REGULATORY DOCKET FILE COPY

MARCH 7 1980

Distribution
w/encl -
Docket
Local PDR
NRC PDR

Docket No. 50-331

w/o enclosure -

ORB #3	TIppolito	ACRS (16)
NRR Reading	SNorris	
DEisenhut	TKevern	
RTedesco	Atty, OELD	
WGammill	RBangart	
RVollmer	FCardile	
JMiller	OI&E (3)	
BGrimes	NSIC	
LShao	TERA	

Mr. Duane Arnold, President
Iowa Electric Light & Power Company
P. O. Box 351
Cedar Rapids, Iowa 52406

Dear Mr. Arnold:

By letter dated August 29, 1979, you submitted proposed Technical Specifications and documents pertaining to radiological effluent and environmental monitoring systems for the Duane Arnold Energy Center (DAEC). The staff has completed a preliminary review of your proposed Technical Specifications and is presently reviewing your Offsite Dose Calculation Manual. We have yet to receive the required Process Control Program for solidification of DAEC radioactive wastes.

Our review of your proposed Technical Specifications was based upon the model Radiological Effluent Technical Specifications (RETS) for Boiling Water Reactors, NUREG-0473, Revision 2. We noted several deficiencies in your submittal. Our comments are attached as Enclosure 1. Additionally, a copy of NUREG-0473, marked up to reflect applicability to DAEC, Enclosure 2, is provided for your assistance in revising your submittal.

It is requested that you provide revised Technical Specifications, based upon the enclosures, and the required Process Control Program within 60 days of receipt of this letter. It is recommended that you arrange for a conference call and/or meeting to discuss Enclosure 2 prior to providing revised Technical Specifications.

Sincerely,

Original signed by
Thomas A. Ippolito, Chief
Operating Reactors Branch #3
Division of Operating Reactors

Enclosures:
1. Comments on Proposed DAEC RETS
2. Mark-up of NUREG-0473

GD
ENVIRO

cc w/o enclosures:
See next page

OFFICE	ORB #3	ORB #3				
SURNAME	TKevern:mjf	TIppolito				
DATE	3/10/80	3/7/80				

NRC FORM 318 (9-76) NRCM 0240 ☆U.S. GOVERNMENT PRINTING OFFICE: 1979-289-369

8003260002

cc:

Mr. Robert Lowenstein, Esquire
Harold F. Reis, Esquire
Lowenstein, Newman, Reis and Axelrad
1025 Connecticut Avenue, N. W.
Washington, D. C. 20036

Cedar Rapids Public Library
426 Third Avenue, S. E.
Cedar Rapids, Iowa 52401

ENCLOSURE 1

COMMENTS ON PROPOSED DAEC RETS

1. In Table 3.14-1 indicate the following:
   a. Are there flow rate devices in the discharge canal?
   b. Does DAEC use radioactivity recorders?
   c. Have you provided tank level devices on outside tanks?

2. Action 18 should provide for 2 members of the staff to verify release.

3. In Table 4.14-1:
   a. The source check on the liquid effluent line should be performed prior to each release (P).
   b. Delete the "notation" for the channel check.

4. In Table 4.14-2 provide P-32/Fe-55 sampling.

5. Dose limits in Sections 3.14.3, 3.15.3 and 3.15.4 should also be on annual basis.

6. In Section 3.14.4 use the OPERABILITY wording of NUREG-0473.

7. Provide a specification for maximum curie content outdoor storage tanks.

8. In Section 3.15.1, Action a. should also be to immediately suspend releases as per NUREG-0473.

9. In Table 3.15-1, does R4 cover all 3 release vents?

10. Is the noble gas release through the upper turbine building vent exhaust an unmonitored release?

11. In Table 3.15-1, indicate monitoring for the drywell purge and, per NUREG-0473, Rev. 2, indicate that on loss of monitor, purge is suspended immediately.

12. In Tables 3.15-1 and 4.15-1 indicate that effluent monitor applicability is at all times.

13. In Table 4.15-1 indicate that you have a channel functional test that will isolate the off-gas treatment system and the drywell purge.

14. In Table 4.15-1 the channel calibration for the hydrogen analyzers should be to 1 and 4 vol % hydrogen.

15. Specification 4.15.2 should be dose controlling as per NUREG-0473, and should be applicable at all times.

16. Is there grab sample on the turbine building vent?

17. In Table 4.15-2 sampling should also include the notes b, c, d and e from Table 4.11-2 of NUREG-0473, Rev. 2.

18. In 3.15.5 indicate that the off-gas treatment system is in operation whenever the main condenser air ejector system is in operation as per NUREG-0473, Rev. 2.

19. Provide specification on ventilation system operability as per NUREG-0473, Rev. 2.

20. In Specification 3.15.6, why do you indicate that the hydrogen level be held to 4% only downstream of recombiners?

21. Add drywell venting/purging specification as per NUREG-0473, Rev. 2.

22. Add solid waste system specification as per NUREG-0473, Rev. 2.

10/29/79 Master

ENCLOSURE 2

[redacted]3
Re[redacted]2

RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS FOR [redacted]

[redacted]

DRESDEN ARNOLD ENERGY CENTER

22

no CAPs

a. CHANNEL CALIBRATION

A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds with the necessary range and accuracy to known values of the parameter which the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel including the sensor and alarm and/or trip functions, and shall include the CHANNEL FUNCTIONAL TEST. The CHANNEL CALIBRATION may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is calibrated.

CHANNEL CHECK

d. A CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrumentation channels measuring the same parameter.

CHANNEL FUNCTIONAL TEST

c. A CHANNEL FUNCTIONAL TEST shall be:

a. Analog channels - the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions.

b. Bistable channels - the injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions.

DOSE EQUIVALENT I-131

The DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcurie/gram) which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134 and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in Table III of TID-14844, "Calculation of Distance Factors for Power and Test Reactor Sites."

SOURCE CHECK

l A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to a radioactive source.

36. PROCESS CONTROL PROGRAM (PCP)

The PROCESS CONTROL PROGRAM shall contain the sampling, analysis, and formulation determination by which SOLIDIFICATION of radioactive wastes from liquid systems is assured.

No CAPS

37. SOLIDIFICATION

SOLIDIFICATION shall be the conversion of radioactive wastes from liquid systems to a homogeneous (uniformly distributed), monolithic, immobilized solid with definite volume and shape, bounded by a stable surface of distinct outline on all sides (free-standing).

28. OFFSITE DOSE CALCULATION MANUAL (ODCM) --

The OFFSITE DOSE CALCULATION MANUAL shall contain the methodology and parameters used in the calculation of offsite doses due to radioactive gaseous and liquid effluents and in the calculation of of gaseous and liquid effluent monitoring alarm/trip setpoints.

30. GASEOUS RADWASTE TREATMENT SYSTEM

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.

33. VENTILATION EXHAUST TREATMENT SYSTEM

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.

34. PURGE - PURGING

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.

35. VENTING

VENTING 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 not provided or required during VENTING. Vent, used in system names, does not imply a VENTING process.

TABLE 1.2

FREQUENCY NOTATION

NOTATION	FREQUENCY
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.
A	At least once per year
R	At least once per 18 months.
S/U	Prior to each reactor startup.
P	Completed prior to each release.
N.A.	Not applicable.

~~INSTRUMENTATION~~

RADIOACTIVE LIQUID EFFLUENT ~~MONITORING~~ INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.14.1 ~~3.14-1~~ 3.14.2

~~3.3.7.11~~ The radioactive liquid effluent monitoring instrumentation channels shown in Table ~~3.3.7.11-1~~ 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 required by the above specification, immediately suspend the release of radioactive liquid effluents monitored by the affected channel or declare the channel inoperable.

b. With one or more radioactive liquid effluent monitoring instrumentation channels inoperable, take the ACTION shown in Table ~~3.3.7.11-1~~. 3.14-1

c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

~~4.3.3.1~~ 4.14.1.1 ~~Each~~ 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 at the frequencies shown in Table ~~4.3.7.11-1~~. 4.14-1.

