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

September 20, 2023

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

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 – PROPOSED ALTERNATIVE REQUEST RV-02D ASSOCIATED WITH THE SIXTH 10-YEAR INSERVICE TESTING INTERVAL (EPID L-2022-LLR-0075)

Dear Mr. Rhoades:

By letter dated November 1, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22305A578), Constellation Energy Generation, LLC (the licensee) submitted alternative request RV-02D to the U.S. Nuclear Regulatory Commission (NRC) for the use of an alternative to specific inservice testing (IST) requirements in the 2017 Edition of the American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants, Division 1, OM Code: section IST (OM Code) during the sixth 10-year interval IST program at Dresden Nuclear Power Station (DNPS) Units 2 and 3.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to implement proposed alternative request RV-02D for the specific main steam relief/safety valves (MSRVs) listed in the licensee's request at DNPS, Units 2 and 3, on the basis that the proposed alternative will provide an acceptable level of quality and safety.

The NRC staff has reviewed the subject alternative request and concluded, as set forth in the enclosed Safety Evaluation, that the proposed alternative request RV-02D to extend the required test interval for the specific MSRVs, from 24 months to 48 months, will provide an acceptable level of quality and safety. Additionally, the NRC staff has concluded that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for this request. Therefore, the NRC staff authorizes the use of alternative request RV-02D for the sixth 10-year interval IST program at DNPS, Units 2 and 3, which will begin on November 1, 2023, and is scheduled to end on October 31, 2033.

All other ASME OM Code requirements as incorporated by reference in 10 CFR 50.55a for which an alternative was not specifically requested and approved remain applicable.

If you have any questions, please contact the NRC Project Manager, Surinder Arora, at 301-415-1421 or via e-mail at Surinder.Arora@nrc.gov.

Sincerely,

Jeffrey A. Whited

Digitally signed by Jeffrey A. Whited
Date: 2023.09.20 10:53:22 -04'00'

Jeffrey A. Whited, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-237 and 50-249

Enclosure:
Safety Evaluation

cc: Listserv

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ALTERNATIVE REQUEST RV-02D

SIXTH 10-YEAR INTERVAL INSERVICE TESTING PROGRAM

CONSTELLATION ENERGY GENERATION, LLC

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

DOCKET NUMBERS 50-237 AND 50-249

EPID NO. L-2022-LLR-0075

1.0 INTRODUCTION

By a letter dated November 1, 2022 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML22305A578), Constellation Energy Generation LLC (CEG, the licensee) submitted alternative request RV-02D to the U.S. Nuclear Regulatory Commission (NRC) for the use of an alternative to specific inservice testing (IST) requirements in the 2017 Edition of the American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants, Division 1, OM Code: section IST (OM Code) during the sixth 10-year interval IST program at Dresden Nuclear Power Station (DNPS) Units 2 and 3.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to implement proposed alternative request RV-02D for specific main steam relief safety valves (MSRVs) at DNPS, Units 2 and 3, on the basis that the proposed alternative will provide an acceptable level of quality and safety.

The DNPS, Units 2 and 3, sixth 10-year interval IST program is scheduled to start on November 1, 2023, and scheduled to end on October 31, 2033.

2.0 REGULATORY EVALUATION

The NRC regulations in 10 CFR 50.55a(f)(4), "Inservice testing standards requirement for operating units," states, in part, that throughout the service life of a boiling- or pressurized-water cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the IST requirements (except design and access provisions) set forth in the ASME OM Code and addenda that become effective subsequent to editions and addenda specified in 10 CFR 50.55a(f)(2) and (3) and that are incorporated by reference in 10 CFR 50.55a(a)(1)(iv), to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The NRC regulations in 10 CFR 50.55a(z), "Alternatives to codes and standards requirements," state that alternatives to the requirements of 10 CFR 50.55a(b) through (h) or portions thereof

may be used when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

(1) *Acceptable level of quality and safety.* The proposed alternative would provide an acceptable level of quality and safety; or

(2) *Hardship without a compensating increase in quality and safety.* Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

3.0 TECHNICAL EVALUATION

The information provided by the licensee in support of the request for an alternative to IST requirements in the ASME OM Code, as incorporated by reference in 10 CFR 50.55a, has been evaluated and the bases for disposition are documented in this safety evaluation (SE).

