NRC RA18-026

2017 Annual Radioactive Effluent Release Report

Part 3

12.1 NOT USED

INTENTIONALLY BLANK

12.2 INSTRUMENTATION

12.2.1 Radioactive Liquid Effluent Monitoring Instrumentation.

REC 12.2.1 The Radioactive Liquid Effluent Instrumentation channels in Table R12.2.1-1 shall be OPERABLE with their alarm/trip setpoints to ensure that the limits of REC 12.3.1 are not exceeded.

APPLICABILITY: When pump flow is present in the system. For Blowdown, when the Blowdown Flow Control Valve is >0% open and the Blowdown line is not otherwise isolated.

ACTIONS

----------NOTE----------

1. Separate Condition entry is allowed for each instrument channel.

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. OR A.2 Enter the Condition referenced in Table R12.2.1-1 for the instrument channel.	Immediately Immediately
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.	Immediately

(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. AND	Prior to each release
	C.2 Verify the release rate calculations and discharge valve line-up independently with at least two qualified members of the technical staff. AND	Prior to each release
	C.3 Return instrument channel to OPERABLE status. OR	30 days
	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. Required Action and associated Completion Time of Condition C not met.	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. AND	Once per 8 hours
	E.2 Restore the instrument channel to OPERABLE status.	30 days

ACTIONS

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

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: 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 IINSTRUMENT	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 IINSTRUMENT	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

12.2 INSTRUMENTATION

12.2.2 Radioactive Gaseous Effluent Monitoring Instrumentation

REC 12.2.2 The Radioactive Gaseous Effluent Instrumentation channels in Table R12.2.2-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of REC 12.4.1 are not exceeded.

APPLICABILITY: According to Table R12.2.2-1

ACTIONS

----------NOTE----------
Separate condition entry is allowed for each instrument channel.

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 gaseous effluents monitored by the instrument channel. OR A.2 Enter the Condition referenced in Table R12.2.2-1 for the instrument channel.	Immediately Immediately
B. One or more required instrument channels inoperable for reasons other than Condition A.	B.1 Enter the Condition referenced in Table R12.2.2-1 for the instrument channel.	Immediately

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. As required by Required Action A.2 or B.1 and referenced in Table R12.2.2-1.	C.1 Place instrument channel in trip.	1 hour
D. As required by Required Action A.2 or B.1 and referenced in Table R12.2.2-1.	D.1 Obtain grab samples. AND D.2 Analyze grab samples for noble gas emitters. AND D.3 Restore instrument channel to OPERABLE status.	Once per 8 hours Within 24 hours following each grab sample 30 days
E. As required by Required Action A.2 or B.1 and referenced in Table R12.2.2-1.	E.1 Obtain grab samples. AND E.2 Analyze grab samples for noble gas emitters at an LLD as specified in Table R12.4.1-1. AND E.3 Restore instrument channel to OPERABLE status.	Once per 8 hours Within 24 hours following each grab sample 30 days
F. As required by Required Action A.2 or B.1 and referenced in Table R12.2.2-1.	F.1 Establish CONTINUOUS SAMPLING with auxiliary sampling equipment as required in Table R12.4.1-1. AND F.2 Restore instrument channel to OPERABLE status.	4 hours 30 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. As required by Required Action A.2 or B.1 and referenced in Table R12.2.2-1.	G.1 Estimate flow rate. AND G.2 Restore instrument channel to OPERABLE status.	Once per 4 hours 30 days
H. As required by Required Action A.2 or B.1 and referenced in Table R12.2.2-1.	H.1 Verify offgas treatment system not bypassed. AND H.2.1 Verify at least one Instrument 1.a channel OPERABLE. OR H.2.2 Verify Required Actions for Condition D are met. AND H.3 Obtain and analyze grab samples. AND H.4 Restore instrument channel to OPERABLE status.	Immediately Immediately Immediately Once per 24 hours. 30 days
I. ----------NOTE---------- Required Action I.1 shall be completed if this Condition is entered. ---------- Required Action and associated Completion Time of Required Action D.3, E.3, F.2, or G.2 or H.4 not met.	I.1 Explain in the next Radioactive Effluent Release Report why the inoperability was not corrected within the time specified.	In accordance with Technical Specification 5.6.3.

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
RSR 12.2.2.1	Perform CHANNEL CHECK.	24 hours
RSR 12.2.2.2	Perform SOURCE CHECK.	24 hours
RSR 12.2.2.3	----------NOTE---------- For Instruments 4.b and 4.c, not required to be performed until 7 days after Standby Gas Treatment is placed in operation. ---------- Perform CHANNEL CHECK.	7 days
RSR 12.2.2.4	Perform SOURCE CHECK.	31 days
RSR 12.2.2.5	Perform CHANNEL FUNCTIONAL TEST. For Instruments 3.a (log monitor only) and 1.a, the test shall also demonstrate that the control room alarm annunciates and the automatic isolation capability of the affected pathway, as applicable, under the following conditions: a. Upscale, b. Inoperative, or c. Downscale	92 days
RSR 12.2.2.6	Perform CHANNEL FUNCTIONAL TEST. The test shall also demonstrate that the instrument indicates measured levels above the alarm setpoint and that the control room alarm annunciates on a Loss of Counts condition.	92 days
RSR 12.2.2.7	Perform CHANNEL CALIBRATION	24 months

Table R12.2.2-1 (page 1 of 2)
Radioactive Gaseous Effluent Monitoring Instrumentation

	INSTRUMENT[a]	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER INSTRUMENT	CONDITION REFERENCED FROM REQUIRED ACTION A.2 AND B.1	SURVEILLANCE REQUIREMENTS
1.	Main Condenser Offgas Treatment System Effluent Monitoring System				
a.	Noble Gas Activity Monitor – Providing Alarm and Automatic Termination of Release (Post-Treat)	(b)	2	C, if only one required channel inoperable D, if both required channels inoperable	RSR 12.2.2.1 RSR 12.2.2.2 RSR 12.2.2.5 RSR 12.2.2.7[e]
2.	Main Stack Monitoring System				
a.	Noble Gas Activity Monitor (Low or Mid Range WRGM)	(c)	1	E	RSR 12.2.2.1 RSR 12.2.2.4 RSR 12.2.2.6 RSR 12.2.2.7[d]
b.	Iodine Sampler (Grab Sampler)	(c)	1	F	RSR 12.2.2.3
c.	Particulate Sampler (Grab Sampler)	(c)	1	F	RSR 12.2.2.3
d.	Effluent System Flow Rate Monitor	(c)	1	G	RSR 12.2.2.1 RSR 12.2.2.5 RSR 12.2.2.7
e.	Sampler Flow Rate Monitor (Low/Mid/Hi)	(c)	1	G	RSR 12.2.2.1 RSR 12.2.2.5 RSR 12.2.2.7

