

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) McGuire Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 6 9 1 JFD 16	PAGE (3) 16
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TITLE (4) Both Trains of the Chilled Water and Control Ventilation System Inoperable Due to Design and Management Deficiencies

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 7 3 0	8 6	8 6	8 6	0 1 2	0 0	0 7 3 1	8 6	8 6	McGuire, Unit 2	0 5 0 0 0 3 7 1 0

OPERATING MODE (9) 6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)									
POWER LEVEL (10) 0 1 0 1 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.38(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.38(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)							
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)							
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)							

LICENSEE CONTACT FOR THIS LER (12)									
NAME Julio G. Torre, Junior Engineer - Licensing								TELEPHONE NUMBER 7 0 4 3 7 3 - 8 0 2 9	

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	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)		
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)										<input checked="" type="checkbox"/> NO		
										MONTH	DAY	YEAR

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

On July 3, 1986, at 0645, the Chilled Water and Control Area Ventilation (VC/YC) system Train B chiller tripped on low oil level. VC/YC system Train A was started but it tripped on chilled water low flow and would not restart. Both trains of the VC/YC system were declared inoperable and Unit 2 and Unit 1 entered Technical Specifications (T.S.) 3.0.3 and 3.7.6, respectively. The VC/YC system Train A was repaired and a functional verification was successfully performed. At 0728, VC/YC system Train A was declared operable and Unit 2 and Unit 1 were removed from T.S. 3.0.3 and 3.7.6, respectively. At 0900, it was determined that a performance retest, on VC/YC system Train A, had not been performed following modification activities on July 2, 1986, at 1650. Again, VC/YC system Train A was declared inoperable. At 0940, the performance retest was completed and VC/YC system Train A was declared operable. Unit 2 and Unit 1 were removed a second time from T.S. 3.0.3 and 3.7.6 respectively. At 1025, VC/YC system Train B was declared operable after all appropriate maintenance and verification were completed. Unit 1 was in Mode 6, Refueling, and Unit 2 was in Mode 1, Power Operation, at 100 percent power at the time of the incident. This event has been attributed to a design deficiency and to a management deficiency. All appropriate personnel will be informed about how to properly handle work requests associated with performance retests. Control room habitability could have been maintained throughout this event under design conditions.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

On July 3, 1986, at 0645, the Chilled Water and Control Area Ventilation (VC/YC) system Train B chiller tripped on low oil level. VC/YC system Train A was started but it tripped on chilled water low flow and would not restart. Both trains of the VC/YC system were declared inoperable and Unit 2 and Unit 1 entered Technical Specifications (T.S.) 3.0.3 and 3.7.6, respectively. The VC/YC system Train A was repaired and a functional verification was successfully performed. At 0728, VC/YC system Train A was declared operable and Unit 2 and Unit 1 were removed from T.S. 3.0.3 and 3.7.6, respectively. At 0900, it was determined that a performance retest, on VC/YC system Train A, had not been performed following modification activities on July 2, 1986, at 1650. Again, VC/YC system Train A was declared inoperable. At 0940, the performance retest was completed and VC/YC system Train A was declared operable. Unit 2 and Unit 1 were removed a second time from T.S. 3.0.3 and 3.7.6 respectively. At 1025, VC/YC system Train B was declared operable after all appropriate maintenance and verification were completed. Unit 1 was in Mode 6, Refueling, and Unit 2 was in Mode 1, Power Operation, at 100 percent power at the time of the incident.

BACKGROUND:

The VC/YC system is designed to maintain the environment in the Control Room, Control Room Area, Battery Rooms, Electrical Penetration Rooms, and Switchgear Rooms within acceptable limits for the operation of unit controls, maintenance and testing of controls, and uninterrupted safe occupancy of the Control Room during post-accident shutdown.

