MISSISSIPPI POWER & LIGHT COMPANY
Helping Build Mississippi
P. O. BOX 1640, JACKSON, MISSISSIPPI 39205

January 12, 1982

NUCLEAR PRODUCTION DEPARTMENT

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 and 50-417
File 0260/15180
Revisions to GGNS Draft Radiological Effluent Technical Specifications
AECM-82/19

Recent conversations between representatives of Mississippi Power & Light Company and the Nuclear Regulatory Commission have revealed the need for revising selected pages in the Grand Gulf Nuclear Station Radiological Effluent Technical Specifications (RETS) and the Offsite Dose Calculation Manual (ODCM). Accordingly, the revised pages are enclosed for your review and insertion.

Please contact us if you have any questions.

Yours truly,

L. F. Dale
Manager of Nuclear Services

LRM/JDR:rg

cc: Mr. N. L. Stampley (w/o)
Mr. R. B. McGehee (w/o)
Mr. T. B. Conner (w/o)
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung, Director (w/o)
Office of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. J. P. O'Reilly, Regional Administrator (w/o)
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101 Marietta St., N.W., Suite 3100
Atlanta, Georgia 30303

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Attachment to AECM-82/19

INSTRUCTIONS FOR INSERTING
THE ENCLOSED REVISED PAGES

Remove and insert the RETS AND ODCM pages shown below. Dashes (---) in the remove or insert column indicate no action required.

	Remove	Insert
ODCM:	1.0-5	1.0-5
	2.0-1	2.0-1
	2.0-2	2.0-2
	2.0-3	2.0-3
	2.0-4	2.0-4
	---	2.0-4a
	2.0-7	2.0-7
	---	2.0-7a
	2.0-24	2.0-24
	2.0-25	2.0-25
	2.0-26	2.0-26
	2.0-27	2.0-27
	2.0-28	2.0-28
	2.0-33	2.0-33
	3.0-6	3.0-6
	3.0-7	3.0-7
	3.0-8	3.0-8
RETS:	5-1	5-1
	Figure 5.1.1-1	Figure 5.1.1-1
	Figure 5.1.2-1	Figure 5.1.2-1
	Figure 5.1.4-1	Figure 5.1.4-1

Step 5) The radioactivity monitor setpoint may now be specified based on the values of $\sum C_i$, F, and f which were specified to provide compliance with the limits of 10CFR20, Appendix B, Table II, Column 2. The monitor response is primarily to gamma radiation; therefore, the actual setpoint is based on $\sum_g C_g$. The setpoint concentration, C_m is determined as follows:

$$C_m = \left(\frac{f_d}{f_a}\right) \sum_g C_g \ (\mu Ci/ml) \tag{7}$$

where f_a is the actual (or maximum expected) effluent flow rate The value of C_m (μCi/ml) is used to determine the monitor setpoint (CPM) from the calibration curve of Figure 1.0-1.

NOTE: The setpoint contains a factor of conservatism, even if the calculated maximum waste tank flow rate is attainable, since the calculated rate contains the safety factor margin, waste tank effluent flow rate margin, and the dilution flow rate margin. In practice, the actual waste tank effluent flow rate normally is many times less than the calculated tank flow rate, thus providing an additional conservatism during release.

2.0 GASEOUS EFFLUENTS

2.1 Gaseous Effluent Monitor Setpoints

2.1.1 For the purpose of implementation of Specification 3.3.7.12 of the RETS, the alarm setpoint level for continuous ventilation noble gas monitors will be calculated as follows:

S_V = Count rate of vent noble gas monitor at alarm setpoint level

$$= \text{the lesser of} \begin{cases} 0.25 \times R_t \times D_{TB} \\ \quad\text{or} \\ 0.25 \times R_s \times D_{SS} \end{cases} \qquad (1)$$

Where,

0.25 = safety factor allowing for cumulative uncertainties of measurements

D_{TB} = Dose rate limit to the total body of an individual in an unrestricted area required to limit dose to 500 mrem in one year.

$$= \frac{500 - F\,[(\overline{X/Q})\,\Sigma_i\,K_i\,\overline{Q}_i]}{(1-F)}$$

D_{SS} = Dose rate limit to the skin of the body of an individual in an unrestricted area required to limit dose to 3000 mrem in one year.

