

EFFLUENT TECHNICAL SPECIFICATIONS  
INDIANA & MICHIGAN POWER COMPANY  
DONALD C. COOK NUCLEAR PLANT UNIT NOS. 1 & 2  
BRIDGMAN, MICHIGAN

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The attached Effluent Technical Specification for the Donald C. Cook Nuclear Plant is based on existing Unit 1 Appendix A Paragraphs. For Unit 2 Technical Specifications, use the following cross-reference list.

Unit 1  
Technical Specification  
Number

Corresponding Unit 2  
Technical Specification  
Number

3/4.3.3.8	3/4.3.3.9
Table 3.3-11	Table 3.3-12
Table 4.3-11	Table 4.3-12
3/4.3.3.9	3/4.3.3.10
Table 3.3-12	Table 4.3-13
Table 4.3-12	Table 4.3-13
Bases 3/4.3.3.8	Bases 3/4.3.3.9
Bases 3/4.3.3.9	Bases 3/4.3.3.10

## 1.0 DEFINITIONS

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### CHANNEL CALIBRATION

1.9 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

1.10 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

1.11 A CHANNEL FUNCTIONAL TESTS 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.

### SOURCE CHECK

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

## 1.0 DEFINITIONS (Continued)

### OFFSITE DOSE CALCULATION MANUAL (ODCM)

1.28 An OFFSITE DOSE CALCULATION MANUAL (ODCM) shall be a manual containing the methodology and parameters to be used in the calculation of off-site doses due to radioactive gaseous and liquid effluents and in the calculation of gaseous and liquid effluent monitoring instrumentation alarm/trip setpoints. Requirements of the ODCM are provided in Specification 6.15.

### GASEOUS RADWASTE TREATMENT SYSTEM

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

### VENTILATION EXHAUST TREATMENT SYSTEM

1.30 A VENTILATION EXHAUST TREATMENT SYSTEM is any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal absorbers 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.

TABLE 1.2  
FREQUENCY NOTATION

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

## INSTRUMENTATION

### RADIOACTIVE LIQUID EFFLUENT INSTRUMENTATION

#### LIMITING CONDITION FOR OPERATION

3.3.3.8 The radioactive liquid effluent monitoring instrumentation channels shown in Table 3.3-11 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.11.1.1 are not exceeded.

APPLICABILITY: As shown in Table 3.3-11.

#### ACTION:

- a. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than a value which will ensure that the limits of 3.11.1.1 are met, immediately suspend the release of radioactive liquid effluents monitored by the affected channel or declare the channels inoperable.
- b. With one or more radioactive liquid effluent monitoring instrumentation channels inoperable, take the applicable ACTION shown in Table 3.3-11.
- c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

#### SURVEILLANCE REQUIREMENTS

4.3.3.8.1 The setpoints shall be determined in accordance with methodology as described in the ODCM and shall be recorded in the Technical Data Book.

4.3.3.8.2 Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST operations during the MODES and at the frequencies shown in Table 4.3-11.

4.3.3.8.3 Records - Auditable records shall be maintained, in accordance with methodology in the ODCM, of all radioactive liquid effluent monitoring instrumentation alarm/trip setpoints. Setpoints and setpoint calculations shall be available for review to ensure that the limits of Specification 3.11.1.1 are met.

TABLE 3.3-11

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>ACTION</u>
1. Gross Radioactivity Monitors Providing Automatic Termination of Release			
a. Liquid Radwaste Effluent Line	(1)	At times of release	23
b. Steam Generator Blowdown Line	(1)	At times of release	24
c. Steam Gen. Blowdown Trt. Effluent	(1)	During primary to secondary leakage	24
2. Gross Radioactivity Monitors Not Providing Automatic Termination of Release			
a. Service Water System Effluent Line	(1)	At all times	25
3. Flow Rate Measurement Devices*			
a. Liquid Radwaste Effluent Line	(1)	At times of release	26
b. Discharge Pipes*	(1)	At all times	NA
c. Steam Generator Blowdown Trt. Effluent	(1)	During primary to secondary leakage	26

\* Pump curves, and valve settings may be utilized to estimate flow; in such cases, action statement 26 is not required.



TABLE 3.3-1 (continued)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>ACTION</u>
4. Continuous Composite Samplers			
a. Turbine Building Sumps Effluent Line	(1)	At all times	25



TABLE 3.3-11  
(Continued)

TABLE NOTATION

ACTION 23 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may be resumed for up to 14 days, provided that prior to initiating a release:

1. At least two independent samples are analyzed in accordance with Specification 4.11.1.1.3, and;
2. At least two technically qualified members of the Facility Staff independently verify the discharge valving.

Otherwise, suspend release of radioactive effluents via this pathway.

ACTION 24 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 14 days provided grab samples are analyzed for gross radioactivity (beta or gamma) at a limit of detection of at least  $10^{-7}$   $\mu\text{Ci}/\text{gram}$ ;

1. At least once per 8 hours when the specific activity of the secondary coolant is  $>0.01$   $\mu\text{Ci}/\text{gram}$  DOSE EQUIVALENT I-131.
2. At least once per 24 hours when the specific activity of the secondary coolant is  $\leq 0.01$   $\mu\text{Ci}/\text{gram}$  DOSE EQUIVALENT I-131.

ACTION 25 With the numbers of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 14 days provided that at least once per 8 hours grab samples are collected and analyzed for gross radioactivity (beta or gamma) at a lower limit of detection of at least  $10^{-7}$   $\mu\text{Ci}/\text{ml}$ .

ACTION 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 14 days provided the flow rate is estimated at least once per 4 hours during actual releases.

TABLE 4.3-11

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>
1. Gross Beta or Gamma Radioactivity Monitors Providing Alarm and Automatic Isolation.				
a. Liquid Radwaste Effluents Line	D*	P	R	Q(1)
b. Steam Generator Blowdown Effluent Line	D*	M	R	Q(1)
c. Steam Generator Blowdown Trt. Effluent	D*	M	R	Q (1)
2. Gross Beta or Gamma Radioactivity Monitors Providing Alarm But Not Providing Automatic Isolation (3)				
a. Service Water System Effluent Line	D*	M	R	Q(2)
3. Continuous Composite Samplers				
a. Turbine Building Sumps Effluent Line	D*	N/A	R	Q

\* During releases via this pathway.

TABLE 4.3-1 (Continued)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>
4. Flow Rate Monitors				
a. Liquid Radwaste Effluent	D <sup>(4)</sup>	N.A.	R	Q
b. Steam Generator Blowdown Treatment Line	D <sup>(4)</sup>	N.A.	R	Q

TABLE 4.3-11  
(Continued)

TABLE NOTATION

- (1) The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occurs if the following condition exists:
  1. Instrument indicates measured levels above the alarm/trip setpoint.
- (2) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if the following condition exists:
  1. Instrument indicates measured levels above the alarm/trip setpoint.
- (3) This requirement is applicable only to systems where the service water system or component cooling water system is discharged to an effluent stream.
- (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.

## INSTRUMENTATION

### RADIOACTIVE GASEOUS PROCESS AND EFFLUENT MONITORING INSTRUMENTATION

#### LIMITING CONDITION FOR OPERATION

3.3.3.9 The radioactive gaseous process and effluent monitoring instrumentation channels shown in Table 3.3-12 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Specification 3.11.2.1 are not exceeded.

APPLICABILITY: As shown in Table 3.3-12.

#### ACTION:

- a. With a radioactive gaseous process or effluent monitoring instrumentation channel alarm/trip setpoint less conservative than a value which will ensure that the limits of 3.11.2.1 are met, declare the channel inoperable.
- b. With one or more radioactive gaseous process or effluent monitoring instrumentation channels inoperable, take the applicable ACTION shown in Table 3.3-12.
- c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

#### SURVEILLANCE REQUIREMENTS

4.3.3.9.1 The setpoints shall be determined in accordance with methodology as described in the ODCM and shall be recorded in the Technical Data Book.

4.3.3.9.2 Each radioactive gaseous process or effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, AND CHANNEL FUNCTIONAL TEST operations during the MODES and at the frequencies shown in Table 4.3-12.

4.3.3.9.3 Auditable records shall be maintained of the calculations made, in accordance with methodology in the ODCM, of all radioactive process and effluent monitoring instrumentation alarm/trip setpoints. Setpoints and setpoint calculations shall be available for review to ensure that the limits of Specification 3.11.2.1 are met.

TABLE 3.3-12

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>PARAMETER</u>	<u>ACTION</u>
1. Waste Gas Holdup System Explosive Gas Monitoring System.				
a. Hydrogen Monitor	(1)	**	% Hydrogen	31
b. Oxygen Monitor	(2)	**	% Oxygen	29
2. Condenser Evacuation System				
a. Noble Gas Activity	(1)	*	Radioactivity Rate Measurement	28
b. Effluent System Flow Rate Measuring Device	(1)	*	System Flow Rate Measurement	27
3. Auxiliary Building Ventilation System				
a. Noble Gas Activity Monitor	(1)	*	Radioactivity Rate Measurement	28
b. Iodine Sampler Cartridge	(1)	*	Verify presence of cartridge	30
c. Particulate Sampler Filter	(1)	*	Verify presence of filter	30
d. Effluent System Flow Rate Measuring Device	(1)	*	System Flow Rate Measurement	27
e. Sampler Flow Rate Measuring Device	(1)	*	Sampler Flow Rate Measurement	27

\* During release via this pathway

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



TABLE 3.3-12  
(Continued)

TABLE NOTATION

- ACTION 27 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, for more than 28 days with the flow rate being estimated at least every 4 hours, prepare a Special Report to the Commission pursuant to Specification 6.9.2. within the next 10 days outlining the cause of the malfunction and plans for restoring the channel to OPERABLE status.
- ACTION 28 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement for more than 28 days with grab samples being taken at least once per 8 hours and analyzed for gross activity within 24 hours, prepare a Special Report to the Commission pursuant to Specification 6.9.2 within the next 10 days outlining the cause of the malfunction and plans for restoring the channel to OPERABLE status.
- ACTION 29 With the number of channels OPERABLE one less than required by the Minimum Channels OPERABLE requirement for more than 14 days, prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2. With both channels INOPERABLE for more than 14 days prepare and submit a Special Report to the Commission pursuant to Specification 6.9.2, within the next 10 days outlining the cause of the malfunction and the plans for restoring the channel(s) to operable status.
- ACTION 30 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement for more than 28 days with samples being collected for periods on the order of seven (7) days and analyzed within 48 hours of the end of sample collection, prepare a Special Report to the Commission pursuant to Specification 6.9.2, within the next 10 days outlining the cause of the malfunction and the plans for restoring the channels to OPERABLE status.
- ACTION 31 With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement for more than 14 days with grab samples being taken and analyzed every 12 hours, prepare a Special Report to the Commission pursuant to Specification 6.9.2 within the next 10 days outlining the cause of the malfunction and plans for restoring the channel to OPERABLE status.

TABLE 4.3.12

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>INSTRUMENT</u>	<u>CHANNEL CHECK</u>	<u>SOURCE CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>
1. Waste Gas Holdup System Explosive Gas Monitoring System				
a. Hydrogen Monitor	D**	N.A.	Q (3)	M
b. Oxygen Monitor	D**	N.A.	Q (3)	M
c. Oxygen Monitor (alternate)	D**	N.A.	Q (3)	M
2. Condenser Evacuation System				
a. Noble Gas Activity Monitor	D *	M	R	Q(2)
b. System Effluent Flow Rate	D *	N.A.	R	Q
3. Auxiliary Building Ventilation System				
a. Noble Gas Activity Monitor	D *	M	R	Q(1)
b. Iodine Sampler	D *	N.A.	N.A.	N.A.
c. Particulate Sampler	D *	N.A.	N.A.	N.A.
d. System Effluent Flow Rate Measurement Device	D *	N.A.	R	Q
e. Sampler Flow Rate Measurement Device	D *	N.A.	R	Q

\* During releases via this pathway

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



TABLE 4.3.12

TABLE NOTATION

- (1) The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occurs if the following condition exist:
  1. Instrument indicates measured levels above the alarm/trip setpoint.
- (2) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if the following condition exists:
  1. Instrument indicates measured levels above the alarm/trip setpoint.
- (3) The CHANNEL CALIBRATION shall include the use of standard gas samples containing: Anominal
  1. High purity nitrogen (zero gas)
  2. 2% oxygen, 80% hydrogen and the balance nitrogen (span gas)
  3. Air-(span gas)

### 3/4.11 RADIOACTIVE EFFLUENTS

#### 3/4.11.1 LIQUID EFFLUENTS

##### CONCENTRATION

##### LIMITING CONDITION FOR OPERATION

3.11.1.1 The concentration of radioactive material released at anytime from the site to unrestricted areas (see Figure 3.11-1) 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  $2 \times 10^{-4}$   $\mu\text{Ci/ml}$  total activity.

