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)
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TITLE (4)
Reactor Water Cleanup Vent Hi Diff Temp

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 2	1 8	8 4	8 4	— 0 0 7	— 0 0	0 3	2 1	8 4	N/A	0 5 0 0 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 0	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
John B. Reis, Jr.	AREA CODE 8 1 5 — 3 5 7 - 6 7 6 1

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	
B	I J	O T I S	R 2 7 9	N							
B	V A	O D M P	A 3 4 0	N							

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 0402 on 2/18/84, Unit 2 Reactor Water Cleanup (IJ) isolated on "A" Pump Room Hi Differential Temperature. The cause of the trip has been determined to be a difference in the room temperature caused by a miss-configuration of the area ventilation system. Sargent and Lundy is reviewing for the most acceptable solution.

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

I. EVENT DESCRIPTION

At 0402 on 2/18/84, the Unit 2 Reactor Water Cleanup (RWCU) (IG) System isolated on a "A" Pump Room Differential Temperature Hi Trip (System B, switch 2E31-N600B). At the time of the isolation, the "A" RWCU Pump was operating alone and the Unit 2 Reactor was in Cold Shutdown, Operating Condition 4, in the process of heating up for a Vessel Hydrostatic Test. Upon investigation, the 2A Pump Room Differential Temperature indications (at 2H13-P632 and 642) were 8 degrees F and 12 degrees F for 2E31-N600A and 2E31-N600B. The system was reset and the 2A pump was restarted. At 0620 the 2A pump again tripped on a LD/RWCU Pump Room "A" Differential Temperature (System B, switch 2E31-N600B). The system was again reset and the 2C RWCU pump was started. The RWCU Pump Room A, B, and C/LD Differential Temperature Switch Trip Points are 13 degrees +0/-3 F with a LCO limit of less than or equal to 19 degrees F - Refer to Unit 2 Technical Specification Table 3.3.2-2 and LIS-RT-203.

II. CAUSE

LIS-RT-203, the Unit 2 RWCU Area Vent Hi Differential Temperature Isolation Calibration was last performed on 2/9/84 with the following comments:

1. For switch 2E31-N600E (Div. I, "C" Pump Room) the As Found Trip Value was 14.1 degrees F increasing and the As Left Trip Value was 11.5 degrees F increasing, per the DVM Test Meter Reading ... The Local Control Room indicator was reading 2 degrees F Low per the DVM Test Meter (i.e., 2E31-N600E was tripping high and indicating low with respect to the test meter).

2. For switch 2E31-N600H (Div. II, "A" NRHx Room), the As Found Trip Value was 96.75 degrees F increasing and the As Left Trip Value was 83 degrees F increasing, per the DVM Test Meter reading. The trip per the Control Room Indicator also read high with respect tothe DVM Test input.

3. For switch 2E31-N600B (Div. II, "A" Pump Room), though the Trip Point per the local indicator read 2.5 degrees F above the actual input, the switch did trip at the satisfactory value per the DVM reading (i.e., the indicator was reading slightly high, but the switch was tripping at the correct point).

4. All other instrument switch trips were within the spec/LCO limits (per the DVM reading).

Therefore, if anything, the Differential Temperature Switches were trending to trip at a Differential Temperature higher than the Required Trip Value. If instrument drifting were the problem, then the switches trend would be to trip at a Differential Temperature lower than the required trip (i.e., be out of spec in the low direction).

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II. CAUSE (Continued)

Upon a 2/27/84 investigation of the Unit 2 "A" RWCU Pump Room, the following was discovered:

