



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PENNSYLVANIA 19406-2713

March 9, 2022

Mr. 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 – BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000352/2022010 AND 05000353/2022010

Dear Mr. Rhoades:

On February 18, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed a problem identification and resolution inspection at your Limerick Generating Station, Units 1 and 2 and discussed the results of this inspection with Mr. Michael Gillin, Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspection team reviewed the station's problem identification and resolution program and the station's implementation of the program to evaluate its effectiveness in identifying, prioritizing, evaluating, and correcting problems, and to confirm that the station was complying with NRC regulations and licensee standards for problem identification and resolution programs. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

The team also evaluated the station's processes for use of industry and NRC operating experience information and the effectiveness of the station's audits and self-assessments. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

Finally, the team reviewed the station's programs to establish and maintain a safety-conscious work environment, and interviewed station personnel to evaluate the effectiveness of these programs. Based on the team's observations and the results of these interviews the team found no evidence of challenges to your organization's safety-conscious work environment. Your employees appeared willing to raise nuclear safety concerns through at least one of the several means available.

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 – BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000352/2022010 AND 05000353/2022010 DATED MARCH 9, 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: 05000352/2022010 and 05000353/2022010

Enterprise Identifier: I-2022-010-0013

Licensee: Constellation Energy Generation, LLC

Facility: Limerick Generating Station, Units 1 and 2

Location: Sanatoga, PA 19464

Inspection Dates: January 31, 2022 to February 18, 2022

Inspectors: L. Casey, Senior Project Engineer
L. Grimes, Resident Inspector
S. Haney, Senior Project Engineer
M. Hardgrove, Resident 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 a biennial problem identification and resolution 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.

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 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. Due to COVID-19 Public Health Emergency concerns, the inspection was performed using a hybrid approach, with some portions, where appropriate, were performed off-site. The inspection documented below met the objectives and requirements for completion of the IP.

OTHER ACTIVITIES – BASELINE

71152B - Problem Identification and Resolution

Biennial Team Inspection (IP Section 03.04) (1 Sample)

- (1) The team performed a biennial assessment of the effectiveness of Constellation Energy Generation, LLC's (Constellation's) problem identification and resolution program, use of operating experience, self-assessments and audits, and safety conscious work environment.
 - Problem Identification and Resolution Effectiveness: The team assessed the effectiveness of Constellation's problem identification and resolution program in identifying, prioritizing, evaluating, and correcting problems. The team also conducted a five-year review of Unit 1 and Unit 2 emergency diesel generator emergency start relay replacements and changes to Unit 1 and Unit 2 moisture carryover operating limit basis.
 - Operating Experience: The team assessed the effectiveness of Constellation's processes for use of operating experience.
 - Self-Assessments and Audits: The team assessed the effectiveness of Constellation's identification and correction of problems identified through audits and self-assessments.
 - Safety Conscious Work Environment: The team assessed the effectiveness of the station's programs to establish and maintain a safety conscious work environment.

INSPECTION RESULTS

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| Assessment | 71152B |
| <p>Problem Identification and Resolution Program Effectiveness –</p> <p>Problem Identification: The team determined that Constellation identified issues and entered them into the problem identification and resolution program at a low threshold.</p> <p>Problem Prioritization and Evaluation: Based on the samples reviewed, the team determined that, in general, Constellation appropriately prioritized and evaluated issues commensurate with the safety significance of the identified problem. In most cases, Constellation appropriately screened issue reports (IRs) for operability and reportability, categorized IRs by significance, and assigned actions to the appropriate department for evaluation and resolution.</p> <p>However, the team identified two minor performance deficiencies regarding Constellation's prioritization and evaluation of issues. The first minor performance deficiency was related to the classification of Maintenance Rule functional failures as conditions adverse to quality in the problem identification and resolution program. The second minor performance deficiency was related to the station's evaluation of a low safety significant (LSS) trend in accordance with the Maintenance Rule program. Additional details about these minor performance deficiencies are included later in this report.</p> <p>Corrective Actions: The team determined that the overall problem identification and resolution program performance related to resolving problems was effective. In general, Constellation implemented corrective actions to resolve problems in a timely manner.</p> | |