$$= \frac{3000 - F\,[(\overline{X/Q})\,\Sigma_i\,(L_i + 1.1\,M_i)\,\overline{Q}_i]}{(1-F)}$$

R_t = count rate per mrem/yr to the total body

$$= C \div \left[\overline{X/Q}\,\sum_i K_i\,\dot{Q}_i\right]$$ See Note 2

Where,

C = count rate of the vent monitor corresponding to grab sample radionuclide concentrations

$\overline{X/Q}$ = highest sector annual average atmospheric dispersion at the unrestricted area boundary

= 5.176×10^{-6}* sec/m^3 in the WSW sector.

K_i = total body dose factor due to gamma emissions from each noble gas radionuclide i (mrem/yr per $\mu Ci/m^3$) from Table 2.1-1.

$\dot{Q}_i$ = rate of release of noble gas radionuclide, i ($\mu Ci/sec$), from release point

F = fraction of current year elapsed at time of calculation

$\overline{Q}_i$ = average rate of release of noble gas radionuclide i for the elapsed fraction of the year F ($\mu Ci/sec$) from release point

R_s = count rate per mrem/yr to the skin

$$= C \div \left[\overline{X/Q} \sum_i (L_i + 1.1\ M_i)\ \dot{Q}_i \right] \qquad \text{See note 2}$$

L_i = skin dose factor due to beta emissions from isotope i (mrem/yr per $\mu Ci/m^3$) from Table 2.1-1

1.1 = mrem skin dose per mrad air dose

M_i = air dose factor due to gamma emissions from isotope i (mrad/yr per $\mu Ci/m^3$) from Table 2.1-1

2.1.2 Containment Purge Monitor

The setpoint level for discharge through the containment purge system monitor, S_d, will be calculated in a corresponding manner:

$$S_d = \text{the lesser of} \begin{cases} 0.25 \times r_t \times D'_{TB} \\ \text{or} \\ 0.25 \times r_s \times D'_{ss} \end{cases} \qquad (2)$$

* Value taken from Reference 4, Table 6.1.26.

Where,

$$D'_{TB} = \frac{500 - F\,[(\overline{X/Q})\ \sum_i K_i\ \overline{q}_i]}{(1-F)}$$

$$D'_{SS} = \frac{3000 - F\,[(\overline{X/Q})\ \sum_i (L_i + 1.1\ M_i)\ \overline{q}_i]}{(1-F)}$$

r_t = count rate per mrem/yr to the total body

$$= c \div \left[\overline{X/Q} \sum_i K_i\ \dot{q}_i \right]$$ See Note 2

c = count rate of the containment purge monitor for radionuclide concentrations to be discharged.

$\dot{q}_i$ = rate of release of noble gas radionuclide i (µCi/sec)

$\overline{q}_i$ = average rate of release of noble gas radionuclide i from the ventilation system for the elapsed fraction of the year F (µCi/sec).

r_s = count rate per mrem/yr to the skin

$$= c \div \left[\overline{X/Q} \sum_i (L_i + 1.1\ M_i)\ \dot{q}_i \right]$$ See note 2

NOTES

1) The calculated setpoint values will be regarded as upper bounds for the actual setpoint adjustments. That is, setpoint adjustments are not required to be performed if the existing setpoint level corresponds to a lower count rate than the calculated value.

2) For ease of implementation, the count rate setpoints may be calculated by applying the methodologies presented in Sections 2.1.1 and 2.1.2 with the more restrictive assumption of continuous release at the limiting rate for a year as follows:

$D''_{TB} = D_{TB} = D'_{TB} =$ 500 mrem/year

$D''_{SS} = D_{SS} = D'_{SS} =$ 3000 mrem/year

3) A more conservative setpoint may be calculated to minimize requirements for adjustment of the monitor as follows:

D''_{TB} = 500 mrem/yr

D''_{SS} = 3000 mrem/yr

R_t'' = conservative count rate per mrem/yr to the total body (Xe-133 detection, Kr-89 dose)

$= C' \div (\overline{X/Q} \times K \times \dot{Q}'')$

Where,

$\dot{Q}''$ = Assigned release rate value of, for example, 1.0 µCi/sec, Xe-133. (See definition of C' below.)

