



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

MAY 31 1988

MEMORANDUM FOR: Karl Kniel, Chief  
Reactor and Plant Safety Issues Branch  
Division of Reactor and Plant Systems, RES

FROM: Charles C. Graves  
Reactor and Plant Safety Issues Branch  
Division of Reactor and Plant Systems, RES

SUBJECT: BWROG DATA FOR MSIV LEAKAGE

Attachment A is a copy of Revision 2 of "Recent MSIV Leakage History and Cost Benefit Data" which was sent to me by Mr. Tom Green of the General Electric Company in March, 1988. Revision 1 of this material was provided in my memorandum to you on February 29, 1988.

*Charles C. Graves*

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Reactor and Plant Safety Issues Branch  
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cc: W. Minners  
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# ATTACHMENT A

APPENDIX A  
REVISION #2

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## BWROG MSIV LEAKAGE CLOSURE COMMITTEE RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

MSIV MANUFACTURER ROCKWELL - 1

|                 | MONTH | YEAR | INBOARD <sup>1</sup> |                 | AFTER<br>REPAIR<br>SCFH | NUMBER<br>OF<br>REWORKS | NEXT <sup>2</sup><br>OUTAGE<br>INITIAL<br>SCFH |  | REPAIR<br>MH | REMS | TOTAL<br>HRS<br>REPAIR<br>TIME | INCREASED <sup>3</sup><br>OUTAGE<br>LENGTH |       | COMMENTS <sup>4</sup> |
|-----------------|-------|------|----------------------|-----------------|-------------------------|-------------------------|------------------------------------------------|--|--------------|------|--------------------------------|--------------------------------------------|-------|-----------------------|
|                 |       |      | OR<br>OUTBOARD       | INITIAL<br>SCFH |                         |                         |                                                |  |              |      |                                | Y/M                                        | HOURS |                       |
| 1.              | 5     | 87   | I                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       | B, NP                 |
| 2.              | 5     | 87   | I                    | 4.5             |                         |                         |                                                |  |              |      |                                |                                            |       | B, NP                 |
| 3.              | 5     | 87   | I                    | 4.1             |                         |                         |                                                |  |              |      |                                |                                            |       | B, NP                 |
| 4.              | 5     | 87   | I                    | 1.9             |                         |                         |                                                |  |              |      |                                |                                            |       | B, NP                 |
| 5.              | 5     | 87   | O                    | 5.3             |                         |                         |                                                |  |              |      |                                |                                            |       | B, NP                 |
| 6.              | 5     | 87   | O                    | 3.1             |                         |                         |                                                |  |              |      |                                |                                            |       | B, NP                 |
| 7.              | 5     | 87   | O                    | 3.5             |                         |                         |                                                |  |              |      |                                |                                            |       | B, NP                 |
| 8.              | 5     | 87   | O                    | 4.1             |                         |                         |                                                |  |              |      |                                |                                            |       | B, NP                 |
| 9.              | 3     | 87   | I                    | 0               |                         |                         |                                                |  | 185          | 2.2  | 80                             | N                                          |       | B                     |
| 10.             | 4     | 85   | I                    | 0               |                         |                         |                                                |  | 437          | 1.6  | 140                            | N                                          |       | B                     |
| 11.             | 3     | 87   | O                    | 22.4            | 0                       | 1                       |                                                |  | 325          | 0.7  | 110                            | N                                          |       | B                     |
| 12.             | 4     | 85   | O                    | 94.0            | 0                       | 1                       | 22.4                                           |  | 755          | 0.6  | 215                            | N                                          |       | B                     |
| 13.             | 4     | 87   | I                    | 530             | 0                       | 1                       |                                                |  | 660          | 2.1  | 160                            | N                                          |       | B                     |
| 14.             | 4     | 85   | I                    | 108             | 0                       | 1                       | 530                                            |  | 437          | 1.6  | 140                            | N                                          |       | B                     |
| 15.             | 3     | 87   | O                    | 48.7            | 0                       | 1                       |                                                |  |              |      |                                | N                                          |       | B                     |
| 16.             | 4     | 85   | O                    | 0               |                         |                         |                                                |  | 755          | 0.6  | 215                            | N                                          |       | B                     |
| 17.             | 4     | 87   | I                    | 77.3            | 0                       | 1                       |                                                |  | 660          | 3.1  | 160                            | N                                          |       | B                     |
| 18.             | 4     | 85   | I                    | 0               |                         |                         |                                                |  | 437          | 1.6  | 140                            | N                                          |       | B                     |
| 19.             | 3     | 87   | O                    | 0               |                         |                         |                                                |  | 180          | 0.3  | 80                             | N                                          |       | B                     |
| 20.             | 4     | 85   | O                    | 71.3            | 0                       | 1                       | 0                                              |  | 1100         | 1.1  | 275                            | N                                          |       | B                     |
| 21.             | 3     | 87   | I                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       | B                     |
| 22.             | 4     | 85   | I                    | 0               |                         |                         |                                                |  | 437          | 1.6  | 140                            | N                                          |       | B                     |
| 23.             | 3     | 87   | O                    | 4.7             |                         |                         |                                                |  | 60           | 0.1  | 40                             | N                                          |       | B                     |
| 24.             | 4     | 85   | O                    | 17.8            | 0                       | 1                       | 4.7                                            |  | 755          | 0.6  | 215                            | N                                          |       | B                     |
| 25.             |       | 85   | I                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| TOTAL REPAIRS   |       |      |                      |                 |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| SCFH TOTALS     |       |      |                      |                 | 1000.7                  | 0                       |                                                |  |              |      |                                |                                            |       |                       |
| BELOW 11.5 SCFH |       |      |                      |                 | 17                      | 8                       |                                                |  |              |      |                                |                                            |       |                       |
| BELOW 100 SCFH  |       |      |                      |                 | 22                      | 8                       |                                                |  |              |      |                                |                                            |       |                       |

- NOTES: 1. I = Inboard, O = Outboard  
 2. If repair is required  
 3. Y = Yes, N = No, U = Unknown  
 4. B = BWROG modifications incorporated, M = BWROG modifications not incorporated, NP = new plant data  
 5. \* = Leak rate not known, however, valve was returned to acceptable leak rates with normal maintenance practices. (Data not included in initial leakage average)

BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

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MSIV MANUFACTURER ROCKWELL -2

