



Metropolitan Edison Company
Post Office Bc 480
Middletown, Pennsylvania 17057

Writer's Direct Dial Number

October 13, 1980
TLL 478

TMI Program Office
Attn: Mr. J. T. Collins
c/o Three Mile Island Nuclear Station
Middletown, PA 17057

Dear Sir:

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

This letter is forwarded in response to your letter dated September 13, 1980. In that letter you state that the NRC staff considers our proposed method to decontaminate the reactor building sump water, the Submerged Demineralizer System (SDS), would be a facility change as described in 10CFR50.59 which may require prior NRC approval. Furthermore, you state that part of your review of the SDS will require submission by Met-Ed of a comprehensive written safety evaluation to determine if such a change would involve an unreviewed safety question and/or a change in the Technical Specifications for the facility, and hence a license amendment.

We recognize the requirement to perform a safety evaluation in accordance with 10CFR50.59 and intend to submit the document to you by December 1, 1980. However, we wish to point out that the document previously submitted (the SDS Technical Evaluation Report) and in your hands for many months contains the necessary information to facilitate your review of our proposal.

On April 10, 1980, via letter TLL 160, we transmitted our Technical Evaluation Report (TER) for the Submerged Demineralizer System. The TER provides a description of the proposed system and the results of our analysis of the operation of the system. Considered in our analysis are the following concerns:

1. A summary of our treatment plan for RCS water and containment sump water including the alternative methods considered.
2. A process description of the selected method for water decontamination.
3. The design basis for the system.
4. A description of the system and the system layout and placement within the TMI-2 facility.

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5. Radiation protection analysis including:
 - a. ALARA design considerations.
 - b. ALARA considerations during operation.
 - c. Facility design features for radiation protection including shielding design, ventilation design, and radiation monitoring instrumentation.
 - d. Dose Assessment for on-site and off-site radiological exposures.
6. Hypothetical accident analysis.

In our April 10, 1980 letter we state:

"We believe the SDS represents an optimum system for decontamination of the containment sump water and reactor coolant system water. Your early approval for use of this system is requested."

The issuance of a TER to the NRC was intended as the vehicle for communication to NRC of technical information to support NRC's review and approval of proposed TMI-2 recovery systems and facilities.

Specifically, your letter promulgates IE Circular 80-18: 10CFR50.59 SAFETY EVALUATIONS FOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS. This circular was issued subsequent to our April 10 submittal and it provides guidelines concerning criteria that should be reviewed prior to the modification of radioactive waste systems. Some of these criteria are:

1. System modifications should be evaluated against the seismic, quality group and quality assurance criteria in Regulatory Guide 1.143. Design provisions for controlling releases of radioactive liquids, as presented in Regulatory Guide 1.143, should also be evaluated.
2. Radiological controls should be evaluated against the criteria in Regulatory Guide 1.21 and Standard Review Plan 11.5, "Process and Effluent Radiological Monitoring and Sampling Systems".
3. Systems involving potentially explosive mixtures should be evaluated against the criteria in Standard Review Plan Section 11.3, "Gaseous Waste Management System", subsection II, item 6.
4. System design and operation should be evaluated to assure that the radiological consequences of unexpected and uncontrolled releases of radioactivity that is stored or transferred in a waste system are a small fraction of the 10CFR100 guidelines; i.e., less than 0.5 rem whole body dose, 1.5 rem thyroid from gaseous releases, and less than the radionuclide concentrations of 10CFR20, Appendix B, Table II, Column 2 from supplies. (See Standard Review Plan Sections 15.7.1, 15.7.2, and 15.7.3 for more details.)

The above criteria have been addressed in our TER, with the exception of item #3. Potentially explosive mixtures have not been addressed in our submittal because, to the best of our knowledge, operation of the SDS does not involve the generation or use of potentially explosive mixtures.

As indicated in our SDS TER, section 4.3.1, the regulatory guidance provided in Regulatory Guide 1.143 has been followed for the design of the SDS. The guidance followed relates to seismic, quality group and quality assurance criteria. The control of releases of radioactive liquids is a positive one; no SDS liquid effluent will be directly released to the environment.

