



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555

September 9, 1992

Docket No. 50-333

Mr. Ralph E. Beedle
Executive Vice President - Nuclear Generation
Power Authority of the State of New York
123 Main Street
White Plains, New York 10601

Dear Mr. Beedle:

SUBJECT: ISSUANCE OF AMENDMENT FOR JAMES A. FITZPATRICK NUCLEAR POWER PLANT
(TAC NO. M83790)

The Commission has issued the enclosed Amendment No. 183 to Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant. The amendment consists of changes to the Technical Specifications in response to your application transmitted by letter dated June 22, 1992.

The amendment adds response time testing requirements for the reactor protection system and main steam isolation valve actuation instrumentation including the analog transmitter trip system (ATTS). These testing requirements are applied to instrument channels for which response time is significant to the Final Safety Analysis Report transient and accident analyses.

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

Sincerely,

A handwritten signature in cursive script that reads "Brian C. McCabe".

Brian C. McCabe, Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 183 to DPR-59
2. Safety Evaluation

cc w/enclosures:
See next page

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DATED: September 9, 1992

AMENDMENT NO. 183 TO FACILITY OPERATING LICENSE NO. DPR-59-FITZPATRICK

Docket File
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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. 183
License No. DPR-59

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Power Authority of the State of New York (the licensee) dated June 22, 1992, 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. 183, 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 to be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION



Robert A. Capra, Director
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 9, 1992

ATTACHMENT TO LICENSE AMENDMENT NO.183

FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

Revise Appendix A as follows:

Remove Pages

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3
30f
38
39
40
-
46
47
49
50
61
-

Insert Pages

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2
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TECHNICAL SPECIFICATIONS

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1.0 (cont'd)

- C. Cold Condition - Reactor coolant temperature $\leq 212^{\circ}\text{F}$.
- D. Hot Standby Condition - Hot Standby condition means operation with coolant temperature $> 212^{\circ}\text{F}$, the Mode Switch in Start-up/Hot Standby and reactor pressure $< 1,005$ psig.
- E. Immediate - Immediate means that the required action will be initiated as soon as practicable considering the safe operation of the unit and the importance of the required action.
- F. Instrumentation
 - 1. Functional Test - A functional test is the manual operation or initiation of a system, subsystem, or component to verify that it functions within design tolerances (e.g., the manual start of a core spray pump to verify that it runs and that it pumps the required volume of water).
 - 2. Instrument Channel Calibration - An instrument channel calibration means the adjustment of an instrument signal output so that it corresponds, within acceptable range, and accuracy, to a known value(s) of the parameter which the instrument monitors. Calibration shall encompass the entire instrument channel including actuation, alarm or trip.
 - 3. Instrument Channel - An instrument channel means an arrangement of a sensor and auxiliary equipment required to generate and transmit to a trip system a single trip signal related to the plant parameter monitored by that instrument channel.
 - 4. Instrument Check - An instrument check is a qualitative determination of acceptable operability by observation of instrument behavior during operation. This determination shall include, where possible, comparison of the instrument with other independent instruments measuring the same variable.
 - 5. Instrument Channel Functional Test - An instrument channel functional test means the injection of a simulated signal into the instrument primary sensor where possible to verify the proper instrument channel response, alarm and/or initiating action.
 - 6. Primary Containment Isolation Actuation Instrumentation Response Time for Main Steam Line isolation is the time interval which begins when the monitored parameter exceeds the isolation actuation set point at the channel sensor and ends when the Main Steam Isolation Valve solenoids are de-energized (16A-K14, K16, K51, & K52 pilot solenoid relay contacts open). The response time may be measured in one continuous step or in overlapping segments, with verification that all components are tested.
 - 7. Logic System Function Test - A logic system functional test means a test of relays and contacts of a logic circuit from sensor to activated device to ensure components are operable per design intent. Where practicable, action will go to completion: i.e., pumps will be started and valves operated.
 - 8. Protective Action - An action initiated by the Protection System when limiting safety system setting is reached. A protective action can be at a channel or system level.

