OFFSITE DOSE CALCULATION MANUAL - TABLE OF CONTENTS

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3087 (DOCUMENT CHANGE, HOLD, AND COMMENT FORM) incorporated:_____				
Resp Supv: CHEM		Assoc Ref: CHEM-I	SR: N	Freq: 2 yrs
ARMS: ODCM-03.01	Doc Type: 7030	Admin Initials:		Date:

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1.0 RECORD OF REVISION

Revision No.	Date	Reason for Revision
1	August - 1995	Page 3 of 23, 2nd paragraph - Changed "In addition, prior to containment purge and venting," to "In addition, prior to containment purging". This change was made because setpoint recalculation is required only for containment purging and to be consistent with the rest of the ODCM. Page 3 of 23, first paragraph - Changed "Reactor Building Vent Plenum Monitor which initiates isolation of Reactor Building releases" to "Reactor Building Vent Noble Gas Monitor". This change was made to differentiate the noble gas monitor from the plenum radiation monitor and because the isolation function has been removed from the noble gas monitor system. Page 3 of 23, section 1.1.1 - Changed "Reactor Building Vent Isolation Setpoint" to"Reactor Building Vent Alarm Setpoint". This change was made because the setpoint exceedance no longer causes the Reactor Building Vent to isolate. Page 4 of 23, Section 1.1.1.B - Changed "For purge releases, substitute (x/q)v, the highest short term dispersion factor from Table A-12" to "For purge releases, substitute the value obtained from Chemistry Manual Procedure I.06.07 (ATMOSPHERIC DISPERSION DETERMINATION). This change was made to more accurately predict off-site dose from containment purging by using near real time actual dispersion values.
2	October - 2000	Incorporated Radiological Effluents Tech Specs section 3.8.B and 4.8.B into document.
3	November - 2001	Added clarification to section 2.4.1.A. and 2.4.3.A. to more accurately describe Off-gas Treatment System operation requirements. Corrected reference in Note h. of Table 2.

Revision No.	Date	Reason for Revision
4	September - 2002	Revised Actions 2.2.3 and 2.3.3 to standardize documentation and reporting. Revised action in Table 3 to make inoperable air ejector off-gas radiation monitors consistent with high monitor readings action in T.S.3.8.A. Revised action in Table 3 to add compensatory sampling for inoperable hydrogen monitors similar to other inoperable monitors in Table 3.
5	January - 2004	Revised Control 2.4.1.A to make it consistent with Tech Spec 6.8.D.6. Revised Action 2.4.3.A to accommodate the revised Control (2.4.1.A).
6	October - 2004	Revised Control 2.6.1.A to make it consistent with Tech Spec 3.7.D.3.a. Deleted surveillance requirement 2.6.4.A to conform to T.S.3.7.D.3.a.

2.0 GASEOUS EFFLUENTS

2.1 Dose Rate

2.1.1 Controls

A. In accordance with T.S.6.8.D.7, the dose rate due to radioactive materials released in gaseous effluents from the site (Figure 1) ***SHALL*** be limited to the following:

1. For Noble Gases: Less than or equal to a dose rate of 500 mrem/yr to the total body and less than or equal to a dose rate of 3000 mrem/yr to the skin, and

2. For Iodine-131, Iodine-133, Tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to a dose rate of 1500 mrem/yr to any organ.

2.1.2 Applicability

At all times.

2.1.3 Action

A. With the dose rate(s) exceeding the above limits, immediately decrease the release rate to within acceptable limits(s).

B. Radioactive material in gaseous effluents released from the site ***SHALL*** be continuously monitored in accordance with Table 3.

C. The Noble Gas Effluent monitors having provisions for the automatic termination of gaseous releases, as listed in Table 3 ***SHALL*** be used to limit off-site dose rates to the values established in 2.1.1.A.1. Setpoints ***SHALL*** be determined in accordance with the ODCM.

