OCT 2 9 1984

MEMORANDUM FOR: Richard C. DeYoung, Director

Office of Inspection and Enforcement

Harold R. Denton, Director

Office of Nuclear Reactor Regulation

FROM:

C. J. Heltemes, Jr., Director

Office for Analysis and Evaluation

of Operational Data

SUBJECT:

ENVIRONMENTALLY UNQUALIFIED VALVE ACTUATORS DISCOVERED

IN OPERATING PLANTS

References:

(1) LER 84-014, Docket 370, Event date 6/9/84.

(2) LER 84-019, Docket 369, Event date 6/6/84.

The purpose of this memorandum is to bring to your attention a few situations (See references 1 & 2) for which it was discovered that installed valve actuators did not meet environmental qualification requirements that had been specified. There appear to be at least three separate issues raised that could result in installation of unqualified valve actuators. The three issues are as follows:

- The valve supplier did not attach environmentally qualified actuators before shipment of the valve assembly. However, it appears that valve actuators are not marked as qualified such that there may not be an easy way to confirm whether a qualified actuator was installed. In fact, reference I states that the only obvious difference would be the presence of a drain hole in the environmentally qualified actuator.
- 2. In order to ensure that a valve actuator retains its environmental qualification status, it appears that plant staff must install the drain plug at the plant.
- 3. Plant staff must also install the drain plug in a manner consistent with the valve actuator orientation in order to maintain environmental qualification status.

The AEOD review of the referenced LERs resulted in a category 2 rating which indicates they are worthy of further review. There were three plants (Catawba and McGuire 1 and 2) identified with situations where unqualified actuators were discovered. In addition, the October 22, 1984 IE Daily Report by Region II identified a similar instance where the valve supplier could not certify that

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qualified valve operators were furnished for four valves in the charging pump mini flow lines at Vogtle 1 and 2. Although we believe there are potential generic aspects, we have not been able to determine how broad the subject may be and the scope is outside the normal areas for AEOD investigations. For instance, we don't know whether only the cited supplier of the valves was unaware of the difference between qualified or unqualified actuators, and whether procedures at each plant are adequate to ensure proper installation of the drain plugs.

Therefore, we believe these events are appropriate to include in the Vendor Program Branch (IE) reviews and inspections related to qualification of valve actuators. In addition, the Equipment Qualification Branch (NRR) may wish to consider implications relative to inspections and audits of licensee valve actuator qualification programs.

These concerns were discussed between Earl J. Brown of my staff, Edward Baker in IF and Robert LaGrange in NRR. If you have further questions, please call Mr. Brown on extension 24437. A copy of each LER is enclosed.

Original signed by Thomas A, Ippolito

C. J. Heltemes, Jr., Director
Office for Analysis and Evaluation
of Operational Data

Enclosure As stated

cc:

D. Eisenhut, NRR

D. Crutchfield, NRR

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R. Kiessel, IR

OCS PDR

ROAB CF

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E. Brown

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C.Heltemes

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Limitorque SMB electric motor actuators are qualified for active inside containment service per Limitorque Qualification Type Test Report 600456. The actuators were qualified with T-drain plugs installed in the bottom of the actuator motor housing to prevent accumulation of condensation during a LOCA or MSLB. Duke Power utilizes actuators qualified to Report 600456 for active valves in both the Containment and Doghouses. The T-drain plugs are packaged inside the actuator switch compartment and tagged with field installation instructions. An inspection conducted (6/6-10/84) at McGuire as a result of deficiencies identified on the Catawba Nuclear Station revealed several active valves with Limitorque SMB actuators were installed in the Containment and Doghouses without the T-drains in place. Both units were in Mode 1 at 100% power at the time of discovery.

Investigation was unable to determine a cause for the failure to install the T-drains. Evaluation indicated there is a very high degree of confidence that the valves would have functioned without T-drain plugs in place. The valve actuators were fitted with T-drain plugs as soon as they became accessible. Limitorque installation and instruction mannals will be revised to include T-drain plug installation requirements.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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Limitorque Corporation SMB "Containment Chamber" electric motor valve actuators (EIIS:XCV) are qualified for active inside containment service per limitorque qualification type test report 600456. Limitorque operators are not designed to be completely sealed from the DBE (LOCA or Main Steam Line Break) environment. The actuator configuration qualified in the Limitorque LOCA Chamber Test had T-drain plugs installed in the bottom of the actuator motor (EIIS:MO) housing to prevent accumulation of condensation due to the harsh environment created during a LOCA or MSLB. In the event of steam entrapment in the motor compartment, the T-drains would allow drainage of condensate, thus preventing possible saturation of the motor insulation and short circuiting of the motor leading to operator failure. Failure of the motor to operate would prevent the actuator from performing its intended safety function; therefore, T-drains are required to maintain the nuclear qualification of the operators. Duke Power utilizes actuators qualified to report 600456 for active valves in both the containment and doghouses.

