2) Logic Channel

A logic channel is a group of relay contact matrices which operate in response to the analog channels signals to generate a protective action signal.

f. Instrumentation Surveillance

1) Channel Check

Channel check is a qualitative determination of acceptable operability by observation of channel behavior during operation. Where other channels are provided, this determination shall include comparison of the channel indication with indications from other independent instrumentation channels measuring the same parameter.

2) Channel Functional Test

A channel functional test consists of injecting a simulated signal into the channel to verify that it is operable, including alarm and/or trip initiating action.

3) Channel Calibration

Channel calibration consists of the adjustment of channel output such that it responds, with acceptable range and accuracy, to known values of the parameter which the channel measures. Calibration shall encompass the entire channel, including equipment action, alarm, or trip, and shall be deemed to include the channel functional test.

g. Shutdown

1) Hot Shutdown

The reactor is in the hot shutdown condition when the reactor is subcritical, by an amount greater than or equal to the margin as specified in Technical Specifications 15.3.10 and T_{avg} is at or greater than 540°F.

15.3.9 Radioactive Effluent Releases

Applicability

Applies to the controlled releases of radioactive gases or liquids from the plant on a total plant or site basis.

Objective

To define the limits and conditions for the controlled release of radioactive materials in liquid and gaseous effluents to the environs to ensure that these releases are as low as is reasonably achievable in conformance with 10 CFR Parts 50.34a and 50.36a, to ensure that these releases result in concentrations of radioactive materials in liquid and gaseous effluents released to unrestricted areas that are within the limits specified in 10 CFR Part 20, and to ensure that the releases of radioactive material above background to unrestricted areas are as low as is reasonably achievable, the following design objectives as defined in Appendix I to 10 CFR Part 50 apply:

A. The annual total quantity of all radioactive material above background that may be released from each light-water-cooled nuclear power reactor to unrestricted areas should not result in an annual dose or dose commitment from liquid effluents for any individual in an unrestricted area from all pathways of exposure in excess of 3 millirems to the total body or 10 millirems to any organ.

B. The annual total quantity of all radioactive material above background that may be released from each light-water-cooled nuclear power reactor to the atmosphere should not result in an annual air dose from gaseous effluents at any location near ground level which could be occupied by individuals in unrestricted areas in excess of 10 millirads for gamma radiation or 20 millirads for beta radiation, or that this quantity should not result in an annual external dose from gaseous effluents to any individual

in unrestricted areas in excess of 5 millirems to the total body or 15 millirems to the skin.

C. The annual total quantity of all radioactive iodine and radioactive material in particulate form above background that may be released from each light-water-cooled nuclear power reactor in effluents to the atmosphere should not result in an annual dose or dose commitment from such radioactive iodine and radioactive material in particulate form for any individual in an unrestricted area from all pathways of exposure in excess of 15 millirems to any organ.

SPECIFICATIONS

A. Radioactive Liquid Effluent Monitoring Instrumentation

The radioactive liquid effluent monitoring instrumentation channels listed in Table 15.3.9-1 shall be operable with their alarm or trip setpoints set to ensure that the limits of Specification 15.3.9.C are not exceeded. In the event that a radioactive effluent monitoring instrumentation channel alarm or trip setpoint is less conservative than required by this Specification, the release of radioactive liquid effluents monitored by the affected channel shall be immediately suspended or the channel shall be declared inoperable. If a radioactive liquid effluent monitoring instrumentation channel is inoperable, the action statement listed in Table 15.3.9-1 opposite the channel shall be taken.

B. Radioactive Gaseous Effluent Monitoring Instrumentation

The radioactive gaseous effluent monitoring instrumentation channels listed in Table 15.3.9-1 shall be operable with their alarm or trip setpoint set to ensure that the limits of Specification 15.3.9.D are not exceeded. In the event that a radioactive gaseous effluent monitoring instrumentation channel alarm or trip setpoint is less conservative than required by this Specification, the release of radioactive gaseous effluents monitored by the affected channel shall be immediately suspended or the channel shall

be declared inoperable. If radioactive gaseous effluent monitoring instrumentation channels are inoperable, the action statement listed in Table 15.3.9-1 opposite that channel shall be taken.

C. Liquid Waste Release Rates

1. The release rate of radioactive liquid effluents shall be such that the annual average concentration of radionuclides in the circulating water discharge does not exceed the limits specified in 10 CFR 20, Appendix B, for unrestricted areas.

2. Prior to release of liquid waste tank contents, a sample shall be taken and analyzed.

3. During release of liquid radioactivity wastes, at least one condenser circulating water pump shall be in operation and the service water return header shall be lined up only to the unit whose circulating water pump is operating.

4. The maximum release rate for any eight hour period shall not exceed ten times the yearly average limit.

D. Gaseous Waste Release Rates

1. The annual average release rates of gaseous and airborne particulate wastes shall be limited as follows:

$$1.5 \times 10^{-6} \frac{\text{sec}}{\text{m}^3} \sum \frac{Qi}{(MPC)_i} \leq 1.0$$

Where Q_i is the annual release rate (Ci/sec) of any radioisotope, i, and $(MPC)_i$ in units of μCi/cc are defined in Column 1, Table II of Appendix B to 10 CFR 20. For purp[illegible] calculating permissible releases by the above formula $(MPC)_i$ for [illegible]sotopes of iodine and

particulates with half-lives longer than 8 days shall be reduced by a factor of 700 from the listed value in 10CFR20, Appendix B, December 22, 1965, edition.

2. The maximum release rate for any 60 minute period shall not exceed ten times the yearly average limit.

3. Gaseous wastes shall have as a minimum 7 days of decay time, except for low radioactivity gaseous wastes resulting from purge and fill operations associated with refueling and reactor startup or maintenance and surveillance activities on the gas stripper system. Prior to release of gaseous wastes, the contents of the gas decay tank shall be sampled and analyzed to determine compliance with 1 and 2 above.

