# PWR SAFETY AND RELIEF VALVE TEST PROGRAM, PORV BLOCK VALVE ADEQUACY REPORT

FOR

CAROLINA POWER AND LIGHT COMPANY
H. B. ROBINSON UNIT 2

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## 1.0 INTRODUCTION

NUREG-0737, Item II.D.1.B requires PWR utilities demonstrate block valves function properly over expected operating and accident conditions. This demonstration is to be supported by test data.

During a meeting between the NRC staff and utility representatives on July 17, 1981, agreement was reached regarding resolution of the above requirement. Details of the utility position on block valve testing is contained in Reference 1.

In response to NUREG-0737, Item II.D.1.B, Reference 2 transmitted to the NRC "EPRI PWR Safety and Relief Valve Test Program, PORV Block Valve Information Package", May 1982 (Reference 3). Included in this submittal was:

- o A description of block valves used in or planned for use in PWR plants.
- o An EPRI report entitled "EPRI/Marshall Electric Motor Operated Valve (Block Valve) Interim Test Data Report," May 31, 1982.
- o A Westinghouse report entitled "EPRI Summary Report: Westinghouse Gate Valve Closure Testing Program," March 31, 1982.

Reference 2 also states that PWR utilities believe sufficient evidence (supported by test data) is available to demonstrate block valve "operability". Response to the NUREG requirement was to be fulfilled by submittal of the above mentioned document package and a separate plant-specific evaluation of safety and relief valve operability.

This document provides the plant-specific response and evaluation of the Block Valve Test program for H. B. Robinson Unit 2.

## 2.0 BLOCK VALVE DESIGN INFORMATION

The block valves installed at H. B. Robinson Unit 2 are Velan Model B10-3054B-13MS motor operated gate valves (described in Table 2-1).

During the EPRI Test program tests were conducted on a Velan Model B10-3054B-13MS block valve at the Marshall test facility. Results of those tests are detailed in Reference 3.

For comparison a description of the Velan test valve is provided in Table 2-2. As can be seen, the valves tested by EPRI are similar to the block valves installed at H. B. Robinson.

Two differences do exist. First the motor operator installed on the H. B. Robinson block valves is a Limitorque SMB-000-5 versus the Limitorque SB-00-15 operator used with the EPRI test valve. Also the speed of the two valves is different 40 seconds for the H. B. Robinson valve and 10 seconds for the EPRI valve.

The EPRI test valve torque switch was set at 1.7 per Reference (3). This torque switch setting results in an output torque of approximately 150.5 ft/lb and a thrust of 9678 lb. At this setting the EPRI valve operated satisfactory.

Valves at H. B. Robinson are set at a torque switch setting of 3. This setting results in an output torque of 109 ft/lb with a resulting thrust of 11645 lb. This thrust exceeds that required to close the valve by approximately 35 percent.

Since the valves at H. B. Robinson are of similar design except for the motor operators (the operators are different due to the required closing times) to the one tested by EPRI and the output thrust is greater than required, the valves at H. B. Robinson should exhibit performance equal to or better than the EPRI test valves.

## 3.0 SUMMARY OF BLOCK VALVE TEST RESULTS

### 3.1 Velan Block Valve Model B10-3054B-13MS

Results of the Velan B10-3054B-13MS Block Valve Tests are contained in Section 3.1 of Reference 3.

Evaluation tests were conducted at the Marshall Steam Station test facility with the Copes-Vulcan PORV with 316 S.S. plug and 17.4PH cage mounted downstream of the Velan test valve. The valve was cycled a total of 21 times for the evaluation test. The results of these tests are summarized in Table 3.1-3 of reference (3).

Prior to the evaluation tests, 16 pretest cycles were put on the test valve during checkout activities. All 16 pretest cycles were performed at ambient temperature and pressure.

Following the evaluation test the valve was cycled three (3) more times to evaluate valve operability with reduced operator torque. Results of these and the 16 pretest cycles are summarized in reference (3).

The Velan valve completely opened and closed for each of the evaluation tests and for each of the supplementary test cycles. Following the supplementary test cycles the Velan test valve was disassembled and inspected. Very slight gallering of the guides was observed, but all other parts were found to be in good condition. No damage was reported that would effect further valve performance.

Stroke times for the test valve were reported to be under 10 seconds and the seat leakage was reported to be zero throughout the evaluation test program.

TABLE 2-1

H. B. ROBINSON PORV BLOCK VALVE DESCRIPTION

Valve Information

| | |
|---|---|
| Manufacturer | Velan |
| Description | Motor Operated Gate Valve |
| Quantity | 2 |
| Model | B10-3054B-13MS |
| Drawing No. | 88405 |

Valve Operator Information

| | |
|---|---|
| Manufacturer | Limitorque |
| Description | Motorized Valve Operator |
| Model | SMB-000-5 |
| Voltage, Volts | 460 |
| Speed | 40 sec. |

TABLE 2-2

VELAN TEST VALVE DESCRIPTION, TEST SERIES

M-VE1**

General Valve Information

| | |
|---|---|
| Manufacturer | Velan Engineering Companies |
| Description | Motor Operated Bolted Bonnet |
| Model | B10-3054B-13MS |
| Serial No | 765 |
| Drawing No. | 88425 |

General Valve Operator Information

| | |
|---|---|
| Manufacturer | Limitorque |
| Description | Motorized Valve Operator |
| Model | SB-00-15 |
| Serial No | 243402 |
| Torque Switch Setting | 1.7 |
| Voltage | 460 |
| RPM | 1700 |

** Source: Reference 3

## 4.0 CONCLUSIONS

The Velan Block valve tested at the Marshall Steam Station as part of the EPRI Safety and Relief Valve test program is similar in design to the block valves installed at H. B. Robinson Unit 2 and this valve successfully completed the evaluation and supplementary test program, fully opening and closing on demand.

## 5.0 REFERENCES

1. Letter from R. C. Youngdahl, Consumers Power, to H. Denton, NRC, dated July 1, 1981.

2. Letter from R. C. Youngdahl, Consumers Power, to H. Denton, NRC, dated June 1, 1982.

3. "EPRI Safety and Relief Valve Test Program PORV Block Valve Information Package" dated May, 1982.