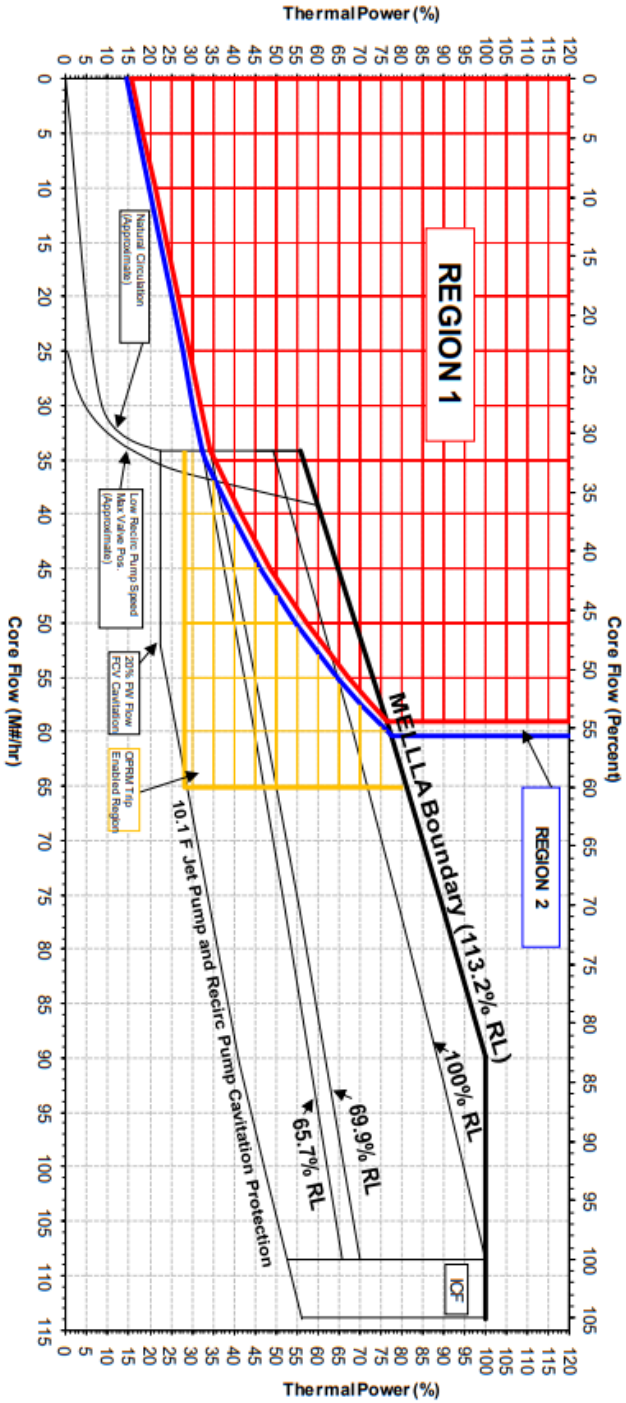


LaSalle County Nuclear Station Unit 2 Power-to-Flow Map



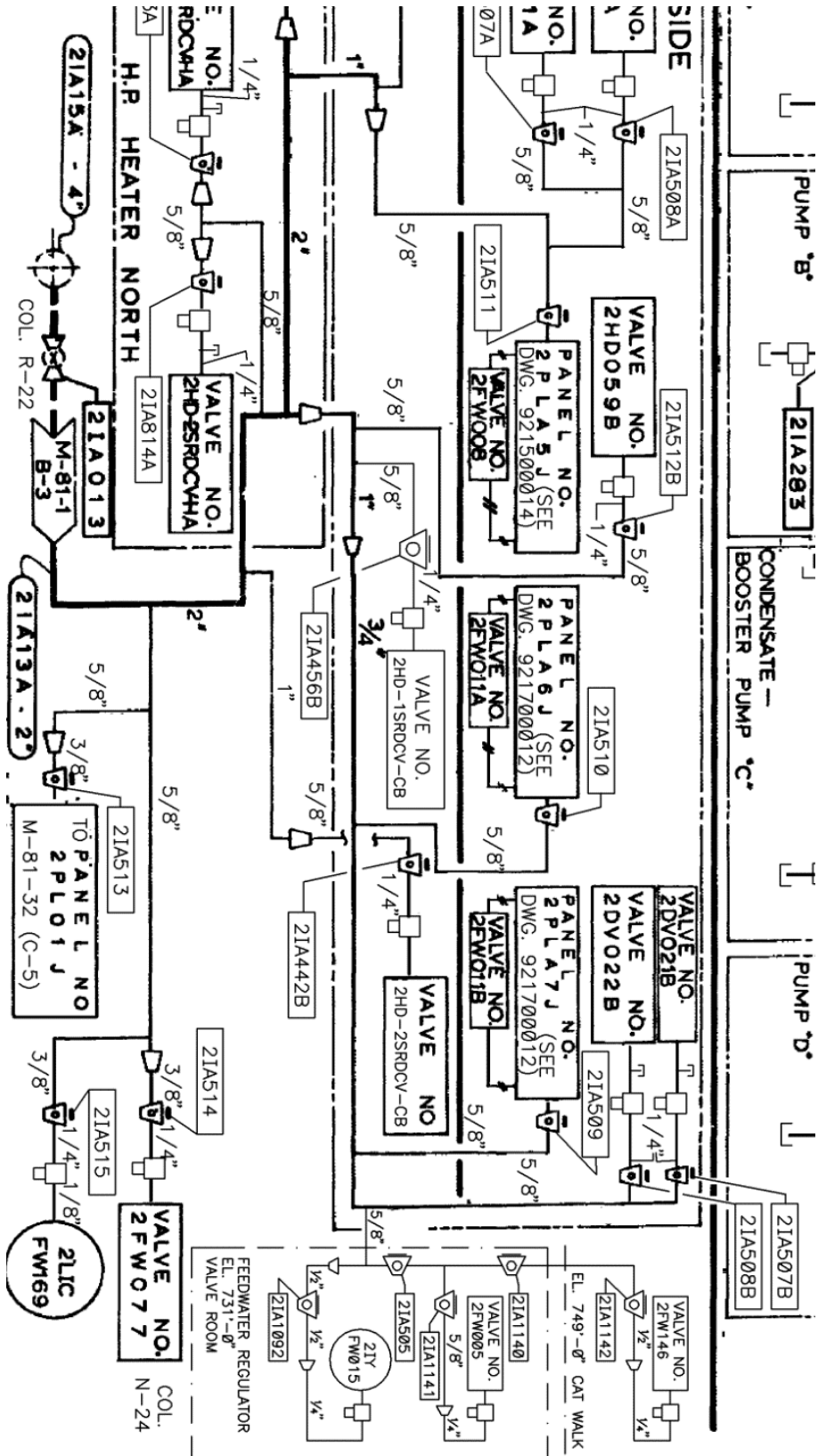
Follow - Up Procedure: LOA-RR-201

Reference Procedure: LOA-RR-201

Yellow Region - (Reference LOR-2HI3-P603-A408, OPRM TRIP ENABLE)

OPRM's should be enabled in the Yellow area. If conditions are met and operation is in this area (>28.1% power and <60%) If the alarm is not initiated this is indication the OPRM's are INOPERABLE.