2.1.4 Surveillance Requirements

A. Gaseous effluent monitoring instrument surveillance ***SHALL*** be performed as required by Table 1.

B. The release rate due to Iodine-131, Iodine-133, Tritium, and Radioactive Particulates with half-lives greater than 8 days ***SHALL*** be determined by obtaining representative samples and performing analysis in accordance with the sampling and analysis program specified in Table 2. Following each analysis, the dose rate due to I-131, I-33, Tritium and Radioactive Particulates with half-lives greater than 8 days, ***SHALL*** be determined to be less than the limit in 2.1.1.A.2. in accordance with the ODCM.

2.2 Dose - Noble Gases

2.2.1 Controls

A. In accordance with T.S.6.8.D.8, the air dose due to noble gases released in gaseous effluents from the site (Figure 1) ***SHALL*** be limited to the following values:

1. During any calendar quarter: $\leq$5 mrad for gamma radiation and $\leq$10 mrad for beta radiation, and

2. During any calendar year: $\leq$10 mrad for gamma radiation and $\leq$20 mrad for beta radiation.

2.2.2 Applicability

At all times.

2.2.3 Action

A. With the calculated air dose from radioactive noble gases in gaseous effluent exceeding any of the above limits, document and report IAW ODCM-01.01, Section 2.4.1.C.

2.2.4 Surveillance Requirements

A. Cumulative dose contributions for the current calendar quarter and current calendar year from noble gases in gaseous effluents ***SHALL*** be determined monthly in accordance with the ODCM.

2.3 Dose - Iodine-131, Iodine-133, Tritium and Particulates

2.3.1 Controls

A. In accordance with T.S.6.8.D.9, the dose to any organ of an individual due to Iodine-131, Iodine-133, Tritium, and radioactive particulates with a half-life greater than 8 days released from the site (FIGURE 1) in gaseous effluent **SHALL** be limited to the following:

1. During any calendar quarter: $\leq$7.5 mrem, and

2. During any calendar year: $\leq$15 mrem.

2.3.2 Applicability

At all times.

2.3.3 Action

A. With the calculated dose from the release of Iodine-131, Iodine-133, Tritium, and Radioactive Particulates with half-lives greater than 8 days, exceeding any of the above limits, document and report IAW ODCM-01.01, Section 2.4.1.C.

2.3.4 Surveillance Requirements

A. Cumulative dose contributions for the current calendar quarter and current calendar year for Iodine-131, Iodine-133, Tritium, and Radioactive Particulates with half-lives greater than 8 days in gaseous effluents ***SHALL*** be determined in accordance with the ODCM monthly.

2.4 Off-gas Treatment System

2.4.1 Controls

A. In accordance with T.S.6.8.D.6, the OFF-GAS TREATMENT SYSTEM ***SHALL*** be in operation whenever the Main Condenser Air Ejector system is in operation. Components of the system ***SHALL*** be operated to provide the maximum holdup time obtainable except:

1. During Plant Startup or Plant Shutdown.

2. During periods of off-gas treatment system equipment maintenance.

3. When off-gas recombiner outlet hydrogen or oxygen concentrations are out of specification.

4. When condenser air in-leakage exceeds off-gas storage compressor capacity.

B. The quantity of radioactivity after 12 hours holdup contained in each gas storage tank ***SHALL*** be limited to $\leq$22,000 curies of noble gases (considered as dose equivalent Xe-133).

C. The concentration of hydrogen in the compressed storage subsystem ***SHALL*** be limited to $\leq$2% by volume. With the concentration of hydrogen >2% by volume, but $\leq$4% by volume, restore the concentration of hydrogen to <2% by volume within 48 hours or suspend operation of the compressed storage subsystem.

D. The hydrogen monitors ***SHALL*** be operable as specified in Table 3 and set to automatically trip the off-gas compressors at $\leq$4% hydrogen by volume.

2.4.2 Applicability

At all times.

2.4.3 Action

A. With the Off-gas Treatment System outside the controls listed in 2.4.1.A. and gaseous waste being discharged for more than seven (7) days with an average holdup time of less than 50 hours, document and report IAW ODCM-01.01, Section 2.4.1.C.