3.14-1

TABLE ~~3.[illegible]-1~~

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
1. GROSS RADIOACTIVITY MONITORS PROVIDING AUTOMATIC TERMINATION OF RELEASE		
a. Liquid Radwaste Effluent Line	(1)	18 ~~110~~
2. GROSS RADIOACTIVITY MONITORS NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE		
a. Service Water System Effluent Line	(1)	~~112~~ 20
~~b. Component Cooling Water System Effluent Line~~	~~(1)~~	~~142~~
3. FLOW RATE MEASUREMENT DEVICES		
a. Liquid Radwaste Effluent Line	(1)	21 ~~110~~
~~b. Discharge Canal~~	~~(1)~~	~~113~~
4. RADIOACTIVITY RECORDERS ~~(2)~~		
a. Liquid Radwaste Effluent Line	(1)	23 ~~115~~

~~(*Required only if alarm/trip set point is based on recorder/controller)~~

3.14-1

TABLE ~~3.3.7.11-1~~ (Continued)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
5. TANK LEVEL INDICATING DEVICES (for tanks outside plant buildings)		
a. _____	(1)	~~14~~ 22
b. _____	(1)	~~14~~ 22
c. _____	(1)	~~14~~ 22

TABLE ~~3.3-13~~ (Continued)

TABLE NOTATION

ACTION 18 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may continue for up to 14 days provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Specification ~~4.11.1.1.3~~ 4.14.2/1.3, and

b. 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 111 Not Applicable.~~

ACTION 20 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided that, at least once per 8 hours, grab samples are collected and analyzed for gross radioactivity (beta or gamma) at a limit of detection of at least 10^{-7} micorcuries/ml.

ACTION 21 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided the flow rate is estimated at least once per 4 hours during actual releases. Pump curves may be used to estimate flow.

ACTION 22 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, liquid additions to this tank may continue for up to 30 days provided the tank liquid level is estimated during all liquid additions to the tank.

ACTION 23 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via the affected pathway may continue for up to 14 days provided the gross radioactivity level is determined at least once per 4 hours during actual releases.

4.14-1

TABLE ~~4.3.7.11-1~~

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST
1. GROSS BETA OR GAMMA RADIOACTIVITY MONITORS PROVIDING ALARM AND AUTOMATIC TERMINATION OF RELEASE				
a. Liquid Radwaste Effluents Line	D	P	R(3)	Q(1)
2. GROSS BETA OR GAMMMA RADIOACTIVITY MONITORS PROVIDING ALARM BUT NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE				
a. Service Water System Effluent Line	D	M	R(3)	Q(2)
~~b. Component Cooling Water System Effluent Line~~	~~D~~	~~M~~	~~R(3)~~	~~Q(2)~~
3. FLOW RATE MEASUREMENT DEVICES (4)				
a. Liquid Radwaste Effluent Line	D(4)	N.A.	R	Q
~~b. Discharge Canal~~	~~D(4)~~	~~N.A.~~	~~R~~	~~Q~~

4.14-1

TABLE ~~4.3.7.11-1~~ (Continued)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST
4. RADIOACTIVITY RECORDERS ~~(GW)~~				
a. Liquid Radwaste Effluent Line	D	N.A.	R	Q
5. TANK LEVEL INDICATING DEVICES (for tanks outside the building) ~~(GW)~~				
a. _____	D*	N.A.	R	Q
b. _____	D*	N.A.	R	Q
c. _____	D*	N.A.	R	Q
d. _____	D*	N.A.	R	Q

4.14-1

TABLE [illegible] (Continued)

TABLE NOTATION

* During liquid additions to the tank.

(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 exists:

1. Instrument indicates measured levels above the alarm/trip setpoint.
2. Circuit failure.
3. Instrument indicates a downscale failure.
4. Instrument controls not set in operate mode.

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

1. Instrument indicates measured levels above the alarm/trip setpoint.
2. Circuit failure.
3. Instrument indicates a downscale failure.
4. Instrument controls not set in operate mode.

(3) The CHANNEL CALIBRATION shall include the use of a known radioactive source (traceable to the National Bureau of Standards radiation measurement system or acceptable non-NBS standards) positioned in a reproducible geometry with respect to the sensor and emitting beta or gamma radiation in the range measured by the channel during normal operation. CHANNEL CALIBRATION may normally be done during refueling outages.

(4) CHANNEL CHECK shall consist of verifying indication of flow during periods of release. CHANNEL CHECK shall be made at least once daily on any day on which continuous, periodic, or batch releases are made.

~~(5) This requirement is applicable only to systems where an alarm/trip action is performed by recorder controller instrumentation.~~

(6) This requirement is not applicable to tanks which have dikes or retention ponds capable of preventing runoff in the event of a tank overflow and have provisions for sampling collected liquids and routing them to a liquid radwaste treatment system.

~~3/4.11 RADIOACTIVE EFFLUENTS~~

~~3/4.11.1~~ LIQUID EFFLUENTS ONE LINE

CONCENTRATION

LIMITING CONDITION FOR OPERATION

3.14.2 3.14-1

~~3.11.1.1~~ The concentration of radioactive material released from the site (see Figure ~~3.11.1.1~~) 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, immediately restore the concentration to within the above limits.

SURVEILLANCE REQUIREMENTS

4.14.2.1 4.14-2

~~4.11.1.1.1~~ The radioactivity content of each batch of radioactive liquid waste shall be determined prior to release by sampling and analysis in accordance with Table ~~4.11.1~~. The results of pre-release analyses shall be used with the calculational methods in the ODCM to assure that the concentration at the point of release is maintained within the limits of Specification ~~3.11.1.1~~. 3.14.2

4.14.2.2 4.14-2

~~4.11.1.1.2~~ Post-release analyses of samples composited from batch releases shall be performed in accordance with Table ~~4.11.1~~. The results of the previous post-release analyses shall be used with the calculational methods in the ODCM to assure that the concentrations at the point of release were maintained within the limits of Specification ~~3.11.1.1~~. 3.14.2

4.14.2.3 4.14-2

~~4.11.1.1.3~~ The radioactivity concentration of liquids discharged from continuous release points shall be determined by collection and analysis of samples in accordance with Table ~~4.11.1~~. The results of the analyses shall be used with the calculational methods in the ODCM to assure that the concentrations at the point of release are maintained within the limits of Specification ~~3.11.1.1~~. 3.14.2.

4.14-2

TABLE

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

Liquid Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) (μCi/ml)[a]
A. Batch Waste Release Tanks[c]	P Each Batch	P Each Batch	Principal Gamma Emitters[d]	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[b]	H-3	1×10^{-5}
			Gross Alpha	1×10^{-7}
			P-32	1×10^{-6}
	P Each Batch	Q Composite[b]	Sr-89, Sr-90	5×10^{-8}
			Fe-55	1×10^{-6}
B. Plant Continuous Releases[e]	Continuous[c]	W Composite[c]	Principal Gamma Emitters[f]	5×10^{-7}
			I-131	1×10^{-6}
	M Grab Sample	M	Dissolved and Entrained Gases (Gamma Emitters)	1×10^{-5}
	Continuous[c]	M Composite[c]	H-3	1×10^{-5}
			Gross Alpha	1×10^{-7}
			P-32	1×10^{-6}
	Continuous[c]	Q Composite[c]	Sr-89, Sr-90	5×10^{-8}
			Fe-55	1×10^{-6}

TABLE [redacted] (Continued)

TABLE NOTATION

a. The LLD is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

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

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

Where:

LLD is the lower limit of detection as defined above (as picocurie 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 transformation),

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

2.22 is the number of transformations per minute per picocurie,

Y is the fractional radiochemical yield (when applicable),

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

Δt is the elapsed time between midpoint of sample collection and time of counting (for plant effluents, not environmental samples).

