

NRC Form 384  
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION  
APPROVED OMS NO.3150-0104  
EXPIRES 8/31/96

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) VERMONT YANKEE NUCLEAR POWER STATION DOCKET NO. (2) 0 5 0 0 0 2 7 1 PAGE (3) 0 1 OF 0 5

TITLE (4) REACTOR VESSEL INVENTORY DECREASE DUE TO PERSONNEL ERROR

EVENT DATE (5) MONTH 0 DAY 3 YEAR 10 8 9 LER NUMBER (6) YEAR 8 SEQ. # 013 REV# 01 REPORT DATE (7) MONTH 0 DAY 5 YEAR 0189 OTHER FACILITIES INVOLVED (8) FACILITY NAMES N/A DOCKET NO.(S) 05000

OPERATING MODE (9) N THIS REPORT IS SUBMITTED PURSUANT TO REQ'MTS OF 10CFR §: ONE OR MORE (11) 20.402(b) 20.405(c) 50.73(a)(2)(iv) 73.71(b) POWER 20.405(a)(1)(I) 50.36(c)(1) X 50.73(a)(2)(v) 73.71(c) LEVEL (10) 000 20.405(a)(1)(II) X 50.36(c)(2) X 50.73(a)(2)(vii) OTHER: 20.405(a)(1)(III) X 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 JAMES P. PELLETIER, PLANT MANAGER TELEPHONE NO. 802 257-7711 AREA CODE

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYST	COMPNT	MFR	REPORTABLE TO NPRDS	CAUSE	SYST	COMPNT	MFR	REPORTABLE TO NPRDS
NA					NA				
NA					NA				

SUPPLEMENTAL REPORT EXPECTED (14) YES (If yes, complete EXPECTED SUBMISSION DATE) X NO EXPECTED SUBMISSION DATE (15) MO DA YR

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

At 2255 on 3-9-89, with the plant shutdown for refueling, maintenance personnel were manually stroking the suction valves for the "A" and "C" Residual Heat Removal (RHR) pumps (EIIS=B0) which were tagged for Maintenance. (Note: The "B" and "D" RHR pumps were providing the shutdown cooling function at that time.)

When these suction valves were stroked, a gravity drain path was created from the Reactor Vessel to the Suppression Chamber. This path was through the common RHR supply valves from the Reactor Vessel that were open to support "B" and "D" pump operation, through the open "A" and "C" pump shutdown cooling suction valves, and then through an open pump minimum flow bypass valve which directs flow to the Suppression Chamber. The drain path was isolated using manual valves at 2349. Total inventory transferred was 10,300 gallons and resulted in a Reactor Vessel level decrease of 72".

The root cause of this event has been determined to be personnel error in that when the shutdown cooling suction valves for the "A" and "C" RHR pumps were tagged and released for maintenance, the already open minimum flow bypass valve downstream was not identified.

To prevent recurrence of this event, RHR operating procedures will be expanded to require an isolation boundary on all potential drain paths in the idle RHR loop. This control was already in place for the operating RHR loop.

