



**DUKE POWER**

April 5, 1990

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

Subject: Catawba Nuclear Station  
Docket No. 50-414  
LER 414/90-05

Gentlemen:

Attached is Licensee Event Report 414/90-05 concerning TECHNICAL SPECIFICATION VIOLATION FOR ONE TRAIN OF THE ANNULUS VENTILATION SYSTEM INOPERABLE DUE TO INAPPROPRIATE ACTION.

This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

Tony B. Owen  
Station Manager

keb\LER-NRC.TBO

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## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Catawba Nuclear Station, Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 4 1 4				PAGE 15 1 OF 07		
TITLE (3) Technical Specification Violation For One Train Of The Annulus Ventilation System Inoperable Due To Inappropriate Action																
EVENT DATE (6)			LER NUMBER (5)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)						
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES				DOCKET NUMBER(S)			
03	08	90	90	005		00	04	05	N/A				0 5 0 0 0			
														0 5 0 0 0		
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5 (Check one or more of the following) (11)														
1		20.402(a)				20.406(a)				50.73(a)(2)(iv)				73.71(a)		
POWER LEVEL (10)		20.406(a)(1)(i)				50.76(a)(1)				50.73(a)(2)(iv)				73.71(a)		
0.97		20.406(a)(1)(ii)				50.76(a)(2)				50.73(a)(2)(iv)				OTHER (Specify in Abstract Draw and in Text, NRC Form 305A)		
		20.406(a)(1)(iii)				50.73(a)(2)(ii)				50.73(a)(2)(iv)(A)						
		20.406(a)(1)(iv)				50.73(a)(2)(iii)				50.73(a)(2)(iv)(B)						
		20.406(a)(1)(v)				50.73(a)(2)(iv)				50.73(a)(2)(iv)						
LICENSEE CONTACT FOR THIS LER (12)																
NAME R.M. Glover, Compliance Manager										TELEPHONE NUMBER AREA CODE 810 8 84311 -13121316						
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC						
SUPPLEMENTAL REPORT EXPECTED (14)																
YES (If yes, complete EXPECTED SUBMISSION DATE)										NO		EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
										X						
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single space typewritten lines) (16)																

On March 8, 1990, at approximately 1945 hours, with Unit 2 in Mode 1, Power Operation, Train A Annulus Ventilation (VE) System heaters did not energize during the performance of PT/2/A/4450/03A, Annulus Ventilation System Train 2A Operability Test. A work request was initiated to determine why the heaters did not energize, and it was noted that wires were disconnected from terminals 9 and 10 in electrical cabinet 2ELCC0043. Train 2A of the VE System was declared inoperable at 1945 hours. The wires were subsequently terminated, PT/2/A/4450/03A was successfully performed, and Train 2A of the VE System was restored to operability by 1840 hours, on March 10. This incident is attributed to an inappropriate action, due to a failure to follow procedure, although the specific action resulting in the lifted leads could not be identified. The wires were lifted on March 2, 1990, during a setpoint adjustment. It is apparent, from discussions with the technicians involved, that these wires were reterminated. While it is known that the wires were disconnected sometime between March 2 and March 8, it is most probable that they were lifted on March 2, during the temperature controller adjustments (see LER 413/90-014), as a result of failure to document lifted leads as required by procedure. As a result, the seven day action statement for one inoperable train of VE was exceeded. Safety-related ventilation instrumentation procedures will be enhanced to include specific signoffs for leads required to be lifted in the conduct of the procedures.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMS NO. 0160-ET10

EXPIRES 6/30/00

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TEXT (If more space is required, use additional NRC Form 806A's) (17)

BACKGROUND

The Annulus Ventilation [E11S:VD] (VE) System is designed to achieve a negative pressure in the annulus, following a loss-of-coolant accident (LOCA). It consists of two independent, 100% capacity trains. Following an event, the VE System minimizes the release of radioisotopes by filtering and recirculating a large amount of air relative to the volume discharged. Each of the VE filter [E11S:FLT] trains uses heaters [E11S:EHTR] to limit relative humidity, ensuring carbon filter efficiency. Each of the heaters is controlled by two temperature controllers: a primary controller, with a setpoint of 185 degrees F (at which the heater will trip), and a backup controller, with a setpoint of 250 degrees F.

