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

March 28, 2024

David P. Rhoades
Senior Vice President
Constellation Energy Generation, LLC
President and Chief Nuclear Officer
Constellation Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT – ISSUANCE OF AMENDMENT NO. 354 RE: REVISE TECHNICAL SPECIFICATIONS SECTION 3.3.1.2, SOURCE RANGE MONITORS INSTRUMENTATION (EPID L-2023-LLA-0096)

Dear David Rhoades:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 354 to Renewed 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 dated June 28, 2023 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23179A021).

The amendment modifies Surveillance Requirement (SR) 3.3.1.2.4 to incorporate an additional acceptance criterion based on a higher signal to noise ratio as provided in General Electric Service Information Letter 478 dated December 16,1988. Specifically, an ‘‘or’’ statement will be added to SR 3.3.1.2.4 as follows: “or Verify count rate is ≥ 0.7 [counts per second] cps with a signal to noise ratio ≥ 20:1.”

A copy of our related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's monthly *Federal Register* notice.

Sincerely,

/RA/

James S. Kim, Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-333

Enclosures:
1. Amendment No. 354 to DPR-59
2. Safety Evaluation

cc: Listserv

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

CONSTELLATION FITZPATRICK, LLC

AND

CONSTELLATION ENERGY GENERATION, LLC

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 354
Renewed Facility Operating License No. DPR-59

1. The U.S. Nuclear Regulatory Commission has found that:

   A. The application for amendment by Exelon Generation Company, LLC, dated June 28, 2023, 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 Renewed Facility Operating License No. DPR-59 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 354, are hereby incorporated in the renewed operating 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 and shall be implemented within 30 days.

FOR THE NUCLEAR REGULATORY COMMISSION

HIPOLITO GONZALEZ

Digitally signed by HIPOLITO GONZALEZ
Date: 2024.03.28 15:03:10 -04'00'

Hipólito González, Chief
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Renewed Facility Operating License and Technical Specifications

Date of Issuance: March 28, 2024

ATTACHMENT TO LICENSE AMENDMENT NO. 354

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

RENEWED FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

Replace the following page of the Renewed Facility Operating License with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove Page	Insert Page
Page 3	Page 3

Replace the following page of the Appendix A Technical Specifications with the attached revised page. The revised page is identified by amendment number and contain marginal lines indicating the areas of change.

Remove Page	Insert Page
3.3.1.2-3	3.3.1.2-3

(3) Constellation Energy Generation, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, at any time, any byproduct, source, and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;

(4) Constellation Energy Generation, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, at any time, any byproduct, source, and special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration; or associated with radioactive apparatus, components or tools.

(5) Constellation Energy Generation, LLC, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

C. This renewed operating license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Constellation Energy Generation, LLC is authorized to operate the facility at steady state reactor core power levels not in excess of 2536 megawatts (thermal).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 354, are hereby incorporated in the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.2.2	----------NOTE---------- 1. Only required to be met during CORE ALTERATIONS. 2. One SRM may be used to satisfy more than one of the following. ---------- Verify an OPERABLE SRM detector is located in: a. The fueled region; b. The core quadrant where CORE ALTERATIONS are being performed, when the associated SRM is included in the fueled region; and c. A core quadrant adjacent to where CORE ALTERATIONS are being performed, when the associated SRM is included in the fueled region.	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.2.3	Perform CHANNEL CHECK.	In accordance with the Surveillance Frequency Control Program
SR 3.3.1.2.4	----------NOTE---------- Not required to be met with less than or equal to four fuel assemblies adjacent to the SRM and no other fuel assemblies in the associated core quadrant. ---------- Verify count rate is ≥ 3.0 cps with a signal to noise ratio ≥ 2:1. or Verify count rate is ≥ 0.7 cps with a signal to noise ratio ≥ 20:1.	In accordance with the Surveillance Frequency Control Program

