May 27, 1988

Docket No. 50-320

Mr. F. R. Standerfer
Vice President/Director
Three Mile Island Unit 2
GPU Nuclear Corporation
Post Office Box 480
Middletown, Pennsylvania 17057

Dear Mr. Standerfer:

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SUBJECT: THREE MILE ISLAND NUCLEAR STATION UNIT 2 APPROVAL OF EXEMPTION FROM 10 CFR 70.24, "CRITICALITY ACCIDENT REQUIREMENTS"

We have reviewed your submittal of April 23, 1987, and revised October 26, November 9, and December 4, 1987 which contained in part a request for exemption from the requirements of 10 CFR 70.24, Criticality accident requirements, for the TMI-2 facility. As discussed in the enclosed Exemption, continuation of monitoring using the intermediate and source range neutron monitors after defueling is not necessary since the possibility of a criticality would be precluded and the reactor building would be unoccupied except for infrequent inspections. We conclude that your request for exemption to 10 CFR 70.24 is appropriate and acceptable, as stated in the enclosed Exemption. The Exemption is being forwarded to the Office of the Federal Register for publication.

Sincerely,

Orginal signed by

Michael T. Masnik, Senior Project Manager
Project Directorate I-4
Division of Reactor Projects I/II

Enclosure:
Exemption

cc w/enclosure:
See next page

LA:PDI-4	PM:PDI-4	PD:PDI-4	OGC	ADRT	DRP:DIR
SNorris	MMasnik	JStolz	SHLewis	BABoger	SVarga
4/13/88	5/24/88	5/24/88	4/21/88	5/25/88	5/27/88

No legal objection, subject to changes noted. Request that M. Masnik read changes to me before sent out.

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PDR ADOCK 05000320
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Mr. F. R. Standerfer
GPU Nuclear Corporation

Three Mile Island Nuclear Station
Unit No. 2

cc:

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Mr. F. R. Standerfer
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Three Mile Island Nuclear Station
Unit No. 2

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UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
GPU NUCLEAR CORPORATION	)	Docket No. 50-320
	)	
(Three Mile Island Nuclear Station Unit 2)	)	

EXEMPTION

I.

GPU Nuclear Corporation, Metropolitan Edison Company, Jersey Central Power and Light Company and Pennsylvania Electric Company (collectively, the licensee) are the holders of Facility Operating License No. DPR-73, which had authorized operation of the Three Mile Island Nuclear Station, Unit 2 (TMI-2) at power levels up to 2772 megawatts thermal. The facility, which is located in Londonderry Township, Dauphin County, Pennsylvania, is a pressurized water reactor previously used for the commercial generation of electricity.

By Order for Modification of License, dated July 20, 1979, the licensee's authority to operate the facility was suspended and the licensee's authority was limited to maintenance of the facility in the present shutdown cooling mode (44 FR 45271). By further Order of the Director, Office of Nuclear Reactor Regulation, dated February 11, 1980, a new set of formal license requirements was imposed to reflect the post-accident condition of the facility and to assure the continued maintenance of the current safe, stable, long-term cooling condition of the facility (45 FR 11292). The license provides, among other things, that it is subject to all rules, regulations and Orders of the Commission now or hereafter in effect.

II.

By letter dated April 23, 1987, and revised October 26, November 9, and December 4, 1987 the licensee requested in part an exemption from the requirements of 10 CFR 70.24, Criticality accident requirements. Specifically, 10 CFR 70.24 requires licensees authorized to possess special nuclear material above a minimum quantity to maintain redundant monitoring systems that are capable of detecting a criticality in each area in which such licensed special nuclear material is handled, used or stored. The monitoring system, using gamma- or neutron sensitive radiation detectors, is required to energize clearly audible alarm signals if an accidental criticality occurs. The regulations applicable to TMI-2 (10 CFR 70.24(a)(1)) state that the monitoring system shall be capable of detecting a criticality that produces an absorbed dose of 20 rads of combined neutron and gamma radiation at an unshielded distance of 2 meters from the special nuclear material within 1 minute. Also, 10 CFR 70.24 requires that the licensee have emergency procedures for each area in which special nuclear material is handled, used or stored. These procedures include evacuation plans, including periodic drills to familiarize personnel, plans for determining the cause of the alarm, and the placement of radiation survey instruments in accessible locations for use in an emergency. Section 70.24(d) states that any licensee may apply to the Commission for an exemption from the regulation if good cause exists.

III.

The licensee has requested exemption from the above described regulation in conjunction with the license amendment request submitted by letter dated April 23, 1987 and revised by letters dated October 26, November 9, and December 4, 1987. The staff has reviewed the safety evaluation submitted in support of the proposed license amendments, which also provides the bases for the licensee's exemption request.

