

April 24, 1984

Docket No. 50-320

Mr. B. K. Kanga, Director
Three Mile Island Unit 2
GPU Nuclear Corporation
P.O. Box 480
Middletown, PA 17057

Dear Mr. Kanga:

Subject: Three Mile Island Nuclear Station, Unit 2
Operating License No. DPR-73
Docket No. 50-320
Technical Specification Change Request No. 45
Recovery Operations Plan Change Request No. 23

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Docket No. 50-320
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The Nuclear Regulatory Commission has issued the enclosed Amendment of Order and Recovery Operations Plan Approval No. 19 for the Three Mile Island Nuclear Station, Unit 2. The Amendment of Order which modifies the Proposed Technical Specifications and the Recovery Operations Plan Change Approval which modifies the TMI-2 Surveillance Requirements was requested by General Public Utilities Nuclear Corporation (GPUNC) in two separate letters, both dated March 22, 1984. In these letters, the licensee requested that the upper limit for the allowable boron concentration in the reactor coolant system (RCS) be raised from its present value of 4,500 parts per million (ppm) to a new value of 6,000 ppm.

The staff has reviewed the licensee's safety evaluation for this change request and concluded that it is acceptable if an upper limit is added to the surveillance requirements for pH for the RCS. The staff has discussed this additional requirement with GPUNC and has incorporated it into the Recovery Operations Plan Change Approval. This Amendment of Order and Recovery Operations Plan Change Approval are effective upon issuance.

Since the February 11, 1980 Order imposing the Proposed Technical Specifications is currently pending before the Atomic Safety and Licensing Board, the staff will be advising the Licensing Board of this Amendment of Order through a Notice of Issuance of Amendment of Order and a Motion to Conform Proposed Technical Specifications in Accordance Therewith.

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not changed
done 4/21/84

OFFICE	TMIPD:NRR	TMIPD:NRR	PD:TMIPD:NRR	ELD	DB:NRR	D:NRR
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DATE	4/23/84	4/23/84	4/18/84	4/23/84	4/1/84	4/27/84

Mr. B. K. Kanga

-2-

Copies of the related Safety Evaluation and revised pages for the Proposed Technical Specifications and the Recovery Operations Plan are enclosed.

Sincerely,

Original signed by
B. J. Snyder

Bernard J. Snyder, Program Director
Three Mile Island Program Office
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment of Order
2. Safety Evaluation
3. Proposed Technical Specification Page Changes
4. Approved Recovery Operations Plan Change No. 19

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of

GENERAL PUBLIC UTILITIES NUCLEAR
CORPORATION

(Three Mile Island Nuclear Station,
Unit 2)

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Docket No. 50-320

AMENDMENT OF ORDER

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 Fed. Reg. 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 Fed. Reg. 11292).

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Although these requirements were imposed on the Licensee by an Order of the Director of Nuclear Reactor Regulation, dated February 11, 1980, the TMI-2 license has not been formally amended. The requirements are reflected in the proposed Recovery Mode Technical Specifications presently pending before the Atomic Safety and Licensing Board. Hereafter in this Amendment of Order, the requirements in question are identified by the applicable Proposed Technical Specification.

II.

By letter dated March 22, 1984, the Licensee requested changes to the Proposed Technical Specifications (PTS), Appendix A for Three Mile Island, Unit 2 (TMI-2). The Licensee has requested staff approval of modifications to Section 3.1.1.1(b) of the PTS that would increase the allowed upper limit for boron concentrations from the present value of 4,500 ppm to a new value of 6,000 ppm. The lower limit of 3,000 ppm will remain unchanged.

The staff's safety assessment of this matter is set forth in the concurrently issued Safety Evaluation. Since the February 11, 1980 Order imposing the Proposed Technical Specifications is currently pending before the Atomic Safety and Licensing Board, the staff will be advising the Licensing Board of this Amendment of Order through a Notice of Issuance of Amendment of Order and a Motion to Conform Proposed Technical Specifications in Accordance Therewith.

