PSE&G

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Nuclear Business Unit

APR 19 1996

LR-N961113

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

Dear Sir:

HOPE CREEK GENERATING STATION
DOCKET NO. 50-354
UNIT NO. 1
LICENSEE EVENT REPORT NO. 96-011-00

This Licensee Event Report entitled "High Pressure Coolant Injection System Failed Surveillance and Automatic Depressurization System Inoperability Resulted in Entry into TS 3.0.3" is being submitted pursuant to 10CFR50.73(a)(2)(i)(B) and 10CFR50.73(a)(2)(v).

Sincerely,

Mark E. Reddemann
General Manager -
Hope Creek Operations

JWK
SORC Mtg. 96-046

C Distribution
LER File

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NRC FORM 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 04/30/98
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

LICENSEE EVENT REPORT (LER)

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

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TITLE (4)
High Pressure Coolant Injection System Failed Surveillance and Automatic Depressurization System Inoperability Resulted in Entry into TS 3.0.3.

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
03	20	96	96	-- 011 --	00	04	19	96		05000
									FACILITY NAME	DOCKET NUMBER
										05000

OPERATING MODE (9)	2	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
POWER LEVEL (10)	8	20.2201(b)	20.2203(a)(2)(v)	x 50.73(a)(2)(i)(B)	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)(ii)	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	TELEPHONE NUMBER (Include Area Code)
John Karrick, LER Coordinator	609-339-5298

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	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE).	x	NO				

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

On March 20, 1996, during plant startup from Refuel Outage 6, the High Pressure Coolant Injection (HPCI) system failed to meet test conditions for an in-service surveillance test. Prior to this test, the plant was prevented from proceeding into Operational Condition 1 by an inoperable Emergency Diesel Generator (EDG). The HPCI test problems added an additional mode change constraint after the EDG was returned to service. The mode constraints prevented the plant from establishing conditions necessary to complete the 18 month manual operability surveillance test for the Automatic Depressurization system (ADS). Technical Specification (TS) 4.5.1.d.2.b provides an exception to TS 4.0.4 for a specific period of time to perform this ADS test. Once this time expired, ADS was declared inoperable after HPCI had already been declared inoperable. Inoperability of both systems required entry into Technical Specification (TS) 3.0.3. The HPCI test problem, which was the inability to establish reference turbine speed for the test, was determined to be the primary cause of the overall event. The cause of the failure to meet test conditions for HPCI was procedural deficiencies which were a result of personnel errors. The HPCI pump flow and head were within specifications at the lower reference turbine speed; therefore, the significance of the test problem was minimal. The ADS system was declared inoperable due to the inability to establish plant conditions for the test. There were no equipment problems noted with the ADS valves. Corrective actions include training, procedure revisions, a review of Operating Experience Feedback information, and a review of other procedures used to calibrate Woodward governors.

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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 (HPCI); EIIS Identifier: {BJ}
Automatic Depressurization System (ADS); EIIS Identifier: {SB}

IDENTIFICATION OF OCCURRENCE:

Event Date: March 20, 1996
Discovery Date: March 20, 1996

CONDITIONS PRIOR TO OCCURRENCE:

The plant was in Operational Condition 2 with plant startup in progress.

The "C" Emergency Diesel Generator (EDG) was inoperable at the start of this event, which did contribute to the event.

DESCRIPTION OF EVENT:

At 0637 on March 18, 1996, the Hope Creek Generating Station (HCGS) entered Operational Condition (OPCON) 2 (Startup) at the end of Refuel Outage 6. During the startup, at 0637 on March 20, 1996, the "C" EDG was declared inoperable due to a low fuel oil storage tank level. The inoperability of this EDG contributed to delays in proceeding from OPCON 2 to OPCON 1.

At 1232 on March 20, 1996, reactor pressure reached the minimum value (700 psig) for performance of the Automatic Depressurization System (ADS) and Safety Relief Valve (SRV) 18 month manual operability test (HC.OP-ST.SN-0001Q) pursuant to Technical Specification (TS) 4.5.1.d.2. This surveillance has a provision that requires this test to be performed within 12 hours after reactor steam dome pressure is adequate to perform the test. This is an exception to TS 4.0.4.

Normally reactor power, pressure and steam flow is increased throughout startup activities and the onset of this surveillance. However, while in OPCON 2, reactor power is limited to approximately 10% due to neutron monitoring system rod block setpoints of 12% power. The mode change constraint caused by the inoperable EDG became a factor since the plant conditions necessary to complete the ADS surveillance (reactor pressure high enough to open 3 turbine bypass valves) could not be achieved in OPCON 2.