4. During release of gaseous wastes to the plant vent, at least one auxiliary building exhaust fan shall be in operation.

E. Radioactive Liquid Effluent Releases

1. Definitions: $Ce_{ij} = C_i \times \frac{DF_i}{DF_j}$

Ce_{ij} = number of curies of isotope i expressed in terms of an equivalent number of curies of isotope j.

C_i = actual number of curies of isotope i.

DF_i = dose factor for isotope i as given in Regulatory Guide 1.109, Revision 1, October 1977.

DF_j = dose factor for reference isotope j as given in Regulatory Guide 1.109, Revision 1, October 1977.

The design objective annual releases in liquid effluents shall be as follows:

2. Tritium: $C_i \leq$ 2.15E+03 curies

3. Radioiodines: $\Sigma Ce_{ij} \leq 2.82E+01$ equivalent curies

where (1) the reference isotope, j, is I-131;

(2) DF_i is the thyroid dose factor for isotope i given in Table E-13 of Regulatory Guide 1.109, Revision 1, October 1977; thyroid dose factors for isotopes not given in Table E-13 are obtained from Table E-11.

(3) DF_j is the thyroid dose factor for the reference isotope, I-131, as given in Table E-13 of Regulatory Guide 1.109, Revision 1, October 1977.

4. Others (isotopes other than tritium, noble gases, or radioiodines):

$\Sigma Ce_{ij} \leq 3.49E+01$ equivalent curies

where (1) the reference isotope, j, is Co-60;

(2) DF_i is the highest dose factor for isotope i in any column of Table E-12 of Regulatory Guide 1.109, Revision 1, October 1977; dose factors for isotopes not given in Table E-12 are obtained from Table E-11. Dose factors for isotopes not giver in either Table E-13 or Table E-11 are obtained from the dose factor for any isotope of the same element, modified by the ratio of their respective maximum permissible concentrations (MPCs) as given in 10 CFR Part 20.

(3) DF_j is the highest dose factor for the reference isotope, Co-60, given in any column of Table E-12 of Regulatory Guide 1.109, Revision 1, October 1977

5. Noble gases released in liquid effluents are to be included with noble gases released in gaseous effluents.

F. Annual Radioactive Gaseous Effluent Releases

1. Definitions of terms are as listed in Specification 15.3.9.C. above.

The design objective annual releases in gaseous effluents shall be as follows:

2. Tritium: $C_i \leq$ 2.90E+04 curies

3. Noble Gases: $\Sigma C_{ij} \leq$ 9.21E+05 equivalent curies

where (1) the reference isotope, j, is Xe-133;

(2) DF_i is the dose factor for isotope i given as DFB_i in Table B-1 of Regulatory Guide 1.109, Revision 1, October 1977; and

(3) DF_j is the dose factor for the reference isotope, Xe-133, given under DFB_i in Table B-1 of Regulatory Guide 1.109, Revision 1, October 1977.

4. Radioiodines: $\Sigma C_{ij} \leq$ 3.72E-01 equivalent curies

where (1) the reference isotope, j, is I-131;

(2) DF_i is the thyroid dose factor for isotope i given in Table E-14 of Regulatory Guide 1.109, Revision 1, October 1977; thyroid dose factors for isotopes not given in Table A-6 are obtained from Table E-11.

(3) DF_j is the thyroid dose factor for the reference isotope, I-131, as given in Table E-14 of Regulatory Guide 1.109, Revision 1, October 1977.

5. Particulates (isotopes other than tritium, noble gases, or radioiodines): $\Sigma C_{ij} \leq$ 1.80E+00 equivalent curies

where (1) the reference isotope, j, is Co-60;

(2) DF_j is the highest dose factor for isotope i in any column of Table E-13 of Regulatory Guide 1.109, Revision 1, October 1977; dose factors for isotopes not given in Table E-13 are obtained from Table E-11. Dose factors for isotopes not given in either Table E-13 or Table E-11 are obtained from the dose factor for

any isotope of the same element, modified by the ratio of their respective maximum permissible concentrations (MPCs) as given in 10 CFR Part 20.

(3) DF_j is the highest dose factor for the reference isotope, Co-60, given in any column of Table E-13 of Regulatory Guide 1.109, Revision 1, October 1977.

G. Tritium

The design objective release for tritium in liquid effluents may be increased, provided it is accompanied by a proportional decrease in the design objective release for tritium in gaseous effluents. Similarly, the design objective release for tritium in gaseous effluents may be increased, provide it is accompanied by a proportional decrease in the design objective release for tritium in liquid effluents.

H. Quarterly Summary

A summary of effluent release shall be made on a quarterly basis to demonstrate compliance with this section. In the event that actual quantities of radioactive materials released in liquid and gaseous effluents exceed twice the quantities corresponding to the annual dose design objectives of Appendix I to 10 CFR Part 50, a special report will be prepared and submitted to the U. S. Nuclear Regulatory Commission.

I. Radioactive Effluent Waste Treatment

The liquid radwaste treatment system shall be operable. The appropriate portions of the system shall be used to reduce the radioactive materials in liquid wastes prior to their discharge whenever such effluents require treatment to meet the design objectives set forth in Appendix I to 10 CFR 50. If such treatment is required, and the liquid radwaste treatment system is inoperable for more than 31 days or radioactive liquid waste is being discharged without treatment, a special report shall be prepared and sent to the U. S. Nuclear Regulatory Commission which includes the following information:

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

b. Actions taken to restore the inoperable equipment to operable status; and

c. Summary description of actions taken to prevent a recurrence.

2. The gaseous radwaste treatment system and the ventilation exhaust treatment system shall be operable. The appropriate portions of the gaseous radwaste treatment and ventilation exhaust treatment systems shall be used to reduce radioactive materials in gaseous wastes prior to their discharge, whenever such effluents require treatment to meet the design objectives set forth in Appendix I to 10 CFR 50. If such treatment is required, and the gaseous radwaste treatment system or the ventilation exhaust treatment system is inoperable for more than 31 days or gaseous waste is being discharged without treatment, a special report shall be prepared and sent to the U. S. Nuclear Regulatory Commission which includes the following information:

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

b. Actions taken to restore the inoperable equipment to operable status; and

c. Summary description of actions taken to prevent a recurrence.