Level of Use
Continuous



Form 4.3-1 Generic Fundamental Equations and conversion sheet

EQUATIONS

$$\dot{Q} = \dot{m}c_p\Delta T$$

$$N = S/(1 - K_{eff})$$

$$\dot{Q} = \dot{m}\Delta h$$

$$CR_1(1 - K_{eff_1}) = CR_2(1 - K_{eff_2})$$

$$\dot{Q} = UA\Delta T$$

$$1/M = CR_1/CR_x$$

$$\dot{Q} \propto \dot{m}_{Nat}^3 \text{ Circ}$$

$$A = \pi r^2$$

$$\Delta T \propto \dot{m}_{Nat}^2 \text{ Circ}$$

$$F = PA$$

$$K_{eff} = 1/(1 - \rho)$$

$$\dot{m} = \rho A \bar{v}$$

$$\rho = (K_{eff} - 1)/K_{eff}$$

$$\dot{W}_{pump} = \dot{m}\Delta P U$$

$$SUR = 26.06/\tau$$

$$P = I^2 R$$

$$\tau = \frac{\bar{\beta}_{eff} - \rho}{\lambda_{eff} \rho}$$

$$P = IE$$

$$P_A = \sqrt{3}IE$$

$$\rho = \frac{\ell^*}{\tau} + \frac{\bar{\beta}_{eff}}{1 + \lambda_{eff} \tau}$$

$$P_T = \sqrt{3}IEpf$$

$$\ell^* = 1.0 \times 10^{-4} \text{ sec}$$

$$P_R = \sqrt{3}IE\sin\theta$$

$$\lambda_{eff} = 0.1 \text{ sec}^{-1} \text{ (for } \rho > 0)$$

Thermal Efficiency = Net Work Out/Energy In

$$DRW \propto \varphi_{tip}^2/\varphi_{avg}^2$$

$$\frac{g(z_2 - z_1)}{g_c} + \frac{(\bar{v}_2^2 - \bar{v}_1^2)}{2g_c} + u(P_2 - P_1) + (u_2 - u_1) + (q - w) = 0$$

$$P = P_0 e^{t/\tau}$$

$$g = 32.2 \text{ ft/sec}^2$$

$$P = P_0 10^{SUR(t)}$$

$$g_c = 32.2 \text{ lbf-ft/lbf-sec}^2$$

$$A = A_0 e^{-\lambda t}$$

CONVERSIONS

$$1 \text{ MW} = 3.41 \times 10^6 \text{ Btu/hr} \quad ^\circ\text{C} = (5/9)(^\circ\text{F} - 32) \quad 1 \text{ ft}^3_{\text{water}} = 7.48 \text{ gal}$$

$$1 \text{ hp} = 2.54 \times 10^3 \text{ Btu/hr} \quad ^\circ\text{F} = (9/5)(^\circ\text{C}) + 32 \quad 1 \text{ gal}_{\text{water}} = 8.35 \text{ lbf}$$

$$1 \text{ Btu} = 778 \text{ ft-lbf} \quad 1 \text{ kg} = 2.21 \text{ lbf} \quad 1 \text{ Curie} = 3.7 \times 10^{10} \text{ dps}$$

SRO Exam

Q #1 LOA-RX-101 Attachment A

ATTACHMENT A

SATURATED STEAM AND WATER TEMPERATURE (°F) VS PRESSURE (PSIG)

Temperature °F	Pressure PSIG
570	1212
560	1119
550	1031
540	948
530	871
520	798
510	730
500	666
490	607
480	551
470	500
460	452
450	408
440	367
430	329
420	294
410	262
400	233
390	206

Temperature °F	Pressure PSIG
380	181
370	159
360	138
350	120
340	103
330	88
320	75
310	63
300	52
290	43
280	35
270	27
260	21
250	15
240	10
230	6
220	2.5
210	-0.6
200	-3.2

RECORD initial Rx Vsl Press/Temp and at least every 30 minutes thereafter.

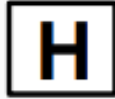
DATE/TIME	RX VSL PRESS	TEMPERATURE	COOLDOWN RATE
/			N/A
/			
/			
/			
/			
/			
/			
/			
/			
/			

