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New York Power Authority

Harry P. Salmon, Jr.
Vice President Engineering

June 14, 2000
JPN-00-020

United States Nuclear Regulatory Commission
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Washington, DC 20555

SUBJECT: **James A. FitzPatrick Nuclear Power Plant**
Docket No. 50-333
Proposed Change to the Technical Specifications to
Eliminate the Operability Requirements for the
Average Power Range Monitors in the Refuel Mode (JPTS-00-001)

Reference: NRC Letter to J. Knubel concerning Request for Additional information Regarding Sections 2.0, 4.0, 3.0, 3.1, 3.2, 3.3, 3.5, 3.7, and 3.10 of the Improved Technical Specifications (TAC No. MA5049).

Dear Sir:

This application for an amendment to the James A. FitzPatrick Technical Specifications (TS) proposes to eliminate the operability requirements for the Average Power Range Monitor (APRM) Trip Functions when in the Refuel Mode. This submittal is also in response to a Request for Additional Information (RAI) regarding the Improved Technical Specification (ITS) amendment application for the FitzPatrick plant (Reference). RAI 3.3.1.1-2 requested that the Authority perform a site specific analyses to support the elimination of the APRM Neutron Flux - Startup and Inoperable Trip Functions while in Mode 5 that was proposed in the ITS application. The Safety Evaluation contained in Attachment II provides the FitzPatrick site-specific evaluation in response to the RAI.

A similar TS change request was approved by the NRC for the Limerick Generating Stations, Units 1 and 2 on July 30, 1990.

The signed original of the application for amendment to the Operating License is enclosed for filing. Attachment I contains the proposed new TS pages. Attachment II contains the Safety Evaluation and No Hazards Consideration. Attachment III contains a markup of the affected TS pages. The James A. FitzPatrick's Plant Operations Review Committee and Safety Review Committee have reviewed this application. A copy of this application and associated attachments is being forwarded to the designated New York State official in accordance with 10 CFR 50.91.

A001

NRR-057

There are no commitments made by the Authority in this letter. If you have any questions, please contact Mr. George Tasick at (315) 349-6572.

Very truly yours,

Harry P. Salmon, Jr.
Vice President Nuclear Engineering

att: as stated

cc: U.S. Nuclear Regulatory Commission
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BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

In the Matter of)
NEW YORK POWER AUTHORITY) Docket No. 50-333
James A. FitzPatrick Nuclear Power Plant)

APPLICATION FOR AMENDMENT TO OPERATING LICENSE

The New York Power Authority requests an amendment to the Technical Specifications (TS) contained in Appendix A and B to Facility Operating License DPR-59 for the James A. FitzPatrick Nuclear Power Plant. This application is filed in accordance with Section 10 CFR 50.90 of the Nuclear Regulatory Commissions regulations.

This application for an amendment to the James A. FitzPatrick Technical Specifications (TS) proposes to eliminate the operability requirements for the Average Power Range Monitor (APRM) Trip Functions when in the Refuel Mode. This submittal is also in response to a Request for Additional Information (RAI) regarding the Improved Technical Specification (ITS) amendment application for the FitzPatrick plant. RAI 3.3.1.1-2 requested that the Authority perform a site specific analyses to support the elimination of the APRM Neutron Flux - Startup and Inoperable Trip Functions while in Mode 5 that was proposed in the ITS application.

The signed original of the Application for Amendment to the Operating License is enclosed for filing. Attachment I contains the proposed new TS pages and Attachment II is the Safety Evaluation for the proposed changes. A markup of the affected TS pages is included as Attachment III.

New York Power Authority

Harry P. Salmon, Jr.
Vice President Nuclear Engineering

STATE OF NEW YORK
COUNTY OF WESTCHESTER
Subscribed and sworn to before me
this 14th day of June, 2000.

GERALDINE STRAND
Notary Public, State of New York
No. 4991272
Qualified in Westchester County
Commission Expires Jan. 27, 2002

Attachment I to JPN-00-020

REVISED TECHNICAL SPECIFICATION PAGES

Proposed Change to the Technical Specifications to Eliminate the Operability Requirements for the Average Power Range Monitors in the Refuel Mode

(JPTS-00-001)

New York Power Authority
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

1.1 (cont'd)

B. Core Thermal Power Limit (Reactor Pressure $\leq$785 psig)

When the reactor pressure is $\leq$785 psig or core flow is less than or equal to 10% of rated, the core thermal power shall not exceed 25 percent of rated thermal power.

C. Power Transient

To ensure that the Safety Limit established in Specification 1.1.A and 1.1.B is not exceeded, each required scram shall be initiated by its expected scram signal. The Safety Limit shall be assumed to be exceeded when scram is accomplished by a means other than the expected scram signal.

