UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

RELATED CORRESPONDENCE

May 16, 1980
NRC/TMI-80-89

Docket No. 50-320

Mr. R. C. Arnold
Senior Vice President
Metropolitan Edison Company
100 Interpace Parkway
Parsippany, New Jersey 07054

Dear Mr. Arnold:

Subject: Submerged Demineralized System Technical Evaluation Report

We have reviewed your report, subject as above, transmitted to us with your letter TLL-160 dated April 10, 1980, and find that we need additional information to enable us to complete our evaluation.

Enclosure 1 is a list of questions for which we would like to have your responses by June 6, 1980. To facilitate an early response to these questions, our on-site staff is prepared to meet with you or your designated representatives at your earliest convenience to discuss our comments in more detail.

John T. Collins

John T. Collins
Deputy Program Director
TMI Program Office

Enclosure: As Stated

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ENCLOSURE I

COMMENTS ON SUBMERGED DEMINERALIZER

SYSTEM TECHNI AL EVALUATION REPORT

GENERAL COMMENTS

1. Provide (1) a complete set of Piping and Instrument Diagrams (P&ID), (2) general arrangement drawings, (3) zeolite, cation, and filter vessel internal drawings, and (4) the system description document of the latest revision for the SDS.

2. Provide a complete process flow diagram indicating (a) expected radioactivity concentration (uCi/ml) in each process stream including the final processed water for each radionuclide present, and (b) expected concentrations (ppm or ppb) of nonradioactive chemicals in each process stream. Include test results, references, and any supporting documents to support and substantiate the decontamination factors you assumed.

3. Provide expected radioactivity loading (Ci) and throughput (gallons) in each pre-filter, final filter, zeolite bed, cation bed, and polishing demineralizer.

4. Provide expected solid loading capacity for pre and final filters and estimate number of spent filter vessels to be generated as a result of SDS operation.

5. Provide expected number of spent resin vessels (zeolite, cation, and pool purification mixed-bed) to be generated during operation of the SDS.

6. Describe process flow and method for processing the reactor coolant through the SDS and/or EPICOR II.

7. Describe the design and operational features of SDS polishing demineralizer.

8. Provide the maximum expected tritium concentration in the TMI-2 fuel pool water with anticipated routine leakage (coupling and decoupling operations of filter and resin vessels) as a result of SDS operation.

9. Provide expected fuel pool water temperature, water volume, evaporation rate, and area ventilation flow rate, and resulting airborne tritium concentration in the TMI-1 and TMI-2 Fuel Handling Areas during operation of the SDS.

10. Describe the provisions provided for the removal and disposal of spent resin from the SDS polishing unit demineralizer.

SPECIFIC COMMENTS

1. Page 1-1, paragraph 1.1

State if specific process features include processing of rinse water through the SOS. If so, estimate the volume and radioactivity concentration of rinse water.

2. Page 1-2, Alternative I

Based on past experience, project the reactor building water level for next two years and list the critical instruments that may be affected by the water level you projected.

3. Page 1-2, Alternative I

You state that the radiation dose at the surface of the sump water measures approximately 120 R/hr. State expected radiation dose rate at the same elevation after removing all waste water in the reactor building.

4. Page 1-3, Alternative II

You state that the construction of a waste storage facility would exceed two years. Describe the waste storage facility considered and state estimated radiation doses from the facility.

5. Page 1-3, Alternative II

Include in your evaluation a solidification system that would utilize a large liner for direct solidification of containment sump waste water.

6. Page 1-7, paragraph 1.4.2

What is the "desired bed loading" for the first zeolite bed. Discuss the manner in which the loading will be determined during operation. Also discuss loading in terms of integrated dose rate limitations and the potential for gas generation while in store.

7. Page 1-7, paragraph 1.4.2

Is it the intent to store the organic cation bed underwater in the storage rack? If not, how will they be disposed of?

8. Page 1-8, first paragraph

You state that cation resin will be limited to less than 75 Ci of strontium based on zeolite bed effluent monitoring. State strontium analysis capability at the TMI site to sustain SDS process without delay.

9. Page 1-8, second paragraph

Describe design and operational features of beta monitors in detail. Are they designed for cesium or strontium breakthrough?

10. Page 1-8, line 2

At a loading of 75 curies of strontium on the cation bed, what is the expected cesium loading? What is the bases for limiting integrated dose rate to 10^8 rads?

