

FINAL

YANKEE ATOMIC ELECTRIC COMPANY
RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS

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DEFINITIONS

the sum of the average beta and gamma energies per disintegration (in MeV) for isotopes, other than iodines, with half lives greater than 30 minutes, making up at least 95% of the total non-iodine activity in the coolant.

SOURCE CHECK

1.27 A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to radiation.

OFFSITE DOSE CALCULATION MANUAL (ODCM)

1.28 A manual containing the current methodology and parameters to be used for calculating the offsite doses due to radioactivity in liquid and gaseous effluents, in calculation of gaseous and liquid effluents monitoring alarm/trip setpoints, and in the conduct of the environmental radiological monitoring program.

GASEOUS RADWASTE TREATMENT SYSTEM

1.29 A GASEOUS RADWASTE TREATMENT SYSTEM is any system designed and installed to reduce radioactive gaseous effluents by collecting primary coolant system offgases from the primary system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

VENTILATION EXHAUST TREATMENT SYSTEM

1.30 A VENTILATION EXHAUST TREATMENT SYSTEM is any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal adsorbers and/or HEPA filters for the purpose of removing iodines or particulates from the gaseous exhaust stream prior to the release to the environment. Such a system is not considered to have any effect on noble gas effluents. Engineered Safety Feature (ESF) atmospheric cleanup systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.)

PROCESS CONTROL PROGRAM (PCP)

1.31 The PROCESS CONTROL PROGRAM shall contain the current formula, sampling, analyses, tests, and determinations to be made to ensure the SOLIDIFICATION of radioactive waste from liquid systems. Dry Active Waste (DAW) such as compacted trash and contaminated components are not included in the scope of the PCP.

DEFINITIONS

PURGE - PURGING

1.32 PURGE or PURGING is the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is required to purify the confinement.

MEMBER(S) OF THE PUBLIC

1.33 MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the plant. This category does not include employees of the utility, its contractors, or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational or other purposes not associated with the production of electricity.

SITE BOUNDARY

1.34 The SITE BOUNDARY shall be that line beyond which the land is not owned, leased, or otherwise controlled by the licensee. Any area within the site boundary used for residential quarters or recreational purposes shall be considered to be beyond the site boundary for purposes of meeting gaseous effluent dose specifications. (Realistic occupancy factors shall be applied at these locations for the purposes of dose calculations).

SOLIDIFICATION

1.35 SOLIDIFICATON shall be the conversion of wet wastes into a form that meets shipping and burial ground requirements.

TABLE 1.1
OPERATIONAL MODES

<u>MODE</u>	<u>REACTIVITY CONDITION, K_{eff}</u>	<u>% RATED THERMAL POWER*</u>	<u>AVERAGE COOLANT TEMPERATURE</u>
1. POWER OPERATION	≥ 0.99	$> 2\%$	$\geq 330^{\circ}\text{F}$
2. STARTUP	≥ 0.99	$\leq 2\%$	$\geq 330^{\circ}\text{F}$
3. HOT STANDBY	< 0.99	0	$\geq 330^{\circ}\text{F}$
4. HOT SHUTDOWN	< 0.96	0	$330^{\circ}\text{F} > T_{avg} > 200^{\circ}\text{F}$
5. COLD SHUTDOWN	< 0.96	0	$\leq 200^{\circ}\text{F}$
6. REFUELING**	≤ 0.95	0	$\leq 140^{\circ}\text{F}$

* Excluding decay heat.

** Reactor vessel head unbolted or removed and fuel in the vessel.

TABLE 1.2
FREQUENCY NOTATION

<u>NOTATION</u>	<u>FREQUENCY</u>
S	At least once per 12 hours.
D	At least once per 24 hours.
W	At least once per 7 days.
M	At least once per 31 days.
Q	At least once per 92 days.
SA	At least once per 184 days.
R	At least once per 18 months.
S/U	Prior to each reactor startup.
P	Prior to each release.
N.A.	Not applicable.

TABLE 3.3-4

RADIATION MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABLE MODES</u>	<u>ALARM SETPOINT</u>	<u>MEASUREMENT RANGE</u>	<u>ACTION</u>
1. AREA MONITORS					
a. Spent Fuel Pit Area 1) Fuel Manipulator	1	*	< 5 mr/hr or 2 x background, whichever is greater	1.0 - 50 mR/hr*	11
b. Containment 1) Fuel Manipulator	1	*	< 10 mr/hr or 2 x background, whichever is greater	1.0 - 1000 mR/hr*	12
2. PROCESS MONITORS					
a. Containment 1) Main Coolant System Leakage Air Particulate Monitor	1	1, 2, 3, & 4	NA	10 - 10 ⁶ cpm	13
b. Radioactive Liquid Monitors 1) Steam Generator Blowdown Monitors	1(1)	1, 2, 3, & 4	< 80 cps or 2 x background, whichever is greater	10 - 10 ⁶ cpm	14
3. ACCIDENT-EMERGENCY MONITORS					
a. High Level Radiation Monitor	1	At all times	< 5 R/hr	1.0 - 1000 R/hr*	14

* Indicated upper end of measurement range is minimum required. Actual measurement range may exceed that stated.

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TABLE 3.3-4 (Continued)

TABLE NOTATION

* When handling irradiated fuel, control rods, or sources.

(1) Per steam generator in a non-isolated loop.

ACTION STATEMENTS

- Action 11 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.9.12.
- Action 12 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, suspend all operations involving CORE ALTERATIONS.
- Action 13 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, comply with the ACTION requirements of Specification 3.4.5.1.
- Action 14 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, provide an OPERABLE temporary continuous monitor within 8 hours.

TABLE 4.3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
1. AREA MONITORS				
a. Spent Fuel Pit Area 1) Fuel Manipulator	S	R	M	*
b. Containment 1) Fuel Manipulator	S	R	M	*
2. PROCESS MONITORS				
a. Containment Main Coolant System Leakage Air Particulate Monitor	S	R	M	1, 2, 3, 4
b. Radioactive Liquid Monitor 1) Steam Generator Blowdown Monitor	S	R	M	1, 2, 3, 4
3. ACCIDENT-EMERGENCY MONITORS				
a. High Level Radiation Monitor	S	R	M	At All Times

*When handling irradiated fuel, control rods or sources.

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INSTRUMENTATION

RADIOACTIVE LIQUID EFFLUENT INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.6 The radioactive liquid effluent monitoring instrumentation channels shown in Table 3.3-8 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.11.1.1 are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with the Offsite Dose Calculation Manual (ODCM).

APPLICABILITY: At all times.

ACTION:

- a. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than a value which will ensure that the limits of Specification 3.11.1.1 are met, without delay, take actions to suspend the release of radioactive liquid effluents monitored by the affected channel, or declare the channel inoperable, or change the setpoint so it is acceptably conservative. With the successful completion of the requirements of the ACTION statement, the provisions of Specification 6.9.4 for the preparation and submittal of Licensee Event Reports are not applicable.
- b. With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.3-8. Exert reasonable efforts to return the instrument(s) to OPERABLE status within 30 days and if unsuccessful, in lieu of Licensee Event Report, explain in the next Semiannual Radioactive Effluent Release Report the reason for delay in correcting the inoperability.
- c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.6 Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST operations during the MODES and at the frequencies shown in Table 4.3-6.

TABLE 3.3-8

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>ACTION</u>
1. Gross Radioactivity Monitors Providing Automatic Isolation		
a. Liquid Radwaste Effluent Line	(1)	15
b. Steam Generator Blowdown Tank Effluent Line	(1)	16
2. Continuous Composite Samplers		
a. Steam Generator Blowdown Tank Effluent Line	(1)	16
b. Secondary Coolant and Condensate Leakage	(1)	16
c. Turbine Building Sump	(1)	16
3. Flow Rate Measurement Devices		
a. Liquid Radwaste Effluent Line+	(1)	17
b. Circulating Water System Discharge+	(1)	17

+ Pump curves may be utilized to estimate flow, in such cases, ACTION Statement is not required.

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TABLE 3.3-8
(Continued)

ACTION STATEMENTS

- Action 15 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases from the tank may continue provided that prior to initiating the release
1. At least two independent samples of the tank's contents are analyzed in accordance with Specification 4.11.1.1.1;
 2. At least two technically qualified members of the Facility Staff independently verify the release rate calculations and discharge line valving;
- otherwise, suspend release of radioactive effluents via this pathway.
- Action 16 - With the number of channels OPERABLE less than required by the minimum channels OPERABLE requirement, effluent releases via this pathway may continue provided grab samples are analyzed for gross radioactivity (beta or gamma) at a limit of detection of at least $1E-07$ microcuries/gram:
- a. At least once per 8 hours when the specific activity of the secondary coolant is greater than 0.01 microcuries/gram DOSE EQUIVALENT I-131.
 - b. At least once per 24 hours when the specific activity of the secondary coolant is less than or equal to 0.01 microcuries/gram DOSE EQUIVALENT I-131.
- Action 17 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per four hours during actual releases. (Pump curves may be used to estimate flow.)

TABLE 4.3-6

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>
1. Gross Beta or Gamma Radioactivity Monitors Providing Alarm and Automatic Isolation				
a. Liquid Radwaste Effluents Line	D	P	R(2)	Q(1)
b. Steam Generator Blowdown Tank Effluent Line	D	M	R(2)	Q(1)
2. Continuous Composite Samplers and Sample Flow Measurement Device				
a. Steam Generator Blowdown Tank Effluent Line	D	N.A.	R	Q
b. Secondary Coolant and Condensate Leakage	D	N.A.	R	Q
c. Turbine Building Sump	D	N.A.	R	Q
3. Flow Rate Measurement Devices				
a. Liquid Radwaste Effluent Line	D(3)	N.A.	R	Q
b. Circulating Water System Discharge*	D(3)	N.A.	N.A.	N.A.
c. Steam Generator Blowdown Tank Effluent	N.A.	N.A.	R(4)	N.A.

*Pump curves utilized for flow rate determination.

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TABLE 4.3-6 (Continued)

TABLE NOTATION

- (1) - The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occurs if any of the following conditions, except as noted, exists:
 1. Instrument indicates measured levels above the alarm/trip setpoint.
 2. Circuit failure.
 3. Instrument indicates a downscale failure, (automatic pathway isolation, and control room warning light indicator, no audible alarm annunciation).
- (2) - The CHANNEL CALIBRATION shall include the use of a known radioactive source(s) positioned in a reproducible geometry with respect to the sensor whose effect on the system was established at the time of the primary calibration. PRIMARY CALIBRATION is the determination of the electronic system accuracy when the detector is exposed in a known geometry to radiation from sources emitting beta and gamma radiation with fluences and energies in the ranges anticipated to be measured by the channel during normal operation. Sources should be traceable to the National Bureau of Standards.
- (3) - CHANNEL CHECK shall consist of verifying indication of flow during periods of release except where pump curves are used to estimate flow. When pump curves are utilized as means of determining flow, no CHANNEL CHECK is required. CHANNEL CHECK shall be made at least once daily on any day on which continuous, periodic, or batch releases are made.
- (4) - The method of estimation of flow rate shall be verified, and adjusted as necessary, by observing the response of blowdown tank level (high level, low level) sensors and the operation (opening and closing) of the tank's discharge valve.

INSTRUMENTATION

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.3.7 The radioactive gaseous effluent monitoring instrumentation channels shown in Table 3.3-9 shall be OPERABLE with their alarm setpoints set to ensure that the limits of Specification 3.11.2.1 are not exceeded. The alarm setpoints of these channels shall be determined in accordance with the ODCM.

APPLICABILITY: As shown in Table 3.3-9.

ACTION:

- a. With a radioactive gaseous effluent monitoring instrumentation channel alarm setpoint less conservative than a value which will ensure that the limits of Specification 3.11.2.1 are met, without delay, take actions to suspend the release of radioactive gaseous effluents monitored by the affected channel, or declare the channel inoperable, or change the setpoint so it is acceptably conservative. With the successful completion of the requirements of the ACTION statement, the provisions of Specification 6.9.4 for the preparation and submittal of Licensee Event Reports are not applicable.
- b. With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 3.3-9. Exert reasonable efforts to return the instrument(s) to OPERABLE status within 30 days and if unsuccessful, in lieu of a Licensee Event Report, explain in the next Semiannual Radioactive Effluent Release Report the reason for the delay in correcting the inoperability.
- c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.3.7 Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST operations during the MODES and at the frequencies shown in Table 4.3-7.

TABLE 3.3-9

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>PARAMETER</u>	<u>ACTION</u>
1. Primary Vent Stack				
a. Noble Gas Activity Monitor	(1)	*	Radioactivity Rate Measurement	21
b. Iodine Sampler Cartridge	(1)	*	Verify Presence of Cartridge	19
c. Particulate Sampler Filter	(1)	*	Verify Presence of Filter	19
d. Effluent System Flow Rate Measuring Device	(1)	*	System Flow Rate Measurement	18
e. Sampler Flow Rate Measuring Device	(1)	*	Sampler Flow Rate Measurement	18
2. Waste Gas Holdup System Explosive Gas Monitoring System				
a. Oxygen Monitor	(1)	**	% Oxygen	20

* At all times.

