

February 25, 1991

Docket No. 50-289

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and Director - TMI-1
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Dear Mr. Broughton:

SUBJECT: ISSUANCE OF AMENDMENT (TAC NO. 79364)

The Commission has issued the enclosed Amendment No. 159 to Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit No. 1, in response to your letter dated November 20, 1990.

The amendment revises the TMI-1 Technical Specifications such that the electrical distribution system degraded voltage trip setpoint is raised from 3,595 volts to 3,760 volts.

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

Ronald W. Hernan, Senior Project Manager
Project Directorate I-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 159 to DPR-50
2. Safety Evaluation

cc w/enclosures:

See next page

DOCUMENT NAME: 79364 AMEND

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Unit No. 1

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

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. 159
License No. DPR-50

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by GPU Nuclear Corporation, et al. (the licensee) dated November 20, 1990, 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.

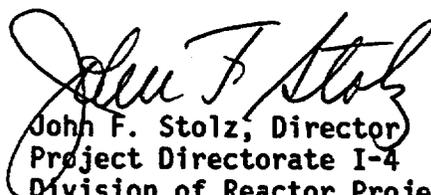
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.c.(2) of Facility Operating License No. DPR-50 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.159 , 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



John F. Stolz, Director
Project Directorate I-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: February 25, 1991

ATTACHMENT TO LICENSE AMENDMENT NO. 159

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 area of change.

Remove

3-37

3-37a

Insert

3-37

3-37a

3.5.3 ENGINEERED SAFEGUARDS PROTECTION SYSTEM ACTUATION SETPOINTS

Applicability:

This specification applies to the engineered safeguards protection system actuation setpoints.

Objective:

To provide for automatic initiation of the engineered safeguards protection system in the event of a breach of Reactor Coolant System integrity.

Specification:

3.5.3.1 The engineered safeguards protection system actuation setpoints and permissible bypasses shall be as follows:

<u>Initiating Signal</u>	<u>Function</u>	<u>Setpoint</u>
High Reactor Building Pressure (1)	Reactor Building Spray	< 30 psig
	Reactor Building Isolation	< 30 psig
	High-Pressure Injection	< 4 psig
	Low-Pressure Injection	≤ 4 psig
	Start Reactor Building Cooling & Reactor Building Isolation	≤ 4 psig
Low Reactor Coolant System Pressure	High Pressure Injection	> 1600(2) and ≥ 500(3) psig
	Low Pressure Injection	> 1600(2) and ≥ 500(3) psig
	Reactor Building Isolation	≥ 1600 psig(2)
4.16 kv E.S. Buses Undervoltage Relays		
Degraded Voltage	Switch to Onsite Power Source and load shedding	3760 volts (4)
Degraded voltage timer		10 sec (5)
Loss of voltage	Switch to Onsite Power Source and load shedding	2400 Volts (6)
Loss of voltage timer		1.5 sec (7)

(1) May be bypassed for reactor building leak rate test.

(2) May be bypassed below 1775 psig on decreasing pressure and is automatically reinstated before 1800 psig on increasing pressure.

(3) May be bypassed below 925 psig on decreasing pressure and is automatically reinstated before exceeding 950 psig on increasing pressure.

- (4) Minimum allowed setting is 3740 v. Maximum allowed setting is 3773 v.
- (5) Minimum allowed time is 8 sec. maximum allowed time is 12 sec.
- (6) Minimum allowed setting is 2200 volts, maximum allowed setting is 2860 volts
- (7) Minimum allowed time is 1.0 second, maximum allowed time is 2.0 seconds.

Bases

High Reactor Building Pressure

The basis for the 30 psig and 4 psig setpoints for the high pressure signal is to establish a setting which would be reached in adequate time in the event of a LOCA, cover a spectrum of break sizes and yet be far enough above normal operation maximum internal pressures to prevent spurious initiation (Reference 1).

Low Reactor Coolant System Pressure

The basis for the 1600 and 500 psig low reactor coolant pressure setpoint for high and low pressure injection initiation is to establish a value which is high enough such that protection is provided for the entire spectrum to break sizes and is far enough below normal operating pressure to prevent spurious initiation. Bypass of HPI below 1775 psig and LPI below 925 psig, prevents ECCS actuation during normal system cooldown (References 1 and 2).

4.16 KV ES Bus Undervoltage Relays

The basis for the degraded grid voltage relay setpoint is to protect the safety related electrical equipment from loss of function in the event of a sustained degraded voltage condition on the offsite power system. The timer setting prevents spurious transfer to the onsite source for transient conditions.

The loss of voltage relay and timers detect loss of offsite power condition and initiate transfer to the onsite source with minimal time delay.

The minimum and maximum allowed settings for the degraded voltage setpoint are based on a relay tolerance of -0.53%, +0.35% and is to be considered an "as-left" setting.