(Continued)

(a) Equipment Part Numbers (EPN) are provided in Table R12.2.2-2.
(b) During effluent releases via this pathway.
(c) At all times.
(d) The initial CHANNEL CALIBRATION shall be performed using one or more of the referenced 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 CALIBRATIONS, the initial reference radioactive standards or radioactive sources that have been related to the initial calibration shall be used.
(e) 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 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 R12.2.2-1 (page 2 of 2)
Radioactive Gaseous Effluent Monitoring Instrumentation

	INSTRUMENT[a]	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER INSTRUMENT	CONDITION REFERENCED FROM REQUIRED ACTION A.2 AND B.1	SURVEILLANCE REQUIREMENTS
3.	Condenser Air Ejector Radioactivity Monitor (Prior to Input to Holdup System)				
	a. Noble Gas Activity Monitor	(f)	1	H	RSR 12.2.2.1 RSR 12.2.2.4 RSR 12.2.2.5 RSR 12.2.2.7[d]
4.	Standby Gas Treatment (SGT) Monitoring System				
	a. Noble Gas Activity Monitor (Low or Mid Range WRGM)	(g)	1	E	RSR 12.2.2.1 RSR 12.2.2.4 RSR 12.2.2.6 RSR 12.2.2.7[d]
	b. Iodine Sampler (Grab Sampler)	(g)	1	F	RSR 12.2.2.3
	c. Particulate Sampler (Grab Sampler)	(g)	1	F	RSR 12.2.2.3
	d. Effluent System Flow Rate Monitor	(g)	1	G	RSR 12.2.2.1 RSR 12.2.2.5 RSR 12.2.2.7
	e. Sampler Flow Rate Monitor (Low/Mid/Hi)	(g)	1	G	RSR 12.2.2.1 RSR 12.2.2.5 RSR 12.2.2.7

(a) Equipment Part Numbers (EPN) are provided in Table R12.2.2-2.
(d) The initial CHANNEL CALIBRATION shall be performed using one or more of the referenced 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 CALIBRATIONS, the initial reference radioactive standards or radioactive sources that have been related to the initial calibration shall be used.
(f) During operation of the main condenser air ejector.
(g) During operation of SGT.

Table R12.2.2-2 (page 1 of 2)
Radioactive Gaseous Effluent Monitoring Instrumentation Applicability

INSTRUMENT	EPNS OF APPLICABLE EQUIPMENT
A. Unit 1 Applicable Instruments	
1. Main Condenser Offgas Treatment System Effluent Monitoring System	
a. Noble Gas Activity Monitor – Providing Alarm and Automatic Termination of Release	1D18-N903A, K901A, K601A, R601 1D18-N903B, K901B, K601B, R601
2. Main Stack Monitoring System	
a. Noble Gas Activity Monitor (Low or Mid Range WRGM)	0D18-N514, R517, R518 Low Range 0D18-N515, R517, R518 Mid Range
b. Iodine Sampler (Grab Sampler)	
c. Particulate Sampler (Grab Sampler)	
d. Effluent System Flow Rate Monitor	0FT-VR019, 0FY-VR019 AND 019A, 0FR-VR019, 0D18-K510, 0D18-R518
e. Sampler Flow Rate Monitor (Low/Mid/Hi)	0D18-N527, 0D18-N528, 0D18-R518 Low 0D18-N530, 0D18-N531, 0B18-R518 Mid/Hi
3. Condenser Air Ejector Radioactivity Monitor (Prior to Input to Holdup System)	
a. Noble Gas Activity Monitor	1D18-N002, K613, R604, or 1D18-N012, K600, R605
4. Standby Gas Treatment (SGT) Monitoring System	
a. Noble Gas Activity Monitor (Low/Mid Range WRGM)	0D18-N511, R515, R516 Low Range 0D18-N512, R515, R516 Mid Range
b. Iodine Sampler (Grab Sampler)	
c. Particulate Sampler (Grab Sampler)	
d. Effluent System Flow Rate Monitor	1FT-VG009, 1FY-VG009, 1FR-VG-009
e. Sampler Flow Rate Monitor (Low/Mid/Hi)	0D18-N521, 0D18-N522, 0D18-R516 Low 0D18-N524, 0D18-N525, 0B18-R516 Mid/Hi

(Continued)

Table R12.2.2-2 (page 2 of 2)
Radioactive Gaseous Effluent Monitoring Instrumentation Applicability

INSTRUMENT	EPNS OF APPLICABLE EQUIPMENT
B. Unit 2 Applicable Instruments	
1. Main Condenser Offgas Treatment System Effluent Monitoring System	
a. Noble Gas Activity Monitor – Providing Alarm and Automatic Termination of Release	2D18-N903A, K901A, K601A, R601 2D18-N903B, K901B, K601B, R601
2. Main Stack Monitoring System	
a. Noble Gas Activity Monitor (Low or Mid Range WRGM)	0D18-N514, R517, R518 Low Range 0D18-N515, R517, R518 Mid Range
b. Iodine Sampler (Grab Sampler)	
c. Particulate Sampler (Grab Sampler)	
d. Effluent System Flow Rate Monitor	0FT-VR019, 0FY-VR019 AND 019A, 0FR-VR019, 0D18-K510, 0D18-R518
e. Sampler Flow Rate Monitor (Low/Mid/Hi)	0D18-N527, 0D18-N528, 0D18-R518 Low 0D18-N530, 0D18-N531, 0B18-R518 Mid/Hi
3. Condenser Air Ejector Radioactivity Monitor (Prior to Input to Holdup System)	
a. Noble Gas Activity Monitor	2D18-N002, K613, R604, or 2D18-N012, K600, R605
4. Standby Gas Treatment (SGT) Monitoring System	
a. Noble Gas Activity Monitor (Low/Mid Range WRGM)	0D18-N511, R515, R516 Low Range 0D18-N512, R515, R516 Mid Range
b. Iodine Sampler (Grab Sampler)	
c. Particulate Sampler (Grab Sampler)	
d. Effluent System Flow Rate Monitor	2FT-VG009, 2FY-VG009, 2FR-VG-009
e. Sampler Flow Rate Monitor (Low/Mid/Hi)	0D18-N521, 0D18-N522, 0D18-R516 Low 0D18-N524, 0D18-N525, 0B18-R516 Mid/Hi