2.4.4 Surveillance Requirements

A. Following each isotopic analysis of a sample of gases from the Main Condenser Off-gas System Pretreatment monitor station required by Tech Spec 3.8.A, verify that the maximum storage tank activity limit specified in 2.4.1.B. cannot be exceeded using the method in the ODCM.

2.5 Main Condenser Off-Gas Activity

2.5.1 Controls

A. In accordance with T.S.3.8.A.1, whenever the Steam Jet Air Ejectors (SJAEs) are in operation, the gross gamma activity rate of the noble gases measured at the Main Condenser Off-gas System Pretreatment Monitor station ***SHALL*** be $\leq 2.6 \times 10^5$ μCi/sec after a decay of 30 minutes.

B. The activity of radioactive material in gaseous form removed from the main condenser ***SHALL*** be continuously monitored by the Main Condenser Off-Gas Pretreatment monitors in accordance with Table 3.

C. The Main Condenser Off-Gas Pretreatment monitors ***SHALL*** be set to automatically terminate off-gas flow within 30 minutes at the limit established in 2.5.1.A.

2.5.2 Applicability

At all times

2.5.3 Action

A. When the gross gamma activity rate of the noble gases is not within the limit of 2.5.1.A above, restore gross gamma activity rate of the noble gases to within the limit within 72 hours.

B. When 2.5.3.A cannot be met, either:

1. Isolate all main steam lines within 12 hours; or

2. Isolate the SJAEs within 12 hours; or

3. Be in hot shutdown within 12 hours and cold shutdown within the following 24 hours.

2.5.4 Surveillance Requirements

A. The gross gamma radioactivity of noble gases from the main condenser air ejector ***SHALL*** be determined to be within the limit specified in 2.5.1.A at the following times by performing an isotopic analysis of a representative sample of gases:

1. Once every month

2. Within 4 hours following an increase in the continuous monitor reading of 50% after factoring out increases due to power level.

2.6 Containment Venting and Purging

2.6.1 Controls

A. In accordance with T.S.6.8.D.11 and 3.7.D.3.a, the inerting and deinerting operations permitted by T.S.3.7.A.5.b ***SHALL*** be via the 18-inch purge and vent valves (equipped with 40-degree limit stops) aligned to the Reactor Building plenum and vent. All other purging and venting, when primary containment integrity is required, ***SHALL*** be via the 2-inch purge and vent valve bypass line and the Standby Gas Treatment System.

B. In accordance with T.S.6.8.D.11, Containment inerting following startup and deinerting prior to shutdown ***SHALL*** be via the Reactor Building plenum and vent.

2.6.2 Applicability

At all times.

2.6.3 Action

None

2.6.4 Surveillance Requirements

A. Prior to containment purging, the sampling and analysis requirements of Table 2 ***SHALL*** be met.

2.7 Bases

2.7.1 Gaseous Effluents

A. Dose Rate

Control 2.1.1.A. provides reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of a Member of the Public in an Unrestricted Area, either at or beyond the Site Boundary in excess of the design objectives of Appendix I to 10CFR Part 50. This specification is provided to ensure that gaseous effluents from all units on the site will be appropriately controlled. It provides operational flexibility for releasing gaseous effluents to satisfy the Section II.A and II.C design objectives of Appendix I to 10CFR Part 50. For Members of the Public who may at times be within the Site Boundary, the occupancy of that Member of the Public will usually be sufficiently low to compensate for the reduced atmospheric dispersion of gaseous effluents relative to that for the Site Boundary. The specified release rate limits restrict, at all times, the corresponding dose rates above background to a Member of the Public at or beyond the Site Boundary to less than or equal to 500 mrem/year to the total body or to less than or equal to 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to a child via the inhalation pathway to less than or equal to 1500 mrem/year. This specification does not affect the requirement to comply with the annual limitations of 10CFR20.1301(a).

B. Dose From Noble Gas

Control 2.2.1.A. is provided to implement the requirements of Sections II.B, III.A and IV.A of Appendix I, 10CFR Part 50. Action required by Control 2.2.1 provides the required operating flexibility and at the same time implements the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in gaseous effluents will be kept “as low as reasonably achievable”.