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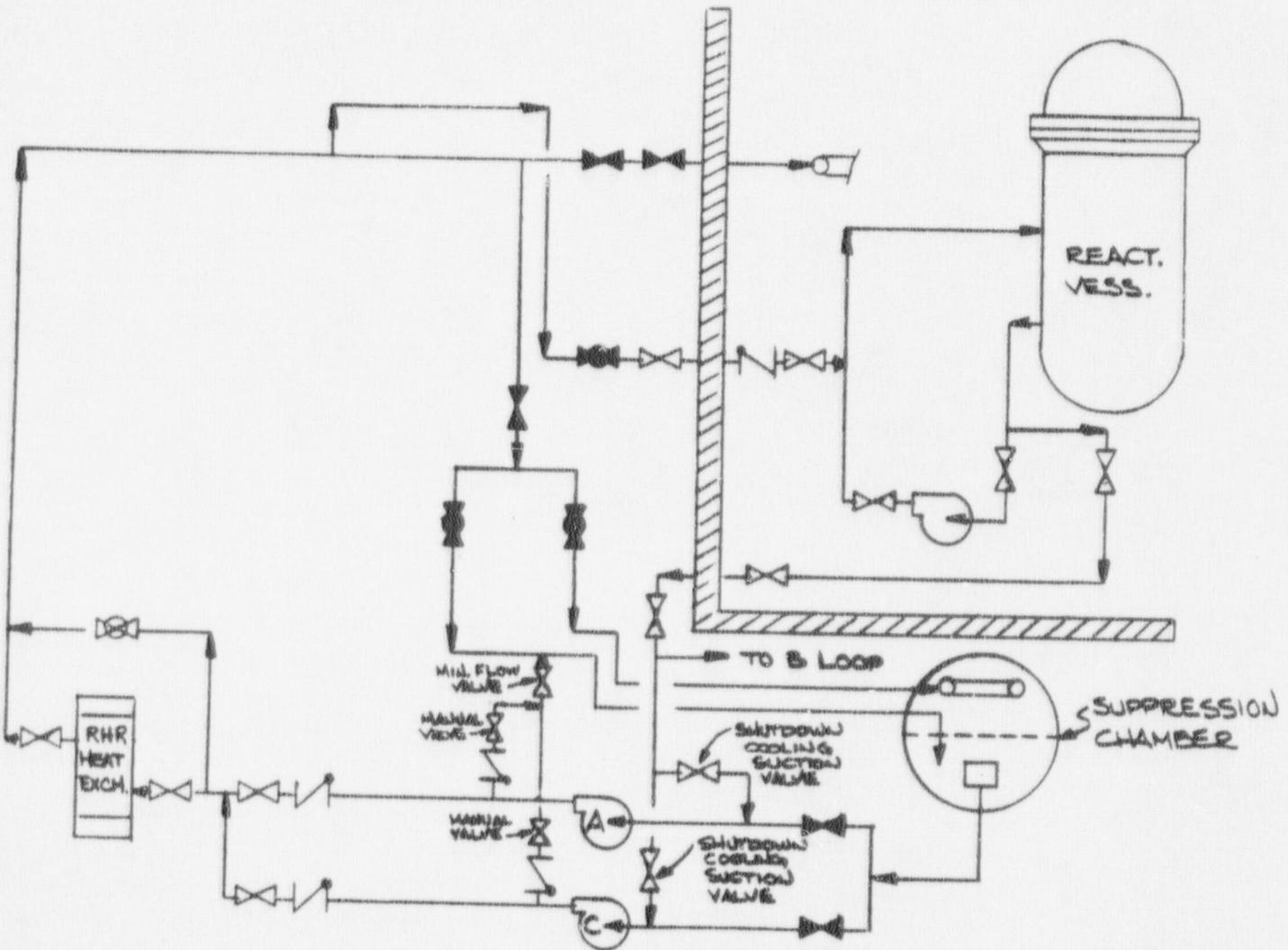
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		YEAR	SEQ. #	REV#		
VERMONT YANKEE NUCLEAR POWER STATION	05000271	89	-013	-01	02	OF 05

TEXT (If more space is required, use additional NRC Form 384A) (17)

DESCRIPTION OF EVENT

At 1350 on 3-4-89, with the plant shutdown for refueling, the "B" loop of the Residual Heat Removal (RHR) System (EIIS-B0) was placed in the Shutdown Cooling mode. (Note: The four RHR pumps at Vermont Yankee are segregated into two cooling loops. The "A" loop contains pumps "A" and "C" while the "B" loop contains pumps "B" and "D". As shown in the simplified system sketch below, two shutdown cooling loops share a common supply line from the Reactor Recirculation System (EIIS=AD) with the unused loop being isolated by the individual pump shutdown cooling suction valves. Therefore, at this time, the shutdown cooling suction valves for the "A" and "C" pumps were closed.)



RESIDUAL HEAT REMOVAL SYSTEM

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(9-83)U.S. NUCLEAR REGULATORY COMMISSION  
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TEXT (If more space is required, use additional NRC Form 384A) (17)

Five days later at 0230 on 3-9-89, to support ongoing maintenance activities, the circuit breakers for the idle "A" and "C" RHR pumps were opened and racked down and their control circuits were de-energized. Upon de-energizing the control circuits, RHR pump logic opened the pump minimum flow bypass valve in the "A" RHR loop which normally protects the "A" and "C" pumps from a potential dead head condition.

At 1700 on 3-9-89, the breakers for the "A" and "C" RHR pump shutdown cooling suction valves were tagged in the open position to allow for electrical maintenance work on the valve operators. Later on 3-9-89, at 2255, Maintenance personnel manually stroked open the pump suction valves for the "A" and "C" RHR pumps. When these valves were opened, a gravity drain path was created from the Reactor Vessel to the Suppression Chamber. This path was through the common supply valves from the Reactor Vessel that were open to support "B" loop operation, through the open "A" and "C" pump shutdown cooling suction valves, and then through the open "A" loop minimum flow bypass valve which directs flow to the Suppression Chamber.

At 2300, the Control Room was notified by personnel working on the refuel floor of a drop in Reactor Vessel level of approximately 18" from its initial 290" level. (Note: Water level is referenced using the Top of Active Fuel (TAF) as 0". The initial level of 290" corresponds to an elevation approximately 13" below the Reactor Vessel flange.) Control Room personnel attributed the drop in level to be due to drained portions of the "A" RHR loop refilling upon opening the "A" and "C" pump shutdown cooling suction valves and did not expect any further decrease.