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1.0 (cont'd)

9. **Protective Function** - A system protective action which results from the protective action of the channels monitoring a particular plant condition.
10. **Reactor Protection System Response Time** is the time interval which begins when the monitored parameter exceeds the reactor protection trip set point at the channel sensor and ends when the scram pilot valve solenoids are de-energized (05A-K14 scram contactors open). The response time may be measured in one continuous step or in overlapping segments, with verification that all components are tested.
11. **Simulated Automatic Actuation** - Simulated automatic actuation means applying a simulated signal to the sensor to actuate the circuit in question.
12. **Trip System** - A trip system means an arrangement of instrument channel trip signals and auxiliary equipment required to initiate action to accomplish a protective function. A trip system may require one or more instrument channel trip signals related to one or more plant parameters in order to initiate trip system action. Initiation of protective action may require the tripping of a single trip system or the coincident of two trip systems.

13. **Sensor** - A sensor is that part of a channel used to detect variations in a monitored variable and to provide a suitable signal to logic.

G. Limiting Conditions for Operation (LCO)

The limiting conditions for operation specify the minimum acceptable levels of system performance necessary to assure safe startup and operation of the facility. When these conditions are met, the plant can be operated safely and abnormal situations can be safely controlled.

H. Limiting Safety System Setting (LSSS)

The limiting safety system settings are settings on instrumentation which initiate the automatic protective action at a level such that the safety limits will not be exceeded. The region between the safety limit and these settings represent margin with normal operation lying below these settings. The margin has been established so that with proper operation of the instrumentation safety limits will never be exceeded.

I. Modes of Operation (Operational Mode)

Mode - The reactor mode is established by the Mode Selector Switch. The modes include shutdown, refuel, startup/hot standby, and run which are defined as follows:

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3.1 LIMITING CONDITIONS FOR OPERATION

3.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the instrumentation and associated devices which initiate the reactor scram.

Objective:

To assure the operability of the Reactor Protection System.

Specification:

- A. The setpoints, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch, shall be as shown in Table 3.1-1. The reactor protection system instrumentation response time shall be within the limits in Table 3.1-2.
- B. Minimum Critical Power Ratio (MCPR)
During reactor power operation, the MCPR operating limit shall not be less than that shown in the Core Operating Limits Report.
1. During Reactor power operation with core flow less than 100% of rated, the MCPR operating limit shall be multiplied by the appropriate K_f as specified in the Core Operating Limits Report.

4.1 SURVEILLANCE REQUIREMENTS

4.1 REACTOR PROTECTION SYSTEM

Applicability:

Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram.

Objective:

To specify the type of frequency of surveillance to be applied to the protection instrumentation.

Specification:

- A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1-1 and 4.1-2 respectively.
The response time for each reactor protection system trip function listed in Table 3.1-2 shall be demonstrated to be within the limits in the table during each 18 month test interval. Each test shall include at least one channel in each trip system. All channels in both trip systems shall be tested within two test intervals.
- B. Maximum Fraction of Limiting Power Density (MFLPD)
The MFLPD shall be determined daily during reactor power operation at $\geq 25\%$ rated thermal power and the APRM high flux scram and Rod Block trip settings adjusted if necessary as specified in the Core Operating Limits Report.

4.1 BASES (cont'd)

The bi-stable trip circuit which is a part of the Group (B) devices can sustain unsafe failures which are revealed only on test. Therefore, it is necessary to test them periodically.

A study was conducted of the instrumentation channels included in the Group (B) devices to calculate their unsafe failure rates. The non-ATTS (Analog Transmitter Trip System) analog devices (sensors and amplifiers) are predicted to have an unsafe failure rate of less than 20×10^{-6} failures/hr. The non-ATTS bi-stable trip circuits are predicted to have unsafe failure rate of less than 2×10^{-6} failures/hr. The ATTS analog devices (sensors), bi-stable devices (master and slave trip units) and power supplies have been evaluated for reliability by Mean Time Between Failure analysis or state-of-the-art qualification type testing meeting the requirements of IEEE 323-1974. Considering the 2 hour monitoring interval for analog devices as assumed above, the instrument checks and functional tests as well as the analyses and/or qualification type testing of the devices, the design reliability goal for system reliability of 0.9999 will be attained with ample margin.

The bi-stable devices are monitored during plant operation to record their failure history and establish a test interval using the curve of Figure 4.1-1. There are numerous identical bi-stable devices used throughout the Plant's instrumentation system. Therefore, significant data on the failure rates for the bi-stable devices should be accumulated rapidly.