The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I is to be shown by calculational procedures based on models and data such that the actual exposure of an individual through the appropriate pathways is unlikely to be substantially underestimated. The dose calculations established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents will be consistent with the methodology provided in Regulatory Guide 1.109, “Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with

10CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from LIght-Water-Cooled Reactors," Revision 1, July 1977. The ODCM equations provided for determining the air doses at the restricted area boundary may be based upon the historical average atmospheric conditions. NUREG-0133, October, 1978 provides methods for dose calculations with Regulatory Guides 1.109 and 1.111.

C. Dose From Iodine 131, Iodine 133, Tritium & Particulates

Control 2.3.1.A. is provided to implement the requirements of Section II.C, III.A and IV.A of Appendix I, 10CFR Part 50. The release rate specifications for I-131, I-133, tritium and radioactive particulates with half-lives greater than eight days are dependent on the existing radionuclide pathways to man in the Unrestricted Area. The pathways which are examined in the development of these calculations are: 1) individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, 3) deposition onto grassy areas where milk animals and meat producing animals graze with consumption of the milk and meat by man, and 4) deposition on the ground with subsequent exposure of man.

D. Off-gas Treatment Systems

Control 2.4.1.A. provides assurance that appropriate portions of the Off-gas Treatment System be used when specified, and provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable". This specification implements the requirements of 10CFR50.36a, General Design Criterion 60 of Appendix A to 10CFR Part 50, and design objective Section II.D of Appendix I to 10CFR Part 50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the guide set forth in Sections II.B and II.C of Appendix I, 10CFR Part 50, for gaseous effluents.

Control 2.4.1.B. is provided to limit the radioactivity which can be stored in one decay tank. Restricting the quantity of radioactivity contained in each gas storage tank provides assurance that in the event of an uncontrolled release of the tank's contents, the resulting total body exposure to an individual at the site Restricted Area Boundary will not exceed 20 mrem. A flow restrictor in the discharge line of the decay tanks prevents a tank from being discharged at an uncontrolled rate. In addition, interlocks prevent the contents of a tank from being released with less than 12 hours of holdup.

The radioactive gaseous effluent monitoring instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The Alarm/Trip Setpoint for these instruments will be calculated in accordance with NRC approved methods in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10CFR Part 20. The OPERABILITY requirements for this instrumentation are consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10CFR Part 50.

E. Main Condenser Off-Gas Activity

Control 2.5.1.A. establishes a maximum activity at the steam jet air ejector. Restricting the gross radioactivity rate of noble gases from the main condenser provides reasonable assurance that the total body exposure to an individual at the restricted area boundary will not exceed the limits of 10CFR Part 20 in the event this effluent is inadvertently discharged directly to the environment with minimal treatment. This control implements the requirements of General Design Criteria 60 and 64 of Appendix A to 10CFR Part 50.

F. Containment Venting and Purging

Control 2.6.1 requires the containment to be purged and vented through the standby gas treatment system except during inerting and deinerting operations. This provides for iodine and particulate removal from the containment atmosphere. During outages when the containment is opened for maintenance, the containment ventilation exhaust is directed to the monitored reactor building vent. Use of the 2 inch flow path prevents damage to the standby gas treatment system in the event of a loss of coolant accident during purging or venting. Use of the reactor building plenum and vent flow path for inerting and deinerting operations permits the control room operators to monitor the activity level of the resulting effluent by use of the Reactor Building Vent Wide Range Gas Monitors. In the event that the Reactor Building release rate exceeds the Reactor Building Vent Wide Range Gas Monitor alarm settings, the monitors will alarm in the Control Room alerting the operators to take actions to limit the release of gaseous radioactive effluents. The alarm settings for the Reactor Building Vent Wide Range Gas Monitors are calculated in accordance with the NRC approved methods in the ODCM to ensure that alarms will alert Control Room Operators prior to the limits of 10CFR Part 20 being exceeded.

