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Nuclear Business Unit

OCT 16 1995

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

Attn: Document Control Desk

HOPE CREEK GENERATING STATION
DOCKET NO. 50-354
LICENSEE EVENT REPORT NO. 95-021-00

This Licensee Event Report entitled "Unplanned Inoperability of the High Pressure Coolant Injection System due to Water Contamination of the Lubricating System" is being submitted pursuant to the requirements of the Code of Federal Regulations 10CFR50.73 (a)(2)(v).

Sincerely,

Mark E. Reddemann
General Manager -
Hope Creek Operations

SORC Mtg. 95-097

DVH

C Distribution
LER File

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The power is in your hands

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LICENSEE EVENT REPORT (LER)

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT

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TITLE (4)
Unplanned Inoperability of the High Pressure Coolant Injection System due to Water Contamination of the Lubricating System

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	20	95	95	021	00	10	20	95		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)										
POWER LEVEL (10) 100	20.2201(b)			20.2203(a)(2)(v)			50.73(a)(2)(i)			50.73(a)(2)(viii)	
	20.2203(a)(1)			20.2203(a)(3)(i)			50.73(a)(2)(ii)			50.73(a)(2)(x)	
	20.2203(a)(2)(i)			20.2203(a)(3)(iii)			50.73(a)(2)(iii)			73.71	
	20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iv)			OTHER	
	20.2203(a)(2)(iii)			50.36(c)(1)			X 50.73(a)(2)(v)			Specify in Abstract below or in NRC Form 366A	
20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(vii)					

LICENSEE CONTACT FOR THIS LER (12)	
NAME Mr. J. S. Moyle, Technical Engineer, NSSS	TELEPHONE NUMBER (Include Area Code) 609-339-3022

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED SUBMISSION DATE (15)		
YES (If yes, complete EXPECTED SUBMISSION DATE).	X	NO		MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On September 20, 1995 results of a High Pressure Coolant Injection (HPCI) system oil reservoir sample indicated a moisture content above the specified limit of 0.20% established by the vendor, General Electric. The sample results indicated 0.23% water in the oil. The HPCI system was declared inoperable at 2000 hours. This event is a repeat of an event that occurred December 13, 1994 and reported in LER 354/94-019-00.

HPCI oil reservoir samples were being taken every two weeks as a result of a corrective action identified in LER 354/94-019-00. The oil was drained from the reservoir, gear box, filters, and other miscellaneous components. The oil was drained, and the reservoir was refilled with clean oil. New filters were installed at that time. The HPCI system was declared operable at 2340 on September 21, 1995.

The apparent cause of this event is steam leakage through the turbine steam admission valve. A contributing factor was previously identified corrective actions not yet completed because they are scheduled to be completed in the upcoming refueling outage.

This event is reported in accordance with 10 CFR 50.73(a)(2)(v), any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

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

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
High Pressure Coolant Injection System,
Turbine Lubrication System reservoir {BJ/RVR}*

* Energy Industry Identification System (EIIS) codes and component function identifier codes appear in the text as {ss/ccc}.

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1 (Power Operation)
Reactor Power 100% of rated power, 1109 MWe

There were no structures, components, or systems that were inoperable at the start of the event that contributed to the event.

DESCRIPTION OF OCCURRENCE

On September 20, 1995 results of a High Pressure Coolant Injection (HPCI) system oil reservoir sample indicated a moisture content above the specified limit of 0.20% established by the vendor, General Electric. The sample results indicated 0.23% water in the oil. The HPCI system was declared inoperable at 2000 hours. This is a repeat of an event that occurred December 13, 1994 and reported in LER 354/94-019-00.

HPCI oil reservoir samples were being taken approximately every two weeks as a result of a corrective action identified in LER 354/94-019-00. The moisture content was increasing at a slow rate. The samples taken on August 28, 1995 and September 7, 1995 indicated a moisture content of approximately 0.055 %. The increase from 0.055 % to 0.23 % in 13 days was unexpected.

The oil was drained from the reservoir, gear box, filters, and other miscellaneous components and the reservoir was refilled with clean oil. New filters were installed at that time. The HPCI system was declared operable at 2340 on September 21, 1995.

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ANALYSIS OF OCCURRENCE

The HPCI system consists of a turbine driven pump which receives steam from the reactor and can supply 5600 GPM at rated pressure from the condensate storage tank or the torus. The turbine lubrication system, which also supplies the main pump bearings, consists of a reservoir, cooler, motor driven and shaft driven oil pump. The cooling is supplied from the HPCI booster pump discharge when the pump is in service.