The air flows through the "A" Pump Room as follows ... From the 761 ft. main floor through the east "A" Pump Room Gravity Damper 2VR50Y (above the door), continuing west along the south wall, over the approximately 8 ft. wall between the valve aisle and pump to the outlet damper 2VR16Y. Due to the valve and piping obstructions at and above the valve aisle, the ventilation current dissipates to almost nothing for the region west of the wall separating the valve aisle and RT pump; with the Div. I Differential Temperature Outlet T.E. 2E31-N002A (on the east end of damper 2VR16Y) receiving some air flow, while the Div. II Differential Temperature Outlet T.E. 2E31-N002B (on the west end of Damper 2VR16Y) receives no air flow. However, for the region east of the wall separating the valve aisle and the pump, the ventillation currents are extremely strong, with T.E. 2E31-N001B being directly in the air path, effectively keeping the temperature element at the Reactor Building temperature, which is less than the Pump Room ambient temperature. The Division I Differential Temperature Inlet T.E. 2E31-N001A is not in the ventilation currents path and therefore, reads a higher inlet temperature (on the order of the Pump Room's ambient temperature). Also the Differential Temperature Outlet temperature elements 2E31-N002A and B are located directly above (approximately 3 ft.) the pump motor, and effectively measure the motors thermal output. Thirdly, during the time of the RWCU pump trip, the RWCU system was pumping much hotter water than the system normally handles. During the Hydrostatic test the system was used for level control. Accordingly the filter demineralizers were bypassed, the high water temperature switch 2G33-N008 was jumpered out, and the RWCU system was pumping approximately 170 degrees F Rx water. Under normal operating conditions, when the water temperature at the pump outlet/filter demin inlet exceeds 140 degrees F, the switch opens, valve 2G33-F004 closes, and the pumps trip (to prevent the resins from melting). This increase in the RWCU operating water temperature further increases the ambient temperature for the pump cubicle region, and further increases the Differential Temperature across the room - especially for switch 2E31-N600B whose inlet temperature element 2E31-N001B is kept constant by the cold air blast from the inlet gravity damper. Accordingly, the pump trip does not appear to be the result of leakage or instrument drifting, but rather the result of a temperature gradient between 2E31-N001B and 2B due to localized cooling via a direct blast of cold air on 2E31-N001B from the Pump Room's east side gravity damper, with the 2 valve aisle walls creating ventilation current barriers and thermal barriers, combined with the pumping of higher than normally allowed RWCU water temperatures through the system.

II. CAUSE (Continued)

In addition, the following was noted:

1. On 2/27/84 the inlet gravity damper 2VR50Y vanes were found to be pointing at a 45 degree angle downward (into the room) - with respect to the horizon and 2E31-N001B was receiving a strong blast of cold air. The outlet damper 2VR16Y was then manually cycled from full open to full closed, with the inlet gravity damper showing no noticeable movement. On 2/28/84 the gravity damper was found to be fully (greater than 95 percent) closed with 2E31-N001B receiving no strong air currents. It appears the gravity damper requires readjustment/repair. On both days the 2A RWCU pump was running.

2. An investigation of the Unit 1 RWCU "A" Pump Room revealed that 1E31-N001B had been moved to a new location, on the east side of the wall separating the valve aisle and the pump room entrance, outside the ventilation path. The Unit 1 location of 1E31-N001B is shown in red on drawing number 1. In addition, the Inlet Gravity Damper was fully closed (greater than 95 percent) with no air flow in the room. RWCU Pump 1A was not running.

3. Further evidence of a ventilation problem with the RWCU Pump Room is the 2/6/84 tripping of the 2A pump off of switch 2E31-N600B (inlet 2E31-N001B/ outlet 2E31-N002B). As previously mentioned, the recalibration of 2E31-N001B under LIS-RT-203 on 2/9/84 found the switch to be in spec.

The Unit 2 VR (VA) Station Test Engineer has been notified of the ventilation problems in the RWCU Pump Rooms andis currently investigating (with SNED and S&L Assistance) to determine what balancing corrections are to be made. It should be noted that during both the pump trip and the subsequent investigation, 2 Unit 2 VR supply and 2 Unit 2 VR return fans were operating. In addition to 2E31-N001B (in the RWCU "A" Pump Room), a similar problem with the inlet T.E. 2E31-N001E (in the RWCU "B AND C" Pump Room) receiving a direct blast of cold air was noticed. Another point to consider is that the return ventilation flow from the RWCU Pump Room goes down to 740 ft., through the hallway outside the outboard MSIV room, to the outboard MSIV room, and down the steam tunnel ... Opening the outboard MSIV room door places a large hole in the return duct ... effectively destroying the return ventilation from the RWCU Pump Rooms, allowing the region surrounding the pumps to heat up, further increasing the Differential Temperature across the pump room. It has not been determined whether or not the outbord MSIV room door was open during the time of the pump trip ... however, a sign has been posted on the outboard MSIV room door and Shift has been notified of the possible results in opening the door