Level of Use

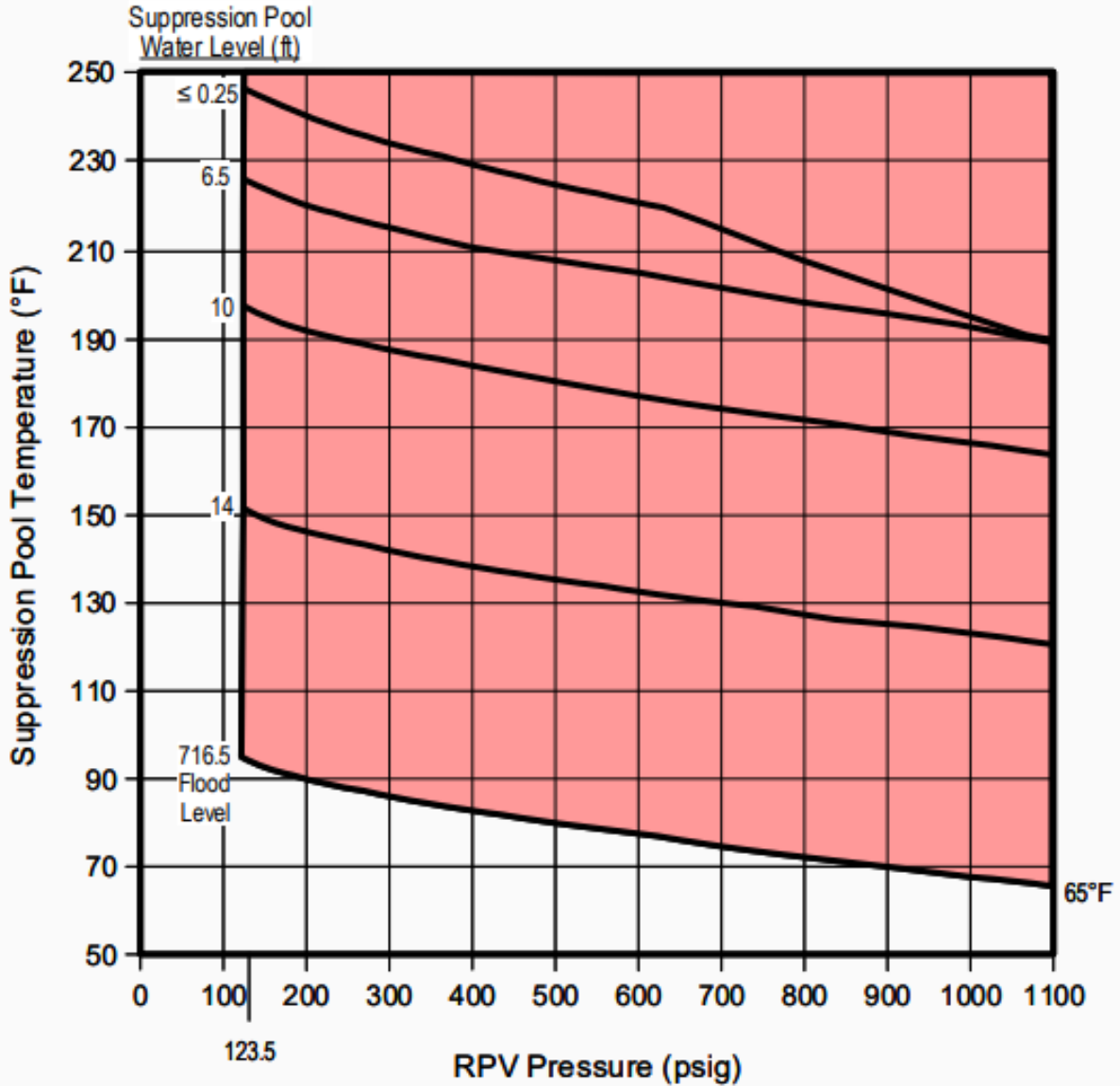
LOA-RX-101

Q #4 HCTL Graph and RCIC NPSH Limit Graph

Large
Level

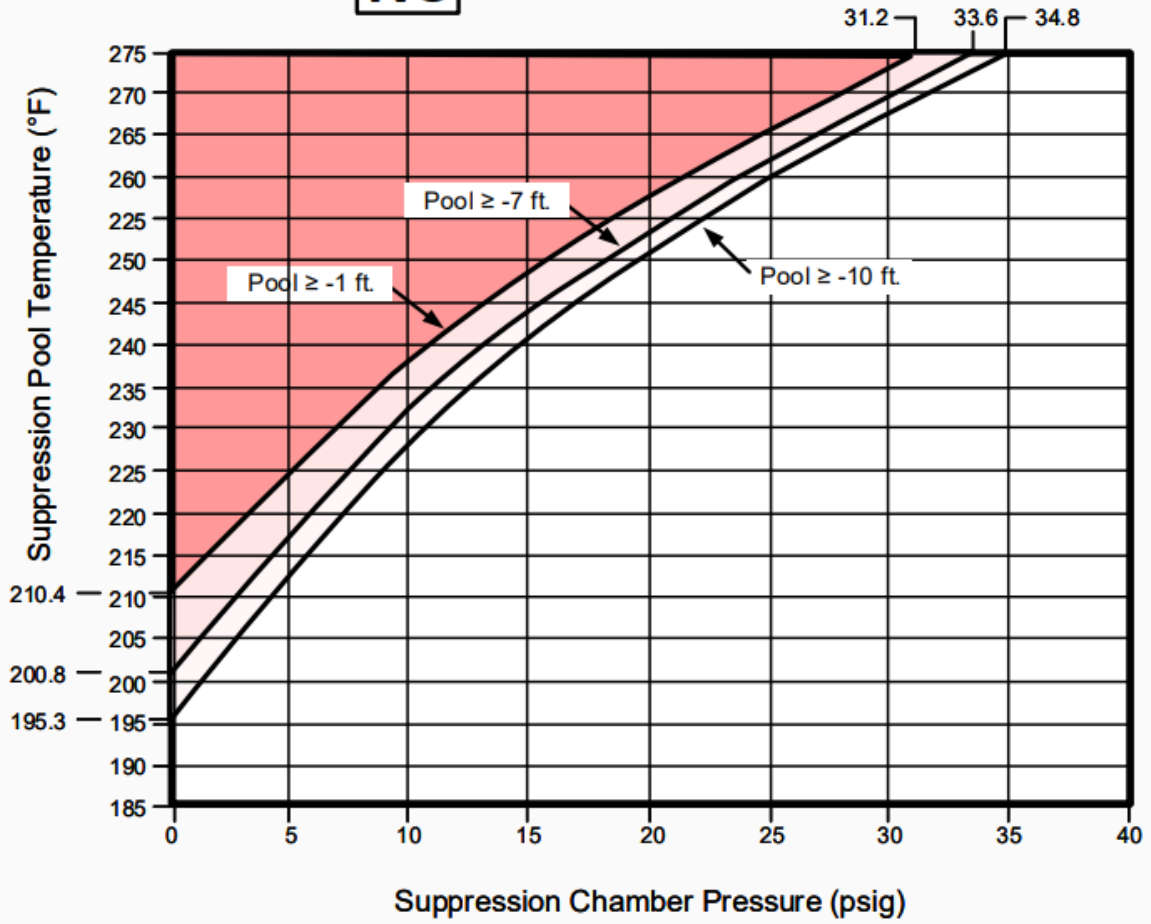


Heat Capacity Temperature Limit



NC

RCIC NPSH Limit



Question #16 REC 12.2.1

CY-LA-170-301
 Revision 10
 September 2021
 Part I, Radiological Effluent Controls

12.2 INSTRUMENTATION

12.2.1 Radioactive Liquid Effluent Monitoring Instrumentation.

REC 12.2.1

APPLICABILITY:

ACTIONS

NOTE

1.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required instrument channels inoperable due to its alarm/trip setpoint less conservative than required.	A.1 Suspend the release of radioactive liquid effluents monitored by the instrument channel. <u>OR</u> A.2 Enter the Condition referenced in Table R12.2.1-1 for the instrument channel.	
B. One or more required instrument channels inoperable for reasons other than Condition A.	B.1 Enter the Condition referenced In Table R12.2.1-1 for the instrument channel.	

