

November 7, 1983

Docket No. 50-333

Mr. J. P. Bayne
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of New York
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Dear Mr. Bayne:

The Commission has issued the enclosed Amendment No. 76 to Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant. The amendment authorizes changes to the Technical Specifications in response to your application dated April 22, 1983.

The amendment changes the Technical Specifications to add Limiting Conditions for Operation and surveillance requirements for the Reactor Protection System (RPS) electrical power supplies. The change is intended to assure that the power produced by the RPS motor-generator sets is of a quality acceptable to the RPS.

A copy of the Commission's related Safety Evaluation is enclosed.

Sincerely,

Original signed by/

Harvey I. Abelson, Project Manager
Operating Reactors Branch #2
Division of Licensing

Handwritten notes:
Committee to be consulted by
before issuing
10/25/83
none - 11/4

Enclosures:

- Amendment No. 76 to License No. DPR-59
- Safety Evaluation

cc w/enclosures:
See next page

DL:ORB#2
SNorris:ajs
10/24/83

DL:ORB#2
HAbelson
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DVassallo
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Power Authority of the State of New York
James A. FitzPatrick Nuclear Power Plant

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

POWER AUTHORITY OF THE STATE OF NEW YORK

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 76
License No. DPR-59

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Power Authority of the State of New York (the licensee) dated April 22, 1983, 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-59 is hereby amended to read as follows:

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(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 76 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Domenic B. Vassallo, Chief
Operating Reactors Branch #2
Division of Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: November 7, 1983

ATTACHMENT TO LICENSE AMENDMENT NO. 76

FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

Revise the Appendix "A" Technical Specifications as follows:

<u>Remove</u>	<u>Replace</u>
222c	222c
---	222d
---	224a
226	226

3.9 (cont'd)

3. From and after the time both power supplies are made or found inoperable the reactor shall be brought to cold condition within 24 hours.

G. REACTOR PROTECTION SYSTEM ELECTRICAL PROTECTION ASSEMBLIES

Two RPS electrical protection assemblies for each inservice RPS MG set and inservice alternate source shall be operable except as specified below:

1. With one RPS electrical protection assembly for an inservice RPS MG set or an inservice alternate power supply inoperable, restore the inoperable channel to operable status within 72 hours or remove the associated RPS MG set or alternate power supply from service.
2. With two RPS electrical protection assemblies for an inservice RPS MG set or an inservice alternate power supply inoperable, restore at least one to operable status within 30 minutes or remove the associated RPS MG set or alternate power supply from service.

4.9 (cont'd)

G. REACTOR PROTECTION SYSTEM ELECTRICAL PROTECTION ASSEMBLIES

The RPS electrical protection assemblies instrumentation shall be determined operable by:

1. At least once every 6 months, performing a channel functional test.
2. At least once per operating cycle, demonstrating the operability of over-voltage, under-voltage and under-frequency protective instrumentation by performance of a channel calibration including simulated automatic actuation of the protective relays, tripping logic and output circuit breakers and verifying the following set points:

	<u>RPS MG SET SOURCE</u>
OVER-VOLTAGE	$\leq 132V$ $\leq 4s$ Time Delay
UNDER-VOLTAGE	$\geq 108V$ $\leq 4s$ Time Delay
UNDER-FREQUENCY	$\geq 57HZ$ $\leq 4s$ Time Delay

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3.9.G (cont'd)

3. With the reactor in the RUN mode, at least one (1) RPS division shall be powered from the MG set except as specified below:

With both RPS divisions powered from the alternate sources, at least one division power source shall be restored to a MG set with operable electrical protection assemblies within seven (7) days or the reactor shall be brought to the cold condition within the subsequent 24 hours.

4.9.G (cont'd)

	<u>ALTERNATE SOURCE</u>
OVER-VOLTAGE	$\leq 132V$ $\leq 4s$ Time Delay
UNDER-VOLTAGE	$\geq 108V$ $\leq 4s$ Time Delay
UNDER-FREQUENCY	$\geq 57HZ$ $\leq 4s$ Time Delay

3.9 BASES (cont'd)

F. Reactor Protection System Power Supplies

Each of two RPS divisions may be supplied power from it's respective RPS MG set or from an alternate source which derives power from the same electrical division. The MG sets and alternate sources for both divisions are provided with redundant, seismic qualified, class 1E electrical protection assemblies between the power source and the RPS bus. Any abnormal output type failure in either of the MG sets or alternate sources (if in service) would result in a trip of one or both of the electrical protection assemblies producing a half scram on that RPS division and retaining full scram capability in the other RPS division.

Limiting operating conditions in Section 3.9.G provide a high degree of assurance that RPS buses are protected as described above.