| REPAIR MANUFACTURER |       |      |                      |              |              |                   |                          |                  |           |      |                       |                               |  |                       |
|---------------------|-------|------|----------------------|--------------|--------------|-------------------|--------------------------|------------------|-----------|------|-----------------------|-------------------------------|--|-----------------------|
| 1.                  | MONTH | YEAR | INBOARD <sup>1</sup> |              | AFTER REPAIR | NUMBER OF REWORKS | NEXT <sup>2</sup> OUTAGE |                  | REPAIR MH | REMS | TOTAL HRS REPAIR TIME | INCREASED <sup>3</sup> OUTAGE |  | COMMENTS <sup>4</sup> |
|                     |       |      | OR OUTBOARD          | INITIAL SCFH |              |                   | INITIAL SCFH             | LENGTH Y/M HOURS |           |      |                       |                               |  |                       |
| 1.                  |       | 85   | O                    | 0            |              |                   |                          |                  |           |      |                       |                               |  |                       |
| 2.                  |       | 85   | I                    | 0            |              |                   |                          |                  |           |      |                       |                               |  |                       |
| 3.                  |       | 85   | O                    | 0            |              |                   |                          |                  |           |      |                       |                               |  |                       |
| 4.                  |       | 85   | I                    | HIGH         | 0.7          | 1                 |                          |                  |           |      |                       |                               |  | *                     |
| 5.                  |       | 85   | O                    | HIGH         | 0.7          | 1                 |                          |                  |           |      |                       |                               |  | *                     |
| 6.                  |       | 85   | I                    | 0.1          |              |                   |                          |                  |           |      |                       |                               |  |                       |
| 7.                  |       | 85   | O                    | 0.1          |              |                   |                          |                  |           |      |                       |                               |  |                       |
| 8.                  | 12    | 85   | I                    | 3.8          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 9.                  | 11    | 85   | I                    | 0.8          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 10.                 | 11    | 85   | I                    | 0.5          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 11.                 | 11    | 85   | I                    | 5.1          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 12.                 | 12    | 85   | O                    | 3.8          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 13.                 | 11    | 85   | O                    | 0.8          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 14.                 | 11    | 85   | O                    | 0.5          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 15.                 | 11    | 85   | O                    | 5.1          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 16.                 | 11    | 86   | I                    | 1.9          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 17.                 | 11    | 86   | I                    | 1.2          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 18.                 | 11    | 86   | I                    | 9.8          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 19.                 | 12    | 86   | I                    | 10.1         |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 20.                 | 11    | 86   | O                    | 1.9          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 21.                 | 11    | 86   | O                    | 1.2          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 22.                 | 11    | 86   | O                    | 9.8          |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 23.                 | 12    | 86   | O                    | 10.1         |              |                   |                          |                  |           |      |                       |                               |  | NP                    |
| 24.                 |       | 85   | I                    | 6            |              |                   |                          |                  |           |      |                       |                               |  |                       |
| 25.                 |       | 85   | I                    | 4            |              |                   |                          |                  |           |      |                       |                               |  |                       |
| TOTAL REPAIRS       |       |      |                      |              |              | 2                 |                          |                  |           |      |                       |                               |  |                       |
| SCFH TOTALS         |       |      |                      |              |              | 76.6              | 1.4                      |                  |           |      |                       |                               |  |                       |
| BELOW 11.5 SCFH     |       |      |                      |              |              | 23                | 2                        |                  |           |      |                       |                               |  |                       |
| BELOW 100 SCFH      |       |      |                      |              |              | 23                | 2                        |                  |           |      |                       |                               |  |                       |

- NOTES: 1. I = Inboard, O = Outboard  
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4. B = BWROG modifications incorporated, M = BWROG modifications not incorporated, NP = new plant data  
5. \* = Leak rate not known, however, valve was returned to acceptable leak rates with normal maintenance practices. (Data not included in initial leakage average)

BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

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MSIV MANUFACTURER ROCKWELL - 3

| INBOARD <sup>1</sup> |      |          |         | AFTER  | NUMBER  | NEXT <sup>2</sup> |        |      | TOTAL  | INCREASED <sup>3</sup> |                       |
|----------------------|------|----------|---------|--------|---------|-------------------|--------|------|--------|------------------------|-----------------------|
| MONTH                | YEAR | OR       | INITIAL | REPAIR | OF      | OUTAGE            | REPAIR |      | HRS    | OUTAGE                 |                       |
|                      |      | OUTBOARD | SCFH    | SCFH   | REWORKS | INITIAL           | MH     | REMS | REPAIR | LENGTH                 | COMMENTS <sup>4</sup> |
|                      |      |          |         |        |         | SCFH              |        |      | TIME   | Y/M HOURS              |                       |
| 1.                   | 85   | I        | 21      |        |         |                   |        |      |        |                        |                       |
| 2.                   | 85   | I        | 5       |        |         |                   |        |      |        |                        |                       |
| 3.                   | 85   | O        | 6       |        |         |                   |        |      |        |                        |                       |
| 4.                   | 85   | O        | 4       |        |         |                   |        |      |        |                        |                       |
| 5.                   | 85   | O        | 21      |        |         |                   |        |      |        |                        |                       |
| 6.                   | 85   | O        | 5       |        |         |                   |        |      |        |                        |                       |
| 7.                   | 86   | I        | 2.3     |        |         |                   |        |      |        |                        |                       |
| 8.                   | 86   | I        | 2.5     |        |         |                   |        |      |        |                        |                       |
| 9.                   | 86   | I        | 5.8     |        |         |                   |        |      |        |                        |                       |
| 10.                  | 86   | I        | 2.4     |        |         |                   |        |      |        |                        |                       |
| 11.                  | 86   | O        | 2.3     |        |         |                   |        |      |        |                        |                       |
| 12.                  | 86   | O        | 2.5     |        |         |                   |        |      |        |                        |                       |
| 13.                  | 86   | O        | 5.8     |        |         |                   |        |      |        |                        |                       |
| 14.                  | 86   | O        | 2.4     |        |         |                   |        |      |        |                        |                       |
| 15.                  | 9    | 86       | I       | 5      |         |                   |        |      |        |                        |                       |
| 16.                  | 9    | 86       | I       | 26     | 0       |                   |        |      |        |                        |                       |
| 17.                  | 9    | 86       | I       | 4      |         |                   |        |      |        |                        |                       |
| 18.                  | 9    | 86       | I       | 3      |         |                   |        |      |        |                        |                       |
| 19.                  | 9    | 86       | O       | 5      |         |                   |        |      |        |                        |                       |
| 20.                  | 9    | 86       | O       | 26     | 0       |                   |        |      |        |                        |                       |
| 21.                  | 9    | 86       | O       | 4      |         |                   |        |      |        |                        |                       |
| 22.                  | 9    | 86       | O       | 3      |         |                   |        |      |        |                        |                       |
| 23.                  | 10   | 86       | I       | 3      |         |                   |        |      |        |                        |                       |
| 24.                  | 10   | 86       | O       | 3      |         |                   |        |      |        |                        |                       |
| 25.                  | 10   | 86       | I       | 6.1    |         |                   |        |      |        |                        |                       |
| TOTAL REPAIRS        |      |          |         | 2      |         |                   |        |      |        |                        |                       |
| SCFH TOTALS          |      |          | 176.1   | 0      |         |                   |        |      |        |                        |                       |
| BELOW 11.5 SCFH      |      |          | 21      | 2      |         |                   |        |      |        |                        |                       |
| BELOW 100 SCFH       |      |          | 25      | 2      |         |                   |        |      |        |                        |                       |

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BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

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MSIV MANUFACTURER Rockwell-4