3.1 Licensee's Alternative Request RV-02D

Applicable Code Edition

The applicable Code of Record for the sixth 10-year interval IST program at DNPS, Units 2 and 3, is the 2017 Edition of ASME OM Code as incorporated by reference in 10 CFR 50.55a.

ASME Code Components Affected

In its submittal, the licensee proposed alternative testing for the MSRVs listed in table 1:

Table 1

Component	Description	Class	Category
2-0203-003A	MS-3A MSRV (Target Rock)	1	C
3-0203-003A	MS-3A MSRV (Target Rock)	1	C

Applicable Code Requirement

The IST requirements in the ASME OM Code, 2017 Edition, as incorporated by reference in 10 CFR 50.55a, related to this alternative request are as follows:

ASME OM Code, Division 1, Mandatory appendix I, "Inservice Testing of Pressure Relief Devices in Water-Cooled Reactor Nuclear Power Plants," paragraph I-1320, "Test Frequencies, Class 1 Pressure Relief Valves," subparagraph *(a)*, *5-Yr* [year] *Test Interval*, states:

> Class 1 pressure relief valves shall be tested at least once every 5 yr[s], starting with initial electric power generation. No maximum limit is specified for the number of valves to be tested within each interval; however, a minimum of 20% of the valves from each valve group shall be tested within any 24-month interval. This 20% shall consist of valves that have not been tested during the current 5-yr interval, if they exist. The test interval for any installed valve shall not exceed 5 yr[s]. The 5-yr test interval shall begin from the date of the as-left set pressure test for each valve.

Reason for Request

At DNPS, Units 2 and 3, there is one Target Rock 3-Stage, Model 67F, MSRV installed on the main steam lines inside the drywell on each unit. Each MSRV is classified into an IST program valve group of one for each reactor unit. ASME OM Code, appendix I, paragraph I-1320*(a)*, requires that the MSRVs be assigned a 5-year test interval, but also must be tested every outage in order to comply with the requirement that at least 20 percent of the valves in each group are tested every 24 months. DNPS, Units 2 and 3, are currently operating on 24-month refueling cycles. These MSRVs at DNPS, Units 2 and 3, have shown reliable set pressure test performance.

The licensee conducted a performance assessment on the MSRVs listed in table 1 of this SE. The licensee determined that there is reasonable assurance that each MSRV will retain the set pressure within the required drift tolerances after extending the test interval from 24 to 48 months. Also, the licensee reports that extending the MSRV test interval will reduce the occupational radiological dose that is incurred during the removal, testing, and reinstallation, of these MSRVs.

Proposed Alternative and Basis for Use

The licensee proposes that the ASME OM Code, appendix I, paragraph I-1320*(a)*, required test interval for the group of one for each MSRV be extended from 24 months to 48 months.

The licensee stated that it has implemented a safety relief valve (SRV) best practices maintenance program at DNPS, Units 2 and 3. The licensee reported that several enhancements incorporated into the program resulted in improved MSRV setpoint drift performance. The improvements to the program have continued to further increase the MSRV reliability.

The licensee stated that the SRV best practices are developed from the application of the Electric Power Research Institute/Nuclear Maintenance Applications Center (EPRI/NMAC) Safety and Relief Valve Testing and Maintenance Guide and from Constellation (formerly Exelon) operational experience. The MSRV best practices have been implemented through the licensee's oversight of the valve vendor's test and rebuild processes. Major program elements include specific performance and inspection criteria, and maintenance steps that exceed the original equipment manufacturer (OEM) specifications and/or industry established guidelines. The main program elements include: (1) spring testing, (2) lapping techniques and tools, (3) set pressure adjustment methodology precision, (4) average delay time trending, and (5) internal component condition variations. The licensee described these elements in detail in its submittal dated November 1, 2022. Collectively, the licensee considers that the use of these elements has supported an improved setpoint retention in the SRVs at DNPS.

