



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
475 ALLENDALE RD, STE 102  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

November 7, 2022

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

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 – INTEGRATED  
INSPECTION REPORT 05000352/2022003 AND 05000353/2022003

Dear David Rhoades:

On September 30, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Limerick Generating Station, Units 1 and 2. On October 18, 2022, the NRC inspectors discussed the results of this inspection with Matthew Bonanno, Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

No findings or violations of more than minor significance were identified during this inspection.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

Jonathan E. Greives, Chief  
Projects Branch 4  
Division of Operating Reactor Safety

Docket Nos. 05000352 and 05000353  
License Nos. NPF-39 and NPF-85

Enclosure:  
As stated

cc w/ encl: Distribution via LISTSERV

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 – INTEGRATED  
INSPECTION REPORT 05000352/2022003 AND 05000353/2022003 DATED  
NOVEMBER 7, 2022

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**U.S. NUCLEAR REGULATORY COMMISSION  
Inspection Report**

Docket Numbers: 05000352 and 05000353

License Numbers: NPF-39 and NPF-85

Report Numbers: 05000352/2022003 and 05000353/2022003

Enterprise Identifier: I-2022-003-0035

Licensee: Constellation Energy Generation, LLC

Facility: Limerick Generating Station, Units 1 and 2

Location: Sanatoga, PA 19464

Inspection Dates: July 1, 2022 to September 30, 2022

Inspectors: A. Ziedonis, Senior Resident Inspector  
D. Beacon, Resident Inspector  
L. Grimes, Resident Inspector  
J. Ambrosini, Senior Emergency Preparedness Inspector  
S. Mercurio, Emergency Preparedness Inspector

Approved By: Jonathan E. Greives, Chief  
Projects Branch 4  
Division of Operating Reactor Safety

Enclosure

## **SUMMARY**

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Limerick Generating Station, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

### **List of Findings and Violations**

No findings or violations of more than minor significance were identified.

### **Additional Tracking Items**

None.

## PLANT STATUS

Unit 1 began the inspection period at rated thermal power. On September 10, 2022, the unit was down-powered to approximately 65 percent thermal power for a control rod sequence exchange, 'B' reactor feed pump repairs, main condenser water box leak investigation, and turbine valve testing. The unit was returned to full power on September 12, 2022, and remained at or near rated thermal power for the remainder of the inspection period.

Unit 2 began the inspection period at rated thermal power and remained at or near rated thermal power for the entire inspection period.

## INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed activities described in IMC 2515, Appendix D, "Plant Status," observed risk significant activities, and completed on-site portions of IPs. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

## REACTOR SAFETY

### 71111.04 - Equipment Alignment

#### Partial Walkdown Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 2 'A' primary containment instrument gas (PCIG) following degraded compressor conditions on July 12, 2022
- (2) Unit 1 D14 emergency diesel generator (EDG) following restoration from maintenance and during D11 EDG surveillance testing on August 1, 2022
- (3) Unit common 201 safeguards transformer and vital power alignment during 101 safeguards transformer replacement on September 27 and 29, 2022

#### Complete Walkdown Sample (IP Section 03.02) (1 Sample)

- (1) The inspectors evaluated system configurations during a complete walkdown of the Unit 2 'A' and 'C' residual heat removal (RHR) system trains on September 15, 2022

## 71111.05 - Fire Protection

### Fire Area Walkdown and Inspection Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Unit 1 fire area 47, standby liquid control and general equipment areas with area fire panel non-functional due to smoke detector trouble condition on July 5, 2022
- (2) Unit common fire area 25, auxiliary equipment room 542 with area fire panel non-functional due to heat detection trouble on July 15, 2022
- (3) Unit common fire area 113, turbine enclosure 23-line and generator equipment area rooms on July 21, 2022
- (4) Unit 2 fire areas 6 and 8, Unit 2 Class IE battery rooms on August 30, 2022
- (5) Unit 2 fire area 56, reactor core isolation cooling pump room 179 on September 23, 2022

## 71111.06 - Flood Protection Measures

### Inspection Activities - Internal Flooding (IP Section 03.01) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

- (1) Unit 2 reactor building core spray pump rooms on July 28, 2022

## 71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

### Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the control room during a Unit 1 post-summer load drop for rod sequence exchange, 'B' reactor feed pump repairs, main condenser water box leak investigation, and turbine valve testing on September 10, 2022

### Licensed Operator Regualification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator training scenarios in the simulator on August 10, 2022

## 71111.12 - Maintenance Effectiveness

### Maintenance Effectiveness (IP Section 03.01) (1 Sample)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

- (1) Unit 2, 21 EDG, following the identification of jacket water leakage on August 2, 2022

### 71111.13 - Maintenance Risk Assessments and Emergent Work Control

#### Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Unit 1 risk assessment associated with the 'B' drywell chiller high vibrations on July 22, 2022
- (2) Unit 1 planned action green risk during high-pressure coolant injection valve maintenance on August 10, 2022
- (3) Unit 1 emergent risk assessment in response to a main generator exciter ground alarm on August 19, 2022
- (4) Unit common risk-informed completion time assessment associated with the 101 safeguards transformer replacement on September 19 and 22, 2022

### 71111.15 - Operability Determinations and Functionality Assessments

#### Operability Determination or Functionality Assessment (IP Section 03.01) (5 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) Unit 1 D11 EDG voltage regulator during slow start test run on July 8, 2022
- (2) Unit 2 'A' PCIG functionality following air leaks found on the PCIG compressor on July 11, 2022
- (3) Unit 1 114C/124C non-safeguard load centers and adjustable speed drive following water intrusion on August 9, 2022
- (4) Unit 1 'A' low-pressure coolant injection following discovery of a drain valve leak on August 31, 2022
- (5) Unit 1 hardened containment vent system following discovery of elevated pressure indication in argon purge header on September 29, 2022

### 71111.18 - Plant Modifications

#### Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) Unit common 101 safeguard transformer replacement during the week of September 26, 2022

#### Severe Accident Management Guidelines (SAMG) Update (IP Section 03.03) (1 Sample)

- (1) The inspectors verified the Site Severe Accident Management Guidelines were updated to incorporate the most recent revisions of the boiling water reactor (BWR) owner's group Generic Severe Accident Technical Guidelines, and validated in

accordance with Nuclear Energy Institute 14-01, "Emergency Response Procedures and Guidelines for Beyond Design Basis Events and Severe Accidents," Revision 1 on July 14, 2022

#### 71111.19 - Post-Maintenance Testing

##### Post-Maintenance Test Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated the following post-maintenance testing activities to verify system operability and/or functionality:

- (1) Unit 2 'B' PCIG capacity check post-maintenance testing following degraded gas compressor on July 12, 2022
- (2) Unit 1 'D' RHR pump, valve and flow test following oil cooler maintenance on July 13, 2022
- (3) Unit 2 D21 EDG following repair of a jacket water leak on August 3, 2022
- (4) Unit 2 D24 EDG following 8-year preventive maintenance window on September 14 and 15, 2022

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance testing activities to verify system operability and/or functionality:

##### Surveillance Tests (other) (IP Section 03.01) (2 Samples)

- (1) ST-6-092-113-1, Unit 1 D13 EDG 24-hour endurance test on July 6 and 7, 2022
- (2) ST-6-051-232-1, Unit 1 'B' RHR system pump, valve, and flow test on September 26, 2022

##### Inservice Testing (IP Section 03.01) (1 Sample)

- (1) ST-6-052-232-1, Unit 1 'B' loop core spray pump, valve, and flow test on August 11, 2022

#### 71114.02 - Alert and Notification System Testing

##### Inspection Review (IP Section 02.01-02.04) (1 Sample)

- (1) The inspectors evaluated Constellation's maintenance and testing of the alert and notification system on September 19 through September 22, 2022, for the period of September 2020 through August 2022

#### 71114.03 - Emergency Response Organization Staffing and Augmentation System

##### Inspection Review (IP Section 02.01-02.02) (1 Sample)

- (1) The inspectors evaluated the readiness of the Constellation's Emergency Preparedness Organization on September 19 through September 22, 2022



#### 71114.04 - Emergency Action Level and Emergency Plan Changes

##### Inspection Review (IP Section 02.01-02.03) (1 Sample)

- (1) The inspectors evaluated the following submitted Emergency Action Level and Emergency Plan changes.
  - 21-20, EP-AA-1008, Addendum 3, Emergency Action Levels for Limerick Generating Station, Revision 6
  - 21-63, EP-AA-1008, Addendum 3, Emergency Action Levels for Limerick Generating Station, Revision 7

This evaluation does not constitute NRC approval.

#### 71114.05 - Maintenance of Emergency Preparedness

##### Inspection Review (IP Section 02.01 - 02.11) (1 Sample)

- (1) The inspectors evaluated Constellation's maintenance and testing of the emergency preparedness program on September 19 through September 22, 2022, for the period of September 2020 through August 2022

#### **OTHER ACTIVITIES – BASELINE**

##### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

##### IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (2 Samples)

- (1) Unit 1 for the period of July 1, 2021 through June 30, 2022
- (2) Unit 2 for the period of July 1, 2021 through June 30, 2022

##### IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (2 Samples)

- (1) Unit 1 for the period of July 1, 2021 through June 30, 2022
- (2) Unit 2 for the period of July 1, 2021 through June 30, 2022

##### MS09: Residual Heat Removal Systems (IP Section 02.08) (2 Samples)

- (1) Unit 1 for the period of July 1, 2021 through June 30, 2022
- (2) Unit 2 for the period of July 1, 2021 through June 30, 2022

##### EP01: Drill/Exercise Performance (DEP) Sample (IP Section 02.12) (1 Sample)

- (1) November 1, 2021 through June 30, 2022

##### EP02: Emergency Response Organization (ERO) Drill Participation (IP Section 02.13) (1 Sample)

- (1) November 1, 2021 through June 30, 2022

EP03: Alert And Notification System (ANS) Reliability Sample (IP Section 02.14) (1 Sample)

(1) November 1, 2021 through June 30, 2022

**INSPECTION RESULTS**

No findings were identified.

**EXIT MEETINGS AND DEBRIEFS**

The inspectors verified no proprietary information was retained or documented in this report.

- On October 18, 2022, the inspectors presented the integrated inspection results to Matthew Bonanno, Plant Manager, and other members of the licensee staff.
- On September 22, 2022, the inspectors presented the Emergency Preparedness program inspection results to Mike Gillin, Site Vice President, and other members of the licensee staff.

**DOCUMENTS REVIEWED**

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.11Q	Corrective Action Documents	IR 4520692	Unit 1 Rx conductivity in AL 1	09/04/2022
		IR 4521231	Water leak from 1B Reactor Feed Pump RV-06-115	09/07/2022
		IR 4521279	U1 CDI Conductivity Above Chem Action Level 1	09/08/2022
		IR 4521466	Unit 1 Rx chloride above goal	09/09/2022
		IR 4522991	Pumping of Circ Water led to Exhaustion of Floor Drain D/B	09/16/2022
		IR 4529398	U1 Post Summer Load Drop Reactor Engineering Critique	10/14/2022
71111.13	Corrective Action Documents	IR 4524015	Emergent work impacts for WW2238/2239	09/22/2022
		IR 4524223	Gaps identified in 101 transformer Project preparation	09/23/2022
		IR 4525624	APS: Stop work entered	09/29/2022
		IR 4526151	101 Transformer High Voltage Cable Damage in 544 breaker	10/01/2022
		IR 4526182	101 Tap Changer indication is not Correct	10/01/2022
		IR 4527341	Configuration control pre-cursor issue on 101 Trans	10/06/2022
	IR 4530274	Issues Identified During 101 Transformer Replacement	10/18/2022	
	Miscellaneous	OP-AA-108-118	101 transformer RICT final	Revision 1
71111.18	Engineering Changes	EC 628883	101 safeguards transformer replacement	
71114.02	Miscellaneous		Limerick Generating Station (LGS) Public Alert and Notification System Design Report	Revision 3
71114.05	Miscellaneous	EP-AA-1000	Exelon Nuclear Standardized Radiological Emergency Plan	Revision 33
		EP-AA-1008	Exelon Nuclear Radiological Emergency Plan Annex for Limerick Generating Station	Revision 32