|                 | MONTH | YEAR | INBOARD <sup>1</sup> |                 | AFTER<br>REPAIR<br>SCFH | NUMBER<br>OF<br>REWORKS | NEXT <sup>2</sup><br>OUTAGE<br>INITIAL<br>SCFH |  | REPAIR<br>MH | REMS | TOTAL<br>HRS<br>REPAIR<br>TIME | INCREASED <sup>3</sup><br>OUTAGE<br>LENGTH |       | COMMENTS <sup>4</sup> |
|-----------------|-------|------|----------------------|-----------------|-------------------------|-------------------------|------------------------------------------------|--|--------------|------|--------------------------------|--------------------------------------------|-------|-----------------------|
|                 |       |      | OR<br>OUTBOARD       | INITIAL<br>SCFH |                         |                         |                                                |  |              |      |                                | Y/N                                        | HOURS |                       |
| 1.              | 10    | 86   | O                    | 6.1             |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 2.              | 2     | 84   | I                    | 6.4             |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 3.              | 2     | 84   | O                    | 6.4             |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 4.              | 2     | 84   | I                    | 5.3             |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 5.              | 2     | 84   | O                    | 5.3             |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 6.              | 2     | 84   | I                    | 9.3             |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 7.              | 2     | 84   | O                    | 9.3             |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 8.              | 2     | 84   | I                    | 11.0            |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 9.              | 2     | 84   | O                    | 11.0            |                         |                         |                                                |  |              |      |                                |                                            |       | NP                    |
| 10.             | 5     | 85   | I                    | 7.7             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 11.             | 5     | 85   | O                    | 7.7             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 12.             | 5     | 85   | I                    | 1.1             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 13.             | 5     | 85   | O                    | 21              | 1.5                     |                         | 0.7                                            |  |              |      |                                |                                            |       |                       |
| 14.             | 5     | 85   | I                    | 1.5             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 15.             | 5     | 85   | O                    | 1.5             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 16.             | 5     | 85   | I                    | 8.4             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 17.             | 5     | 85   | O                    | 8.4             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 18.             | 5     | 86   | I                    | 26.4            | 0.9                     |                         | 1.4                                            |  |              |      |                                |                                            |       |                       |
| 19.             | 5     | 86   | O                    | 0.9             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 20.             | 5     | 86   | I                    | 0.7             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 21.             | 5     | 86   | O                    | 0.7             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 22.             | 5     | 86   | I                    | 10.5            |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 23.             | 5     | 86   | O                    | 10.5            |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 24.             | 5     | 86   | I                    | 30              | 0.3                     |                         | 6.9                                            |  |              |      |                                |                                            |       |                       |
| 25.             | 5     | 86   | O                    | 0.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| TOTAL REPAIRS   |       |      |                      |                 | 3                       |                         |                                                |  |              |      |                                |                                            |       |                       |
| SCFH TOTALS     |       |      |                      |                 | 207.4                   | 2.7                     |                                                |  |              |      |                                |                                            |       |                       |
| BELOW 11.5 SCFH |       |      |                      |                 | 22                      | 3                       |                                                |  |              |      |                                |                                            |       |                       |
| BELOW 100 SCFH  |       |      |                      |                 | 25                      | 3                       |                                                |  |              |      |                                |                                            |       |                       |

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5. \* = Leak rate not known, however, valve was returned to acceptable leak rates with normal maintenance practices. (Data not included in initial leakage average)

BVROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

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MSIV MANUFACTURER Rockwell-S

|                 |       |      | INBOARD <sup>1</sup> |         | AFTER  | NUMBER  | NEXT <sup>2</sup> |        |      | TOTAL  | INCREASED <sup>3</sup> |       |                       |
|-----------------|-------|------|----------------------|---------|--------|---------|-------------------|--------|------|--------|------------------------|-------|-----------------------|
|                 | MONTH | YEAR | OR                   | INITIAL | REPAIR | OF      | OUTAGE            |        |      | NRS    | OUTAGE <sup>3</sup>    |       |                       |
|                 |       |      | OUTBOARD             | SCFH    | SCFH   | REWORKS | INITIAL           | REPAIR | REMS | REPAIR | LENGTH                 |       | COMMENTS <sup>4</sup> |
|                 |       |      |                      |         |        |         | SCFH              | MH     |      | TIME   | Y/M                    | HOURS |                       |
| 1.              | 5     | 87   | I                    | 1.4     |        |         |                   |        |      |        |                        |       |                       |
| 2.              | 5     | 87   | O                    | 1.4     |        |         |                   |        |      |        |                        |       |                       |
| 3.              | 5     | 87   | I                    | 27      | 10.5   |         |                   |        |      |        |                        |       |                       |
| 4.              | 5     | 87   | O                    | 10.5    |        |         |                   |        |      |        |                        |       |                       |
| 5.              | 5     | 87   | I                    | 85      | 13     |         |                   |        |      |        |                        |       |                       |
| 6.              | 5     | 87   | O                    | 1.3     |        |         |                   |        |      |        |                        |       |                       |
| 7.              | 5     | 87   | I                    | 6.9     |        |         |                   |        |      |        |                        |       |                       |
| 8.              | 5     | 85   | O                    | 6.9     |        |         |                   |        |      |        |                        |       |                       |
| 9.              | 8     | 85   | I                    | 0.0     |        |         |                   |        |      |        |                        |       |                       |
| 10.             | 8     | 85   | O                    | 0.0     |        |         |                   |        |      |        |                        |       |                       |
| 11.             | 8     | 85   | I                    | 0.6     |        |         |                   |        |      |        |                        |       |                       |
| 12.             | 8     | 85   | O                    | 0.6     |        |         |                   |        |      |        |                        |       |                       |
| 13.             | 8     | 85   | I                    | 0.5     |        |         |                   |        |      |        |                        |       |                       |
| 14.             | 8     | 85   | O                    | 0.5     |        |         |                   |        |      |        |                        |       |                       |
| 15.             | 8     | 85   | O                    | 44.9    | 3.4    |         | 3.8               |        |      |        |                        |       |                       |
| 16.             | 9     | 85   | I                    | 3.4     |        |         |                   |        |      |        |                        |       |                       |
| 17.             | 9     | 85   | I                    | 9.5     |        |         |                   |        |      |        |                        |       |                       |
| 18.             | 9     | 85   | O                    | 9.5     |        |         |                   |        |      |        |                        |       |                       |
| 19.             | 2     | 87   | I                    | 11.5    | 0.0    |         |                   |        |      |        |                        |       |                       |
| 20.             | 2     | 87   | O                    | HIGH    | 0.0    |         |                   |        |      |        |                        |       |                       |
| 21.             | 5     | 87   | I                    | 0.0     |        |         |                   |        |      |        |                        |       |                       |
| 22.             | 5     | 87   | O                    | 0.0     |        |         |                   |        |      |        |                        |       |                       |
| 23.             | 2     | 87   | I                    | 0.0     |        |         |                   |        |      |        |                        |       |                       |
| 24.             | 2     | 87   | O                    | 42.4    | 0.0    | 2       |                   |        |      |        |                        |       |                       |
| 25.             | 2     | 87   | I                    | 17.2    | 0.0    | 0       |                   | 0      |      |        |                        |       | FLUSH ONLY            |
| TOTAL REPAIRS   |       |      |                      |         | 7      |         |                   |        |      |        |                        |       |                       |
| SCFH TOTALS     |       |      |                      |         | 281    | 15.2    |                   |        |      |        |                        |       |                       |
| BELOW 11.5 SCFH |       |      |                      |         | 18     | 7       |                   |        |      |        |                        |       |                       |
| BELOW 100 SCFH  |       |      |                      |         | 24     | 7       |                   |        |      |        |                        |       |                       |

- NOTES: 1. I - Inboard, O = Outboard  
2. If repair is required  
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4. B = BVROG modifications incorporated, N = BVROG modifications not incorporated, NP = new plant data  
5. \* = Leak rate not known, however, valve was returned to acceptable leak rates with normal maintenance practices. (Data not included in initial leakage average)

BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

PAGE 6 OF 15

MSIV MANUFACTURER Rockwell -6

|                 | MONTH | YEAR | INBOARD <sup>1</sup><br>OR<br>OUTBOARD | INITIAL<br>SCFH | AFTER<br>REPAIR<br>SCFH | NUMBER<br>OF<br>REWORKS | NEXT <sup>2</sup><br>OUTAGE<br>INITIAL<br>SCFH | REPAIR<br>MH | REMS | TOTAL<br>HRS<br>REPAIR<br>TIME | INCREASED <sup>3</sup><br>OUTAGE<br>LENGTH<br>Y/M HOURS | COMMENTS <sup>4</sup> |
|-----------------|-------|------|----------------------------------------|-----------------|-------------------------|-------------------------|------------------------------------------------|--------------|------|--------------------------------|---------------------------------------------------------|-----------------------|
|                 |       |      |                                        |                 |                         |                         |                                                |              |      |                                |                                                         |                       |
| 1.              | 2     | 87   | O                                      | 0.0             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 2.              | 2     | 87   | I                                      | 3.8             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 3.              | 2     | 87   | O                                      | 3.8             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 4.              | 12    | 85   | I                                      | 2.9             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 5.              | 12    | 85   | O                                      | 2.9             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 6.              | 12    | 85   | I                                      | 2.4             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 7.              | 12    | 85   | O                                      | 2.4             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 8.              | 12    | 85   | I                                      | 0.0             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 9.              | 12    | 85   | O                                      | 0.0             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 10.             | 12    | 85   | I                                      | 6.4             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 11.             | 12    | 85   | O                                      | 6.4             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 12.             | 3     | 86   | I                                      | 0.0             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 13.             | 3     | 86   | O                                      | 0.0             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 14.             | 3     | 86   | I                                      | HIGH            | 5.9                     | 0                       |                                                | 0            |      |                                |                                                         | FLUSH ONLY            |
| 15.             | 3     | 86   | O                                      | 5.9             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 16.             | 3     | 86   | I                                      | 19.4            | 0.0                     | 0                       |                                                | 0            |      |                                |                                                         | FLUSH ONLY            |
| 17.             | 3     | 86   | O                                      | 0.0             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 18.             | 3     | 86   | I                                      | 6.5             |                         |                         |                                                |              |      |                                |                                                         |                       |
| 19.             | 3     | 86   | O                                      | 53.7            | 6.5                     | 0                       |                                                | 0            |      |                                |                                                         | FLUSH ONLY            |
| 20.             |       |      |                                        |                 |                         |                         |                                                |              |      |                                |                                                         |                       |
| 21.             |       |      |                                        |                 |                         |                         |                                                |              |      |                                |                                                         |                       |
| 22.             |       |      |                                        |                 |                         |                         |                                                |              |      |                                |                                                         |                       |
| 23.             |       |      |                                        |                 |                         |                         |                                                |              |      |                                |                                                         |                       |
| 24.             |       |      |                                        |                 |                         |                         |                                                |              |      |                                |                                                         |                       |
| 25.             |       |      |                                        |                 |                         |                         |                                                |              |      |                                |                                                         |                       |
| TOTAL REPAIRS   |       |      |                                        |                 | 3                       |                         |                                                |              |      |                                |                                                         |                       |
| SCFH TOTALS     |       |      |                                        | 116.5           | 12.4                    |                         |                                                |              |      |                                |                                                         |                       |
| BELOW 11.5 SCFH |       |      |                                        | 16              | 3                       |                         |                                                |              |      |                                |                                                         |                       |
| BELOW 100 SCFH  |       |      |                                        | 1.8             | 3                       |                         |                                                |              |      |                                |                                                         |                       |

- NOTES: 1. I - Inboard, O = Outboard  
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4. B = BWROG modifications incorporated, N = BWROG modifications not incorporated, NP = new plant data  
5. \* = Leak rate not known, however, valve was returned to acceptable leak rates with normal maintenance practices. (Data not included in initial leakage average)

BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

PAGE 7 OF 15

MSIV MANUFACTURER Atwood-Morrill - 1

|                 | MONTH | YEAR | INBOARD <sup>1</sup> |                 | AFTER<br>REPAIR<br>SCFH | NUMBER<br>OF<br>REWORKS | NEXT <sup>2</sup><br>OUTAGE<br>INITIAL<br>SCFH |     | REPAIR<br>MH | REMS | TOTAL<br>HRS<br>REPAIR<br>TIME | INCREASED <sup>3</sup><br>OUTAGE<br>LENGTH |       | COMMENTS <sup>4</sup> |
|-----------------|-------|------|----------------------|-----------------|-------------------------|-------------------------|------------------------------------------------|-----|--------------|------|--------------------------------|--------------------------------------------|-------|-----------------------|
|                 |       |      | OR<br>OUTBOARD       | INITIAL<br>SCFH |                         |                         |                                                |     |              |      |                                | Y/M                                        | HOURS |                       |
| 1.              | 4     | 86   | I                    | 0.7             |                         |                         |                                                |     |              |      |                                |                                            |       | N                     |
| 2.              | 4     | 86   | I                    | 2.1             |                         |                         |                                                |     |              |      |                                |                                            |       | N                     |
| 3.              | 4     | 86   | I                    | 1.3             |                         |                         |                                                |     |              |      |                                |                                            |       | N                     |
| 4.              | 4     | 86   | I                    | 2.7             |                         |                         |                                                |     |              |      |                                |                                            |       | N                     |
| 5.              | 4     | 86   | O                    | 7.5             |                         |                         |                                                |     |              |      |                                |                                            |       | N                     |
| 6.              | 4     | 86   |                      | 11.5            | 0.4                     | 1                       |                                                | 225 | 1.0          | 112  | N                              |                                            |       | N                     |
| 7.              | 4     | 86   | O                    | 3.7             |                         |                         |                                                |     |              |      |                                |                                            |       | N                     |
| 8.              | 4     | 86   | O                    | 10.4            |                         |                         |                                                |     |              |      |                                |                                            |       | N                     |
| 9.              | 11    | 87   | I                    | >43             | 0.9                     | 1                       |                                                | 120 |              | 48   |                                |                                            |       | NP, *                 |
| 10.             | 11    | 87   | O                    | >37             | 0.9                     | 1                       |                                                | 120 |              |      |                                |                                            |       | NP, *                 |
| 11.             | 11    | 87   | I                    | >43             | 6.4                     | 1                       |                                                | 180 |              | 60   |                                |                                            |       | NP, *                 |
| 12.             | 11    | 87   | O                    | >43             | 6.4                     | 1                       |                                                | 120 |              | 48   |                                |                                            |       | NP, *                 |
| 13.             | 11    | 87   | O                    | >43             | 1.6                     | 1                       |                                                | 120 |              | 48   |                                |                                            |       | NP, *                 |
| 14.             | 11    | 87   | I                    | >43             | 1.6                     | 1                       |                                                | 120 |              | 48   |                                |                                            |       | NP, *                 |
| 15.             | 10    | 87   | I                    | 2.6             |                         |                         |                                                |     |              |      |                                |                                            |       | NP                    |
| 16.             | 2     | 84   | I                    | 2.2             |                         |                         |                                                |     |              |      |                                |                                            |       | NP                    |
| 17.             | 3     | 85   | I                    | 5.6             |                         |                         |                                                |     |              |      |                                |                                            |       |                       |
| 18.             | 3     | 87   | I                    | 0.1             |                         |                         |                                                |     |              |      |                                |                                            |       |                       |
| 19.             | 6     | 87   | I                    | 4.1             |                         |                         |                                                |     |              |      |                                |                                            |       |                       |
| 20.             | 3     | 86   | O                    | 7.3             |                         |                         |                                                |     |              |      |                                |                                            |       |                       |
| 21.             | 11    | 87   | I                    | 1.7             |                         |                         |                                                |     |              |      |                                |                                            |       |                       |
| 22.             | 10    | 87   | I                    | 0.9             |                         |                         |                                                |     |              |      |                                |                                            |       |                       |
| 23.             | 9     | 87   | O                    | 2.6             |                         |                         |                                                |     |              |      |                                |                                            |       |                       |
| 24.             | 10    | 87   | O                    | 42.8            | 1.6                     | 1                       |                                                |     |              |      |                                |                                            |       | N                     |
| 25.             | 9     | 86   | I                    | 3.1             |                         |                         |                                                |     |              |      |                                |                                            |       | N                     |
| TOTAL REPAIRS   |       |      |                      |                 | 8                       |                         |                                                |     |              |      |                                |                                            |       |                       |
| SCFH TOTALS     |       |      |                      | 159.1           | 19.8                    |                         |                                                |     |              |      |                                |                                            |       |                       |
| BELOW 11.5 SCFH |       |      |                      | 15              | 8                       |                         |                                                |     |              |      |                                |                                            |       |                       |
| BELOW 100 SCFH  |       |      |                      | 19              | 8                       |                         |                                                |     |              |      |                                |                                            |       |                       |

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BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

