Wolf Creek
Nuclear Operating Corporation

Robert J. Bayer
Plant Manager

March 17, 2021
WO 21-0012

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Subject: Docket No. 50-482: Licensee Event Report 2021-001-01, "Entry into Mode 4 with Excessive Containment Valve Leakage Resulted in a Condition Prohibited by Technical Specifications"

Commissioners and Staff:

The enclosed Licensee Event Report (LER) 2021-001-01 is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) as a condition prohibited by Technical Specifications.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4015, or Ron Benham at (620) 364-4204.

Sincerely,

Robert J. Bayer

RJB/rlt

Enclosure: LER 2021-001-01

cc: S. S. Lee (NRC), w/e
S. A. Morris (NRC), w/e
N. O'Keefe (NRC), w/e
Senior Resident Inspector (NRC), w/e

NRC FORM 366 (08-2020) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

APPROVED BY OMB: NO. 3150-0104 **EXPIRES: 08/31/2023**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk ail: oira_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name	2. Docket Number	3. Page
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4. Title

Entry into Mode 4 with Excessive Containment Valve Leakage Resulted in a Condition Prohibited by Technical Specifications

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Revision No.	Month	Day	Year	Facility Name	Docket Number
05	15	2018	2021	- 001 -	01	03	17	2021		05000
									Facility Name	Docket Number
										05000

9. Operating Mode	10. Power Level
4	N/A

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*

10 CFR Part 20	☐ 20.2203(a)(2)(vi)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(A)	**10 CFR Part 73**
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.69(g)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(4)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(i)	**10 CFR Part 21**	☑ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(1)(i)
☐ 20.2203(a)(2)(ii)	☐ 21.2(c)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(i)
☐ 20.2203(a)(2)(iii)	**10 CFR Part 50**	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)	☐ 73.77(a)(2)(ii)
☐ 20.2203(a)(2)(iv)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)	
☐ 20.2203(a)(2)(v)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)	

☐ **OTHER** (Specify here, in abstract, or NRC 366A).

12. Licensee Contact for this LER

Licensee Contact	Phone Number (Include area code)
Ron Benham, Director Nuclear and Regulatory Affairs	(620) 364-4204

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to IRIS		Cause	System	Component	Manufacturer	Reportable to IRIS

14. Supplemental Report Expected		15. Expected Submission Date	Month	Day	Year
☑ No	☐ Yes (If yes, complete 15. Expected Submission Date)				

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

At 0510 Central Daylight Time (CDT) on May 15, 2018, Wolf Creek Generating Station (WCGS) entered Mode 4 as part of coming out of Refueling Outage 22 (RF22). At that time, the as-left maximum pathway leakage rate (MXPLR) for the containment isolation valves associated with the containment purge supply was greater than 0.6La (250,000 sccm). Technical Specification (TS) Surveillance Requirement (SR) 3.6.1.1 requires that containment penetration leak rate testing be performed in accordance with the Containment Leakage Rate Testing Program as defined in TS 5.5.16 and in Wolf Creek Nuclear Operating Corporation Procedure AP 29E-001. The as-left MXPLR leak rate being greater than 0.6La is contrary to the requirements of TS 5.5.16 and AP 29E-001. As such, TS SR 3.6.1.1 was not satisfied prior to entering Mode 4. TS Limiting Condition for Operation (LCO) 3.6.1, requires that containment be operable in Modes 1, 2, 3, and 4. Therefore, this event represents a condition prohibited by TS. Specifically, LCO 3.6.1 was not met, along with LCO 3.0.4 which prohibits entering into a mode of applicability when the LCO is not met unless the specified actions in the LCO have no time limit, a risk assessment is performed, or when specifically allowed by the Specification. This event was repeated when WCGS entered Mode 4 at 0850 CDT on November 2, 2019, coming out of RF23.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
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Wolf Creek Generating Station	05000- 482	2021	- 001	- 01

NARRATIVE

DESCRIPTION OF STRUCTURE(S), SYSTEM(S), AND COMPONENT(S)

In general, the containment isolation valves [EIIS System: JM, Component: ISV] form part of the containment pressure boundary and provide a means for fluid penetration flow paths not serving accident consequence limiting systems to be provided with two isolation barriers that are closed on a containment isolation signal. These isolation devices are either passive or active (automatic). Manual valves, de-activated automatic valves secured in their closed position (including check valves with flow through the valve secured), blind flanges, and closed systems are considered passive devices. Check valves or other automatic valves that are designed to close without operator action following an accident are considered active devices.

A minimum of two barriers in series are provided for each penetration flow path so that no single credible failure or malfunction of an active component can result in a loss of isolation or leakage that exceeds limits assumed in the safety analyses. The containment isolation valves are subject to the requirements of Technical Specification (TS) Limiting Condition for Operation (LCO) 3.6.3, “Containment Isolation Valves.” This LCO was derived from the assumptions related to minimizing the loss of reactor coolant inventory and establishing the containment boundary during a design basis accident (DBA). In the event leakage through a containment penetration is greater than 250,000 standard cubic centimeters per min (sccm), containment is declared inoperable and entry into TS LCO 3.6.1, "Containment," Condition A is entered.

