

Figure 2.3-1  
Plume Depletion Effect for Ground-Level Releases  
(All Atmospheric Stability Classes)

Graph taken from Reference 7, Figure 2

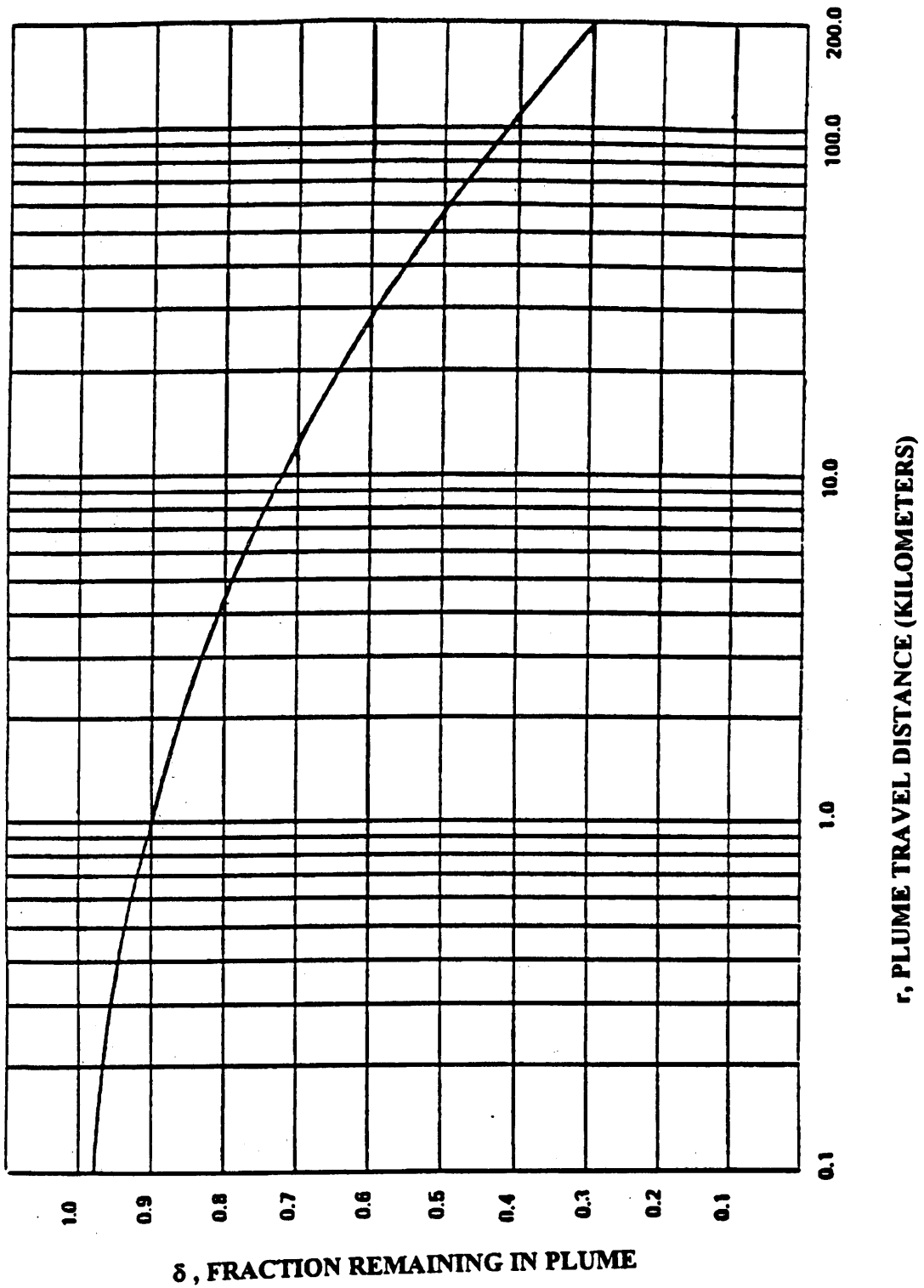
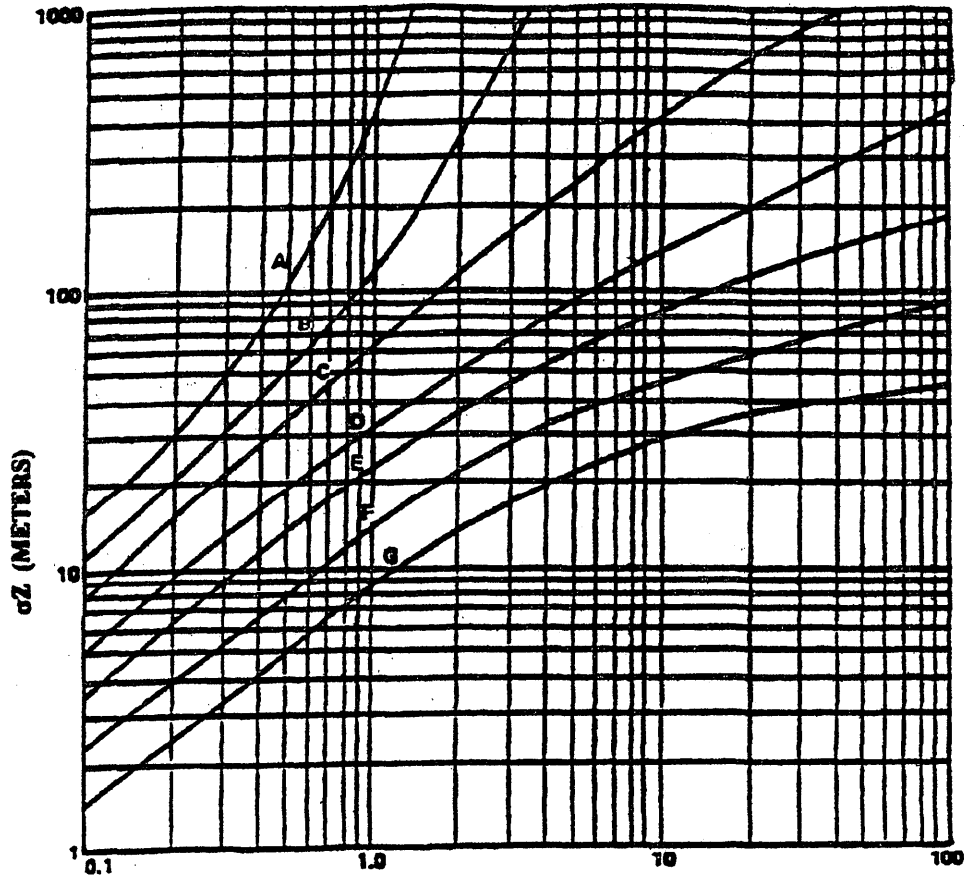


Figure 2.3-2  
 Vertical Standard Deviation of Material in a Plume  
 (Letters denote Pasquill Stability Class)

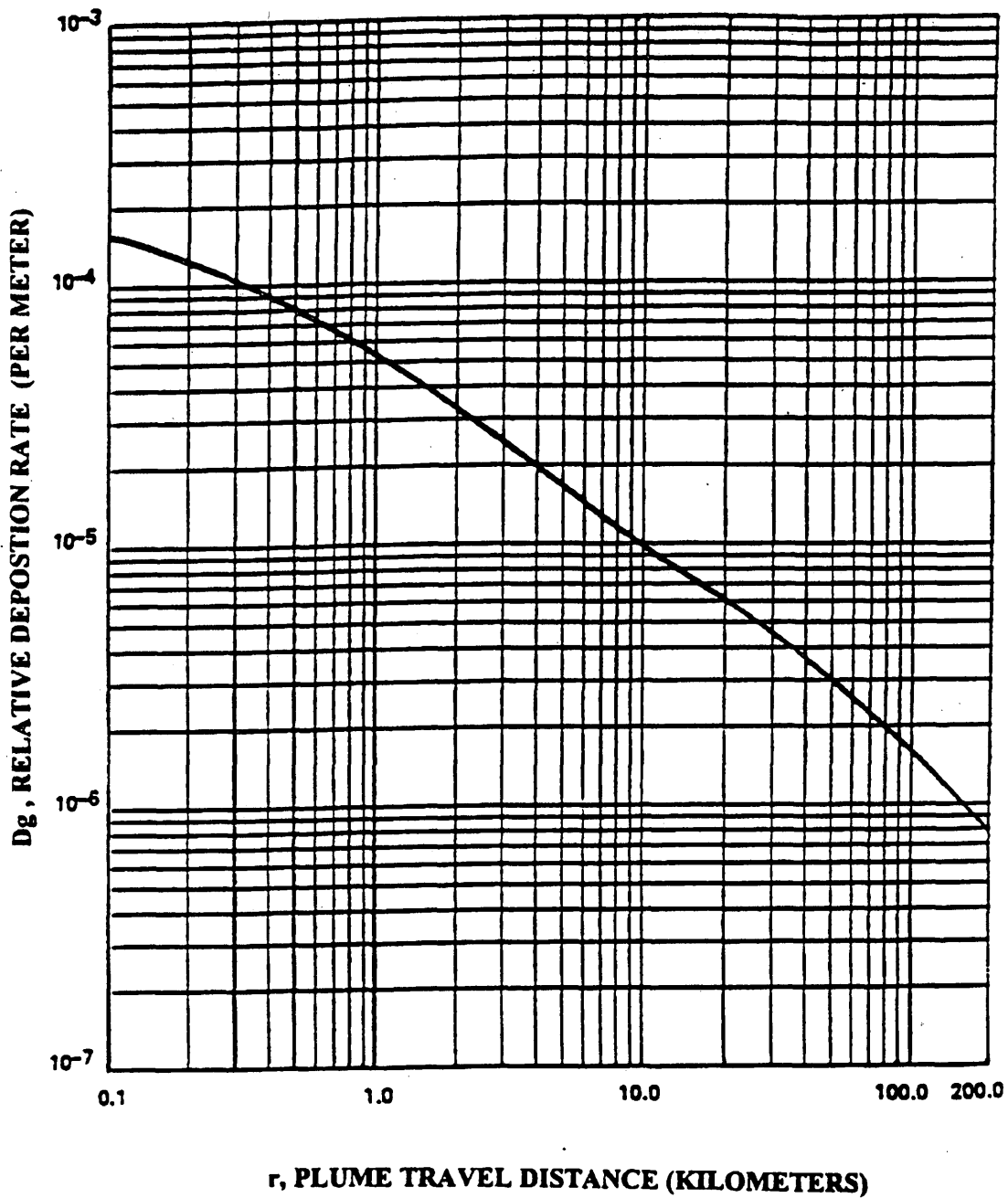


r, PLUME TRAVEL DISTANCE (KILOMETERS)

Temperature Change with Height ( $\Delta T$ ) ( $^{\circ}\text{F}/40\text{m}$ )	Pasquill Category	Stability Classification
$\leq -1.37$	A	Extremely Unstable
$> -1.37$ and $\leq -1.22$	B	Moderately Unstable
$> -1.22$ and $\leq -1.08$	C	Slightly Unstable
$> -1.08$ and $\leq -0.36$	D	Neutral
$> -0.36$ and $\leq 1.08$	E	Slightly Stable
$> 1.08$ and $\leq 2.88$	F	Moderately Stable
$> 2.88$	G	Extremely Stable

Graph taken from Reference 7, Figure 1

Figure 2.3-3  
Relative Deposition for Ground-Level Releases  
(All Atmospheric Stability Classes)



Graph taken from Reference 7, Figure 6

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## 2.5 Gaseous Radwaste Treatment System

The instruments required to be checked by LCO 6.11.7 to ensure that the GASEOUS RADWASTE TREATMENT (Offgas) SYSTEM is functioning are:

1. Adsorber train bypass switch (1N64-HS-M611)
2. Bypass valve indication (1N64-F045)

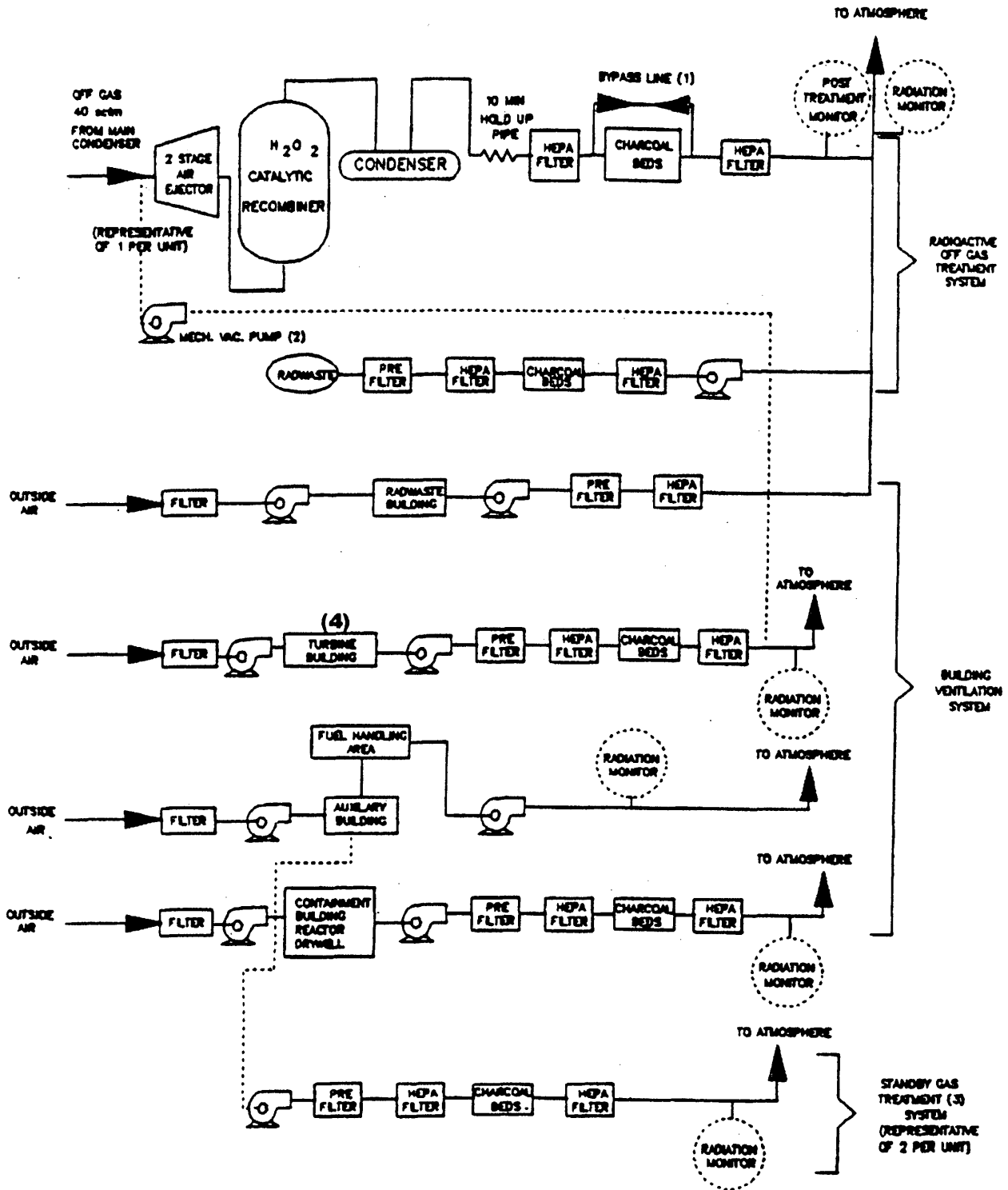
When the adsorber train bypass switch is in the TREAT position and the bypass valve indicates closed, the GASEOUS RADWASTE TREATMENT (Offgas) SYSTEM is functioning.

### NOTES for ODCM Figure 2.5-1

A flow diagram for the Gaseous Radwaste Treatment System is provided on the following page. Notes for the diagram are listed below.

- (1) The charcoal beds are bypassed during startup until an adequate dewpoint is obtained in the process stream.
- (2) This pathway may be utilized for power levels  $\leq 5\%$ .
- (3) Standby Gas Treatment System not normally operated.
- (4) In modes 1, 2 and 3, the south-east most smoke hatch of the turbine building may be used as an occasional release point provided that the proper monitoring equipment is used. During Modes 4 & 5 up to four roof hatches may be used and release rates estimated based on calculated flow rates and measured activity.

Figure 2.5-1  
Gaseous Radwaste Treatment System



## 2.6 Annual Dose Commitment

If required, the annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC will be calculated by summing the following doses for the calendar year:

- Direct radiation dose
- Liquid effluent dose ( $D_{\text{Tau}}$ )
- Noble gas dose ( $D_{\gamma}$ ,  $D_{\beta}$ )
- Particulate dose ( $D_p$ )

These calculations are required only if the liquid or gaseous effluents exceed twice the limits of LCOs 6.11.2, 6.11.5 and 6.11.6.

### 2.6.1 Direct Radiation Dose Measurement

LCOs 6.11.2, 6.11.5 and 6.11.6 require the determination of cumulative dose contributions to a MEMBER OF THE PUBLIC from direct radiation from the reactor units and from radwaste storage tanks. This requirement is applicable only under conditions set forth in Action B.1 of the applicable LCO. This determination is made by the utilization of direct radiation measurements from indicator thermoluminescent dosimeters (TLDs) located near the GGNS property line.

Measurements from these TLDs represent the direct radiation generated by the facility plus normal background radiation. The locations are identified in ODCM Table 3.0-3 by the following TLD numbers:

M-16	M-22	M-23	M-97	M-100
M-19	M-25	M-95	M-98	
M-21	M-28	M-96	M-99	

Control TLDs are also utilized to differentiate between background radiation and direct radiation from the facility. The following two TLDs are designated as controls based on the criterion that they are located ten miles or greater from the facility. Exact locations are identified in ODCM Table 3.0-3.

M-14

M-33

The difference between the averaged quarterly radiation measurements of the indicator TLDs and the control TLDs represents the direct radiation dose to a MEMBER OF THE PUBLIC from the operating facility.



### 3.0 RADIOLOGICAL ENVIRONMENTAL MONITORING

#### 3.1 Sampling Locations

Sampling locations to fulfill the requirements of LCO 6.12.1, as described in ODCM Table 6.12.1-1, are identified in ODCM Tables 3.0-1 through 3.0-3 and shown on maps in ODCM Figures 3.0-1 and 3.0-2.

ODCM

TABLE 3.0-1

AIR SAMPLER COLLECTION SITES

AIR SAMPLERS

<u>NUMBER</u>	<u>FIGURE</u>	<u>LOCATION</u>
AS-1 PG	3.0-2	Southeast of GGNS at the Port Gibson City Barn (Sector G Radius, 5.5 miles)
AS-3 61VA	3.0-2	NNE of GGNS on Hwy. 61, north of the Vicksburg Airport (Sector B Radius, 18 miles)
AS-7 UH	3.0-1	SSE of GGNS at the IBEW Union Hall (Sector H Radius, 0.5 miles)



ODCM

TABLE 3.0-2 (Continued)

MISCELLANEOUS COLLECTION SITES

Page 2 of 2

<u>SEDIMENT SAMPLES</u>	<u>FIGURE</u>	
SEDDHAM	3.0-1	Downstream of the GGNS discharge point in the Mississippi River near Hamilton Lake outlet (Sector N, 1.6 miles)
SEDCONT	3.0-1	Upstream of the GGNS discharge point in the Mississippi River (Minimum of 100 yds)
<u>VEGETATION</u>		
Broadleaf Vegetation	3.0-1	S of GGNS near former Training Center on Bald Hill Road (Sector J, 0.4 miles)
		<u>OR</u>
		SSE of GGNS near former Training Center on Bald Hill Road (Sector H, 0.46 miles)
<u>NOTE:</u>		The above location is located inside the SITE BOUNDARY. The sampling site exceeds the requirements of LCO 6.12.1.
	3.0-2	Alcorn State University SSW of GGNS (Sector K, 10.5 miles) any alternate location 15-30 km distant may be used.
<u>FISH SAMPLES</u>		
Fish and Invertebrates	3.0-1	Downstream of the GGNS discharge point into the Mississippi River
	3.0-1	Upstream of the GGNS discharge point into the Mississippi River uninfluenced by plant operations
GRAND GULF, UNIT 1	3.0-3a	

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ODCM

TABLE 3.0-3

TLD LOCATIONS

Page 1 of 2

<u>TLD NO.</u>	<u>LOCATION</u>	<u>FIGURE</u>	<u>SECTOR</u>	<u>MILE</u>
M-01	Across the road from Lake Claiborne entry gate	3.0-1	E	3.5
M-07	AS-1 PG, Port Gibson City Barn	3.0-2	G	5.5
M-09	Warner Tully Y-Camp	3.0-1	D	3.5
M-10	Grand Gulf Military Park	3.0-1	A	1.5
M-14 (CONTROL)	AS-3-61VA, Hwy. 61, north of Vicksburg Airport	3.0-2	B	18.0
M-16	Meteorological Tower	3.0-1	A	0.9
M-19	Eastern SITE BOUNDARY property line, NNE of HWSA	3.0-1	E	0.5
M-21	Near former Training Center Building, on Bald Hill Road	3.0-1	J	0.4
M-22	Former RR entrance crossing on Bald Hill Road	3.0-1	G	0.5
M-23	Gin Lake Road 50 yards north of Heavy Haul Road on power pole	3.0-1	Q	0.5
M-25	Radial Well Number 1	3.0-1	N	1.6
M-28	Former Glodjo residence	3.0-1	L	0.9
M-33	Newellton, Louisiana, Water Tower	3.0-2	P	12.5
M-36	Curve on HW 608, point nearest GGNS at power pole	3.0-2	P	5.0
M-38	Lake Bruin State Park, entrance road	3.0-2	M	9.5
M-39	St. Joseph, Louisiana, Aux. Water Tank	3.0-2	M	13.0
M-40	Headley Drive, near River Port entrance	3.0-1	M	2.3

ODCM

TABLE 3.0-3 (Continued)

TLD LOCATIONS

Page 2 of 2

<u>TLD NO.</u>	<u>LOCATION</u>	<u>FIGURE</u>	<u>SECTOR</u>	<u>MILE</u>
M-48	0.4 miles South on Mont Gomer Road on west side	3.0-2	K	4.8
M-49	Fork in Bessie Weathers Road/ Shaifer Road	3.0-2	H	4.5
M-50	Panola Hunting Club entrance	3.0-2	B	5.3
M-55	Near Ingelside Karnac Ferry Road/ Ashland Road Intersection	3.0-2	D	5.0
M-57	Hwy. 61, behind the Welcome to Port Gibson sign at Glensdale Subdivision	3.0-2	F	4.5
M-94	Sector R near Meterological tower	3.0-1	R	0.8
M-95	Spoils Area, fence of old storage area, near entrance gate	3.0-1	F	0.5
M-96	North Gate fence	3.0-1	B	0.7
M-97	Grand Gulf Road entrance gate to spoils area	3.0-1	D	0.8
M-98	Bald Hill Road, across from Union Hall, in curve	3.0-1	H	0.5
M-99	North Fence of old Ball Field Near utility pole	3.0-1	K	0.4
M-100	Grand Gulf Road, across from L. Frazier	3.0-1	C	0.6

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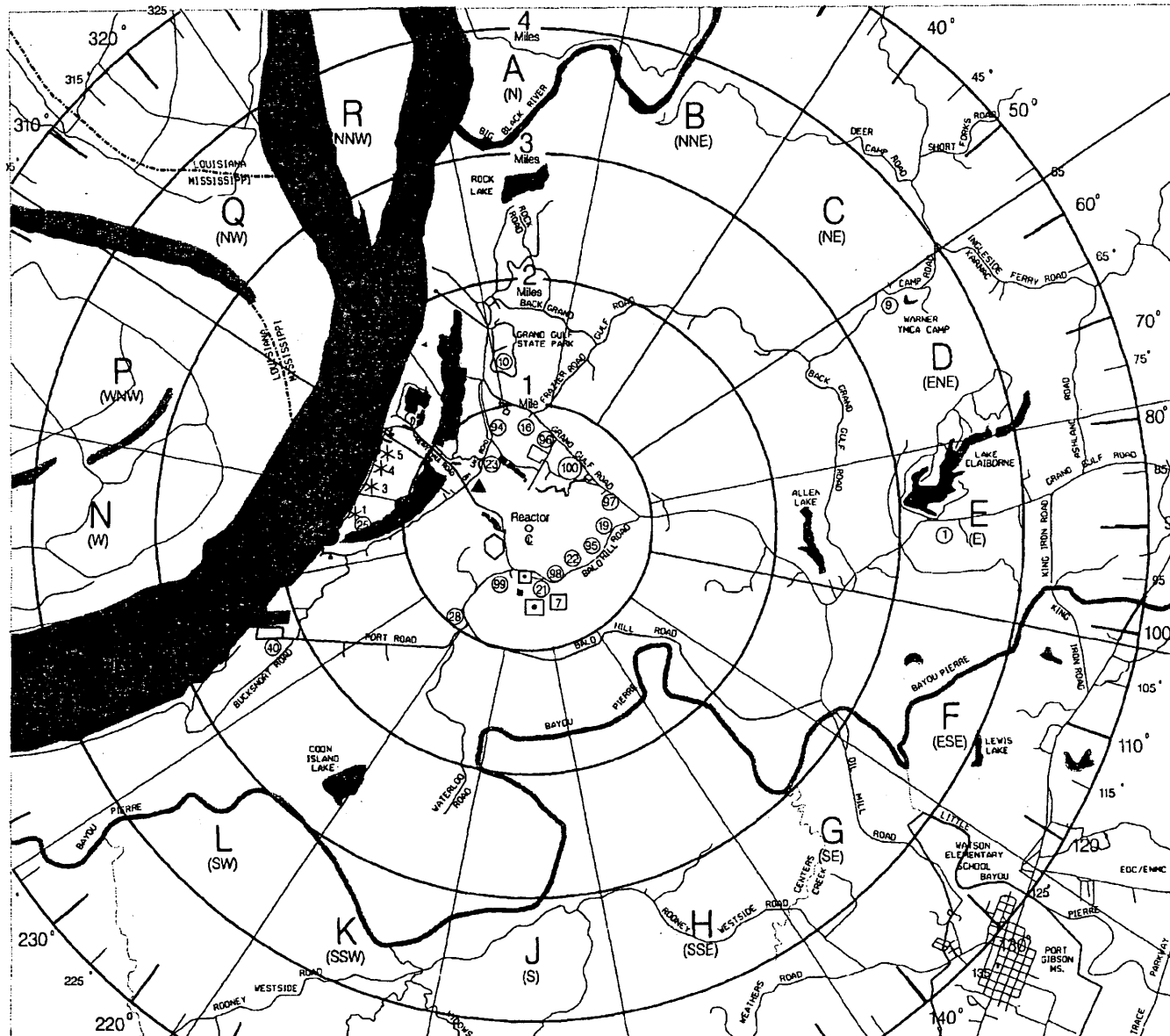
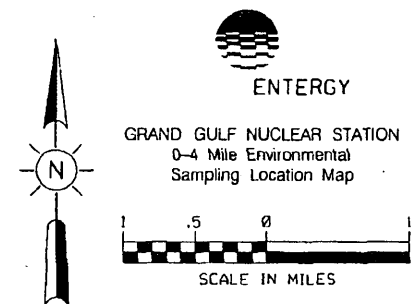
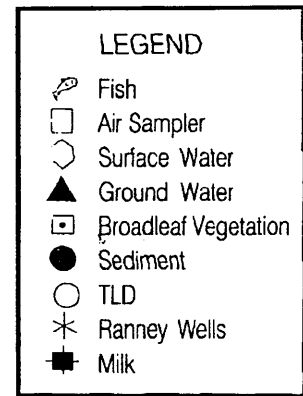