12.3 LIQUID EFFLUENTS

12.3.1 Liquid Effluent Concentration

REC 12.3.1 The concentration of radioactive material released from the site to areas at or beyond the SITE BOUNDARY shall be limited to:

a. 10 times the concentration specified in 10 CFR 20.1001-20.2402 Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases; and

b. the values listed in Table R12.3.1-1 for total activity concentration for all dissolved or entrained noble gases.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Concentration of radioactive material released to areas at or beyond the SITE BOUNDARY not within limits.	A.1 Initiate action to restore the concentration to within limits.	Immediately
B. Requirements of RSR 12.3.1.4 not met.	B.1 Enter Condition A of Technical Requirements Manual Section 3.7.d.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.3.1.1	Determine radioactivity content of each radioactive liquid waste batch by sampling and analysis in accordance with Table R12.3.1-2.	In accordance with the Radioactive Liquid Waste Sampling and Analysis Program.
RSR 12.3.1.2	Perform post-release analysis of samples composited from batch releases in accordance with Table R12.3.1-2.	In accordance with the Radioactive Liquid Waste Sampling and Analysis Program.
RSR 12.3.1.3	Determine radioactivity concentration of liquids discharged from continuous release points by sampling and analysis in accordance with Table R12.3.1-2.	In accordance with the Radioactive Liquid Waste Sampling and Analysis Program.

(Continued)

SURVEILLANCE REQUIREMENTS

RSR 12.3.1.4	----------NOTE---------- Not required to be performed until 7 days after the start of addition if tank(s) is empty at the beginning of the addition. ---------- Verify the quantity of radioactive material of each outside temporary tank is low enough to ensure that in the event of an uncontrolled release of the tanks contents, the resulting concentration would be less than the REC limits.	7 days when radioactive material is being added to the tank(s). AND Once within 7 days after each completion of addition of radioactive material to the tank(s).

Table R12.3.1-1

ALLOWABLE CONCENTRATION (AC) OF DISSOLVED OR ENTRAINED NOBLE GASES RELEASED FROM THE SITE TO UNRESTRICTED AREAS IN LIQUID WASTE

NUCLIDE	ALLOWABLE CONCENTRATION (μCi/ml)*
Kr-85m	2×10^{-4}
Kr-85	5×10^{-4}
Kr-87	4×10^{-5}
Kr-88	9×10^{-5}
Ar-41	7×10^{-5}
Xe-131m	7×10^{-4}
Xe-133m	5×10^{-4}
Xe-133	6×10^{-4}
Xe-135m	2×10^{-4}
Xe-135	2×10^{-4}

* Computed from Equation 20 of ICRP Publication 2 (1959), adjusted for infinite cloud submersion in water, and R = 0.01 rem/week, density = 1.0 g/cc and Pw/Pt = 1.0.

Table R12.3.1-2 (Page 1 of 4)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

LIQUID RELEASE TYPE	SAMPLING FREQUENCY[g]	MINIMUM ANALYSIS FREQUENCY[g]	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD)[a] (µCi/ml)
A. Batch Waste Release Tanks[d]	Prior to each release, Each Batch	Prior to each release, Each Batch	Principal Gamma Emitters[f]	$5x10^{-7}$
			I-131	$1x10^{-6}$
	Prior to each release, Each Batch	31 days Composite [b]	H-3	$1x10^{-5}$
			Gross Alpha	$1x10^{-7}$
	Prior to each release, Each Batch	92 days Composite [b]	Sr-89, Sr-90	$5x10^{-8}$
			Fe-55	$1x10^{-6}$
	Prior to each release, One Batch per 31 days	31 days	Dissolved & Entrained Gases (Gamma Emitters)	$1x10^{-5}$
B. Plant Continuous Releases[e] Cooling Pond Blowdown	CONTINUOUS[c]	7 days Composite [c]	I-131	$1x10^{-6}$
			Principal Gamma Emitters[f]	$5x10^{-7}$
	31 days Grab Sample	31 days	Dissolved & Entrained Gases (Gamma Emitters)	$1x10^{-5}$
	CONTINUOUS[c]	31 days Composite[c]	H-3	$1x10^{-5}$
			Gross Alpha	$1x10^{-7}$
	CONTINUOUS[c]	92 days Composite[c]	Sr-89, Sr-90	$5x10^{-8}$
			Fe-55	$1x10^{-6}$

Table R12.3.1-2 (Page 2 of 4)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM TABLE NOTATION

a. The LLD is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66 S_b}{E \cdot V \cdot 2.22x10^6 \cdot Y \cdot e^{(-\lambda \Delta t)}}$$

Where:

LLD = the a priori lower limit of detection (microcurie per unit mass or volume),

s_b = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

$= \frac{\sqrt{B}}{t}$

B = background sum (counts)
t = count time (minutes)

E = the counting efficiency (counts per transformation),

V = the sample size (units of mass or volume),

2.22×10^6 = the number of transformations per minute per microcurie,

Y = the fractional radiochemical yield, when applicable,

λ= the radioactive decay constant for the particular radionuclide and for composite samples, and

Δt = the elapsed time between the midpoint of sample collection and the time of counting (for plant effluents, not environmental samples). For batch samples taken and analyzed prior to release, Δt is taken to be zero.

The value of s_b used in the calculation of the LLD for a detection system shall be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance. Typical values of E, V, Y, and Δt shall be used in the calculation.

Alternate LLD Methodology

An alternate methodology for LLD determination follows and is similar to the above LLD equation:

$$LLD = \frac{(2.71 + 4.65\sqrt{B}) \cdot Decay}{E \cdot q \cdot b \cdot Y \cdot t \cdot (2.22x10^6)}$$

Table R12.3.1-2 (Page 3 of 4)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM TABLE NOTATION

Where:

B = background sum (counts)

E = counting efficiency

q = sample quantity (mass or volume)

b = abundance (if applicable)

Y= fractional radiochemical yield or collection efficiency (if applicable)

t= count time (minutes)

2.22×10^6 = number of disintegrations per minute per microcurie

$2.71 + 4.65\sqrt{B} = k^2 + (2k\sqrt{2}\sqrt{B})$, and k = 1.645

(k=value of the t statistic from the single-tailed t distribution at a significance level of 0.95 and infinite degrees of freedom. This means that the LLD result represents a 95% detection probability with a 5% probability of falsely concluding that the nuclide is present when it is not or that the nuclide is not present when it is.)

