

January 31, 1995

Mr. T. Gary Broughton, Vice President
and Director - TMI-1
GPU Nuclear Corporation
Post Office Box 480
Middletown, PA 17057

SUBJECT: ISSUANCE OF AMENDMENT - TSCR NO. 211 (TAC NO. M86713)

Dear Mr. Broughton:

The Commission has issued the enclosed Amendment No. 193 to Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit No. 1 (TMI-1), in response to your letter dated May 17, 1993, as supplemented on December 23, 1994.

The amendment revises the action requirements of Technical Specification 3.5.1, "Operational Safety Instrumentation," Table 3.5.1, in the event of an inoperable degraded grid voltage or loss of voltage relay or associated timers.

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

Docket No. 50-289

Enclosures: 1. Amendment No. 193 to DPR-50
2. Safety Evaluation

cc w/encls: See next page

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

January 31, 1995

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and Director - TMI-1
GPU Nuclear Corporation
Post Office Box 480
Middletown, PA 17057

SUBJECT: ISSUANCE OF AMENDMENT - TSCR NO. 211 (TAC NO. M86713)

Dear Mr. Broughton:

The Commission has issued the enclosed Amendment No. ¹⁹³ to Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit No. 1 (TMI-1), in response to your letter dated May 17, 1993, as supplemented on December 23, 1994.

The amendment revises the action requirements of Technical Specification 3.5.1, "Operational Safety Instrumentation," Table 3.5.1, in the event of an inoperable degraded grid voltage or loss of voltage relay or associated timers.

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,

A handwritten signature in cursive script, reading "Ronald W. Hernan", is written over the typed name.

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

Docket No. 50-289

Enclosures: 1. Amendment No. ¹⁹³ to DPR-50
2. Safety Evaluation

cc w/encs: See next page

Mr. T. Gary Broughton
GPU Nuclear Corporation

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Unit No. 1

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
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. 193
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 May 17, 1993, as supplemented on December 23, 1994, 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.

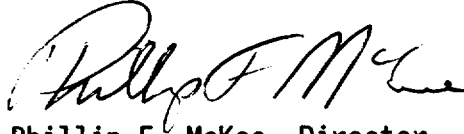
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.c.(2) of Facility Operating License No. DPR-50 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.193, 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 the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Phillip F. McKee, 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: January 31, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 193

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

3-28
3-32a

Insert

3-28
3-32a

The four reactor protection channels were provided with key operated bypass switches to allow on-line testing or maintenance on only one channel at a time during power operation. Each channel is provided alarm and lights to indicate when that channel is bypassed. There will be one reactor protection system bypass switch key permitted in the control room.

Each reactor protection channel key operated shutdown bypass switch is provided with alarm and lights to indicate when the shutdown bypass switch is being used.

Power is normally supplied to the control rod drive mechanisms from two separate parallel 460 volt sources. Redundant trip devices are employed in each of these sources. The AC Trip Breaker is one means to trip a source. The redundant means is a parallel configuration consisting of two DC Trip Breakers and five SCR power supplies. The SCRs are turned off by the "electronic trip relays."

Diverse trip features are provided on each breaker. These are the undervoltage relay and shunt trip attachment. Each trip feature is tested separately. Failure of one breaker trip feature does not result in loss of redundancy and a reasonable time limit is provided for corrective action.

Failure in the untripped state of a breaker or SCR electronic trip results in loss of redundancy and prompt action is required. Failure of both trip features on one breaker is considered failure of the breaker.

Power may be restored through the failed breaker (SCRs) for a limited time to perform required testing.

The 4.16kv ES Bus Undervoltage Relays detect a degraded voltage or Loss of Voltage on the associated ES Bus. Detection of low voltage will separate the ES bus from the offsite power, initiate load shedding and start the associated diesel generator. The relays do not function during design basis events where acceptable offsite voltage is available. If the voltage relays on either train are not operable, the time permitted for repair is consistent with other safety related equipment. If both trains are affected then shutdown is initiated in accordance with Specification 3.0.1 since automatic response of the diesel generator is required to assure completion of the safety function if offsite power is degraded or lost.