APPLICABILITY: At all times

##### ACTION:

With the concentration of radioactive material released from the site to unrestricted areas exceeding the above limits, immediately restore concentration within the above limits and provide prompt notification to the Commission pursuant to Specification 6.9.1.12.

##### SURVEILLANCE REQUIREMENTS

4.11.1.1.1 The concentration of radioactive material at any time in liquid effluents released from the site shall be continuously monitored in accordance with Table 3.3-11.

4.11.1.1.2 The liquid effluent continuous monitors having provisions for automatic termination of liquid releases, as listed in Table 3.3-11, shall be used to limit the concentration of radioactive material released at any time from the site to unrestricted areas to the values given in Specification 3.11.1.1.

4.11.1.1.3 The radioactivity content of each batch of radioactive liquid waste to be discharged 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 limited to the values in Specification 3.11.1.1.

4.11.1.1.4 Release analyses of samples from batch release shall be performed in accordance with Table 4.11-1. The results of the post-release analyses shall be used with the calculational methods in the ODCM to assure that the concentrations at the point of release are limited to the values in Specification 3.11.1.1.

## SURVEILLANCE REQUIREMENTS (Continued)

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4.11.1.1.5 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 limited to the values in Specification 3.11.1.1.

4.11.1.1.6 Reports. The semiannual Radioactive Effluent Release Report shall include the information specified in Specification 6.9.1.9.

TABLE 4.11-1

## RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

Liquid Release Type	Sampling	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) ( $\mu\text{Ci/ml}$ ) <sup>a</sup>
A. Batch Waste <sup>d</sup> Release Tanks	P Each Batch	P Each Batch	Principal Gamma Emitters <sup>f</sup>	$5 \times 10^{-7}$ <sup>b</sup>
			I-131	$1 \times 10^{-6}$
	P One Batch/M	M	Dissolved and Entrained Gases	$1 \times 10^{-5}$
	P Each Batch	M Composite <sup>c</sup>	H-3	$1 \times 10^{-5}$
			Gross $\alpha$	$1 \times 10^{-7}$
	P Each Batch	Q Composite <sup>c</sup>	Sr-89, Sr-90	$5 \times 10^{-8}$
B. Plant Continuous Releases <sup>e</sup>	Daily	W Composite <sup>c</sup>	Principal Gamma Emitters <sup>f</sup>	$5 \times 10^{-7}$ <sup>b</sup>
			I-131	$1 \times 10^{-6}$
	M Grab Sample	M	Dissolved and Entrained Gases	$1 \times 10^{-5}$
	Daily	M Composite	H-3	$1 \times 10^{-5}$
			Gross $\alpha$	$1 \times 10^{-5}$
	Daily	Q Composite	Sr-89, Sr-90	$5 \times 10^{-8}$

TABLE 4.11-1(Continued)

TABLE NOTATION

- a. The lower limit of detection (LLD) is defined in Table Notation a. of Table 4.12-1 of Specification 4.12.1.1.
- b. For certain radionuclides with low gamma yield or low energies, or for certain radionuclide mixtures, it may not be possible to measure radionuclides in concentrations near the LLD. Under these circumstances, the LLD may be increased inversely proportionally to the magnitude of the gamma yield (i.e. ,  $5 \times 10^{-7} / I$ , where I is the photon abundance expressed as a decimal fraction), but in no case shall the LLD, as calculated in this manner for specific radionuclide, be greater than 10% of the MPC value specified in 10 CFR 20, Appendix, B, Table II, Column 2.
- c. A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen which is representative of the liquids released.
- d. A batch release is the discharge of liquid wastes of a discrete volume.
- e. A continuous release is the discharge of liquid wastes of a non-discrete volume; e.g., from a volume of system that has an input flow during the continuous release.
- f. The principal gamma emitters for which the LLD specification will apply are exclusively in the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141, and Ce-144. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses should not be reported as being present at the LLD level. When unusual circumstances result in LLD's higher than required, the reasons shall be documented in the semiannual Radioactive Effluent Release Report.



## RADIOACTIVE EFFLUENTS

### DOSE

#### LIMITING CONDITION FOR OPERATION

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3.11.1.2 The dose or dose commitment to an individual from radioactive material in liquid effluents released to unrestricted areas (see Figure 3.11-1) shall be limited:

- a. During any calendar quarter to  $\leq 1.5$  mrem to the total body and to  $\leq 5$  mrem to any organ, and
- b. During any calendar year to  $\leq 3$  mrem to the total body and to  $\leq 10$  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, 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 average 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. (Applicable only if drinking water supply is taken from the receiving water body.)
- b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

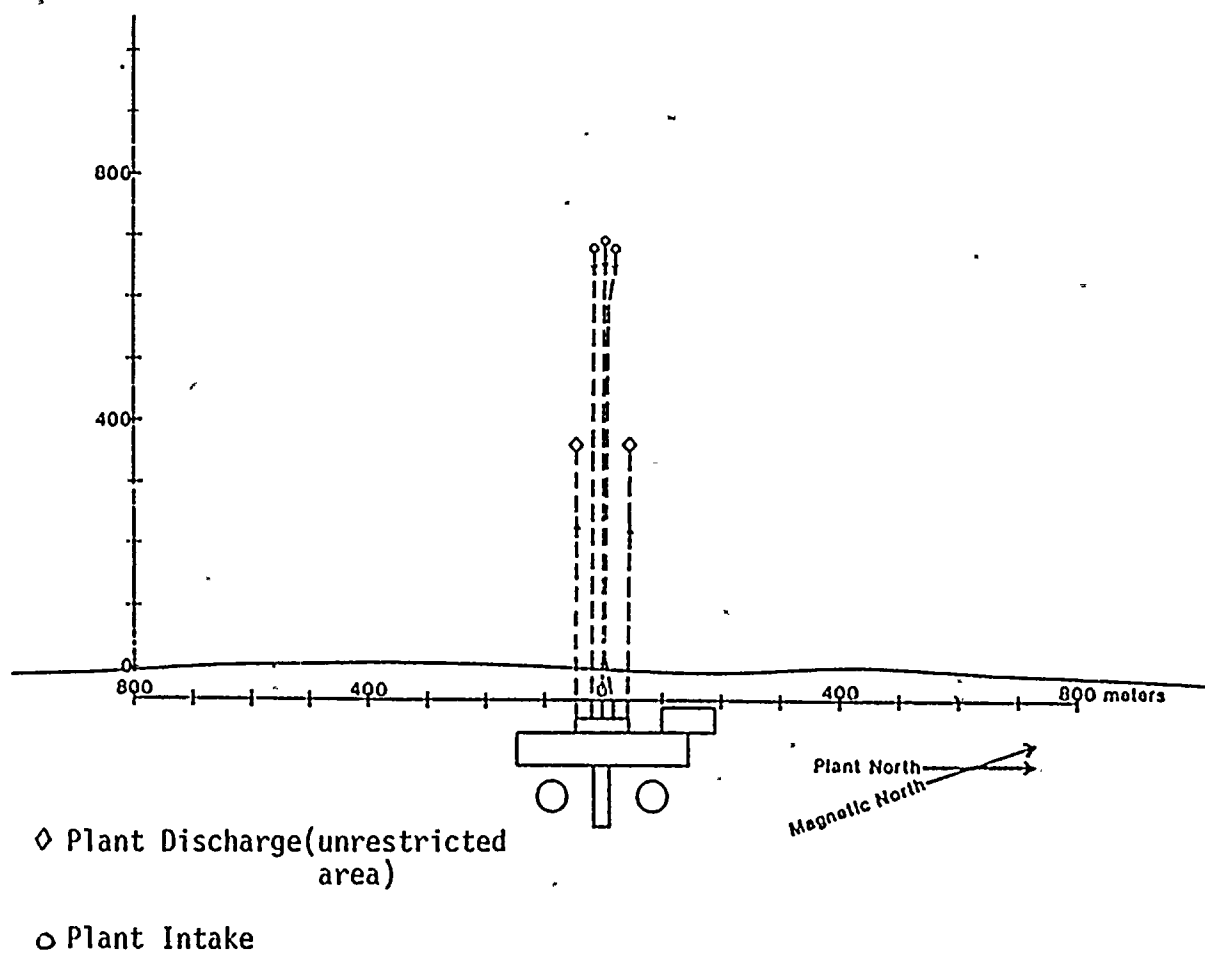
#### SURVEILLANCE REQUIREMENTS

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4.11.1.2.1 Dose Calculations. Cumulative dose contributions from liquid effluents shall be determined in accordance with the Offsite Dose Calculation Manual (ODCM) at least once per 31 days.

4.11.1.2.2. Reports. The semiannual Radioactive Effluent Release Report shall include the information specified in Specification 6.9.1.9.

Figure 3.11-1



## RADIOACTIVE EFFLUENTS

### LIQUID WASTE TREATMENT

#### LIMITING CONDITION FOR OPERATION

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3.11.1.3 The liquid radwaste treatment system shall be OPERABLE. The system shall be used to reduce the radioactive materials in liquid wastes prior to their discharge when the projected dose due to liquid effluent releases to unrestricted areas (see Figure 3.11-1) when averaged over 31 days would exceed 0.25 mrem to the total body or 0.8 mrem to any organ.

APPLICABILITY At all times.

#### ACTION:

- a. With radioactive liquid waste being discharged without treatment and in excess of the above limits, 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 equipment or subsystems not OPERABLE and the reason for inoperability.
  2. Action (s) taken to restore the inoperable equipment to OPERABLE status.
  3. Summary description of action(s) taken to prevent a recurrence.
- b. The provisions of Specification 3.0.3 and 3.0.4 are not applicable:

#### SURVEILLANCE REQUIREMENTS

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4.11.1.3.1 Doses due to liquid release to unrestricted areas shall be projected at least once per 31 days, whenever liquid release are being made without being processed by the liquid radwaste treatment system.

4.11.1.3.2 The liquid radwaste system shall be demonstrated OPERABLE 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

### 3/4.11.2 GASEOUS EFFLUENTS

#### DOSE RATE

#### LIMITING CONDITION FOR OPERATION

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3.11.2.1 The dose rate, at any time, in the unrestricted areas (see Page 3/4 12-6) due to radioactive materials released in gaseous effluents from the site shall be limited to the following values.

- a. The dose rate limit for noble gases shall be  $\leq 500$  mrem/yr to the total body and  $\leq 3000$  mrem/yr to the skin, and
- b. The dose rate limit for all radioiodines and for all radioactive materials in particulate form and radionuclides other than noble gases with half lives greater than 8 days shall be  $\leq 1500$  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 comply with the limit(s) given in Specification 3.11.2.1 and provide prompt notification to the Commission pursuant to Specification 6.9.1.12.

#### SURVEILLANCE REQUIREMENTS

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4.11.2.1.1 The release rate, at any time, of noble gases in gaseous effluents shall be controlled by the offsite dose rate as established above in Specification 3.11.2.1.

4.11.2.1.2 The noble gas effluent continuous monitors having provisions for the automatic termination of gaseous release, as listed in Table 3.3-12, shall be used to limit offsite doses within the values established in Specification 3.11.2.1 when monitor setpoint values are exceeded.

4.11.2.1.3 The release rate of radioactive materials, other than noble gases, in gaseous effluents shall be determined by obtaining representative samples and performing analyses in accordance with the sampling and analysis program, specified in Table 4.11-2.

## SURVEILLANCE REQUIREMENTS

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4.11.2.1.4 The dose rate in unrestricted areas, due to radioactive materials other than noble gases released in gaseous effluents, shall be determined to be within the required limits by using the results of the sampling and analysis program, specified in Table 4.11-2, in performing the calculations of dose rate in unrestricted areas.

