



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038
Hope Creek Operations

July 12, 1991

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 90-014-01

This revised Licensee Event Report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(ii).

Sincerely,

J. J. Hagan
General Manager -
Hope Creek Operations

RBC/

Attachment
SORC Mtg. 90-068

C Distribution

The Energy People

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LICENSEE EVENT REPORT																				
FACILITY NAME (1) HOPE CREEK GENERATING STATION												DOCKET NUMBER (2) 0 5 0 0 0 3 5 4						PAGE (3) 1 OF 6		
TITLE (4): DESIGN CALCULATION ERROR RESULTS IN TECHNICAL SPECIFICATION LIMIT FOR ULTIMATE HEAT SINK (DELAWARE RIVER) BEING ESTABLISHED UNCONSERVATIVELY HIGH																				
EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)										
MONTH	DAY	YEAR	YEAR	**	NUMBER	**	REV	MONTH	DAY	YEAR	FACILITY NAME(S)					DOCKET NUMBER(S)				
0	8	1790	90	-	014	-	01	0	7	1291										
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR: (CHECK ONE OR MORE BELOW) (11)																		
		20.402(b)				20.405(c)				50.73(a) (2) (iv)				73.71(b)						
POWER LEVEL: 1 0 0		20.405(a) (1) (i)				50.36(c) (1)				50.73(a) (2) (v)				73.71(c)						
		20.405(a) (1) (ii)				50.36(c) (2)				50.73(a) (2) (vii)				XX OTHER (Specify in						
		20.405(a) (1) (iii)				50.73(a) (2) (i)				50.73(a) (2) (viii) (A)				Abstract below						
//////////		20.405(a) (1) (iv)				XX 50.73(a) (2) (ii)				50.73(a) (2) (viii) (B)				and in Text)						
//////////		20.405(a) (1) (v)				50.73(a) (2) (iii)				50.73(a) (2) (x)				10CFR21						
LICENSEE CONTACT FOR THIS LER (12)																				
NAME Richard Cowles, Senior Staff Engineer - Technical												TELEPHONE NUMBER 6 0 9 3 3 9 3 4 3 1								
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE NOTED IN THIS REPORT (13)																				
CAUSE	SYSTEM	COMPONENT	MANUFAC- Turer	REPORTABLE TO NPRDS?	CAUSE	SYSTEM	COMPONENT	MANUFAC- Turer	REPORTABLE TO NPRDS?	CAUSE	SYSTEM	COMPONENT	MANUFAC- Turer	REPORTABLE TO NPRDS?	CAUSE	SYSTEM	COMPONENT	MANUFAC- Turer	REPORTABLE TO NPRDS?	
SUPPLEMENTAL REPORT EXPECTED? (14) YES [XX] NO										DATE EXPECTED (15)										
										MONTH DAY YEAR										
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ABSTRACT (16)

On 8/17/90 at 0845, Nuclear Engineering Department personnel informed the Senior Nuclear Shift Supervisor (SNSS, SRO licensed) that the Technical Specification minimum operability value specified for the Ultimate Heat Sink (Delaware River) temperature was unconservatively high (90.5°F). This determination was made after reviewing plant construction design calculations which were utilized to verify design criteria for the Station Service Water (SSWS) Pumps. In response to this finding, an administrative maximum limit of 85° F for the Ultimate Heat Sink (UHS) was established. Exceeding this limit requires entry into required actions as specified in Technical Specifications. Subsequent to this 1990 review, a refined engineering analysis and 10CFR50.59 evaluation of this situation was conducted. The evaluation determined that this administrative limit could be increased to 87.5°F. To date, the following actions have been taken:

- 1) Nuclear Engineering is continuing to perform an engineering analysis of all system design parameters and operating margins to determine if additional margin is available.
- 2) Criteria for increasing surveillance frequencies have been established, should river water temperature approach the current administrative limit.
- 3) A license change request will be submitted to change the Technical Specification required maximum river water temperature as soon as engineering analysis is complete.

