May 7, 1985

Docket No. 50-333

Mr. J. P. Bayne
First Executive Vice President,
Chief Operations Officer
Power Authority of the State
of New York
123 Main Street
White Plains, New York 10601

Dear Mr. Bayne:

The Commission has issued the enclosed Amendment No. 89 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 request dated March 21, 1985 as supplemented March 28, 1985.

The amendment revises the Technical Specifications by changing surveillance and calibration requirements in support of operation with the newly installed Analog Trip Transmitter System.

A copy of our Safety Evaluation is enclosed.

Sincerely,

Original signed by/

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

Enclosures:
1. Amendment No. 89 to License No. DPR-59
2. Safety Evaluation

cc w/enclosures:
See next page

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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. 89
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 March 21, 1985, as supplemented March 28, 1985, 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:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 89 , 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: May 7, 1985

ATTACHMENT TO LICENSE AMENDMENT NO. 89

FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

Revise the Appendix "A" Technical Specifications as follows:

Remove	Insert
33	33
38	38
44	44
45	45
45a	45a
46	46
47	47
61	61
78	78
79	79
80	80
81	81
82	82
83	83
84	84
85	85

3.1 BASES (cont'd)

subchannel. APRM's B, D and F are arranged similarly in the other protection trip system. Each protection trip system has one more APRM than is necessary to meet the minimum number required per channel. This allows the bypassing of one APRM per protection trip system for maintenance, testing or calibration. Additional IRM channels have also been provided to allow for bypassing of one such channel. The bases for the scram setting for the IRM, APRM, high reactor pressure, reactor low water level, main steam isolation valve (MSIV) closure, generator load rejection and turbine stop valve closure are discussed in Sections 2.1 and 2.2.

Instrumentation for the drywell is provided to detect a loss of coolant accident and initiate the core standby cooling equipment. A high drywell pressure scram is provided at the same setting as the Core and containment Cooling Systems (ECCS) initiation to minimize the energy which must be accommodated during a loss-of-coolant accident and to prevent return to criticality. This instrumentation is a backup to the reactor vessel water level instrumentation.

High radiation levels in the main steam line tunnel above normal levels that due to the nitrogen and oxygen radioactivity are an indication of leaking fuel. A scram is initiated whenever such radiation level exceeds three times normal background. The purpose of this scram is to reduce the source of such radiation to the extent necessary to prevent excessive turbine contamination. Discharge of excessive amounts of radioactivity to the site environs is prevented by the air ejector offgas monitors which cause an isolation of the main condenser offgas line.

A Reactor Mode Switch is provided which actuates or bypasses the various scram functions appropriate to the particular plant operating status.
Reference paragraph 7.2.3.7 FSAR.

The manual scram function is active in all modes, thus providing for a manual means of rapidly inserting control rods during all modes of reactor operation.

The APRM (high flux in startup or refuel) System provides protection against excessive power levels and short reactor periods in the startup and intermediate power ranges.

The IRM System provides protection against short reactor periods in these ranges.

The Control Rod Drive Scram System in designed so that all of the water which

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 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.

Group (C) devices are active only during a given portion of the operational cycle. For example, the IRM is active during startup and inactive during full-power operation. Thus, the only test that

Table 4.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TEST
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

Instrument Channel	Group	Functional Test	Minimum Frequency (3)
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	Each refueling outage.
Manual Scram	A	Trip Channel and Alarm	Every 3 months.
RPS Channel Test Switch	A	Trip Channel and Alarm	Every refueling outage or after channel maintenance.
IRM High Flux	C	Trip Channel and Alarm(4)	Once per week during refueling or startup and before each startup.
IRM Inoperative	C	Trip Channel and Alarm(4)	Once per week during refueling or startup and before each startup.
APRM			
High Flux	B	Trip Output Relays(4)	Once/week.
Inoperative	B	Trip Output Relays(4)	Once/week.
Downscale	B	Trip Output Relays(4)	Once/week.
Flow Bias	B	Calibrate Flow Bias Signal(4)	Once/month(1).
High Flux in Startup or Refuel	C	Trip Output Relays(4)	Once per week during refueling or startup and before each startup.
High Reactor Pressure	B	Trip Channel and Alarm(4)	Once/month.(1)(8)
High Drywell Pressure	B	Trip Channel and Alarm(4)	Once/month.(1)(8)
Reactor Low Level(5)	B	Trip Channel and Alarm(4)	Once/month.(1)(8)
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel	Once/month.(7)
High Water Level in Scram Discharge Instrument Volume	B	Trip Channel and Alarm(4)	Once/month.(1)(8)

