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

February 27, 2024

Edward Casulli
Site Vice President
Susquehanna Nuclear, LLC
769 Salem Boulevard
NUCSB3
Berwick, PA 18603-0467

SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 286 AND 270 RE: CHANGES TO TECHNICAL SPECIFICATIONS FOR CONTROL RODS (EPID L-2023-LLA-0086)

Dear Edward Casulli:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued the enclosed Amendment Nos. 286 and 270 to Renewed Facility Operating License Nos. NPF-14 and NPF-22, respectively, for the Susquehanna Steam Electric Station, Unit 1 and Unit 2. The amendments consist of changes to the technical specifications (TSs) in response to Susquehanna Nuclear, LLC's application dated June 8, 2023. The amendments revise TS 3.1.3, "Control Rod Operability;" TS 3.1.6, "Rod Pattern Control;" TS 3.3.2.1, "Control Rod Block Instrumentation;" TS 3.10.7, "Control Rod Testing – Operating;" and TS 3.10.8, "Shutdown Margin (SDM) Test – Refueling," by modifying the current requirements on control rod withdrawal order and conditions to protect against a postulated control rod drop accident during startup and low power conditions. The NRC's safety evaluation for the amendments is enclosed. The NRC will include a notice of issuance in its monthly *Federal Register* notice.

Sincerely,

***/RA/***

Audrey Klett, Senior Project Manager
Plant Licensing Branch I
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-387 and 50-388

Enclosures:
1. Amendment No. 286 to License No. NPF-14
2. Amendment No. 270 to License No. NPF-22
3. Safety Evaluation

cc: Listserv

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

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-387

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 286
Renewed License No. NPF-14

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

   A. The application for the amendment filed by Susquehanna Nuclear, LLC, dated June 8, 2023, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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 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 Renewed Facility Operating License and Technical Specifications, as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-14 is hereby amended to read as follows:

2.C.(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 286, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

HIPOLITO GONZALEZ

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Date: 2024.02.27 16:31:38 -05'00'

Hipólito J. 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: February 27, 2024

ATTACHMENT TO LICENSE AMENDMENT NO. 286

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1

RENEWED FACILITY OPERATING LICENSE NO. NPF-14

DOCKET NO. 50-387

Replace the following page of Renewed Facility Operating License No. NPF-14 with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

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| 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 contains marginal lines indicating the areas of change.

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| 3.1-8 | 3.1-8 |
| 3.1-9 | 3.1-9 |
| 3.1-10 | 3.1-10 |
| 3.1-11 | 3.1-11 |
| 3.1-18 | 3.1-18 |
| 3.1-19 | 3.1-19 |
| 3.3-17 | 3.3-17 |
| 3.3-18 | 3.3-18 |
| 3.3-19 | 3.3-19 |
| 3.3-20 | 3.3-20 |
| 3.10-18 | 3.10-18 |
| 3.10-20 | 3.10-20 |

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

(4) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to receive, posses, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, 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 license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission nor or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Susquehanna Nuclear, LLC is authorized to operate the facility at reactor core power levels not in excess of 3952 megawatts thermal in accordance with the conditions specified herein. The preoperational tests, startup tests and other items identified in License Conditions 2.C.(36), 2.C.(37), 2.C.(38), and 2.C.(39) to this license shall be completed as specified.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 286, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

For Surveillance Requirements (SRs) that are new in Amendment 178 to Facility Operating License No. NPF-14, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 178. For SRs that existed prior to Amendment 178, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment 178.

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. (continued) | A.3 | Perform SR 3.1.3.3 for each withdrawn OPERABLE control rod. | 24 hours from discovery of Condition A concurrent with THERMAL POWER greater than the low power setpoint (LPSP) of the RWM. |
| | AND | | |
| | A.4 | Perform SR 3.1.1.1. | 72 hours |
| B. Two or more withdrawn control rods stuck. | B.1 | Be in MODE 3. | 12 hours |
| C. One or more control rods inoperable for reasons other than Condition A or B. | C.1 | ----------NOTE----------<br>RWM may be bypassed as allowed by LCO 3.3.2.1, if required, to allow insertion of inoperable control rod and continued operation.<br>---------- | |
| | | Fully insert inoperable control rod. | 3 hours |
| | AND | | |
| | C.2 | Disarm the associated CRD. | 4 hours |

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| D. Required Action and associated Completion Time of Condition A or C not met.<br><br>OR<br><br>Nine or more control rods inoperable. | D.1 Be in MODE 3. | 12 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.3.1 | Determine the position of each control rod. | In accordance with the Surveillance Frequency Control Program |
| SR 3.1.3.2 | NOT USED. | |
| SR 3.1.3.3 | ----------NOTE----------<br>Not required to be performed until 31 days after the control rod is withdrawn and THERMAL POWER is greater than the LPSP of the RWM.<br>----------<br><br>Insert each withdrawn control rod at least one notch. | In accordance with the Surveillance Frequency Control Program |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.3.4 | Verify each control rod scram time from fully withdrawn to notch position 05 is ≤ 7 seconds. | In accordance with SR 3.1.4.1, SR 3.1.4.2, SR 3.1.4.3, and SR 3.1.4.4 |
| SR 3.1.3.5 | Verify each control rod does not go to the withdrawn overtravel position. | Each time the control rod is withdrawn to "full out" position<br><br>AND<br><br>Prior to declaring control rod OPERABLE after work on control rod or CRD System that could affect coupling |

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## 3.1 REACTIVITY CONTROL SYSTEMS

### 3.1.6 Rod Pattern Control

LCO 3.1.6 OPERABLE control rods shall comply with the requirements of the analyzed rod position sequence.

