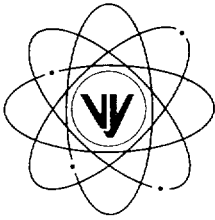


VERMONT YANKEE NUCLEAR POWER CORPORATION



P.O. Box 157, Governor Hunt Road
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December 20, 2001
BVY 01-95

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

Subject: Vermont Yankee Nuclear Power Station
License No. DPR-28 (Docket No. 50-271)
Reportable Occurrence No. LER 2001-005, Rev. 0

As defined by 10CFR50.73, we are reporting the attached Reportable Occurrence as LER 2001-005, Rev. 0.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Kevin H. Bronson
Plant Manager

cc: USNRC Region I Administrator
USNRC Resident Inspector - VYNPS
USNRC Project Manager - VYNPS
Vermont Department of Public Service

IE22

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bis1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104) Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of
digits/characters for each block)

1. FACILITY NAME
VERMONT YANKEE NUCLEAR POWER STATION (VY)

2. DOCKET NUMBER
05000271

3. PAGE
1 of 4

4. TITLE
Primary Containment Breach Due to Broken Tubing at Hydrogen/Oxygen Monitor

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME N/A	DOCKET NUMBER 05000 -
10	25	2001	2001	005	00	12	20	2001	FACILITY NAME N/A	DOCKET NUMBER 05000 -
9. OPERATING MODE		N	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
10. POWER LEVEL		100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)				
			<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)				
			<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 73.71(a)(4)				
			<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(5)				
			<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A			
			<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(C)					
			<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(D)					
			<input type="checkbox"/> 20.2203(a)(2)(v)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)					
			<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)					
			<input type="checkbox"/> 20.2203(a)(3)(i)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)					

12. LICENSEE CONTACT FOR THIS LER

NAME
Kevin Bronson, Plant Manager

TELEPHONE NUMBER (Include Area Code)
(802) 257-7711

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

CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX
X	BB	P	T086	Y	B	BB	TBG	T086	Y
14. SUPPLEMENTAL REPORT EXPECTED					15. EXPECTED SUBMISSION DATE		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)					X	NO	N/A	N/A	N/A

16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On October 25, 2001 at 0900 with the reactor at full power, the "B" Containment Hydrogen/Oxygen (H₂/O₂) Analyzer (SAH-VG-5B) pump was discovered exhibiting excessive noise during weekly I&C minor maintenance. A black residue was observed in the cabinet due to deterioration of the coupling spider. A Work Request was initiated to investigate the cause of the pump noise. At 1225 the Control Room received a trouble alarm on the "B" H₂/O₂ Analyzer. Inspection revealed that the sample pump discharge tubing had broken off below the fitting to the regulator (R-2), causing a breach in Primary Containment. The Shift Supervisor was notified and the system was isolated at 1244. The System Engineer determined this breach to be in excess of the maximum allowable accident leak rate (L_a) and reported this to the Shift Supervisor. The appropriate 10CFR50.72 notifications were made. Due to the short duration of the breach (nineteen minutes), there was no increased risk to public health and safety. The Root Cause Analysis determined the tubing break was due to the cumulative effects of strains and stresses exerted on the tubing at this connection, amplified by vibration from a failing pump coupling. Three of four set-screws which hold the coupling together had failed. Subsequent leak rate testing demonstrated the leak to be in excess of the Technical Specification limit of 0.6 L_a (L_a equals 0.8% of Primary Containment air wt./day) and greater than the analytical limit of 1.5 % wt./day.

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VERMONT YANKEE NUCLEAR POWER STATION (VY)	05000271	2001	-- 005	-- 00	2 OF 4

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)**DESCRIPTION:**

On October 25, 2001 at 0900 with the reactor power at 100%, the "B" Containment Hydrogen/Oxygen (H₂/O₂) Analyzer (SAH-VG-5B) was discovered exhibiting excessive noise while performing a weekly I&C minor maintenance. Closer inspection revealed a black residue inside the cabinet. This residue was due to deterioration of the pump to motor coupling spider. Flows were found low and were adjusted to within specification. A Work Request and Event Report were initiated to investigate the cause of the pump noise. At 1225, the Control Room received a trouble alarm on the "B" H₂/O₂ analyzer. An I&C Technician and Supervisor, in route to inspect for the Work Order, were contacted by the Control Room to investigate the alarm. The I&C Technician discovered that the tubing had broken off below the fitting on the discharge side regulator (R-2), causing a breach in primary containment. The Shift Supervisor was notified and the "B" H₂/O₂ Analyzer was isolated at 1244, nineteen minutes after receiving the alarm. The pumps rotating spindle had become severely damaged due to a failure of the pump to pump motor coupling. Three of the four setscrews, which hold the coupling together, had backed off and fallen out during operation. The failing coupling caused excessive vibration on the discharge tubing and resulted in a radial fracture of the tubing, at the fixed point below the R-2 regulator. The System Engineer determined this to be a breach of Primary Containment, in excess of the maximum allowable accident leak rate (L_a) and reported this to the Shift Supervisor. As part of a root cause analysis, a metallurgist analyzed the failed section of tubing and concluded; "the tubing failed due to the failure of the pump, which most likely subjected the line to a high stress low cycle failure".