4.11.2.1.5 Reports The semiannual Radioactive Effluent Release Report shall include the information specified in Specification 6.9.1.9.

## RADIOACTIVE EFFLUENTS

### DOSE, NOBLE GASES

#### LIMITING CONDITION FOR OPERATION

3.11.2.2 The air dose in unrestricted areas (see Page 3/4 12-6) due to noble gases released in gaseous effluents shall be limited to the following:

- a. During any calendar quarter, to  $\leq 5$  mrad for gamma radiation and  $\leq 10$  mrad for beta radiation;
- b. During any calendar year, to  $\leq 10$  mrad for gamma radiation and  $\leq 20$  mrad for beta radiation.

APPLICABILITY: At all times.

#### ACTION:

- a. With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, 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 average 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

4.11.2.2.1 Dose Calculations Cumulative dose contributions for the total time period shall be determined in accordance with the Offsite Dose Calculation Manual (ODCM) at least once every 31 days.

4.11.2.2.2 Reports The Semiannual Radioactive Effluent Release Report shall include the information specified in Specification 6.9.1.9.

## RADIOACTIVE EFFLUENTS

### DOSE, RADIOIODINES, RADIOACTIVE MATERIAL IN PARTICULATE FORM, AND RADIONUCLIDES OTHER THAN NOBLE GASES

#### LIMITING CONDITION FOR OPERATION

3.11.2.3 The dose to an individual from radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half-lives greater than 8 days in gaseous effluents released to unrestricted areas (see Page 3/14 12-6) shall be limited to the following:

- a. During any calendar quarter to  $\leq 7.5$  mrem to any organ;
- b. During any calendar year to  $\leq 15$  mrem to any organ.

APPLICABILITY: At all times

#### ACTION:

- a. With the calculated dose from the release of radioiodines, radioactive materials in particulate form, or radionuclides other than nobles gases in gaseous effluents exceeding any of the above limits, 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, radioactive materials in particulate form, and radionuclides other than noble 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 average 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

4.11.2.3.1 Dose Calculations Cumulative dose contributions for the total time period shall be determined in accordance with the ODCM at least once every 31 days.

4.11.2.3.2 Reports The semiannual Radioactive Effluent Release Report shall include the information specified in Specification 6.9.1.9.





TABLE 4.11-2

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

Gaseous Release Type	Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) ( $\mu$ Ci/ml) <sup>a</sup>
A. Waste Gas Storage	P Each Tank Grab Sample	P Each Tank	Principal Gamma Emitters <sup>f</sup>	$1 \times 10^{-4b}$
			H-3	$1 \times 10^{-6}$
B. Containment Purge	P Each Purge <sup>c</sup> Grab Sample	P Each Purge <sup>c</sup>	Principal Gamma Emitters <sup>f</sup>	$1 \times 10^{-4b}$
			H-3	$1 \times 10^{-6}$
C. Air Ejector	MC Grab Sample	MC	Principal Gamma Emitters <sup>f</sup>	$1 \times 10^{-4b}$
			H-3	$1 \times 10^{-6}$
D. Auxiliary Building Vent	Continuous <sup>e</sup>	W <sup>d</sup> Charcoal Sample	I-131	$1 \times 10^{-12}$
			I-133	$1 \times 10^{-10}$
	Continuous <sup>e</sup>	W <sup>d</sup> Particulate Sample	Principal Gamma Emitters <sup>f</sup> (I-131, Others)	$1 \times 10^{-11}$
	Continuous <sup>e</sup>	M Composite Particulate Sample	Gross alpha	$1 \times 10^{-11}$
	Continuous <sup>e</sup>	Q Composite Particulate Sample	Sr-89, Sr-90	$1 \times 10^{-11}$

TABLE 4.11-2 (Continued)

TABLE NOTATION

- a. The lower limit of detection (LLD) is defined in Table Notation a. of Table 4.12-1 of Specification 4.12.1.1.
- b. For certain radionuclides with low gamma yield or low energies, or for certain radionuclide mixtures, it may not be possible to measure radionuclides in concentrations near the LLD. Under these circumstances, the LLD may be increased inversely proportionally to the magnitude of the gamma yield (i.e.,  $1 \times 10^{-4} / I$ , where  $I$  is the photon abundance expressed as a decimal fraction), but in no case shall the LLD, as calculated in this manner for specific radionuclide, be greater than 10% of the MPC value specified in 10 CFR 20, Appendix B, Table II, Column 1.
- c. Analyses shall also be performed following shutdown, startup, or similar operational occurrence which has altered the mixture of radionuclides as indicated by RCS analysis.
- d. Analyses shall also be performed at least once per 24 hours for 7 days following each shutdown, startup or similar operational occurrence which lead to significant increases or decreases in radioiodine in the Reactor Coolant System. Samplers shall also be changed and analyzed at the intervals in Specifications 3.11.2.1 and 2.11.2.3. When samples collected for 24 hours are analyzed, the corresponding LLD's may be increased by a factor of 10.
- e. The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Specifications 3.11.2.1, 3.11.3.3 and 3.11.3.3.
- f. The principal gamma emitters for which the LLD specification will apply are exclusively the following radionuclides: KR-87, KR-88, Xe-133, Xe-133m, Xe-135, and Xe-138 for gaseous emissions and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD for the analyses should not be reported as being present at the LLD level for that nuclide. When unusual circumstances result in LLD's higher than required, the reasons shall be documented in the semi-annual effluent report.

## RADIOACTIVE EFFLUENTS

### GASEOUS RADWASTE TREATMENT

#### LIMITING CONDITION FOR OPERATION

3.11.2.4 The gaseous radwaste treatment system and the ventilation exhaust treatment system shall be OPERABLE. The gaseous radwaste treatment system shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected gaseous effluent air doses due to gaseous effluent releases to unrestricted areas (see Page 3/4 12-6) when averaged over 31 days would exceed 0.8 mrad for gamma radiation and 1.6 mrad for beta radiation and ventilation exhaust treatment system shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected doses due to gaseous effluent releases to unrestricted areas (see Page 3/4 12-6) when averaged over 31 days would exceed 1.25 mrem to any organ.

APPLICABILITY: At all times.

#### ACTION:

- a. With gaseous waste being discharged for more than 31 days without treatment and in excess of the above limits, 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 equipment of subsystems not OPERABLE and the reason for inoperability.
  2. Action(s) taken to restore the inoperable equipment to OPERABLE STATUS.
  3. Summary description of action(s) taken to prevent a recurrence.
- b. The provisions of Specification 3.0.3 and 3.0.4 are not applicable.

#### SURVEILLANCE REQUIREMENTS

4.11.2.4.1 Doses due to gaseous releases to unrestricted areas shall be projected at least once per 31 days, whenever the gaseous waste treatment system or ventilation exhaust treatment system is not in operation.

4.11.2.4.2 The appropriate systems shall be demonstrated OPERABLE 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

### DOSE

#### LIMITING CONDITION FOR OPERATION

3.11.2.5 The dose or dose commitment to a real individual from all uranium fuel cycle sources is limited to  $\leq 25$  mrem to the total body or any organ (except the thyroid, which is limited to  $\leq 75$  mrem) over a period of 12 consecutive months.

APPLICABILITY: At all times

#### ACTION:

- a. With the calculated dose from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Specifications 3.11.1.2.a, 3.11.1.2.b, 3.11.3.3.a, 3.11.2.2.b, 3.11.2.3.a, or 3.11.2.3.b, 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 a real individual from all uranium fuel cycle sources is limited to  $\leq 25$  mrem to the total body or any organ (except thyroid, which is limited to  $\leq 75$  mrem) over 12 consecutive months. This Special Report shall include an analysis which demonstrates that radiation exposures to all real individuals from all 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 exceeds the 40 CFR Part 190 Standard.
- b. The provisions of Specification 3.0.3 and 3.0.4 are not applicable.

#### SURVEILLANCE REQUIREMENTS

4.11.2.5.1 Dose Calculations Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with Specifications 3.11.1.2.a, 3.11.1.2.b, 3.11.2.2.a, 3.11.2.2.b, 3.11.2.3.a, and 3.11.2.3.b, and in accordance with the Offsite Dose Calculation Manual (ODCM).

4.11.2.5.2 Reports Special Reports shall be submitted as required under Specification 3.11.2.5.a.

## RADIOACTIVE EFFLUENTS

EXPLOSIVE GAS MIXTURE (Systems not designed to withstand a hydrogen explosion)

### LIMITING CONDITON FOR OPERATION

3.11.2.6 The concentration of oxygen in the waste gas holdup system shall be limited to  $\leq 2\%$  by volume if the hydrogen in the system is  $\geq 4\%$  by volume.

APPLICABILITY: At all times.

#### ACTION:

- a. With the concentration of oxygen in the waste gas holdup system  $> 2\%$  by volume but  $\leq 4\%$  by volume and containing  $\geq 4\%$  hydrogen, restore the concentration of oxygen to  $\leq 2\%$  or reduce the hydrogen concentration to  $< 4\%$  within 48 hours.
- b. With the concentration of oxygen in the waste gas holdup system or tank  $> 4\%$  by volume and  $> 4\%$  hydrogen by volume immediately suspend all additions of waste gases to the system or tank and reduce the concentration of oxygen to  $\leq 2\%$  or the concentration of hydrogen to  $\leq 4\%$  within 48 hours in the system or tank.
- c. The provisons of Specification 3.0.3 and 3.0.4 are not applicable.

### SURVEILLANCE REQUIREMENTS

4.11.2.6 The concentrations of oxygen in the waste gas holdup system shall be determined to within the above limits by continuously monitoring the waste gases in the waste gas holdup system with the oxygen monitors required OPERABLE by Table 3.3-12 of Specification 3.3.3.9.



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## RADIOACTIVE EFFLUENTS

### GAS STORAGE TANKS

#### LIMITING CONDITION FOR OPERATION

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3.11.2.7 The quantity of radioactivity contained in each gas storage tank shall be limited to  $\leq 438,000$  curies noble gases (considered as Xe-133).

APPLICABILITY: At all times

#### ACTION:

- a. With the quantity of radioactive material in any gas storage tank exceeding the above limit, immediately suspend all additions of radioactive material to the tank and within 48 hours either reduce the tank contents to within the limit or provide prompt notification to the Commission pursuant to Specification 6.9.1.12. The written followup report shall include a description of activities planned and/or taken to reduce the tank contents to within the above limit.
- b. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

#### SURVEILLANCE REQUIREMENTS

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4.11.2.7 The quantity of radioactive material contained in each gas storage tank shall be determined to be within the above limit at least once per 4 days by analysis of the Reactor Coolant System noble gases.

### 3/4.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

#### 3/4.12.1 MONITORING PROGRAM

##### LIMITING CONDITION FOR OPERATION

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

APPLICABILITY: At all times

##### ACTION:

- a. With the radiological environmental monitoring program not being conducted as specified in Table 3.12-1, prepare and submit to the Commission, in the Annual Radiological Operating Report, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence. (Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, or to malfunction of automatic sampling equipment. If the latter, every effort shall be made to complete corrective action prior to the end of the next sampling period.)
- b. With the level of radioactivity in an environmental sampling medium at one or more of the locations specified in Table 3.12-1 exceeding the limits of Table 6.9.2 when averaged over any calendar quarter, prepare and submit to the Commission within 30 days from the end of the affected calendar quarter, a Special Report which includes an evaluation of any release conditions, environmental factors or other aspects which caused the limits of Table 6.9-2 to be exceeded. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report.
- c. With milk or fresh leafy vegetable samples unavailable from any of the sample locations required by Table 3.12-1, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, a Special Report which identifies the cause of the unavailability of samples and identifies locations for obtaining replacement samples. The locations from which samples were unavailable may then be deleted from Table 3.12-1 provided the locations from which the replacement samples were obtained are added to the environmental monitoring program as replacement locations, if available.
- d. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.





## SURVEILLANCE REQUIREMENTS

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4.12.1.1 The radiological environmental monitoring samples shall be collected pursuant to Table 3.12-1 from the locations shown on Figure 3.12-1 and shall be analyzed pursuant to the requirements of Tables 3.12-1 and 4.12-1.

4.12.1.2 Reports The results of analyses performed on the radiological environmental monitoring samples shall be summarized in the Annual Radiological Environmental Operating Report, pursuant to Specification 6.9.1.6.

