

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Catawba Nuclear Station, Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 4 1 4 1	PAGE (3) OF 0 4
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TITLE (4)
Failure Of Rotork Actuator On Residual Heat Removal Valve Due To Installation 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	2	0	8	8	0	0	1	0	N/A			0 5 0 0 0
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THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (9) 6	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(e)(1)	<input type="checkbox"/> 73.71(e)
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(e)(2)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 365A)
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	Voluntary
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME Julio G. Torre, Associate Engineer - Licensing	TELEPHONE NUMBER
	AREA CODE: 7104 317131-1810219

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS
B	B	P	V	R	3	7	8	Y	

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On February 3, 1988, during an NRC Equipment Qualification (EQ) Inspection, a damaged Residual Heat Removal (ND) System Rotork Electric Motor Operated (EMO) valve actuator was discovered. The Unit was in Mode 6, Refueling, at the time of discovery. The motor was found disconnected from the actuator with its electrical wiring intact. An investigation established that the torque/limit switch on the actuator, which stops valve motion upon full travel, had been bypassed under a Corrective Maintenance work request (WR). The bypassed torque/limit switch resulted in the motor stalling and subsequently ejecting itself from the actuator. This type of failure had previously occurred in April 1986. After the 1986 incident, it was discovered that in 1978 the manufacturer had increased the size of the motor mounting bolts on certain type actuators. When an affected motor manufactured after 1978 is mounted to an affected actuator manufactured before 1978, a sleeve and washer assembly must be used. Unit 2 has operated in all modes with an improperly installed motor on the 2ND2A valve actuator. This incident has been attributed to an installation deficiency due to improper installation of the motor to the actuator during maintenance in July of 1985. This incident has also been attributed to a management deficiency. After the 1986 incident, a Nonconforming Item (NCI) report was not written because of the incorrect motor to actuator fit. A Nuclear Station Problem Report was originated following the 2ND36B incident but that program did not require that a more generic evaluation be performed. The ND System actuator was repaired and returned to service. The health and safety of the public were unaffected by this incident. Although this event was determined to be non-reportable this LER is being submitted as a voluntary report for information purposes only.

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

BACKGROUND:

Rotork Electric Motor (IIS:MO) Operators (EMO)s are used throughout the station for remote valve (EIS:V) operation. There are various sizes depending on the valve and system requirements. There are also two different qualifications of actuators used in safety related applications at Catawba. The NA-1 is qualified for use inside Containment and the NA-2 is qualified for use outside Containment.

DESCRIPTION OF INCIDENT:

On February 3, 1988, an NRC Equipment Qualification (EQ) team arrived on site to conduct an audit of the Catawba Nuclear Station EQ program. As part of the audit, the inspectors were required to visually inspect pre-selected items for compliance. During this phase of the audit an inspector found the motor on the Rotork Actuator for 2ND2A, Residual Heat Removal (EIS:BP) (ND) Pump 2A Suction valve, to be separated from the actuator. A follow-up investigation into the cause of the failure disclosed that the actuator was damaged when the torque/limit switch contacts were bypassed under an Operations work request. The bypassed torque/limit switch prevented the motor from de-energizing when the valve reached its full open position. This resulted in the valve backseating and the motor entering a stalled condition and subsequently ejecting itself from the actuator. Further analysis disclosed that the motor had pulled free over its socket head mounting bolts and washers leaving the bolts and washers in place. This was an unexpected failure mode and prompted an inquiry into the possibility of an equipment deficiency that may have safety significance. This inquiry disclosed a similar failure on April 10, 1986. An identical actuator was being set up for torque certification using the Rotork test bench when the motor stalled and ejected itself. This failure was attributed to the mounting of a post 1978 manufactured NA-1 motor to an a pre 1978 manufactured NA-1 actuator gear case. The post 1978 NA-1 motor has significantly larger mounting holes than a pre 1978 NA-1 motor which caused it to have an insufficient bolt head to motor mating surface and will allow the motor to pull free of the actuator housing when the motor enters an excessive load condition. At that time, the Instrumentation and Electrical (IAE) responsible Engineer contacted Design Engineering (DE) and informed them of the problem. DE responded with a modification to the NA-1 motors that was recommended to them by the manufacturer in November of 1982. This modification required the use of a sleeve and washer assembly to reduce the motor mounting hole size and increase the bolt to motor loading surface when an NA-1 motor is mounted to an NA-2 actuator. This modification prevents the motor from pulling free of the actuator. There was no follow-up action in 1982 by either Design Engineering or the Station to determine if there were any other affected actuators at Catawba. It was assumed that the problem was only a motor mounting problem between the NA-1 motor and the NA-2 actuator and had no safety significance. It was not until the 1986 incident that it was realized that the problem extended to the pre 1978 actuator and the post 1978 motor.