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| Assessment | 71152B |
| <p>Use of Operating Experience: The team determined that Constellation appropriately evaluated industry operating experience for its relevance to Limerick Generating Station. Constellation appropriately incorporated both internal and external operating experience into plant procedures and processes, as well as lessons learned for training and pre-job briefs.</p> <p>While the team determined the station appropriately evaluated industry and NRC operating experience, the team identified one observation related to the dissemination of operating experience for Maintenance Rule LSS trends externally to the industry.</p> <p>Self-Assessments and Audits: The team reviewed a sample of self-assessments and audits to assess whether Constellation was identifying and addressing performance trends. The team concluded that Constellation had an effective self-assessment and audit process.</p> | |

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| Assessment | 71152B |
| <p>Safety Conscious Work Environment: The team interviewed approximately 24 individuals. The purpose of these interviews was to evaluate the willingness of Constellation staff to raise nuclear safety issues; to evaluate the perceived effectiveness of the problem identification and resolution program at resolving identified problems; and to evaluate Constellation's safety conscious work environment. The personnel interviewed were randomly selected by the team from the Operations, Engineering, Maintenance, Security, Chemistry, Radiation Protection, and Emergency Preparedness work groups. To supplement these discussions, the team interviewed the Employee Concerns Program (ECP) representative to assess his</p> | |

perception of the site employees' willingness to raise nuclear safety concerns. The team also reviewed the ECP case log and select case files.

All individuals interviewed indicated that they would raise safety concerns. All individuals felt that their management was receptive to receiving safety concerns and generally addressed them promptly, commensurate with the significance of the concern. Interviewees indicated they were adequately trained and proficient on initiating condition reports. All interviewees were aware of Constellation's ECP, stated they would use the program if necessary, and expressed confidence that their confidentiality would be maintained if they brought issues to the ECP. When asked whether there have been any instances where individuals experienced retaliation or other negative reaction for raising safety concerns, all individuals interviewed stated that they had neither experienced nor heard of an instance of retaliation at the site. The team determined that the processes in place to mitigate potential safety conscious work environment issues were adequately implemented.

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| Minor Performance Deficiency | 71152B |
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Minor Performance Deficiency: The team identified one minor performance deficiency related to the classification of Maintenance Rule functional failures as conditions adverse to quality in the problem identification and resolution program. Step 4.6.4.3 of procedure PI-AA-120, "Issue Identification and Screening Process," directs the Station Ownership Committee to coordinate with line department representatives to identify programmatic or organizational impacts such as Maintenance Rule functional failures or potential Maintenance Rule functional failures. Further, Step 4.6.6.3 directs the Station Ownership Committee to determine the significance of corrective action program issues in accordance with Attachment 2, "Issue Report Level and Class Criteria." In the Significance Level 3 guidance of Attachment 2, the Asset Management-Equipment Reliability examples list Maintenance Rule functional failure or potential Maintenance Rule a(1) Condition, in accordance with Maintenance Rule procedure.

Contrary to that PI-AA-120 guidance, the team identified two potential Maintenance Rule a(1) conditions that were classified as Significance Level 4. IR 4364623, written for a LSS trend in H₂O₂ analyzer calibration failures, and IR 4450131, written for a condition monitoring event due to a service air compressor trip, each documented potential Maintenance Rule (a)(1) conditions and should have been subsequently classified as Significance Level 3.

Screening: The inspectors determined the performance deficiency was minor. Because although those IRs were classified as Significance Level 4, existing work requests to address those issues would have been acceptable corrective actions to address the conditions adverse to quality. This minor performance deficiency is captured in IR 4478628.

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| Minor Performance Deficiency | 71152B |
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Minor Performance Deficiency: The team identified one minor performance deficiency related to the station's evaluation of a LSS trend in accordance with the Maintenance Rule program. Step 4.2.5.1 and 4.2.5.5 of ER-AA-320-1004, "Maintenance Rule 18-10 – Performance Monitoring and Dispositioning between (a)(1) and (a)(2)," directs the system manager to obtain LSS events for monitoring and trending from station IRs and determine if an adverse trend in structure, system, or component performance is identified. Performance monitoring identified a LSS trend in H₂O₂ analyzer calibration failures as documented in IRs 4263434 and 4364623. Step 4.4.2. requires an (a)(1) determination when any of the conditions in step 4.4.1 exist. Step 4.4.1 lists LSS structure, system, or component exhibiting an unacceptable

trend in performance. Contrary to the ER-AA-320-1004 guidance, the team identified the documented (a)(1) determination for IR 4364623 was not in compliance with the Maintenance Rule process in retaining the system in (a)(2) status based on the addition of preventive maintenance as recommended by the vendor.