The value of s_b used in the calculation of the LLD for a detection system shall be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance. 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. Typical values of E, V, Y, and Δt shall be used in the calculation. The background count rate is calculated from the background counts that are determined to be within $\pm$ one FWHM (Full-Width-at-Half-Maximum) energy band about the energy of the gamma ray peak used for the quantitative analysis for that radionuclide.

4.14-2

TABLE ~~4.11-1~~ (Continued)

TABLE NOTATION

b. 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.

~~c.~~ To be representative of the quantities and concentrations of radioactive materials in liquid effluents, samples shall be collected continuously in proportion to the rate of flow of the effluent stream. Prior to analyses, all samples taken for the composite shall be thoroughly mixed in order for the composite sample to be representative of the effluent release.

c. ~~d.~~ A batch release is the discharge of liquid wastes of a discrete volume. Prior to sampling for analyses, each batch shall be isolated, and then thoroughly mixed, by a method described in the ODCM, to assure representative sampling.

~~e.~~ A continuous release is the discharge of liquid wastes of a nondiscrete volume; e.g., from a volume of system that has an input flow during the continuous release.

d. ~~f.~~ 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 shall be reported as "less than" the nuclide's LLD, and shall not be reported as being present at the LLD level for that nuclide. The "less than" values shall not be used in the required dose calculations.

LIQUID
RADIOACTIVE EFFLUENTS DOSE

~~DOSE~~

LIMITING CONDITION FOR OPERATION

3.14.3
~~3.11.1.2~~ The dose or dose commitment to an individual from radioactive materials in liquid effluents released from the site (see Figure ~~5.1.3-1~~ 3.14-1) shall be limited:

a. During any calendar quarter to 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 to 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 6.9.1, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, 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 of radioactive materials in liquid effluents during the remainder of the current calendar quarter and during the subsequent three calendar quarters, so that the cumulative dose or dose commitment to an individual from such releases during these four calendar quarters is within 3 mrem to the total body and 10 mrem to any organ. *This Special Report shall also include (1) the results of radiological analyses of the drinking water source and (2) the radiological impact on finished drinking water supplies with regard to the requirements of 40 CFR 141, Safe Drinking Water Act.

b. The provisions of specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.14.3
~~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.

~~*Applicable only if drinking water supply is taken from the receiving water body~~.

RADIOACTIVE ~~EFFLUENTS~~

LIQUID WASTE TREATMENT

LIMITING CONDITION FOR OPERATION

3.14.4

~~3.11.1.3~~ The liquid radwaste treatment system shall be OPERABLE. The appropriate portions of the system shall be used to reduce the radioactive materials in liquid wastes prior to their discharge when the projected doses due to the liquid effluent from the site (see Figure ~~3.11.1.1~~) when averaged over 31 days, would exceed 0.06 mrem to the total body or 0.2 mrem to any organ. 3.14-1

APPLICABILITY: At all times.

ACTION:

a. With the liquid radwaste treatment system inoperable for more than 31 days or with radioactive liquid waste being discharged without treatment and in excess of the above limits, in lieu of any other report required by Specification 6.9.1, prepare and submit to the Commission within 30 days pursuant to Specification 6.9.2 a Special Report which includes the following information:

   1. Identification of the inoperable equipment or subsystems and the reason for 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 Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.14.4.1

~~4.11.1.3.1~~ Doses due to liquid releases shall be projected at least once per 31 days, in accordance with the ODCM.

4.14 4.2

~~4.11.1.3.2~~ The liquid radwaste treatment system shall be demonstrated OPERABLE by operating the liquid radwaste treatment system equipment for at least ___ minutes at least once per 92 days unless the liquid radwaste system has been utilized to process radioactive liquid effluents during the previous 92 days.

RADIOACTIVE ~~EFFLUENTS~~

LIQUID HOLDUP TANKS*

LIMITING CONDITION FOR OPERATION

3.14.5

~~3.11.1.4~~ The quantity of radioactive material contained in each of the following tanks shall be limited to less than or equal to ____ curies, excluding tritium and dissolved or entrained noble gases.

a. _____
b. _____
c. _____
d. Outside temporary tank

APPLICABILITY: At all times.

ACTION:

a. With the quantity of radioactive material in any of the above listed tanks exceeding the above limit, immediately suspend all additions of radioactive material to the tank and within 48 hours reduce the tank contents to within the limit.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.14.5

~~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.

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

3/4.14.1

~~3/4.11.1.3~~ 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 shall be calculated in accordance with the procedures in the ODCM 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.

LIQUID EFFLUENT

3/4.14.2

~~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 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, 10 CFR 50, to an individual and (2) the limits of 10 CFR 20.106(e) to the population. The concentration limit for dissolved or entrained noble gases is based upon the assumption that Xe-135 is the controlling radioisotope and its MPC in air (submersion) was converted to an equivalent concentration in water using the methods described in International Commission on Radiological Protection (ICRP) Publication 2.

3/4.14.3

~~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 effleunts will be kept "as low as is reasonably achievable". Also, for fresh water sites with drinking water supplies which can be potentially affected by plant operations, there is reasonable assurance that the operation of the facility will not result in radionuclide concentrations in the finished drinking water that are in excess of the requirements of 40 CFR 141. The dose calculations in the ODCM 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 an individual 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 materials in liquid effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 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.

This specification applies to the release of liquid effluents from each reactor at the site. For units with shared radwaste treatment systems, the liquid effluents from the shared system are proportioned among the units sharing that system.

3/4 14.4

~~3/4.11.3~~ LIQUID WASTE TREATMENT

The OPERABILITY of the liquid radwaste treatment system ensures that this system will be available for use whenever liquid effluents require treatment prior to release to the environment. 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 14.5

~~3/4.11.1.4~~ LIQUID HOLDUP TANKS

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.

~~INSTRUMENTATION~~

RADIOACTIVE GASEOUS EFFLUENT ~~MONITORING~~ INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.15.1 3.15-1 3.15.2
~~3.3.7.12~~ The radioactive gaseous effluent monitoring instrumentation channels shown in Table ~~3.3.7.12-1~~ shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification ~~3.11.2.1~~ are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with the ODCM.

APPLICABILITY: As shown in Table ~~3.3.7.12-1~~ 3.15-1

ACTION:

a. With a radioactive gaseous effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above Specification, immediately suspend the release of radioactive gaseous effluents monitored by the affected channel or declare the channel inoperable.

b. With one or more radioactive gaseous effluent monitoring instrumentation channels inoperable, take the ACTION shown in Table ~~3.3.7.12-1~~ 3.15-1

c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.15.1
~~4.3.7.12~~ 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 at the frequencies shown in Table ~~4.3.7.12-1~~. 4.15-1

3.15-1

TABLE ~~3.3.7.12-1~~

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
1. MAIN CONDENSER OFFGAS TREATMENT ~~SYSTEM EFFLUENT MONITORING SYSTEM~~ (SJAE PRE.)			
a. Noble Gas Activity Monitor (R1)	(1)	*	25 ~~120~~
~~b. Iodine Sampler~~	~~(1)~~	~~*~~	~~127~~
~~c. Particulate Sampler~~	~~(1)~~	~~*~~	~~127~~
~~d. Effluent System Flow Rate Measuring Device~~	~~(1)~~	~~*~~	~~122~~
~~e. Sampler Flow Rate Measuring Device~~	~~(1)~~	~~*~~	~~122~~
~~1.~~ ~~2a.~~ MAIN CONDENSER OFFGAS ~~TREATMENT SYSTEM EXPLOSIVE GAS MONITORING SYSTEM (for systems designed to withstand the effects of a hydrogen explosion)~~ (SJAE)			
~~2b.~~ Hydrogen Monitor (R2)	(1)	**	~~125~~ 29
~~b. Hydrogen or Oxygen Monitor~~	~~(1)~~	~~**~~	~~125~~
~~2B.~~ MAIN CONDENSER OFFGAS TREATMENT SYSTEM EXPLOSIVE GAS MONITORING SYSTEM (for systems not designed to withstand the effects of a hydrogen explosion)			
a. Hydrogen Monitor	~~(2)~~	~~**~~	~~125~~
b. Hydrogen or Oxygen Monitor	~~(2)~~	~~**~~	~~125~~