The frequency of calibration of the APRM flow biasing network has been established as each refueling outage. The flow biasing network is functionally tested at least once/month and, in addition, cross calibration checks of the flow input to the flow biasing network can be made during the functional test by direct meter reading. There are several instruments which must be calibrated and it will take several days to perform the calibration of the entire network. While the calibration is being performed, a zero flow signal will be sent to half of the APRM's resulting in a half scram and rod block condition. Thus, if the calibration were performed during operation, flux shaping would not be possible. Based on experience at other generating stations, drift of instruments, such as those in the flow biasing network, is not significant and therefore, to avoid spurious scrams, a calibration frequency of each refueling outage is established.

The measurement of response time within the specified intervals provides assurance that the Reactor Protection System trip functions are completed within the time limits assumed in the transient and accident analyses.

The Reactor Protection System trip functions in Table 3.1-2 are those functions for which the transient and accident analyses described in Chapter 14 of the FSAR take credit for the response time of instrument channels.

4.1 BASES (cont'd)

In terms of the transient analysis, the Standard Technical Specifications define individual trip function response time as "the time interval from when the monitored parameter exceeds its trip setpoint at the channel sensor until de-energization of the scram pilot valve solenoids." The individual sensor response time defined as "operating time" in General Electric (GE) design specification data sheet 22A3083AJ, note (8), is "the maximum allowable time from when the variable being measured just exceeds the trip setpoint to opening of the trip channel sensor contact during a transient." A transient is defined in note (4) of the same data sheet as "the maximum expected rate of change of the variable for the accident or the abnormal operating condition which is postulated in the safety analysis report.

The individual sensor response time may be measured by simulating a step change of the particular parameter. This method provides a conservative value for the sensor response time, and confirms that the instrument has retained its specified electromechanical characteristics. When sensor response time is measured independently, it is necessary to also measure the remaining portion of the response time in the logic train up to the time at which the scram pilot valve solenoids de-energize. The channel response time must include all component delays in the response chain to the ATTS output relay plus the 50 ms design allowance for RPS logic system response time. A response time for the RPS logic relays in excess of 50 ms is acceptable provided the overall response time does not exceed the response time limits of Table 3.1-2 which includes allowances for sensors, relays, and switches as follows:

High Reactor Pressure sensor	500 ms
High Drywell Pressure sensor	550 ms

Low Reactor Water Level sensor	1000 ms
Main Steam Isolation Valve Closure and Turbine Stop Valve Closure switches	10 ms
Turbine Control Valve Fast Closure from the first movement of the main turbine control valves until actuation of pressure switches which detect the loss of hydraulic control oil pressure.	30 ms

The 10 ms limit for the MSIV and TSV position switch response time is defined by GE design specification data sheet 22A3083AJ. It requires that after MSIV or TSV moves to the set point corresponding to 10% closure from full open, the position switch contacts should open in less than or equal to 10 ms. When the correct set point is verified by surveillance testing for the position switch, the response time requirement is considered to be satisfied. The maximum permissible TCV fast closure channel, logic, and scram contactor response time is 70 ms rather than the sum of TCV fast closure logic (30 ms) and the trip logic and scram contactor response time (50 ms). This provides a 10 ms margin to allow for uncertainty in the test method.

"The maximum permissible APRM channel, logic, and scram contactor response time is 90 ms rather than the sum of the APRM channel response time (60 ms) and the trip logic and scram contactor response time (50 ms)..." (GE design specification data sheet 22A3083AJ), note (12). This measurement is applicable to both the APRM fixed high neutron flux and the flow referenced simulated thermal power channels and requires measuring the time delay through the LPRM cards. The latter case does not include the time constant of approximately six seconds which is calibrated separately. The basis for excluding the neutron detectors from response time testing is provided by NRC Regulatory Guide 1.118, Revision 2, section C.5.

4.1 BASES (cont'd)

The 18 month response time testing interval is based on NRC NUREG-0123, Revision 3, "Standard Technical Specifications," surveillance requirement 4.3.1.3.

Group (C) devices are active only during a given portion of the operational cycle. For example, the IRM is active during start-up and inactive during full power operation. Thus the only test that is meaningful is the one performed just prior to shutdown or start-up; i.e., the tests that are performed just prior to use of the instrument.