Bases:

Liquid wastes from the radioactive Waste Disposal System are diluted in the Circulating Water System discharge prior to release to the lake[1]. With two pumps operating per unit, the rated flow of the circulating water system is approximately 356,000 gpm per unit. Operation of a single circulating water pump per unit reduces the nominal flow rate by about 40%. Liquid waste from the waste disposal system may be discharged to the circulating water discharge of either unit via the service water return header. Because of the low radioactivity

levels in the circulating water discharge, the concentrations of liquid radioactive effluents at this point are not measured directly. The concentrations in the circulating water discharge are calculated from the measured concentration in the waste condensate tank, the flow rate of the waste condensate pumps, and the nominal flow in the circulating water system.

If the annual average concentration of liquid wastes in the circulating water discharge should equal MPC as specified in C-1, the average concentration at the intake of the nearest public water supply at Two Rivers would be well below MPC(2). Thus, discharge of liquid wastes at the specified annual average concentrations would not result in significant exposure to members of the public as a result of consumption of drinking water from the lake, even if the effect of potable water treatment systems on reducing radioactive concentrations of the water supply is neglected.

Prior to release to the atmosphere, gaseous wastes from the radioactive waste disposal system are mixed in the auxiliary building vent with the flow from at least one of two auxiliary building exhaust fans. Further dilution then occurs in the atmosphere. Startups involving heavy boration of a main coolant system can result in a substantial increase in rejected dilution water to the holdup tanks and a net increase in the volume of gas makeup to the gas blanket system. These startups involve a power outage and considerable decay time has already occurred for the residual radioactive gases; hence, almost no radioactive gases exist. Since the gases are predominantly hydrogen and nitrogen with low or trace radioactive, and since volumes can be large, monitoring and bypassing these low radioactivity gases directly to the vent discharge is allowed.

The formula prescribed in Specification D-1 takes atmospheric dilution into account and ensures that at the point of maximum ground concentration at the

site boundary the requirements of 10 CFR 20 will not be exceeded. The limit is based on the highest long term value of χ/Q, which occurs at the nearest site boundary.

The release of radioactive materials in liquid effluents to unrestricted areas shall not exceed the limits set forth in Section 15.3.9 and should be as low as is reasonably achievable in accordance with the requirements of 10 CFR Part 50.34a and 50.36a. These Specifications provide reasonable assurance that the resulting average annual dose or dose commitment from liquid effluents from each radioactive waste producing reactor for any individual in an unrestricted area from all pathways of exposure will not exceed 3 mrem to the total body or 10 mrem to any organ. Further, these Specifications provide reasonable assurance that the resulting annual air dose due to gamma radiation will not exceed 10 mrad and that the resulting annual air dose due to beta radiation will not exceed 20 mrad from the gaseous waste effluents from each radioactive waste producing reactor at the site. These Specifications also provide reasonable assurance that no individual in an unrestricted area will receive an annual dose to the total body greater than 5 mrem or an annual dose to the skin greater than 15 mrem from these gaseous effluents, and that the annual dose to any organ of an individual from radioiodines and radioactive material in particulate form will not exceed 15 mrem from each radioactive waste producing reactor at the site.

At the same time, these Specifications permit the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided with a dependable source of power even under unusual operating conditions which may temporarily result in releases higher than such numerical guides for design objectives but still within levels that assure that the average population exposure is equivalent to small fractions of doses from natural background radiation.

The design objective releases set forth in this Specification are derived from the dose evaluation performed in accordance with Appendix I to 10 CFR Part 50. In the evaluation, certain maximum calculated doses to an individual result from the calculated effluent releases. Design objective releases are defined by scaling calculated releases upward to the point at which corresponding doses reach the applicable limit specified in Appendix I to 10 CFR Part 50.

Design objective releases are calculated in terms of "equivalent curies", referenced to an appropriate single isotope within each release group, to allow for minor shifts in the distribution of actual effluent releases. Dose factors used in the calculation of equivalent curies are selected for the age group in which the dose limit is most closely approached. From the Appendix I evaluation, it is observed that ingestion is generally the most significant dose pathway for both gaseous and liquid effluent types, except for noble gases; hence, ingestion dose factors are used in evaluating effluent releases except when noted otherwise. Conservatively, the highest dose factor listed for each isotope within the applicable age group is used for calculating equivalent curies, regardless of organ of applicability. For each effluent category, the design objective release is as follows:

$$\Sigma DCe_{ijk} = \frac{\Sigma\ ACe_{ijk} \times L_k \times 2}{D_k}$$

where ΣDCe_{ijk} = Dose objective release in total equivalent curies for all isotopes of effluent type k.

ΣACe_{ijk} = Calculated release in total equivalent curies for all isotopes of effluent type k.

2 = two units per plant.

D_k = calculated dose resulting from release of ΣACe_{ijk} curies.

1. The following notes apply to the calculation of design objective releases for gaseous effluents:

a) For noble gases, the gamma air dose is limiting;

b) For radioiodines, the thyroid dose to the infant is limiting; the dose contribution from other isotopes is negligible.

c) For remaining isotopes, the liver dose to the child is limiting; the dose contribution from radioiodines is negligible for all organs other than the thyroid.

2. The following notes apply to the calculation of design objective releases for liquid effluents:

a) For radioiodines, the thyroid dose to a child is limiting; for scaling purposes, the dose contribution from other isotopes is negligible.

b) For remaining isotopes, the total body dose to the adult is limiting; the dose contribution from radioiodines is negligible for all organs other than the thyroid. Dose factors for the teenager are conservatively used, since the liver dose for teenagers is the next limiting case after total body dose for adults.