3.15-1

TABLE 3~~.7.12~~

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

	INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
2.	DRYWELL ~~REACTOR BLDG. VENTILATION~~/PURGE MONITORING SYSTEM			
	a. Noble Gas Activity Monitor	(1)	*	~~24~~ 28
	b. Iodine Sampler	(1)	*	~~29~~ 30
	c. Particulate Sampler	(1)	*	~~29~~ 30
	d. Effluent System Flow Rate Monitor	(1)	*	~~22~~ 26
	e. Sampler Flow Rate Monitor	(1)	*	~~23~~ 26
4.	OFFGAS ~~MAIN~~ STACK MONITORING SYSTEM (R3)			
	a. Noble Gas Activity Monitor	(1)	*	~~23~~ 27
	b. Iodine Sampler Cartridge	(1)	*	~~29~~ 30
	c. Particulate Sampler Filter	(1)	*	~~29~~ 30
	d. Effluent ~~System~~ Flow Rate Monitor	(1)	*	~~22~~ 26
	e. Sampler Flow Rate Monitor	(1)	*	~~23~~ 26
5.	UPPER EXHAUST VENT SAMPLING TURBINE BLDG. ~~VENTILATION MONITORING~~ SYSTEM (R3)			
	a. Noble Gas Activity Monitor	(1)	*	~~23~~ 27
	b. Iodine Sampler Cartridge	(1)	*	~~29~~ 30
	c. Particulate Sampler Filter	(1)	*	~~29~~ 30

3.15-1

TABLE ~~3.8.7.12-1~~ (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
5. UPPER EXHAUST VENT SAMPLING TURBINE BLDG. ~~VENTILATION MONITORING~~ SYSTEM (Continued)			
e. Effluent System Flow Rate Monitor	(1)	*	~~22~~ 26
f. Sampler Flow Rate Monitor	(1)	*	~~22~~ 26
6. REACTOR EXHAUST VENT ~~AUXILIARY~~ BUILDING ~~VENTILATION~~ MONITORING SYSTEM (R4)			
a. Noble Gas Activity Monitor	(1)	*	~~25~~ 27
b. Iodine Sampler Cartridge	(1)	*	~~28~~ 30
c. Particulate Sampler Filter	(1)	*	~~28~~ 30
d. Effluent Flow Rate ~~Monitor~~ Measuring Device	(1)	*	~~22~~ 26
e. Sample Flow Rate ~~Monitor~~ Measuring Device	(1)	*	~~22~~ 26
7. FUEL STORAGE AREA VENTILATION MONITORING SYSTEM			
a. Noble Gas Activity Monitor	(1)	*	~~23~~ 27
b. Iodine Sampler	(1)	*	27
c. Particulate Sampler	(1)	*	27
d. Flow Rate Monitor	(1)	*	22
e. Sampler Flow Rate Monitor	(1)	*	22

3.15-1

TABLE ~~3.3.7.12-1~~ (Continued)

TABLE NOTATION

* At all times.

** During main condenser offgas treatment system operation.

*** During operation of the main condenser air ejector.

ACTION ~~125~~ 25 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, the contents of the tank(s) may be released to the environment for up to 72 hours provided:

a. The offgas system is not bypassed, and

b. The offgas delay system noble gas activity ~~effluent~~ (downstream) monitor is OPERABLE;

Otherwise, be in at least HOT STANDBY within 12 hours.

ACTION ~~126~~ 26 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided the flow rate is estimated at least once per 4 hours.

ACTION ~~127~~ 27 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided grab samples are taken at least once per 8 hours and these samples are analyzed for gross activity within 24 hours.

ACTION ~~128~~ 28 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, suspend release of radioactive effluents via this pathway.

ACTION ~~129~~ 29 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, operation of main condenser offgas treatment system may continue for up to 30 days provided grab samples are collected at least once per 4 hours and analyzed within the following 4 hours.

~~ACTION 130~~ - With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement, operation of this system may continue for up to 14 days. With (two) channels inoperable, be in at least HOT STANDBY within 6 hours.

ACTION ~~131~~ 30 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided samples are continuously collected with auxiliary sampling equipment as required in Table ~~4.11.2~~. 4.15-2

4.15-1

TABLE ~~3.7.12-1~~

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. MAIN CONDENSER ~~OFFGAS~~ TREATMENT SYSTEM ~~EFFLUENT MONITORING SYSTEM~~ SJAE PRE					
a. Noble Gas Activity Monitor	D	M	R(3)	Q(2) ~~(2)~~	*
~~b. Iodine Sampler~~	~~W~~	~~N.A.~~	~~N.A.~~	~~N.A.~~	~~*~~
~~c. Particulate Sampler~~	~~W~~	~~N.A.~~	~~N.A.~~	~~N.A.~~	~~*~~
~~d. Flow Rate Monitor~~	~~D~~	~~N.A.~~	~~R~~	~~Q~~	~~*~~
e. ~~Sampler Flow Rate Monitor~~	~~D~~	~~N.A.~~	~~R~~	~~Q~~	~~*~~
2. MAIN CONDENSER OFFGAS TREATMENT SYSTEM EXPLOSIVE GAS MONITORING SYSTEM					
a. Hydrogen Monitor	D	N/A	Q(4)	M	**
~~b. Hydrogen Monitor (alternate)~~	~~D~~	~~N/A~~	~~Q(4)~~	~~M~~	~~**~~
~~c. Oxygen Monitor~~	~~D~~	~~N/A~~	~~Q(5)~~	~~M~~	~~**~~
~~d. Oxygen Monitor (alternate)~~	~~D~~	~~N.A.~~	~~Q(5)~~	~~M~~	~~**~~

4.15-1

TABLE ~~4.3.7.12-1~~ (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
3. ~~REACTOR BLDG. VENTILATION~~ DRYWELL/PURGE MONITORING SYSTEM					
a. Noble Gas Activity Monitor	D	M	R(3)	Q(1)	*
b. Iodine Sampler	W	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W	N.A.	N.A.	N.A.	*
d. Effluent System Flow Rate Monitor	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D	N.A.	R	Q	*
4. ~~MAIN~~ OFFGAS STACK MONITORING SYSTEM					
a. Noble Gas Activity Monitor	D	M	R(3)	Q(2)	*
b. Iodine Sampler Cartridge	W	N.A.	N.A.	N.A.	*
c. Particulate Sampler Filter	W	N.A.	N.A.	N.A.	*
d. Effluent ~~System~~ Flow Rate Monitor	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D	N.A.	R	Q	*

4.15-1

TABLE ~~4.3.7.12-1~~ (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
5. UPPER EXHAUST TURBINE BLDG. VENTILATION MONITORING SYSTEM					
a. Noble Gas Activity Monitor	D	M	R(3)	Q(2)	*
b. Iodine Sampler Cartridge	W	N.A.	N.A.	N.A.	*
c. Particulate Sampler Filter	W	N.A.	N.A.	N.A.	*
d. Flow Rate Monitor	D	N.A.	R	Q	*
e. Sample Flow Rate Monitor	D	N.A.	R	Q	*
6. REACTOR ~~AUXILIARY~~ BUILDING VENTILATION MONITORING SYSTEM					
a. Noble Gas Actvity Monitor	D	M	R(3)	Q(2)	*
b. Iodine Sampler Cartridge	W	N.A.	N.A.	N.A.	*
c. Particulate Sampler Filter	W	N.A.	N.A.	N.A.	*
d. Flow Rate Monitor	D	N.A.	R	Q	*
e. Sample Flow Rate Monitor	D	N.A.	R	Q	*

4.15-1

TABLE ~~4.3-7.12-1~~ (Continued)

TABLE NOTATION

* At all times.