Figure 1 Monticello Nuclear Generating Plant Site Boundary for Gaseous Effluents

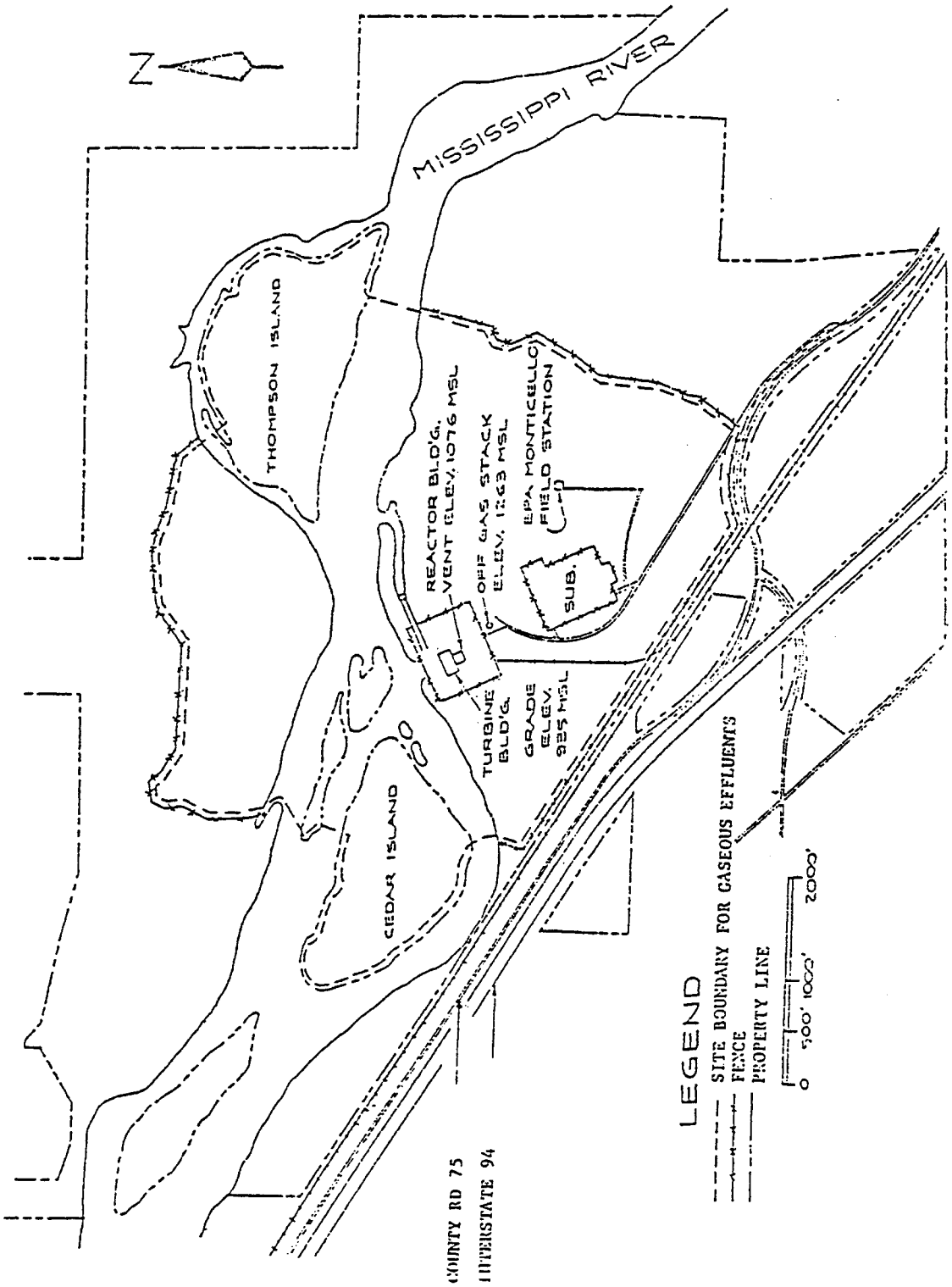

Table 1 Radioactive Gaseous Effluent Monitoring Instrumentation Surveillance Requirements

