T_m = Fraction of the radioactivity from the site that may be released via the monitored pathway to ensure that the site boundary limit is not exceeded due to simultaneous releases from several pathways.

= .50 for the Waste Disposal System Liquid Effluent Monitor (RMS-18).

= .50 for the Steam Generator Blowdown Monitor[5] (RMS-19).

2.1.1.7 The monitor high alarm setpoint shall be set at or below the HSP value for the appropriate liquid effluent stream as calculated above.

2.1.2 Setpoint Based on an Analysis of Liquid Prior to Discharge

The following method applies to liquid releases when determining the setpoint for the maximum acceptable discharge flow rate prior to dilution and determining the associated high alarm setpoint based on this flow rate for the Waste Disposal System Liquid Effluent Monitor (RMS-18) and the Steam Generator Blowdown Monitor (RMS-19) when an analysis of the activity of the principal gamma emitters has been made prior to each batch release.

2.1.2.1 Determine the maximum allowable discharge flow rate prior to dilution by the following:

a. Determine D (the minimum acceptable dilution factor):

$$D = \sum_i \frac{C_i}{MPC_i} \qquad (2.1\text{-}6)$$

C_i = Radioactivity concentration of radionuclide "i" in the liquid effluent prior to dilution (μCi/ml) from analysis of the liquid effluent to be released.

MPC_i = The liquid effluent radioactivity limit for radionuclide "i" (µCi/ml) from Table 2.1-1 or, if not listed in Table 2.1-1, from Reference 1.

b. Determine f_{max} (the maximum acceptable discharge flow rate prior to dilution (gpm)) for each of the dilution water flow rates.

$$f_{max} = \frac{0.8F\ T_m}{D} \qquad (2.1\text{-}7)$$

0.8 = An engineering factor to prevent spurious alarms caused by deviations in the mixture of radionuclides that affects monitor reponse.

F = Dilution water flow rate (gpm).

= 160,000 gpm from one circulating water pump[2], Unit 2.

= 250,000 gpm from two circulating water pumps[2], Unit 2.

= 400,000 gpm from three circulating water pumps[2], Unit 2.

or

= 50,000 gpm from one circulating water pump[4], Unit 1.

= 80,000 gpm from two circulating water pumps[4], Unit 1.

T_m = Fraction of the radioactivity from the site that may be released via the monitored pathway to ensure that the site boundary limit is not exceeded due to simultaneous releases from several pathways.

= 0.50 for the Waste Disposal System Liquid Effluent Monitor[5] (RMS-18).

= 0.50 for the Steam Generator Blowdown Monitor[5] (RMS-19) when draining a steam generator.

c. Determine the monitor setpoint correction ratio:

$$\frac{f_{max}}{f} = R$$

f = Approved release rate 20-60 gpm

R = Monitor setpoint correction ratio

d. The rate at which the liquid radwaste is pumped from a tank during discharges to the environment shall not exceed f in gpm.

2.1.2.2 Determine the monitor setpoint equivalent to the maximum discharge flow rate prior to dilution.

a. Determine CR (the calculated monitor count rate above background attributed to the radionuclides (ccpm)) for the dilution water flow rate available during the release.

CR is obtained by using the applicable effluent monitor efficiency curve located in the Plant Operating Manual, Volume 15, Curve Book. Use the radioactivity concentration "C_m" to find CR.

C_m = The total radioactivity concentration of the radionuclides (excluding tritium) in the liquid discharge prior to dilution (μCi/ml).

b. Determine monitor setpoint without background(s): S = (R) (CR).

c. If $S \geq$ background count rate in cpm, make the release in accordance with this calculational method. If $S <$ background, do not make

release based on this calculational method as spurious alarms will prevent completing release. Use setpoint previously described in Section 2.1.1.

d. Determine HSP (the monitor high alarm setpoint including background (cpm)) for each of the dilution water flow rates.

$$HSP = S + \text{Background (cpm)} \tag{2.1-8}$$

e. The monitor high alarm setpoint, including background (cpm), shall be set at or below the HSP value as calculated above that corresponds to the number of circulating water pumps providing the dilution water flow rate at the time that the discharge is made as described in Standing Order No. 4 (Radiation Monitor Setpoints).

where:

T_m = Fraction of the radioactivity from the site that may be released via the monitored pathway to ensure that the site boundary limit is not exceeded due to simultaneous releases from several pathways;

= 0.80 percent for Plant Vent Gas Monitor (RMS-14);

= 0.20 percent for the Condenser Vacuum Pump Gas Monitor (RMS-15).