2.1 (cont'd)

b. APRM Flux Scram Trip Setting (Startup & Hot Standby Mode)

APRM - The APRM flux scram setting shall be $\leq$15 percent of rated neutron flux with the Reactor Mode Switch in Startup/Hot Standby.

c. APRM Flux Scram Trip Settings (Run Mode)

(1) Flow Referenced Neutron Flux Scram Trip Setting

When the Mode Switch is in the RUN position, the APRM flow referenced flux scram trip setting shall be less than or equal to the limit specified in Table 3.1-1. This setting shall be adjusted during single loop operation when required by Specification 3.5.J.

For no combination of recirculation flow rate and core thermal power shall the APRM flux scram trip setting be allowed to exceed 117% of rated thermal power.

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, and generator load rejection, 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.

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) 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.

3.1 BASES (cont'd)

The Control Rod Drive Scram System is designed so that all of the water which is discharged from the reactor by a scram can be accommodated in the discharge piping. Each scram discharge instrument volume accommodates in excess of 34 gallons of water and is the low point in the piping. No credit was taken for this volume in the design of the discharge piping as concerns the amount of water which must be accommodated during a scram.

During normal operation the discharge volume is empty; however, should it fill with water, the water discharged to the piping from the reactor could not be accommodated, which would result in slow scram times or partial control rod insertion. To preclude this occurrence, level detection instruments have been provided in each instrument volume which alarm and scram the reactor when the volume of water reaches 34.5 gallons. As indicated above, there is sufficient volume in the piping to accommodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accommodate the discharged water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

A Source Range Monitor (SRM) System is also provided to supply additional neutron level information during startup but has no scram functions (reference paragraph 7.5.4 FSAR).

The IRM high flux and APRM $\leq$15% power scrams provide adequate coverage in the startup and intermediate range. Thus, the IRM system is required to be operable in the refuel and startup/hot standby modes and the APRM system is required to be operable in the startup/hot standby mode. The APRM $\leq$120% power and flow referenced scrams provide required protection in the power range (reference FSAR Section 7.5.7). The power range is covered only by the APRMs. Thus, the IRM system is not required in the run mode.

The high reactor pressure, high drywell pressure, reactor low water level and scram discharge volume high level scrams are required for startup and run modes of plant operation. They are, therefore, required to be operational for these modes of reactor operation.

The requirement to have the scram functions indicated in Table 3.1-1 operable in the refuel mode assures that shifting to the refuel mode during reactor power operation does not diminish the protection provided by the Reactor Protection System.

Turbine stop valve closure occurs at 10 percent of valve closure. Below 29% of rated reactor power, the scram signal due to turbine stop valve closure is bypassed because the flux and pressure scrams are adequate to protect the reactor.

TABLE 3.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Mode in Which Function Must Be Operable: Refuel (Note 7)	Startup	Run	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (Note 3)
1	Mode Switch in Shutdown		X	X	X	1 Mode Switch	A
1	Manual Scram		X	X	X	2	A
3	IRM High Flux	≤96% (120/125) of full scale	X	X		8	A
3	IRM Inoperative		X	X		8	A
2	APRM Neutron Flux-Startup (Note 15)	≤15% Power		X		6	A
2	APRM Flow Referenced Neutron Flux (Not to exceed 117%) (Note 13)	(Note 12)			X	6	A or B
2	APRM Fixed High Neutron Flux	≤120% Power			X	6	A or B
2	APRM Inoperative	(Note 10)		X	X	6	A or B

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TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

NOTES OF TABLE 3.1-1 (cont'd)

3. Action Statements:

   A. Insert all operable control rods within four hours.
   B. Reduce power level to IRM range and place Mode Switch in the Startup position within eight hours.
   C. Reduce power level to less than 29 percent of rated within four hours.

4. Permissible to bypass, if the Reactor Mode Switch is in the Refuel or Shutdown position.

5. Bypassed when reactor power is less than 29 percent of rated power.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be operable:

   A. Mode Switch in Shutdown.
   B. Manual Scram.
   C. High Flux IRM
   D. Scram Discharge Volume High Level when any control rod in a control cell containing fuel is not fully inserted.

8. Not required to be operable when primary containment integrity is not required.

9. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

10. An APRM will be considered operable if there are at least 2 LPRM inputs per level and at least 11 LPRM inputs of the normal complement.

