATING CUE:**

Based on these conditions, classify this event and complete EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form) to support initial off-site notifications.

**ARE THERE ANY QUESTIONS?**

**TIME CRITICAL: YES**



## **JPM INSTRUCTION SHEET**

### **DIRECTIONS TO STUDENT:**

When I tell you to begin, you are to **CLASSIFY THE EVENT, AND COMPLETE THE MAROG NOTIFICATIONS FORM, ATTACHMENT 1 (PA/MD NOTIFICATION FORM) TO SUPPORT INITIAL OFF-SITE NOTIFICATIONS.** Before you start, I will describe the general plant conditions, state the initiating cues, and answer any questions. Perform procedure steps to identify the EAL, classify the event, and complete the initial notifications form as if you were actually performing the task.

### **INITIAL CONDITIONS:**

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2. The crew shifted operating MU pumps IAW procedures.
3. Seal injection valve MU-V-32 failed in auto, requiring manual mode to control seal injection flow.
4. Greater than 1 GPM OTSG tube leak occurs, and crew commences plant shutdown IAW EOP-005.
5. CRD Diamond station fails to respond in auto, requiring ICS to be placed in manual for power reduction.
6. Large break OTSG tube rupture occurs, requiring HPI and Rx trip.
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10. All steam line RMS indications and surveys are elevated **>2 times** background levels, but below any alarm.

### **Current Conditions:**

Reactor is shutdown.  
RCS is 45°F subcooled.  
The current time is 1710.  
Wind Speed 11 mph.  
Wind direction is from 285.  
The EOF is NOT activated.

### **INITIATING CUE:**

Based on these conditions, classify this event and complete EP-MA-114-100 MAROG Notifications Attachment 1 (PA/MD Notification Form) to support initial off-site notifications.

### **TIME CRITICAL: YES**

\*Denotes Critical Elements  
#Denotes Sequential Step

#	STEP	STANDARD	S/U
<b>INITIATING CUE: Identify the EAL and classify the event based on current plant conditions as required.</b>			
<b>NOTE: Record time that direction to classify the event is given. _____</b>			
*1	Examinee obtains a copy of Exelon Nuclear Radiological Emergency Plan Annex for Three Mile Island (TMI) Station and/or Table TMI 3-1, Emergency Action Level (EAL) Matrix, to identify the specific EAL(s) applicable to current conditions, and to classify the event.	<p>The examinee determines that an ALERT condition exists, specifically:</p> <ul style="list-style-type: none"> <li>ALERT FA1 Event, due to High Make Up Flow alarm (D-3-1) or leakrate &gt;160 gpm</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>ALERT FA1 Event, due to High Make Up Flow alarm (D-3-1) or leakrate &gt;160 gpm AND Loss of inventory into OTSG</li> </ul>	
*2	The examinee declares the event and identifies himself as the ED. (Examinee may indicate to the examiner that they would make the announcement.)	<p>The examinee declares the event and identifies himself as the ED. (Examinee may indicate to the examiner that they would make the announcement.)</p> <p><b>NOTE: This declaration is required to be completed within 15 minutes from the time the examiner provides direction to classify the event.</b></p> <p>Time of Declaration: _____</p>	
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**END TASK**

JPM CHANGE HISTORY PAGE

REVISION	DATE	REFERENCE TITLE	DESCRIPTION (Include AI # if Appropriate)
0	4/12/2003	NA	Initial issue.
1	5/12/2003		per NRC validation added RMS indications to support non-routine release call.