

G. Schoeblig  
DES  
ONS

**DUKE POWER COMPANY**  
P.O. BOX 33189  
CHARLOTTE, N.C. 28242

Am 4/4

**AL B. TUCKER**  
VICE PRESIDENT  
NUCLEAR PRODUCTION

TELEPHONE  
(704) 373-4531

50:12

PDR

May 16, 1986

Dr. J. Nelson Grace, Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region II  
101 Marietta Street NW, Suite 2900  
Atlanta, Georgia 30323

**Subject:** McGuire Nuclear Station  
Catawba Nuclear Station  
Oconee Nuclear Station  
Docket Nos. 50-369 and 50-370; 50-413 and 50-414;  
50-269, 50-270 and 50-287  
Motor-Operated Valve Common Mode Failures During  
Plant Transients Due to Improper Switch Settings  
(NRC/OIE Bulletin 85-03)

Dear Dr. Grace:

r. J.M. Taylor's (NRC/OIE) November 15, 1985 letter (Bulletin 85-03) concerned motor-operated valve common mode failures during plant transients due to improper switch settings. The purpose of this bulletin is to request licensees to develop and implement a program to ensure that switch settings on certain safety-related motor-operated valves are selected, set and maintained correctly to accommodate the maximum differential pressures expected on these valves during both normal and abnormal events within the design basis. This action is to include the components (i.e. action items a-d) outlined in the bulletin. In addition to the development and implementation of the above program, various reports are required to be submitted to the NRC (Bulletin action items e and f). By May 14, 1986 a report(s) addressing each unit must be submitted which provides the results of action item a and contains the program to accomplish action items b-d including a schedule for completion of these items (note that for ONS Units 1, 2, 3, MNS Units 1, 2, and CNS Units 1, 2, (OL plants) this schedule is to ensure that these items are completed as soon as practical and by November 15, 1987 at the latest). Further, a report(s) must be submitted within 60 days of completion of the program on each unit providing (1) a verification of completion of the requested program, (2) a summary of the findings as to valve operability prior to any adjustments as a result of this bulletin, and (3) a summary of data in accordance with Table 2, "Suggested Data Summary Format".

Please find attached Duke Power Company's response to action item (a) of the subject bulletin for the McGuire, Catawba, and Oconee Nuclear

8607230469 860516  
PDR ADOCK 05000269  
Q PDR

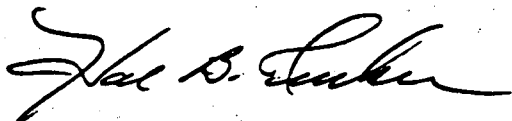
Official Copy

Stations and an outline of our plan to accomplish items (b-d) by November 15, 1987. Note that the concerns raised in NRC/OIE Information Notice 86-29 will be considered during this process. This report meets the requirements of bulletin item (e). In addition, Licensee Event Reports are being submitted as appropriate for valves being determined inoperable as a result of the bulletin actions. A final report will be submitted by January 14, 1988 that will summarize the data and findings of our completed MOV Maintenance Program (i.e. Bulletin item (f)).

In order that a complete report could be provided, this report is being submitted two days late; we regret any inconvenience this may have caused. If there are any questions concerning this matter or if additional information is required, please advise.

I declare under penalty of perjury that the statements set forth herein are true and correct to the best of my knowledge.

Very truly yours,



Hal B. Tucker

PBN/jgm

Attachment

xc: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Mr. Darl Hood  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

Mr. T.A. Lordi, Manager  
Westinghouse Owners Group  
c/o Westinghouse Electric Corporation  
Nuclear Services Integration Division  
Box 2728  
Pittsburgh, Pennsylvania 15230-2728

Mr. R.W. Ganthner, Manager  
B&W Owners Group Engineering Services  
c/o Babcock & Wilcox  
Nuclear Power Division  
3315 Old Forest Road  
P.O. Box 10935  
Lynchburg, VA 24506-0935

Mr. W.T. Orders  
NRC Senior Resident Inspector  
McGuire Nuclear Station

Mr. P.K. Van Doorn  
NRC Senior Resident Inspector  
Catawba Nuclear Station

Mr. J.C. Bryant  
NRC Senior Resident Inspector  
Oconee Nuclear Station

DUKE POWER COMPANY

McGUIRE, CATAWBA, AND OCONEE NUCLEAR STATIONS

RESPONSE TO NRC/OIE BULLETIN 85-03 (ACTION ITEM (e))

Introduction:

The purpose of NRC/OIE Bulletin (IEB) 85-03 is to require licensees to develop and implement a program to ensure that switch settings on certain safety-related motor operated valves (MOV) are selected, set, and maintained correctly to accommodate the maximum differential pressures (D/P) expected on these valves during both normal and abnormal events within the design basis.

Duke Power Company has recognized the need to improve the reliability of MOV's and for the last several years has supported this effort in several ways:

1. Increased resources allocated to MOV training.
2. Provided support toward development of MOV diagnostic equipment for the nuclear industry.
3. Required operability testing by valve manufacturers supplying MOV's to Catawba Nuclear Station.
4. Initiated an actuator rebuild program for safety related valves that have experienced more than 10 years of commercial operating time at Oconee Nuclear Station.
5. Utilized actuator test benches that verify output torque for post maintenance testing at McGuire and Catawba Nuclear Stations.