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

III. PROBABLE CONSEQUENCE OF THE OCCURRENCE

The RWCU (Leak Detection) System operates in the following manner:

Along with a single loss of power contact, one Differential Temperature and one Ambient High Temperature switch from each Pump Room and Non Regen Heat Exchanger Room is wired in series to make up the "A" Leak Detection string (ESS Division I)

2E31-N600A, "A" RWCU Pump Room Differential Temperature Switch
2E31-N601A, "A" RWCU Pump Room High Ambient Temp Switch
2E31-N600C, "B" RWCU Pump Room Differential Temperature Switch
2E31-N601C, "B" RWCU Pump Room Hi Ambient Temp Switch
2E31-N600E, "C" RWCU Pump Room Differential Temperature Switch
2E31-N601E, "C" RWCU Pump Room Hi Ambient Temp Switch
2E31-N600G, "A" RWCU Non Regen Hx Room Differential Temperature Switch
2E31-N601G, "A" RWCU Non Regen Hx Room High Ambient Temp Switch
2E31-N600J, "B" RWCU Non Regen Hx Room Differential Temperature Switch
2E31-N601J, "B" RWCU Non Regen Hx Room High Ambient Temp Switch
K7A (T1/M1), Power Failure

If any one of these 11 contacts open, the RWCU isolation ESS Division I channel trips, closing the RWCU outboard isolation valve 2G33-F004, and tripping the RWCU pumps 2G33-C001A, B and C (if running). A redundant RWCU/LD System exists and operates in the following manner:

Along with a single loss of power contact, one Differential Temperature and one ambient high temperature switch from each Pump Room and Non Regen Hx Room is wired in series to make up the "B" Leak Detection string (ESS Division II)

2E31-N600B, "A" RWCU Pump Room Differential Temperature Switch
2E31-N601B, "A" RWCU Pump Room High Ambient Temp Switch
2E31-N600D, "B" RWCU Pump Room Differential Temperature Switch
2E31-N601D, "B" RWCU Pump Room High Ambient Temp Switch
2E31-N600F, "C" RWCU Pump Room Differential Temperature Switch
2E31-N601F, "C" RWCU Pump Room High Ambient Temp Switch
2E31-N600H, "A" RWCU Non Regen Hx Room Differential Temperature Switch
2E31-N601H, "A" RWCU Non Regen Hx Room High Ambient Temp Switch
2E31-N600K, "B" RWCU Non Regen Hx Room Differential Temperature Switch
2E31-N600K, "B" RWCU Non Regen Hx Room High Ambient Temp Switch
K7B (T1/M1), Power Failure

If any one of these 11 contacts open, the RWCU Isolation ESS Division II Channel trips, closing the RWCU Inboard Isolation Valve 2G33-F001, and tripping the RWCU pumps 2H33-C001A, B, and C (if running).

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III. PROBABLE CONSEQUENCE OF THE OCCURRENCE (Continued)

The associated trip points and LCO limits for the Differential Temperature and high ambient are as follows:

Pump A, B and C room Differential Temperature: 2E31-N600 A, B, C, D, E and F Trip Point 13 degrees +0/-3 F, LCO limit less than or equal to 19 degrees F.

Pump A, B, and C Room High Ambient: 2E31-N601A, B, C, D, E, and F Trip Point 116 degrees +0/-6 F, LCO limit less than or equal to 122 degrees F.

Hx A and B Room Differential Temperature: 2E31-N600G, H, J, and K Trip Point 85 degrees +0/-3 F, LCO limit less than or equal to 91 degrees F.

Hx A and B Room High Ambient: 2E31-N601 G, H, J, and K Trip Point 181 degrees +0/-6 F, LCO limit less than or equal to 187 degrees F.

- Refer to Unit 2 Technical Specification Table 3.3.2-2 and LIS-RT-203.

