NRC FORM 366
(04-2018)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See Page 2 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/)

1. Facility Name	2. Docket Number	3. Page
Wolf Creek Generating Station	05000 482	1 OF 4

4. Title

Plant Shutdown Due to Inoperable Containment Purge Isolation Valves

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
02	01	2020	2020	001	00	04	01	2020		05000
									Facility Name	Docket Number 05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
100	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☑ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☑ 50.73(a)(2)(i)(A)	☑ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A)	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Ron Benham, Manager 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 ICES		Cause	System	Component	Manufacturer	Reportable to ICES
	JM	ISV	Fisher	Y						

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☑ Yes (If yes, complete 15. Expected Submission Date) ☐ No		06	01	2020

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On 2/1/2020, while in Mode 1 at 100% power, surveillance testing of containment isolation valves associated with the containment shutdown purge supply piping was being conducted. It was discovered that the leakage rate through the penetration was greater than that allowed by Technical Specifications (TS). Two containment isolation valves in series were determined to be inoperable. This led to entry into TS Limiting Condition for Operation (LCO) 3.6.3 Condition E which requires the plant be in Mode 3 within 6 hours. Due to the high leakage rate, containment was also declared inoperable so Wolf Creek Generating Station (WCGS) entered TS LCO 3.6.1 Condition A which requires restoration of containment to operable status within 1 hour. This was not possible, so TS LCO 3.6.1 Condition B was entered which also requires the plant to be in Mode 3 within 6 hours.

At 2154 Central Standard Time (CST) on 2/1/2020, WCGS completed a shutdown required by Technical Specifications. Therefore, this is being reported in accordance with 10 CFR 50.73(a)(2)(i)(A). In addition, because containment was declared inoperable, this is also being reported in accordance with 10 CFR 50.73(a)(2)(v) as a condition that could have prevented fulfillment of a safety function needed to control the release of radioactive material as well as to mitigate the consequences of an accident. Both valves were returned to service the following day, and WCGS subsequently returned to Mode 1 on 2/3/2020.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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Wolf Creek Generating Station	05000- 482	2020	- 001	- 00

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.

The containment minipurge system may be used during reactor power operations to reduce the concentration of noble gases within the containment prior to and during personnel access or to equalize internal and external pressures. The containment minipurge system lines are branch lines off the shutdown purge system between the shutdown purge system isolation valves. Therefore, the minipurge supply line shares the same containment penetration piping as the containment shutdown purge supply line, but has its own containment isolation valves inside and outside containment. GTHZ0004 is the outside containment minipurge isolation valve and GTHZ0005 is the inside containment minipurge isolation valve. These are 18" valves and are qualified for automatic closure during accident conditions.

PLANT CONDITIONS PRIOR TO EVENT

Prior to the event on February 1, 2020, Wolf Creek Generating Station (WCGS) was in Mode 1 operating at 100 percent power. Outside containment isolation valve GTHZ0006 had been inoperable since November 2, 2019, due to excessive leakage. Inside containment isolation valve GTHZ0007, as well as the minipurge supply inside containment isolation valve GTHZ0005 were both closed and de-energized in accordance with TS LCO 3.6.3 Condition D. No other structures, systems, or components were inoperable which contributed to the event.

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NARRATIVE

EVENT DESCRIPTION

WCGS Refueling Outage 23 (RF23) began on 9/21/2019. During RF23, leak rate testing was performed on GTHZ0006 and GTHZ0007. The administrative leakage rate limit is 12,000 sccm for each of these valves. The TS surveillance acceptance criteria for the penetration (which includes the mini-purge valve leakage) is 21,000 sccm. Prior to RF23, previous tests had shown both valves had measured leak rates which were within their administrative limits. The as-left leakage following maintenance discovered during RF23 for both valves exceeded the TS limit. Maintenance work was performed on GTHZ0007, and prior to entering Mode 4 coming out of RF23 (which occurred at 0850 Central Standard Time (CST) on 11/2/19), measured leakage through this penetration was 10,500 sccm. This measurement was the summation of leakage through GTHZ0004, GTHZ0005,and GTHZV0007 because the blind flange was installed on GTHZ0006 which eliminated this leak path. This leakage was below the administrative limit for this penetration. The decision was made to postpone maintenance work on GTHZ0006 as it is the outside containment isolation valve, and could be performed online.