C' = count rate of vent monitor for an effluent concentration of Xe-133 corresponding to a 1.0 µCi/sec release rate of Xe-133, (Note: Calculate the related concentration based on dilution flow.)

K = total body dose factor for Kr-89, the most restrictive isotope, from Table 2.1-1.

R_s'' = conservative count rate per mrem/yr to the skin

$= C' \div \left[\overline{X/Q} \times (L + 1.1M) \times \dot{Q}''\right]$

Where,

L = skin dose factor for Kr-89, the most restrictive isotope, from Table 2.1-1,

M = air dose factor for Kr-89, the most restrictive isotope, from Table 2.1-1.

D''_{TB} = 500 mrem/yr

D''_{SS} = 3000 mrem/yr

r_t'' = conservative count rate per mrem/yr to the total body for containment purge only

$= c' \div \left[\overline{X/Q} \times K \times \dot{q}''\right]$

Where,

$\dot{q}''$ = release rate from the containment purge (may be determined for maximum flow from the system and the concentration specified for c' above).

c' = count rate of the containment purge monitor corresponding to a 1.0 μCi/ml concentration of Xe-133,

r_s'' = conservative count rate per mrem/yr to the skin for containment purge only,

$$= c' \div \left[\overline{X/Q} \times (L + 1.1M) \times \dot{q}'' \right]$$

2.2.2.a For the purpose of implementation of Specification 3.11.2.2, the air dose in unrestricted areas shall be determined as follows:

D_γ = air dose due to gamma emissions from noble gas radionuclide i (mrad)

$$= 3.17 \times 10^{-8} \Sigma_i M_i \overline{X/Q'} \tilde{Q}_i \quad (1)$$

Where,

$\overline{X/Q'}$ = relative concentration for unrestricted areas

= $5.176 \times 10^{-6*}$ sec/m^3, in the WSW sector

M_i = air dose factor due to gamma emissions from noble gas radionuclide i (mrad/yr per uCi/m^3) from Table 2.1-1

$\tilde{Q}_i$ = cumulative release of noble gas radionuclide i over the period of interest (uCi)

Note: 3.17×10^{-8} is the inverse of the number of seconds per year, and

D_β = air dose due to beta emissions from noble gas radionuclide i (mrad)

$$= 3.17 \times 10^{-8} \Sigma_i N_i \overline{X/Q'} \tilde{Q}_i \quad (2)$$

Where,

N_i = air dose factor due to beta emissions from noble gas radionuclide i (mrad/yr per uCi/m^3) from Table 2.1-1

* Values taken from Reference 4, Table 6.1.26

$\overline{X/Q'}$ = relative concentration for unrestricted areas

= $5.176 \times 10^{-6*}$ sec/m^3, in the WSW sector

$\tilde{Q}_i$ = cumulative release of noble gas radionuclide i over the period of interest (uCi).

2.2.2.b Dose to an individual from tritium, radioiodines and radioactive materials in particulate form, with half-lives greater than eight (8) days will be calculated for the purpose of implementation of Specification 3.11.2.3 as follows:

* Values taken from Reference 4, Table 6.1.26

TABLE 2.3-1

ATMOSPHERIC DISPERSION PARAMETERS*

FOR TECHNICAL SPECIFICATION 4.11.2.4.1

SECTOR	X/Q	D/Q
N	5.468×10^{-7}	1.840×10^{-9}
NNE	4.079×10^{-7}	1.600×10^{-9}
NE	1.121×10^{-6}	5.759×10^{-9}
ENE	7.044×10^{-8}	3.207×10^{-10}
E	2.283×10^{-7}	1.093×10^{-9}
ESE	7.188×10^{-8}	3.520×10^{-10}
SE	1.817×10^{-7}	8.420×10^{-10}
SSE	7.600×10^{-7}	3.300×10^{-9}
S	1.219×10^{-6}	3.809×10^{-9}
SSW	4.113×10^{-7}	8.261×10^{-10}
SW	3.001×10^{-6}	4.440×10^{-9}
WSW	3.931×10^{-7}	3.177×10^{-10}
W	4.259×10^{-7}	3.476×10^{-10}
WNW	4.359×10^{-7}	4.662×10^{-10}
NW	1.548×10^{-7}	2.733×10^{-10}
NNW	1.373×10^{-6}	4.174×10^{-9}