On May 16, 1984 a deficiency was identified on the Catawba Nuclear Station in which the T-drain plugs had not been field installed, as required by the vendor, on certain Limitorque electric motor valve operators (Ref. Significant Deficiency : Report SD 413-414/84-15). Subsequent inspection of McGuire revealed (June 6-10, 1984) that several active valves (EIIS:V) with Limitorque SMB actuators were installed in the containment vessel and doghouses without the T-drains in place. Both units were in Mode 1 at 100% power at the time of the discovery. The following is a list of all the McGuire valves with Limitorque actuators without T-drains for which T-drains are required (note that various other active valves have T-drains missing or don't have provisions for T-drains but don't require them for their application):

-Inside Containment:

Containment Air Return \Exchange & Hydrogen Skimmer System (VX) (EIIS:VD) valves 1VX-1A and 1VX-2B

-Safety Injection System (NI) (EIIS:BP) valves 1NI-430A and 1NI-431B

-Doghouse:

Auxiliary Feedwater System (CA) (EIIS:BA) valves 1CA-38B, 1CA-50B, 1CA-54A, & 1CA-66A

UNIT 2

-Inside containment:

Containment Air Return Exchange & Hydrogen Skimmer System (VX) valves 2VX-1A | and 2VX-2B

Reactor Coolant System (NC) (EIIS:AB) valves 2NC-54A and 2NC-196A Safety Injection System (NI) valves 2NI-430A and 2NI-431B

Component Cooling System (KC) (EIIS:CC) valve 2KC-424B

(Note that the unit 1 valves corresponding to 2NI-430A, 2NI-431B, and 2KC-424B do not have Limitroque operators)

-Doghouse:

Auxiliary Feedwater System (CA) valves 2CA-38E, 2CA-50B, 2CA-54A, and 2CA-66A.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION APPROVED DIME NO. 3150-0104

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The T-drains should be field installed (according to actuator orientation) in place of the two lowest (existing) solid pipe plugs in the motor end bells. The T-drain plugs are shipped packaged inside the actuator switch compartment and tagged with field installation instructions. Limitorque Nuclear Qualification Report B-0058 also briefly states T-drain installation requirements. Investigation was unable to determine a cause for the failure to install the T-drains.

Of the valves listed, only the Auxiliary Feedwater System (CA) valves and Unit 2 Containment Isolation valves 2KC-424B and 2NC-54A must function in the event of a LOCA or MSLB. All others are active but are not required to function to mitigate a LOCA or MSLB. 2KC-424B and 2NC-54A receive an automatic containment isolation signal, initiated by high containment pressure, and will reach their safety position within 40 seconds and 10 seconds, respectively, after receipt of signal. The valves are not required to operate thereafter. Condensation is not expected to form in the motor housing before the valves reach their safety position.

Auxiliary Feedwater System (CA) valves receive a manual signal from the control room operator. Several minutes could pass before the CA valves receive their signal so some condensation may form in the motor housing due to worst case 5 psig Doghouse environment. Even if condensation actually formed and it was not allowed to drain, it would have negligible affect on the Class RH motor insulation. In support of this, Limitorque has demonstrated operability of similar actuators with less durable Class H motor insulation, without motor housing drains, in a seven day LOCA test (as documented in Limitorque Report 600198).

All valve actuators listed were fitted with T-drain plugs as soon as they became accessible in order for the actuators to match the tested condition. Work was completed 6/10/84 for all valves except 2KC-424B (refer to LER-370/84-14 for discussion of this valve).

Limitorque installation and instruction manuals will be revised by Duke Power Company to include T-drain plug installation requirements.

Based on the above technical evaluation there is a very high degree of confidence that all valves in question would have functioned without T-drain plugs in place. Therefore, safety consequences to the station were negligible prior to installation of the T-drains. The health and safety of the public were unaffected by this deficiency.

