Met-Ed / GPU

Metropolitan Edison Company
Post Office Box 480
Middletown, Pennsylvania 17057
717 944-4041

Writer's Direct Dial Number

February 20, 1980
TLL 068

TMI Support
Attn: J. T. Collins, Deputy Director
U. S. Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, Pa. 17057

Dear Sir:

Three Mile Island Nuclear Station, Unit II (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Processed Water Storage Tanks

As discussed in our letter of January 24, 1980 (TLL 029), enclosed please find the Tank Venting Analysis on the subject tanks.

The controlling isotope for this analysis was determined to be tritium. The release rate was conservatively based on filling the tank at a flow rate of 2,000 gpm, which resulted in a tritium release rate of 4.59 μCi/sec.

The analysis resulted in concentrations that are well within the limits specified in Appendix B to 10 CFR 20. The results of these analyses and the limits specified in Appendix B to 10 CFR 20 are given below.

	Calculated Concentration	10 CFR Part 20 Appendix B Allowable
Offsite Unrestricted Areas	3.08E-11 μCi/cc	2.0E-7 μCi/cc
Occupational Workers	1.02E-7 μCi/cc	5.0E-6 μCi/cc

Sincerely,

R. F. Wilson
Director, TMI-II

RFW:LWH:hah
Enclosure
cc: R. Vollmer

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ATTACHMENT 2

TANK VENTING ANALYSIS

Described below is the analysis performed to determine the tritium concentration at the site boundary and a worker occupational concentration adjacent to the Processed Water Storage Tank (PWST) resulting from tank venting. Tritium was the only isotope considered due to it being the predominant isotope.

The concentration of tritium in the water (1.05 μCi/cc) was based on 2,000 Ci. of tritium in 500,000 gallons of water. The relative humidity in the tank to be filled was assumed to be 100 percent. The evaporation rate of tritium was assumed to be equal to that of water, which results in the relative concentration of tritium in the vapor being the same as in the liquid. This results in a tritium concentration in the vapor of 3.64E-5 μCi/cc.

The flow rate into the tank was assumed to be 2,000 gpm, this being the limiting flow rate based on the tank vent capacity specified in the tank specification. Converting this flow rate to a volume of vapor displaced and using the tritium concentration in the vapor, the release rate for tritium was calculated to be 4.59 μCi/sec.

Using the average annual X/Q of 6.7E-6 sec/m^3, the offsite concentration was calculated to be 3.08E-11 μCi/cc. This is well below the limit of 2.0E-7 μCi/cc specified in Appendix B to 10 CFR 20.

For the worker concentration a X/Q was calculated by using the low wind speed of 2.7 m/sec (6 mph) and an isopleth of K_c = 10. This resulted in a X/Q of 2.22E-2 sec/m^3. Using this X/Q and the flow rate of 4.59 μCi/cc, the tritium concentration adjacent to the tank was calculated to be 1.02E-7 μCi/cc. This is below the limit of 5.0E-6 μCi/cc specified in Appendix B to 10 CFR 20.

Since the resultant tritium concentrations are below the limits specified in Appendix B to 10 CFR 20, the present venting design for the tanks is considered satisfactory.

The following comments are offered regarding the X/Q in the worker concentration calculation. The X/Q in this calculation was determined assuming the tank was in an open area. In reality, this is not the case. However, the X/Q calculation did not consider building wake effects from surrounding structures. In addition, the K_c = 10 is a conservative value for this case. When all of these are considered, the X/Q used for the determination of the worker concentration is considered a realistic, yet conservative value.

We would point out three significant areas where both of the concentration results are conservative. The first of these is that the anticipated tritium concentration is well below the 1.05 μCi/cc assumed for the analysis. The

second area deals with the flow rate of 2,000 gpm into the tank. This value is for the purpose of sizing the tank vent. The transfer pumps have not yet been sized but are expected to have no more than half this flow, i.e. the transfer pumps would be no greater than 1,000 gpm, which would be the upper bound for the flow rate. The third area concerns how often there would be flow to one of these tanks. It is anticipated that most of the time there will be no flow to these tanks. During this time, the tritium venting from the tank would be due only to evaporation, which is significantly less than the assumed flow rate.