** During waste gas holdup system (treatment for primary system offgases) operation.

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TABLE 3.3-9
(Continued)

ACTION STATEMENTS

- Action 18 - With the number of channels OPERABLE less than the minimum channels OPERABLE requirement, effluent releases may continue provided the flow rate is estimated at least once per 8 hours.
- Action 19 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided samples are continuously collected with auxiliary sampling equipment as required in Table 4.11-2.
- Action 20 - With the number of channels OPERABLE less than the minimum channels OPERABLE requirement, operation of the waste gas system may continue provided a grab sample is analyzed for oxygen at least once per 24 hours.
- Action 21 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided grab samples are taken at least once per 8 hours and these samples are analyzed for gross activity within 24 hours.

TABLE 4.3-7

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>MODES IN WHICH SURVEILLANCE REQUIRED</u>
1. Primary Vent Stack					
a. Noble Gas Activity Monitor	D	M	R(2)	Q(1)	*
b. Iodine Sampler Cartridge	W	N.A.	N.A.	N.A.	*
c. Particulate Sampler Filter	W	N.A.	N.A.	N.A.	*
d. System Effluent Flow Rate Measuring Device	D	N.A.	N.A.	N.A.	*
e. Sampler Flow Rate Measuring	D	N.A.	R	Q	*
2. Waste Gas Holdup System Explosive Gas Monitoring System					
a. Oxygen Monitor	D	N.A.	Q(3)	M	**

*At all times, other than when the line is valved out and locked.

**During waste gas holdup system operation (treatment for primary system offgases).

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TABLE 4.3-7
(Continued)

TABLE NOTATION

- (1) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exist:
 1. Instrument indicates measured levels above the alarm/trip setpoint.
 2. Circuit failure.
 3. Instrument indicates a downscale failure.

- (2) The initial CHANNEL CALIBRATION for radioactivity measurement instrumentation shall be performed using one or more of the reference standards certified by the National Bureau of Standards or using standards that have been obtained from suppliers that participate in measurement assurance activities with NBS. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration can be used, at intervals of at least once per eighteen months.

- (3) The CHANNEL CALIBRATION shall include the use of standard gas samples (high range and low range) containing suitable concentrations, oxygen, balance nitrogen, for the detection range of interest per Specification 3.11.2.5.

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3/4.11 RADIOACTIVE EFFLUENTS

3/4.11.1 LIQUID EFFLUENTS

CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.11.1.1 The concentration of radioactive material released from the site (see Figure 5.1-4) shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} microcuries/ml total activity.

APPLICABILITY: At all times.

ACTION:

With the concentration of radioactive material released from the site exceeding the above limits, without delay, take actions to restore the concentration to within the above limits. With the successful completion of the requirements of the ACTION statement, the provisions of Specification 6.9.4 for the preparation and submittal of Licensee Event Reports are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.1.1.1 Radioactive liquid wastes shall be sampled and analyzed according to the sampling and analysis program of Table 4.11-1.

4.11.1.1.2 The results of radioactive analysis shall be used in accordance with the methods of the ODCM to assure that concentrations at the point of release are maintained within the limits of Specification 3.11.1.1.

TABLE 4.11-1

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

Liquid Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) ^a (uCi/ml)
A. Batch Waste Release Tanks ^b	P Each Batch	P Each Batch	Principal Gamma Emitters ^g	5×10^{-7}
			I-131	1×10^{-6}
	P One Batch/M	M	Dissolved and Entrained Gases (Gamma emitters)	1×10^{-5}
			P Each Batch	M Composite ^c
	Gross Alpha	1×10^{-7}		
	P Each Batch	Q Composite ^c	Sr-89, Sr-90	5×10^{-8}
			Fe-55	1×10^{-6}
	B. Plant Continuous Releases ^e , (Steam generator blowdown; Secondary coolant and condensate leakage; Turbine building sump)	Continuous ^d	W Composite ^d	Principal Gamma Emitters ^g
I-131				1×10^{-6}
M Grab Sample		M	Dissolved and Entrained Gases (Gamma emitters)	1×10^{-5}
Continuous ^d		M Composite ^d	H-3	1×10^{-5}
			Gross Alpha	1×10^{-7}
Continuous ^d		Q Composite ^d	Sr-89, Sr-90	5×10^{-8}
			Fe-55	1×10^{-6}

TABLE 4.11-1 (Continued)
TABLE NOTATION

- a. The lower limit of detection (LLD) is defined in Table Notation a. of Table 4.12-1 of Specification 4.12.1.1.
- b. A batch release is the discharge of liquid wastes of a discrete volume. Prior to sampling for analysis, each batch shall be isolated, and then thoroughly mixed to assure representative sampling.
- c. A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen which is representative of the liquids released.
- d. Prior to analyses, all samples taken for the composite shall be thoroughly mixed in order for the composite sample to be representative of the average effluent release.
- e. A continuous release is the discharge of liquid wastes of a nondiscrete volume; e.g., from a volume or system that has an input flow during the continuous release.
- g. The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses should not be reported as being present at the LLD level.

RADIOACTIVE EFFLUENTS

DOSE, (LIQUID)

LIMITING CONDITION FOR OPERATION

3.11.1.2 The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released from the site (see Figure 5.1-4) to available uptake pathways shall be limited:

- a. During any calendar quarter: less than or equal to 1.5 mrem to the total body and to less than or equal to 5 mrem to any organ, and
- b. During any calendar year: less than or equal to 3 mrem to the total body and to less than or equal to 10 mrem to any organ.

APPLICABILITY: At all times.

ACTION:

- a. With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, in lieu of any other report required by Specification 6.9, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.6, a Special Report which identifies the cause(s) for exceeding the limit(s) and defines the corrective actions taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be within the above limits.
- b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.1.2 Dose Calculations - Cumulative dose contributions from liquid effluents shall be determined in accordance with the ODCM at least once per 31 days.

RADIOACTIVE EFFLUENTS

LIQUID RADWASTE TREATMENT

LIMITING CONDITION FOR OPERATION

3.11.1.3 The liquid radwaste treatment system shall be used to reduce the radioactive materials in the liquid waste prior to its discharge when the estimated doses due to the liquid effluent from the site (see Figure 5.1-4) when averaged over 31 days, would exceed 0.06 mrem to the total body, or 0.2 mrem to any organ.

APPLICABILITY: At all times

ACTION:

- a. With liquid waste being discharged without processing through appropriate treatment systems as defined in the ODCM and estimated doses in excess of the above limits, in lieu of any other report required by Specification 6.9 prepare and submit to the Commission within 30 days pursuant to Specification 6.9.6, a Special Report which includes the following information:
 1. Explanation of why liquid radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reasons for the inoperability,
 2. Action(s) taken to restore the inoperable equipment to operable status, and
 3. Summary description of action(s) taken to prevent a recurrence.
- b. The provisions of Specification 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.1.3.1 Doses due to liquid releases shall be estimated at least once per 31 days, in accordance with the ODCM. No dose estimates are required if the liquid radwaste treatment system has been continually used to reduce the radioactive materials in liquid waste prior to its discharge, or if no liquid discharges have taken place over the appropriate 31 day period.

RADIOACTIVE EFFLUENTS

LIQUID HOLDUP TANKS

LIMITING CONDITION FOR OPERATION

3.11.1.4 The quantity of radioactive material contained in any outside temporary tank* shall be limited to less than or equal to 10 curies, excluding tritium and dissolved or entrained noble gases.

APPLICABILITY: At all times

ACTION:

- a. With the quantity of radioactive material in any outside temporary tank exceeding the above limit, without delay, take action to suspend all additions of radioactive material to the tank. Within 48 hours reduce the tank contents to within the limit, and in lieu of a Licensee Event Report, describe the events leading to this condition in the next Semiannual Radioactive Effluent Release Report.
- b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.1.4 The quantity of radioactive material contained in each of the above listed tanks shall be determined to be within the above limit by analyzing a representative sample of the tank's contents at least once per 7 days when radioactive materials are being added to the tank.

*Note: Tanks included in this Specification are those temporary outdoor tanks that are not surrounded by liners, dikes, or walls capable of holding the tank contents, or that do not have tank overflows connected to the liquid radwaste treatment system.

RADIOACTIVE EFFLUENTS

3/4.11.2 GASEOUS EFFLUENTS

DOSE RATE

LIMITING CONDITION FOR OPERATION

3.11.2.1 The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) shall be limited to the following:

- a. For noble gases: less than or equal to 500 mrem/yr to the total body and less than or equal to 3,000 mrem/yr to the skin, and
- b. For iodine-131, tritium, and radionuclides in particulate form with half lives greater than 8 days: less than or equal to 1500 mrem/yr to any organ.

APPLICABILITY: At all times.

ACTION:

With the dose rate(s) exceeding the above limits, without delay, take actions to decrease the release rate to within the above limit(s). With the successful completion of the requirements of the ACTION statement, the provisions of Specification 6.9.4 for the preparation and submittal of Licensee Event Reports are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.1.1 The dose rate due to noble gases in gaseous effluents shall be determined to be within the above limits in accordance with the methods and procedures of the ODCM.

4.11.2.1.2 The dose rate due to iodine-131, tritium, and radionuclides in particulate form with half lives greater than 8 days, in gaseous effluents shall be determined to be within the above limits in accordance with the methods and procedures of the ODCM by obtaining representative samples and performing analyses in accordance with the sampling and analysis program, specified in Table 4.11-2.

TABLE 4.11-2

Radioactive Gaseous Waste Sampling and Analysis Program

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	LLD uCi/ml(a)
A. Waste Gas Surge Drum (one only)	P Grab Sample	P	Principal Gamma Emitters ^b	1E-04
B. Containment PURGE	P Each PURGE Grab Sample	P Each PURGE	Principal Gamma Emitters ^b	1E-04
			H-3	1E-06
C. Plant Vent (1) (Primary Vent Stack)	M(c) Grab Sample	M(c)	Principal Gamma Emitters ^b	1E-04
			H-3	1E-06
	Continuous ^e	W(d) Charcoal Sample	I-131	1E-12
	Continuous ^e	W(d) Particulate	Principal Gamma Emitters ^b I-131	1E-11
	Continuous ^e	M Composite Particulate Sample	Gross Alpha	1E-11
	Continuous ^e	Q Composite Particulate Sample	Strontium 89, 90	1E-11
Continuous ^e	Noble Gas Monitor	Noble Gases Gross Beta or Gamma	1x10 ⁻⁵	

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Amendment No.

TABLE 4.11-2 (Continued)

TABLE NOTATION

NOTE 1 - The ventilation header channels air through the ventilation system to the plant vent stack. The following ventilation systems discharge directly into the ventilation header.

- | | |
|----------------------|-------------------------------------|
| o Auxiliary Building | o Fuel Storage Area |
| o Radwaste Building | o Condenser Air Ejector |
| o Containment Purge | o Waste Gas Holdup System Discharge |

The steam generator blowdown vent discharges directly into the plant vent stack.

- a. The lower limit of detection (LLD) is defined in Table Notation a. of Table 4.12-1 of Specification 4.12.1.1.
- 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, 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. Nuclides which are below the LLD for the analyses should not be reported as being present at the LLD level for that nuclide.
- c. Sampling and analyses shall also be performed following shutdown, startup, or a THERMAL POWER change exceeding 15 percent of RATED THERMAL POWER within one hour unless; (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; and (2) the noble gas activity monitor shows that effluent activity has not increased by more than a factor of 3.
- d. Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing or after removal from samples. Sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup or THERMAL POWER change exceeding 15 percent of RATED THERMAL POWER in one hour, and analyses shall be completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLD's may be increased by a factor of 10. This requirement does not apply if: (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; and (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.
- e. 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 3.11.2.1, 3.11.2.2 and 3.11.2.3.

RADIOACTIVE EFFLUENTS

DOSE, NOBLE GASES

LIMITING CONDITION FOR OPERATION

3.11.2.2 The air dose due to noble gases released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) shall be limited to the following:

- a. During any calendar quarter: less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation and,
- b. During any calendar year: less than or equal to 10 mrad for gamma radiation, and less than or equal to 20 mrad for beta radiation.

APPLICABILITY: At all times.

ACTION:

- a. With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, in lieu of any other report required by Specification 6.9, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.6, a Special Report which identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be within the above limits.
- b. The provisions of Specification 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.2 Dose Calculation: Cumulative dose contributions for current calendar quarter and current calendar year shall be determined in accordance with the ODCM at least once every 31 days.

RADIOACTIVE EFFLUENTS

DOSE: IODINE-131, TRITIUM, AND RADIONUCLIDES IN PARTICULATE FORM

LIMITING CONDITION FOR OPERATION

3.11.2.3 The dose to a MEMBER OF THE PUBLIC from iodine-131, tritium, and radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released from the site to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) shall be limited to the following:

- a. During any calendar quarter: less than or equal to 7.5 mrem to any organ and,
- b. During any calendar year: less than or equal to 15 mrem to any organ

APPLICABILITY: At all times.

ACTION:

- a. With the calculated dose from the release of radioiodines, radioactive materials in particulate form, or radionuclides other than noble gases in gaseous effluents exceeding any of the above limits, in lieu of any other report required by Specification 6.9, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.6, a Special Report which identifies the cause(s) for exceeding the limit and defines the corrective actions taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be within the above limits.
- b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.3 Dose Calculations: Cumulative dose contributions for the current calendar quarter and current calendar year for iodine-131, tritium, and radionuclides in particulate form with half-lives greater than 8 days shall be determined in accordance with the ODCM at least once every 31 days.