11. (Deleted)

TABLE 4.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION TEST REQUIREMENTS

Trip Function	Group (Note 2)	Functional Test	Functional Test Frequency (Note 3)	Instrument Check
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	R	NA
Manual Scram	A	Trip Channel and Alarm	Q	NA
RPS Channel Test Switch	A	Trip Channel and Alarm	W (Note 1)	NA
IRM High Flux	C	Trip Channel and Alarm (Note 4)	S/U and W (Note 5)	NA
IRM Inoperative	C	Trip Channel and Alarm (Note 4)	S/U and W (Note 5)	NA
APRM				
High Flux	B	Trip Output Relays (Note 4)	Q	NA
Inoperative	B	Trip Output Relays (Note 4)	Q	NA
Flow Biased High Flux	B	Trip Output Relays (Note 4)	Q	NA
High Flux in Startup	C	Trip Output Relays (Note 4)	S/U and W (Note 5)	NA
Reactor High Pressure	B	Trip Channel and Alarm (Note 4)	Q	D
Drywell High Pressure	B	Trip Channel and Alarm (Note 4)	Q	D
Reactor Low Level	B	Trip Channel and Alarm (Note 4)	Q	D
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel	Q (Note 6)	NA
High Water Level in Scram Discharge Instrument Volume	B	Trip Channel and Alarm (Note 4)	Q	D

Attachment II to JPN-00-020

SAFETY EVALUATION

Proposed Change to the Technical Specifications to Eliminate the Operability Requirements for the Average Power Range Monitors in the Refuel Mode

(JPTS-00-001)

New York Power Authority
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

I. PURPOSE OF THE PROPOSED CHANGES

The James A. FitzPatrick Technical Specification (TS) Table 3.1-1, "Reactor Protection System (SCRAM) Instrumentation Requirements," currently requires that the APRM Neutron Flux-Startup and APRM Inoperative Trip Functions be operable in the Refuel Mode. This requirement restricts outage maintenance activities and requires surveillance and maintenance as necessary to maintain system operability. The primary reason for removing the APRM operability requirements is to reduce critical path time during refueling by allowing maintenance activities to be performed on the Local Power Range Monitor (LPRM) strings (which input to the APRM circuitry) in conjunction with other refuel activities. In addition, the proposed change will preclude the need for testing and maintenance to maintain system operability in the Refuel Mode.

This Safety Evaluation provides a site-specific evaluation in response to a Request for Additional Information (RAI) regarding the Improved Technical Specifications (ITS) amendment application for the FitzPatrick plant (Reference 1). This proposal is consistent with the BWR Standard Technical Specifications and a previously approved amendment for the Limerick Nuclear Generating Stations, Units 1 and 2 (July 30, 1990).

II. DESCRIPTION OF THE PROPOSED CHANGES

This application for amendment to the James A. FitzPatrick Nuclear Power Plant TS proposes to delete the Operability requirements for the APRM instrumentation during the Refuel Mode required by TS Table 3.1-1, "Reactor Protection System (SCRAM) Instrumentation Requirements."

The specific changes to the TS are:

<u>Page 8, Paragraph 2.1.A.1.b, "APRM Flux Scram Trip Setting (Refuel or Start & Hot Standby Mode)"</u>

Delete:

"Refuel or" from the paragraph title and "or Refuel" from last sentence.

Change:

the word "Start" in paragraph title to "Startup."

<u>Page 33, "3.1 BASES (cont'd) fifth paragraph, first sentence</u>

Delete:

The words "or refuel" from fifth paragraph first sentence.

<u>Page 34, "3.1 BASES (cont'd)" fourth paragraph, second sentence</u>

Replace:

The words "and APRM systems are" with "system is" in the fourth paragraph, second sentence.

Change:

The word "modes" to "mode" in fourth paragraph, second sentence.

Add:

The words "and the APRM system is required to be operable in the startup/hot standby mode." to the end of the second sentence, fourth paragraph.

Page 40, Table 3.1-1 "Reactor Protection System (Scram) Instrumentation Requirements"

Delete:

The "X" for the Trip Functions "APRM Neutron Flux-Startup" and "APRM Inoperative" under the sub-column "Refuel" under the column heading "Mode in Which Function Must Be Operable."

Page 43, Table 3,1-1 (cont'd), Note 7.E,

Delete:

"E. APRM 15% power Trip."

Page 44, Table 4.1-1 "Reactor Protection System (Scram) Instrumentation Test Requirements"

Delete:

The words "or refuel" from the trip function "APRM High Flux in Startup or Refuel"

III. SAFETY IMPLICATIONS OF THE PROPOSED CHANGES

The proposed TS changes remove the requirements for APRM operability while the plant is in the Refuel Mode. To assess the impact of the proposed change on safety and the design bases accidents, we need to examine those systems and mechanisms which contribute to safe operation while the plant is in the Refuel Mode. Each of these systems and mechanisms contribute to the defense-in-depth design and operation. We also will show that the current APRM operability requirement is unnecessary to maintain this defense-in-depth.

