JOINT OWNERS' GROUP

Motor-Operated Valves

Boiling Water Reactor Owners' Group – Pressurized Water Reactor Owners Group

June 20, 2007
BWROG-07033

United States Nuclear Regulatory Commission
Document Control Desk
Washington DC 20555-0001

Subject: JOG MOV PV Program Revised Data for Valve B22.4

BWROG Project Number 691
PWROG Project Number 694

Enclosure: (1) Revised pages to JOG MOV PV Summary Report (MPR-2524-A), 6 pages total

Dear Sirs:
The Joint Owners Group (JOG) previously submitted the Motor-Operated Valve (MOV) Periodic Verification (PV) Program Summary for NRC Review and acceptance. Recently it was found that the input design data for Valve B22.4 used in MPR-24-524-A was found to be incorrect, which affects the results in MPR-2524-A. This information has been distributed to the Owners Groups participants for evaluation. Attached are the affected pages of MPR-2524-A, which have been revised to show the corrected data for B22.4. Based on a survey done of the program participants, the impact for all BWROG and PWROG plants is considered minimal, with only one plant reporting use of this type valve. A copy of this revision is provided to the NRC for your information. This Letter is also being transmitted to all Owners Group participants.

If you have any questions regarding the attached or the contents of this letter, please contact Reginald Dulaney at 412-374-6549 or any of the undersigned.

Regards,

Randolph Bunt
Southern Nuclear
Chairperson,
BWR Owners' Group
(205) 992-7475

K. A. McCall for
Frederick P. "Ted" Schiffley, II
Exelon Nuclear
Chairperson,
PWR Owners Group
(630) 657-3897

D044
D048

NRR

cc: William Bateman, USNRC
Samson Lee, USNRC
Sean Peters, USNRC (2 copies)
Michelle Honcharik, USNRC
Thomas G. Scarbrough, USNRC (2 copies)
Joseph M. Ondish (GE), BWROG Project Manager
Dennis Kreps (WEC), PWROG Project Manager
Paul Damerell, MPR
JOG MOV PV Program Participants

MPR
ASSOCIATES INC.
ENGINEERS

April 27, 2007

QUALITY ASSURANCE DOCUMENT

This document has been prepared, reviewed, and approved in accordance with the Quality Assurance requirements of 10CFR50 Appendix B, as specified in the MPR Quality Assurance Manual.

Prepared by
Reviewed by
Approved by

Kenneth McCall
GE Nuclear
P.O. Box 780
M/C A16
Wilmington, NC 28402

Subject: Revised Pages of MPR-2524-A

Reference: MPR letter, "Re-Analysis of JOG Valve B22.4", from T. Shaw, dated March 13, 2007

Dear Mr. McCall:

The referenced letter detailed the pages of MPR-2524-A affected by the re-analysis of the DP Test Data for JOG Valve B22.4. Per your request, this letter forwards revised pages of this report for your submittal to the NRC. An identical letter is being issued to Dennis Kreps of the PWROG.

As MPR discussed with you, we plan to incorporate the attached pages into Revision B of MPR-2524 later this year, to satisfy internal QA requirements. Copies of MPR-2524-B will be available to you upon request.

If you have any questions or comments, please call Jeffrey Gratz or me.

Sincerely,

Timothy Shaw

Enclosure: Revised Pages to JOG MOV PV Summary Report (MPR-2524-A), 6 pages

cc: T. Neckowicz, Exelon

320 KING STREET ALEXANDRIA, VA 22314-3230 703-519-0200 FAX: 703-519-0224 http://www.mpr.com

REVISED PAGES TO JOG MOV PV SUMMARY REPORT (MPR-2524-A)

6 pages including this sheet

Valve B16.3 has the Nylatron bearing and is located in an untreated water system. Similar to other raw water valves, the bearing friction tends to drift from test to test, with the minimum value on the second test and the maximum value on the third test. The values are below those from the other two valves on this graph.

BUTTERFLY VALVE CONCLUSIONS

1. There is no age-related degradation in required bearing torque. Specifically, there is no increase in the required bearing torque due only to the passage of time (without DP stroking).

2. There is no service-related degradation in required bearing torque. Specifically, there is no increase in the required bearing torque due to DP stroking.

