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DUKE POWER

August 28, 1989

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

Subject: McGuire Nuclear Station Units 1 and 2
Docket No. 50-369
Licensee Event Report 369/89-17

Gentlemen:

Pursuant to 10CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/89-17 concerning the inoperability of the Annulus Ventilation System because of wiring not meeting Environmental Qualification requirements. This report is being submitted in accordance with 10CFR 50.73(a)(2)(i). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

T.L. McConnell/mgl

T.L. McConnell

ARS/bcb

Attachment

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MC-815-04
(20)

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
McGuire Nuclear Station, Unit 1	0 5 0 0 0 3 6 9	1 OF 0 5

TITLE (4) Annulus Ventilation System Inoperable Because Wiring Did Not Meet Environmental Qualification Requirements As A Result Of Manufacturing Deficiency

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	1 4	8 9	8 9	— 0 1 7 —	0 0	0 8	2 1	8 9	McGuire, Unit 2	0 5 0 0 0 3 7 0
										0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Part 21
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	TELEPHONE NUMBER	
	AREA CODE	
Alan Sipe, Chairman, McGuire Safety Review Group	7 0 4	8 7 5 - 4 1 8 3

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

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

During a materials evaluation, Design Engineering personnel determined on July 14, 1989 that wiring for the Annulus Ventilation filter unit preheater contained a teflon jacket. Since the teflon jacket would breakdown when subjected to accident radiation dose levels, the wire did not meet the required environmental qualifications. Operations personnel made appropriate procedure changes to ensure that the Annulus Ventilation system was maintained operable. A replacement wire was identified and requisitioned. This event is assigned a cause of Manufacturing Deficiency resulting from a material deficiency because of improper selection. Unit 1 was in Mode 1, Power Operations, at 100% power and Unit 2 was in Mode 6, Refueling, at the time the wiring problem was discovered. This event is Part 21 reportable.

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

EVALUATION:

Background

The Annulus Ventilation [EIIS:VD] (VE) system serves to produce and maintain a negative pressure in the containment annulus following a Loss Of Coolant Accident (LOCA), minimizes the release of radioisotopes, and provides long-term fission product removal capability by decay and filtration. The system consists of two 100 percent capacity trains of equipment and is actuated by 2 of 4 high-high containment pressure signals.

The VE filter [EIIS:FLT] trains are each equipped with demisters and electric preheaters. The demisters and preheaters are installed to limit the relative humidity of the air entering the filters to below 70 percent to keep the charcoal in a dried condition, conservatively assuming the entering air is at 100 percent.

The preheaters are designed to run continuously while the fans [EIIS:FAN] are running. Both trains of VE are started automatically by the Solid State Protection System (SSPS) on a 3 psig signal.

Description of Event

During a Commercial Grade Evaluation (a review to determine if material can be purchased as Commercial Grade), Design Engineering (DE) personnel determined on July 14, 1989 that wiring for the VE filter unit preheater contained a teflon jacket. DE personnel determined that the wire jacket for Rockbestos Firezone 101, would breakdown when subjected to the accident radiation dose levels postulated for a LOCA, and could potentially allow the electrical insulation to become moisture laden. The electrical cables could then short to ground or to each other. If this had happened, the preheater would have been inoperable. The fan would have still operated. However, without the preheater, the carbon filter could have been exposed to 100 percent relative humidity air rendering it less effective.

Problem Investigation Report (PIR) 0-M89-0154 was initiated concerning the problem on July 14, 1989. DE personnel were assigned responsibility for evaluating the PIR and determining operability of the VE system for continued operation.

DE personnel completed the Operability determination for continued operation on July 20, 1989. The VE system was determined to be conditionally operable as long as it is continuously operated or if for any reason, a train fails, that train is not restarted. If one of the trains experiences a single active failure, then no attempt should be made to restart that train of the system. Procedure changes were approved by Station personnel for OP/1,2/A/6450/02, Annulus Ventilation System, on July 14, 1989. The changes added a caution to each procedure to instruct Operations personnel not to stop either VE fan during a plant accident without consulting personnel staffing the Technical Support Center. An Immediate Training package was issued to the Operations Shift personnel to ensure that Control Room personnel were trained on the procedure changes. The procedure changes will be in effect until Problem Investigation Report (PIR) 0-M89-0154 is resolved. Final

resolution will be completed when the Firezone 101 wire is replaced with the approved wire, #8AWG Rockbestos Firewall SR.

After the initial operability determination resulted in conditional operable status, DE personnel performed a past operability determination as requested by Compliance personnel, and concluded that the VE system had been inoperable.

Conclusion

This event is assigned a cause of Manufacturing Deficiency resulting from a material deficiency because of improper selection. The preheater wiring did not meet the required environmental qualifications. Duke Power Company provided the vendor with Specification No. MCS-1211.00-00-1101, Annulus Ventilation Filter Unit Control Panel Modifications, which detailed the environmental conditions required for continuous operation of the VE filter units.