The Neutron Monitoring System (NMS) is composed of the following subsystems: SRM, IRM, LPRM, APRM, Rod Block Monitor, and Traversing Incore Probe. The purpose of the SRM, IRM, and APRM subsystems is to monitor local and core average neutron flux levels and provide trip signals to the Reactor Protection System (RPS) and control rod block portion of the Reactor Manual Control System (RMCS) as required. The NMS provides local and core average power information to the reactor operator. The IRM and APRM are safety-related subsystems and provide safety functions. The SRM subsystem is composed of four detectors that are inserted into the core during shutdown and refuel conditions. Although the SRM subsystem is not safety-related, it is important to plant safety.

The SRMs are required by TS to be operational in the Refuel Mode. During refueling operations, the plant operators use the SRMs to ensure that neutron flux remains within an acceptable range. Also, plant operators can monitor the SRMs for increases in neutron flux which may indicate that the reactor is approaching criticality.

The IRM subsystem is composed of eight incore detectors that are inserted into the core. The IRM is a five-decade instrument with ten ranges that are ranged up during normal power increases. The IRMs are designed to monitor neutron flux levels at a local core location and provide protection against local criticality events caused by control rod withdrawal and fuel insertion errors. The IRMs monitor neutron flux levels from the upper portion of the SRM range to the lower portion of the APRM range. In terms of rated reactor power, the IRMs range from about 10E-4 % of rated reactor power to greater than 15% of rated reactor power. The IRMs provide control rod block and scram functions at $\leq$108 and $\leq$120, respectively, of a 125 division scale.

The APRMs do not have incore detectors of their own but receive input from the LPRM detectors which are located at various levels throughout the core. The APRMs monitor core power from about 2.5% of rated reactor power to 125% of rated reactor power. The APRMs represent a core average power level while the IRMs and SRMs indicate a local power level. In the Refuel and Startup Mode, the APRMs operate in the startup mode to provide a scram function at $\leq$15% core average power. The APRMs also provide a rod block function in the startup mode at $\leq$12% core average power, but is not required to be operable in the Refuel Mode.

The safety design bases of the IRM subsystem is to generate trip signals to prevent fuel damage resulting from anticipated or abnormal operational transients that could possibly occur while operating in the intermediate power range. The safety design bases of the APRM subsystem is to generate trip signals in response to average neutron flux increases in time to prevent fuel damage while the plant is in the operating power range. The independence and redundancy incorporated in the design of the IRM and APRM subsystems are consistent with the safety design bases of the NMS and RPS.

There are various levels of control to prevent inadvertent reactor criticality and fuel damage during refueling operations.

1. Licensed plant operators are trained to operate equipment and follow approved procedures.

2. Plant approved refueling and maintenance procedures specify core alteration steps.

3. SRMs indicate the potential for reactor criticality and generate a control rod block signal on high neutron flux levels.

4. Refueling interlocks prevent the withdrawal of more than one control rod and prevent the insertion of fuel assemblies into the core unless all control rods are fully inserted (except as permitted by TS section 3.10, "Core Alterations") .

5. The IRMs and APRMs provide an indication of local power and average power, respectively. IRMs and APRMs will provide rod blocks and scram signals on high neutron flux levels (APRM rod block not required to be operable in the Refuel Mode).

The APRMS are not necessary for safe operation of the plant during refueling because the IRMs will generate an RPS scram or control rod block if neutron flux increases to the applicable setpoint. The IRMs are required by TS to be operational in the Refuel Mode. The IRMs are a safety-related subsystem of the NMS and are designed to indicate and respond to neutron flux increases at local core locations. The APRMs are designed to monitor and respond (scram and/or control rod block) to a core average neutron flux level. The most likely reactivity insertion transient expected during refueling would be a core alteration type event, e.g., control rod withdrawal or fuel assembly insertion into the core. A core alteration event would result in a local core criticality transient readily detected by the IRMs and/or SRMs.

The IRM subsystem is designed and calibrated to respond to a neutron flux level that is significantly less than the flux level monitored by the APRMs. For example, during refueling, when the IRMs are on their most sensitive range, the IRMs will generate a scram signal at less than 0.01% core average power while the APRMs will generate a scram signal at $\leq$15% core average power. The IRM subsystem acts as a backup protection system to the Refueling Interlocks (RIs) during refueling.

RIs are required to be operational during refueling operations. They are not safety-related but are designed such that a single component failure does not cause an interlock failure. The purpose of the RIs is to restrict the movement of the control rods and the operation of the refueling equipment to reinforce operational procedures that prevent the reactor from becoming critical during refueling operations. RIs will prevent the withdrawal of a control rod if the refueling platform is over the core. Also, the RIs require an "all-rods-in" signal before allowing the refueling platform to go over the core.