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At 1643 on March 20, 1996, with the plant in OPCON 2, the HPCI system was placed in service to perform surveillance testing pursuant to TS 4.5.1.b.3 in conjunction with HPCI pump In-Service Tests (IST). The HPCI system is required to be demonstrated operable at reactor pressures greater than 200 psig within 12 hours after reactor steam pressure is adequate to perform the test. This is also an exception to TS 4.0.4. Due to the inability to establish the procedurally required turbine reference speed, the HPCI system was secured at 1713 to troubleshoot the problem.

At 1848 hours, the "C" EDG was declared operable after refilling the fuel oil storage tanks. This removed the EDG constraint for the OPCON change; however, HPCI system troubleshooting was in progress. This imposed another mode constraint that inhibited ADS testing.

At 2255 hours, the HPCI system was declared inoperable after troubleshooting efforts were unsuccessful. With time running out for performing the ADS surveillance, at 2354 hours, operators began reducing reactor pressure to 100 psig where ADS and HPCI are both not required to be operable . At 0032 hours on March 21, 1996, the 12 hour exception to TS 4.0.4 expired for the ADS surveillance, and ADS was declared inoperable. The combination of HPCI and ADS being inoperable at the same time resulted in entry into TS 3.0.3 and the initiation of a shutdown required by TS. A 1 hour report was made to the NRC pursuant to 10 CFR 50.72 (b) (1) (i) (A) for the initiation of a plant shutdown required by TS.

At 1008 on March 21, 1996, with reactor pressure at 95 psig, the reactor shutdown was terminated and TS 3.0.3. was exited. This report is being submitted pursuant to 10 CFR 50.73 (a) (2) (i) (B) as a condition prohibited by TS and 10 CFR 50.73 (a) (2) (v) as an event or condition alone that could have prevented the fulfillment of a safety function (for the HPCI surveillance test failure).

ANALYSIS OF OCCURRENCE:

The "C" EDG had been operated for a surveillance test prior to startup, after which the indicated fuel oil storage tank (FOST) levels were satisfactory. Engineering guidance pertaining to level indication accuracy exists for FOST levels that was not applied to the "C" EDG until March 20, 1996. When this guidance was used, the levels were lower than what was indicated, and since the time allotted for refilling the FOST had past, the EDG was declared inoperable. Subsequent review has determined that the FOST levels remained above the minimum required per TS. The circumstances regarding the timeliness of actions to restore FOST level is being investigated independent of this report.

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The inability to complete the ADS surveillance testing was caused by the constraints in changing Operational Condition due to the HPCI surveillance test failure and the inoperable EDG. The ADS 18 month system functional test required by TS 4.5.1.d.1. had been successfully completed prior to startup. There were no equipment problems associated with the ADS system throughout this event. Subsequent performance of HC.OP-ST.SN-0001Q on March 24, 1996 was satisfactory.

TS 4.5.1.b.3 requires "Verifying that, when tested pursuant to Specification 4.0.5: The HPCI pump develops a flow of at least 5600 gpm against a test line pressure corresponding to a reactor vessel pressure of 1000 psig when steam is being applied to the turbine at 1000, +20, -80 psig". The procedure that implements this surveillance (HC.OP-IS.BJ-0001) additionally requires that a HPCI turbine speed of 4125 +/- 25 rpm be obtained as a reference value and the pump produce a head of 1196 to 1274 psid in accordance with the IST program. During the test on March 20, 1996, a maximum turbine speed of 4080 rpm was observed. The pump flow achieved at 4080 rpm was 5600 gpm and the head was approximately 1210 psid (these parameters were observed but not recorded). The inability of the HPCI turbine to obtain the IST reference speed resulted in HPCI being declared inoperable at 2255 on March 20, 1996.

It has been determined that procedural deficiencies caused by previous personnel errors resulted in the failed HPCI surveillance. The instrument calibration procedures for the HPCI turbine governor specified a value of 4000 rpm in lieu of the nameplate speed of 4150 rpm. Recently performed calibrations using the deficient procedures set up the turbine governor for a speed of 4000 rpm. The governor controlled speed to within its calibration limits and prevented the turbine from reaching the reference speed during the IST surveillance test.

These procedural deficiencies have been in place since June, 1990, when the calibration procedures were revised to incorporate information contained in General Electric (GE) Service Information Letter (SIL) 351, revision 2. This SIL was issued by GE to provide information for the calibration of the Woodward governor installed on HPCI turbines. Within the SIL, 4000 rpm was used as the nominal value, but the SIL provided specific instructions for each plant to establish their plant specific governor calibration settings. This was not done at Hope Creek.

