Met-Ed / GPU

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October 1, 1979

TMI-2 Support
Attn: R. Vollmer, Director
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)
License No. DPR-73
Docket No. 50-320
Water Storage Assessment

As discussed at the Commission meeting on September 28, 1979, TMI Unit II is continuing to experience water inleakage from various operating systems in the Auxiliary and Fuel Handling Buildings. This inleakage has been minimized, as much as possible, and is now occurring at a rate of approximately 800-1000 gallons per day. The leakage is being stored in tankage in Unit II. At this leakage rate, available Unit II storage capacity will be full in about four to five weeks or about the end of October.

Enclosed is a summary of the water inleakage/storage problem that discusses various options to address the problem. Based upon our review of the problem as summarized in the enclosure, Metropolitan Edison Company recommends that Commission authorization to utilize EPICOR II be given by October 15, 1979. If appropriate, an initial authorization could be limited to the processing of up to 60,000 gallons. The Company assumes that authorization will be contingent upon verification by the NRC of completion of those activities currently underway to ensure reliable operation of EPICOR II as discussed with NRC staff personnel at TMI.

Since the system leakage, which is primarily from non-contaminated systems, can not be terminated, the Company believes use of EPICOR II is necessary to prevent unacceptable radiological consequences. We are not requesting authorization to discharge any of the decontaminated water but will store the water in tankage until the Environmental Assessment associated with disposal alternatives ordered by the Commission, and its associated review, has been completed.

The Company will be pleased to provide any additional information required.

Sincerely,

R. C. Arnold
Senior Vice President

RCA:LWH:rdg

Enclosure

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R. Vollmer
October 1, 1979
Enclosure

WATER INLEAKAGE OPTIONS AND RECOMMENDATIONS

INTRODUCTION

Accumulation of water leakage from systems in the Unit II Auxiliary and Fuel Handling Buildings has been a continuing problem mandating almost daily evaluation of storage options. Leakage is primarily the result of operation of systems necessary to control plant conditions for reliable removal of decay heat. The predominant approach to addressing the problem has been to make available a clean up system for processing the "intermediate water" (terminology used to describe waste water having a concentration of Cesium of less than 100 μc/ml), EPICOR II, and to minimize the rate at which available storage capacity was utilized by minimizing system leakage. The use of tanks installed in the spent fuel pool and one tank in Unit I has increased the available storage space. Despite our best efforts, we are now approaching circumstances which will force a different approach. Within a few weeks, we must either use EPICOR II to process the Unit II intermediate waste water or provide for storage of contaminated Unit II water by means that have not been acceptable while tankage has been available in Unit II.

This document reviews the various options available and provides the basis for the conclusion that use of EPICOR II is the best option.

Attachment 1 to this document tabulates the current storage status. Attachment 2 displays the recent rate of accumulation of leakage. The purpose of Attachment 2 is not to provide the basis for a definitive forecast of how soon the available storage will be utilized, but to indicate the magnitude and variation in daily leak rates.

OPTIONS

1. DO NOTHING. ALLOW TANKAGE TO OVERFLOW WITHIN THE UNIT II BUILDINGS

Tankage overflow will cause the uncontrolled spread of contaminated water back through the Auxiliary Building sump systems and to the building floors. This will constitute an uncontrolled release of radioactive material, increase the risk of an off-site release of radiation and cause recontamination of areas in the Auxiliary Buildings which have been decontaminated. The on-site staff would be subjected to large increases in man-rem exposure. This course is considered to be totally unacceptable from the standpoint of protection of the general health and safety of the public and the option's impact on staff and site activities.