Decay = $e^{\lambda\Delta t}[\lambda RT/(1-e^{-\lambda RT})][\lambda T_d/(1-e^{-\lambda T_d})]$ if applicable

λ = radioactive decay constant (units consistent with Δt, RT and T_d)

Δt = "delta t", or the elapsed time between sample collection or the midpoint of sample collection and the time the count is started, depending on the type of sample (units consistent with λ)

RT = elapsed real time, or the duration of the sample count (units consistent with λ)

T_d = sample deposition time, or the duration of analyte collection onto the sample media (units consistent with λ)

The LLD may alternately be determined using installed radioanalytical software, if available. In addition to determining the correct number of channels over which to total the background sum, utilizing the software's ability to perform decay corrections (i.e. during sample collection, from sample collection to start of analysis, and during counting), this alternate method will result in a more accurate determination of the LLD.

It should be recognized that the LLD is defined as a before the fact limit representing the capability of a measurement system and not as an after the fact limit for a particular measurement.

Table R12.3.1-2 (Page 4 of 4)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM TABLE NOTATION

b. A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sample employed results in a specimen which is representative of the liquids released.

c. To be representative of the quantities and concentrations of radioactive materials in liquid effluents, samples shall be collected in proportion to the rate of flow of the effluent stream. Prior to analyses, all samples taken for the composite shall be thoroughly mixed in order for the composite sample to be representative of the effluent release.

d. A batch release is the discharge of liquid waste of a discrete volume. Prior to sampling for analyses, each batch shall be isolated, and then thoroughly mixed to assure representative sampling.

e. A continuous release is the discharge of liquid wastes of a non-discrete volume; e.g., from a volume of system that has an input flow during the continuous release.

f. The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141, and Ce-144. This list does not mean that only these nuclides are to be detected and reported. Other peaks that are measurable and identifiable, at the 95% confidence level, together with the above nuclides, shall also be identified and reported.

g. The provisions of RSR 12.0.2 and RSR 12.0.3 are applicable to the Radioactive Liquid Waste Sampling and Analysis Program.

12.3 LIQUID EFFLUENTS

12.3.2 Dose from Liquid Effluents

REC 12.3.2 The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each reactor unit, from the site shall be limited to:

a. ≤ 1.5 mrem to the total body and ≤ 5.0 mrem to any organ during any calendar quarter; and

b. ≤ 3.0 mrem to the total body and ≤ 10.0 mrem to any organ during any calendar year.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.1 shall be completed if this Condition is entered. --- Calculated dose not within limits.	A.1 Submit a Report, pursuant to 10CFR50, Appendix I, Section IV.A, to the NRC that identifies causes for exceeding limits, radiological impact on finished drinking water supplies at the nearest downstream drinking water source and defines actions to be taken to reduce releases of radioactive materials in liquid effluents during the remainder of the current calendar quarter and during the subsequent three calendar quarters so that the cumulative dose or dose commitment is within the limits of REC 12.3.2.b.	30 days following the end of the quarter in which the release occurred
B. Calculated dose exceeds two times (2x) the limits.	B.1 Enter Condition A of REC 12.4.7.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
RSR 12.3.2.1	----------NOTE---------- Only required to be performed if liquid releases have occurred since the last performance of this RSR. --- Calculate cumulative dose contributions from liquid effluents in accordance with the ODCM.	31 days

12.3 LIQUID EFFLUENTS

12.3.3 Liquid Radwaste Treatment Systems

REC 12.3.3. The Liquid Radwaste Treatment System shall:

a. Be OPERABLE; and

b. Be used to reduce the radioactive materials in liquid wastes prior to their discharge when the projected doses due to the liquid effluent, from each reactor unit, from the site would exceed 0.06 mrem to the total body or 0.2 mrem to any organ when averaged over 31 days.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Liquid Radwaste Treatment System inoperable.	A.1 Restore Liquid Radwaste Treatment System to OPERABLE status.	31 days
B. ----------NOTE---------- Required Action B.1 shall be completed if this Condition is entered. ---------- Untreated liquid waste release in progress. AND Projected dose not within limits.	B.1 Submit a report to the NRC that includes inoperable equipment or subsystem identification and reason, action taken to restore the inoperable equipment to OPERABLE status, and a summary description of the action(s) taken to prevent recurrence.	30 days
C. ----------NOTE---------- Required Action C.1 shall be completed if this Condition is entered. ---------- Required Action and Associated Completion time of Condition A not met.	C.1 Submit a report to the NRC that includes inoperable equipment or subsystem identification and reason, action taken to restore the inoperable equipment to OPERABLE status, and a summary description of the action(s) taken to prevent recurrence.	30 days

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
RSR 12.3.3.1	----------NOTE---------- Only required to be performed if liquid releases are planned and RSR has not been performed in the last 38 days 18 hours. ---------- Determine projected doses due to liquid releases in accordance with the ODCM methods.	31 days
RSR 12.3.3.2	----------NOTE---------- Not required to be performed if Liquid Radwaste Treatment System has been used to process radioactive liquid effluents in the last 115 days. ---------- Operate the Liquid Radwaste Treatment System equipment for at least 30 minutes.	92 days if a portable (vendor supplied) waste treatment system is being used. AND 180 days if a portable (vendor-supplied) waste treatment system is not being used.

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.1 Gaseous Effluent Dose Rates

REC 12.4.1 The dose rate at or beyond the SITE BOUNDARY due to radioactive materials in gaseous effluents released from the site shall be limited to the following:

a. For noble gases, ≤ 500 mrem/year to the total body and ≤ 3000 mrem/year to the skin; and

b. For iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives > 8 days, ≤ 1500 mrem/year to any organ via the inhalation pathway.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Dose rate not within limits.	A.1 Initiate action to decrease release rates to maintain dose rates within limits.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.4.1.1	Verify the dose rates due to noble gases, iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half lives > 8 days in gaseous effluents is within limits utilizing the methodology and parameters of the ODCM limits by obtaining and analyzing representative samples in accordance with Table R12.4.1-1.	In accordance with the Radioactive Gaseous Waste Sampling and Analysis Program

Table R12.4.1-1 (Page 1 of 5)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