*Reference: Grand Gulf Nuclear Station, Environmental Report, Table 6.1.26

2.4 Definitions of Gaseous Effluents Parameters

b	=	height of reactor building (m) (2.3.1)
C	=	count rate of the station vent monitor corresponding to grab sample radionuclide concentrations (2.1.1)
C'	=	count rate of station vent monitor corresponding to a 1.0 μCi/ml concentration of Xe-133 (2.1.2)
c	=	count rate of the containment purge monitor for radionuclide concentrations to be discharged (2.1.2)
c'	=	count rate of the containment purge monitor corresponding to a 1.0 μCi/ml concentration of Xe-133 (2.1.2)
D_g	=	relative deposition rate for ground level releases from Figure 2.3-3 (m^{-1}) (2.3.2)
D_o	=	average organ dose rate in current year (mrem) (2.2.1.b)
D_p	=	dose to an individual from radioiodines and radionuclides in particulate form, with half-life greater than eight days (mrem) (2.2.2.b)
D_s	=	average skin dose rate in current year (mrem) (2.2.1.a)
D_{tb}	=	average total body dose rate in current year (mrem) (2.2.1.a)
D_β	=	air dose due to beta emissions from noble gas radionuclide i (mrad) (2.2.2.a)
D_γ	=	air dose due to gamma emissions from noble gas radionuclide i (mrad) (2.2.2.a)
D/Q	=	relative deposition per unit area (m^{-2}) (2.3.2)
δ	=	plume depletion factor at distance r for appropriate stability class and effective height from Figures 2.3-2 and 2.3-3. (2.3.1)
F	=	fraction of current year elapsed at time of calculation (2.1.1)
k	=	open terrain recirculation factor at distance r from Figure 2.3-1 (2.3.1)
K	=	total body dose factor for Kr-89, the most restrictive isotope (mrem/yr per $\mu Ci/m^3$), from Table 2.1-1 (2.1.2)
K_i	=	total body dose factor due to gamma emissions from isotope i (mrem/yr per $\mu Ci/m^3$) from Table 2.1-1 (2.1.1)
D_{TB}	=	limiting dose rate to the total body based on the limit of 500 mrem in one year. (2.1.1)

2.4 Definitions of Gaseous Effluents Parameters (Continued)

D_{SS}	=	limiting dose rate to the skin based on the limit of 3000 mrem in one year. (2.1.1)
D'_{TB}	=	limiting dose rate to the total body based on the limit of 500 mrem in one year (containment purge) (2.1.2)
D'_{SS}	=	limiting dose rate to the skin based on the limit of 3000 mrem in one year (containment purge) (2.1.2)
D''_{TB}	=	limiting dose rate to the total body based on the conservative dose rate of 500 mrem/year. (Note 2)
D''_{SS}	=	limiting dose rate to the skin based on the conservative dose rate of 3000 mrem/year. (Note 2)
L	=	skin dose factor for Kr-89, the most restrictive isotope (mrem/yr per $\mu Ci/m^3$), from Table 2.1-1 (2.1.2)
L_i	=	skin dose factor due to beta emissions from isotope i (mrem/yr per $\mu Ci/m^3$) from Table 2.1-1 (2.1.1)
M	=	air dose factor for Kr-89, the most restrictive isotope (mrad/yr per $\mu Ci/m^3$), from Table 2.1-1 (2.1.2)
M_i	=	air dose factor due to gamma emissions from isotope i (mrad/yr per $\mu Ci/m^3$) from Table 2.1-1 (2.1.1)
N_i	=	air dose factor due to beta emissions from noble gas radionuclide i (mrad/yr per $\mu Ci/m^3$) from Table 2.1-1 (2.2.2.a)
P_i	=	dose parameter for radionuclide i, (mrem/yr per $\mu Ci/m^3$) for inhalation and ($m^2 \cdot$ mrem/yr per μCi/sec) for other pathways, from Table 2.2-1 (2.2.1.b)
$\dot{Q}_i$	=	rate of release of noble gas radionuclide i (μCi/sec) (2.1.1)
$\overline{Q}_i$	=	average rate of release of noble gas radionuclide i for the elapsed fraction of the year F (μCi/sec) (2.1.1)
$\overline{Q}'_i$	=	average release rate of isotope i of radioiodine or other radionuclide in particulate form, with half-life greater than eight (8) days in the current year (μCi/sec) (2.2.1.b)
$\tilde{Q}_i$	=	cumulative release of noble gas radionuclide i over the period of interest (μCi) (2.2.2.a)
$\tilde{Q}'_i$	=	cumulative release of radionuclide i of iodine or material in particulate form over the period of interest (μCi) (2.2.2.b)
$\dot{q}_i$	=	rate of release of noble gas radionuclide i (μCi/sec) (2.1.2)
$\overline{q}_i$	=	average rate of release of noble gas radionuclide i from the elapsed fraction of the year F (μCi/sec) (2.1.2)