PAGE 8 OF 15

MSIV MANUFACTURER Atwood Morrill - 2

| ACTIVITY MANUFACTURER AIRCRAFT MAINTENANCE - 2 |      |                      |         |        |         |                   |        |      |       |                        |                     |        |                       |
|------------------------------------------------|------|----------------------|---------|--------|---------|-------------------|--------|------|-------|------------------------|---------------------|--------|-----------------------|
|                                                |      | INBOARD <sup>1</sup> |         | AFTER  | NUMBER  | NEXT <sup>2</sup> |        |      | TOTAL | INCREASED <sup>3</sup> |                     |        |                       |
| MONTH                                          | YEAR | OR                   | INITIAL | REPAIR | OF      | OUTAGE            | REPAIR |      | HRS   | REPAIR                 | OUTAGE <sup>3</sup> | LENGTH | COMMENTS <sup>4</sup> |
|                                                |      | OUTBOARD             | SCFH    | SCFH   | REWORKS | INITIAL           | MH     | REMS | TIME  |                        | Y/M                 | HOURS  |                       |
| 1.                                             | 10   | 85                   | I       | 15.2   |         |                   |        |      |       |                        |                     |        | N                     |
| 2.                                             | 9    | 86                   | I       | 0.5    |         |                   |        |      |       |                        |                     |        | N                     |
| 3.                                             | 3    | 85                   | I       | 0.1    |         |                   |        |      |       |                        |                     |        | N                     |
| 4.                                             | 9    | 86                   | I       | 3.7    |         |                   |        |      |       |                        |                     |        | N                     |
| 5.                                             | 11   | 85                   | I       | 1.6    |         |                   |        |      |       |                        |                     |        | N                     |
| 6.                                             | 9    | 86                   | I       | 3.8    |         |                   |        |      |       |                        |                     |        | N                     |
| 7.                                             | 11   | 85                   | I       | 1.3    |         |                   |        |      |       |                        |                     |        | N                     |
| 8.                                             | 9    | 86                   | O       | 3.8    |         |                   |        |      |       |                        |                     |        | N                     |
| 9.                                             | 10   | 85                   | O       | 0      |         |                   |        |      |       |                        |                     |        | N                     |
| 10.                                            | 9    | 86                   | O       | 0.5    |         |                   |        |      |       |                        |                     |        | N                     |
| 11.                                            | 3    | 85                   | O       | 0.1    |         |                   |        |      |       |                        |                     |        | N                     |
| 12.                                            | 9    | 86                   | O       | 3.7    |         |                   |        |      |       |                        |                     |        | N                     |
| 13.                                            | 11   | 85                   | O       | 2.7    |         |                   |        |      |       |                        |                     |        | N                     |
| 14.                                            | 9    | 86                   | O       | High   | 0       | 1                 | 222    | 10   |       |                        |                     |        | N, *                  |
| 15.                                            | 11   | 85                   | O       | High   | 0.9     | 1                 | 1100   | 40   |       |                        |                     |        | N, *                  |
| 16.                                            | 2    | 84                   | I       | 2.2    |         |                   |        |      |       |                        |                     |        | B                     |
| 17.                                            | 3    | 85                   | I       | 2.1    |         |                   |        |      |       |                        |                     |        | B                     |
| 18.                                            | 3    | 87                   | I       | .02    |         |                   |        |      |       |                        |                     |        | B                     |
| 19.                                            | 6    | 87                   | I       | 6.4    |         |                   |        |      |       |                        |                     |        | B                     |
| 20.                                            | 2    | 84                   | I       | 6.0    |         |                   |        |      |       |                        |                     |        | B                     |
| 21.                                            | 4    | 85                   | I       | HIGH   | 0.5     | 1                 | 94     | 0.6  |       |                        | N                   |        | B, *                  |
| 22.                                            | 7    | 87                   | I       | HIGH   | 4.1     | 5                 | 288    | 4.6  |       |                        | N                   |        | B *                   |
| 23.                                            | 2    | 84                   | I       | 0.1    |         |                   |        |      |       |                        |                     |        | B                     |
| 24.                                            | 2    | 85                   | I       | 3.9    |         |                   |        |      |       |                        |                     |        | B                     |
| 25.                                            | 3    | 87                   | I       | .02    |         |                   |        |      |       |                        |                     |        | B                     |
| TOTAL REPAIRS                                  |      |                      |         |        | 4       |                   |        |      |       |                        |                     |        |                       |
| SCFH TOTALS                                    |      |                      |         | 57.7   | 5.5     |                   |        |      |       |                        |                     |        |                       |
| BELOW 11.5 SCFH                                |      |                      |         | 20     | 4       |                   |        |      |       |                        |                     |        |                       |
| BELOW 100 SCFH                                 |      |                      |         | 21     | 4       |                   |        |      |       |                        |                     |        |                       |

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**BWROG MSIV LEAKAGE CLOSURE COMMITTEE**  
**RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA**

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MSIV MANUFACTURER Atwood Merrill-3

|                 | MONTH | YEAR | INBOARD <sup>1</sup> |                 | AFTER<br>REPAIR<br>SCFH | NUMBER<br>OF<br>REWORKS | NEXT <sup>2</sup><br>OUTAGE<br>INITIAL<br>SCFH |     | REPAIR<br>MH | REMS | TOTAL<br>HRS<br>REPAIR<br>TIME | INCREASED <sup>3</sup><br>OUTAGE<br>LENGTH<br>Y/N HOURS |    | COMMENTS <sup>4</sup> |
|-----------------|-------|------|----------------------|-----------------|-------------------------|-------------------------|------------------------------------------------|-----|--------------|------|--------------------------------|---------------------------------------------------------|----|-----------------------|
|                 |       |      | OR<br>OUTBOARD       | INITIAL<br>SCFH |                         |                         |                                                |     |              |      |                                |                                                         |    |                       |
| 1.              | 5     | 87   | I                    | 4.8             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 2.              | 2     | 84   | I                    | 8.0             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 3.              | 4     | 85   | I                    | 4.1             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 4.              | 3     | 87   | I                    | .02             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 5.              | 6     | 87   | I                    | 3.5             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 6.              | 2     | 84   | O                    | 14.7            | 2.3                     | 1                       | 2.1                                            | 82  | 0.3          |      |                                | N                                                       |    | B                     |
| 7.              | 10    | 87   | I                    | 28.4            | 0.1                     | 1                       |                                                | 200 | 0.03         | 40   |                                | N                                                       |    | B, NP                 |
| 8.              | 10    | 87   | I                    | >30             | 4.3                     | 1                       |                                                | 300 | 0.04         | 60   |                                | N                                                       |    | B*, NP                |
| 9.              | 10    | 87   | I                    | 4.8             |                         |                         |                                                |     |              |      |                                |                                                         |    | B, NP                 |
| 10.             | 10    | 87   | I                    | >30             | 1.2                     | 1                       |                                                | 300 | 0.04         | 60   |                                | N                                                       |    | B*, NP                |
| 11.             | 10    | 87   | O                    | >30             | 0.2                     | 1                       |                                                | 200 | 0.03         | 40   |                                | N                                                       |    | B*, NP                |
| 12.             | 10    | 87   | O                    | 5.2             |                         |                         |                                                |     |              |      |                                |                                                         |    | B, NP                 |
| 13.             | 10    | 87   | O                    | 4.0             |                         |                         |                                                |     |              |      |                                |                                                         |    | B, NP                 |
| 14.             | 10    | 87   | O                    | >30             | 3.6                     | 1                       |                                                | 200 | 0.03         | 40   |                                | Y                                                       | 48 | B*, NP                |
| 15.             | 3     | 85   | O                    | 2.1             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 16.             | 3     | 87   | O                    | 7.1             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 17.             | 6     | 87   | O                    | 6.4             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 18.             | 2     | 84   | O                    | 10.7            |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 19.             | 4     | 85   | O                    | HIGH            | 0.5                     | 1                       | 1.1                                            | 92  | 0.2          |      |                                | N                                                       |    | B*                    |
| 20.             | 6     | 87   | O                    | 1.1             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 21.             | 7     | 87   | O                    | 4.1             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 22.             | 2     | 84   | O                    | 1.6             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 23.             | 2     | 85   | O                    | 3.9             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 24.             | 3     | 87   | O                    | 4.3             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| 25.             | 5     | 87   | O                    | 4.8             |                         |                         |                                                |     |              |      |                                |                                                         |    | B                     |
| TOTAL REPAIRS   |       |      |                      |                 | 7                       |                         |                                                |     |              |      |                                |                                                         |    |                       |
| SCFH TOTALS     |       |      |                      | 121.6           | 12.2                    |                         |                                                |     |              |      |                                |                                                         |    |                       |
| BELOW 11.5 SCFH |       |      |                      | 18              | 7                       |                         |                                                |     |              |      |                                |                                                         |    |                       |
| BELOW 100 SCFH  |       |      |                      | 20              | 7                       |                         |                                                |     |              |      |                                |                                                         |    |                       |

