3.6 Radioactive Effluents

Applicability: Applies to the radioactive effluents of the facility.

Objective: To assure that radioactive material is not released to the environment in an uncontrolled manner and to assure that the radioactive concentrations of any material released is kept as low as is reasonably achievable and, in any event, within the limits of 10 CFR part 20.106 and 40 CFR Part 190.10(a).

Specification

3.6.A. Reactor Coolant Radioactivity

The specific activity of the primary coolant except during REFUEL MODE shall be limited to: Less than or equal to 0.2 microcuries per gram DOSE EQUIVALENT (D.E.) I-131.

Limiting Condition for Operation

1. Whenever an isotopic analysis shows reactor coolant activity exceeds 0.2 uCi/gram DOSE EQUIVALENT (D.E.) I-131, operation may continue for up to 48 hours. Additional analyses shall be done at least once per 4 hours until the specific activity of the primary coolant is restored to within its limit.

2. If the reactor coolant activity is greater than 0.2 microcuries per gram DOSE EQUIVALENT I-131 for more than 48 hours during one continuous time interval or greater than 4.0 microcuries per gram D.E. I-131, be in at least SHUTDOWN CONDITION within 12 hours.

3. Annual Reporting Requirement

   The results of specific activity analyses in which the reactor coolant exceeded the limits of Specification 3.6.A shall be reported on an annual basis. The following information shall be included: (1) Reactor power history starting 48 hours prior to the first sample in which the limit was exceeded until after the radioiodine activity is reduced to less than the limit; (2) Results of the last isotopic analysis for radioiodine performed prior to exceeding the limit, results of analysis while limit was exceeded and results of one analysis after radioiodine activity was reduced to less than the limit. Each result should include date and time of sampling and the radioiodine concentrations; (3) Clean-up system flow history starting 48 hours prior to the first sample in which the limit was exceeded until after the radioiodine activity is reduced to less than the limit; (4) Graph of the I-131 concentration and one other radioiodine isotope concentration in microcuries per gram as a function of time for the duration of the specific activity above the steady-state level; and (5) The time duration when the specific activity of the primary coolant exceeded the radioiodine limit.

4. With the reactor mode switch in Run or Startup position, with:

   1. Thermal power changed by more than 15% of rated thermal power in one hour*, or

   2. The off-gas level, at the SJAE, increased by more than 10,000 microcuries per second in one hour during steady state operation at release rates less than 75,000 microcuries per second, or

   3. The off-gas level, at the SJAE, increased by more than 15% in one hour during steady state operation at release rates greater than 75,000 microcuries per second,

take sample and analyze at least one sample, between 2 and 6 hours following the change in thermal power or off-gas level and at least once per four hours thereafter, until the specific activity of the primary coolant is restored to within limits.

3.6.B Liquid Radwaste Treatment and Discharge

Applicability: To liquid radwaste batches for discharge as aqueous effluent.

1. Any untreated batch of liquid radwaste shall be treated (in appropriate liquid radwaste treatment equipment) before discharge as aqueous effluent when the radioactivity concentration, exclusive of tritium and dissolved noble gases, in the batch exceeds 0.001 Ci/ml.

2. When radioactive liquid waste is discharged without treatment and in excess of the above limit, in lieu of any other report, prepare and submit to the Commission within 30 days pursuant to Specification 6.9.3 a Special Report that includes the following information.

   a. Identification of any inoperable equipment or subsystems, and the reason for the inoperability.

   b. Action(s) taken to restore the inoperable equipment to OPERABLE status, and a

   c. Summary description of action(s) taken to prevent a recurrence.

* If there are consecutive thermal power changes by more than 15% per hour, take sample and analyze at least one sample between 2 and 6 hours following the change and at least once per four hours thereafter, until the specific activity of the primary coolant is restored to within limits.

3. Specifications 3.0.A and 3.0.B do not apply.

4. Liquid radwaste discharges may occur provided that:

   a. At least two independent batch samples shall be taken, one prior to discharge and one near the completion of discharge. These samples shall be analyzed in accordance with Specification 4.6.I.1.

   b. Prior to discharge, qualified personnel shall determine an acceptable release rate and establish proper discharge valving. Other qualified personnel shall independently verify that the release rate and discharge valving are acceptable.