Design objective releases calculated in the manner described above are quantities of radioactivity in effluents which, for the particular environmental parameters and conditions at Point Beach Nuclear Plant, would result in maximum doses to an individual corresponding to the limits set forth in Appendix I to 10 CFR Part 50. Actual plant releases are expected to be well within the design objective release quantities. The periodic review required by this section ensures that plant releases remain as low as is reasonably achievable.

The radioactive liquid and gaseous effluent instrumentation is provided to monitor and control as applicable, the releases of radioactive materials in liquid and gaseous effluents during actual or potential releases of these effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance

with the procedures in the offsite dose calculation manual to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20.

The operability of the liquid and gaseous radwaste treatment systems and the ventilation exhaust treatment system ensures that the systems will be available for use whenever liquid or gaseous effluents require treatment prior to release to the environment. The requirement that the appropriate portions of these systems be used when specified provides assurance that the releases of radioactive materials in liquid and gaseous effluents will be kept "as low as is reasonably achievable".

Compliance with the provisions of Appendix I to 10 CFR Part 50 is adequate demonstration of conformance to the standards set forth in 40 CFR Part 190 regarding the dose commitment to individuals from the uranium fuel cycle. The Specifications direct that if actual quantities of radioactive materials released exceed twice the quantities associated with the design dose objective of Appendix I to 10 CFR Part 50, a special report will be submitted.

References

(1) FSAR, Section 10.2

(2) FSAR, Section 2, Appendix 2A

(3) FSAR, Sections 2.6 and 2.7

TABLE 15,3.9-1

RADIOACTIVE EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
A. Radioactive Liquid Effluent Monitoring		
1. LW16, Waste Distillate Tank Discharge	1	Note 1
2. R18, Waste Condensate Tank Discharge	1	Note 1
3. 1R19, Unit 1 Steam Generator Blowdown Liquid	1	Note 2
4. 2R19, Unit 2 Steam Generator Blowdown Liquid	1	Note 2
5. R16, Containment Cooling Fan Service Water Return	1	Note 3
6. R20, Spent Fuel Pool Heat Exchanger Service Water Outlet	1	Note 3
7. FRC-LW15, Waste Distillate Tank Discharge Flow Recorder	1	Note 4
8. FI-1064, Waste Condensate Tank Discharge Flow Meter	1	Note 4
B. Radioactive Gaseous Effluent Monitoring		
1. Gas Decay Tank System		
a. Noble Gas-R14, Auxiliary Building Vent Stack	1	Note 5
b. Iodine and Particulate - Portable Continuous Air Sampler	1	Note 6
c. FI-014, Gas Decay Tank Flow Measuring Device	1	Note 7
d. Sampler Flow Rate Measuring Device	1	Note 6

TABLE 15.3.9-1 (Continued)

INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
2. Auxiliary Building Ventilation System		
a. Noble Gas-R14, Auxiliary Building Vent Stack	1	Note 8
b. Iodine and Particulate - Portable Continuous Air Sampler	1	Note 6
c. Sampler Flow Rate Measuring Device	1	Note 6
3. Condenser Air Ejection System		
a. Noble Gas-CR9, Combined Air Ejector Discharge Monitor and R15, Air Ejector Monitors (one per unit)	1	Note 8
b. Flow Rate Monitor - Air Ejectors (one per unit)	1	Note 7
4. Containment Purge and Continuous Vent System		
a. Noble Gas-R12 Monitors, (one per unit)	1	Note 8
b. Iodine and Particulate - Portable Continuous Air Sampler	1	Note 6
c. 10CFM Vent Path Flow Monitor	1	Note 7
d. Sampler Flow Rate Measuring Device	1	Note 6
5. Fuel Storage and Drumming Area Ventilation System		
a. Noble Gas-R21, Drumming Area Stack	1	Note 8
b. Iodine and Particulate - Portable Continuous Air Sampler	1	Note 6
c. Sampler Flow Rate Measuring Device	1	Note 6

TABLE 15.3.9-1 (Continued)

INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
6. Gas Stripper Building Ventilation		
a. Noble Gas - GW112 Monitor	1	Note 8
b. Iodine and Particulate - Portable Continuous Air Sampler	1	Note 6
c. Sampler Flow Rate Measuring Device	1	Note 6

Note 1: With the number of channels operable less than required by the minimum channels operable requirement, effluent releases may continue for up to 14 days provided that prior to initiating a release, two separate samples are analyzed in accordance with the applicable part of Specification 15.4.6 and the release rate calculation is reviewed.

Note 2: With the number of channels operable less than required by the minimum channels operable requirement, effluent releases via this pathway may continue for up to 30 days provided grab samples are analyzed for gamma radioactivity at least once every 24 hours when the R-15 Air Ejector Monitor is operable or at least once every 8 hours if the R-15 monitor is not operable.

Note 3: With the number of channels operable less than required by the minimum channels operable requirement, effluent releases via this pathway may continue for up to 30 days provided that at least once every 24 hours grab samples are collected and analyzed for gamma radioactivity.

Note 4: With the number of channels operable less than required by the minimum channels operable requirement, effluent releases via this pathway may continue for up to 30 days provided the flow rate is estimated at least once per 4 hours during actual releases.

Note 5: With the number of channels operable less than required by the minimum channels operable requirement, the contents of the tanks may be released to the environment for up to 14 days provided that prior to initiating the release two separate samples of the tank's contents are analyzed in accordance with the applicable part of Specification 15.4.16 and the release rate calculation is reviewed.

Note 6: With the number of channels operable less than required by the minimum channels operable requirement, effluent releases via the affected pathway may continue for up to 30 days provide samples are continuously collected with auxiliary sampling equipment.

Note 7: With the number of channels operable less than required by the minimum channels operable requirement, effluent releases via this pathway may continue for up to 30 days provided the flow rate is estimated at least once every 4 hours or determined with auxiliary indication.

