

ORGANIZATION:- NATIONAL TECHNICAL SYSTEMS
SAUGUS, CALIFORNIA

REPORT NO: 99900907/82-01	INSPECTION DATE(S) 6/7-10/82	INSPECTION ON-SITE HOURS: 81
CORRESPONDENCE ADDRESS: National Technical Systems (NTS) ATTN: Mr. Arthur Edelstein Executive Vice President, Engineering 26525 Golden Valley Road Saugus, CA 91350		
ORGANIZATION CONTACT: Mr. A. Edelstein TELEPHONE NUMBER: (805) 251-6622		
PRINCIPAL PRODUCT: Equipment testing		
NUCLEAR INDUSTRY ACTIVITY: Approximately 15% of the facility capacity and total man hours are involved in testing of equipment for the nuclear power industry.		
ASSIGNED INSPECTOR:	<u>J.R. Agee</u> J. R. Agee, Equipment Qualification Section (EQS)	<u>8/3/82</u> Date
OTHER INSPECTORS:	A. L. Smith, EQS J. J. Benson, Consultant, Sandia National Laboratories	
APPROVED By:	<u>H.S. Phillips</u> H. S. Phillips, Chief, EQS	<u>8-3-82</u> Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES:</u> 10 CFR Part 50, Appendix B, 10 CFR Part 21, and NTS Quality Procedures Manual		
B. <u>SCOPE:</u> The inspection was the initial inspection to evaluate the test facility, examine the test specimen, inspect the test fixture and test setup, review the test plan, verify the thermal aging analysis, and review the quality assurance manual.		
PLANT SITE APPLICABILITY:		
This inspection applies to Docket No. 50-382.		
DESIGNATED ORIGINAL Certified By <u>Rheanne Jouts</u>		

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A. VIOLATIONS:

None

B. NONCONFORMANCES:

None

C. UNRESOLVED ITEMS:

None

D. OTHER FINDINGS OR COMMENTS:

1. Company Organization and Quality Assurance Program -

The NTS Testing Division is engaged only in providing testing services and has no charter for manufacturing facilities. The test facility provides testing for the military, commercial organizations, and the nuclear industry. Currently, the facility uses about 15% of its manpower in testing for the nuclear industry. There are about 100 employees at the Saugus, California, facility consisting of the following approximate percentages: professional-30, administrative-15, technicians-40, and maintenance-15.

The Saugus facility has been active for several years but has just recently initiated testing of nuclear safety related equipment. Saugus has the capability for testing to the full spectrum of environmental qualification except for radiation. That work is contracted to others.

NTS facility at Chatsworth, California, is currently being moved to Saugus and is being combined with the Saugus capabilities. The move and the merging of the two test facilities should be completed by October 1982.

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The Quality Assurance Program was based on the Quality Procedures Manual which describes a quality control program that has been established to comply with the requirement of MIL-I-45208A and those portions of MIL-Q-9858A, MIL-C-45662A, and the NASA Handbook (NHB) 5300.4 (1C) that are applicable to a testing laboratory. The Quality Procedures Manual contains an Appendix entitled "Supplementary Quality Procedures Manual for Nuclear Power Industry Contracts." This supplement addresses compliance to the criteria of 10 CFR 50, Appendix B. The Quality Procedures Manual is in the midst of a gross revision resultant from the move of the Chatsworth facility to the Saugus site and the combination of the test programs of the two test facilities. The consolidation of the two QA programs is scheduled for completion by late June 1982. The total QA program will be reviewed in a followup inspection.

2. Test Facility and Test Setup

The Saugus test facility was examined for capabilities for conducting a LOCA/HELB test. The facility currently has the capability for conducting the required thermal aging test for the Borg-Warner Valve Actuator test but cannot yet accomodate the HELB test. Equipment and test setup for LOCA/HELB testing existed at the NTS, Chatsworth, California, facility and is now being transferred and installed at the NTS, Saugus, California, test site. The equipment will be installed and ready for LOCA/HELB testing by late summer 1982.