2.4 Definitions of Gaseous Effluents Parameters (Continued)

$\dot{Q}''$ = assigned release rate value of, for example, 1.0 µCi/sec, Xe-133; related to definition of C' for the vent. (Note 3)

$\dot{q}''$ = release rate from containement purge associated with maximum flow from system and concentration specified for c'. (Note 3)

R_i = dose factor for radionuclide i, (mrem/yr per $\mu Ci/m^3$) or ($m^2 \cdot$ mrem/yr per µCi/sec)

R_s = count rate per mrem/yr to the skin. (2.1.1)

R_t = count rate per mrem/yr to the total body. (2.1.1)

R''_s = conservative count rate per mrem/yr to the skin. (2.1.2)

R''_t = conservative count rate per mrem/yr to the total body (Xe-133 detection, Kr-89 dose). (2.1.2)

r = distance (m) from release point to location of interest for dispersion calculation. (2.3.1)

r_s = count rate per mrem/yr to the skin for containment purge monitor only. (2.1.2)

r_t = count rate per mrem/yr to the total body for containment purge monitor only. (2.1.2)

r''_s = conservative count rate per mrem/yr to the skin for containment purge only. (2.1.2)

r''_t = conservative count rate per mrem/yr to the total body for containment purge only. (2.1.2)

S_d = count rate of containment purge noble gas monitor at alarm setpoint level. (2.1.2)

S_v = count rate of station vent noble gas monitor at alarm setpoint level. (2.1.1)

$\sum$ = vertical standard deviation of the plume with building wake correction (m). (2.3.1)

σ = vertical standard deviation (m) of the plume at distance r for effective height under stability category indicated by T(m) from Figure 2.3-2. (2.3.1)

$\dot{T}$ = temperature differential with vertical separation (°K/100m). (2.3.1)

u = wind speed at ground level (m/sec). (2.3.1)

2.4 Definitions of Gaseous Effluents Parameters (Continued)

W = controlling sector annual average atmospheric dispersion at the site boundary for the appropriate pathway (sec/m^3). (2.2.1.b)

W' = relative concentration for unrestricted areas (sec/m^3). (2.2.2.b)