Automatic initiation of EFW is provided on loss of all reactor coolant pumps, loss of both main feedwater pumps, low OTSG level, and high reactor building pressure. High reactor building pressure would be indicative of a loss of coolant accident, main steam line or feedwater line break inside the reactor building. Operability of these instruments is required in order to assure that the EFW system will actuate and control at the appropriate OTSG level without operator action for those events where timely initiation of EFW is required.

Automatic isolation of main feedwater is provided on low OTSG pressure in order to maintain appropriate RCS cooling (minimize overcooling) following a loss of OTSG integrity and minimize the energy released to the Reactor Building atmosphere.

TABLE 3.5-1 (Cont'd)

INSTRUMENTS OPERATING CONDITIONS

C. Engineered Safety Features (cont'd)

- (a) Restore the conditions of Column (A) and Column (B) within one hour or place the reactor in HOT SHUTDOWN within an additional 6 hours and COLD SHUTDOWN within the following 24 hours.
- (b) The minimum degree of redundancy may be reduced to 0 up to 8 hours for surveillance testing.
- (c) The Operability requirement is two out of three pressure switches in each train, with a minimum degree of redundancy of one, in each train.
 - 1. If the minimum conditions are not met on one train, restore the function to OPERABLE within 48 hours, or place the reactor in HOT SHUTDOWN within 6 hours.
 - 2. If the minimum conditions are not met on either train, then place the reactor in HOT SHUTDOWN in 6 hours and in COLD SHUTDOWN within the following 30 hours.
- (d) The Operability requirement is two out of three pressure switches in each train, with a minimum degree of redundancy of one, in each train.
 - 1. If the minimum conditions are not met on one train, restore the function to OPERABLE within 72 hours, or place the reactor in HOT SHUTDOWN within 6 hours.
 - 2. If the minimum conditions are not met on either train, then place the reactor in HOT SHUTDOWN in 6 hours and COLD SHUTDOWN within the following 24 hours.
- (e) The operability requirement for the undervoltage relay, its associated auxiliary relays, and the timer
 - 1. If one 4.16 kv ES Bus does not meet the minimum conditions, restore the function to operable status within 72 hours or be in hot shutdown within an additional 6 hours.
 - 2. If both 4.16 kv Buses do not meet the minimum conditions, then restore at least one 4.16 kv ES Bus to meet the minimum conditions within 1 hour or be in hot shutdown within an additional 6 hours.
- (f) Discontinue Reactor Building purging and close AHV-1A, 1B, 1C, and 1D within 8 hours.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 193 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 May 17, 1993, GPU Nuclear Corporation (GPUN, the licensee) submitted Technical Specifications Change Request (TSCR) No. 221 for the Three Mile Island Nuclear Station, Unit No. 1 (TMI-1). This proposed TSCR would revise Table 3.5.1, Section C, Footnote (e), "Engineered Safety Features," in the TMI-1 Technical Specifications (TSs). By letter of December 23, 1994, GPUN submitted supplemental information that further revised Footnote (e) as a result of discussions with the staff. This revised Footnote (e) is to apply to both the loss of offsite power (LOOP) and degraded grid voltage electrical circuitry for each of the two 4160-V ac emergency safety (1E) buses and removes potentially unambiguous language from the footnote.

The revised Footnote (e) clarifies actions to be taken if an undervoltage relay, its associated auxiliary relay, or its timer is inoperable. In addition, it gives action requirements for the low-voltage relays that are consistent with the action requirements for other similar safety components. Further, it deletes the requirement to place an inoperable relay in a tripped state within 12 hours since tripping a failed degraded grid voltage relay for the TMI-1 electrical circuitry design prevents the associated block loading timer from functioning.