ASSESSMENT OF SAFETY CONSEQUENCES:

"A" H₂/O₂ Analyzer was fully operable, thirty day LCO entered for repair of "B" H₂/O₂ Analyzer.

It has been determined that this condition would not adversely impact the plant's containment Level-2 Risk Assessment. Specifically, this failure of Primary Containment integrity would not contribute to the determination of the Large Early Release Frequency (LERF) due to the small size of the air space release flow path (≤ 2 inches diameter piping) and the fact that this condition was corrected nineteen minutes after receiving the trouble alarm. Therefore, there was no increased risk to public health and safety.

BACKGROUND:

The failed tubing had been in service for ten years without consequence.

CAUSE OF THE EVENT:

The Root Cause Analysis determined the cause for the breach in Primary Containment, was due to the cumulative effects of strains and stresses exerted on the tubing at the R-2 connection, amplified by vibration from a failing pump coupling. The coupling setscrews were found to have backed out from either inadequate setscrew installation with normal vibration or from pump to motor misalignment during installation, causing increased vibration. Although assembly was completed in accordance with the Vendor's manual, it was subsequently determined that the Vendor's manual did not provide any required torque values, and did not provide any specific requirements for pump alignment. Additionally, the tubing was not configured to an ideal orientation, which caused the vibrational forces to be transmitted to one single point in a twisting motion. Three of the four setscrews, which hold the coupling together, had backed off and fallen out during operation. Specific torque values are not provided in the Vendors manual for the coupling setscrews.

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

The failing coupling caused excessive vibration on the discharge tubing from the pump to the R-2 regulator. The tubing failed at the first point from the pump discharge where it is restrained to a fixed point, below the R-2 regulator. The other end of the tubing is attached to the pump and is free to move with the pump vibrations. This configuration causes most of the pump vibrations to be absorbed at the fixed point. The pump suction has the same restraint as the discharge tubing when attached to the cabinet. However, that section of tubing is configured in one plane to enhance the vibrational absorption capabilities over the system, rather than transmitting them to one single fixed point. The discharge tubing is configured in such an orientation that a twisting motion was created on the tubing at the fixed point, while absorbing the vibrations of the pump. This configuration led to a radial fracture when combined with the excessive vibrations from the failing pump coupling.

ANALYSIS OF THE EVENT:

SAH-VG-5B is a closed loop system outside of the Primary Containment structure. The failure of the H₂/O₂ analyzer pump's discharge tubing resulted in a breach of Primary Containment. Leakage from Primary Containment is permitted, providing the leak rate does not compromise the ability of the barrier to mitigate the consequences of a Design Bases Loss of Coolant Accident (DBA LOCA). A Primary Containment maximum allowable accident leak rate of 1.5% Primary Containment air wt./day at 44 psig [P_a is the established analytical (accident) limit]. The Technical Specification Limit for the maximum allowable Primary Containment leak rate is 0.8% wt./day (L_a at P_a). The combined local leak rate test (Type B and C tests) acceptance criterion is less than or equal to 0.6 L_a , calculated on a minimum pathway basis, at all times when primary containment is required. A leak rate test was performed on the system. When the combined minimum pathway flow is summed with the restricted or the unrestricted calculated flows, the resultant flow exceeds all applicable limits, up to and including the analytical limit (1.5% wt./day).

CORRECTIVE ACTIONS:

1. The system was isolated in nineteen minutes after receiving the H₂/O₂ Trouble Alarm, which restored Primary Containment.
2. The pump, pump to motor coupling, coupling spider and the fractured section of discharge tubing were replaced. The system was subsequently leak rate tested satisfactorily in accordance with the Primary Containment Leak Rate Test Program.
3. The discharge tubing was re-configured to reduce the effects of pump vibration on the system.
4. Preventative Maintenance practices and procedures for this equipment will be evaluated for improvement opportunities.

ADDITIONAL INFORMATION:

No similar events have occurred at VY within ten years.

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Containment Monitor Piping Schematic
Model 225 CMA & 225 CMAB
VY Drawing Number: 5920-6273