FIGURE 3.0-1

Collection Site Locations  
0-4 Mile Area Map





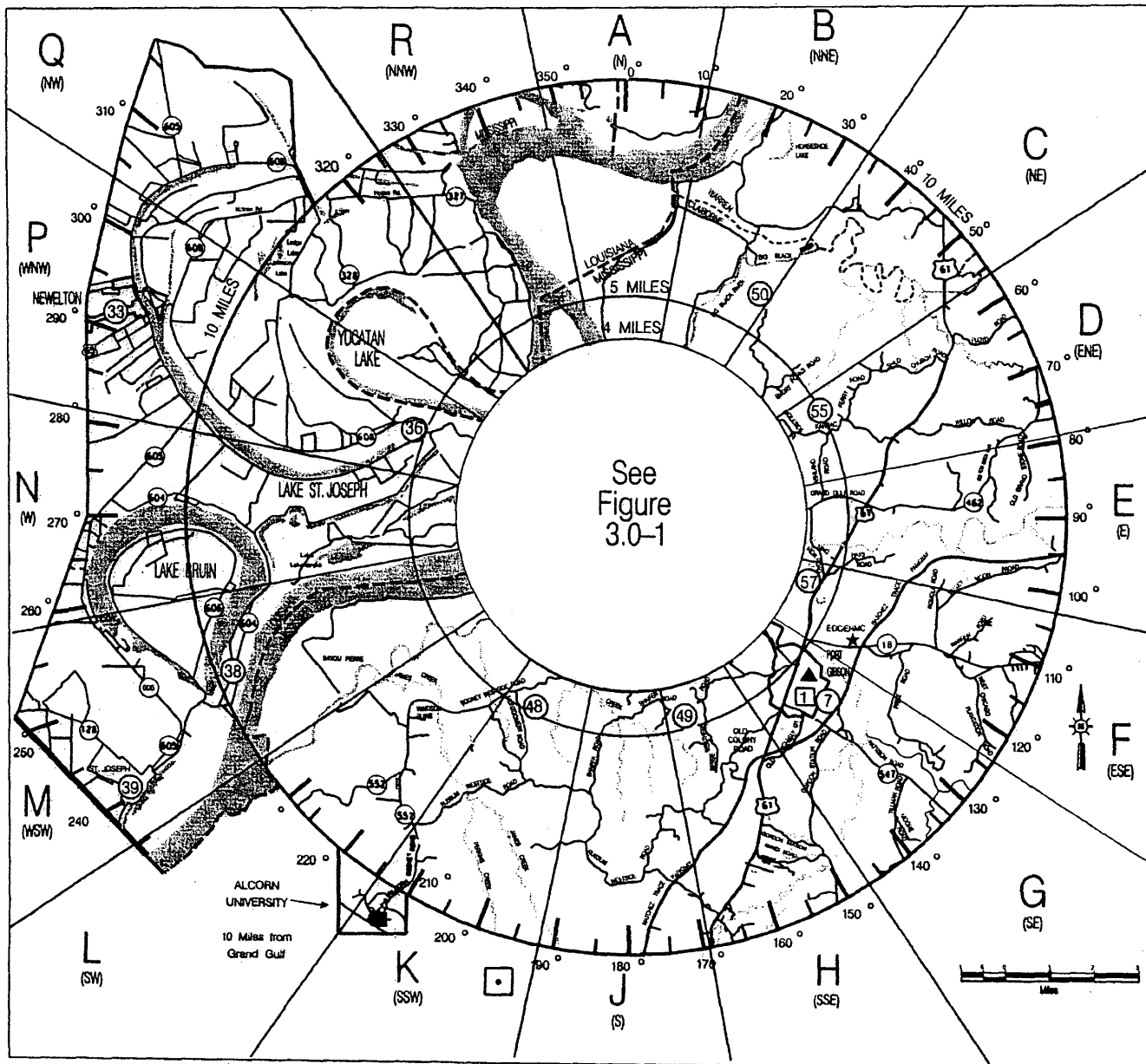
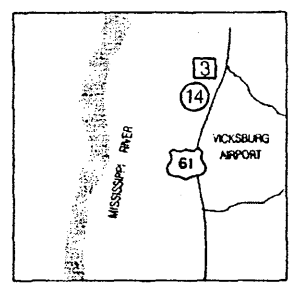
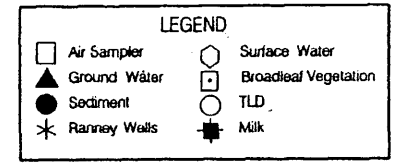



FIGURE 3.0-2  
 Collection Site  
 Locations, General Area Map  
 4-10 Mile Area Map



18 MILES FROM GRAND GULF TO  
 VICKSBURG AIRPORT Sector (B)

  
 ENTERGY  
 GRAND GULF NUCLEAR STATION  
 4-10 Mile Environmental  
 Sampling Location Map  
 Grand Gulf, Unit 1 3.0-8 Revision 35 0907

OFFSITE DOSE CALCULATION MANUAL  
APPENDIX A  
RADIOLOGICAL EFFLUENT CONTROLS AND  
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAMS

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## 1.0 DEFINITIONS

### GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM

1.1 The GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM is the 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.

### MEMBER(S) OF THE PUBLIC

1.2 MEMBER(S) OF THE PUBLIC shall include individuals in a controlled or unrestricted area. However, an individual is not a member of the public during any period in which the individual receives an occupational dose.

### OFFSITE DOSE CALCULATION MANUAL (ODCM)

1.3 The OFFSITE DOSE CALCULATION MANUAL (ODCM) shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Environmental Radiological Monitoring Program. The ODCM shall also contain (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs required by Technical Specification 5.5.4 and Technical Requirement 7.6.3.2 and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Annual Radioactive Effluent Release Reports required by Technical Specifications 5.6.2 and 5.6.3.

### PROCESS CONTROL PROGRAM (PCP)

1.4 The PROCESS CONTROL PROGRAM (PCP) shall contain the current formulas, sampling, analyses, test, and determinations to be made to ensure that processing and packaging of solid radioactive wastes based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure compliance with 10CFR Parts 20, 61, and 71, State regulations, burial ground requirements, and other requirements governing the disposal of solid radioactive waste.

SITE BOUNDARY

1.5 The SITE BOUNDARY shall be that line beyond which the land or property is not owned, leased, or otherwise controlled by the licensee.

UNRESTRICTED AREA

1.6 An UNRESTRICTED AREA shall be any area, at or beyond the SITE BOUNDARY, access to which is not controlled by the licensee for the purposes of protection of individuals from exposure to radiation and radioactive materials, or any area within the SITE BOUNDARY used for residential quarters or for industrial commercial, institutional, and/or recreational purposes. The UNRESTRICTED AREA and SITE BOUNDARY are synonymous with the exception of areas over bodies of water.

VENTILATION EXHAUST TREATMENT SYSTEM

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

Additional Definitions are listed in Technical Specification Section 1.1.

TABLE 1.1

SURVEILLANCE FREQUENCY NOTATION

Surveillance Frequencies are specified in individual LCOs. For more information see Technical Specification Section 1.4.

TABLE 1.2

MODES

Modes of operation are shown in Technical Specification Table 1.1-1

3.0 APPLICABILITY

LIMITING CONDITION FOR OPERATION (LCO)

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See Technical Specification Section 3.0 for LCO Applicability.



APPLICABILITY

SURVEILLANCE REQUIREMENTS (SR)

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See Technical Specification Section 3.0 for SR applicability.

**SECTION 5.0**

**ADMINISTRATIVE CONTROLS**

## 5.0 ADMINISTRATIVE CONTROLS

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### 5.6.2 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT

Routine radiological environmental operating reports covering the operation of the unit during the previous calendar year shall be submitted before May 1 of each year.

The annual radiological environmental operating reports shall include summaries, interpretations, and an analysis of trends of the results of the radiological environmental surveillance activities for the report period, including a comparison with preoperational studies, operational controls (as appropriate), and previous environmental surveillance reports and an assessment of the observed impacts of the plant operation on the environment. The reports shall also include the results of land use censuses required by LCO 6.12.2. 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 the Table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979 of all radiological environmental samples taken during the report period. Deviations from the sampling program identified in LCO 6.12.1 shall be reported. 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:

- 1) a summary description of the radiological environmental monitoring program;
- 2) a map of all sampling locations keyed to a table giving distances and directions from one reactor;
- 3) and the results of licensee (or offsite laboratory's) participation in the Interlaboratory Comparison Program, required by LCO 6.12.1.

## 5.0 ADMINISTRATIVE CONTROLS

### 5.6.3 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

A Radioactive Effluent Release Report covering the operation of the unit during the previous year shall be submitted before May 1 of each year.

- a. The Radioactive Effluent Release Report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the unit as outlined in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof. For solid wastes, the format for Table 3 and Appendix B shall be supplemented with three additional categories: class of solid wastes (as defined by 10 CFR Part 61), type of container (e.g., Steel Liner, High Integrity Container) and SOLIDIFICATION Agent or absorbent (e.g., cement, urea formaldehyde).

The Radioactive Effluent Release Report shall include an annual summary of hourly meteorological data collected over the previous year. This annual summary may be either in the form of an hour-by-hour listing on magnetic tape of wind speed, wind direction, atmospheric stability, and precipitation (if measured), or in the form of joint frequency distributions of wind speed, wind direction, and atmospheric stability.\* This same report shall include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released from the unit or station during the previous calendar year. This same report shall also include an assessment of the radiation doses from radioactive liquid and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the SITE BOUNDARY during the reporting period. All assumptions used in making these assessments, i.e., specific activity, exposure time, and location, shall be included in these reports. The meteorological conditions concurrent with the time of release of radioactive materials in gaseous effluents, as determined by sampling frequency and measurement or historical annual average meteorological conditions, shall be used for determining the gaseous pathway doses. The assessment of radiation doses shall be performed in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

The Radioactive Effluent Release Report shall also include an assessment of radiation doses to the likely most exposed MEMBER OF THE PUBLIC from reactor releases and other nearby uranium fuel cycle sources, including doses from primary effluent pathways and direct radiation, for the previous calendar year to show conformance with 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operation." Acceptable methods for calculating the dose contribution from liquid and gaseous effluents are given in Regulatory Guide 1.109, Rev 1, October 1977 and NUREG - 0133.

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

The Radioactive Effluent Release Report shall include any changes made during the reporting period to the OFFSITE DOSE CALCULATION MANUAL (ODCM), pursuant to Technical Specification 5.5.1, as well as any major change to Liquid, Gaseous, or Solid Radwaste Treatment Systems. It shall also include a listing of new locations for dose calculations and/or environmental monitoring identified by the Land Use Census pursuant to LCO 6.12.2.

\* In lieu of submission with the Radioactive Effluent Release Report, the licensee has the option of retaining this summary of required meteorological data onsite in a file that shall be provided to the NRC on request.

## 5.0 ADMINISTRATIVE CONTROLS

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### 5.6.3 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (Continued)

The Radioactive Effluent Release Report shall also include the following: an explanation as to why the inoperability of liquid or gaseous effluent monitoring instrumentation was not corrected within the time specified in LCOs 6.3.9 or 6.3.10, and description of the events leading to liquid holdup tanks exceeding the limits of Technical Specification 5.5.8.b.

- b. Major changes to the Radioactive Waste Treatment System (liquid, gaseous and solid\*\*) shall be reported to the Commission in the Annual Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the OSRC.
- (1) A summary of the evaluation that led to the determination that the change could be made in accordance with 10 CFR 50.59;
  - (2) Sufficient detailed information to totally support the reason for the change without benefit of additional or supplemental information;
  - (3) A detailed description of the equipment, components and processes involved and the interfaces with other plant systems;
  - (4) An evaluation of the change which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the license application and amendments thereto;
  - (5) An evaluation of the change which shows the expected maximum exposures to MEMBERS OF THE PUBLIC in the UNRESTRICTED AREA and to the general population that differ from those previously estimated in the license application and amendments thereto;
  - (6) 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 before when the changes are to be made;
  - (7) An estimate of the exposure to plant operating personnel as a result of the change; and
  - (8) Documentation of the fact that the change was reviewed and found acceptable by the OSRC.

