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Metropolitan Edison Company
Post Office Box 480
Middletown, Pennsylvania 17057

Writer's Direct Dial Number

May 15, 1981
LL2-81-0136

TMI Program Office
Attn: Mr. L. H. Barrett, Deputy Director
U. S. Nuclear Regulatory Commission
c/o Three Mile Island Nuclear Station
Middletown, Pennsylvania 17057

Dear Sir:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
Operating License No. DPR-73
Docket No. 50-320
Submerged Demineralizer System

During discussions with members of your staff we have been requested to provide the following additional information in support of the SDS Safety Review:

> "The licensee will update airborne source term description to include dewatering operations and the use of processed water in the SFP. Provide analysis of the radiological consequences of placing processed water in the spent fuel pool to NRC. This submittal should include (and, perhaps, be based on) data from previous storage of processed water in the pool."

This submittal responds to that request.

Assumptions used for development of source terms associated with filling the spent fuel pool with tritiated water and, hence, release rates are defined below.

H-3	1.0 uCi/ml
Cs-134	1.0×10^{-3}
Cs-137	1.6×10^{-4}
Sr-89	8.0×10^{-5}
Sr-90	2.7×10^{-5}

It is to be noted that the H-3 concentration in the water currently used to fill the pool is approximately 0.2 uCi/ml. Therefore, the release rate calculated is actually higher (by about a factor of 500) than the actual release rates we have seen in the past. Two primary factors contribute to this conservatism. They are:

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1. The evaporation rate factor is conservative.

P 2. The H-3 concentration is lower than assumed.

We may, however, elect to fill the spent fuel pool with tritiated water with a concentration of up to 1 μCi/ml.

Table 1 provides the results of our analysis for filling the spent fuel pool with tritiated water.

During the process of dewatering spent SDS liners, the airborne source term will be increased as a result of the dewatering operations. This increase in airborne radioactivity may be due to two primary factors. They are:

1. Airborne source term as a result of possible radionuclide concentration in the water.

2. Zeolite fines carryover during dewatering.

Table 2 provides the results of our analysis for the airborne source term during dewatering operations.

Should you wish to discuss this matter further, please contact Mr. L. J. Lehman, Jr. of my staff.

Sincerely,

G. K. Hovey
Vice-President and
Director, TMI-2

GKH:LJL:djb

Attachment

cc: Dr. B. J. Snyder, Program Director - TMI Program Office

Table 1

Source Term of Gaseous Effluents

Filling of Spent Fuel Pool with Processed Water

Radionuclide	Concentration Entering F.H. Bldg. Ventilation(a) uCi/ml	Concentration in Plant Effluent(b) uCi/ml	Release Rate uCi/sec
H-3	2.5×10^{-6}	3.5×10^{-7}	16.5
Sr-89	2.0×10^{-15}	2.8×10^{-18}	1.3×10^{-10}
Sr-90	6.7×10^{-17}	9.4×10^{-20}	4.5×10^{-12}
Cs-134	2.5×10^{-15}	3.5×10^{-18}	1.7×10^{-10}
Cs-137	4.0×10^{-15}	5.6×10^{-18}	2.6×10^{-10}

(a) This is the calculated radionuclide concentration in the air entering the fuel handling building ventilation. An entrainment factor of 10^{-6} and ventilation flow rate of 14000 CFM on 347' elevation with a resulting evaporation rate was assumed.

(b) This is the calculated radionuclide concentration in the off-gas (100,650 $ft.^3$ /min.) from TMI-II as it enters the atmosphere. An additional DF of 100 is assumed for particlates however no further treatment is assumed for tritium.

Source Term for Dewatering Liners Including Zeolite Fines Carryover

Dewatering

Radionuclide	Concentration in SDS Dewatering Effluent Air (a) μCi/cc	Concentration in Plant Effluent (b) μCi/cc	Release Rate μCi/sec.
H-3	5.1×10^{-7}	3.3×10^{-9}	0.2
Sr-89	8.0×10^{-12}	5.2×10^{-16}	2.4×10^{-8}
Sr-90	2.7×10^{-13}	1.7×10^{-17}	8.3×10^{-10}
Cs-134	1.0×10^{-11}	6.5×10^{-16}	3.1×10^{-8}
Cs-137	1.6×10^{-11}	1.0×10^{-15}	4.9×10^{-8}

Zeolite Fines Carryover

Radionuclide	Concentration in SDS Dewatering Effluent Air (a) μCi/cc	Concentration in Plant Effluent (b) μCi/cc	Release Rate μCi/sec.
Cs-137	2.1×10^{-13}	1.3×10^{-17}	6.3×10^{-10}
Cs-134	3.4×10^{-14}	2.2×10^{-18}	1.0×10^{-10}
Sr-90	3.3×10^{-14}	2.1×10^{-18}	9.9×10^{-11}
Sr-89	6.9×10^{-16}	4.5×10^{-20}	2.1×10^{-12}

(a) This is the calculated radionuclide concentration in the off-gas (650 $ft.^3$/min.) following treatment from the SDS prior to entering the existing effluent treatment system in TMI-II. DF of 100 and an entrainment factor of 10^{-6} have been assumed for particulates. No effluent treatment is assumed is for ^3H.

(b) This is the calculated radionuclide concentration in the off-gas (100,650 $ft.^3$/min.) from TMI-II as it enters the atmosphere. An additional DF of 100 is assumed for particulates and no further treatment is assumed for ^3H.