4.9 BASES (cont'd)

D. Battery System

Measurements and electrical tests are conducted at specified intervals to provide indication of cell condition and to determine the discharge capability of the batteries.

E. LPCI MOV Independent Power Supply

Measurement and electrical tests are conducted at specified intervals to provide indication of cell condition, to determine the discharge capability of the battery.

F. Reactor Protection Power Supplies

Functional testes of the electrical protection assemblies are conducted once each six (6) months utilizing a built-in test device and once per operating cycle by performing an instrument calibration which verifies operation within the limits of Section 4.9.G.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 76 TO FACILITY OPERATING

LICENSE NO. DPR-59

POWER AUTHORITY OF THE STATE OF NEW YORK

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 50-333

1. Introduction

Our concerns regarding the deficiencies in the existing design of the Reactor Protection System (RPS) power monitoring in the BWRs was transmitted to the Power Authority of the State of New York (PASNY) by NRC generic letter dated September 24, 1980. In response to this, by letters dated November 2, 1981, and April 22, 1983 and a telecon dated February 23, 1982, PASNY proposed design modifications and changes to the Technical Specifications. A detailed review and technical evaluation of these proposed modifications and changes to the Technical Specifications were performed by Lawrence Livermore Laboratory (LLL) under contract to the NRC, and with general supervision by NRC staff. This work is reported in LLL report UCID-19706, "Technical Evaluation of the Monitoring of Electric Power to the Reactor Protection System" dated June 1983 (enclosed). We have reviewed this Technical Evaluation Report and concur in its conclusion that the proposed design modifications and Technical Specification changes are acceptable.

2. Proposed Changes and Evaluation Criteria

The following design modifications and Technical Specification changes were proposed by PASNY.

- A. Installation of GE designed protection assemblies, two in each of the four sources of power to the RPS (RPS M-G sets A and B and the two alternate sources). Each assembly includes a circuit breaker and a monitoring module consisting of an undervoltage, overvoltage and an underfrequency sensing relay.
- B. PASNY also proposed the addition of trip setpoint, limiting condition for operation and surveillance requirements in the Technical Specifications associated with the design modifications cited above.

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The criteria used by LLL in its technical evaluation of the proposed changes includes General Design Criteria (GDC)-2, "Design Basis for Protection Against Natural Phenomenon," and GDC-21, "Protection System Reliability and Testability," of Appendix A to 10 CFR 50; IEEE-279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations;" and NRC memorandum from F. Rosa to J. Stolz, T. Ippolito and G. Lainas dated February 19, 1979.

3. Evaluation Summary

We have reviewed the LLL Technical Evaluation Report and concur in its findings that (1) the proposed modifications will provide automatic protection to the RPS components from sustained abnormal power supply and (2) the proposed changes to the Technical Specifications include acceptable Limiting Conditions for Operation (LCO) and periodic testing in accordance with the Standard Technical Specification for BWRs. Therefore, we conclude that PASNY's proposed design modifications and changes to Technical Specifications are acceptable.

4. Environmental Consideration

We have determined that the amendment 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 amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

5. Summary

We have concluded, based on the considerations 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 issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: I. Ahmed

Enclosure:
Technical Evaluation Report

Dated: November 7, 1983

UCID- 19706

TECHNICAL EVALUATION REPORT ON THE
MONITORING OF ELECTRIC POWER
TO THE REACTOR PROTECTION SYSTEM
FOR THE
JAMES A. FITZPATRICK NUCLEAR POWER PLANT

(Docket No. 50-333)

James C. Selan

June 15, 1983



This is an informal report intended primarily for internal or limited external distribution. The opinions and conclusions stated are those of the author and may or may not be those of the Laboratory.

This work was supported by the United States Nuclear Regulatory Commission under a Memorandum of Understanding with the United States Department of Energy.

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ABSTRACT

This report documents the technical evaluation of the monitoring of electric power to the reactor protection system (RPS) at the James A. Fitzpatrick Nuclear Power Plant. The evaluation is to determine if the proposed design modification will protect the RPS from abnormal voltage and frequency conditions which could be supplied from the power supplies and will meet certain requirements set forth by the Nuclear Regulatory Commission.

The proposed design modifications will protect the RPS from sustained abnormal voltage and frequency conditions from the supplying sources.

FOREWORD

This report is supplied as part of the Selected Operating Reactor Issues Program II being conducted for the U. S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of Licensing, by Lawrence Livermore National Laboratory.

The U. S. Nuclear Regulatory Commission funded the work under the authorization entitled "Selected Operating Reactor Issues Program II," B&R 20 19 10 11 1, FIN No. A-0250.