Duke Power Company also recognizes that many problems still exist and Duke is eager to address those problems. Even today, Duke continues to learn more about MOV performance characteristics and, therefore, see the need for a deliberate, fully researched MOV maintenance program rather than a reactive, quick-fix solution that may create additional concerns. Every effort will be made to comply with the time restraints required in the bulletin.

If initially set up correctly and properly adjusted and lubricated, Duke believes that actuator life can be indefinite with only minimal attention required under a basic Preventive Maintenance Program. For this reason, Duke's long term objective is to implement a comprehensive maintenance program for MOV's, one that cannot be implemented during one refueling outage.

The philosophy concerning switch settings at Duke Power has been that the torque switch (TS) bypass is designed to cover initial disc unseating. TS settings were calculated to include design D/P. Duke plans to investigate these assumptions by performing D/P testing with signature analysis on a sample of IEB 85-03 valves.

Valve Selection:

For the scope of IEB 85-03, Duke included all motor operated valves that are in our ASME Section XI, IWV Program and are part of the high pressure (safety) injection and emergency feedwater systems, except for:

1. Non-active valves that are administratively controlled by locking or de-energizing them in their safety position, and
2. Kerotest diaphragm globe valves.

The Kerotest valves were excluded for the following reasons:

1. Kerotest valves are small globe valves 2 inches or smaller and are not subject to large seating and unseating loads,
2. Unseating loads are provided by an internal spring in the valve and not the actuator. The disc is not connected to the actuator stem,
3. Duke has not experienced failures due to a lack of available thrust,
4. Kerotest performed tests on one valve from each item number to ensure that the actuator was sized to meet design requirements. Kerotest valve item numbers were tested to close against design pressure and to open against design D/P, although not at flow conditions.

Attachment 1 is a complete listing of all the IEB 85-03 valves Duke considers applicable.

Action Items:

- a) Review and document the design basis for the operation of each valve.

Response: During our review it was verified that Duke normally utilized the design pressure conditions of the valve when specifying D/P conditions. In using this conservative approach, the actual D/P conditions the valve would see will be less than or equal to the specified D/P values. Also, since many Duke valves were purchased by an item number in which one type of valve was used in many different applications, and since the most severe conditions of all the applications was specified, all those valves used in less severe applications will have a greater design margin.

Included in Attachment 1 is the list of applicable valves with the as-purchased D/P specified and the maximum expected D/P. In all cases the as-purchased D/P values met or exceeded the maximum expected D/P.

b) Establish correct switch settings.

Response: A program to establish correct switch settings will be implemented and will include the following components:

1. Review and revise methods of selecting switch settings by October 1, 1986 as a result of limited D/P testing and signature analysis as determined in c.1 below.
2. Review and if required, change open/close TS settings and overload switch sizes on Design Engineering controlled Electric Motor Operator (EMO) Setpoint Listing by February 1, 1987.
3. Verify required settings on EMO Setpoint Listing with field data sheets obtained during each units refueling outage (see Attachment 2).
4. Review, re-write if required, and implement procedures for setting position limit switches at each site by November 15, 1986. These procedures shall provide detailed requirements for setting the TS bypass (the percent of additional stem travel after disc movement), and the open limit switch (verification that the disc does not contact the backseat after electrical operation).
5. Implement procedures that will ensure torque switches are properly balanced by November 15, 1986.

c) Demonstrate valve to be operable.

c.1) Test valve at maximum D/P.

Response: Limited D/P testing with signature analysis will be performed on a sample of the IEB 85-03 valves by September 1, 1986 in order to:

1. Verify or revise, as required, vendor methodology for sizing actuators and determining recommended and maximum TS settings.
2. Determine if TS bypass setting should be changed to more than 10% of stem travel after disc movement.

This testing may be performed at less than design D/P, but by performing signature analysis at zero D/P conditions and subsequently at limited D/P conditions, verification of the methodology of calculating the thrust to overcome D/P can be confirmed. Duke Power will test primarily a sample of those valves most likely to be affected by high D/P, we will test in-place using existing flow paths and equipment for those valves that are suitable for testing, and we will be limited to valve line-ups that will preclude system or component degradation and will meet all Technical Specification requirements.

- c.2) Stroke test valve to verify settings have been properly implemented.

Response: For Rotork actuated valves only signature analysis verifying limit switch settings will be performed on each IEB 85-03 Rotork actuated valve. Since Rotork actuators are originally set-up on a calibrated test bench and retested after major maintenance, the TS settings are presently being maintained and verified.

For Limitorque actuated valves, a complete calibrated signature analysis will be performed to verify actuator output at the prescribed TS settings identified in (b) above as well as the appropriate limit switch settings.

These actions will be completed by November 15, 1987.

- d) Revise procedures to ensure correct switch settings are maintained.