TS and plant operating procedures allow only one control rod to be withdrawn or removed at a time while the mode switch is in "Refuel" (except as permitted by TS section 3.10, "Core Alterations"). The core loading pattern is designed to ensure that the core is subcritical by a specified margin with the most reactive control rod at the full out position. Withdrawal of one control rod would not cause criticality and the event would not result in an APRM response.

The design of the control rod drive system reduces the probability of a control rod error during refueling. For example, the latching action of the collet finger assembly serves to lock the index tube in place. The velocity limiter physically prevents the control blade from being removed from the core with fuel in place.

The James A. FitzPatrick Final Safety Analysis Report (FSAR) Section 14.5.4, "Events Resulting in a Positive Reactivity Insertion," evaluated the potential for a control rod withdrawal error and fuel assembly insertion error during refueling. The FSAR concludes that the above scenarios are adequately precluded by refueling interlocks, core design, and control rod hardware design. However, should operator errors, followed by equipment malfunctions, result in an inadvertent criticality event, necessary safety actions (control rod block or scram) will be taken prior to violation of a safety limit. The IRMs would provide a rod block or scram function as appropriate.

The hypothetical question arises as to whether the APRM subsystem (if operable) would indicate and scram the control rods on a high neutron flux level before the operable IRMs would respond to the event. The answer is that a neutron flux transient would be observed by the IRMs before the APRM electronics would detect the event. The core coupling is such that a local criticality event would immediately be transmitted throughout the core and would be detected by the operable IRMs. The IRMs would be on scale before the APRMs detected the event because the IRMs are designed and calibrated to be more sensitive to neutron flux than the APRMs.

In summary, the APRMs are not necessary for safe operation of the plant while in the Refuel Mode for the following reasons:

- The IRMs are a safety-related subsystem of the NMS and are required by TS to be operable in the Refuel Mode. The IRMs will generate an RPS Scram or control rod block if neutron flux increases to the applicable setpoint.

- The IRMs and SRMs are designed and calibrated to be more sensitive to neutron flux than the APRMs.

- The IRMs are designed to monitor local core events while the APRMs provide a measure of core average power condition. The IRMs can monitor and react to the reactivity events expected during refueling, i.e., control rod withdrawal or fuel insertion.

- The IRMs would detect and respond (control rod block or reactor scram) to an inadvertent criticality event before the APRMs would provide a trip function.

- The withdrawal of only one control rod in the Refuel Mode is permitted by the "one-rod-out" interlock while in "Refuel". The core is designed to be subcritical with one rod out.

- The withdrawal of a second control rod or inadvertent insertion of a fuel bundle in the Refuel Mode is precluded by refueling interlocks, refueling procedures, and administrative controls.

- The APRMs are required to be operational during shutdown margin demonstration - the reactor is in the Startup Mode for this testing.

- The SRMs are required to be Operational when in the Refuel mode.

- The transient analysis discussed in the FSAR does not require the APRMs to be operational in the Refuel Mode to mitigate a transient condition.

The proposed TS changes will not represent a change in the plant as described in the FSAR. FSAR sections 7.5, 12.2A, and 14 were reviewed in making this determination.

In conclusion, monitoring of neutron flux levels, administrative controls, plant procedures, refueling interlocks, and SRM and IRM protective features provide and maintain the defense-in-depth design and operation which precludes the need for the APRMs and APRM Trip Functions to be operable in the Refuel Mode.

IV. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

The Commission has provided standards (10 CFR Section 50.92(c)) for determining whether a significant hazards consideration exists. A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

After reviewing this proposed change, we have concluded:

1. The proposed change will not significant increase the probability or consequences of any previously evaluated accidents.

   Not requiring APRMs to be operational in the Refuel Mode will not increase the probability of inadvertent reactor criticality during refueling operations. RIs, NMS (SRMs, IRMs), and procedural restrictions provide assurance that inadvertent criticality does not occur due to the simultaneous withdrawal or removal of two control rods (except as permitted by TS section 3.10, "Core Alterations") or due to the inadvertent insertion of a fuel assembly into a core location with a control rod removed or withdrawn.

   The FSAR Section 14.5.4 discusses the potential for a control rod withdrawal error during refueling and startup operations. The discussion concludes that the withdrawal of one control rod does not require a safety action because the total worth of one control rod is not sufficient to cause criticality. The attempted withdrawal of two control rods in fuel cells containing fuel, assuming an operator error and a single active failure, would result in a control rod block initiated by the RIs. The safety-related IRM subsystem, which is required by TS to be operable while in the Refuel Mode, is designed to generate a rod block or reactor scram on high neutron flux and is therefore a backup protective system for the RIs during refueling.