3.1.2 Gaseous Effluents Analyzed Prior to Release

The following method applies to gaseous releases via the plant vent when determining the maximum acceptable effluent flow rate at the point of release and the associated high alarm setpoint based on this flow rate for the Plant Vent Gas Monitor (RMS-14) during the following operational conditions:

- Batch release of containment purge
- Batch release of containment pressure relief
- Batch release of Waste Gas Decay Tanks

3.1.2.1 Determine the maximum allowable discharge flow rate prior to dilution.

a. Determine f_{max} (the maximum acceptable gaseous flow rate from containment or from the Waste Gas Decay Tanks) (cfm) based upon the whole body exposure limit by:

$$f_{max} = \frac{0.848\ T_m}{(\overline{X/Q})\ \Sigma_i\ K_i\ C_i} \qquad (3.1\text{-}6)$$

where:

T_m = Fraction of the radioactivity from the site that may be released via the monitored pathway to ensure that the site boundary limit is not exceeded due to simultaneous releases from several pathways;

= 0.80 for the plant vent gas monitor (RMS-14)

$\overline{(X/Q)}$ = The highest calculated annual average relative dispersion factor for any area at or beyond the unrestricted area boundary for all sectors sec/m^3) from Appendix A;

= 5.1 E-5 sec/m^3 (Batch Ground Release) from Table A-7, Appendix A;

= 2.9 E-6 sec/m^3 (Batch Mixed Mode Release) from Table A-16, Appendix A only with upper wind speeds $\geq$ 9 mph;

K_i = The total whole body dose factor due to gamma emissions from noble gas radionuclide "i" (mrem/year/μCi/m^3) from Table 3.1-2;

C_i = The radioactivity concentration of noble gas radionuclide "i" in the gaseous effluent (μCi/cc) from the analysis of the gaseous effluent to be released;

0.848 = A combined numerical conversion factor consisting of the whole body dose limit of 500 mrem/yr times a conversion constant of 2.12 E-3 to convert cc/sec to cfm, times an engineering correction factor of 0.8 to prevent spurious alarms.

b. Determine f_{max} based upon the skin exposure limit by:

$$f_{max} = \frac{5.09\ T_m}{\overline{(X/Q)}\ \Sigma_i \left[(L_i + 1.1\ M_i)\ \ C_i\right]} \qquad (3.1\text{-}7)$$

where:

$L_i+1.1M_i$ = The total skin dose factor due to emissions from noble gas radionuclide "i" (mrem/year/μCi/m^3) from Table 3.1-2;

5.09 = A combined conversion factor consisting of the skin dose limit of 3000 mrem/yr, times a conversion constant of 2.12 E-3 to convert cc/sec to cfm, times an engineering factor of 0.8 to prevent spurious alarms.

c. The rate at which the noble gas activity is released from the containment during purging or pressure relief or from the Waste Gas Decay Tanks shall not exceed the smaller of the two f_{max} values calculated in Steps a and b above.

3.1.2.2 Determine the monitor setpoint equivalent to the maximum allowable discharge flow rate:

a. Determine C_m (the maximum radioactivity concentration of all noble gas radionuclides to be released during containment purge or pressure relief or Waste Gas Decay Tanks discharge via the stack after dilution by other discharges in the stack) by:

$$C_m = \frac{C_t f_{max}}{F} \quad (3.1\text{-}8)$$

where:

C_t = The total radioactivity concentration of all noble gas radionuclides in the gas to be discharged from the containment or Waste Gas Decay Tanks prior to dilution (μCi/cc);

f_{max} = The maximum allowable gaseous flow rate from containment or from the Waste Gas Decay Tanks (cfm) selected in Step 3.1.2.1 above.

F = The maximum design stack flow rate (cfm).

$= 60{,}000\ cfm^1.$

b. Determine the monitor setpoint correction ratio by:

$$R = \frac{f_{max}}{f}$$

where:

f = approved release rate not to exceed f_{max}.

c. Determine CR (the calculated monitor count rate above background attributed to the radionuclides (ccpm)).

CR is obtained by using the applicable effluent monitor efficiency curve located in the Plant Operating Manual, Volume 15, Curve Book. Use the radioactivity concentration "C_m" to find CR.

d. Determine monitor setpoint without background(s):

$$S = (R)\ (CR)$$

e. If $S \geq$ Background count rate in cpm, make the release in accordance with this calculational method. If $S <$ Background do not make release based on this calculational method as spurious alarms will prevent completing release. Use setpoint previously described in Section 3.1.1.

f. Determine HSP (the monitor high alarm setpoint including background (cpm)) by:

$$HSP = S + \text{Background (cpm)} \qquad (3.1\text{-}9)$$

g. The monitor HSP shall be set at below the calculated value during containment purges or releases from the Waste Gas Decay Tanks. If containment purges or pressure relief or Waste Gas Decay Tank releases are made while other sources of noble gas activity are being released from the stack, the monitor HSP shall not exceed the calculated value determined in Section 3.1.1.