3.6.C Radioactive Liquid Storage

Applicability: Applies at all times to specified outdoor tanks used to store radioactive liquids.

1. The quantity of radioactive material, excluding tritium, noble gases, and radionuclides having half-lives shorter than three days, contained in any of the following outdoor tanks shall not exceed 10.0 curies:

   a. Waste Surge Tank, HP-T-3

   b. Condensate Storage Tank

2. In the event the quantity of radioactive material in any of the tanks named exceeds 10.0 curies, begin treatment as soon as reasonably achievable, continue it until the total quantity of radioactive material in the tank is 10 curies or less, and describe the reason for exceeding the limit in the next Semi-annual Effluent Release Report.

3. Specifications 3.0.A and 3.0.B do not apply.

3.6.D Condenser Offgas Treatment

Applicability: Whenever the main condenser air ejector system is in operation except during startup or shutdown with reactor power less than 40 percent of rated. In addition, the Augmented Offgas System need not be in operation during end of cycle coast-down periods when the system can no longer function due to low offgas flow.

The LCO statement permitting power operation to continue for limited time periods with the primary coolant's specific activity greater than 0.2 microcuries per gram DOSE EQUIVALENT I-131, but less than or equal to 4.0 microcuries per gram DOSE EQUIVALENT I-131, accommodates possible iodine spiking phenomenon which may occur following changes in thermal power. The reporting of cumulative operating time with greater than 0.2 microcuries per gram DOSE EQUIVALENT I-131 will allow sufficient time for Commission to evaluate the circumstances.

Information obtained on iodine spiking will be used to asess the parameters associated with spiking phenomena. A reduction in frequency of isotopic analysis following power changes may be permissible if justified by the data obtained.

The surveillance requirements provide adequate assurance that excessive specific activity levels in the reactor coolant will be detected in sufficient time to take corrective action.

3.6.B This specification implements the requirements of 10 CFR 50.36a related to operation of radioactive waste treatment equipment to keep radioactive material in effluents to unrestricted areas as low as reasonably achievable. Radioactive liquid wastes generated at the OCNGS are controlled on a batch basis with each batch processed by a method appropriate for the quality and concentration of material present. Below 0.001 uCi/ml, it is not cost-beneficial to treat a batch of aqueous waste for the purpose of reducing potential radiation exposure offsite. Hence specification 3.6.B implements 10 CFR Part 50 Appendix I provisions for cost-beneficial treatment of radioactive liquid waste before release in effluent. Each batch of radioactive liquid waste is sampled and analyzed for radioacivity before release to the discharge canal so that an appropriate discharge rate can be determined, accounting for dilution by condenser cooling water and/or canal flow.

The method of double sampling and independent verification of release rate and valve alignment is adequate to ensure liquid radwaste batch discharges are in compliance with the concentration limits of 10 CFR 20 in the discharge canal at the Route 9 bridge.

4. When less than the minimum number of radioactive gaseous monitoring instrumentation channels are OPERABLE, take the ACTION shown in Table 3.15.2. Make every reasonable effort to restore the instrument to OPERABLE status within 30 days and, if unsuccessful, explain in the next Semiannual Radioactive Effluent Release Report why the inoperability was not corrected in a timely manner.

5. The Provisions of Specifications 3.0.A, 3.0.B, and 6.9.2 are not applicable.

Basis:

A. The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The use of this instrumentation is consistent with the requirements of General Design Criteria 60 and 64 of Appendix A to 10 CFR Part 50. A radioactivity monitor on the liquid effluent line from the Turbine Building Sump No. 1-5 initiates a trip to stop the effluent discharge pump when the trip setpoint is exceeded. The reactor service water system discharge line radioactivity monitor initiates an alarm in the reactor control room when the alarm setpoint is exceeded. A method for double sampling and independent verification of release rate and valve alignment is used in lieu of a radiation monitor for batch releases via the liquid radwaste effluent line.

The alarm/trip setpoint for each of these instruments is calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20.106.