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BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

PAGE 10 OF 15

MSIV MANUFACTURER Atwood-Morrill - 4

|                 | MONTH | YEAR | INBOARD <sup>1</sup> |                 | AFTER<br>REPAIR<br>SCFH | NUMBER<br>OF<br>REWORKS | NEXT <sup>2</sup><br>OUTAGE<br>INITIAL<br>SCFH |     | REPAIR<br>HH | REMS | TOTAL<br>HRS<br>REPAIR<br>TIME | INCREASED <sup>3</sup><br>OUTAGE<br>LENGTH |       | COMMENTS <sup>4</sup> |
|-----------------|-------|------|----------------------|-----------------|-------------------------|-------------------------|------------------------------------------------|-----|--------------|------|--------------------------------|--------------------------------------------|-------|-----------------------|
|                 |       |      | OR<br>OUTBOARD       | INITIAL<br>SCFH |                         |                         |                                                |     |              |      |                                | Y/M                                        | HOURS |                       |
| 1.              | 2     | 84   | O                    | 2.4             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 2.              | 3     | 85   | O                    | HIGH            | 4.1                     | 1                       | 3.0                                            | 97  | 0.2          |      |                                | N                                          |       | B, *                  |
| 3.              | 3     | 87   | O                    | 3.0             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 4.              | 6     | 87   | O                    | 3.5             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 5.              | 2     | 85   | I                    | 82.3            | 1.8                     | 1                       | 108.6                                          | 213 | 2.3          |      |                                | N                                          |       | B                     |
| 6.              | 7     | 85   | I                    | 108.6           | 0.6                     | 2                       | 5.3                                            | 163 | 1.5          |      |                                | N                                          |       | B                     |
| 7.              | 4     | 87   | I                    | 5.3             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 8.              | 2     | 85   | I                    | 4.0             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 9.              | 7     | 85   | I                    | 1.7             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 10.             | 4     | 87   | I                    | 0.6             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 11.             | 2     | 85   | I                    | 1.4             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 12.             | 7     | 85   | I                    | 4.3             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 13.             | 4     | 87   | I                    | 5.1             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 14.             | 2     | 85   | I                    | HIGH            | 0.1                     | 1                       | HIGH                                           | 290 | 3.1          |      |                                | N                                          |       | B, *                  |
| 15.             | 7     | 85   | I                    | HIGH            | 0.7                     | 1                       | HIGH                                           | 144 | 1.7          |      |                                | N                                          |       | B, *                  |
| 16.             | 4     | 87   | I                    | HIGH            | 9.4                     | 2                       |                                                | 291 | 2.9          |      |                                | N                                          |       | B, *                  |
| 17.             | 2     | 85   | O                    | 18.6            | 0.6                     | 1                       | 7.8                                            | 150 | 0.6          |      |                                | N                                          |       | B                     |
| 18.             | 7     | 85   | O                    | 7.8             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 19.             | 4     | 87   | O                    | 1.1             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 20.             | 2     | 85   | O                    | 0.1             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 21.             | 7     | 85   | O                    | 5.9             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 22.             | 4     | 87   | O                    | 5.3             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 23.             | 2     | 85   | O                    | 5.7             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 24.             | 7     | 85   | O                    | 2.4             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| 25.             | 4     | 87   | O                    | 2.3             |                         |                         |                                                |     |              |      |                                |                                            |       | B                     |
| TOTAL REPAIRS   |       |      |                      |                 | 7                       |                         |                                                |     |              |      |                                |                                            |       |                       |
| SCFH TOTALS     |       |      |                      | 269.4           | 17.3                    |                         |                                                |     |              |      |                                |                                            |       |                       |
| BELOW 11.5 SCFH |       |      |                      | 18              | 7                       |                         |                                                |     |              |      |                                |                                            |       |                       |
| BELOW 100 SCFH  |       |      |                      | 20              | 7                       |                         |                                                |     |              |      |                                |                                            |       |                       |

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BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

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MSIV MANUFACTURER Atwood Monill - 5

