NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Oyster Creek, Unit I	0 5 0 0 0 2 1 9	1 OF 0 5

TITLE (4) Potential Loss of Adequate Containment Cooling During A LOCA Due To A Design Deficiency In The Containment Spray System

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 NAMES	DOCKET NUMBER(S)
0 3	2 1	8 9	8 9	— 0 0 9 —	0 0					0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 0 0 0

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

20.402(b)	20.405(a)	50.73(a)(2)(iv)	73.71(b)
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)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (AREA CODE)
Michael Godknecht, Plant Engineering	6 0 9 9 7 1 1 - 4 1 8 9

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)	X NO				

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

A review of the Containment Spray System (EIIS-BE) logic on March 9, 1989, determined that the system would not perform as expected during a design basis loss of coolant accident (LOCA) due to the design of the system logic. A low low water level in the reactor prevents the Containment Spray System from operating in the torus cooling mode of operation, which is required by the Emergency Operating Procedures. Procedures also restrict manual initiation of the system in the containment spray mode when containment pressure is less than 3 psig. Because this combination of system logic and procedural direction creates a condition where the Containment Spray System cannot be run in either mode when containment pressure is less than 2 psig, long term cooling of the torus is precluded. Continued decay heat addition to the torus will result in a temperature increase in the torus to the point where net positive suction head (NPSH) to the core spray and containment spray pumps would be lost. This occurrence is considered to have potential safety significance in that the loss of NPSH to the core spray pumps could lead to core damage during a LOCA. Any core damage would be minimized by the fact that other sources of water external to the primary containment would be used to provide cooling to the core if the torus was unavailable. As water level in the containment rises due to external sources of water being used to cool the reactor, the NPSH for the pumps should be recovered. Modifications that will allow the system to remove decay heat under all conditions are being evaluated. In the interim, system trip setpoints and procedures have been changed to permit the system to operate in the torus cooling mode regardless of reactor water level.

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DATE OF DISCOVERY

The condition described within this report was identified on March 9, 1989 and determined reportable on March 21, 1989.

IDENTIFICATION OF OCCURRENCE

Review of Containment Spray System (EIIS-BE) determined that the design of the system logic would prevent the operator from cooling the torus as directed in the Symptom Based Emergency Operating Procedures (SBEOP's) during a design basis loss of coolant accident (LOCA). Failure to cool the torus would result in continued heatup of the torus and eventual loss of net positive suction head (NPSH) for the core spray and containment spray pumps. This could result in a loss of adequate core cooling.

This condition is considered reportable in accordance with 10 CFR 50.73(a)(2)(ii)(b) in that the system would not have functioned in accordance with its design basis analysis.

CONDITIONS PRIOR TO OCCURRENCE

The reactor was shutdown, in a refueling outage with various outage related work activities in progress. The system configuration described in this report has existed since initial plant operation.

DESCRIPTION OF OCCURRENCE

The Containment Spray System logic prevents the system from operating in the dynamic test (torus cooling) mode of operation during a low low water level condition in the reactor pressure vessel (86" Top of Active Fuel (TAF)). However, the Emergency Operating Procedures direct the use of the torus cooling mode when high temperatures in the torus are present, and at the same time restrict manual initiation of the system in the containment spray mode when containment pressure is less than 3 psig.

Because this combination of system design and procedural direction creates a condition where the system cannot be run in either mode when containment pressure is less than 2 psig and reactor water level is less than 86" TAF, long term cooling of the torus is precluded. Continued decay heat addition to the torus from the Core Spray System will result in a temperature increase in the torus to the point where NPSH to the core spray and containment spray pumps would be lost.

APPARENT CAUSE OF OCCURRENCE

The apparent cause of this occurrence is an unrecognized system design deficiency in the Containment Spray System which prevents the system from being operated in accordance with the Symptom Based Emergency Operating Procedures.

The Containment Spray System is designed to operate in one of two modes. The containment spray mode of operation is used to spray the drywell during a design basis loss of coolant accident. In this mode, the pumps in the system are tripped when the pressure in the containment drops to 2 psig, either automatically or by the operator, and the operator is prevented by the SBEOP's from manually starting the pumps to spray the drywell until containment pressure increases to 3 psig or greater.

