NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Calvert Cliffs Unit 1	0 5 0 0 0 3 1 7	1 OF 0 3

TITLE (4)
Loss of Circulating Water Caused by Sea Nettle Impingement

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)
1 0	0 2	8 4	8 4	— 0 1 3	— 0 0	1 0	2 6	8 4	N/A	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 9 2	20.402(b)	20.405(c)	X 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
M. T. Finley, Operational Safety Analyst	AREA CODE 3 0 1 — 2 6 0 — 4 3 7 4

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	
D	C B	P C	A 5 0 2	Y							

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)

At 1606, on October 2, 1984, Unit 1 was manually tripped while operating in MODE 1 at 92% power. This trip was caused by an imminent loss of circulating water due to the clogging of several of the Unit 1 traveling water screens with sea nettles (jelly fish).

A large number of sea nettles in the Chesapeake Bay, the ultimate heat sink, drifted into the plant intake and clogged several traveling water screens. Circulating water pump Nos. 11, 12, and 13 were stopped, in accordance with established procedure, to prevent damage to their associated traveling water screens. The unit was manually tripped, by procedure for operation of the main condenser, when it was known that the second circulating water pump would be stopped.

An evaluation of alternative traveling water screens, better able to permit flow during severe impingement episodes, is being actively pursued.

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

At 1545, on October 2, 1984, during normal MODE 1 operation at 100% power, an alarm indicated to the Control Room Operator that a high differential pressure existed across at least one set of traveling water screens (KE-SCN). The operator then noted that the differential pressures across traveling water screen Nos. 11A and 11B, 12A and 12B, and 13A and 13B were greater than 10" (water) and rapidly increasing. By 1550, the shear pins for traveling water screen Nos. 11A and 11B, 12A and 12B, and 13A and 13B had sheared and those screens had stopped rotating. A power reduction for the unit was commenced at this time.

By 1559, the differential pressure across traveling water screen Nos. 13A and 13B exceeded 40" and circulating water pump (KE-P) No. 13 was stopped in accordance with Operating Instruction (OI) 38A in order to prevent damage to the associated screens due to excessive differential pressure. By 1606, the differential pressure across traveling water screen Nos. 11A and 11B, and 12A and 12B had exceeded 40" and the Shift Supervisor, recognizing the imminent loss of circulating water, ordered the unit tripped in accordance with OI-14 from 92% power and circulating water pump Nos. 11 and 12 stopped.

The actions in Emergency Operating Procedure (EOP)-1 were properly carried out following the trip. Charging pump (CB-P) No. 13 did not start automatically after the trip on decreasing pressurizer level as designed due to a faulty low suction pressure controller (CB-PC). All other safety systems functioned as expected. No personnel errors occurred during the event. All traveling water screens were inspected, cleaned, and repaired (shear pins replaced) as necessary prior to restart of the unit.

The root cause of this event was sea nettle impingement of the traveling water screens. This particular species of sea nettle, Chrysaora, had not been seen before in such large numbers and of such large individual size. Meteorological and bay salinity conditions resulted in the sea nettles being farther north in the bay than normal for this late in the season. Persistent northeasterly winds caused the sea nettles to drift into the plant intake. The traveling water screens were unable to remove such a large quantity, number and size, of sea nettles. As a result, the differential pressure across three of six sets of traveling water screens rose rapidly, forcing operator action to protect the screens and the main turbine.

The shear pin for this traveling water screen is designed to shear in order to protect the major components of the screen and had done so for three sets of screens because of the high differential pressure.

Charging pump No. 12 had been taken out of service prior to this event for packing replacement. When charging pump No. 13 did not start after the trip, only charging pump No. 11 was operating to provide makeup to the reactor coolant system (AB). This allowed pressurizer level and, therefore, pressurizer pressure to decrease more than expected following the trip. The minimum pressurizer pressure reached was 1806 psig, 81 psi above the Safety Injection Actuation Signal (SIAS) setpoint. The faulty pressure controller for charging pump No. 13 was located by troubleshooting the circuit breaker trip circuitry and was repaired within three hours of the event. It was noted that the charging pump pressure controller was not covered under a preventive maintenance program.

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

There have been four similar events at Calvert Cliffs Nuclear Power Plant. However, all four previous events involved fish impingement of the traveling water screens at Unit 1. This is the first sea nettle impingement event experienced at Calvert Cliffs.

Since this event began during **MODE** 1 operation at 100% power, the heat load on both the circulating water (KE) and salt water (BI) systems, whose suctions are protected by the traveling water screens, was at a maximum for non-accident conditions. Therefore, the safety consequences of this event would not have been more severe under reasonable and credible alternative circumstances.

During the first fish impingement event of August 1975, it was noted that if the circulating water pumps were allowed to operate continuously with their associated traveling water screens clogged with fish in spite of the high differential pressure indication in the control room, it is possible to lower the pressure head at the suction of a salt water pump (BI-P) enough to degrade pump operation. Since that event, procedural changes have been implemented that require stopping a circulating water pump when the differential pressure across its associated traveling water screens exceeds 40". Operating experience during the four impingement events that have occurred since the 1975 event has substantiated the fact that timely stoppage of the circulating water pumps prevents any degrading effect on the salt water system. When the circulating water pumps are secured, the traveling water screen differential pressure rapidly decreases to near 0".

Attachment 1 is provided as a description of the Unit 1 intake structure. Each salt water pump takes suction on either of two adjacent circulating water pump wells. There are three salt water pumps, six circulating water pumps, and twelve traveling water screens for each unit.