GASEOUS RELEASE TYPE	SAMPLING FREQUENCY[i]	MINIMUM ANALYSIS FREQUENCY[i]	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) (µCi/ml)[a]
A. Containment Vent and Purge System[h]	Prior to each release Each Purge[b, k] Grab Sample	Prior to each release Each Purge[b]	Principal Gamma Emitters[g]	$1x10^{-4}$
		31 days[b, k]	H-3	$1x10^{-6}$
B. Main Vent Stack	31 days[b] Grab Sample	31 days[b]	Principal Gamma Emitters[g]	$1x10^{-4}$
	7 days[b,e] Grab Sample	7 days[b,e]	H-3	$1x10^{-6}$
C. Standby Gas Treatment System	24 hours[c] Grab Sample	24 hours[c]	Principal Gamma Emitters[g]	$1x10^{-4}$
D. Main Vent Stack And Standby Gas Treatment System[c]	CONTINUOUS[f]	7 days[d] Charcoal Sample	I-131	$1x10^{-12}$
			I-133	$1x10^{-10}$
	CONTINUOUS[f]	7 days[d] Particulate Sample	Principal Gamma Emitters[g] (I-131, Others)	$1x10^{-11}$
	CONTINUOUS[f]	31 days Composite Particulate Sample	Gross Alpha	$1x10^{-11}$
	CONTINUOUS[f]	92 days Composite Particulate Sample	Sr-89,Sr-90	$1x10^{-11}$
	CONTINUOUS[f]	Noble Gas Monitor	Noble Gases, Gross Beta or Gamma	$1x10^{-6}$

Table R12.4.1-1 (Page 2 of 5)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM TABLE NOTATION

a. The LLD is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

$$LLD = \frac{4.66 S_b}{E \cdot V \cdot 2.22x10^6 \cdot Y \cdot e^{(-\lambda \Delta t)}}$$

Where:

LLD is the "a priori" lower limit of detection as defined above (as microcurie per unit mass or volume),

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute),

$$= \frac{\sqrt{B}}{t}$$

B = background sum (counts)
t = count time (minutes)

E is the counting efficiency (as counts per transformation),

V is the sample size (in units of mass or volume),

$2.22x10^6$ is the number of transformations per minute per microcurie,

Y is the fractional radiochemical yield (when applicable),

λ is the radioactive decay constant for the particular radionuclide, and

Δt is the elapsed time between midpoint of sample collection and time of counting (for plant effluents, not environmental samples).

The value of s_b used in the calculation of the LLD for a detection system shall be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance. Typical values of E, V, Y, and Δt shall be used in the calculation.

Alternate LLD Methodology

An alternate methodology for LLD determination follows and is similar to the above LLD equation:

$$LLD = \frac{(2.71 + 4.65\sqrt{B}) \cdot Decay}{E \cdot q \cdot b \cdot Y \cdot t \cdot (2.22x10^6)}$$

Table R12.4.1-1 (Page 3 of 5)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM TABLE NOTATION

Where:

B = background sum (counts)

E = counting efficiency

q = sample quantity (mass or volume)

b = abundance (if applicable)

Y = fractional radiochemical yield or collection efficiency (if applicable)

t = count time (minutes)

2.22×10^6 = number of disintegrations per minute per microcurie

$2.71 + 4.65\sqrt{B}$ = $k^2 + (2k\sqrt{2}\sqrt{B})$, and k = 1.645

(k=value of the t statistic from the single-tailed t distribution at a significance level of 0.95 and infinite degrees of freedom. This means that the LLD result represents a 95% detection probability with a 5% probability of falsely concluding that the nuclide is present when it is not or that the nuclide is not present when it is.)

Decay = $e^{\lambda\Delta t}[\lambda RT/(1-e^{-\lambda RT})][\lambda T_d/(1-e^{-\lambda T_d})]$ if applicable

λ = radioactive decay constant (units consistent with Δt, RT and T_d)

Δt = "delta t", or the elapsed time between sample collection or the midpoint of sample collection and the time the count is started, depending on the type of sample (units consistent with λ)

RT = elapsed real time, or the duration of the sample count (units consistent with λ)

T_d = sample deposition time, or the duration of analyte collection onto the sample media (units consistent with λ)

The LLD may alternately be determined using installed radioanalytical software, if available. In addition to determining the correct number of channels over which to total the background sum, utilizing the software's ability to perform decay corrections (i.e. during sample collection, from sample collection to start of analysis, and during counting), this alternate method will result in a more accurate determination of the LLD.

It should be recognized that the LLD is defined as a before the fact limit representing the capability of a measurement system and not as an after the fact limit for a particular measurement.

b. Sampling and analyses shall also be performed following shutdown, startup, or a thermal power change exceeding 20 percent of RATED THERMAL POWER in 1 hour unless (1) analysis shows that the dose equivalent I-131 concentration in the primary coolant has not increased more than a factor of 5, and (2) the noble gas activity monitor shows that effluent activity has not increased by more than a factor of 3.

Table R12.4.1-1 (Page 4 of 5)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM TABLE NOTATION

c. Whenever there is flow through the SGT. If SGT is run more than 2 hrs in a 24-hour period, ensure a noble gas sample is obtained prior to securing SGT and particulate and iodine samples are taken within 24 hrs after securing SGT. A 2-hour run ensures required sample lower limits of detection are met for particulates and iodine. A SGT run of less than 2 hrs is not a significant contribution to offsite dose and requires no sampling.

d. Samples shall be changed at least once per 7 days and the analyses completed within 48 hours after removal from the sampler. Sampling shall also be performed within 24 hours following each shutdown, startup, or thermal power level change exceeding 20% of RATED THERMAL POWER in one hour. This requirement does not apply if 1) analysis shows that the dose equivalent I-131 concentration in the primary coolant has not increased by more than a factor of 5, and 2) the noble gas activity monitor shows that effluent activity has not increased by more than a factor of 3. When samples collected for ≤ 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10.

e. Tritium grab samples shall be taken at least once per 7 days from the plant vent to determine tritium releases in the ventilation exhaust from the spent fuel pool area whenever spent fuel is in the spent fuel pool. If there is no spent fuel in the fuel pool, sampling and analysis of tritium grab samples shall be performed at least once per 31 days.

f. The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with RECs 12.4.1, 12.4.2 and 12.4.3.

g. The principal gamma emitters for which the LLD specification applies include the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 for gaseous emissions and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be detected and reported. Other peaks that are measurable and identifiable, at the 95% confidence level, together with the above nuclides, shall also be identified and reported.

h. The drywell tritium and noble gas samples and associated purge calculations are required when the Unit is at power (i.e. critical) and for the first 24 hours of purging activities following shutdown. The drywell tritium and noble gas sample results are valid for 30 hours from sample time if 1) the drywell radioactivity monitors have not indicated an increase in airborne or gaseous radioactivity, and 2) the drywell equipment and floor drain sump pumps run times have not indicated an increase in leakage in the drywell since the sample was taken, and 3) conditions are such that activity can be calculated for the radionuclide concentration at the time of the release.