TABLE 3.12-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

<u>Exposure Pathway and/or Sample</u>	<u>Sample Locations**</u>	<u>Sampling and Collection Frequency</u>	<u>Type and Frequency of Analysis</u>
1. AIRBORNE			
A. Radioiodine and Particulates	A1-A6 NBF, SBN, DOW, COL	Continuous operation of sampler with sample col- lection as required by dust loading but at least once per 7 days.	Radioiodine canister. Analyze at least once per 7 days for I-131  Particulate sampler. Analyze for gross beta radioactivity $\geq 24$ hours following filter change. Perform gamma isotopic analysis on each sample when gross beta activity is > 10 times the mean of control sample. Perform gamma isotopic analysis on com- posite (by location) sample at least once per 92 days.
2. DIRECT RADIATION	A1-A6 NBF, SBN, DOW, COL *	At least once per 92 days	Gamma dose. At least once per 92 days.

\*Direct radiation TLD badges located with each air sampler

\*\* Sample locations are shown on Figure 3.12-1.

TABLE 3.12-1 (continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

<u>Exposure Pathway and/or Sample</u>	<u>Sample Locations**</u>	<u>Sampling and Collection Frequency</u>	<u>Type and Frequency of Analysis</u>
3. WATERBORNE			
a. Surface	L <sub>1</sub> , L <sub>2</sub> , L <sub>3</sub>	Composite * sample collected over a period of $\leq 31$ days.	Gamma isotopic analysis of each composite sample by location. Tritium analy- sis of composite sample at least once per 92 days.
b. Ground	W1-W7	At least once per 92 days	Gamma isotopic and tritium analyses of each sample.
c. Drinking	St. Joseph Lake Township New Buffalo	Composite* sample collected over a period of $\leq 31$ days.	Gross beta and gamma isotopic analysis of each composite sample. Tritium analysis of composite sample at least once per 92 days.
d. Sediment from Shoreline	L <sub>2</sub> , L <sub>3</sub>	2/year	Gamma isotopic analysis of each sample.
4. INGESTION			
a. Milk	Stevensville  Bridgman Galien Dowagiac South Bend	At least once per 15 days when animals are on pasture; at least once per 31 days at other times.	Gamma isotopic and I-131 analysis of each sample.

\* Composite samples shall be collected by collecting an aliquot at intervals not exceeding 24 hours

\*\*Sample Locations are shown on Figure 3.12-1.

TABLE 3.12-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

<u>Exposure Pathway and/or Sample</u>	<u>Sample Locations **</u>	<u>Sampling and Collection Frequency</u>	<u>Type and Frequency of Analysis</u>
4. INGESTION (cont.)			
b. Fish	Plant site Off-Site	2/year	Gamma isotopic analysis on edible portions.
c. Food Products	Plant Site Off-Site (approx. 20 miles)	At time of harvest. One sample of each of the following classes of food products: -1. Grapes	Gamma isotopic analysis on edible portion.
	Plant Site	At time of harvest. One sample of broad leaf vegetation.	Gamma isotopic analysis.

\* At least 5 miles from plant centerline.

\*\* Sample locations are shown on Figure 3.12-1.

Figure 3.12-1A

- A - Air, Precipitation, TLD Stations
- Lake Water Sample Stations
- M - Milk Sample Stations

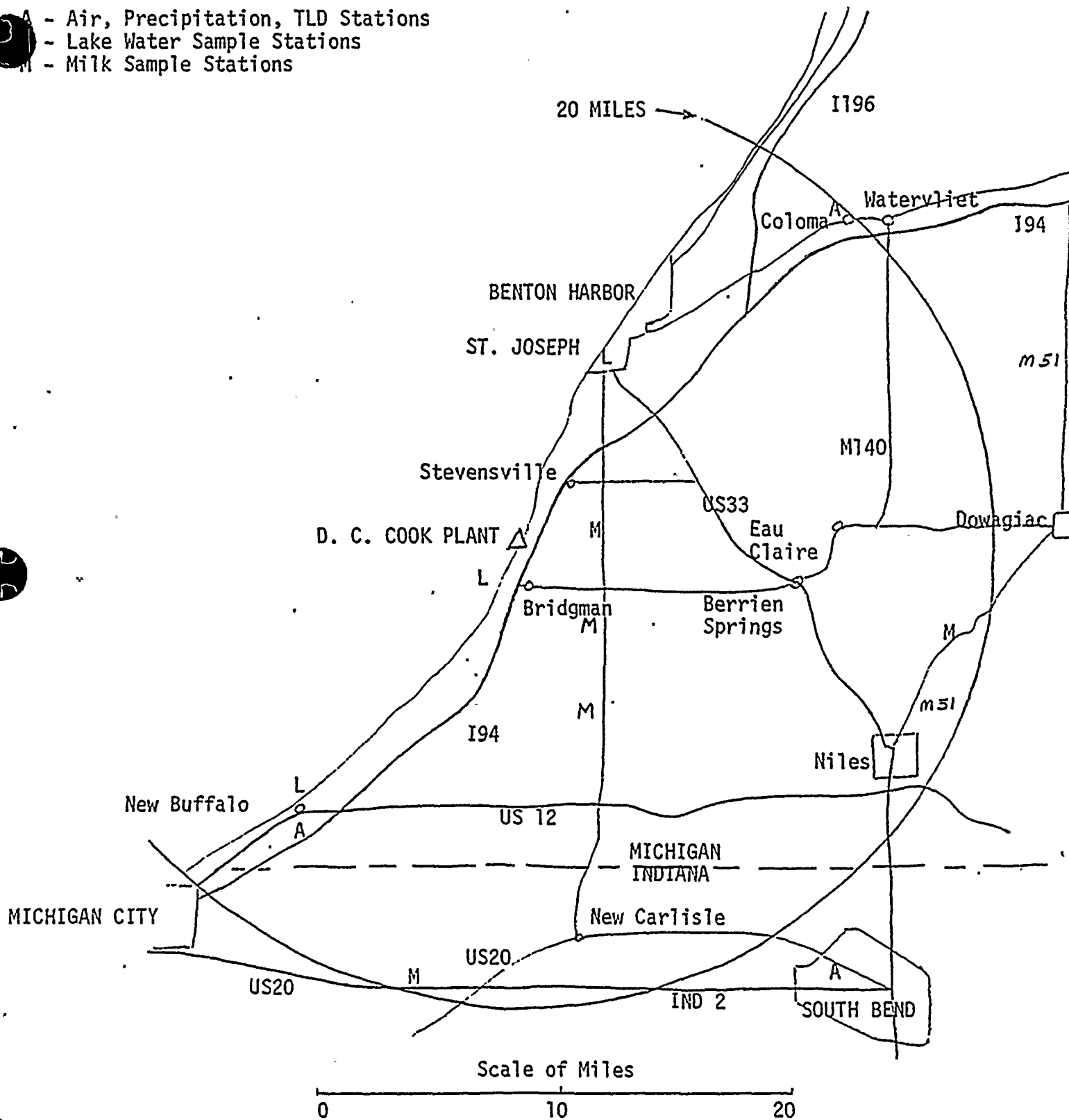
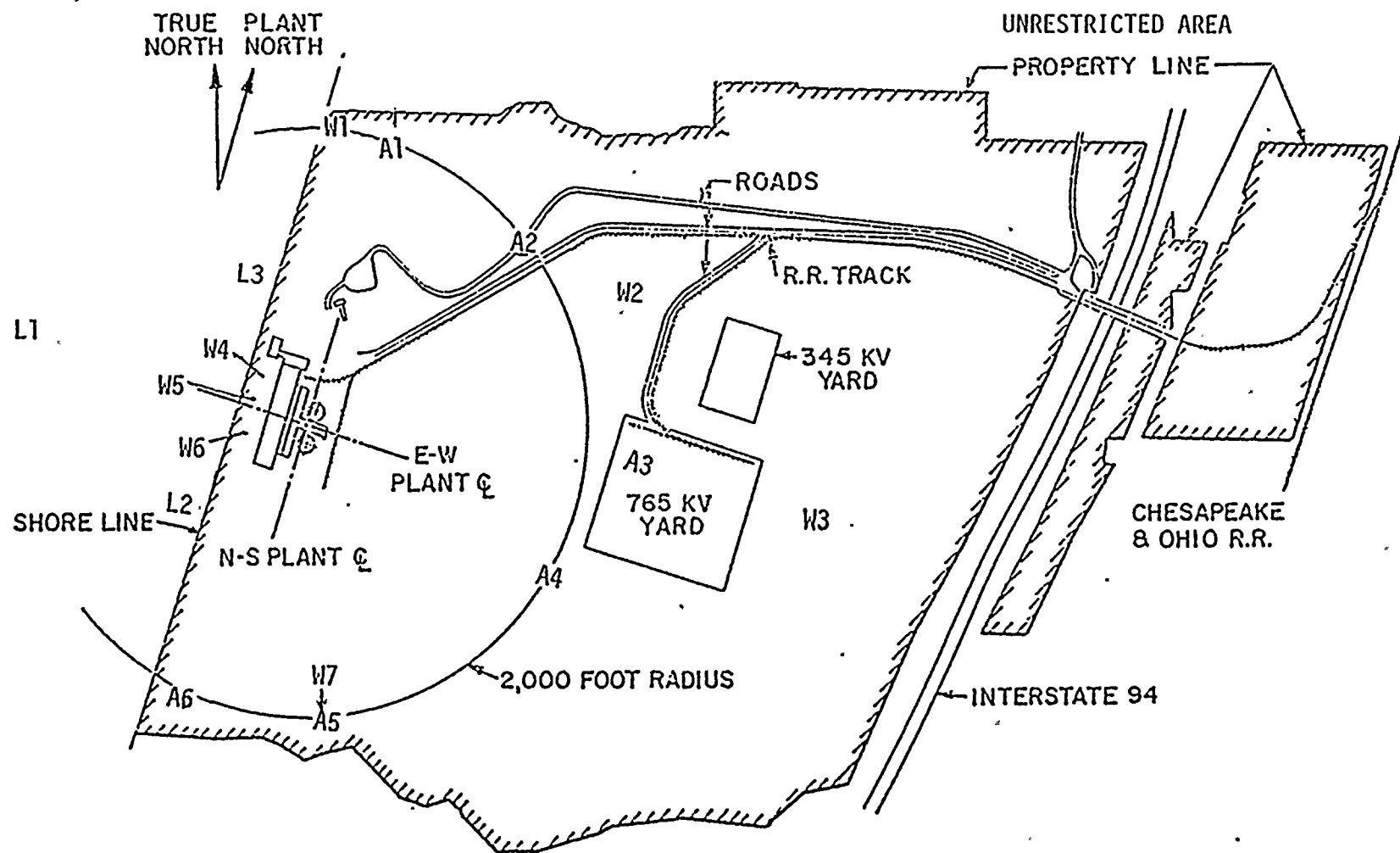


FIGURE 12-1B



SCALE

0 1,000 2,000 3,000 4,000 FEET

- A - Air, Precipitation, TLD Stations
- W - Well Water Sample Stations
- L - Lake Water Sample Stations
- M - Milk Sample Stations





TABLE 4.12-1

MAXIMUM VALUES FOR THE LOWER LIMITS OF DETECTION (LLD)<sup>a</sup>

Analysis	Water (pCi/l)	Airborne Particulate or Gas (pCi/m <sup>3</sup> )	Fish (pCi/kg,wet)	Milk (pCi/l)	Food Products (pCi/kg, wet)	Sediment (pCi/kg,dry)
gross beta	4 <sup>b</sup>	1 x 10 <sup>-2</sup>				
<sup>3</sup> H	2000 (1000 <sup>b</sup> )					
<sup>54</sup> Mn	15		130			
<sup>59</sup> Fe	30		260			
<sup>58,60</sup> Co	15		130			
<sup>65</sup> Zn	30		260			
<sup>95</sup> Zr-Nb	15					
<sup>131</sup> I	1	7 x 10 <sup>-2</sup>		1	60 <sup>c</sup>	
<sup>134,137</sup> Cs	15(10 <sup>b</sup> ), 18	1 x 10 <sup>-2</sup>	130	15	80	150
<sup>140</sup> Ba-La	15			15		

TABLE 4.12-1 (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 radio-chemical 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 pCi 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 transformation per minute per curie.