APPLICABILITY: MODES 1 and 2 with THERMAL POWER $\leq$ 10% RTP.

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. One or more OPERABLE control rod(s) not in compliance with the analyzed rod position sequence. | A.1 | ----------NOTE----------<br>Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation."<br>----------<br>Move associated control rod(s) to correct position. | 8 hours |
| | OR | | |
| | A.2 | Declare associated control rod(s) inoperable. | 8 hours |

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| B. Nine or more OPERABLE control rods not in compliance with the analyzed rod position sequence. | B.1 | ----------NOTE----------<br>RWM may be bypassed as allowed by LCO 3.3.2.1.<br>----------<br>Suspend withdrawal of control rods. | Immediately |
| | AND | | |
| | B.2 | Place the reactor mode switch in the shutdown position. | 1 hour |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.6.1 | Verify all OPERABLE control rods comply with the analyzed rod position sequence. | In accordance with the Surveillance Frequency Control Program |

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| C. Rod worth minimizer (RWM) inoperable during reactor startup. | C.1 | Suspend control rod movement except by scram. | Immediately |
| | OR | | |
| | C.2.1.1 | Verify ≥ 12 rods withdrawn. | Immediately |
| | | OR | |
| | C.2.1.2 | Verify by administrative methods that startup with RWM inoperable has not been performed in the last calendar year. | Immediately |
| | | AND | |
| | C.2.2 | Verify movement of control rods is in compliance with the analyzed rod position sequence by a second licensed operator or other qualified member of the technical staff. | During control rod movement |
| D. RWM inoperable during reactor shutdown. | D.1 | Verify movement of control rods is in accordance with the analyzed rod position sequence by a second licensed operator or other qualified member of the technical staff. | During control rod movement |

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| E. One or more Reactor Mode Switch-Shutdown Position channels inoperable. | E.1 | Suspend control rod withdrawal. | Immediately |
| | AND | | |
| | E.2 | Initiate action to fully insert all insertable control rods in core cells containing one or more fuel assemblies. | Immediately |

SURVEILLANCE REQUIREMENTS

----------NOTES----------

1. Refer to Table 3.3.2.1-1 to determine which SRs apply for each Control Rod Block Function.

2. When an RBM channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the associated Function maintains control rod block capability.

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| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.3.2.1.1 | Perform CHANNEL FUNCTIONAL TEST. | In accordance with the Surveillance Frequency Control Program |
| SR 3.3.2.1.2 | ----------NOTE----------<br>Not required to be performed until 1 hour after any control rod is withdrawn at ≤ 10% RTP in MODE 2.<br>---<br>Perform CHANNEL FUNCTIONAL TEST. | In accordance with the Surveillance Frequency Control Program |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.3.2.1.3 | ----------NOTE----------<br>Not required to be performed until 1 hour after THERMAL POWER is ≤ 10% RTP in MODE 1.<br>----------<br>Perform CHANNEL FUNCTIONAL TEST. | In accordance with the Surveillance Frequency Control Program |
| SR 3.3.2.1.4 | Verify the RBM:<br>a. Low Power Range – Upscale Function is not bypassed when APRM Simulated Thermal Power is ≥ 28% RTP and ≤ Intermediate Power Range Setpoint specified in the COLR.<br>b. Intermediate Power Range – Upscale Function is not bypassed when APRM Simulated Thermal Power is > Intermediate Power Range Setpoint specified in the COLR and ≤ High Power Range Setpoint specified in the COLR.<br>c. High Power Range – Upscale Function is not bypassed when APRM Simulated Thermal Power is > High Power Range Setpoint specified in the COLR. | In accordance with the Surveillance Frequency Control Program |
| SR 3.3.2.1.5 | Verify the RWM is not bypassed when THERMAL POWER is ≤ 10% RTP. | In accordance with the Surveillance Frequency Control Program |

SURVEILLANCE REQUIREMENTS

| | SURVEILLANCE | FREQUENCY |
|---|---|---|
| SR 3.3.2.1.6 | ----------NOTE----------<br>Not required to be performed until 1 hour after reactor mode switch is in the shutdown position.<br>----------<br>Perform CHANNEL FUNCTIONAL TEST. | In accordance with the Surveillance Frequency Control Program |
| SR 3.3.2.1.7 | ----------NOTE----------<br>Neutron detectors are excluded.<br>----------<br>Perform CHANNEL CALIBRATION. | In accordance with the Surveillance Frequency Control Program |
| SR 3.3.2.1.8 | Verify control rod sequences input to the RWM are in conformance with the analyzed rod position sequence. | Prior to declaring RWM OPERABLE following loading of sequence into RWM |

## 3.10 SPECIAL OPERATIONS

### 3.10.7 Control Rod Testing - Operating

LCO 3.10.7 The requirements of LCO 3.1.6, “Rod Pattern Control,” may be suspended to allow performance of SDM demonstrations, control rod scram time testing, control rod friction testing and the Start-up Test Program, provided:

a. The analyzed rod position sequence requirements of SR 3.3.2.1.8 are changed to require the control rod sequence to conform to the specified test sequence.

OR

b. The RWM is bypassed; the requirements of LCO 3.3.2.1, “Control Rod Block Instrumentation,” Function 2 are suspended; and conformance to the approved control rod sequence for the specified test is verified by a second licensed operator or other qualified member of the technical staff.