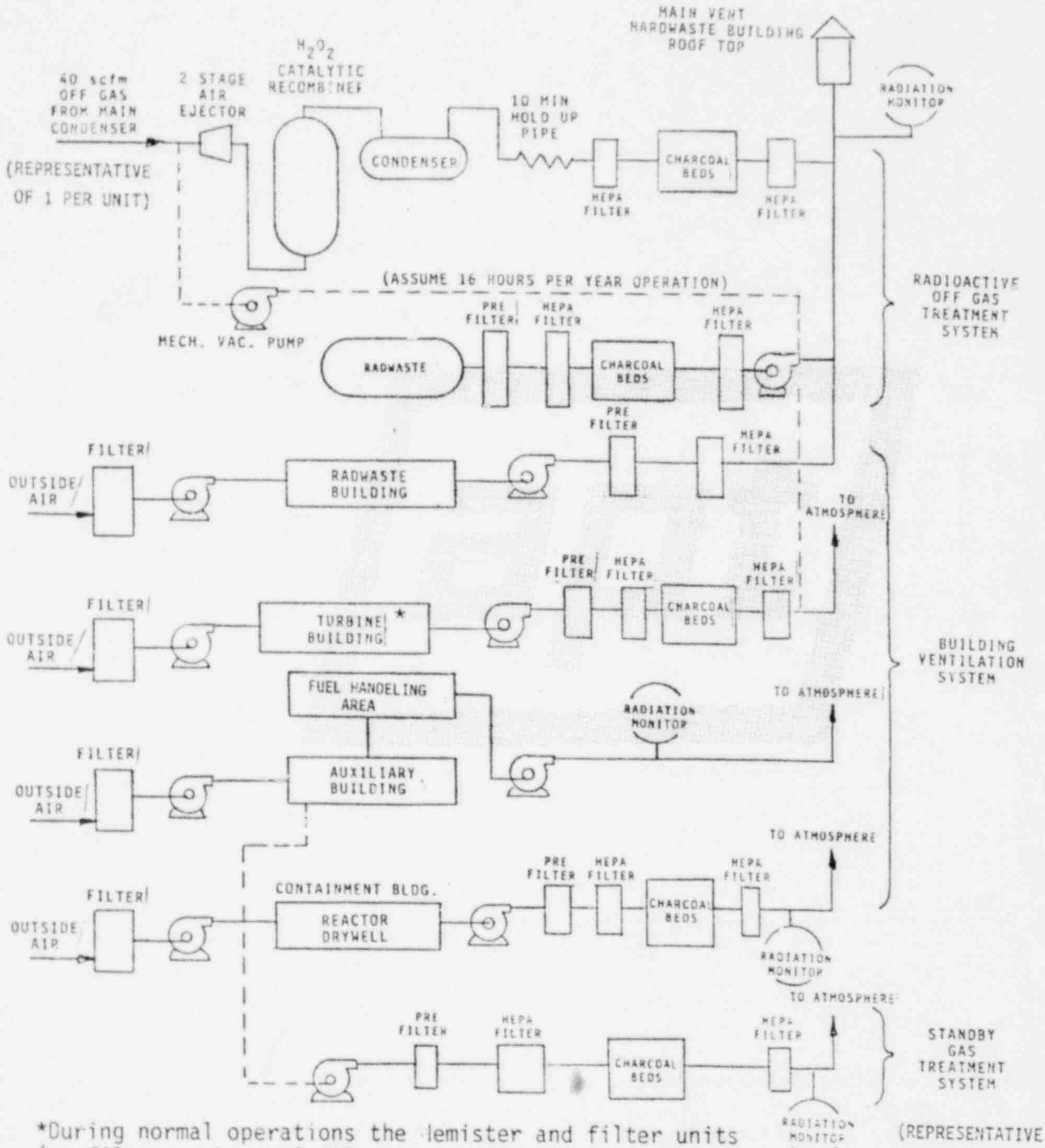
X/Q = atmospheric dispersion (sec/m^3) (2.3.1)

$\overline{X/Q}$ = highest sector annual average atmospheric dispersion at the unrestricted area boundary (sec/m^3) (2.1.1)

$\overline{X/Q}$' = relative concentration for unrestricted areas (sec/m^3) (2.2.2.a)

2.5 GASEOUS RADWASTE TREATMENT SYSTEM

The essential components of the gaseous radwaste treatment system for the OPERABILITY requirement of RETS Specification 3/4.11.2.5 are indicated below.