Note 8: With the number of channels operable less than required by the minimum channels operable requirement, effluent releases via this pathway may continue for up to 30 days provided grab sam-les are taken at least once per 8 hours and these samples are analyzed for gamma radioactivity within 24 hours.

TABLE 15.4.1-1 (CONTINUED)

	Channel Description	Check	Calibrate	Test	Remarks
10.	Rod Position Bank Counters	S (1)**	N.A.	N.A.	1) With analog rod position
11.	Steam Generator Level	S **	R	M**	
12.	Steam Generator Flow Mismatch	S **	R	M**	
13.	Charging Flow	N.A.	R	N.A.	
14.	Residual Heat Removal Pump Flow	N.A.	R	N.A.	
15.	Boric Acid Tank Level	D	R	N.A.	
16.	Refueling Water Storage Tank Level	N.A.	R	N.A.	
17.	Volume Control Tank Level	N.A.	R	N.A.	
18.	Reactor Containment Pressure	D	R	B/W (1)**	1) Isolation Valve signal
19.	Radiation Monitoring System	D	R	M	Radioactive Effluent Monitor Instrumentation Requirements are covered in 15.4.16.
20.	Boric Acid Control	N.A.	R	N.A.	
21.	Containment Sump Level	N.A.	R	N.A.	
22.	Turbine Overspeed Trip*	N.A.	R	M (1)**	1) Block Trip
23.	Accumulator Level and Pressure	S	R	N.A.	

* Overspeed Trip Mechanism, and Independent Turbine Speed Detection and Valve Trip System.

** Not required during periods of refueling shutdown, but must be performed prior to starting up if it has not been performed during the previous surveillance period.

TABLE 15.4.10-1 - OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING

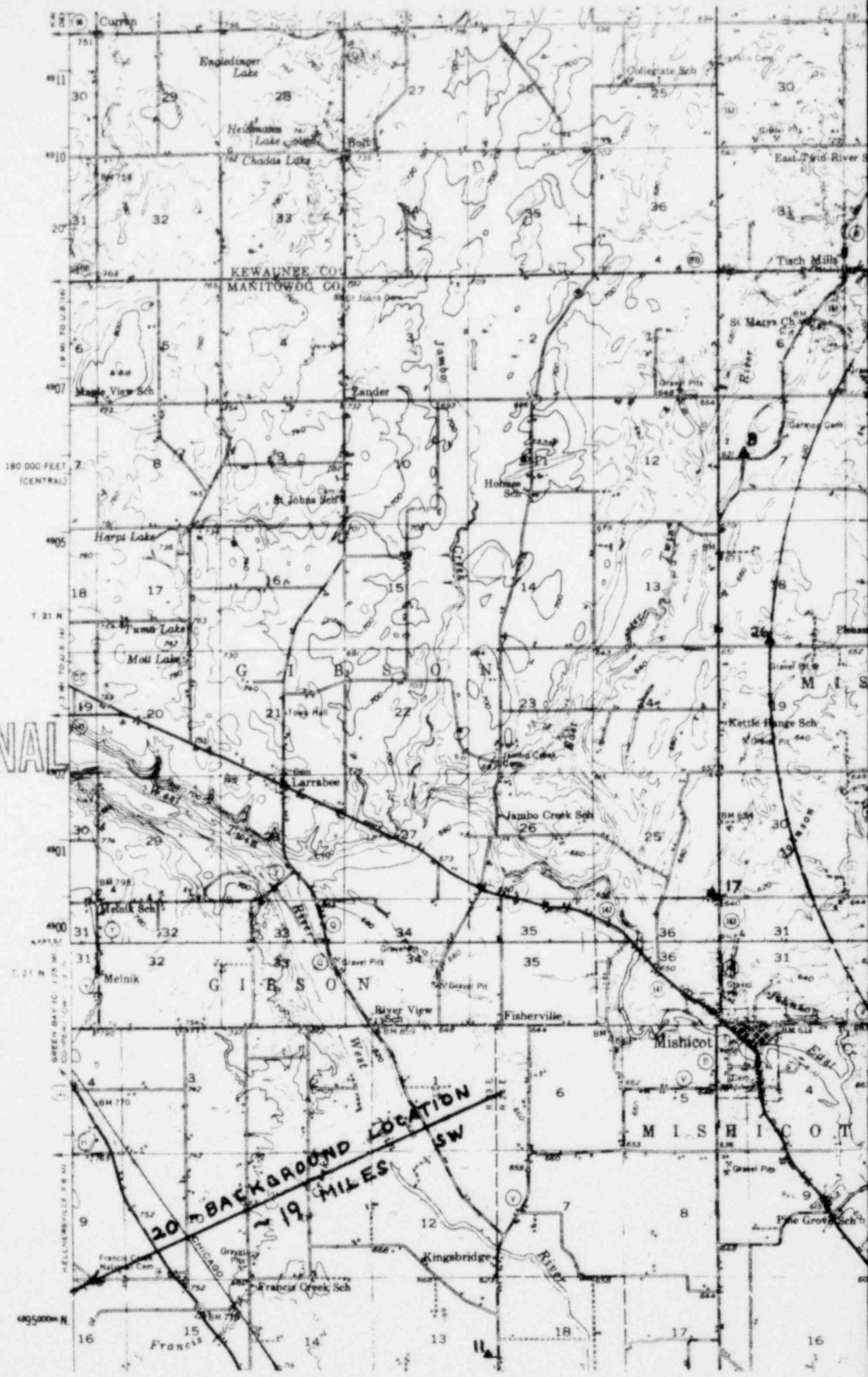
Sample Type	Locations[a,b]	Frequency	Analysis	Comments
Vegetation	1-Reference (20) 4-Site Boundary (1,2,3,4) 3-Within 5 miles (6,8,9)	3x/yr. as available	Gross Beta Gamma Scan	Vegetation samples are general grasses and weeds.
Shoreline Silt	1-Discharge Flume (12) 2-N of Discharge (5,9) 2-S of Discharge (1,6)	2x/yr.	Gross Beta Gamma Scan	-
Soil	1-Reference (20) 4-Site Boundary (1,2,3,4) 3-Within 5 miles (6,8,9)	2x/yr.	Gross Beta Gamma Scan	- -
TLD's	1-Reference (20) 9-Site Vicinity (1,2,3,4,5,14,15,16,22) 11-Within 3 to 6 miles (6,7,8,9,17,18,23,24,25,26,27) 1-PBNP Pier (12) 1-Transportation Control (20)	Quarterly	Gamma Dose	Control TLD is used for round trip transportation
Lake Water	1-Discharge Flume (12) 2-N of Discharge (5,9) 2-S of Discharge (1,6)	Monthly (Sample at flume is composited weekly for monthly analysis.)	Gross Beta Gamma Scan Tritium Strontium-89 Strontium-90	Gross Beta and Gamma Scan done monthly on total solids; Tritium and Radiostrontium done quarterly on composites for each location.
Air Filters	1-Reference (20) 4-Site Boundary (1,2,3,4) 1-Within 5 miles (8)	Weekly	Gross Beta Radioiodine Gamma Scan	Gross Beta analysis done weekly on particulate filters; Radioiodine done weekly on charcoal cannisters; gamma scan done quarterly on particulate filter composites for each location.