Table 4.1-1 (Cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TEST
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

Instrument Channel	Group (2)	Functional Test	Minimum Frequency (3)
Main Steam Line High Radiation	B	Trip Channel and Alarm(4)	Once/week.
Main Steam Line Isolation Valve Closure	A	Trip Channel and Alarm	Once/month.(1)
Turbine Control Valve EHC Oil Pressure	A	Trip Channel and Alarm	Once/month.
Turbine First Stage Pressure Permissive	B	Trip Channel and Alarm(4)	Once/month.(1)(8)
Turbine Stop Valve Closure	A	Trip Channel and Alarm	Once/month.(1)
Reactor Pressure Permissive	A	Trip Channel and Alarm	Every 3 months.

NOTES FOR TABLE 4.1-1

1. Initially once every month until acceptable failure rate data are available; thereafter, a request may be made to the NRC to change the test frequency. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instrument operates in an environment similar to that of JAFNPP.

2. A description of the three groups is included in the Bases of this Specification.

3. Functional tests are not required on the part of the system that is not required to be operable or are tripped.

   If tests are missed on parts not required to be operable or are tripped, then they shall be performed prior to returning the system to an operable status.

4. This instrumentation is exempted from the instrument channel test definition. This instrument channel functional test will consist of injecting a simulated electrical signal into the instrument channels.

Table 4.1-1 (Cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENT FUNCTIONAL TEST
MINIMUM FUNCTIONAL TEST FREQUENCIES FOR SAFETY INSTRUMENT AND CONTROL CIRCUITS

NOTES FOR TABLE 4.1-1 (cont'd)

5. The water level in the reactor vessel will be perturbed and the corresponding level indicator changes will be monitored. This perturbation test will be performed every month after completion of the functional test program.

6. Deleted.

7. The functional test 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.

8. Instrument check once per day.

Table 4.1-2

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

Instrument Channel	Group (1)	Calibration (4)	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	Trip System Traverse	Every 1000 effective full power hours
High Reactor Pressure	B	Standard Pressure Source	Note(7)
High Drywell Pressure	B	Standard Pressure Source	Note(7)
Reactor Low Water Level	B	Standard Pressure Source	Note(7)
High Water Level in Scram Discharge Instrument Volume	A	Water Column, Note(6)	Once/operating cycle, Note(6)
High Water Level in Scram Discharge Instrument Volume	B	Standard Pressure Source	Every 3 months
Main Steam Line Isolation Valve Closure	A	Note(5)	Note(5)
Main Steam Line High Radiation	B	Standard Current Source(3)	Every 3 months
Turbine First Stage Pressure Permissive	B	Standard Pressure Source	Note(7)

Amendment No. ~~42~~, ~~43~~, ~~62~~, ~~75~~, 89

Table 4.1-2 (cont'd)

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

Instrument Channel	Group (1)	Calibration (4)	Minimum Frequency (2)
Turbine Control Valve Fast Closure Oil Pressure Trip	A	Standard Pressure Source	Once/operating cycle
Turbine Stop Valve Closure	A	Note (5)	Note(5)
Reactor Pressure Permissive	A	Standard Pressure Source	Every 6 months

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 made each refueling outage.

4. Response time is not a part of the routine instrument channel test but will be checked once per operating cycle.

5. Actuation of these switches by normal means will be performed during the refueling outages.

6. 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.

7. Sensor calibration once per operating cycle. Master/slave trip unit calibration once per 6 months.

4.2 BASES

The instrumentation listed in Table 4.2-1 through 4.2-6 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.

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:

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

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 min. 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:

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

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

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.