3. For butterfly valves with bronze bearings in treated water systems, the bearing friction coefficient does not degrade and is relatively stable.

4. For butterfly valves with bronze bearings in untreated water systems with hub seals, the bearing friction coefficient does not degrade and is stable, demonstrating behavior analogous to valves with bronze bearings in treated water systems.

5. For butterfly valves with bronze bearings in untreated water systems without hub seals, there is significant variation (increases and decreases) in the bearing friction coefficient. This variation is unrelated to DP stroking, and there is no overall increasing or decreasing trend. A bearing friction coefficient of 0.39 bounds 95% of all the COF data from all butterfly valves with bronze bearings.

6. For butterfly valves with 300 series stainless steel bearings against a 17-4PH stainless steel shaft in untreated water systems without hub seals, there is significant variation (increases and decreases) in the bearing friction coefficient. This variation is unrelated to DP stroking, and there is no overall increasing or decreasing trend. A maximum COF of 0.50 was observed.

7. For butterfly valves with bearings made of Teflon in a fiberglass carrier, Teflon on a stainless steel substrate, or Tefzel, the bearing coefficient is stable in treated water. In untreated water, there are slight variations (increases and decreases) in bearing friction coefficient. A few valves with low initial bearing friction coefficients increased during testing to values more typical of the average. A bearing friction coefficient of 0.13 is the bounding value of all the COF data from butterfly valves with Teflon/fiberglass and Teflon/stainless steel bearings in both treated and untreated water. This bounding value (0.13) is also the value that bounds 95% of the COF data. For Tefzel, a Teflon derivative expected to have higher friction, the maximum observed COF was 0.31.

8. For butterfly valves with bearings made of Nomex, Polyethylene, or Nylatron, the bearing friction was observed to be generally stable, with small variations in untreated water comparable to those observed for Teflon bearings. A maximum COF of 0.23 was observed

Table 4-1. Attributes of JOG MOV PV Program Butterfly Valves

JOG Test Matrix No.	Manufacturer	Size (in)	Pressure Class (lbs)	Shaft Material	Bearing Material	Stem Orientation	Normal Position	Fluid Type	Normal Fluid Temp. (°F)	No. of DP Strokes Per Year
B01.1[1]	Clow	10	150	Monel-K 500	Bronze	Horizontal	Open	Untreated Water	95	6
B03.2[1]	Clow	20	150	400 series SS	Bronze	Horizontal	Open	Untreated Water	80	6
B06.1[2]	Crane/Flowseal	6	150	17-4 PH SS	Bronze	Vertical	Open	Untreated Water	105	4
B07.1	Henry Pratt	30	150	17-4 PH SS	Bronze	Horizontal	Closed	Untreated Water	80	8
B08.1	Contromatics	14	150	17-4 PH SS	300 series SS	Horizontal	Closed	Untreated Water	121	10
B09.1[3]	Ace	20	125	300 series SS	Bronze/Graphite	Vertical	Closed	Untreated Water	85	50 - 100
B09.3[3]	Henry Pratt	6	150	17-4 PH SS	Bronze	Vertical	Closed	Untreated Water	90	12
B09.4[3]	Henry Pratt	6	150	17-4 PH SS	Bronze	Vertical	Closed	Untreated Water	90	12
B11.1	Contromatics	10	150	300 series SS	Bronze	Horizontal	Open	Treated Water	80	10
B12.1	Fisher	8	150	17-4 PH SS	Bronze/Graphite	45°	Open	Treated Water	105	2
B13.1	Contramatics	10	150	17-4 PH SS	Bronze	Vertical	Open	Treated Water	80	10
B15.1[3]	Henry Pratt	14	150	17-4 PH SS	Bronze	Vertical	Closed	Treated Water	105	0 - 2
B16.1	Henry Pratt	24	150	17-4 PH SS	Fiberglass / Teflon	Vertical	Closed	Untreated Water	95	12
B16.2	Henry Pratt	96	25	300 series SS	Fiberglass / Teflon	Vertical	Open	Untreated Water	95	5
B16.3[3]	Henry Pratt	18	150	17-4 PH SS	Nylatron	Vertical	Open	Untreated Water	75	0 - 5
B20.1	Henry Pratt	24	150	17-4 PH SS	Fiberglass / Teflon	Horizontal	Closed	Untreated Water	80	2
B22.1	Henry Pratt	10	150	17-4 PH SS	Fiberglass / Teflon	Vertical	Open	Treated Water	105	8
B22.2	Henry Pratt	10	150	17-4 PH SS	Fiberglass / Teflon	Vertical	Open	Treated Water	105	8
B22.3[2]	Jamesbury	16	150	17-4 PH SS	Nomex	Vertical	Open	Treated Water	80	50
B22.4[2]	Hills-McCanna	16	150	17-4 PH SS	Tefzel	Vertical	Open	Treated Water	105	0 - 1
B25.3	Allis-Chalmers	24	150	300 series SS	SS / Teflon	Vertical	Open	Untreated Water	95	0 - 2
B30.2	Henry Pratt	12	150	17-4 PH SS	Fiberglass / Teflon	Vertical	Open	Treated Water	95	0 - 5
B30.3[2]	Jamesbury	12	150	17-4 PH SS	SS / Polyethylene	Vertical	Open	Treated Water	94	0 - 1