Subsequent to the failure of 2ND2A, a follow-up investigation identified two additional affected actuators, 2NV89A, Reactor (EIS:RCT) Coolant (EIS:AB) Pump (EIS:P) Seal Return Containment Isolation valve, and 1WL805A, Reactor Coolant Drain Tank (EIS:TK) Pump Discharge Containment Isolation valve. These actuator motors were modified and the valves returned to service.

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

CONCLUSION:

This incident has been attributed to an installation deficiency due to improper installation of the motor to actuator on valve 2ND2A during Maintenance in July 1985. The failure of 2ND2A was the result of mounting a post 1978 Rotork motor to a pre 1978 Rotork actuator without the proper mounting hardware.

This incident has also been attributed to a management deficiency. This deficiency was recognized in 1986 when 2ND36B, ND Pump 2B Suction valve, ejected its motor while undergoing bench certification. The 2ND36B incident was not reported using a Non-Conforming Item (NCI) report. Had an NCI been written, the requirements for follow-up action would have identified the problem with 2ND2A, 1WL805A, and 2NV89A, and this incident would not have occurred. A Nuclear Station Problem Report was issued on the 2ND36B incident, but that program did not ensure additional generic follow-up which would have identified the 2ND2A problem.

Since the 2ND36B incident, the NCI program was replaced in September 1986, with a program more suitable to identifying this type of problem. The new program requires a Problem Investigation Report (PIR) be written by the responsible individual when follow-up action is required after a problem has been identified. This ensures that all responsible support groups are notified of the problem and that each group responds to those action items assigned, until a satisfactory resolution is achieved, and also requires a generic review for similar problems.

The practice of installing jumpers using maintenance work requests was identified as a violation of Station Directives prior to the discovery of this incident. Corrective measures have been taken to ensure compliance in the future.

Design Engineering reviewed the stress on the affected valve and determined that the actuator failure did not adversely affect the valve itself.

There have been no previous incidents in which an improperly installed component has caused a Rotork actuator to become inoperable. Therefore, this type of incident is nonrecurring.

A review of NPRDS did not reveal any previous failures of Type 90, Rotork Actuators due to installation or maintenance related problems. The failure of 2ND2A will be reported to NPRDS.

CORRECTIVE ACTIONS:

SUBSEQUENT

- (1) IAE repaired 2ND2A and it was returned to service.
- (2) IAE reviewed all appropriate work request and determined that there were two additional affected valves currently installed in the plant.
- (3) IAE repaired the two affected valves.

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- (4) IAE revised appropriate procedures to ensure that additional hardware is also installed on the affected type of Rotork actuators.

SAFETY ANALYSIS:

The motor on the valve actuator for 2ND2A ejected itself due to backseating causing the motor to stall. Had an actual Design Based Event (DBE) occurred during normal operating conditions, 2ND2A would have moved to its safe position. Train B of ND was also available at the time of this incident. 1WL805A and 2NV89A are size 11 actuators. These type actuators were shown by testing at McGuire to have enough loading area on the bolt motor mounting surface not to be affected.

The health and safety of the public were unaffected by this incident.

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NUCLEAR PRODUCTION

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March 31, 1988

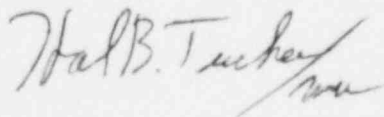
Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Catawba Nuclear Station, Unit 2
Docket No. 50-414
LER 414/88-10

Gentlemen:

Pursuant to 10 CFR 50.73 Section (a) (1) and (d), attached is Licensee Event Report 414/88-10 concerning a failure of a Rotork actuator on a Residual Heat Removal valve due to installation 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/10013/sbn

Attachment

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