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February 28, 1986

Office of Inspection and Enforcement  
Attn: Dr. T. E. Murley  
Regional Administrator  
US Nuclear Regulatory Commission  
Region I  
631 Park Avenue  
King of Prussia, PA 19406

Dear Dr. Murley:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)  
Operating License No. DPR-73  
Docket No. 50-320  
Quarterly Dose Assessment Report - Fourth Quarter 1985  
Semi-Annual Radioactive Effluent Release Report

Per the requirements of Section 5.6.1.C of Appendix B to the Recovery Technical Specifications, the quarterly report of radiological releases and estimated doses is submitted. Attachment 1 is an executive summary of TMI-2 effluents and doses reported in Attachments 2 through 4. Attachment 2 presents a summary of releases listing estimates of total activity and the time rate of release of each nuclide. Attachment 3 is the interpretation of Attachment 4, the Dose Summary Table, which provides a summary of the maximum hypothetical and/or real doses to individuals and the general population resulting from TMI-2 activities. Doses were extracted from calculational models and represent the bounding dose for all cases. The reporting period includes October 1, 1985, through December 31, 1985.

Also enclosed as Attachment 5, in accordance with the requirements of 10 CFR 50.36a(a)(2), is the Radioactive Effluent Release Reports for TMI-2. Table 1B, "Effluent and Waste Disposal Semi-Annual Report, Gaseous Effluent-Elevated Releases", is not included as we have chosen to treat all releases as groundlevel releases for conservatism. Attachment 6 presents the Joint Frequency Tables for TMI-2. These reports cover the period of July 1, 1985, through December 31, 1985.

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Dose summaries and effluent releases for the previous quarters of the 1985 calendar year were submitted via GPU Nuclear letters 4410-86-L-0120 dated May 30, 1985, 4410-85-L-0175 dated August 29, 1985, and 4410-85-L-0238 dated November 27, 1985.

The NRC Inspection Report 50-320/85-21, dated December 24, 1985, reported that a potential unmonitored release pathway from the Contaminated Drain Tanks (WDL-T-11A and WDL-T-11B) to the atmosphere had been discovered, by the licensee, to have existed during and after the accident of March 29, 1979. The Inspection Report stated that Semi-Annual Effluent Release Reports would be updated when the licensee's evaluation of this unmonitored release pathway was completed.

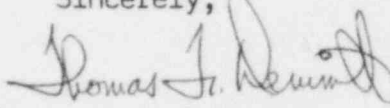
GPU Nuclear has evaluated this monitored release pathway and has determined that the potential, i.e., a source, a pathway and driving force, for an airborne release existed only during the accident and immediate post-accident time period. This evaluation also identified radioiodine as the significant nuclide available for release.

To estimate the amount of Iodine 131 (I-131) available for potential release, two (2) methods of analysis were employed. The first method used was based on available I-131 air samples from the Contaminated Drain Tanks, Contaminated Drain Sump and the Contaminated Drain Tank Room. The maximum available I-131 for release calculated by this method was  $6.53 \times 10^{-4}$  Ci. The second method used to calculate an estimate was based on I-131 air samples taken from the Service Building Basement. The maximum I-131 available for release based on this method was  $1.75 \times 10^{-3}$  Ci.

A total of 14.4 Ci of I-131 was reported for the first three quarters of 1979. For conservatism, the value of  $1.75 \times 10^{-3}$  Ci of I-131 was assumed to have been available for release through the Contaminated Drain Tanks. The addition of this  $1.75 \times 10^{-3}$  Ci of I-131 to the reported value of 14.4 Ci of I-131 is considered insignificant. Therefore, no amendments to previously submitted Semi-Annual Radioactive Effluent Release Reports are required.

As a result of the discovery of this unmonitored release pathway from the Contaminated Drain Tanks, GPU Nuclear has initiated a program to evaluate other unmonitored release paths which currently exist at TMI-2. This investigation has identified ten (10) potential unmonitored release pathways. Radiological Controls is currently evaluating the release potential of these pathways to establish their bounding conditions. The TMI Cleanup Project Directorate will be apprised of the results of this review when they are available. This review will also be documented in a subsequent Semi-Annual Radioactive Effluent Release Report.

