NRC FORM 366 (6-89) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

# LICENSEE EVENT REPORT (LER)

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| Shoreham Nuclear Power Station Unit 1 | 0 5 0 0 0 3 2 2 | 1 OF 0 6 |

TITLE (4) RBCLCW split on low-low head tank level during placement of heat exchanger into service due to filling and venting problem

| 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 5 0 0 0 |
| 1 1 | 0 6 | 8 8 | 8 8 | – | 0 1 9 | – | 0 1 | 0 5 | 1 6 | 9 0 | | 0 5 0 0 0 |

| OPERATING MODE (9) | 4 | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11) | | | |
|---|---|---|---|---|---|
| POWER LEVEL (10) | 0 0 | 20.402(b) | 20.405(c) | X 50.72(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 |
|---|---|
| George D. Schnaars, Operational Compliance Engineer | AREA CODE 5 1 6 — 9 2 9 – 8 3 0 0 |

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)


On November 6, 1988 at 0239, a Reactor Building Closed Loop Cooling Water (RBCLCW) split occurred while placing the "A" main RBCLCW heat exchanger into service. The plant was in Operational Condition 4 with the mode switch in shutdown and all rods inserted in the core. The RBCLCW system split into its accident configuration due to a low-low water level in the "A" head tank. When the heat exchanger and its associated piping were drained and then refilled, a portion of the piping remained unfilled. When the heat exchanger inlet valve was opened, the head tank drained to fill the remaining portion of the piping. This valve is located approximately 16 feet above the heat exchanger. Vents are located on the heat exchanger and are opened when it is being filled. Because there is no vent by the inlet valve, the system piping configuration prevents a portion of the piping leading to the inlet valve to be completely filled. This was the cause of the event. Operators restored the head tank to the normal level and the RBCLCW system was placed in its configuration prior to the event. Plant Management was notified of the event and the NRC was notified at 0607 per 10CFR50.72. This Supplemental Report is being submitted to inform the Commission of the status of corrective actions taken.

## PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as [xx].

## IDENTIFICATION OF THE EVENT

Reactor Building Closed Loop Cooling Water (RBCLCW) [CC] split on low-low "A" head tank level during the placement of the "A" main heat exchanger into service, due to a filling and venting problem.

Event Date: 11/6/88

Report Date: 5/16/90

## CONDITIONS PRIOR TO THE EVENT

Operational Condition 4 (Cold Shutdown)

Mode Switch - Shutdown

RPV Pressure = 0 psig RPV Temperature = 104 Degrees F

POWER LEVEL - 0

All rods inserted in the core.

## DESCRIPTION OF THE EVENT

NOTE: A simplified diagram of the piping, valves and heat exchanger is included in this report. Refer to page 6 of 6.

On November 6, 1988 at 0239, a RBCLCW split occurred while placing the "A" main RBCLCW heat exchanger in service due to a low-low "A" head tank level.

The "A" heat exchanger was drained the previous day due to high conductivity levels and refilling had commenced later that day. When the filling and venting was completed, the 10" "A" RBCLCW heat exchanger inlet valve (1P42*MOV-042A) was opened to place the heat exchanger back in service to allow system flow. As the valve started to open, RBCLCW system low pressure and low head tank level alarms came in. The Watch Supervisor instructed the Nuclear Station

Operator (NSO) to close the valve. In the process of waiting for the valve to complete its travel cycle from full open to full closed (approximately 1 minute), the "A" head tank level dropped approximately 2" below the setpoint (approximately 69") for a system split. The RBCLCW system split into two separate and independent loops, isolating nonsafety related loads as designed in response to the low-low tank level signal.

Upon inlet valve closure, makeup from the 2" demineralized water line to the "A" head tank restored the level to its normal status, the "A" heat exchanger was placed in standby, fully vented, and the RBCLCW system was placed in its configuration prior to the event.

An investigation into the cause of the event ensued. Plant Management was notified of the event and the NRC was notified at 0607 per 10CFR50.72.

CAUSE OF THE EVENT

The RBCLCW system split into its accident configuration due to a low-low water level in the "A" head tank. When the heat exchanger and its associated piping were drained and then refilled, a portion of the piping remained unfilled. When the heat exchanger inlet valve (MOV-42) was opened, the head tank drained to fill the remaining portion of the piping causing the system split. The cause can be attributed to a combination of procedural inadequacies and system design deficiencies.

A previous occurrence (LER 86-007) initially identified a problem with the filling and venting of heat exchangers, and procedures were developed as corrective action to alleviate the problem. Subsequently, another RBCLCW system split occurred (LER 87-023) because the method chosen for filling and venting of the heat exchanger in Station Procedure 23.118.01, RBCLCW System was inadequate in that the heat exchanger was being filled through a 10-inch valve, while the makeup to the head tanks was through a 2-inch valve. At that time an alternate method was developed and utilized to fill and vent the heat exchanger. However, this method did not entirely solve the problem due to the piping system design.

After the second event, Engineering was requested, via EEAR (Engineering Evaluation and Assistance request) 87-119, to evaluate the need to install high point vent valves and bypass lines around the inlet valve to insure proper filling of the piping.

The inlet valve (MOV-42) is located approximately 16 feet above the heat exchanger. Vents are located on the heat exchanger and are opened when the heat exchanger is being filled. The possibility does exist that the piping (14" line) leading to the inlet valve will not be sufficiently filled, creating a large void in the system (enough to allow the draining of the head tank below its accident signal level). There is no vent located at the inlet valve. This was the apparent cause of the present event.

A discrepancy also exists in the procedure between actions required for the filling and venting (8.1.1) and the draining of the heat exchanger (8.1.7) which compounded the problem. The valves used to isolate and drain the heat exchanger do not coincide with the valves used during filling and venting. This can result in confusion during the heat exchanger return to service as to whether the heat exchanger and associated piping is adequately filled and vented.

NOTE: The problem associated with this event affects both loops (A&B) of the RBCLCW system.

## ANALYSIS OF THE EVENT

The event resulted in the unplanned automatic actuation of an ESF (RBCLCW) and is reportable per 10CFR50.73 (a)(2)(iv).

There was no safety significance to the event. The RBCLCW system operated as designed by splitting into two independent loops whereby non-safety related loads were automatically isolated. The "A" head tank normal water level was restored within one minute and the emergency signal was reset.

Had this event occurred under a more severe set of circumstances (5% power) there would still be no safety significance.

## CORRECTIVE ACTIONS

1. As indicated previously, EEAR 87-119 has been initiated. This modification applies to the main and booster heat exchangers. It requires installation of vent valves on the inlet and outlet piping of each heat exchanger and also a bypass valve around the heat exchanger inlet isolation valves.

2. Because of the recurrence of this event, a more in depth review of the procedure (SP 23.118.01) was performed identifying deficiencies in the filling and venting of the heat exchangers. These deficiencies have been corrected.

3. Because of this most recent event, EEAR 89-011 has been initiated to change the control circuitry for the main and booster heat exchanger inlet isolation valves (1P42*MOV-033A/B and 1P42*MOV-042A/B). This modification will delete the seal-in circuitry and allow these valves to be bumped open when placing the heat exchangers in service.

Implementation of the above modifications has been deferred indefinitely due to the New York State - LILCO Shoreham Settlement Agreement.

ADDITIONAL INFORMATION

a. Manufacturer and model number of failed component (s)

None

b. LER numbers of previous similar events

86-007
87-023

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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