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Writer's Direct Dial Number

August 7, 1980  
TLL 362

TMI Program Office  
Attn: Mr. John T. Collins, 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 II (TMI-2)  
Operating License No. DPR-73  
Docket No. 50-320  
Interim Waste Staging Facility - Radiation Dose Limits

Confirming discussion with Ed Fuller of July 17, 1980, criteria have been established for maximum direct radiation dose limits related to the Interim Waste Staging Facility (IWSF). They are as follows:

Onsite: 0.6 mrem/hour just outside the fence surrounding  
the IWSF (10 CFR Part 20)  
  
Offsite: 0.3 mrem/hour at the nearest site boundary, which  
is the normal high water line of the river  
(40 CFR Part 190)

For your information, the basis for the above values is attached.

Sincerely,

/s/ G. K. Hovey

G. K. Hovey  
Director, TMI-II

GKH:RIN:EDF:dad

cc:

R. L. Rider  
R. W. Heward

Attachment

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INTERIM WASTE STAGING FACILITY  
RADIATION DOSE LIMITS

The design bases for direct radiation dose limits for the Interim Waste Staging Facility (IWSF) have been established as:

ONSITE: 0.6 mrem/hour just outside the fence surrounding  
the IWSF (10 CFR Part 20)

OFFSITE: 0.3 mrem/hour at the nearest site boundary, which is  
the normal high water line of the river (40 CFR Part 190).

ONSITE LIMIT (10 CFR Part 20)

10 CFR Section 20.105 provides standards for radiation protection in unrestricted areas. Sections 105(b)(1) and 105(b)(2) apply to the TMI Station outside the fence which delineates the restricted area as shown on Figure 1-1 of the Unit 1 FSAR. Section 20.105(b)(1) establishes a maximum allowable dose outside the fence of 2 mrem/hour. Section 105(b)(2) limits the total dose to 100 mrem in seven (7) consecutive days. The latter is the more limiting requirement so it is used to establish the limit in the unrestricted area to radiation from the IWSF. 100 mrem divided by 168 hours (7 days) equates to an average of 0.6 mrem/hour.

10 CFR Section 20.202(a)(1) sets dose limits within the restricted area which must not be exceeded without appropriate personnel monitoring equipment. This limitation is given as 25% of the applicable value specified in paragraph (a) of Section 20.101. This applicable value is 1250 mrem per quarter for the whole body. Conservatively assuming a full forty (40) hour weekly occupancy at the fence around the IWSF, this calculates to an average exposure rate of 0.6 mrem/hour.

Therefore, a design basis maximum radiation rate of 0.6 mrem/hour is established for any point just outside the entire fence surrounding the IWSF. This 0.6 mrem/hour is the same as the limit outside the control fence which was part of the basis on which the NRC granted permission to TVA (Brown's Ferry, Docket 50-259) on March 17, 1980, to temporarily store radioactive waste.

#### OFFSITE LIMIT (40 CFR Part 190).

While Appendix I to 10 CFR Part 50 limits reactor effluents and their resultant offsite radiation exposures, 40 CFR Part 190 limits total offsite radiation exposure including that from both effluent and direct radiation. As stated above, the Part 190 limit on direct radiation from the IWSF will be 0.3 mrem/hour. This number is derived as the exposure limit of 20 mrem/year (25 total allowable under Part 190 less a conservative 5 mrem from other TMI effluents) to a person at the site boundary (high water line of the river) spread over 67 hours per year.

#### Annual Dose Limit

NUREG 0133 makes it clear that the limit to offsite radiation exposure resulting from operations at any nuclear site under 40 CFR Part 190 is 25 mrem/year, if there are no other nearby nuclear facilities. There are no other nuclear operations near to TMI, so its total Part 190 dose limit is 25 mrem/year. Operation of the IWSF will result in no gaseous or liquid effluents, but will emit direct radiation which cannot be allowed to result in the total exposure of any member of the public to more than 25 mrem/year. During the operation of the IWSF, TMI Unit I will also be operating. Accordingly, exposure to Unit I effluents must be deducted from the 25 mrem total. Though effluents from Unit I are limited by Appendix I to not result in exposure of any member of the public in excess of 5 mrem to the whole body, the Unit I effluents are expected to result in exposures of well under the 5 mrem limit. Therefore, the 5 mrem deducted from the Part 190 limit of 25 mrem/year conservatively bounds other effluents. This, then, requires that the direct radiation from the IWSF not result in an exposure exceeding 20 mrem/year to a real person at the site boundary.

#### Site Boundary

Under the heading, "Definitions", in 40 CFR Part 190, are:

"(k)'Member of the public' means any individual that can receive a radiation dose in the general environment..."

"(c)'General environment' means the total terrestrial, atmospheric and aquatic environments outside sites upon which any operation which is part of a nuclear fuel cycle is conducted."

and,

"(d)'Site' means the area contained within the boundary of a location under the control of persons possessing or using radioactive material on which is conducted one or more operations covered by this Part."

(Emphasis added in all three quotes)

Thus, it is clear that the member of the public addressed by Part 190 limits (here for the IWSF) is outside the boundary of the site on which the TMI Station is located, all of which site is owned and controlled by Metropolitan Edison Company. The nearest boundary to the IWSF is the normal high water line of the river on the east side of the island. Therefore, under 40 CFR Part 190, no person at this boundary may be exposed to more than 20 mrem/year from direct radiation emanating from the IWSF.

#### Duration of Exposure

Metropolitan Edison does not have site-specific data on the presence of persons on the river bank. However, NUREG 0133 states that Part 190 doses can be calculated "...using the methodologies described in this NUREG document and applicable references". One such reference given is Regulatory Guide 1.109, "Calculations of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I". On page 40 of this Regulatory Guide is Table E-5 entitled, "Recommended Values for  $U_{ap}$  to be Used for the Maximum Exposed Individual in Lieu of Site-Specific Data". ( $U_{ap}$  is "a usage factor that specifies the exposure time...") This Table provides the annual time for the age group of maximum exposure as 67 hours per year for "shoreline recreation" (in this case, fishing--the only reason a person would be at this river bank).

### Conclusion

Therefore, the limit to direct radiation exposure to a member of the public from operation of the IWSF under 40 CFR Part 190 is 0.3 mrem/hour. This is calculated by dividing the net allowable annual dose of 20 mrem by 67 hours per year.