RADIOACTIVE EFFLUENTS

GASEOUS RADWASTE TREATMENT

LIMITING CONDITION FOR OPERATION

3.11.2.4 The GASEOUS RADWASTE TREATMENT SYSTEM and the VENTILATION EXHAUST TREATMENT SYSTEM shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the estimated gaseous effluent air doses due to gaseous effluent releases from the site to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) would exceed 0.2 mrad for gamma radiation and 0.4 mrad for beta radiation over 31 days. The VENTILATION EXHAUST TREATMENT SYSTEM shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the estimated doses due to gaseous effluent releases from the site to areas at and beyond the SITE BOUNDARY (see Figure 5.1-3) would exceed 0.3 mrem to any organ over 31 days.

APPLICABILITY: At all times.

ACTION:

- a. With gaseous waste being discharged without processing through appropriate treatment systems as defined in the ODCM and in excess of the above limits, in lieu of any other report required by Specification 6.9, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.6, a Special Report that includes the following information:
 1. Explanation of why gaseous radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reasons for the inoperability,
 2. Action(s) taken to restore any inoperable equipment to operable status, and
 3. Summary description of action(s) taken to prevent a recurrence.
- b. The provisions of Specification 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.4 Doses due to gaseous releases from the site shall be estimated at least once per 31 days, in accordance with the ODCM.

RADIOACTIVE EFFLUENTS

EXPLOSIVE GAS MIXTURE

LIMITING CONDITION FOR OPERATION

3.11.2.5 The concentration of oxygen in the waste gas holdup system shall be limited to less than or equal to 2% by volume.

APPLICABILITY: At all times.

ACTION:

- a. With the concentration of oxygen in the waste gas holdup system greater than 2% by volume but less than or equal to 4% by volume, restore the concentration of oxygen to within the limit within 48 hours. With the successful completion of the requirements of the ACTION statement, the provisions of Specification 6.9.4 for the preparation and submittal of Licensee Event Reports are not applicable.
- b. With the concentration of oxygen in the waste gas holdup system greater than 4% by volume, without delay, take actions to suspend all additions of waste gases to the system and reduce the concentration of oxygen to less than or equal to 2% within 48 hours, or reduce the hydrogen concentration to less than 4% by volume. With the successful completion of the requirements of the ACTION statement, the provisions of Specification 6.9.4 for the preparation and submittal of Licensee Event Reports are not applicable.
- c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.6 The concentrations of oxygen in the waste gas holdup system shall be determined to be within the above limits by continuously monitoring the waste gases in the waste gas holdup system with the oxygen monitor required OPERABLE by Table 3.3-9 of Specification 3.3.3.7.

RADIOACTIVE EFFLUENTS

GAS STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.11.2.6 The quantity of radioactivity contained in the waste gas surge drum* shall be limited to less than or equal to $7.0E+04$ curies noble gases (considered as Xe-133).

APPLICABILITY: At all times.

ACTION:

- a. With the quantity of radioactive material in the waste gas surge drum exceeding the above limit, without delay, take actions to suspend all additions of radioactive material to the drum and within 48 hours either reduce the drum's contents to within the limit or provide prompt notification to the Commission pursuant to Specification 6.9.4.a. The written followup report shall include a description of activities planned and/or taken to reduce the drums contents to within the above limit.
- b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.6 The quantity of radioactive material contained in the waste gas surge drum shall be determined to be less than or equal to 20% of the above limit at least once per (30 days).

If the quantity of radioactive material contained in the waste gas surge drum exceeds 20% of the above limit, or the specific activity of the primary coolant exceeds the limits of Specification 3.4.7, surveillance will be performed at least once per 24 hours.

* For the purpose of determining the quantity of radioactive gases, the waste gas surge drum (TK-36) volume shall include the associated waste cover gas system volume and be considered equivalent to 30,000 cubic feet at STP.

RADIOACTIVE EFFLUENTS

3/4.11.3 SCLID RADIOACTIVE WASTE

LIMITING CONDITION FOR OPERATION

3.11.3 The solid radwaste system shall be used in accordance with a PROCESS CONTROL PROGRAM to process wet radioactive waste to meet shipping and burial ground requirements.

APPLICABILITY: At all times.

ACTION:

- a. With the provisions of the PROCESS CONTROL PROGRAM not satisfied, suspend shipments of defectively processed or defectively packaged solidified wet radioactive wastes from the site. With the successful completion of the requirements of the ACTION statement, the provisions of Specification 6.9.4 for the preparation and submittal of Licensee Event Reports are not applicable.
- b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.3 Verification of SOLIDIFICATION of representative test specimens of wet waste shall be performed as required and in accordance with the PROCESS CONTROL PROGRAM.

RADIOACTIVE EFFLUENTS

3/4.11.4 TOTAL DOSE

LIMITING CONDITION FOR OPERATION

3.11.4 The dose or dose commitment to any real MEMBER OF THE PUBLIC from all station sources is limited to less than or equal to 25 mrem to the total body or any organ (except the thyroid, which is limited to less than or equal to 75 mrem) over a calendar year.

APPLICABILITY: At all times.

ACTION:

- a. With the calculated dose from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Specifications 3.11.1.2.a, 3.11.1.2.b, 3.11.2.2.a, 3.11.2.2.b, 3.11.2.3.a, or 3.11.2.3.b, calculations should be made including direct radiation contributions from the reactor and from outside storage tanks to determine whether the above limits of Specification 3.11.4 have been exceeded. If such is the case, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.6, a Special Report that defines the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits and includes the schedule for achieving conformance with the above limits. This Special Report, as required by 10 CFR Part 20.405c, shall include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from station sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report. It shall also describe levels of radiation and concentrations of radioactive material involved, and the cause of the exposure levels or concentrations. If the estimated dose(s) exceeds the above limits, and if the release condition resulting in violation of 40 CFR Part 190 has not already been corrected, the Special Report shall include a request for a variance in accordance with the provisions of 40 CFR Part 190. Submittal of the report is considered a timely request, and a variance is granted until staff action on the request is complete.
- b. The provisions of Specification 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.4 Dose Calculations: Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with Specifications 4.11.1.2, 4.11.2.2, and 4.11.2.3, and in accordance with the Offsite Dose Calculation Manual (ODCM).

3.4.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.12.1 MONITORING PROGRAM

LIMITING CONDITION FOR OPERATION

3.12.1 The radiological environmental monitoring program shall be conducted as specified in Table 3.12-1.

APPLICABILITY: At all times.

ACTION:

- a. With the radiological environmental monitoring program not being conducted as specified in Table 3.12-1, in lieu of a Licensee Event Report, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence. Deviations are permitted from the required sampling schedule if specimen are unobtainable due to hazardous conditions, seasonal unavailability or to malfunction of automatic sampling equipment. If the latter, every effort shall be made to complete corrective action prior to the end of the next sampling period.
- b. With the level of radioactivity as the result of plant effluents in an environmental sampling media at one or more of the locations specified in Table 3.12-1 exceeding the reporting levels of Table 3.12-2 when averaged over any calendar quarter, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days from the receipt of the Laboratory Analyses, pursuant to Specification 6.9.6, a Special Report which includes an evaluation of any release conditions, environmental factors or other aspects which caused the limits of Table 3.12-2 to be exceeded. When more than one of the radionuclides in Table 3.12-2 are detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{concentration (1)}}{\text{reporting level (1)}} + \frac{\text{concentration (2)}}{\text{reporting level (2)}} + \dots > 1.0$$

When radionuclides other than those in Table 6.9-1 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose to a MEMBER OF THE PUBLIC is equal or greater than the calendar year limits of Specifications 3.11.1.2, 3.11.2.2 and 3.11.2.3. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report.

RADIOLOGICAL ENVIRONMENTAL MONITORING

LIMITING CONDITION FOR OPERATION (Continued)

- c. With milk or fresh leafy vegetation samples no longer available from one or more of the sample locations required by Table 3.12-1, identify new location(s) if available, for obtaining replacement samples and add them to the radiological environmental monitoring program within 30 days. The specific location(s) from which samples were no longer available may then be deleted from the monitoring program. In lieu of a Licensee Event Report and pursuant to Specification 6.9.5.b, identify the cause of the samples no longer being available and identify the new location(s) for obtaining available replacement samples in the next Semiannual Radioactive Effluent Release Report and include revised ODCM figure(s) and table(s) reflecting the new location(s).

- d. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.12.1 The radiological environmental monitoring samples shall be collected pursuant to Table 3.12-1 from the locations given in the ODCM and shall be analyzed pursuant to the requirements of Table 3.12-1 and the detection capabilities required by Table 4.12-1.

TABLE 3.12-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM*

Exposure Pathway and/or Sample	Number of Sample Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
1. AIRBORNE A. Radioiodine and Particulates	5	Continuous operation of sampler with sample collection as required by dust loading but at least once per week.	Radioiodine canister. Analyze weekly for I-131. Particulate sampler: Gross beta radioactivity following filter change. Composite (by location) for gamma isotopic at least once per quarter.
2. DIRECT RADIATION	a) 22 b) 16	Quarterly Quarterly	Gamma dose, at least once per quarter. Incident response TLD;s in the outer (4-5 mile) ring, de-dose only quarterly unless gaseous release LCO was exceeded in period.
3. WATERBORNE			
a. Surface	2	Composite *** sample collected over a period of one month.	Gross beta, I-131 analysis and gamma isotopic analysis of each sample. Tritium analysis of composite sample at least once per quarter.
b. Ground	2	At least once per quarter.	Gamma isotopic and tritium analyses of each sample.
c. Sediment from Shoreline	1	At least once per 6 months.	Gamma isotopic analysis of each sample.

TABLE 3.12-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM*

Exposure Pathway and/or Sample	Number of Sample Locations	Sampling and Collection Frequency	Type and Frequency of Analysis
4. INGESTION			
a. Milk	3	At least once per two weeks when animals are on pasture**; at least once per month at other times.	Gamma isotopic and I-131 analysis of each sample.
b. Fish	2	Commercially and Recreationally important species. Seasonal or semiannually if not seasonal.	Gamma isotopic analysis on edible portions.
c. Food Products	3	At time of harvest. One sample of any of the following classes of food products: 1. Tuberous vegetable 2. Above-ground vegetable 3. Fruit	Gamma isotopic analysis on edible portion.
	1	At time of harvest. One sample of broad leaf vegetation.	I-131 analysis.

* Specific sample locations for all media are specified in the Offsite Dose Calculation Manual and reported in the Annual Radiological Environmental Operating Report.

** Grazing season extends from June 1 to November 1.

*** Composite samples shall be collected by collecting an aliquot at intervals not exceeding 2 hours.

TABLE 3.12-2

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Reporting Levels

Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m ³)	Fish (pCi/Kg, wet)	Milk (pci/l)	Food Product (pCi/Kg, wet)
H-3	3 x 10 ⁴ (a)				
Mn-54	1 x 10 ³		3 x 10 ⁴		
Fe-59	4 x 10 ²		1 x 10 ⁴		
Co-58	1 x 10 ³		3 x 10 ⁴		
Co-60	3 x 10 ²		1 x 10 ⁴		
Zn-65	3 x 10 ²		2 x 10 ⁴		
Zr-Nb-95	4 x 10 ²				
I-131	2	0.9		3	1 x 10 ²
Cs-134	30	10	1 x 10 ³	60	1 x 10 ³
Cs-137	50	20	2 x 10 ³	70	2 x 10 ³
Ba-La-140	2 x 10 ²			3 x 10 ²	

(a) Reporting level for non-drinking water pathways.

Table 4.12-1

Detection Capabilities For Environmental Sample Analysis a,d

Analysis(e)	Water (pCi/l)	Airborne Particulate or Gas (pCi/m ³)	Fish (pCi/Kg,wet)	Milk (pCi/l)	Food Products (pCi/Kg,wet)	Sediment (pCi/Kg,dry)
Gross beta	4	0.01				
H-3	2000					
Mn-54	15		130			
Fe-59	30		260			
Co-58,60	15		130			
Zn-65	30		260			
Zr-Nb-95	15 ^(c)					
I-131	1 ^(b)	0.07		1	60 ^(g)	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-La-140	15 ^{(c)(f)}			15 ^{(c)(f)}		

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TABLE 4.12-1 (Continued)

TABLE NOTATION

- a. - The LLD is 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 with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

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

$$LLD = \frac{4.66 * S}{b}$$

$$E * V * 2.22 * Y * \text{Exp}(-\lambda * \Delta t)$$

where

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

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

E is the counting efficiency (as counts per disintegration)

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

2.22 is the number of disintegrations per minute per picocurie

Y is the fractional radiochemical yield (when applicable)

λ is the radioactive decay constant for the particular radionuclide

Δt is the elapsed time between sample collection and analysis.

Typical values of E, V, Y, and Δt can be used in the calculation. In calculating the LLD for a radionuclide determined by gamma-ray spectrometry, the background shall include the typical contributions of other radionuclides normally present in the samples (e.g., potassium-40 in milk samples).

Analysis shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally, background fluctuations, unavoidably small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unavailable. In such cases, the contributing factors will be identified and described in the Annual Radiological Environmental Operating Report.

TABLE 4.12-1 (Continued)

TABLE NOTATION

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. This does not preclude the calculation of an a posteriori LLD for a particular measurement based upon the actual parameters for the sample in question and appropriate decay correction parameters such as decay while sampling and during analysis.