Calibration frequency of the instrument channel is divided into two groups. These are as follows:

1. Passive type indicating devices that can be compared with like units on a continuous basis.
2. Vacuum tube or semiconductor devices and detectors that drift or lose sensitivity.

Experience with passive type instruments in generating stations and substations indicates that the specified calibrations are adequate. For those devices which employ amplifiers, etc., drift specifications call for drift to be less than 0.4 percent/month; i.e., in the period of a month a maximum drift of 0.4 percent could occur, thus providing for adequate margin.

For the APRM System, drift of electronic apparatus is not the only consideration in determining a calibration frequency. Change in power distribution and loss of chamber sensitivity dictate a calibration every 7 days.

Calibration on this frequency assures plant operation at or below thermal limits.

A comparison of Tables 4.1-1 and 4.1-2 indicates that two instrument channels have not been included in the latter table. These are: mode switch in shutdown and manual scram. All of the devices or sensors associated with these scram functions are simple on-off switches and, hence, calibration during operation is not applicable.

- B. The MFLPD is checked once per day to determine if the APRM scram requires adjustment. Only a small number of control rods are moved daily and thus the MFLPD is not expected to change significantly and thus a daily check of the MFLPD is adequate.

The sensitivity of LPRM detectors decreases with exposure to neutron flux at a slow and approximately constant rate. This is compensated for in the APRM system by calibrating twice a week using heat balance data and by calibrating individual LPRM's every 1000 effective full power hours, using TIP traverse data.

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TABLE 3.1-2

REACTOR PROTECTION SYSTEM INSTRUMENTATION RESPONSE TIMES

TRIP FUNCTION	REACTOR TRIP SYSTEM RESPONSE TIME (Seconds)
1) Reactor Vessel Pressure - High (02-3PT-55A, B, C, D)	≤ 0.550
2) Drywell Pressure - High (05PT-12A, B, C, D)	≤ 0.600
3) Reactor Water Level - Low (L3) (02-3LT-101A, B, C, D)	≤ 1.050
4) Main Steam Isolation Valve Closure (29PNS-80A2, B2, C2, D2) (29PNS-86A2, B2, C2, D2)	≤ 0.060
5) Turbine Stop Valve Closure (94PNS-101, 102, 103, 104)	≤ 0.060
6) Turbine Control Valve Fast Closure (94PS-200A, B, C, D)	≤ 0.070
7) APRM Fixed (120%) High Neutron Flux	≤ 0.090 (2)
8) APRM Flow Referenced Simulated Thermal Power	≤ 0.090 (1) (2)

Notes for Table 3.1-2:

1. Trip system response time does not include the simulated thermal power time constant of approximately six seconds which is calibrated separately.
2. Trip system response time is the measured time interval from trip signal input to the first electronic component in the channel after the LPRM detector until the scram pilot valve solenoids de-energize (05A-K14 scram contactors open).

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TABLE 4.1-2

**REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS**

Instrument Channel	Group (1)	Calibration	Minimum Frequency (2)
IRM High Flux	C	Comparison to APRM on Controlled Shutdowns	Maximum frequency once/week
APRM High Flux Output Signal	B	Heat Balance	Daily
Flow Bias Signal	B	Internal Power and Flow Test with Standard Pressure Source	Every refueling outage
LPRM Signal	B	TIP System Traverse	Every 1000 effective full power hours
High Reactor Pressure	B	Standard Pressure Source	Note (6)
High Drywell Pressure	B	Standard Pressure Source	Note (6)
Reactor Low Water Level	B	Standard Pressure Source	Note (6)
High Water Level in Scram Discharge Instrument Volume	A	Water Column, Note (5)	Once/operating cycle, Note (5)
High Water Level in Scram Discharge Instrument Volume	B	Standard Pressure Source	Every 3 months
Main Steam Line Isolation Valve Closure	A	Note (4)	Note (4)
Main Steam Line High Radiation	B	Standard Current Source (3)	Every 3 months
Turbine First Stage Pressure Permissive	B	Standard Pressure Source	Note (6)

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TABLE 4.1-2 (Cont'd)

**REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT CALIBRATION
MINIMUM CALIBRATION FREQUENCIES FOR REACTOR PROTECTION INSTRUMENT CHANNELS**