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 354

CONSTELLATION FITZPATRICK, LLC

CONSTELLATION ENERGY GENERATION, LLC

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-59

1.0 INTRODUCTION

By letter dated June 28, 2023 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML23179A021), the Constellation Energy Generation, LLC (Constellation, the licensee), submitted a license amendment request (LAR) to revise James A. Fitzpatrick (FitzPatrick) Nuclear Power Plant Technical Specifications (TSs). The requested change would modify TS Section 3.3.1.2, “Source Range Monitors (SRM) Instrumentation.” Specifically, the proposed change will allow a lower required count rate for Surveillance Requirement (SR) 3.3.1.2.4 of ≥ 0.7 counts per second (cps) with a signal-to-noise (S/N) ratio ≥ 20:1.

2.0 REGULATORY EVALUATION

2.1 Description of System

The source range instrumentation monitors and indicates the neutron flux level of the reactor core and the rate by which the neutron flux changes during refueling or control rod movement, shutdown, and low power operations.

The SRM performance is established from data taken with the operational neutron sources in place. During reactor operations, the SRM system is calibrated. The SRM’s performance is compared with criteria on noise, S/N ratio, and then gives the control room operator early indication of unexpected subcritical multiplication that could be indicative of an approach to criticality.

The neutron flux is indicated in cps.

S/N ratio is defined as the ratio of the power of a signal (input) to the power of background noise (unwanted input) (S/N ratio = P_{signal} / P_{noise}).

Both signal and noise powers must be measured at the same or equivalent points in a system, and within the same system bandwidth.

The current FitzPatrick updated final safety analysis report (UFSAR) described the SRM downscale (≥ 3cps) Trip Function/Action as below:

Trip Function	Trip Action
Detector retraction permissive (SRM downscale)	Bypass detector full-in limit switch when above preset limit, annunciator, white light display (SRM downscale), rod block when below preset limit with IRM range switches on first ranges
SRM downscale (≥ 3 cps)	Rod block, white light display, annunciator

2.2 Background

As most of the BWR plants, the FitzPatrick TS requires that the SRM downscale setpoint be set at 3 cps with the S/N ratio of at least 2:1.

According to FitzPatrick TS SR 3.3.1.2.4, SRMs are required to be reading a minimum count rate of ≥ 3.0 cps with a signal to noise ratio ≥ 2:1. This requirement ensures that the detectors are indicating count rates indicative of neutron flux levels within the core, and that the count rate reading is not from background or cable noise.

In the LAR, the licensee stated, in part, that:

> "For an SRM to be considered operable, the indicated count rate is required to be high enough to be distinguishable from any noise induced into the instrument circuit. GE SIL 478 provides the design basis for the original GE neutron monitoring system and provides the basis for adopting an alternative design basis. The original design bases for the SRM minimum count rate of 3 cps are based on a signal to noise ratio of 2:1. GE SIL 478 provides the technical bases for allowing a minimum count rate of 0.7 cps with a corresponding signal to noise ratio ≥ 20:1."

The licensee proposed to modify SR 3.3.1.2.4 by adding an acceptance criterion that is based on the results from the General Electric Service Information Letter (GE SIL) 478, dated December 16, 1988 (Reference 1 of the LAR), which provides a higher S/N ratio (minimum count rate of ≥ 0.7 cps is based on a S/N ratio of ≥ 20:1). The licensee also performed a S/N ratio determination test using procedure for ST-5H test (Reference 2 of the LAR).

The U.S. Nuclear Regulatory Commission (NRC) staff performed a regulatory audit of the following documents as documented in the audit plan dated October 27, 2023 (ML23289A244):

1. General Electric (GE) Service Information Letter (SIL) No. 478, "SRM Minimum Count Rate," dated December 16, 1988 (Reference 1 of the LAR)

2. James A. FitzPatrick Nuclear Power Plant Operation Surveillance Procedure - SRM Signal to Noise Ratio Determination Test ST-5H, Revision 5 (Reference 2 of the LAR)

The audit summary can be found at ADAMS Accession No. ML24036A140.