Response: The following procedures and programs will be implemented to verify correct switch settings are maintained:

1. Procedures for setting position limit switches shall be reviewed, rewritten if required, and implemented at each site by November 15, 1986.
2. Procedures for verifying the correct settings of position limit switches during post maintenance testing shall be implemented by November 15, 1987. These procedures will be required only when maintenance is performed that could affect these settings.
3. Procedures for establishing and maintaining correct torque switch settings and overload sizes, if applicable, for all IEB 85-03 valves will be implemented by January 1, 1987. These settings will be maintained in a Design Engineering controlled document and any changes from this document will be performed under Duke's Nuclear Station Modification Program.
4. A Preventive Maintenance (PM) Program will be implemented by November 15, 1987 for all safety-related electric motor operators (EMO's). Items to be inspected every five years will include:

For Limitorque Actuators

- i) gear housing grease (quantity, color, consistency)
- ii) stem lubrication
- iii) bearing lubrication
- iv) limit switch grease (quantity, color, consistency)
- v) wiring insulation, contacts (visual)

For Rotork Actuators

- i) gear housing oil (level, color, leakage)
- ii) stem lubrication

5. A rebuild program will be implemented for IEB 85-03 actuators that have been in service at least 10 years from commercial operating date and have not been included in a PM program as described above. In this program each actuator shall be completely disassembled, refurbished, inspected, reassembled, and tested during the next refueling outage on each unit (see Attachment 2).

Page 1 of 8  
Catawba IEB 85-03  
Design Verifications

P = Powell  
R = Rockwell  
C = Crane  
B-W = Borg Warner  
W = Westinghouse  
Mal = Malworth

Unit 1

<u>Tag</u>	<u>Vlv. Vendor</u>	<u>Item #</u>	<u>Act. Mfg.</u>	<u>Vlv. Size Type</u>	<u>Pos.</u>	<u>Maximum Expected AP</u>	<u>As Purchased AP</u>	<u>Function</u>
1CA015A	B-W	2B-393	ROT	6" GT	NC	175	175	CA Pump 1A Suct. from RN
1CA018B	B-W	2B-393	ROT	6" GT	NC	175	175	CA Pump 1B Suct. from RN
1CA085B	B-W	2B-393	ROT	6" GT	NC	175	175	CA Pump #1 Suct. from RN
1CA116A	B-W	2B-393	ROT	6" GT	NC	175	175	CA Pump #1 Suct. from RN
1CA038A	B-W	6J-219	ROT	4" GT	NC	2000	2000	CA Pump #1 Disch. to S/G 1D
1CA042B	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump 1B Disch. to S/D 1D
1CA046B	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump 1B Disch. to S/G 1C
1CA050A	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump #1 Disch.
1CA054B	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump #1 Disch.
1CA058A	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump 1A Disch. to S/G 1B
1CA062A	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump 1A Disch. to S/G 1B
1CA066B	B-W	6J-219	ROT	4" GT	NC	2000	2000	CA Pump #1 Disch. to S/G 1B
1NI009A	B-W	9J-202	ROT	4" GT	NC	2735	2735	CCP To C-Leg
1NI010B	B-W	9J-202	ROT	4" GT	NC	2735	2735	CCP to C-Leg
1NI054A	W	9J-209	LIM	10"GT	NO	2485	2485	C-Leg Accum. A Disch. Isol.
1NI065B	W	9J-209	LIM	10"GT	NO	2485	2485	C-Leg Accum. B Disch. Isol.
1NI076A	W	9J-209	LIM	10"GT	NO	2485	2485	C-Leg Accum. C Disch. Isol.
1NI088B	W	9J-209	LIM	10"GT	NO	2485	2485	C-Leg Accum. D Disch. Isol.
1NI100B	W	9D-214	ROT	8" GT	NO	220	220	NI Pump Suct. from FWST
1NI103A	B-W	5B-203	ROT	6" GT	NO	225	225	NI Pump 1A Suct.
1NI118A	B-W	9H-201	ROT	4" GT	NO	1750	1750	NI Pump 1A to C-Leg
1NI121A	B-W	9J-219	ROT	4" GT	NC	2485	2485	NI Pump 1A to H-Legs B&C
1NI135B	B-W	5B-203	ROT	6" GL	NO	225	225	NI Pump 1B Suction
1NI136B	B-W	4G-204	ROT	8" GT	NC	600	600	ND Hx to NI Pump 1B Suction
1NI150B	B-W	9H-201	ROT	4" GT	NO	1750	1750	NI Pump 1B to C-Leg
1NI152B	B-W	9J-219	ROT	4" GT	NC	2485	2485	NI Pump 1B to H-Legs A&D
1NI183B	W	9J-213	LIM	12"GT	NC	2485	2485	ND Hdr. A&B H-Leg Inj.



CMS Unit 1 Cont'd.