2. TRANSFER INTERMEDIATE LIQUID WASTE TO THE UNIT II REACTOR CONTAINMENT BUILDING

Transfer of intermediate liquid waste to the Reactor Containment Building is theoretically possible through existing installed piping (with modification). The Reactor Containment Building would provide controlled storage capability. The disadvantages to Containment Building storage are ones associated with the continuing safe operation of the reactor. A large influx of water would cause additional cooling at low points of the primary system adversely impacting natural circulation. We would immediately require that the decay heat line valves presently closed be opened, exposing the primary system to a low pressure (370 psig) setpoint relief valve. Opening the decay heat line

valves would also allow highly contaminated water to enter the decay heat system adversely impacting construction necessary to tie in planned long term reactor cooling systems. We believe the importance of achieving long term stability in the cooling of the reactor render this mode unacceptable because of its impact on the activities necessary for long term decay heat removal.

Additionally, modification of installed piping to make the transfer would require removal of check valve internals in high radiation areas (10-20 R/hr) making accomplishment of the modification an exposure and maintenance concern.

3. TRANSFER INTERMEDIATE LEVEL WASTE TO UNIT I TANKAGE

Theoretically about 140,000 gallons of storage capacity is available in two of the Unit I bleed tanks. Permanent piping exists for the transfer of liquid waste. The transfer of water to Unit I, however, poses substantive operational risks.

The Unit I bleed tanks are required to facilitate repair of the Unit I Borated Water Storage Tank. The intermediate level Unit II radioactive waste water, containing up to 56 μc/ml and 17 ppm chlorides is chemically and radiologically a significant Unit I contamination hazard. With the transfer of water from Unit II, there would even be the potential for contamination of the Unit I primary system.

Transferring water of intermediate level activity to Unit I will expand the Unit II health physics problems to Unit I. The resultant high radiation levels associated with piping, cubicles, and storage tanks, make this option very undesirable from a personnel exposure viewpoint. Although necessary procedures and precautions exist to operate safely with radioactively contaminated systems, we would be increasing the potential for exposing plant personnel to radiation to an extent which has been so far restricted to Unit II.

The potential for leaks exists which would spread contamination to undesirable locations. Such an occurrence would expand such problems as Beta contamination to Unit I. With this leakage entering the Unit I Auxiliary Building Sump, a potential exists that the activity levels will be too high (specific activity greater than 1μc/ml) for processing via EPICOR I System. The inability to process would be a compounding problem since then Unit I water would also require storage. The maintenance of equipment (pumps, instrumentation, etc.) in contact with this water would result in exposures an order of magnitude higher than what Unit I is now experiencing. Further, this option, which exposes a much larger fraction of the staff to higher radiation levels, is in direct conflict with the Commission's objective for keeping radiation exposure at levels which are as low as reasonable achievable (ALARA). The transfer of such water also violates the NRC direction to achieve separation of the two units.

Some Unit II water was placed in the Unit I Miscellaneous Waste Holdup Tank (MWHT). That action was taken recognizing most of the disadvantages outlined above. The judgment at the time was that the much lower specific activity of the water to be placed in the tank adequately minimized the adverse consequences of the transfer. Any additional water placed in Unit I would have a total specific activity about six times the specific activity of the water in the MWHT and would have a SR^{89} concentration about 42 times the concentration of SR^{89} in the MWHT.

4. TRANSFER LIQUID WASTE TO EPICOR II TANKAGE

The EPICOR II waste processing system currently has installed two tanks designed for storage of processed water. Theoretically, unprocessed water could be stored in either one or both of these tanks. Doing so, however, would cause radiation levels around the tankage up to about 20 R per hour preventing needed access to the EPICOR II system.

Added shielding would reduce this problem; however, appropriate shielding can not be installed in the available time because the design would have to accommodate severe space limitations. Additionally, contamination of the clean storage tanks would further cause serious operational problems if and when EPICOR II processing is authorized.

5. STORAGE IN UNIT II B SPENT FUEL POOL

The B Spent Fuel Pool is dry and capable of containing radioactive liquid. The four-foot thick walls provide radiation protection to areas immediately outside the pool; however, significant radiation fields would then exist above the pool. Use of this pool would unjustifiably hamper the implementation of one option, Chem-Nuclear Submerged Demineralizer System (SDS), under development for the treatment of highly contaminated waste water in the Reactor Containment Building and the Reactor Coolant System. This system would be installed in the B Spent Fuel Pool. Should the pool be used, and emptied for installation of the SDS at a later date, the generation of liquids from the decon effort to clean the pool would have additional radwaste and ALARA problems.