The Radioactive Effluent Release Report shall also include:

- c. a summary of the quantities of radioactive solid waste released from the unit as outlined in Regulatory Guide 1.21, "Measuring, Evaluating, and Report Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B and Table 3. The following information for each type of solid waste shipped offsite for the report will be included in the report:
- (1) Container Volume,
  - (2) Total curie quantity (specify whether determined by measurement or estimate),

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\*\* The information called for in this Specification may be submitted as part of the next UFSAR update.

5.0 ADMINISTRATIVE CONTROLS

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5.6.3 ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (Continued)

- (3) Principal radionuclide (specify whether determined by measurement or estimate),
- (4) Type of waste (e.g., spent resin, compact dry waste),
- (5) Class of solid waste (as defined by 10CFR Part 61),
- (6) Type of Container (e.g. Steel Liner, High Integrity Container),
- (7) Solidification agent or absorbent (e.g. cement, urea formaldehyde).

SECTION 6.0  
LIMITING CONDITIONS FOR OPERATION  
AND  
SURVEILLANCE REQUIREMENTS

6.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY

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LCO 6.0.1           When a Technical Specification (if LCO 3.0.3 is not applicable) or an Offsite Dose Calculation Manual LCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, the following actions shall be taken:

1.     Develop and implement compensatory actions as needed.
2.     Verify that a required safety function is not compromised by the inoperabilities.
3.     Develop a plan for exiting LCO 6.0.1.
4.     Obtain Duty Manager approval of the compensatory actions and a plan for exiting LCO 6.0.1 within 4 hours.

Where corrective measures are completed that permit operation in accordance with the LCO or ACTIONS, completion of the actions required by LCO 6.0.1 is not required.

LCO 6.0.1 is always applicable to Offsite Dose Calculation Manual LCOs and only applicable to Technical Specification LCOs if LCO 3.0.3 is not applicable.

LCO 6.0.1 is not to be voluntarily entered and actions to exit LCO 6.0.1 must be pursued without delay and in a controlled manner.





ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. As required by Required Action A.2 and referenced in Table 6.3.9-1.</p>	<p>B.1 At least two independent samples are analyzed in accordance with LCO 6.11.1.</p> <p><u>AND</u></p> <p>B.2 At least two technically qualified members of the Facility Staff independently verify the release rate calculations and discharge path valve line-up.</p> <p><u>AND</u></p> <p>B.3 Restore channel to operable.</p>	<p>Prior to each release.</p> <p>Prior to each release.</p> <p>14 days</p>
<p>C. As required by Required Action A.2 and referenced in Table 6.3.9-1.</p>	<p>C.1 Estimate the flow rate for the affected pathway during actual releases. Pump curves or discharge canal flow monitor may be used to estimate flow.</p> <p><u>AND</u></p> <p>C.2 Restore channel to operable.</p>	<p>Once per 4 hours</p> <p>30 days</p>
<p>D. Required Action and associated Completion Time of Condition B not met.</p>	<p>D.1 Suspend release of radioactive effluent via affected pathway.</p> <p><u>AND</u></p> <p>D.2 Initiate action to explain why this inoperability was not corrected in a timely manner in the next Annual Radioactive Effluent Release Report.</p>	<p>Immediately</p> <p>Immediately,</p>
<p>E. Required Action and associated Completion Time of Condition C not met.</p>	<p>E.1 Initiate action to explain why this inoperability was not corrected in a timely manner in the next Annual Radioactive Effluent Release Report.</p>	<p>Immediately</p>

SURVEILLANCE REQUIREMENTS

-----NOTES-----  
 Refer to Table 6.3.9-1 to determine which SRs apply to each channel.  
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SURVEILLANCE	FREQUENCY
SR 6.3.9.1 -----NOTE----- For flow rate measurement devices a CHANNEL CHECK shall consist of verifying indication of flow during periods of release. A CHANNEL CHECK shall be made at least once per 24 hours on days which batch releases are made. ----- Perform CHANNEL CHECK.	24 hours
SR 6.3.9.2 Perform a source check, a qualitative assessment of channel response when the channel sensor is exposed to a radioactive source.	Prior to each release.
SR 6.3.9.3 -----NOTE----- The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occur if any of the following conditions exists: 1. Instrument indicates measured levels above the alarm/trip setpoint. 2. Circuit failure. 3. Instrument indicates a downscale failure. 4. Instrument controls not set in operate mode. ----- Perform CHANNEL FUNCTIONAL TEST.	92 days

(continued)

SURVEILLANCE	FREQUENCY
SR 6.3.9.4 Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 6.3.9.5 -----NOTE----- The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used. ----- Perform a CHANNEL CALIBRATION.	12 months
SR 6.3.9.6 Perform a CHANNEL CALIBRATION	18 months

TABLE 6.3.9-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>CONDITIONS REFERENCED FROM REQUIRED ACTION A.2</u>	<u>SURVEILLANCE REQUIREMENTS</u>
1. GROSS RADIOACTIVITY MONITORS PROVIDING ALARM AND AUTOMATIC TERMINATION OF RELEASE			
a. Liquid Radwaste Effluent Line	1	B	SR 6.3.9.1 SR 6.3.9.2 SR 6.3.9.3 SR 6.3.9.5
2. FLOW RATE MEASUREMENT DEVICES			
a. Liquid Radwaste Effluent Line	1	C	SR 6.3.9.1 SR 6.3.9.4 SR 6.3.9.6
b. Circulating Water Blowdown	1	C	SR 6.3.9.1 SR 6.3.9.4 SR 6.3.9.6

6.3 INSTRUMENTATION

6.3.10 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

LCO 6.3.10 The radioactive gaseous effluent monitoring instrumentation channels shown in Table 6.3.10-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of LCO 6.11.4 are not exceeded. The alarm/trip setpoints of these channels shall be determined in accordance with the OFFSITE DOSE CALCULATION MANUAL (ODCM).

APPLICABILITY: As shown in Table 6.3.10-1

ACTIONS

-----NOTES-----

1. Separate Condition entry is allowed for each Channel.
  2. The provisions of Specification 3.0.3 and LCO 3.0.4 are not applicable.
- 

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1 Suspend release of radioactive effluent via affected pathway.	Immediately
	<p><u>OR</u></p> <p>-----NOTES-----                      Once required Action A.2 is entered the Completion Time for Condition Referenced on Table 6.3.10-1 can not be restarted by reentering Required Action A.1.                      -----</p> <p>A.2 Enter the Condition referenced in Table 6.3.10-1 for the channel.</p>	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. As required by Required Action A.2 and referenced in Table 6.3.10-1.</p>	<p>B.1 Take grab samples during release.</p> <p><u>AND</u></p> <p>B.2 Analyze the above required samples for gross activity.</p> <p><u>AND</u></p> <p>B.3 Restore channel to operable.</p>	<p>Once per 8 hours</p> <p>Within 24 hours of taking the sample</p> <p>30 days</p>
<p>C. As required by Required Action A.2 and referenced in Table 6.3.10-1.</p>	<p>C.1 Establish an alternate means to collect samples required by Table 6.11.4-1.</p> <p><u>AND</u></p> <p>C.2 Enter Condition D for the alternate sample established in C.1.</p> <p><u>AND</u></p> <p>C.3 Restore channel to operable.</p>	<p>Immediately</p> <p>Immediately</p> <p>30 days</p>
<p>D. As required by Required Action A.2 and referenced in Table 6.3.10-1 or Required Action C.2.</p>	<p>D.1 Estimate flow rate.</p> <p><u>AND</u></p> <p>D.2 Restore channel to operable.</p>	<p>Once per 8 hours</p> <p>30 days</p>

(continued)





ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>G. As required by Required Action A.2 and referenced in Table 6.3.10-1.</p>	<p>G.1 Take grab samples during release.</p> <p><u>AND</u></p> <p>G.2 Analyze the above required samples for gross activity.</p> <p><u>AND</u></p> <p>G.3 Restore channel to operable.</p>	<p>Once per 4 hours</p> <p>Within 24 hours of taking the sample</p> <p>30 days</p>
<p>H. Required Actions and associated Completion Times of Condition B,C,D,E or G not met.</p>	<p>H.1 Suspend release of radioactive effluent via this pathway.</p> <p><u>AND</u></p> <p>H.2 Initiate action to explain why this inoperability was not corrected in a timely manner in the next Annual Radioactive Effluent Release Report.</p>	<p>Immediately</p> <p>Immediately</p>
<p>I. Required Action and associated Completion Time of Condition F not met.</p>	<p>I.1 Enter LCO 6.0.1</p>	<p>Immediately</p>

SURVEILLANCE REQUIREMENTS

-----NOTES-----

1. Refer to Table 6.3.10-1 to determine which SRs apply to each channel.
  2. When a monitor is placed in an inoperable status solely for performance of required Surveillance's, entry into associated Conditions and Required Actions in accordance with LCO 6.3.10 may be delayed for up to 1 hour.
- 

SURVEILLANCE	FREQUENCY
SR 6.3.10.1    Perform CHANNEL CHECK.	24 hours
SR 6.3.10.2    Perform CHANNEL CHECK.	7 days
SR 6.3.10.3    -----NOTE----- 1. Not required to be performed in MODES 1 and 2 for the offgas pre-treatment monitor if inaccessible due to a high radiation area.  2. Not required to be performed for the offgas pretreatment monitor when entering MODES 3 and 4 from MODES 1 or 2 until 8 hours after entering MODE 3 or 4 if monitor was inaccessible due to a high radiation area.  -----  Perform SOURCE CHECK , a qualitative assessment of channel response when the channel sensor is exposed to a radioactive source.	31 days
SR 6.3.10.4    -----NOTE----- The CHANNEL FUNCTIONAL TEST shall also demonstrate the automatic isolation capability of the instrumentation for this pathway and the control room alarm annunciation capability, if any of the following conditions exists:  1. Instrument indicates measured levels above the alarm/trip setpoint.  2. Circuit failure.  3. Instrument indicates a downscale failure.  4. Instrument controls not set in operate mode.  -----  Perform CHANNEL FUNCTIONAL TEST.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 6.3.10.5 -----NOTE-----                      The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occur if any of the following conditions exists:</p> <ol style="list-style-type: none"> <li>1. Instrument indicates measured levels above the alarm/trip setpoint.</li> <li>2. Circuit failure.</li> <li>3. Instrument indicates a downscale failure.</li> <li>4. Instrument controls not set in operate mode.</li> </ol> <p>-----                      Perform CHANNEL FUNCTIONAL TEST.</p>	<p>92 days</p>
<p>SR 6.3.10.6 -----NOTE-----                      Compare the measured flow rate to the expected design flow rate for existing plant conditions.</p> <p>-----                      Perform CHANNEL FUNCTIONAL TEST.</p>	<p>92 days</p>
<p>SR 6.3.10.7 -----NOTE-----                      1. The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.</p> <p>2. The offgas pre-treatment and offgas post-treatment sensors will be calibrated for mr/hr or cpm from the calibration standard. The conversion to release rate will be performed during subsequent unit operation, but within one week.</p> <p>-----                      Perform a CHANNEL CALIBRATION.</p>	<p>12 months</p>
<p>SR 6.3.10.8 Perform a CHANNEL CALIBRATION</p>	<p>18 months</p>

TABLE 6.3.10-1

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>CONDITIONS REFERENCED FROM REQUIRED ACTION A.2</u>	<u>SURVEILLANCE REQUIREMENTS</u>
1. RADWASTE BUILDING VENTILATION MONITORING SYSTEM				
a. Noble Gas Activity Monitor Providing Alarm	1	(a)	B	SR 6.3.10.1 SR 6.3.10.3 SR 6.3.10.5 SR 6.3.10.7
b. Iodine Sampler	1	(a)	C	SR 6.3.10.2
c. Particulate Sampler	1	(a)	C	SR 6.3.10.2
d. Effluent System Flow Rate Measuring Device	1	(a)	D	SR 6.3.10.1 SR 6.3.10.8
e. Sampler Flow Rate Measuring Device	1	(a)	D	SR 6.3.10.1 SR 6.3.10.8
2. CONTAINMENT VENTILATION MONITORING SYSTEM				
a. Noble Gas Activity Monitor Providing Alarm	1	(a)	B	SR 6.3.10.1 SR 6.3.10.3 SR 6.3.10.5 SR 6.3.10.7

