PSEG Nuclear LLC
P.O. Box 236, Hancocks Bridge, New Jersey 08038-0236

PSEG
Nuclear LLC

OCT 3 1 2001

LRN-01 – 0369

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

SPECIAL REPORT 354/2001-003-00
HOPE CREEK GENERATING STATION
FACILITY OPERATING LICENSE NO. NPF-57
DOCKET NO. 50-354

Gentlemen:

This Special Report entitled "Potential to Exceed Licensed Power Level Due to Reactor Heat Balance Calculation Error" is being submitted pursuant to the requirements of License Conditions 2.C. (1) and 2.F. The attached Special Report contains no commitments.

Sincerely,

D. F. Garchow
Vice President -
Operations

Attachment

/MGM

C Distribution
LER File 3.7

IE22

NRC FORM 366 (7-2001)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 7-31-2004

Estimated burden per response to comply with this mandatory information 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 Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@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 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

LICENSEE EVENT REPORT (LER)

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

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Hope Creek Generating Station	05000354	1 OF 4

4. TITLE

Potential to Exceed Licensed Power Level Due to Reactor Heat Balance Calculation Error

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
10	10	01	2001	– 003	– 00	10	31	01	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	1
10. POWER LEVEL	95

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)
20.2203(a)(1)	50.36(c)(1)(i)(A)	50.73(a)(2)(iv)(A)	73.71(a)(4)
20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)
20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	X OTHER Specify in Abstract below or in NRC Form 366A
20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	
20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	
20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)	
20.2203(a)(2)(vi)	0.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)	
20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)	

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
Michael G. Mosier, Senior Licensing Engineer	856-339-5434

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

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

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

On September 28, 2001 PSEG Nuclear LLC received a General Electric (GE) report titled, 'Impact of Steam Carryover Fraction on Process Computer Heat Balance Calculations, September 2001,' from the Boiling Water Reactor Owners Group (BWROG). This report documents a non-conservative assumption for moisture carryover used in the calculation of core thermal power. The assumed carryover fraction of 0.1% was discovered to be closer to 0.0% (non-conservative) in later model GE BWRs. Hope Creek Generating Station may be affected by the non-conservative core thermal power calculation with an estimated bias of less than 4 MWt. As a result, there is a potential that Hope Creek Generating Station has operated at power levels in excess of 100 percent of rated power as stated in License Condition 2.C (1). This event is being reported as a Special Report in accordance with the requirements of License Condition 2.F.

The apparent cause, as described in the GE report, is that a non-conservative assumption for moisture carryover was used in the calculation of core thermal power. The design specification for the steam separator/steam dryer of 0.1% carryover was assumed to be correct and was used in the plant process computer for many BWR units.

The immediate corrective action was to limit shift average power to not exceed 99.9% of rated.

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)					PAGE (3)		
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER			
Hope Creek Generating Station	05000354	2001	0	0	3	00	2	OF	4

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)

Computer System (ID)

- Energy Industry Identification System {EIIS} codes and component function identifier codes appear as (SS/CCC)

IDENTIFICATION OF OCCURRENCE

Date determined to be reportable: October 2, 2001

CONDITIONS PRIOR TO OCCURRENCE

Mode 1 – 95% power. No structures, systems, or components were inoperable at the time of the occurrence that contributed to the event.

DESCRIPTION OF OCCURRENCE

On September 28, 2001 the Operating Experience Group received a fax from the Boiling Water Reactor Owners Group (BWROG). The fax contained a report titled, "Impact of Steam Carryover Fraction on Process Computer Heat Balance Calculations." This report noted that recent measurements of steam carryover fraction in BWR 4s, 5s, 6s, and ABWRs indicated that the fraction was significantly lower than 0.1%. The value of 0.1% is based on the specifications for the steam dryer and is used by the plant process computer as a constant term in the calculation of core thermal power.

On October 2, 2001, at 1620, a twenty-four hour notification was made to report potential operation outside of License Condition 2.C (1), which authorizes PSEG Nuclear LLC to operate the facility at reactor core power levels not in excess of 3339 megawatts thermal (100 percent rated power). This event is being reported as a Special Report in accordance with the requirements of License Condition 2.F.

ANALYSIS OF OCCURRENCE

The impact of the use of an incorrect moisture carryover value in the plant process computer was that actual core thermal power may have been higher than the indicated thermal power. The immediate recommendation was to limit shift average core thermal power to not exceed 99.9% of rated.

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)					PAGE (3)		
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER			
Hope Creek Generating Station	05000354	2001	0	0	3	00	3	OF	4

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

ANALYSIS OF OCCURRENCE (Cont'd)

The GE report calculates a bias of 0.08% on core thermal power with use of 0.1% carryover fraction. At the time of occurrence, Hope Creek was operating at 95% of rated power. An administrative shift average power limit of 99.9 % was implemented. This was in effect until Tuesday, October 9, when Hope Creek began shutdown for RF10.

On October 2, 2001, at 1620, a twenty-four hour notification was made to report potential operation outside of License Condition 2.C (1), which authorizes PSEG Nuclear LLC to operate the facility at reactor core power levels not in excess of 100 percent rated power. This event is being reported as a Special Report in accordance with the requirements of License Condition 2.F.

CAUSE OF OCCURRENCE

The apparent cause, as described in the GE report, is that the design specification for the steam separator/steam dryer moisture carryover of 0.1% was based on measurements for BWR/3s. This was assumed to be correct for all BWRs and was used as input to the plant process computer. Based on results from later model BWRs, carryover fractions on the order of 0.003% are typical. This reduction has been attributed to design improvements.

PRIOR SIMILAR OCCURRENCES

Prior Hope Creek LERs were reviewed for similar potential overpower events. One event was identified that resulted in Operating in Excess of 100 Percent of Rated Core Thermal Power based on a nonconservative calculation assumption (see LER 95-039-00). This event was related to control rod drive (CRD) system flow. The previous corrective actions would not have prevented this event.

SAFETY CONSEQUENCES AND IMPLICATIONS

The magnitude of the impact (0.08% CTP) is such that nuclear instrumentation calibration would not be affected (APRMs must be within 2% of the heat balance power). There is also no impact on core operating limits since the power measurement uncertainties in the calculations that produce thermal limits are 2% (SLMCPR, for example). Therefore, this issue has no safety-significance. Reactor power was maintained within uncertainties used in the Hope Creek Accident and Transient Analysis.

A review of this condition determined that a Safety System Functional Failure (SSFF) has not occurred as defined in Nuclear Energy Institute (NEI) 99-02.
Based on the above this event did not present an undue risk to the health and safety of the public.

FACILITY NAME (1)	DOCKET (2) NUMBER (2)	LER NUMBER (6)					PAGE (3)		
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER			
Hope Creek Generating Station	05000354	2001	0	0	3	00	4	OF	4

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

CORRECTIVE ACTIONS:

1. The carryover fraction input parameter used in plant process computer for core thermal power calculations was changed from 0.1% to 0.0%

2. Reactor Engineering has revised HC.RE-RA.ZZ-0001 to change carryover fraction used in manual heat balance.

3. A change notice has been posted to the Hope Creek Heat Balance Uncertainty Calculation SC-BB-0525 to incorporate the change in carryover fraction from 0.1% to 0.0%. This is being tracked by the Corrective Action Program.

4. An action has been generated in the Corrective Action Program to review existing calculations concerning Hope Creek Heat Balance and determine if revision is necessary based on this change to carryover fraction.

COMMITMENTS

The corrective actions cited in this Special Report do not constitute commitments.