

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Clay C. Warren
Vice President & Chief Operating Officer

NOV 22 1999

WO 99-0100

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Subject: Docket No. 50-482: Supplemental Licensee Event Report
1999-009-01

Gentlemen:

The enclosed Supplemental Licensee Event Report (LER) 1999-009-01 is being submitted, pursuant to 10 CFR 50.73 (a)(2)(v), regarding Wolf Creek Nuclear Operating Corporation's (WCNOC) identification of a fire separation issue affecting safe shutdown components. This supplement revises the completion date for one of the two commitments made in the original LER.

Attachment I to this letter identifies actions committed to by WCNOC in the enclosed LER.

If you should have any questions regarding this submittal, please contact me at (316) 364-4048, or Mr. Michael J. Angus at (316) 364-4077.

Very truly yours,



Clay C. Warren

CCW/rlr

Enclosure
Attachment

cc: J. N. Donohew (NRC), w/a, w/e
W. D. Johnson (NRC), w/a, w/e
E. W. Merschoff (NRC), w/a, w/e
Senior Resident Inspector (NRC), w/a, 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 information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If 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.

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TITLE (4)
Inadequate Fire Separation Could Result in Loss of Charging Water Capability

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
08	11	1999	1999	009	01	11	22	99	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	MODE 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)																				
POWER LEVEL (10)	100%	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(c)	50.36(c)(1)	50.36(c)(2)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vii)	50.73(a)(2)(viii)(A)	50.73(a)(2)(viii)(B)	50.73(a)(2)(x)	73.71(b)	73.71(c)	OTHER

LICENSEE CONTACT FOR THIS LER (12)

NAME Michael J. Angus Manager Licensing and Corrective Action	TELEPHONE NUMBER (Include Area Code) (316) 364-4077
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

YES	<input checked="" type="checkbox"/>	NO		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (16):

On August 11, 1999, while reviewing a Licensee Event Report from another plant, WCNOC personnel determined that volume control tank (VCT) outlet isolation valves BGLCV112B and C, and VCT level transmitters BGLT112 and BGLT185, do not meet 10 CFR 50 Appendix R Section III.G minimum separation criteria for redundant components required for safe shutdown following a fire. Due to the inadequate separation, in the event of a fire, a potential exists for gas intrusion into the suction of the centrifugal charging pump (CCP).

The preliminary root cause is that the Electrical Fire Hazards Analysis (EFHA), performed in 1984, contained several unvalidated engineering judgments regarding safe shutdown equipment. Those judgments were apparently used as the bases for not providing adequate protection for the VCT outlet valves and level transmitters from a fire. Immediate actions taken include establishing a continuous fire watch and implementing procedure revisions to address operator actions to take in the event of a fire in the affected area. Long-term actions are being evaluated.

This issue is of low safety significance since the plant could have been placed in a safe shutdown condition even if all the assumed failures occurred. The reported condition is outside Wolf Creek's licensing basis for protection of components required for safe shutdown. However, the plant was not challenged by a fire in the affected fire area. Since compensatory measures have been established, the condition no longer poses a potential threat to the safety of the public, plant personnel, or the plant.

Supplement 1 to this LER revises the completion date for the evaluation/design modification related to fire protection of the VCT outlet valves and level transmitters.

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

Plant Conditions Prior to the Event:

The plant conditions on August 11, 1999, when the reported item was determined to be reportable, were:

- Mode - 1
- Power - 100 percent
- Temperature - 586.6 degrees Fahrenheit
- Pressure - 2233.8 pounds per square inch gauge

Basis for Reportability:

Wolf Creek's Volume Control Tank (VCT) outlet valves (BGLCV112B and C) are approximately 42 inches apart and not separated by a 3 hour fire barrier. A postulated fire in this area could prevent these valves from being closed. These valves are normally open to provide a suction source for the centrifugal charging pumps (CCPs). The postulated fire could prevent the VCT from being isolated from CCP suction, allowing the hydrogen cover gas from the VCT to enter the CCPs, damage the pumps, and causing loss of high head safety injection. In addition, the VCT level transmitters associated with the above valves are not separated by a 3 hour fire barrier and are less than 20 feet apart. Thus, a fire could damage both transmitters and prevent them from isolating the VCT from CCPs upon low VCT level. This is a condition considered to be outside the Licensing Basis of the plant for fire protection for safe shutdown components. In the postulated fire scenario, a short circuit could occur and damage the control cables to the valves, thus preventing the valves from closing and isolating the CCPs from the VCT. Therefore, this is a condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to maintain the reactor in a safe shutdown condition.

10 CFR 50.73 (a) (2) (v) states that licensees shall report any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to maintain the reactor in a safe shutdown condition. Pursuant to 10 CFR 50.72 (b) (1) (ii) (B), a one hour notification was made to the NRC Operation Center on August 11, 1999.