TABLE 6.3.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>CONDITIONS REFERENCED FROM REQUIRED ACTION A.2</u>	<u>SURVEILLANCE REQUIREMENTS</u>
b. Iodine Sampler	1	(a)	C	SR 6.3.10.2
c. Particulate Sampler	1	(a)	C	SR 6.3.10.2
d. Effluent System Flow Rate				
1. High Volume Flow Device	1	(d)	D	SR 6.3.10.1 SR 6.3.10.8
2. Low Volume Flow Device	1	(e)	D	SR 6.3.10.1 SR 6.3.10.6 SR 6.3.10.8
e. Sampler Flow Rate Measuring Device	1	(a)	D	SR 6.3.10.1 SR 6.3.10.8
3A. TURBINE BLDG. VENTILATION MONITORING SYSTEM				
a. Noble Gas Activity Providing Alarm	1	(a)	B	SR 6.3.10.1 SR 6.3.10.3 SR 6.3.10.5 SR 6.3.10.7
b. Iodine Sampler	1	(a)	C	SR 6.3.10.2
c. Particulate Sampler	1	(a)	C	SR 6.3.10.2
d. Effluent System Flow Rate Measuring Device	1	(a)	D	SR 6.3.10.1 SR 6.3.10.8
e. Sampler Flow Rate Measuring Device	1	(a)	D	SR 6.3.10.1 SR 6.3.10.8

TABLE 6.3.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>CONDITIONS REFERENCED FROM REQUIRED ACTION A.2</u>	<u>SURVEILLANCE REQUIREMENTS</u>	
3B. TURBINE BUILDING OCCASIONAL RELEASE POINT MONITORING SYSTEM					
a. Noble Gas Activity Providing Alarm	1(i)	(f) (h)	Immediately isolate	SR 6.3.10.1(g) SR 6.3.10.3(g) SR 6.3.10.5(g) SR 6.3.10.7(g)	
b. Iodine Sampler	1	(f) (h)	Immediately isolate	SR 6.3.10.2(g)	
c. Particulate Sampler	1	(f) (h)	Immediately isolate	SR 6.3.10.2(g)	
d. Effluent System Flow Rate Measuring Device	1(i)	(f) (h)	Immediately isolate	SR 6.3.10.1(g) SR 6.3.10.6(g) SR 6.3.10.8(g)	
e. Sampler Flow Rate Measuring Device	1	(f) (h)	Immediately isolate	SR 6.3.10.1(g) SR 6.3.10.8(g)	
4. FUEL HANDLING AREA VENTILATION MONITORING SYSTEM					
a. Noble Gas Activity Providing Alarm	1	(a)	B	SR 6.3.10.1 SR 6.3.10.3 SR 6.3.10.5 SR 6.3.10.7	
b. Iodine Sampler	1	(a)	C	SR 6.3.10.2	
c. Particulate Sampler	1	(a)	C	SR 6.3.10.2	
d. Effluent Flow Rate Measuring Device	1	(a)	D	SR 6.3.10.1 SR 6.3.10.8	
e. Sampler Flow Rate Measuring Device	1	(a)	D	SR 6.3.10.1 SR 6.3.10.8	

TABLE 6.3.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>CONDITIONS REFERENCED FROM REQUIRED ACTION A.2</u>	<u>SURVEILLANCE REQUIREMENTS</u>
5. OFFGAS PRE-TREATMENT MONITOR				
a. Noble Gas Activity Monitor Providing Alarm	1	(c)	F	SR 6.3.10.1 SR 6.3.10.3 SR 6.3.10.5 SR 6.3.10.7
6. OFFGAS POST-TREATMENT MONITOR				
a. Noble Gas Activity Monitor Providing Alarm and Automatic Termination of Release	2	(b)	E	SR 6.3.10.1 SR 6.3.10.3 SR 6.3.10.4 SR 6.3.10.7
7. STANDBY GAS TREATMENT EXHAUST MONITORING SYSTEM (A&B)				
a. Noble Gas Activity Monitor Providing Alarm	1/system	(a)	G	SR 6.3.10.1 SR 6.3.10.3 SR 6.3.10.5 SR 6.3.10.7

TABLE 6.3.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION  
TABLE NOTATION

- (a) At all times.
- (b) During main condenser offgas treatment system operation.
- (c) When any steam jet air ejector (SJAE) is in operation.
- (d) During containment high volume purge.
- (e) During containment low volume purge.
- (f) In modes 1, 2 and 3, when in service.
- (g) Prior to each use and at the specified frequency.
- (h) When in modes 4 & 5, UP TO 4 Turbine roof hatches may be open as long as the radionuclide concentrations are  $\leq 30\%$  of the ODCM dose limits in 6.11.4 and 6.11.6.
- (i) When in modes 4 and 5, this monitoring instrumentation is not required.



6.11 RADIOACTIVE EFFLUENTS

6.11.1 LIQUID EFFLUENTS CONCENTRATION

LCO 6.11.1 The concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS shall be limited to ten times the effluent concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to  $2 \times 10^{-4}$  microcuries/ml total activity.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS exceeds the above limits.	A.1 Restore the concentration to within the above limits. <u>AND</u> A.2 Declare the liquid effluent waste treatment system inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 6.11.1.1	The radioactivity content of each batch of radioactive liquid waste shall be determined before release by sampling and analysis in accordance with (ODCM) Table 6.11.1-1.	Per (ODCM) Table 6.11.1-1.
SR 6.11.1.2	Post-release analyses of samples composited from batch releases shall be performed in accordance with (ODCM) Table 6.11.1-1.	Per (ODCM) Table 6.11.1-1.

TABLE 6.11.1-1

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

Liquid Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) ( $\mu\text{Ci/ml}$ ) (a)
A. Batch Waste Release Tanks (c)	Prior to Release Each Batch	Prior to Release Each Batch	Principal Gamma Emitters(d)	$5 \times 10^{-7}$
			I-131	$1 \times 10^{-6}$
	Prior to Release One Batch/M	31 days	Dissolved and Entrained Gases (Gamma emitters)	$1 \times 10^{-5}$
			H-3	$1 \times 10^{-5}$
				Gross Alpha
Prior to Release Each Batch	31 days Composite(b)	Sr-89, Sr-90	$5 \times 10^{-8}$	
		Fe-55	$1 \times 10^{-6}$	
B. SSW Basin (before blowdown)	Prior to Release Each Blowdown	Prior to Release Each Batch	Principal Gamma Emitters(d)	$5 \times 10^{-7}$
			I-131	$1 \times 10^{-6}$

TABLE 6.11.1-1 (Continued)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATION

- a. The LLD is the smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

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

$$\text{LLD} = \frac{4.66 s_b}{\text{_____}}$$

where

$$E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)$$

- LLD is the "a priori" lower limit of detection as defined above (as  $\mu\text{Ci}$  per unit mass or volume). (Current literature defines the LLD as the detection capability for the instrumentation only, and the MDC, minimum detectable concentration, as the detection capability for a given instrument, procedure, and type of sample.)
- $s_b$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute)
- E is the counting efficiency (as counts per disintegration)
- V is the sample size (in units of mass or volume)
- $2.22 \times 10^6$  is the number of disintegrations per minute per microcurie
- 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 particular measurement system should 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 predicated variance.

Typical values of E, V, Y and  $\Delta t$  should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as a posteriori (after the fact) limit for a particular measurement.

TABLE 6.11.1-1 (Continued)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATION (Continued)

- b. A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen which is representative of the liquids released.
- c. A batch release is the discharge of liquid wastes of a discrete volume. Before sampling for analyses, each batch shall be isolated, and then thoroughly mixed to assure representative sampling.
- d. The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141, and Ce-144. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported.

6.11 RADIOACTIVE EFFLUENTS

6.11.2 LIQUID EFFLUENT DOSE

LCO 6.11.2 The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released to UNRESTRICTED AREAS shall be:

- a.  $\leq 1.5$  mrem to the total body and  $\leq 5$  mrem to any organ, during any calendar quarter, and
- b.  $\leq 3$  mrem to the total body and  $\leq 10$  mrem to any organ, during any calendar year.

APPLICABILITY: At all times.

ACTIONS

-----NOTES-----

- 1. The provisions of Specification 3.0.3 are not applicable.
  - 2. Separate Condition entry is allowed for each of the above limits.
- 

<u>CONDITION</u>	<u>REQUIRED ACTION</u>	<u>COMPLETION TIME</u>
A. The calculated dose from the release of radioactive materials in liquid effluents greater than any of the above limits.	A.1 Initiate action to prepare and submit a Special Report within 30 days.  <u>AND</u>  A.2 Declare the liquid effluent waste treatment system inoperable.	Immediately

(continued)

<p>B. The calculated doses from the release of radioactive materials in liquid effluents greater than twice any of the above limits.</p>	<p>B.1 Initiate action to calculate the direct radiation contributions from the reactor unit and from outside storage tanks to determine whether the total annual dose or dose commitment to any MEMBER OF THE PUBLIC greater than:</p> <p>a) 25 mrem to the total body or any organ, except the thyroid.</p> <p><u>OR</u></p> <p>b) 75 mrem to the thyroid.</p>	<p>Immediately</p>
--	--	--------------------

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 6.11.2.1 Cumulative dose contributions from liquid effluents for the current calendar quarter and the current calendar year shall be determined in accordance with the methodology and parameters of the ODCM.</p>	<p>31 days</p>

6.11 RADIOACTIVE EFFLUENTS

6.11.3 LIQUID EFFLUENT WASTE TREATMENT

LCO 6.11.3 The liquid radwaste system shall be used to reduce the radioactive materials in liquid wastes before their discharge when the projected doses due to the liquid effluent to UNRESTRICTED AREAS would be > 0.06 mrem to the total body or > 0.2 mrem to any organ, in a 31-day period.

APPLICABILITY: At all times.

ACTIONS

-----NOTES-----

The provisions of specification 3.0.3 are not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Radioactive liquid waste being discharged without treatment and in excess of the above limits.	A.1 Initiate action to prepare and submit, a Special Report within 30 days.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 6.11.3.1 Doses due to liquid releases to UNRESTRICTED AREAS shall be projected in accordance with methodology and parameters in the ODCM.</p> <p><u>AND</u></p> <p>-----NOTE-----                      Not required to be met when the projected dose less than or equal to the above limit.                      -----                      Verify the liquid effluent waste treatment system is being used to reduce radioactive materials before discharge.</p>	31 days



6.11 RADIOACTIVE EFFLUENTS

6.11.4 GASEOUS EFFLUENTS - DOSE RATE

LCO 6.11.4 The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY shall be:

- a. For noble gases:  $\leq 500$  mrem/yr to the total body and  $\leq 3000$  mrem/yr to the skin, and
- b. For all iodine-131, iodine-133, tritium and all radionuclides in particulate form with half lives greater than 8 days:  $\leq 1500$  mrem/yr to any organ.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Dose rate exceeding the above limits.	A.1 Decrease the release rate to within the above limit(s).  <u>AND</u>  A.2 Declare the ventilation exhaust treatment system inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 6.11.4.1     The dose rate due to noble gases in gaseous effluents shall be determined to be within the above limits by obtaining representative samples and performing analyses in accordance with (ODCM) Table 6.11.4-1.	Per (ODCM) Table 6.11.4-1.
SR 6.11.4.2     The dose rate due to iodine-131, iodine-133, tritium and to radionuclides in particulate form with half lives greater than 8 days in gaseous effluents shall be determined to be within the above limits by obtaining representative samples and performing analyses in accordance with (ODCM) Table 6.11.4-1.	Per (ODCM) Table 6.11.4-1.

TABLE 6.11.4-1  
RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

Gaseous Release Type	Sampling Frequency	Minimum Analysis Frequency	Type of Activity Analysis	Lower Limit of Detection (LLD) ( $\mu\text{Ci/ml}$ ) (a)
A. (1) Radwaste Building Ventilation Exhaust	31 days Grab Sample (f)	31 days	Principal Gamma Emitters (b,e)	$1 \times 10^{-4}$
			H-3	$1 \times 10^{-6}$
(2) Fuel Handling Area Ventilation Exhaust	Continuous (d) (f)	7 days (c) Charcoal Sample	I-131	$1 \times 10^{-12}$
			I-133	$1 \times 10^{-10}$
(3) Containment Ventilation Exhaust	Continuous (d) (f)	7 days (c) Particulate Sample	Principal Gamma Emitters (e) (I-131, Others)	$1 \times 10^{-11}$
(4A) Turbine Building Ventilation Exhaust	Continuous (d) (f)	31 days Composite Particulate Sample	Gross Alpha	$1 \times 10^{-11}$
(4B) Turbine Building Occasional Release Point (g) (when in service)	Continuous (d) (f)	92 days Composite Particulate Sample	Sr-89, Sr-90	$1 \times 10^{-11}$
			Noble Gas Monitor	Noble Gases Gross Beta or Gamma
B. (1) Offgas Post Treatment Exhaust, whenever there is flow	31 days Grab Sample (f)	31 days	Principal Gamma Emitters (e)	$1 \times 10^{-4}$
(2) Standby Gas Treatment A Exhaust, whenever there is flow				
(3) Standby Gas Treatment B Exhaust, whenever there is flow				

See "Table Notation" which follows.

TABLE 6.11.4-1 (Continued)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATION

- a. The LLD is the smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

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

$$\text{LLD} = \frac{4.66 s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

where

- LLD is the "a priori" lower limit of detection as defined above (as  $\mu\text{Ci}$  per unit mass or volume). (Current literature defines the LLD as the detection capability for the instrumentation only, and the MDC, minimum detectable concentration, as the detection capability for a given instrument, procedure, and type of sample.)
- $s_b$  is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute)
- E is the counting efficiency (as counts per disintegration)
- V is the sample size (in units of mass or volume)
- $2.22 \times 10^6$  is the number of disintegrations per minute per microcurie
- 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 particular measurement system should 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 predicated variance.