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
 Ultimate Heat Sink (EHS Designation: BS)
 Service Water System (EHS Designation: BI)
 Safety Auxiliaries Cooling System (EHS Designation: CC)

IDENTIFICATION OF OCCURRENCE

Design Calculation Error Results in Technical Specification Limit for the Ultimate Heat Sink (Delaware River) Being Established Unconservatively High

Date of Discovery: 8/17/90
 Time of Discovery: 0845
 This LER was initiated by Incident Report No. 90-102

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1 (Power Operation), Reactor Power 100%, Unit Load 1090MWe

DESCRIPTION OF OCCURRENCE

On 8/17/90 at 0845, a Nuclear Engineering Department Supervisor informed the Senior Nuclear Shift Supervisor (SNSS, SRO licensed) that the Technical Specification maximum value specified for the Ultimate Heat Sink temperature (Delaware River) was unconservatively high (90.5°F). This condition was discovered during a review of plant construction design calculations which were utilized to verify design criteria for the Station Service Water System (SSWS) pumps. After consultation with station management, the SNSS initiated a four hour report IAW 10CFR50.72 and an incident report IAW station administrative procedures to document the above findings as a design basis discrepancy. No immediate actions were required by control room personnel.

APPARENT CAUSE OF OCCURRENCE

The primary cause of this occurrence was a misinterpretation of an evaluation of Service Water System and Safety Auxiliaries Cooling System heat exchanger design calculations in 1985 during plant construction by the plant architect / engineering firm.

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ANALYSIS OF OCCURRENCE

During the initial licensing review of the Hope Creek FSAR during plant construction, the NRC staff submitted the following request for clarification of Section 2.4.11.6:

" Identify the maximum temperature of the intake water that will allow the plant to safely shut down under normal and emergency conditions and discuss the ability of the Ultimate Heat Sink to supply service cooling water below this maximum intake temperature."

In conjunction with the plant A/E and the Safety Auxiliaries Cooling System (SACS) heat exchanger vendor, an analysis was conducted to determine this maximum temperature. This analysis was conducted assuming the SSWS pumps were new, and eliminating ASME Section XI allowances for Service Water Pump performance degradation (thus eliminating operational performance margins of the pumps). Results of the analysis determined that under flow conditions for the most limiting event, the maximum SACS inlet temperature (from SSWS) must be no greater than 90.5°F to assure that a maximum SACS outlet temperature of 95°F could be achieved under the highest expected heat loads. Based on this input, FSAR Section 9.2.5.2 was updated to reflect a maximum allowable river temperature of 91.6°F under normal operating conditions, and 90.5°F under LOCA/LOP conditions.

In 1984, a design calculation to determine minimum design pump head for the SSWS pumps was revised, and again indicated that under the most limiting conditions, the pumps would be able to meet required flow rates. The calculations again did not consider any performance margin, and the results of the calculation indicated that the pumps would meet required flow rates.

In June, 1985, during an FSAR validation review, an engineering concern was raised regarding SSWS system flowrates. The concern centered on the capability of SSWS to supply the increased service water flow rate necessary to maintain required SACS heat exchanger outlet temperature under elevated river water temperatures. This concern was dispositioned by stating, in part:

" The design basis river water temperature for Hope Creek is 85°F maximum and 31°F minimum in DITS 10855-D-3.10, paragraph 1.3.1m.

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ANALYSIS OF OCCURRENCE, CONT'D

" The intent of FSAR section (9.2.5.2) was to respond to NRC question 240.15. The postulated scenario, which is not an HC design basis (but required by 10CFR50, Appendix R), was evaluated to determine the maximum river temperatures that could be accommodated by using some of the equipment design margins..."

In response to this concern, FSAR section 9.2.5.2 was modified to state that the higher river water temperatures were a "design assessment parameter only".