B. The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during releases of gaseous effluents. The alarm/trip setpoint for each of the noble gas monitors is calculated and adjusted in accordance with the methodology and parameters in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20.106. The instrumentation in Table 3.15.2 also includes provisions for monitoring hydrogen below the explosive level in the offgas system downstream from the recombiner. The operability and use of this instrumentation is consistent with the requirements of General Design Criteria 60 and 64 of Appendix A to 10 CFR Part 50. The offgas hydrogen monitor and the radioactive gas monitors for the condenser air ejector offgas, the stack effluent, and the offgas building exhaust ventilation have alarms which report in the reactor control room. The offgas hydrogen monitor initiates a bypass of the Augmented Offgas System in the event the setpoint is exceeded.

The Stack and the Turbine Building exhaust ventilation effluent air are monitored by a radioactive gaseous effluent monitoring system. It can measure the gross concentration of radioactive noble gases. A grab sample of the effluent air will be taken at least once per month and analyzed for the principal noble gas radionuclides (Reference Table 4.6.2).

The gross gamma activity concentration of noble gas in Stack effluent is displayed in the reactor control room. That channel also causes an alarm

TABLE 3.15.1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

	Instrument	Minimum[a] Channels Operable	Applicability	Action
1.	GROSS RADIOACTIVITY MONITORS			
	a. [Deleted]			
	b. Reactor Building Service Water System Effluent Line	1	b	112
	c. Turbine Building Sump No. 1-5	1	b	114
2.	FLOW MEASUREMENT DEVICES			
	a. Liquid Radwaste Effluent Line	1	b	113

Table 3.15.1 Notations

a. Instrument channels shall be OPERABLE and in service as indicated except that a channel may be taken out-of-service for the purpose of a check, calibration, test, or maintenance without declaring the channel to be inoperable.

b. During releases via this pathway.

ACTION 112 With no channel OPERABLE, effluent releases via this pathway may continue provided that, at least once per 24 hours during the release, grab samples are collected and analyzed for gross radioactivity (beta or gamma) at a limit of detection of at least 10^{-6} microcuries/ml.

ACTION 113 With no channel OPERABLE effluent releases via the affected pathway may continue provided the flow is estimated with the pump curve or change in tank level, at least once per batch during a release.

ACTION 114 With no channel operable effluent may be released provided that before initiating a release:

1. A sample is taken and analyzed in accordance with Specification 4.6.I.1.

2. Qualified personnel determine and independently verify the acceptable release rate.

TABLE 4.15.1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Instrument	Channel Check	Source Check	Channel Calibration	Channel Functional Test	Surveillance Required[a]
1. Gross Radioactivity Monitors					
a. [Deleted]					
b. Reactor Building Service Water System Effluent Line	D	M	R[f]	Q[e]	b
c. Turbine Building Sum No. 1-5	D	M	R[f]	Q[e]	b
2. Flow Rate Measurement Devices					
a. Liquid Radwaste Effluent Line	D[h]	N.A.	R	Q	b

Legend S = once per 12 hours, D = once per 24 hours, W = once per 7 days,
M = once per 31 days, Q = once per 92 days, SA = once per 184 days,
R = once per 18 months, S/U = before each reactor startup,
P = completed before each release, N.A. = Not Applicable.

TABLE 4.15.1 NOTATIONS

a. Instrumentation shall be OPERABLE and in service except that a channel may be taken out of service for the purpose of a check, calibration, test or maintenance without declaring it to be inoperable.

b. During releases via this pathway.

c. This notation not used

d. This notation not used.

e. The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

1. Instrument indicates measured levels above the alarm setpoint.
2. Instrument indicates a downscale failure.
3. Instrument controls not set in operate mode.
4. Instrument electrical power loss.

f. The CHANNEL CALIBRATION shall be performed according to established station calibration procedures.

g. This notation not used.

h. A CHANNEL CHECK shall consist of verifying indication of flow during effluent release. A CHANNEL CHECK shall be made at least once during any day on which a release is made.

i. The CHANNEL FUNCTIONAL TEST shall also demonstrate that Control Room alarm annunciator occurs if any of the following conditions exist:

1. Instrument indicates measured levels above the alarm setpoint.
2. Instrument indicates a downscale failure.