Notes:

1. Valve is a triple-offset design.
2. Valve is a double-offset design.
3. Valve is symmetric design with hub seal.

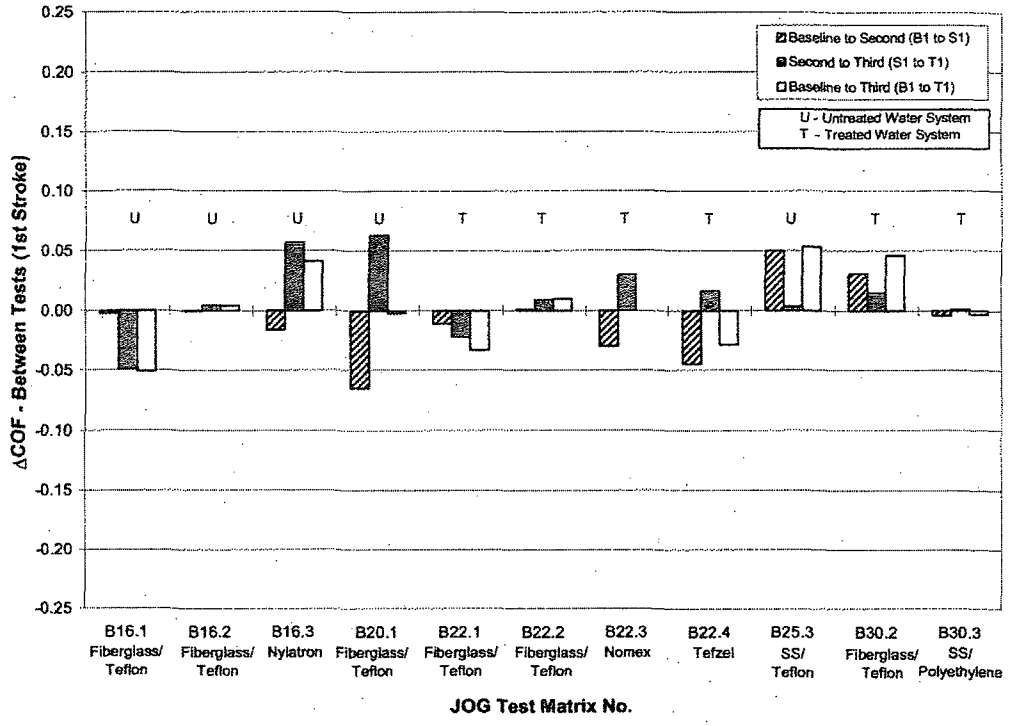

Figure 4-12. Change in Bearing Friction Coefficient for Butterfly Valves with Non-Metallic Bearings