** During main condenser offgas treatment system operation.

*** During operation of the main condenser air ejector.

(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 exists:

1. Instrument indicates measured levels above the alarm/trip setpoint.
2. Circuit failure.
3. Instrument indicates a downscale failure.
4. Instrument controls not set in operate mode.

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

1. Instrument indicates measured levels above the alarm/trip setpoint.
2. Circuit failure.
3. Instrument indicates a downscale failure.
4. Instrument controls not set in operate mode.

(3) The CHANNEL CALIBRATION shall include the use of a known radioactive source (traceable to the National Bureau of Standards radiation measurement system or other acceptable non-NBS standards) positioned in a reproducible geometry with respect to the sensor and emitting beta and/or gamma radiation in the range measured by the channel during normal operation.

~~requirements~~)

(4) The CHANNEL CALIBRATION shall include the use of standard gas samples containing a nominal:

1. One volume percent hydrogen, balance nitrogen, and
2. Four volume percent hydrogen, balance nitrogen.

(5) The CHANNEL CALIBRATION shall include the use of standard gas samples containing a nominal:

1. One volume percent oxygen, balance nitrogen, and
2. Four volume percent oxygen, balance nitrogen.

RADIOACTIVE ~~EFFLUENTS~~

~~3.11.2~~ GASEOUS EFFLUENTS

DOSE RATE

one Line

LIMITING CONDITION FOR OPERATION

3.15.2

~~3.11.2.1~~ The dose rate due to radioactive materials released in gaseous effluents from the site (see Figure ~~3.11.2-1~~ 3.14-1) 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 3000 mrem/yr to the skin, and

b. For all radioiodines and for all radioactive materials in particulate form and radionuclides (other than noble gases) 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, immediately decrease the release rate to within the above limit(s).

SURVEILLANCE REQUIREMENTS

4.15.2.1

~~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.

4.15.2.2

~~4.11.2.1.4~~ The dose rate due to radioactive materials, other than noble gases, 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 ~~4.11.2.1.2~~ 4.15-2.

4.15-2

TABLE ~~4.11-2~~

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) (μCi/ml)[a]
~~A. Waste Gas Storage Tank~~	~~P Each Tank Grab Sample~~	~~P Each Tank~~	~~Principal Gamma Emitters[g]~~	~~1x10^{-4}~~
~~A~~ B. Containment Purge	P Each Purge[b] Grab Sample	P Each Purge[b]	Principal Gamma Emitters[g]	1x10^{-4}
			H-3	1x10^{-6}
~~B~~ C. ~~(List other release points where gaseous effluents are discharged from the facility).~~	M[b,c,e] Grab Sample	M[b]	Principal Gamma Emitters[g]	1x10^{-4}
			H-3	1x10^{-6}
D. All Release Types as listed in A, B, ~~C above~~ and	Continuous[f]	W[d] Charcoal Sample	I-131	1x10^{-12}
			I-133	1x10^{-10}
	Continuous[f]	W[d] Particulate Sample	Principal Gamma Emitters[g] (I-131, Others)	1x 10^{-11}
	Continuous[f]	M Composite Particulate Sample	Gross Alpha	1x10^{-11}
	Continuous[f]	Q Composite Particulate Sample	Sr-89, Sr-90	1x10^{-11}
	Continuous[f]	Noble Gas Monitor	Noble Gases Gross Beta & Gamma	1x10^{-6}

Off Gas Stack
Reactor Bldg Vent

4.15-2

TABLE [redacted] (Continued)

TABLE NOTATION

a. The LLD is the smallest concentration of radioactive material in a sample that will be detected with 95% probability with 5% probability of falsely concluding that a blank observation represents a "real" signal.

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

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

Where:

LLD is the lower limit of detection as defined above (as picocurie 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 transformation),

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

2.22 is the number of transformations per minute per picocurie,

Y is the fractional radiochemical yield (when applicable),

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

Δt is the elapsed time between midpoint of sample collection and time of counting (for plant effluents, not environmental samples).

The value of s_b used in the calculation of the LLD for a detection system shall be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance. 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. Typical values of E, V, Y, and Δt shall be used in the calculation. The background count rate is calculated from the background counts that are determined to be within $\pm$ one FWHM (Full-Width-at-Half-Maximum) energy band about the energy of the gamma ray peak used for the quantitative analysis for that radionuclide.

4.15-2

TABLE ~~4.11-2~~ (Continued)

TABLE NOTATION

b. Analyses shall also be performed following shutdown, startup, or similar operational occurrence which could alter the mixture of radionuclides.

c. Tritium grab samples shall be taken at least once per 24 hours when the refueling canal is flooded.

d. Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after charging (or after removal from sampler). Sampling and analyses shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup or thermal power level change exceeding 15% of RATED THERMAL POWER in one hour. When samples collected for 24 hours are analyzed, the corresponding LLD's may be increased by a factor of 10.

e. Tritium grab samples shall be taken at least once per 7 days from the ventilation exhaust from the spent fuel pool area.

f. The ratio of the sample flow rate to the sampled ~~steam~~ 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~~ 3.15.2, ~~3.11.2.2~~ 3.15.3 and 3.~~11.2.3~~ 3.15.4.

g. 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 measureable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses shall be reported as "less than" the nuclide's LLD and shall not be reported as being present at the LLD level for that nuclide. The "less than" values shall not be used in the required dose calcultions.

RADIOACTIVE EFFLUENTS

DOSE - NOBLE GASES

one line

LIMITING CONDITION FOR OPERATION

3.15.3

~~3.11.2.2~~ The air dose due to noble gases released in gaseous effluents from the site (see Figure ~~5.1.3-1~~ 3.14-1) 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.

~~(The dose design objectives shall also be reduced based on expected public occupancy of areas, e.g., beaches and visitor centers within the site boundary.)~~

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 6.9.1, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, 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 of radioactive noble gases in gaseous effluents during the remainder of the current calendar quarter and during the subsequent three calendar quarters so that the cumulative dose during these four calendar quarters is within 10 mrad for gamma radiation and 20 mrad for beta radiation.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.15.3

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

RADIOACTIVE EFFLUENTS

one line

DOSE - RADIOIODINES, RADIOACTIVE MATERIALS IN PARTICULATE FORM, AND RADIONUCLIDES OTHER THAN NOBLE GASES

LIMITING CONDITION FOR OPERATION

3.11.4

~~3.11.2.3~~ The dose to an individual from radioiodines and radioactive materials in particulate form, and radionuclides (other than noble gases) with half-lives greater than 8 days in gaseous effluents released from the site (see Figure ~~5.1.3-1~~ 3.11-1) 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.

~~(The dose design objectives shall be reduced based on predicted carbon-14 releases releases if effluent sampling is not provided.)~~

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) with half lives greater than 8 days, in gaseous effluents exceeding any of the above limits, in lieu of any other report required by Specification 6.9.1, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, a Special Report which identifies the cause(s) for exceeding the limit and defines the corrective actions to be taken to reduce the releases of radioiodines and radioactive materials in particulate form, and radionuclides (other than nobles gases) with half-lives greater than 8 days in gaseous effluents during the remainder of the current calendar quarter and during the subsequent three calendar quarters, so that the cumulative dose or dose commitment to an individual from such releases during these four calendar quarters is within (15) mrem to any organ.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.4

~~4.11.2.3~~ Dose Calculations Cumulative dose contributions for the current calendar quarter and current calendar year shall be determined in accordance with the ODCM at least once every 31 days.

RADIOACTIVE ~~EFFLUENTS~~

GASEOUS RADWASTE TREATMENT } one line

LIMITING CONDITION FOR OPERATION

3.15.5
~~3.11.2.4~~ The gaseous radwaste treatment system shall be in operation.

APPLICABILITY: Whenever the main condenser air ejector system is in operation.

ACTION:

a. With the gaseous radwaste treatment system inoperable for more than 7 days, in lieu of any other report required by Specification 6.9.1, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, a Special Report which includes the following information:

1. Identification of the inoperable equipment or subsystems and the reason for 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 Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.15.5
~~4.11.2.4~~ The gaseous radwaste treatment system shall be demonstrated OPERABLE by operating the gaseous radwaste treatment system equipment for at least ___ minutes, at least once per 92 days unless the system has been utilized to process radioactive gaseous effluents during the previous 92 days.

