WOLF CREEK
NUCLEAR OPERATING CORPORATION

Clay C. Warren
Vice President & Chief Operating Officer

DEC 3 0 1999

WO 99-0110

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

Subject: Docket No. 50-482: Licensee Event Report 1999-014-00

Gentlemen:

The enclosed Licensee Event Report (LER) 1999-014-00 is being submitted, pursuant to 10 CFR 50.73(b)(1)(ii)(B), regarding Wolf Creek Nuclear Operating Corporation's identification of a condition outside the design basis.

The attachment to this letter identifies actions committed to by Wolf Creek Nuclear Operating Corporation 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

Clay C. Warren

CCW/rlr

Enclosure
Attachment

cc: J. N. Donohew (NRC), w/e, w/a
W. D. Johnson (NRC), w/e, w/a
E. W. Merschoff (NRC), w/e, w/a
Senior Resident Inspector (NRC), w/e, w/a

IE22

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION
(6-1998)

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

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.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
WOLF CREEK GENERATING STATION	05000482	1 OF 4

TITLE (4)

Computer Leak Rate Calculation For Containment Sump Leakage Indication Does Not Meet Design

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
12	02	1999	1999	014	00	12	30	1999	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(c)		50.73(a)(2)(iv)		73.71(b)
			20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
			20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER
			20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		Voluntary
			20.405(a)(1)(iv)	X	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		
			20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Michael J. Angus Manager Licensing and Corrective Action	(316) 364-4077

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)				EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES	X	NO				

ABSTRACT (16):

On December 2, 1999, during readiness activities associated to conversion to improved Technical Specifications, Wolf Creek Nuclear Operating Corporation (WCNOC) determined that the current computer leak rate calculation for the instrument tunnel sump and the containment normal sumps would not always detect a 1 gpm leak in one hour. The 1 gpm per hour criterion provides the basis for the Technical Specification. Therefore, inability to properly measure reactor coolant leakage constitutes a condition outside the design basis and is reportable per 10 CFR 50.73 (a) (2) (ii) (B) and NUREG-1022, Revision 1. This condition has existed since 1991 when the Nuclear Plant Information System (NPIS) computer was replaced. The software for the replacement NPIS computer was not properly programmed to calculate the leak rate start time. The root cause of the programming error can not be identified due to the historical nature of the condition.
When discovered, the computer point was modified to provide correct indication. Safety significance is minimal since there are other means of detecting Reactor Coolant Leakage.

Plant Conditions Prior to the Event:

Mode -- 1
Power -- 100 percent
Temperature -- 586.2 degrees Fahrenheit
Pressure - 2238.2 pounds per square inch gauge

Basis for Reportability:

Technical Specification 3.4.15 requires that Reactor Coolant System (RCS) leakage detection shall be OPERABLE. The basis for operability is the ability of leakage detection systems to detect significant reactor coolant pressure boundary degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. The containment sump level and flow monitoring system used to collect unidentified leakage is instrumented to alarm for increase of 1 gpm in the normal flow rate. In 1991, the Wolf Creek Generating Station (WCGS) plant computer manufactured by Honeywell was replaced by a computer system designed and supplied by Science Applications International Corporation (SAIC). However, the new sump level detection calculation program portion did not provide a reset for the 1 gpm detection requirement. Therefore, after the computer replacement, the design basis for the technical specification, as noted in the USAR, was not met and resulted in a condition that was outside the design basis.

In accordance with NUREG-1022, Revision 1, conditions outside the design basis are reportable. Therefore, this event is reportable in accordance with 10 CFR 50.73(a)(2)(ii).

Event Description:

The original design of the WCGS computer system used the Balance of Plant computer to calculate RCS leakage. This system, designed per Specification J-106 by Bechtel, obtained plant secondary side data and primary side data via a data link from the NSSS system. After initial factory testing of the computer systems, a module was added during 1981-82 time frame to enable calculation of RCS leakage. This leakage detection system and the accompanying software was supplied by Honeywell. During initial startup testing in 1985, the Honeywell leak rate software was revised to resolve some functional problems. Specifically, deficiencies were identified that could have caused a failure to detect a leak within the required time to meet commitments to Regulatory Guide 1.97, Revision 2. To correct the deficiencies, software changes were implemented to change the calculation interval to once every 15 minutes. The changes enabled initialization of all sump calculations every 15 minutes after the normal 15 minute calculations take place. A startup test was performed in February 1985 to simulate actual leakage. The test demonstrated that, after the changes were made, the RCS leakage program would ensure leakage of 1 gpm would be detected.

In 1991, a plant computer upgrade was initiated. SAIC was awarded the contract for the computer replacement. The RCS leakage program for the upgrade was part of the system to be supplied by SAIC. The SAIC design specification for the upgrade was based on existing computer applications and additional licensee input. In addition, the Honeywell software supporting the original RCS leakage module was replaced with SAIC software, since the two had been found to be incompatible. The RCS leakage program for the upgrade was initially tested during factory acceptance testing using the SAIC test plan. Review of the SAIC leakage program determined that, during implementation of the computer upgrade in 1991,

the timer used for leak rate calculations did not reset to the 15 minute intervals, as in the original Honeywell software. The SAIC software design document did not specify the timer reset requirement. Although SAIC identified the calculation needed to be at 15 minute intervals, absence of the timer reset requirement from the design document resulted in the SAIC programmer failing to recognize that the time needed to be reset at 15 minute intervals. This deficiency has therefore existed since the 1991 implementation of the computer upgrade.