Event Description:

NRC Plant Event #35481 reports that on March 5, 1999, Beaver Valley made a non-emergency event notification to identify potential loss of high head safety injection (HHSI)/charging water pump capability due to hydrogen intrusion into the pumps' suction piping. The potential for hydrogen intrusion results from inadequate pre-fire plan procedures to isolate the VCT outlet valves.

The Wolf Creek Fire Hazards Analysis (FHA) validation review has confirmed the potential for loss of charging pump capability also exists at Wolf Creek. Specifically, VCT outlet isolation valves BGLCV112B and BGLCV112C, and VCT level transmitters BGLT112 and BGLT185, do not meet the minimum separation criteria for redundant components required for safe shutdown following a fire, given in 10 CFR 50 Appendix R Section III.G. Because of the inadequate separation between the valves and the transmitters, a potential loss of centrifugal charging pump (CCP) capability is plausible at Wolf Creek. This is because a

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localized fire could render those components inoperable, causing hydrogen intrusion into CCP suction piping.

Root Cause:

Due to the historical origin of this issue, sufficient information is not available to conclude a specific root cause; however, Wolf Creek's review to date has identified that the Electrical Fire Hazards Analysis (EFHA) generated in 1984 contained several unvalidated engineering judgments regarding safe shutdown equipment. Those judgments were apparently used as the bases for not providing fire barriers and fire suppression/detection to protect the VCT outlet valves and level transmitters from a fire. Therefore, the apparent causal factor is Lack of Information Validation or Verification.

Corrective Action Taken:

On August 11, 1999, Operations issued a temporary change (OTSC 99-0273) to Off Normal Operations Procedure OFN KC-016, "Fire Response." The procedure change ensures that, in case of a fire in Room 1318 or Room 1320 between columns A2 and A5, concurrent with a loss of letdown or if letdown has been diverted, an adequate suction source is maintained to the CCPs at all times. The OTSC was issued as essential reading to the operating crews.

On August 11, 1999, Breach Authorization Permit 99-396 was issued to post a continuous fire watch for Room 1318 and Room 1320 between columns A2 and A5.

Actions to Prevent Recurrence:

Engineering will issue an evaluation or a design modification, as appropriate, to meet Appendix R commitments or demonstrate compliance for fire protection of the VCT outlet valves and level transmitters. Planned completion date is December 2, 1999. Any necessary modification will be scheduled for work as a high priority, corrective work order, for the earliest available time after the design change package is issued. Implementation of corrective action will ensure events that could lead to the gas binding scenario are mitigated well in advance and provide a heightened awareness of fire protection for Fire Area A-8.

Supplement 1 information: The completion date for this activity is revised to January 28, 2000.

The corrective action program has identified discrepancies with the FHA. In addition, the USAR Fidelity Review identified similar discrepancies. Subsequently, a FHA Re-validation Project was undertaken. Since the FHA was originally prepared in 1984, standards and the amount of focus on fire protection issues have changed such that there is now a heightened awareness of the Fire Protection Program.

The FHA Re-validation project will validate the post-fire safe shutdown analysis and provide necessary correction to the USAR. This project consists of two phases. Phase One re-verifies the design criteria by identifying the minimum functions/systems necessary to achieve and maintain post-fire safe shutdown. Phase Two will complete the post-fire safe

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shutdown analysis review and ensure that the design criteria established in Phase One are adequately met. The Phase One review includes 44 systems, approximately 800 components and approximately 2180 cables. It is approximately 90% complete with only this issue identified to date. Planned completion date of the FHA Re-validation project is December 15, 2002.

Safety Significance:

The chemical and volume control system (CVCS) maintains the required water inventory in the reactor coolant system (RCS) during normal operation, power changes, startup and shutdown, including pressurizer auxiliary spray for depressurization. The CVCS varies the RCS soluble neutron absorber (boron) concentration to compensate for core burnup. The CVCS provides sufficient boron, in the form of boric acid, for the required shutdown margin during refueling.

Portions of the CVCS associated with emergency boration, charging for emergency core cooling, reactor coolant pressure boundary and containment isolation are safety related. These portions are required to function following either a design basis accident (DBA) or hazard which requires or causes a shutdown (such as a fire) to achieve and maintain the plant in a safe shutdown condition.

The CCP subsystem of the CVCS, in conjunction with other systems, provides a borated injection flow to the RCS upon receipt of a safety injection signal. The CCP subsystem of the CVCS is an integral part of the emergency core cooling systems (ECCS).