The containment shutdown purge system operates during reactor outages (Mode 6 and Defueled) to supply outside air into the containment for ventilation and cooling or heating and may also be used, when the reactor is in the cold shutdown mode (Mode 5), to reduce the concentration of noble gases within the containment prior to and during personnel access.

The containment shutdown purge system supply line has automatic containment isolation valves both inside and outside containment. GTHZ0006 is the outside containment isolation valve and GTHZ0007 is the inside containment isolation valve. Due to the size of these isolation valves (36”), it was determined that they were not qualified for automatic closure from their open position under accident conditions. Therefore, during Modes 1, 2, 3, and 4 they are required to be maintained sealed closed. GTHZ0004 and GTHZ0005 are the 18" mini-purge isolation valves which correspond to GTHZ0006 and GTHZ0007 respectively.

CONTAINMENT LEAKAGE RATE TESTING PROGRAM DESCRIPTION

Wolf Creek Generating Station (WCGS) TS LCO 3.6.1 requires that containment be operable during Modes 1, 2, 3, and 4. TS Surveillance Requirement (SR) 3.6.1.1 states, in part, that leakage rate testing is required to be performed in accordance with the Containment Leakage Rate Testing Program. The general requirements of the Containment Leakage Rate Testing Program are described in TS 5.5.16. Wolf Creek Nuclear Operating Corporation (WCNOC) procedure AP 29E-001, "Program Plan for Containment Leakage Measurement" contains the site-specific requirements of the Containment Leakage Rate Testing Program for WCGS. AP 29E-001 requires that the combined leakage rate for all penetrations subject to Type B and Type C tests shall be less than or equal to 0.6La (250,000 sccm) as determined on a maximum pathway leakage rate (MXPLR) basis from the as-left local leak rate testing (LLRT) results. This MXPLR criterion is only required to be met prior to entering a mode where containment integrity is required following a refueling outage or following a shutdown that included Type B or Type C testing. For WCGS this constitutes the transition from Mode 5 to Mode 4. Once in Mode 4 the requirement for containment operability changes to utilize minimum pathway leak rate (MNPLR). As identified in AP 29E-001, the definition of MNPLR and MXPLR are as follows:

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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CONTAINMENT LEAKAGE RATE TESTING PROGRAM DESCRIPTION (cont.)

-MNPLR is the minimum leakage rate that can be attributed to a penetration leakage path (e.g., the smaller of either the inboard or outboard barrier's individual leakage rates). The pathway's MNPLR can be determined by one half of the total measured leakage rate when tested by pressurizing between the inboard and outboard barriers.

-MXPLR is the maximum leakage rate that can be attributed to a penetration leakage path. The MXPLR is the larger, not the total, leakage of two valves in a series tested individually (e.g., the larger of either the inboard or outboard barrier's individual leakage rate).

EVENT DESCRIPTION

At 0510 Central Daylight Time (CDT) on May 15, 2018, WCGS transitioned from Mode 5 to Mode 4 as part of completing Refueling Outage 22 (RF22). At that time, the recorded as-left leakage rate from GTHZ0006 couldn't be quantified to be less than 250,000 sccm, while the leakage rate for GTHZ0007 was measured to be less than its administrative limit. Actions were taken to meet TS LCO 3.6.3 Condition D (see Licensee Event Report 2018-001-00 for details related to issues in meeting TS LCO 3.6.3 Condition D at the time). At this time, it wasn't clear that the Containment Leakage Rate Testing Program required the use of MXPLR, rather than MNPLR. Because one of the containment isolation valves on the containment purge supply line was within its administrative limit, it was believed at the time that SR 3.6.1.1 was satisfactorily met and so WCGS entered Mode 4.

At 0850 CDT on November 2, 2019, a similar event occurred when WCGS transitioned from Mode 5 to Mode 4 coming out of RF23 with GTHZ0006 again not able to be quantified to be less than 250,000 sccm, while GTHZ0007 was measured to be less than its administrative limit.

On December 16, 2020, engineering personnel discovered that in both cases above, WCGS did not meet TS SR 3.6.1.1 due to the failure to use MXPLR as the basis of recording as-left containment leakage rates through the containment purge supply isolation valves.

PLANT CONDITION PRIOR TO EVENTS

Both events occurred during transition from Mode 5 to Mode 4 coming out of RF22 and RF23 respectively. No other structures, systems or components were inoperable which contributed to this event.