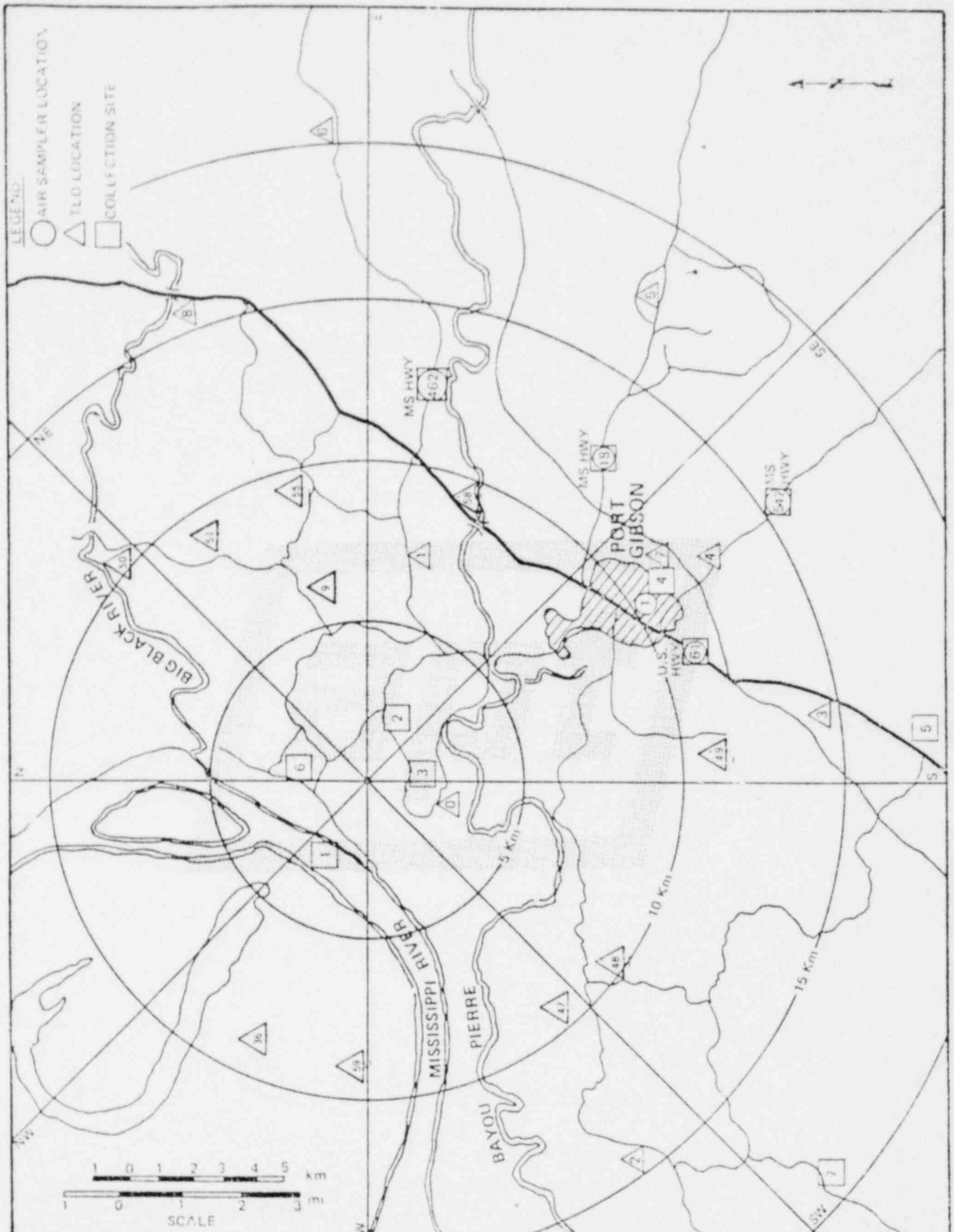


*During normal operations the demister and filter units (prefilters, charcoal filters and HEPA filters) are not installed in the filter train. However, the filter train is available to be operable at a later date when the filter and demister are installed.

Taken from Reference 4, Figure 3-8.