If there is any reason to suspect that gaseous radioactivity levels have changed in the drywell that would compromise the calculated, or estimated, radionuclide concentrations at the time of the release, since the last sample (30 hours), a new sample and analyses should be requested prior to starting a drywell purge to meet the intent of providing current analyses to reflect actual activity released to the environment. If a known steady state leakage condition exists in the drywell it is possible to calculate a safe and accurate release package. Final release quantification will be based on calculated radionuclide concentrations at the time of the actual release.

Table R12.4.1-1 (Page 5 of 5)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM TABLE NOTATION

If the drywell is PURGED in accordance with the ODCM definition, both noble gas and tritium sampling along with the appropriate purge calculations must be completed before the purge begins. If the drywell is simply VENTING in accordance with the ODCM definition, no sample is required before venting.

i. The provisions of RSR 12.0.2 and RSR 12.0.3 are applicable to the Radioactive Gaseous Waste Sampling and Analysis Program.

j. Not used.

k. Drywell tritium results obtained during the previous 31 days may be used in the purge calculations, in lieu of actual results (from most recent purge sample), to allow completion of the purge calculations in an expeditious manner permitting a timely drywell entry, if necessary. However, the substitute tritium results are valid for use only if the three (3) conditions set forth in Note "h" surrounding sample validity are met. In addition, the substitute results do not change the requirements for tritium sampling frequency (Prior to each release Each Purge) per Table R12.4.1-1. The most recent purge sample tritium analyses should be completed, and the associated purge calculations should be updated as soon as possible following sampling. For reporting purposes (i.e. annual reports, etc.), actual results are used, when possible.

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.2 Dose from Noble Gases

REC 12.4.2 The air dose due to noble gases in gaseous effluents released from each reactor unit from the site shall be limited to the following:

a. For gamma radiation, ≤ 5 mrad during any calendar quarter and ≤ 10 mrad during any calendar year; and

b. For beta radiation, ≤ 10 mrad during any calendar quarter and ≤ 20 mrad during any calendar year.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.1 shall be completed if this Condition is entered. ---------- Calculated air dose not within limits.	A.1 Submit a report to the NRC, pursuant to 10CFR50 Appendix I Section IV.A, that identifies causes for exceeding limits, defines corrective actions to be taken to reduce the releases, and proposed corrective actions to assure that subsequent releases are within limits.	30 days following the end of the quarter in which the release occurred
B. Calculated air dose exceeds two times (2x) the limits.	B.1 Enter Condition A of REC 12.4.7.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
RSR 12.4.2.1 Determine cumulative dose contributions for the current calendar quarter and current calendar year in accordance with the ODCM.	31 days

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.3 Dose From Iodine -131, Iodine -133, Tritium, and Radioactive Materials in Particulate Form

REC 12.4.3 The dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, tritium and all radionuclides in particulate form, with half-lives > 8 days, in gaseous effluents released from each reactor unit, to areas at and beyond the SITE BOUNDARY shall be limited to:

a. ≤ 7.5 mrem to any organ during any calendar quarter; and

b. ≤ 15 mrem to any organ during any calendar year.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.1 shall be completed if this Condition is entered. ---------- Calculated dose not within limits.	A.1 Submit a report to the NRC, pursuant to 10CFR50 Appendix I Section IV.A, that identifies causes for exceeding limits, defines corrective actions to be taken to reduce the releases, and proposed corrective actions to assure that subsequent releases are within limits.	30 days following the end of the quarter in which the release occurred
B. Calculated dose exceeds two times (2x) the limits.	B.1 Enter Condition A of REC 12.4.7.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.4.3.1	Determine cumulative dose contributions for the current calendar quarter and calendar year for iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days in accordance with the methodology and parameters in the ODCM.	31 days

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.4 GASEOUS RADWASTE TREATMENT SYSTEM

REC 12.4.4 The GASEOUS RADWASTE (OFF-GAS) TREATMENT SYSTEM shall be OPERABLE and in operation.

APPLICABILITY: During Main Condenser Air Ejector system operation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. GASEOUS RADWASTE TREATMENT SYSTEM inoperable. OR GASEOUS RADWASTE TREATMENT SYSTEM not in operation.	A.1 Restore system to OPERABLE status. AND A.2 Place system in operation.	7 days
B. ----------NOTE---------- Required Action B.1 shall be completed if this Condition is entered. ---------- Required action and Associated Completion Time not met.	B.1 Submit a report to the NRC that includes defective equipment or subsystem identification and inoperability cause, actions taken to restore the inoperable equipment to OPERABLE status, and summary description of actions taken to prevent a recurrence.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.4.4.1	Verify the GASEOUS RADWASTE TREATMENT SYSTEM is in operation.	7 days

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.5 VENTILATION EXHAUST TREATMENT SYSTEM

REC 12.4.5 The appropriate portions of the VENTILATION EXHAUST TREATMENT SYSTEM shall;

a. BE OPERABLE; and

b. be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected doses from each reactor unit from the site would exceed 0.3 mrem to any organ, when average over 31 days.

APPLICABILITY: At all times.

----------NOTE----------
Separate Condition entry is allowed for each VENTILATION EXHAUST TREATMENT system pathway.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required VENTILATION EXHAUST TREATMENT SYSTEMS inoperable.	A.1 Restore system to OPERABLE status.	31 days
B. ----------NOTE---------- Required Action B.1 shall be completed if this condition is entered. ---------- Untreated gaseous waste release in progress. AND Projected dose not within limits.	B.1 Submit a report to the NRC that includes inoperable equipment or subsystem identification and reason for inoperability, actions taken to restore the inoperable equipment to OPERABLE status, and summary description of actions taken to prevent a recurrence.	30 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ----------NOTE---------- Required Action C.1 shall be completed if this Condition is entered. ---------- Required Action and associated Completion Time of Condition A not met.	C.1 Submit a report to the NRC that includes inoperable equipment or subsystem identification and reason for inoperability, actions taken to restore the inoperable equipment to OPERABLE status, and summary description of actions taken to prevent a recurrence.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.4.5.1	Project doses due to gaseous releases from the site in accordance with the ODCM.	31 days
RSR 12.4.5.2	----------NOTE---------- Not required to be performed if the VENTILATION EXHAUST TREATMENT SYSTEM has been used to process gaseous effluents in the last 115 days. ---------- OPERATE each required VENTILATION EXHAUST TREATMENT SYSTEM equipment for at least 30 minutes.	92 days

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.6 MARK II Containment

REC 12.4.6 VENTING or PURGING of the containment drywell shall be:

a. through the Primary Containment Vent and Purge System, or

b. through the Standby Gas Treatment (SGT) System.