Typical values of E, V, Y and  $\Delta t$  should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as a posteriori (after the fact) limit for a particular measurement.

TABLE 6.11.4-1 (Continued)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATION (Continued)

- b. Analyses shall also be performed following startup from cold shutdown, or a THERMAL POWER change exceeding 15 percent of the RATED THERMAL POWER within a one hour period. This requirement does not apply if:
- (1) routine analysis required by the Surveillance Requirements of LCO 3.4.8 shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; and
  - (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.
- c. Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing or after removal from sampler. Sampling and analyses shall be performed at least once per 24 hours for at least 7 days following each shutdown, startup or THERMAL POWER change exceeding 15 percent of RATED THERMAL POWER in one hour. When samples collected for 24 hours are analyzed, the corresponding LLD's may be increased by a factor of 10. This requirement does not apply if:
- (1) routine analysis required by the Surveillance Requirements of LCO 3.4.8 shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; and
  - (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.
- d. 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 LCOs 6.11.4 and 6.11.6.
- e. The principal gamma emitters for which the LLD specification applies exclusively are the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 for gaseous emissions and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported.
- f. When a monitor is placed in an inoperable status solely for performance of required Surveillance's, entry into associated Conditions and Required Actions in accordance with LCO 6.3.10 may be delayed for up to 1 hour.
- g. When in modes 4 and 5, continuous noble gas monitor alarm is not required.

6.11 RADIOACTIVE EFFLUENTS

6.11.5 GASEOUS EFFLUENT DOSE - NOBLE GASES

LCO 6.11.5 The air dose due to noble gases released in gaseous effluents, from the site to areas at and beyond the SITE BOUNDARY shall be:

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

APPLICABILITY: At all times.

ACTIONS

-----NOTES-----

- 1. The provisions of Specification 3.0.3 are not applicable.
  - 2. Separate Condition entry is allowed for each of the above limits.
- 

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The calculated air dose from the radioactive noble gases in gaseous effluents greater than any of the above limits.	A.1 Initiate action to prepare and submit, a Special Report within 30 days.  <u>AND</u>  A.2 Declare the ventilation exhaust treatment system inoperable.	Immediately

(continued)

<p>B. The calculated doses from the release of radioactive materials in gaseous effluents greater than twice any of the above limits.</p>	<p>B.1 Initiate action to calculate the direct radiation contributions from the reactor unit and from outside storage tanks to determine whether the total annual dose or dose commitment to any MEMBER OF THE PUBLIC greater than:</p> <p>a) 25 mrem to the total body or any organ, except the thyroid.</p> <p><u>OR</u></p> <p>b) 75 mrem to the thyroid.</p>	<p>Immediately</p>
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SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 6.11.5.1 Cumulative dose contributions for noble gases for the current calendar quarter and current calendar year shall be determined in accordance with the methodology and parameters in the ODCM.</p>	<p>31 days</p>

6.11 RADIOACTIVE EFFLUENTS

6.11.6 GASEOUS EFFLUENT DOSE - IODINE-131, IODINE-133, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM

LCO 6.11.6 The dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, tritium and radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from the site to areas at and beyond the SITE BOUNDARY shall be:

- a.  $\leq 7.5$  mrem to any organ during any calendar quarter, and
- b.  $\leq 15$  mrem to any organ during any calendar year.

APPLICABILITY: At all times.

ACTIONS

-----NOTES-----

- 1. The provisions of Specification 3.0.3 are not applicable.
  - 2. Separate Condition entry is allowed for each of the above limits.
- 

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. The calculated dose from the release of iodine-131, iodine-133, tritium and radionuclides in particulate form, with half-lives greater than 8 days, in gaseous effluents greater than any of the above limits.</p>	<p>A.1 Initiate action to prepare and submit, a Special Report within 30 days.</p> <p><u>AND</u></p> <p>A.2 Declare the ventilation exhaust treatment system inoperable.</p>	<p>Immediately</p>

(continued)



<p>B. The calculated doses from the release of radioactive materials in gaseous effluents greater than twice any of the above limits.</p>	<p>B.1 Initiate action to calculate the direct radiation contributions from the reactor unit and from outside storage tanks to determine whether the total annual dose or dose commitment to any MEMBER OF THE PUBLIC greater than:</p> <p>a) 25 mrem to the total body or any organ, except the thyroid.</p> <p><u>OR</u></p> <p>b) 75 mrem to the thyroid.</p>	<p>Immediately</p>
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SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
<p>SR 6.11.6.1 Cumulative dose contributions from iodine-131, iodine-133, tritium and radionuclides in particulate form with half-lives greater than 8 days for the current calendar quarter and current calendar year shall be determined in accordance with the methodology and parameters in the ODCM.</p>	<p>31 days</p>

6.11 RADIOACTIVE EFFLUENTS

6.11.7 GASEOUS RADWASTE TREATMENT

LCO 6.11.7 The GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM shall be in operation.

APPLICABILITY: When the steam jet air ejector (SJAE) is in operation.

ACTIONS

-----NOTES-----

The provisions of Specification 3.0.3 are not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Gaseous radwaste from the SJAE being discharged without treatment.	A.1 Restore treatment to this discharge.	7 days
B. Required Action A.1 and Associated Completion Time not met.	B.1 Initiate action to prepare and submit a Special Report to the Commission within 30 days.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 6.11.7.1 Ensure that the GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM is operating.	12 hours

6.11 RADIOACTIVE EFFLUENTS

6.11.8 VENTILATION EXHAUST TREATMENT SYSTEM

LCO 6.11.8 The VENTILATION EXHAUST TREATMENT SYSTEM shall be used to reduce radioactive materials in gaseous waste before their discharge when the projected dose due to gaseous effluent releases to areas at and beyond the SITE BOUNDARY in a 31 day period would exceed 0.3 mrem to any organ.

APPLICABILITY: At all times.

ACTIONS

-----NOTES-----

The provisions of Specification 3.0.3 are not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Gaseous waste being discharged without treatment and greater than the above limit.	A.1 Initiate action to prepare and submit a Special Report to the Commission within 30 days.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 6.11.8.1 Doses due to gaseous releases to areas at and beyond the SITE BOUNDARY shall be projected in accordance with the methodology and parameters in the ODCM.  <u>AND</u>  -----NOTE----- 1. Not required to be met when the ventilation exhaust treatment system is undergoing routine maintenance.  2. Not required to be met when the projected dose less than or equal to the above limit.  ----- Verify the ventilation exhaust treatment system is operating.	31 days

6.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

6.12.1 MONITORING PROGRAM

LCO 6.12.1 The radiological environmental monitoring program shall be conducted as specified in ODCM Table 6.12.1-1. The results of this program shall be validated by use of an Interlaboratory Comparison Program corresponding to samples required by Table 6.12.1-1.

APPLICABILITY: At all times.

ACTIONS

-----NOTES-----  
 The provisions LCO 3.0.3 are not applicable.  
 -----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The radiological environmental monitoring program not being conducted as specified in ODCM Table 6.12.1-1.  <u>OR</u>  The required Interlaboratory Comparison Program not performed.	A.1 Initiate action to include in the next Annual Radiological Environmental Operating Report, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.	Immediately
B. The level of radioactivity as the result of plant effluent in an environmental sampling medium at a specified location exceeding the reporting levels of ODCM Table 6.12.1-2 when averaged over any calendar quarter.	B.1 Initiate action to prepare and submit a Special Report within 30 days.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Milk or broad leaf vegetation sampling is relocated from one or more of the sample locations required by ODCM Table 6.12.1-1.	C.1 Initiate action to identify this changed location(s) in the next Annual Radioactive Effluent Release Report.	Immediately
	<u>AND</u> C.2 Add this location(s) to the radiological environmental monitoring program.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 6.12.1.1 Radiological environmental monitoring samples shall be collected pursuant to ODCM Table 6.12.1-1 from the locations given in the table and figures in the ODCM and shall be analyzed pursuant to the requirements of ODCM Tables 6.12.1-1 and 6.12.1-3.	Per ODCM Table 6.12.1-1.
SR 6.12.1.2 Conduct an Interlaboratory Comparison Program and include a summary of the results in the Annual Radiological Environmental Operating Report.	366 days

TABLE 6.12.1-1  
OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples(a) and Locations	Sampling and Collection Frequency(a)	Type and Frequency of Analysis
<b>AIRBORNE</b>			
Radioiodine and Particulates	<p>Samples from 3 locations:</p> <p>1 sample close to the SITE BOUNDARY having the highest calculated annual average groundlevel D/Q.</p> <p>1 sample from the vicinity of a community having the highest calculated annual average groundlevel D/Q.</p> <p>1 sample from a control location 15-30 km (10-20 miles) distance(d)</p>	<p>Continuous sampler operation with sample collection per 7 days or as required by dust loading, whichever is more frequent</p>	<p>Radioiodine Cannister: I-131; 7 days</p> <p>Particulate Sampler: Gross beta radioactivity following filter change(b), composite (by location) for gamma isotopic(c); 92 days</p>
<b>DIRECT RADIATION(e)</b>	<p>16 stations with two or more dosimeters or one instrument for measuring and recording dose rate continuously. The stations will be placed in accessible sectors alternating between inner and outer ring locations*:</p> <ol style="list-style-type: none"> <li>1) an inner ring of stations in the general areas of the SITE BOUNDARY</li> <li>2) an outer ring approximately 3 to 5 miles from the site.</li> </ol> <p>8 additional stations should be placed in special interest areas such as population centers, nearby residences, schools, and in 1 or 2 areas to serve as control stations.</p> <p>5 additional stations will be placed in locations in the general area of the site boundary to supplement the inner ring monitoring locations.</p>	92 days	Gamma dose; 92 days

TABLE 6.12.1-i (Continued)

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples (a) and Locations	Sampling and Collection Frequency (a)	Type and Frequency of Analysis
<b>WATERBORNE</b>			
Surface	1 sample upstream 1 sample downstream	92 days	Gamma isotopic(c) and tritium analyses; 92 days
	One sample downstream during a liquid Radwaste Discharge	366 days	Gamma Isotopic (c) and tritium analyses; 366 days
	1 sample from Outfall 007	31 days	Tritium; 31 days
Ground	Samples from 2 sources	366 days	Gamma isotopic(c) and tritium; 366 days
Sediment from Shoreline	1 sample from downstream area 1 sample from upstream area	366 days	Gamma isotopic(c); 366 days
<b>INGESTION</b>			
Milk	1 sample from milking animals within 8 km if milk is available commercially.	92 days when required	Gamma isotopic(c) and I-131; 92 days
	1 control sample (only if indicator exists) > 8 km if milk is available.		

TABLE 6.12.1-1 (Continued)

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Exposure Pathway and/or Sample	Number of Samples(a) and Locations	Sampling and Collection Frequency(a)	Type and Frequency of Analysis
Food Products	1 sample of broad leaf vegetation grown in one of two different offsite locations with highest anticipated annual average ground level D/Q if milk sampling is not performed	92 days when available	Gamma isotopic(c) and I-131; 92 days
	1 sample of similar vegetation grown 15-30 km distant if milk sampling is not performed	92 days when available	Gamma isotopic(c) and I-131; 92 days
Fish	1 sample (e) in vicinity of GGNS discharge point	366 days	Gamma isotopic(c) on edible portion; 366 days
	1 sample (e) uninfluenced by GGNS discharge	366 days	Gamma isotopic(c) on edible portion; 366 days



TABLE 6.12.1-1 (Continued)

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

TABLE NOTATION

- \* As described in the ODCM. If a location is not accessible, instruments may be placed in an adjacent inner or outer location.
  
- a Specific parameters of distance and direction sector from the centerline of one reactor, and additional description where pertinent, shall be provided for each and every sample location in Table 6.12.1-1 in the table(s) and figure(s) in the ODCM. Refer to NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October 1978, and to Radiological Assessment Branch Technical Position, Revision 1, November 1979. Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment and other legitimate reasons. If specimens are unobtainable due to sampling equipment, malfunction, every effort shall be made to complete corrective action before the end of the next sampling period. All above deviations from the sampling schedule shall be documented in the Annual Radiological Environmental Operating Report.  
  
It is recognized that, at times, it may not be possible or practicable to continue to obtain samples of the media of choice at the most desired location or time. In these instances suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made within 30 days in the radiological environmental monitoring program. Identify the cause of the unavailability of samples for that pathway and identify the new location(s) for obtaining replacement samples in the next Annual Radioactive Effluent Release Report and also include in the report a revised figure(s) and table(s) for the ODCM reflecting the new location(s).
  
- b Particulate sample filters should be analyzed for gross beta 24 hours or more after sampling to allow for radon and thoron daughter decay. If gross beta activity in air or water is greater than ten times the yearly mean of control samples for any medium, gamma isotopic analysis should be performed on the individual samples.
  
- c Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents from the facility.
  
- d The purpose of this sample is to obtain background information.
  
- e Commercially important species preferred (catfish, buffalo); however, if unavailable, other species may be substituted.

TABLE 6.12.1-1 (Continued)

OPERATIONAL RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

TABLE NOTATION (Continued)

- e One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purposes of this table, a thermoluminescent dosimeter may be considered to be one phosphor and two or more phosphors in a packet may be considered as two or more dosimeters. Film badges should not be used for measuring direct radiation.