Screening: The inspectors determined the performance deficiency was minor. The H₂O₂ analyzer system was appropriately in (a)(2) status, but not for the reasons determined in the (a)(1) determination. It was later determined during this inspection that an adverse LSS trend did not exist because one of the calibration failures did not result in a loss of function, and as such the (a)(1) determination was unnecessarily performed. This minor performance deficiency is captured in IR 4478628.

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| Observation: Maintenance Rule Low Safety Significant Trend Not Disseminated as Operating Experience | 71152B |
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The team identified one observation related to the dissemination of operating experience for Maintenance Rule LSS trends. Step 4.6.4.4.A of procedure PI-AA-120 directs the Station Ownership Committee to determine operating experience for Significance Level 1, 2, or 3 issues in accordance with PI-AA-115-1004. Step 4.2.1 of PI-AA-115-1004, "Processing of NEB and IRIS Reports," states to screen plant events for sharing with the industry that meet INPO 19-002 reporting criteria, and that Form 3 of that procedure may be used as a guide. The criteria in Form 3, of PI-AA-115-1004-F-03, "IRIS Report Screening Form," are derived from INPO 19-002, "Industry Reporting and Information System (IRIS) Reporting Requirements," and list:

- All Maintenance Rule functional failures
- Maintenance Rule condition monitoring criteria exceeded
- Maintenance Rule plant-level monitoring criteria exceeded

INPO 19-002 and therefore Form 3 of PI-AA-115-1004 have not been updated to reflect a major revision to the Maintenance Rule program known as Maintenance Rule 2.0, so LSS trend, a fourth potential Maintenance Rule (a)(1) condition, is not listed. As a result, IR 4364623, written for a Maintenance Rule LSS trend in H₂O₂ analyzer calibration failures, did not have an IRIS Report generated to disseminate that operating experience.

EXIT MEETINGS AND DEBRIEFS

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

- On February 18, 2022, the inspectors presented the biennial problem identification and resolution inspection results to Mr. Michael Gillin, Plant Manager, and other members of the licensee staff.