APPLICABILITY: During drywell VENTING or PURGING.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Above requirements not met.	A.1 Suspend all drywell VENTING and PURGING.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
RSR 12.4.6.1	Verify containment drywell is aligned for VENTING or PURGING through the Primary Containment Vent and Purge System or the SGT System.	12 hours
RSR 12.4.6.2	----------NOTE---------- Only required to be met when in MODES 1, 2, or 3. ---------- Verify: a. Both SGT trains are OPERABLE, and b. Only one of the SGT System trains to be used for PURGING.	Prior to PURGING through the SGT System.

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.7 Total Dose

REC 12.4.7 The dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and radiation from all uranium fuel cycle sources over 12 consecutive months shall be limited to:

a. ≤ 25 mrem to the total body; and

b. ≤ 75 mrem to the thyroid; and

c. ≤ 25 mrem to any other organ.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.1 and A.2 shall be completed if this Condition is entered. ---------- As required by Required Action B.1 of REC 12.3.2, 12.4.2, or 12.4.3. OR Calculated Total Dose not within limits.	A.1 Submit a report to the NRC (Director, Nuclear Reactor Regulation) that defines the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the limits to include estimates of radiation exposure to a MEMBER OF THE PUBLIC from uranium fuel cycle sources, including all effluent pathways and direct radiation, for a 12 consecutive month period that includes the release(s) covered by this report. AND	30 days (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2 ----------NOTE---------- Only applicable if the release condition resulting in violation of 40 CFR 190 has not been corrected. ---------- Submit a request for a variance in accordance with 40 CFR 190, including the specified information of 40 CFR 190.11.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
RSR 12.4.7.1 Determine cumulative dose contributions from direct radiation and liquid and gaseous effluents in accordance with the ODCM.	31 days

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.8 Main Condenser

REC 12.4.8 The release rate of the sum of the activities from the noble gases measured prior to the holdup line shall be limited to $\leq 3.4 \times 10^5$ µCi/sec after 30 minutes decay.

APPLICABILITY: MODE 1,
MODES 2 and 3 with any steam line not isolated and steam jet air ejectors (SJAE) in operation.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Release rate of the sum of the activities from noble gases prior to the holdup line not within the limits.	A.1 Refer to Technical Specification 3.7.6 Main Condenser Offgas.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.4.8.1	Monitor the noble gas radioactivity rate prior to the holdup line in accordance with the ODCM and Table R12.2.2-1	CONTINUOUSLY

(Continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
RSR 12.4.8.2	----------NOTE---------- Not required to be performed until 31 days after any Main Steam line not isolated and SJAE in operation. ---------- Verify the release rate of the sum of the activities from noble gases prior to the holdup line is within limits by performing an isotopic analysis of a representative sample of gases taken prior to the holdup line.	Once within 4 hours after a ≥50% increase in the nominal steady state fission gas release from the primary coolant, as indicated by the off gas pre-treatment Noble Gas Activity Monitor, after factoring out increases due to changes in THERMAL POWER level AND 31 days

12.4 GASEOUS EFFLUENTS AND TOTAL DOSE

12.4.9 Dose Limits for MEMBERS OF THE PUBLIC

REC 12.4.9 Operations shall be conducted such that:

a. Total Effective Dose Equivalent (TEDE) to individual MEMBERS OF THE PUBLIC does not exceed 100 mrem/year; and

b. The dose in any unrestricted area from external sources does not exceed 2 mrem in any one hour.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.1 shall be completed if this Condition is entered. ---------- Dose limit of REC Item a. exceeded.	A.1 Submit a report to the NRC in accordance with 10 CFR 20.2203.	30 days
B. ----------NOTE---------- Required Action B.1 shall be completed if this Condition is entered. ---------- Dose limit of REC Item b. exceeded.	B.1 Submit a report to the NRC in accordance with 10 CFR 20.2203.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
RSR 12.4.9.1	Calculate the TEDE to individual MEMBERS OF THE PUBLIC in accordance with the ODCM.	12 months
RSR 12.4.9.2	Determine and/or evaluate direct radiation exposures in unrestricted areas.	12 months

12.5 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

12.5.1 Radiological Environmental Monitoring Program (REMP)

REC 12.5.1 The REMP shall be conducted as specified in Table R12.5.1-1.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ----------NOTE---------- Required Action A.2 shall be completed if this Condition is entered. ---------- Sample type or location(s) required by Table R12.5.1-1 permanently unavailable.	A.1 Initiate action to identify suitable, alternative sampling media and/or specific locations for obtaining replacement samples for the pathway of interest and add them to the REMP. Delete locations from which samples are unavailable. AND A.2 Prepare and submit a controlled version of the ODCM, in the next Annual Radiological Environmental Operating Report (REOR) including revised figures and tables reflecting the new location(s) with supporting information identifying the sample unavailability cause and justification of the new sampling location(s).	Immediately In accordance with Technical Specification 5.6.2

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ----------NOTE---------- Required Action B.1 shall be completed if this Condition is entered. ---------- Level of radioactivity as the result of plant effluents in an environmental sampling medium at a specified location exceeds the reporting levels of Table R12.5.1-2 when averaged over any calendar quarter.	B.1 Submit a report to the NRC that identifies the cause(s) for exceeding the limits and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year reporting level of REC 12.3.2, 12.4.2 or 12.4.3. The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report.	30 days
C. ----------NOTE---------- Required Action C.1 shall be completed if this Condition is entered. ---------- More than one radionuclide in Table R12.5.1-2 detected in the sampling medium. AND $\frac{C_1}{RL_1} + \frac{C_2}{RL_2} + \ldots \geq 1.0$ where; C = concentration RL = reporting level.	C.1 Submit a report to the NRC that identifies the cause(s) for exceeding the limits and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year reporting level of REC 12.3.2, 12.4.2 or 12.4.3. The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report.	30 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. ----------NOTE---------- Required Action D.1 and D.2 shall be completed if this Condition is entered. ---------- Radionuclides other than those in Table R12.5.1-2 are detected. AND The potential annual dose to a MEMBER OF THE PUBLIC from all radionuclides is greater than or equal to the calendar year limits of REC 12.3.2, 12.4.2, or 12.4.3.	D.1 ----------NOTE---------- Only required when the measured levels of radioactivity are the result of plant effluents. ---------- Submit a report to the NRC that identifies the cause(s) for exceeding the limits and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year reporting level. The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report. AND D.2 ----------NOTE---------- Only required when the radionuclides detected are not the result of plant effluents. ---------- Describe the condition in the next Annual REOR.	30 days In accordance with Technical Specification 5.6.2.