- b. - LLD for drinking water.
- c. - Parent only.
- d. - If the measured concentration minus the 5 sigma counting statistics is found to exceed the specified LLD, the sample does not have to be analyzed to meet the specified LLD.
- e. - This list does not mean that only these nuclides are to be considered. Other peaks that are identifiable, together with those of the listed nuclides, shall also be analyzed and reported in the Annual Radiological Environmental Operating Report pursuant to Specification 6.9.5.a.
- f. - The Ba-140 LLD and concentration can be determined by the analysis of its short-lived daughter product La-140 subsequent to an 8 day period following collection. The calculation shall be predicted on the normal ingrowth equations for a parent-daughter situation and the assumption that any unsupported La-140 in the sample would have decayed to an insignificant amount (at least 3.6 percent of its original value). The ingrowth equations will assume that the supported La-140 activity at the time of collection is zero.
- g. - LLD for leafy vegetation.

RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.12.2 LAND USE CENSUS

LIMITING CONDITION FOR OPERATION

3.12.2 A land use census shall be conducted to identify the location of the nearest milk animal, the nearest residence and the nearest garden* of greater than 500 square feet producing fresh leafy vegetables in each of the 16 meteorological sectors within a distance of five miles.

APPLICABILITY: At all times.

ACTION:

- a. With a land use census identifying a location(s) which yields at least a 20 percent greater dose or dose commitment than the values currently being calculated in Specification 4.11.2.3, in lieu of any other report required by Specification 6.9, identify the new location(s) in the next Semiannual Effluent Release Report.
- b. With a land use census identifying a location(s) which yields a calculated dose or dose commitment (via the same exposure pathway) at least 20 percent greater than at a location from which samples are currently being obtained in accordance with Specification 3.12.1, add the new location(s) to the radiological environmental monitoring program within 30 days if permission from the owner to collect samples can be obtained, and sufficient sample volume is available. The sampling location(s), excluding the control station location, having the lowest calculated dose or dose commitment (via the same exposure pathway) may be deleted from this monitoring program after October 31 of the year in which this land use census was conducted. In lieu of any other report required by Specification 6.9, identify the new location(s) in the next Semiannual Effluent Release Report.
- c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.12.2 The land use census shall be conducted at least once per 12 months between the dates of (June 1 and October 1) by either a door-to-door survey, aerial survey, or by consulting local agriculture authorities. The results of the land use census shall be included in the Annual Radiological Environmental Operating Report pursuant to Specification 6.9.5.a.

*In lieu of the garden census, broad leaf vegetation sampling may be performed at the site boundary in the direction sector with the highest D/Q.

RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.12.3 INTERCOMPARISON PROGRAM

LIMITING CONDITION FOR OPERATION

3.12.3 Analyses shall be performed on referenced radioactive materials supplied as part of an Intercomparison Program which has been approved by NRC.

APPLICABILITY: At all times.

ACTION:

- a. With analyses not being performed as required above, in lieu of a Licensee Event Report, report the corrective actions taken to prevent a recurrence to the Commission in the Annual Radiological Environmental Operating Report.
- b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.12.3 A summary of the results of analyses performed as part of the above required Intercomparison Program shall be included in the Annual Radiological Environmental Operating Report. The identification of which NRC approved Intercomparison Program that is being participated in shall be stated in the ODCM.

INSTRUMENTATION

BASES

3/4.3.3.6 RADIOACTIVE LIQUID EFFLUENT INSTRUMENTATION

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 alarm/trip setpoints for these instruments are to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63 and 64 of Appendix A to 10 CFR Part 50.

Gross radioactivity monitors which provide for automatic isolation of liquid discharges on detection of radioactivity concentrations in excess of the limits of 10 CFR Part 20 are included on the two principal radioactive effluent discharge pathways from the plant (Liquid Radwaste Effluent Line, and Steam Generator Blowdown Effluent Line). The automatic alarm/trip function provided by these monitors gives assurance as a final check that all conditions assumed, measured, or calculated that were used to determine effluent discharge rates have been appropriately made. This provides a degree of protection against calculational errors on discharge rate, operator errors in setting discharge flow, non-representative samples used for isotopic content of discharge volume, or crud releases during discharge which could lead to discharge concentration limits of Specification 3.11.1.1 being exceeded.

Composite samples are provided on all continuous and secondary radioactive effluent pathways to give assurance that all potential radioactive liquid releases to the environment are accounted for.

3/4.3.3.7 RADIOACTIVE GASEOUS EFFLUENT INSTRUMENTATION

The radioactive gaseous effluent instrumentation in the Primary Vent Stack is provided to monitor, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm setpoints for these instruments are set conservatively to ensure that the limits of 10 CFR Part 20 are not exceeded. Gas monitoring instrumentation also includes provisions for monitoring the concentrations of potentially explosive gas mixtures in the waste gas holdup system. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63 and 64 of Appendix A to 10 CFR Part 50.

The Primary Vent Stack (PVS) exhaust building ventilation air, as well as gaseous process streams, to the atmosphere, and as such can not be isolated due to building ventilation requirements. The indications of the source of abnormally high radiation measurements at the PVC is provided by a series of area monitors which are located through the plant in areas where potentially high radiation levels could be encountered. Each area radiation detector readout is displayed in the main control room and provided with both audible and visual alarms. The operating ranges and locations of the principal in-plant area monitors are as follows:

INSTRUMENTATIONRADIOACTIVE GASEOUS EFFLUENT INSTRUMENTATION (Continued)

<u>Detector Location</u>	<u>Range</u>
Waste Disposal Bldg.	1 mR/hr - 10 ⁵ mR/hr
PAB Chem Sample	1 mR/hr - 10 ⁵ mR/hr
PAB Valve Room	1 mR/hr - 10 ⁵ mR/hr
Spent Fuel Pit	1 mR/hr - 10 ⁵ mR/hr
PAB Fan Room	1 mR/hr - 10 ⁵ mR/hr
PAB Corridor	1 mR/hr - 10 ⁵ mR/hr
PAB Charging Pump #1	1 mR/hr - 10 ⁵ mR/hr
PAB Charging Pump #2	1 mR/hr - 10 ⁵ mR/hr
PAB Charging Pump #3	1 mR/hr - 10 ⁵ mR/hr
New Fuel Vault	1 mR/hr - 10 ⁵ mR/hr
Diesel and SI Bldg.	1 mR/hr - 10 ⁵ mR/hr
Aux. Boiler Feed	1 mR/hr - 10 ⁵ mR/hr
Turbine Hall	1 mR/hr - 10 ⁵ mR/hr
Vapor Container (Fuel Crane)	1 mR/hr - 10 ⁵ mR/hr
Vapor Container (PAM #1)	10 ⁰ R/hr - 10 ⁷ R/hr
Vapor Container (PAM #2)	10 ⁰ R/hr - 10 ⁷ R/hr

The capability of the area monitors, such as in the charging pump cubicles which have detected leaking pumps before any significant increase in activity was detected at the PVS, to help identify the source of radioactivity measured at the PVS, so that corrective actions can be taken to curtail the release, has been demonstrated. In addition to the area monitors, process monitors which assist in identifying process streams with abnormal levels of radioactivity include the steam generator blowdown (4), main steam lines (4), condenser air ejector, waste gas header loop seal, and the Main Coolant System Leakage Air Particulate Monitors (2) in the vapor container. In total, the process and area monitors provide the control room operators with substantial information to indicate and identify contaminated areas within the plant, or subsystems with high activity levels which could lead to high activity measurements at the PVS. Corrective actions can then be initiated by the control room operators to mitigate the release of radioactivity from the plant.

PLANT SYSTEMS

BASES

3/4.7.7 WASTE EFFLUENTS

3/4.7.7.1 RADIOACTIVE SOLID WASTES

DELETED

3/4.7.7.2 RADIOACTIVE LIQUID WASTE

DELETED

3/4.7.7.3 RADIOACTIVE GASEOUS WASTE

DELETED

PLANT SYSTEMS

BASES

3/4.7.8 ENVIRONMENTAL MONITORING

DELETED

3/4.7.9 SNUBBERS

All snubbers are required OPERABLE to ensure that the structural integrity of the reactor coolant system and all other safety-related systems is maintained during and following a seismic or other event initiating dynamic loads. Snubbers excluded from this inspection program are those installed on non-safety-related systems and then only if their failure or failure of the system on which they are installed, would have no adverse effect on any safety-related system.

The visual inspection frequency is based upon maintaining a constant level of snubber protection to systems. Therefore, the required inspection interval varies inversely with the observed snubber failures and is determined by the number of inoperable snubbers found during an inspection. Inspections performed before that interval has elapsed may be used as a new reference point to determine the next inspection. However, the results of such early inspections performed before the original required time interval has elapsed (nominal time less 25%) may not be used to lengthen the required inspection interval. Any inspection whose results require a shorter inspection interval will override the previous schedule.

When the cause of the rejection of a snubber is clearly established and remedied for that snubber and for any other snubbers that may be generically susceptible, and verified by inservice functional testing, that snubber may be exempted from being counted as inoperable. Generically susceptible snubbers are those which are of a specific make or model and have the same design features directly related to rejection of the snubber by visual inspection, or are similarly located or exposed to the same environmental conditions such as temperature, radiation, and vibration.

3/4.11 RADIOACTIVE EFFLUENTS

BASES

3/4.11.1 LIQUID EFFLUENTS

3/4.11.1.1 CONCENTRATION

This specification is provided to ensure that the concentration of radioactive materials released in liquid waste effluents from the site (at the point of discharge from the plant discharge structure into Sherman Pond) will be less than the concentration levels specified in 10 CFR Part 20, Appendix B, Table II, column 2. This limitation provides additional assurance that the levels of radioactive materials in bodies of water outside the site will result in exposures within (1) the Section II.A design objectives of Appendix I, 10CFR Part 50, to a MEMBER OF THE PUBLIC, and (2) the limits of 10CFR Part 20.106 (e) to the population.

The required detection capabilities for radioactive materials in liquid waste samples are tabulated in terms of the lower limits of detection (LLDs). Detailed discussion of the LLD, and other detection limits can be found in HASL Procedures Manual, HASL-300 (revised annually), Currie, L. A., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry" Anal. Chem. 40, 586-93 (1968), and Hartwell, J. K., "Detection Limits for Radioanalytical Counting Techniques, "Atlantic Richfield Hanford Company Report ARH-SA-215 (June 1975). The concentration limit for noble gases is based upon the assumption that Xe-135 is the controlling radionuclide and its MPC in air (submersion) was converted to an equivalent concentration in water using the International Commission on Radiological Protection (ICRP) Publication 2.

3/4.11.1.2 DOSE

This specification is provided to implement the requirements of Sections II.A, III.A and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation implements the guides set forth in Section II.A of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in liquid effluents will be kept as low as is reasonably achievable. The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. Existing pathways of liquid exposure to MEMBER(S) OF THE PUBLIC which form the basis for calculating liquid doses in the ODCM are described in detail in Yankee Atomic Electric Company's design report, "Supplemental Information for the Purpose of Evaluation of 10 CFR Part 50, Appendix I", dated June 2, 1976, (with amendments). The point of exposure

RADIOACTIVE EFFLUENTS

BASES

from existing pathways for dose calculational purposes is taken downstream of Sherman Dam in the Deerfield River. The equations specified in the ODCM for calculating the doses due to the actual release rates of radioactive materials in liquid effluents were developed from 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 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," April 1977. Also, there is reasonable assurance that the operation of the facility will not result in radionuclide concentrations in finished drinking water that are in excess of the requirements of 40 CFR 141. No drinking water supplies from the Deerfield River below the plant have been identified.

3/4.11.1.3 LIQUID RADWASTE TREATMENT

The requirement that the appropriate portions of this system be used, when specified, provides assurance that the releases of radioactive materials in liquid effluents will be kept "as low as is reasonably achievable". This specification implements the requirements of 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50 and the design objective given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the liquid radwaste treatment system were specified as a suitable fraction of the dose design objectives set forth in Section II.A of Appendix I, 10 CFR Part 50, for liquid effluents.

3/4.11.1.4 LIQUID HOLDUP TANKS

The tanks listed in this Specification include all outdoor tanks that contain radioactivity that are not surrounded by liners, dikes, or walls capable of holding the tank contents, or that do not have tank overflows and surrounding area drains connected to the liquid radwaste treatment system.

Restricting the quantity of radioactive material contained in the specified tanks provides assurance that in the event of an uncontrolled release of the tanks' contents, the resulting concentrations would be less than the limits of 10 CFR Part 20, Appendix B, Table II, Column 2, at the nearest potable water supply and the nearest surface water supply in an unrestricted area.

RADIOACTIVE EFFLUENTS

BASES

3/4.11.2 GASEOUS EFFLUENTS

3/4.11.2.1 DOSE RATE

This specification is provided to ensure that the dose at any time at and beyond the SITE BOUNDARY from gaseous effluents will be within the annual dose limits of 10 CFR Part 20. The annual dose limits are the doses associated with the concentrations of 10 CFR Part 20, Appendix B, Table II, Column 1. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of MEMBER(S) OF THE PUBLIC either within or outside the SITE BOUNDARY, to annual average concentrations exceeding the limits specified in Appendix B, Table II of 10 CFR Part 20 [10 CFR Part 20.106(b)]. For MEMBER(S) OF THE PUBLIC who may at times be within the SITE BOUNDARY, the occupancy of the individual will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the SITE BOUNDARY. The specified release rate limits as determined by the procedures in the ODCM, restrict, at all times, the corresponding gamma and beta dose rates above background to a MEMBER OF THE PUBLIC at or beyond the SITE BOUNDARY to (500) mrem/year to the total body or to (3,000) mrem/year to the skin.

