



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

Nuclear Business Unit

SEP 30 1996

LR-N96304

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. 96-014-01

This supplemental Licensee Event Report entitled "Non-conservative safety limit minimum critical power ratio calculation methodology error discovery" is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(ii).

Sincerely,

M. B. Bezilla
General Manager -
Hope Creek Operations

Attachment LER
SORC Mtg. 96-091
JJK

C Distribution
LER File 3.7

9610040129 960930
PDR ADOCK 05000354
S PDR

IE221,

The power is in your hands.

SEP 30 1996

Document Control Desk
LR-N96304

Attachment A

The following item represents the commitment that Public Service Electric & Gas (PSE&G) made to the Nuclear Regulatory Commission (NRC) relative to this LER (354/96-014-01). The commitments are as follows:

MCPR is being controlled at an interim value that bounds initial accident analysis conditions until this matter is resolved. This value is conservative with respect to the NFV calculated MCPR of 1.094 and Technical Specification section 2.1.2 limits.

Upon NRC approval of the NFV licensing topical report, PSE&G will submit a Hope Creek Technical Specification amendment request for the SL MCPR. This amendment request will be submitted within 90 days of notice of NRC approval. The NFV topical report submittal to the NRC is currently anticipated by February 13, 1997.

EXPIRES 04/30/98

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 5

TITLE (4)

Non-conservative Safety Limit Minimum Critical Power Ratio Calculation Methodology Error Discovery.

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
04	16	96	96	-- 014	-- 01	09	30	96		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)							
			20.2201(b)			20.2203(a)(2)(v)			50.73(a)(2)(i)(B)	
			20.2203(a)(1)			20.2203(a)(3)(i)			50.73(a)(2)(viii)	
POWER LEVEL (10)		100	20.2203(a)(2)(i)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)	
			20.2203(a)(2)(ii)			20.2203(a)(4)			50.73(a)(2)(iii)	
			20.2203(a)(2)(iii)			50.36(c)(1)			50.73(a)(2)(iv)	
			20.2203(a)(2)(iv)			50.36(c)(2)			50.73(a)(2)(v)	
									OTHER	
									Specify in Abstract below or in NRC Form 366A	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (include Area Code)
Jeff Keenan, Licensing	609 - 339 - 5429

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)

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

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

This LER supplement provides updated information to our report dated May 14, 1996. On April 16, 1996, Hope Creek was notified, by our nuclear fuel vendor (NFV), that generic reactor core calculations methods do not bound the current cycle reactor core. Verified values for our GE9 fuel product Safety Limit (SL) Minimum Critical Power Ratio (MCPR) supplied by the NFV are 1.08 with two loop operation and 1.09 for single loop operation. As the newly confirmed SL MCPR value is nonconservative with respect to the Technical Specification section 2.1.2 limits (SL MCPR shall not be less than 1.07 with two recirculation loop operation and shall not be less than 1.08 with single recirculation loop operation), a notification per 10 CFR 50.72(b)(1)(ii) and a report per 10 CFR 50.73(a)(2)(ii)(B) as a condition that could result in conditions outside the design basis of the plant were made on April 16, 1996 and May 14, 1996 respectively. The apparent causes of the event include less than adequate design assumptions and design review process when developing procedures and processes to determine SL MCPRs. In addition, past independent review processes were not established or were less than adequate in identification of this condition. Corrective actions include interim controls on MCPR, development of an action plan, an audit of NFV root cause report, and submitting a Technical Specification amendment pending topical report approval.

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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)

IDENTIFICATION OF OCCURRENCE

Discovery Date: April 16, 1996

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1

Reactor at 100% of Rated Power and there were no Systems, Structures, or Components inoperable that contributed to this event.

DESCRIPTION OF OCCURRENCE

This LER supplement provides updated information to our LER dated May 14, 1996. On April 16, 1996, Hope Creek was notified, by our nuclear fuel vendor (NFV), that generic reactor core calculations methods do not bound the current cycle reactor core. Specifically, a calculation for GE9 fuel product Safety Limit (SL) Minimum Critical Power Ratio (MCPR) yielded a confirmed value of 1.08 for two loop operation and 1.09 for single loop operation. As the SL MCPR value is nonconservative with respect to the Hope Creek Technical Specification section 2.1.2 limit (SL MCPR shall not be less than 1.07 with two recirculation loop operation or shall not be less than 1.08 with single recirculation loop operation with reactor vessel steam dome pressure greater than 785 psig and core flow greater than 10 percent of rated flow), a notification was made per 10 CFR 50.72(b)(1)(ii) on April 16, 1996 at 1545 and was reported per 10 CFR 50.73(a)(2)(ii)(B) on May 14, 1996 as a condition that could result in conditions outside the design basis of the plant.

ANALYSIS OF OCCURRENCE

The fuel cladding integrity SL is set such that no fuel damage is calculated to occur if the limit is maintained. The MCPR is defined as the smallest ratio of power in the assembly which is calculated by application of the critical power correlation to cause some point in the assembly to experience boiling transition. This is then divided by the actual assembly operating power which may exist in the core. MCPR greater than the SL MCPR specified in Technical Specification section 2.1.2 represents a conservative margin relative to the conditions required to maintain fuel cladding integrity. The fuel cladding SL is established with a margin to the conditions which could produce the onset of transition boiling, MCPR of 1.0. The condition of MCPR of less than 1.0 would represent a significant departure from the condition intended by design for planned operation.