TABLE 4.2-1

MINIMUM TEST AND CALIBRATION FREQUENCY FOR PCIS

Instrument Channel (8)	Instrument Functional Test	Calibration Frequency	Instrument Check(4)
1) Reactor High Pressure (Shutdown Cooling Permissive)	(1)	Once/3 months	None
2) Reactor Low-low Water Level	(1)(5)	(15)	Once/day
3) Main Steam High Temp.	(1)(5)	(15)	Once/day
4) Main Steam High Flow	(1)(5)	(15)	Once/day
5) Main Steam Low Pressure	(1)(5)	(15)	Once/day
6) Reactor Water Cleanup High Temp.	(1)	Once/3 months	None
7) Condenser Low Vacuum	(1)(5)	(15)	Once/day

Logic System Functional Test (7) (9)	Frequency
1. Main Steam Line Isolation valves Main Steam Line Drain Valves Reactor Water Sample Valves	Once/6 months
2. RHR - Isolation Valve Control Shutdown Cooling Valves Head Spray	Once/6 months
3. Reactor Water Cleanup Isolation	Once/6 months
4. Drywell Isolation Valves Tip Withdrawal Atmospheric Control Valves	Once/6 months
5. Standby Gas Treatment System Reactor Building Isolation	Once/6 months

NOTE: See listing of notes following Table 4.2-6 for the notes referred to herein.

Table 4.2-2

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CORE AND CONTAINMENT COOLING SYSTEMS

Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check (4)
1) Reactor Water Level	(1)(5)	(15)	Once/day
2a) Drywell Pressure (non-ATTS)	(1)	Once/3 months	None
2b) Drywell Pressure (ATTS)	(1)(5)	(15)	Once/day
3a) Reactor Pressure (non-ATTS)	(1)	Once/3 months	None
3b) Reactor Pressure (ATTS)	(1)(5)	(15)	Once/day
4) Auto Sequencing Timers	None	Once/operating cycle	None
5) ADS - LPCI or CS Pump Disch.	(1)	Once/3 months	None
6) Trip System Bus Power Monitors	(1)	None	None
8) Core Spray Sparger d/p	(1)	Once/3 months	Once/day
9) Steam Line High Flow (HPCI & RCIC)	(1)(5)	(15)	Once/day
10) Steam Line/Area High Temp.(HPCI & RCIC)	(1)(5)	(15)	Once/day
12) HPCI & RCIC Steam Line Low Pressure	(1)(5)	(15)	Once/day
13) HPCI Suction Source Levels	(1)	Once/3 months	None
14) 4KV Emergency Power Under-Voltage Relays and Timers	Once/operating cycle	Once/operating cycle	None
15) HPCI & RCIC Exhaust Diaphragm Pressure High	(1)	Once/3 months	None
17) LPCI/Cross Connect Valve Position	Once/operating cycle	None	None

Note: See listing of notes following Table 4.2-6 for the notes referred to herein.

TABLE 4.2-2 (CONT'D)

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CORE AND CONTAINMENT COOLING SYSTEMS

	Logic System Functional Test		Frequency
1)	Core Spray Subsystem	(7) (9)	Once/6 months
2)	Low Pressure Coolant Injection Subsystem	(7) (9)	Once/6 months
3)	Containment Cooling Subsystem	(9)	Once/6 months
4)	HPCI Subsystem	(7) (9)	Once/6 months
5)	HPCI Subsystem Auto Isolation	(7) (9)	Once/6 months
6)	ADS Subsystem	(7) (9)	Once/6 months
7)	RCIC Subsystem Auto Isolation	(7) (9)	Once/6 months
8)	ADS Relief Valve Bellow Pressure Switch	(7) (9)	Once/operating cycle

NOTE: See listing of notes following Table 4.2-6 for the notes referred to herein.