<u>Instrument Channel</u>	<u>Group (1)</u>	<u>Calibration</u>	<u>Minimum Frequency (2)</u>
Turbine Control Valve Fast Closure Oil Pressure Trip	A	Standard Pressure Source	Once/operating cycle
Turbine Stop Valve Closure	A	Note (4)	Note (4)

NOTES FOR TABLE 4.1-2

1. A description of three groups is included in the Bases of this Specification.
2. Calibration test is not required on the part of the system that is not required to be operable, or is tripped, but is required prior to return to service.
3. The current source provides an instrument channel alignment. Calibration using a radiation source shall be performed each refueling outage.
4. Actuation of these switches by normal means will be performed during the refueling outages.
5. Calibration shall be performed utilizing a water column or similar device to provide assurance that damage to a float or other portions of the float assembly will be detected.
6. Sensor calibration once per operating cycle. Master/slave trip unit calibration once per 6 months.

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3.2 LIMITING CONDITIONS FOR OPERATION

3.2 INSTRUMENTATION

Applicability:

Applies to the plant instrumentation which either (1) initiates and controls a protective function, or (2) provides information to aid the operator in monitoring and assessing plant status during normal and accident conditions.

Objective:

To assure the operability of the aforementioned instrumentation.

Specifications:

A. Primary Containment Isolation Functions

When primary containment integrity is required, the limiting conditions of operation for the instrumentation that initiates primary containment isolation are given in Table 3.2-1.

When primary containment integrity is required, the primary containment isolation actuation instrumentation response time for MSIV closure shall be within the limits in Table 3.2-9.

4.2 SURVEILLANCE REQUIREMENTS

4.2 INSTRUMENTATION

Applicability:

Applies to the surveillance requirement of the instrumentation which either (1) initiates and controls protective function, or (2) provides information to aid the operator in monitoring and assessing plant status during normal and accident conditions.

Objective:

To specify the type and frequency of surveillance to be applied to the aforementioned instrumentation.

Specifications:

A. Primary Containment Isolation Functions

Instrumentation shall be functionally tested and calibrated as indicated in Table 4.2-1.

System logic shall be functionally tested as indicated in Table 4.2-1.

The response time of each primary containment isolation actuation instrumentation isolation trip function listed in Table 3.2-9 shall be demonstrated to be within the limits in the table during each 18 month test interval. Each test shall include at least one channel in each trip system. All channels in both trip systems shall be tested within two test intervals.

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3.2 (cont'd)

B. Core and Containment Cooling Systems - Initiation and Control

The limiting conditions for operation for the instrumentation that initiates or controls the Core and Containment Cooling Systems are given in Table 3.2-2. This instrumentation must be operable when the system(s) it initiates or controls are required to be operable as specified in Specification 3.5.

C. Control Rod Block Actuation

1. The limiting conditions of operation for the instrumentation that initiates control rod block are given in Table 3.2-3.
2. The minimum number of operable instrument channels specified in Table 3.2-3 for the rod block monitor may be reduced by one in one of the trip systems for maintenance and/or testing, provided that this condition does not last longer than 24 hours in any 30 day period.

D. Radiation Monitoring Systems - Isolation and Initiation Functions

Refer to the Radiological Effluent Technical Specifications (Appendix B).

4.2 (cont'd)

B. Core and Containment Cooling Systems - Initiation and Control

Instrumentation shall be functionally tested, calibrated, and checked as indicated in Table 4.2-2.

System logic shall be functionally tested as indicated in Table 4.2-2.

C. Control Rod Block Actuation

Instrumentation shall be functionally tested, calibrated, and checked as indicated in Table 4.2-3.

System logic shall be functionally tested as indicated in Table 4.2-3.

D. Radiation Monitoring Systems - Isolation and Initiation Functions

Refer to the Radiological Effluent Technical Specifications (Appendix B).

4.2 BASES

The instrumentation listed in Tables 4.2-1 through 4.2-8 will be functionally tested and calibrated at regularly scheduled intervals. The same design reliability goal as the Reactor Protection System is generally applied. Sensors, trip devices and power supplies are tested, calibrated and checked at the same frequency as comparable devices in the Reactor Protection System.