RADIOACTIVE EFFLUENTS -

VENTILATION EXHAUST TREATMENT

one line

LIMITING CONDITION FOR OPERATION

3.15.6

~~3.11.2.5~~ The appropriate portions of the ventilation exhaust treatment system shall OPERABLE and be used to reduced radioactive materials in gaseous waste prior to their discharge when the projected doses due to gaseous effluent releases from the site (see Figure ~~3.11.2.5-1~~ 3.14-1 when averaged over 31 days would exceed 0.3 mrem to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the ventilation exhaust treatment system inoperable for more than 31 days, or with gaseous waste being discharged without treatment and in excess of the above limits, in lieu of any other report required by Specification 6.9.1, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, a Special Report which includes the following information:

   1. Identification of the inoperable equipment or subsystems and the reason for 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 Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.15.6.1

~~4.11.2.5.1~~ Doses due to gaseous releases from the site shall be projected at least once per 31 days in accordance with the ODCM.

4.15.6.2

~~4.11.2.5.2~~ The ventilation exhaust treatment system shall be demonstrated OPERABLE by operating the ventilation exhaust treatment system equipment for at least ___ minutes, at least once per 92 days unless the appropriate system has been utilized to process radioactive gaseous effluents during the previous 92 days.

~~RADIOACTIVE EFFLUENTS~~

EXPLOSIVE GAS MIXTURE (~~Systems designed to withstand a hydrogen explosion~~)

LIMITING CONDITION FOR OPERATION

3.15.7

~~3.11.2.6~~ The concentration of hydrogen ~~or oxygen~~ in the main condenser offgas treatment system shall be limited to less than or equal to 4% by volume.

APPLICABILITY: At all times.

ACTION:

a. With the concentration of hydrogen ~~or oxygen~~ in the main condenser offgas treatment system exceeding the limit, restore the concentration to within the limit within 48 hours.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.15.7

~~4.11.2.6~~ The concentration of hydrogen ~~or oxygen~~ in the main condenser offgas treatment system shall be determined to be within the above limits by continuously monitoring the waste gases in the main condenser offgas treatment system with the hydrogen ~~or oxygen~~ monitors required OPERABLE by Table ~~3.3.7.12-1~~ 3.15-1 of Specification ~~3.3.7.12.~~ 3.15.1

RADIOACTIVE EFFLUENTS] one line

MAIN CONDENSER

LIMITING CONDITION FOR OPERATION

3.15.8
~~3.11.2.7~~ The gross radioactivity (beta and/or gamma) rate of noble gases measured at the main condenser air ejector shall be limited to less than or equal to (100 microcuries/sec/ MW_t).

APPLICABILITY: At all times.

ACTION:

With the gross radioactivity (beta and/or gamma) rate of noble gases at the main condenser air ejector exceeding (100 microcuries/sec/MW_t), restore the gross radioactivity rate to within its limit within 72 hours or be in at least HOT STANDBY within the next 12 hours.

SURVEILLANCE REQUIREMENTS

4.15.8.1
~~4.11.2.7.1~~ The radioactivity rate of noble gases at (near) the outlet of the main condenser air ejector shall be continuously monitored in accordance with Specification ~~3.3.7.12.~~ 3.15.1

4.15.8.2
~~4.11.2.7.2~~ The gross radioactivity (beta and/or gamma) rate of noble gases from the main condenser air ejector shall be determined to be within the limits of Specification ~~3.11.2.7~~ 3.15.8 at the following frequencies by performing an isotopic analysis of a representative sample of gases taken at the discharge (prior to dilution and/or discharge) of the main condenser air ejector:

a. At least once per 31 days.

b. Within 4 hours following an increase, as indicated by the Condenser Air Ejector Noble Gas Activity Monitor, of greater than 50%, after factoring out increases due to changes in THERMAL POWER level, in the nominal steady state fission gas release from the primary coolant.

RADIOACTIVE EFFLUENTS —

MARK I or II CONTAINMENT (~~Optional~~)

LIMITING CONDITION FOR OPERATION

3.15.9
~~3.11.2.8~~ VENTING or PURGING of the Mark I or II containment drywell shall be through the Standby Gas Treatment System.

APPLICABILITY: Whenever the drywell is vented or purged.

ACTION:

a. With the requirements of the above specification not satisfied, suspend all VENTING and PURGING of the drywell.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIRMENTS

4.15.9
~~3.10.2.8~~ The containment drywell shall be determined to be aligned for VENTING or PURGING through the Standby Gas Treatment System within 4 hours prior to start of and at least once per 12 hours during VENTING or PURGING of the drywell.

3/4.15.1

~~3/4.3.3.10~~ RADIOACTIVE GASEOUS EFFLUENT INSTRUMENTATION

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring (and controlling) 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.

~~3/4.11.2 GASEOUS EFFLUENTS~~

3/4.15.2

~~3/4.11.2.1~~ DOSE RATE

This specification is provided to ensure that the dose at any time at the site boundary from gaseous effluents from all units on the site will be within the annual dose limits of 10 CFR Part 20 for unrestricted areas. 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 an individual in an unrestricted area, 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)(1)). For individuals 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 restrict, at all times, the corresponding gamma and beta dose rates above background to an individual at or beyond the site boundary to less than or equal to 500 mrem/ year to the total body or to less than or equal to 3000 mrem/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to an

~~RADIOACTIVE EFFLUENTS~~

BASES

This specification applies to the release of gaseous effluents from all reactors at the site. For units with shared radwaste treatment systems, the gaseous effluents from the shared system are proportioned among the units sharing that system.

3/4.15.3

~~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 an individual through appropriate pathways is unlikely to be substantially underestimated. The dose calculations established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 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 equations provided for determining the air doses at the site boundary are based upon the historical average atmospheric conditions.

3/4 15.4

~~3/4.11.2.3~~ DOSE - RADIOIODINES, RADIOACTIVE MATERIALS IN PARTICULATE FORM AND RADIONUCLIDES OTHER THAN NOBLE GASES

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 Conditions 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 ODCM calculational methods specified in 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 an individual through appropriate pathways is unlikely to be substantially underestimated. The ODCM calculational methods for calculating the doses due to the actual release rates of the subject materials are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses

to the actual release rates of the subject materials are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 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 radioiodines, radioactive materials in particulate form and radionuclides other than noble gases are dependent on the existing radionuclide pathways to man, in the unrestricted area. The pathways which were examined in the development of these calculations 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.

3/4.15.5 3/4 15.6

~~3/4.11.E.1~~ AND ~~3/4.11.E.2~~ GASEOUS RADWASTE TREATMENT AND VENTILATION EXHAUST TREATMENT

The OPERABILITY of the gaseous radwaste treatment system and the ventilation exhaust treatment system ensures that the systems will be available for use whenever gaseous effluents require treatment prior to release to the environment. The requirement that the appropriate portions of these systems 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 given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the dose design objectives set forth in Sections II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents.

3/4 15.7

~~3/4.11.F~~ 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 limits of hydrogen and oxygen. (Automatic control features are included in the system to prevent the hydrogen and oxygen concentrations from reaching these flammability limits. These automatic control features include isolation of the source of hydrogen and/or oxygen, automatic diversion to recombiners, or injection of dilutants to reduce the concentration below the flammability limits.) Maintaining the concentration of hydrogen and oxygen below their flammability limits 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 15.8

MAIN CONDENSER

Restricting the gross radioactivity rate of noble gases from the main condenser provides reasonable assurance that the total body exposure to an individual at the exclusion area boundary will not exceed a small fraction of the limits of 10 CFR Part 100 in the event this effluent is inadvertently discharged directly to the environment without treatment. This specification implements the requirements of General Design Criteria 60 and 64 of Appendix A to 10 CFR Part 50.