TABLE 4.2-3

MINIMUM TEST AND CALIBRATION FREQUENCY FOR CONTROL ROD BLOCKS ACTUATION

	Instrument Channel	Instrument Functional Test (5)	Calibration	Instrument Check (12)(4)
1)	APRM - Downscale	(1)	Once/3 months	Once/day
2)	APRM - Upscale	(1)	Once/3 months	Once/day
3)	IRM - Upscale	(2)	(3) (6)	Once/day
4)	IRM - Downscale	(2)	(3) (6)	Once/day
5)	RBM - Upscale	(1)	Once/3 months	Once/day
6)	RBM - Downscale	(1)	Once/3 months	Once/day
7)	SRM - Upscale	(2)	(3) (6)	Once/day
8)	SRM - Detector Not in Startup Position	(2)	(3) (6)	None
9)	IRM - Detector Not in Startup Position	(2)	(3) (6)	None
10)	Scram Discharge Instrument Volume - High Water Level (Group B Instruments)	Once/month (1)	Once/3 months	Once/day

	Logic System Functional Test (7) (9)	Frequency
1)	System Logic Check	Once/6 months

NOTE: See listing of notes following Table 4.2-6 for the notes referred to herein.

TABLE 4.2-4

MINIMUM TEST AND CALIBRATION FREQUENCY FOR RADIATION MONITORING SYSTEMS

	Instrument Channel	Instrument Functional Test	Calibration	Instrument Check (12)(4)
1)	Refuel Area Exhaust Monitors	(1)	Once/3 months	Once/day
2)	Reactor Building Area Exhaust Monitors	(1)	Once/3 months	Once/day
	Turbine Building Exhaust Monitors	(1)	Once/6 months	Once/day
	Radwaste Building Exhaust Monitors	(1)	Once/6 months	Once/day
3)	Off-Gas Radiation Monitors	(1)	Once/3 months	Once/day
4)	Main Control Room Ventilation Monitor	(1)	Once/3 months	Once/day
5)	Mechanical Vacuum Pump Isolation	See Table 4.1-2		
6)	Liquid Radwaste Discharge Monitor	(1)	Once/3 months	Once/day when discharging

	Logic System Functional Test (7)(9)	Frequency
1)	Reactor Building Isolation	Once/6 months
2)	Standby Gas Treatment Sys. Actuation	Once/6 months
3)	Steam Jet Air Ejector Off-Gas Line Isolation	Once/6 months
4)	Mechanical Vacuum Pump Isolation	Once/Operating Cycle
5)	Liquid Radwaste Discharge Isolation	Once/6 months

NOTE: See listing of notes following Table 4.2-6 for the notes referred to herein.

TABLE 4.2-5

MINIMUM TEST AND CALIBRATION FREQUENCY FOR DRYWELL LEAK DETECTION

	Instrument Channel	Instrument Functional Test	Calibration Frequency	Instrument Check (4)
1)	Equipment Drain Sump Flow Integrator	(1)	Once/3 months	Once/day
2)	Floor Drain Sump Flow Integrator	(1)	Once/3 months	Once/day

NOTE: See listing of notes following Table 4.2-6 for the notes referred to herein.

TABLE 4.2-6

MINIMUM TEST AND CALIBRATION FREQUENCY FOR SURVEILLANCE INSTRUMENTATION

	INSTRUMENT CHANNEL	CALIBRATION FREQUENCY	INSTRUMENT CHECK (4)
1)	Reactor Water Level	Once/6 months	Once Each Shift
2)	Reactor Pressure	Once/6 months	Once Each Shift
3)	Drywell Pressure	Once/6 months	Once Each Shift
4)	Drywell Temperature	Once/6 months	Once Each Shift
5)	Suppression Chamber Temperature	Once/6 months	Once Each Shift
6)	Suppression Chamber Water Level	Once/6 months	Once Each Shift
7)	Control Rod Position Indication	None	Once Each Shift
8)	Neutron Monitoring (APRM)	Five/week	Once Each Shift
9)	Neutron Monitoring (IRM and SRM)	Note 13	Note 13
10)	Drywell-Suppression Chamber Differential Pressure	Once/6 months	Once Each Shift
11)	Safety/Relief Valve Position Indicator (Primary)	Note 14	Once/Month
12)	Safety/Relief Valve Position Indication (Secondary)	Note 14	Once/Month

NOTES FOR TABLES 4.2-1 THROUGH 4.2-6

1. Initially once every month until acceptance failure rate data are available; thereafter, a request may be made to the NRC to change the test frequency. The compilation of instrument failure rate data may include data obtained from other boiling water reactors for which the same design instruments operate in an environment similar to that of JAFNPP.