Y is the fractional radiochemical yield (when applicable)

$\lambda$  is the radioactive decay constant for the particular radionuclide

$\Delta t$  is the elapsed time between sample collection (or end of the sample collection period) and time of counting.

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 (e.g., potassium-40 in milk samples).

TABLE 4.12-1 (Continued)

TABLE NOTATION

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

- b LLD for drinking water.
- c LLD for leafy vegetables.

## RADIOLOGICAL ENVIRONMENTAL MONITORING

### 3/4.12.2 LAND USE CENSUS

#### LIMITING CONDITION FOR OPERATION

3.12.2 A land use census shall be conducted and shall identify the location of the nearest milk animal, the nearest residence and the nearest garden\* of greater than 500 square feet producing fresh leafy vegetables in each of the 9 land covering meteorological sectors within a distance of five miles.

APPLICABILITY: At all times.

#### ACTION:

- a. With a land use census identifying a location(s) which yields a calculated dose or dose commitment greater than the values currently being calculated in Specification 4.11.2.3.1, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, a Special Report which identifies the new location(s).
- b. With a land use census identifying a location(s) which yields a calculated dose or dose commitment (via the same exposure pathway) greater than at a location from which samples are currently being obtained in accordance with Specification 3.12.1, prepare and submit to the Commission within 30 days, pursuant to Specification 6.9.2, a Special Report which identifies the new location. The new location shall be added to the radiological environmental monitoring program within 30 days, if possible. The sampling location having the lowest calculated dose or dose commitment (via the same exposure pathway) may be deleted from this monitoring program after (October 31) of the year in which this land use census was conducted.
- c. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

#### SURVEILLANCE REQUIREMENTS

4.12.2.1 The land use census shall be conducted at least once per 12 months between the dates of June 1 and October 1, by door-to-door survey, aerial survey, or by consulting local agriculture authorities.

4.12.2.2 Reports The results of the land use census shall be included in the Annual Radiological Environmental Operating Report.

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

## INSTRUMENTATION

### BASES

#### RADIOACTIVE LIQUID EFFLUENT INSTRUMENTATION

3/4.3.3.8 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. The alarm/trip setpoints for these instruments shall be calculated in accordance with NRC approved methods in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 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.

#### 3/4.3.3.9

#### RADIOACTIVE GASEOUS EFFLUENT INSTRUMENTATION

3/4.3.3.9 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. The alarm/trip setpoints for these instruments shall be calculated in accordance with NRC approved methods in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. This instrumentation also includes provisions for monitoring the concentrations of potentially explosive gas mixtures in the waste gas holdup system. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

### 3/4.11 RADIOACTIVE EFFLUENTS

#### BASES

#### 3/4.11.1 LIQUID EFFLUENTS

3/4.11.1.1 CONCENTRATION. This specification is provided to ensure that the concentration of radioactive materials released in liquid waste effluents from the site to unrestricted areas will be less than the concentration levels specified in 10 CFR Part 20, Appendix B, Table II. This limitation provides additional assurance that the levels of radioactive materials in bodies of water outside the site will not result in exposures within (1) the Section II.A design objectives of Appendix I, 10 CFR Part 50, to an individual and (2) the limits of 10 CFR Part 20.106(e) to the population. The concentration limit for 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.

3/4.11.1.2 DOSE. This specification is provided to implement the requirements of Sections II.A, III.A and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation implements the guides set forth in Section II.A of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in liquid effluents will be kept "as low as is reasonably achievable". 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 is to 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 will be consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 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. NUREG-0133 provides methods for dose calculations consistent with Regulatory Guides 1.109 and 1.113.

## RADIOACTIVE EFFLUENTS

### BASES

This specification applies to the release of liquid effluents from each reactor at the site. The liquid effluents from the shared system are proportioned among the units sharing the system.

3/4.11.1.3 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 requirements 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 design objective Section 11.D of Appendix A 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 guide set forth in Section 11.A of Appendix I, 10 CFR Part 50, for liquid effluents.

### 3/4.11.2 GASEOUS EFFLUENTS

3/4.11.2.1 DOSE RATE. This specification is provided to ensure that the dose rate at anytime 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. 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, to annual average concentrations exceeding the limits specified in Appendix B, Table II of 10 CFR Part 20 (10 CFR Part 20.106(b)). For individuals who may at times be within the site boundary, the occupancy of the individual will be sufficiently low to compensate for any increase

## RADIOACTIVE EFFLUENTS

### BASES

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  $< (500)$  mrem/year to the total body or 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 infant via the cow-milk-infant pathway to  $< 1500$  mrem/year for the nearest cow to the plant.

This specification applies to the release of gaseous effluents from all reactors at the site. The gaseous effluents from the shared system are proportioned among the units sharing that system.

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 assure that the releases of radioactive material in gaseous effluents will be kept "as low as is reasonable achievable". The Surveillance Requirement implement the requirements in Section III.A of Appendix I that conform with the guides of Appendix I to be shown by calculational procedures based on models and data such that the actual exposure of an individual through the appropriate pathways is unlikely to be substantially underestimated. The dose calculations established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents will be consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 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 exclusion area boundary will be based upon the historical average atmospheric conditions. NUREG-0133 provides methods for dose calculations consistent with Regulatory Guides 1.109 and 1.111.

3/4.11.2.3 DOSE, RADIOIODINES, RADIOACTIVE MATERIAL 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.



## RADIOACTIVE EFFLUENTS

### BASES

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 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 substantially underestimate. The ODCM calculational methods approved by NRC for calculating the doses due to the actual release rates of the subject materials are required to be consistent with the methodology provided in Regulatory Guide 1.109, "Calculating 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 I, 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 material 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 are examined in the development of these calculations are: 1) individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, 3) deposition onto grassy areas where milk animals and meat producing animals graze with consumption of the milk and meat by man, and 4) deposition on the ground with subsequent exposure of man.

### 3/4.11.2.4 GASEOUS WASTE TREATMENT

The OPERABILITY of the gaseous radwaste treatment system and the ventilation exhaust treatment systems 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 design objective Section IID 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 guide set forth in Sections II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents.

## RADIOACTIVE EFFLUENTS

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### 3/4.11.2.5 DOSE

This specification is provided to meet the reporting requirements of 40 CFR 190.

### 3/4.11.2.6 EXPLOSIVE GAS MIXTURE

This specification is provided to ensure that the concentration of potentially explosive gas mixtures contained in the waste gas treatment system is maintained below the flammability limits of hydrogen and oxygen mixtures. Maintaining the concentration of hydrogen or 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.

### 3/4.11.2.7 GAS STORAGE TANKS

Restricting the quantity of radioactivity contained in each gas storage tank provides assurance that in the event of an uncontrolled release of the tanks contents, the resulting total body exposure to an individual at the nearest site boundary will not exceed 0.5 rem. This is consistent with Standard Review Plan 15.7.1, "Waste Gas System Failure."

### 3/4.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

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#### BASES

##### 3/4.12.1 MONITORING PROGRAM

The radiological monitoring program required by this specification provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides which lead to the highest potential radiation exposures of individuals resulting from the station operation. This monitoring program thereby supplements the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. The initially specified monitoring program will be effective for at least the first three years of commercial operation. Following this period, program changes may be initiated based on operational experience.

The detection capabilities required by Table 4.12.-1 are state-of-the-art for routine environmental measurements in industrial laboratories. The LLD's for drinking water meet the requirements of 40 CFR 141.

##### 3.4.12.2 LAND USE CENSUS

This specification is provided to ensure that changes in the use of unrestricted areas are identified and that modifications to the monitoring program are made if required by the results of this census. This census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. Restricting the census to gardens of greater than 500 square feet provides assurance that significant exposure pathways via leafy vegetables will be identified and monitored since a garden of this size is the minimum required to produce the quantity (26 kg/year) of leafy vegetables assumed in Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumptions were used, 1) that 20% of the garden was used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage), and 2) a vegetation yield of 2 kg/square meter.

## 6.0 ADMINISTRATIVE CONTROLS

### 6.1. RESPONSIBILITY

6.1.1 The plant Manager shall be responsible for overall facility operation and shall delegate in writing the succession to this responsibility during his absence.

### 6.2 ORGANIZATION

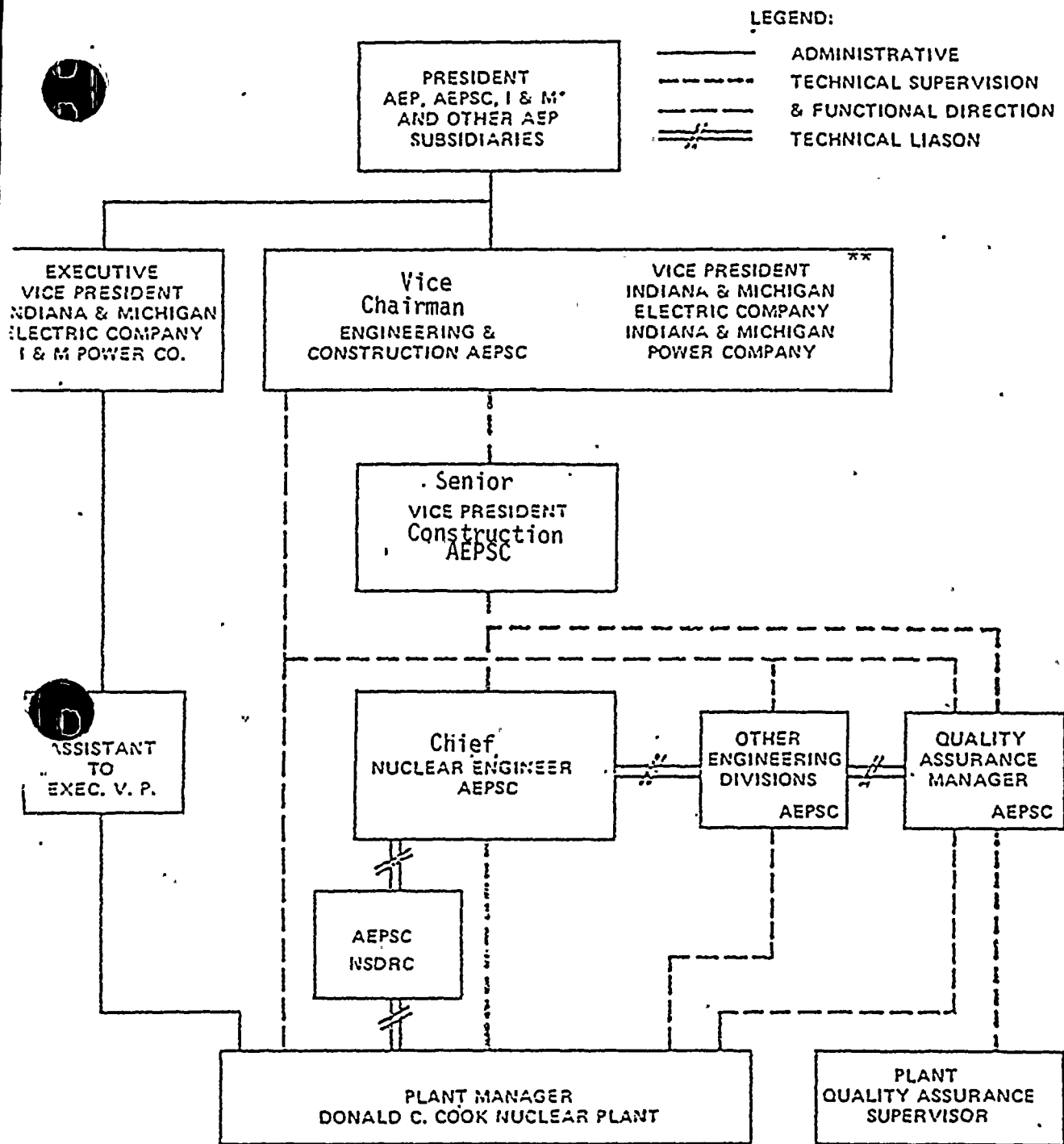
#### OFFSITE

6.2.1 The offsite organization for facility management and technical support shall be as shown on Figure 6.2-1.

#### FACILITY STAFF

6.2.2 The Facility organization shall be as shown on Figure 6.2-2 and:

- a. Each on duty shift shall be composed of at least the minimum shift crew composition shown in Table 6.2-1.
- b. At least one licensed Operator shall be in the control room when fuel is in the reactor.
- c. At least two licensed Operators shall be present in the control room during reactor start-up, scheduled reactor shutdown and during recovery from reactor trips.
- d. An individual qualified in radiation protection procedures shall be on site when fuel is in the reactor.
- e. ALL CORE ALTERATIONS after the initial fuel loading shall be directly supervised by either a licensed Senior Reactor Operator or Senior Reactor Operator Limited to Fuel Handling who has no other concurrent responsibilities during this operation.
- f. A site Fire Brigade of at least 5 members shall be maintained onsite at all times. The fire Brigade shall not include 3 members of the minimum shift crew necessary for safe shutdown of the unit or any personnel required for other essential functions during a fire emergency.



