

The Light company

Houston Lighting & Power

South Texas Project Electric Generating Station P. O. Box 289 Wadsworth, Texas 77483

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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498 and STN 50-499
Reply to Inspection Followup Item 498; 499/9206-03

Attached are the South Texas Project STP responses to the three issues requiring additional information, Inspection Followup Item 498; 499/9206-03, which were identified during the inspection of the motor-operated valve program conducted on February 24-28, 1992.

The responses, were discussed and presented to NRC Inspectors during their follow-up inspection visit, June 16 through 18, 1992. We believe response items 2 and 3 were found to be satisfactory at that time. For response item 1, the NRC inspectors raised a concern regarding the effect of Rate-of-Loading. The enclosed response to item 1 includes the resolution to that Rate-of-Loading concern.

If you have any questions, please contact Mr. S. D. Phillips at (512) 972-8472 or me at (512) 972-7205.

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SDP/asg

Attachment: Reply to Inspection Followup Item 498; 499/9206-03

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L4/NRC/

Reply to Inspection Follow-up Item 498; 499/9206-03

RESPONSE ITEM 1 : Paragraph 2.3.3:

"The licensee was requested to provide the methodology they plan to utilize for extrapolating diagnostic test results from test conditions to design basis conditions and in particular in order to estimate the thrust and torque required to operate the valve at 100 percent differential pressure and flow. This is to include a review of previous dynamic test results to identify and document any operability concerns."

RESPONSE:

STPEGS developed a methodology for extrapolating diagnostic test results from test conditions to design basis conditions. The method had been applied to previous dynamic test results to identify and document any operability concerns. During a follow-up inspection on June 16 through June 18, NRC inspectors reviewed the draft methodology and noted that Rate of Loading was not appropriately factored into the methodology. The draft methodology was revised. The final methodology incorporates Rate of Loading. That methodology (Enclosure 1) was then applied to the previous dynamic test results.

The valves with positive indication of differential pressure effects were evaluated using the extrapolation methodology. The review did not identify any operability concerns. The results of this review are:

Number of valves in initial evaluation	- 68
Number of valves found acceptable in the initial evaluation	- 47
Number of valves undergoing additional evaluation	- 21

For those dynamic test occurrences which are equal to or greater than eighty percent of the Maximum Expected Differential Pressure (MEDP) but less than full MEDP, the test results are adjusted for comparison to the acceptance criteria. The method utilizes the ratio of MEDP to the test differential pressure (DP) to extrapolate the DP thrust at the actual test DP to the thrust at MEDP. This is compared to available thrust to ensure that margin exists. The method utilizes linear extrapolation. This method is considered the initial acceptance evaluation which will be updated to factor in the results from the EPRI Performance Prediction Program.

RESPONSE ITEM 1 - Paragraph 2.3.3: (Cont'd)

Those valves which did not pass the initial acceptance evaluation were reviewed to determine if the valves are functional and operational. All twenty-one valves were determined functional and operational. This is documented in the test data evaluation package based on (1) actual testing results, (2) valve function, (3) operational requirements, (4) testing equipment accuracies and/or (5) conservative assumptions in the Design Basis Calculation. Reconciliation with the initial acceptance evaluation in the extrapolation methodology associated with these twenty-one valves will be resolved as part of the program plan implementation (Phase II effort).

RESPONSE ITEM 2 - Paragraph 2.3.3

The licensee is requested to provide their long-term plans for all MOVs which were left in a condition where total thrust may exceed 110 percent of the actuators ratings.

RESPONSE:

Westinghouse Electric Corporation (Westinghouse) and Kalsi Engineering Inc. (Kalsi) are independently performing tests on the Limitorque actuator to increase the thrust rating over the 110 percent allowed by Limitorque. STPEGS is participating in both actuator up-rating programs. The Kalsi actuator up-rating report including seismic testing report, and Westinghouse preliminary reports have been reviewed for applicability to STPEGS. Either program may be used on a case by case basis to justify increasing the rated output of a given actuator.