Technical Specification 3.6.1.8 requires both trains of VE to be operable in Mode 1, Power Operation, Mode 2, Startup, Mode 3, Hot Standby, and Mode 4, Hot Shutdown. The Action Requirement is that with one train of VE inoperable, the inoperable train must be restored to operable status within seven days, or the Unit must be in at least Mode 2 within the next 6 hours, and in Mode 5, Cold shutdown, within the following 30 hours.

PT/2/A/4450/03A, Annulus Ventilation System Train 2A Operability Test, is performed on a periodic basis to demonstrate the operability of VE Train 2A. Filter Train 2A is run for a minimum of 10 hours, with verification that the heaters are operating.

Calibration of VE instrumentation is performed using instrumentation procedure IP/2/A/3160/01, Annulus Ventilation System (VE). This procedure is used to check and adjust temperature controller setpoints, along with those of other safety-related instrument loops in the VE System.

IP/0/A/3890/02, Controlling Procedure for Changes on Systems and Components, provides means to record isolations and restorations.

EVENT DESCRIPTION

On March 2, 1990, with Unit 2 in Mode 1, the determination was made that, given setpoint values and the stated inaccuracy of the Fenwal Model 543 temperature controller, several of these controllers, in safety-related ventilation system applications, should be conservatively declared inoperable (see LER 413/90-014). Exempt Changes were issued to raise the affected heater controller setpoints to 500 degrees F, to ensure the heaters would remain energized. Nuclear Station Modification (NSM) Work Requests 3564 through 3576 and 3589 NSM were initiated on March 2 to perform the adjustments on various ventilation systems, as described in LER 414/90-014. Both trains of Unit 2 VE were restored to operability by setting both A and B Train filter unit primary and backup controllers (CN2VETS5370, CN2VETS5380, CN2VETS5390, and CN2VETS5400) to 500 degrees F. Train A controllers (CN2VETS5370 and CN2VETS5380) were adjusted under Work Request 3567 NSM, and Train B controllers (CN2VETS5390 and



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED ONE NO. 2150-01EM  
EXPIRES: 8/31/88

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TEXT (If more space is required, use additional NRC Form 206A's) (17)

CN2VETS5400) were adjusted under Work Request 3568 NSM. Both work requests were worked between 1425 hours and 1830 hours, on March 2. Prior to adjusting the setpoints for CN2VETS5370 and CN2VETS5380 under Work Request 3567 NSM, wires were disconnected from terminals 9 and 10 in electrical cabinet 2ELCC0043, Annulus Ventilation Heater Control Panel 2A. Following setpoint adjustments using IP/2/A/3160/01, and functional verification, in which heater operation was verified by placing a signal at terminals 9 and 10, the wires were reterminated to terminals 9 and 10. Neither the lifting nor the retermination of these leads was documented on IP/0/A/3890/02, which was to be used in conjunction with IP/2/A/3160/01 to perform Work Request 3567 NSM. IP/2/A/3160/01 does not specify which leads to lift in order to perform a calibration adjustment. However, it does require that circuit alterations (such as lifting leads) be documented.

On March 8, at approximately 1945 hours, with Unit 2 in Mode 1, Train A VE heaters did not energize during the monthly performance of PT/2/A/4450/03A. Train 2A of the VE System was declared inoperable at 1945 hours, and Work Request 46135 OPS was initiated to determine the cause of Train 2A VE heaters not energizing. It was noted that wires were disconnected from terminals 9 and 10 in electrical cabinet 2ELCC0043. The wires were terminated, and PT/2/A/4450/03A was successfully performed, verifying operability of the Train 2A VE heaters. Train 2A of the VE System was returned to operable status by 1840 hours, on March 10.

Work Requests 3390, 3391, and 3392 MES (Maintenance Engineering Services) were initiated on March 9 to inspect terminals in other electrical cabinets which were opened on March 2 for the setpoint adjustments. No other disconnected wires were found.

