July 15, 1988

Subject: Offsite Dose Calculation Manual
Revision 21

The General Office Radwaste Engineering Staff is transmitting to you this date, Revision 21 of the Offsite Dose Calculation Manual. As this revision only affects Oconee Nuclear Station, the approval of other station managers is not required. Please update your copy No. 1, and discard the affected pages.

REMOVE THESE PAGES		REPLACE/ADD THESE PAGES	
A-12	Rev. 15	A-12	Rev. 21
A-13	Rev. 11	A-13	Rev. 21
		A-13a	Rev. 21
A-14	Rev. 15	A-14	Rev. 21
A-18	Rev. 15	A-18	Rev. 18
Table A5.0-2	Rev. 18	Table A5.0-2	Rev. 21

NOTE: As this letter, with it's attachments, contains "LOEP" information, please insert this letter in front of the June 10, 1988 letter.

Approval Date: 7/19/88

Effective Date: 8/1/88

Mary L. Birch
System Radwaste Engineer

Approval Date: 7/5/88

Effective Date: 8/1/88

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Enclosure

JUSTIFICATIONS FOR REVISION 21

Pages A-12, A-13, A-13a and A-14	Pages were changed/added/re-arranged to separate Semi-elevated Gaseous Radiation monitor setpoint information from Ground-level Gaseous Radiation monitor setpoint information.
Page A-18	Corrected typo error; "Auxiliary" should have been "Interim Radwaste".
Table A5.0-2	Added footnote for clarification purposes.

A3.2 GASEOUS RADIATION MONITOR SETPOINTS FOR SEMI-ELEVATED RELEASE POINTS

The following equation shall be used to calculate final effluent noble gas radiation monitor setpoints based on Xe-133:

$$K(\overline{X/Q})\tilde{Q}_i < 500 \text{ mrem (See Section A2.2.1)}$$

$$\tilde{Q}_i = 4.72E+2\ C_i f \text{ (See Section A2.2.2)}$$

$$(K)(\overline{X/Q})(472)(C_i)(f) < 500$$

$$C_i < \frac{500}{(294)(4.1E-7)(472)} \div f$$

$$C_i < 8.79E+3/f$$

where:

C = the gross activity in undiluted effluent, in μCi/ml

f = the flow from the tank or building and varies for various release sources, in cfm

K = from Table 1.2-1 for Xe-133, 2.94E+2 mrem/yr per μCi/m^3

$\overline{X/Q}$ = 4.1E-7 sec/m^3, as defined in section A2.2.2.

A3.2.1 Gaseous Radwaste Effluent Line - Waste Gas Decay Tanks

As described in Section 2.2, the release is controlled by limiting the flow rate of the effluent from the station. Although the release rate is flow rate controlled, the radiation monitor setpoint shall be set to terminate the release if the effluent activity should exceed that determined by laboratory analyses and that used to calculate the release rate. A typical radiation monitor setpoint may be calculated as follows:

$$C < 8.79E+3/f = 2.93\ E+02\ \mu Ci/ml$$

where:

f = 30 cfm

A3.2.2 Unit Vent

As stated in Section A2.2, the unit vent is the release point for waste gas decay tanks, containment building purges, the condenser air ejector, and auxiliary building ventilation. Since all of these releases are through the unit vent, the radiation monitor on the unit vent may be used to assure that station release limits are not exceeded. Depending on the stack flow, a typical radiation monitor setpoint may be calculated as follows:

$$C < 8.79E+3/f = 9.25E-2 \ \mu Ci/ml$$

where:

f = 45,000 cfm (auxiliary building) + 50,000 cfm (containment purge) = 95,000 cfm

or

$$C < 8.79E+3/f = 1.95E-1 \ \mu Ci/ml$$

where:

f = 45,000 cfm (auxiliary building ventilation)

A3.3 GASEOUS RADIATION MONITOR SETPOINTS FOR GROUND-LEVEL RELEASE POINTS

The following equation shall be used to calculate final effluent noble gas radiation monitor setpoints based on Xe-133:

$$K(\overline{X/Q})\tilde{Q}_i < 500 \text{ mrem (See Section A2.2.1)}$$

$$\tilde{Q}_i = 4.72E+2\ C_i f \text{ (See Section A2.2.2)}$$

$$(K)(\overline{X/Q})(472)(C_i)(f) < 500$$

$$C_i < \frac{500}{(294)(9.2E-6)(472)} \div f$$

$$C_i < 3.92E+2/f$$

where:

C = the gross activity in undiluted effluent, in μCi/ml

f = the flow from the tank or building and varies for various release sources, in cfm

K = from Table 1.2-1 for Xe-133, 2.94E+2 mrem/yr per μCi/m^3

$\overline{X/Q}$ = 9.2E-6 sec/m^3, as defined in section A2.2.2.