APPLICABILITY: MODES 1 and 2 with LCO 3.1.6 not met.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. Requirements of the LCO not met. | A.1 Suspend performance of the test and exception to LCO 3.1.6. | Immediately |

3.10 SPECIAL OPERATIONS

3.10.8 SHUTDOWN MARGIN (SDM) Test - Refueling

LCO 3.10.8 The reactor mode switch position specified in Table 1.1-1 for MODE 5 may be changed to include the startup/hot standby position, and operation considered not to be in MODE 2, to allow SDM testing, provided the following requirements are met:

a. LCO 3.3.1.1, “Reactor Protection System Instrumentation,” MODE 2 requirements for Functions 2.a, 2.d, and 2.e of Table 3.3.1.1-1;

b. 1. LCO 3.3.2.1, “Control Rod Block Instrumentation,” MODE 2 requirements for Function 2 of Table 3.3.2.1-1, with the analyzed rod position sequence requirements of SR 3.3.2.1.8 changed to require the control rod sequence to conform to the SDM test sequence.

OR

2. Conformance to the approved control rod sequence for the SDM test is verified by a second licensed operator or other qualified member of the technical staff;

c. Each withdrawn control rod shall be coupled to the associated CRD;

d. All control rod withdrawals that are not in conformance with the analyzed rod position sequence shall be made in notch out mode;

e. No other CORE ALTERATIONS are in progress; and

f. CRD charging water header pressure $\geq$ 940 psig.

APPLICABILITY: MODE 5 with the reactor mode switch in startup/hot standby position.

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

SUSQUEHANNA NUCLEAR, LLC

ALLEGHENY ELECTRIC COOPERATIVE, INC.

DOCKET NO. 50-388

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 270
Renewed License No. NPF-22

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

   A. The application for the amendment filed by Susquehanna Nuclear, LLC, dated June 8, 2023, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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 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 Renewed Facility Operating License and Technical Specifications, as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Renewed Facility Operating License No. NPF-22 is hereby amended to read as follows:

2.C.(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 270, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

HIPOLITO GONZALEZ

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Hipólito J. 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: February 27, 2024

ATTACHMENT TO LICENSE AMENDMENT NO. 270

SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 2

RENEWED FACILITY OPERATING LICENSE NO. NPF-22

DOCKET NO. 50-388

Replace the following page of Renewed Facility Operating License No. NPF-22 with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

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Replace the following page of the appendix A technical specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

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| 3.1-9 | 3.1-9 |
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| 3.1-19 | 3.1-19 |
| 3.3-17 | 3.3-17 |
| 3.3-20 | 3.3-20 |
| 3.10-18 | 3.10-18 |
| 3.10-20 | 3.10-20 |

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

(4) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70 to receive, posses, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

(5) Susquehanna Nuclear, LLC, pursuant to the Act and 10 CFR Parts 30, 40, 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 license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations and orders of the Commission nor or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

Susquehanna Nuclear, LLC is authorized to operate the facility at reactor core power levels not in excess of 3952 megawatts thermal in accordance with the conditions specified herein. The preoperational tests, startup tests and other items identified in License Conditions 2.C.(20), 2.C.(21), 2.C.(22), and 2.C.(23) to this license shall be completed as specified.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 270, and the Environmental Protection Plan contained in Appendix B are hereby incorporated in the license. Susquehanna Nuclear, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

For Surveillance Requirements (SRs) that are new in Amendment 151 to Facility Operating License No. NPF-22, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 151. For SRs that existed prior to Amendment 151, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment 151.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| D. Required Action and associated Completion Time of Condition A or C not met.<br><br>OR<br><br>Nine or more control rods inoperable. | D.1 Be in MODE 3. | 12 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.3.1 | Determine the position of each control rod. | In accordance with the Surveillance Frequency Control Program |
| SR 3.1.3.2 | NOT USED | |
| SR 3.1.3.3 | ----------NOTE----------<br>Not required to be performed until 31 days after the control rod is withdrawn and THERMAL POWER is greater than the LPSP of the RWM.<br>----------<br><br>Insert each withdrawn control rod at least one notch. | In accordance with the Surveillance Frequency Control Program |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.3.4 | Verify each control rod scram time from fully withdrawn to notch position 05 is $\leq$ 7 seconds. | In accordance with SR 3.1.4.1, SR 3.1.4.2, SR 3.1.4.3, and SR 3.1.4.4 |
| SR 3.1.3.5 | Verify each control rod does not go to the withdrawn overtravel position. | Each time the control rod is withdrawn to "full out" position<br><br>AND<br><br>Prior to declaring control rod OPERABLE after work on control rod or CRD System that could affect coupling |

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## 3.1 REACTIVITY CONTROL SYSTEMS

### 3.1.6 Rod Pattern Control

LCO 3.1.6 OPERABLE control rods shall comply with the requirements of the analyzed rod position sequence.

APPLICABILITY: MODES 1 and 2 with THERMAL POWER ≤ 10% RTP.

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. One or more OPERABLE control rod(s) not in compliance with the analyzed rod position sequence. | A.1 | ----------NOTE----------<br>Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation."<br>----------<br>Move associated control rod(s) to correct position. | 8 hours |
| | OR | | |
| | A.2 | Declare associated control rod(s) inoperable. | 8 hours |

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| B. Nine or more OPERABLE control rods not in compliance with the analyzed rod position sequence. | B.1 ----------NOTE---------- RWM may be bypassed as allowed by LCO 3.3.2.1. ---------- Suspend withdrawal of control rods. | Immediately |
| | AND | |
| | B.2 Place the reactor mode switch in the shutdown position. | 1 hour |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.1.6.1 | Verify all OPERABLE control rods comply with the analyzed rod position sequence. | In accordance with the Surveillance Frequency Control Program |