DUKE POWER COMPANY P.O. BOX 33189 CHARLOTTE, N.C. 28242

HAL B. TUCKER VICE PRESENT

July 6, 1984

TELEPHONE (704) 373-4531

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

Subject: McGuire Nuclear Station, Units 1 and 2 Docket Nos. 50-369 and 50-370

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 369/84-19 concerning the failure to install T-Drains in Limitorque SMB Electrical Motor Operators which is submitted in accordance with \$50.73(a) (2) (v)/(vi). This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

F.B. Tucker 1 The Hal B. Tucker

PBN:slb Attachment

cc: Mr. James P. O'Reilly, Regional Administrator Mr. W. T. Orders U.S. Nuclear Regulatory Commission Region II 101 Marietta Street, NW, Suite 2900 Atlanta, Georgia 30303

Records Center Institute of Nuclear Power Operations 1100 Circle 75 Parkway, Suite 1500 Atlanta, Georgia 30339

NRC Resident Inspector McGuire Nuclear Station

American Nuclear Insurers c/o Dottie Sherman, ANI Library The Exchange, Suite 245 270 Farmington, CT 06032

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U.S. NUCLEAR REGULATORY COMMISSION APPROVED OME NO. 3150-0104 LICENSEE EVENT REPORT (LER) EXPINES: B/31/85 DOCKET NUMBER (2) McGuire Nuclear Station, Unit 2 0 15 10 10 10 13 1 71 0 1 10 1 0 12 Active Valves With Commercial Limitorque Actuators SVENT DATE (8) LER NUMBER IS REPORT DATE (7) OTHER FACILITIES INVOLVED (8) SEQUENTIAL MONTH DAY YEAR MEVISION MONTH DAY FACILITY NAMES DOCKET NUMBERIS 0 | 5 | 0 | 0 | 0 | 0 6 0 9 8 4 8 4 0 1 4 0 7 0 9 010 8 4 1510.10101 THIS REPORT IS BUBMITTED PURBUANT TO THE REQUIREMENTS OF 10 CFR & (Check one or more of the fo MODE (8) 20.406(a) 86 73(a) (2)(let 73,7100 25.406(+)(1)(() BC 36(4)(1) 80.73(a)(2)(v) 73.71(4) 1010 20.406(4)(1)(8) 50.38(e)(2) 50.73(x)(2)(vil) OTHER ISDNETTY IN ANA 20.406(a)(1)(M) 80.7361(2)(() 50.73(a)(2)(vWHA) 20 A08 (a) (1) ((m) 80.73(41(2)(8) 80.73(a)(2)(a)(b)(8) 20.406 (a1511a) 80.73(4)(2)(40) 80.73(a)(2)(a) LICENSEE CONTACT FOR THIS LER (12) MANA TELLPHONE NUMBER Phillip B. Nardoci, Licensing Engineer AREA CODE 71014 317 1 31 -17 1 41 312 COMPLETE ONE LINE FOR EACH COMPONENT PAILURE DESCRIBED IN THIS REPORT (15) TO NPROS MANUFAC TURER CAUSE SYSTEM COMPONENT MANUFAC TURER TO NPROS

Commercial grade Limitorque actuators are installed on Unit 2 component cooling system (KC) containment isolation valves 2KC-4243 (Inside Containment) and 'KC-425A (Auxiliary Building). Fisher Controls, the supplier for both Class 1E active valves, failed to provide environmentally qualified actuators as required by Duke specifications. The commercial grade actuators were discovered during an attempt (on June 9, 1984) to install T-drain plugs in the motor housing of valve 2KC-424B when it was discovered there was no provision for the plugs. Unit 2 was in Mode 1 100% power at the time of discovery.

SUPPLEMENTAL REPORT EXPECTED (14)

YES III yes, complete EXPECTED SUBMISSION DATE!

ABSTRACT (Limit to 1400 spaces, i.e., approximately lifteen single-space typewritte)

This error went undetected because Limitorque model numbers/nameplates do not distinguish qualified actuators and their qualification level from commercial type actuators. Only Limitorque can determine the qualification level by tracing their factory order number back to a bill of material.