LER 354/94-019-00 identified three potential sources of the moisture contamination. The sources are Oil Cooler tube leakage, pump seal leakage into the bearing housings, and condensation from either turbine seal leakage (due to steam admission valve leakage) or room humidity. Each of these potential sources was evaluated and reported in LER 354/94-019-00. The determination in LER 354/94-019-00 that the most likely source of the water contamination as leakage from the steam admission valve remains valid for this LER.

Trending of the moisture content since December 1994 indicates that the rate of moisture intrusion is proportional to the rate of seat leakage of the Steam Admission Valve, and that valve leakage changes significantly week to week. The leakage appears to worsen after certain evolutions such as cycling of the Steam Admission Valve and starting up from cold shutdown conditions.

APPARENT CAUSE OF OCCURRENCE

The source of water in the HPCI Oil Reservoir has been determined to be steam leakage through the Steam Admission Valve 1FDHV-F001, and subsequent leakage through the turbine shaft seals while the system is in standby. It is believed the leakage has increased through the Steam Admission Valve which caused the unexpected increase in moisture content. A contributing factor to the occurrence of this event was the corrective actions identified in LER 354/94-019 to repair the Steam Admission Valve and install a low point drain have not been completed yet. These corrective actions are scheduled to be completed in the upcoming RFO-6 outage scheduled to start November 11, 1995.

Analysis of the oil samples is done on site except that each month one sample is sent to an off site lab for a more complete analysis. An oil sample was taken on September 12, 1995 following cycling of the Steam Admission Valve during a routine quarterly surveillance HPCI run. This sample was sent off site to the normal lab facility, and the results had not yet been received on September 20, 1995 when the next sample was taken. The September 20, 1995 sample was analyzed on site and found to be 0.23 %. Had the September 12, 1995 oil sample been analyzed on site, with results which indicated 0.13 % moisture, actions could have been taken which may have prevented the moisture concentration from increasing beyond the acceptance limit.

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SAFETY SIGNIFICANCE

This incident posed minimal safety significance. The 0.20 % moisture limit is based on functional capability of the lube oil filters which are made from corrugated paper. NRC Circular 80-07 described a problem associated with a HPCI turbine hydraulic oil failure which was amplified by failure of the paper filters. While the paper material is an excellent filter material for lubrication systems, it is susceptible to water contamination which causes the filter to swell and restrict flow. The incident noted in the NRC Circular involved a water contamination of 20 % to 25 % as compared to the 0.23 % in this LER. Based on this information, GE issued guidance, in GE letter G8-81-88, which recommended continued use of the paper material and provided a recommended preventative maintenance schedule, which has been implemented at Hope Creek. The letter also states, "If moisture of greater than 0.2% is found in the turbine oil, the cause of the moisture should be found and corrected." In the moisture intrusion events in this LER and LER 94-019-00, the HPCI system was immediately removed from service, the reservoir was drained, cleaned and refilled with new oil and the filters were replaced with new elements. Additionally the filters that were replaced showed no signs of abnormal degradation. Based on the above, there is reasonable assurance that the incident posed minimal safety significance.

In addition, the Hope Creek Technical Specifications contains an allowable outage time of 14 days for HPCI provided the Core Spray System, the Low Pressure Coolant Injection, the Automatic Depressurization system, and the Reactor Core Isolation system are operable. These systems were operable. The total time the HPCI was inoperable was less than 26 hours.

PREVIOUS SIMILAR OCCURRENCES

LER 354/90-009-00 and 354/94-019-00 addressed water contamination in the HPCI lubricating system. LER 354/94-019-00 did not address that LER 354/90-009-00 also covered a similar event. The installation of a low point drain line to facilitate periodic draining of accumulated water and sludge was identified as a corrective action in LER 354/94-019-00. LER 354/90-009-00 also identified installing a low point drain line in the reservoir as a corrective action. This drain line has not been installed. The installation of the drain line was re-evaluated after the event described in the 1990 LER as an enhancement and did not address the root cause of the water intrusion. Consequently it was not pursued.

Two corrective actions identified in LER 354/94-019-00 that have not been completed are to repair the Steam Admission Valve and install the low point drain. These are scheduled for the upcoming refueling outage, RFO-6.

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CORRECTIVE ACTIONS

The HPCI lube oil system has been drained and filled with new lube oil.

Oil samples will be taken every week for moisture content; a few gallons of oil will be pumped out each week to help remove accumulated moisture; and the vacuum pump will be run each day. Additional oil samples will be taken after events such as stroking of the Steam Admission Valve and after starting up from cold shutdowns or if increased valve leakage is detected.

All oil samples will be analyzed on site until the repair of the Steam Admission Valve has been completed and shown to be effective.

The 1FDHV-F001, Steam Admission Valve will be repaired in the RFO-6 refueling outage scheduled to start November 11, 1995.

A low point drain valve on the reservoir will be installed in the RFO-6 refueling outage scheduled to start November 11, 1995.