

JHT/93-179 July 22, 1993 3315 Old Forest Road P.O. Box 10935 Lynchburg, VA 24506-0935 Telephone: 804-385-2000 Telecopy: 804-385-3663

Document Control Center U. S. Nuclear Regulatory Commission Washington, DC 20555

Subject: Potential Safety Issue Re: Limitorque Valve Actuator Motors

Gentlemen:

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PDR

The purpose of this letter is to supplement a notification provided by Limitorque Corporation to the NRC, dated May 13, 1993, concerning the starting torque of Limitorque actuator motors at elevated temperatures.

The Limitorque letter (copy attached) advised that in a wide range of valve actuator types and sizes the motor starting torque decreases with increasing temperature, thereby, decreasing actuator output torque. Safety related valves/actuators that are required to operate at elevated temperatures may not function as required if the temperature effects were not properly taken into account in the sizing of the motors and actuators.

The affected valve actuators were supplied to the B&W-designed plants (see list in Attachment A) by BWNT in the initial scope of supply. BWNT also supplied actuator motors to utilities and other purchasers, as listed in Attachment B.

BWNT is advising the utilities and other purchasers, listed in Attachments A and B, of the concern for their evaluation as to the safety implications and reportability under Federal regulations. BWNT will perform no further evaluation of the concern unless requested and authorized by the utilities. This advisory to NRC is not a notification under 10CFR21.

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If you have any questions on this matter, you may contact me at 804/385-2817, or Mr. David Mars at 804/385-2852.

Very truly yours,

1. H. Jaylor/www J. H. Taylor, Manager

Licensing Services

JHT/bcc

Attachments

cc:

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C. R. Gaines, Entergy Operations, Inc.

Manager, Nuclear Safety Assurance, Duke Power Company

R. C. Widell, Florida Power Corporation

R. S. Harbin, GPU Nuclear Corporation

E. C. Caba, Toledo Edison Company

R. D. Wells, Tennessee Valley Authority L. C. Oakes, Washington Public Power Supply System

I. E. Wilkinson, Limitorque Corporation

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Limitorque Corporation

Automated Valve Actuators and Jacks for Industry

5114 Woodall Road • P.O. Box 11318 • Lynchburg, VA 24506-1318 Telephone (804) 528-4400 • FAX (804) 845-9736



May 13, 1993

SUB DASGUPTA

MAY 2 0 1993

Re: Potential 10 CFR 21 Condition

Subject: Reliance 3Ø L. C. Actuator Motors (Starting Torque at Elevated Temperature)

Limitorque Corporation has completed an evaluation of the subject motors. The results of this evaluation should be utilized to determine actuator operability at motor temperatures of 25° C through 180° C. The motor starting torque decreases with increasing temperature thereby decreasing actuator output torque. This condition could potentially be reportable depending on the operating practice of the licensee. Therefore, pursuant to the requirement of 10 CFR Part 21, herein provided is notification of a potential defect in Limitorque Corporation supplied motor actuators or motors supplied as spare parts.

Identification of Basic Component

The affected component is the Reliance 30 A.C. motor that provides input power to actuator types SMB/SBD 000 through 5 and SMB 000 through 5/HBC 0 through 7 combinations.

Discovery Date

The discovery date of this potential defect was July 27, 1989.

Nature of the Defect

The electrical characteristics of the Reliance $3\emptyset$ A.C. Limitorque Corporation valve actuator motor are temperature dependent and locked rotor <u>torque</u> and locked rotor <u>amperage</u> will vary with motor temperature. Typically locked rotor torque and locked rotor amperage decrease as motor temperature increases. The attached tabulation details both parameters percentage changes in the temperature range of 25° C to 180° C. The percentage change is linear with respect to temperature for both parameters with baseline data at 25° C. . . .

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The tabulation provides data that is relevant to standard Limitorque Corporation motor designs. The user must ensure that the motor performance curve number shown on the tabulation (e.g. M2735A) is applicable to the motor that is undergoing analysis. If this data is not available, the licensee may furnish the applicable motor identification numbers to Limitorque Corporation in order to make this determination.

The following guidance is offered:

- 1. Credit should be taken for the locked rotor amperage decrease which will result in a higher available motor terminal voltage.
- 2. Motor temperature rise due to prior motor energization and motor run time (valve stroke time) must be accounted for.
- 3. The tabulated data is expected to also predict 550/575 V 3Ø 15 minute duty motor performance. The starting torque rating, no load speed and frame size of the 550/575V motor must match the attached data to allow this analysis. The licensee is requested to provide the motor identification numbers to Limitorque Corporation to verify this assumption.
- 4. The tabulated data is based on analysis by Reliance Electric. Limitorque Corporation performed testing on two motor designs (quantity of 5 motors) which validated the analysis.