### CONCLUSION

This incident is attributed to an inappropriate action, due to a failure to follow procedure, since the circuit alterations performed were not documented. The activity responsible for disconnecting the wires could not be identified, however, it is known that it occurred sometime between March 2 and March 8. It is likely that the wires were disconnected during the setpoint adjustments on March 2, since several temperature controller setpoints were adjusted, which involved opening similar heater control cabinets, and lifting leads from terminals 9 and 10. It is apparent from discussions with the technicians involved, that the wires were properly reterminated at the completion of Work Request 3567 NSM. This conclusion is based on the level of detail with which the technicians involved, and the supervisor involved, remembered lifting and terminating these particular leads at the heater control panel. However, the wires may have again been disconnected subsequent to the performance of work Request 3567 NSM, on March 2, during the performance of subsequent setpoint adjustment work in other heater control cabinets, of similar appearance. Due to the likelihood of this action having occurred on March 2, it has been conservatively determined that the seven day Technical Specification Action

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OME NO. 2150-01EM  
EXPIRES: 8/31/88

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TEXT (If more space is required, use additional NRC Form 305A's) (17)

Requirement for restoring an inoperable train of VE to operable status expired on March 9. Since Train 2A of the VE System was not declared operable until March 10, a potential violation of Technical Specification 3.6.1.8 occurred. Corrective actions were to reterminate the leads, perform PT/2/A/4450/03A, and perform a follow-up inspection of similar electrical cabinets opened on March 2 for setpoint adjustments. Other NSM work requests issued on March 2 to adjust temperature controller setpoints, under Exempt Change Nos. CE-2798 and CE-27999, were reviewed to determine if the inappropriate lifting of leads 9 and 10 in cabinet 2ELCC0043 was documented. No such documentation was found. In addition, personnel involved with this work were interviewed. The Technical Specification Action Item Logbook (TSAIL) was reviewed for the period in question, and no entries were made indicating work which may have been responsible. The nuclear maintenance database program was reviewed, and no work was identified, for Unit 1 or Unit 2 VE, which could have been responsible. Instrumentation procedures involving safety-related ventilation systems will be revised to ensure that functional verifications are performed after all other procedure steps are completed. In addition, these instrumentation procedures will be revised to properly document which leads need to be lifted to perform calibrations.

Technical Specification violations involving ventilation systems are a recurring concern at Catawba. To deal with this, an extensive review of ventilation systems and associated procedures was initiated, to verify that ventilation system testing is meeting the intent of Technical specifications, the Final Safety Analysis Report (FSAR), and Regulatory Guides. In LER 414/89-020, a comprehensive response was developed to deal with ventilation system problems. Part of this response was a planned action for Performance, Operations, and Design Engineering to review available plant parameters for addition to the Performance Monitoring Database System to enhance the analysis and trending of ventilation systems performance data.

CORRECTIVE ACTION

## SUBSEQUENT

- 1) Wires were reconnected to terminals 9 and 10 in electrical cabinet 2ELCC0043 under Work Request 46135 OPS.
- 2) Train 2A of the VE System was successfully tested by PT/2/A/4450/02A, verifying heater operation, and Train 2A VE was returned to operable status.
- 3) A follow-up inspection of other similar cabinets, opened during the March 2 setpoint adjustments, was performed under Work Requests 3390, 3391, and 3392 MES. No other disconnected wires were found. The operability of the Unit 1 VE System was verified prior to entering Mode 4.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0154  
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TEXT (If more space is required, use additional NRC Form 306A's) (17)

- 4) Other NSM work requests involving temperature controller setpoint adjustments were reviewed, as well as the nuclear maintenance database program. In addition, the technicians involved in these setpoint adjustments were interviewed. No evidence of the work activity responsible for this action was found.