   The safety-related IRM subsystem of the NMS is required by TS to be operable during refueling to support the safety design bases of the NMS and RPS. The SRM is not a safety-related subsystem but is important to plant safety and is required by TS to be operable in the Refuel Mode. The SRM subsystem provides the plant operator with indication of neutron flux levels from startup conditions to the IRM operating range. The SRMs and IRMs are designed to respond to local core conditions and would indicate and respond (control rod block or scram) to an accident condition to mitigate the transient. Thus, the APRMs are not necessary in the Refuel Mode. The proposed TS change will not alter the current requirements that the APRMs be operable during shutdown margin demonstrations, because the reactor will be in the Startup Mode for the test.

The proposed TS change eliminates the APRM operability requirement when in the Refuel mode and would not affect the FSAR evaluation of the inadvertent criticality due to the withdrawal or removal of the highest worth control rod or due to the insertion of fuel assemblies in uncontrolled cells. The FSAR concludes that the RIs and plant procedures provide assurance that inadvertent criticality does not occur during refueling.

The consequences of an accident will not be increased by the proposed TS change because of the existing lines of defense which prevent an inadvertent criticality event during refueling, e.g., administrative restrictions, refueling procedures, licensed plant operators, SRMs, RIs, and IRMs. Furthermore, should the number of operable IRM or SRM channels be less than that required by TS, the TS require that core alteration activities be suspended and all insertable control rods be inserted into the core.

Therefore, the proposed changes do not result in an increase in the probability or consequences of an accident previously evaluated.

2. The proposed change will not create the possibility of a new or different kind of accident.

The proposed changes to the TS will remove the APRM operability requirement when in the Refuel Mode; however, the SRMs and IRMs will still be required to be operable. The IRMs are safety-related and are designed to detect and respond to increases in neutron flux within the local core regions. Any increases in neutron flux during refueling would originate at a local core location, i.e., due to rod withdrawal or fuel assembly insertion. TS require IRM operability and IRMs will generate an RPS scram or control rod block if neutron flux increases to the setpoint. Therefore, removing the APRM operability requirement in the Refuel Mode would not effect any safety-related equipment or equipment important to safety.

Removing the APRM operability in the Refuel Mode will not affect the response of safety-related equipment as previously evaluated in the FSAR. The proposed changes to the TS do not affect any safety-related equipment or equipment important to safety, other than the APRMs.

The proposed changes to the TS would remove the APRM operability requirement during refueling operations. TS require IRM operability and will generate an RPS scram or control rod block if neutron flux increases to the applicable setpoint.

No new types of accidents would be introduced since the SRMs and IRMs are required to be operable in the Refuel Mode. Both SRMs and IRMs would indicate and provide a control rod block or scram signal, as appropriate, to an increase in neutron flux to mitigate a transient event. Furthermore, should the number of operable IRM or SRM channels be less than that required by TS, the TS require that core alteration activities be suspended and all insertable control rods be inserted into the core.

Finally, the APRMs do not have functions which can cause an accident condition.

Therefore, the proposed TS changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed change will not involve a significant reduction in a margin of safety.

There are various levels of control to prevent inadvertent reactor criticality and fuel damage during refueling operations.

1. Licensed plant operators are trained to operate equipment and follow approved procedures.

2. Plant approved refueling and maintenance procedures specify core alteration steps.

3. SRMs indicate the potential for reactor criticality and generate a control rod block signal on high neutron flux levels.

4. Refueling interlocks prevent the removal or withdrawal of more than one control rod and prevent the insertion of fuel assemblies into the core unless the control rod for the applicable fuel cell is fully inserted (except as permitted by TS section 3.10, "Core Alterations").

The APRMS are not necessary for safe operation of the plant during refueling because the IRMs will generate an RPS scram or control rod block if neutron flux increases to the applicable setpoint. The IRMs are required by TS to be operational in the Refuel Mode. The IRMs are a safety-related subsystem of the NMS and are designed to indicate and respond to neutron flux increases at local core locations. The APRMs are designed to monitor and respond (scram and/or control rod block) to a core average neutron flux level. For those events in which an APRM trip would occur, the IRM trip would occur at much lower flux levels. A reactivity insertion transient that could occur during refueling would be a core alteration type event, e.g., control rod withdrawal or fuel assembly insertion into the core. A core alteration event that would result in a local core criticality transient would be readily detected by the IRMs and/or SRMs.

The IRM subsystem is designed and calibrated to respond to a neutron flux level that is significantly less than the flux level monitored by the APRMs. For example, during refueling, when the IRMs are on their most sensitive range, the IRMs will generate a scram signal at less than 0.01% core average power while the APRMs will generate a scram signal at $\leq$15% core average power. The IRM subsystem acts as a backup protection system to the Refueling Interlocks (RIs) during refueling.

Therefore, the proposed TS changes do not involve a significant reduction in a margin of safety.

V. IMPLEMENTATION OF THE PROPOSED CHANGES

This amendment request meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) as follows:

(i) the amendment involves no significant hazards determination.