Specification 3.11.2.1.b also restricts at all times comparable with the length of the sampling periods of Table 4.11-2 the corresponding thyroid dose rate above background to an infant via the cow-milk-infant pathway to 1500 mrem/year for the nearest cow to the plant.

3/4.11.2.2 DOSE: NOBLE GASES

This specification is provided to implement the requirements of Sections II.B, III.A and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation implements the guides set forth in Section II.B of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement 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 is reasonably achievable". The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of A MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The equations specified in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents were developed from 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 10 CFR 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 provides for determining the air doses at the SITE BOUNDARY based upon the historical average atmospheric conditions.

RADIOACTIVE EFFLUENTS

BASES

3/4.11.2.3 DOSE: IODINE-131, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM

This specification is provided to implement the requirements of Sections II.C, III.A and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation are the guides set forth in Section II.C of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive materials in gaseous effluents will be kept as low "as is reasonably achievable." The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of A MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The equations specified in the ODCM for calculating the doses due to the actual release rates of the subject materials were also developed using 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 10 CFR 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. These equations also provide for determining the actual doses based upon the historical average atmospheric conditions. The release rate specifications for Iodine 131, tritium, and radionuclides in particulate form with half-lives greater than 8 days are dependent on the existing radionuclide pathways to man, in areas at and beyond its SITE BOUNDARY. The pathways which were examined in the development of these specifications were: 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.

3/4.11.2.4 GASEOUS RADWASTE TREATMENT

The requirement that the appropriate portions of the gaseous waste treatment system and ventilation exhaust treatment system be used when specified 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 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50, and the design objectives of Appendix I to 10 CFR Part 50. The action levels governing the use of appropriate portions of the gaseous radwaste treatment system were specified as a suitable fraction of the guide set forth in Sections II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents.

RADIOACTIVE EFFLUENTS

BASES

3/4.11.2.5 EXPLOSIVE GAS MIXTURE

This specification is provided to ensure that the concentration of potentially explosive gas mixtures contained in the waste gas holdup system is maintained below the flammability limit for hydrogen and oxygen. Maintaining the concentration of oxygen below its flammability limit provides assurance that the releases of radioactive materials will be controlled in conformance with the requirements of General Design Criterion 60 of Appendix A to 10 CFR Part 50.

3/4.11.2.6 GAS STORAGE TANK

Restricting the quantity of radioactivity contained in the waste gas surge drum (TK-36) and associated waste cover gas volume servicing the primary drain tank (TK-30), waste holdup tank (TK-31) and the activity dilution decay tank (TK-32) 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 nearest exclusion area boundary will not exceed 0.5 rem. This is consistent with Standard Review Plan 15.7.1, "Waste Gas System Failure".

The curie limit for noble gases (considered Xe-133) given in Specification 3.11.2.6 is based on the calculated radionuclide inventory of the waste gas surge drum and associated cover gas system in use at the plant (equivalent to 30,000 cubic feet at STP). The radionuclide inventory is based on the conservative assumptions that the plant has been operating at 618 MWt with one percent failed fuel and that a cold shutdown has occurred near the end of an equilibrium core cycle. It is assumed that 100% of the noble gases are removed from the reactor coolant and transported to the waste gas surge drum/cover gas system.

The total body gamma dose (0.5 rem) is calculated based on the criteria given in NUREG 0133, Section 5.6.1 using an exclusion boundary dispersion coefficient (x/Q) value of 7.62×10^{-4} sec m⁻³.

3/4.11.3 SOLID RADIOACTIVE WASTE

This specification implements the requirement of 10 CFR Part 50.36a and General Design Criterion 60 of Appendix A to 10 Part 50. The process parameters included in establishing the PROCESS CONTROL PROGRAM (PCP) may include, but are not limited to waste type, waste pH, waste/liquid solidification agent/catalyst ratios, waste oil content, waste principal of constituents, mixing and curing times. This Specification and the PCP address the handling of wet waste (liquid evaporator bottoms and spent resins) only.

3/4.11.4 TOTAL DOSE

This specification is provided to meet the dose limitations of 40 CFR Part 190 that have been incorporated into 10 CFR Part 20 by 46 FR 18525. The specification requires the preparation and submittal of a Special Report whenever the calculated doses from plant radioactive effluents exceed twice the design objective doses of Appendix I. For sites containing up to 4

RADIOACTIVE EFFLUENTS

BASES

reactors, it is highly unlikely that the resultant dose to a MEMBER OF THE PUBLIC will exceed the dose limits of 40 CFR Part 190 if the individual reactors remain within the reporting requirement level. The Special Report will describe a course of action that should result in the limitation of the annual dose to a MEMBER OF THE PUBLIC to within the 40 CFR Part 190 limits. For the purposes of the Special Report, it may be assumed that the dose commitment to the MEMBER OF THE PUBLIC from other uranium fuel cycle sources is negligible. If the dose to any MEMBER OF THE PUBLIC is estimated to exceed the requirements of 40 CFR Part 190, the Special Report with a request for a variance (provided the release conditions resulting in violation of 40 CFR Part 190 have not already been corrected), in accordance with the provisions of 40 CFR Part 190.11 and 10 CFR Part 20.405c, is considered to be a timely request and fulfills the requirements of 40 CFR Part 190 until NRC staff action is completed. The variance only relates to the limits of 40 CFR Part 190, and does not apply in any way to the other requirements for dose limitation of 10 CFR Part 20, as addressed in Specifications 3.11.1 and 3.11.2. An individual is not considered a MEMBER OF THE PUBLIC during any period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

3/4.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

BASES

3/4.12.1 MONITORING PROGRAM

The radiological monitoring program required by this specification provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides, which lead to the highest potential radiation exposures of MEMBER(S) OF THE PUBLIC resulting from the station operation. This monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50 and thereby supplements the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. Guidance for this monitoring program is provided by the Radiological Assessment Branch Technical Position on environmental monitoring, Revision 1, November 1979. Program changes may be initiated based on operational experience.

The detection capabilities required by Table 4.12-1 are considered optimum for routine environmental measurements in industrial laboratories. 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. This does not preclude the calculation of an a posteriori LLD for a particular measurement based upon the actual parameters for the sample in question.

3/4.12.2 LAND USE CENSUS

This specification is provided to ensure that changes in the use of areas at and beyond the SITE BOUNDARIES are identified and that modifications to the monitoring program are made if required by the results of this census. This census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. Restricting the census to gardens of greater than 500 square feet provides assurance that significant exposure pathways via leafy vegetables will be identified and monitored since a garden of this size is the minimum required to produce the quantity (26 kg/year) of leafy vegetables assumed in Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumptions were used; 1) that 20% of the garden was used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage), and 2) a vegetation yield of 2 kg/square meter. In lieu of the garden census, broad leaf vegetation samples from the site boundary in the direction sector with the highest D/Q may be substituted. The use of the maximum offsite D/Q value predicted for gaseous effluents from the plant stack (plant stack does not qualify for an elevated release as defined in Regulatory Guide 1.111, March 1976) will generate the maximum possible calculated dose and thus no real garden located at any other point could have a greater calculated dose or dose commitment.

The addition of new sampling locations to Specification 3.12.1 based on the land use census is limited to those locations which yield a calculated dose or dose commitment greater than 20 percent of the calculated dose or dose commitment at any location currently being sampled. This eliminates the unnecessary changing of the environmental radiation monitoring program for new

RADIOLOGICAL ENVIRONMENTAL MONITORING

BASES

locations which, within the accuracy of the calculation, contributes essentially the same to the dose or dose commitment as the location already sampled. The substitution of a new sampling point for one already sampled when the calculated difference in dose is less than 20 percent, would not be expected to result in a significant increase in the ability to detect plant effluent related nuclides.

3/4.12.3 INTERCOMPARISON PROGRAM

The requirement for participation in a Intercomparison program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive material in environmental sample matrices are performed as part of a quality assurance program for environmental monitoring in order to demonstrate that the results are reasonably valid for the purposes of Section IV.B.2 of Appendix I to 10 CFR Part 50.

5.0 DESIGN FEATURES

5.1 SITE

EXCLUSION AREA

5.1.1 The exclusion area shall be as shown in Figure 5.1-1.

LOW POPULATION ZONE

5.1.2 The low population zone shall be as shown in Figure 5.1-2.

SITE BOUNDARY FOR GASEOUS EFFLUENTS

5.1.3 The site boundary for gaseous effluents shall be shown in Figure 5.1-3.

SITE BOUNDARY FOR LIQUID EFFLUENTS

5.1.4 The site boundary for liquid effluents shall be shown in Figure 5.1-4.

5.2 CONTAINMENT

CONFIGURATION

5.2.1 The reactor containment building is a steel spherical shell having the following design features:

- a. Nominal inside diameter = 125 feet.
- b. Minimum thickness of steel shell = 7/8 inches.
- c. Net free volume = 860,000 cubic feet.

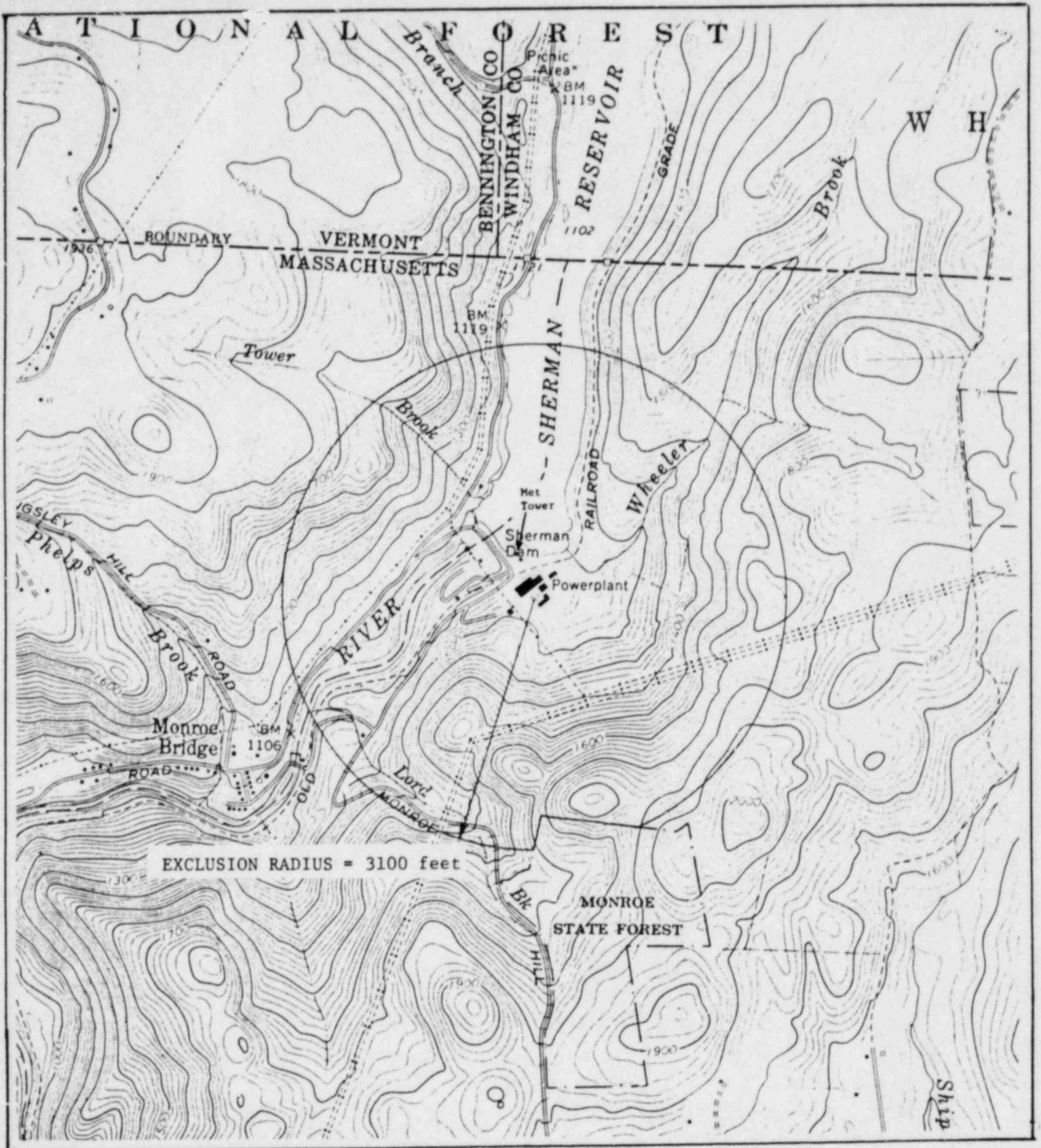
DESIGN PRESSURE AND TEMPERATURE

5.2.2 The reactor containment is designed and shall be maintained for a maximum internal pressure of 34.5 psig and a temperature of 249°F.

