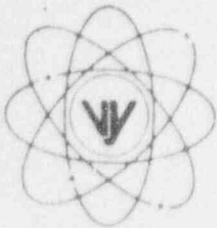


# VERMONT YANKEE NUCLEAR POWER CORPORATION



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June 11, 1997  
BVY 97-79

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

Reference: (a) License No. DPR-28 (Docket No. 50-271)

Subject: Reportable Occurrence No. LER 97-011, Rev. 0

As defined by 10CFR50.73, we are reporting the attached Reportable Occurrence  
as LER 97-011, Rev. 0.

Sincerely,

Vermont Yankee Nuclear Power Corporation



Gregory A. Maret  
Plant Manager

cc: USNRC Region I Administrator  
USNRC Resident Inspector - VYNPS  
USNRC Project Manager - VYNPS

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NRC Form 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION  <b>LICENSEE EVENT REPORT (LER)</b>				APPROVED BY OMB NO. 3150-0104 EXPIRES 04/30/98 ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.							
FACILITY NAME (1) VERMONT YANKEE NUCLEAR POWER STATION						DOCKET NUMBER (2) 05000271			PAGE (3) 01 OF 04		
TITLE (4) THE PRIMARY CONTAINMENT TORUS WAS NOT INERTED TO TECHNICAL SPECIFICATION REQUIREMENTS DUE TO AN INADEQUATE PROCEDURE WHICH RESULTED IN AN INSUFFICIENT NITROGEN INERTING PURGE FLOWRATE.											
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 NAME	DOCKET NO.(S)	
05	12	97	97	-- 011 --	00	06	11	97	N/A	05000	
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: CHECK ONE OR MORE (11)									
N		20.2201(b)		20.2203(a)(2)(v)		X		50.73(a)(2)(i)		50.73(a)(2)(viii)	
POWER LEVEL (10)		100		20.2203(a)(1)				50.73(a)(2)(ii)		50.73(a)(2)(x)	
				20.2203(a)(2)(i)				50.73(a)(2)(iii)		73.71	
				20.2203(a)(2)(ii)				50.73(a)(2)(iv)		OTHER	
				20.2203(a)(2)(iii)				50.73(a)(2)(v)		(Specify in Abstract below or in NRC Form 366A)	
				20.2203(a)(2)(iv)				50.73(a)(2)(vii)			
LICENSEE CONTACT FOR THIS LER (12)											
NAME GREGORY A. MARET, PLANT MANAGER								TELEPHONE NO. (Include Area Code) 802-257-7711			
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	
NA				NO	.....	NA					
NA					.....	NA					
SUPPLEMENTAL REPORT EXPECTED (14)						EXPECTED SUBMISSION DATE (15)		MO	DAY	YEAR	
YES (If yes, complete EXPECTED SUBMISSION DATE)				X	NO						

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

At 0035 hours on 05/12/97, with the reactor operating at 100% power, while performing a containment oxygen (O2) concentration surveillance, it was discovered that containment torus O2 concentration did not meet the technical specification requirement. The cause of the event was inadequate procedural guidance which resulted in purging the torus with an insufficient nitrogen purge flowrate. Corrective actions consisted of checking for air in-leakage, obtaining grab samples, confirming the actual O2 concentration, and initiating a normal reactor shutdown in accordance with plant technical specifications (TS). Prior to completion of the shutdown, the containment was successfully inerted and the plant was returned to rated power operation. There was no increased threat to the health and safety of the public because the overall containment O2 concentration, considering the combination of both drywell and torus volumes, has been estimated as 4.6 %. This concentration would have eliminated any H2 combustion. Additionally, the time operated with the deficient inerted condition was very short (approximately 4 days), and there was no coolant leak during that time which would have required the torus pressure suppression chamber to perform its function.

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

#### DESCRIPTION OF EVENT

At 0035 hours on 05/12/97, with the reactor operating at 100% power, while performing a containment oxygen (O2) concentration surveillance, it was discovered the containment (EIS=NH) torus was not inerted to the TS O2 concentration. There were no inoperative structures, systems, or components that contributed to this event.

Prior to this event the procedure for inerting the primary containment was revised to require separate inerting of the containment drywell and containment torus air volumes. This was done to account for a perceived design deficiency which made the containment potentially vulnerable to overpressurization in the event of a Loss of Coolant Accident during the inerting process. The previous procedure revision allowed inerting of the torus and drywell volumes simultaneously or sequentially.

The TS requires the containment be inerted to less than 4% O2 concentration within 24 hours of placing the reactor mode switch in run. The drywell was inerted to < 3% O2 concentration in approximately 4 hours. The torus was inerted to an indicated O2 concentration of < 3% in approximately 10 hours. The torus inerting process used a flowrate of approximately 20,000 standard cubic feet per hour (scfh). Subsequent investigation determined that this was approximately 22% of the flow required to inert the combined volumes when the previous procedure revision had been applied. On 5/12/97 at 0035, while performing an O2 concentration surveillance, it was discovered that the torus O2 concentration was approximately 8%. A grab sample confirmed the surveillance results. The containment torus O2 concentration was above the allowed concentration for approximately 3.5 days prior to the discovery.