Root Cause:

Performance Improvement Request (PIR) 1999-3666 was initiated to investigate this event and to determine corrective actions. The root cause of this programming error could not be determined due to the historical nature of the condition.

However, four contributing factors were identified. These factors are:

- The timer used for leak rate calculations was not designed to reset to the 15 minute intervals. The SAIC software design did not specify the timer reset requirement.
- Factory acceptance testing by the vendor failed to identify the leakage program deficiency. The test was not conducted over a long enough time at a small enough value of sump level input, to successfully validate that a 1 gpm leak could be detected within 1 hour.
- The site acceptance test method used by WCNOC also failed to identify the deficiency. No formal quality check was performed on the program conversion since the NPIS is considered non safety-related.
- A programmatic concern was identified as a result of Self Assessment 99-031 associated to the validation, verification, classification and grading of computer software. This issue has resulted in three additional PIRs which will be resolved in accordance with the WCNOC quality program.

Corrective Action Taken:

A software-driven sump event flag was implemented to simulate the cycling on/off of all containment sump pumps, and thus cause sump reference levels to be taken at intervals to support detection of 1 gpm or greater leakage within one hour.

Actions to Prevent Recurrence:

Computer software control procedures will be reviewed and revised as necessary to ensure adequate controls and quality assurance requirements are applied to software-calculated computer points supporting Technical Specification implementation. This corrective action will be completed by April 14, 2000.

Computer points supporting Technical Specification implementation will be identified. The identified points will then be reviewed to ensure they have been appropriately tested and adequate software quality controls have been applied. The study will be completed by April 14, 2000. In addition, an investigation of the issue of classification and grading of software will take place to determine the scope and extent of the concern. Corrective actions generated during Self Assessment 99-031 will be included as part of this evaluation. Corrective actions associated to the programmatic issues will be evaluated by December 22, 2000.

Safety Significance:

Failure to detect RCS leakage using the containment normal sump level indication could potentially result in an unanalyzed condition due to unidentified RCS leakage in excess of that assumed in the safety analyses. The assumption of 1 gpm unidentified leakage detection in the safety analyses is used to develop radiological source term information for dose consequence calculations. However, as described below, other available indications have been used by operators to detect unidentified leakage from RCS pressure boundary degradation. Therefore, the reported condition has no adverse impact on the safety analyses.

Alternate means exist for Control Room operators to detect leakage caused by RCS pressure boundary degradation. These include containment atmosphere particulate and gaseous radioactivity monitors, the containment cooler condensate flow monitoring system, and containment temperature and humidity indications. Leakage rates of the magnitude necessary to be detectable by increased sump levels or more frequent sump pump operation are expected to be noted first by the more sensitive radiation and moisture detection equipment. Since initial plant startup, at least one containment atmosphere particulate radioactivity monitor, at least one containment atmosphere gaseous radioactivity monitor, and the containment cooler condensate flow monitoring system have been in service the majority of time.

Further, gross leakage can be detected by the charging pump flow method (which uses charging flow rate, letdown flow rate, pressurizer level and reactor coolant temperatures), as well as by monitoring pressurizer level and unscheduled increases in the amount of reactor makeup water required to maintain the normal level in the pressurizer. These monitoring capabilities provide reasonable assurance that gross RCS leakage would have been detected despite the past unreliability of calculating containment sump leakage monitoring program. Therefore, there is minimal safety significance associated with this condition.

In addition, RCS Water Inventory Balance STS BB-004 has been performed every 48 hours. This surveillance test does not rely on calculated computer points, and is totally independent of the containment sumps. The surveillance enables calculation of both RCS identified and unidentified leakage, to determine whether they meet the acceptance criteria (no more than 10 gpm identified, and no more than 1 gpm unidentified). This surveillance satisfies Surveillance Requirement 3.4.13.1. Since plant startup, a few cases of minor RCS leakage above the acceptance limits have been identified by this surveillance. In each case, the leaks were isolated and repaired in accordance with established requirements. Therefore, the condition does not represent a condition that compromised plant safety.

Other Previous Occurrences:

LERs were reviewed for the years 1997, 1998, and 1999. This review identified LER 1999-013-00, "Missed Surveillance (Technical Specification 4.5.1.1.b) on Accumulator Boron Concentration Verification Due to Inadequate Tracking Mechanism." LER 1999-013-00 contained a similar contributing cause and corrective action associated to quality assurance of new computer software. However, due to the historical nature of this event, the corrective actions associated to LER 1999-013-00 would not have precluded this event.

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
Computer software control procedures will be reviewed and revised as necessary to ensure adequate controls and quality assurance requirements are applied to software-calculated computer points supporting Technical Specification implementation.	April 14, 2000
Computer points supporting Technical Specification implementation will be identified. The identified points will then be reviewed to ensure they have been appropriately tested and adequate software quality controls have been applied.	April 14, 2000
An investigation of the issue of classification and grading of software will take place to determine the scope and extent of the concern. Corrective actions generated during Self Assessment 99-031 will be included as part of this evaluation. Corrective actions associated to the programmatic issues will be evaluated.	December 22, 2000