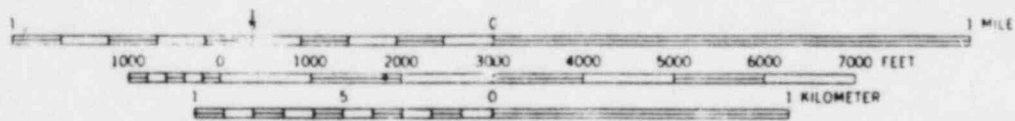
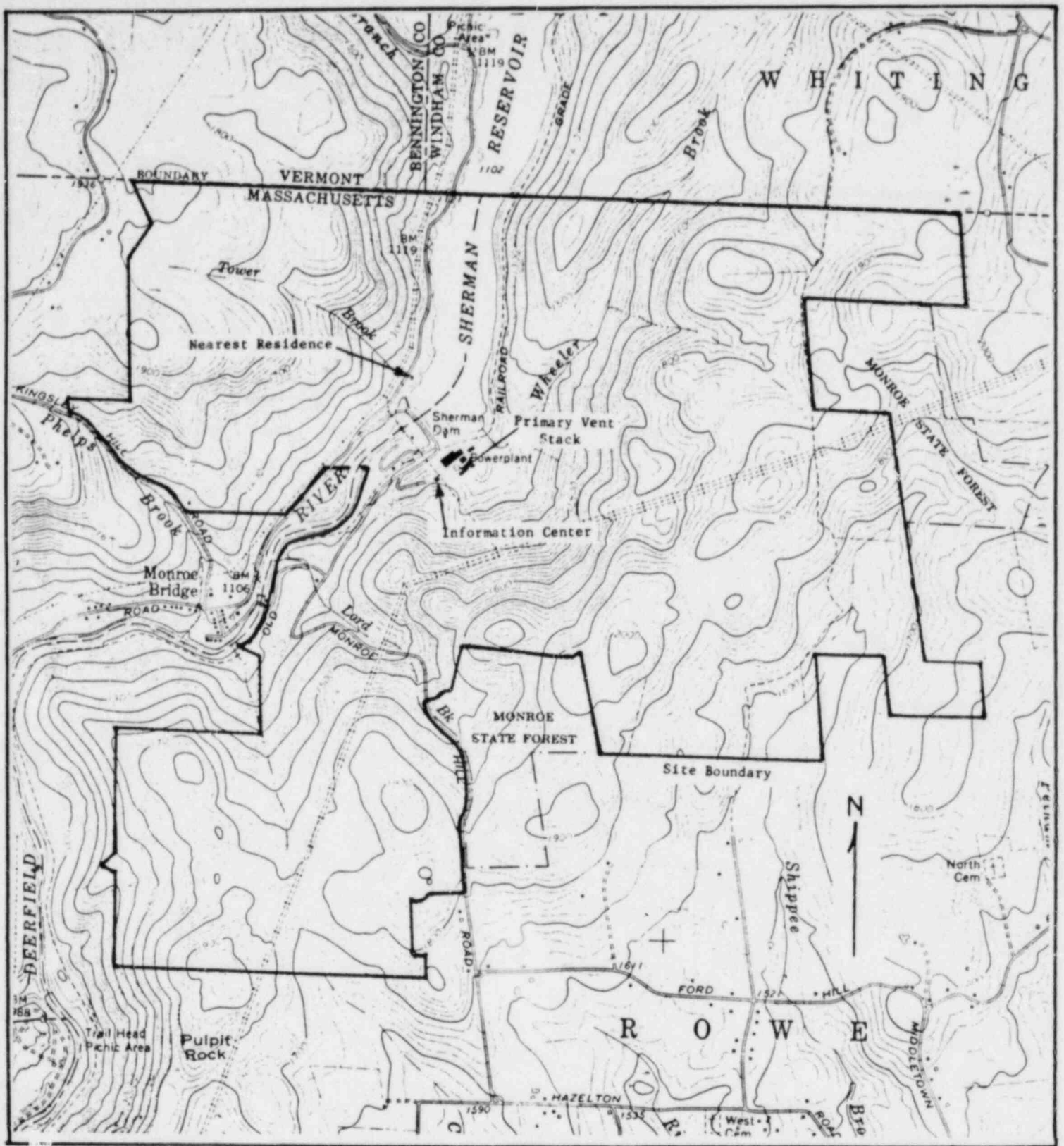
5.3 REACTOR CORE

FUEL ASSEMBLIES

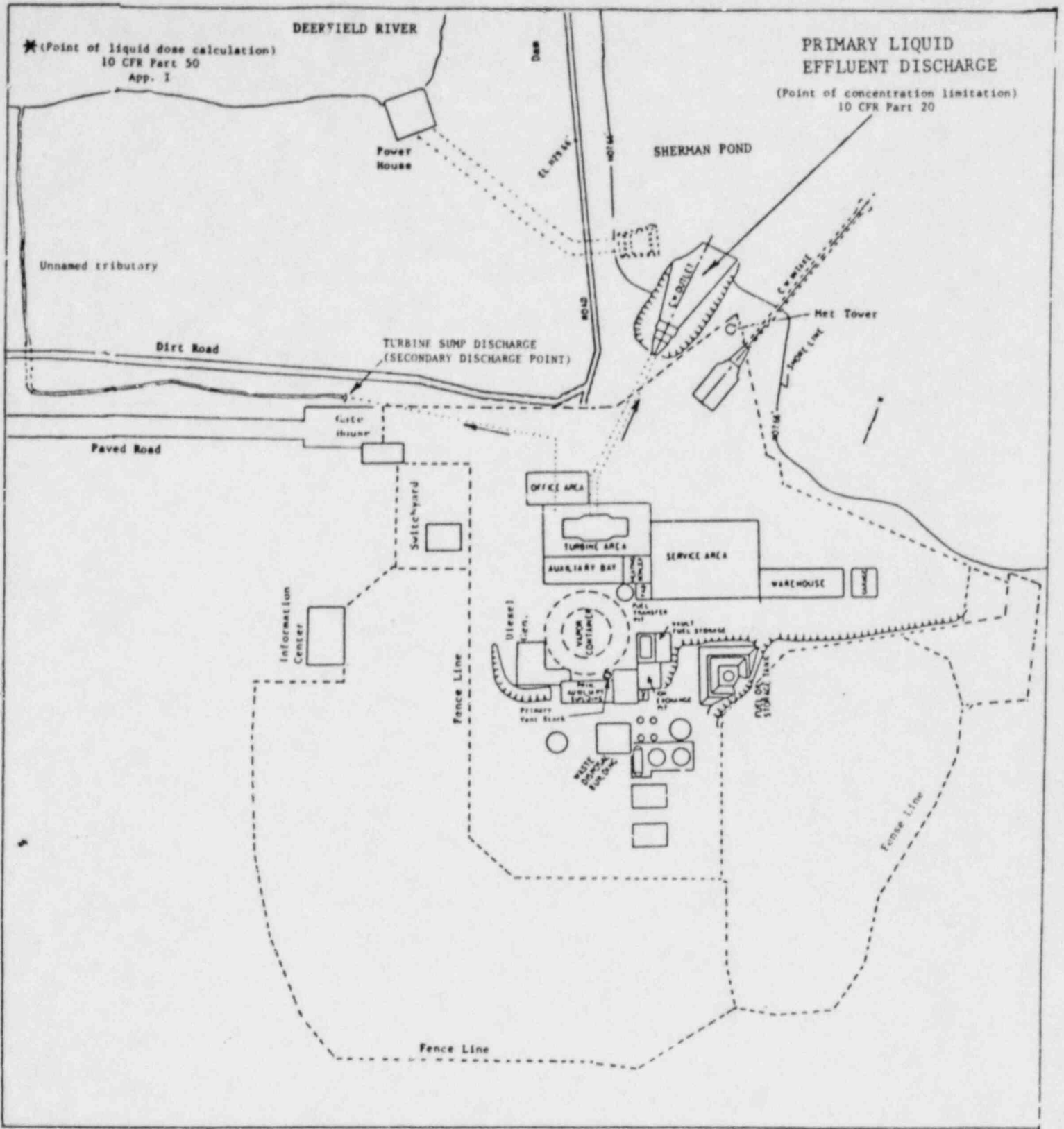
5.3.1 The reactor core shall contain 76 fuel assemblies with each fuel assembly containing 230 or 231 fuel rods clad with Zircaloy-4. Each fuel rod shall have a nominal active fuel length of 91 inches. Each fuel assembly shall contain a maximum total weight of 234 kilograms uranium. Reload fuel is similar in physical design to the Core XII EXXON fuel and shall have a maximum enrichment of 3.5 weight percent U-235.



Yankee Atomic Electric Company	Exclusion Area
Figure 5.1-1	



Yankee Atomic Electric Company	SITE BOUNDARY LINE
	Figure 5.1-3



Yankee Atomic Electric Company	LIQUID EFFLUENT DISCHARGE POINTS Site Plot Plan
Figure 5.1-4	

ADMINISTRATIVE CONTROLS

- b. Review of all proposed tests and experiments that affect nuclear safety.
- c. Review of all proposed changes to the Technical Specifications.
- d. Review of all proposed changes or modifications to plant systems or equipment that affect nuclear safety.
- e. Investigation of all violations of the Technical Specifications including the preparation and forwarding of reports covering evaluation and recommendations to prevent recurrence to the Manager of Operations and to the Chairman of the Nuclear Safety Audit and Review Committee.
- f. Review of events requiring 24-hour written notification to the Commission.
- g. Review of facility operations to detect potential nuclear safety hazards.
- h. Performance of special reviews, investigations of analyses and reports thereon as requested by the Chairman of the Nuclear Safety Audit and Review Committee.
- i. Review of the Plant Security Plan and implementing procedures and shall submit recommended changes to the Security Advisor.
- j. Review of the Emergency Plan and implementing procedures and shall submit recommended changes to the Radiation Protection Manager.
- k. Review of every unplanned onsite release of radioactive material to the environs including the preparation of reports covering evaluation, recommendations and disposition of the corrective action to prevent recurrence and the forwarding of these reports to the Plant Superintendent and to the Nuclear Safety Audit and Review Committee.
- l. Review of changes to the PROCESS CONTROL PROGRAM and the OFFSITE DOSE CALCULATION MANUAL.

AUTHORITY

- 6.5.1.7 The Plant Operation Review Committee shall:
- a. Recommend to the Plant Superintendent, written approval or disapproval of items considered under 6.5.1.6(a) through (d) above.

ADMINISTRATIVE CONTROLS

- b. Render determinations in writing with regard to whether or not each item considered under 6.5.1.6(a) through (e) above constitutes an unreviewed safety question.
- c. Provide written notification within 24 hours to the Manager of Operations of disagreement between the PORC and the Plant Superintendent; however, the Plant Superintendent shall have responsibility for resolution of such disagreements pursuant to 6.1.1 above.

RECORDS

6.5.1.8 The Plant Operation Review Committee shall maintain written minutes of each meeting and copies shall be provided to the Manager of Operations and chairman of the Nuclear Safety Audit and Review Committee.

6.5.2 NUCLEAR SAFETY AUDIT AND REVIEW COMMITTEE

FUNCTION

6.5.2.1 The Nuclear Safety Audit and Review (NSAR) Committee shall function to provide independent review and audit of all aspects of plant safety. Adequacy of this review and audit is assured by the cross section of disciplines required of the Committee membership as described in Section 6.5.2.3.

COMPOSITION

6.5.2.2 The NSAR Committee shall be composed of at least six persons with the Committee membership and its Chairman and Vice Chairman appointed by the Yankee Atomic Electric Company Vice President, or such person as he shall designate.

- a. Chairman
- b. Vice Chairman
- c. Four technically qualified persons who are not members of the plant staff.

QUALIFICATION

6.5.2.3 Membership to the NSAR Committee requires that an individual meet one of the below academic and/or experience requirements:

- a. Bachelor Degree or equivalent, plus five (5) years total experience in the below listed disciplines.
- b. Nine (9) years total experience in the below listed disciplines:

ADMINISTRATIVE CONTROLS

- (a) Nuclear Power Plant Technology
- (b) Reactor Operations
- (c) Utility Operations
- (d) Power Plant Design
- (e) Reactor Engineering
- (f) Radiation Safety
- (g) Safety Analysis
- (h) Instrumentation and Control
- (i) Metallurgy
- (j) Quality Assurance

ALTERNATES

6.5.2.4 All NSAR Committee alternate members shall be appointed in writing by the Yankee Atomic Electric Company Vice President, or such person as he may designate, to serve on a temporary basis; however, no more than two alternates shall participate as voting members in NSAR Committee activities at any one time.

CONSULTANTS

6.5.2.5 Consultants may be utilized as determined by the NSAR Committee Chairman to provide expert advice, when needed, to the NSAR Committee.

MEETING FREQUENCY

6.5.2.6 The NSAR Committee shall meet at least once per six months, $\pm 25\%$. Special meetings may be held when deemed necessary by Company management or by the Chairman of the NSAR Committee, or, in the absence of the Chairman, by the Vice Chairman.

QUORUM

6.5.2.7 A NSAR Committee quorum shall consist of a minimum of five members as follows:

- a. The Chairman or Vice Chairman plus four members (or two members plus two alternates).
- b. The Chairman and Vice Chairman plus three members (or one member plus two alternates).
- c. Those personnel from the organization reporting to the Manager of Operations shall always be in the minority.