3/4 15.9

MARK I CONTAINMENT (OPTIONAL)

This specification provides reasonable assurance that releases from drywell pruging operations will not exceed the annual dose limits of 10 CFR Part 20 for unrestricted areas.

~~RADIOACTIVE EFFLUENTS~~

~~3/4.11.3~~ SOLID RADIOACTIVE WASTE

LIMITING CONDITION FOR OPERATION

3.16
~~3.11.3~~ The solid radwaste system shall be OPERABLE and used, as applicable in accordance with a PROCESS CONTROL PROGRAM, for the SOLIDIFICATION and packaging of radioactive wastes to ensure meeting the requirements of 10 CFR Part 20 and of 10 CFR Part 71 prior to shipment of radioactive wastes from the site.

APPLICABILITY: At all times.

ACTION:

a. With the packaging requirements of 10 CFR Part 20 and/or 10 CFR Part 71 not satisfied, suspend shipments of defectively packaged solid radioactive wastes from the site.

b. With the solid radwaste system inoperable for more than 31 days, in lieu of any other report required by Specification 6.9.1, prepare and submit to the Commission within 30 days pursuant to Specification 6.9.2 a Special Report which includes the following information:

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

2. Action(s) taken to restore the inoperable equipment to OPERABLE status,

3. A description of the alternative used for SOLIDIFICATION and packaging of radioactive wastes, and

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

c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.16.1
~~4.11.3.1~~ The solid radwaste system shall be demonstrated OPERABLE at least once per 92 days by:

a. Operating the solid radwaste system at least once in the previous 92 days in accordance with the PROCESS CONTROL PROGRAM, or

b. Verification of the existence of a valid contract for SOLIDIFICATION to be performed by a contractor in accordance with a PROCESS CONTROL PROGRAM.

SURVEILLANCE REQUIREMENTS (Continued)

4.16.2

~~4.11.3.2~~ THE PROCESS CONTROL PROGRAM shall be used to verify the SOLIDIFICATION of at least one representative test specimen from at least every tenth batch of each type of wet radioactive waste (e.g., filter sludges, spent resins, evaporator bottoms, and sodium sulfate solutions).

a. If any test specimen fails to verify SOLIDIFICATION, the SOLIDIFICATION of the batch under test shall be suspended until such time as additional test specimens can be obtained, alternative SOLIDIFICATION parameters can be determined in accordance with the PROCESS CONTROL PROGRAM, and a subsequent test verifies SOLIDIFICATION. SOLIDIFCATION of the batch may then be resumed using the alternative SOLIDIFICATION parameters determined by the PROCESS CONTROL PROGRAM.

b. If the initial test specimen from a batch of waste fails to verify SOLIDIFICATION, the PROCESS CONTROL PROGRAM shall provide for the collection and testing of representative test specimens from each consecutive batch of the same type of wet waste until at least 3 consecutive initial test specimens demonstrate SOLIDIFCATION. The PROCESS CONTROL PROGRAM shall be modified as required, as provided in Specification 6.14, to assure SOLIDIFICATION of subsequent batches of waste.

3/4.3.16

[redacted] SOLID RADIOACTIVE WASTE

The OPERABILITY of the solid radwaste system ensures that the system will be available for use whenever solid radwastes require processing and packaging prior to being shipped offsite. This specification implements the requirements of 10 CFR Part 50.36a and General Design Criterion 60 of Appendix A to 10 CFR Part 50. The process parameters included in establishing the PROCESS CONTROL PROGRAM may include, but are not limited to waste type, waste pH, waste/liquid/solidification agent/catalyst ratios, waste oil content, waste principal chemical constituents, mixing and curing times.

RADIOACTIVE EFFLUENTS — June Rev

~~3/4.11.4~~ TOTAL DOSE

LIMITING CONDITION FOR OPERATION

3.17

~~3.11.4~~ The dose or dose commitment to any real individual from uranium fuel cycle sources shall be limited to less than or equal to 25 mrem to the total body or any organ (except the thyroid, which shall be limited to less than or equal to 75 mrem) over 12 consecutive months.

APPLICABILITY: At all times.

ACTION: 3.14.3a, 3.14.3b, 3.15.3a, 3.15.3.b, 3.15.4a or 3.15.4.b

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~~, ~~3.11.2.3.a~~, ~~3.11.2.3.b~~, ~~3.11.2.3.a~~, ~~or 3.11.2.3.b~~, in lieu of any other report required by Specification 6.9.1, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2 and limit the subsequent releases such that the dose or dose commitment to any real individual from uranium fuel cycle sources is limited to less than or equal to 25 mrem to the total body or any organ (except thyroid, which is limited to less than or equal to 75 mrem) over 12 consecutive months. This Special Report shall include an analysis which demonstrates that radiation exposures to any real individual from uranium fuel cycle sources (including all effluent pathways and direct radiation) are less than the 40 CFR Part 190 Standard. Otherwise, obtain a variance from the Commission to permit releases which exceed the 40 CFR Part 190 Standard.

b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.17

~~4.11.4~~ Dose Calculations Cumulative dose contributions from liquid and 4.14.3 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 ODCM.

4.15.3 4.15.4

3/4.3.17

~~3/4.11.1~~ TOTAL DOSE

This specification is provided to meet the dose limitations of 40 CFR 190. 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 reactors, it is highly unlikely that the resultant dose to a real individual will exceed 40 CFR 190 if the individual reactors remain within the reporting requirement level. The Special Report will describe a course of action which should result in the limitation of dose to a real individual for 12 consecutive months to within the 40 CFR 190 limits. For the purposes of the Special Report, it may be assumed that the dose commitment to the real individual from other uranium fuel cycle sources is negligible, with the exception that dose contributions from other nuclear fuel cycle facilities at the same site or within a radius of 5 miles must be considered.

5.0 DESIGN FEATURES

SITE

EXCLUSION AREA

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

LOW POPULATION ZONE

The low population zone shall be as shown in Figure 5.1.2-1.

SITE BOUNDARY FOR GASEOUS EFFLUENTS

The site boundary for gaseous effluents shall be as shown in Figure 5.1.3-1.

SITE BOUNDARY FOR LIQUID EFFLUENTS

The site boundary for liquid effluents shall be as shown in Figure 5.1.4-1.

CONTAINMENT

CONFIGURATION

The primary containment is a steel lined presetressed concrete structure consisting of a drywell and suppression chamber. The drywell is in the form of a truncated cone on top of a cylindrical suppression chamber attached to the suppression chamber through a series of downcomer vents. The primary containment has a minimum free air volume of (273,000) cubic feet.

DESIGN TEMPERATURE AND PRESSURE

The primary containment is designed and shall be maintained for:

a. Maximum internal pressure (45 psig).

b. Maximum internal temperature: drywell (340)°F.
suppression chamber (275)°F.

c. Maximum external pressure (2) psig.

e. Maximum floor differential pressure: (25) psid, downward.
(9) psid, upward.

This figure shall consist of a map of the site area and provide, at a minimum, the information described in Section (2.1.2) of the FSAR and meteorological tower location.

EXCLUSION AREA

FIGURE 5.1.1-1

This figure shall consist of a map of the site area showing the Low Population Zone boundary. Features such as towns, roads and recreational areas shall be indicated in sufficient detail to allow identification of significant shifts in population distribution within the LPZ.

LOW POPULATION ZONE

FIGURE 5.1.2 -1

This figure shall consist of a map of the site area showing the perimeter of the site and locating the points where gaseous effluents are released. If on-site land areas subject to radioactive materials in gaseous waste are utilized by the public for recreational or other purposes, then these areas shall be identified by occupancy factors and the licensee's method of occupancy control. The figure shall be sufficiently detailed to allow identification of structures and release point elevations, and areas within the site boundary that are accessible by members of the general public. See NUREG-0133 for additional guidance.