In the case of one containment purge isolation valve not within leakage limits, TS LCO 3.6.3 Condition D is entered. TS LCO 3.6.3 Required Action D.1 requires that the affected penetration flow path be isolated by the use of at least one closed and de-activated automatic valve or closed manual valve. To meet TS LCO 3.6.3 Condition D prior to entering Mode 4 (the first mode of applicability), GTHZ0007 and GTHZ0005 were both verified closed and deactivated. In addition, the blind flange associated with GTHZ0006 was installed to enable leakage measurement of penetration V-161 (GTHZ0004, GTHZ0005, and GTHZ0007).

Required Action D.3 requires that leak rate testing be performed every 92 days on those purge valves that have resilient seals that are closed to comply with Required Action D.1. On 2/1/2020, surveillance procedure STS PE-015 “Containment Purge Valve Leakage Test” was performed to meet Required Action D.3. The as-found leakage rate at the time of this performance was greater than 21,000 sccm. As a result, at 1845 CST on 2/1/2020, LCO 3.6.3 Required Action D.3 could not be met. This required entry into LCO 3.6.3 Condition E which directs the plant to be in Mode 3 within 6 hours and Mode 5 within 36 hours. The leak rate was also greater than 250,000 sccm which is the TS limit for containment. Therefore, containment was declared inoperable at this time so TS LCO 3.6.1 Condition A was entered for an inoperable containment. Required Action A.1 is to restore containment to OPERABLE status within 1 hour. If Required Action A.1 cannot be completed, then Condition B requires the plant to be in Mode 3 within 6 hours and Mode 5 within 36 hours. The plant entered Mode 3 at 2154 CST on 2/1/2020 within the Required Completion Time for the applicable Conditions in both LCO 3.6.1 and 3.6.3.

It was determined that GTHZ0007 was leaking, in addition to the previously known leak through GTHZ0006. Repairs were first completed on GTHZ0007 and at 1009 CST on 2/2/2020, GTHZ0007 was declared operable. Because this allowed isolation of the containment penetration flowpath, containment was declared operable. Therefore, at this time TS LCO 3.6.1 Conditions A and B, as well as LCO 3.6.3 Condition E were exited. GTHZ0006 was then also repaired. At 1638 CST on 2/2/2020, GTHZ0006 was declared operable. At this time TS LCO 3.6.3 Condition D was exited. With LCOs 3.6.1 and 3.6.3 met, WCGS subsequently began preparations to return to power operations and reached Mode 1 at 0656 CST on 2/3/2020.

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NARRATIVE

REPORTABILITY

This event is being reported in accordance with 10 CFR 50.73(a)(2)(i)(A) for the completion of a nuclear plant shutdown required by the plant's TS. WCGS entered Mode 3 (Hot Standby) at 2154 CST on 2/1/2020. Event notification 54508 was made in accordance with 10 CFR 50.72(B)(2)(i) as a four-hour notification for initiation of a plant shutdown required by TS at 2206 CST on 2/1/2020.

This event is also being reported in accordance with 10 CFR 50.73(a)(2)(v) as an event or condition that could have prevented fulfillment of the safety function(s) of structures or systems that are needed to (C) control the release of radioactive material, and (D) mitigate the consequences of an accident. The leakage rate measured from the containment shutdown purge penetration on 2/1/2020 was greater than the allowed TS leak rate for containment. Therefore, containment integrity was not maintained and as such, containment was declared inoperable at 1845 on 2/1/2020.

CAUSE

The root cause investigation for this event is still ongoing. The cause will be documented in the supplement to this LER.

CORRECTIVE ACTIONS

Initial corrective actions included repairing both GTHZ0006 and GTHZ0007 to restore them to operable status. Additionally, the surveillance procedure was revised to account for installed blind flanges and a voluntary surveillance was performed early in March of 2020 to validate acceptable leakage limits were being maintained. Additional surveillances are planned to be performed in April 2020 and again in May 2020 to further monitor the condition of the valves. Further corrective actions will be documented in the supplement to this LER.

SAFETY SIGNIFICANCE

The actual safety significance was low. During the time that GTHZ0006 was out of service, the blind flange associated with this valve had been installed. While this blind flange is not safety-related, and as such, cannot be credited for completing Required Action D.1 of TS LCO 3.6.3, it is bounded by the seismic analysis performed for the piping associated with this containment penetration. The only credible failure mechanism is a seismic event; therefore, in a seismic event, the blind flange would likely still have maintained actual containment integrity. In addition, there are no design basis accidents (DBAs) which would have impacted the ability of the blind flange to limit containment leakage to within acceptable limits.

OPERATING EXPERIENCE/PREVIOUS EVENT

None