Instrument	Sensor Check Frequency	Source Check Frequency	Functional Test Frequency	Calibration Frequency
Main Condenser Air Ejector Noble Gas Activity Monitors	Daily during air ejector operation		Quarterly	Once each Operating Cycle
Main Condenser Off-gas Treatment System Hydrogen Monitors	Daily during air ejector operation		Monthly	Quarterly#
Plant Stack Wide Range Noble Gas Activity Monitors	Daily	Monthly	Quarterly	Once each Operating Cycle*
Plant Stack Iodine and Particulate Samplers	Weekly			
Plant Stack Flow Monitor	Daily			Once each Operating Cycle
Plant Stack Sample Flow Instruments	Daily			Once each Operating Cycle
Reactor Building Vent Wide Range Noble Gas Activity Monitors	Daily	Monthly	Quarterly	Once each Operating Cycle*
Reactor Building Vent Iodine and Particulate Samplers	Weekly			
Reactor Building Vent Duct Flow Monitors	Daily			Once each Operating Cycle
Reactor Building Vent Sample Flow Instruments	Daily			Once each Operating Cycle

* - The initial Instrument Calibration ***SHALL*** be performed using one or more of the reference standards certified by the National Bureau of Standards (NBS) or using sources traceable to NBS standards. These standards ***SHALL*** permit calibrating the system over its intended range of energy and measurement range. For subsequent calibration sources that have been related to the initial calibration ***SHALL*** be used.

\# - The Calibration ***SHALL*** include the use of standard gas samples containing a nominal four volume percent hydrogen.

Table 2 Radioactive Gaseous Waste Sampling and Analysis Program

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) (uci/ml)[a,e,f]
Containment Purge	Each Purge Grab Sample	Each Purge	Principal Gamma Emitters(f)	1×10^{-4}
			H-3[h]	1×10^{-6}
Plant Stack and Reactor Building Vent	Monthly[b] Grab Sample	Monthly	Principal Gamma Emitters(f)	1×10^{-4}
			H-3[i]	1×10^{-6}
	Continuous[g]	Weekly[c] Charcoal Sample	I-131 I-133	1×10^{-12} 1×10^{-10}
	Continuous[g]	Weekly[c] Particulate Sample	Principal Gamma Emitters (I-131, Others)	1×10^{-11}
	Continuous[g]	Monthly[d] Composite Particulate Sample	Gross alpha	1×10^{-11}
	Continuous[g]	Quarterly[d] Composite Particulate Sample	Sr-89, Sr-90	1×10^{-11}
	Continuous[g]	Composite monitor	Gross gamma or gross beta noble gas activity	1×10^{-6}

Table 2 Radioactive Gaseous Waste Sampling and Analysis Program (cont'd)

Notes

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. Note (a) of Table 2 is applicable.

b. Grab samples taken at the discharge of the plant stack and Reactor Building vent are generally below minimum detectable levels for most nuclides with existing analytical equipment. For this reason, isotopic analysis data, corrected for holdup time, for samples taken at the steam jet air ejector may be used to calculate noble gas ratios.

c. Whenever the steady state radioiodine concentration is greater than 10 percent of the limit of Specification 3.6.C.1, daily sampling of reactor coolant for radioactive iodines of I-131 through I-135 is required. Whenever a change of 25% or more in calculated Dose Equivalent I-131 is detected under these conditions, the iodine and particulate collection devices for all release points ***SHALL*** be removed and analyzed daily until it is shown that a pattern exists which can be used to predict the release rate. Sampling may then revert to weekly. When samples collected for one day are analyzed, the corresponding LLDs may be increased by a factor of 10. Samples ***SHALL*** be analyzed within 48 hours after removal.

d. To be representative of the average quantities and concentrations of radioactive materials in particulate form in gaseous effluents, samples should be collected in proportion to the rate of flow of the effluent streams.

e. The principal gamma emitters for which the LLD specification will apply are exclusively 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 which are measurable and identifiable, together with the above nuclides, ***SHALL*** also be identified and reported.