REVIEW

6.5.2.8 The NSAR Committee shall review:

- a. The safety evaluations for 1) changes to equipment of systems, and 2) tests or experiments completed under the provisions of Section 50.59, 10 CFR, to verify that such actions did not constitute an unreviewed safety question.

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- b. Proposed changes to equipment or systems which involve an unreviewed safety question as defined in Section 50.59, 10 CFR.
- c. Proposed test or experiments which involve an unreviewed safety question as defined in Section 50.59, 10 CFR.
- d. Proposed changes to Technical Specifications or this Operating License.
- e. Violations of codes, regulations, orders, Technical Specifications, license requirements, or of internal procedures or instructions having nuclear safety significance.
- f. Significant operating abnormalities or deviations from normal and expected performance of plant equipment that affect nuclear safety, defined as Plant Information Reports.
- g. Events requiring 24-hour written notification to the Commission.
- h. Reports and meeting minutes of the Plant Operation Review Committee.
- i. Perform special reviews and investigations and render reports thereon as requested by the Vice President of Operations.

AUDITS

6.5.2.9 Audits of facility activities shall be performed under the cognizance of the NSAR Committee. These audits shall encompass:

- a. The conformance of facility operation to provisions contained within the Technical Specifications and applicable license conditions at least once per 12 months, +25%.
- b. The performance, training and qualification of those members of the facility staff who have a direct relationship to operation, maintenance or technical aspects of the plant, at least once per 12 months, + 25%.
- c. The results of actions taken to correct deficiencies occurring in facility equipment, structures, systems or method of operation that affect nuclear safety at least once per 6 months, + 25%.
- d. The performance of activities required by the Operational Quality Assurance Program to meet the criteria of Appendix "B", 10 CFR 50, at least once per 24 months, + 25%.
- e. The Facility Emergency Plan and implementing procedures at least once per 24 months, + 25%.

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- f. The Facility Security Plan and implementing procedures at least once per 24 months, + 25%.
- g. The Facility Fire Protection Program and implementing procedures at least once per 24 months, + 25%.
- h. The radiological environmental monitoring program and the results thereof at least once per 12 months, + 25%.
- i. The Offsite Dose Calculation Manual and implementing procedures at least once per 24 months, + 25%.
- j. The PROCESS CONTROL PROGRAM and implementing procedures for processing and packaging of radioactive waste at least once per 24 months, + 25%.
- k. The performance of activities required by the Quality Assurance Program to meet the provisions of Regulatory Guide 1.21, Revision 1, June 1974 and Regulatory Guide 4.1, Revision 1, April 1975 at least once per 12 months, + 25%.
- l. Any other area of facility operation considered appropriate by the NSAR Committee or the Vice President.

AUTHORITY

6.5.2.10 The NSAR Committee shall report to and advise the Vice President on those areas of responsibility specified in Sections 6.5.2.8 and 6.5.2.9.

RECORDS

6.5.2.11 Minutes of each NSAR Committee meeting shall be prepared and forwarded to the Vice President and each member of the Committee for review within 20 working days following each meeting. The meeting minutes shall include, where applicable, reports of reviews encompassed by Section 6.5.2.8; and reports of audits encompassed by Section 6.5.2.9. The review of the minutes shall be completed within 60 days of the date of their distribution.

6.5.3 INDEPENDENT AUDIT AND REVIEW

6.5.3.1 An independent fire protection and loss prevention program inspection and audit shall be performed at least once per 12 months utilizing either qualified offsite licensee personnel or an outside fire protection firm.

ADMINISTRATIVE CONTROLS

6.5.3.2 An inspection and audit of the fire protection and loss prevention program shall be performed by a qualified outside fire consultant at least once per 36 months.

6.6 REPORTABLE OCCURRENCE ACTION

6.6.1 The following actions shall be taken for REPORTABLE OCCURRENCES:

- a. The Commission shall be notified and/or a report submitted pursuant to the requirements of Specification 6.9.
- b. Each REPORTABLE OCCURRENCE requiring 24 hour notification to the Commission shall be reviewed by the PORC and submitted to the NSAR Committee and the Manager of Operations.

6.7 SAFETY LIMIT VIOLATION

6.7.1 The following actions shall be taken in the event a Safety Limit is violated:

- a. The facility shall be placed in at least HOT STANDBY within one hour.
- b. The Safety Limit violation shall be reported to the Commission, the Manager of Operations and to the NSAR Committee within 24 hours.
- c. A Safety Limit Violation Report shall be prepared. The report shall be reviewed by the Plant Operation Review Committee. This report shall describe (1) applicable circumstances preceding the violation, (2) effects of the violation upon facility components, systems or structures, and (3) corrective action taken to prevent recurrence.
- d. The Safety Limit Violation Report shall be submitted to the Commission, the NSAR Committee and the Manager of Operations within 14 days of the violation.

6.8 PROCEDURES

6.8.1 Written procedures shall be established, implemented and maintained that meet or exceed the requirements and recommendations of Sections 5.1 and 5.3 of ANSI N18.7-1972 and Appendix "A" of Regulatory Guide 1.33, November 1972, except as provided in 6.8.2 and 6.8.3 below. The written procedures shall also cover the activities relating to:

- a. FIRE PROTECTION PROGRAM implementation.
- b. PROCESS CONTROL PROGRAM implementation.
- c. OFFSITE DOSE CALCULATION MANUAL implementation.
- d. Quality Assurance Program for effluent and environmental monitoring, using the guidance in Regulatory Guide 1.21, Revision 1, June 1974 and Regulatory Guide 4.1, Revision 1, April 1975.

ADMINISTRATIVE CONTROLS

6.8.2 Each procedure and administrative policy of 6.8.1 above, and changes thereto, shall be reviewed by the Plant Operations Review Committee and approved by the Plant Superintendent prior to implementation and reviewed periodically as set forth in administrative procedures.

6.8.3 Procedures that have been developed as a result of changes defined in 10 CFR 50.59(a)(2) shall be independently reviewed to verify that the implementing actions do not constitute an unreviewed safety question. Those reviews shall be performed by Nuclear Service Division personnel having qualifications at least equivalent to those specified for NSAR Committee membership in 6.5.2.3. The procedures shall be approved by the Manager of Operations, NSD.

6.8.4 Temporary changes to procedures of 6.8.1 above may be made provided:

- a. The intent of the original procedure is not altered.
- b. The change is approved by two members of the plant management staff, at least one of whom holds a Senior Reactor Operator's License.
- c. The change is documented, reviewed by PORC and approved by the Plant Superintendent within 14 days of implementation.

6.9 REPORTING REQUIREMENTS

In addition to the applicable reporting requirements of Title 10, Code of Federal Regulations, the following identified reports shall be submitted to the Director of the appropriate Regional Office of Inspection and Enforcement unless otherwise noted. The reporting requirements of Specifications 6.9.1, 6.9.2, 6.9.3 and 6.9.4 are in accordance with Revision 4 of Regulatory Guide 1.16, "Reporting of Operating Information - Appendix A Technical Specifications".

ROUTINE REPORTS

6.9.1 Startup Report. A summary report of plant startup and power escalation testing shall be submitted following (1) receipt of an operating license, (2) amendment to the license involving and planned increase in power level, (3) installation of fuel that has a different fuel supplier, and (4) modifications that may have significantly altered the nuclear, thermal, or hydraulic performance of the plant. The report shall address each of the tests identified in the FHSR and shall in general include a description of measured values of the operating conditions or characteristics obtained during the test program and a comparison of these values with design predictions and specifications. Any corrective actions that were required to obtain satisfactory operation shall also be described. Any additional specific details required in license conditions based on other commitments shall be included in this report.

ADMINISTRATIVE CONTROLS

Startup reports shall be submitted within (1) 90 days following completion of the startup test program (2) 90 days following resumption or commencement of commercial power operation, or (3) 9 months following initial criticality, whichever is earliest. If the Startup Report does not cover all three events (i.e., initial criticality, completion of startup test program, and resumption or commencement of commercial power operation), supplementary reports shall be submitted at least every 3 months until all three events have been completed.

6.9.2 Annual Report. Annual reports covering the activities of the unit as described below for the previous calendar year shall be submitted prior to March 1 of each year.

Reports required on an annual basis shall include:

- a. A tabulation on an annual basis of the number of station, utility and other personnel (including contractors) receiving exposures greater than 100 mrem/yr and their associated man rem exposure according to work and job functions, (a) e.g., reactor operations and surveillance, inservice inspection, routine maintenance, special maintenance (describe maintenance), waste processing, and refueling. The dose assignment to various duty functions may be estimates based on pocket dosimeter, TLD, or film badge measurements. Small exposures totalling less than 20% of the individual total dose need not be accounted for. In the aggregate, at least 80% of the whole body dose received from external sources shall be assigned to specific major work functions.
- b. Any other unit-unique reports required on an annual basis.

6.9.3 Monthly Operating Report. Routine reports of operating statistics and shutdown experience shall be submitted on a monthly basis to the Director, Office of Management Information and Program Control, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, with a copy to the appropriate Regional Office, to arrive no later than the 15th of each month following the calendar month covered by the report.

(a) This tabulation supplements the requirements of Section 20.407 of 10 CFR Part 20.

ADMINISTRATIVE CONTROLS

REPORTABLE OCCURRENCES

6.9.4 REPORTABLE OCCURRENCES, including corrective actions and measures to prevent recurrence, shall be reported to the NRC. Supplemental reports may be required to fully describe final resolution of occurrence. In case of corrected or supplemental reports, a licensee event report shall be completed and reference shall be made to the original report date.

- a. Prompt Notification With Written Followup. The types of events listed below shall be reported as expeditiously as possible, but within 24 hours, by telephone and confirmed by telegraph, mailgram, or facsimile transmission to the Director of the appropriate Regional Office, or his designate no later than the first working day following the event, with a written followup report within two weeks. The written followup report shall include, as a minimum, a completed copy of a licensee event report form. Information provided on the licensee event report form shall be supplemented, as needed, by additional narrative material to provide a complete explanation of the circumstances surrounding the event.

- (1) Failure of the reactor protection system or other systems subject to limiting safety system settings to initiate the required protective function by the time a monitored parameter reaches the setpoint specified as the limiting safety system setting in the Technical Specifications or failure to complete the required protective function.

NOTE: Instrument drift discovered as a result of testing need not be reported under this item but may be reportable under items a(5), a(6), or b(1) below.

- (2) Operation of the unit or affected systems when any parameter or operation subject to a limiting condition is less conservative than the least conservative aspect of the limiting condition for operation established in the Technical Specifications.

NOTE: If specified action is taken when a system is found to be operating between the most conservative and the least conservative aspects of a limiting condition for operation listed in the Technical Specifications, the limiting condition for operation is not considered to have been violated and need not be reported under this item, but it may be reportable under item b(2) below.

- (3) Abnormal degradation discovered in fuel cladding, reactor coolant pressure boundary, or primary containment.

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NOTE: Leakage of valve packing or gaskets within the limits for IDENTIFIED LEAKAGE set forth in Technical Specifications need not be reported under this item.

- (4) Reactivity anomalies, involving disagreement with the predicted value of reactivity balance under steady-state conditions during power operation, greater than or equal to $1\% \Delta k/k$; a calculated reactivity balance indicating a shutdown margin less conservative than specified in the Technical Specifications; short-term reactivity increases that correspond to a reactor period of less than 5 seconds or, if sub-critical, an unplanned reactivity insertion of more than $0.5\% \Delta k/k$; or occurrence of any unplanned criticality.
- (5) Failure or malfunction of one or more components which prevents or could prevent, by itself, the fulfillment of the functional requirements of system(s) used to cope with accidents analyzed in the FHSR.
- (6) Personnel error or procedural inadequacy which prevents or could prevent, by itself, the fulfillment of the functional requirements of systems required to cope with accidents analyzed in the FHSR.

NOTE: For items a(5) and a(6), reduced redundancy that does not result in a loss of system function need not be reported under this section but may be reportable under items b(2) and b(3) below.

- (7) Conditions arising from natural or man-made events that, as a direct result of the event require plant shutdown, operation of safety systems, or other protective measures required by Technical Specifications.
- (8) Errors discovered in the transient or accident analyses or in the methods used for such analyses as described in the FHSR or in the Basis for the Technical Specifications that have or could have permitted reactor operation in a manner less conservative than assumed in the analyses.
- (9) Performance of structures, systems, or components that requires remedial action or corrective measures to prevent operation in a manner less conservative than assumed in the accident analyses in the FHSR or Technical Specifications Bases; or discovery during plant life of conditions not specifically considered in the FHSR or Technical Specifications that require remedial action or corrective measures to prevent the existence or development of unsafe conditions.

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Note: This item is intended to provide for reporting of potentially generic problems.

(10) Exceeding the limits in Specification 3.11.2.6 for the storage of radioactive materials in the listed tanks. The written follow-up report shall include a schedule and description of activities planned and/or taken to reduce the contents to within the specified limits.

b. Thirty Day Written Reports. The REPORTABLE OCCURRENCES discussed below shall be the subject of written reports to the Director of the appropriate Regional Office within thirty days of occurrence of the event. The written report shall include, as a minimum, a completed copy of a licensee event report form. Information provided on the licensee event report form shall be supplemented, as needed, by additional narrative material to provide complete explanation of the circumstances surrounding the event.