TABLE 15.4.10-1 (CONTINUED)

Sample Type	Locations[a,b]	Frequency	Analysis	Comments
Well Water	1-Onsite Well (10)	Quarterly	Gross Beta Gamma Scan Tritium Strontium-89 Strontium-90	Gross Beta and Gamma Scan done on total solids.
Milk	1-Dairy Farm, W (11) 1-Dairy Farm, NNW (19) 1-Dairy Farm, SSE (21)	Monthly	Gamma Scan Radioiodine Strontium-89 Strontium-90	Radioiodine analysis done by the resin extraction technique.
Algae	1-North of Discharge (5) 1-Discharge of Flume (12)	2x/yr. as available	Gross Beta Gamma Scan	-
Fish	1-Travelling Screens (13)	2x/yr. as available	Gross Beta Gamma Scan	Analysis of edible portions only.
Food Products	1-Onsite (3)	At Harvest	Gross Beta Gamma Scan	Analysis of food crop produced onsite.

(a) Reference location is chosen well in excess of 10 miles from the plant in a low X/Q sector to provide an estimate of background levels.

(b) Numbers given under location correspond to sampling locations shown in Figure 15.4.10-1.



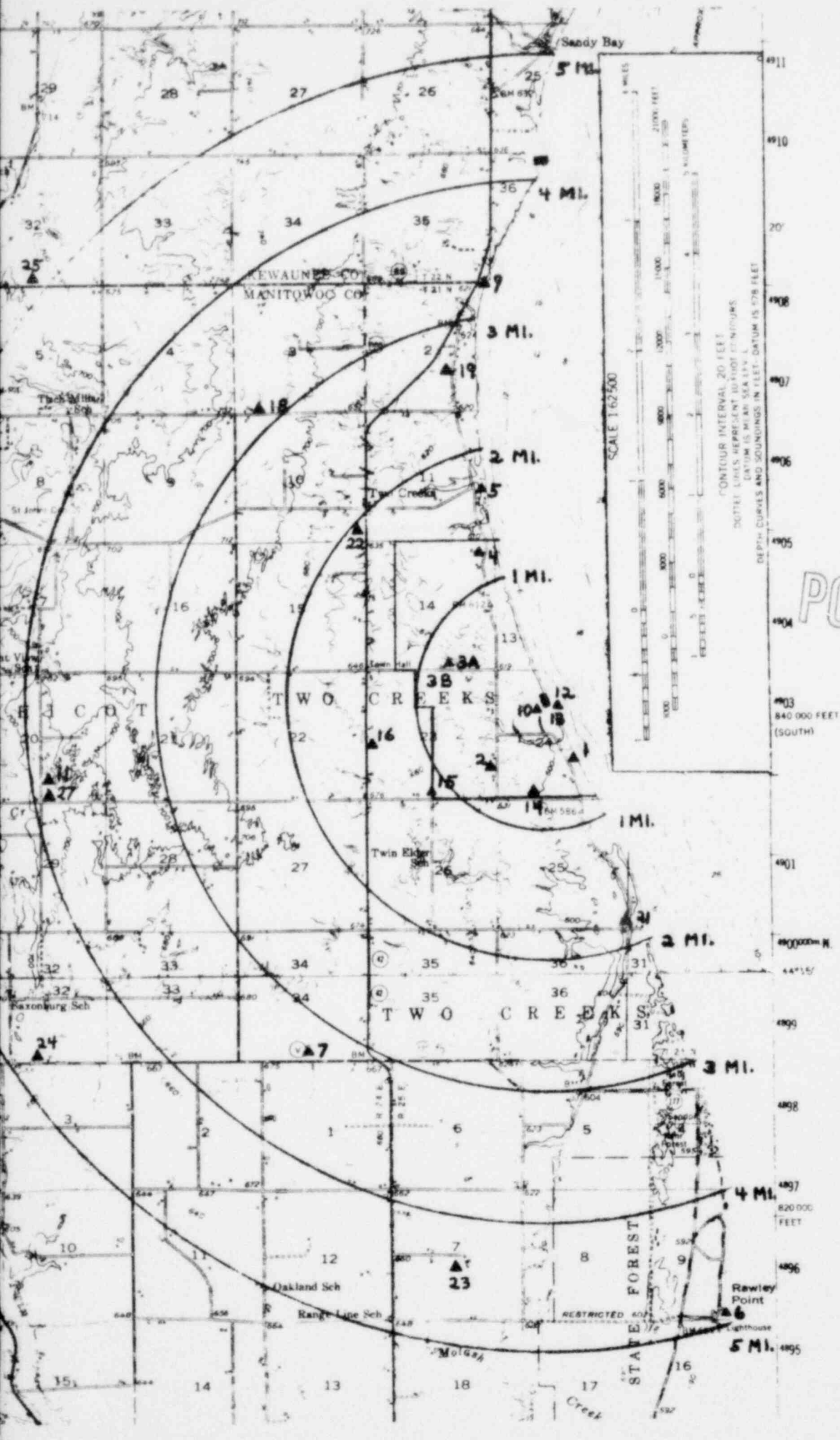


Figure 15.4.10-1 Sampling Locations

15.4.16 RADIOACTIVE EFFLUENT MONITORING AND CONTROL SYSTEMS

Applicability

Applies to the periodic inspection, testing calibration and verification of operability requirements for the radioactive liquid and gaseous effluent monitoring instrumentation and waste processing systems.

