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

December 14, 2023

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

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 262 AND 224 RE: ADOPTION OF TSTF-477, REVISION 3 AND ASSOCIATED TECHNICAL SPECIFICATION CHANGES (EPID L-2022-LLA-0174)

Dear David P. Rhoades:

The U.S. Nuclear Regulatory Commission (NRC or the Commission) has issued the enclosed Amendment Nos. 262 and 224 to Renewed Facility Operating License Nos. NPF-39 and NPF-85 for the Limerick Generating Station, Units 1 and 2, respectively. The amendments consist of changes to the technical specifications in response to Constellation Energy Generation, LLC's application dated November 17, 2022, as supplemented by letters dated August 30, 2023, and October 31, 2023. The enclosed amendments revise and add technical specifications for the control room emergency fresh air supply and air conditioning systems, consistent with Technical Specifications Task Force Traveler 477, Revision 3, with plant-specific variations. The NRC's related safety evaluation 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. 50-352 and 50-353

Enclosures:
1. Amendment No. 262 to NPF-39
2. Amendment No. 224 to NPF-85
3. Safety Evaluation

cc: Listserv

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

CONSTELLATION ENERGY GENERATION, LLC

DOCKET NO. 50-352

LIMERICK GENERATING STATION, UNIT 1

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 262
Renewed License No. NPF-39

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

   A. The application for amendment by Constellation Energy Generation, LLC, dated November 17, 2022, as supplemented by letters dated August 30, 2023, and October 31, 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 that (i) the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) 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-39 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 262, are hereby incorporated into this renewed license. Constellation Energy Generation, 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 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Hipolito J. 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: December 14, 2023

ATTACHMENT TO LICENSE AMENDMENT NO. 262

RENEWED FACILITY OPERATING LICENSE NO. NPF-39

LIMERICK GENERATING STATION, UNIT 1

DOCKET NO. 50-352

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 a marginal line indicating the area of change.

Remove	Insert
3	3

Replace the following pages of the appendix A technical specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
3/4 7-6	3/4 7-6
3/4 7-7	3/4 7-7
3/4 7-8	3/4 7-8
----	3/4 7-8a
----	3/4 7-8b

(2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and to use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;

(3) 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) Pursuant to the Act and 10 CFR Parts 30, 40, 70, to receive, possess, 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) 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, and to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station.

C. This renewed 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 (except as exempted from compliance in Section 2.D. below) 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 reactor core power levels not in excess of 3515 megawatts thermal (100% rated power) in accordance with the conditions specified herein and in Attachment 1 to this license. The items identified in Attachment 1 to this renewed license shall be completed as specified. Attachment 1 is hereby incorporated into this renewed license.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 262, are hereby incorporated into this renewed license. Constellation Energy Generation, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

LIMITING CONDITION FOR OPERATION

3.7.2.1 Two control room emergency fresh air supply system subsystems shall be OPERABLE.

NOTE: The main control room envelope (CRE) boundary may be opened intermittently under administrative control

APPLICABILITY: All OPERATIONAL CONDITIONS and when RECENTLY IRRADIATED FUEL is being handled in the secondary containment.

ACTION:

a. In OPERATIONAL CONDITION 1, 2, or 3:

1. With one control room emergency fresh air supply subsystem inoperable for reasons other than Condition a.2, restore the inoperable subsystem to OPERABLE status within 7 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one or more control room emergency fresh air supply subsystems inoperable due to an inoperable CRE boundary,

a. Initiate action to implement mitigating actions immediately or be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours; and

b. Within 24 hours, verify mitigating actions ensure CRE occupant exposures to radiological and chemical hazards will not exceed limits and actions to mitigate exposure to smoke hazards are taken or be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours; and

c. Restore CRE boundary to operable status within 90 days or be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With both control room emergency fresh air supply subsystems inoperable for reasons other than Condition a.2, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITION 4, 5, or when RECENTLY IRRADIATED FUEL is being handled in the secondary containment:

1. With one control room emergency fresh air supply subsystem inoperable for reasons other than Condition b.3, restore the inoperable subsystem to OPERABLE status within 7 days or initiate and maintain operation of the OPERABLE subsystem in the radiation isolation mode of operation.

2. With both control room emergency fresh air supply subsystems inoperable for reasons other than Condition b.3, immediately suspend handling of RECENTLY IRRADIATED FUEL in the secondary containment. The provisions of Specification 3.0.3 are not applicable.

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

3. With one or more control room emergency fresh air subsystems inoperable due to an inoperable CRE boundary, immediately suspend handling of RECENTLY IRRADIATED FUEL in the secondary containment. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.2.1.1 Each control room emergency fresh air supply subsystem shall be demonstrated OPERABLE:

a. DELETED

b. In accordance with the Surveillance Frequency Control Program on a STAGGERED TEST BASIS by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the subsystem operates with the heaters OPERABLE.

c. In accordance with the Surveillance Frequency Control Program or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the subsystem by:

1. Verifying that the subsystem satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% and uses the test procedure guidance in Regulatory Positions C.5.a, C.5.c, and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is 3000 cfm ± 10%.

2. Verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration of less than 2.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 70%.

3. Verifying a subsystem flow rate of 3000 cfm ± 10% during subsystem operation when tested in accordance with ANSI N510-1980.

d. After every 720 hours of charcoal adsorber operation by verifying within 31 days after removal that a laboratory analysis of a representative carbon sample obtained in accordance with Regulatory Position C.6.b of Regulatory Guide 1.52, Revision 2, March 1978, shows the methyl iodide penetration of less than 2.5% when tested in accordance with ASTM D3803-1989 at a temperature of 30°C (86°F) and a relative humidity of 70%.

SURVEILLANCE REQUIREMENTS (Continued)

e. In accordance with the Surveillance Frequency Control Program by:

1. Verifying that the pressure drop across the combined prefilter, upstream and downstream HEPA filters, and charcoal adsorber banks is less than 6 inches water gauge while operating the subsystem at a flow rate of 3000 cfm ± 10%; verifying that the prefilter pressure drop is less than 0.8 inch water gauge and that the pressure drop across each HEPA is less than 2 inches water gauge.

2. Relocated to the TRM.

3. Verifying that on each of the below radiation isolation mode actuation test signals, the subsystem automatically switches to the radiation isolation mode of operation:

a) Outside air intake high radiation, and

b) Manual initiation from control room.

f. After each complete or partial replacement of a HEPA filter bank by verifying that the HEPA filter bank satisfies the inplace penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 while operating the system at a flow rate of 3000 cfm ± 10%.

g. After each complete or partial replacement of a charcoal adsorber bank by verifying that the charcoal adsorber bank satisfies the inplace penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the system at a flow rate of 3000 cfm ± 10%.

4.7.2.1.2 The control room envelope boundary shall be demonstrated OPERABLE:

a. At a frequency in accordance with the Control Room Envelope Habitability Program by performance of control room envelope unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program.

3/4.7.2.2 CONTROL ROOM AIR CONDITIONING (AC) SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.2.2 Two control room AC subsystems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, and when RECENTLY IRRADIATED FUEL is being handled in the secondary containment.

ACTION:

a. In OPERATIONAL CONDITION 1, 2 OR 3:

1. With one control room AC subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With two control room AC subsystems inoperable:#

a. Verify control room air temperature is less than 90°F Wet Bulb Globe Temperature at least once per 4 hours; and

b. Restore one control room AC subsystem to OPERABLE status within 72 hours.

Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. When RECENTLY IRRADIATED FUEL is being handled in the secondary containment:

1. With one control room AC subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 30 days; or immediately place the OPERABLE control room AC subsystem in operation; or immediately suspend movement of RECENTLY IRRADIATED FUEL assemblies in the secondary containment*.

2. With two control room AC subsystems inoperable, immediately suspend movement of recently irradiated fuel assemblies in the secondary containment.*

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* The provisions of Specification 3.0.3 are not applicable.

Supplemental cooling provisions, if required, may be implemented under this condition. When Hazard Barriers are unable to perform their support function(s) to allow implementation of DWCW to CECW supplemental cooling, any supported system Limiting Conditions for Operation are not required to be declared not met soley for this reason.

SURVEILLANCE REQUIREMENTS

4.7.2.2 Each control room AC subsystem shall be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by verifying each subsystem has the capability to remove the assumed heat load.