The licensee stated that an SRV best practices fleet engineering program has been established to provide governance over the vendor SRV maintenance procedures, to define the program elements, and to establish performance tracking and trending guidelines. The program document and the vendor procedures are updated to incorporate advances in technology and operating experience from the licensee's fleet of nuclear power plants, the OEM, and the industry.

The licensee recently performed an assessment pertaining to the performance of the Target Rock MSRVs at DNPS, Units 2 and 3. This assessment determined that the setpoint drift

performance of the MSRVs at DNPS Units 2 and 3 has steadily improved by implementation of the enhanced maintenance program. The assessment reviewed as-left and as-found set pressure data since 1998 and identified (1) whether the valves' set pressure drifted up or down, and (2) the absolute set pressure change between tests. Based on the time between the as-left and as-found set pressure test of each MSRV, the licensee linearly extrapolated the set pressure drift to determine whether the MSRV set pressure would remain within the site's required ± 3.0 percent tolerance following a 48-month period.

The licensee stated that since 2014, they removed and as-found tested eight MSRVs at DNPS, Units 2 and 3, and projected that seven of the eight valves would have lift set points within the ± 3.0% set pressure tolerance for more than 48 months. Table RV-02D-1 in the licensee's submittal summarizes the set pressure test performance, in years of service, predicting when each MSRV would exceed the ± 3.0 percent set pressure tolerance for MSRVs tested since 2014. The licensee performed an evaluation of the one MSRV that did not meet the 48-month set point tolerance criteria and provided a summary identifying the cause for the set point drift, how the SRV best practices maintenance program addresses the cause, and the corrective actions performed.

The licensee states that the improved MSRV performance can be attributed to implementation of the SRV best practices program. The licensee will continue to disassemble and inspect each subject MSRV following as-found set pressure testing to verify that parts are free of defects resulting from time-related degradation or service-induced wear. Each MSRV shall be disassembled and inspected prior to as-left testing and installation in accordance with the SRV best practices.

The licensee proposes that extending the MSRV test interval from 24 months to 48 months is acceptable based upon past performance, and its evaluation that the MSRVs are capable of maintaining their setpoint within tolerance over a 48-month period. The licensee considers that the proposed alternative to the MSRV testing requirements will contribute to the principal of maintaining radiation dose as low as reasonably achievable.

The licensee stated that when an as-found set pressure test result failure is discovered, the failure will be documented in its Corrective Action Program and the requirements of ASME OM Code, appendix I, paragraph I-1320*(c)*, will be followed. The licensee will take actions determined by the evaluation to address the test failure.

3.2 NRC Staff Evaluation

In alternative request RV-02D, the licensee submitted an alternative to the IST requirements in ASME OM Code (2017 Edition), appendix I, paragraph I-1320*(a).* In particular, the licensee proposes to extend the required test interval for the MSRVs listed in table 1 of this SE at DNPS, Units 2 and 3, from 24 months to 48 months.

In its alternative request, the licensee stated that an SRV best practices maintenance program had been in place for several years at DNPS resulting in improvement in the performance of the MSRVs within the scope of the request. The elements of the program include spring testing, lapping techniques, and tools, set pressure adjustment methodology precision, average delay trending, and internal component condition variations. For example, the licensee applies tighter tolerances to the pilot abutment and preload gaps for the applicable MSRVs, which reduce the likelihood of vibration-induced seat leakage caused by pressure transients. The time between the pilot valve opening and the main disk opening is measured and trended to determine if

additional maintenance should be performed on the MSRVs. The licensee also disassembles and inspects the MSRVs after as-found set pressure testing and before as-left set pressure testing. If any internal parts are found damaged, the licensee will replace those parts.

In its alternative request, the licensee stated that it performed an assessment of the applicable MSRVs at DNPS. This assessment reviewed as-left and as-found set pressure data since 1998. Based on the time between the as-left and as-found set pressure test for each MSRV, the set pressure drift was linearly extrapolated to determine whether the SRV set pressure would remain within the ± 3.0 percent tolerance following a 48-month interval. Since 2014, eight SRVs at DNPS were as-found tested, and were projected to have lift setpoints within the ± 3.0 percent tolerance for more than 48 months. The licensee states that the setpoint drift performance of the SRVs at DNPS has improved as a result of the SRV best practices maintenance program. The licensee asserts that each SRV will retain the set pressure within the required drift tolerances throughout a 48-month interval.