Objective

To verify that radioactive liquid and gaseous effluent monitoring instrumentation channels and liquid and gaseous radwaste treatment systems are periodically demonstrated to be operable and to verify that the concentrations of radioactive material released from the site do not exceed the limits specified in Specification 15.3.9.

Specifications

A. Radioactive Effluent Monitoring Instrumentation Channel Surveillance Requirements

Each radioactive liquid effluent monitoring instrumentation channel and each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated operable by performance of the channel check, channel calibration and channel functional test operations at the frequencies shown in Table 15.4.16-1.

B. Radioactive Liquid Waste Sampling and Analysis

1. The radioactivity content of each batch of radioactive liquid waste shall be determined prior to release by sampling and analysis in accordance with Table 15.4.16-2. The results of pre-release analyses shall be used with the calculational methods in the Offsite Dose Calculation Manual (ODCM) to assure that the concentration at the point of releases is maintained within the limits of Specification 15.3.9.
2. Post-release analyses of samples composited from batch releases shall be performed in accordance with Table 15.4.16-2. The results of the previous post-release analyses shall be used with the calculational

methods in the ODCM to assure that the concentrations at the point of release were maintained within the limits of Specification 15.3.9.

3. The radioactivity concentration of liquids discharged from continuous release points shall be determined by collection and analysis of samples in accordance with Table 15.4.6-2. The results of the analyses shall be used with the calculational methods in the ODCM to assure that the concentrations at the point of release are maintained within the limits of Specification 15.3.9

C. Radioactive Gaseous Waste Sampling and Analysis

1. The radioactivitiy concentration of radioactive gaseous wastes shall be determined by sampling and analyses in accordance with Table 15.4.16-3. The results of the analyses shall be used with the calculation methods in the ODCM to assure that concentrations are maintained within the limits of Specification 15.3.9.

D. Radioactive Waste Processing System Operability

1. The liquid radwaste treatment systems shall be demonstrated operable by the following means:

   a. The blowdown evaporator and one of two redundant boric acid evaporators together with their associated equipment shall be operated at least once a quarter with a demonstrated minimum Decontamination Factor (DF) for soluble gamma isotopes of 10.

   b. The waste evaporator and associated equipment, while not normally used, shall be demonstrated operable with a minimum DF for soluble gamma isotopes of 10 prior to each use.

   c. The polishing condensate demineralizers shall be checked to verify a minimum DF of 10 for soluble gamma isotopes at least once a quarter.

2. The ventilation and gaseous waste processing systems shall be demonstrated operable by the following means.

a. For the Auxiliary Building Ventilation, Containment Purge and Continuous Vent (one system per unit), and Chemistry Laboratory Ventilation Systems, the HEPA filters and charcoal absorbers shall be inspected for damage or misalignment and verified in place once a quarter.

b. For the Spent Fuel Pool - Drumming Area, Service Building and Auxiliary Building - (low radiation areas) ventilation systems, the HEPA filters shall be inspected for damage or misalignment and verified in place once a quarter.

c. The Charcoal Decay Tanks shall be checked for operability once a quarter by verifying with appropriate beta-gamma survey instruments a reduction in gross radioactivity between the inlet and outlet flow stream.

d. The Condenser Air Ejector decay duct valve lineup shall be checked and the charcoal absorber inspected for damage and verified in place once a quarter.

TABLE 15.4.16-1

Radioactive Effluent Monitoring Instrumentation Surveillance Requirements

Channel Description	Check	Calibrate	Test*	Remarks
A. Radioactive Liquid Monitors				
1. LW16, Waste Distillate Tank Discharge	D	R	M	
2. R18, Waste Condensate Tank Discharge	D	R	M	
3. R19, Unit 1, Steam Generator Blowdown Liquid	D	R	M	
4. R19, Unit 2, Steam Generator Blowdown Liquid	D	R	M	
5. R16, Containment Cooling Fan Service Water Return	D	R	M	
6. R20, Spent Fuel Pool Heat Exchanger Service Water Outlet	D	R	M	The test for this channel is satisfied by a source response check only.
B. Flow Rate Measurement Devices - Liquid Effluents				
1. FRC-LW15, Waste Distillate Tank Discharge Flow Recorder	P	R	NA	
2. FI-1064, Waste Condensate Tank Discharge Flow Meter	P	R	NA	
C. Radioactivity Recorders - Liquid Effluents				
1. R19, Steam Generator Blowdown	D	R	NA	
2. LW16, Waste Distillate Tank Discharge	D	R	NA	
3. R18, Waste Condensate Tank Discharge	D	R	NA	
D. Radioactive Gaseous Monitors				
1. Gas Decay Tank System and Auxiliary Building Ventilation System				
a. Noble Gas - R14, Auxiliary Building Vent Stack	D	R	M	

TABLE 15.4.16-1 (Continued)