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| C. Rod worth minimizer (RWM) inoperable during reactor startup. | C.1 | Suspend control rod movement except by scram. | Immediately |
| | OR | | |
| | C.2.1.1 | Verify ≥ 12 rods withdrawn. | Immediately |
| | | OR | |
| | C.2.1.2 | Verify by administrative methods that startup with RWM inoperable has not been performed in the last calendar year. | Immediately |
| | | AND | |
| | C.2.2 | Verify movement of control rods is in compliance with the analyzed rod position sequence by a second licensed operator or other qualified member of the technical staff. | During control rod movement |
| D. RWM inoperable during reactor shutdown. | D.1 | Verify movement of control rods is in accordance with the analyzed rod position sequence by a second licensed operator or other qualified member of the technical staff. | During control rod movement |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.3.2.1.6 | ----------NOTE----------<br>Not required to be performed until 1 hour after reactor mode switch is in the shutdown position.<br>----------<br>Perform CHANNEL FUNCTIONAL TEST. | In accordance with the Surveillance Frequency Control Program |
| SR 3.3.2.1.7 | ----------NOTE----------<br>Neutron detectors are excluded.<br>----------<br>Perform CHANNEL CALIBRATION. | In accordance with the Surveillance Frequency Control Program |
| SR 3.3.2.1.8 | Verify control rod sequences input to the RWM are in conformance with the analyzed rod position sequence. | Prior to declaring RWM OPERABLE following loading of sequence into RWM |

3.10 SPECIAL OPERATIONS

3.10.7 Control Rod Testing - Operating

LCO 3.10.7 The requirements of LCO 3.1.6, “Rod Pattern Control,” may be suspended to allow performance of SDM demonstrations, control rod scram time testing, control rod friction testing and the Start-up Test Program, provided:

a. The analyzed rod position sequence requirements of SR 3.3.2.1.8 are changed to require the control rod sequence to conform to the specified test sequence.

OR

b. The RWM is bypassed; the requirements of LCO 3.3.2.1, “Control Rod Block Instrumentation,” Function 2 are suspended; and conformance to the approved control rod sequence for the specified test is verified by a second licensed operator or other qualified member of the technical staff.

APPLICABILITY: MODES 1 and 2 with LCO 3.1.6 not met.

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. Requirements of the LCO not met. | A.1 | Suspend performance of the test and exception to LCO 3.1.6. | Immediately |

3.10 SPECIAL OPERATIONS

3.10.8 SHUTDOWN MARGIN (SDM) Test - Refueling

LCO 3.10.8 The reactor mode switch position specified in Table 1.1-1 for MODE 5 may be changed to include the startup/hot standby position, and operation considered not to be in MODE 2, to allow SDM testing, provided the following requirements are met:

a. LCO 3.3.1.1, “Reactor Protection System Instrumentation,” MODE 2 requirements for Functions 2.a, 2.d and 2.e of Table 3.3.1.1-1;

b. 1. LCO 3.3.2.1, “Control Rod Block Instrumentation,” MODE 2 requirements for Function 2 of Table 3.3.2.1-1, with the analyzed rod position sequence requirements of SR 3.3.2.1.8 changed to require the control rod sequence to conform to the SDM test sequence.

OR

2. Conformance to the approved rod sequence for the SDM test is verified by a second licensed operator or other qualified member of the technical staff;

c. Each withdrawn control rod shall be coupled to the associated CRD;

d. All control rod withdrawals that are not in conformance with the analyzed rod position sequence shall be made in notch out mode;

e. No other CORE ALTERATIONS are in progress; and

f. CRD charging water header pressure $\geq$ 940 psig.

APPLICABILITY: MODE 5 with the reactor mode switch in startup/hot standby position.

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

February 27, 2024

**SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION FOR AMENDMENT NO. 286 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-14 AMENDMENT NO. 270 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-22 SUSQUEHANNA NUCLEAR, LLC ALLEGHENY ELECTRIC COOPERATIVE, INC. SUSQUEHANNA STEAM ELECTRIC STATION, UNIT 1 AND UNIT 2 DOCKET NOS. 50-387 and 50-388**

## 1.0 INTRODUCTION

### 1.1 Background

By application dated June 8, 2023 [1], Susquehanna Nuclear, LLC (the licensee) submitted a license amendment request (LAR) pertaining to the Susquehanna Steam Electric Station (Susquehanna), Unit 1 and Unit 2 technical specifications (TS), which are in appendix A of Renewed Facility Operating License Nos. NPF-14 and NPF-22.

The proposed changes would revise the following technical specifications by modifying the current requirements on control rod withdrawal order and conditions to protect against a postulated control rod drop accident (CRDA) during startup and low power conditions:

- TS 3.1.3, “Control Rod Operability”
- TS 3.1.6, “Rod Pattern Control”
- TS 3.3.2.1, “Control Rod Block Instrumentation”
- TS 3.10.7, “Control Rod Testing – Operating”
- TS 3.10.8, “Shutdown Margin (SDM) Test – Refueling”

The proposed changes would remove conditions D and E from TS 3.1.3, which would eliminate the control rod operability separation criteria and banked position withdrawal sequence (BPWS) group requirements in startup or low power conditions. The proposed changes would also modify TS 3.1.6, TS 3.3.2.1, TS 3.10.7, and TS 3.10.8 by replacing references to BPWS with “the analyzed rod position sequence” to allow for greater flexibility in rod manipulation during various stages of reactor power operation.

The U.S. Nuclear Regulatory Commission (NRC or the Commission) previously approved the temporary use of the analyzed rod position sequence in lieu of only BPWS for Susquehanna, Unit 2 on January 15, 2023 [2].

