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U S Nuclear Regulatory Commission
Region IV
Material Radiation Protection Section
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 70611

Pathfinder
Byproduct Material License No. 22-08799-02

Calculation for the High Radiation Alarm Setpoint for Ventilation Units

We would like to inform you of a change to the calculations for the high radiation alarm setpoints for the Reactor Building and the Fuel Handling Building ventilation systems. On September 27, 1990, we submitted our methodology for selecting the high radiation alarm setpoint for the ventilation units. This methodology used a stationary filter collection system in the continuous air monitors. Accumulation of non-radioactive particulate on the stationary filter caused rapid plugging of the filter during construction work.

In order to eliminate this problem, we are using a moving filter (1 inch/hour). This change was discussed with and approved by NRC inspectors during their site inspection on December 5 and 6, 1990. The setpoint calculation is attached.

Please contact us if you have any questions or comments on this matter.

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Manager
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c: Director NMSS, NRC
D Martin, NMSS, NRC (2 copies)
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South Dakota Department of Water and Natural Resources
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Attachment: Calculation for the High Radiation Alarm Setpoint for Ventilation Units

ATTACHMENT

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Calculation for the High Radiation Alarm Setpoint for Ventilation Units

The Fuel Handling Building and Reactor Building ventilation exhaust points are monitored by NMC Model AM-3D continuous air monitors which utilize DGM-2 probes. The equation for the overall sensitivity is given as follows.

$$CPM = 1.33 \times 10^{+10} \, YRAT \qquad (1)$$

where CPM = counts per minute (after one transit of the sample)

$1.33 \times 10^{+10}$ = unit correction factor

Y = yield of the detector arrangement, percent

R = air sample flow rate, cubic feet per minute (cfm)

A = Co-60 activity in microcuries per cc

T = Maximum transit time of the sample, hrs time. (The transit distance is 2 inches and the transit time becomes 2/v where v is the advance rate of the filter paper in inches per hour.)

Equation 1 is utilized to determine the high alarm setpoint in counts per minute for Co-60. The setpoint value was calculated to be 1,461 cpm using a Co-60 activity (A) of 2.3×10^{-9} microcuries per cc. The parameters used in this calculation are listed below.

A background reading of 80 cpm exists due to a low activity Co-60 source in the CAM lead shield. The purpose of this source is to provide a minimal activity to ensure the proper operation of the radiation detector when no measurable process radiation exists (release rates to date are below detectability on the continuous air monitors).

The overall high alarm level setpoint value will include the addition of a background source of 80 cpm. This results in the overall high alarm setpoint of 1,500 cpm (conservatively rounded off from 1,541 cpm).

HIGH ALARM SETPOINT PARAMETERS

Parameter	Value
Y, Yield	4.55 percent
R, Sample Flow Rate	5.25 cfm
A, Activity	2.3×10^{-9} microcuries per cc
T, Transit Time	two hours