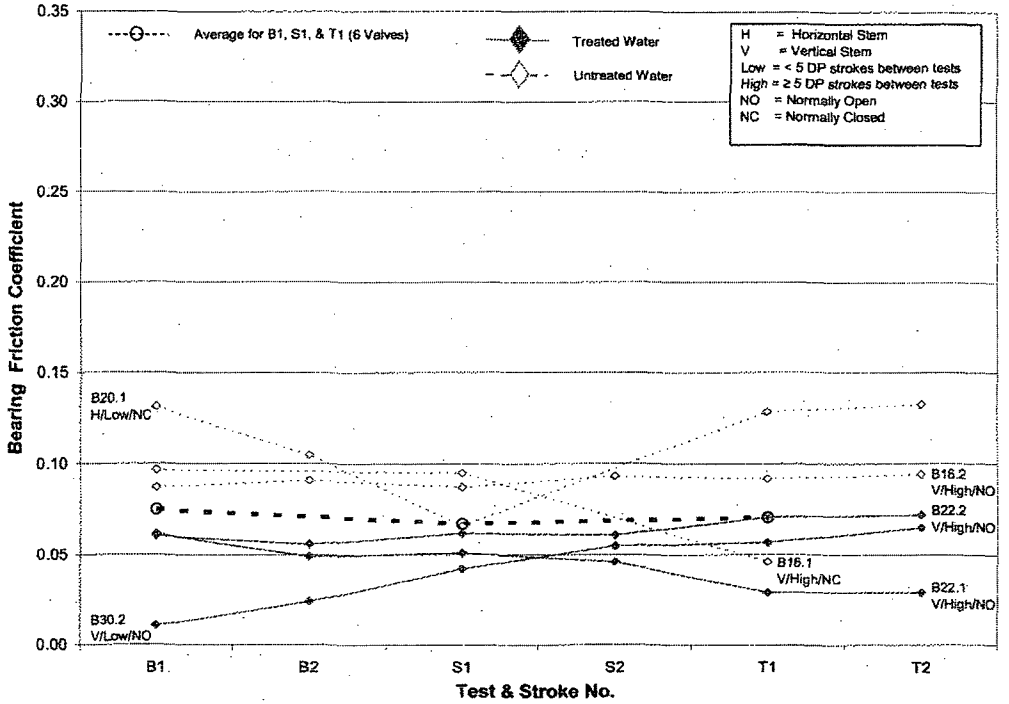

Figure 4-13. Bearing Friction Coefficient for Butterfly Valves with Teflon Lined Bearings in Fiberglass Carriers

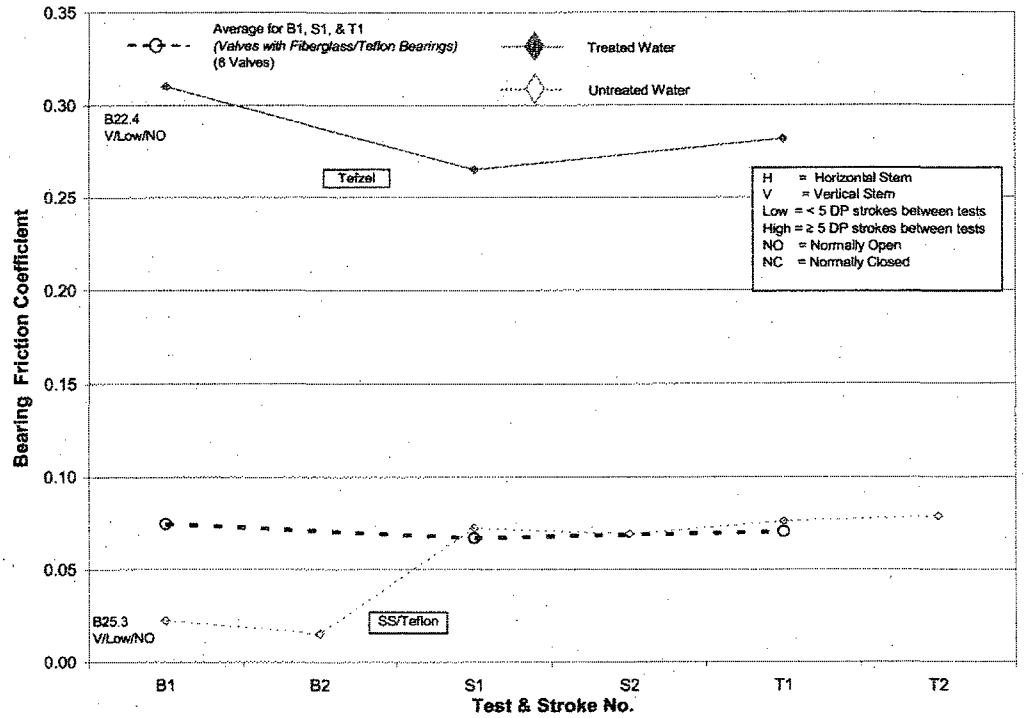

Figure 4-18. Bearing Friction Coefficient for Butterfly Valves with Tefzel and Teflon-Lined Bearings on Stainless Steel Backings