Also in June, 1985, the Hope Creek Technical Specification for Ultimate Heat Sink (3.7.1.3) was drafted. In preparing this specification, the writer referred to the parameters discussed in FSAR section 9.2.5.2. The writer assumed that the "design assessment parameter" referenced in the FSAR was the design basis river water temperature, and utilized this number as the Technical Specification limit for river water temperature. During review of the draft Technical Specifications by all parties involved in the review of Hope Creek's Technical Specifications, the basis for this parameter was never questioned.

At the beginning of August, 1990, the station Inservice Test Engineer was involved in reviewing design parameters of SSWS pumps. Since the initial startup of the SSWS in 1985, quarterly IST testing has been conducted on the SSWS pumps. During the course of this testing, pump performance has been monitored. Trending of decreased pump performance prompted the IST engineer to research the possibility of developing a lower baseline performance parameter for pump differential pressure. The previously described deficiencies were discovered by the IST engineer during this research.

In an attempt to resolve this discrepancy, the Nuclear Engineering Department evaluated the calculations and history behind development of the design parameters. Results of this evaluation could not justify the maximum river water temperature being established at 90.5°F to support the pump head necessary for meeting LOCA/LOP flow requirements of the SACS heat exchangers given the current operating margins of the pumps. This information was communicated to plant management and the SNSS on 8/17/90.

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ANALYSIS OF OCCURRENCE, CONT'D

Additionally, the PSE&G Licensing Department evaluated the conditions noted in this report for potential 10CFR21 reportability. It was determined that due to the site specific misapplication of the design calculations, the situation is not clearly reportable under 10CFR21. However, PSE&G finds it prudent to note that this evaluation was conducted.

SAFETY SIGNIFICANCE

As part of the above evaluation, the Nuclear Engineering Department assessed the safety significance of this finding for all occasions where river water temperature had exceeded 85°F. It was noted that the highest recorded river water temperature was seen in 1988, at 86.8°F. Since initial fuel load in 1986, the longest continuous period of time that river water temperature exceeded 85°F was 6 hours, occurring on August 15, 1988.

Technical Specification Action Statement 3.7.1.3.b states that the plant shall be in at least Hot Shutdown within 12 hours and in cold Shutdown the following 24 hours when the maximum average river water temperature is exceeded. Therefore, if the Technical Specification Action Statement had been invoked during the brief periods temperature exceeded 85°F, analysis of these periods indicates that the Action Statement could have been exited prior to the 12 hours elapsing at which point Hot Shutdown is required. The station would have been bounded by Technical Specification LCO limits during all occasions where river water temperature exceeded 85°F.

When the situation described in this report was originally discovered in 1990, it was expected that an evaluation of all applicable system design parameters and calculations could be completed in a timeframe such that a license change request (LCR) could be submitted for NRC review in early 1991. Due to the complexity of the calculations involved, the engineering evaluation could not be completed in support of LCR submittal prior to summer operating conditions in 1991. However, a 10CFR50.59 safety evaluation has determined that a maximum river water temperature of 87.5° assures that the SSWS can remove the required heat load under the most limiting conditions with single SSWS and SACS loop operation.

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CORRECTIVE ACTIONS, CONT'D

1. The Hope Creek Technical Department initiated a design change request to establish the maximum allowable river water temperature given maximum SSWS pump degradation allowed by ASME Section XI. The Nuclear Engineering Department is currently performing further analysis to provide additional margin above 87.5° F.
2. When this evaluation is completed, the Nuclear Licensing Department will submit a Technical Specification change request to reflect the above calculated temperature as the maximum allowable river water temperature.
3. In the interim, Nuclear Engineering has performed a 10CFR50.59 review to support plant operation with river water temperature at a maximum of 87.5°F, as previously described.
4. Nuclear Licensing Department has reviewed the remainder of the subject Technical Specification to determine if alternate or increased surveillance frequencies are necessary as river water temperature approaches 85°F. The surveillance frequency of river water temperature was modified in accordance with this review.
5. As previously noted, an administrative river water temperature limit of 87.5°F has been established.

Sincerely,



J.J. Hagan
General Manager -
Hope Creek Operations

RBC/

SORC Mtg. 91-068