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. As required by Required Action A.2 or B.1 and referenced in Table R12.2.1-1.	C.1 Perform RSR 12.3.1.1 on at least two independent samples of the tanks contents.	Prior to each release
	<u>AND</u>	
	C.2 Verify the release rate calculations and discharge valve line-up independently with at least two qualified members of the technical staff.	Prior to each release
	<u>AND</u>	
D. Required Action and associated Completion Time of Condition C not met.	C.3 Return instrument channel to OPERABLE status.	30 days
	<u>OR</u>	
E. -----NOTE----- Required Action E.2 shall be completed if this Condition is entered. ----- As required by Required Action A.2 or B.1 and referenced in Table R12.2.1-1.	C.4 Place Administrative Control Clearance order to Lock-Closed 0WF201, RW DSCH Tank River DSCH Valve, to remove the ability to conduct a Liquid Radwaste Discharge.	30 days
	D.1 Suspend release of radioactive effluents via this pathway.	Immediately
E. -----NOTE----- Required Action E.2 shall be completed if this Condition is entered. ----- As required by Required Action A.2 or B.1 and referenced in Table R12.2.1-1.	E.1 Analyze affected effluent grab samples for principal gamma emitters and I-131 at an LLD as specified in Table R12.3.1-2.	Once per 8 hours
	<u>AND</u>	
	E.2 Restore the instrument channel to OPERABLE status.	30 days

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>F. As required by Required Action A.2 or B.1 and referenced in Table R12.2.1-1.</p>	<p>F.1 -----NOTE----- Pump curves for instrument 3.a, or known valve positions for instrument 3.b, may be used to estimate flow.</p> <hr/> <p>Estimate the flow rate for the release in progress via the affected pathway.</p> <p>F.2 With remote position indication for 0WL005 (BDFCV) not available, verify valve position locally.</p>	<p>Once per 4 hours</p> <p>Prior to each release.</p>
<p>G. -----NOTE----- Required Action G.1 shall be completed if this Condition is entered.</p> <hr/> <p>Required Action C.3 or C.4, or E.2 and associated Completion Time not met.</p>	<p>G.1 Explain why the inoperability was not corrected in a timely manner in the next Radioactive Effluent Release Report.</p>	<p>In accordance with Technical Specification 5.6.3.</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.2.1.1	Perform SOURCE CHECK.	Prior to each release
RSR 12.2.1.2	Perform CHANNEL FUNCTIONAL TEST.	Prior to each Release
RSR 12.2.1.3	Perform CHANNEL CHECK.	24 hours
RSR 12.2.1.4	Perform SOURCE CHECK.	31 days
RSR 12.2.1.5	Perform CHANNEL FUNCTIONAL TEST. Except for Instrument 3.b, the test shall also demonstrate that the instrument indicates measured levels above the alarm/trip setpoint and that the control room alarm annunciates and the affected pathway automatically isolates, as applicable, under the following conditions: <ul style="list-style-type: none"> a. Loss of power, b. Downscale failure, or c. Controls not set in Operate or High Voltage mode. 	92 days
RSR 12.2.1.6	Perform CHANNEL CALIBRATION. (No longer applicable per E.C. #360580)	N/A
RSR 12.2.1.7	Perform CHANNEL CALIBRATION	24 months
RSR 12.2.1.8	Perform POSITION INDICATION VERIFICATION	12 months

Table R12.2.1-1 (page 1 of 2)
Radioactive Liquid Effluent Monitoring Instrumentation