The response times for MSIV isolation in Table 3.2-9 include the primary sensor and all components of the logic which must function to de-energize the MSIV pilot valve solenoids. Electrolytic filter capacitors are installed on the input to the main steam line flow ATTS trip units. General Electric analysis (MDE-278-1285 December 1985) accounts for the delay caused by the capacitors and justifies the increase in response time to 2.5 seconds for the main steam line high flow actuation signal. With the exception of the MSIVs, response time testing is not required for any other primary containment isolation actuation instrumentation. The safety analyses results are not sensitive to individual sensor response times of the logic systems to which the sensors are connected for isolation actuation instrumentation.

Those instruments which, when tripped, result in a rod block have their contacts arranged in a 1 out of n logic, and all are capable of being bypassed. For such a tripping arrangement with bypass capability provided, there is an optimum test interval that should be maintained in order to maximize the reliability of a given channel (7). This takes account of the fact that testing degrades reliability and the optimum interval between tests is approximately given by:

$$i = \sqrt{\frac{2t}{r}}$$

Where:

- i = the optimum interval between tests.
- t = the time the trip contacts are disabled from performing their function while the test is in progress.
- r = the expected failure rate of the relays.

To test the trip relays requires that the channel be bypassed, the test made, and the system returned to its initial state. It is assumed this task requires an estimated 30 minutes to complete in a thorough and workmanlike manner and that the relays have a failure rate of 10^{-6} failures per hour. Using this data and the above operation, the optimum test interval is:

$$i = \sqrt{\frac{2(0.5)}{10^{-6}}} = 1 \times 10^3 \text{ hr.} \\ = 40 \text{ days}$$

For additional margin a test interval of once/month will be used initially.

The sensors and electronic apparatus have not been included here as these are analog devices with readouts in the control room and the sensors and electronic apparatus can be checked by comparison with other like instruments. The checks which are made on a daily basis are adequate to assure operability of the sensors and electronic apparatus, and the test interval given above provides for optimum testing of the relay circuits.

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TABLE 3.2-9

PRIMARY CONTAINMENT ISOLATION SYSTEM ACTUATION INSTRUMENTATION RESPONSE TIMES

TRIP FUNCTION	RESPONSE TIME (Seconds)
1) MSIV Closure - Reactor Low Water Level (L1) (02-3LT-57A, B and 02-3LT-58A, B)	≤ 1.0
2) MSIV Closure - Low Steam Line Pressure (02PT-134A, B, C, D)	≤ 1.0
3) MSIV Closure - High Steam Line Flow (02DPT-116A-D, 117A-D, 118A-D, 119A-D)	≤ 2.5

Note for Table 3.2-9:

The measurement of the response time interval begins when the monitored parameter exceeds the isolation actuation set point at the channel sensor and ends when the Main Steam Isolation Valve pilot solenoid relay contacts open. The pilot solenoid relay contacts to be used for determination of the end point of the response time measurement are:

For the Inboard MSIV pilot solenoid relays: 16A-K14 (ac solenoids)
 16A-K51 (dc solenoids)

For the Outboard MSIV pilot solenoid relays: 16A-K16 (ac solenoids)
 16A-K52 (dc solenoids)



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 183 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

1.0 INTRODUCTION

By letter dated June 22, 1992 (JPN-92-030), the Power Authority of the State of New York (PASNY, the licensee) submitted a request for changes to the James A. FitzPatrick Nuclear Power Plant Technical Specifications (TS). The requested changes would add and clarify response time testing requirements for the reactor protection system (RPS) and main steam isolation valve (MSIV) actuation instrumentation including the analog transmitter trip system (ATTS). The proposed changes would add response time testing (RTT) requirements for the instrument channels for 11 trip functions to the definitions, limiting conditions for operation, and surveillance requirements sections. Existing RPS relay logic response time testing requirements would be eliminated for those trip functions which are not included in the RTT requirements of NUREG-0123 Revision 3, the Standard Technical Specifications (STS), and for which response time is not considered in the accident and transient analyses described in the Final Safety Analysis Report (FSAR). In order to be consistent with the STS, RTT requirements would be limited to those trip functions for which the instrument channel response time is significant (when compared to the total system response time) and for which credit for response time is taken in the transient and accident analyses described in the FSAR. The response time limits would be increased from the previous 50 millisecond (ms) limit to accommodate the response time of the additional sensors, ATTS components, and other components installed in the instrument channels by modification (MOD-F1-82-053), and those components which were already existing in instrument channels and which will now, by the new definitions, be included in response time testing. The frequency of individual channel response time testing would be decreased from the existing requirements to reduce personnel radiation exposure during testing and to be consistent with the STS.