Equipment Affected

- 1. Same as the basic component identification.
- 2. Previously supplied technical data that may be used as the basis for operability justification. Where applicable this data should be revised to account for the applicable elevated temperature effects.

Licensee Corrective Action

Ensure operability justification considers the effect of motor performance at the applicable motor temperature.

Limitorque Corporation Corrective Action

Revise the selection procedure for safety related actuators, motors, and technical data packages to account for motor performance at the applicable motor temperature.

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A copy of this notification has been sent to the Nuclear Regulatory Commission (NRC) under a separate cover letter.

Any questions or clarifications regarding the above notification may be directed to P. McQuillan, Nuclear/Special Projects Manager at (804)528-4400 Ext. 714.

Signed:

I. B. Wilkinson

Vice-President of Engineering

Attachment

cc: T. Mignogna Part 21 Notification File

Current/Torque Changes from 25 to 1 Centigrade

			76 CUITORIL	76 I Orq
Start/RPM	Frame	Curve #	<u>L053</u>	Loss
2'#/1800	56	M2735A	27.8%	20.7%
5'#/1800	48	M2734	29.0%	18.6%
5'#/1800	58	M1658	21.8%	21.9%
7.5'#/1800	56	M2925	22.4%	5.7%
10'#/1800	56	M1468	26.9%	27.7%
15'#/1800	58	M1476	23.7%	23.1%
25'#/1800	56	M1480	23.1%	23.2%
40'#/1800	56	M1488	21.1%	23.4%
60'#/1800	56	M5204	20.8%	20.9%
60'#/1800	180	SK-59454	19.6%	18.2%
80'#/1800	210	SK-59423	16.1%	15.8%
100'#/1800	210	SK-59419A	17.0%	13.1%
200'#/1800	256	SK-34177	13.5%	9.0%
250'#/1800	256	SK-34193	11.8%	6.9%
300'#/1800	326	SK-34183	11.7%	5.8%
2'#/3600	48	413018-03	28.3%	16.0%
5'#/3600	48	M189	27.7%	18.5%
5'#/3600	58	M1454	. 24.7%	26.8%
7.5'#/3600	56	M1457	27.6%	16.7%
10'#/3600	56	M1458	23.5%	30.8%
15'#/3600	56	M1460	19.2%	21.4%
25'#/3600	56	M1463	16.2%	24.1%
40'#/3600	58	M4635	27.9%	15.9%
40'#/3600	180	SK-59450	16.2%	11.8%
60*#/3600	210	SK-59446	18.2%	16.5%
80'#/3600	210	SK-59448	18.0%	18.3%
100'#/3600	256	SK-34176	14.1%	9.8%
150'#/3600	256	SK-34184	13.9%	10.0%
200'#/3600	326	SK-34188	10.5%	3.4%
250'#/3600	326	SK-34173	9.3%	3.4%
300'#/3600	326	SK-34171	10.8%	2.9%
400'#/3600	365	SK-34800-	8.8%	-1.8%

ATTACHMENT A

B&W-Designed Plants (Operating or Under Construction)

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<u>Plant</u> Utility Duke Power Company Oconee Units 1, 2, 3 Arkansas Nuclear One-Unit 1 Entergy Operations Florida Power Corp. Crystal River-3 General Public Utilities-Nuclear Three Mile Island-Unit 1 Bellefonte Units 1. 2 (1) Tennessee Valley Authority Toledo Edison Company Davis-Besse Washington Public Power Washington Nuclear Power-Unit 1 Supply System (2)

(1) TVA intends to re-activate construction

(2) WNP-1 is in a deferred status of construction

<u>\ttachment B</u>

Purchasers of Limitorque Reliance Motors

Wol. Creek Generating Station

Portland General Electric Co. Trojan Nuclear Plant

TU Electric Company

Union Electric, Callaway Plant

Omaha Public Power District

Wisconsin Electric Power Co. Point Beach Plant

Public Service Electric & Gas

Gulf States Utilities

Arizona Public Service Co.

Consolidated Edison of NY Indian Point Station

Control Components Inc.

NUSCO/Millstone

Bechtel Overseas Corp.

New York Power Authority Indian Point 3 Nuclear Project

Fitzpatrick Nuclear Power Plant

Commonwealth Edison Quad Cities Sta. #4

Commonwealth Edison LaSalle County Station

Commonwealth Edison Zion Station #22

Virginia Power

Baltimore Gas & Electric Calvert Cliffs Nuclear Plant

Carolina Power & Light Robinson Nuclear Project

Florida Power Corp.

Halliburton NUS