### 1.2 Description of Control Rod Design Basis and Technical Specifications

Section 4.1.2, “Reactor Internal Components,” of the updated final safety analysis report (UFSAR) [3] states, in part, that the core (fuel, channels, control rods, and

instrumentation) and the core support structure (including the shroud, top guide, and core plate) are some of the major reactor internal components. As stated in section 4.1, “Summary Description,” of the UFSAR, the reactor assembly includes the control rods, control rod drive housings, and the control rod drives. Each reactor contains 764 fuel assemblies and 185 control rods. As stated in section 4.1.3, “Reactivity Control Systems,” of the UFSAR, the control rods perform dual functions of power distribution shaping and reactivity control.

In section 2.1 of enclosure 1 to its LAR [1], the licensee stated that the control rods are components of the control rod drive system, which is the primary reactivity control system for the reactor. The licensee also indicated that the control rod drive system with the reactor protection system provides the means for the reliable control of reactivity changes to ensure under conditions of normal operation, including anticipated operational occurrences, that specified acceptable fuel design limits are not exceeded. The licensee stated that the control rods provide the capability to hold the reactor core subcritical under all conditions and to limit the potential amount and rate of reactivity increase caused by a malfunction in the control rod drive system.

As stated in section 15.4.1.2.2.1, “Sequence of Events,” of the UFSAR [3], the purpose of the rod worth minimizer (RWM) is to control rod patterns during startup, such that only specified rod sequences and relative positions are allowed over the operating range from all control rods inserted to approximately 10 percent of rated core power. The UFSAR states that the sequences effectively limit the potential amount and rate of reactivity increase during a control rod drop accident.

In section 3.1 of enclosure 1 to the LAR [1], the licensee indicates that the design basis accident that results in a positive reactivity insertion in a boiling water reactor is the CRDA, which assumes a control rod becomes uncoupled from its control rod drive mechanism prior to or during its withdrawal. As stated in section 15.4.9, “Control Rod Drop Accident (CRDA),” of the UFSAR [3], the control rod drop accident is the result of a postulated event in which a high worth control rod is inserted in-sequence into the core. Subsequently, the rod would become decoupled from its drive mechanism. The mechanism would be withdrawn, but the decoupled control rod is assumed to be stuck in place. At a later optimum moment, the control rod would suddenly fall free and drop out of the core. This would result in the insertion of large positive reactivity to the core and cause a localized power excursion. As stated in section 15.4.9.1.2, “Frequency Classification,” of the UFSAR, the CRDA is categorized as a limiting fault because it is not expected to occur during the lifetime of the plant; but, if postulated to occur, it would have consequences that include the potential for the release of radioactive material from the fuel.

General design criterion (GDC) 28 in Appendix A, “General Design Criteria for Nuclear Power Plants,” to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, “Domestic Licensing of Production and Utilization Facilities,” requires, in part, that reactivity control systems be designed to provide limitations on potential amounts and rates of reactivity increases to ensure that the effects of postulated reactivity accidents do not damage the reactor coolant system, the core, or reactor pressure vessel internals, to ensure long term core cooling capability.

As described in the General Electric Company Report NEDO-21231, “Banked Position Withdrawal Sequence” [4], the banked position withdrawal sequence mitigates the consequences of a CRDA in the startup and low power operating ranges of a boiling water reactor by reducing control rod reactivity worth. In section 3.1 of enclosure 1 to its LAR [1], the licensee indicated that the BPWS limits the potential reactivity increase from a postulated CRDA during reactor startups and shutdowns below the low power setpoint of ten percent rated

thermal power, and that CRDA analyses assume that the plant operator follows prescribed withdrawal sequences that define the potential initial conditions for the CRDA analysis. The licensee indicated that the BPWS is applied to both reactor startup and shutdown processes to limit the impact of a CRDA. The licensee indicated that by using the RWM, which is a rod pattern control system that validates that the BPWS is maintained, the maximum control rod worth during each rod step of the startup or shutdown process is reduced. The licensee indicated that by using the RWM and operator actions, as controlled by plant procedures, the proper withdrawal or insertion rod sequence is followed for startup or shutdown evolutions, respectively, and the potential reactivity addition from a CRDA during that evolution is minimized.

Technical specification limiting condition for operation (LCO) 3.1.3 states that each control rod shall be operable in modes 1 (power operation) and 2 (startup). If two or more inoperable control rods are not in compliance with the BPWS and not separated by two or more operable control rods, then required actions D.1 and D.2 require the licensee to either restore compliance with BPWS within four hours or restore the control rod to operable status within four hours. If there are one or more BPWS groups with four or more inoperable control rods, then required action E.1 requires the licensee to restore the control rod to operable status within four hours. If the required actions of conditions D or E are not met within the specified completion times, then condition F requires placing the reactor in mode 3 within 12 hours. A note identifies that conditions D and E are not applicable when rated thermal power is greater than ten percent.

As stated in technical specification LCO 3.1.6, operable control rods shall comply with the requirements of the BPWS in modes 1 and 2 with thermal power less than or equal to ten percent rated thermal power. If one or more operable control rods are not in compliance with BPWS, then required actions A.1 and A.2 require the licensee to move the associated control rods to the correction position within 8 hours or declare the associated control rod(s) inoperable within eight hours, respectively. If nine or more operable control rods are not in compliance with BPWS, then required actions B.1 and B.2 require the licensee to suspend withdrawal of control rods immediately and place the reactor mode switch in the shutdown position within one hour. Surveillance requirement (SR) 3.1.6.1 requires the licensee to verify all operable control rods comply with the BPWS in accordance with the surveillance frequency control program.