2. Functional tests are not required when these instruments are not required to be operable or are tripped. Functional tests shall be performed within seven (7) days prior to each startup.

3. Calibrations are not required when these instruments are not required to be operable or are tripped. Calibration tests shall be performed within seven (7) days prior to each startup or prior to a pre-planned shutdown.

4. Instrument checks are not required when these instruments are not required to be operable or are tripped.

5. This instrumentation is excepted from the functional test definition. The functional test will consist of injecting a simulated electrical signal into the measurement channel.

6. These instrument channels will be calibrated using simulated electrical signals once every three months.

7. Simulated automatic actuation shall be performed once each operating cycle. Where possible, all logic system functional tests will be performed using the test jacks.

8. Reactor low water level, high drywell pressure and high radiation main steam line tunnel are not included on Table 4.2-1 since they are tested on Table 4.1-2.

9. The logic system functional tests shall include a calibration of time delay relays and timers necessary for proper functioning of the trip systems.

10. At least one (1) Main Stack Dilution Fan is required to be in operation in order to isokinetically sample the Main Stack.

11. Uses same instrumentation as Main Steam Line High Radiation. See Table 4.1-2.

12. See Technical Specification 1.0.F.4, Definitions, for meaning of term. "Instrument Check".

13. Calibration and instrument check surveillance for SRM and IRM Instruments are as specified in Tables 4.1-1, 4.1-2, 4.2-3.

14. Functional test is performed once each operating cycle.

15. Sensor calibration once per operating cycle. Master/slave trip unit calibration once per 6 months.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 89 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 JPN-85-22 dated March 21, 1985, the licensee (Power Authority of the State of New York) proposed changes to the James A. FitzPatrick Technical Specifications associated with the installation of Analog Transmitter/Trip System (ATTS) components used to initiate reactor trip and actuate engineered safety feature systems. The ATTS modification consists of the replacement of existing flow, level, and pressure mechanical sensor switches, used to provide inputs to plant protection systems, with analog sensor/trip unit combinations which provide continual monitoring of critical parameters in addition to providing protection system inputs. In addition, various leak detection system temperature elements will be replaced with nuclear-qualified Class 1E Resistance Temperature Detectors (RTDs). The licensee provided additional information concerning the ATTS hardware changes by letter dated March 28, 1985.

The ATTS was developed by the General Electric Company (GE) to offset operating disadvantages regarding testing and setpoint drift associated with the mechanical sensor (differential pressure) switches. The licensee has stated that the purpose of the ATTS modification is to improve sensor accuracy and reliability, reduce the amount of time that the Reactor Protection System (RPS) logic must be in a half-scram condition (during testing), reduce instrument channel calibration frequency, and reduce personnel radiation exposure. The ATTS design is being supplied as original equipment in later-built BWRs (e.g., BWR-6s), and is being backfitted on several earlier BWRs. The ATTS modification was reviewed and approved by the staff for Hatch Units 1 and 2. GE provided a description of the ATTS design in Topical Report NEDO-21617. The staff reviewed this report on a generic basis 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 licensees implementing the ATTS design. This information pertains 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.

Because of previous staff review efforts which have documented the overall acceptability of the GE ATTS design, the review of ATTS modifications at

FitzPatrick was limited to plant-specific aspects of the ATTS installation, and the associated Technical Specification changes requested by the licensee.

2.0 Evaluation

The licensee has stated that installation of the FitzPatrick ATTS is in accordance with GE's Licensing Topical Report NEDO-2167-A, "Analog Transmitter Trip Unit System for Engineered Safeguard Sensor Trip Inputs," dated December 1978. This report contains the staff's June 27, 1978 acceptance letter referenced above. The added ATTS hardware consists of Rosemount transmitters (models 1153GB, 1153DB, and 1153AB) located at instrument racks in the reactor building, RTDs used in area leak detection systems, instrument racks used to support the ATTS instruments (some existing instrument racks are being modified), and ATTS cabinets (located in the relay room in the administration building, underneath the control room) which house the solid state electronics (trip units) used to process the analog signals. The instrument channel outputs from the ATTS cabinets are routed to the existing RPS and emergency core cooling system (ECCS) logic cabinets in the control room. The ATTS modification does not involve any logic changes. The automatic and manual initiation functions and protective actions of essential systems remain unchanged. Furthermore, all setpoint values for initiation of protective actions will remain unchanged. The ATTS modification is limited to instrument channel components that provide inputs to the existing protection system logic.