The NTS test procedure for the Borg-Warner thermal aging test had been submitted for final review and approval by Borg-Warner. Borg-Warner is currently completing the final acceptance test procedure (ATP) and checklist for the functional testing and development of baseline test data for the thermal aging test.

An inspection was made of the two separate test buildings where the thermal aging for the electronic controls and the test specimen (electrohydraulic valve actuator) will be conducted. The controls will be thermally aged in a 27 cu. ft. oven at 257° F in which a minimum number of thermocouples will be used for temperature/heater controls and recording.

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No redundant thermocouples are planned for temperature gradient measurements nor are spare thermocouples planned for the controls or recording.

The valve actuator will be thermally aged at 300° F in a separate 48 cu. ft. oven. The same philosophy will be followed in the use of a minimum number of thermocouples as used for the temperature measurements, controls, and recording in the 27 cu. ft. oven.

The Saugus test facility has the capability for transmitting all test data into a central data acquisition system for storage.

3. Test Procedure:

Test procedure 528-0847, Nuclear Qualification of a Modulating Electro-hydraulic Operator, P/N 85280 was reviewed to: (a) determine compliance with criteria specified in IEEE Standards 323-1974, 344-1975, and 382-1980; (b) verify thermal aging calculations and conclusions; and (c) verify the radiation aging analysis. During the course of this evaluation the inspectors reviewed the applicable IEEE Standards, performed independent thermal aging calculations, interviewed the cognizant NTS Nuclear Analysts, and reviewed five references contained in section 2.3 of Exhibit I to the Test Procedure to verify referenced technical information. The findings of the inspectors were:

- a. NTS Test Procedure 528-0847 is consistent with the criteria and requirements contained in IEEE Standard 323-1974, 344-1974, and 382-1980.
- b. NTS used the temperature/time relationship established in the Arrhenius chemical reaction rate theory to determine the time required for the accelerated aging of the specimen components. The inspectors performed independent calculations for the actuator module (paragraph 5.3.3.2 of Exhibit I), motor module (paragraph 5.3.3.3 of Exhibit I), and the servo amplifier module (paragraph 5.3.3.4 of Exhibit I). The results of the calculations performed by the inspectors and those contained in the above sections were in agreement.
- c. For operation cycle aging NTS has chosen to substitute 250,000 cycles of operation at 80% stroke (with a 2000 lb. load) for 10⁶ cycles at 20% stroke. Review of IEEE 382-1980 revealed that only 10⁵ cycles were required, therefore, the test is more severe than the IEEE requirements.

As a result of this review the following items will require additional evaluation:

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<ul style="list-style-type: none">a. Appendix A, "Borg-Warner Nuclear Valve Division Acceptance Test Procedure," to NTS Procedure 528-0847 was not available for review at the time of this inspection. This appendix will be reviewed as soon as it is available.b. The DC motor brushes were not considered when NTS performed the thermal aging analysis. NTS is to investigate the brush material to determine if it has any impact on the thermal aging analysis. This item will be reviewed during the next visit to NTS.c. NTS Procedure 528-0847 indicates the valve operator will be mounted in only one position (vertical) during qualification testing. Previous discussions with the Borg-Warner Project Manager indicated that the operator was to be qualified for installation in several positions. NTS will contact Borg-Warner and establish if additional mounting orientations are desired.d. Exhibit I, "Analysis Report," to NTS Procedure 528-0847 did not contain radiation specifications for the Syncotemp Hydraulic Fluid or the Loctite Magnet Cement. NTS is waiting for this information from Borg-Warner. This item will be reviewed during the next visit to NTS.e. The P/N for the test specimen as contained in NTS Procedure 528-0847 and the Borg-Warner drawing are not the same. NTS personnel were made aware of this and are resolving the matter with Borg-Warner.		