The December 13, 1994, letter provided additional information that did not change the initial proposed no significant hazards consideration determination.

Description of the TMI-1 LOOP and Degraded Grid Voltage Electrical Circuitry Designs

The staff obtained descriptive information for the circuitry design from TMI Unit 1 personnel during an August 25, 1994, site visit to TMI. This information is given here to enhance understanding of the staff's evaluation and the need for the TSCR.

The LOOP electrical circuitry for each of the two 4160-V ac Emergency Safety (ES) buses comprises three separate channels. Each of the three channels for a 4160 volt alternating current (vac) ES bus monitors the voltage of one of the three bus phases and contains a potential transformer, a solid-state undervoltage relay, and an auxiliary relay. The potential transformer output circuit for each channel is connected to a solid-state undervoltage relay. This relay sends an actuation signal to an auxiliary relay. Each of the three channels is set to actuate if the monitored voltage for the attendant 4160 vac bus phase falls below 2400 vac. Auxiliary relay contacts from the three channels and a timer are arranged so that if any two of the three channels are actuated for 1.5 seconds or more, a LOOP actuation occurs. This actuation results in isolating the associated 4160 vac ES bus and starting the attendant emergency diesel generator. In a similar manner, the degraded grid voltage electrical circuitry for each 4160 vac ES bus comprises three additional separate channels. Each of these channels comprises a potential transformer that is shared with one of the channels for a LOOP, a solid-state relay, and an auxiliary relay. These channel-attendant circuit elements are arranged so that the potential transformer connects to a solid-state relay and this relay sends an actuation signal to an auxiliary relay. Each degraded grid voltage channel for a 4160 vac ES bus monitors the voltage of one of the three bus-attendant phases and is set to actuate if this voltage decreases to below 3760 vac. Auxiliary relay contacts and a timer are arranged so that if any two of the three channels are actuated for 10 seconds or more, the bus is isolated. This isolation results in removing the offsite power source and connected loads from the associated 4160 vac ES bus and starting the emergency diesel generator (EDG) for that bus.

In addition, an auxiliary relay contact from one degraded grid voltage circuit channel is arranged in one engineered safety actuation system (ESAS) circuit channel so that if the degraded grid voltage channel actuates, the ESAS circuit channel is prevented from actuating. Two additional auxiliary relay contacts from the other two degraded grid voltage circuit channels are arranged similarly in the other two ESAS circuit channels. Thus, with this circuit design, if a degraded grid voltage channel actuates (trip state), then the control logic necessary to actuate the ESAS is reduced from any 2 of the 3 channels tripping to 2 of the 2 remaining channels tripping. However, additional channel circuitry is provided so that, if the attendant 4160 vac bus EDG output circuit breaker closes and any degraded grid voltage channel is in a trip state, then the control logic necessary to actuate the ESAS automatically returns to any 2 of the 3 channels tripping.

Technical Specifications Change Request

As indicated above, the TSCR revises Footnote (e) of Section C in Table 3.5-1 of the TMI-1 TSs to replace the current Footnote (e). Both the current and revised footnotes are given below.

Current Footnote (e):

If a relay fails in the untripped state, it shall be placed in a tripped state within 12 hours to obtain a degree of redundancy of 1. The relay may be removed from the tripped state for up to 2 hours for functional testing pursuant to Table 4.1-1.

Revised Footnote (e):

The operability requirement for the undervoltage relay, its associated auxiliary relay, and the timer

1. If one 4.16 kv ES Bus does not meet the minimum conditions, restore the function to operable status within 72 hours or be in hot shutdown within an additional 6 hours.
2. If both 4.16 kv ES Buses do not meet the minimum conditions, then restore at least one 4.16 kv ES Bus to meet the minimum conditions within 1 hour or be in hot shutdown within an additional 6 hours.