<u>Tag</u>	<u>Valv. Vendor</u>	<u>Item #</u>	<u>Act. Mfg.</u>	<u>Valv. Size Type</u>	<u>Pos.</u>	<u>Maximum Expected AP</u>	<u>As Purchased AP</u>	<u>Function</u>
INI332A	B-W	5B-203	ROT	6" GT	NC	225	225	NI Pump Suct. X-Over from ND Hx 1A
INI333B	B-W	5B-203	ROT	6" GT	NC	225	225	NI Pump Suct. X-Over from ND Hx 1A
INI334B	B-W	5B-203	ROT	6" GT	NO	225	225	NI Pump Suct. from ND Hx 1A
INI162A	B-W	9J-220	ROT	4" GT	NO	2485	2485	NI to C-Legs
INI173A	W	9J-211	ROT	8" GT	NO	2485	2485	ND Hdr. 1A to C-Legs
INI178B	W	9J-211	ROT	8" GT	NO	2485	2485	ND Hdr. 1B to C-Legs
INI184B	W	9D-204	ROT	18"GT	NC	600	600	ND Pump 1B from Cont. Sump
INI185A	W	9D-204	ROT	18"GT	NC	600	600	ND Pump 1A from Cont. Sump
INV015B	Wal	4G-202	ROT	3" GL	NO	600	600	Let Down Isolation O/S RB
		or 4G-206						
INV089A	B-W	5B-202	ROT	4" GT	NO	225	225	Seal Wtr. Return Isol. I/S RB
INV091B	B-W	5B-202	ROT	4" GT	NO	225	225	Seal Wtr. Return Isol. O/S RB
INV188A	B-W	5B-202	ROT	4" GT	NO	225	225	VCT To Charging pp. Suct. Hdr.
INV189B	B-W	5B-202	ROT	4" GT	NO	225	225	VCT To Charging pp. Suct. Hdr.
INV252A	W	9D-203	ROT	8" GT	NC	275	275	FWST to CCP Suct. Hdr.
INV253B	W	9D-203	ROT	8" GT	NC	275	275	FWST to CCP Suct. Hdr.
INV312A	B-W	9J-204	ROT	3" GT	NO	2750	2750	CCP Miniflow
INV314B	B-W	9J-204	ROT	3" GT	NO	2750	2750	CCP Miniflow

CMS Unit 2

2CA015A	B-W	2B-393	ROT	6" GT	NC	175	175	CA Pump 2A Suct. from RN
2CA018B	B-W	2B-393	ROT	6" GT	NC	175	175	CA Pump 2B Suct. from RN
2CA085B	B-W	2B-393	ROT	6" GT	NC	175	175	CA Pump #2 Suct. from RN
2CA116A	B-W	2B-393	ROT	6" GT	NC	175	175	CA Pump #2 Suct. from RN
2CA038A	B-W	6J-219	ROT	4" GT	NC	2000	2000	CA Pump #2 Disch. to S/G 2D
2CA042B	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump 1B Disch. to S/G 2D
2CA046B	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump 2B Disch. to S/G 2C
2CA050A	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump #2 Disch.
2CA054B	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump #2 Disch.
2CA058A	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump 2A Disch. to S/G 2B
2CA062A	B-W	6J-219	ROT	4" GT	NO	2000	2000	CA Pump 2A Disch. to S/G 2B
2CA066B	B-W	6J-219	ROT	4" GT	NC	2000	2000	CA Pump #2 Disch. to S/G 2B
2NI009A	B-W	9J-202	ROT	4" GT	NC	2735	2735	CCP to C- Leg
2NI010B	B-W	9J-202	ROT	4" GT	NC	2735	2735	CCP to C-Leg

CMS Unit 2 Cont'd.