Actuators not specifically covered by either of the up-rating programs will be reset within the original Limitorque rating. Actuators with a potential overthrust greater than 140 percent will be reset to comply with either the Westinghouse or Kalsi Programs. Overthrust actuators which do not meet the rated life cycles under the Westinghouse program will be either reset if possible to the lower thrust rating or the fasteners torqued as required per the latest Kalsi program requirements. These actions will be completed in the next refueling outage for both units.

RESPONSE ITEM 3 - Paragraph 2.3.3

The licensee was requested to justify the apparent conflict between the recent "Limitorque Technical Update #92-01" recommended housing cover and actuator base fastener minimum torque levels, including manufacturer plant-specific seismic considerations, and previous information provided by the licensee based on their discussions with Limitorque and Westinghouse.

RESPONSE:

STPEGS discussed the subject of fasteners torquing with Limitorque and Westinghouse engineers and concluded that there are no specific torquing requirements for the actuator housing cover bolts. These bolts should be tightened until considered tight by the technician performing the task. The basis for the above conclusion is as follows:

The torquing criteria in Limitorque Technical Update 92-01 were based on the requirements in Kalsi Engineering testing program Document #1701-C, Rev. 0. Kalsi test procedures have imposed specific torque values for the fasteners as part of the qualification program. Limitorque reviewed Kalsi data and concurred with their conclusions. The fastener torquing criteria are applicable when Limitorque's Update 92-01 is used for uprating the actuator.

Qualification tests performed by Limitorque to increase actuator thrust ratings for Westinghouse did not specify torque values for the housing cover and actuator mounting bolts. Torquing values for the actuator to valve bolts are typically specified by the valve vendor. STPEGS has obtained concurrence from Limitorque confirming these statements.

Furthermore, Kalsi Engineering indicated that the housing cover and the actuator to valve bolt torquing requirements are being re-evaluated and the results will be published following completion of the review.

STP 724 (02/90)

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION ENGINEERING INSTRUCTIONS	NUMBER	REV. NO.
	EI 4.05	
	PAGE	OF
EFFECTIVE DATE		

1.0 PURPOSE/SCOPE

- 1.1 This procedure addresses the methodology to determine the acceptability of MOV test results, and provides the criteria for determination of satisfactory completion of testing, the need for retest, or placement of the MOV in the Phase II program. The acceptance criteria are compared to as left test data for the MOV's that have been tested under dynamic and/or static conditions.
- 1.2 The determination of valve test acceptability discussed above services to document the justification of valve configuration and acceptability as required to NRC GNL 89-10 and described in the STPEGS GNL 89-10 program plan as given in procedure OPGP03-ZE-0037.
- 1.3 A detailed evaluation of test results and reconciliation of these results against GNL 89-10 design basis calculations is necessary to demonstrate the implementation of the HL&P MOV Program. Proper test result evaluation allows:
 - 1.3.1 Closure of Phase I and II MOV Testing,
 - 1.3.2 Demonstration of available thrust/torque margin,
 - 1.3.3 Establishment of the MOV specific baseline by which the condition of the specific MOV may be assessed throughout plant life.
- 1.4 The test acceptance criteria found in this instruction applies to all safety related and position changeable MOV's that are diagnostically tested within the scope of Motor Operated Valve Program, OPGP03-ZE-0037.

2.0 DEFINITIONS

- 2.1 MEDP - Maximum Expected Differential Pressure
- 2.2 Phase I - The portion of the GNL 89-10 program where the MOV is statically tested and dynamically tested (if possible) at or near maximum design basis conditions.
- 2.3 Phase II - The portion of the GNL 89-10 program where the adequacy of the MOVs that are not capable of being tested at or near MEDP conditions is demonstrated.
- 2.4 TT - Total Thrust/Torque - highest value of thrust/torque measured by the diagnostic testing equipment during the valve stroke.