2.0 BACKGROUND

The ATTS was developed by General Electric Company (GE) to offset operating disadvantages regarding testing and setpoint drift associated with the mechanical sensor (differential pressure) switches. GE provided a description of the ATTS design in Licensing Topical Report NEDO-21617-A, "Analog Transmitter/Trip Unit System for Engineered Safeguard Sensor Trip Inputs," dated December 1978. The NRC staff reviewed this report on a generic basis

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and concluded that the ATTS design was acceptable (Reference letter dated June 27, 1978 from O. Parr, NRC to G. Sherwood, GE). However, the staff identified plant-specific design information to be submitted by the licensees implementing the ATTS design. This information pertained to interfaces between the ATTS and other systems, environmental qualification of ATTS components, and divisional separation of redundant ATTS hardware to be installed in the plant.

By letter dated March 21, 1985, as supplemented March 28, 1985, the licensee proposed changes to the FitzPatrick TS associated with the installation of ATTS components used to initiate a reactor trip and actuate engineered safety feature systems. The licensee stated that installation of the ATTS, was in accordance with GE's Licensing Topical Report NEDO-21617-A. Because of previous staff review efforts which documented the overall acceptability of the GE ATTS design, the review of the ATTS modifications at FitzPatrick was limited to plant specific aspects of the ATTS installation, and the associated TS changes requested by the licensee. The NRC issued Amendment 89 on May 7, 1985. The amendment changed the surveillance and calibration requirements to accommodate the ATTS. However, the amendment did not change requirements for response time testing to reflect the methods described in the licensing topical report nor the Standard Technical Specifications.

Response time testing for instrument loops using mechanical sensors began at the output contacts of the sensors. With the installation of ATTS, the comparable contacts are located at the output of the ATTS relays rather than the output of the sensors. Since the installation of the ATTS in 1985, response time testing has been conducted beginning from the output of the ATTS relays. Accordingly, the measured response time did not include the response time of the ATTS components (sensor, trip unit, relay) as described in the GE ATTS licensing topical report, NEDO-21617-A.

Following the identification of this error in 1992, the licensee (DCM-11), and GE (DRG-A00-03658-1) evaluated the entire scope of response time testing requirements for both ATTS and other instrument channels, based on the transient and accident analyses described in the Final Safety Analysis Report. These evaluations identified the specific instrument channels for which there is a basis to require response time testing. Accordingly, the licensee prepared an application for an amendment to the Technical Specifications to incorporate appropriate response time testing requirements.

3.0 EVALUATION

The licensee has performed an evaluation (DCM-11) identifying those reactor protection system and primary containment isolation system (PCIS) trip functions for which the instrument channel response time is considered in the transient and accident analyses described in the FSAR. The licensee concluded that the results of the transient and accident analyses described in the FSAR

are potentially sensitive to response time for eight RPS trip functions. These RPS trip functions are:

1. Reactor Vessel Pressure - High
2. Drywell Pressure - High
3. Reactor Water Level-Low (L3)
4. Main Steam Isolation Valve Closure
5. Turbine Stop Valve Closure
6. Turbine Control Valve Fast Closure
7. APRM Fixed (120%) High Neutron Flux
8. APRM Flow Referenced Simulated Thermal Power

These eight RPS trip functions and their associated response times are listed in the proposed TS Table 3.1-2, "Reactor Protection System Instrumentation Response Times." The licensee concluded that with the exception of the main steam isolation valves (MSIVs), response time testing is not required for any of the isolation systems and associated isolation actuation instrumentation. The position was supported by analyses which examine the basis for primary containment isolation response time with respect to the loss of coolant accident (LOCA), and high energy line break (HELB). Therefore, the licensee concluded that the results of the transient and accident analyses described in the FSAR are potentially sensitive to response time for three PCIS trip functions. These PCIS trip functions are:

1. MSIV Closure - Reactor Low Water Level (L1)
2. MSIV Closure - Low Steam Line Pressure
3. MSIV Closure - High Steam Line Flow

These three PCIS trip functions and their associated response times are listed in the proposed TS Table 3.2-9, "Primary Containment Isolation System Actuation Instrument Response Times."