The Division I Pump and Hx Room Differential Temperature switches are wired in parallel and alarm at 2H13-P601, window C311. The Division I Pump and Hx Room High Ambient Temperature switches are wired in parallel and alarm at 2H13-P601, window C211. The Division I Power Failure and Test Bypass alarms are wired in parallel and alarm at 2H13-P601, window C309. The Division II Pump and Hx Room Differential Temperature switches are wired in parallel and alarm at 2H13-P601, window B506. The Division II Pumps and Hx Room High Ambient Temperature switches are wired in parallel and alarm at 2H13-P601, window B505. The Division II Power Failure and Test Bypass alarms are wired in parallel and alarm at 2H13-P601, window B504. Refer to 1E-2-4224AM. In addition, each Division I Differential Temperature and Ambient Temperature switch has an individual alarm at 2H13-P632 (which auto resets); and each Division II Differential Temperature and Ambient Temperature switch has an individual alarm at 2H13-P642 (which auto resets). At the time of the RWCU isolations/trips, the Unit 2 Reactor was in Cold Shutdown (Operating Condition 4). The Unit 2 Technical Specification Table 3.3.2-1, Trip Function 3.e (RWCU Isolation) "Pump Area Ventilation Differential Temperature - High" requires the trip system to be operable only in Operating Conditions (1) Power Operation, (2) Startup, and (3) Hot Shutdown, with an associated action 22 applicable upon discovery of an inoperative channel in the trip system which states, "Close the affected system isolation valve within 1 hour and declare the affected system inoperable." With RWCU inop, plant operations can continue until Chemistry specifications are exceeded. Upon actuation of 2E31-N600B, Group 5 isolations and RWCU pump trips were received, signifying all components operated per design. Since at the time of the trips the plant was in Operating Condition 4, Cold Shutdown (which does not require RWCU operability), and since theRWCU Filter demineralizers were already being bypassed per hydrostatic procedure LLP 84-5 (with the RWCU system only being used as a backup to CRD for vessel level control), the tripping/restarting and closing/reopening of the RWCU System Pumps and Isolation Valves had no effect upon plant operability nor upon Technical Specifications.

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

IV. CORRECTIVE ACTION

The following actions have been taken:

1. The Unit 2 VR STE has been notified of the ventilation problem in the RWCU Pump Rooms and is currently investigating (with SNED and S&L assistance) as to what balancing corrections are to be made.

2. AIR #1-84-67030 has been generated to investigate the Unit 2 RWCU Pump Room ventilation problem with the following recommendations:

   a. To consider moving 2E31-N001B in the 2A RWCU Pump Room to a location similar to that in Unit 1.

   b. To consider moving 2E31-N001E to a location out of the air stream coming through 2VR051Y.

   c. To consider shielding for 2E31-N100B and 2E31-N100E.

   d. To consider the possibility of changing the trip points for the reasons specified and in the G.E. Leak Detection Design Spec Data Sheet 22A2870AA Sheet 11 and 12.

The inlet gravity dampers contain a counterweight which controls the amount the vanes open for a given Differential Pressure across the damper. System Design is as follows:

As the temperature around the pump motor increases, a VR temperature controller will signal the outlet damper (above the pump motor) to open, creating a suction which opens the inlet gravity damper, allowing cooling air to enter (at a controlled rate), thus maintaining acceptable room temperatures. As previously stated, this is not the case. Therefore, consideration should be given to installing manual operated inlet dampers or revising the installed inlet dampers to be manually operated, so that they can be manually adjusted as conditions require, with the room ambient and Differential Temperature valves being monitored at the 2H13-P632 and P642 Control Room panels (via the temperature switches being placed in the read position).

This LER is being submitted past the 30 day due date because of a recordkeeping discrepancy during the initial writing.

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V. PREVIOUS OCCURRENCES

No previous LER's have been written.

VI. NAME AND TELEPHONE NUMBER OF PREPARER

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March 22, 1984

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

Dear Sir:

Reportable Occurrence Report #84-007-00, Docket #050-374 is being submitted to your office in accordance with 10 CFR 50.73.

C E Dargent
for G. J. Diederich
Superintendent
LaSalle County Station

GJD/GW/kg

Enclosure

xc: NRC, Regional Director
INPO-Records Center
File/NRC

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