INSTRUMENT	REQUIRED CHANNELS PER INSTRUMENT	CONDITION REFERENCED FROM REQUIRED ACTION A,2 AND B,1	SURVEILLANCE REQUIREMENTS
1. Gamma Scintillation Monitor providing Alarm and Automatic Termination of Release			
a. Liquid Radwaste Effluents Line	1	C	RSR 12.2.1.1 RSR 12.2.1.3 RSR 12.2.1.5 RSR 12.2.1.7 ^(a)
2. Gamma Scintillation Monitors providing Alarm but not providing Automatic Termination of Release			
a. Service Water Effluent Line (Unit 1)	1	E	RSR 12.2.1.4 RSR 12.2.1.3 RSR 12.2.1.5 RSR 12.2.1.7 ^(a)
b. Service Water Effluent Line (Unit 2)	1	E	RSR 12.2.1.4 RSR 12.2.1.3 RSR 12.2.1.5 RSR 12.2.1.7 ^(a)
c. RHR Service Water (Line A) Effluent Line (Unit 1)	1	E	RSR 12.2.1.4 RSR 12.2.1.3 RSR 12.2.1.5 RSR 12.2.1.7 ^(a)
d. RHR Service Water (Line B) Effluent Line (Unit 1)	1	E	RSR 12.2.1.4 RSR 12.2.1.3 RSR 12.2.1.5 RSR 12.2.1.7 ^(a)
e. RHR Service Water (Line A) Effluent Line (Unit 2)	1	E	RSR 12.2.1.4 RSR 12.2.1.3 RSR 12.2.1.5 RSR 12.2.1.7 ^(a)
f. RHR Service Water (Line B) Effluent Line (Unit 2)	1	E	RSR 12.2.1.4 RSR 12.2.1.3 RSR 12.2.1.5 RSR 12.2.1.7 ^(a)

(continued)

^(a) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference radioactive standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, the initial reference radioactive standards or radioactive sources that have been related to the initial calibration shall be used, in order to demonstrate linearity of the original calibration. This transfer calibration, combined with signal inputs, satisfies channel calibration and functional test requirements as implemented by station procedures.

Table R12.2.1-1 (page 2 of 2)
Radioactive Liquid Effluent Monitoring Instrumentation

INSTRUMENT	REQUIRED CHANNELS PER INSTRUMENT	CONDITION REFERENCED FROM REQUIRED ACTION A.2 AND B.1	SURVEILLANCE REQUIREMENTS
3. Flow Rate Measurement Devices			
a. Liquid Radwaste Effluent Line	1	F	RSR 12.2.1.2 RSR 12.2.1.3 RSR 12.2.1.7
b. 0WL005 BDFCV Position Indication	1	F	RSR 12.2.1.8

Q #21 LCO 3.6.1.3

PCIVs
3.6.1.3

3.6 CONTAINMENT SYSTEMS

3.6.1.3 Primary Containment Isolation Valves (PCIVs)

LCO 3.6.1.3

APPLICABILITY:

ACTIONS

----- NOTES -----

- 1.
- 2.
- 3.
- 4.

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. -----NOTE----- Only applicable to penetration flow paths with two or more PCIVs. ----- One or more penetration flow paths with one PCIV inoperable for reasons other than Condition D.</p>	<p>A.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, blind flange, or check valve with flow through the valve secured.</p> <p><u>AND</u></p>	<p>4 hours or in accordance with the Risk Informed Completion Time Program except for main steam line</p> <p><u>AND</u></p> <p>8 hours or in accordance with the Risk Informed Completion Time Program for main steam line</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>A.2 -----NOTES-----</p> <ol style="list-style-type: none"> 1. Isolation devices in high radiation areas may be verified by use of administrative means. 2. Isolation devices that are locked, sealed, or otherwise secured may be verified by use of administrative means. <p>-----</p> <p>Verify the affected penetration flow path is isolated.</p>	<p>Once per 31 days following isolation for isolation devices outside primary containment</p> <p><u>AND</u></p> <p>Prior to entering MODE 2 or 3 from MODE 4 if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days, for isolation devices inside primary containment</p>