STP 724 (02/90)

SOUTH TEXAS PROJECT ELECTRIC GENERATING STATION ENGINEERING INSTRUCTIONS	NUMBER	REV. NO.
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2.0 DEFINITIONS (continued)

- 2.5 CST - Control Switch Trip
- 2.6 DB - Design Basis Calculation
- 2.7 DP - Differential Pressure
- 2.8 ER - MOVATS Engineering Report
- 2.9 MEDP - Maximum Expected Differential Pressure
- 2.10 OC - Open versus Close Test Equipment Accuracy
- 2.11 ROL - Rate of Loading
- 2.12 TE - Test Equipment Accuracy
- 2.13 (c) - Closed valve stem direction
- 2.14 (o) - Open valve stem direction
- 2.15 TP - Test Package

ATTACHMENT EI-4.05-02
SUMMARY OF TEST REVIEW PARAMETERS (TYPICAL)
 (Page 1 of 4)
 (TYPICAL)

Work Page _____

Static/DP
(circle one)

Valve _____

The following data shall be gathered from the test package, the thrust/torque calculation, vendor data, etc., and the necessary calculated values determined.

ITEM DESCRIPTION	FROM		
1. Thrust/Torque @ CST (open)	T P	_____	lb/ftlb
2. Thrust/Torque @ CST (close)	T P	_____	lb/ftlb
3. Valve Limiting Thrust/Torque	D B	(o) _____	lb/ftlb
	D B	(c) _____	lb/ftlb
4. Actuator Rated Thrust/Torque	D B	_____	lb/ftlb
5. Maximum Allowable Thrust/Torque (minimum of 3, or 4.)	Calculated	(o) _____	lb/ftlb
	Calculated	(c) _____	lb/ftlb
6. Item 1. * [1 + TE]	Calculated	_____	lb/ftlb
7. Item 2. * [1 + TE + (OC if applicable)]	Calculated	_____	lb/ftlb
8. Stall Thrust/Torque @ DVAC	D B	_____	lb/ftlb
9. TT(o) * [1 + TE]	T P, Calculated	_____	lb/ftlb
10. TT(c) * [1 + TE + (OC if applicable)]	T P, Calculated	_____	lb/ftlb
11. Item 1. * [1 - TE]	Calculated	_____	lb/ftlb
12. Item 2. * [1 - TE - (OC if applicable)]	Calculated	_____	lb/ftlb
13. Minimum Required Thrust/Torque	D B	(o) _____	lb/ftlb
	D B	(c) _____	lb/ftlb
14. Item 13.(c) * [1+ROL] (static tests and closed only)	Calculated- (if necessary)	_____	lb/ftlb

ATTACHMENT EI-4.05-02 (CONT.)

(This section for DP tests only)

(Page 2 of 4)

(TYPICAL)

ITEM DESCRIPTION	FROM		
15. MEDP (from calculation)	D B	(o) _____	PSI
	D B	(c) _____	PSI
16. $P_{\text{upstream}} * [1 - TE] - P_{\text{downstream}}$ * [1 + TE] (from test package)	T P	(o) _____	PSI
	T P	(c) _____	PSI
17. Item 15. *0.80	Calculated	_____	PSI

If Item 17 \leq item 16 < Item 15, proceed with following (extrapolation of differential pressure effects):

18. Differential Pressure Effect (open)	T P	_____	lb/ftlb
19. Differential Pressure Effect (close)	T P	_____	lb/ftlb
20. (Item 15 + Item 16) x Item 18 {1+TE}	Calculated	(o) _____	lb/ftlb
21. (Item 15 + Item 16) x Item 19 {1+TE}	Calculated	(c) _____	lb/ftlb
22. Predicted DP Effect	D B	(o) _____	lb/ftlb
23. Predicted DP Effect	D B	(c) _____	lb/ftlb
24. Item 13 (o) - Item 22 + Item 20	Calculated	(o) _____	lb/ftlb
25. Item 13 (c) - Item 23 + Item 21	Calculated	(c) _____	lb/ftlb

For torque close valves which use direct stem thrust measurement for close direction Dynamic test (Rate of loading effect.)