<u>Tag</u>	<u>Vlv. Vendor</u>	<u>Item #</u>	<u>Act. Mfg.</u>	<u>Vlv. Size Type</u>	<u>Pos.</u>	<u>Maximum Expected AP</u>	<u>As Purchased AP</u>	<u>Function</u>
2NI054A	W	9J-209	LIM	10"GT	NO	2485	2485	C-Leg Accum. A Disch. Isol.
2NI065B	W	9J-209	LIM	10"GT	NO	2485	2485	C-Leg Accum. B Disch. Isol.
2NI076A	W	9J-209	LIM	10"Gt	NO	2485	2485	C-Leg Accum. C Disch. Isol.
2NI088B	W	9J-209	LIM	10"GT	NO	2485	2485	C-Leg Accum. D. Disch. Isol.
2NI100B	W	9D-214	ROT	8" GT	NO	220	220	NI Pump Suct. from FWST
2NI103A	B-W	5B-203	ROT	6" GT	NO	225	225	NI Pump 2A Suct.
2NI118A	B-W	9H-201	ROT	4" GT	NO	1750	1750	NI Pump 2A to C-Leg
2NI121A	B-W	9J-219	ROT	4" GT	NC	2485	2485	NI Pump 2A to H-Legs B&C
2NI135B	B-W	5B-203	ROT	6" GL	NO	225	225	NI Pump 2B Suction
2NI136B	B-W	4G-204	ROT	8" GT	NC	600	600	ND Hx to NI Pump 1B Suction
2NI150B	B-W	9H-201	ROT	4" GT	NO	1750	1750	NI Pump 2B to C-Leg
2NI152B	B-W	9J-219	ROT	4" GT	NC	2485	2485	NI Pump 2B to H-Legs A&D
2NI183B	W	9J-213	LIM	12"GT	NC	2485	2485	ND Hdr. A&B H-Leg Inj.
2NI332A	B-W	5B-203	ROT	6" GT	NC	225	225	NI Pump Suct. X-Over from ND Hx 2A
2NI33B	B-W	5B-203	ROT	6" GT	NC	225	225	NI Pump Suct. X-Over from ND Hx 2A
2NI334B	B-W	5B-203	ROT	6" GT	NO	225	225	NI Pump Suct. from ND Hx 2A
2NI162A	B-W	9J-220	ROT	4" GT	NO	2485	2485	NI to C-Legs
2NI173A	W	9J-211	ROT	8" GT	NO	2485	2485	ND Hdr. 2A to C-Legs
2NI178B	W	9J-211	ROT	8" GT	NO	2485	2485	ND Hdr. 2B to C-Legs
2NI184B	W	9D-204	ROT	18"GT	NC	600	600	ND Pump 2B from Cont. Sump
2NI185A	W	9D-204	ROT	18"GT	NC	600	600	ND Pump 2A from Cont. Sump
2NV015B	Wal	4G-202	ROT	3" GL	NO	600	600	Letdown Isol. O/S RB
		or 4G-206						
2NV089A	B-W	5B-202	ROT	4" GT	NO	225	225	Seal Wtr. Return Isol. I/S RB
2NV091B	B-W	5B-202	ROT	4" GT	NO	225	225	Seal Wtr. Return Isol. O/S RB
2NV188A	B-W	5B-202	ROT	4" GT	NO	225	225	VCT To Charging pp. Suct. Hdr.
2NV189B	B-W	5B-202	ROT	4" GT	NO	225	225	VCT To Charging pp. Suct. Hdr.
2NV252A	W	9D-203	ROT	8" GT	NC	275	275	FWST to CCP Suct. Hdr.
2NV253B	W	9D-203	ROT	8" GT	NC	275	275	FWST to CCP Suct. Hdr.
2NV312A	B-W	9J-204	ROT	3" GT	NO	2750	2750	Charging Line Isol.
2NV314B	B-W	9J-204	ROT	3" GT	NO	2750	2750	Charging Line Isol.

Oconee IEB 85-03  
Design Verifications

P = Powell  
R = Rockwell  
C = Crane  
B-W = Borg Warner  
W = Westinghouse  
Mal - Malworth

Unit 1

Tag	Vlv. Vendor	Item #	Act. Mfg.	Vlv. Size Type	Pos.	Maximum Expected AP	As Purchased AP	Function
1FDW-347	B-W		LIM	6" GT	NO	1450	2580	EFWP Disch. to S/G 1B
1C-156	C		LIM	8" GT	NO	35	247	Cond. to EFW from UST
1C-391	C		LIM	8" GT	NC	3	15	Turb. EFW Suct. - Hotwell Pump
1MS-82	C		LIM	6" GT	NO	1050	1104	EFWP Turb. MS Supply
1MS-84	C		LIM	6" GT	NO	1050	1104	EFWP Turb. MS Supply
1HP-3	R		LIM	2.5"GL	NO	2500	2500	A LD Cooler Outlet
1HP-4	R		LIM	2.5"GL	NO	2500	2500	B LD Cooler Outlet
1HP-20	R		LIM	4" GL	NO	2500	2500	RC Pump Seal Return to Coolers
1HP-24	P		LIM	6" GT	NC	25	320	A HPI Pump Suct. - BWST
1HP-25	P		LIM	6" GT	NC	25	320	C HPI Pump Suct. - BWST
1HP-26	R		LIM	4" GL	NC	3050	3050	A Loop Inj.
1HP-27	R		LIM	4" GL	NO	3050	3050	B Loop Inj.
1HP-409	W		LIM	4" GT	NC	2500	2500	B Loop HPI X-Connect
1HP-410	W		LIM	4" GT	NC	2500	2500	A Loop HPI X-Connect

ONS Unit 2

2FDW-247	B-W		ROT	6" GT	NO	1450	2580	EFWP Disch. To S/G 1B
2C-156	C		LIM	8" GT	NO	35	247	Cond. to EFW from UST
2C-391	C		LIM	8" GT	NC	3	15	Turb. EFW Suct. - Hotwell Pump
2MS-82	C		LIM	6" GT	NO	1050	1104	EFWP Turb. MS Supply
2MS-84	C		LIM	6" GT	NO	1050	1104	EFWP Turb. MS Supply
2HP-3	R		LIM	2.5"GL	NO	2500	2500	A LD Cooler Outlet

OMS Unit 2 Cont'd.