2.3 Description of Proposed Changes

The proposed amendment revises TS SR 3.3.1.2.4 as shown below:

	SURVEILLANCE	FREQUENCY
From	Verify count rate is ≥ 3.0 cps with a signal to noise ratio ≥ 2:1	In accordance with the Surveillance Frequency Control Program
To	Verify count rate is ≥ 3.0 cps with a signal to noise ratio ≥ 2:1 or Verify count rate is ≥ 0.7 cps with a signal to noise ratio ≥ 20:1	In accordance with the Surveillance Frequency Control Program

With an existing Note (no change):

"NOTE: Not required to be met with less than or equal to four fuel assemblies adjacent to the SRM and no other fuel assemblies in the associated core quadrant."

2.4 Applicable Regulatory Requirements and Reference Documents

The following regulations and reference documents are relevant to the NRC staff's evaluation:

Regulatory Requirements

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50.36, "Technical Specifications," established its regulatory requirements related to the content of TSs. Pursuant to 10 CFR 50.36, TSs are required to include items in the following categories: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) surveillance requirements (SRs); (4) design features; and (5) administrative controls. The regulation does not specify the particular requirements to be included in a plant's TSs.

10 CFR 50.36(c)(3) requires that TSs include surveillance requirements (SRs), which are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met.

10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," specifically, Appendix A, "General Design Criteria (GDC) for Nuclear Power Plants," to 10 CFR Part 50, provides the minimum necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety.

General Design Criteria (GDC)

The NRC staff applied the GDC 13 to evaluate this LAR for FitzPatrick NPP.

10 CFR 50 Appendix A, GDC 13, "Instrumentation and Control," states, in part, that "Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems

that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges."

In the LAR, the licensee stated, in part, that "JAF [James A. FitzPatrick] was evaluated against the Atomic Energy Commission (AEC) Design Criteria, 10 CFR 50 34, Appendix A, General Design Criteria for Nuclear Power Plants, effective May 21, 1971. The evaluation is documented in Section 16.6 of the FitzPatrick UFSAR. The proposed change is consistent with Section 16.6 of the FitzPatrick UFSAR and the intent of GDC 13."

The NRC staff notes that FitzPatrick UFSAR, Section 16.6, "Conformance to AEC Design Criteria," states, in part, that "The James A. FitzPatrick Nuclear Power Plant was evaluated against the USAEC Design Criteria, 10 CFR 50 34, Appendix A, General Design Criteria for Nuclear Power Plants, effective May 21, 1971." The staff believed there is a typo error in this statement because NRC 10 CFR Part 50.34, that is "Contents of application: general information," doesn't contain "Appendix A." The General Design Criteria for Nuclear Power Plants are instead contained in Appendix A of NRC 10 CFR 50, "Domestic Licensing of Production and Utilization." Therefore, the NRC staff applied GDC 13 in Appendix A of NRC 10 CFR 50 to evaluate this LAR.

Reference Document:

- General Electric (GE) Service Information Letter (SIL) No. 478, "SRM Minimum Count Rate," Dated December 16, 1988.

- James A. FitzPatrick Nuclear Power Plant Operation Surveillance Procedure - SRM Signal to Noise Ratio Determination Test ST-5H, Revision 5.

- NUREG 1433 Rev 5 Vol 1: Improved Standard Technical Specifications (ITS) of BWR/4 (ML21272A357).

3.0 TECHNICAL EVALUATION

The NRC staff reviewed the LAR, applicable TS, and applicable references to evaluate the licensee's proposed change.

3.1 Evaluation of Proposed Technical Specification Changes

The licensee used GE SIL 478 and ST-5H test results, as technical justification, to propose FitzPatrick TS SR 3.3.1.2.4 by adding a minimum count rate of 0.7 cps with a minimum S/N ratio of 20:1.

