August 27, 1997

Mr. James W. Langenbach, Vice President
and Director, TMI
GPU Nuclear Corporation
P.O. Box 480
Middletown, PA 17057

SUBJECT: THREE MILE ISLAND - ISSUANCE OF AMENDMENT RE: THE CORE FLOOD TANK VOLUME, HIGH PRESSURE INJECTION PUMP FLOWRATE, AND DECAY HEAT SYSTEM VALVE OPERABILITY (TAC NO. M98472)

Dear Mr. Langenbach:

The Commission has issued the enclosed Amendment No. 203 to Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit No. 1, (TMI-1) in response to your application dated April 21, 1997, as supplemented July 17, 1997.

The amendment reduces the required volume of borated water in each core flood tank from 1040 ft^3 to 940 ft^3, reduces the required high pressure injection pump flowrate from 500 gallons per minute (gpm) to 431 gpm, and deletes the local manual valve operability option for decay heat system valves DH-V-6A and DH-V-6B.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original signed by:

Bart C. Buckley, Senior Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosures:
1. Amendment No. 203 to DPR-50
2. Safety Evaluation

DFO1

cc w/encls: See next page

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AMENDMENT NO. 203 TO FACILITY OPERATING LICENSE NO. DPR-50 THREE MILE ISLAND

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Three Mile Island Nuclear Station, Unit No. 1

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WASHINGTON, D.C. 20555-0001

METROPOLITAN EDISON COMPANY

JERSEY CENTRAL POWER & LIGHT COMPANY

PENNSYLVANIA ELECTRIC COMPANY

GPU NUCLEAR CORPORATION

DOCKET NO. 50-289

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 203
License No. DPR-50

1. The Nuclear Regulatory Commission (the Commission or NRC) has found that:

   A. The application for amendment by GPU Nuclear Corporation, et al. (the licensee) dated April 21, 1997, as supplemented July 17, 1997, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.c.(2) of Facility Operating License No. DPR-50 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 203, are hereby incorporated in the license. GPU Nuclear Corporation shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Ronald B. Eaton, Acting Director
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: August 27, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 203

FACILITY OPERATING LICENSE NO. DPR-50

DOCKET NO. 50-289

Replace the following pages of the Appendix A, Technical Specifications, with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the areas of change.

Remove	Insert
3-21	3-21
4-41	4-41

3.3 EMERGENCY CORE COOLING, REACTOR BUILDING EMERGENCY COOLING AND REACTOR BUILDING SPRAY SYSTEMS

Applicability: Applies to the operating status of the emergency core cooling, reactor building emergency cooling, and reactor building spray systems.

Objective: To define the conditions necessary to assure immediate availability of the emergency core cooling, reactor building emergency cooling and reactor building spray systems.

Specification:

3.3.1 The reactor shall not be made critical unless the following conditions are met:

3.3.1.1 Injection Systems

a. The borated water storage tank shall contain a minimum of 350,000 gallons of water having a minimum concentration of 2,500 ppm boron at a temperature not less than 40°F. Specification 3.0.1 applies.

b. Two makeup pumps are operable in the engineered safeguards mode powered from independent essential buses. Specification 3.0.1 applies.

c. Two decay heat removal pumps are operable. Specification 3.0.1 applies.

d. Two decay heat removal coolers and their cooling water supplies are operable. (See Specification 3.3.1.4) Specification 3.0.1 applies.

e. Two BWST level instrument channels are operable.

f. The two reactor building sump isolation valves (DH-V-6A/B) shall be remote-manually operable. Specification 3.0.1 applies.

3.3.1.2 Core Flooding System

a. Two core flooding tanks each containing 940 $\pm$ 30 ft^3 of borated water at 600 $\pm$ 25 psig shall be available. Specification 3.0.1 applies.

b. Core flooding tank boron concentration shall not be less than 2,270 ppm boron.

c. The electrically operated discharge valves from the core flood tank will be assured open by administrative control and position indication lamps on the engineered safeguards status panel. Respective breakers for these valves shall be open and conspicuously marked. Specification 3.0.1 applies.

d. One core flood tank pressure instrumentation channel and one core flood tank level instrumentation channel per tank shall be operable.

4.5.2 EMERGENCY CORE COOLING SYSTEM

Applicability: Applies to periodic testing requirement for emergency core cooling systems.

Objective: To verify that the emergency core cooling systems are operable.

Specification:

4.5.2.1 High Pressure Injection

a. During each refueling interval and following maintenance or modification that affects system flow characteristics, system pumps and system high point vents shall be vented, and a system test shall be conducted to demonstrate that the system is operable.