As described in Section IV of this evaluation, the proposed change involves no significant hazards consideration.

(ii) there are no significant change in the types or significant increase in amounts of any effluent that may be released offsite.

The proposed amendment does not involve any physical alterations to the plant configuration. Nor does the amendment affect the operation of the APRMs in a way that could change the types or significantly increase the amounts of any effluent that may be released offsite.

(iii) there is no significant increase in individual or cumulative occupational radiation exposure.

Based on the above, the Authority concludes that the proposed change meet the criteria specified in 10 CFR 51.22 for categorical exclusion from the requirements of 10 CFR 51.21 relative to requiring an environmental assessment by the Commission.

VI. CONCLUSION

Therefore, operation of the FitzPatrick plant in accordance with the proposed change will not endanger the health and safety of the public.

The Plant Operating Review Committee (PORC) and Safety Review Committee (SRC) have reviewed this proposed change to the TS and agree with this conclusion.

VII. REFERENCES

1. NRC Letter to J. Knubel concerning Request for Additional information Regarding Sections 2.0, 4.0, 3.0, 3.1, 3.2, 3.3, 3.5, 3.7, and 3.10 of the Improved Technical Specifications (TAC No. MA5049).

2. PECO Letter, G.A. Hunger, Jr., to NRC, "Limerick Generating Station, Units 1 and 2 Technical Specification Change Request No. 90-02-0," dated June 14, 1990.

3. NRC Letter, Richard J. Clark, to Mr. George A. Hunger, Jr., Philadelphia Electric Company, "APRM Operability During OPCON 5 (TSCR No. 90-02-0), Limerick Generating Station, Units 1 and 2 (TAC Nos. 76958/76959)," dated July 30, 1990.

Attachment III to JPN-00-020

MARKED UP TECHNICAL SPECIFICATION PAGES

Proposed Change to the Technical Specifications to Eliminate the Operability Requirements for the Average Power Range Monitors in the Refuel Mode

(JPTS-00-001)

New York Power Authority
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
Docket No. 50-333
DPR-59

1.1 (cont'd)

B. <u>Core Thermal Power Limit (Reactor Pressure ≤785 psig)</u>

When the reactor pressure is ≤785 psig or core flow is less than or equal to 10% of rated, the core thermal power shall not exceed 25 percent of rated thermal power.

C. <u>Power Transient</u>

To ensure that the Safety Limit established in Specification 1.1.A and 1.1.B is not exceeded, each required scram shall be initiated by its expected scram signal. The Safety Limit shall be assumed to be exceeded when scram is accomplished by a means other than the expected scram signal.

2.1 (cont'd)

b. <u>APRM Flux Scram Trip Setting (~~Refuel or~~ Start up & Hot Standby Mode)</u>

APRM - The APRM flux scram setting shall be ≤15 percent of rated neutron flux with the Reactor Mode Switch in Startup/Hot Standby. ~~or Refuel.~~

c. <u>APRM Flux Scram Trip Settings (Run Mode)</u>

(1) Flow Referenced Neutron Flux Scram Trip Setting

When the Mode Switch is in the RUN position, the APRM flow referenced flux scram trip setting shall be less than or equal to the limit specified in Table 3.1-1. This setting shall be adjusted during single loop operation when required by Specification 3.5.J.

For no combination of recirculation flow rate and core thermal power shall the APRM flux scram trip setting be allowed to exceed 117% of rated thermal power.

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, and generator load rejection, 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.

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.

3.1 BASES (cont'd)

The Control Rod Drive Scram System is designed so that all of the water which is discharged from the reactor by a scram can be accommodated in the discharge piping. Each scram discharge instrument volume accommodates in excess of 34 gallons of water and is the low point in the piping. No credit was taken for this volume in the design of the discharge piping as concerns the amount of water which must be accommodated during a scram.

During normal operation the discharge volume is empty; however, should it fill with water, the water discharged to the piping from the reactor could not be accommodated, which would result in slow scram times or partial control rod insertion. To preclude this occurrence, level detection instruments have been provided in each instrument volume which alarm and scram the reactor when the volume of water reaches 34.5 gallons. As indicated above, there is sufficient volume in the piping to accommodate the scram without impairment of the scram times or amount of insertion of the control rods. This function shuts the reactor down while sufficient volume remains to accommodate the discharged water and precludes the situation in which a scram would be required but not be able to perform its function adequately.

A Source Range Monitor (SRM) System is also provided to supply additional neutron level information during startup but has no scram functions (reference paragraph 7.5.4 FSAR).