As stated in technical specification LCO 3.3.2.1, the control rod block instrumentation for each function in table 3.3.2.11 shall be operable according to table 3.3.2.11. If the RWM is inoperable during reactor startup, then required action C.2.2 requires, in part, the licensee to verify that movement of control rods is in compliance with BPWS during control rod movement. If the RWM is inoperable during reactor shutdown, then required action D.1 requires, in part, the licensee to verify movement of control rods is in accordance with BPWS during control rod movement. Surveillance requirement 3.3.2.1.8 requires the licensee to verify control rod sequences input to the RWM are in conformance with BPWS prior to declaring the RWM operable following loading of sequence into the RWM.

As stated in technical specification LCO 3.10.7, when in modes 1 and 2 with LCO 3.1.6 not met, the requirements of LCO 3.1.6 may be suspended to allow performance of SDM demonstrations, control rod scram time testing, control rod friction testing, and the start-up test program provided, in part, that the BPWS requirements of SR 3.3.2.1.8 are changed to require the control rod sequence to conform to the specified test sequence.

As stated in technical specification LCO 3.10.8, the reactor mode switch position specified in table 1.1-1 for mode 5 may be changed to include the startup/hot standby position, and

operation considered not to be in mode 2, to allow SDM testing provided, in part, that the following are met: LCO 3.3.2.1, mode 2 requirements for function 2 of table 3.3.2.1-1, with the BPWS requirements of SR 3.3.2.1.8 changed to require the control rod sequence to conform to the SDM test sequence; and all control rod withdrawals that are not in conformance with the BPWS shall be made in notch out mode.

1.3 Description of the Proposed Changes

In its LAR [1], the licensee indicated that using the analyzed rod position sequence phrasing in the technical specifications in lieu of BPWS would allow greater flexibility in control rod manipulation during various stages of reactor power operation. The changes would allow the use of the analyzed rod position sequence for control rod withdrawal order and conditions to protect against a postulated CRDA during startup and low power conditions. The licensee indicated that the analyzed rod position sequence is developed using methods identified in ANP-10333P-A, Revision 0, "AURORA-B: An Evaluation Model for Boiling Water Reactors; Application to Control Rod Drop Accident (CRDA)" [5], which the NRC previously approved for use at Susquehanna [6]. In its LAR, the licensee proposed to modify TS 3.1.6, 3.3.2.1, 3.10.7, and 3.10.8 to replace current reference to BPWS with reference to the analyzed rod position sequence. The licensee proposed to remove conditions D and E from TS 3.1.3, which would eliminate the control rod operability separation criteria and BPWS requirements in startup or low power conditions. The licensee also proposed some editorial changes to the technical specifications.

Specifically, the licensee requested the following changes, which would apply to both units' technical specifications unless specified:

- In TS 3.1.3, delete conditions D and E and references to those conditions in condition F; re-letter condition F to D and required action F.1 to D.1; move the "AND" further down between required actions A.3 and A.4 (to appear below the A.3 completion time) in the Unit 1 technical specifications; delete footnote 1 for conditions D and E in the Unit 2 technical specifications; reformat the SR 3.1.3.3 note; and move up text throughout the TS 3.1.3 pages because of the space left by deleting conditions D and E.
- In TS 3.1.6, replace "banked position withdrawal sequence" or "BPWS" with "analyzed rod position sequence" in LCO 3.1.6, conditions A and B, and SR 3.1.6.1; delete "Rod worth minimizer" in required action B.1 (but leave the initialism RWM); delete the note under LCO 3.1.6 in Unit 2 technical specifications; and delete footnotes 1 and 2 from Unit 2 technical specifications pages 3.1-18 and 3.1-19.
- In TS 3.3.2.1, replace "banked position withdrawal sequence" or "BPWS" with "analyzed rod position sequence" in required actions C.2.2 and D.1 and SR 3.3.2.1.8; delete footnote 1 from Unit 2 technical specifications pages 3.3-17 and 3.3-20; and shift text among Unit 1 technical specifications pages 3.3-17 through 3.3-20.
- In TS 3.10.7, replace "banked position withdrawal sequence" with "analyzed rod position sequence" in LCO 3.10.7.a.
- In TS 3.10.8, replace "banked position withdrawal sequence" or "BPWS" with "analyzed rod position sequence" in LCO 3.10.8.b.1 and d.

## 2.0 REGULATORY EVALUATION

### 2.1 Regulatory Requirements

Under 10 CFR 50.92(a), in determining whether an amendment to a license will be issued, the NRC staff is guided by the considerations that govern the issuance of initial licenses to the extent applicable and appropriate. The common standards for licenses in 10 CFR 50.40(a), and those specifically for issuance of operating licenses in 10 CFR 50.57(a)(3), provide that there must be "reasonable assurance" that the activities at issue will not endanger the health and safety of the public, and that the applicant will comply with the Commission's regulations. Accordingly, for this LAR, the NRC staff must conclude that there is reasonable assurance that the proposed changes to the technical specifications do not endanger public health and safety.

Section 50.36, "Technical specifications," of 10 CFR establishes the requirements related to the content of the technical specifications. Pursuant to 10 CFR 50.36(c), technical specifications are required, in part, to include LCOs. Section 50.36(c)(2)(i) states, in part, that LCOs are the lowest functional capability or performance level of equipment required for safe operation of the facility, and when LCOs are not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the LCO can be met.

Section 50.36(c)(3), "Surveillance requirements," of 10 CFR states:

> Surveillance requirements 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 limiting conditions for operation will be met.