<u>Tag</u>	<u>Vlv. Vendor</u>	<u>Item #</u>	<u>Act. Mfg.</u>	<u>Vlv. Size Type</u>	<u>Pos.</u>	<u>Maximum Expected AP</u>	<u>As Purchased AP</u>	<u>Function</u>
2HP-4	R		LIM	2.5"GL	NO	2500	2500	B LD Cooler Outlet
2HP-20	R		LIM	4" GL	NO	2500	2500	RC Pump Seal Return to Coolers
2HP-24	P		LIM	6" GT	NC	25	320	A HPI Pump Suct. - BWST
2HP-25	P		LIM	6" GT	NC	25	320	C HPI Pump Suct. - BWST
2HP-26	R		LIM	4" GL	NC	3050	3050	A Loop Inj.
2HP-27	R		LIM	4" GL	NC	3050	3050	B Loop Inj.
2HP-409	W		LIM	4" GT	NC	2500	2500	B Loop HPI X-Connect
2HP-410	W		LIM	4" GT	NC	2500	2500	A Loop HPI X-Connect

OMS Unit 3

3FDW-347	B-W		ROT	6" GT	NO	1450	2580	EFWP Disch. to S/G 3B
3C-156	C		LIM	8" GT	NO	35	247	Cond. to EFW from UST
3C-391	C		LIM	8" GT	NC	3	15	Turb. EFWP Suct. - Hotwell Pump
3MS-82	C		LIM	6" GT	NO	1050	1104	EFWP Turb. MS Supply
3MS-84	C		LIM	6" GT	NO	1050	1104	EFWP Turb. MS Supply
3HP-3	R		LIM	2.5"GL	NO	2500	2500	A LD Cooler Outlet
3HP-4	R		LIM	2.5"GL	NO	2500	2500	B LD Cooler Outlet
3HP-20	R		LIM	4" GL	NO	2500	2500	RC Pump Seal Return to Coolers
3HP-24	P		LIM	6" GT	NC	25	320	A HPI Pump Suct. - BWST
3HP-25	P		LIM	6" GT	NC	25	320	C HPI Pump Suct. - BWST
3HP-26	R		LIM	4" GL	NC	3050	3050	A Loop Inj.
3HP-27	R		LIM	4" GL	NC	3050	3050	B Loop Inj.
3HP-409	W		LIM	4" GT	NC	2500	2500	B Loop HPI X-Connect
3HP-410	W		LIM	4" GT	NC	2500	2500	A Loop HPI X-Connect

P - Powell  
 R - Rockwell  
 C - Crane  
 B-W - Borg Warner  
 W - Westinghouse  
 Wal - Walworth

Unit 1

<u>Tag</u>	<u>Vlv. Vendor</u>	<u>Item #</u>	<u>Act. Mfg.</u>	<u>Vlv. Size Type</u>	<u>Pos.</u>	<u>Maximum Expected AP</u>	<u>As Purchased AP</u>	<u>Function</u>
1CA-7AC	WAL-G	02B-113	ROT	8" GT	NO	34	135	Aux. FWP #1 Suction
1CA-9B	WAL-G	02B-113	ROT	8" GT	NO	34	135	Aux. FWP 1B Suction
1CA-11A	WAL-G	02B-113	ROT	8" GT	NO	34	135	Aux. FWP 1A Suction
1CA-15A	WAL-G	02B-072	ROT	6" GT	NC	133	135	Aux. FWP 1A Suct. - RN Hdr. 1A
1CA-18B	WAL-G	02B-072	ROT	6" GT	NC	133	135	Aux. FWP 1B Suct. - RN Hdr. 1B
1CA-86A	WAL-G	02B-052	ROT	8" GT	NC	135	150	Aux. FWP 1B Suct. - RN Hdr. 1A
1CA-116B	WAL-G	02B-052	ROT	8" GT	NC	135	150	Aux. FWP #1 Suct. - RN Hdr. 1B
1CA-38B	B-W	06H-102	LIM	4" GT	NO	1260	1746	Aux. FWP #1 Disch. to S/G 1D
1CA-42B	WAL-G	02H-011	ROT	4" GT	NO	1255	1657	Aux. FWP 1B Disch. to S/G 1D
1CA-46B	WAL-G	02H-011	ROT	4" GT	NO	1255	1657	Aux. FWP 1B Disch. to S/G 1C
1CA-50B	B-W	06H-102	LIM	4" GT	NO	1260	1746	Aux. FWP #1 Disch. to S/G 1C
1CA-54AC	B-W	06H-102	LIM	4" GT	NO	1260	1746	Aux. FWP #1 Disch. to S/G 1B
1CA-58A	WAL-G	02H-011	ROT	4" GT	NO	1255	1672	Aux. FWP 1A Disch. to S/G 1B
1CA-62A	WAL-G	02H-011	ROT	4" GT	NO	1255	1672	Aux. FWP 1A Disch. to S/G 1A
1CA-66AC	B-W	06H-102	LIM	4" GT	NO	1260	1746	Aux. FWP #1 Disch. to S/G 1A
1NI-9A	WAL-G	04J-034	ROT	4" GT	NC	2700	2735	CCP Disch. to NC Syst.
1NI-10B	WAL-G	04J-032	ROT	4" GT	NC	2700	2735	CCP Disch. to NC Syst.
1NI-100B	WAL-A	05B-049	ROT	8" GT	NO	37	240	FWST to SI Pumps
1NI-103A	WAL-A	05B-002	ROT	6" GT	NO	195	240	SI Pump 1A Suct. from FWST
1NI-118A	WAL-G	04H-003	ROT	4" GT	NO	1515	1750	SI Pump 1A to C-Legs
1NI-121A	WAL-G	04J-003	ROT	4" GT	NC	1515	2485	SI Pump 1A to H-Legs 2 & 3
1NI-135B	WAL-A	05B-002	ROT	6" GT	NO	195	240	SI Pump 1B Suct. from FWST
1NI-136B	WAL-A	04D-008	ROT	8" GT	NC	195	600	ND Hx 1B to SI Pumps
1NI-150B	WAL-G	04H-003	ROT	4" GT	NO	1515	1750	SI Pump 1B to C-Legs
1NI-152B	WAL-G	04J-003	ROT	4" GT	NC	1515	2485	SI Pump 1B to H-Legs 1&4
1NI-183B	WAL-G	04J-009	ROT	12"GT	NC	195	2485	ND Hdr. to NC H-Legs
1NI-332A	WAL-A	05B-002	ROT	6" GT	NC	195	240	SI Pump Suct. from ND Hx A