The makeup pump and its required supporting auxiliaries will be started manually by the operator and a test signal will be applied to the high pressure injection (HPI) valves MU-V-16A/B/C/D to demonstrate actuation of the high pressure injection system for emergency core cooling operation.

b. The test will be considered satisfactory if the valves have completed their travel and the makeup pumps are running as evidenced by the control board component operating lights. Minimum acceptable injection flow must be greater than or equal to 431 gpm per HPI pump when pump discharge pressure is 600 psig or greater (the pressure between the pump and flow limiting device) and when the RCS pressure is equal to or less than 600 psig.

c. Testing which requires HPI flow through MU-V-16A/B/C/D shall be conducted only under either of the following conditions:

1) T avg shall be greater than 332 °F.
2) Head of the Reactor Vessel shall be removed.

4.5.2.2 Low Pressure Injection

a. During each refueling period and following maintenance or modification that affects system flow characteristics, system pumps and high point vents shall be vented, and a system test shall be conducted to demonstrate that the system is operable. The auxiliaries required for low pressure injection are all included in the emergency loading sequence specified in 4.5.1.

b. The test will be considered satisfactory if the decay heat pumps listed in 4.5.1.1b have been successfully started and the decay heat injection valves and the decay heat supply valves have completed their travel as evidenced by the control board component operating lights. Flow shall be verified to be equal to or greater than the flow assumed in the Safety Analysis for the single corresponding RCS pressure used in the test.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 203 TO FACILITY OPERATING LICENSE NO. DPR-50

METROPOLITAN EDISON COMPANY

JERSEY CENTRAL POWER & LIGHT COMPANY

PENNSYLVANIA ELECTRIC COMPANY

GPU NUCLEAR CORPORATION

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1

DOCKET NO. 50-289

1.0 INTRODUCTION

By letter dated April 21, 1997, as supplemented by letter dated July 17, 1997, GPU, the licensee for Three Mile Island, Unit 1 (TMI-1), submitted "Technical Specification Change Request (TSCR) No. 263," requesting three changes to their Technical Specifications (TS). Specifically, the proposed TS changes include TS 3.3.1.2 to decrease the Core Flood Tank borated water volume to 940 ft^3 from 1040 ft^3; TS 4.5.2.1.b to decrease the surveillance acceptance criteria of the high pressure injection (HPI) flow rate from 500 gallons per minute (gpm) to 431 gpm; and TS 3.3.1.1.f to assume credit only for remote manual operation of the decay heat valves instead of local or remote manual operation. The first two changes are being requested to maintain the acceptance criteria with the impending power uprate to 2620 megawatts thermal (MWt) at mid-cycle, during Cycle 12 (the power uprate will be requested separately). Several editorial changes to the TS have also been proposed. The July 17, 1997, submittal provided clarifying information that did not affect the initial no significant hazards determination.

2.0 EVALUATION

2.1 Valves DH-V-6A/B Operability

During a recent inspection at TMI (Inspection Report 50-289/96-201), the NRC staff noted that the use of the current TS 3.3.1.1.f could result in operation of the plant outside of the design basis. While this TS has existed since the original operating license was granted, it was determined that design basis operation would be exceeded with respect to the dose consequences and the time allowance for operator actions if the two reactor building sump isolation valves (DH-V-6A/B) were operated by local controls.

As stated, the TS allows for either local-manual or remote-manual operation of DH-V-6A/B valves. The operator response time for opening these valves, as assumed by the calculations for borated water storage tank (BWST) drawdown and swapover to the reactor building sump, was based on opening the valves by remote-manual operation. Also, the manual operation of these valves during plant operation may not be possible in the decay heat removal system pump room because of the high radiation conditions.

Therefore, the licensee proposes to correct TS 3.3.1.1.f by deleting the wording "either manually or" thus allowing only remote-manual operation of the these valves. As the TS is currently stated, the licensee is able to remain in compliance with only local-manual operation capability and diverts to TS 3.0.1 when both local and remote manual operation are unavailable. With the proposed TS change, the licensee is diverted to TS 3.0.1 when the remote-manual operation is unavailable. The staff finds this TS change is more restrictive and it is, therefore, acceptable.

2.2 Core Flood Tank

The purpose of the core flood tank (CFT) is to provide borated water to the reactor vessel during the blowdown phase of a loss-of-coolant accident (LOCA), to provide a portion of the inventory for the refill phase that follows, and to provide Reactor Coolant System (RCS) makeup for a small break LOCA (SBLOCA). The CFT is partially full of borated water, pressurized by nitrogen and connected by a single injection line to the reactor vessel downcomer. This passive system is activated when the RCS pressure drops below the CFT pressure and the borated water is injected in to the vessel downcomer. The CFT provides the initial injection of borated water following a LOCA before the active systems, high pressure and low pressure injection, are activated.