Although dissolved radioactive gasses may be released if the waste water is stored in the open B Spent Fuel Pool, and such releases would pose some risk of exposures and contamination in the Fuel Handling Building and the Unit 1 buildings, the risk associated with this consideration is thought to be minimal. Nevertheless, ALARA concerns and the adverse impact on the development of the SDS make this option extremely unattractive.

6. PROCEED WITH INTERIM PROCESSING VIA EPICOR II AND STORE IN EPICOR II TANKAGE

This option requires interim processing, without release, using the EPICOR II system. This system was designed specifically for the processing of intermediate level liquid waste and could be used within two or three days on an emergency basis. For a more routine situation, several (about 15) construction "punch list" items should be completed. In addition, the balance of the emergency procedures should receive final review and approval and additional training for the operators should be completed, including practice operation with clean water, before the system is used for contaminated water. All of these items are scheduled for completion by mid October.

The system places radioactivity in a stable, well controlled resin bed suitable for ultimate safe disposal. Processing via EPICOR II can be performed without liquid release from the site. Radiological consequences of this action both on-site and off-site are considered to be acceptable. Total integrated man rem exposure to operating personnel would be less than the exposure associated with all other options.

CONCLUSIONS AND RECOMMENDATIONS

The continued production of intermediate level liquid waste at Unit II will fill all available Unit II tankage by about the end of October, leading to a potential emergency situation. This influx of intermediate level wastes can not be terminated. Public and site health and safety concerns require action to be taken to prevent unacceptable radiological consequences. It is concluded that the environmental and radiological approach most acceptable is to use the EPICOR II system to process the liquid waste. The lowest contained activity (miscellaneous waste holdup tank and spent fuel pool tank farm) water should be processed first. The system is expected to process the water such that contained activity would be a factor of 10 below current Technical Specification limitations at the point of entry into the river, if released, and we will try to approach drinking quality water (as defined in the EPA 570). Decontaminated water will not be released, but will be stored in the EPICOR II storage tanks, or in tanks currently containing the contaminated water, until completion of the study of alternatives for disposal of the water and approval by the NRC of a disposal method.

