

ORGANIZATION: LIMITORQUE CORPORATION
LYNCHBURG, VIRGINIA

REPORT NO.:	99900904/82-01	INSPECTION DATE(S)	7/27/82, 8/23/82, & 9/14-15/82	INSPECTION ON-SITE HOURS:	38
CORRESPONDENCE ADDRESS: Limitorque Corporation ATTN: Mr. W. J. Denkowski Vice President Engineering 5114 Woodall Road Lynchburg, Virginia 2450C					
ORGANIZATIONAL CONTACT: Mr. J. B. Drab TELEPHONE NUMBER: (804) 528-4400					
PRINCIPAL PRODUCT: Electric Motor Operated Valve Actuator Assemblies					
NUCLEAR INDUSTRY ACTIVITY: Limitorque Corporation supplies safety-related electric motor operated valve actuator assemblies for valve operation to the nuclear industry. This represents approximately 5% of their total production.					
ASSIGNED INSPECTOR: <u>A. R. Johnson</u> A. R. Johnson, Equipment Qualification Section (EQS)				12/10/82 Date	
OTHER INSPECTOR(S): H. S. Phillips, EQS					
APPROVED BY: <u>H. S. Phillips</u> H. S. Phillips, Chief, EQS				12/10/82 Date	
INSPECTION BASES AND SCOPE:					
A. <u>BASES</u> : 10 CFR Part 50, Appendix B.					
B. <u>SCOPE</u> :					
1. A management meeting was held to explain the NRC Region IV Equipment Qualification Inspection Program and current test programs and schedules. (cont. on next page)					
PLANT SITE APPLICABILITY:					
The Class 1E Limitorque valve control assemblies are supplied to various PWR nuclear power generating station applications.					

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Certified By Rhianne Clark

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SCOPE: (Cont.)

2. The purpose of the inspection was to witness the first 12 hours of a loss-of-coolant accident (LOCA)/high energy line break (HELB) environmental qualification (30-day) test, for a Limitorque valve control assembly (type SMB-00 valve actuator with a newly developed Reliance type LR electric motor). The Class 1E equipment was to be qualified in accordance with IEEE Standards 323-1974, 344-1975, 382-1980, and NUREG-0588, Revision 1, Category I with reduced requirements as specified by two reactor manufacturers.

A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Initial Management Meeting:

a. On July 27, 1982, the accompanying Region IV EQS supervisor presented to Limitorque management the NRC Region IV EQ Inspection Program. The presentation covered the Region IV Vendor Program Branch Inspection Program policies, authority, responsibility, objectives, and activities relating to test laboratory services. The status of proposed 10 CFR Part 50.49 was also discussed with Limitorque management.

b. Limitorque and NRC Region IV management discussed the mechanics of NRC EQ inspections including NRC access to proprietary data, purchase orders, and QA records at Limitorque and their subcontractors. The discussions were constructive and both now have a better understanding relative to how the respective organizations operate.

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<p>2. <u>LOCA/HELB Environmental Qualification Test:</u></p> <p>a. On August 23, 1982, the above test started obtaining the first qualification test profile (modified transient margin ramp) at 440° F/68 psig. Over the next 5 hours, the temperature/pressure test profile of IEEE 382-1980 (Figure 5, Case IV) was followed. At 1:30 p.m., on August 23, 1982, the second qualification test profile was obtained at the modified 440° F/68 psig and held for 2 minutes, followed by the temperature/pressure test profile of IEEE 382-1980 (Figure 5, Case IV). Approximately 28 hours into the test, during a scheduled functional check at the 280° F/36 psig plateau, the actuator motor experienced overcurrent in two of the three phases during the close stroke. Upon reaching the open limit position, both phases drew excessive overcurrent. The test was then terminated after two additional attempts to operate the actuator failed. The actuator motor was packaged and shipped to Reliance Electric Corporation for analysis.</p> <p>b. On September 7, 1982, the results of Reliance Electric Corporation's analysis was submitted to Limatorque. The Reliance report indicated high temperature was the cause for the overcurrent condition, based on a color comparison analysis technique used by Reliance. Limatorque Corporation does not necessarily agree with the Reliance analysis and is currently reviewing the results. During a future inspection, the NRC inspector will review a report to be issued by Limatorque.</p> <p>c. On August 23, 1982, approximately 7 minutes into the second qualification test profile at the 365° F/68 psig plateau, a momentary indication that the actuator had reached the full open position occurred. The anomaly was dispositioned as documented in a Limatorque memo to Mr. Joseph Drab, Special Projects Engineer, from Mr. Charles Cox, Assistant Chief Test Engineer, dated August 24, 1982. A limit switch (open position) malfunction occurred and was caused by drive cartridge loose bolting. The Limatorque disposition of this anomaly was that this occurrence was an isolated random failure. During a future inspection, the NRC inspector will review a report to be issued by Limatorque.</p> <p>3. <u>LOCA/HELB Environmental Qualification Test Rerun:</u></p> <p>a. On September 14, 1982, the above test started obtaining the first qualification test profile (modified transient margin ramp) at 420° F/68 psig and held for 3 minutes before returning to the</p>		