Channel Description	Check	Calibrate	Test*	Remarks
b. Iodine and Particulate - Portable Continuous Air Sampler	P/W	P	NA	
c. FI-014, Gas Decay Tank Flow Measuring Device	P	R	NA	
d. Sampler Flow Rate Measuring Device	W	R	NA	
2. Condenser Air Ejector System				
a. Noble Gas - CR9, Combined Air Ejector Discharge	D	R	M	
b. Noble Gas - R15, Air Ejector, (one per unit)	D	R	M	
c. Flow Rate Measuring Device - Air Ejectors (one per unit)	D	NA	NA	
3. Containment Purge and Continuous Vent System				
a. Noble Gas - R12, one per unit	D	R	M	
b. Iodine and Particulate - Portable Continuous Air Sampler	P/W	R	NA	
c. 10CFM Vent Path Flow Monitor	P/D**	R	NA	
d. Sampler Flow Rate Measuring Device	P/W	R	NA	
4. Fuel Storage and Drumming Area Ventilation System				
a. Noble Gas - R21, Drumming Area Stack	D	R	M	
b. Iodine and Particulate - Portable Continuous Air Sampler	W	R	NA	
c. Sampler Flow Rate Measuring Device	W	R	NA	

TABLE 15.4.16-1 (Continued)

Channel Description	Check	Calibrate	Test*	Remarks
5. Gas Stripper Building Ventilation				
a. Noble Gas - GW11	D	R	M	
b. Iodine and Particulate - Portable Continuous Air Sampler	W	R	NA	
c. Sampler Flow Rate Measuring Device	W	R	NA	

* The channel functional tests identified in this table include a source check response test.

D = Daily
W = Weekly
M = Monthly
R = One each refueling cycle
P = Prior to or during a release

**When in use.

TABLE 15.4.16-2

Radioactive Liquid Waste Sampling and Analysis Program

Liquid Release Type	Sampling Frequency	Analysis Frequency	Type of Activity Analysis
1. Waste Condensate Tank, Waste Distillate Tank	Prior to Release	Prior to Release	Gamma Emitters, Tritium
		Monthly on Composite Sample	Gross Alpha Sr-89, Sr-90
2. Continuous Releases	Twice Weekly Grab Samples	Twice Weekly	Gamma Emitters, Tritium
		Monthly on Composite Sampler	Gross Alpha Sr-89, Sr-90

TABLE 15.4.16-3

Radioactive Gaseous Waste Sampling and Analysis Program

Gaseous Release Type	Sampling Frequency	Analysis Frequency	Type of Activity Analysis
1. Gas Decay Tank	Prior to Release	Prior to Release	Gamma Emitters
2. Containment Purge or Continuous Vent	Prior to Purge or Vent	Prior to Purge or Vent	Gamma Emitters, Tritium
3. All Continuous Releases	Continuous	Weekly Analysis of Charcoal and Particulate Samples	Gamma Emitters, I-131, I-133
	Continuous	Monthly Composite Particulate Sample	Gross Alpha
	Continuous	Quarterly Composite Particulate Sample	Sr-89, Sr-90
	Weekly (Grab)	Weekly	Noble Gases

15.5 DESIGN FEATURES

15.5.1 SITE

Applicability

Applies to the location and extent of the reactor site.

Objective

To define those aspects of the site which affect the overall safety of the installation.

Specification

The Point Beach Nuclear Power Plant is located on property owned by the Wisconsin Electric Power Company at a site on the shore of Lake Michigan, approximately 30 miles southeast of the city of Green Bay. The minimum distance from the reactor containment center line to the site exclusion boundary as defined in 10 CFR 100.3 is 1200 meters. The site boundary is identical with the exclusion area boundary. The site exclusion area boundary is identified on Figure 15.5.1-1.

FIGURE 15.5.1-1 SITE PLAN
SITE BOUNDARY = PROPERTY LINE
SCALE: 1" = 400'

b) Review all proposed tests and experiments related to safety and the results thereof when applicable.

c) Review all proposed changes to Technical Specifications.

d) Review all proposed changes or modifications to plant systems or equipment where changes would require a change in operating or emergency procedures or that affect nuclear safety.

e) Periodically review plant operations for industrial and nuclear safety hazards.

f) Investigate violations or suspected violations of Technical Specifications, such investigations to include reports, evaluations, and recommendations to prevent recurrence, to the Vice President - Nuclear Plant and to the Chairman of the Off-Site Review Committee.

g) Perform special reviews and investigations and prepare reports thereon as requested by the Chairman of the Off-Site Review Committee.

h) Investigate, review, and report on all reportable occurrences.

i) Cause to be conducted periodic drills on emergency procedures, including evacuation (partial or complete) of the site and check adequacy of communications with off-site support groups.

j) Review the Facility Fire Protection Program and implementing procedures at least once per 24 months.

k) Review every unplanned onsite release of radioactive material to the environs which exceeds the permissible release concentrations specified in Specification 15.3.9. Such review will include the preparation and forwarding of reports covering evaluation, recommendation and disposition to prevent recurrence to the Director - Nuclear Power Department and the Executive Vice President.

9. Performance of structures, systems, or components that requires remedial action or corrective measures to prevent operation in a manner less conservative than that assumed in the accident analyses in the safety analysis report or technical specifications bases; or discovery during plant life of conditions not specifically considered in the safety analysis report or technical specification that require remedial action or corrective measures to prevent the existence or development of an unsafe condition.

10. Offsite Releases of radioactive materials in liquid or gaseous effluents which exceed twice the quantities corresponding to the dose design objectives of Appendix I to 10 CFR Part 50.

11. An unplanned offsite release of 1) more than 1 curie of radioactive material in liquid effluents, 2) more than 150 curies of noble gas in gaseous effluents, or 3) more than 0.05 curies of Iodine 131 in gaseous effluents.

12. Confirmed measured levels of radioactivity in an environmental sampling medium determined to exceed the notification levels shown in Table 15.4.10-2 when averaged over any calendar quarter sampling period.

B. Thirty-Day Written Reports

The types of events listed in items 1 through 4 below have lesser immediate importance. These events shall be the subject of written reports to the Director, Regulatory Operations, Region III within 30 days of the occurrence of the event. The written report shall include, as a minimum, a completed copy of the licensee event report form, and may be supplemented, as needed to provide complete explanation of the circumstances surrounding the event.