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. -----NOTE----- Only applicable to penetration flow paths with two or more PCIVs. ----- One or more penetration flow paths with two or more PCIVs inoperable for reasons other than Condition D.</p>	<p>B.1</p>	
<p>C. -----NOTE----- Only applicable to penetration flow paths with only one PCIV. ----- One or more penetration flow paths with one PCIV inoperable for reasons other than Condition D.</p>	<p>C.1 Isolate the affected penetration flow path by use of at least one closed and de-activated automatic valve, closed manual valve, or blind flange.</p> <p><u>AND</u></p>	<p>4 hours except for excess flow check valves (EFCVs) and penetrations with a closed system</p> <p><u>AND</u></p> <p>72 hours for EFCVs and penetrations with a closed system</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. (continued)	<p>C.2</p> <p>-----NOTES-----</p> <p>1. Isolation devices in high radiation areas may be verified by use of administrative means.</p> <p>2. Isolation devices that are locked, sealed, or otherwise secured may be verified by administrative means.</p> <p>-----</p> <p>Verify the affected penetration flow path is isolated.</p>	<p>Once per 31 days following isolation</p>
D. One or more penetration flow paths with MSIV leakage rate or hydrostatically tested line leakage rate not within limit.	<p>D.1</p> <p>Restore leakage rate to within limit.</p>	<p>4 hours for hydrostatically tested line leakage not on a closed system</p> <p><u>AND</u></p> <p>8 hours for MSIV leakage</p> <p><u>AND</u></p> <p>72 hours for hydrostatically tested line leakage on a closed system</p>

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition A, B, C, or D not met in MODE 1, 2, or 3.	E.1 Be in MODE 3.	12 hours
	E.2 Be in MODE 4.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.6.1.3.1 -----NOTE----- Not required to be met when the 8 inch and 26 inch primary containment purge valves are open for inerting, de-inerting, pressure control, ALARA or air quality considerations for personnel entry, or Surveillances that require the valves to be open, provided the drywell purge valves and suppression chamber purge valves are not open simultaneously. ----- Verify each 8 inch and 26 inch primary containment purge valve is closed.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.6.1.3.2 -----NOTES----- 1. Valves and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for PCIVs that are open under administrative controls. ----- Verify each primary containment isolation manual valve and blind flange that is located outside primary containment and not locked, sealed, or otherwise secured and is required to be closed during accident conditions is closed.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 3.6.1.3.3 -----NOTES-----</p> <ol style="list-style-type: none"> 1. Valves and blind flanges in high radiation areas may be verified by use of administrative means. 2. Not required to be met for PCIVs that are open under administrative controls. <p>-----</p> <p>Verify each primary containment isolation manual valve and blind flange that is located inside primary containment and not locked, sealed, or otherwise secured and is required to be closed during accident conditions is closed.</p>	<p>Prior to entering MODE 2 or 3 from MODE 4 if primary containment was de-inerted while in MODE 4, if not performed within the previous 92 days</p>
<p>SR 3.6.1.3.4 Verify continuity of the traversing incore probe (TIP) shear isolation valve explosive charge.</p>	<p>In accordance with the Surveillance Frequency Control Program</p>
<p>SR 3.6.1.3.5 Verify the isolation time of each power operated, automatic PCIV, except MSIVs, is within limits.</p>	<p>In accordance with the INSERVICE TESTING PROGRAM</p>

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.6	Verify the isolation time of each MSIV is ≥ 3 seconds and ≤ 5 seconds.	In accordance with the INSERVICE TESTING PROGRAM
SR 3.6.1.3.7	Verify each automatic PCIV actuates to the isolation position on an actual or simulated isolation signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.8	Verify a representative sample of reactor instrumentation line EFCVs actuate to the isolation position on an actual or simulated instrument line break signal.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.9	Remove and test the explosive squib from each shear isolation valve of the TIP System.	In accordance with the Surveillance Frequency Control Program
SR 3.6.1.3.10	Verify leakage rate through any one main steam line is ≤ 200 scfh and through all four main steam lines is ≤ 400 scfh when tested at ≥ 25.0 psig.	In accordance with the Primary Containment Leakage Rate Testing Program
SR 3.6.1.3.11	Verify combined leakage rate through hydrostatically tested lines that penetrate the primary containment is within limits.	In accordance with the Primary Containment Leakage Rate Testing Program