| 1.              | MONTH | YEAR | INBOARD <sup>1</sup> |                 | AFTER<br>REPAIR<br>SCFH | NUMBER<br>OF<br>REWORKS | NEXT <sup>2</sup><br>OUTAGE<br>INITIAL<br>SCFH |      | REPAIR<br>MH | REMS | HRS<br>REPAIR<br>TIME | INCREASED <sup>3</sup><br>OUTAGE<br>LENGTH |       | COMMENTS <sup>4</sup> |
|-----------------|-------|------|----------------------|-----------------|-------------------------|-------------------------|------------------------------------------------|------|--------------|------|-----------------------|--------------------------------------------|-------|-----------------------|
|                 |       |      | OR<br>OUTBOARD       | INITIAL<br>SCFH |                         |                         |                                                |      |              |      |                       | Y/M                                        | HOURS |                       |
| 1.              | 2     | 85   | O                    | 1.6             |                         |                         |                                                |      |              |      |                       |                                            |       | B                     |
| 2.              | 2     | 85   | O                    | 13.6            | 7.1                     | 1                       | 9.5                                            | 156  | 0.4          |      |                       | N                                          |       | B                     |
| 3.              | 7     | 85   | O                    | 9.5             | 0.7                     | 1                       | 5.8                                            | 87   | 0.3          |      |                       | N                                          |       | B                     |
| 4.              | 4     | 87   | O                    | 5.8             |                         |                         |                                                |      |              |      |                       |                                            |       | B                     |
| 5.              | 5     | 87   | O                    | 2.7             |                         |                         |                                                |      |              |      |                       |                                            |       | B                     |
| 6.              | 5     | 87   | O                    | 1.1             |                         |                         |                                                |      |              |      |                       |                                            |       | B                     |
| 7.              | 5     | 87   | I                    | 35              | 4.8                     | 1                       |                                                | 734  | 0.04         |      |                       | N                                          |       | N, NP                 |
| 8.              | 5     | 86   | I                    | 1.8             |                         |                         |                                                |      |              |      |                       |                                            |       | N, NP                 |
| 9.              | 5     | 86   | I                    | >42.3           | 0.3                     | 1                       | >42.3                                          | 1225 | 0.07         |      |                       | N                                          |       | N, NP                 |
| 10.             | 5     | 87   | I                    | >42.3           | 3.0                     | 2                       |                                                | 1113 | 0.06         |      |                       | N                                          |       | N, NP                 |
| 11.             | 5     | 86   | I                    | >42.3           | 1.6                     | 1                       | 37.6                                           | 1134 | 0.04         |      |                       | N                                          |       | N, NP, *              |
| 12.             | 5     | 87   | I                    | 37.6            | 7.8                     | 1                       |                                                | 694  | 0.05         |      |                       | N                                          |       | N, NP                 |
| 13.             | 5     | 87   | I                    | >42.3           | 3.6                     | 1                       |                                                | 754  | 0.06         |      |                       | N                                          |       | N, NP, *              |
| 14.             | 5     | 86   | O                    | 1.8             |                         |                         |                                                |      |              |      |                       |                                            |       | N, NP                 |
| 15.             | 5     | 87   | O                    | 1.6             |                         |                         |                                                |      |              |      |                       |                                            |       | N, NP                 |
| 16.             | 5     | 86   | O                    | 0.3             |                         |                         |                                                |      |              |      |                       |                                            |       | N, NP                 |
| 17.             | 5     | 87   | O                    | 2.8             |                         |                         |                                                |      |              |      |                       |                                            |       | N, NP                 |
| 18.             | 5     | 86   | O                    | 1.1             |                         |                         |                                                |      |              |      |                       |                                            |       | N, NP                 |
| 19.             | 5     | 87   | O                    | 3.1             |                         |                         |                                                |      |              |      |                       |                                            |       | N, NP                 |
| 20.             | 5     | 86   | O                    | >42.3           | 8.0                     | 1                       | >42.3                                          | 1240 | 0.03         |      |                       | N                                          |       | N, NP, *              |
| 21.             | 5     | 87   | O                    | >42.3           | 3.6                     | 2                       |                                                | 1282 | 0.08         |      |                       | N                                          |       | N, NP, *              |
| 22.             |       |      |                      |                 |                         |                         |                                                |      |              |      |                       |                                            |       |                       |
| 23.             |       |      |                      |                 |                         |                         |                                                |      |              |      |                       |                                            |       |                       |
| 24.             |       |      |                      |                 |                         |                         |                                                |      |              |      |                       |                                            |       |                       |
| 25.             |       |      |                      |                 |                         |                         |                                                |      |              |      |                       |                                            |       |                       |
| TOTAL REPAIRS   |       |      |                      |                 | 10                      |                         |                                                |      |              |      |                       |                                            |       |                       |
| SCFH TOTALS     |       |      |                      |                 | 119.4                   | 40.5                    |                                                |      |              |      |                       |                                            |       |                       |
| BELOW 11.5 SCFH |       |      |                      |                 | 12                      | 10                      |                                                |      |              |      |                       |                                            |       |                       |
| BELOW 100 SCFH  |       |      |                      |                 | 15                      | 10                      |                                                |      |              |      |                       |                                            |       |                       |

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5. \* = Leak rate not known, however, valve was returned to acceptable leak rates with normal maintenance practices. (Data not included in initial leakage average)

BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

PAGE 12 OF 15

MSIV MANUFACTURER Crane-1

|                 |       |      | INBOARD <sup>1</sup> |         | AFTER  | NUMBER  | NEXT <sup>2</sup> |        | TOTAL | INCREASED <sup>3</sup> |        |                       |
|-----------------|-------|------|----------------------|---------|--------|---------|-------------------|--------|-------|------------------------|--------|-----------------------|
|                 | MONTH | YEAR | OR                   | INITIAL | REPAIR | OF      | OUTAGE            | REPAIR | HRS   | OUTAGE                 | LENGTH | COMMENTS <sup>4</sup> |
|                 |       |      | OUTBOARD             | SCFH    | SCFH   | REWORKS | INITIAL           | MH     | REMS  | TIME                   | Y/M    | HOURS                 |
| 1.              | 4     | 83   | I                    | 1.3     |        |         |                   |        |       |                        |        |                       |
| 2.              | 3     | 85   | I                    | 4.1     |        |         |                   |        |       |                        |        |                       |
| 3.              | 4     | 83   | O                    | 1.3     |        |         |                   |        |       |                        |        |                       |
| 4.              | 3     | 85   | O                    | 4.1     |        |         |                   |        |       |                        |        |                       |
| 5.              | 4     | 83   | I                    | 42.8    | 4.3    | 1       | 1.3               | 2      |       | 2                      |        |                       |
| 6.              | 3     | 85   | I                    | 1.3     |        |         |                   |        |       |                        |        |                       |
| 7.              | 4     | 83   | O                    | 42.8    | 4.3    | 1       | 1.3               | 2      |       | 2                      |        |                       |
| 8.              | 3     | 85   | O                    | 1.3     |        |         |                   |        |       |                        |        |                       |
| 9.              | 4     | 83   | I                    | 2.6     |        |         |                   |        |       |                        |        |                       |
| 10.             | 3     | 85   | I                    | 2.8     |        |         |                   |        |       |                        |        |                       |
| 11.             | 4     | 83   | O                    | 2.6     |        |         |                   |        |       |                        |        |                       |
| 12.             | 3     | 85   | O                    | 2.8     |        |         |                   |        |       |                        |        |                       |
| 13.             | 4     | 83   | I                    | 1.3     |        |         |                   |        |       |                        |        |                       |
| 14.             | 3     | 85   | I                    | 2.7     |        |         |                   |        |       |                        |        |                       |
| 15.             | 4     | 83   | O                    | 1.3     |        |         |                   |        |       |                        |        |                       |
| 16.             | 3     | 85   | O                    | 2.7     |        |         |                   |        |       |                        |        |                       |
| 17.             | 4     | 84   | I                    | 2.6     |        |         |                   |        |       |                        |        |                       |
| 18.             | 7     | 86   | I                    | 2.7     |        |         |                   |        |       |                        |        |                       |
| 19.             | 4     | 84   | O                    | 2.6     |        |         |                   |        |       |                        |        |                       |
| 20.             | 7     | 86   | O                    | 2.7     |        |         |                   |        |       |                        |        |                       |
| 21.             | 4     | 84   | I                    | 0       |        |         |                   |        |       |                        |        |                       |
| 22.             | 7     | 86   | I                    | 2.7     |        |         |                   |        |       |                        |        |                       |
| 23.             | 4     | 84   | O                    | 0       |        |         |                   |        |       |                        |        |                       |
| 24.             | 7     | 86   | O                    | 2.7     |        |         |                   |        |       |                        |        |                       |
| 25.             | 4     | 84   | I                    | 0       |        |         |                   |        |       |                        |        |                       |
| TOTAL REPAIRS   |       |      |                      |         | 2      |         |                   |        |       |                        |        |                       |
| SCFH TOTALS     |       |      |                      |         | 133.8  | 8.6     |                   |        |       |                        |        |                       |
| BELOW 11.5 SCFH |       |      |                      |         | 23     | 2       |                   |        |       |                        |        |                       |
| BELOW 100 SCFH  |       |      |                      |         | 25     | 2       |                   |        |       |                        |        |                       |

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BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA

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MSIV MANUFACTURER Crane - 2

|                 | MONTH | YEAR | INBOARD <sup>1</sup> |                 | AFTER<br>REPAIR<br>SCFH | NUMBER<br>OF<br>REWORKS | NEXT <sup>2</sup><br>OUTAGE<br>INITIAL<br>SCFH |  | REPAIR<br>MH | REMS | TOTAL<br>HRS<br>REPAIR<br>TIME | INCREASED <sup>3</sup><br>OUTAGE<br>LENGTH |       | COMMENTS <sup>4</sup> |
|-----------------|-------|------|----------------------|-----------------|-------------------------|-------------------------|------------------------------------------------|--|--------------|------|--------------------------------|--------------------------------------------|-------|-----------------------|
|                 |       |      | OR<br>OUTBOARD       | INITIAL<br>SCFH |                         |                         |                                                |  |              |      |                                | Y/M                                        | HOURS |                       |
| 1.              | 7     | 86   | I                    | 1.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 2.              | 4     | 84   | O                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 3.              | 7     | 86   | O                    | 1.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 4.              | 4     | 84   | I                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 5.              | 7     | 86   | I                    | 1.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 6.              | 4     | 84   | O                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 7.              | 7     | 86   | O                    | 1.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 8.              | 1     | 86   | I                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 9.              | 1     | 86   | O                    | 146             | 1.2                     |                         | 16.3                                           |  |              |      |                                |                                            |       |                       |
| 10.             | 1     | 86   | I                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 11.             | 1     | 86   | O                    | 18.4            | 0                       |                         | 2.3                                            |  |              |      |                                |                                            |       |                       |
| 12.             | 1     | 86   | I                    | 0               |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 13.             | 1     | 86   | O                    | 48.4            | 0                       |                         | 4.6                                            |  |              |      |                                |                                            |       |                       |
| 14.             | 1     | 86   | I                    | 5.8             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 15.             | 1     | 86   | O                    | 5.8             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 16.             | 9     | 87   | I                    | 16.3            | 10.4                    |                         |                                                |  |              |      |                                |                                            |       |                       |
| 17.             | 9     | 87   | O                    | 16.3            | 10.4                    |                         |                                                |  |              |      |                                |                                            |       |                       |
| 18.             | 9     | 87   | I                    | 2.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 19.             | 9     | 87   | O                    | 2.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 20.             | 9     | 87   | I                    | 4.6             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 21.             | 9     | 87   | O                    | 4.6             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 22.             | 9     | 87   | I                    | 3.5             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 23.             | 9     | 87   | O                    | 3.5             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 24.             | 3     | 85   | I                    | 2.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| 25.             | 3     | 85   | O                    | 2.3             |                         |                         |                                                |  |              |      |                                |                                            |       |                       |
| TOTAL REPAIRS   |       |      |                      |                 | 5                       |                         |                                                |  |              |      |                                |                                            |       |                       |
| SCFH TOTALS     |       |      |                      |                 | 287.6                   | 22                      |                                                |  |              |      |                                |                                            |       |                       |
| BELOW 11.5 SCFH |       |      |                      |                 | 20                      | 5                       |                                                |  |              |      |                                |                                            |       |                       |
| BELOW 100 SCFH  |       |      |                      |                 | 24                      | 5                       |                                                |  |              |      |                                |                                            |       |                       |

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**BWROG MSIV LEAKAGE CLOSURE COMMITTEE**  
**RECENT MSIV LEAKAGE HISTORY AND COST BENEFIT DATA**

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MSIV MANUFACTURER CRANE-3

|                 |       |      | INBOARD <sup>1</sup> |         | AFTER  | NUMBER  | NEXT <sup>2</sup> |        | TOTAL  | INCREASED <sup>3</sup> |        |     |                       |
|-----------------|-------|------|----------------------|---------|--------|---------|-------------------|--------|--------|------------------------|--------|-----|-----------------------|
|                 | MONTH | YEAR | OR                   | INITIAL | REPAIR | OF      | OUTAGE            | REPAIR | HRS    | OUTAGE                 | LENGTH | Y/N | COMMENTS <sup>4</sup> |
|                 |       |      | OUTBOARD             | SCFH    | SCFH   | REWORKS | INITIAL           | MH     | REPAIR | TIME                   | HOURS  |     |                       |
| 1.              | 3     | 85   | I                    | 0       |        |         |                   |        |        |                        |        |     |                       |
| 2.              | 3     | 85   | O                    | 13.8    | 4.6    |         | 4.6               |        |        |                        |        |     |                       |
| 3.              | 3     | 85   | I                    | 6.9     |        |         |                   |        |        |                        |        |     |                       |
| 4.              | 3     | 85   | O                    | 6.9     | -      |         |                   |        |        |                        |        |     |                       |
| 5.              | 3     | 85   | I                    | 0       |        |         |                   |        |        |                        |        |     |                       |
| 6.              | 3     | 85   | O                    | 158     | 9.2    |         | 37.8              |        |        |                        |        |     |                       |
| 7.              | 10    | 86   | I                    | 2.3     |        |         |                   |        |        |                        |        |     |                       |
| 8.              | 10    | 86   | O                    | 2.3     |        |         |                   |        |        |                        |        |     |                       |
| 9.              | 10    | 86   | I                    | 4.6     |        |         |                   |        |        |                        |        |     |                       |
| 10.             | 10    | 86   | O                    | 4.6     |        |         |                   |        |        |                        |        |     |                       |
| 11.             | 10    | 86   | I                    | 9.2     |        |         |                   |        |        |                        |        |     |                       |
| 12.             | 10    | 86   | O                    | 9.2     |        |         |                   |        |        |                        |        |     |                       |
| 13.             | 10    | 86   | I                    | 3.5     |        |         |                   |        |        |                        |        |     |                       |
| 14.             | 10    | 86   | O                    | 37.8    | 0      |         |                   |        |        |                        |        |     |                       |
| 15.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 16.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 17.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 18.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 19.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 20.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 21.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 22.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 23.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 24.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| 25.             |       |      |                      |         |        |         |                   |        |        |                        |        |     |                       |
| TOTAL REPAIRS   |       |      |                      |         | 3      |         |                   |        |        |                        |        |     |                       |
| SCFH TOTALS     |       |      |                      | 259.1   | 13.8   |         |                   |        |        |                        |        |     |                       |
| BELOW 11.5 SCFH |       |      |                      | 11      | 3      |         |                   |        |        |                        |        |     |                       |
| BELOW 100 SCFH  |       |      |                      | 1       | 3      |         |                   |        |        |                        |        |     |                       |

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BWROG MSIV LEAKAGE CLOSURE COMMITTEE  
RECENT MSIV LEAKAGE HISTORY SUMMARY

| MSIV Manufacturer                                        | <u>Rockwell</u> | Atwood<br><u>Morrill</u> | <u>Crane</u> | <u>Totals</u> |       |
|----------------------------------------------------------|-----------------|--------------------------|--------------|---------------|-------|
| NUMBER OF PLANTS                                         | <u>11</u>       | <u>9</u>                 | <u>4</u>     | <u>24</u>     |       |
| TOTAL INITIAL TESTS                                      | <u>144</u>      | <u>121</u>               | <u>64</u>    | <u>329</u>    |       |
| TOTAL INITIAL TESTS MINUS<br>TESTS WITH >X SCFH REPORTED | <u>140</u>      | <u>96</u>                | <u>64</u>    | <u>300</u>    |       |
| TOTAL INITIAL SCFH                                       | <u>1858.3</u>   | <u>727.2</u>             | <u>814.3</u> | <u>3399.8</u> |       |
| AVERAGE INITIAL SCFH/TEST                                | <u>13.3</u>     | <u>7.6</u>               | <u>12.7</u>  | <u>11.3</u>   |       |
| TOTAL INITIAL TESTS ><br>ALLOWED LEAKAGE                 | <u>25</u>       | <u>36</u>                | <u>10</u>    | <u>71</u>     |       |
| TOTAL AFTER REPAIR SCFH                                  | <u>31.7</u>     | <u>95.3</u>              | <u>44.4</u>  | <u>171.4</u>  |       |
| AVERAGE AFTER REPAIR<br>SCFH/TEST                        | <u>1.3</u>      | <u>2.6</u>               | <u>4.4</u>   | <u>2.4</u>    |       |
| OF INITIAL TESTS:                                        |                 |                          |              |               |       |
| TOTAL < 11.5 SCFH                                        | <u>117</u>      | <u>83</u>                | <u>54</u>    | <u>254</u>    | (77%) |
| TOTAL < 100 SCFH                                         | <u>137</u>      | <u>95</u>                | <u>62</u>    | <u>294</u>    | (89%) |