It is further determined that the modification does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. In light of this determination, it was concluded that the instant action is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR 51.5 (d)(4), that an environmental impact statement or environmental impact appraisal need not be prepared herewith.

III.

Accordingly, pursuant to the Atomic Energy Act of 1954, as amended, the Director's Order of February 11, 1980, is hereby revised to incorporate the deletions, additions, and modifications set forth in Attachment A hereto. For further details with respect to this action, see (1) Letter to B. J. Snyder, USNRC, from E. E. Kintner, GPU, Technical Specification Change Request No. 45, dated March 22, 1984, (2) Letter to B. J. Snyder, USNRC, from B. K. Kanga, GPU, Recovery Operations Plan Change Request No. 23, dated March 22, 1984, and (3) The Director's Order of February 11, 1980.

All of the above documents are available for inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., and at the

Commissioner's Local Public Document Room at the State Library of Pennsylvania,
Government Publications Section, Education Building, Commonwealth and Walnut
Streets, Harrisburg, Pennsylvania 17126.

FOR THE NUCLEAR REGULATORY COMMISSION



Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Effective Date: April 24, 1984
Dated at Bethesda, Maryland
Issuance Date: April 24, 1984

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

GPU NUCLEAR CORPORATION

METROPOLITAN EDISON COMPANY

PENNSYLVANIA ELECTRIC COMPANY

JERSEY CENTRAL POWER & LIGHT COMPANY

DOCKET NO. 50-320

THREE MILE ISLAND NUCLEAR STATION UNIT NO. 2

INTRODUCTION

By letters dated March 22, 1984 and April 16, 1984, General Public Utilities Nuclear Corporation (GPUNC), requested changes and provided supporting information to modify the Technical Specifications of Operating License No. DPR-73 and the Recovery Operations Plan. The requested change would increase the maximum allowable boron concentration in the Reactor Coolant System (RCS) from its present limit of 4,500 ppm to a new limit of 6,000 ppm. The purpose of the change is to allow latitude for increasing the RCS boron concentration so as to provide a conservative subcriticality margin for any potential core configuration that may occur during refueling.

DISCUSSION AND EVALUATION

The licensee requested a change in the upper limit for boron concentration in the Reactor Coolant System to support defueling options that could potentially rearrange the core or portions of the core into a more reactive configuration. It is the Licensee's opinion that the increase will provide a sufficient subcriticality margin for any core configuration.

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The original TMI-2 Technical Specifications and Recovery Operations Plan established an RCS Limiting Condition for Operation (LCO) and Surveillance Requirement respectively for a boron concentration of 3,000-4,500 ppm boron. The Licensee proposed that the upper limit of the LCO for boron be increased to 6,000 ppm resulting in an allowable concentration range of 3,000-6,000 ppm. The staff evaluated the effects of the increased boron concentration on system corrosion, solubility, core cooling and criticality controls.

The primary coolant system corrosion rate in a boric acid solution is significantly influenced by the pH of the reactor coolant. The current Surveillance Requirements of the Recovery Operations Plan establish a minimum pH of 7.5 for the RCS. This alkaline condition provides a significantly lower corrosion rate when compared to other pressurized water reactor coolant systems. The proposed increase in boron concentration will be buffered by sodium hydroxide addition to maintain the RCS pH between 7.6 and 7.8 and thereby assure no measurable change in system corrosion and RCS integrity.

The solubility of boric acid is influenced by the coolant temperature, pH and boric acid concentration. The current core coolant temperature is approximately 85°F. The present Technical Specification and Recovery Operation plan require that system temperatures be maintained greater than 50°F. Boric acid at 50°F and a pH of 7.5 is inversely proportional to solubility as pH increases. For the expected system pH range of 7.6 and 7.8 the boron solubility is greater than 11,000 ppm. However

at a pH of approximately 8.5 the boron solubility falls below the proposed boron upper limit of 6,000 ppm. The staff has therefore added to the Surveillance Requirements an upper pH limit of 8.4. This requirement will insure no boron precipitation occurs within the RCS or associated sample lines.