REPORTABILITY

TS 3.6.1 Requires Containment be operable in Modes 1, 2, 3, and 4. SR 3.6.1.1 requires, in part, that leakage rate testing be performed in accordance with the Containment Leakage Rate Testing Program which is described in TS 5.5.16. TS 5.5.16 requires WCGS to follow the guidelines provided in NRC Regulatory Guide 1.163. RG 1.163 endorsed NEI 94-01, "Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J," Revision 0. NEI 94-01 requires that the combined leakage rate for all penetrations subject to Type B and C tests be less than 0.6La as determined on a MXPLR basis from the as-left LLRT results.

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REPORTABILITY (cont.)

Because the leakage rate through GTHZ0006 was greater than 250,000 sccm as measured on an MXPLR basis at the time WCGS transitioned to Mode 4 from Mode 5, the requirements of SR 3.6.1.1 were not met. In addition, LCO 3.0.4 prohibits entry into a mode of applicability of an LCO when it is not met, unless the associated actions permit operation in the mode for an unlimited period of time, or after performance of a risk assessment. No risk assessment was performed so LCO 3.0.4 was also not met when WCGS entered Mode 4 in both cases. Therefore, this was a condition prohibited by TS and as a result is reportable under 10 CFR 50.73(a)(2)(i)(B).

CAUSE

Inappropriate isolation credit was given to the non-safety related blind flange installed for a failed containment purge valve coming out of RF22 such that MXPLR summation was concealed and thus not properly applied for the failed valve. (See WCGS LER 2018-001-00, "Inappropriate Use of Blind Flange for Containment Isolation Valve Results in Condition Prohibited by Technical Specifications," dated October 4, 2018, for more information regarding this event.)
- The Post Outage Local Leak Rate Testing Report for RF22 did not include degraded containment purge isolation valve GTHZ0006 (which was provided with blind flange) within the MXPLR summation. The MXPLR summation for RF22 was identified as 60,385 sccm.
- The Mode 4 Restart Checklist (WCNOC Form AIF 22D-008-04) for RF22 was signed by the Appendix J Program owner identifying that containment was ready for Mode change when in fact MXPLR exceeded 250,000 sccm considering that isolation capability was being inadvertently credited for the non-safety related blind flange installed for the failed containment isolation valve.
- The Post Outage Local Leak Rate Testing Report for RF23 did not include containment purge isolation GTHZ0006 (which was provided with a blind flange) within the MXPLR summation. The MXPLR summation for RF23 was identified as 75,913 sccm.
- The Mode 4 Restart Checklist for RF23 was signed by the Appendix J Program owner identifying that containment was ready for Mode change when in fact MXPLR exceeded 250,000 sccm considering that isolation capability should not have been credited for the non-safety related blind flange installed for the failed containment isolation valve.

Two contributing causes were also identified:
- Implementing documents for restarting the plant did not have adequate guidance to ensure Appendix J program requirements were met prior to entering Mode 4 from Mode 5.
- There was general unawareness by WCGS personnel (including Appendix J Program Owners) of applicability for how and when MXPLR was to be applied.

CORRECTIVE ACTIONS

Implementing documents (Mode 4 Restart Checklist, and Technical Specification Bases) will be revised to specify that prior to entering Mode 4, the combined as-left MXPLR bases for all containment penetrations be less than 0.6La (250,000 sccm). LLRT procedures will be revised to include Mode 5 to Mode 4 MXPLR requirement in the acceptance criteria with a confirmation check in the Restoration section that the acceptance criteria have been met.

This event and lessons learned will be communicated to all Appendix J qualified personnel. Qualification Standard ES9280272, Appendix J Testing will be revised to include this event as required reading.

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SAFETY SIGNIFICANCE

The safety significance was low. The as-left leakage rate through GTHZ0007 was under the administrative limit in both events. In addition, though they could not be credited for meeting LCO 3.6.3, non-safety related (but seismically analyzed blind flanges had been installed on GTHZ0006 prior to entry into Mode 4 in both events. These blind flanges have since been qualified as safety-related and a license amendment request has been submitted to formally permit the use of blind flanges in meeting LCO 3.6.3, Condition D. Finally, except for the time between May 15, 2018 and August 8, 2018 (when it was discovered that a blind flange was being inappropriately used to meet LCO 3.6.3), GTHZ0007 was maintained shut and deactivated while WCGS was in Mode 1, 2, 3, or 4. As such, there is reasonable assurance that had a design basis accident occurred, containment integrity would have been maintained.

OPERATING EXPERIENCE/PREVIOUS EVENT

There were 2 previous events that were related to the event described here. LER 2018-001-00, "Inappropriate Use of Blind Flange for Containment Isolation Valve Results in Condition Prohibited by Technical Specifications," dated October 4, 2018, described that blind flanges were inappropriately credited for meeting LCO 3.6.3 Condition D. LER 2020-001-01, "Plant Shutdown Due to Inoperable Containment Purge Isolation Valves," dated July 6, 2020, detailed a plant shutdown due to as-found excessive leakage measured in both GTHZ0006 and GTHZ0007.