\*INDIANA AND MICHIGAN ELECTRIC COMPANY  
AND INDIANA AND MICHIGAN POWER COMPANY

\*\*Responsible for Fire Protection Program.

FIGURE 6.2-1 Offsite Organization for Facility Management and Technical Support

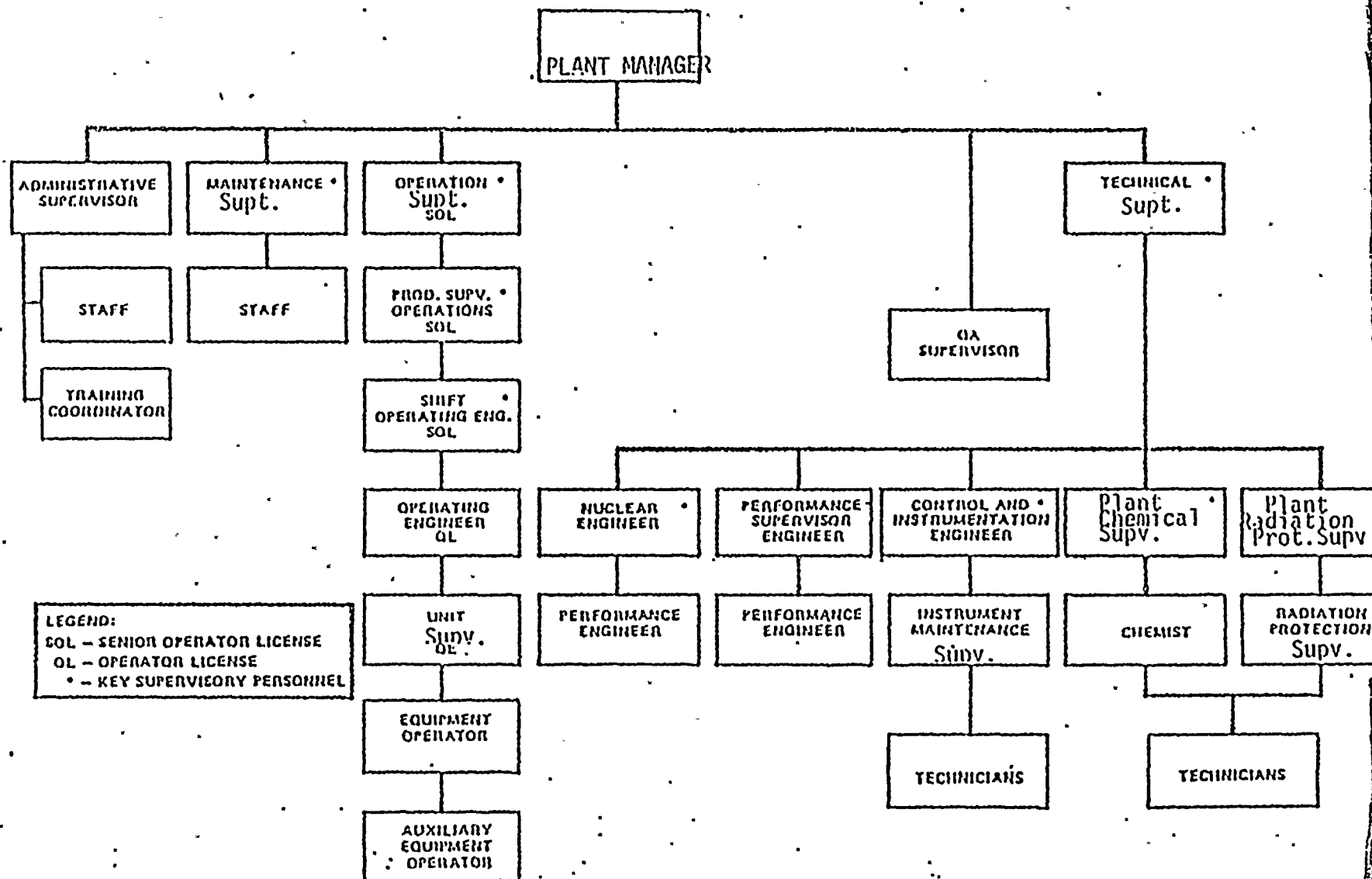


FIGURE 6.2-2 Facility Organization - Donald C. Cook - Unit No. 1

TABLE 6.2-1  
MINIMUM SHIFT CREW COMPOSITION <sup>#</sup>

LICENSE CATEGORY	APPLICABLE MODES	
	1,2,3,& 4	5 & 6
SOL	1**	1*
OL	2	1
NON-Licensed	2	1

\* Does not include the licensed Senior Reactor Operator or Senior Reactor Operator Limited to Fuel Handling, supervising CORE ALTERATIONS after the initial fuel loading.

\*\* Shared with D. C. Cook Unit 2

# Shift crew composition may be less than the minimum requirements for a period of time not to exceed 2 hours in order to accomodate unexpected absence of on duty shift crew members provided immediate action is taken to restore the shift crew composition to within the minimum requirements of Table 6.2-1.

## ADMINISTRATIVE CONTROLS

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### 6.3 FACILITY STAFF QUALIFICATIONS

6.3.1 Each member of the facility staff shall meet or exceed the minimum qualifications of ANSI N18.1-1971 for comparable position, except for the Radiation Protection Supervisor who shall meet or exceed the qualifications of Regulatory Guide 1.8, September 1975.

### 6.4 TRAINING

6.4.1 A retraining and replacement training program for the facility staff shall be maintained under the direction of the Training Coordinator and shall meet or exceed the requirements and recommendations of Section 5.5 of ANSI N18.1-1971 and Appendix "A" of 10 CFR Part 55.

6.4.2 A training program for the Fire Brigade shall be maintained under the direction of the Plant Manager and shall meet or exceed the requirements of Section 27 of the NFPA Code-1976.

### 6.5 REVIEW AND AUDIT

#### 6.5.1 PLANT NUCLEAR SAFETY REVIEW COMMITTEE (PNSRC)

##### FUNCTION

6.5.1.1 The PNSRC shall function to advise the Plant Manager on all matters related to nuclear safety.



## ADMINISTRATIVE CONTROLS

### COMPOSITION

6.5.1.2 The PNSRC shall be composed of the:

Chairman:	Plant Manager or designated alternate
Member:	Asst. Plant Manager
Member:	Operations Superintendent
Member:	Technical Superintendent
Member:	Maintenance Superintendent
Member:	Control and Instrument Engineer
Member:	Nuclear Engineer
Member:	Plant Chemical Supervisor
Member:	Performance Supervisor Engineer
Member:	Plant Radiation Protection Supervisor

### ALTERNATES

6.5.1.3 All alternate members shall be appointed in writing by the PNSRC Chairman to serve on a temporary basis; however, no more than two alternates shall participate as voting members in PNSRC activities at any one time

### MEETING FREQUENCY

6.5.1.4 The PNSRC shall meet at least once per calendar month and as convened by the PNSRC Chairman or his designated alternate.

### QUORUM

6.5.1.4 A quorum of the PNSRC shall consist of the Chairman or his designated alternate and four members including alternates.

### RESPONSIBILITIES

6.5.1.6 The PNSRC shall be responsible for:

- a. Review of 1) all procedures required by Specification 6.8 and changes thereto as determined by the Plant Manager to affect nuclear safety.
- b. Review of all proposed tests and experiments that affect nuclear safety.

## ADMINISTRATIVE CONTROLS

- c. Review of all proposed changes to Appendix "A" Technical Specifications.
- d. Review of all proposed changes or modifications to plant systems or equipment that affect nuclear safety.
- e. Investigation of all violations of the Technical Specifications including the preparation and forwarding of reports covering evaluation and recommendations to prevent recurrence to the Chairman of the NSDRC.
- f. Review of those REPORTABLE OCCURENCES requiring 24 hour notification to the Commission.
- g. Review of facility operations to detect potential safety hazards.
- h. Performance of special reviews, investigations or analyses and reports thereon as requested by the Chairman of the NSDRC.
- i. Review of the Plant Security Plan and implementing procedures and shall submit recommended changes to the Chairman of the NSDRC.
- j. Review of every unplanned release of radioactive material to the environs; evaluate the event; specify remedial action to prevent recurrence and document the event description, evaluation, and corrective action and the disposition of the corrective action in the plant records.

### AUTHORITY

#### 6.5.1.7 The PNSRC shall

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

## ADMINISTRATIVE CONTROLS

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### RECORDS

6.5.1.8 The PNSRC shall maintain written minutes of each meeting and copies shall be provided to the Chairman of the NSDRC.

### 6.5.2. NUCLEAR SAFETY AND DESIGN REVIEW COMMITTEE(NSDRC)

#### FUNCTION

6.5.2.1 The NSDRC shall function to provide independent review and audit of designated activities in the areas of:

- a. nuclear power plant operations
- b. nuclear engineering
- c. chemistry and radiochemistry
- d. metallurgy
- e. instrumentation and control
- f. radiological safety
- g. mechanical and electrical engineering
- h. quality assurance practices.



COMPOSITION

6.5.2.2 The NSDRC shall be composed of the:

Vice Chairman Engineering and Construction

Senior Vice President Construction

Executive Vice President Indiana & Michigan Electric Company

Vice President Electrical Engineering

Vice President Mechanical Engineering

Assistant Vice President and Chief Civil Engineer

Chief Nuclear Engineer (Chairman)

Chief Design Engineer

Plant Manager, Donald C. Cook Plant

Head Environmental Engineering Division

Head, Nuclear Safety & Licensing Section (Secretary)

Alternate: Executive Assistant to the Vice Chairman Engineering & Construction

Alternate: Assistant Division Head, Project Control and Support Division

Alternate: Executive Assistant to the Executive Vice President I & M

Alternate: Assistant Chief Mechanical Engineer.

Alternate: Assistant Chief Civil Engineer

Alternate: Assistant Division Head, Nuclear Engineering Division

Alternate: Head, Electrical Plant Design Section

Alternate: Assistant Plant Manager, Donald C. Cook Plant

Alternate: Senior Staff Engineer, Environmental Engineering Division

Alternate: Engineer, Nuclear Safety & Licensing Section

Alternate: AEPSC Manager of Quality Assurance

Alternate: Assistant Chief Electrical Engineer

ALTERNATES

6.5.2.3 All alternate members shall be appointed in writing by the NSDRC Chairman to serve on a temporary basis; however, no more than two alternates shall participate as voting members in NSDRC activities at any one time.

CONSULTANTS

6.5.2.4 Consultants shall be utilized as determined by the NSDRC Director to provide expert advice to the NSDRC.

MEETING FREQUENCY

6.5.2.5 The NSDRC shall meet at least once per calendar quarter during the initial year of facility operation following fuel loading and at least once per six months thereafter.

QUORUM

6.5.2.6 A quorum of NSDRC shall consist of the Chairman or his designated alternate and at least 4 NSDRC members including alternates. No more than a minority of the quorum shall have line responsibility for operation of the facility.

## ADMINISTRATIVE CONTROLS

### REVIEW

6.5.2.7 The NSDRC shall review:

- a. The safety evaluations for 1) changes to procedures, equipment or systems and 2) tests or experiments completed under the provision of Section 50.50, 10 CFR, to verify that such actions did not constitute an unreviewed safety questions.
- b. Proposed changes to procedures, equipment or systems which involve an unreviewed safety questions as defined in Section 50.59, 10 CFR
- c. Proposed tests or experiments which involve an unreviewed safety question as defined in Section 50.59, 10 CFR
- d. Proposed changes in Technical Specifications or licenses.
- e. Violations of applicable statutes, codes, regulations orders, Technical Specifications, license requirements or of internal procedures or instructions having nuclear safety significance.
- f. Significant operating abnormalities or deviations from normal and expected performance of plant equipment that affect nuclear safety.
- g. REPORTABLE OCCURRENCES requiring 24 hour notification to the Commission.
- h. All recognized indications of an unanticipated deficiency in some aspect of design or operation of safety related structures, systems, or components.
- i. Reports and meetings minutes of the PNSRC.