The current CFT inventory and pressure of 1040 ft^3 and 600 psig, respectively, are based on the analyses to evaluate the effects of pre-accident CFT level and pressure on the LOCA linear heat rate (LHR) limits and were performed by Framatome (FTI) for the B&W Owners Group Analysis Committee.

The sensitivity studies performed by the licensee for the impending power uprate indicated that the power uprate could increase the peak cladding temperature (PCT) beyond the limits of 10 CFR 50.46, following a LOCA. The CFT injection occurs at a critical time during the reflood phase of the transient, when the core is experiencing an adiabatic heatup with very little liquid inventory remaining in the reactor vessel. The increase in power will cause an increase in LHR and therefore require more inventory or higher injection rate to maintain the limits of 10 CFR 50.46.

Since the CFT pressure of 600 psig is approaching the pressure limit of the CFT, the licensee decided to decrease the inventory to 940±30 ft^3, while maintaining the same nitrogen pressure. As proposed, this change would allow the CFT inventory to fill the reactor vessel at a higher flow rate because of the increased pressure ratio to inventory.

The licensee's analysis to support this TS change was included in the recent LOCA analyses performed at 2772 MWt with pre-accident values of 985 ft^3

inventory and 580 psia pressure. These values bound the TS values in that; 985 ft^3 is the greatest volume of inventory that can be delivered to the reactor vessel, at a rate that will prevent exceeding the limits of 10 CFR 50.46; and the pressure of 580 psia is the lowest pressure that will activate the CFT in a timely manner to prevent exceeding the acceptance criteria.

Currently nitrogen is released to the RCS once the liquid inventory is depleted. With the proposed TS, there will be an increased amount of nitrogen released to the RCS because of the reduced volume and increased pressure. The licensee has evaluated this change and determined that during a LBLOCA, the core flow is so turbulent that adequate core heat transfer will exist even with entrained nitrogen. The nitrogen may collect in the once-through steam generators (OTSGs) or reactor coolant loops but the OTSGs are not used for heat removal.

The licensee stated that this change results in the reduction of the post-LOCA reactor building sump inventory reduction of ¼" or 1500 gallons and a reduction of the total sump recirculation volume of 0.375%. The licensee also concluded that, based on the small change in these two volumes, the net positive suction head of the emergency core cooling system pump when taking suction from the reactor building sump, the boron concentration, the dose consequences and changes in the post-LOCA reactor building pressure and temperature are all within the acceptance criteria. The resultant LBLOCA PCT of 2041°F is also within the acceptance criteria of 2200°F.

2.3 High Pressure Injection Flow Rate Change

Credit for the HPI pumps are included in the SBLOCA analyses only. The pumps are actuated either automatically by low RCS pressure or manually on loss of subcooling margin. The licensee is requesting to reduce the HPI flow from 500 gpm to 431 gpm. The reduction could result in reduced core cooling and extend the time it takes to refill the RCS following initiation.

The licensee's new LOCA analyses include the HPI flow rate of 431 gpm at 2772 MWt. With the resultant SBLOCA PCT of 1444.4°F, remained below the acceptance criteria of 2200°F and the maximum amount of core-wide oxidation and calculated local cladding were within the acceptance criteria.

3.0 SUMMARY

The staff has reviewed the licensee's request to change the operation of decay heat valves to remote manual operation only in TS 3.3.1.1.f. The licensee indicated that this change is consistent with the calculations for BWST drawdown and swapover to the reactor building sump and since this change results in a more restrictive TS, the staff finds this TS change acceptable.

The staff also reviewed the request to reduce the inventory in the CFT from 1040 ft^3 to 940 ft^3 in TS 3.3.1.2 and reduce the high pressure injection flow rate from 500 gpm to 431 gpm in TS 4.5.2.1. Since both analyses were based on approved methodologies and all acceptance criteria remained within the limits, the staff finds these TS changes acceptable. The proposed editorial changes revise TS 4.5.2.1.a and b so that "M.U." reads "makeup"; in TS 4.5.2.1.c.(1)

the word "the" was changed to "than"; and in TS 4.5.2.2.b, the words "equal or greater than" were changed to "equal to or greater than." These editorial changes clarify the TS and are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes a surveillance requirement. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (62 FR 27795). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Brewer

Date: August 27, 1997