



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038-0236

Nuclear Business Unit

JAN 04 1996

LR-N96002

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

Attn.: Document Control Desk

Dear Sir:

HOPE CREEK GENERATING STATION  
LICENSE NO. NPF-57  
DOCKET NO. 50-354  
UNIT NO. 1  
LICENSEE EVENT REPORT NO. 95-039-00

This Licensee Event Report entitled "Operation in Excess of 100 Percent Rated Core Thermal Power due to Core Thermal Power Calculation Methodology Error" is being submitted to the requirements of the Operating License, NPF-57, Section 2.F.

Sincerely,

M. E. Reddemann  
General Manager  
Hope Creek

Attachment LER  
SORC Mtg. 95-130  
JJK

c Distribution  
LER File 3.7

9601160002 960104  
PDR ADOCK 05000354  
S PDR

110110  
The power is in your hands.

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: 50.0 HR. 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

FACILITY NAME (1) HOPE CREEK GENERATING STATION	DOCKET NUMBER (2) 05000-354	PAGE (3) 1 OF 4
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TITLE (4)  
Operation in Excess of 100 Percent Rated Core Thermal Power due to Core Thermal Power Calculation Methodology Error

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
12	08	95	95	-- 039	-- 00	01	04	96		05000
										05000

OPERATING MODE (9) 5  
POWER LEVEL (10) 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

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)(ii)	50 73(a)(2)(iii)	73 71
20 2203(a)(2)(ii)	20 2203(a)(4)	50 73(a)(2)(iv)	<input checked="" type="checkbox"/> OTHER
20 2203(a)(2)(iii)	50 36(c)(1)	50 73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A O.L. Condition 2.F
20 2203(a)(2)(iv)	50 36(c)(2)	50 73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Randy Schmidt, Reactor Engineering Supervisor	TELEPHONE NUMBER (Include Area Code) 609 - 339 - 3740
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NFRDS

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On December 8, 1995, Hope Creek Generating Station reported an incident per Operating License condition 2.F due to the confirmation of a nonconservative error in the core thermal power (CTP) calculation. A portion of the control rod drive system (CRD) system flow is diverted to the recirculation pump seals for purge flow. Some of this flow is allowed to leak to the drywell equipment drain sump; however, most of it passes along the pump shaft into the reactor coolant and thus into the vessel. Since the CRD system flow element is located downstream of the diversion point for the purge flow, this energy and flow input were not accounted for in the Hope Creek CTP calculation. An analysis was performed and confirmed that when this additional flow is included, core thermal power is nonconservative by a maximum of 1.67 Mwt or 0.051 percent of rated power. The apparent cause of this discrepancy is failure to account for this flow path in the original vendor supplied CTP calculations. Although this error is nonconservative, it is of small magnitude and does not represent a safety concern. Corrective actions include revising the CTP calculations to reflect this additional flow.

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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)  
Control Rod Drive System (CRD) - EIIS Identifier AA

IDENTIFICATION OF OCCURRENCE

Date determined to be reportable: December 8, 1995

CONDITIONS PRIOR TO OCCURRENCE

Plant in Mode 5 (Refueling)  
Reactor at 0% of Rated Power

DESCRIPTION OF OCCURRENCE

On December 8, 1995, while shutdown for refueling, Hope Creek Generating Station concluded that a nonconservative calculation error within the core thermal power calculation resulted in operation marginally above 100 percent of rated core thermal power (i.e. 3293 Megawatts thermal power (Mwt)). During a review of industry events, this condition was determined to be applicable at Hope Creek and potentially generic to other General Electric BWR's. Specifically, flow from the Control Rod Drive (CRD) system was not properly accounted for in the core thermal power calculation. This flow results in an actual reactor power exceeding indicated power.

ANALYSIS OF OCCURRENCE

In the Hope Creek Generating Station's original design, a portion of the CRD system flow is diverted to the reactor recirculation system pump seals for purge flow. Some of this flow is allowed to leak off to the drywell equipment drain sump; however, most of this seal purge flow passes along the pump shaft into the reactor coolant and thus into the vessel. Since the CRD system flow element is located downstream of the diversion point for purge flow, this energy and flow input were not accounted for in the CTP calculation. This flow is locally adjustable and limited by operating procedures. Initially the flow was limited to 10 gpm. During March 1992 the operating procedure was revised to reduce the limit to 5 gpm as recommended by the vendor to reduce the severity of thermal stresses in the recirculation pump shafts and covers.

Manual calculations performed as part of this evaluation show that when this additional flow is included, core thermal power is higher by approximately

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1.67 Mwt prior to March 1992 (10 gpm flow) and 0.84 Mwt (5 gpm flow) after March 1992. Hope Creek does not use diverted CRD flow for reactor water cleanup system pump seal cooling, as do some other plants, which would increase the magnitude of the nonconservative error.

This event is reportable in accordance with Operating License, NPF-57, Section 2.F due to violation of Section 2.C.1, "... authorized to operate the facility at reactor core power levels not in excess of 3293 megawatts thermal...".

## APPARENT CAUSE OF THE OCCURRENCE

The apparent cause for the nonconservative calculation error was the failure to account for the effect of unmonitored CRD flow entering the reactor through the Recirculation Pump seal when the vendor developed the initial core thermal power calculation. Additionally the Architect Engineer and Hope Creek Engineering failed to identify the error.

The core thermal power calculations were provided as part of the process computer system in the original plant design. A review of the documentation for the process computer confirmed that this flow path was not documented as being accounted for in some other manner such as inclusion in the overall calculation uncertainty. It can not be determined if the root cause was oversight, inadequate documentation, or some combination of these and other causal factors.

## SAFETY SIGNIFICANCE

This event had minimal safety significance. Reactor power was maintained within uncertainties used in the Hope Creek Accident and Transient Analysis throughout this event.

## PREVIOUS OCCURRENCES

There have been three previous conditions of overpower conditions. One event was attributed to a span error on the feedwater flow transmitters, see LER 88-024-00. The other two events were reported in Special Report 94-003 and relate to a procedural non-compliance and an equipment malfunction. These events were reviewed against the current event and are different as to causal nature. Therefore, previous corrective action should not have prevented this event.

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

CORRECTIVE ACTIONS

The following corrective actions are being taken to correct the condition and prevent recurrence:

1. Changes will be made to the computer core thermal power calculation to account for the missing input. The manual CTP calculation procedure will be revised to reflect the changes. This will be completed prior to plant startup from the current refueling outage.
2. The core thermal power calculations will be reviewed against the plant configuration to confirm that all necessary inputs are included in the calculation. This will be completed prior to plant startup from the current refueling outage.
3. The operating procedures that limit recirculation pump purge flow will be revised to ensure future revisions that alter the flow will be reviewed against the CTP calculation. This will be completed by April 1, 1996.
4. The design considerations checklists will be reviewed for controlling changes which affect the CTP calculations and revised if necessary. This will be completed by June 1, 1996.
5. Past Hope Creek overpower events will be reviewed to determine whether the combined effects present any challenge to the steady state Technical Specification thermal limit LCOs, or whether this overpower event would change any previously reported conclusions. This will be completed by February 1, 1996.