Technical Specification 4.7.6 states the Control Room temperature must be maintained less than or equal to 120 degrees F. Technical Specification 3.7.6 states that when one train of the VC/YC system is inoperable when in Modes 1, 2, 3, or 4, the inoperable train must be restored to operable status within seven days or be in at least Hot Standby within the next six hours and in Cold Shutdown within the following thirty hours. When in Modes 5 or 6, with one train inoperable, the train must be restored to operable status within seven days or initiate and maintain operation of the remaining operable train in the recirculation mode. With both trains inoperable, in addition to the above, reactor core alterations or positive reactivity changes must be suspended. Technical Specification 3.0.3 states that when a Limiting Condition of Operation is not met, except as provided in associated action requirements, within one hour, action must be initiated to place the unit in a mode in which the specification does not apply by placing it, as applicable, in:

1. at least Hot Standby within the next six hours,
2. at least Hot Shutdown within the following six hours and,
3. at least Cold Shutdown within the next twenty four hours.

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DESCRIPTION OF EVENTS:

On July 2, 1986, at 0417, VC/YC system Train A was declared inoperable to allow for the installation of interposing relays on 24 control circuits of the 600 Volt alternating current essential auxiliary circuits. The modification activities on VC/YC system Train A were completed at 1505. At 1650, VC/YC system Train A was declared operable.

On July 3, 1986, at 0645, VC/YC system Train B chiller tripped on low oil level. At this time, Train A was started, but it tripped on chilled water low flow and would not restart. Therefore, both Trains A and B of the VC/YC system were declared inoperable. Also, Unit 2 and Unit 1 were declared to be under the Technical Specification provisions of Technical Specifications 3.0.3 and 3.7.6 respectively. Accordingly all Unit 1 reactor core alterations were suspended, and the Control Room Hi Temperature procedure was implemented to prevent the Control Room temperature from exceeding Technical Specification limits. Work requests were issued at this point to investigate and repair both trains of the VC/YC system.

Subsequently, it was determined that the VC/YC system Train A chiller tripped on chilled water low flow. The chilled water low flow alarm switch was reset, refrigerant was added to the chiller, and a functional verification was successfully performed. At 0728, VC/YC system Train A was declared operable and Unit 2 and Unit 1 were removed from the provisions of Technical Specifications 3.0.3 and 3.7.6, respectively.

At 0900, Duke Power personnel determined that after the modification work done on VC/YC system Train A was completed on July 2, the train had been declared operable without the performance retest being done.

Subsequently, Control Room personnel were notified of the event and VC/YC system Train A was declared inoperable. At this time, Unit 2 and Unit 1 were declared to be under the provisions of Technical Specifications 3.0.3 and 3.7.6, respectively.

At 0925, Duke Power personnel completed adding oil to VC/YC system Train B chiller and successfully performed a functional verification.

At 0940, the retest on VC/YC system Train A was completed. At this time, VC/YC system Train A was declared operable and Unit 2 and Unit 1 were removed from the provisions of Technical Specifications 3.0.3 and 3.7.6, respectively. Also, Unit 1 reactor core alterations were resumed and implementation of the control Room Hi Temperature procedure was terminated.

At 1025, VC/YC system Train B was declared operable.

CONCLUSION:

This incident has been attributed to a design deficiency because the VC/YC chiller

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units are unable to effectively control the compressor oil level under varying heat loads resulting in trips on low and high oil level. When the chiller package is in operation, it is normal for a portion of lubricating oil to mix with the refrigerant and travel through the refrigerant cycle. The oil, which will accumulate in the evaporator, is returned to the reservoir by the velocity of the refrigerant during normal and heavy heat loads. When the chiller is not operated under full heat load, the refrigerant is traveling in the system at a slower velocity resulting in some of the oil not being returned to the reservoir. When enough oil has been accumulated in the evaporator, the oil level decreases to the point where more oil must be added or the chiller will trip. After oil has been added, the chiller can be restarted and loaded. If the chiller has a normal to heavy heat load, the oil in the evaporator is returned to the reservoir where there is now an excess. The chiller will then eventually trip on high bearing temperature if the excess oil is not removed. The high bearing temperature results from the compressors transmission operating in the overfilled reservoir. Duke Power personnel determined the cause of the problem to be that the VC/YC system chillers do not operate under full heat load capacity. The chillers are only loaded to eighty percent capacity, whereas, they were designed to be loaded and operated at one hundred percent capacity. Every time the heat load is substantially reduced, the possibility of a VC/YC system trip on low or high oil level exists. During this incident, Train B chiller tripped on low oil level. Currently, Duke Power personnel are pursuing a possible change in the hot gas bypass valve setpoints on the chiller packages which may counteract the effects of operating the VC/YC system at less than design capacity.