The licensee has stated that existing components such as switches, racks, and accessories are being replaced by nuclear Class 1E qualified equipment meeting more stringent codes and standards than the original equipment. The ATTS transmitters, RTDs, instrument racks, and cabinets are environmentally and seismically qualified in accordance with IEEE Standards 323-1974 and 344-1975.

The licensee has stated that the installation of the ATTS at FitzPatrick satisfies the requirements of IEEE Standard 279-1971, and that all ATTS wiring complies with the separation requirements of IEEE Standard 384-1981 and Regulatory Guide 1.75. All new wiring from instrument racks in the reactor building to the ATTS cabinets in the relay room is routed in steel conduit. The output contacts from the ATTS cabinets are routed to the same points as they previously were. All previous safety analyses for individual instruments and interface equipment remain unchanged. The interface with the annunciator system is accomplished using relay coil-to-contact isolation between ATTS circuits and annunciator circuits.

The ATTS instrument channels are powered from the same divisional/essential distribution system as the corresponding equipment they replaced. The RPS portion of the ATTS is supplied (as is the remainder of the RPS) from the RPS buses. Redundant Class 1E electrical protection assemblies (EPAs) are installed between each RPS bus and its power source (motor-generator set). This protects each RPS bus against a sustained degraded voltage or frequency condition. Each EPA consists of a circuit breaker with a trip coil driven by logic circuitry that senses line voltage and frequency and trips the circuit breaker open on conditions of overvoltage, undervoltage or underfrequency. The RPS itself is a fail-safe system (i.e., protective action occurs on loss of power). Power for the ECCS portion of the ATTS is provided from Class 1E inverters which are, in turn, powered from the 125 Vdc battery-backed ECCS buses. The Class 1E batteries are divisionalized and supplied by chargers that are powered from the emergency buses. The batteries are sized for two hours continuous duty without the chargers. Undervoltage/overvoltage to ECCS portions of the ATTS is prevented by protective design features of the inverters. The ATTS is designed to operate properly if inverter input voltage is maintained between 100 and 140 Vdc. High and low input voltage detectors will automatically turn off the inverter if input voltage should stray outside of these limits. This in turn will activate power supply trouble alarms and trip unit trouble alarms to alert the operators. The staff concludes that the ATTS RPS and ECCS power supplies are acceptable.

Rosemount Instruction Manual 4247-1 dated July 1976 contains maximum transmitter lead length requirements to assure sufficient voltage out of the trip unit to drive the transmitter. The maximum allowable lead length for size 16 AWG copper wire used at FitzPatrick is 3,820 feet. The licensee has stated that the maximum cable length used in the FitzPatrick ATTS modification is 828 feet. The ATTS instrument channels are provided with high and low current gross failure alarms to detect short and open circuit conditions in the transmitter current loops. The high/low gross failure setpoints will be set at values of 30±0.5 and 2.5±0.5 mA respectively. These setpoint values will provide adequate detection of short/open circuits.

GE Report NEDO-21617-A outlines a stringent electromagnetic interference (EMI) test made on the individual components of the ATTS on the basis of EMI parameters which can be found in and around nuclear plants. Measures developed as a result of this test to minimize the effects of EMI will be implemented at FitzPatrick. In particular, shielded cables are used for all analog signals. These cables are routed in metal conduits. Instrument racks and trip unit racks are grounded. Physical locations of instrument racks and trip units have been selected to minimize potential exposure to a common source of EMI.