The IRM high flux and APRM ≤15% power scrams provide adequate coverage in the startup and intermediate range. Thus, the IRM ~~and APRM systems are~~ required to be operable in the refuel and startup/hot standby modes. The APRM ≤120% power and flow referenced scrams provide required protection in the power range (reference FSAR Section 7.5.7). The power range is covered only by the APRMs. Thus, the IRM system is not required in the run mode.

system is (1) (1) and the APRM system is required to be operable in the startup/hot standby mode.

The high reactor pressure, high drywell pressure, reactor low water level and scram discharge volume high level scrams are required for startup and run modes of plant operation. They are, therefore, required to be operational for these modes of reactor operation.

The requirement to have the scram functions indicated in Table 3.1-1 operable in the refuel mode assures that shifting to the refuel mode during reactor power operation does not diminish the protection provided by the Reactor Protection System.

Turbine stop valve closure occurs at 10 percent of valve closure. Below 29% of rated reactor power, the scram signal due to turbine stop valve closure is bypassed because the flux and pressure scrams are adequate to protect the reactor. (1)

TABLE 3.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

Minimum No. of Operable Instrument Channels Per Trip System (Notes 1 and 2)	Trip Function	Trip Level Setting	Mode in Which Function Must Be Operable: Refuel (Note 7)	Startup	Run	Total Number of Instrument Channels Provided by Design for Both Trip Systems	Action (Note 3)
1	Mode Switch in Shutdown		X	X	X	1 Mode Switch	A
1	Manual Scram		X	X	X	2	A
3	IRM High Flux	≤96% (120/125) of full scale	X	X		8	A
3	IRM Inoperative		X	X		8	A
2	APRM Neutron Flux-Startup (Note 15)	≤15% Power	~~X~~	X		6	A
2	APRM Flow Referenced Neutron Flux (Not to exceed 117%) (Note 13)	(Note 12)			X	6	A or B
2	APRM Fixed High Neutron Flux	≤120% Power			X	6	A or B
2	APRM Inoperative	(Note 10)	~~X~~	X	X	6	A or B

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TABLE 3.1-1 (cont'd)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENTS

NOTES OF TABLE 3.1-1 (cont'd)

3. Action Statements:

   A. Insert all operable control rods within four hours.
   B. Reduce power level to IRM range and place Mode Switch in the Startup position within eight hours.
   C. Reduce power level to less than 29 percent of rated within four hours.

4. Permissible to bypass, if the Reactor Mode Switch is in the Refuel or Shutdown position.

5. Bypassed when reactor power is less than 29 percent of rated power.

6. The design permits closure of any two lines without a scram being initiated.

7. When the reactor is subcritical and the reactor water temperature is less than 212°F, only the following trip functions need to be operable:

   A. Mode Switch in Shutdown.
   B. Manual Scram.
   C. High Flux IRM
   D. Scram Discharge Volume High Level when any control rod in a control cell containing fuel is not fully inserted.
   ~~E. APRM 15% Power Trip.~~

8. Not required to be operable when primary containment integrity is not required.

9. Not required to be operable when the reactor pressure vessel head is not bolted to the vessel.

10. An APRM will be considered operable if there are at least 2 LPRM inputs per level and at least 11 LPRM inputs of the normal complement.

11. (Deleted)

Amendment No. ~~49, 62, 64, 67, 69, 72, 74, 100, 117, 159, 162, 207, 227,~~ 239

TABLE 4.1-1

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION TEST REQUIREMENTS

Trip Function	Group (Note 2)	Functional Test	Functional Test Frequency (Note 3)	Instrument Check
Mode Switch in Shutdown	A	Place Mode Switch in Shutdown	R	NA
Manual Scram	A	Trip Channel and Alarm	Q	NA
RPS Channel Test Switch	A	Trip Channel and Alarm	W (Note 1)	NA
IRM High Flux	C	Trip Channel and Alarm (Note 4)	S/U and W (Note 5)	NA
IRM Inoperative	C	Trip Channel and Alarm (Note 4)	S/U and W (Note 5)	NA
APRM				
High Flux	B	Trip Output Relays (Note 4)	Q	NA
Inoperative	B	Trip Output Relays (Note 4)	Q	NA
Flow Biased High Flux	B	Trip Output Relays (Note 4)	Q	NA
High Flux in Startup ~~or Refuel~~	C	Trip Output Relays (Note 4)	S/U and W (Note 5)	NA
Reactor High Pressure	B	Trip Channel and Alarm (Note 4)	Q	D
Drywell High Pressure	B	Trip Channel and Alarm (Note 4)	Q	D
Reactor Low Level	B	Trip Channel and Alarm (Note 4)	Q	D
High Water Level in Scram Discharge Instrument Volume	A	Trip Channel	Q (Note 6)	NA
High Water Level in Scram Discharge Instrument Volume	B	Trip Channel and Alarm (Note 4)	Q	D