In the LAR, the licensee stated, in parts:

"From GE SIL 478 (Reference 1 of LAR): GE has studied the effect of reducing the SRM Tech Spec setpoint to 0.7 cps. The purpose of the study was to determine if the SRMs could monitor neutron counts with the same confidence as in the original design basis with this lower count rate and a S/N ratio of 2:1.

> The results of the study showed that a S/N ratio of at least 20:1 is required to maintain the original level of uncertainty with a 0.7 cps minimum count rate. The higher S/N ratio is required so that the SRM can distinguish between actual counts and noise at the lower count rates. At a 0.7 cps setpoint and a 2:1 S/N ratio, the level of confidence will be reduced."

During the regulatory audit of GE SIL 478 and ST-5H test results, the NRC staff noted that GE SIL 478 specifies an SRM S/N ratio of at least 2:1 with a minimum count of 3 cps provides a statistical neutron flux monitoring confidence of 95 percent that the indicated signal is correct (with an uncertainty of about 5 percent as counting error).

The NRC staff verified that:

- The licensee's proposed change incorporated the results of the study in GE SIL 478 by adding a criterion that is based on a higher S/N ratio (minimum count rate of ≥ 0.7 cps is based on a signal-to-noise ratio of ≥ 20:1) into the current FitzPatrick SR 3.3.1.2.4.

- The performance of the ST-5H test (SRM signal to noise ratio determination test) demonstrates that a 20:1 S/N ratio is possible at the lower count rates, minimum of 0.7 cps, for all four SRMs. If the 20:1 S/N ratio could not be demonstrated, the S/N ratio 2:1 will demonstrate operability.

In addition, the NRC staff reviewed Revision 5 of NUREG 1433 and noted that for SR 3.3.1.2.4, NUREG 1433 requires the following to be verified:

a. ≥ [3.0] cps with a signal to noise ratio ≥ [2:1] or
b. ≥ [0.7] cps with a signal to noise ratio ≥ [20:1]

The NRC staff finds that the results of the GE SIL 478 study are consistent with NUREG 1433.

3.2 Evaluation Conclusion

Based on the above discussions, NRC staff has determined that:

- The proposed SRM count rate and associated S/N ratio in TS SR 3.3.1.2.4 are consistent with the results of the GE study 478, which ensure that SRMs could monitor neutron counts with the same confidence of 95 percent as in the original design basis with the minimum count rate of 0.7 cps and a signal to noise ratio greater than or equal to 20:1. The results of the GE study 478 showed that the higher S/N ratio is required so that the SRM can effectively distinguish between actual counts and noise at lower count rates.

- With the proposed change, FitzPatrick could find the SRM signal at much lower level than it was during routine shutdowns, core alterations, or before pulling rods for reactor criticality. Therefore, the proposed SR 3.3.1.2.4 is consistent with the study results in GE 478 to maintain the original level of uncertainty of 5 percent with a 0.7 cps minimum count rate.

- The existing acceptance criterion in SR 3.3.1.2.4 is maintained. The proposed additional acceptance criterion provides a more conservative value of associated signal to noise ratio to this SR for a lower value of minimum count rate.

- The proposed TS SR 3.3.1.2.4 would be consistent with the SR 3.3.1.2.4 of the improved standard technical specifications (NUREG 1433).

The NRC staff finds that the proposed change would improve plant's personnel safety by reducing the chances of additional occupational radiation exposure. Therefore, the proposed SR 3.3.1.2.4 would continue to satisfy the requirements of the regulatory requirements in Section 2.4 of this safety evaluation. Specially, the proposed change would continue to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met. The NRC staff finds the proposed change to SR 3.3.1.2.4 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 on March 14, 2024. 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 (October 31, 2023; 88 FR 74530). 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) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: H. Vu

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT – ISSUANCE OF AMENDMENT NO. 354 RE: REVISE TECHNICAL SPECIFICATIONS SECTION 3.3.1.2, SOURCE RANGE MONITORS INSTRUMENTATION (EPID L-2023-LLA-0096) DATED MARCH 28, 2024

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ADAMS Accession No.: ML24068A053 **NRR-058**

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