

WOLF CREEK
NUCLEAR OPERATING CORPORATION

Terry J Garrett
Vice President, Engineering

July 8, 2005

ET 05-0010

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

Subject: Docket No. 50-482: Licensee Event Report 2005-004-00, Failure of Auxiliary Building Ventilation Dampers to Close on Safety Injection Signal

Gentlemen:

The enclosed Licensee Event Report (LER) 2005-004-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.36(c)(2) regarding plant operation prohibited by Technical Specifications, 10 CFR 50.73(a)(2)(v)(C) regarding loss of safety function, and 10 CFR 50.73(a)(2)(ii)(B) regarding unanalyzed condition, due to failure of auxiliary building ventilation dampers to close on a safety injection signal at Wolf Creek Generating Station.

Wolf Creek Nuclear Operating Corporation has made no commitments in the enclosed LER. If you have any questions concerning this matter, please contact me at (620) 364-4084, or Mr. Kevin Moles at (620) 364-4126.

Very truly yours,



Terry J. Garrett

TJG/rg

Enclosure

cc: J. N. Donohew (NRC), w/e
W. B. Jones (NRC), w/e
B. S. Mallett (NRC), w/e
Senior Resident Inspector (NRC), w/e

JE22

LICENSEE EVENT REPORT (LER)

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

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME WOLF CREEK GENERATING STATION	2. DOCKET NUMBER 05000 482	3. PAGE 1 OF 4
--	--------------------------------------	--------------------------

4. TITLE
Failure of Auxiliary Building Ventilation Dampers to Close on Safety Injection Signal

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
05	10	2005	2005	- 004 -	00	07	08	2005	N/A	05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE 6	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: <i>(Check all that apply)</i>			
10. POWER LEVEL 0%	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input checked="" type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME Kevin J. Moles, Manager Regulatory Affairs	TELEPHONE NUMBER <i>(Include Area Code)</i> (620) 364-4126
---	---

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	VF	DMP	A340	Y					

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES <i>(If yes, complete 15. EXPECTED SUBMISSION DATE)</i> <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On May 10, 2005, during Wolf Creek Generating Station (WCGS) refueling outage number 14, during performance of integrated testing of the Emergency Diesel Generator and Safeguards Actuation System, four condenser air removal filtration dampers located in the auxiliary building failed to close following a safety injection signal due to a design inadequacy of the actuation circuitry. The function of the dampers is to support operability of the Emergency Exhaust System per Technical Specification LCO 3.7.13, which limits the release of radioactivity from the Auxiliary Building following certain accident conditions. This condition is considered reportable to the requirements of 10 CFR 50.36(c)(2), 10 CFR 50.73(a)(2)(i)(B), 10 CFR 50.73(a)(2)(v)(C), and 10 CFR 50.73(a)(2)(ii)(B).

The design inadequacy was determined to have occurred in 1981, prior to commercial operation. The deficiency in the design of the actuation circuitry was corrected and modifications were implemented in the field prior to entering the mode requiring operability of the Emergency Exhaust System. The four modified dampers were tested and all were found acceptable.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
WOLF CREEK GENERATING STATION	05000 482	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
		2005	-- 004	-- 00	

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Background:

The emergency exhaust system (EES) [EIS: VF] exhausts from the auxiliary building following a loss of coolant accident (LOCA) and processes the air through a charcoal adsorber train prior to releasing it to the atmosphere through the unit vent. The EES also exhausts a limited amount of air from the fuel building following a LOCA to prevent excessive negative pressure in the auxiliary building.

The EES serves the auxiliary building only following a LOCA to assure that all emergency core cooling system (ECCS) leakage to the auxiliary building atmosphere and the containment air purged via the hydrogen purge system are processed. All ductwork which is not required for operation of the emergency exhaust system and penetrates the auxiliary building boundary is automatically isolated. These nonessential systems are provided with two motor-operated dampers [EIS: DMP] in a series arrangement at the boundary penetrations. These dampers will close automatically following receipt of a safety injection signal (SIS). The emergency exhaust system maintains a negative pressure in the auxiliary building to assure that all leakage is into the building.

Two auxiliary building boundary penetrations are part of the main condenser air removal filtration system [EIS: SH]. Ductwork directs non-condensable gasses from the main condenser [EIS: COND] to the auxiliary building penetration. Two motor-operated dampers in each penetration, one powered from safety train A and one powered from safety train B, close on a SIS to isolate the auxiliary building boundary as described above.

An integrated system test demonstrates the operation of the valves, pump circuit breakers and the automatic loading of emergency core cooling system (ECCS) components on the emergency diesel generators by introducing a SIS and simultaneously simulating a loss of offsite power to the vital electrical busses. The electrical bus supplying power to the damper motor operators would be shed by the load shedder emergency load sequencer (LSELS) and then re-loaded, if the safety injection SIS is still present, with power supplied by the emergency diesel generator.

Plant Conditions Prior to the Event:

Mode – 6

Power – 0%

RCS temperature was approximately 90 degrees F at atmospheric pressure.