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TECHNICAL EVALUATION REPORT ON THE
MONITORING OF ELECTRIC POWER
TO THE REACTOR PROTECTION SYSTEM
AT THE JAMES A. FITZPATRICK NUCLEAR POWER PLANT

(Docket No. 50-333)

James C. Selan

Lawrence Livermore National Laboratory, Nevada

1. INTRODUCTION

During the operating license review for Hatch 2, the Nuclear Regulatory Commission (NRC) staff raised a concern about the capability of the Class 1E reactor protection system (RPS) to operate after suffering sustained, abnormal voltage or frequency conditions from a non-Class 1E power supply. Abnormal voltage or frequency conditions could be produced as a result of one of the following causes: combinations of undetected, random single failures of the power supply components, or multiple failures of the power supply components caused by external phenomena such as a seismic event.

The concern for the RPS power supply integrity is generic to all General Electric (GE) boiling water reactors (BWR) MARK 3's, MARK 4's, and MARK 5's and all BWR MARK 6's that have not elected to use the solid state RPS design. The staff therefore pursued a generic resolution. Accordingly, GE proposed a revised design, in conceptual form, for resolution of this concern [Ref. 1]. The proposed modification consists of the addition of two Class 1E "protective packages" in series between each RPS motor-generator (M-G) set and its respective RPS bus, and the addition of two similar packages in series in the alternate power source circuit to the RPS buses. Each protective package would include a breaker and associated overvoltage, undervoltage and underfrequency relaying. Each protective package would meet the testability requirements for Class 1E equipment.

With the protective packages installed, any abnormal output type failure (undetectable random or seismically caused) in either of the two RPS M-G sets (or the alternate supply) would result in a trip of either one or both of the two Class 1E protective packages. This tripping would interrupt the power to the effected RPS channel, thus producing a scram signal on that channel, while retaining full scram capability by means of the other channel. Thus, fully redundant Class 1E protection is provided, bringing the overall

RPS design into full conformance with General Design Criteria (GDC)-2 [Ref. 2], and GDC-21 [Ref. 3] (including IEEE-279 [Ref. 4] and the Standard Review Plan [Ref. 5]). The NRC staff reviewed the proposed GE design and concluded that the modification was acceptable [Ref. 6], and should be implemented in conformance with the applicable criteria for Class 1E systems.

The NRC requires that the components of the RPS not be exposed to unacceptable electric power of any sustained abnormal quality that could damage the RPS. This involves providing means to detect any overvoltage, undervoltage, or underfrequency condition that is outside the design limits of the RPS equipment and to disconnect the RPS from such abnormal electric power before damage to the RPS can occur. The equipment which performs these functions must satisfy the single failure criterion and be seismically qualified. The NRC issued a generic letter [Ref. 7] to all operating BWR's requesting the licensees to submit design modification details and Technical Specifications for post implementation review.

By letters dated January 19, 1981 [Ref. 8], May 13, 1981 [Ref. 9], November 2, 1981 [Ref. 10], April 22, 1983 [Ref. 12], and a telecon on February 23, 1982 [Ref. 11], Power Authority of the State of New York (PASNY), the licensee, submitted design modification details and Technical Specification changes regarding the monitoring of electrical power to the RPS at the James A. Fitzpatrick Nuclear Power Plant.

The purpose of this report is to evaluate the licensee's submittal with respect to the NRC criteria and present the reviewer's conclusion on the adequacy of the design modifications to protect the RPS from abnormal voltage and frequency conditions.

2. DESIGN DESCRIPTION

The licensee has proposed to install the GE designed "electrical protection assembly" (GE No. 914E175) to monitor the electric power in each of the four sources of power (RPS M-G sets 1A and 1B, and the two alternate sources) to the RPS. Each assembly (EPA) consists of two identical and redundant packages. Each package includes a circuit breaker and a monitoring module. When abnormal electric power is detected by either module, the respective circuit breaker will trip and disconnect the RPS from the abnormal power source.

The monitoring module will detect overvoltage, undervoltage, and underfrequency conditions and provides a time-delayed trip when a setpoint is exceeded.

3. EVALUATION

The NRC stated several requirements that the licensee must meet in their design modification to monitor the power to the RPS. A statement of these requirements followed by an evaluation of the licensee's submittals are as follows:

- (1) "The components of the RPS shall not be exposed to unacceptable electric power of any sustained abnormal quality that could damage the RPS."

The monitoring module will detect overvoltage, undervoltage, and underfrequency conditions with the following setpoints. The chosen setpoints are within the ratings of the RPS components and thus ensures their protection from sustained abnormal power:

Nominal voltage 120 volts, 60 Hz nominal

Condition	Setpoint	Time Delay
Overvoltage	\leq 132 volts	\leq 4 seconds
Undervoltage	\geq 108 volts	\leq 4 seconds
Underfrequency	\geq 57 Hz	\leq 4 seconds

- (2) "Disconnecting the RPS from the abnormal power source shall be automatic."