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stabilization temperature of 120° F. The second qualification test profile was then obtained at the modified 420° F/68 psig and held for 3 minutes followed by the modified test profile outlined in the Qualification Test Plan, Project 681063, Revision 4. Approximately 72 hours into the test (September 17, 1982), during a scheduled functional check, the Reliance motor malfunctioned and the test was again terminated. Limitorque is currently performing an evaluation to determine a course of action. During a future inspection, the NRC inspector will review a report to be issued by Limitorque.

4. Quality Assurance Manual Review:

The QA Manual, Nuclear Qualification Facility, was examined by the NRC Region IV inspector; however, an indepth review will be accomplished during a future QA review.

5. Inspection Results:

Within the scope of this inspection, the NRC inspector determined that:

- a. Qualification test plans met the requirements of NUREG-0588, Revision 1.
- b. Qualification test procedures conformed to the qualification test plans.
- c. Test and test inspection activities were performed in accordance with detailed test procedures.
- d. All necessary information and data collected to allow evaluation of test results were properly recorded and documented.
- e. The installation of test specimens in the environmental test chamber was in accordance with the qualification test procedures.
- f. Notice of Anomalies were prepared in a timely manner, properly documented, and properly dispositioned.
- g. The Limitorque valve control assembly (SMB-00 actuator with Reliance type LR electric motor) did not meet the acceptance criteria as outlined in the qualification test plans during each of the LOCA/HELB tests of August 23, 1982, and September 14, 1982.

Inspector A. R. JOHNSONScope/Module 099017BDOCUMENTS EXAMINEDDocket No. 99-904
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1	2	TITLE/SUBJECT	3	4
1	3	Limitorque IEEE 382 PWR Qualification Test Plan Project 681063	7/6/82	Rev 3
2	3	Limitorque IEEE 382 PWR Qualification Test Plan Project 681063	9/2/82	Rev 4
3	3	Qualification Test Procedure; SMB-00 Actuator; PWR Inside Containment Qualification; IEEE 382-80 Test Parameters; 681063	7/6/82	Rev 3
4	3	Qualification Test Procedure; SMB-00 Actuator; PWR Inside Containment Qualification; IEEE 382-80 Test Parameters; 681063	9/2/82	Rev 4
5	4	Quality Assurance Manual, Nuclear Qualification Facility	2/26/82	N/A.
6	5	Limitorque Corporation Purchase Requisition # RPI-521, Isomedix, Parsippany, N.J.	6/29/82	N/A
7	5	Limitorque Corporation Purchase Order # 063274	6/29/82	N/A
8	6	Memo to Mr. Joseph Drab from Mr. Walter Sykes Subject: Tel-Con W. Sykes and L. Timpanick of Isomedix	9/14/82	N/A

Document Types:

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| 1. Drawing | 5. Purchas Order |
| 2. Specification | 6. Internal Memo |
| 3. Procedure | 7. Letter |
| 4. QA Manual | 8. Other (Specify-if necessary) |

Columns:

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| 1. Sequential Item Number |
| 2. Type of Document |
| 3. Date of Document |
| 4. Revision (If applicable) |

Inspector A. R. JOHNSON
 Scope/Module 099017B

DOCUMENTS EXAMINED

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1	2	TITLE/SUBJECT	3	4
9	7	Letter to Mr. Walter Denkowski of Limitargue from Mr. David P. Constantine, Gen. Mgr. of Isomedix Subject: Irradiation Certification Specimens # 342835 and # 342836.	*	N/A
10	5	Limitargue Corporation Purchase Requisition # RD 1547, Acton Environmental Laboratories Acton Massachusetts	8/10/82	N/A
11	7	Letter to Limitargue Corporation from Reliance Electric Corporation, D.A. Kinney, Acc. Mgr. Subject: Motor 112-11 Failed Prototype Testing at Limitargue Corporation.	9/7/82	N/A
12	6	Memo to Mr. Joseph Drab Special Projects Engr. from Mr. Charles Cox, Assistant Chief Test Engr. Subject: Anomaly - LOCA/HELB Test Limit Switch Malfunction.	8/24/82	N/A

Columns:
 1. Sequential Item Number
 2. Type of Document
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 4. Revision (If applicable)

* NRC Inspector did not record date.

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