Event Description:

On May 10, 2005, during Wolf Creek Generating Station (WCGS) refueling outage number 14, technical specifications surveillance testing simulating a LOCA coincident with a loss of off-site power was being conducted. It was noted that the four dampers required to close to isolate the auxiliary building from the main condenser air removal filtration system had not fully closed, but were in mid-position. A review of the test sequence revealed that the loss of off-site power portion of the test was initiated while the damper was stroking to the closed position.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
WOLF CREEK GENERATING STATION	05000 482	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3 OF 4
		2005	-- 004	-- 00	

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Event Description Continued:

If power is lost to the electrical bus during the stroking operation, the motor operator would stop and the damper would remain in its current position until the power to the bus was restored by the LSELS. Then the motor should restart and move the damper to its required closed position. The damper motor operator electrical circuitry design was investigated and it was determined that the current design did not allow the motor to receive power following the restoration of power to the electrical bus. The failure of the dampers to fully close, and not reach a fully closed condition once power is restored, would occur only when electrical power is lost while the damper is in mid-position. If the loss of off-site power would occur either prior to or coincident with a SIS signal, or if the damper has reached its fully closed position prior to the loss of off-site power, then the damper will close or remain closed and the auxiliary building boundary will be isolated as required.

The original design indicates the dampers would have closed on a SIS, and if power would have failed during any intermediate position of the stroke, the damper would have closed upon restoration of power. In 1981, a design change was issued which interlocked the condenser vacuum pumps and the condenser air removal filtration fans with the system discharge dampers that close on a SIS. This design change created the problem resulting in the dampers not fully closing once power is restored, if the damper motors lost power in mid-position.

Basis for Reportability:

This condition is being reported pursuant to 10 CFR 50.73 (a)(2)(i)(B), "Any operation or condition prohibited by the plant's Technical Specifications" and 10 CFR 50.36 (c)(2), limiting condition for operation of a nuclear reactor not met. Technical Specification (TS) Limiting Condition for Operation (LCO) 3.7.13, Emergency Exhaust System, requires two trains to be operable while in MODES 1 through 4. An EES train is considered operable when, in addition to other components, its associated dampers are operable. Condition B of TS 3.7.13 requires that if two EES trains are inoperable due to an inoperable auxiliary building boundary in MODE 1 through 4, then the boundary must be restored to OPERABLE status within 24 hours. Since this design inadequacy occurred in 1981, WCGS operated in a condition prohibited by Technical Specifications.

This event is also being reported pursuant to 10 CFR 50.73(a)(ii)(B), "Any event or condition that resulted in the nuclear power plant being in an unanalyzed condition that significantly degraded plant safety." Since the design inadequacy involved dampers in both safety trains, this portion of the auxiliary building boundary isolation system, which is required to meet the single failure criterion does not do so. The additional radioactive release path allowed by open dampers has not been previously evaluated in the radiological analysis of engineered safety features component leakage following a LOCA.

This event is also being reported pursuant to 10 CFR 50.73(a)(2)(V), "Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to ... control the release of radioactive material." The intended safety function (isolation of the auxiliary building boundary following a LOCA) could not be fulfilled since dampers in both trains were incapable of closing if power was lost while the valve was in mid-position.

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
WOLF CREEK GENERATING STATION	05000 482	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		2005	-- 004	-- 00	

17. NARRATIVE (If more space is required, use additional copies of NRC Form 366A)

Root Cause:

The root cause of this condition is design inadequacy. Since the relevant design change occurred in 1981, the circumstances surrounding the design change process and the specific reason for the error could not be determined.

Corrective Actions:

A design change was prepared to correct the design inadequacy. This design change was installed and tested to ensure proper operation on May 13, 2005.

Safety Significance:

The safety significance of this condition is considered to be low. The specific sequence of events that revealed this condition during testing is unlikely to occur during an accident situation. The design issue resulting in the damper failing to close occurs only when the loss of off-site power occurs while the damper is in mid-stroke. It does not occur if the loss of off-site power occurs prior to or coincident with the SIS when the damper is full open, or after the damper has completed stroking and is closed. The stroke time for these dampers is observed to be very short, estimated to be approximately two to five seconds. Therefore, for the dampers to fail to close due to this design issue, a loss of off-site power would have to occur after two seconds, but not later than five seconds after the initiation of a SIS.

Previous Occurrences:

A search of internal operating experience identified three previous occurrences of design inadequacies resulting in either unanalyzed conditions or conditions that could have prevented the fulfillment of a required safety function. In LER 99-009-00, unvalidated engineering judgements in a fire hazards analysis resulted in components not meeting the 10 CFR 50, Appendix R minimum cable separation criteria. In LER 2001-01-00, use of incorrect values in calculations resulted in several safety related instruments being mounted below the projected post accident flood level. In LER 2002-004-01, failure to consider cable-to-cable interactions in the original plant design resulted in the inability to satisfy post-fire safe shutdown requirements.