(1) Reactor protection system or engineered safety feature instrument settings which are found to be less conservative than those established by the Technical Specifications but which do not prevent the fulfillment of the functional requirements of affected systems.

(2) Conditions leading to operation in a degraded mode permitted by a limiting condition for operation or plant shutdown required by a limiting condition for operation.

Note: Routine surveillance testing, instrument calibration, or preventative maintenance which require system configurations as described in items b(1) and b(2) need not be reported except where test results themselves reveal a degraded mode as described above.

(3) Observed inadequacies in the implementation of administrative or procedural controls which threaten to cause reduction of degree of redundancy provided in reactor protection systems or engineered safety feature systems.

(4) Abnormal degradation of systems other than those specified in item a(3) above designed to contain radioactive material resulting from the fission process.

ADMINISTRATIVE CONTROLS

Note: Sealed sources or calibration sources are not included under this item. Leakage of valve packing or gaskets within the limits for IDENTIFIED LEAKAGE set forth in Technical Specifications need not be reported under this item.

6.9.5 Unique Reporting Requirements

a. Environmental Radiological Monitoring

- (1) Routine radiological environmental operating reports covering the operation of the unit during the previous calendar year shall be submitted prior to May 1 of each year.
- (2) The annual radiological environmental operating reports shall include summaries, interpretations, and an analysis of trends of the results of the radiological environmental surveillance activities for the report period, including a comparison with operational controls (as appropriate), and previous environmental surveillance reports and an assessment of the observed impacts of the plant operation on the environment. The reports shall also include the results of the land use censuses required by Specification 3.12.2.

The annual radiological environmental operating reports shall include summarized and tabulated results of all radiological environmental samples taken during the report period pursuant to the Table and Figures in the ODCM. In the event that some results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

ADMINISTRATIVE CONTROLS

The reports shall also include the following: a summary description of the radiological environmental monitoring program including a map of all sampling locations keyed to a table giving distances and directions from the reactor; and the results of licensee participation in the Intercomparison Program required by Specification 3.12.3, and discussion of all analyses in which the LLD required by Table 4.12-1 was not achievable.

b. Semiannual Effluent Release Report

- (1) Within 60 days after January 1 and July 1 of each year, a report shall be submitted covering the radioactive content of effluents released to unrestricted areas during the previous six months of operation.
- (2) The radioactive effluent release reports shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit as outlined in Regulatory Guide 1.21, Revision 1, June 1974, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," with data summarized on a quarterly basis following the format of Appendix B thereof.

In addition the radioactive effluent release report to be submitted 60 days after January 1 of each year shall include an annual summary of hourly meteorological data collected over the previous year. This annual summary may be either in the form of an hour-by-hour listing on magnetic tape of wind speed, wind direction, atmospheric stability, and precipitation (if measured), or in the form of joint frequency distributions of wind speed, wind direction, and atmospheric stability.* This same report shall include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released from the unit during the previous calendar year. (The semiannual effluent release report submitted within 60 days of July 1 each year need not contain any dose estimates from the previous 6 months' effluent releases.) This report shall also include an assessment of the radiation doses from radioactive effluents to MEMBER(S) OF THE PUBLIC due to the allowed recreational activities inside the SITE BOUNDARY (Figures 5.1-3 and 5.1-4) during the previous calendar year. All assumptions used in making these assessments (e.g., specific activity, exposure time and

* In lieu of submission with the first half year radioactive effluent release report, the licensee has the options of retaining this summary of required meteorological data in a file that shall be provided to the NRC upon request.

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location) shall be included in these reports. For batch or discrete gas volume releases, the meteorological conditions concurrent with the time of release of radioactive materials in gaseous effluents (as determined by sampling frequency and measurement) shall be used for determining the gaseous pathway doses. For radioactive materials released in continuous effluent streams, quarterly average meteorological conditions concurrent with the quarterly release period shall be used for determining the gaseous pathway doses. The assessment of radiation doses shall be performed in accordance with the Offsite Dose Calculation Manual (ODCM).

The radioactive effluent release report to be submitted 60 days after January 1 of each year shall also include an assessment of radiation doses to the likely most exposed real MEMBER(S) OF THE PUBLIC from reactor releases (including doses from primary effluent pathways and direct radiation) for the previous calendar year to show conformance with 40 CFR 190, Environmental Radiation Protection Standards for Nuclear Power Operation, if Specification 3.11.4 has been exceeded during the calendar year.

The Radioactive Effluent Release Reports shall include the following information for each class of solid waste (as defined by 10 CFR Part 61) shipped offsite during the report period:

- a. Container volume.
- b. Total curie quantity (specify whether determined by measurement or estimate).
- c. Principal radionuclides (specify whether determined by measurement or estimate).
- d. Source waste and processing employed (e.g., dewatered spent resin, compacted dry waste, evaporator bottoms).
- e. Type of container (e.g., LSA, Type A, Type B, Large Quantity), and
- f. Solidification agent or absorbent (e.g., cement, asphalt, "Dow").

The Radioactive Effluent Release Reports shall include a list and description of unplanned releases from the site to site boundary of radioactive materials in gaseous and liquid effluents made during the reporting period.

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The Radioactive Effluent Release Reports shall include any changes made during the reporting period to the PROCESS CONTROL PROGRAM (PCP) and to the OFFSITE DOSE CALCULATION MANUAL (ODCM), as well as a listing of new locations for dose calculations and/or environmental monitoring identified by the land use census pursuant to Specification 3.12.2.

6.9.6 Special reports shall be submitted to the Director of the Office of Inspection and Enforcement Regional Office within the time period specified for each report. These reports shall be submitted covering the activities identified below pursuant to the requirements of the applicable reference specification:

- a. Inservice Inspection Program Reviews, Specification 4.4.9.1.
- b. ECCS Actuation, Specifications 3.4.2 and 3.5.3.
- c. Inoperable Meteorological Monitoring Instrumentation, Specification 3.3.3.3.
- d. Sealed Source leakage in excess of limits, Specification 3.7.6.
- e. Fire Detection Instrumentation, Specification 3.3.3.4.
- f. Fire Suppression Systems, Specifications 3.7.10.1, 3.7.10.2, 3.7.10.3, 3.7.10.5 and 3.7.10.6.
- g. Liquid Effluents, Specifications 3.11.1.2 and 3.11.1.3.
- h. Gaseous Effluents, Specifications 3.11.2.2, 3.11.2.3, 3.11.2.4.
- i. Total Dose, Specification 3.11.4
- j. Radiological Environmental Monitoring, Specification 3.12.1.

6.10 RECORD RETENTION

6.10.1 The following records shall be retained for at least five years:

- a. Records and logs of facility operation covering time interval at each power level.
- b. Records and logs of principal maintenance activities, inspection repair and replacement of principal items of equipment related to nuclear safety.
- c. ALL REPORTABLE OCCURRENCE reports submitted to the COMMISSION.
- d. Records of surveillance activities, inspections and calibrations required by these Technical Specifications.

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- e. Records of reactor tests and experiments.
- f. Records of changes made to Operating Procedures.
- g. Records of radioactive shipments.
- h. Records of sealed source leak tests and results.
- i. Records of annual physical inventory of all sealed source material of record.

6.10.2 The following records shall be retained for the duration of the Facility Operating License:

- a. Records and drawing changes reflecting facility design modifications made to systems and equipment described in the Final Hazards Summary Report.
- b. Records of new and irradiated fuel inventory, fuel transfers and assembly burnup histories.
- c. Records of facility radiation and contamination surveys.
- d. Records of radiation exposure for all individuals entering radiation control areas.
- e. Records of gaseous and liquid radioactive material released to the environs.
- f. Records of transient or operational cycles for those facility components identified in Table 5.7-1.
- g. Records of training and qualification for current members of the plant staff.
- h. Records of inservice inspections performed pursuant to these Technical Specifications.
- i. Records of Quality Assurance activities required by the QA Manual.
- j. Records of reviews performed for changes made to procedures or equipment or reviews of tests and experiments pursuant to 10 CFR 50.59.
- k. Records of meetings of the PORC and the NSAR Committee.
- l. Records for Environmental Qualification which are covered under the provisions of paragraph 6.13.
- m. Records of analysis required by the Radiological Environmental Monitoring Program.

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- m. Records of the service lives of all mechanical snubbers listed on Table 3.7-4, including the date at which the service life commences and associated installation and maintenance records.

6.11 RADIATION PROTECTION PROGRAM

Procedures for personnel radiation protection shall be prepared consistent with requirements of 10 CFR Part 20 and shall be approved, maintained and adhered to for all operations involving personnel radiation exposures.

6.12 HIGH RADIATION AREA

6.12.1 Paragraph 20.203 "Caution signs, labels, signals, and controls". In lieu of the "control device" or "alarm signal" required by paragraph 20.203(c)(2), each high radiation area in which the intensity of radiation is 1000 mrem/hr or less shall be barricaded and conspicuously posted as a high radiation area, and entrance thereto shall be controlled by requiring issuance of a Radiation Work Permit.* An individual or group of individuals permitted to enter such areas shall be provided with one or more of the following:

- a. A radiation monitoring device which continuously indicates the radiation dose rate in the area.
- b. A radiation monitoring device which continuously integrates the radiation dose rate in the area, and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate level in the area has been established and personnel have been made knowledgeable of them.
- c. A Health Physics qualified individual (i.e., qualified in radiation protection procedures), with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area and who will perform radiation surveillance at the frequency specified in the RWP. The surveillance frequency will be established by the Plant Health Physicist.

* Health Physics personnel shall be exempt from the RWP issuance requirement during the performance of their assigned radiation protection duties, providing they are following plant radiation protection procedures for entry into high radiation areas.

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The above procedure shall also apply to each high radiation area in which the intensity of radiation is greater than 1000 mrem/hr. In addition, locked doors shall be provided to prevent unauthorized entry into such areas and the key shall be maintained under the administrative control of the Shift Supervisor on duty and/or the Plant Health Physicist.

6.13 ENVIRONMENTAL QUALIFICATION

- A. By no later than June 30, 1982, all safety-related electrical equipment in the facility shall be qualified in accordance with the provisions of: Division of Operating Reactors "Guidelines for Evaluating Environmental Qualification of Class IE Electrical Equipment in Operating Reactors" (DOR Guidelines); or, NUREG-0588 "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment, December 1979. Copies of these documents are attached to Order for Modification of License DPR-3, dated October 24, 1980.
- B. By no later than December 1, 1980, complete and auditable records must be available and maintained at a central location which describe the environmental qualification method used for all safety-related electrical equipment in sufficient detail to document the degree of compliance with the DOR Guidelines or NUREG-0588. Thereafter, such records should be updated and maintained current as equipment is replaced, further tested, or otherwise further qualified.

6.14 PROCESS CONTROL PROGRAM (PCP)

6.14.1 Licensee initiated changes to the PCP:

1. Shall be submitted to the Commission in the Semiannual Radioactive Effluent Release Report for the period in which the change(s) was made. This submittal shall contain:
 - a. Sufficiently detailed information to support the rationale for the change without benefit of additional or supplemental information;
 - b. A determination that the change did not reduce the overall conformance of the solidified waste product to existing criteria for solid wastes; and
 - c. Documentation of the fact that the change has been reviewed and found acceptable by PORC.
2. Shall become effective upon review and acceptance by PORC.

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6.15 OFFSITE DOSE CALCULATION MANUAL (ODCM)

6.15.1 The ODCM shall be approved by the Commission prior to implementation.

6.15.2 Licensee initiated changes to the ODCM:

1. Shall be submitted to the Commission in the Semiannual Radioactive Effluent Release Report for the period in which the change(s) was made effective. This submittal shall contain:
 - a. Sufficiently detailed information to support the rationale for the change without benefit of additional or supplemental information. Information submitted should consist of a package of those pages of the ODCM to be changed with each page numbered and provided with an approval and date box, together with appropriate analyses or evaluations justifying the change(s);
 - b. A determination that the change will not reduce the accuracy or reliability of dose calculations or setpoint determinations; and
 - c. Documentation of the fact that the change has been reviewed and found acceptable by PORC.
2. Shall become effective upon review and acceptance by PORC.

6.16 MAJOR CHANGES TO RADIOACTIVE LIQUID, GASEOUS AND SOLID WASTE TREATMENT SYSTEMS

6.16.1 Licensee initiated major changes to the radioactive waste systems (liquid, gaseous and solid):

1. Shall be reported to the Commission in the Semiannual Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the PORC. The discussion of each change shall contain:
 - a. A summary of the evaluation that led to the determination that the change could be made in accordance with 10 CFR Part 50.59;
 - b. Sufficient detailed information to support the reason for the change without benefit of additional or supplemental information;
 - c. A detailed description of the equipment, components and processes involved and the interfaces with other plant systems;

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- d. An evaluation of the change, which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the license application and amendments thereto;
 - e. An evaluation of the change, which shows the expected maximum exposures to member(s) of the public at the site boundary and to the general population that differ from those previously estimated in the license application and amendments thereto;
 - f. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents and in solid waste, to the actual releases for the period prior to when the changes are to be made;
 - g. An estimate of the exposure to plant operating personnel as a result of the change; and
 - h. Documentation of the fact that the change was reviewed and found acceptable by PORC.
2. Shall become effective upon review and acceptance by PORC.