SITE BOUDARY FOR GASEOUS EFFLUENTS

FIGURE 5.1.3-1

This figure shall consist of a map of the site area showing the perimeter of the site and locating the points where liquid effluent leaves the site. If on-site water areas containing radioactive wastes are utilized by the public for recreational or other purposes, the points of release to these water areas shall be identified. The figure shall be sufficiently detailed to allow identification of structures near the release points and areas within the site boundary where ground and surface water is accessible by members of the general public. See NUREG-0133 for additional guidance.

SITE BOUNDARY FOR LIQUID EFFLUENTS

FIGURE 5.1.4-1

OPERATIONS COMMITTEE (OC)

6.5.1 ~~UNIT REVIEW GROUP (URG)~~

RESPONSIBILITIES

6.5.1.6 The ~~URG~~ OC shall be responsible for:

k. Review of every unplanned onsite release of radioactive material to the environs including the preparation and forwarding of reports covering evaluation, recommendations and disposition of the corrective action to prevent recurrence to the ~~(Superintendent of Power Plants)~~ and to the (~~Company Nuclear Review and Audit Group~~).

l. Review of changes to the PROCESS CONTROL PROGRAM, OFFSITE DOSE CALCULATION MANUAL, and radwaste treatment systems.

SAFETY COMMITTEE (SC)

6.5.2 ~~COMPANY NUCLEAR REVIEW AND AUDIT GROUP (CNRAG)~~

AUDITS

6.5.2.8 Audits of unit activities shall be performed under the cognizance of the ~~(CNRAG)~~ SC. These audits shall encompass:

l. The radiological environmental monitoring program and the results thereof at least once per 12 months.

m. The OFFSITE DOSE CALCULATION MANUAL and implementing procedures at least once per 24 months.

n. The PROCESS CONTROL PROGRAM and implementing procedures for solidification of radioactive wastes at least once per 24 months.

o. The performance of activities required by the Quality Assurance Program to meet the criteria of Regulatory Guide 4.15, December 1977 at least once per 12 months.

6.8 PROCEDURES

6.8.1 Written procedures shall be established, implemented and maintained covering the activities referenced below:

g. PROCESS CONTROL PROGRAM implementation.

h. OFFSITE DOSE CALCULATION MANUAL implementation.

i. Quality Assurance Program for effluent and environmental monitoring, using the guidance in Regulatory Guide 4.15, December 1977.

ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT[3/]

6.9.1.6 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. The initial report shall be submitted prior to May 1 of the year following initial criticality.

6.9.1.7 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 preoperational studies, 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 land use censuses required by Specification 3.12.2. If harmful effects or evidence of irreversible damage are detected by the monitoring, the report shall provide an analysis of the problem and a planned course of action to alleviate the problem.

The annual radiological environmental operating reports shall include summarized and tabulated results in the format of Regulatory Guide 4.8, December 1975 of all radiological environmental samples taken during the report period. 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.

The reports shall also include the following: a summary description of the radiological environmental monitoring program; a map of all sampling locations keyed to a table giving distances and directions from one reactor; and the results of licensee participation in the Interlaboratory Comparison Program, required by Specification 3.12.3.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT[3/]

6.9.1.8 Routine radioactive effluent release reports covering the operation of the unit during the previous 6 months of operation shall be submitted within 60 days after January 1 and July 1 of each year. The period of the first report shall begin with the data of initial criticality.

3/ A single submittal may be made for a multiple unit station. The submittal should combine those sections that are common to all units at the station; however, for units with separate radwaste systems, the submittal shall specify the releases of radioactive material from each unit.

6.9.1.9 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, "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," Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof.

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 of wind speed, wind direction, atmospheric stability, and precipitation (if measured) on magnetic tape, 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 or station during the previous calendar year. This same report shall also include an assessment of the radiation doses from radioactive liquid and gaseous effluents to individuals due to their activities inside the site boundary (Figures 5.1-3 and 5.1-4) during the report period. All assumptions used in making these assessments (i.e., specific activity, exposure time and location) shall be included in these reports. 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. 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 individual from reactor releases and other nearby uranium fuel cycle sources (including doses from primary effluent pathways and direct radiation) for the previous 12 consecutive months to show conformance with 40 CFR 190, Environmental Radiation Protection Standards for Nuclear Power Operation. Acceptable methods for calculating the dose contribution from liquid and gaseous effluents are given in Regulatory Guide 1.109, Rev. 1.

The radioactive effluent release reports shall include the following information for each type of solid waste 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. Type of waste (e.g., spent resin, compacted dry waste, evaporator bottoms),

e. Type of container (e.g., LSA, Type A, Type B, Large Quantity), and

f. Solidification agent (e.g., cement, urea formaldehyde).

The radioactive effluent release reports shall include unplanned releases from the site to unrestricted areas of radioactive materials in gaseous and liquid effluents on a quarterly basis.

The radioactive effluent release reports shall include any changes to the PROCESS CONTROL PROGRAM (PCP) made during the reporting period.

MONTHLY REACTOR OPERATING REPORT

6.9.1.10 Routine reports of operating statistics and shutdown experience shall be submitted on a monthly basis to the Director, Office of Management and Program Analysis, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, with a copy to the Regional Office of Inspection and Enforcement, no later than the 15th of each month following the calendar month covered by the report.

Any changes to the OFFSITE DOSE CALCULATION MANUAL shall be submitted with the Monthly Operating Report within 90 days in which the change(s) was made effective. In addition, a report of any major changes to the radioactive waste treatment systems shall be submitted with the Monthly Operating Report for the period in which the evaluation was reviewed and accepted by the (Unit Review Group).

PROMPT NOTIFICATION WITH WRITTEN FOLLOWUP

6.9.1.12

j. Offsite releases of radioactive materials in liquid and gaseous effluents which exceed the limits of Specification 3.11.1.1 or 3.11.2.1.

k. Exceeding the limits in Specification 3.11.1.4 or 3.11.2.6 for the storage of radioactive materials in the listed tanks. The written follow-up report shall include a schedule and a description of activities planned and/or taken to reduce the contents to within the specified limits.

THIRTY DAY WRITTEN REPORTS

6.9.1.13

e. An unplanned offsite release of 1) more than 1 curie of radioactive material in liquid effluents, 2) more than 150 curies of noble gas in gaseous effluents, or 3) more than 0.05 curies of radioiodine in gaseous effluents. The report of an unplanned offsite release of radioactive material shall include the following information:

1. A description of the event and equipment involved.

2. Cause(s) for the unplanned release.

3. Actions taken to prevent recurrence.

4. Consequences of the unplanned release.

f. Measured levels of radioactivity in an environmental sampling medium determined to exceed the reporting level values of Table 3.12-2 when averaged over any calendar quarter sampling period.

6.10 RECORD RETENTION

6.10.2

1. Records of analyses required by the radiological environmental monitoring program.

6.13 PROCESS CONTROL PROGRAM (PCP)

6.13.1 The PCP shall be approved by the Commission prior to implementation.

6.13.2 Licensee initiated changes to the PCP:

1. Shall be submitted to the Commission in the semi-annual Radioactive Effluent Release Report for the period in which the change(s) was made. This submittal shall contain:

   a. Sufficiently detailed information to totally 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 the [redacted] OC.

2. Shall become effective upon review and acceptance by the [redacted]. OC.

6.14 OFFSITE DOSE CALCULATION MANUAL (ODCM)

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

6.14.2 Licensee initiated changes to the ODCM:

1. Shall be submitted to the Commission in the Monthly Operating Report within 90 days of the date the change(s) was made effective. This submittal shall contain:

   a. Sufficiently detailed information to totally 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 the [redacted]. OC.

2. Shall become effective upon review and acceptance by the [redacted]. OC.

6.15 MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS (Liquid, Gaseous and solid)

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

1. Shall be reported to the Commission in the Monthly Operating Report for the period in which the evaluation was reviewed by the ~~(the Review Group)~~ OC. 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 50.59;

   b. Sufficient detailed information to totally 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;

   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 individual in the unrestricted area 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 the ~~(URG)~~ OC.

2. Shall become effective upon review and acceptance by the ~~(URG)~~ OC.