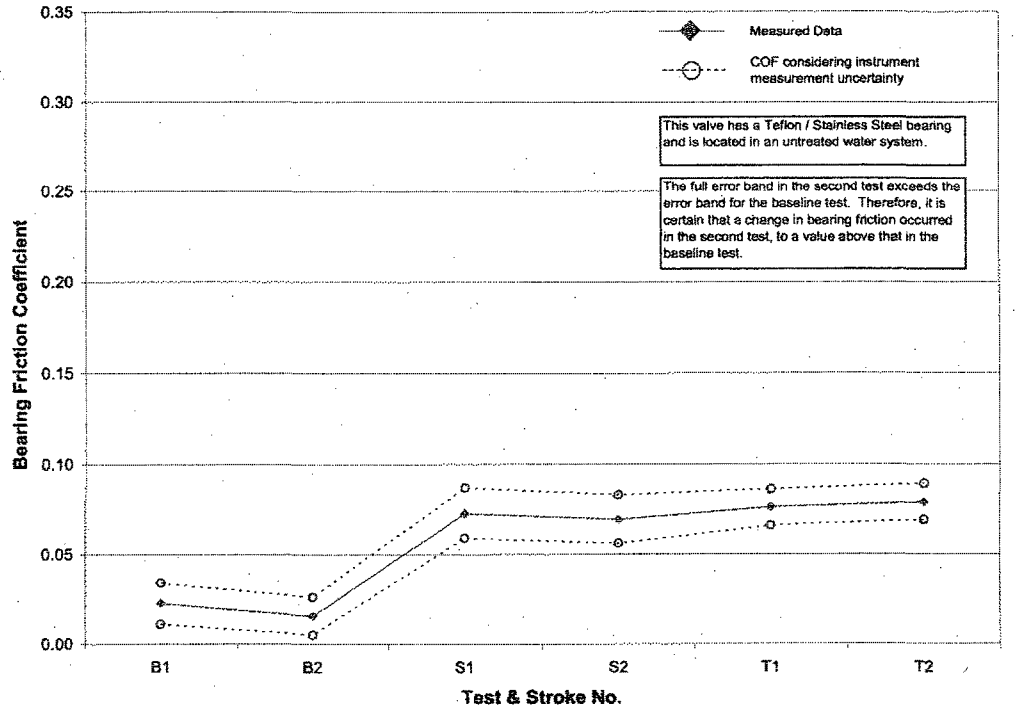

Figure 4-19. Bearing Friction Coefficient for B25.3 with Instrument Measurement Uncertainty

Table 7-7. COF Threshold Values for Butterfly Valves

Category			Threshold COF
Bearing Material	**Fluid and Temperature**	**Hub Seal**	
Bronze	Treated Water, All Temperatures or Air/N_2 ≤ 150°F	N/A	See Note 1
	Untreated Water, All Temperatures	Yes	See Note 1
		No	0.39
Teflon on a Fiberglass carrier	All Water, All Temperatures or Air/N_2 ≤ 150°F	N/A	0.13
Teflon on a stainless steel substrate			
Tefzel	All Water, All Temperatures or Air/N_2 ≤ 150°F	N/A	0.31
Nomex	All Water ≤ 150°F or Air/N_2 ≤ 150°F	N/A	0.23
Nylatron			
Polyethylene			
300 series SS	All Water ≤ 150°F or Air/N_2 ≤ 150°F	N/A	0.60
Stellite	Treated Water ≤ 150°F	N/A	See Note 1
	Untreated Water ≤ 150°F	Yes	

Notes:

1. No threshold evaluation is required for valves under the conditions identified. The answer to the question "COF ≥ Threshold" on Figure 7-3 is taken to be "YES."