f. Nuclides which are below the LLD for the analyses ***SHALL*** be reported as "less than" the LLD of the nuclide and should not be reported as being present at the LLD level for that nuclide. The "less than" values ***SHALL NOT*** be used in the required dose calculations. When unusual circumstances result in LLDs higher than reported, the reasons ***SHALL*** be documented in the semiannual effluent report.

g. The ratio of the sample flow rate to the sampled stream flow rate ***SHALL*** be known for the time period sampled.

h. H^3 analysis ***SHALL*** not be required prior to purging if the limits of control 2.1.1 are satisfied for other nuclides. However, the H^3 analysis ***SHALL*** be completed within 24 hours after sampling.

i. In lieu of grab samples, continuous monitoring with bi-weekly analysis using silica-gel samplers may be provided.

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Table 3 Radioactive Gaseous Effluent Monitoring Instrumentation

Instrument	Minimum Channels Operable	Applicability	Action if Minimum Channels not Operable
Main Condenser Air Ejector Noble Gas Activity Monitor	2	During air ejector operation	From and after the date that one of the two steam jet air ejector off-gas radiation monitors is made or found to be inoperable, continued reactor power operation is permissible provided the inoperable radiation monitor instrument channel is tripped. Upon loss of both steam jet air ejector off-gas radiation monitors, power operation is permissable up to 72 hours provided the off-gas treatment system and post-treatment monitors are operable. If an air ejector off-gas radiation monitor is not restored to service within 72 hours, either: Isolate all main steam lines within 12 hours; or Isolate the Steam Jet Air Ejectors within 12 hours; or Be in hot shutdown within 12 hours and cold shutdown within the following 24 hours.
Main Condenser Off-gas Treatment System Hydrogen Monitors	2#	During air ejector operation	Operation may continue for up to 14 days with one Operable channel per operating recombiner train. With all channels inoperable, operation may continue provided the compressed gas storage system is bypassed.
Plant Stack Wide Range Noble Gas Activity Monitors*	1	At all times	Releases via this pathway may continue for up to 30 days provided grab samples are taken and analyzed at least once every 8 hours.
Iodine Sampler Cartridge	1	At all times	Releases via this pathway may continue for up to 30 days provided within 8 hours samples are continuously collected with auxiliary sampling equipment as required by Table

Table 3 Radioactive Gaseous Effluent Monitoring Instrumentation (cond't)

Instrument	Minimum Channels Operable	Applicability	Action if Minimum Channels not Operable
Particulate Sampler Filter	1	At all times	Releases via this pathway may continue for up to 30 days provided within 8 hours samples are continuously collected with auxiliary sampling equipment as required by Table 2.
Stack Flow Monitor	1	At all times	Releases via the pathway may continue for up to 30 days provided the flow rate is estimated at least once every 4 hours.
Sample Flow Instrument	1	At all times	Releases via the pathway may continue for up to 30 days provided the flow rate is estimated at least once every 4 hours.
Reactor Building Vent (includes Turbine Building & Radwaste Building releases)			
Wide Range Noble Gas Activity Monitors**	1	At all times	Releases via this pathway may continue for up to 30 days provided grab samples are taken and analyzed at least every 8 hours.
Iodine Sampler Cartridge	1	At all times	Releases via this pathway may continue for up to 30 days provided within 8 hours samples are continuously collected with auxiliary sampling equipment as required by Table 2.
Particulate Sampler Cartridge	1	At all times	Releases via this pathway may continue for up to 30 days provided within 8 hours samples are continuously collected with auxiliary sampling equipment as required by Table 2.
Duct Flow Monitors	1	At all times	Releases via the pathway may continue for up to 30 days provided the flow rate is estimated at least once every 4 hours.
Sample Flow Instruments	1	At all times	Releases via the pathway may continue for up to 30 days provided the flow rate is estimated at least once every 4 hours.

Notes:
- Indicates number of channels required per operating recombiner train.
* - Provides automatic termination of off-gas treatement system releases.
** - Provides Control Room indication prior to exceeding 10CFR Part 20 release limits.