Sincerely,



F. R. Standerfer  
Director, TMI-2

FRS/CJD/eml

cc: Director - TMI Cleanup Project Directorate, Dr. W. D. Travers

EXECUTIVE SUMMARY  
Three Mile Island Nuclear Station Unit 2  
Effluent and Offsite Dose Report  
for the Period of October 1, 1985 to December 31, 1985

This report summarizes the radioactive liquid and gaseous releases from Three Mile Island Unit 2 and the calculated maximum hypothetical radiation exposure to the public resulting from these releases. This report covers the period of operation from October 1 to December 31 of 1985.

Radiological releases from the plant are measured by installed plant effluent monitors sampling the plant stack for gaseous releases and liquid monitors for discharges to the Susquehanna River. These monitors provide a means for accurate determination of the type and quantities of radioactive materials being released to the environment.

Calculations of the maximum hypothetical dose to an individual and the total population around Three Mile Island due to radioactive releases from the plant are made utilizing environmental conditions that existed at the time of the release. Susquehanna River flow data are used to calculate the maximum hypothetical doses to an individual and the population downstream of TMI due to liquid releases. Actual or "real-time" meteorological data from an onsite met tower are used to determine the doses resulting from gaseous releases from the plant. The use of real-time meteorological information permits the determination of both the direction in which the release traveled and the dispersion of radioactive material in the environment.

Utilizing gaseous effluent data and real-time meteorology, the maximum hypothetical dose to any individual and to the total population within 50 miles of the plant is calculated. Similarly, Susquehanna River flow and liquid effluent data are used to calculate a maximum hypothetical dose to an individual and a population dose from liquid effluents for any shoreline exposure down to the Chesapeake Bay. Ingestion exposure to the public from consumption of water and fish withdrawn from the Susquehanna River downstream of the plant is also calculated.

Dose calculations for liquid and gaseous effluents are performed using a mathematical model which is based on the methodology defined by the U.S. Nuclear Regulatory Commission.

The maximum hypothetical doses are conservative overestimates of the actual offsite doses which are likely to occur. For example, the dose does not take into consideration the removal of radioactive material from the river water by precipitation of insoluble salts, absorption onto river sediment, biological removal, or removal during processing by water companies prior to distribution and consumption.

Liquid discharges made during the reporting period October 1 to December 31, 1985 consisted of about 0.002 curies of tritium, 0.00003 curies of unidentified beta activity and 0.000009 curies of cesium-137. Unidentified beta activity is treated as strontium-90 for the purpose of dose calculations. These release rates and quantities are consistent with results of previous quarters. The quantities of each radioisotope released are actually from 100 to 100,000 times smaller than the normally existing environmental quantities that flow past the plant during the same period.

During the reporting period October 1 to December 31 of 1985, the maximum hypothetical calculated whole body dose to an individual due to liquid effluents from Three Mile Island Unit 2 was about 0.0003 mrem. The maximum hypothetical calculated dose to any organ of an individual was about 0.0008 mrem to the bone.

Airborne discharges made during this same time period consisted of about 12 curies of tritium, 0.000002 curies of cesium-137, 0.0000001 curies of gross alpha activity, and 0.000003 curies of unidentified beta activity, which is, as with liquid effluents, conservatively assumed to be entirely strontium-90. These release rates and quantities are also consistent with the results from previous reporting periods. Noble gas releases consisted of about 0.1 curies of xenon-133 during the reporting period. The xenon-133 was produced in Unit 1 and was exhausted through Unit 2 by exchange in the fuel handling building.

The maximum hypothetical calculated dose to any individual from noble gases was about 0.00001 mrem to the skin and 0.000005 mrem to the whole body. Airborne particulates are calculated to produce about 0.001 mrem to the total body of the maximum hypothetical individual.

The maximum hypothetical whole body dose received by any individual from effluents from the Three Mile Island Nuclear Station Unit 2 for the latest reporting period is 25,000 times lower than the dose the average individual in the Three Mile Island area receives from natural background during the same time period. Natural background averages about 25 mrem whole body per quarter in the Three Mile Island area. In addition, the average equivalent dose from natural radon is about 90 mrem per quarter.

The doses which could be received by the maximum hypothetical individual are less than .02% of the guides established by the Nuclear Regulatory Commission.