The staff has reviewed the Technical Specification changes proposed by the licensee to support implementation of the ATTS modifications. There are two major changes concerning instrument surveillance requirements. The first change involves added requirements to perform instrument channel checks for the ATTS channels. An instrument channel check is the qualitative assessment of channel behavior during operation by comparison of a group of instrument channel readouts/displays (in this case, trip unit panel meters) for a given monitored parameter. An instrument channel readout that differs significantly from the readouts of the remaining instrument channels is indicative of a channel malfunction. The performance of a channel check provides a quick and easy method for detecting gross instrument failures in the non-conservative direction during the intervals between other more extensive tests (e.g., monthly channel functional tests) which would detect the failure. A gross failure in the conservative direction would typically be detected in the form of a channel trip (i.e., the setpoint value would be exceeded). The licensee will perform a channel check daily for all added ATTS instrument channels by comparing trip unit panel meters at the ATTS cabinets in the relay room. These meters display the value of the measured parameter which can be scaled in units of the process variable. The meters monitor the normalized voltage at the output of the input buffer amplifiers (this voltage varies from 1 to 5 volts for a corresponding 4 to 20 mA signal from the transmitters). The capability to perform channel checks did not exist in the previous design because the mechanical differential pressure switches (sensors) were the non-indicating type. The daily channel check Technical Specification requirements proposed by the licensee provide an additional means of verifying instrument channel operability, and therefore, are acceptable.

The second major Technical Specification change proposed involves relaxation of the required channel calibration frequency for ATTS instrument channels. The calibration frequency for the mechanical sensor switches specified in the existing Technical Specifications is once per three months. The proposed calibration frequency for ATTS instrument channels is once per operating cycle for sensors (transmitters), and once per six months for both master and slave trip units. The calibration frequency has been relaxed because the solid-state electronic ATTS components are highly reliable, more accurate, and have lower failure rates than the mechanical instruments being replaced. The proposed calibration frequencies are at least as conservative as the calibration frequencies specified for ATTS components in the BWR Standard Technical Specifications. The Standard Technical Specifications are recognized by the staff as an acceptable implementation of the applicable requirements.

The remaining Technical Specification changes proposed by the licensee involve the definition of channel functional tests for analog versus digital channels (i.e., injecting a simulated signal into the ATTS instrument channels versus exercising the sensor for mechanical instrument channels), or changes which are editorial in nature. These changes are also acceptable.

3.0 Summary

We have previously reviewed the use of the ATTS and found that, provided certain interface requirements were satisfied, the system is acceptable (letter of approval, dated June 27, 1978, is part of General Electric Topical Report NEDO-21617-A dated December 1978). Based on our review of the documentation submitted by the licensee, we conclude that the proposed modifications satisfy the constraints of our prior approval and also satisfy the requirements of the applicable General Design Criterion and Regulatory Guides as referenced in Sections 7.2 (Reactor Trip System) and 7.3 (Engineered Safety Features Systems) of the Standard Review Plan (NUREG-0800). In addition, based on the data submitted, we concluded that:

1) The replacement instrumentation has better reliability, accuracy, and response time than the existing instrumentation.

2) The separation criteria of the original plant design is unchanged. Separation is provided by locating equipment on separate racks and panels and by running cable in separated conduits. The power supply used for a given ATTS instrument channel is dependent on that channel's divisional assignment, and is the same as the supply used for the channel being replaced.

3) No new single failure events have been created. Therefore, no single failure will result in any action not previously evaluated in the Final Safety Analysis Report (FSAR).

4) All new equipment has been tested or analyzed to assure that the design basis environmental and seismic requirements are met.

5) Means are provided to test the trip units periodically by injecting a signal into the transmitter current loop and observing trip unit response (trip setpoint and alarm functions). Operability of the analog loop is verified by periodic instrument checks.

6) Proposed Technical Specification revisions permit the operation of the facility in a manner that is consistent with the licensing basis and accident analysis for FitzPatrick.

Therefore, we conclude that the modifications of the RPS and ECCS (including RCIC) as discussed above, and the associated Technical Specification revisions, are acceptable.

4.0 Environmental Consideration

This amendment involves a change in the installation or use of a facility component located within the restricted area and changes in surveillance requirements as defined in 10 CFR Part 20. The 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding.

Accordingly, this 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 this amendment.

5.0 Conclusions

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Dated: May 7, 1985