The monitoring module will automatically disconnect the RPS buses from the abnormal power supply after the set time delay should the parameters setpoints be exceeded.

- (3) "The power monitoring system shall meet the requirements of IEEE 279-1971, GDC-2 and GDC-21."

The monitoring packages meet the Class 1E requirements of IEEE 279, the single failure criteria of GDC-21, and the seismic qualifications of GDC-2.

- (4) "Technical Specifications shall include limiting conditions of operation, surveillance requirements, and trip setpoints."

The protective packages were installed in February, 1982. In accordance with the Standard Technical Specifications, the licensee submitted Technical Specification changes which included limiting conditions for operation when the number of operable monitoring systems is less than required and surveillance requirements which included a functional test, channel calibration, and verification of the trip setpoints.

4. CONCLUSION

Based on the information submitted by the Power Authority of the State of New York for the James A. Fitzpatrick Nuclear Power Plant, it is concluded that:

- (1) The proposed setpoints of the relays in the two protective packages to be installed in series, in each of the power sources to the RPS buses, will automatically protect the RPS components from sustained abnormal overvoltage, undervoltage, and underfrequency conditions outside the design limits of the RPS components.
- (2) The protective packages meet the requirements of Class 1E equipment (IEEE 279), single failure criteria (GDC-21), and seismic qualification (GDC-2).
- (3) The proposed time delay before circuit breaker tripping will not result in damage to components of the RPS or prevent the RPS from performing its safety functions.
- (4) The following minimum and maximum limits to the trip setpoints, limiting conditions for operation (LCO), and surveillance requirements, as proposed by the licensee in accordance with the Standard Technical Specifications, will protect the RPS components from sustained abnormal power:
 - (a) Overvoltage \leq 132 volts, time delay \leq 4 seconds
Undervoltage \geq 108 volts, time delay \leq 4 seconds
Underfrequency \geq 57 Hz, time delay \leq 4 seconds
 - (b) With one RPS electric power monitoring channel for an inservice RPS MG set or alternate power supply inoperable, restore the inoperable channel to operable status within 72 hours or remove the associated RPS MG set or alternate power supply from service.
 - (c) With both RPS electric power monitoring channels for an inservice RPS MG set or alternate power supply inoperable, restore at least one to operable status within 30 minutes or remove the associated RPS MG set or alternate power supply from service.
 - (d) A functional test at least once per 6 months and a channel calibration once per operating cycle to determine the operability of the protective instrumentation including simulated automatic actuation, tripping logic, output circuit breaker tripping, and verification of the setpoints.

- (e) With the reactor in the RUN mode, at least one (1) RPS division shall be powered from the MG set except as specified below:

With both RPS divisions powered from the alternate sources, at least one division power source shall be restored to a MG set with operable electrical protection assemblies within seven (7) days or the reactor shall be brought to the cold condition within the subsequent 24 hours.

REFERENCES

1. General Electric Company letter, MFN 408-78 (G. G. Sherwood) to NRC (R. S. Boyd), dated October 31, 1978.
2. General Design Criteria-2 (GDC-2), "Design Bases for Protection Against Natural Phenomena," of Appendix A, "General Design Criteria for Nuclear Power Plants," in the Code of Federal Regulations, Title 10, Part 50 (10 CFR 50).
3. General Design Criteria-21 (GDC-21), "Protection System Reliability and Testability," of Appendix A, "General Design Criteria for Nuclear Power Plants," in the Code of Federal Regulations, Title 10, Part 50 (10 CFR 50).
4. IEEE Std. 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations."
5. NUREG-75/087, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants."
6. NRC memorandum from Faust Rosa to J. Stolz, T. Ippolito, and G. Lainas, dated February 19, 1979.
7. NRC letter to Operating BWR's, dated September 24, 1980.
8. PASNY letter (J. P. Bayne) to NRC (T. A. Ippolito), dated January 19, 1981.
9. PASNY letter (J. P. Bayne) to NRC (T. A. Ippolito), dated May 13, 1981.
10. PASNY letter (J. P. Bayne) to NRC (T. A. Ippolito), dated November 2, 1981.
11. Telecon, L. Guaquil and J. Escarzaga (PASNY), J. Hegner and I. Ahmed (NRC), and J. Selan (LLNL), dated February 23, 1982.
12. PASNY letter (J. P. Bayne) to NRC (D. B. Vassallo), dated April 22, 1983.