TMI UNIT II
WATER STORAGE SUMMARY (GALLONS)***

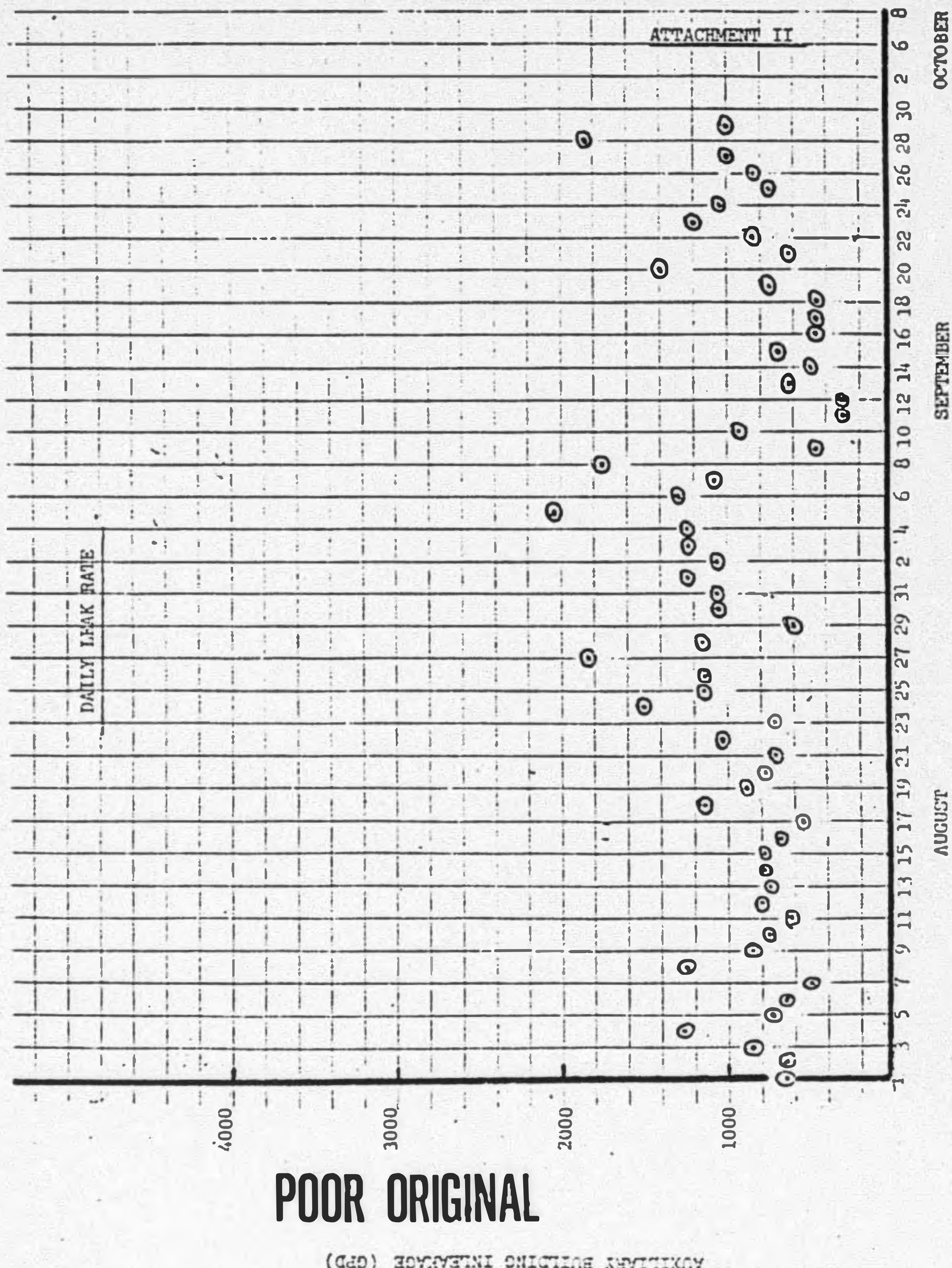
Tank	Geometric Volume	Usable Volume**	Existing Liquid Level (9/29/79) (0300)	Remaining Capacity	Est. Gross Activity uci/ml
Tank Farm (Upper Tanks)	60,000	58,328	53,667	4,661	25
Tank Farm (Lower Tanks)	50,000	48,842	41,674	7,168	25
Misc. Waste Holdup Tank*	19,800	19,610	9,214	10,396	25
Neutralizer Tank A	8,780	8,780	8,780	0	25
Neutralizer Tank B	8,780	8,780	8,780	0	25
RC Bleed Tank A	83,400	77,250	77,250	0	56
RC Bleed Tank B	83,400	77,250	77,250	0	56
RC Bleed Tank C	83,400	77,250	77,250	0	56
Aux. Bldg. Sump Tank*	3,215	2,600	2,600	0	25
Aux. Bldg. Sump*	11,071	9,000	2,577	6,423	25
Concentrated Waste Tank	9,000	9,000	9,000	0	25
Misc. Waste Storage (Unit I) Tank	20,300	18,500	18,500	0	4
	441,146	415,190	386,542	28,648	

* Initial processing with EPICORE II would be from these tanks.

** Usable volume is the maximum amount of volume that can be used in a tank because of operational considerations such as overflow piping arrangements.

*** Summary is for intermediate level waste water.

ATTACHMENT II



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