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 (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
HOPE CREEK	05000354	1 OF 5

TITLE (4)

Potential to Operate in an Unanalyzed Condition due to a Design Deficiency in the Overboard Discharge Line

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
										05000
04	10	96	96	015	00	05	10	96	FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9)	1
POWER LEVEL (10)	100

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)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)	X	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)
Robin Ritzman, Hope Creek Operational Licensing	(609) 339-1445

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 DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	NO		XX	XX	XX

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

On 4/10/96, Nuclear Design Engineering personnel met with Operations personnel to discuss the preliminary results of a hydraulic calculation of the emergency Service Water System flowpath. This calculation determines the total Service Water flow in the overboard discharge line. The preliminary results of the calculation indicate that the minimum required Service Water flow required to maintain the Safety Auxiliaries Cooling System (SACS) Heat Exchanger Outlet temperatures below the 95 degree design limit may not be available following a Safe Shutdown Earthquake with a Loss of Offsite Power combined with the Ultimate Heat Sink (UHS) at its maximum Technical Specification allowable temperature and river water level at its Technical Specification minimum. Similar assumptions are made for a hurricane with greater than 100 mph winds. A four hour report was made in accordance with 10CFR50.72(b)(2)(iii). As an immediate action, an administrative limit of 85 degrees was established for the UHS maximum temperature; this has been subsequently lowered to 75 degrees. The postulated combination of events has been determined to have a probability of occurrence of less than 1.0E-6 per year. However, if these events were to occur simultaneously, Service Water/SACS performance would be degraded such that the SACS outlet design temperature would not be maintained. Corrective actions, include a review of the Service Water/SACS/UHS design basis and a determination of the appropriate design modifications. This LER is being submitted in accordance with 10CFR50.73(a)(2)(ii) and 10CFR50.73(a)(2)(v).

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
Service Water
Safety Auxiliaries Cooling System

IDENTIFICATION OF OCCURRENCE

Discovery Date: April 10, 1996
Report Date: May 10, 1996
Problem Report: 960403215

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1 (POWER OPERATIONS)
Reactor Power at 100%

DESCRIPTION OF OCCURRENCE

On April 10, 1996, Nuclear Design Engineering (NDE) personnel met with Operations personnel to discuss the preliminary results of a hydraulic calculation of the emergency Service Water System flowpath. This calculation determines the total Service Water flow in the overboard discharge line. This calculation was part of a review of the Service Water system being performed as a result of the inappropriate Service Water/Safety Auxiliaries Cooling System (SACS) throttle valve settings discussed in LER 96-009.

Following a Safe Shutdown Earthquake (SSE), or a hurricane with greater than 100 mph winds, the normal Service Water flowpath to the Cooling Tower through underground piping downstream of the safety related SACS Heat Exchangers is assumed to be unavailable. In addition, the following conditions are assumed: Loss of Offsite Power, river water level is at the Technical Specification minimum, the Ultimate Heat Sink (UHS) temperature is at its Technical Specification maximum, and the Service Water pumps are performing at the minimum performance acceptable by the Inservice Test (IST) Program. When these factors are combined with the most limiting single failure, assumed to be loss of the redundant Service Water loop, the preliminary calculation performed on May 4, 1996, yielded a maximum UHS temperature of 77.7 degrees to preserve the SACS design basis. This is below the current maximum allowed UHS Technical Specification limit of 88.6 degrees.

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

DESCRIPTION OF OCCURRENCE

On April 10, 1996, at 2215 hours, a four hour report was made in accordance with 10CFR50.72(b)(2)(iii). As an immediate action, an administrative limit of 85 degrees was established for the UHS maximum temperature; this has been subsequently lowered to 75 degrees.

ANALYSIS OF OCCURRENCE

Service Water is supplied to the SACS Heat Exchangers to provide cooling for safety related equipment that is required for the normal and emergency safe shutdown of the reactor. During normal operation, service water is routed through the safety related SACS and non-safety related Reactor Auxiliaries Cooling System (RACS) Heat Exchangers and is then discharged to the cooling tower basin through an underground 48 inch diameter pipe. If the underground pipe flowpath becomes blocked, as assumed during the SSE or after the collapse of the cooling tower during a hurricane with greater than 100 mph winds, a discharge path to the yard through an overboard line is made available.

Recent preliminary calculations indicate that the Service Water flow rate during this postulated event, using the overboard line, would not be sufficient to maintain the SACS Heat Exchanger Outlet temperature below the required 95 degrees. This is due to accumulated system flow resistance from the combination of elevation change, pipe diameter change, and hydraulic losses across the diffuser in the overboard flow path that are not present in the normal return line to the Cooling Tower Basin. In addition, the RACS flowpath was assumed to be unavailable in the initial calculation that determined the UHS temperature limit. The combination of increased hydraulic losses and diverted flow to RACS results in a maximum allowable UHS temperature of 77.7 degrees to preserve the SACS design basis. An administrative limit of 75 degrees has been established to preserve adequate margin. This event is being reported in accordance with 10CFR50.73(a)(2)(ii) and 10CFR50.73(a)(2)(v).

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PRIOR SIMILAR OCCURRENCES

A review of the LERs for the past two years indicated that LERs 95-037 and 96-009 represent prior similar occurrences. These LERs document events where SACS was operated outside of its design basis. Both events involved a discrepancy between calculated system parameters and actual system conditions. However, LER 95-037 was caused by an ineffective corrective action program and LER 96-009 was caused by deficient engineering evaluation procedures. The event reported in this LER is an original design deficiency.

CAUSE OF OCCURRENCE

The cause of this event is an original design calculation deficiency in that the total overboard discharge line flowpath system resistance was estimated non-conservatively by the Architect-Engineer. A rigorous calculation had not been performed during construction to determine the hydraulic losses in the overboard discharge line.

ASSESSMENT OF SAFETY CONSEQUENCES AND POTENTIAL IMPLICATIONS

The loss of the flowpath to the cooling tower basin due to either a SSE or a hurricane with 100 mph winds (the probable maximum hurricane is assumed to have a maximum wind speed of 124 mph), coincident with river water level at the Technical Specification minimum, the UHS temperature at its Technical Specification maximum, the Service Water pumps performing at the minimum performance allowed by IST Program, and the most limiting single failure, assumed to be loss of the redundant Service Water loop, has been determined to have a probability of occurrence of less than 1.0E-6 per year. If this event were to occur with these postulated conditions, Service Water/SACS performance could be degraded such that the SACS outlet design temperature would be exceeded. There are currently no existing calculations that support SACS operation with greater than 95 degree temperature.

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CORRECTIVE ACTIONS

1. A design review and configuration baseline documentation validation of the Service Water system design basis will be completed by 6/6/96. Action items will be assigned as appropriate following the completion of the Service Water system design basis review. These action items will be tracked via the Corrective Action Program. Upon completion of the design basis review, the appropriate maximum UHS temperature will be re-evaluated. Technical Specification changes will be applied for if appropriate.

2. As an interim action, the Technical Specification maximum UHS temperature limit has been administratively lowered to 75 degrees. The limit is imposed as though it were the Limiting Condition for Operation. The administrative limit will remain in place until the appropriate design modifications are complete and/or Technical Specification changes are implemented.