During RFO 6, the hydraulic portion of the HPCI turbine governor (EGR) was replaced. This EGR is factory calibrated and can only be tested when the turbine is in service. The null voltage adjustment for the EGR can vary as much as 100 rpm. It is believed that the previous null voltage was set up on the high side of 4000 rpm. This setting, calibration tolerances, and speed indication accuracy masked the procedural deficiencies in the past. The new EGR and its null voltage setting was closer to 4000 rpm such that the reference speed could not be obtained during the March 20th test.

Had the HPCI surveillance passed with the EDG being restored when it was, there would have been sufficient time to enter OPCON 1 and complete the ADS surveillance test. Therefore, it is concluded that the causes of the HPCI surveillance failure were the indirect cause of the overall event with respect to initiation of a plant shutdown and entry into TS 3.0.3.

APPARENT CAUSE OF OCCURRENCE:

The apparent cause of the HPCI turbine governor procedure discrepancies was the failure of two system engineers and a procedure writer to validate and verify the calibration speed of 4000 rpm against the rated speed of 4150 rpm. This was a personnel error and applies to the June 1990 revision of calibration procedures HC.IC-LC.FD-0001 and HC.IC-LC.BJ-0002.

A contributing cause was the failure of the system engineers to assess the relationship of the governor controls to the required pump flow rate, pump head and reference speed. A second contributor was the HPCI system engineer's failure to develop plant specific HPCI data for the June 1990 procedure revisions recommended by GE SIL 351.

PREVIOUS OCCURRENCES:

A review of Hope Creek LERs over the last two years revealed LERs 94-019, 95-011, 95-021, and 95-025 involving instances of unplanned HPCI inoperability. The details of these events differed from this event such that the root causes and corrective actions were not applicable to this event. LER 95-023, which involved an entry into TS 3.0.3., did not result from similar root causes nor contain corrective actions applicable to this event.

LER 95-008 was similar to this event in that it involved an instance of HPCI system inoperability caused by a personnel error associated with procedures. The details of that event involved the on the spot procedure change process (OTSC). The corrective actions were limited to correcting deficiencies associated with the OTSC process which therefore would not have prevented this event.

LER 95-018 involved both the HPCI and ADS system being declared inoperable due to missed surveillances that were caused by personnel error and procedural deficiencies. However, these procedural deficiencies were associated with improper crediting of channel functional tests performed for TS surveillances. The corrective actions for that event were directed at revisions to the applicable procedures and as such should not have prevented this event.

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ASSESSMENT OF SAFETY SIGNIFICANCE

The HPCI in-service surveillance test is performed quarterly and whenever work is performed on the pump. The surveillance test did specify the correct reference speed. The reference speed used in the in-service test is to ensure that data from each test is obtained using similar test conditions. In this case, the observed pump flow and head parameters were within specifications, but the reference speed could not be obtained and procedural requirements were not met. Subsequent performance of the TS 4.5.1.b.3 surveillance, after re-calibrating the turbine governor, was satisfactory. It has been determined that HPCI remained capable of performing its safety function during the event.

As stated previously, there were no known equipment problems with the ADS system and the 18 month functional test which includes simulated automatic actuation of the system throughout its emergency operating sequence (except for actual valve actuation) was completed satisfactorily prior to startup. Additionally, bench testing of the ADS Safety Relief Valves had been successfully completed during RFO 6, which ensures the relief setpoints were within 1% of their design values. The ADS system was capable of performing its design function during this event.

CORRECTIVE ACTIONS:

1. The HPCI turbine speed control calibration procedure, HC.IC-LC.BJ-0002 was revised on March 22, 1996, to reflect the correct turbine speed and the turbine speed controller was re-calibrated to 4150 rpm. HC.IC-LC.FD-0001 was revised on April 5, 1996 to reflect the correct turbine speed.

2. This event will be reviewed at Hope Creek System Engineering training. This training will be completed by May 31, 1996.

3. The calibration procedures for Woodward governors in the RCIC and EDG systems and applicable IST procedures will be reviewed to verify speeds are calibrated to proper values and the speeds required by applicable IST procedures are achievable. This review will be completed by May 28, 1996.

4. A review of the implementation of a sample of Operating Experience Feedback (OEF) data assigned to System Engineering will be performed to verify that plant specific data has been developed and implemented when required by the OEF information. This review will be completed by June 28, 1996.