Appendix A to 10 CFR Part 50 provides the minimum necessary design, fabrication, construction, testing, and performance requirements for structures, systems, and components important to safety. GDC 28, "Reactivity Limits," states:

> The reactivity control systems shall be designed with appropriate limits on the potential amount and rate of reactivity increase to assure that the effects of postulated reactivity accidents can neither (1) result in damage to the reactor coolant pressure boundary greater than limited local yielding nor (2) sufficiently disturb the core, its support structures or other reactor pressure vessel internals to impair significantly the capability to cool the core. These postulated reactivity accidents shall include consideration of rod ejection (unless prevented by positive means), rod dropout, steam line rupture, changes in reactor coolant temperature and pressure, and cold water addition.

### 2.2 Licensing Basis

The NRC staff considered the following licensing basis during its review:

- Amendment No. 268 [2] to Renewed Facility Operating License No. NPF-22 (Susquehanna, Unit 2), which temporarily changed technical specifications by adding references to the analyzed rod position sequence to temporarily allow for greater flexibility in rod manipulation during various stages of reactor power operation.

- Amendment Nos. 278 and 260 [6] to Renewed Facility Operating License Nos. NPF-14 and NPF-22 (Susquehanna, Units 1 and 2), respectively, which authorized the licensee to apply Framatome analysis methodologies necessary to support a planned transition to ATRIUM 11 fuel. Specifically, the NRC staff considered these amendments' approval of the use of the following analytical method in the core operating limits report under TS 5.6.5.b.22, "ANP-10333P-A, 'AURORA-B: An Evaluation Model for Boiling Water Reactors; Application to Control Rod Drop Accident (CRDA).'"

- Chapter 15, "Accident Analyses," of the UFSAR [3], which examines the effects and consequences of anticipated process disturbances and postulated component failures and evaluates the capability of the units to control or accommodate such failures and events. Specifically, the staff considered section 15.4.9, "Control Rod Drop Accident (CRDA)."

## 3.0 TECHNICAL EVALUATION

Under 10 CFR 50.92(a), in determining whether an amendment to a license will be issued, the NRC staff is guided by the considerations that govern the issuance of initial licenses to the extent applicable and appropriate. The staff evaluated the request to determine whether the proposed changes are consistent with the regulations and licensing basis discussed in section 2.0 of this safety evaluation. The staff reviewed the proposed changes to the technical specifications to determine whether they meet the requirements of 10 CFR 50.36 and GDC 28 and provide reasonable assurance that operation with the new allowable control rod insertion and withdrawal sequences will not endanger the health and safety of the public.

### 3.1 Evaluation of Addition of Analyzed Rod Position Sequence

The proposed changes would allow startup sequence modifications beyond those allowed by the general requirements of the BPWS and would minimize unnecessary reactivity manipulations and associated operational challenges. The changes would allow control rods to remain inserted in control cells with identified fuel channel discrepancies, such as suspected channel bow or failed fuel suppression rods. The changes would also allow the licensee to optimize cycle-specific control rod startup and shutdown sequences while conforming to the existing CRDA bounding assumptions and acceptance criteria. These sequences would be developed to minimize incremental control rod reactivity worth in accordance with the NRC-approved ANP-10333P-A, Revision 0 [5] AURORA-B CRDA methodology. Cycle-specific CRDA results would continue to be subject to the licensee's 10 CFR 50.59 program to ensure that more than minimal CRDA changes will not occur without required NRC approvals.

The licensee performs the CRDA analysis each cycle and documents the thermal operating limit and rod block setpoint results in the core operating limits report in accordance with TS 5.6.5. In its LAR [1], the licensee stated that rod sequence patterns do not fall within the category of information currently specified by technical specifications or the core operating limits report. The licensee indicated in its LAR that is uses the station's process for updating and controlling calculations to control the development, approval, and documentation of analyzed control rod sequences consistent with existing process controls used in the development of BPWS compliant sequences. The licensee indicated in its LAR that the approved rod control sequence will be developed under the same station processes and procedures for calculations control. The licensee stated in its LAR that it would continue to document sequences in engineering

calculations, and that existing administrative controls would continue to provide a backup methodology to the RWM in assuring compliance with analyzed sequences.

The ANP-10333P-A, Revision 0 [5], AURORAB CRDA models can evaluate sequences that are beyond those provided by the BPWS methodology- documented in NEDO-21231 [4]. In its LAR [1], the licensee stated that the term “analyzed rod position sequence” is used to indicate that the sequence, regardless of the use of BPWS, would meet the same CRDA technical requirements as BPWS. The licensee would develop the sequence using the same approved methods as those used to support the current CRDA analysis and implement the sequence in a manner equivalent to those used in the implementation of BPWS-compliant sequences.

The NRC staff finds that the proposed changes ensure that control rod worths are maintained within the limits prescribed by the postulated reactivity accident for rod dropout during startups and shutdowns, which is described in the UFSAR section 15.4.9 [3] for the CRDA, using the existing AURORA-B CRDA methodology approved by the NRC for use at Susquehanna under Amendment Nos. 278 and 260 [6]. The staff also confirmed that the proposed changes also maintain key safety aspects of the BPWS rules and usage methodology, which provides an equivalent level of protection for managing core power distribution during startup and shutdown. Therefore, the NRC staff finds that the proposed changes are acceptable and continue to comply with GDC 28.

### 3.2 Evaluation of Proposed BPWS-Related Changes to Technical Specifications

The licensee’s proposed changes to TS 3.1.3, 3.1.6, 3.3.2.1, 3.10.7, and 3.10.8 related to the BPWS are summarized in section 1.3. As discussed in section 3.1, the NRC staff finds that the proposed analyzed rod position sequence methodology is acceptable. Based on this evaluation, the staff finds that the proposed changes to the LCOs, conditions, required actions, and surveillance requirements listed in section 1.3 related to the BPWS and analyzed rod position sequence are adequate, that the changes to the surveillance requirements will assure that the necessary quality of systems and components is maintained and support meeting the LCOs, and that facility operation will be within safety limits because the changes are bounded by the existing CRDA analysis as described in section 15.4.9 of the UFSAR [3]. Therefore, the staff concludes that the proposed changes to the technical specifications comply with the requirements of 10 CFR 50.36(c)(2)(i) and 50.36(c)(3).