The guidance provided in Regulatory Guide 1.27 has been followed in the design of the SDS. In fact, there are no planned liquid releases from the SDS. Gaseous effluents are discharged via the normal plant vent stack. Furthermore, the guidelines of this Regulatory Guide regarding the generation of solid waste during operation of SDS will be followed.

The system design and operation has been evaluated and the determination has been made that the radiological consequences of potential unexpected and uncontrolled releases of radioactivity are a small fraction of the 10CFR100 guidelines. Our submittal to you, TLL 251, dated May 27, 1980, provides our analysis of the hypothetical accidents presented in the TER. This analysis documents that even potential uncontrolled and unexpected releases of gaseous radioactivity are acceptable and are below the guideline limits of 10CFR100.

In our opinion, we have provided the necessary information to you to enable your review and evaluation of our proposed change. Although this change is temporary in nature, we believe that a thorough review of the safety significance of system implementation is required. The results of our review were transmitted to you in our TER.

Essentially, we have concluded the following:

1. The operation of SDS is not an unreviewed safety question from the point of view of increasing the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the safety analysis report. The influent waters to be processed by SDS, will be batch processed into the tank farm tanks. In the case of sump water, the containment boundary will be broken for the duration of the water transfer. In reality, processing the containment sump water via SDS represents a smaller hazard than allowing it to remain in the containment sump. Letdown from the RCS into the tank will be compensated for by suitable makeup to the RCS. In either case, operational procedures to administratively control the processing of sump or RCS water by the SDS will be issued to the NRC for their review and approval.
2. The operation of SDS is not an unreviewed safety question from the point of view of creating the possibility for an accident or malfunction of a different type than any evaluated previously in the safety analysis report. Potential hypothetical accidents, as discussed in the SDS TER, result in consequences no more severe than the consequences associated with the maximum hypothetical accident postulated in the TMI-2 Final Safety Analysis Report (FSAR). Therefore the consequences of hypothetical SDS Accidents are within the umbrella of accidents provided in the FSAR.

3. The operation of SDS is not anticipated to cause a reduction in the margin of safety as defined in the basis for any technical specification. The SDS does not provide for a liquid effluent pathway to the environment. The gaseous pathway contributes to a dose rate at the site boundary of less than:
 - a. 5 mrem/yr. to the whole body or any organ from radionuclides except I-131 and particulate nuclides with half lives greater than 8 days, and
 - b. 15 mrem/yr. by inhalation or to the thyroid of a child through the cow-milk chain from I-131 and other particulate radionuclides with half lives longer than 8 days.

These limits are objectives as stated in the TMI-2 Interim Recovery Technical Specifications Appendix B, to be achieved and the subsequent limits concerning gaseous effluents. Furthermore, as stated in the bases for the Appendix B Technical Specifications, the resulting annual exposure rate from noble gases at any location at the site boundary will not exceed 10 millirems per year.

Section 6.3.2 of the SDS TER provides the analytical basis and methodology employed to assure that the off-site radiological exposure does not represent a reduction in the margin of safety for operation of the SDS.

Currently, TMI-2 PORC is reviewing the SDS system including system design operation and maintenance to verify that the operation of the system does not present an "unreviewed safety question". The results of this review will be forwarded to you when it becomes available. However, the results of this review are not expected to provide results that exceed the upper bounds of projected consequences of SDS operation as presented in the TER. Therefore, we continue to maintain that the TER provides information that is adequate to enable your safety analysis of SDS.

In summary, we recognize that a safety evaluation in the SDS is required by 10CFR50.59 and we intend to submit such a document by December 1, 1980. However, we wish to emphasize that all of the elements of the safety evaluation have been addressed in our previous submittals, which you have had in-hand since April of this year. We do not perceive any need for extension in NRC review schedule, associated with our submittal of the Safety Evaluation.

Sincerely,

/S/ G. K. HOVEY

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

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