If only safety-related equipment is available, the CCP subsystem of the CVCS functions in conjunction with other systems of the cold shutdown design to borate the RCS to achieve and maintain a cold shutdown boron concentration. However, a postulated fire in the subject fire area that causes both the VCT level transmitters to fail in a certain failure mode, and cause a loss of off-site power, could cause the CCPs to become gas-bound within approximately 7 minutes. The failure of both level transmitters could cause the CCP suction valves from the Refueling Water Storage Tank (RWST) to fail to open. The suction valves from the VCT would remain open. The loss of off-site power would cause the instrument air compressors to trip, closing valves BGHV8152 and BGHV8160, which are containment isolation valves on the letdown line to the VCT. This would cause a loss of letdown flow into the VCT. All of the suction to the CCP's would be from the VCT. It has been calculated that the water in the VCT would be exhausted in approximately 7 minutes, and hydrogen gas would be allowed to flow into the suction of the CCP's. This would prevent the CCP's from fulfilling their post-fire hazard function of achieving cold shutdown boron concentration.

For the above scenario to actually occur, several low probability events have to occur. The area in question contains a low amount of combustible material. A fire must occur near the two transmitters. In the area of the transmitters, fixed automatic suppression and detection are installed. A transient combustible and hot work program controls combustibles and ignition sources in the power block.

The transmitters have been analyzed and it has been determined that there are three potential failure modes. Of the three failure modes, two are fail-safe modes, that is, the valves from the RWST would be opened. Since the transmitters each serve one valve, both transmitters would have to fail in the non-safe mode for both of the RWST valves to be negatively affected. This failure mode is a conductor-to-conductor short, and must

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continue to exist. In addition, the circuitry for the transmitters are completely encased in conduit and are not free aired. Once an open circuit is detected, the fail safe signal will be sent to the RWST valves. In addition, the fire must cause a loss of off-site power. Since the fire is postulated to occur in the corridor, where many cables exist, a cable-by-cable analysis is impractical. However, the design of Wolf Creek includes a fuse-to-breaker, and a breaker-to-breaker coordination program. All circuits, by design, trip at the lowest possible level to limit the effect of any fault. There would be at least two levels of protection between this postulated fire and any circuit which could cause a loss of off-site power.

In the unlikely event all of the above events and failures did occur, the plant would trip on a loss of off-site power and would be in the hot standby mode, which is the Wolf Creek "safe shutdown" condition. At this point, loss of the CCP's would only create two concerns: Boration to cold shutdown concentration, and protection of the Reactor Coolant Pump(RCP) seals and O-rings. Since the Component Cooling Water Pumps sequence on following a loss of off-site power, they would provide cooling to the RCP seals and O-rings. The plant operators would have sufficient time to provide a contingent method of borating the reactor, such as repairing a CCP, or providing power to the non-safety related Charging Pump. Operators have a procedure (EMG C-0) to cope with a complete station blackout, which would be more limiting than this condition.

This issue is of low safety significance since the plant could have been placed in a safe shutdown condition even if all the assumed failures occurred. The reported condition is outside Wolf Creek's licensing basis for protection of components required for safe shutdown following a fire. However, the plant was not challenged by a fire in the area which houses the VCT and associated equipment. Since compensatory measures have been established, the condition no longer poses a potential threat to the safety of the public, plant personnel, or the plant.

Other Previous Occurrences:

A similar occurrence involving the volume control tank (VCT) was reported in LERs 1998-004-00 and 1998-004-01. During review of an LER from another plant, Wolf Creek Generating Station (WCGS) personnel identified that the report details were relevant to operation of WCGS. The LER reported the Volume Control Tank isolation valve, which procedures direct operators to close by a local handswitch, did not have redundant control power fusing. In a postulated Control Room fire scenario a short circuit could "blow" the control circuit fuse prior to circuit isolation from the Main Control Board (MCB). This failed fuse condition would not be evident to operators manipulating the hand/isolation switch and could have resulted in failure to close the valve. This event was reported as an event which could have prevented a system from performing its safety function. The cause was determined to be inadequate administrative controls in that the appropriate Control Room fire response plan requirements were not incorporated into procedures. Immediate corrective action included a procedure revision to provide for local manual closure of the valve. Supplement one to this LER provides information associated to a condition found during the corrective actions for the initial LER. While similar, the event reported in LERs 1998-004-00 and 01 did not involve a fire separation question and the corrective actions for those LERs would not have prevented the current situation.

LIST OF COMMITMENTS

The following table identifies those actions committed to by Wolf Creek Nuclear Operating Corporation (WCNOC) in this document. Any other statements in this submittal are provided for information purposes and are not considered to be commitments. Please direct questions regarding these commitments to Mr. Michael J. Angus, Manager Licensing and Corrective Action at Wolf Creek Generating Station, (316) 364-4077.

COMMITMENT	Due Date/Event
Engineering will issue an evaluation or a design modification, as appropriate, to meet Appendix R commitments or demonstrate compliance for fire protection of the VCT outlet valves and level transmitters.	January 28, 2000
The FHA Re-validation project will validate the post-fire safe shutdown analysis and provide necessary correction to the USAR. This project consists of two phases. Phase One re-verifies the design criteria by identifying the minimum functions/systems necessary to achieve and maintain post-fire safe shutdown. Phase Two will complete the post-fire safe shutdown analysis review and ensure that the design criteria established in Phase One are adequately met.	December 15, 2002