#### CAUSES OF EVENT

The cause of the event was an inadequate procedure which led to the use of insufficient nitrogen purge flowrate resulting in the torus not being inerted to less than 4%.

#### ANALYSIS OF EVENT

When it was discovered the torus was not inerted to tech. spec. requirements, efforts were made to determine why. A grab sample was obtained and an O2 surveillance was performed to confirm the actual O2 concentration in the torus. When the oxygen concentration was confirmed to be greater than TS requirements a reactor shutdown was initiated. A troubleshooting check of the H2O2 Analyzer (EIS=IK) sample flowpath was conducted to ascertain if there was air in-leakage at the analyzer. No significant leakage was found. A search for other leaks was conducted and none were found. The containment was purged with air, then was re-inerted using a nitrogen flow rate of approximately 90,000 scfh. On 5/12/97 at 1230 hours the torus was re-inerted. At 1330 hours the torus O2 concentration was confirmed to be 0.3%.

The nitrogen inerting system (EIS=LK) was originally sized such that a 3% O2 concentration could be achieved in approximately 4 hours, assuming complete mixing of the purge flow and the containment atmosphere. The FSAR describes initial containment inerting as reducing containment O2 concentration from 21% to 4% by volume within approximately four to six hours using a purge flowrate in the normal operating range of 100,000 to 150,000 scfh.

The containment drywell contains recirculating fans (EIS=BK) that can contribute to mixing the nitrogen purge flow with the drywell atmosphere. The containment torus only has the nitrogen purge flow to promote mixing within the torus atmosphere.

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

### SAFETY SIGNIFICANCE

There was no increased threat to the health and safety of the public because the overall containment O<sub>2</sub> concentration, considering the combination of both drywell and torus gas volumes (a combination which would occur during the postulated loss of coolant accident), would have approached the TS concentration requirement. Additionally, the time operated with the deficient inerted condition was very short (approximately 4 days), and there was no coolant leak during that time which would have required the torus pressure suppression chamber to perform its function. The primary containment is designed to mitigate a design basis accident. Also, the quantity of hydrogen liberated during a LOCA would not be enough to form a combustible mixture. This event is being reported because the primary containment torus was not inerted to the technical specification of < 4% O<sub>2</sub> concentration within 24 hours of placing the reactor mode switch in the RUN position.

### CORRECTIVE ACTIONS

#### Immediate Actions:

These actions have already been accomplished.

1. Once it was determined the O<sub>2</sub> concentration was greater than TS requirements a reactor shutdown was initiated.
2. Troubleshooting was conducted to determine if there were any air leaks. No significant leaks were found.
3. An event report was initiated to document this event and initiate a root cause analysis to determine the root cause and appropriate corrective actions for this event.

#### Short Term Corrective Actions

VY is revising the primary containment operating procedure as follows:

- Provided guidance for a minimum inerting flowrate.
- Provided guidance for the time required to inert to TS requirements.
- Provided instructions for monitoring drywell and torus pressures while inerting.
- Provide instructions for obtaining grab samples to confirm that an O<sub>2</sub> concentration of less than 4% has been attained.

The expected completion date for these changes is: 6/12/97

#### Long Term Corrective Actions

1. VY is revising the containment inerting calculation to provide guidance for inerting times and inerting purge flowrates that reflect the configuration of the nitrogen purge system and the primary containment. This revision will provide specific guidance to support separate inerting of the drywell and the torus volumes (expected completion date: 11/1/97).

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2. VY will revise the FSAR to describe the separate inerting of the primary containment drywell and torus. This description will provide nitrogen purge flowrates and inerting times consistent with the installed configuration of the nitrogen purge system and the primary containment (expected completion date: 9/21/98).
3. VY will revise the primary containment operating procedure as follows:
  - Add instructions for setting nitrogen purge flowrates in accordance with the FSAR.
  - Add instructions to monitor and record nitrogen flowrates during the inerting process.
  - Add instruction for monitoring torus pressure and drywell pressure when the torus is being inerted.
  - Add instructions for obtaining a grab sample, and performing an O2 concentration surveillance to confirm that inerting to less than 4% O2 concentration has been achieved.
  - The expected completion date for these changes is: 1/9/98

#### ADDITIONAL INFORMATION

Two similar events reported within the last five years include:

- |           |   |
|-----------|---|
| LER 97-01 | Inadequate design evaluation allows plant operation under conditions where a single postulated electrical failure coincident with a LOCA could result in containment overpressure |
| LER 93-04 | Jet Pump Operability Surveillance not performed during Single Loop Operations as required by Technical Specifications due to inadequate plant procedures.                         |