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ANALYSIS OF OCCURRENCE (Continued)

The SL MCPR is determined using a statistical model that combines all of the uncertainties in operating parameters and in the procedures used to calculate critical power (Reference Technical Specification Bases section 2.1.2). Calculation of the SL MCPR's is defined in General Electric Standard Application for Reactor Fuel (GESTAR II), NEDE-24011-P-A. The required inputs to the statistical model are the uncertainties listed in Technical Specification Bases Table B2.1.2-1.

The generic GE9 SL MCPR was calculated using licensing basis conditions stated in GESTAR-II and standard NFV procedures. For this analysis, a large equilibrium core operating in 18 month cycles is selected. The analysis is performed at the cycle exposure corresponding to maximum hot excess reactivity, with the flattest possible (i.e. most conservative) power distribution. For these core designs, the peak hot excess reactivity point in the cycle typically represents the point of minimum CPR margin.

In the course of using the new process for plant specific SL MCPR, a discovery was made that the above procedure used for determination of generic SL MCPR may not always yield the most conservative result. When the approved licensing basis conditions and uncertainties were used with the core specific loading and rod patterns selected, the preliminary results yielded a SL MCPR of 1.094 for both middle of cycle (point of peak hot excess reactivity) and end of cycle conditions. This value formed the basis for the preliminary interim actions taken to ensure safe operation of the plant.

The NFV has since supplied a verified Hope Creek Cycle 7 specific value of 1.08 for two loop operation (1.09 for single loop operation). Since the verified SL MCPR value is conservative with respect to the preliminary values used to establish interim corrective actions, the controls in place have been confirmed to be adequate.

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APPARENT CAUSE OF THE OCCURRENCE

The apparent causes of the event include less than adequate design assumptions and design review process when developing procedures and processes to determine SL MCPRs by the NFV. In addition, independent review processes, by the NFV and the utility were either not established or less than adequate in the identification of this condition.

PSE&G has completed an audit of the NFV facility. This audit included a review of the NFV root cause determination process for this event and the identified corrective actions. This audit team evaluated the NFV root cause report to be effective and comprehensive. The root cause investigation determined that the range of applicability for the SL MCPR calculation and procedure were inadequate. Other barriers that were less than adequate included the NFV internal review processes that were designed to identify procedural weaknesses and ineffective corrective actions of concerns raised in prior external audits. The PSE&G audit team ensured that the NFV is tracking the root cause corrective actions to address these issues. (see Corrective Action #4)

ASSESSMENT OF SAFETY CONSEQUENCES

The NFV preliminary evaluation, using nominal conditions and realistic estimates of power uncertainty, indicated that there was no substantial safety hazard involved. Specifically, SL MCPRs calculated under closer to actual conditions are bounded by the generic SL MCPR. Based on the evidence to date, the NFV continues to believe that there is no safety consequence involved. Currently, the NFV is developing a revision to their topical report covering SL MCPR. Specifically, this revision is considering a review and modification of the computer codes used and techniques involved in the SL MCPR analysis process. Approval of this topical report by the NRC is a prerequisite to any plant specific Technical Specification amendment.

At Hope Creek, the operating limit MCPR, as discussed in Hope Creek Safety Evaluation Report (SER) section 4.4.3, is cycle specific. The current MCPR value is 1.26 and is controlled by the Core Operational Limits Report (COLR). The COLR is referenced in the Technical Specifications. The operational history for the current cycle (fuel cycle 7) has been reviewed. The minimum actual MCPR was at least 1.55 at all times. This value is markedly above the interim established administrative limit of 1.29, which is in turn above the minimum operating CPR limits established for accident

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ASSESSMENT OF SAFETY CONSEQUENCES (Continued)

analysis section initial transient conditions. The interim established operational MCPR limit continues to bound initial accident analysis conditions, therefore the Hope Creek Cycle 7 verified SL MCPR value of 1.08 (1.09 for single loop operation) is maintained and has minimal safety consequence.

PREVIOUS OCCURRENCES

A review of previous LERs revealed no events involving safety limit MCPR or concerns with NFV developed documents or calculations.

CORRECTIVE ACTIONS

- 1) MCPR is being controlled at an interim value that bounds initial accident analysis conditions. This value is conservative with respect to the NFV calculated MCPR of 1.08 and Technical Specification section 2.1.2 limits.
- 2) The NFV root cause evaluation is completed, PSE&G has reviewed the report and has established an action plan. This plan includes an internal review of PSE&G NFV evaluation programs to address the SL MCPR issue. This action plan was developed on July 30, 1996.
- 3) PSE&G performed an audit to review the NFV's root cause investigation and deemed the root cause report, including identified corrective actions, to be acceptable. The audit team field review was completed 9/13/96.
- 4) Upon NRC approval of the NFV licensing topical report, PSE&G will submit a Hope Creek Technical Specification amendment request for the SL MCPR. The amendment request will be submitted within 90 days of notice of NRC approval. The NFV topical report submittal to the NRC is currently anticipated by February 13, 1997.