## ADMINISTRATIVE CONTROLS

### AUDITS

6.5.2.8 Audits of facility activities shall be performed under the cognizance of the NSDRC. These audits shall encompass.

- a. The conformance of facility operation to provisions contained within the Technical Specifications and applicable license conditions at least once per 12 months.
- b. The performance, training and qualifications of the entire facility staff at least once per 12 months.
- c. The results of actions taken to correct deficiencies occurring in facility equipment, structures, systems or method of operation that affect nuclear safety at least once per 6 months.
- d. The performance of activities required by the Quality Assurance Program to meet the criteria of Appendix "B" 10 CFR 50, at least once per 24 months.
- e. The Facility Emergency Plan and implementing procedures at least once per 24 months.
- f. The Facility Security Plan and implementing procedures at least once per 24 months.
- g. Any other area of facility operation considered appropriate by the NSDRC.
- h. The Facility Fire Protection Program and implementing procedures at least once per 24 months.
- i. An independent fire protection and loss prevention program inspection and audit shall be performed at least once per 12 months utilizing either qualified offsite licensee personnel or an outside fire protection firm.
- j. An inspection and audit of the fire protection and loss prevention program shall be performed by a qualified outside fire consultant at least once per 36 months.
- k. The radiological environmental monitoring program and the results thereof at least once per 12 months.
- l. The OFFSITE DOSE CALCULATION MANUAL and implementing procedures at least once per 24 months.

## ADMINISTRATIVE CONTROLS

### AUTHORITY

6.5.2.9 The NSDRC shall report to and advise the Vice Chairman Engineering and Construction AEPSC, and those areas of responsibility specified in sections 6.5.2.7 and 6.5.2.8.

### RECORDS

6.5.2.10 Records of NSDRC activities shall be prepared, approved and distributed as indicated below:

- a. Minutes of each NSDRC meeting shall be prepared, approved and forwarded to the Vice Chairman, Engineering and Construction, AEPSC, within 14 days following each meeting.
- b. Reports of review encompassed by Section 6.5.2.7 above, shall be prepared, approved and forward to the Vice Chairman, Engineering and Construction, AEPSC within 14 days following completion of the review.
- c. Audit reports encompassed by Section 6.5.2.8 above, shall be forwarded to the Vice Chairman, Engineering and Construction, AEPSC, and to the management positions responsible for the areas audited within 30 days after completion of the audit.

## 6.6 REPORTABLE OCCURRENCE ACTION

6.6.1 The following actions shall be taken for REPORTABLE OCCURRENCES

- a. The Commission shall be notified and/or a report submitted pursuant to the requirements of Specification 6.9.
- b. Each REPORTABLE OCCURRENCE requiring 24 hour notification to the Commission shall be reviewed by the PNSRC and submitted to the NSDRC and the Chief Nuclear Engineer.



## ADMINISTRATIVE CONTROLS

### 6.7 SAFETY LIMIT VIOLATION

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

- a. The facility shall be placed in at least HOT STANDBY within on hour.
- b. The Safety Limit violation shall be reported to the Commission and to the Chairman of the NSDRC within 24 hours.
- c. A Safety Limit Violation Report shall be prepared. The report shall be reviewed by the PNSRC. This report shall describe (1) applicable circumstances preceding the violation, (2) effects of the violation upon facility components, systems, structures, and (3) corrective action taken to prevent recurrence.
- d. The Safety Limit Violation Report shall be submitted to the Commission, the Chairman of the NSDRC and the Chief Nuclear Engineer within 14 days of the violation.

### 6.8 PROCEDURES

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

- a. The applicable procedures recommended in Appendix "A" of Regulatory Guide 1.33, Revision 2, February 1978.
- b. The radiological environmental monitoring program.
- c. Refueling operations.
- d. Surveillance and test activities of safety related equipment
- e. Security Plan implementation.
- f. Emergency Plan implementation.
- g. Fire Protection Program implementation.
- h. OFFSITE DOSE CALCULATION MANUAL implementation.

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

## ADMINISTRATIVE CONTROLS

6.8.3 Temporary Changes to procedures of 6.8.1 above may be made provided:

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

## 6.9 REPORTING REQUIREMENTS

### ROUTINE REPORTS AND REPORTABLE OCCURRENCES

6.9.1 In addition to the applicable reporting requirements of Title 10, Code of Federal Regulations, the following reports shall be submitted to the Director of the Regional Office of Inspection and Enforcement unless otherwise noted.

### STARTUP REPORT

6.9.1.1 A summary report of plant startup and power escalation testing shall be submitted following (1) receipt of an operating license, (2) amendment to the license involving a planned increase in power level, (3) installation of fuel that has a different design or has been manufactured by a different fuel supplier, and (4) modifications that may have significantly altered the nuclear, thermal, or hydraulic performance of the plant.

6.9.1.2 The startup report shall address each of the tests identified in the FSAR and shall include a description of the measured values of the operating conditions or characteristics obtained during the test program and a comparison of these values with design predictions and specifications. Any corrective actions that were required to obtain satisfactory operation shall also be described. Any additional specific details required in license conditions based on other commitments shall be included in this report.

## ADMINISTRATIVE CONTROLS

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

### ANNUAL REPORTS<sup>1</sup>

6.9.1.4 Annual reports covering the activities of the unit as described below for the previous calendar year shall be submitted prior to March 1 of each year. The initial report shall be submitted prior to March 1 of the year following initial criticality.

6.9.1.5 Reports required on an annual basis shall include:

- a. A tabulation on an annual basis of the number of station utility and other personnel (including contractors) receiving exposures greater than 100 mrem/yr and their associated man rem exposure according to work and job functions; e.g., reactor operations and surveillance, inservice inspection, routine maintenance, special maintenance (describe maintenance), waste processing, and refueling. The dose assignment to various duty functions may be estimates based on pocket dosimeter, TLD, or film badge measurements. Small exposures totalling less than 20% of the individual total dose need not be accounted for. In the aggregate, at least 80% of the total whole body dose received from external sources shall be assigned to specific major work functions.
- b. The complete results of steam generator tube inservice inspections performed during the report period (reference Specification 4.4.5.5.b.)

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<sup>1</sup> 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.

<sup>2</sup> This tabulation supplements the requirements of 20.407 of 10 CFR Part 20.

## ADMINISTRATIVE CONTROLS

### ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT<sup>3</sup>

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 statistical evaluation 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 the 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 Table 6.9-1 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 including sampling methods for each sample type, size and physical characteristics of each sample type, sample preparation methods, analytical methods, and measuring equipment used; a map of all sampling locations keyed to a table giving distances and directions from one reactor; the result of land use census required by the Specification 3.12.2; and the results of participation in the Quality Assurance Program required by Specification 3.12.3.

### SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT<sup>3</sup>

6.9.1.8 Routine radioactive effluent release reports covering the operating 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.

<sup>3</sup>-----  
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.

TABLE 6.9-1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

Name of Facility \_\_\_\_\_ Docket No. \_\_\_\_\_

Location of Facility \_\_\_\_\_  
(County, State) Reporting Period \_\_\_\_\_

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (I) <sup>b</sup> Range <sup>b</sup>	Location with Highest Annual Mean		Control Locations Mean (I) <sup>b</sup> Range <sup>b</sup>	Number of REPORTABLE OCCURRENCES
				Name Distance and Direction	Mean (I) <sup>b</sup> Range <sup>b</sup>		
Example Data Presentation <sup>d</sup>							

<sup>a</sup>Nominal Lower Limit of Detection (LLD) as defined in table notation a, of Table 4.12-1 of Specification 4.12.1.1.

<sup>b</sup>Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses, (I)

<sup>d</sup>Note: The example data are provided for illustrative purposes only.

## ADMINISTRATIVE CONTROLS

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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," with data summarized on a quarterly basis following the format of Appendix B thereof.

The radioactive effluent release reports shall include a summary of the meteorological conditions concurrent with the release of gaseous effluents during each quarter as outlined in Regulatory Guide 1.21, with data summarized on a quarterly basis following the format of Appendix B thereof.

The radioactive effluent release reports shall include an assessment of the radiation doses from radioactive effluents to individuals due to their activities inside the unrestricted area boundary (Figure 5.1-1) during the report period. All assumptions used in making these assessments (e.g., specific activity, exposure time and location) shall be included in these reports.

The radioactive effluent release reports shall include the following information for all unplanned releases to unrestricted area of radioactive materials in gaseous and liquid effluents:

- a. A description of the event and equipment involved.
- b. Cause(s) for the unplanned release.
- c. Actions taken to prevent recurrence.
- d. Consequences of the unplanned release.

The radioactive effluent release reports shall include an assessment of radiation doses from the radioactive liquid and gaseous effluents released from the unit during each calendar quarter as outlined in Regulatory Guide 1.21. In addition, the site boundary maximum noble gas gamma air and beta air doses shall be evaluated. The meteorological conditions concurrent with the releases of effluents 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).

## ADMINISTRATIVE CONTROLS

### 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. In addition, any changes to the Offsite Dose Calculation Manual of Specification 6.15 shall be submitted with the Monthly Operating Report within 90 days in which the change(s) was made effective.

### REPORTABLE OCCURRENCES

6.9.1.11 The REPORTABLE OCCURRENCES of Specification 6.9.1.12 and 6.9.1.13 below, including corrective actions and measures to prevent recurrence, shall be reported to the NRC. Supplemental reports may be required to fully describe final resolution of occurrence. In case of corrected or supplemental reports, a licensee event report shall be completed and reference shall be made to the original report date.

### PROMPT NOTIFICATION WITH WRITTEN FOLLOWUP

6.9.1.12 The types of events listed below shall be reported within 24 hours by telephone and confirmed by telegraph, mailgram, or facsimile transmission to the Director of the Regional Office, or his designate no later than the first working day following the event, with a written followup report within 14 days. The written followup report shall include, as a minimum a completed copy of a license event report form. Information provided on the licensee event report form shall be supplemented, as needed, by additional narrative material to provide complete explanation of the circumstances surrounding the event.

- a. Failure of the reactor protection system or other systems, subject to limiting safety system settings to initiate the required protective function by the time a monitored parameter reaches the setpoint specified as the limiting safety system setting in the technical specifications or failure to complete the required protective function.
- b. Operation of the unit or affected systems when any parameter or operation subject to a limiting condition for operation is less conservative than the least conservative aspect of the limiting condition for operation established in the technical specifications.
- c. Abnormal degradation discovered in fuel cladding reactor coolant pressure boundary, or primary containment.





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- d. Reactivity anomalies involving disagreement with the predicted value of reactivity balance under steady state conditions during power operation greater than or equal to  $0.1\% \Delta k/k$ ; a calculated reactivity balance indicating a SHUTDOWN MARGIN less conservative than specified in the technical specification; short-term reactivity increases that correspond to a reactor period of less than 5 seconds or, if subcritical, an unplanned reactivity insertion of more than  $0.5\% \Delta k/k$ ; or occurrence of any unplanned criticality.
- e. Failure or malfunction of one or more components which prevents or could prevent, by itself, the fulfillment of the functional requirements of system(s) used to cope with accidents analyzed in the SAR.
- f. Personnel error or procedural inadequacy which prevents or could prevent, by itself, the fulfillment of the functional requirements of systems required to cope with accidents analyzed in the SAR.
- g. Conditions arising from natural or man-made events that, as a direct result of the event require unit shutdown, operation of safety systems, or other protective measures required by technical specifications.
- h. Errors discovered in the transient or accident analyses or in the methods used for such analyses as described in the safety analysis report or in the bases for the technical specifications that have or could have permitted reactor operation in a manner less conservative than assumed in the analyses.
- i. Performance of structures, systems, or components that requires remedial action or corrective measures to prevent operation in a manner less conservative than assumed in the accident analysis in the safety analysis report or technical specification bases; or discovery during unit life of conditions not specifically considered in the safety analysis report or technical specifications that require remedial action or corrective measures to prevent the existence or development of an unsafe condition.
- j. Occurrence of an unusual or important event that has a significant environmental impact or that has potential environmental impact from unit operation.
- k. Conditions where radioactive material contained in liquid or gaseous holdup tanks is in excess of that permitted by the limiting condition for operation established in the technical specifications.