(continued)

ACTIONS

CONDITION	REQUIRED COMPENSATORY MEASURE	COMPLETION TIME
E. ----------NOTE---------- Required Action E.1 shall be completed if this Condition is entered. ---------- RSR 12.5.1.1 not met.	E.1 Prepare and submit to the NRC, in the next Annual REOR, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.	In accordance with Technical Specification 5.6.2.

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
RSR 12.5.1.1	----------NOTES---------- 1. Deviations to the sampling schedule for the following reasons may occur and the RSR still be considered met provided the deviations are described in the next Annual REOR: a. specimens are unobtainable due to hazardous conditions, seasonal unavailability, or malfunction of sampling equipment, or b. a person or business who participates in the program goes out of business or can no longer provide samples, or c. a contractor omission which is corrected as soon as discovered. 2. Malfunctioning equipment shall be corrected/replaced and replacement suppliers shall be found, as applicable, as soon as practicable. ---------- Collect and analyze samples in accordance with Table R12.5.1-1 and the ODCM to the detection capabilities required by Table R12.5.1-3.	In accordance with the Radiological Environmental Monitoring Program

Table R12.5.1-1 (Page 1 of 6)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/ OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[1]	SAMPLING AND COLLECTION FREQUENCY[11]	TYPE AND FREQUENCY OF ANALYSIS[11]
1. Airborne Radioiodine and Particulates	Samples from a total of eight locations: a. Indicator- Near Field Four samples from locations within 4.0 km (2.5 mi) in different sectors. b. Indicator- Far Field Four additional locations within 4.0 to 10 km (2.5 to 6.2 mi) in different sectors. c. Control One sample from a control location within 10 to 30 km (6.2 to 18.6 mi).	CONTINUOUS sampler operation with particulate sample collection weekly, or more frequently if required due to dust loading, and radioiodine canister collection weekly.	Radioiodine Canister: I-131 analysis weekly on near field samples and control[2] samples. Particulate Sampler: Gross beta analysis following weekly filter change[3] and gamma isotopic analysis[4] quarterly on composite filters by location on near field and control[2] samples.

(continued)

Table R12.5.1-1 (Page 2 of 6)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/ OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[1]	SAMPLING AND COLLECTION FREQUENCY[11]	TYPE AND FREQUENCY OF ANALYSIS[11]
2. Direct Radiation[5]	Forty routine monitoring stations, either with a Field Dosimeter or with one instrument for measuring dose rate continuously, placed as follows: a. Indicator- Inner Ring (100 Series) One in each meteorological sector, in the general area of the SITE BOUNDARY (within 0.1 to 2.0 miles; 0.2 to 3.2 km); b. Indicator- Outer Ring (200 Series) One in each meteorological sector, within 4.8 to 10 km (3 to 6.2 mi); c. Other One at each Airborne location given in part 1.a. and 1.b. The balance of the Field Dosimeters to be placed at special interest locations beyond the Restricted Area where either a MEMBER OF THE PUBLIC or Exelon Nuclear employees have routine access. d. Control One at each airborne control location given in part 1.c.	Quarterly	Gamma dose on each Field Dosimeter quarterly.

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Table R12.5.1-1 (Page 3 of 6)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/ OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[1]	SAMPLING AND COLLECTION FREQUENCY[11]	TYPE AND FREQUENCY OF ANALYSIS[11]
3. Waterborne a. Ground/ Well	a. Indicator Samples from two sources only if likely to be affected.[6]	Quarterly	Gamma isotopic[4] and tritium analysis quarterly.
b. Drinking[7]	a. Indicator One Sample from each community drinking water supply that could be affected by the station discharge within 10 km (6.2 mi) downstream of discharge.	Grab samples weekly.	Gross beta and gamma isotopic analyses[4] on monthly composite; tritium analysis on quaterly composite.
			I-131 on each composite when calculated dose for water consumption > 1 mrem/year.
c. Surface Water[7]	If no community water supply (Drinking Water) exists within 10 km downstream of discharge then surface water sampling shall be performed. a. Indicator[7] One surface sample downstream of discharge. b. Control[7] One surface sample upstream of discharge.	Grab samples weekly.	Gross beta and gamma isotopic analyses[4] on monthly composite; tritium analysis on quarterly composite.
d. Sediment	a. Indicator At least one sample from downstream[7] area within 10 km (6.2 mi) of discharge.	Semiannually	Gamma isotopic analysis[4] semiannually.

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Table R12.5.1-1 (Page 4 of 6)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/ OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[1]	SAMPLING AND COLLECTION FREQUENCY[11]	TYPE AND FREQUENCY OF ANALYSIS[11]
4. Ingestion a. Milk [8]	a. Indicator Samples from milking animals from a maximum of three locations within 10 km (6.2 mi) distance. b. Control One sample from milking animals at a control location within 10 to 30 km (6.2 to 18.6 mi).	Biweekly when animals are on pasture (May through October), monthly at other times (November through April).	Gamma isotopic[4] and I-131[9] analysis on each sample.
b. Fish	a. Indicator Representative samples of commercially and recreationally important species in discharge area, and representative samples from the LaSalle Lake. b. Control Representative samples of commercially and recreationally important species in control locations upstream of discharge.	Two times annually.	Gamma isotopic analysis[4] on edible portions
c. Food Products	a. Indicator Two representative samples from the principal food pathways grown in each of four major quadrants within 10 km (6.2 mi), if available: At least one root vegetable sample[10] At least one broad leaf vegetable (or vegetation)[10] b. Control Two representative samples similar to indicator samples grown within 15 to 30 km (9.3 to 18.6 mi).	Annually	Gamma isotopic[4] and I-131 analysis on each sample.

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Table R12.5.1-1 (Page 5 of 6)
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/ OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[1]	SAMPLING AND COLLECTION FREQUENCY[11]	TYPE AND FREQUENCY OF ANALYSIS[11]
4. Ingestion d. Vegetation	----------NOTE---------- These vegetation samples are only required if milk sampling is not performed. ---------- a. Indicator Samples of 3 different types of broadleaf vegetation within 10 km (6.2 miles) at 2 different offsite locations in the highest D/Q sector of the station, if available. b. Control Samples of 3 different types of broadleaf vegetation within 15 to 30 km (9.3 to 18.6 miles) in the lowest D/Q sector of station, if available.	Monthly during the growing season (May through October).	Gamma isotopic [4] analysis and I-131 analysis on each sample.