2.0 EVALUATION

The current footnote explicitly addresses only relays. The revised footnote explicitly addresses associated auxiliary relays and timers in addition to undervoltage relays. Thus, this action alone is not viewed as changing an existing TSs requirement or adding a new TSs requirement but rather as clarifying actions to be taken should any LOOP or degraded grid voltage channel circuit elements become inoperable.

Current TSs require implementation of Specification 3.0.1 (commence reactor shutdown within 1 hour) if two relays in either the LOOP circuitry or the degraded grid voltage circuitry are inoperable. Such LOOP or degraded grid voltage channel inoperability results in applying an action requirement that is consistent with that for the ESAS analog instrumentation channels. Treating the LOOP or degraded grid voltage channels in this manner is inappropriate because of design differences between an ESAS-type instrumentation system design and that for the two 4160 vac emergency safety buses. In the case of the ESAS analog instrumentation channels, each channel can contain circuit elements that are common to both trains and, as such, an inoperable channel impacts both trains simultaneously. For the two 4160 vac ES buses, separate sets of LOOP and degraded grid voltage undervoltage relays along with attendant circuitry are provided for each train (one safety bus) and, as such, inoperability of a relay or attendant circuitry or both only impacts that train. Thus, regarding this area, the current TSs and Footnote (e) are overly restrictive and are not consistent with the intent of requirements contained in the Revised Standard Technical Specifications (RSTSS) for Babcock & Wilcox plants (NUREG-1430). The revised Footnote (e) explicitly addresses this area by providing action statements that apply if minimum conditions for either one of the two or both trains of LOOP or

degraded grid voltage circuitry are not met. Minimum conditions for a train of circuitry (either LOOP or degraded grid voltage) means that, as a minimum, two of the three channels are operable with a minimum degree of redundancy of one. The 72-hour allowed outage time (AOT) for a train of circuitry to be degraded below minimum conditions is consistent with the 72-hour AOT provided in the RSTs for an inoperable EDG. The revised Footnote (e) also requires that if both trains do not meet the minimum conditions, then within 1 hour at least one train is to be restored to meet minimum conditions or the reactor is to be in hot shutdown within an additional 6 hours. This situation requires immediate action since it indicates that the functional operation of both trains of circuitry is degraded below minimum conditions. The resulting immediate action is also consistent with that provided in the RSTs.

Finally, the revised Footnote (e) removes the current requirement to place an inoperable undervoltage relay in its trip state within 12 hours. Although the requirement to place an inoperable undervoltage relay or attendant circuit channel or both in its trip state is consistent with a requirement contained in the RSTs, for the TMI-1 degraded grid voltage circuitry design, this action is not consistent with the intent of the requirement. The intent of the related requirement contained in the RSTs is to maintain the same degree of redundancy with an inoperable undervoltage relay or attendant circuit channel or both as is the case with all circuit channels operable. As such, in a three-channel undervoltage circuitry design requiring coincident actuation of two of the three channels, with all channels operable the degree of redundancy is one and if one of the circuit channels is inoperable and placed in the trip state, the resulting logic requires actuation of one of the remaining two operable channels, thus maintaining a degree of redundancy of one. However, as described above, for the three-channel TMI-1 degraded grid voltage circuit design, placing an inoperable channel in the trip state reduces the degree of redundancy. Thus, with all three degraded voltage circuit channels operable, the degree of redundancy is one, and with one of the three channels inoperable and placed in the trip state, the degree of redundancy is reduced to zero. Therefore, in this design, the current requirement to place an inoperable degraded voltage channel in its trip state is not consistent with the intent of the requirement contained in the RSTs.

SUMMARY

On the basis of the findings provided in the above evaluation, the staff concludes that the revised Footnote (e) provides TSs action requirements for undervoltage circuitry channel elements that are consistent with other similar safety components, is consistent with the intent of requirements contained in the RSTs, and is acceptable.

3.0 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.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts or types of 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 (58 FR 59750). 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.

5.0 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: F. Ashe

Date: January 31, 1995