Based on evaluation there is a very high confidence level that the subject valves will operate at the onset of an accident, and the probability of a DBE occurring and challenging the KC System before actuator replacement can be made is quite remote. Therefore, actual safety consequences to the station is considered negligible and continued operation for a reasonable period of time is justified. The actuators will be replaced with qualified units as soon as plant availability permits. The qualification level of all other active valves furnished by Fisher Controls will be confirmed, and any necessary corrective actions taken.

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MONTH

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NAC Form 366A

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

FACILITY NAME (1)		EXPIRES: 8/31	/85		
	OOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)		
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McGuire Nuclear Station, Unit 2	0 15 10 10 10 13 17 10	814 - 01114 - 010	010 05 010		
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Commercial grade Limitorque actuators [EIIS:XCV] are installed on Unit 2 component cooling system (KC) [EIIS:CC] containment isolation valves [EIIS:V] 2KC-424B (Inside Containment) and 2KC-425A (Aux. Bldg.). Fisher Controls, the supplier for both Class 1E active valves, failed to provide environmentally qualified actuators as required by Duke specifications. The commercial grade actuators were discovered during an attempt (on June 9, 1984) to install T-drain plugs in the motor [EIIS:MO] housing of valve 2KC-424B when it was discovered there was no provision for the plugs (Ref. LER 369/84-19 for discussion of the T-drain deficiency). Unit 2 was in Mode 1 at 100% power at the time of discovery. (The corresponding Unit 1 valves do not have Limitorque actuators.)

This error went undetected because Limitorque model numbers/nameplates do not distinguish qualified actuators and their qualification level from commercial type actuators. Only back to a bill of material.

It is felt that the above deficiency is an isolated case at the McGuire Nuclear Station. Valves 2KC-424B and 2KC-425A receive an automatic containment isolation signal at the onset of an accident; after which the valves would not be required to operate again. Valves are secured in their safety position 40 seconds after they receive their signal and prior to accident environment having any detrimental effect on the actuators. With the exception of some quality control inspections during manufacturing, these actuators are similar to actuators qualified for active outside containment service per Limitorque Qualification Type Test Report B-0003.

All electrical power and control components associated with the subject valves are Class 1E qualified (e.g., feeder breakers, reversing starters, cabling, etc.). The Class 1E feeder breakers [EIIS:BRK] are acceptably coordinated with the associated Class 1E bus breaker, such that electrical faults at the valve operator (postulated to occur only well into the DBE) would be isolated without degrading the Class 1E bus [EIIS:CON] and other safety-related loads. In addition, the two valves have passed their timing requirements in all surveillances performed since Unit 2 startup.

Based on the above technical evaluation, there is a very high confidence level that the subject valves will operate at the onset of an accident, and the probability of a DBE occurring and challenging the KC System before accuator replacement can be made is quite remote. Therefore, actual safery consequences to the station is considered negligible and continued operation for a reasonable period of time is justified. The health and safety of the public were unaffected by this deficiency.

Non-nuclear grade actuators on valves 2KC-424B and 2KC-425A will be replaced with qualified units as soon as necessary equipment is received and plant availability allows adequate time to make the replacement, but no later than during McGuire Unit 2 refueling outage, presently scheduled for January 6, 1985. In addition, the qualification level of all other active electric motor operated valves furnished by Fisher Controls will be confirmed by obtaining the order numbers from operator nameplates and tracing them back through Limitorque. Any additional deficiencies identified through this review will be evaluated, justified or corrected as required.

This deficiency is being reviewed in parallel at other Duke Nuclear Stations and appropriate actions will be taken and reported as required.

P.O. BOX 33189 CHARLOTTE, N.C. 28242

HAL B. TUCKER
VICE PARRIDENT
NOCLEAR PRODUCTION

July 9, 1984

TELEPHONE (704) 373-4531

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

Subject: McGuire Nuclear Station, Unit 2 Docket No. 50-370 LER 370/84-14

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 370/84-14 concerning active valves with commercial limitorque actuators which is submitted in accordance with \$50.73(a)(2)(v)/(vi). This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

#B. Tucher 150

PBN:scs

Attachment

cc: Mr. James P. O'Reilly
Regional Administrator
U. S. Nuclear Regulatory Commission
Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30323

Records Center Institute of Nuclear Power Operations 1100 Circle 75 Parkway, Suite 1500 Atlanta, Georgia 30339 Mr. W. T. Orders NRC Resident Inspector McGuire Nuclear Station

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