In a letter dated February 4, 2020 (ML20036D962) as supplemented by a letter dated June 12, 2020 (ML20164A188), the licensee requested to implement alternative request RV-02D for the remainder of the fifth 10-year interval IST program. In its June 12, 2020, letter, the licensee stated that data had been collected, trended, and analyzed for SRV tests, maintenance, inspections, and performance since 2014 for several of its fleet nuclear power plants. The licensee stated that some of those nuclear power plants have the same base model Target Rock SRVs. Similar to the NRC staff discussion in the SE dated January 14, 2021 (ML21005A061), for alternative request RV-02D during the fifth 10-year interval IST program, the NRC staff considers this information to support the sharing of information regarding the performance of the Target Rock SRVs during the sixth 10-year interval IST program at DNPS.

In summary, alternative request RV-02D proposes the following for the MSRVs listed in table 1 of this SE at DNPS, Units 2 and 3:

1. The licensee will disassemble and inspect the MSRVs within the scope of the request at DNPS prior to as-left testing and installation;

2. The licensee's SRV best practices maintenance program has been implemented for the MSRVs within the scope of the request at DNPS;

3. The licensee's SRV best P\practices fleet engineering program provides for the sharing of applicable SRV test data between the licensee's nuclear power plants; and

4. The results of the as-left and as-found set pressure test data for the MSRVs at DNPS within the scope of this request provide reasonable assurance that the MSRV set pressures will remain within acceptable tolerance levels for more than 48 months.

Based on the licensee's SRV best practices maintenance program at DNPS, the implementation of the licensee's SRV best practices fleet engineering program to share applicable SRV test data between the licensee's nuclear power plants, and the results of the SRV as-left and as-found set pressure testing, the NRC staff finds that the proposal in Alternative Request RV-02D to extend the required test interval for the MSRVs listed in table 1 of this SE from 24 months to 48 months provides an acceptable level of quality and safety in accordance with 10 CFR 50.55a(z)(1) for the sixth 10-year Interval IST program at DNPS, Units 2 and 3.

4.0 CONCLUSION

As described above, the NRC staff finds that the licensee's proposal described in alternative request RV-02D, to extend the required test interval for the MSRVs listed in table 1 of this SE from 24 months to 48 months, will provide an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for alternative request RV-02D. Therefore, the NRC staff authorizes the use of alternative request RV-02D for the sixth 10-year Interval IST program at DNPS, Units 2 and 3, which is scheduled to start on November 1, 2023, and scheduled to end on October 31, 2033.

All other ASME OM Code requirements as incorporated by reference in 10 CFR 50.55a for which relief or an alternative was not specifically requested and approved remain applicable.

Principal Contributors: G. Bedi, NRR/DEX/EMIB
T. Scarbrough, NRR/DEX/EMIB

Dated: September 20, 2023

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 – PROPOSED ALTERNATIVE REQUEST RV-02D ASSOCIATED WITH THE SIXTH 10-YEAR INSERVICE TESTING INTERVAL (EPID L-2022-LLR-0075) DATED SEPTEMBER 20, 2023

DISTRIBUTION:
PUBLIC
PM File Copy
RidsACRS_MailCTR Resource
RidsNrrDorlLpl3 Resource
RidsNrrDexEmib Resource
RidsNrrLASRohrer Resource
RidsNrrPMDresden Resource
RidsRgn3MailCenter Resource

ADAMS Accession No.: ML23205A136

OFFICE	NRR/DORL/LPL3/PM	NRR/DORL/LPL3/LA	NRR/DSS/EMIB/BC	NRR/DORL/LPL3/BC
NAME	SArora	SRohrer	SBailey	JWhited
DATE	07/24/2023	07/25/2023	06/20/2023	09/20/2023

OFFICIAL RECORD COPY