Also during this incident Train A of the VC/YC system tripped on chilled water low flow. The VC/YC system Train A has a lead-lag control circuit that places both VC/YC system trains in a series alignment. When Train A trips and is restarted, it is usually accompanied by a chilled water low flow alarm. Duke Power personnel believe deleting the lead-lag circuit will eliminate the chilled water low flow problem. This proposed modification is currently being considered for implementation.

During this incident, VC/YC system Train A was declared operable without having the required performance retest being done. The work performed on VC/YC system Train A involved installing interposing relays in twenty four control circuits involving twenty four different components. Seventeen work requests were written for the implementation of this work. Two work requests were written to document the performance retest. On all seventeen work requests the retest designation was marked "no". The work requests should have been marked "yes" to require a performance retest. However, the responsible personnel had previously agreed to complete performance retests under separate work requests. The individual who declared the VC/YC operable before completion of the performance test stated that when reviewing the work requests he noticed that no performance test was required by the work requests. He also noticed a note stating that a functional verification would be done under another work request. Since no performance retest was required on the work request under which the work was performed, he declared VC/YC system Train A operable. This part of the event has been attributed to a management deficiency. Work requests under which work was

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performed were marked "no" when a performance retest was actually required prior to declaring the affected equipment operable (as it had been previously agreed by the responsible personnel).

A review of past reports revealed that both trains of the VC/YC system have previously been declared inoperable due to high bearing temperature as a result of high oil level in the chillers, and VC/YC system Train B has previously been inoperable once, due to low oil level in the chiller. Both trains have previously been inoperable at the same time due to chilled water low flow (i.e. LER 369/84-18). There have been no previous incidents of VC/YC system inoperability due to missed performance retests following maintenance or modification activities.

A review of past reports also revealed there have been three cases of equipment being declared inoperable due to missed performance retests following maintenance activities. There have been no previous occurrences of missed performance retests following modification activities. Therefore, this is an isolated event.

There were no personnel injuries, personnel overexposures, or releases of radioactive material as a result of this incident.

CORRECTIVE ACTIONS:

Subsequent:

1. The Control Room Hi Temperature procedure was implemented.
2. The chilled water low flow alarm switch was reset and refrigerant was added to VC/YC system Train A chiller.
3. Oil was added to VC/YC system Train B chiller.
4. The performance retest on VC/YC system Train A was successfully completed.

Planned:

All appropriate personnel will be informed about the method by which work requests associated with performance retests will be handled and documented in order to avoid this type of event.

SAFETY ANALYSIS:

During this incident, there was a 43 minute period when the cooling portion of both trains of the VC/YC system were not capable of operating. During this time period, the Control Room temperature did not exceed 84 degrees F. Also, there were no spurious alarms or events involving high temperature in the Control Room.

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With the cooling portion of the VC/YC system inoperable, in the event of an accident resulting in the possibility of chlorine or radioactive airborne contamination, the VC/YC system air handling filtration units could have been operated which would have maintained the habitability of the Control Room.

During the time period, excluding the previously mentioned 43 minutes, VC/YC system Train A was technically inoperable due to a missed performance retest, the system could have been operated and would have maintained the temperature and habitability of the Control Room environment.

The health and safety of the public were not affected by this incident.

DUKE POWER COMPANY

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July 31, 1986

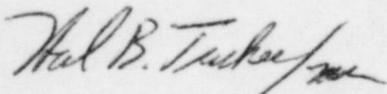
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Washington, D.C. 20555

Subject: McGuire Nuclear Station - Unit 1
Docket No. 50-369
LER 369/86-12

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(2)(i)(B), attached is Licensee Event Report 369/86-12 concerning both trains of the Chilled Water and Control Ventilation System being Inoperable Due to Design and Management deficiencies. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,



Hal B. Tucker

JGT/34/jgm

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