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4410-85-L-0146  
Document ID 0284A

July 17, 1985

TMI Program Office  
Attn: Dr. W. D. Travers  
Deputy Program Director  
US Nuclear Regulatory Commission  
c/o Three Mile Island Nuclear Station  
Middletown, PA 17057

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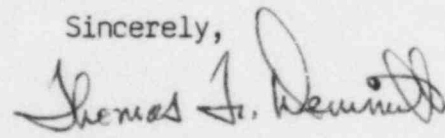
Dear Dr. Travers:

Three Mile Island Nuclear Station, Unit 2 (TMI-2)  
Operating License No. DPR-73  
Docket No. 50-320  
Recovery Operations Plan Change Request No. 34

Attached for your review and approval is Recovery Operations Plan Change No. 34. This change request proposes the addition of criticality monitors to Table 4.3-3 of the Recovery Operations Plan. The proposed criticality monitors are being installed in order to comply with the requirements of 10 CFR 70.24.

Per the requirements of 10 CFR 170, an application fee of \$150.00 is enclosed for review of this document.

Sincerely,

  
F. R. Standerfer  
Vice President/Director, TMI-2

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Attachments

Enclosure: GPU Nuclear Check No. 00016892

cc: Program Director - TMI Program Office, Dr. B. J. Snyder

GPU Nuclear Corporation is a subsidiary of the General Public Utilities Corporation

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

Recovery Operations Plan Change Request (ROPCR) No. 34

The licensee requests the addition of the attached pages 4.3-4a and 4.3-5a to the Recovery Operations Plan. This change request proposes the addition of criticality monitors to Table 4.3-3.

Reason for Change

The proposed criticality monitors are being installed in order to comply with the requirements of 10 CFR 70.24, "Criticality Accident Requirements". These monitors will alert personnel of a criticality event during the handling and transfer of the TMI-2 defueling canisters. Based on previous safety evaluations submitted to the NRC, GPU Nuclear believes that a criticality event cannot occur during the handling and transfer of the TMI-2 defueling canisters; thus, these monitors are only being installed to meet the requirements of 10 CFR 70.24.

Description of Monitors

The proposed monitors will consist of a neutron dose equivalent detector and a rate meter, modified for a louder alarm. The alarm setpoint of these monitors will be set at 1 Rem/hr based on the requirements of 10 CFR 70.24. The attached proposed surveillance requirements are based on those listed in Table 3.3-6 of the Babcock and Wilcox Standard Technical Specifications.

Location of Monitors

GPU Nuclear is installing two (2) criticality monitors, as required by 10 CFR 70.24, in each of the following locations:

<u>Monitor</u>	<u>Location</u>
Fuel Transfer Canal Criticality Monitor	347' elevation of the Reactor Building at the shallow end of the Fuel Transfer Canal
Fuel Pool "A" Criticality Monitor	349' elevation of the Fuel Handling Building at the north edge of Fuel Pool "A"
Fuel Handling Building Truck Bay Criticality Monitor	315' elevation of the Fuel Handling Building near the environmental barrier in the truck bay

Justification for Alarm Setpoint and Location

The locations and alarm setpoint of the criticality monitors were based on the requirements of 10 CFR 70.24 and ANSI/ANS-8.3-1979, "Criticality Accident Alarm System". These documents require that the monitoring system must be capable of detecting a criticality that produces an absorbed dose of 20 Rads at an unshielded distance of 2 meters within one minute.

The alarm setpoint of 1 Rem/hr was determined as follows:

Per ANSI/ANS 8.3-1979 a metallic, unreflected  $^{239}\text{Pu}$  assembly yielded a neutron to gamma absorbed dose ratio of 12 to 1. This was selected as a worst case conservative event for this analysis due to the different attenuations of gamma and neutron flux in shields expected for defueling operations.

An unshielded absorbed dose ratio of 12 to 1 after attenuation by a six inch lead shield, e.g., the Transfer Cask, yields a ratio of 81000 to 1 neutron to gamma. Since it is desirable for one monitor to cover a large area (such as the entire Fuel Pool) the alarm setpoints were based on the absorbed dose rate at 20 meters rather than at 2 meters. In this case the monitors must detect .2 Rad at 20 meters within one minute (equivalent to a rate of 12 Rad/hr). Using the ratios previously defined, this equates to a setpoint of 120 Rem/hr neutron and  $1.5 \times 10^{-4}$  Rem/hr gamma. Clearly only the neutron dose rate is detectable. Therefore, an alarm setpoint of 1 Rem/hr neutron is well above any expected neutron background but two orders of magnitude lower than required.

Additionally, per ANSI/ANS 8.3-1979, a similar analysis was performed using a moderated neutron-to-gamma dose ratio of 0.3 to 1. This ratio equates to a setpoint of 120 Rem/hr neutron and  $6.0 \times 10^{-3}$  Rem/hr gamma. Thus, based on this analysis, an alarm setpoint of 1 Rem/hr neutron is still two orders of magnitude lower than that required by regulation.

The locations of the criticality monitors, based on the above analysis, ensure adequate detection capability of the TMI-2 fuel material contained in the defueling canisters.

#### Safety Evaluation Justifying Change

The addition of the proposed criticality monitors does not reduce any margins of safety during defueling activities. These monitors would serve to alert personnel if a criticality event would occur during the handling and transfer of the TMI-2 core via the defueling canisters. Therefore, this proposed change does not present an undue risk to the health and safety of the public.

TABLE 4.3-3 (Cont'd)

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

<u>FUNCTIONAL UNIT</u>	<u>CHANNEL CHECK</u>	<u>CHANNEL CALIBRATION</u>	<u>CHANNEL FUNCTIONAL TEST</u>	<u>CHANNELS OPERABLE</u>	<u>APPLICABILITY</u>	<u>ACTION</u>
5. FUEL TRANSFER CANAL						
a. Criticality Monitor	S	R	M	1	Note 11	Note 12
6. FUEL POOL "A"						
a. Criticality Monitor	S	R	M	1	Note 11	Note 12
7. FUEL HANDLING BUILDING TRUCK BAY						
a. Criticality Monitor	S	R	M	1	Note 11	Note 12

(See following pages for Notes)

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

NOTES: (Cont'd)

- 11) During either of the following operations:
  - a. Handling of canisters containing core material.
  - b. Handling of any heavy load over canisters containing core material.
- 12) With less than one channel operable, terminate the following operations:
  - a. Handling of canisters containing core material.
  - b. Handling of any heavy load over canisters containing core material.