PLANNED

- 1) An extensive review of ventilation systems and associated procedures is currently in progress at Catawba, which will verify that ventilation system testing is meeting the intent of Technical Specifications, the FSAR, and Regulatory Guides.
- 2) Performance, Operations, and Design Engineering will review available plant parameters for addition to the Performance Monitoring Database System to enhance the analysis and trending of ventilation systems (as well as other systems) performance data (from Planned Corrective Action 13, LER 414/89-020).
- 3) Instrumentation procedures involving safety-related ventilation systems will be enhanced to include documentation of leads to be lifted to perform calibrations.

SAFETY ANALYSIS

The VE System consists of two independent, 100% capacity trains, each having the ability, following a LOCA, to achieve a negative pressure in the annulus. During the period which Train 2A VE was assumed to be inoperable, from March 2 to March 10, Train 2B VE was operable and fully capable of performing its safety functions, with the exception of March 5, between 0100 hours and 0600 hours when Diesel Generator [EIIIS:GEN] 2B was inoperable. The VE System however was still capable of performing its design function on March 5, because of a compensatory action which had been in effect since February 28, 1990. This compensatory action was in response to Problem Investigation Report (PIR) No. 0-C90-0065, which questioned whether or not a single failure of a VE System heater could allow doses to exceed FSAR values. Design Engineering provided the following operability evaluation:

The purpose of this evaluation is to address the failure of a heater in one of the Annulus Ventilation System (VE) filter trains following a LOCA. Presently, there are no alarms, annunciators [EIIIS:ANN], or status lights located in the Control room to provide the Operator information on the status of the VE System heaters.



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED DATE NO. 2180-0104

EXPIRES: 8/31/88

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TEXT (IF MORE SPACE IS REQUIRED, USE ADDITIONAL NRC Form 360a's) (17)

The filter train heaters function to insure that the air entering the carbon adsorber is equal to or less than 70% relative humidity (R.H.). The heaters are sized to reduce the relative humidity of the air from 100% R.H. to 70% R.H. Each filter train heater has two 22.5 KW sections for a total of 45 KW. Loss of one or both of these sections would preclude the heater function. This would permit air to enter the carbon adsorber at greater than 70% R.H. The effect of this condition is to decrease the adsorber efficiency for the removal of iodine following a LOCA.

A review of the effect on the calculated site boundary and Control Room doses under the condition of a failed heater has been performed. This review indicates that while regulatory guidelines are not exceeded there is an increase in the calculated site boundary and Control Room dose.

Insuring that a filter train with a failed heater is operated less than eight hours reduces the impact of a heater failure on the site boundary and Control Room doses. Since the inspection frequency defines the period of time a filter train could operate with a failed heater, the shorter the inspection interval is, the less impact on calculated dose. An eight hour inspection frequency is considered to provide a reasonable limitation on dose impact without being an undue burden to the Operator.

Therefore, Design Engineering recommends that heater operation be verified at least once every eight hours. Verification can be made at the motor [E11S:MO] control center (1EMXI, 1EMXB, 2EMXI or 2EMXB) for each filter train heater by taking an amp reading for each leg of the power supply. An average current reading of less than 38 amps indicates that heater failure has occurred. At this time, the Control Room must take the necessary actions to stop operation of the filter train with the failed heater and insure that the other filter train remains in operation.

Appropriate heater function is verified by Technical Specification surveillance requirement 4.6.1.8.d.5. The failed heater question has no impact on the Technical specification.

Based on the above evaluation and compensatory action, Design Engineering recommends that the VE System be declared conditionally operable. This evaluation is valid through 1EOC5 and 2EOC4. The compensatory actions defined in this evaluation assure that the design functions of the VE System regarding iodine removal are maintained while a permanent resolution is developed and implemented.

Upon receipt of the above operability evaluation, on February 28, a compensatory action was implemented that, within 8 hours of a safety-injection and every 8 hours thereafter, amperage to VE heaters be verified. If this amperage is less than 38 amps, then that train of VE should be secured and operation of the other

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

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TEXT (If more space is required, use additional NRC Form 300A's) (17)

train should be assured. Therefore, if a LOCA had occurred on March 5, Train 2A of the VE System would have started as required. Within 8 hours, it would have been found that Train 2A VE heaters were not operating, and Train 2B VE would have then been manually placed in operation.

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