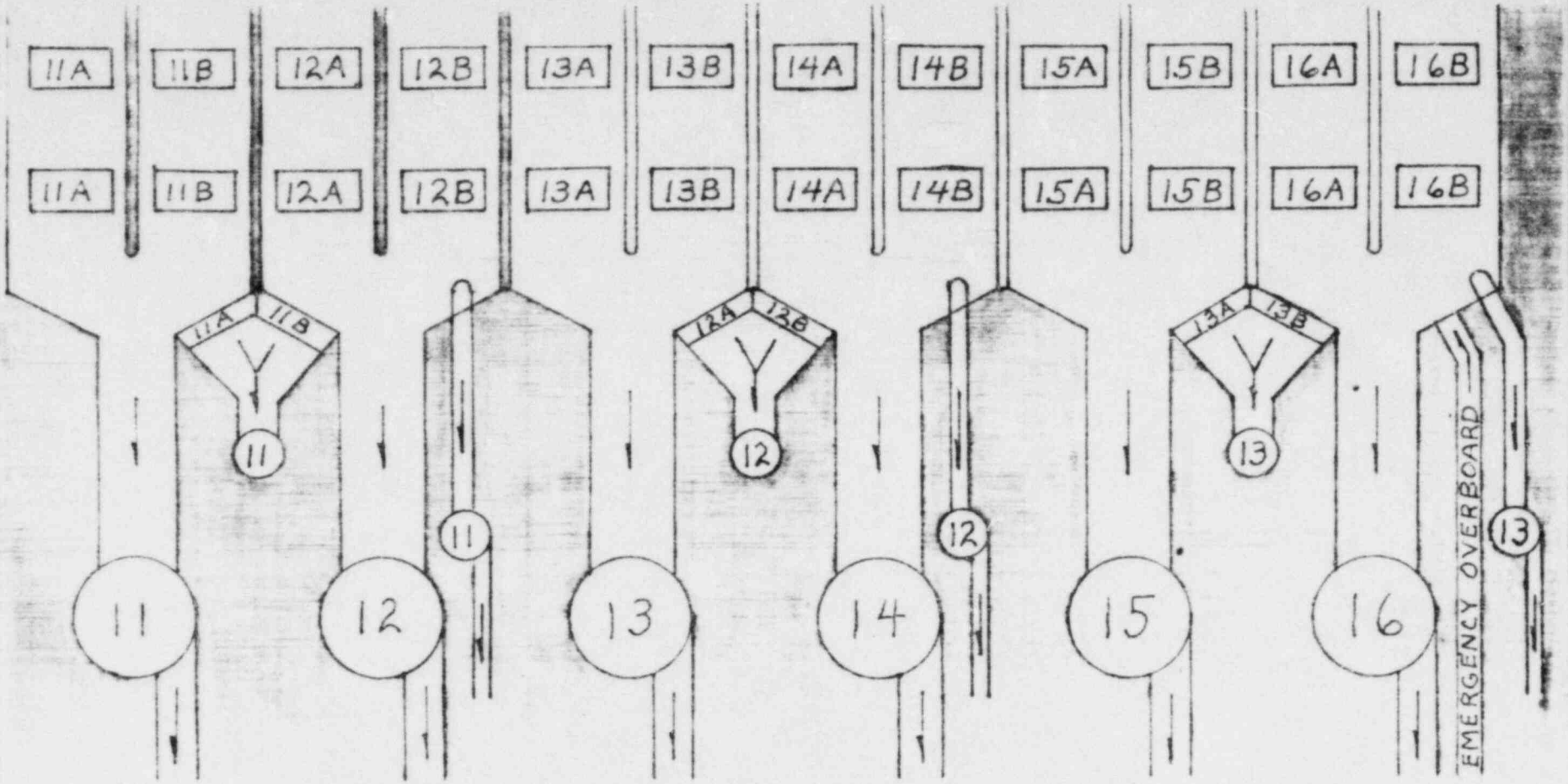
Only one salt water pump is necessary to meet the system design function of providing cooling water for the service water (BI) and component cooling water (CC) heat exchangers and the emergency core cooling system pump room cooler (VF) during a Loss of Coolant Incident (LOCI). A massive fish or sea nettle impingement, more severe than ever observed, of all the traveling water screens and the failure of operators to stop the circulating water pumps in accordance with procedure would be necessary for degradation of the salt water system's ability to mitigate the consequences of a LOCI. Therefore, the overall safety significance of this event is considered minimal.

Two long term corrective actions will be taken:

1. Evaluate upgrading the traveling water screens to allow unobstructed water flow during a severe sea nettle or fish impingement occurrence.

2. Establish a preventive maintenance program for the charging pump pressure controllers.

The contact for further discussion of this event is M. T. Finley, (301) 260-4374.



UNIT 1 WATERFRONT

#11A Waterbox | #11B Waterbox | #12A Waterbox | #12B Waterbox | #13A Waterbox | #13B Waterbox

ATTACHMENT 1

BALTIMORE GAS AND ELECTRIC COMPANY

P.O. BOX 1475

BALTIMORE, MARYLAND 21203

NUCLEAR POWER DEPARTMENT
CALVERT CLIFFS NUCLEAR POWER PLANT
LUSBY, MARYLAND 20657

October 26, 1984

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

Docket No. 50-317
License No. DPR 53

Dear Sirs:

The attached LER 84-13 is being sent to you as required by 10 CFR 50.73.

Should you have any questions regarding this report, we would be pleased to discuss them with you.

Very truly yours,

L. B. Russell
Plant Superintendent

LBR:MTF:mdh

cc: Dr. Thomas E. Murley
Director, Office of Management Information
and Program Control
Messrs: A. E. Lundvall, Jr.
J. A. Tiernan

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