A3.3.1 Interim Radwaste Building Ventilation Exhaust

Ventilation exhaust from the Interim Radwaste Building is considered a separate release point. This exhaust is normally considered non-radioactive; that is, it is possible but unlikely that the effluent will contain measurable activity above background. Since the exhaust is continuous, a maximum concentration of gases in the exhaust, which also is the radiation monitor setpoint, is calculated to assure compliance with release limits. A typical radiation monitor setpoint may be calculated as follows:

$$C < 3.92E+2/f = 2.67E-2\ \mu Ci/ml$$

where:

f = 1.47E+04 cfm

A3.3.1 Hot Machine Shop Building Ventilation Exhaust

Ventilation exhaust from the Hot Machine Shop is considered to be a separate release point. This filtered exhaust is sampled and analyzed for particulates and radioiodines to assure that the effluent released has not exceeded station release limits. Since it is assumed that no noble gases will be generated by machine shop work, no provision for monitoring noble gas releases are provided.

A3.3.2 Contaminated Oil Burning In Auxiliary Boiler

Contaminated oil is burned in the auxiliary boiler which is not released through the unit vent and is considered a separate release point. The contaminated oil is filtered, mixed, and sampled to determine the total activity to be released and the allowable release (burn) rate.

By Technical Specification, releases from the auxiliary boiler from incineration of contaminated oil must meet the instantaneous release rate for iodines and particulates given in Section A2.2.2. Also, the total dose due to these releases must be less than 0.1% of the allowable yearly dose from particulate gaseous effluents.

Doses from incineration of contaminated oil are calculated for all organs and all pathways using either the models provided in Section 3.1.2.2 of this manual or the GASPAR computer program. Cumulative doses are calculated quarterly at a minimum.

All the activity in the contaminated oil is assumed to be released during incineration and the total is added to the station's quarterly and annual release records.

A3.3.3 Radwaste Facility Ventilation and Process Gas Exhaust

The ventilation and process gas exhaust from the Radwaste Facility considered a separate release point. This exhaust is sampled continuously for iodine and particulates and noble gases. This data is used in calculations to assure that the effluents released have not exceeded station release limits. A typical radiation monitor setpoint may be calculated as follows:

$$C < 8.79E+3/f = 6.78E-02\ \mu Ci/ml$$

where:

f = 129,700 cfm, The total combined ventilation and process SAS exhaust flow.

A4.3.2.2 Radioiodines, Particulates, and Other Radionuclides with T 1/2 > 8 Days

For dose estimates, simplified dose calculations based on the assumptions in A4.2.2.2 and operational source term data are presented below. Updated operational source term data shall be used to revise these calculations as necessary. These calculations further assume that the annual average dispersion/deposition parameter is used and that 99% of the dose results from Iodine-131 ingested by the maximally exposed individual via the cow milk pathway at the semi-elevated release controlling location. The simplified dose estimate for exposure to the thyroid of an infant is:

$$D = 1.53E+04\ W\ (\tilde{Q})_{I-131} \quad (1.01)$$

where:

W = 9.2E-10 $(\overline{D/Q})$ for food and ground plane pathway, in m^{-2} from Table A4.0-2 for the controlling location (WNW @ 4.5 miles).

$(\tilde{Q})_{I-131}$ = the total Iodine-131 activity released in μCi.

1.53E+04 = (3.17E-08) $(R_i^C\ [\overline{D/Q}])$ with the appropriate substitutions for the cow milk pathway factor, $R_i^C\ [\overline{D/Q}]$, for Iodine-131. See Section 3.1.2.2.

1.01 = factor derived from the assumption that 99% of the total inhalation, food and ground plane pathway dose to the maximally exposed individual is contributed by I-131 via the cow milk pathway.

A4.3.3 Gaseous Effluents From Ground-Level Release Points

Meteorological data for Hot Machine Shop Building Ventilation exhaust, Radwaste Facility exhaust, and Interim Radwaste Building releases is provided in Tables A4.0-3 and A4.0-4.

A4.3.3.1 Noble Gases

For dose estimates, simplified dose calculations based on the assumptions in A4.2.2.1 and operational and design basis source term data are presented below. These calculations further assume that the annual average dispersion parameter is used and that Xenon-133 contributes 56% of the gamma air dose and 73% of the beta air dose for ground-level releases.

$$D_\gamma = 1.03E-10\ [\ \tilde{Q}\ ]_{Xe-133} \quad (1.79)$$

$$D_\beta = 3.06E-10\ [\ \tilde{Q}\ ]_{Xe-133} \quad (1.37)$$

where: