Enclosure 1

OFFSITE DOSE CALCULATION MANUAL
REVISION 16

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The changes to the ODCM are delineated as follows:

1. The following footnote was added to Section 2.1.3:

   "7804 to be used until the completion and turnover of DCP53N. Until turnover is complete and upon adoption of Unit 2 Technical Specification Amendment 31 and Unit 3 Technical Specification Amendment 20, either Section 2.1.3.1 or 2.1.3.2 may be used to determine the maximum permissible alarm setting."

2. A new Section 2.1.3.1, "Maximum Permissible Alarm Setting (RT-7865)" to provide the method for determining the maximum permissible alarm setting for RT-7865 as a maximum release rate (µCi/sec).

3. A new Section 2.1.3.2, "Maximum Permissible Alarm Setting (7804-1) (2RT-7828)" to add monitor 2RT-7828 for containment purge and to provide the method for determining the maximum permissible alarm setting for 2RT-7828 in µCi/cc and for RT-7804 in cpm.

4. In Section 2.1.4, Monitor 2/3-7814 was deleted and Monitor 3RT-7865 added. The method for calculating the maximum permissible alarm setting for 3RT-7865 was added. The reason for the substitution of 3RT-7865 for 2/3 RT-7814 is that 7814 is no longer in the Technical Specifications.

5. The maximum permissible waste gas header flow rate on page 2-10 of Revision 15 was changed to reflect the fact that when 3RT-7865 or 2/3 RT-7808 are monitoring waste gas release, dilution with stack flow has occurred.

The changes in this revision to the ODCM do not reduce the accuracy or reliability of the dose calculations or setpoint determinations.

This revision was reviewed and found acceptable on January 31, 1985.

If there is no release associated with this monitor, the monitor setpoint should be established as close as practical to background to prevent spurious alarms yet assure an alarm should an inadvertent release occur.

2.1.3 Containment Purge - 2RT-7804-1* 3RT-7804-1*

For the purpose of implementation of Specification 3.11.2.1, the alarm setpoint level for noble gas monitors is based on the gaseous effluent flow rate and meteorological dispersion factor.

The concentration at the detector corresponding to a total body dose rate of 500 mrem/yr at the exclusion boundary is determined by using:

$$C_{det2} = \frac{(0.45)\ (P_2)\ (2120\ \frac{cfm}{m^3/sec})\ (500\ mrem/yr)\ (10^{-6}\ Ci/uCi)}{(\text{Flow Rate},\ cfm)\ (X/Q,\ sec/m^3)\ [\sum_i (K_i,\ \frac{mrem/yr}{uCi/m^3})\ (\frac{C_i}{C_{tot}})]} \quad (2\text{-}6)$$

$$C_{det3} = \frac{(0.45)\ (P_3)\ (2120\ \frac{cfm}{m^3/sec})\ (500\ mrem/yr)\ (10^{-6}\ Ci/uCi)}{(\text{Flow Rate},\ cfm)\ (X/Q,\ sec/m^3)\ [\sum_i (K_i,\ \frac{mrem/yr}{uCi/m^3})\ (\frac{C_i}{C_{tot}})]} \quad (2\text{-}7)$$

* 7804 to be used until the completion & turnover of DCP53N. Until turnover is complete and upon adoption of Unit 2 Tech Spec Amendment 31 and Unit 3 Tech Spec Amendment 20, either Section 2.1.3.1 or 2.1.3.2 may be used to determine the maximum permissible alarm setting.

2.1.3 (Continued)

The concentration at the detector corresponding to a 3000 mrem/yr skin dose rate at the exclusion area boundary is determined by using:

$$C_{det2} = \frac{(0.45)\ (P_2)\ (2120\ \frac{cfm}{m^3/sec})\ (3000\ mrem/yr)\ (10^{-6}\ Ci/uCi)}{(\text{Flow Rate},\ cfm)\ (X/Q,\ sec/m^3)\ [\sum_i (L_i + 1.1M_i\ \frac{mrem/yr}{uCi/m^3})\ (\frac{C_i}{C_{tot}})]} \quad (2\text{-}6a)$$

$$C_{det3} = \frac{(0.45)\ (P_3)\ (2120\ \frac{cfm}{m^3/sec})\ (3000\ mrem/yr)\ (10^{-6}\ Ci/uCi)}{(\text{Flow Rate},\ cfm)\ (X/Q,\ sec/m^3)\ [\sum_i (L_i + 1.1M_i\ \frac{mrem/yr}{uCi/m^3})\ (\frac{C_i}{C_{tot}})]} \quad (2\text{-}7a)$$

where:

C_{det2} = The instantaneous concentration at the detector in uCi/cc.

C_{det3} = The instantaneous concentration at the detector in uCi/cc.

0.45 is an administrative values used to account for potential activity from other gaseous release pathways.

P_2 and P_3 are administrative values used to account for

simultaneous releases from both SONGS 2 and SONGS 3. The fractions P_2 and P_3 will be assigned such that $P_2 + P_3 \leq 1.0$.

flow rate = the containment purge flow rate in cfm

= 40,000 cfm full purge

= 2,000 cfm mini purge

other parameters are as specified in 2.1.1.1. above.

The smaller of the values of maximum permissible C_{det} from equation (2-6) or (2-6a) and for equations (2-7) or (2-7a) is to be used in determining the maximum permissible monitor alarm setpoints.

2.1.3.1 Maximum permissible alarm setting (RT-7865)

The maximum permissible alarm setting expressed as a maximum release rate (uCi/sec) is determined by converting the concentration at the detector, C_{det} to an equivalent release rate in uCi/sec.

A_{max} = (C_{det}, uCi/cc) (flow rate, cc/sec)

where: A_{max} = the maximum permissible release rate

C_{det} = the smaller value of C_{det}, as obtained from equation (2-6, 2-6a) or (2-7, 2-7a)

flow rate = flow rate, cc/sec

= either 9.439E5 cc/sec for mini purge or 1.888E7 cc/sec for main purge.

2.1.3.2 Maximum Permissible Alarm Setting (7804-1) (2RT-7828)

The maximum permissible alarm setting for 2RT-7828 is the smaller of the values of C_{det2} (uCi/cc) from equations (2-6) and (2-6a).

The maximum permissible alarm setting for 7804 (cpm) is determined by using the calibration constant for the Containment Airborne Monitor given in Table 2-1. The Maximum permissible alarm setpoint is the cpm value corresponding to the concentration, C_{det}, obtained from the smaller of equations (2-6, 2-6a) or (2-7, 2-7a). The calibration constant is based on Kr-85 or on Xe-133 whichever yields a lower detection efficiency.

The alarm setpoint will not be set greater than the maximum permissible alarm setting determined above.

If there is no release associated with this monitor, the monitor setpoint should be established as close as practical to background to prevent spurious alarms yet assure an alarm should an inadvertent release occur.

2.1.4 Waste Gas Header - 3-7865, 2/3 RT-7808

For the purpose of Specification 3.11.2.1, the alarm setpoint level for noble gas monitors is based on the gaseous effluent flow rate and meteorological dispersion factor. Since the waste gas header discharges to the plant vent stack, either 3-7865 or 2/3 RT-7808 may be used to monitor waste gas header releases.

The concentration at the detector corresponding to a body dose rate of 500 mrem/yr or a skin dose rate of 3000 mrem/yr at the exclusion area boundary is determined by using equation (2-1) and (2-2) with sample concentration (C_i) being obtained from the waste gas decay tank to be released.

The smaller of the values of maximum permissible concentration (C_{det}) from equations (2-1) or (2-2) is to be used in determining the maximum permissible monitor alarm setpoint.

2/3 RT-7808

The maximum permissible alarm setting is determined by using the calibration constant for plant vent stack monitor 7808 given in Table 2-1. The maximum permissible setpoint is the cpm value corresponding to the concentration C_{det}, (smaller value from equation (2-1) or (2-2).

3 RT-7865

The maximum permissible alarm setting expressed as a maximum release rate (uCi/sec) is determined by converting the concentration at the detector, C_{det}, to an equivalent release rate in uCi/sec by equation (2-8).

$$A_{max} = \frac{(C_{det}, \text{uCi/cc})\ (\text{flowrate, cc/sec})}{2} \qquad (2\text{-}8)$$

where A_{max} = the maximum permissible release rate, uCi/sec

C_{det} = the smaller value of C_{det}, as obtained from equations (2-1) or (2-2)

flowrate = flowrate, cc/sec

= 7.83E7 cc/sec for 2 fan operation or 3.92E7 cc/sec for 1 fan operation

2 = corrects for 3-7865 viewing only 1/2 the total Plant Vent Stack Flow.

A release from the waste gas header is not possible if:

$$\left(\sum_i C_{\gamma i}\right) \left(\frac{f}{F}\right) > C_{det}$$

where

$\left(\sum_i C_{\gamma i}\right)$ = total concentration in waste gas holdup tank to be released

f = waste gas header effluent flow rate, cpm

F = plant vent stack flowrate in cfm (166,00 cfm for 2 fan operation, 83,000 for 1 fan operation)

C_{det} = smaller of the values of C_{det} from equations (2-1) or (2-2)

If a release is not possible, adjust the waste gas header flow by determining the maximum permissible waste gas header effluent flow rate corresponding to the Vent Stack Monitor setpoint in accordance with the following:

$$f < \frac{(0.9)\ C_{det} F}{\sum_i C_{\gamma i}} \qquad (2\text{-}9)$$

Where:

f = waste gas header effluent flow rate (cfm)

F = plant vent stack flow rate (cfm) used in equations (2-1) or (2-2)

C_{det} = the smaller of the value of C_{det} from equation (2-1) or (2-2)

$\sum_i C_{\gamma i}$ = total gamma activity (uCi/cc) of the waste gas holdup tank to be released, as determined from the pre-release sample analysis.

The 0.9 is an administrative value to account for the potential activity from other releases in the same release pathway.