DOCUMENTS REVIEWED

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|---|---|------------------|
| 71152B | Corrective Action Documents | CAPE 4337800 | Li1R18LL: Estimated Dose Impact of Co Carryover | 07/08/2020 |
| | | CAPE 4346892 | Unit 1 Suppression Pool High Oxygen Concentration | 07/14/2020 |
| | | CAPE 4372283 | 1B ASD Coolant Leak | 11/19/2020 |
| | | CAPE 4377981 | Excavation work caused leak in 36 inch Service water pipe | 02/24/2021 |
| | | CAPE 4410585 | Circulating Water Leak From Piping | 01/06/2021 |
| | | CAPE 4423923 | 2R16 WHR Violation | 06/24/2021 |
| | | CAPE 4437521 | FME - "C" MSLP PM identified missing parts | 09/16/2021 |
| | | ECAPE 4145616 | 1B ASD Coolant System Leak | 02/23/2021 |
| | | ECAPE 4202624 | Limerick U1 Fuel Cladding Defect Identified By Routine Chemistry Offgas Sampling | 02/02/2021 |
| | | Issue Reports (IRs) | 4337001, 4364623, 4372283, 4391308, 4430911, 4443754, 4448242, 4450131 | |
| | | RCR 4337051 | HV-051-1F024A Inoperable due to Foreign Material | 06/15/2020 |
| | | RCR 4384039 | Unexpected Closure of 1B Inboard MSIV (HV-041-1F022B) Resulted in Automatic High Reactor Pressure Scram | 01/18/2021 |
| | | RCR 4384739 | Unit 1 HPCI and RCIC not Aligned for Service Per GP-2 | 01/08/2021 |
| | Corrective Action Documents Resulting from Inspection | Issue Reports (IRs) | 4475545, 4475826, 4475858, 4475861, 4475863, 4475866, 4477463, 4476112, 4478242, 4478628 | |
| | Engineering Changes | 625675 | Unit 1 - ASD Obsolescence and Cooling Upgrades | 1 |
| | | 625675 | Unit 1 - ASD Obsolescence and Cooling Upgrades | 2 |
| | | 625675 | Unit 1 - ASD Obsolescence and Cooling Upgrades | 3 |
| | Engineering Evaluations | 4343534 | 2020 Maintenance Rule Periodic (a)(3) Assessment | 0 |
| | | AR 4425565 | Limerick GNF2 1C19 EOC MCO Operating Limit Increase | 05/25/2021 |
| | Miscellaneous Procedures | LG-MRULE-005 | LGS Maintenance Rule Risk Ranking | 4 |
| Procedures | AD-AA-3000 | Nuclear Risk Management Process | 5 | |
| | CC-AA-10 | Configuration Control Process Description | 10 | |
| | CC-AA-102 | Design Input and Configuration Change Impact Screening | 33 | |
| | CC-AA-103 | Configuration Change Control for Permanent Physical Plant Changes | 33 | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|------------------|--------------------|--|------------------|
| | | CC-AA-103-100 | Configuration Change Control for Permanent Physical Plant Changes | 2 |
| | | CC-AA-103-F-02 | Engineering Change Material List | 1 |
| | | ER-AA-320 | Maintenance Rule Implementation per NEI 18-10 | 0 |
| | | ER-AA-320-1003 | Maintenance Rule 18-10 - Failure Definition | 0 |
| | | ER-AA-320-1004 | Maintenance Rule 18-10 - Performance Monitoring and Dispositioning between (a)(1) and (a)(2) | 1 |
| | | ER-LG-310-1010 | Maintenance Rule Implementation Limerick Generating Station | 23 |
| | | IP-ENG-001 | Common Design Package | 1 |
| | | MA-AA-1000 | Conduct of Maintenance Manual | 23 |
| | | MA-AA-716-017 | Station Rework Reduction Program | 11 |
| | | NO-AA-10 | Quality Assurance Topical Report | 97 |
| | | NO-AA-210-1001 | Nuclear Oversight Audit Handbook | 26 |
| | | NO-AA-300 | Inspection Planning and Execution of Quality Inspection Activities | 6 |
| | | OP-AA-102-103 | Operator Work-Around Program | 5 |
| | | OP-AA-102-103-1001 | Operator Burden and Plant Significant Decisions Impact Assessment Program | 8 |
| | | OU-AA-101 | Refuel Outage Management | 28 |
| | | OU-AA-102 | Forced Maintenance Outage Management | 12 |
| | | PI-AA-101-1001 | Performance Monitoring and Analysis Manual | 3 |
| | | PI-AA-1012 | Safety Culture Monitoring | 3 |
| | | PI-AA-115 | Operating Experience Program | 5 |
| | | PI-AA-115-1004 | Processing of NEB and IRIS Reports | 8 |
| | | PI-AA-120 | Issue Identification and Screening Process | 11 |
| | | PI-AA-125 | Corrective Action Program (CAP) Procedure | 7 |
| | | PI-AA-125-1001 | Root Cause Analysis Manual | 6 |
| | | PI-AA-125-1003 | Corrective Action Program Evaluation Manual | 6 |
| | | PI-AA-125-1004 | Effectiveness Review Manual | 2 |
| | | PI-AA-125-1006 | Investigation Techniques Manual | 5 |
| | | PI-AA-126-1001 | Self-Assessments | 5 |
| | Self-Assessments | 4308207 | Preparation for NRC Problem Identification & Resolution | 05/14/2020 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-------------|------------------------------|---|------------------|
| | | | (PI&R) NRC Inspection | |
| | | 4454542 | Pre-PI&R Self Assessment | 01/24/2022 |
| | | NOSA-COMP-21-05 (AR 4378299) | 2021 Corrective Action Program Comparative Audit Report | 10/29/2021 |
| | | NOSA-LIM-21-05 (AR 4435732) | Corrective Action Program Audit Report | 09/01/2021 |
| | Work Orders | 4965694 | | |