The licensee also performed an evaluation of Emergency Core Cooling Systems (ECCS) (i.e., Core Spray, Low Pressure Coolant Injection, High Pressure Coolant Injection, Automatic Depressurization, and Reactor Core Isolation Cooling) to determine whether the accident and transient analyses were sensitive to individual instrument response times for these systems. The licensee concluded that measurement of individual instrument response times for the ECCS is not required because the ECCS initiation sensors do not represent a significant portion of the particular system overall response time.

As outlined above, the proposed TS will require response time testing for those RPS and PCIS trip functions for which the instrument channel response time is significant to the transient and accident analyses described in the FSAR. This response time testing will include all components in the channel, beginning with the sensor and including the ATTS components and RPS logic relays, through and including opening of the contactors which de-energize the scram pilot valve solenoids, or the MSIV actuation solenoids as applicable.

Accordingly, for the RPS, the proposed response times will be increased to include the original 50 ms for the RPS logic relays and an additional time interval for the sensor, ATTS, and stated other components in the channel. The response time of the neutron monitoring sensors will not be included in channel response time measurements because they are excluded by NRC Regulatory Guide 1.118, Revision 2 dated June 1978. The licensee has also proposed to change the channel testing frequency. The current TS require that all channels of each trip function be tested on an 18-month interval. The proposed TS will require that one channel of each trip function be tested in each trip system during an 18-month interval and that all channels of each trip function be tested within two test intervals. This change in channel testing frequency is based on STS surveillance requirements.

The NRC staff has reviewed the Technical Specification changes proposed by the licensee to support new response time testing requirements for the RPS and PCIS trip functions. Based on our review of the documentation submitted by the licensee, we conclude that the licensee's application of response time testing requirements only to those instrument channels for which response time is significant to the FSAR transient and accident analyses is consistent with the Standard Technical Specifications and is acceptable. Furthermore, increasing the number of channel components that are subject to response time testing is appropriate and should provide increased assurance of proper system performance and safety.

The NRC staff review of the proposed response times for both the RPS and PCIS actuation instrumentation indicates that these response times are either more conservative or the same as those outlined in the STS except for the MSIV closure on high steam line flow. The STS value for high steam line flow instrumentation response time for MSIV actuation is ≤ 0.5 second whereas the proposed TS change calls for a ≤ 2.5 second response time. GE analysis of MSIV closure instrumentation response time indicated that this increase in the instrument response time was caused by the electronic filter that was installed to eliminate spurious high flow trips. The GE analysis determined that the FSAR evaluation of a main steam line break is based on a 0.5 second instrument response time and a conservative 10 second MSIV closing time; whereas, the FitzPatrick FSAR (Table 7.3-1) allows a maximum of 5 seconds for closing of a MSIV. The GE analysis of the main steam line break (assuming 2.5 second response time and 5.0 second MSIV closure time) found that the FSAR evaluation remains bounding, and that a 2.5 second flow instrument response time does not degrade plant safety. Based on our review of the documentation submitted by the licensee, we conclude that proposed response times, including that for MSIV closure on high steam flow, are acceptable.

The NRC staff has reviewed the licensee's proposed TS changes that result in a reduction in channel testing frequency. Specifically, the current TS require that all channels of each trip function be tested on an 18-month interval. The proposed change will require that one channel of each trip function be tested in each trip system during an 18-month interval and that all channels of each trip function be tested within two test intervals. The NRC staff

concludes that the proposed testing frequency is consistent with the STS (4.3.1.3), and is adequate to appropriately monitor system performance. Therefore, the staff finds the proposed channel testing frequency requirements acceptable.

In addition to the above stated changes to the TS, the licensee has added associated definitions, revised affected Limiting Conditions for Operation and Bases, and made several administrative changes. Our review found these changes appropriate and acceptable.

Based on the above evaluation, the NRC staff concludes that the TS changes proposed by the licensee in its amendment application dated June 22, 1992 are acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New York 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 surveillance requirements. 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 (57 FR 30256). 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.

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