TABLE 6.12.1-2

## REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Reporting Levels<sup>b</sup>

Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m <sup>3</sup> )	Fish (pCi/Kg, wet)	Milk (pCi/l)	Food Products (pCi/Kg, wet)
H-3	$2 \times 10^4$ <sup>a</sup>	NA	NA	NA	NA
Mn-54	$1 \times 10^3$	NA	$3 \times 10^4$	NA	NA
Fe-59	$4 \times 10^2$	NA	$1 \times 10^4$	NA	NA
Co-58	$1 \times 10^3$	NA	$3 \times 10^4$	NA	NA
Co-60	$3 \times 10^2$	NA	$1 \times 10^4$	NA	NA
Zn-65	$3 \times 10^2$	NA	$2 \times 10^4$	NA	NA
Zr-Nb-95	$4 \times 10^2$	NA	NA	NA	NA
I-131	2	0.9	NA	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	$2 \times 10^2$	NA	NA	$3 \times 10^2$	NA

<sup>a</sup> For drinking water samples. This is a 40 CFR Part 141 value. If no drinking water pathway exists, a value of  $3 \times 10^4$  pCi/l may be used.

<sup>b</sup> See BASES 6.12.1 for reporting requirements when multiple or unlisted radionuclides are detected.

TABLE 6.12.1-3

MAXIMUM VALUES FOR THE LOWER LIMITS OF DETECTION (LLD) (a,b)

Analysis	Water (pCi/l)	Airborne Particulate or Gas (pCi/m <sup>3</sup> )	Fish (pCi/kg, wet)	Milk (pCi/l)	Broad Leaf Vegetation (pCi/kg, wet)	Sediment (pCi/kg, dry)
Gross beta	4	1 x 10 <sup>-2</sup>	NA	NA	NA	NA
H-3	2 x 10 <sup>3</sup> (d)	NA	NA	NA	NA	NA
Mn-54	15	NA	1.3 x 10 <sup>2</sup>	NA	NA	NA
Fe-59	30	NA	2.6 x 10 <sup>2</sup>	NA	NA	NA
Co-58, 60	15	NA	1.3 x 10 <sup>2</sup>	NA	NA	NA
Zn-65	30	NA	2.6 x 10 <sup>2</sup>	NA	NA	NA
Zr-95	30	NA	NA	NA	NA	NA
Nb-95	15	NA	NA	NA	NA	NA
I-131	1 (c)	7 x 10 <sup>-2</sup>	NA	1	60	NA
Cs-134	15	5 x 10 <sup>-2</sup>	1.3 x 10 <sup>2</sup>	15	60	1.5 x 10 <sup>2</sup>
Cs-137	18	6 x 10 <sup>-2</sup>	1.5 x 10 <sup>2</sup>	18	80	1.8 x 10 <sup>2</sup>
Ba-140	60	NA	NA	60	NA	NA
La-140	15	NA	NA	15	NA	NA

TABLE 6.12.1-3 (Continued)

MAXIMUM VALUES FOR THE LOWER LIMITS OF DETECTION (LLD)  
TABLE NOTATION

- a. Acceptable detection capabilities for thermoluminescent dosimeters used for environmental measurements are given in Regulatory Guide 4.13.
- b. Table 6.12.1-3 indicates acceptable detection capabilities for radioactive materials in environmental samples. These detection capabilities are tabulated in terms of the lower limits of detection (LLDs). The LLD is defined, for purposes of this guide, as the smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

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

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

where

LLD is the "a priori" lower limit of detection as defined above (as pCi per unit mass or volume). (Current literature defines the LLD as the detection capability for the instrumentation only, and the MDC, minimum detectable concentration, as the detection capability for a given instrument, procedure, and type of sample.)

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

E is the counting efficiency (as counts per disintegration)

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

2.22 is the number of disintegrations per minute per picocurie

Y is the fractional radiochemical yield (when applicable)

$\lambda$  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 particular measurement system should 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 predicated variance.

TABLE 6.12.1-3 (Continued)

MAXIMUM VALUES FOR THE LOWER LIMITS OF DETECTION (LLD)

TABLE NOTATION (Continued)

Typical values of E, V, Y and  $\Delta t$  should be used in the calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as a posteriori (after the fact) limit for a particular measurement. Occasionally background fluctuations, unavoidable small sample size, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable. In such cases, the contributing factors should be identified and described in the Annual Radiological Environmental Operating Report.

- c. LLD for drinking water samples. If no drinking water pathway exists, the LLD of gamma isotopic may be used.
- d. If no drinking water pathway exists, a value of  $3 \times 10^3$  pCi/l may be used.



SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 6.12.2.1    Conduct a land use census during the growing season. The land use census shall verify the appropriateness of the sample location used to fulfill the requirements of LCO 6.12.1	Once per 2 years



BASES FOR  
SECTION 6.0  
LIMITING CONDITIONS FOR OPERATION  
AND  
SURVEILLANCE REQUIREMENTS

## 6.3 INSTRUMENTATION

### BASES

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#### 6.3.9 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The LCO for radioactive liquid effluent monitoring instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur before exceeding ten times the effluent concentration 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 50.

#### 6.3.10 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

The LCO for radioactive gaseous effluent monitoring instrumentation is provided to monitor and control, as applicable, gaseous effluents during actual or potential releases. Those instruments that monitor the activity of gaseous effluents being released to the environment shall have their alarm/trip setpoints calculated in accordance with the methods in the ODCM to ensure that the alarm/trip will occur before exceeding the limits of 10 CFR Part 20. Other instruments that monitor offgas processing, (i.e., Offgas Pre-Treatment Monitor and Offgas Post-Treatment Monitor) are calibrated according to plant procedures. 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.

## 6.11 RADIOACTIVE EFFLUENTS

### BASES

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### LIQUID EFFLUENTS

#### 6.11.1 CONCENTRATION

This LCO is provided to ensure that the concentration of radioactive materials released in liquid waste effluents to UNRESTRICTED AREAS will be less than ten times the effluent concentration values specified in Appendix B, Table 2, Column 2 to 10 CFR 20.1001-20.2402. It provides operational flexibility for releasing liquid effluents in concentrations to follow the Section II.A and II.C design objectives of Appendix I to 10 CFR Part 50. This limitation provides reasonable assurance that the levels of radioactive materials in bodies of water in UNRESTRICTED AREAS will result in exposures within (1) the Section II.A design objectives of Appendix I, 10 CFR 50, to a MEMBER OF THE PUBLIC, and (2) restrictions authorized by 10 CFR 20.1301(e). The concentration limit for dissolved or entrained noble gases is based upon the assumption that Xe-135 is the controlling radionuclide and its effluent concentration in air (submersion) was converted to an equivalent concentration in water. This LCO does not affect the requirement to comply with the annual limitations of 10 CFR 20.1301(a).

The results of pre-release analyses and post release analyses (of composited samples) shall be used with the calculational methods and parameters in the ODCM to assure that the concentrations at the point of release are maintained within the limits.

The required detection capabilities for radioactive materials in liquid waste samples are tabulated in terms of the lower limits of detection (LLDs). Detailed discussion of the LLD, and other detection limits, can be found in:

- (1) HASL Procedures Manual, HASL-300.
- (2) Currie, L. A., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry," Anal. Chem. 40, 586-93 (1968).
- (3) Hartwell, J. K., "Detection Limits for Radioisotopic Counting Techniques," Atlantic Richfield Hanford Company Report ARH-2537 (June 22, 1972).

#### 6.11.2 DOSE

This LCO is provided to implement the requirements of Sections II.A, III.A and IV.A of Appendix I, 10 CFR Part 50. 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 which assure that the releases of radioactive material in liquid effluents to UNRESTRICTED AREAS will be kept "as low as is reasonably achievable." Also, for fresh water sites with drinking water supplies which can be potentially affected by plant operations, there is reasonable assurance that the operation of the facility will not result in radionuclide concentrations in the finished drinking water that are in excess of the requirements of 40 CFR 141. The dose calculations in the ODCM implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data, such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated.

## RADIOACTIVE EFFLUENTS

### BASES

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#### 6.11.2 DOSE (Continued)

The equations specified in the ODCM for calculating the doses due to the actual release rates of radioactive materials in liquid effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluent from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," April 1977.

This LCO, in conjunction with LCOs 6.11.5 and 6.11.6 is also provided to meet the dose limitation of 40 CFR 190 that has been incorporated into 10 CFR 20.1301(d). Even if a site contained up to four reactors, it is highly unlikely that the resultant dose to a MEMBER OF THE PUBLIC will exceed the dose limits of 40 CFR 190 if the individual reactors remain within twice the dose design objectives of 10 CFR 50 Appendix I, and the direct radiation doses from the units (including outside storage tanks, etc.) are kept small.

#### Special Report:

LCO 6.11.2 requires preparation and submittal of a report in accordance with 10 CFR 50.4 and as defined in 10 CFR 20.2203(a)(4), if the dose design objectives of 10 CFR 50 Appendix I are exceeded.

If either the quarterly or the annual limit is exceeded, the report will:

- (1) identify the cause(s) for exceeding the limit(s),
- (2) define the corrective actions that have been taken to reduce the releases, and
- (3) define the corrective actions to be taken to ensure that future releases will be in compliance with the limits.

If a drinking water supply is taken from the receiving water body within three miles downstream of the plant discharge, the report shall also include:

- (1) 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.

If the doses exceed the limits of 40 CFR 190, 25 mrem to the whole body or any organ, except the thyroid, which is limited to 75 mrem, the report shall:

- (1) define the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits,
- (2) include the schedule for achieving conformance with the above limits,
- (3) include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from uranium fuel cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report,
- (4) describe the levels of radiation and concentrations of radioactive material involved,
- (5) describe the cause of the exposure level or concentrations involved,

RADIOACTIVE EFFLUENTS

BASES

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6.11.2 DOSE (Continued)

- (6) describe a course of action that should result in the limitation of the annual dose to a MEMBER OF THE PUBLIC to within the 40 CFR 190 limits.

For the purposes of the report it may be assumed that the dose commitment to the MEMBER OF THE PUBLIC from other uranium fuel cycle sources is negligible, with the exception that the dose distribution from other nuclear fuel cycle facilities at the same site or within a radius of 8 kilometers must be considered.

The Special Report with a request for a variance (provided the release conditions resulting in a violation of 40 CFR 190 have not already been corrected), in accordance with the provisions of 40 CFR 190.11 and 10 CFR 20.2203(a)(4), is considered to be a timely request and fulfills the requirements of 40 CFR 190 until NRC staff action is completed. The variance only relates to the limits of 40 CFR 190, and does not apply in any way to other requirements for dose limitations of 10 CFR 20, as addressed in LCOs 6.11.1 and 6.11.4. An individual is not considered a MEMBER OF THE PUBLIC during any period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

Demonstration of compliance with the limits of 40 CFR 190 or with the design objectives of Appendix I to 10 CFR 50 will be considered to demonstrate compliance with the 0.1 rem limit of 10 CFR 20.1301.

## RADIOACTIVE EFFLUENTS

### BASES

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#### 6.11.3 LIQUID WASTE TREATMENT

The LCO 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 LCO implements the requirements of 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50 and the design objective given in Section II.D of Appendix I to 10 CFR Part 50. The specified limit governing the use of appropriate portions of the liquid radwaste treatment system were specified as a suitable fraction of the dose design objectives set forth in Section II.A of Appendix I, 10 CFR Part 50, for liquid effluents.

#### Special Report:

LCO 6.11.3 requires preparation and submittal of a report in accordance with 10 CFR 50.4 if radioactive liquid waste is being discharged without treatment and in excess of the limits. The report shall include:

- (1) an explanation why liquid radwaste was being discharged without treatment,
- (2) identification of any inoperable equipment or subsystems which resulted in liquid radwaste being discharged without treatment,
- (3) the reason for the inoperability
- (4) action(s) taken to restore the inoperable equipment to an OPERABLE status,
- (5) summary descriptions of actions taken to prevent a recurrence.

## GASEOUS EFFLUENTS

#### 6.11.4 DOSE RATE

This LCO provides reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of a MEMBER OF THE PUBLIC in an UNRESTRICTED AREA, either at or beyond the SITE BOUNDARY in excess of the design objectives of Appendix I to 10 CFR Part 50. This specification is provided to ensure that gaseous effluents from all units on the site will be appropriately controlled. It provides operational flexibility for releasing gaseous effluents to satisfy the Section II.A and II.C design objectives of Appendix I to 10 CFR Part 50. For MEMBERS OF THE PUBLIC who may at times be within the SITE BOUNDARY, the occupancy of that MEMBER OF THE PUBLIC will usually be sufficiently low to compensate for the reduced atmosphere dispersion of gaseous effluents relative to that for the SITE BOUNDARY. The calculational methods and parameters in the ODCM are used to assure that the dose rates are maintained within the limits. Examples of calculations for such MEMBERS OF THE PUBLIC, with the appropriate occupancy factors, shall be given in the ODCM. The specified release rate limits restrict, at all times, the corresponding dose rates above background to a MEMBER OF THE PUBLIC at or beyond the SITE BOUNDARY to less than or equal to 500 mrem/year to the total body or to less than or equal to 3000 mrem/year to the skin. These releases rate limits also restrict, at all times, the corresponding thyroid dose rate above background to a child via the inhalation pathway to less than or equal to 1500 mrem/year. This specification does not affect the requirement to comply with the annual limitations of 10 CFR 20.1301(a).

The dose rate due to radioactive gaseous effluents shall be determined in accordance with the methodology and parameters of the ODCM.

## RADIOACTIVE EFFLUENTS

### BASES

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#### 6.11.4 DOSE RATE (Continued)

The required detection capabilities for radioactive materials in gaseous waste samples are tabulated in terms of the lower limits of detection (LLDs). Detailed discussion of the LLD, and other detection limits, can be found in:

- (1) HASL Procedures Manual, HASL-300 (revised annually).
- (2) Currie, L. A., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry," Anal. Chem. 40, 586-93 (1968).
- (3) Hartwell, J. K., "Detection Limits for Radioisotopic Counting Techniques," Atlantic Richfield Hanford Company Report ARH-2537 (June 22, 1972).

#### 6.11.5 DOSE - NOBLE GASES

This LCO is provided to implement the requirements of Sections II.B, III.A and IV.A of Appendix I, 10 CFR Part 50. The Limiting Condition for Operation implements the guides set forth in Section II.B of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in gaseous effluents to UNRESTRICTED AREAS will be kept "as low as is reasonably achievable."

The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The dose calculations established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water Cooled Reactors," Revision 1, July 1977. The ODCM equations provided for determining the air doses at and beyond the SITE BOUNDARY are based upon the historical average atmospheric conditions.

This LCO, in conjunction with LCOs 6.11.2 and 6.11.6 is also provided to meet the dose limitation of 40 CFR 190 that has been incorporated into 10 CFR 1301(d). Even if a site contained up to four reactors, it is highly unlikely that the resultant dose to a MEMBER OF THE PUBLIC will exceed the dose limits of 40 CFR 190 if the individual reactors remain within twice the dose design objectives of 10 CFR 50 Appendix I, and if the direct radiation doses from the units (including outside storage tanks, etc.) are kept small.

## RADIOACTIVE EFFLUENTS

### BASES

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#### 6.11.5 DOSE - NOBLE GASES (Continued)

##### Special Report:

LCO 6.11.5 requires preparation and submittal of a report in accordance with 10 CFR 50.4 and as defined in 10 CFR 20.2203(a)(4), if the dose design objectives of 10 CFR 50 Appendix I are exceeded.

If either the quarterly or the annual limit is exceeded, the report will:

- (1) identify the cause(s) for exceeding the limit(s),
- (2) define the corrective actions that have been taken to reduce the releases, and
- (3) define the corrective actions to be taken to ensure that future releases will be in compliance with the limits.

If the doses exceed the limits of 40 CFR 190, 25 mrems to the whole body or any organ, except the thyroid, which is limited to 75 mrems, the report shall:

- (1) define the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits,
- (2) include the schedule for achieving conformance with the above limits,
- (3) include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from uranium fuel cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report,
- (4) describe the levels of radiation and concentrations of radioactive material involved,
- (5) describe the cause of the exposure level or concentrations involved,
- (6) describe a course of action that should result in the limitation of the annual dose to a MEMBER OF THE PUBLIC to within the 40 CFR 190 limits.

For the purposes of the report it may be assumed that the dose commitment to the MEMBER OF THE PUBLIC from other uranium fuel cycle sources is negligible, with the exception that the dose distribution from other nuclear fuel cycle facilities at the same site or within a radius of 8 kilometers must be considered.

The Special Report with a request for a variance (provided the release conditions resulting in a violation of 40 CFR 190 have not already been corrected), in accordance with the provisions of 40 CFR 190.11 and 10 CFR 20.2203(a)(4), is considered to be a timely request and fulfills the requirements of 40 CFR 190 until NRC staff action is completed.

The variance only relates to the limits of 40 CFR 190, and does not apply in any way to other requirements for dose limitations of 10 CFR 20, as addressed in LCOs 6.11.1 and 6.11.4. An individual is not considered a MEMBER OF THE PUBLIC during any period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

Demonstration of compliance with the limits of 40 CFR 190 or with the design objectives of Appendix I to 10 CFR 50 will be considered to demonstrate compliance with the 0.1 rem limit of 10 CFR 20.1301.



## RADIOACTIVE EFFLUENTS

### BASES

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#### 6.11.6 DOSE - IODINE-131, IODINE-133, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM

This LCO is provided to implement the requirements of Sections II.C, III.A and IV.A of Appendix I, 10 CFR Part 50. The Limiting Conditions for Operation are the guides set forth in Section II.C of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive materials in gaseous effluents to UNRESTRICTED AREAS 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 a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The ODCM calculational methods for calculating the doses due to the actual release rates of the subject materials are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I,"

Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," Revision 1, July 1977. These equations also provide for determining the actual doses based upon the historical average atmospheric conditions. The release rate specifications for iodine-131, iodine-133, tritium and radionuclides in particulate form are dependent on the existing radionuclide pathway to man in the areas at and beyond the SITE BOUNDARY. The pathways which were examined in the development of these calculations were: (1) individual inhalation of airborne radionuclides, (2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, (3) deposition onto grassy areas where milk animals and meat-producing animals graze with consumption of the milk and meat by man, and (4) deposition on the ground with subsequent exposure of man.

This LCO, in conjunction with LCOs 6.11.2 and 6.11.5 is also provided to meet the dose limitation of 40 CFR 190 that has been incorporated into 10 CFR 1301(d). Even if a site contained up to four reactors, it is highly unlikely that the resultant dose to a MEMBER OF THE PUBLIC will exceed the dose limits of 40 CFR 190 if the individual reactors remain within twice the dose design objectives of 10 CFR 50 Appendix I, and if the direct radiation doses from the units (including outside storage tanks, etc.) are kept small.

#### Special Report:

LCO 6.11.6 requires preparation and submittal of a report in accordance with 10 CFR 50.4 and as defined in 10 CFR 20.2203(a)(4), if the dose design objectives of 10 CFR 50 Appendix I are exceeded.

If either the quarterly or the annual limit is exceeded, the report will:

- (1) identify the cause(s) for exceeding the limit(s),
- (2) define the corrective actions that have been taken to reduce the releases, and
- (3) define the corrective actions to be taken to ensure that future releases will be in compliance with the limits.

## RADIOACTIVE EFFLUENTS

### BASES

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#### 6.11.6 DOSE - IODINE-131, IODINE-133, TRITIUM AND RADIONUCLIDES IN PARTICULATE FORM (Continued)

If the doses exceed the limits of 40 CFR 190, 25 mrems to the whole body or any organ, except the thyroid, which is limited to 75 mrems, the report shall:

- (1) define the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits,
- (2) include the schedule for achieving conformance with the above limits,
- (3) include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from uranium fuel cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report,
- (4) describe the levels of radiation and concentrations of radioactive material involved,
- (5) describe the cause of the exposure level or concentrations involved,
- (6) describe a course of action that should result in the limitation of the annual dose to a MEMBER OF THE PUBLIC to within the 40 CFR 190 limits.

For the purposes of the report it may be assumed that the dose commitment to the MEMBER OF THE PUBLIC from other uranium fuel cycle sources is negligible, with the exception that the dose distribution from other nuclear fuel cycle facilities at the same site or within a radius of 8 kilometers must be considered.

The Special Report with a request for a variance (provided the release conditions resulting in a violation of 40 CFR 190 have not already been corrected), in accordance with the provisions of 40 CFR 190.11 and 10 CFR 20.2203(a)(4), is considered to be a timely request and fulfills the requirements of 40 CFR 190 until NRC staff action is completed.

The variance only relates to the limits of 40 CFR 190, and does not apply in any way to other requirements for dose limitations of 10 CFR 20, as addressed in LCOs 6.11.1 and 6.11.4. An individual is not considered a MEMBER OF THE PUBLIC during any period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

Demonstration of compliance with the limits of 40 CFR 190 or with the design objectives of Appendix I to 10 CFR 50 will be considered to demonstrate compliance with the 0.1 rem limit of 10 CFR 20.1301.

## RADIOACTIVE EFFLUENTS

### BASES

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#### 6.11.7 and 6.11.8 GASEOUS RADWASTE TREATMENT AND VENTILATION EXHAUST TREATMENT

The OPERABILITY of the GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM and the VENTILATION EXHAUST TREATMENT SYSTEM ensures that the system will be available for use whenever gaseous effluents require treatment before release to the environment. The requirement that the appropriate portions of the system be used, when specified, provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable." This specification implements the requirements of 10 CFR Part 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50, and the design objectives given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the system were specified as a suitable fraction of the dose design objectives set forth in Section II.B and II.C of Appendix I, 10 CFR 50, for gaseous effluents.

#### Special Report:

LCOs 6.11.7 and 6.11.8 require preparation and submittal of a report in accordance with 10 CFR 50.4 including:

- (1) an explanation of why gaseous radwaste was being discharged without treatment,
- (2) identification of the inoperable equipment or subsystems which resulted in gaseous radwaste being discharged without treatment,
- (3) the reason for the inoperability,
- (4) action(s) taken to restore the inoperable equipment to an OPERABLE status,
- (5) summary descriptions of action(s) taken to prevent a recurrence.

LCO 6.11.8 is not applicable to the Turbine Building ventilation exhaust unless filtration media is installed.

Instruments checked to ensure the GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM is functioning are:

- (1) Adsorber Train Bypass Switch (1N64-HS-M611),
- (2) Bypass Valve Indication (1N64-F045).

When the Adsorber Train Bypass Switch is in the TREAT position and the bypass valve indicates CLOSED, the GASEOUS RADWASTE TREATMENT (OFFGAS) SYSTEM is functioning.

## 6.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

### BASES

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#### 6.12.1 MONITORING PROGRAM

The radiological monitoring program required by this LCO 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 MEMBERS OF THE PUBLIC resulting from the station operation. This monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50 and thereby supplements the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. 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 6.12.1-3 are state-of-the-art for routine environmental measurements in industrial laboratories. It should be recognized that the LLD is defined as an "a priori" (before the fact) limit representing the capability of a particular measurement. 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.

For a more complete discussion of the LLD, and other detection limits, see the following:

- (1) HASL Procedure Manual, HASL-300 (revised annually).
- (2) Currie, L. A., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry," Anal.Chem. 40, 586-93 (1968).
- (3) Hartwell, J. K., "Detection Limits for Radioisotopic Counting Techniques," Atlantic Richfield Hanford Company Report ARH-2537 (June 22, 1972).

If milk or broadleaf vegetation sampling locations are relocated, the cause shall be reported in the next Annual Radioactive Effluent Release Report. Also, include in this report, revised ODCM figure(s) and table(s) reflecting the new locations. The specific locations from which samples were unavailable may then be deleted from the radiological environmental monitoring program and the table(s) in the ODCM, provided the locations from which the replacement samples were obtained are added to the table(s) as replacement locations.

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

## 6.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

### BASES

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#### 6.12.1 MONITORING PROGRAM (Continued)

##### Special Report:

LCO 6.12.1 requires preparation and submittal of a report in accordance with 10 CFR 50.4 when:

- (1) the level of radioactivity as a result of plant effluents in an environmental sampling medium at a specified location exceeds the reporting level(s) in ODCM Table 6.12.1-2 when averaged over a calendar quarter, or
- (2) more than one of the radio nuclides in ODCM Table 6.12.1-2 are detected in the sampling medium and

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

- (3) radio nuclides other than those in ODCM Table 6.12.1-2 are detected, and the potential annual dose to a MEMBER OF THE PUBLIC is equal to or greater than the calendar year limits of LCOs 6.11.2, 6.11.5 and 6.11.6.

The report shall:

- (1) identify the cause(s) for exceeding the limit(s), and
- (2) define the corrective actions to be taken to reduce radioactive effluents so the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year limits of LCOs 6.11.2, 6.11.5 and 6.11.6.

The Special Report is not required if the measured level of radioactivity is not the result of plant effluents; however in such an event, the condition shall be reported and identified in the Annual Radiological Environmental Operating Report.

#### 6.12.2 LAND USE CENSUS

This LCO is provided to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the radiological environmental monitoring program are made if required by the results of the census. The best information from door-to-door survey, visual or aerial survey or from consulting with local agricultural authorities shall be used. 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 50 m<sup>2</sup> 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 made: (1) 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/m<sup>2</sup>. Specifications for broad leaf vegetation sampling in the Table 6.12.1-1 shall be followed, including analysis of control samples.

6.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

BASES

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6.12.2 LAND USE CENSUS (Continued)

The land use census should utilize information which provides the best results, such as a door-to-door-survey, an aerial survey or by consulting local agriculture authorities. The results of the land use census shall be included in the Annual Radiological Environmental Operating Report pursuant to Technical Specification 5.6.2.

When the Land Use Census requires addition of sampling location(s) to the Environmental Monitoring Program, the sampling locations(s) having the lowest calculated dose or dose commitments(s), via the same exposure pathway, may be deleted from the monitoring program. This deletion may take place after October 31 of the year in which this land use census was conducted.

The new sampling location(s) shall be identified in the next Annual Radioactive Effluent Release Report including a revised figure(s) and table(s) for the ODCM.