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

CONSTELLATION ENERGY GENERATION, LLC

DOCKET NO. 50-353

LIMERICK GENERATING STATION, UNIT 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 224
Renewed License No. NPF-85

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

A. The application for amendment by Constellation Energy Generation, LLC, dated November 17, 2022, as supplemented by letters dated August 30, 2023, and October 31, 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 that (i) the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) 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-85 is hereby amended to read as follows:

(2) Technical Specifications
The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 224, are hereby incorporated into this renewed license. Constellation Energy Generation, 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 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Hipolito J. 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: December 14, 2023

ATTACHMENT TO LICENSE AMENDMENT NO. 224

RENEWED FACILITY OPERATING LICENSE NO. NPF-85

LIMERICK GENERATING STATION, UNIT 2

DOCKET NO. 50-353

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 a marginal line indicating the area of change.

Remove	Insert
3	3

Replace the following pages of the appendix A technical specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
3/4 7-6	3/4 7-6
3/4 7-6a	3/4 7-6a
3/4 7-8	3/4 7-8
----	3/4 7-8a
----	3/4 7-8b

(2) Pursuant to the Act and 10 CFR Part 70, to receive, possess and to use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Final Safety Analysis Report, as supplemented and amended;

(3) 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) Pursuant to the Act and 10 CFR Parts 30, 40, 70, to receive, possess, 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) 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, and to receive and possess, but not separate, such source, byproduct, and special nuclear materials as contained in the fuel assemblies and fuel channels from the Shoreham Nuclear Power Station.

C. This renewed 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 (except as exempted from compliance in Section 2.D. below) 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 reactor core power levels of 3515 megawatts thermal (100 percent rated power) in accordance with the conditions specified herein.

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 224, are hereby incorporated into this renewed license. Constellation Energy Generation, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3/4.7.2 CONTROL ROOM SYSTEMS - COMMON SYSTEMS

3/4.7.2.1 CONTROL ROOM EMERGENCY FRESH AIR SUPPLY SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.2.1 Two control room emergency fresh air supply system subsystems shall be OPERABLE.

NOTE: The main control room envelope (CRE) boundary may be opened intermittently under administrative control.

APPLICABILITY: All OPERATIONAL CONDITIONS and when RECENTLY IRRADIATED FUEL is being handled in the secondary containment.

ACTION:

a. In OPERATIONAL CONDITION 1, 2, or 3:

1. With the Unit 1 diesel generator for one control room emergency fresh air supply subsystem inoperable for more than 30 days, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one control room emergency fresh air supply subsystem inoperable for reasons other than Condition a.5, restore the inoperable subsystem to OPERABLE status within 7 days, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one control room emergency fresh air supply subsystem inoperable for reasons other than Condition a.5, and the other control room emergency fresh air supply subsystem with an inoperable Unit 1 diesel generator, restore the inoperable subsystem to OPERABLE status or restore the Unit 1 diesel generator to OPERABLE status within 72 hours, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4. With the Unit 1 diesel generators for both control room emergency fresh air supply subsystems inoperable for more than 72 hours, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

5. With one or more control room emergency fresh air supply subsystems inoperable due to an inoperable CRE boundary,

a. Initiate action to implement mitigating actions immediately or be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours; and

b. Within 24 hours, verify mitigating actions ensure CRE occupant exposures to radiological and chemical hazards will not exceed limits and actions to mitigate exposure to smoke hazards are taken or be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours; and

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

c. Restore CRE boundary to operable status within 90 days or be in HOT SHUTDOWN within 12 hours and in COLD SHUTDOWN within the following 24 hours.

6. With both control room emergency fresh air supply subsystems inoperable for reasons other than Condition a.5, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. In OPERATIONAL CONDITION 4, 5 or when RECENTLY IRRADIATED FUEL is being handled in the secondary containment:

1. With one control room emergency fresh air supply subsystem inoperable for reasons other than Condition b.3, restore the inoperable subsystem to OPERABLE status within 7 days, or initiate and maintain operation of the OPERABLE subsystem in the radiation isolation mode of operation.

2. With both control room emergency fresh air supply subsystems inoperable for reasons other than Condition b.3, immediately suspend handling of RECENTLY IRRADIATED FUEL in the secondary containment. The provisions of Specification 3.0.3 are not applicable.

3. With one or more control room emergency fresh air subsystems inoperable due to an inoperable CRE boundary, immediately suspend handling of RECENTLY IRRADIATED FUEL in the secondary containment. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

4.7.2.1.1 Each control room emergency fresh air supply subsystem shall be demonstrated OPERABLE:

a. DELETED

b. In accordance with the Surveillance Frequency Control Program on a STAGGERED TEST BASIS by initiating, from the control room, flow through the HEPA filters and charcoal adsorbers and verifying that the subsystem operates with the heaters OPERABLE.

c. In accordance with the Surveillance Frequency Control Program or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housings, or (2) following painting, fire, or chemical release in any ventilation zone communicating with the subsystem by:

1. Verifying that the subsystem satisfies the in-place penetration and bypass leakage testing acceptance criteria of less than 0.05% and uses the test procedure guidance in Regulatory Positions C.5.a, C.5.c, and C.5.d of Regulatory Guide 1.52, Revision 2, March 1978, and the system flow rate is 3000 cfm ± 10%.

SURVEILLANCE REQUIREMENTS (Continued)

f. After each complete or partial replacement of a HEPA filter bank by verifying that the HEPA filter bank satisfies the inplace penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 while operating the system at a flow rate of 3000 cfm ± 10%.

g. After each complete or partial replacement of a charcoal adsorber bank by verifying that the charcoal adsorber bank satisfies the inplace penetration and bypass leakage testing acceptance criteria of less than 0.05% in accordance with ANSI N510-1980 for a halogenated hydrocarbon refrigerant test gas while operating the system at a flow rate of 3000 cfm ± 10%.

4.7.2.1.2 The control room envelope boundary shall be demonstrated OPERABLE:

a. At a frequency in accordance with the Control Room Envelope Habitability Program by performance of control room envelope unfiltered air inleakage testing in accordance with the Control Room Envelope Habitability Program.

3/4.7.2.2 CONTROL ROOM AIR CONDITIONING (AC) SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.2.2 Two control room AC subsystems shall be OPERABLE.

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, 3, and when RECENTLY IRRADIATED FUEL is being handled in the secondary containment.

ACTION:

a. In OPERATIONAL CONDITION 1, 2 or 3:

1. With the Unit 1 diesel generator for one control room AC subsystem inoperable for more than 30 days, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

2. With one control room AC subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 30 days or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

3. With one MCR AC subsystem inoperable and the other control room AC subsystem with an inoperable Unit 1 diesel generator, restore the inoperable subsystem to OPERABLE status or restore the inoperable Unit 1 diesel generator to OPERABLE status within 72 hours, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

4. With the Unit 1 diesel generators for both control room AC subsystems inoperable for more than 72 hours, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

5. With two control room AC subsystems inoperable:[#]

a. Verify control room air temperature is less than 90°F Wet Bulb Globe Temperature at least once per 4 hours; and

b. Restore one control room AC subsystem to OPERABLE status within 72 hours.

Otherwise, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.

b. When RECENTLY IRRADIATED FUEL is being handled in the secondary containment:

1. With one control room AC subsystem inoperable, restore the inoperable subsystem to OPERABLE status within 30 days; or immediately place the OPERABLE control room AC subsystem in operation; or immediately suspend movement of RECENTLY IRRADIATED FUEL assemblies in the secondary containment[*].

2. With two control room AC subsystems inoperable, immediately suspend movement of recently irradiated fuel assemblies in the secondary containment. [*]

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[*] The provisions of Specification 3.0.3 are not applicable.

[#] Supplemental cooling provisions, if required, may be implemented under this condition. When Hazard Barriers are unable to perform their support function(s) to allow implementation of DWCW to CECW supplemental cooling, any supported system Limiting Conditions for Operation are not required to be declared not met solely for this reason.

SURVEILLANCE REQUIREMENTS

4.7.2.2 Each control room AC subsystem shall be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by verifying each subsystem has the capability to remove the assumed heat load.

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

December 14, 2023

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION FOR AMENDMENT NO. 262 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-39 AMENDMENT NO. 244 TO RENEWED FACILITY OPERATING LICENSE NO. NPF-85 CONSTELLATION ENERGY GENERATION, LLC LIMERICK GENERATING STATION, UNITS 1 AND 2 DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

1.1 Background

By license amendment request (LAR) dated November 17, 2022 [1], as supplemented by letters dated August 30, 2023 [2], and October 31, 2023 [3], Constellation Energy Generation, LLC (the licensee) requested amendments to Renewed Facility Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station (Limerick), Units 1 and 2, respectively. The licensee requested to revise and add technical specifications (TS) for the control room emergency fresh air supply and air conditioning systems to facilitate the adoption of Technical Specifications Task Force (TSTF) Traveler 477 (TSTF-477), Revision 3, "Adding an Action Statement for Two Inoperable Control Room Air Conditioning Subsystems" [4],[1] with plant-specific variations. The availability of this TSTF traveler was published *Federal Register* on March 26, 2007 [5].

The U.S. Nuclear Regulatory Commission (NRC or the Commission) staff performed an audit to support its review of the LAR.[2] By emails dated July 21, 2023 [6], and October 3, 2023 [7], the NRC staff requested additional information from the licensee. The licensee responded to the NRC staff's requests and audit discussions by supplements dated August 30, 2023 [2], and October 31, 2023 [3].

The NRC staff published a proposed no significant hazards consideration (NSHC) determination for the proposed amendments in the *Federal Register* on March 21, 2023 [8]. Subsequently, by letters dated August 30, 2023 [2], and October 31, 2023 [3], the licensee provided additional information that clarified the LAR, did not expand the scope of the LAR as previously noticed, and did not change the NRC staff's proposed NSHC determination as published in the *Federal Register*. The licensee revised attachment 1 to the LAR [1] and resubmitted it as attachment 4 to the supplement dated August 30, 2023 [2].

1.2 Description of Applicable Licensing Basis

The proposed changes revise and add technical specifications for the control room emergency fresh air supply system (CREFAS) and main control room (MCR) heating, ventilation, and air conditioning (HVAC) system. Section 3.1 of attachment 1 to the LAR supplement [2] describes the CREFAS and MCR HVAC system. The LAR, as supplemented, states that CREFAS is

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[1] Unless otherwise stated, references to TSTF-477 throughout this safety evaluation are to Revision 3 of TSTF-477.

[2] The NRC staff's audit plan is dated July 27, 2023 [27]. The NRC staff's audit summary report is dated November 13, 2023 [28].

designed to keep the MCR habitable during design basis accidents (DBAs), filter out radioisotopes, and allow operators to remain in the MCR to mitigate a transient. Section 9.4.1.1.m of the Updated Final Safety Analysis Report (UFSAR) [9] states that the MCR HVAC system is a subsystem of the CREFAS. The LAR, as supplemented, states that the MCR HVAC system, which is comprised of a control enclosure chilled water (CECW) system (described in sections 9.4.1.1.2 and 9.2.10.2 of the UFSAR [9]), provides a suitable temperature environment that ensures both occupant habitability and equipment functionality during normal and accident conditions. The LAR, as supplemented, states that the redundant CREFAS HVAC trains function to limit control room envelope occupant exposure and that the redundant CECW subsystems, which maintain control room temperature, can operate independently from each other. The LAR, as supplemented, also states that one control room supply fan, one control room return air fan, and their associated ductwork, dampers, and controls that are part of CREFAS, are required for air circulation to support the control room air conditioning chilled water subsystem's function.

The limiting condition for operation (LCO) for TS 3/4.7.2, "Control Room Emergency Fresh Air Supply System – Common System," states that two independent CREFAS subsystems shall be operable in all operational conditions and when recently irradiated fuel is being handled in secondary containment. When this LCO is not met, the licensee is required to follow the applicable remedial (or required) actions. TS 3/4.7.2 also has surveillance requirement (SR) 4.7.2.1.a, which requires the licensee to verify the control room air temperature to be less than or equal to 85 degrees Fahrenheit (°F) effective temperature in accordance with the surveillance frequency control program.

1.3 Proposed Changes

The LAR, as supplemented, states that the proposed changes to technical specifications are consistent with TSTF-477 [4] and NUREG-1433, Revision 5, "Standard Technical Specifications – General Electric BWR [Boiling Water Reactor]/4 Plants" [10].[3] The licensee also proposed plant-specific variations from TSTF-477 to accommodate the Limerick technical specifications and design. The licensee proposed to modify and add new technical specifications to TS 3/4.7.2. Section 3.1 of Attachment 4 of the LAR supplement [2] states that the MCR HVAC chilled water systems, which are safety related and seismically qualified, do not have an associated LCO that governs their operability requirements. The proposed changes would enable entry into new LCO 3.7.2.2's required actions for inoperable control room air conditioning equipment (e.g., because of a chiller or chilled water pump trip) and would avoid entry into the CREFAS LCO's required actions. The proposed changes would continue to require the licensee to enter the CREFAS LCO's required actions, but not the proposed new LCO's required actions, for inoperable air circulation components such as the control room supply fan, control room return air fan, and their associated ductwork, dampers and controls that are required for both CREFAS and MCR HVAC systems. However, the required actions have more stringent completion times for restoring inoperable equipment on CREFAS than on the control room air conditioning system. For example, the current completion time for restoring an inoperable CREFAS subsystem is 7 days, but the proposed change would allow a completion time of 30 days to restore an inoperable control room air conditioning subsystem.

[3] Unless otherwise stated, references to NUREG-1433 throughout this safety evaluation are to Revision 5 of NUREG-1433.

In its LAR, as supplemented, the licensee requested the following changes to the TS.

(1) add new TS 3/4.7.2.2, “Control Room Air Conditioning (AC) System,” that would contain:

- a new LCO 3.7.2.2 that would state, “Two control room AC subsystems shall be OPERABLE.”
- an applicability statement for the LCO that states, “OPERATIONAL CONDITIONS 1, 2, 3 and when RECENTLY IRRADIATED FUEL is being handled in the secondary containment.”
- required actions for when the LCO is not met, including the use of supplemental cooling provisions.
- a surveillance requirement to demonstrate each control room air conditioning subsystem operable in accordance with the surveillance frequency control program by verifying each subsystem has the capability to remove the assumed heat load.

(2) To accommodate the addition of a new LCO to TS 3/4.7.2, the licensee proposed to:

- change the title of TS 3/4.7.2 from “Control Room Emergency Fresh Air Supply System – Common System” to “Control Room Systems – Common Systems.”
- add TS 3/4.7.2.1, “Control Room Emergency Fresh Air Supply System,” which would contain the content of TS 3/4.7.2, further modified as described in (3) below.
- change the number of the CREFAS LCO 3.7.2 to LCO 3.7.2.1.
- renumber SR 4.7.2.1 to SR 4.7.2.1.1, and renumber SR 4.7.2.2 to SR 4.7.2.1.2.

(3) The licensee proposed the following changes to the CREFAS technical specifications currently in TS 3/4.7.2, which would be incorporated under TS 3/4.7.2.1:

- modify the LCO by deleting “independent” (“Two ~~independent~~ control room emergency fresh air supply system subsystems shall be OPERABLE.”)
- add a new required action a.3 under action a, that would state, “With both control room emergency fresh air supply subsystems inoperable for reasons other than Condition a.2, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.”
- delete the content of SR 4.7.2.1.1.a (currently numbered 4.7.2.1.a) because the new TS 3/4.7.2.2 would have a similar surveillance requirement, and replace it with “DELETED”.

(4) The licensee proposed the following variations from TSTF-477 [4] pertaining to the required actions associated with new LCO 3.7.2.2:

- The licensee proposed a variation to TSTF-477 [4] in that required action a.2.a (Unit 1) and action a.5.a (Unit 2) would use the temperature limit of 90 °F wet bulb globe temperature (WBGT), instead of using a 90 °F dry bulb globe temperature.
- The licensee proposed three additional required actions for the Unit 2 TS 3/4.7.2.2 to recognize that the air conditioning chillers are a common system

and that emergency alternating current power to the chillers and associated components is provided only by the Unit 1 emergency diesel generators.

2.0 REGULATORY EVALUATION

The NRC staff considered the following regulations, guidance, and precedent during its review of the proposed changes.

2.1 Regulations

- Under Section 50.92(a) of Title 10 to the *Code of Federal Regulations* (10 CFR), 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, the NRC staff reviewed the LAR to determine whether there is reasonable assurance that the proposed changes to the technical specifications do not endanger public health and safety.

- The NRC's regulatory requirements related to the content of the technical specifications are set forth 10 CFR 50.36, "Technical specifications." This regulation requires that the technical specifications include items in five specific categories that include, in part, LCOs and surveillance requirements.

2.2 Guidance

- NRC model safety evaluation [11] for TSTF-477 [4] published in the *Federal Register* on December 18, 2006

- NUREG-0700, Revision 3, "Human-System Interface Design Review Guidelines" [12]

- NUREG-0800, "Standard Review Plan [SRP] for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR [Light-Water Reactor] Edition," Section 6.4, Revision 3, "Control Room Habitability System" [13]

- NUREG-0800, Section 9.4.1, Revision 3, "Control Room Area Ventilation System" [14]

- NUREG-1433, Revision 5, "Standard Technical Specifications [STS], General Electric Plants BWR/4," Volume 1, "Specifications" [10]

- NUREG-1433, Revision 5, "Standard Technical Specifications, General Electric Plants BWR/4," Volume 2, "Bases" [15]

2.3 Precedent

The NRC staff's safety evaluation for amendment nos. 108 and 107 [16] for Vogtle Electric Generating Plant, Units 3 and 4 (Vogtle) is a precedent for the NRC staff's acceptance of 90 °F WBGT in the MCR. Vogtle's control room habitability technical specification surveillance

requirement temperature acceptance criterion following a DBA was changed from an effective temperature of 85 °F to the WBGT index of 90 °F.

3.0 TECHNICAL EVALUATION

3.1 Method of Review

In determining whether an amendment to a license will be issued, the NRC is guided by the considerations that govern the issuance of initial licenses to the extent applicable and appropriate. The NRC staff evaluated the licensee's LAR to determine whether the proposed changes are consistent with the regulations, guidance, and precedent, as applicable, discussed in section 2.0. Because this LAR, as supplemented, is not a risk-informed application submitted in accordance with NRC Regulatory Guide 1.174 [17], the NRC staff did not review the licensee's probabilistic risk assessment models to determine their technical acceptability as a basis to support this application. However, the NRC staff considered qualitative risk insights to aid in the deterministic review of the proposed change. The NRC staff determined that "special circumstances," as discussed in section 19.2, "Review of Risk Information Used to Support Permanent Plant-Specific Changes to the Licensing Basis: General Guidance" [18], which would have necessitated additional risk information to be provided, did not exist for the proposed change.

3.2 Evaluation of New TS 3/4.7.2.2, "Control Room Air Conditioning (AC) System"

3.2.1 Evaluation of LCO 3.7.2.2

The licensee proposed a new technical specification, TS 3/4.7.2.2, "Control Room Air Conditioning (AC) System," which would have LCO 3.7.2.2, "Two control room AC subsystems shall be OPERABLE," that would be applicable in operational conditions 1, 2, and 3, and when recently irradiated fuel is being handled in the secondary containment. In section 3.3 of attachment 4 to the LAR supplement [2], the licensee stated that Limerick does not have an LCO for MCR cooling subsystems and that the new technical specification and LCO would establish separate LCO requirements for the control room air conditioning system; provide the necessary requirements, consistent with NUREG-1433 [10] to address the condition when control room air conditioning subsystems are inoperable; and establish operability conditions for the air conditioning subsystems. The licensee also stated that it proposed the title of LCO 3.7.2.2 to be consistent with NUREG-1433 [10] but that no system is currently titled this way at Limerick. Therefore, for purposes of system consistency, the licensee proposed that the control room air conditioning system be synonymous with the CECW system that is discussed in the LAR. Figure 4, "Control Enclosure Chilled Water," at the conclusion of attachment 4 to the LAR supplement [2] is an illustration of the system. The licensee states that the design functions and basis for operation are the same. As stated in figure 4, the main components that are governed by TS 3/4.7.2.2 and required to be operable are the control enclosure chillers, CECW pumps, and MCR HVAC cooling coils.

The NRC staff determined that the proposed LCO 3.7.2.2 statement (i.e., "Two control room AC subsystems shall be operable") is consistent with LCO 3.7.5 in TS 3.7.5, "[Control Room Air Conditioning (AC)] System," in the STS in NUREG-1433 [10] except for nomenclature and formatting differences between the Limerick technical specifications and STS. The staff also determined that the proposed applicability and required actions for proposed LCO 3.7.2.2 are consistent with NUREG-1433, to the extent applicable, with one exception. In NUREG-1433, the applicability statements are similar between the MCR environmental control system and the

control room air conditioning system (i.e., the LCOs are applicable in modes 1, 2, and 3, and during movement of [recently] irradiated fuel assemblies in the [secondary] containment). However, Limerick's design differs from the generic design assumptions for the STS. The current Limerick LCO 3.7.2 contains an additional applicability to operational conditions 4 and 5, via required action b, that is specific to control room habitability portions of CREFAS but not the control room air conditioning system. The technical specifications bases for both the existing and the modified TS 3/4.7.2.1, states, "Since the Control Room Emergency Fresh Air Supply System is not credited for filtration in OPERATIONAL CONDITIONS 4 and 5, applicability to [operational conditions] 4 and 5 is only required to support the Chlorine and Toxic Gas design basis isolation requirements." This applicability will be retained in TS 3.7.2.1. The NRC staff determined that the proposed new LCO 3.7.2.2 provides the lowest functional capability or performance level of the control room air conditioning system required for safe operation of the facility and meets criterion 3 of 10 CFR 50.36(c)(2) (i.e., the control room air conditioning system is part of the primary success path and functions or actuates to mitigate a DBA or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier). Based on this review, the NRC staff finds that the proposed new LCO 3.7.2.2 meets 10 CFR 50.36(c)(2) and, therefore, is acceptable.

3.2.2 Evaluation of Required Actions a.1 and a.2 (Unit 1) and a.5 (Unit 2) for LCO 3.7.2.2

The licensee proposed required actions to take when LCO 3.7.2.2 is not met. For both units, the licensee proposed that if the LCO is not met in operational conditions 1, 2, or 3 with one control room air conditioning subsystem inoperable, then the licensee would have to restore the inoperable subsystem to operable status within 30 days or be in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours. The licensee proposed a variation to TSTF-477 [4] in that TS 3/4.7.2.2 required action a.2 (for Unit 1) and action a.5 (for Unit 2) would use the temperature limit of 90 °F WBGT instead of the 90 °F dry bulb globe temperature evaluated in TSTS-477. The licensee also proposed that if the LCO is not met in operational conditions 1, 2, or 3 with two control room air conditioning subsystems inoperable, then the licensee would have to either verify control room air temperature is less than 90 °F WBGT at least once per 4 hours and restore one control room air conditioning subsystem to operable status within 72 hours, or be in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours. The proposed footnote for these required actions is discussed and evaluated in section 3.2.3 of this safety evaluation.

Limerick's current SR 4.7.2.1a requires the control room temperature to be maintained at less than or equal to 85 °F effective temperature. In section 3.4 of attachment 4 to the LAR supplement [2], the licensee explained that an effective temperature of 85 °F ranges from 85 °F dry bulb temperature at 100 percent (%) relative humidity to 113 °F dry bulb temperature at 7% relative humidity. The 85 °F effective temperature is derived from an NRC memorandum dated June 29, 1984 [19], and MIL-STD-1472E, "Department of Defense Design Criteria Standard: Human Engineering" [20]. The licensee is proposing to change the criteria for acceptable conditions for control room habitability in the proposed new LCO 3.7.2.1 from the effective temperature of 85 °F to 90 °F WBGT.

The LAR, as supplemented, states that the WBGT is defined as 0.7 times the natural wet bulb temperature of the air plus 0.3 times the dry bulb temperature of the air, using the 1993 edition of the American Society of Heating, Refrigerating and Air-Conditioning Engineers fundamentals handbook [21]. The licensee used NUREG-0700, Revision 2, "Human-System Interface Design Review Guidelines" [22], table 12.7, "Stay Times for Different WBGTs," as the basis for stay time limits. This table indicates that at 90 °F WBGT or less under typical control room working

conditions (e.g., low metabolism as determined by level of work activity, normal work clothing), there is no stay time limit. The temperature ranges in Revision 2 of NUREG-0700 are intended to minimize performance decrements and potential harm to workers because of excessive heat. These temperature ranges are ceiling values (i.e., they assume that protective practices, such as acclimatization, training, and a cool place to rest, are in place). Revision 3 [12] of NUREG-0700, table 12.7, “Stay Times (Or Hours “H”) for Different WBGTs,” provides a stay time limit of greater than 8 hours for similar conditions (i.e., low metabolism as determined by level of work activity, normal work clothing). Because an upper bound limit is not included in Revision 3 of NUREG-0700, the NRC staff concludes that the stay times remain unchanged from Revision 2 of NUREG-0700. Revision 3 of NUREG-0700 provides a detailed set of limitations based on temperature, clothing, and work activity (or metabolism). Revision 3 of NUREG-0700 is also NRC-approved guidance for human factors. The staff finds that the change of acceptance criteria for control room habitability from the effective temperature of 85 °F (29 degrees Celsius (°C)) in the current Limerick technical specifications to a WBGT of less than 90 °F (32 °C) in the proposed LCO 3.7.2.1.1 is acceptable because the proposed limit would maintain an unlimited stay time in the MCR, as does the current limit, and provides reasonable assurance that operator performance will not be affected by the MCR environment.

With one control room air conditioning subsystem inoperable, proposed LCO 3.7.2.2 required actions a.1 (Unit 1) and a.2 (Unit 2) would require the inoperable subsystem to be restored to operable status within 30 days. The NRC staff finds that the allowed outage time is reasonable based on the low probability of an event occurring requiring control room isolation and the consideration that the remaining subsystem can provide the required cooling function. These required actions are also consistent with NUREG-1433 [10]. Therefore, the NRC staff finds that proposed LCO 3.7.2.2 required actions a.1 (Unit 1) and a.2 (Unit 2) are acceptable.

Proposed LCO 3.7.2.2 required actions a.1 (Unit 1) and a.2 (Unit 2) would include the provisions in TSTF-477 [4]. Specifically, required actions a.1 (Unit 1) and a.2 (Unit 2) would allow both control room air conditioning subsystems to be inoperable as long as: (1) control room air temperature was verified to be less than 90 °F WBGT at least once per 4 hours; and (2) one control air conditioning subsystem was restored to operable status within 72 hours. If the above conditions are not met, the plant must be in hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours.

The licensee stated in its LAR [1] that it has reviewed TSTF-477 [4] and the NRC model safety evaluation [11] for TSTF-477. The licensee concluded that the information in TSTF-477 and the model safety evaluation prepared by the NRC staff are applicable to Limerick.

The NRC staff finds that: (1) the 90 °F WBGT temperature limit is acceptable since it will ensure that affected equipment will still operate within its design specifications; (2) the 72-hour allowed outage time is reasonable and consistent with TSTF-477 [4] considering that the control room temperature is being maintained within equipment design specifications and the low probability of an event occurring that would require control room isolation; and (3) the timeframes for plant shutdown (i.e., hot shutdown within 12 hours and cold shutdown within the following 24 hours) are consistent with the current requirements in TS 3.0.3 for when an LCO is not met. Based on the above considerations, the NRC staff has reasonable assurance that proposed LCO 3.7.2.2 required actions a.1 (Unit 1) and a.2 (Unit 2) are acceptable remedial actions to follow until the LCO is met.

3.2.3 Evaluation of Footnote for Required Actions a.2 (Unit 1) and a.5 (Unit 2) Supplemental Cooling Provisions

The licensee proposed that supplemental cooling provisions (e.g., using the MCR HVAC purge mode and a temporary mechanical jumper from drywell chilled water (DWCW) to CECW coils), if required, may be implemented when in required actions a.2 (Unit 1) or a.5 (Unit 2). Specifically, the proposed footnote for required actions a.1 (Unit 1) and a.2 (Unit 2) states:

> Supplemental cooling provisions, if required, may be implemented under this condition. When Hazard Barriers are unable to perform their support function(s) to allow implementation of DWCW to CECW supplemental cooling, any supported system Limiting Conditions for Operation are not required to be declared not met solely for this reason.

TSTF-477 [4] states, “Alternate methods of maintaining control room temperature, such as non-safety grade air conditioning systems or fans, can also be used to maintain control room temperature.” The NRC staff determined that the licensee’s proposed use of supplemental cooling provisions to maintain control room temperature within the temperature limit, as described in section 3.4 of attachment 4 to the LAR supplement [2], is within scope of the TSTF.

In its LAR, as supplemented, the licensee discussed its proposed use of the normal mode of cooling the MCR, without chilled water, as a possible cooling provision. The licensee also described two other supplemental cooling provisions for which it requested the NRC’s review and prior approval: using the MCR HVAC purge mode and using a temporary mechanical jumper from DWCW to CECW coils. The MCR HVAC purge mode would operate without chilled water by continuously bringing outside air only into the control room and exhausting all that air quantity out of the control room. The mechanical jumper supplemental cooling provision, from the air side, is same as the normal operating mode of MCR HVAC, but without chilled water. It would operate by bringing a small quantity of outside air with the remaining amount of air recirculated from the control room. Because the CECW system would be inoperable during the required action, the mechanical jumper cooling provision would bring chilled water to the control room air conditioning system from sources other than the CECW system. The NRC staff’s evaluation of the proposed supplemental cooling provisions is described in sections 3.2.3.1 and 3.2.3.2 below.

3.2.3.1 Evaluation of Normal and Purge Modes of Operation Cooling Provision

In section 3.4 of attachment 4 of the LAR supplement [2], the licensee described its analysis for determining the temperatures that could be reached in the control room using outdoor ambient air. The licensee evaluated two methods: a normal mode of operation and a purge mode of operation that assumes the control room air conditioning system (i.e., chilled water) is not available. During the normal mode, the system draws 2,100 cubic feet per minute (CFM) of outside air, mixes with the control room air, and recirculates it back to the control room. The normal mode is depicted in figure 1 of attachment 4 of the LAR supplement [2]. This LAR supplement states that the function of the purge mode is to purge the areas served by the control room HVAC system of smoke from a fire using 100% fresh air supply and exhausting 100% of the air. The purge mode is depicted in figure 2 of attachment 4 of the LAR supplement [2]. The licensee stated that the amount of purge flow is 25,200 CFM.

In its LAR, as supplemented, the licensee stated that its analyses used Bechtel Power Company’s “CFLUD” computer program, which it also used for previous heat-up calculations

that were reviewed and approved by the NRC staff for Limerick [23]. The licensee described some of the conservative aspects of the analysis, such as varying outside temperatures that would be less than the design basis outside temperatures during the day, and non-consideration of heat sinks, such as structural steel, concrete, and cabinets. Based on its review of the NRC's prior approval and the conservative aspects of the licensee's analyses, the NRC staff finds that use of the CFLUD program for this application is acceptable.

The licensee performed its CFLUD analysis during these modes at a range of constant outside air temperatures up to and including design basis outside air conditions of 95 °F dry bulb and 78 °F wet bulb for Limerick. The licensee presented the results of the analysis in the table, "Control Room Temperatures with Normal and Purge Flow Outside Air Flow Rates," in attachment 4 of the LAR supplement [2]. The results show that unless outside dry bulb air temperatures is less than or equal to 92 °F, the normal MCR HVAC outside air flow alone is not sufficient to maintain control room temperature at or below 90 °F WBGT. However, the results of the analysis conveyed in the LAR also show the MCR HVAC system in the purge mode of operation can maintain the control room below 90 °F WBGT when outside air temperatures are at Limerick's design basis maximum conditions and that control room will remain below 90 °F WBGT at all times during the 72-hour completion time for proposed required actions a.2 (Unit 1) and a.5 (Unit 2).

As stated in section 3.4 of attachment 4 of the LAR supplement [2], the current temperature limit of 85 °F or the proposed temperature limit of 90 °F WBGT are not the normal operating temperature limits in the MCR. At Limerick, the MCR dry bulb temperature is automatically maintained in a range of 68–70 °F. Currently, there is a provision to use supplemental cooling in the purge mode of operation in Limerick's off normal procedure ON-115, "Loss of Control Enclosure Cooling," if control room temperature reaches 78 °F. The licensee stated that based on a review of operator logs since 2005, the 78 °F dry bulb temperature has not been challenged.

In section 3.5.1 of attachment 4 to the LAR supplement [2], the licensee stated that the challenges to purge mode of operation are (1) a postulated DBA that automatically isolates the MCR upon sensing high radiation in the outside air intakes or (2) release of toxic gases from an offsite location. During a DBA, the purge mode is overridden and cannot be used for cooling when the control room is automatically isolated on high radiation when the CREFAS is required in the event of a DBA. The LAR, as supplemented, states that if required after a DBA, other continuous or non-continuous temporary non-preferred supplemental cooling methods (such as opening the turbine enclosure, MCR, and control panel doors, or using ice vests, portable fans, or an air conditioning unit) are available for temperature controls. The LAR, as supplemented, also states that a portable diesel generator, cables, flexible ductwork, and potable fans are available to cope with a fire-induced loss of MCR HVAC for plant fire shutdown, and that a FLEX (diverse and flexible coping strategies) generator is available onsite for a motive power supply in support of other less preferred temporary supplemental cooling methods.

The LAR, as supplemented, states, and the NRC staff confirmed, that the duration and supporting rationale for LCO 3.7.2.2 required actions a.2 (Unit 1) and a.5 (Unit 2) are the same as those in NUREG-1433, Volume 2 [15], section 3.7.5 that address loss of all MCR air conditioning cooling. These required actions provide a 72-hour completion time for when LCO 3.7.2.2 is not met if MCR temperature is being maintained within allowable limits. This completion time is based on the low probability of an event occurring that requires MCR isolation during the 72-hour period and the availability of safety related and non-safety related alternate cooling methods. If a control enclosure chiller or subsystem cannot be restored within

72 hours or the MCR temperature cannot be maintained at less than or equal to the 90 °F WBGT limit, then the technical specifications would require both units to be placed in at least operational condition 3 within 12 hours.

On these bases, the NRC staff finds that use of the MCR purge mode is considered acceptable as a supplemental cooling source during LCO 3.7.2.2 required actions a.2 (Unit 1) and a.5 (Unit 2) until a control enclosure chiller or subsystem is returned to service within 72 hours.

In its LAR, as supplemented, the licensee stated that the same rationale used for the DBA considerations can be applied to a postulated toxic gas event on the basis of event low probability while in the purge mode of operation during LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2). In its LAR, the licensee stated that it performs periodic control room habitability toxic gas surveys per its calculations LM-0740, “Control Room Habitability for Hazardous Chemical Releases,” and LM-0744, “Control Room Habitability Offsite Chemical Hazard Survey and Screening.” The licensee stated that these calculations justified elimination of the automatic control room chlorine isolation function. The licensee stated that the frequency of a toxic gas initiating event for Limerick is below 1×10^{-6} per year per unique chemical as documented in table 6-2 of calculation LM-0740, which the licensee asserted meets the low probability threshold without considering the other failures needed to utilize the purge mode for supplemental cooling while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2).

The NRC staff confirmed that the 1981 version of the SRP, section 2.2.3, “Evaluation of Potential Accidents” [24], and the current version of that section [25] of the SRP states that a design basis event resulting from the presence of hazardous materials in the vicinity of the plant is acceptable if the occurrence rate of potential radiation exposures in excess of the 10 CFR 100 guidelines is equal to or less than approximately 1×10^{-6} per year and reasonable qualitative arguments exist supporting the realistic probability of this rate of occurrence. Based on this information and the NRC staff’s review of the information provided by the licensee, the NRC staff concludes that the probability of a postulated toxic gas event occurring during the 72-hour period associated with the purge mode of operation is sufficiently low.

In its LAR, as supplemented, the licensee stated that the occurrence of a toxic chemical accident that results in MCR operators becoming incapacitated by toxic chemicals and causes radiation exposures to exceed 10 CFR 100 limits would occur with a lower frequency (qualitatively) than a chemical release creating toxic concentrations in the MCR while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2). The licensee stated that if the probability remains below 1×10^{-6} per year, accidents caused by releases of hazardous chemicals are improbable. The NRC staff determined that because these probabilities for a toxic gas release and transport exceeding a toxic limit in the MCR are lower than the 1×10^{-6} criterion of the SRP [25], a toxic gas release can be excluded from consideration for MCR habitability while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2).

In its LAR, as supplemented, the licensee stated that preemptive donning of self-contained breathing apparatuses (SCBAs) is not required while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2) because the toxic gas event probability meets the exclusion criteria in section 2.2.3 [25] of the SRP using a probabilistic argument, and donning a mask challenges operator heat stress and habitability. The licensee also stated that if a valid toxic gas event is identified, its procedure ON-115 will still require donning of SCBAs and that habitability and plant operation would then be reassessed based on MCR conditions. The NRC staff confirmed that a low probably threshold of 1×10^{-6} considered by the licensee is in conformance with section 2.2.3 of the SRP [24]. The licensee has calculations that support the low probability

threshold and conducts periodic surveys to verify that the low probability threshold is maintained. In addition, licensee procedures require donning of SCBAs during toxic gas events. Therefore, the NRC finds the use of the MCR purge mode acceptable as a primary supplemental cooling source for the footnote in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2) until a control enclosure chiller or subsystem is returned to service within 72 hours.

3.2.3.2 DWCW to CECW Mechanical Jumper Supplemental Cooling Provision

Section 3.5.2 of attachment 4 to the LAR supplement [2] describes the supplemental cooling provision. It involves installing manually operated process tap connections to facilitate tying the non-safety related DWCW to the MCR safety related CECW cooling coils. The licensee would use these connections, combined with temporary fire hose type mechanical jumpers, as another form of temporary cooling while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2). The licensee would use two jumpers—one for chilled water supply and the other for chilled water return. The jumpers would be equipped with backflow and excess flow protection devices to minimize possible internal flooding or loss of drywell cooling water. The licensee stated that this option could provide more supplemental cooling capacity without relying on the MCR purge mode of operation. The LAR states that the licensee performed another heat-up evaluation assuming 22.6 tons of temporary cooling in the normal HVAC alignment providing 2,100 CFM of outside air with chilled water from only the drywell chiller. The results show that in this mode of operation, the licensee can maintain the MCR at a WBGT temperature of 83.1 °F.

In its LAR, as supplemented, the licensee stated that the 72-hour completion time applicable for a loss of MCR cooling is based, in part, on the low probability of the occurrence of concurrent postulated events while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2) and, therefore, the supplementary cooling method assumes no other concurrent postulated accidents, severe natural phenomenon, or other events. In addition, the LAR states that for the crosstie supply and return jumpers to be a successful temporary cooling sources, a loss of offsite power, seismic event, or postulated high energy line break (HELB) in the turbine enclosure are the specific deterministic events that require short term relief on a low probability basis while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (unit 2). Further, the licensee stated that a HELB door between the turbine enclosure and control enclosure must be partially opened to run the temporary supply and return jumpers. Opening this door would cause it to not be able to perform its support function, and the licensee would apply LCO 3.0.9, which provides requirements for equipment protected by the HELB door to be declared inoperable. The proposed footnote would exempt the licensee from declaring equipment inoperable that is protected by the HELB door when it is unable to perform its support function during the time it is open when the temporary mechanical jumper provision is used.

Section 3.5.2 of attachment 4 of the LAR supplement [2] states that in the unlikely event that one of these scenarios occurs concurrently, while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2), plant safe shutdown is not adversely impacted. The licensee stated that available mitigators are reestablishing MCR HVAC purge mode, using other means of supplemental cooling, crosstie jumper external leakage and backflow protection, and isolating the temporary crosstie jumpers with the qualified manual isolation valve piping connections. The LAR states that industry experience has shown that high energy pipes experience leaks long before a pipe break condition develops. Because of the large amount of physical and spatial separation (i.e., walls, floors, and elevation) between the door and the high energy piping locations, the licensee does not expect that safety related equipment will be challenged with the HELB door partially open to facilitate the temporary jumpers. The licensee stated that effective detection and isolation systems are also available for main steam piping to isolate the leak early at low flow

conditions to minimize consequences. The LAR further states that, on a qualitative basis, having multiple concurrent failures while in LCO 3.7.2.2 required action a.2 (Unit 1) or a.5 (Unit 2), meets the low probability threshold and therefore temporary crosstie supply and return jumper installation is considered acceptable, as a viable non-preferred temporary supplemental cooling source.

As noted above in section 3.1, the NRC staff considered qualitative risk insights to aid in the deterministic review of the proposed temporary mechanical jumper provision. In attachment 4 of the LAR supplement [2], the licensee stated that a HELB door between the turbine enclosure and the control enclosure must be partially open to run the temporary supply and return jumpers during implementation of the supplementary cooling provision of a temporary mechanical jumper from DWCW to CECW coils. The NRC staff determined that a HELB occurring during the implementation of the temporary mechanical jumper from DWCW to CECW coils could affect the ability to safely shut down the plant due to the open HELB door between the turbine enclosure and the control enclosure. The NRC staff considered the risk triplet[4] with respect to a HELB during implementation of the temporary mechanical jumper from DWCW to CECW coils and the conditions under which the implementation of the temporary mechanical jumper from DWCW to CECW coils would be precluded.

In its response [3] to the NRC's request for additional information (RAI) [7], specifically RAI 7, the licensee addressed the factors that make a catastrophic pipe failure in the turbine building unlikely during implementation of the temporary mechanical jumper from DWCW to CECW coils. The licensee stated that the piping systems are analyzed and designed using appropriate codes and standards with implicit large margins to limit applied stresses far below the material ultimate strength and that the materials are selected to provide adequate strength, ductility, and toughness to minimize fatigue. The licensee also stated that, if a small leak occurred due to a pipe flaw, it would be proactively detected and isolated long before the flaw could grow to an unstable size and lead to a design-basis pipe break.

In its response [3] to RAI 9 [7], the licensee addressed the ability of operators to detect leakage in the turbine enclosure prior to a HELB, including the leak rates that may be detected. The licensee stated that the worst-case turbine enclosure HELB vulnerabilities are a main steam system steam break of a 26" pipe and a feedwater system high energy liquid break of either a 20" or 34" pipe. The licensee referred to section 5.2.5.6, "Crack Length and Through-Wall Flow," of the UFSAR [9], which states:

> It is important to recognize that the failure of ductile piping with a long, through-wall crack is characterized by large crack opening displacements which precede unstable rupture. Judging from observed crack behavior in the GE [General Electric] and BMI [Battelle Memorial Institute] experimental programs involving both circumferential and axial cracks, it is estimated that leak rates of hundreds of gallons per minute will precede crack instability.

The licensee stated that routine operator rounds can detect small steam and liquid leakage well before the margin to piping rupture is challenged. The licensee stated that a main steam line break is the bounding design basis HELB event. For a feedwater line leak, the licensee stated that the feedwater line break HELB causes a loss of feedwater flow that initiates a reactor scram

[4] Per NRC NUREG-2122, "Glossary of Risk-Related Terms in Support of Risk-Informed Decisionmaking," [29], the "risk triplet" refers to the three questions: what can go wrong, how likely is it, and what are the consequences?

and terminates the HELB. The licensee also stated that operations personnel can detect small feedwater leakage flows by routine inspections during rounds and other available equipment monitoring data well before a pipe break condition can develop.

In its response [3] to RAI 10 [7], the licensee addressed conditions under which the implementation of the temporary mechanical jumper from DWCW to CECW coils would be precluded. For the main steam system HELB hazard, the licensee stated that the turbine enclosure main steam line leakage will be checked prior to breaching the HELB door. For the feedwater system HELB hazard, the licensee stated that it would confirm there is no evidence of pressure boundary pipe leakage prior to breaching the HELB door. If pressure boundary pipe leakage is suspected or identified, then jumper installation and breaching the HELB door will be aborted.

In its response [3] to RAI 15 [7], the licensee addressed the actions that operators would take if leakage was detected in the turbine building. The licensee stated that this condition would be placed into the corrective action program. Furthermore, any leakage would be periodically monitored; managed; and, as warranted, temporarily or permanently repaired by plant personnel well before the margin to piping rupture is challenged. The licensee also stated that, if a steam leak was identified from the main steam line piping, the operability evaluation procedure would be entered, and the appropriate actions implemented to either mitigate or monitor and manage this condition before it could develop into a rupture.

In its response [3] to RAI 16 [7], the licensee addressed the ability of operators to shut down the plant if a HELB occurs during implementation of the temporary mechanical jumper from DWCW to CECW coils. The licensee used an available deterministic fire protection evaluation, which assumed the complete loss of equipment in control enclosure room 619, to justify that existing plant procedures contain the temporary ventilation provisions that can be implemented, if required, to achieve plant safe shutdown. The licensee stated that the equipment relied upon to shut down the plant in this evaluation would not be affected by a HELB in the turbine enclosure.

In its supplement [3], the licensee stated that operators would use procedure T-101, “RPV Control,” procedure ON-115, and procedure SE-1-3, “Protected Ventilation Source,” if required, to achieve a plant shutdown. The licensee stated that engineering and operations personnel have verified that the procedures are adequate to shut down the plant if a HELB occurs during implementation of the temporary mechanical jumper from DWCW to CECW coils. The licensee stated that it would revise procedure ON-115 to include: (1) adding the once per 4-hour WBGT surveillance; (2) adding other supplemental cooling provisions such as placing a portable air conditioning unit in the supply return; (3) adding the crosstie cooling jumper, which is a procedurally controlled temporary configuration change; and (4) confirming a main steam or feedwater high energy pipe leak is not present prior to breaching the HELB door. The licensee also stated that no additional training would be required over and above the standard process for operational procedure revisions.

In its response [3] to RAI 16 [7], the licensee also stated that the HELB door cannot be manually closed and, therefore, cannot be credited as a possible postulated HELB mitigative action since the temporary crosstie cooling jumpers are routed through the partially open HELB door and impede its prompt closure.

The NRC staff reviewed the risk insights associated with the implementation of the temporary mechanical jumper from DWCW to CECW coils described above. Based on its review, the NRC staff finds that: (1) the probability of a HELB occurring during the 72-hour period associated with

the temporary mechanical jumper from DWCW to CECW coils is sufficiently low; (2) the licensee appropriately addressed the likelihood of occurrence, identification, and operator response to a HELB during implementation of the temporary mechanical jumper from DWCW to CECW coils and as well as the conditions under which the implementation of the temporary mechanical jumper from DWCW to CECW coils would be precluded; and (3) the licensee's available procedures appropriately manage the risk from the dominant scenarios. Therefore, the NRC staff concludes that the risk insights support the staff's conclusion on the proposed temporary mechanical jumper provision. Based on its evaluation and consideration of risk insights above, the NRC staff finds that the footnote maintains reasonable assurance of public health and safety and, therefore, is acceptable.

3.2.4 Evaluation of Unit 2-Specific Required Actions a.1, a.3, and a.4 for LCO 3.7.2.2

For Unit 2, the licensee proposed three additional required actions if the LCO is not met in operational conditions 1, 2, or 3 to recognize that the TS 3.7.2.2 air conditioning chillers is a common system and emergency alternative current power is provided by the Unit 1 emergency diesel generators. The licensee proposed that with the Unit 1 diesel generator for one control room air conditioning subsystem inoperable for more than 30 days, the licensee would have to place the unit in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours. The licensee proposed that with one MCR air conditioning subsystem inoperable and the other control room air conditioning subsystem with an inoperable Unit 1 diesel generator, the licensee would have to either restore the inoperable subsystem to operable status or restore the inoperable Unit 1 diesel generator to operable status, within 72 hours, or be in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours. The licensee proposed that with the Unit 1 diesel generators for both control room air conditioning subsystems inoperable for more than 72 hours, Unit 2 would have to be in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours.

The current TS 3/4.7.2 for Unit 2 contains the same requirements for equipment to be covered by the proposed required actions a.1, a.3, and a.4 for proposed LCO 3.7.2.2. Because the new technical specification requirements would be the same for this equipment as the current technical specification requirements, the NRC staff has reasonable assurance that the proposed required actions a.1, a.3, and a.4 are acceptable remedial actions to follow until the LCO can be met.

3.2.5 Evaluation of Required Action b for LCO 3.7.2.2

For both units, the licensee proposed that if the LCO is not met when recently irradiated fuel is being handled in the secondary containment with one control room air conditioning subsystem inoperable, then the licensee would have to restore the inoperable subsystem to operable status within 30 days, immediately place the operable control room air conditioning subsystem in operation, or immediately suspend movement of recently irradiated fuel assemblies in the secondary containment. The licensee proposed that if the LCO is not met when recently irradiated fuel is being handled in the secondary containment with two control room air conditioning subsystems inoperable, then the licensee would have to immediately suspend movement of recently irradiated fuel assemblies in the secondary containment. The licensee proposed that both action statements would have a footnote stating that the provisions of TS 3.0.3 are not applicable.

The current TS 3/4.7.2 for Unit 2, condition b, contains the same requirements for equipment to be covered by the proposed required actions b.1 and b.2 for proposed LCO 3.7.2.2. The completion time for proposed required action b.2 of 30 days is consistent with TSTF-477 [4], and therefore acceptable. Because the new TS requirements are the same for this equipment as the current technical specification requirements, the NRC staff has reasonable assurance that the proposed required actions b.1 and b.2 are acceptable remedial actions to follow until the LCO can be met.

3.2.6 Evaluation of SR 4.7.2.2

The licensee proposed SR 4.7.2.2 to demonstrate each control room air conditioning subsystem operable in accordance with the surveillance frequency control program by verifying each subsystem has the capability to remove the assumed heat load. In section 3.3 of attachment 4 to its LAR supplement [2], the licensee stated that this surveillance requirement would require the licensee to verify that the heat removal capability of the system is sufficient to remove the control room heat load assumed in the design analysis.

The current surveillance requirements in TS 3/4.7.2 do not contain any provisions for verifying the heat removal capability of the control room air conditioning system. The proposed surveillance requirement is also consistent with NUREG-1433 [10]. The NRC staff finds that the proposed surveillance requirement is more restrictive than the current surveillance requirement because it is more comprehensive than the current temperature verification. The NRC staff concludes that the proposed surveillance requirement provides sufficient testing requirements to verify control room air conditioning subsystem operability. Therefore, the NRC staff determined that the new surveillance requirement meets 10 CFR 50.36(c)(3) and is acceptable because it provides reasonable assurance that necessary quality of systems and components is maintained and that the LCO will be met.

3.3 Evaluation of Other Changes to TS 3/4.7.2

3.3.1 Evaluation of Conforming Changes to TS 3.7.2 from Adding TS 3/4.7.2.2

The licensee proposed several conforming editorial changes to TS 3.7.2 that would result from adding the new TS 3.7.2.2, including: changing the title of TS 3/4.7.2 from, “Control Room Emergency Fresh Air Supply System – Common System,” to “Control Room Systems – Common Systems”; adding TS 3/4.7.2.1,which would contain the contents of the current TS 3/4.7.2 but modified as described in the sections below; changing the number of the “CREFAS” LCO 3.7.2 to LCO 3.7.2.1; and renumbering SR 4.7.2.1 to SR 4.7.2.1.1 and SR 4.7.2.2 to SR 4.7.2.1.2. The NRC staff finds that these changes are editorial in nature and do not substantively alter the technical specification requirements and, therefore, are acceptable.

3.3.2 Evaluation of LCO 3.7.2.1 Change

The licensee proposed to modify LCO 3.7.2 (which would be renumbered LCO 3.7.2.1) by deleting the word “independent” (“Two ~~independent~~ control room emergency fresh air supply system subsystems shall be OPERABLE”) to be consistent with NUREG-1433 [10]. The NRC staff determined that removal of this detail, which is related to the system design, from the technical specifications is acceptable because this type of information is not necessary to be included in the technical specifications to provide adequate protection of public health and safety. As noted above, this proposed change is consistent with NUREG-1433. The staff also

finds that the proposed TS 3.7.2.1 would still retain the requirement that two CREFAS subsystems shall be OPERABLE. Based on its review, the NRC staff determined that LCO 3.7.2.1 would continue to meet 10 CFR 50.36(c)(2) and, therefore, is acceptable.

3.3.3 Evaluation of New Required Action under LCO 3.7.2.1 Required Action a

The licensee proposed to add a new required action for when LCO 3.7.2.1 is not met in operational condition 1, 2, or 3. The licensee proposed that when both CREFAS subsystems are inoperable for reasons other than condition a.2 (Unit 1) or condition a.5 (Unit 2), that the licensee be required to place the respective unit in at least hot shutdown within the next 12 hours and in cold shutdown within the following 24 hours. In section 3.3 of attachment 4 of its LAR supplement [2], the licensee stated that this required action provides a shutdown statement to ensure that at least one CREFAS subsystem is OPERABLE; otherwise, the licensee would enter a dual unit shutdown statement. The licensee also stated that adding this action statement ensures that MCR radiological habitability conditions would meet the design criteria of keeping radiological effluent material below design limits in the event of a DBA.

The current TS 3.7.2 does not contain a required action addressing both CREFAS subsystems inoperable in operational condition 1, 2, or 3. In the current technical specifications, if both CREFAS subsystems are inoperable, the licensee would be required to enter LCO 3.0.3, which would require the units to be in hot shutdown in 12 hours, and in cold shutdown within the following 24 hours. A similar condition is included in NUREG-1433 [10]. The NRC staff determined that this new required action would maintain the current shutdown requirements and would align the Limerick technical specifications with NUREG-1433. Therefore, the NRC staff has reasonable assurance that the proposed change is acceptable.

3.3.4 Evaluation of Deletion of SR 4.7.2.1.a Content

The licensee proposed to delete the content SR 4.7.2.1.a and replace it with “DELETED,” because the new TS 3/4.7.2.2 would have a similar surveillance requirement. In section 3.1 of attachment 4 to its supplement [2], the licensee stated that the proposed change relocates verification of MCR cooling to new LCO 3.7.2.2 required action a.2 (Unit 1) and a.5 (Unit 2). In section 3.3 of attachment 4 to its LAR supplement [2], the licensee stated that while this surveillance requirement provides an indication of control room cooling, it does not assure that the necessary quality of the systems and components for control room cooling is maintained. The licensee stated that the new SR 4.7.2.2 would confirm adequate control room cooling at an appropriate frequency and that the new TS 3.7.2.2 required action to verify control room air temperature is less than 90 °F WBGT when two air conditioning subsystems are inoperable would be a better way to verify the cooling function and the quality of the control room cooling systems and components. The licensee stated that deletion of current SR 4.7.2.1.a is consistent with NUREG-1433 [10] and TSTF-477 [4].

The NRC staff determined that relocation of the surveillance requirement content from SR 4.7.2.1 to SR 4.7.2.2 is appropriate because verification of heat removal capability is a function of the control room air conditioning system and not the CREFAS. Proposed SR 4.7.2.2 requires that each control room air conditioning subsystem be demonstrated OPERABLE in accordance with the surveillance frequency control program by verifying each subsystem has the capability to remove the assumed heat load. The current surveillance requirements in TS 3/4.7.2 do not contain any provisions for verifying the heat removal capability of the control room air conditioning system. As such, the NRC staff determined that the proposed surveillance requirement is more restrictive than the current surveillance requirements. The staff also

determined that proposed SR 4.7.2.2 is also consistent with NUREG-1433 [10]. Therefore, the NRC staff concludes that the proposed surveillance requirement provides sufficient testing requirements to verify control room air conditioning subsystem operability and, therefore, meets 10 CFR 50.36(c)(3) because it provides reasonable assurance that necessary quality of systems and components is maintained and that the LCOs will be met.

3.4 Technical Specification Bases, Index Changes, and Typographical Correction

The LAR included proposed changes to the technical specification bases and index pages to be implemented with the associated technical specification changes. The licensee provided the technical specification bases and index pages for information only. The licensee is required to revise technical specification bases in accordance with the licensee's technical specification bases control program. The NRC staff also corrected a typographical error in the current Unit 1 TS 3/4.7.2, action b.1 by making "subsystems" singular in TS 3/4.7.2.1, action b.1, which does not substantively alter the technical specification requirements.

3.5 Conclusion for Proposed Changes to Technical Specifications

Based on its review above, the NRC staff finds that, consistent with 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), there is reasonable assurance that the proposed technical specification changes will not endanger the health and safety of the public, and that the licensee will comply with the Commission's regulations in 10 CFR 50.36. Therefore, the proposed changes are acceptable. Accordingly, the NRC staff approves the licensee's proposed changes to the technical specifications.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the NRC staff notified the Commonwealth of Pennsylvania official on November 7, 2023 [26], of the proposed issuance of the amendments. The Commonwealth official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. 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 [8] published in the *Federal Register* that the amendments involve NSHC, and there has been no public comment on such finding. 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 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

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8.0 ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
AC	air conditioning
BMI	Battelle Memorial Institute
BWR	boiling water reactor
CECW	control enclosure chilled water
CFM	cubic feet per minute
CFR	*Code of Federal Regulations*
CREFAS	control room emergency fresh air supply system
DBA	design basis accident
DWCW	drywell chilled water
GE	General Electric
HELB	high energy line break
HVAC	heating, ventilation, and air conditioning
LAR	license amendment request
LCO	limiting condition for operation
LWR	light-water reactor
MCR	main control room
NRC	U.S. Nuclear Regulatory Commission
NSHC	no significant hazards consideration
SCBA	self-contained breathing apparatus
SR	surveillance requirement
SRP	Standard Review Plan
TS	technical specification(s)
TSTF	Technical Specifications Task Force
UFSAR	Updated Final Safety Analysis Report
WBGT	wet bulb globe temperature

9.0 PRINCIPAL CONTRIBUTORS

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SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 - ISSUANCE OF AMENDMENT NOS. 262 AND 224 RE: ADOPTION OF TSTF-477, REVISION 3 AND ASSOCIATED TECHNICAL SPECIFICATION CHANGES (EPID L-2022-LLA-0174) DATED DECEMBER 14, 2023

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NAME	BGreen	SVasavada	BWittick
DATE	11/29/2023	11/20/2023	11/26/2023
OFFICE	NRR/DSS/STSB/BC	OGC (NLO)	NRR/DORL/LPL1/BC
NAME	SMehta	MWright	H González
DATE	11/27/2023	12/13/2023	12/14/2023
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NAME	AKlett		
DATE	12/14/2023		

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