References

- (1) UFSAR, Table 7.1-3
- (2) UFSAR, Section 14.1.2.10 - "Steam Generator Tube Failure"



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 159 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

INTRODUCTION

The NRC has, for many years, had concerns regarding nuclear safety problems that could result from degraded electrical grid system voltage. A generic letter to all power reactor licensees, "Adequacy of Station Electric Distribution Systems Voltages," was issued by the NRC on August 8, 1979. In response to that letter, GPU Nuclear Corporation, the licensee for Three Mile Island Unit 1 (TMI-1), performed a voltage drop study and made certain plant modifications to remedy inadequacies identified by the study. One of those modifications was an undervoltage relay on the 4,160 volt buses which, if bus voltage dropped to 3,595 volts, would disconnect the plant 1E electrical system from the offsite power system (grid), trip certain nonessential loads and automatically start the emergency diesel generators. License Amendment No. 70 was issued on July 29, 1981 to incorporate the setpoint for the undervoltage trip into the Technical Specifications (TSs). The Safety Evaluation (SE) supporting the amendment approved the 3,595 volt setpoint for this trip but noted it was lower than might have been expected.

The NRC sent Generic Letter No. 88-15 to all licensees on September 12, 1988, noting that various problems with plant electrical systems, including potential for degraded grid voltage, were being identified with increasing regularity. In response to the generic letter, the licensee commissioned an updated degraded grid voltage drop study by Gilbert/Commonwealth, Inc. This study (TDR No. 995 dated 2/20/90) indicated that the degraded voltage trip setpoint was too low to protect all motors under all scenarios postulated in the study. The recommendations resulting from the study included raising the degraded voltage trip setpoint to a nominal value of 3,748 volts. Consequently, GPU Nuclear submitted Technical Specification Change Request No. 203 on November 20, 1990 to implement this recommendation.

EVALUATION

One of the prime objectives of the degraded grid voltage effort was to ensure adequate voltage to motors driving critical components. The electrical industry (i.e., NEMA) generally uses the guideline that voltage should be at least 90% of

the motor's nameplate voltage to prevent overheating and thermal degradation of insulation. As discussed above, License Amendment No. 70 incorporated an undervoltage trip on the 4,160 volt buses. The staff's SE supporting the amendment noted that voltage at the terminals of 460 volt motors could be as low as 393 volts (85% of nominal voltage) before the undervoltage trip occurs separating the buses from the grid. The SE stated that the licensee justified this seemingly low setpoint partly on the basis that all 460 volt motors have a service rating of 1.15. As noted in TDR No. 995, however, some 460 volt motors have a service factor of 1.0 and that under degraded grid voltage conditions with one unit auxiliary transformer not in service, 46 ES motors would see less than 90% of rated voltage. Since the undervoltage trip relays would not have actuated at the assumed voltage of 227 kilovolts (Kv) on the 230 Kv system, manual load shedding would be relied upon to restore voltage. Raising the setpoint of the undervoltage relays to about 3,750 volts would provide separation from the grid and initiate load shedding automatically under those conditions after a 10 second time delay.

The analysis reported in TDR No. 995 utilized the DAPPER computer program and calculated actual load current for each motor under the assumed degraded voltage conditions. This current was then compared to the rated (nameplate) full load current for each motor, taking into consideration the service factor of that motor. The revised setpoint for the undervoltage trip is based on preventing any motor exceeding an actual current equal to its nameplate current multiplied by its service factor. The staff considers this approach to be acceptable.

The revised undervoltage protection setpoint provides the necessary protection of 480 volt safety related electrical loads for the worst case electrical lineup and loading assuming a degraded grid condition, one (1) auxiliary transformer in operation, and a design basis LOCA. In addition to the existing first and second level of undervoltage protection, existing relays on the 480 volt safety buses are used to sound an annunciator in the control room at approximately 92% of the nominal ratings of the motors (460V) connected to these buses. This alarm alerts the operators to a low voltage condition to allow them time to shed unnecessary loads to restore and preclude trips if possible for this low probability event.

The revised undervoltage protection setpoint will result in an increased probability of separation from the 230Kv system during a postulated accident coincident with single auxiliary transformer operation and a degraded grid event while the offsite system is still capable of providing power to the plant. However, neither the accident nor the degraded grid result in any event-related electrical system transfers that would cause loss of an auxiliary transformer or the automatic transfer of loads. Existing Technical Specification Section 3.7.2 restricts single auxiliary transformer operation to a period of 30 days only, during which both emergency diesel generators (EDG) must be operable with one EDG running continuously. Accordingly, it is concluded that simultaneous occurrence of these unrelated events is a very low probability, and the intent of requiring an adequate level of undervoltage protection is maintained by the revised degraded voltage setpoint.

Based upon the above discussion, the staff finds the proposed change to the degraded voltage relay setpoint to be acceptable.

ENVIRONMENTAL - CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted areas as defined in 10 CFR Part 20. 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. 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.

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: Ronald W. Hernan

Date: February 25, 1991