11. Page 2-1. line 10

Provide estimates of the expected occupational exposures from the processing of sump and RCS water, and handling of all generated solid waste, including filters. Provide the bases for your estimates.

12. Page 2-1, line 2

Identify those components which will require shielding, in addition to those in the fuel pool, to reduce dose rates to less than one (1) mR/hr. Also include components in the SDS off-gas system.

13. Page 2-2, paragraph 2.3

Provide the basis for the 450 gallons water being released to the pool and for the 233,000 gallons of additional contaminated water.

14. Page 2-2, last paragraph

You state "It is possible that workers could be contaminated, however, prompt emergency decontamination procedures would prevent major radiation exposures". Elaborate this statement and describe the location and the method to be used for prompt emergency decontamination procedures. Provide the basis for the 11 R/hr maximum exposure rate assumed.

15. Page 2-4, paragraph 2.6

Discuss ultimate disposition of generated solid radwaste in greater detail. Describe storage capability for spent liners, spent resin processing, cask availability for shipment, and acceptability of the processed waste at a low level waste burial facility.

16. Page 3-5, paragraph 3.4

You state that the results of recent experimental work with simulated and actual water samples from TMI-2 were used to support the selection of specific ion exchanger materials for the SDS. Provide a copy of such test results to the NRC for review.

17. Page 3-5, paragraph 3.4

You state that only 200 bed volumes (approximately 2000 cubic feet or 15,000 gallons) of waste water are anticipated to be processed before the first zeolite bed is removed and replaced.

This will require more than 60 zeolite bed replacement (excluding the subsequent zeolite beds, cation beds, and filters) to process one million gallons of waste water through the SDS. Justify the storage capacity provided for only 40 spent vessels in the fuel pool.

18. Page 4-6, line 6

Provide the flow capacity of the pool secondary containment demineralizers.

19. Page 5-2, line 1

Provide the administrative surface dose rate limit for change out of the SDS filters.

20. Page 5-6, line 6

Describe how the shipping cask and its' contained liner will be drained prior to movement out of the pool.

21. Page 5-2, line 1

Describe how spent SDS filters will be changed out and packaged for ultimate disposition.

22. Page 5-1, paragraph 5.1

The SDS feed tanks can be considered as one feed tank with a capacity of 60,000 gallons since there are no valves between these feed tanks and two monitor tanks which receive processed waste water have a capacity of 19,100 gallons each.

Describe the criteria for determining the batch volume without risking radioactivity contamination of already processed water in the monitor tanks. The in-line monitors may not provide the sensitivity required to detect desired radioactivity breakthrough due to the radioactivity plateout and background radiation buildup.

23. Page 5-1, paragraph 5.1.1

Provide estimated contact dose on spent filter, zeolite, and cation vessel casks.

24. Page 5-3, paragraph 5.1.4

You have provided an in-line monitor in a common recirculation line from all vessel containment boxes to the leakage containment ion exchangers. Describe leakage detection method to identify the source of leakage from each vessel containment box.

Describe also how you would distinguish accidental leakage from the leakages resulting from routine connections and disconnections of vessels.

25. Page 5-4, paragraph 5.2

Describe leakage detection method provided within Hi-Rad Filter Glove Box, Hi-Rad Feed Sample Box, Intermediate Level Sampling Glove Box, and Beta Monitor Manifold. Describe (1) type of analysis to be performed on Hi-Rad samples, and (2) capability of such analyses on the TMI site.

26. Page 5-6, paragraph 5.5

You state that the capability to solidify the spent resin vessels generated by the operation of the SDS has been developed. Describe the capability and process involved in detail.

27. Page 6-6, line 15

Provide an estimate of dissolved Kr-85 concentration and include it as a part of the gaseous source term.

28. Page 7-2, line 12

Wouldn't the compartment cleanup and monitoring system for the pool water indicate a leakage contamination problem long before area radiation monitors in SDS area would detect such leakage? What level are these area monitor alarms set? Provide type, number, location, and set point for all area radiation monitors.

29. Page 7-1, paragraph 7.1 and 7.2

State if the reactor building water pump and SDS feed pump are provided with automatic trip upon detection of a preset high radiation level by in-line radiation monitor (RE527-13), fuel pool area monitors, and/or radiation monitors in the filter containment boxes.

30. Page 7-1, paragraph 7.1 and 7.2

Provide estimated annual dose for any individual in an unrestricted area and population dose resulting from hypothetical accidents considered.