MMS Unit 1 Cont'd.

<u>Tag</u>	<u>Vlv. Vendor</u>	<u>Item #</u>	<u>Act. Mfg.</u>	<u>Vlv. Size Type</u>	<u>Pos.</u>	<u>Maximum Expected AP</u>	<u>As Purchased AP</u>	<u>Function</u>
1NI-333B	WAL-A	05B-002	ROT	6" GT	NC	195	240	SI Pump Suct. from ND Hx A
1NI-334B	WAL-A	05B-002	ROT	6" GT	NO	195	240	SI Pump Suct. from ND Hx A
1NI-162A	WAL-G	04J-003	ROT	4" GT	NO	1515	2485	SI Pump Disch. to C-Legs
1NI-173A	WAL-G	04J-007	ROT	8" GT	NO	195	2485	ND Hdr. to NC C-Legs
1NI-178B	WAL-G	04J-007	ROT	8" GT	NO	195	2485	ND Hdr. to NC C-Legs
1NI-184B	WAL-G	04D-005	ROT	18"GT	NC	44	600	Cont. Sump Line 1B to ND pp. Suct.
1NI-185A	WAL-G	04D-005	ROT	18"GT	NC	44	600	Cont. Sump Line 1A to ND pp. Suct.
1NV-94AC	WAL-A	05B-807	ROT	4" GT	NO	150	150	Seal Wtr. Return Isol. I/S RB
1NV-95B	WAL-A	05B-809	ROT	4" GT	NO	150	150	Seal Wtr. Return Isol. O/S RB
1NV-7B	WAL-A	04D-030	ROT	3" GL	NO	600	615	Letdown Isol. O/S RB
1NV-141A	WAL-A	05B-806	ROT	4" GT	NO	100	150	VCT To Charging pp. Suct. Hdr.
1NV-142B	WAL-A	05B-806	ROT	4" GT	NO	100	150	VCT To Charging pp. Suct. Hdr.
1NV-244A	WAL-G	04J-019	ROT	3" GT	NO	2700	2735	Charging Line Isolation
1NV-245B	WAL-G	04J-030	ROT	3" GT	NO	2700	2735	Charging Line Isolation
1NV-221A	WAL-A	05B-004	ROT	8" GT	NC	195	240	FWST to CCP Suction
1NV-222B	WAL-A	05B-004	ROT	8" GT	NC	195	240	FWST to CCP Suction

MMS Unit 2

2CA-7AC	WAL-G	02B-113	ROT	8" GT	NO	34	135	Aux. FWP #2 Suction
2CA-9B	WAL-G	02B-113	ROT	8" GT	NO	34	135	Aux. FWP 2B Suction
2CA-11A	WAL-G	02B-113	ROT	8" GT	NO	34	135	Aux. FWP 2A Suction
2CA-15A	WAL-G	02B-072	ROT	6" GT	NC	133	135	Aux. FWP 2A Suct. - RN Hdr. 2A
2CA-18B	WAL-G	02B-072	ROT	6" GT	NC	133	135	Aux. FWP 2B Suct. - RN Hdr. 2B
2CA-86A	WAL-G	02B-812	ROT	8" GT	NC	135	135	Aux. FWP #2 Suct. - RN Hdr. 2A
2CA-116B	WAL-G	02B-812	ROT	8" GT	NC	135	135	Aux. FWP #2 Suct. - RN Hdr. 2B
2CA-38B	B-W	06H-102	LIM	4" GT	NO	1260	1746	Aux. FWP #2 Disch. to S/G 2D
2CA-42B	WAL-G	02H-011	ROT	4" GT	NO	1255	1657	Aux. FWP 2B Disch. to S/G 2D
2CA-46B	WAL-G	02H-011	ROT	4" GT	NO	1255	1657	Aux. FWP 2B Disch. to S/G 2C
2CA-50B	B-W	06H-102	LIM	4" GT	NO	1260	1746	Aux. FWP #2 Disch. to S/G 2C
2CA-54AC	B-W	06H-102	LIM	4" GT	NO	1260	1746	Aux. FWP #2 Disch. to S/G 2B
2CA-58A	WAL-G	02H-011	ROT	4" GT	NO	1255	1672	Aux. FWP 2A Disch. to S/G 2B
2CA-62A	WAL-G	02H-011	ROT	4" GT	NO	1255	1672	Aux. FWP 2A Disch. to S/G 2A
2CA-66AC	B-W	06H-102	LIM	4" GT	NO	1260	1746	Aux. FWP #2 Disch. to S/G 2A