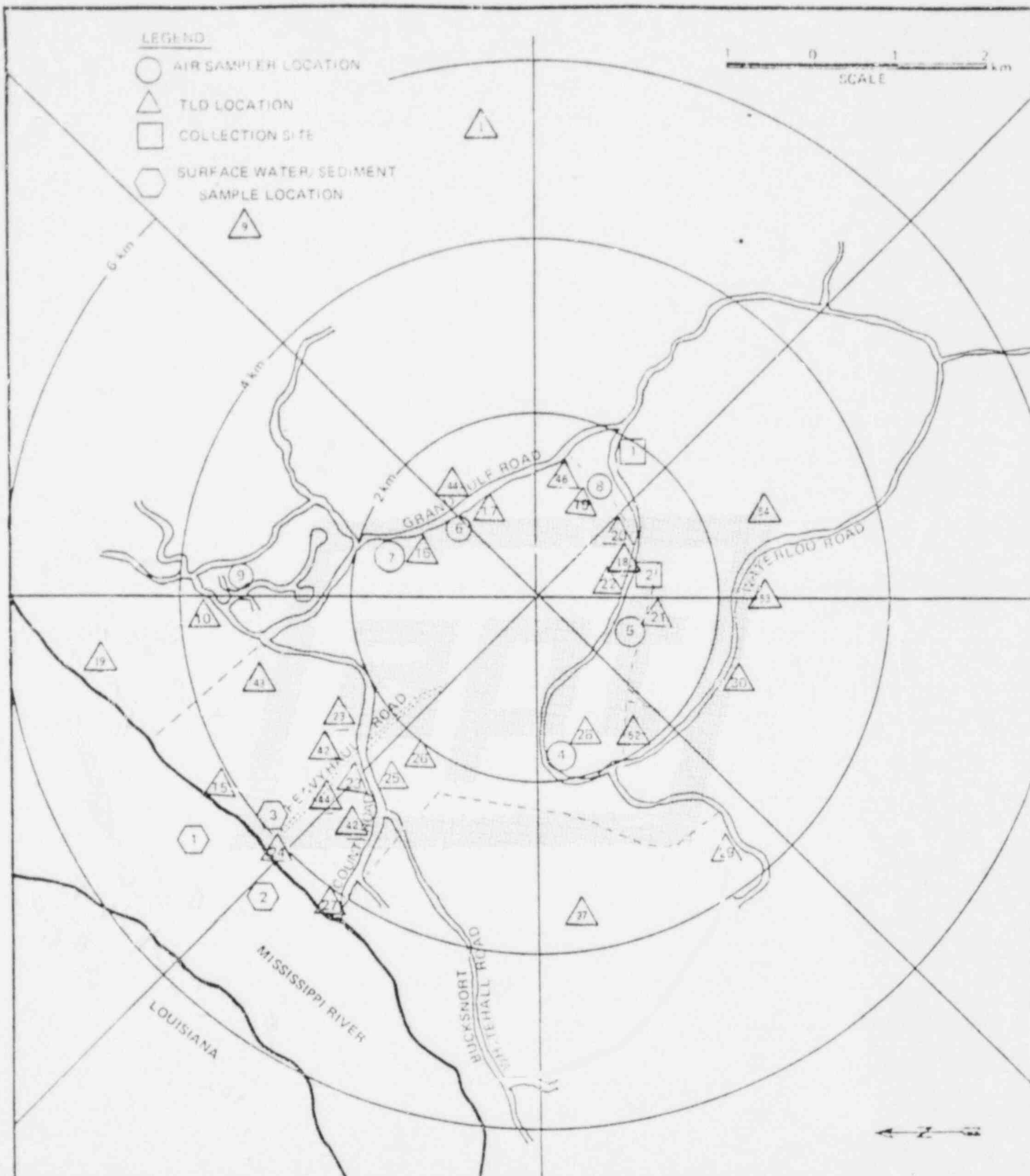
MISSISSIPPI POWER & LIGHT COMPANY GRAND GULF NUCLEAR STATION UNITS 1 & 2 ODCM	COLLECTION SITE LOCATIONS GENERAL AREA MAP FIGURE 3.0-1

 From: Environmental Report, Figure 6.4-1



MISSISSIPPI POWER & LIGHT COMPANY GRAND GULF NUCLEAR STATION UNITS 1 & 2 ODCM	COLLECTION SITE LOCATIONS CLAIBORNE COUNTY, MISSISSIPPI FIGURE 3.0-2

 From: Environmental Report, Figure 6.4-2



MISSISSIPPI POWER & LIGHT COMPANY GRAND GULF NUCLEAR STATION UNITS 1 & 2 ODCM	COLLECTION SITE LOCATIONS SITE PERIMETER FIGURE 3.0-3