

TABLE 3.2-1
RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) ^(a) ($\mu\text{Ci/ml}$)
Main Stack and Refuel Floor Vent and Reactor Building	Monthly	Monthly	Principal Gamma Emitters ^(b)	1×10^{-4}
Vent and Turbine Building	Quarterly	Quarterly	H-3	1×10^{-6}
Vent and Radwaste Building	Continuous ^(c)	Weekly	I-131	1×10^{-12}
		Charcoal Sample ^{(e), (f)}		
	Continuous ^(c)	Weekly	Principal Gamma Emitters ^(b)	1×10^{-11}
		Particulate Sample ^{(e), (f)}	(I-131, others)	
	Continuous ^(c)	1 Wk/Mo	Gross Alpha	1×10^{-11}
		Particulate Sample		
	Continuous ^(c)	4 Wk/Qr	Sr-89, Sr-90	1×10^{-11}
		Composite Particulate Sample		
	Continuous ^(c)	Noble Gas Monitor	Noble Gases	1×10^{-5}
			Gross Beta or Gamma	
Incinerated Oil ^(g)	Prior to Each Batch ^(h)	Each Batch ^(h)	Principal Gamma Emitters ^(b)	5×10^{-7}
			I-131	1×10^{-6}

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NOTES FOR TABLE 3.2-1

- (a) The LLD is defined, for purpose of these specifications, as the smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability and 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):

$$\text{LLD} = \frac{4.66 s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD is the a priori lower limit of detection, as defined above (in microcuries 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 (in counts per minute);

E is the counting efficiency (in counts per disintegration);

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

2.22×10^6 is the number of disintegrations per minute per microcurie;

Y is the fractional radiochemical yield (when applicable);

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

Δt for plant effluents is the elapsed time between the midpoint of sample collection and time of counting.

Typical values of E, V, Y, and Δt should be used in the calculation.

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

- (b) The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, Xe-135m, and Xe-138 for gaseous emissions; and, Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, and Cs-137 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, together with the above nuclides, shall also be identified and reported in the Semiannual Radioactive Effluent Release Report. The LLD for Mo-99, Ce-141, and Ce-144 is 5×10^{-11} . For oil samples, Table 2.2-1, Note (c) applies.
- (c) 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 Specifications. This determination shall be made using design flow rates if flow meters are not provided or are inoperable.

NOTES FOR TABLE 3.2-1 (continued)

- (d) Main stack sampling and analysis shall also be performed following shut-down, start-up, or a thermal power change exceeding 20% of rated thermal power in one hour. This requirement applies only if: (1) analysis shows that the dose equivalent I-131 concentration in the primary coolant has increased more than a factor of 3; and (2) the noble gas activity monitor shows that effluent activity has increased by more than a factor of 3 after correcting for increases due to changes in thermal power level in both cases.
- (e) When the offgas filter system charcoal absorbers are not in service, main stack samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing, or after removal from sampler. In addition, sampling shall be performed following each shut-down, start-up or thermal power change exceeding 20% of rated thermal power in one hour. In those instances, sampling shall be performed at least daily until two consecutive samples show no increase in concentration but in no case for more than 7 consecutive days. This requirement applies only if: (1) analysis shows that the dose equivalent I-131 concentration in the primary coolant has increased more than a factor of 3; and (2) the noble gas monitor shows that effluent activity has increased more than a factor of 3 after correcting for increases due to changes in thermal power level in both cases. Analysis of daily samples shall be completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10.
- (f) When the offgas filter system charcoal absorbers are in service, main stack samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing, or after removal from sampler. In addition, sampling shall be performed following each shut-down and start-up. In those instances, sampling shall be performed at least daily until two consecutive samples show no increase in concentration but in no case for more than 7 consecutive days. This requirement applies only if: (1) analysis shows that the dose equivalent I-131 concentration in the primary coolant has increased more than a factor of 3; and (2) the noble gas monitor shows that effluent activity has increased more than a factor of 3 after correcting for increases due to changes in thermal power level in both cases. Analysis of daily samples shall be completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10.
- (g) Incinerated oil may be discharged via points other than the main stack and building vents (i.e., auxiliary boiler). Release shall be accounted for based on pre-release grab sample data.
- (h) Samples for incinerated oil releases shall be collected from and representative of filtered oil in liquid form. Whenever oil samples cannot be filtered such as No. 6 bunker fuel oil, raw oil samples shall be collected and analyzed.

LIMITING CONDITIONS FOR OPERATION

SURVEILLANCE REQUIREMENTS

3.4 DOSE DUE TO IODINE-131, IODINE-133, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM

Applicability

Applies to the cumulative dose from Iodine-131, Iodine-133, Tritium, and radionuclides in particulate form in gaseous effluents.

Objective

To assure that the dose limitations of 10 CFR 50, Appendix I, are met.

Specifications

- a. The dose to a member of the public at or beyond the site boundary from Iodine-131, Iodine-133, Tritium, and radionuclides in particulate form with half-lives greater than 8 days released from the plant in gaseous effluents shall be limited:
1. During any calendar quarter to less than or equal to 7.5 mrem to any organ; and,
 2. During any calendar year to less than or equal to 15 mrem to any organ.
 3. Less than 0.1% of the limits of Specification 3.4.a.1 and 3.4.a.2 as a result of burning contaminated oil.

3.4 DOSE DUE TO IODINE-131, IODINE-133, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM

Applicability

Applies to the calculation of the dose due to Iodine-131, Iodine-133, Tritium, and radionuclides in particulate form in gaseous effluents.

Objective

To ensure that appropriate calculations are performed to determine the dose from Iodine-131, Iodine-133, Tritium, and radionuclides in particulate form.

Specifications

- a. Cumulative dose contributions shall be calculated at least monthly in accordance with the ODCM for the current calendar quarter and the current calendar year.

b. With the calculated dose from the release of Iodine-131, Iodine-133, Tritium, and radionuclides in particulate form with half-lives greater than 8 days, in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days a report that:

1. Identifies the cause(s) for exceeding the limit; and
2. Defines the corrective actions that have been taken to reduce the releases; and
3. Identifies the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.