The Control Room was again contacted by refuel floor personnel at 2315 and informed level had dropped approximately 18" further for a total decrease of 36". At this point, refuel floor personnel evacuated the Reactor cavity and Control Room operators began a search for the leakage path. Two additional calls were received from the refuel floor at 2330 and 2345 reporting total level decreases of approximately 60" and 120" respectively. Actual total level decrease, based on the measured inventory increase in the Suppression Chamber, was later determined to have been 72". (This corresponds to a level of 218" above TAF.)

At 2347, Control Room personnel identified the leakage path through the "A" loop minimum flow bypass valve discussed above. However, since the "A" and "C" RHR pump motor breakers were still racked out, control circuitry did not allow remote closure of the minimum flow bypass valve. Therefore, an operator was dispatched to close the manual isolation valves on the "A" and "C" pump minimum flow bypass lines upstream of the common motor operated valve that was open. This action, completed at 2349, isolated the drain path and terminated the level decrease.

The Control Room then notified the refuel floor at 2350 that the drain path was secured and level was being restored using the Control Rod Drive System. Level was restored to the original 290" at 0300 on 3-10-89.

CAUSE OF EVENT

The intermediate cause of this event was that plant operators did not anticipate that racking out RHR pump circuit breakers would result in the pump's corresponding minimum flow valve opening.

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The root cause of this event has been determined to be personnel error in that when the shutdown cooling suction valves for the "A" and "C" RHR pumps were tagged and released for work, the already open minimum flow bypass valve was not identified. Although operators are aware of this potential drain path, the "open" indication of the minimum flow bypass valve was not noted.

ANALYSIS OF EVENT

The total Reactor Vessel level decrease observed in this event was 72" over a period of approximately 54 minutes. Total volume transferred was determined to be 10,300 gallons.

Since Vermont Yankee Technical Specification 3.5.H.3 allows all Core and Containment Cooling subsystems to be inoperable when the reactor is in the cold shutdown condition provided no work is permitted which has the potential for draining the Reactor Vessel, a number of these systems were out of service at the time of the event. However, numerous systems were available to provide Reactor Vessel makeup including the RHR System "B" loop, the Control Rod Drive System, and the Feedwater System.

Without any operator action, the draindown would have been terminated by automatic initiation of the Primary Containment Isolation System (PCIS) upon reaching a level of 127". At this level, PCIS initiates closure of the two isolation valves on the common RHR System supply from the Reactor Recirculation System. Therefore, both the operator action that was taken and the backup PCIS function that was available provided a large inventory margin over the Vermont Yankee Safety Limit of 12" above TAF during refueling.

Air samples were taken in the Reactor Vessel cavity immediately after the draindown was secured to evaluate airborne activity. No increase in radiation levels were noted.

Therefore, during the events of this report, there is reasonable assurance that there were no adverse safety implications to plant equipment, personnel, or to the public.

CORRECTIVE ACTION

Immediate corrective action taken to terminate the event included closing and tagging manual isolation valves on the "A" loop minimum flow bypass line.

The operating procedure for the RHR system will be revised with a precaution that emphasizes the fact that the corresponding minimum flow valve will open when an RHR pump breaker is opened and racked down. In addition, an operator aid will be installed at the RHR pump breaker cabinets which will direct operators to inform the Control Room of the pending minimum flow valve "open" signal prior to racking down RHR pump breakers.

Current procedures require operators to isolate potential drain paths on the Shutdown Cooling loop in service by closing the associated valves (including the minimum flow bypass valve) and opening their breakers to assure isolation. To prevent recurrence of the subject event, these procedures will be expanded to require closure of the RHR pump suction valves in the idle loop and opening their breakers. If any activity requires opening these idle loop suction valves, the isolation boundary will be moved downstream of the idle pumps by closing all other potential draindown paths, including the idle loop minimum flow bypass valve, and opening the corresponding breakers.

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ADDITIONAL INFORMATION

No similar events have been reported to the Commission in the last five years.



VERMONT YANKEE NUCLEAR POWER CORPORATION

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May 01, 1989  
VYV 89-081

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

REFERENCE: Operating License DPR-28  
Docket No. 50-271  
Reportable Occurrence No. LER 89-13

Dear Sirs:

As defined by 10 CFR 50.73, we are reporting the attached Reportable Occurrence as LER 89-13, Rev. 1 to make reportability requirement revisions.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

James P. Pelletier  
Plant Manager

cc: Regional Administrator  
USNRC  
Region I  
475 Allendale Road  
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