ANCO Products Group Engineers, Inc. performed the testing and analysis to qualify the material/components used in the VE filter units. The Firezone 101 wire was qualified by a similarity analysis based on the results of testing performed on Firewall III wire. (Testing on the Firewall III wire was conducted by the Franklin Institute Research for the Cerro Wire and Cable Company and did meet the required environmental qualifications.) The conclusion drawn by ANCO Products Group Engineers, Inc. was in error because Firewall III and Firezone 101 were not similar because the insulation/jacketing materials of the two wire types have different properties. ANCO Products Group Engineers, Inc. identified the difference between Firezone 101 and Firewall III in their test report as follows:

> "The only difference between the components is that the installed conductor has an insulation system consisting of an inorganic insulation and inorganic dielectric barrier next to the copper conductor in addition to the organic moisture insulation and glass braid covering for the conductor. The similar conductor consisted of the copper conductor and organic insulation."

Firezone 101 wire has not been purchased by Duke personnel for use in safety related applications. DE personnel are not aware of any other syrtems where Firezone 101 wire is in use. Therefore, this event is considered to be an isolated case.

During October 1988, the McGuire VE system environmental qualification documentation was reviewed after a problem with environmental qualification was discovered on the VE system at Catawba Nuclear Station. The problem at Catawba involved wiring that was qualified for everything but the radiation levels that the VE system would be exposed to. The wiring was a different type than that used at McGuire. The review of McGuire's environmental qualification documentation for the VE system did not reveal any problems.

A review of the McGuire LER data base for the previous twelve months did not reveal any LERs with a root cause or contributing cause of manufacturing deficiency resulting from a material deficiency. In addition, the review did not reveal any

previous incidents involving an environmental qualification problem with the VE system. Therefore, this event is considered not recurring.

This event is not reportable to Nuclear Plant Reliability Data System.

This event is Part 21 reportable.

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

CORRECTIVE ACTIONS:

Immediate:

1) Operations personnel implemented procedure changes for the VE system to ensure the VE system was maintained conditionally operable.

2) Operations personnel issued an Immediate Training package to be included with the Shift Supervisor's turnover to ensure appropriate Operations personnel were cognizant of the procedure changes.

Subsequent: Replacement wire for Rockbestos Firezone 101 was identified and requisitioned.

Planned: DE personnel will initiate a Station Problem Report to replace the Rockbestos Firezone 101 wire in the VE system with the approved replacement wire.

SAFETY ANALYSIS:

The operability evaluation for continued operation concluded that the VE system is conditionally operable provided that once the system has been actuated, neither train would be turned off. As long as the train is continuously operated, the environment in the filter train will preclude the formation of condensation on the electrical insulation which could lead to an electrical failure. Condensation would be undesirable because without the heaters [EIIS:HTR], carbon filter performance may become degraded which could result in higher radioactive releases through the unit vent.

If one train is turned off and a restart is attempted, the above mentioned electrical failure could occur and may degrade the performance of that filter train. Therefore, it was necessary to impose the restriction of allowing continuous operation of both trains of VE after they start. If for any reason a train fails, that train should not be restarted.

The VE system is not an accident initiator. Therefore, the probability of accidents is not increased. The teflon material would not be subjected to a radiation environment until after an assumed accident has occurred. By this time, both trains would already be running and the preheaters would keep moisture from entering the insulation precluding an electrical failure. Therefore, the

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

probability of a malfunction of equipment important to safety previously evaluated is not increased.

The teflon coated heater wiring will not degrade the performance of the VE system, if neither train is turned off nor restarted. Therefore, the consequences of accidents will not be increased.

Since the teflon coated heater wiring does not introduce a common mode failure and all other components are still qualified, the consequences of a malfunction of equipment important to safety will not be increased. Assuming restarts are not attempted, no new malfunctions of equipment are created.

No safety limits have been affected and the integrity of the fission product barrier has been preserved. Therefore, the margin of safety as defined in the bases to the Technical Specification is not reduced.

With respect to the past operability determination, the scenario of losing humidity control on a train of VE could have potentially occurred and rendered that train inoperable according to Technical Specification 3/4.6.1.8. However, if this had occurred, NCS Corporation (formerly Nuclear Containment Systems, Inc.), the carbon test lab who tests the VE filter carbon stated that the filters would have less than 10 percent penetration if tested with air at 100 percent humidity at 80 degrees-C. This is in lieu of 1 percent penetration if tested with air at 70 percent humidity at 30 degrees-C. Based on this judgement, according to Regulatory Guide 1.52, a filter efficiency of 90 percent for elemental iodine may be assigned to the filter operating with non-preheated air. An offsite dose analysis was performed using the total 8,000 cfm flow through the degraded carbon filter (non-preheated air) and the results showed the total offsite doses to be within the guidelines of 10CFR100.

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