The licensee proposes to extensively revise the TMI-2 Technical Specifications to align license requirements appropriate to current, as well as future, plant conditions through the remainder of the current cleanup operations. At the end of the current cleanup operations the licensee plans to place the facility into a post-defueling monitored storage condition (PDMS). The proposed amendment to the Technical Specifications allows for the transition from the current defueling phase through the completion of defueling and offsite fuel shipment by the incorporation of Technical Specifications that are applicable during specific phases or modes of the cleanup. Certain Technical Specifications are retained during the entire transition period while others are phased out or modified as the cleanup progresses. Phase-out of specific requirements would be dependent on the status of the cleanup as defined by the facility mode. Three cleanup modes are proposed:

Mode 1 - The current condition, during which defueling and other major tasks are in progress.

Mode 2 - The period subsequent to defueling of the reactor vessel and the reactor coolant system but prior to completion of the core debris shipping program. The possibility of criticality in the Reactor Building (RB) is precluded and no canisters containing core material are in the RB.

Mode 3 - The period subsequent to shipment of the remaining core material offsite.

Prior to an anticipated change in Mode, the licensee proposes to submit to the NRC a report which provides the basis for the transition.

The requested exemption from 10 CFR 70.24, Criticality accident requirements, would be for Modes 2 and 3, after defueling has been completed and there no longer exists the possibility of criticality.

The licensee's Mode 1 defueling program is expected to result in removal of greater than 99% of the reactor fuel. Because of the March 28, 1979 accident, fuel has escaped from the fuel pins and reactor fuel and fission products were dispersed throughout the reactor coolant piping system as finely divided particles and/or as plating on surfaces. During the accident, a small quantity of finely fragmented fuel was also released into the basement by reactor coolant escaping through the pressurizer relief valve to the reactor coolant drain tank into the basement through a rupture disk. Directional surveys of the reactor coolant system components have permitted estimates of fuel present outside the reactor vessel. The majority of this residual fuel is contained within the reactor coolant system with less than 11 lbs (5 kg) in piping drains, floors and sumps of the Auxiliary and Fuel Handling Building and less than 7 lbs (3 kg) dispersed in the reactor building basement. Prior to the

transition to Mode 2 the licensee will provide a criticality analysis that will address each separate quantity of residual fuel in each defined location. The criticality analysis will estimate the quantity of fuel remaining, its location, its dispersion within the location, its physical form (i.e. film, finely fragmented, intact fuel pellets), its mobility, the presence of any mechanism that would contribute to the mobility of the material, the presence of any moderating or reflecting material, and its potential for a critical event. In this submittal the licensee must demonstrate that the cleanup has progressed far enough such that an inadvertent criticality is precluded and therefore, may enter Mode 2 without the need for criticality monitoring.

The licensee's request for an exemption to the requirements of 10 CFR 70.24 subsequent to Mode 1 operation is based on the conclusion that an inadvertent criticality will not occur. All fuel will have been removed to the extent practicable, and the remaining fuel will be in a geometric configuration that precludes criticality. Reactor systems will be drained. There will be no mechanism that could result in significant movement or concentration of dispersed fuel such that a critical geometry could be attained. At the conclusion of defueling there will be a lack of material that could act as a moderator or reflector. Once defueling has been completed, access to the reactor building will be primarily limited to readying the facility for long-term monitored storage. Once the facility enters monitored storage, access will be on a frequency of once a month or less. Residual fuel will be limited to areas normally inaccessible to personnel.

Based on the quantities of fuel that will remain, the configuration of the fuel, the lack of a mechanism to move and concentrate the remaining fuel, the lack of a moderator or a reflector, and the infrequent personnel access to the building, the staff finds that a significant radiation exposure due to a hypothetical criticality event is highly improbable.

IV.

Accordingly, the Commission has determined that pursuant to 10 CFR 70.24(d) good cause exists for the grant of this exemption after the transition to Mode 2. Further, in accordance with 10 CFR 50.12 granting of this exemption from the requirements of 10 CFR 70.24 after staff review of the Mode 1 criticality analysis and transition to Mode 2 is authorized by law and will not present an undue risk to the public health and safety, and is consistent with the common defense and security. The Commission further determines that in accordance with 50.12(a)(2)(ii) special circumstances are present justifying this exemption. The application of the criticality monitoring requirements of 10 CFR 70.24 will not be necessary at TMI-2 following Mode 1 to achieve the underlying purpose of the rule, which is to provide for warning of, and adequate response in the event of, an inadvertent criticality.

Accordingly, the Commission hereby grants exemption from the requirements of 10 CFR 70.24, criticality accident requirements, contingent upon staff review of the Mode 1 criticality analysis described above, and will be effective upon transition to Mode 2.

Pursuant to 10 CFR 51.32, the Commission has determined that granting of this exemption will have no significant impact on the environment (53 FR 15608).

FOR THE NUCLEAR REGULATORY COMMISSION

Steven A. Varga, Director
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Dated at Rockville, Maryland
this May 27, 1988