The staff has evaluated the potential effects of boric acid precipitation and the associated flow blockage within the core region. Based on current RCS temperature data, the existing core decay heat (17.5 kW) is being dissipated through the reactor vessel to the reactor building ambient with no apparent natural recirculation. Additionally, because of the operational controls on temperature, pH and boron concentration, the staff believes that the probability for boric acid precipitation is very low. The staff also determined that an adequate subcriticality margin will be maintained with the proposed increase in the upper limit for boron poison. The staff therefore concludes that adequate assurance exists that the proposed increase in the upper limit of boron concentration (6,000 ppm) in conjunction with new pH limit (<8.4) will not degrade the system integrity nor adversely impact core cooling and criticality controls.

ENVIRONMENTAL CONSIDERATIONS

We have determined that the change does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the change involves an action which is insignificant from the standpoint of environmental impact and, pursuant to

10 CFR 51.5 (d)(4), than an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this change.

CONCLUSION

Based upon our review of the above discussed changes as modified, the staff finds that the requested revision of the proposed Technical Specifications is acceptable.

We have also 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, and
- (2) such activities will be conducted in compliance with the Commission's regulations and the implementation of this change will not be inimical to the common defense and security or to the health and safety of the public.

FACILITY OPERATING LICENSE NO. DPR-73

DOCKET NO. 50-320

Replace the following pages of Appendix "A" Proposed Technical Specifications with the enclosed pages as indicated. The revised pages contain vertical lines indicating the area of change.

3.1-1

Replace the following pages of the TMI-2 Recovery Operations Plan with the enclosed pages as indicated.

4.1-1

4.1-2

4.1-3

4.4-1

LIMITING CONDITIONS FOR OPERATION

3.1 WATER INJECTION COOLING AND REACTIVITY CONTROL SYSTEMS

3.1.1 BORATION CONTROL

BORON INJECTION

3.1.1.1 At least two systems capable of injecting borated cooling water into the Reactor Coolant System shall be OPERABLE* with:

- a. One system comprised of:
 1. One OPERABLE makeup pump.#
 2. One OPERABLE decay heat removal pump.
 3. An OPERABLE flow path from the BWST. The BWST shall contain at least 100,000 gallons of borated water at a minimum temperature of 50°F and at a boron concentration of between 3000 and 6000 ppm.
- b. The second system comprised of the Standby Reactor Coolant System Pressure Control System.

APPLICABILITY: When fuel is in the reactor pressure vessel.

ACTION:

With one of the above required systems inoperable, restore the inoperable system to OPERABLE status within 72 hours.

BORON CONCENTRATION

3.1.1.2 The reactor coolant shall be maintained at a boron concentration of between 3000 and 6000 ppm and at a temperature above 50°F.

APPLICABILITY: When fuel is in the reactor pressure vessel.

ACTION:

None except as provided in Specification 3.0.3.

*Both systems shall be considered OPERABLE when aligned per procedures approved pursuant to Specification 6.8.2.

#All makeup pumps shall be made inoperable when valve DH-V1 or DH-V171 is open by racking out their electrical power supply circuit breakers.

SURVEILLANCE REQUIREMENTS

4.1 WATER INJECTION COOLING AND REACTIVITY CONTROL SYSTEMS

4.1.1 BORATION CONTROL

BORON INJECTION

4.1.1.1 Two systems capable of injecting borated cooling water into the Reactor Coolant System shall be demonstrated OPERABLE:

- a. Deleted.
- b. At least once per 31 days by verifying that each accessible (per occupational exposure considerations) valve (manual, power operated or automatic) in each flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.
- c. At least once per 31 days (when makeup pump is required OPERABLE) by verifying (per occupational exposure considerations), that on recirculation flow, the makeup pump required by Technical Specification 3.1.1.1 develops a discharge pressure of greater than or equal to 1125 psig and that each pump operates for at least 15 minutes.
- d. At least once per 31 days by verifying (per occupational exposure considerations), that on recirculation flow, the decay heat removal pump required by Technical Specification 3.1.1.1 develops a discharge pressure of greater than or equal to 151 psig and that each pump operates for at least 15 minutes.
- e. Deleted.
- f. At least once per 7 days when valve DH-V1 or DH-V171 is open by verifying that the makeup pump electrical power supply circuit breakers are "racked out."
- g. At least once per 7 days by:
 1. Deleted.
 2. Verifying the boron concentration in the BWST is between 3000 and 6000 ppm.
 3. Deleted.
 4. Verifying the contained borated water volume of the BWST is at least 100,000 gallons.
 5. Deleted.

SURVEILLANCE REQUIREMENTS

BORON INJECTION (Continued)

- h. At least once per 24 hours by verifying the BWST temperature is at least 50°F when the outside air temperature is less than 50°F.
- i. At least once per 12 hours (when system is in operation) by verifying that the standby reactor coolant system pressure control system:
 - 1. Surge tank water volume is filled to between 55% and 80% of tank capacity and the tank is pressurized to the operating RCS pressure \pm 25 psig but not higher than 600 psig.
 - 2. Isolation valves on the discharge side of the water filled tank nearest the reactor coolant system are open.
 - 3. The in-service nitrogen supply bank is pressurized to between 225 and 400 psig.
- j. At least once per 7 days by verifying that the standby reactor coolant system pressure control system surge tanks and the charging water storage tank contain borated water with:
 - 1. A boron concentration of between 3000 and 6000 ppm.
 - 2. A dissolved gas concentration of less than 15 scc/kg of water.*
- k. At least once per 31 days by verifying that the standby reactor coolant system pressure control system isolation valve on the discharge side of the water filled tank nearest the reactor coolant system closes automatically on a tank low level test signal.

*Dissolved gas concentration for the SPC System is determined by taking a representative sample from the sampling point located downstream from the SPC-T-1.

SURVEILLANCE REQUIREMENTS

BORON CONCENTRATION

4.1.1.2 The reactor coolant shall be determined to be within its limits by:

- a. Determining the boron concentration of the primary coolant to be between 3000 and 6000 ppm by:
 1. A mass balance calculation at least once per 24 hours.
 2. A chemical analysis at least once per 7 days.
- b. Verifying the primary coolant temperature to be greater than 50°F at least once per 12 hours.

4.1.3 CONTROL ASSEMBLIES

CONTROL MECHANISM ENERGIZATION

4.1.3.1 The control rod drive mechanisms shall be verified deenergized at least once per 7 days except when single mechanisms are energized in accordance with NRC approved procedure(s) and Technical Specification 3.1.3.1. Any energized control rod drive mechanism shall be verified deenergized within 24 hours after completion of any rod movement tests.

SURVEILLANCE REQUIREMENTS

4.4 REACTOR COOLANT SYSTEM

REACTOR COOLANT LOOPS

4.4.1 Verify that surveillance of the Reactor Coolant System is being performed in accordance with procedures approved pursuant to Technical Specification 6.8.2.

SAFETY VALVES

4.4.3 Not applicable.

4.4.9 PRESSURE/TEMPERATURE LIMITS

REACTOR COOLANT SYSTEM

4.4.9.1.1 The Reactor Coolant System pressure and temperature shall be determined to be within the limits at least once per 12 hours.

4.4.9.1.2 Deleted.

4.4.9.1.3 Deleted.

4.4.9.1.4 The pH of the reactor coolant shall be determined to be greater than or equal to 7.5 and less than 8.4 at least once per 7 days.

4.4.9.1.5 The chloride concentration in the reactor coolant shall be determined to be less than or equal to 5 ppm at least once per 7 days.