### 3.3 Evaluation of Editorial Changes to Technical Specifications

The licensee’s proposed editorial changes to TS 3.1.3, 3.1.6, and 3.3.2.1 are summarized in section 1.3. The licensee proposed to shift the text on technical specifications page 3.1-11 to page 3.1-10, which would have left page 3.1-11 blank. Therefore, the text, “This page intentionally left blank,” was added to page 3.1-11. The NRC staff confirmed that the proposed editorial changes do not materially change technical specification requirements and, therefore, the changes are acceptable.

### 3.4 Technical Evaluation Conclusion

The NRC staff finds that the proposed changes conform to the existing NRC-approved CRDA methodology and maintain the current bounding assumptions and acceptance criteria of the CRDA described in UFSAR section 15.4.9 [3]. The staff determined that the licensee’s proposed changes to the rod groupings for the withdrawal sequence are appropriate from a reactivity

management standpoint. The staff also confirmed that the proposed changes maintain key safety aspects of the BPWS methodology to the extent practicable. Therefore, the NRC staff finds that the proposed changes are acceptable and maintain compliance with GDC 28.

The NRC staff concludes the proposed changes to the technical specifications that allow implementation of an analyzed rod position sequence and, thus, greater flexibility in rod manipulation during various stages of reactor power operation, are acceptable because the changes are bounded by the existing CRDA analysis as described in section 15.4.9 of the UFSAR [3] and, therefore, meet the requirements of 10 CFR 50.36.

## 4.0 STATE (COMMONWEALTH) CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b), the NRC staff notified the Commonwealth of Pennsylvania official on January 29, 2024, of the proposed issuance of the amendments. The Commonwealth official had no comments.

## 5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of facility components located within the restricted area as defined in 10 CFR Part 20, "Standards for protection against radiation," and change surveillance requirements. The NRC staff has determined that the amendments involve 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 in the *Federal Register* [7] that the amendments involve no significant hazards consideration, and there has been no public comment on this finding. Accordingly, the amendments meet 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 amendments.

## 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 amendments will not be inimical to the common defense and security or to the health and safety of the public.

## 7.0 REFERENCES

[1] Casulli, E., Susquehanna Nuclear, LLC, letter to U.S. Nuclear Regulatory Commission, "Susquehanna Steam Electric Station Proposed Amendment to Licenses NPF-14 and NPF-22: Remove Control Rod Operability Separation Criteria and Replace Reference to Banked Position Withdrawal Sequence with the Analyzed Rod Position Sequence PLA-8054," June 8, 2023, ML23159A160.

[2] Klett, A., U.S. Nuclear Regulatory Commission, letter to Jones, D., Susquehanna Nuclear, LLC, "Susquehanna Steam Electric Station, Unit 2 – Issuance of Amendment No. 268 re: Change to Certain Technical Specifications for Control Rods (Emergency Circumstances) (EPID L-2023-LLA-0003)," January 15, 2023, ML23010A108.

[3] Casulli, E., Susquehanna Nuclear, LLC, letter to U.S. Nuclear Regulatory Commission, "Susquehanna Steam Electric Station Submittal of Updated Final Safety Analysis Report Revision 71 and Fire Protection Review Report Revision 25, PLA-8081," October 12, 2023, ML23291A105.

[4] Paone, C.J., General Electric, Licensing Topical Report NEDO-21231, "Banked Position Withdrawal Sequence," January 1977, ML090771242 (proprietary information, not publicly available).

[5] Peters, G., Framatome Inc., letter to U.S. Nuclear Regulatory Commission, "Publication of ANP-10333P-A, Revision 0, 'AURORA-B: An Evaluation Model for Boiling Water Reactors; Application to Control Rod Drop Accident (CRDA),'" July 25, 2018, ML18208A415.

[6] Goetz, S., U.S. Nuclear Regulatory Commission, letter to Cimorelli, K., Susquehanna Nuclear, LLC, "Susquehanna Steam Electric Station, Units 1 and 2 – Issuance of Amendment Nos. 278 and 260 to Allow Application of Advanced Framatome ATRIUM 11 Fuel Methododologies (EPID L-2019-LLA-0153)," January 21, 2021, ML20168B004.

[7] U.S. Nuclear Regulatory Commission, Monthly Notice, "Applications and Amendments to Facility Operating Licenses and Combined Licenses Involving No Significant Hazards Considerations," Office of the Federal Register, Volume 88, Page 60719 (88 FR 60719), September 5, 2023, ML23228A111.

## 8.0 ABBREVIATIONS

| | |
|---|---|
| BPWS | banked position withdrawal sequence |
| CFR | *Code of Federal Regulations* |
| CRDA | control rod drop accident |
| GDC | general design criterion |
| LAR | license amendment request |
| LCO | limiting condition(s) for operation |
| NRC | U.S. Nuclear Regulatory Commission |
| RWM | rod worth minimizer |
| SDM | shutdown margin |
| SR | surveillance requirement |
| TS | technical specification(s) |
| UFSAR | updated final safety analysis report |

## 9.0 PRINCIPAL CONTRIBUTORS

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SUBJECT: SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 286 AND 270 RE: CHANGES TO TECHNICAL SPECIFICATIONS FOR CONTROL RODS (EPID L-2023-LLA-0086) DATED FEBRUARY 27, 2024

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