MMS Unit 2 Cont'd.

<u>Tag</u>	<u>Vlv. Vendor</u>	<u>Item #</u>	<u>Act. Mfg.</u>	<u>Vlv. Size Type</u>	<u>Pos.</u>	<u>Maximum Expected AP</u>	<u>As Purchased AP</u>	<u>Function</u>
2NI-9A	WAL-G	04J-036	ROT	4" GT	NC	2700	2735	CCP Disch. to NC Syst.
2NI-10B	WAL-G	04J-036	ROT	4" GT	NC	2700	2735	CCP Disch. to NC Syst.
2NI-100B	WAL-A	05B-049	ROT	8" GT	NO	37	240	FWST to SI Pumps
2NI-103A	WAL-A	05B-002	ROT	6" GT	NO	195	240	SI Pump 2A Suct. from FWST
2NI-118A	WAL-G	04H-003	ROT	4" GT	NO	1515	1750	SI Pump 2A to C-Legs
2NI-121A	WAL-G	04J-003	ROT	4" GT	NC	1515	2485	SI Pump 2A to H-Legs 2 & 3
2NI-135B	WAL-A	05B-002	ROT	6" GT	NO	195	240	SI Pump 2B Suct. from FWST
2NI-136B	WAL-A	04D-008	ROT	8" GT	NC	195	600	ND Hx 2B to SI Pumps
2NI-150B	WAL-G	04H-003	ROT	4" GT	NO	1515	1750	SI Pump 2B to C-Legs
2NI-152B	WAL-G	04J-003	ROT	4" GT	NC	1515	2485	SI Pump 2B to H-Legs 1&4
2NI-183B	WAL-G	04J-009	ROT	12"GT	NC	195	2485	ND Hdr. to NC H-Legs
2NI-332A	WAL-A	05B-002	ROT	6" GT	NC	195	240	SI Pump Suct. from ND Hx A
2NI-333B	WAL-A	05B-002	ROT	6" GT	NC	195	240	SI Pump Suct. from ND Hx A
2NI-334B	WAL-A	05B-002	ROT	6" GT	NO	195	240	SI Pump Suct. from ND Hx A
2NI-162A	WAL-G	04J-003	ROT	4" GT	NO	1515	2485	SI Pump Disch. to C-Legs
2NI-173A	WAL-G	04J-007	ROT	8" GT	NO	195	2485	ND Hdr. to NC C-Legs
2NI-178B	WAL-G	04J-007	ROT	8" GT	NO	195	2485	ND Hdr. to NC C-Legs
2NI-184B	WAL-G	04D-005	ROT	18"GT	NC	44	600	Cont. Sump Line 2B to ND pp. Suct.
2NI-185A	WAL-G	04D-005	ROT	18"GT	NC	44	600	Cont. Sump Line 2A to ND pp. Suct.
2NV-94AC	WAL-A	05B-807	ROT	4" GT	NO	150	150	Seal Wtr. Return Isol. I/S RB
2NV-95B	WAL-A	05B-809	ROT	4" GT	NO	150	150	Seal Wtr. Return Isol. O/S RB
2NV-7B	WAL-A	04D-030	ROT	3" GL	NO	600	615	Letdown Isol. O/S RB
2NV-141A	WAL-A	05B-808	ROT	4" GT	NO	100	150	VCT To Charging pp. Suct. Hdr.
2NV-142B	WAL-A	05B-808	ROT	4" GT	NO	100	150	VCT To Charging pp. Suct. Hdr.
2NV-244A	WAL-G	04J-019	ROT	3" GT	NO	2700	2735	Charging Line Isolation
2NV-245B	WAL-G	04J-030	ROT	3" GT	NO	2700	2735	Charging Line Isolation
2NV-221A	WAL-A	05B-004	ROT	8" GT	NC	195	240	FWST to CCP Suction
2NV-222B	WAL-A	05B-004	ROT	8" GT	NC	195	240	FWST to CCP Suction

Attachment 2 - Outage Schedules

<u>Unit</u>	<u>Outage Start Date</u>
Oconee Unit 1	July 3, 1987
Oconee Unit 2	August 14, 1986
Oconee Unit 3	February 14, 1987
McGuire Unit 1	August 13, 1987
McGuire Unit 2	May 24, 1987
Catawba Unit 1	August 15, 1987
Catawba Unit 2	September 28, 1987