The dynamic test or torus cooling mode of operation is used to recirculate water from the torus, through the containment spray heat exchangers, thus providing long term cooling. In this mode, the automatic trip at 2 psig is bypassed and the operator is directed to run the system to control torus water temperature.

The original safety analsyis for containment response during an accident did not address the automatic pump trip as pressure drops in the containment. The analysis assumes the Containment Spray System operates in the containment spray mode throughout the accident. The dynamic test mode of operation was only expected to be used for testing the system and not for providing long term decay heat removal during a LOCA. However, the low pressure trip of the system is required to prevent de-inerting of the containment, and therefore the dynamic test (torus cooling) mode of operation is required to ensure adequate decay heat removal.

Guidance for running the Containment Spray System in the torus cooling mode is provided in the Emergency Operating Procedures; however, no allowance was made for the condition where torus cooling cannot be provided when containment pressure is less than 3 psig and a reactor low low water level condition exists.

ANALYSIS OF OCCURRENCE AND SAFETY SIGNIFICANCE

The Containment Spray System is designed to remove heat from the primary containment. It is used with the Core Spray System to remove the decay heat of the reactor core from the containment system following a loss of coolant accident.

ANALYSIS OF OCCURRENCE AND SAFETY SIGNIFICANCE (cont'd)

During a LOCA, the condition discussed in this report would create the following circumstances. The Containment Spray System would automatically start in the containment spray mode and act to reduce pressure and temperature in the containment. When the pressure in the containment drops to less than 2 psig, the system will automatically shutoff. Over a period of time, the heat addition from the reactor will cause pressure to increase above 3 psig and the Containment Spray System will be restarted. Long term operation in this mode will result in a cycling of the Containment Spray System between 2 and 3 psig. The time that the system is operating in this mode would not be sufficient to remove adequate decay heat from the torus resulting in heatup of the torus and a loss of NPSH to the containment spray and core spray pumps in about one (1) hour.

Operators would attempt to initiate torus cooling by starting the system in the dynamic test mode but the system logic design will not allow operation in this mode as long as water level in the reactor is less than 86" TAF.

Decay heat in the reactor could still be removed by cross-connecting the suction of the core spray pumps to the condensate storage tank (CST) or by initiating flow from the Fire Protection System via the core spray piping. As water level in the containment rises due to external sources of water being used to cool the reactor, the NPSH for both the core spray and containment spray pumps should be recovered.

This occurrence is considered to have potential safety significance in that the loss of NPSH to the core spray pumps could lead to core damage during a LOCA. Any core damage would be minimized by the fact that other sources of water would be used to provide cooling to the core if the torus was unavailable.

CORRECTIVE ACTION

Short Term

1. The automatic trip setpoint for the Containment Spray System was adjusted to 0.6 psig and procedures were changed such that manual shutdown of the system in the containment spray mode would occur at 0.6 psig. Analysis shows that setting this automatic trip point for the system pumps will greatly extend the time that the system will operate after initiation and yet still prevent de-inerting of the containment.

2. Procedural guidance has been added to the Symptom Based Emergency Operating Procedures directing the installation of electrical jumpers that will lineup one Containment spray System to the torus cooling mode during a loss of coolant accident regardless of the level in the reactor pressure vessel.

CORRECTIVE ACTION (cont'd)

3. Training has been conducted on the procedural changes resulting from this condition and the basis behind the changes. Also, active licensed operators have participated in walkdowns of the electrical jumpers and have been instructed on the requirements for installing them.

LONG TERM

Prior to the discovery of this condition, GPUN had initiated an evaluation into technical justification for the removal of the automatic actuation feature of the Containment Spray System. This evaluation has been expanded to include consideration for any changes that will be required to allow system operation in all modes of operation without the need for electrical jumpers. This evaluation will be completed by September 30, 1989.

SIMILAR EVENTS

None.

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Writer's Direct Dial Number:

April 20, 1989

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
Licensee Event Report

This letter forwards one (1) copy of Licensee Event Report (LER) No. 89-009.

Very truly yours,

E. E. Fitzpatrick
Vice President and Director
Oyster Creek

EEF/BDM:aa
Att.
(0490A:25)

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