TABLE 6.9-2

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Reporting Levels					
Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m <sup>3</sup> )	Fish (pCi/Kg,wet)	Milk (pCi/l)	Vegetables (pCi/Kg, wet)
H-3	$3 \times 10^4$				
Mn-54	$1 \times 10^3$		$3 \times 10^4$		
Fe-59	$4 \times 10^2$		$1 \times 10^4$		
Co-58	$1 \times 10^3$		$3 \times 10^4$		
Co-60	$3 \times 10^2$		$1 \times 10^4$		
Zn-65	$3 \times 10^2$		$2 \times 10^4$		
Zr-Nb-95	$4 \times 10^2$				
I -131	2	0.9		3	$1 \times 10^2$
CS-134	30	10	$1 \times 10^3$	60	$1 \times 10^3$
Cs-137	50	20	$2 \times 10^3$	70	$2 \times 10^3$
Ba-La-140	$2 \times 10^2$			$3 \times 10^2$	

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### THIRTY DAY WRITTEN REPORTS

6.9.1.13 The types of events listed below shall be the subject of written reports to the Director of the Regional Office within thirty days of occurrence of the event. The written report shall include, as a minimum, a completed copy of a licensee event report form. Information provided on the licensee event report form shall be supplemented, as needed, by additional narrative material to provide complete explanation of the circumstances surrounding the event.

- a. Reactor protection system or engineered safety feature instrument settings which are found to be less conservative than those established by the technical specifications but which do not prevent the fulfillment of the functional requirements of affected systems.
- b. Conditions leading to operation in a degraded mode permitted by a limiting condition for operation or plant shutdown required by a limiting condition for operation.
- c. Observed inadequacies in the implementation of administrative or procedural controls which threaten to cause reduction of degree of redundancy provided in reactor protection systems or engineered safety feature systems.
- d. Abnormal degradation of systems other than those specified in 6.9.1.12.c above designed to contain radioactive material resulting from the fission process.
- 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.
- f. Measured levels of radioactivity in an environmental sampling medium determined to exceed the reporting level values of Table 6.9-2 when average over any calendar quarter sampling period. When more than one of the radionuclides in Table 6.9-2 are detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{concentration (1)}}{\text{limit level (1)}} + \frac{\text{concentration (2)}}{\text{limit level (2)}} = \dots \geq 1.0$$

When radionuclides other than those in Table 6.9-2 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose to an individual is equal to or greater than the calendar year limits of Specifications 3.11.1.2, 3.11.2.2 and 3.11.2.3. This report is not required if the measured level of radioactivity was not the

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### 6.9.1.13 cont.

- f. result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report.

## SPECIAL REPORTS

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

- a. Inservice Inspection Program Review, Specification 4.4.10.
- b. ECCS Actuation, Specifications 3.5.2 and 3.5.3
- c. Inoperable Seismic Monitoring Instrumentation, Specification 3.3.3.3.
- d. Inoperable Meteorological Monitoring Instrumentation, Specification 3.3.3.4.
- e. Waste Gas Hold-Up System explosive gas monitors, Specification 3.3.3.9.
- f. Auxiliary Building ventilation radiation monitoring, Specification 3.3.3.9.
- g. Condenser Evaluation System, Specification 3.3.3.9.

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### 6.10 RECORD RETENTION

In addition to the applicable record retention requirements of Title 10, Code of Federal Regulations, the following records shall be retained for at least the minimum period indication.

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

- a. Records and logs of unit operation covering time interval at each power level.
- b. Records and logs of principal maintenance activities, inspections, repair and replacement of principal items of equipment related to nuclear safety.
- c. ALL REPORTABLE OCCURRENCES submitted to the Commission.
- d. Records of surveillance activities, inspections and calibrations required by these Technical Specifications.
- e. Records of changes made to the procedures required by Specification 6.8.1.
- f. Records of radioactive shipments.
- g. Records of sealed source and fission detector leak tests and results.
- h. Records of annual physical inventory of all sealed source material on record.

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

- a. Records and drawing changes reflecting unit design modifications made to systems and equipment described in the Final Safety Analysis Report.
- b. Records of new and irradiated fuel inventory, fuel transfers and assembly burnup histories.
- c. Records of radiation exposure for all individuals entering radiation control areas.
- d. Records of gaseous and liquid radioactive material released to the environs.

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- E. Records of transient of operational cycles for those unit components identified in Table 5.7-1.
- f. Records of reactor tests and experiments.
- g. Records of training and qualification for current members of the unit staff.
- h. Records of in-service inspections performed pursuant to these Technical Specifications.
- i. Records of Quality Assurance activities required by the QA Manual.
- j. Records of reviews performed for changes made to procedures or equipment or reviews of tests and experiments pursuant to 10 CFR 50.59.
- k. Records of meetings of the PNSRC and the NSDRC

### 6.11 RADIATION PROTECTION PROGRAM

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

### 6.12 HIGH RADIATION AREA

6.12.1 In lieu of the "control device" of "alarm signal" required by paragraph 20.203 (c) (2) of 10 CFR 20, each high radiation area in which the intensity of radiation is greater than 100 mrem/hr but less than 1000 mrem/hr shall be barricaded and conspicuously posted as a high radiation area and entrance thereto shall be controlled by requiring issuance of a Radiation Work Permit\*. Any individual or group of individuals permitted to enter such areas shall be provided with or accompanied by one or more of the following:

- a. A radiation monitoring device which continuously indicates the radiation dose rate in the area.

\* Health Physics personnel or personnel escorted by Health Physics personnel in accordance with approved emergency procedures shall be exempt from the RWP issuance requirement during the performance of their radiation protection duties, provided they comply with approved radiation protection procedures for entry into high radiation areas.

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- b. A radiation monitoring device which continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry in to such areas with this monitoring device may be made after the dose rate level in the area has been established and personnel have been made knowledgeable of them.
- c. An individual qualified in radiation protection procedures who is equipped with a radiation dose rate monitoring device. This individual shall be responsible for providing positive control over the activities within the area and shall perform periodic radiation surveillance at the frequency specified by the facility Health Physicist in the Radiation Work Permit.

6.12.2 The requirements of 6.12.1, above, also apply to each high radiation area in which the intensity of radiation is greater than 1000 mrem/hr. In addition, locked doors shall be provided to prevent unauthorized entry into such areas and the keys shall be maintained under the administrative control of the Shift Supervisor on duty and/or the Plant Health Physicist.





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### 6.15 OFFSITE DOSE CALCULATION MANUAL (ODCM)

#### FUNCTION

6.15.1 The ODCM shall describe the methodology and parameters to be used in the calculation of offsite doses due to radioactive gaseous and liquid effluents and in the calculation of gaseous and liquid effluent monitoring instrumentation alarm/trip setpoints consistent with the applicable LCO's contained in these Technical Specifications.

6.15.2 Any changes to the ODCM shall be made by either of the following methods:

#### A. Licensee initiated changes:

1. Shall be submitted to the Commission by inclusion in the Monthly Operating Report pursuant to Specification 6.9.1.10 within 90 days of the date the change(s) was made effective and 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 both the PNSRC and NSDRC.
2. Shall become effective upon a date specified and agreed to by both the PNSRC and NSDRC following their review and acceptance of the change (s).

#### B. Commission initiated changes:

1. Shall be determined by the PNSRC to be applicable to the facility after consideration of facility design.

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2. The licensee shall provide the Commission with written notification of their determination of applicability including any necessary revisions to reflect facility design.
3. Shall be reviewed by the (NSDRC) at its next regularly scheduled meeting.

### 6.16 MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS (liquid, Gaseous and Solid)

#### FUNCTION

6.16.1 The radioactive waste treatment systems (liquid, gaseous and solid) are those systems described in the facility Final Safety Analysis Report or Hazards Summary Report, and amendments thereto, which are used to maintain that control over radioactive materials in gaseous and liquid effluents and in solid waste packaged for offsite shipment required to meet the LCO's set forth in Specifications 3.11.1.1, 3.11.1.3, 3.11.1.4, 3.11.1.4, 3.11.2.1, 3.11.2.2, 3.11.2.3, 3.11.2.4, 3.11.2.5, 3.11.2.7, and 3.11.3.1.

6.16.2 Major changes to the radioactive waste systems (liquid, gaseous and solid) shall be made by either of the following methods, For the purpose of this specification 'major changes' is defined in Specification 6.16.3 below.

#### A. Licensee initiated changes:

1. The Commission shall be informed of all changes by the inclusion of a suitable discussion of each change in the Semiannual Radioactive Effluent Release Report for the period in which the changes were made. 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;



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- d. an evaluation of the change which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste from those previously predicted in the licensee 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 from those previously estimated in the licensee 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 in which the changes were 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 both the (PNSRC) and the (NSDRC).

2. The change shall become effective upon review and acceptance by both the (PNSRC) and (NSDRC).

### B. Commission initiated changes:

1. The applicability of the change to the facility shall be determined by the (PNSRC) after consideration of the facility design.
2. The licensee shall provide the Commission with written notification of its determination of applicability including any necessary revisions to reflect facility design.
3. The change shall be reviewed by the (NSDRC) at its next regularly scheduled meeting.
4. The change shall become effective on a date specified by the Commission.

6.16.3 Background and definition of what constitutes 'major changes' to radioactive waste systems (liquid, gaseous and solid).

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### A. Background

1. 10 CFR Part 50, Section 50.34a(a) requires that each application to construct a nuclear power reactor provide a description of the equipment installed to maintain control over radioactive material in gaseous and liquid effluents produced during normal reactor operations including operational occurrences.
2. 10 CFR Part 50, Section 50.34a (b) (2) requires that each application to construct a nuclear power reactor provide an estimate of the quantity of radionuclides expected to be released annually to unrestricted areas in liquid and gaseous effluents produced during normal reactor operation.
3. 10 CFR Part 50, Section 50.34 a(3) requires that each application to construct a nuclear power reactor provide a description of the provisions for packaging, storage and shipment offsite of solid waste containing radioactive materials resulting from treatment of gaseous and liquid effluents and from other sources.
4. 10 CFR Part 50, Section 50.34a (c) requires that each application to operate a nuclear power reactor shall include (1) a description of the equipment and procedures for the control of gaseous and liquid effluents and for the maintenance and use of equipment installed in radioactive waste systems and (2) a revised estimate of the information required in (b)(2) if the expected releases and exposures differ significantly from the estimate submitted in the application for a construction permit.
5. The Regulatory staff's Safety Evaluation Report and amendments thereto issued prior to the issuance of an operating license contains a description of the radioactive waste systems installed in the nuclear power reactor and a detailed evaluation (including estimated releases of radioactive materials in liquid and gaseous waste and quantities of solid waste produced from normal operation, estimated annual maximum exposures to an individual in the unrestricted area and estimated exposures to the general population) which shows the capability of these systems to meet the appropriate regulations.

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6. The Regulatory staff's Final Environmental Statement issued prior to the issuance of an operating license contains a detailed evaluation as to the expected environmental impact from the estimated releases of radioactive material in liquid and gaseous effluents.

### 8. Definition

"Major Changes" to radioactive waste systems (liquid, gaseous and solid) shall include the following:

1. Major changes in process equipment, components, structures and effluent monitoring instrumentation from those described in the Final Safety Analysis Report (FSAR) or the Hazards Summary Report and evaluated in the staff's Safety Evaluation Report (SER) ( e.g., deletion of evaporators and installation of demineralizers; use of fluidized bed calciner/incineration in place of cement solidification systems);
2. Major changes in the design of the radwaste treatment system (liquid, gaseous and solid) that could significantly alter the characteristics and/or quantities of effluents released or volumes of solid waste stored or shipped offsite from those previously considered in the FSAR and SER (e.g., use of asphalt system in place of cement);
3. Changes in system design which may invalidate the accident analysis as described in the SER (e.g. changes in tank capacity that would alter the curies released); and
4. Changes in system design that could potentially result in a significant increase in occupational exposure of operating personnel (e.g., use of skid mounted equipment, use of mobile processing equipment).