26. Item 2 static - (Item 15/Item 16) (Item 2 static - Item 2 Dynamic)	Calculated	(c) _____	lb/ftlb
27. Item 26 * [1+TE]	Calculated	(c) _____	lb/ftlb

For torque closed valves with no direct stem thrust measurement during DYNAMIC testing, i.e., used spring pack methodology.

28. Item 25 * [1+ROL]	Calculated	(c) _____	lb/ftlb
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ATTACHMENT EI-4.05-02-01

EXTRAPOLATION METHODOLOGY FOR DIFFERENTIAL PRESSURE TESTING PERFORMED AT OR ABOVE 80% OF MEDP (Continuation of EI 4.05-02 for DP test results evaluation)

(Page 3 of 4)

(TYPICAL)

These steps are to be completed if Item 17 \leq Item 16 < Item 15 on the existing EI 4.05-02 DP test summary.

Work Package _____ Valve Type _____ Valve _____

ITEM DESCRIPTION	FROM	
A. Extrapolate the open DP Thrust; factor in accuracy: $\frac{\text{Item 15}}{\text{Item 16}} * \text{Item 18} * (1 + \text{TE})$	Calculated	(o) _____ lb/ft-lb
B. Extrapolate the closing DP Thrust; factor in accuracy: $\frac{\text{Item 15}}{\text{Item 16}} * \text{Item 19} * [1 + \text{TE} + (\text{OC if applicable})]$	Calculated	(c) _____ lb/ft-lb
C. Determine the predicted DP thrust from the design basis calculation	DB	(o) _____ lb/ft-lb (c) _____ lb/ft-lb
D. Adjust the minimum required thrust/torque with the extrapolated DP thrust: Item 13(o) - Item C(o) above + Item A above Item 13(c) - Item C(c) above + Item B above	Calculated	(o) _____ lb/ft-lb (c) _____ lb/ft-lb
E. Compare the test results to the adjusted minimum value: Item D (o) less than degraded voltage stall thrust (Item 8)? Item D (c) less than degraded voltage stall thrust (Item 8)? Item D (c) less than closing CST minus TE (Item 12)?		YES/NO YES/NO YES/NO

Rate of Loading adjustment Valve _____

For CLOSING direction only.

For Torque Switch controlled valves only.

If test DP > MEDP, do not perform this correction.

ATTACHMENT EI-4.05-02-01

EXTRAPOLATION METHODOLOGY FOR DIFFERENTIAL PRESSURE TESTING PERFORMED AT OR ABOVE 80% OF MFDP *(Continuation of EI 4.05-02 for DP test results evaluation)*

(Page 4 of 4)

(TYPICAL)

Different methods are used to factor in rate of loading effects. To quantify these effects, direct thrust measurement is required during STATIC and DYNAMIC testing. An alternate method is provided when the dynamic closing thrust is based on spring pack deflection.

For test results obtained using direct stem thrust measurement during the STATIC and DYNAMIC test:
To account for potential rate of loading affects, extrapolate closing control switch trip thrust.

$$\text{CST thrust at MEDP} = \text{Item 2}_{\text{STATIC}} \cdot \frac{\text{Item 15}}{\text{Item 16}} * (\text{Item 2}_{\text{STATIC}} - \text{Item 2}_{\text{DYNAMIC}})$$

Make the necessary adjustments for TE, test equipment accuracy.

G. For DYNAMIC test results obtained using spring pack thrust correlation: Adjust the minimum required thrust to include a factor for rate of loading effects.

$$\text{Item D(c)} * [1 + \text{ROL}] \quad (\text{'ROL' from ER 5.0, Table 5 or use 10\%})$$

H. Compare the adjusted test results to the adjusted minimum value.

For direct thrust measurement:

Item D (c) less than Item F?

YES/NO

For spring pack thrust measurement:

Item G less than close CST

(Item 12) from the STATIC
test results?

YES/NO

COMMENTS:

Prepared by: _____ Date _____

Reviewed by: _____ Date _____