

ACCELERATED DISTRIBUTION DEMONSTRATION SYSTEM

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8801200042 DOC.DATE: 88/01/15 NOTARIZED: YES DOCKET #
 FACIL:STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528
 STN-50-529 Palo Verde Nuclear Station, Unit 2, Arizona Publi 05000529
 STN-50-530 Palo Verde Nuclear Station, Unit 3, Arizona Publi 05000530
 AUTH.NAME AUTHOR AFFILIATION
 VAN BRUNT,E.E. Arizona Nuclear Power Project (formerly Arizona Public Serv
 RECIP.NAME RECIPIENT AFFILIATION
 Document Control Branch (Document Control Desk)

SUBJECT:..Forwards final rept re response to IE Bulletin 85-003,
 "Motor-Operated Valve Common Mode Failures...."

DISTRIBUTION CODE: IE11D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 40pp
 TITLE: Bulletin Response (50 DKT)

NOTES:Standardized plant.
 Standardized plant.
 Standardized plant.

05000528
 05000529
 05000530

	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR ENCL
	PD5 LA	1 0	PD5 PD	1 1
	LICITRA,E	1 1	DAVIS,M	1 1
INTERNAL:	AEOD/DOA	1 1	AEOD/DSP	1 1
	AEOD/DSP/TPAB	1 1	NRR/DEST/ADE	1 1
	NRR/DEST/ADS	1 1	NRR/DEST/MEB	1 1
	NRR/DOEA/EAB	1 1	NRR/DOEA/GCB	1 1
	NRR/DREP/EPB	1 1	NRR/PMAS/ILRB	1 1
	REG FILE 02	1 1	RES/DE/EIB	1 1
	RGN5 FILE 01	1 1		
EXTERNAL:	LPDR	1 1	NRC PDR	1 1
	NSIC	1 1		
NOTES:		1 1		

R
I
D
S
/
A
D
D
S

TOTAL NUMBER OF COPIES REQUIRED: LTTR 21 ENCL 20



Arizona Nuclear Power Project

P.O. BOX 52034 • PHOENIX, ARIZONA 85072-2034

January 15, 1988
161-00745-EEVB/JBK

Docket Nos. STN-528/529/530

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

Dear Sir:


Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
NRC IE Bulletin 85-03: Motor-Operated Valve
Common Mode Failures and Improper Switch Settings
File: 87-055-026

References: (1) Letter from ANPP to U.S. NRC (Subject:
Same; ANPP-37192-EEVB/JBK/98.05; dated June
30, 1986).
(2) Letter to ANPP from U.S. NRC (Subject:
Same; dated September 17, 1986).
(3) Letter from ANPP to U.S. NRC (Subject:
Same; ANPP-38862-JGH/JBK/98.05; dated
October 27, 1986).
(4) Letter from ANPP to U.S. NRC (Subject:
Same; 161-00213-JGH/JBK; dated May 15, 1987).
(5) Letter to ANPP from U.S. NRC (Subject:
Same; dated June 30, 1987).
(6) Letter from ANPP to U.S. NRC (Subject:
Same; 161-00420-JGH/JBK; dated August 3,
1987).

Reference (1) contained ANPP's response to Item e in the subject bulletin. Reference (2) requested further clarification for two specific areas within Reference (1). Reference (3) provided clarification regarding the two specific areas. Reference (4) revised ANPP's scheduler commitment's provided in Reference (1). Reference (5) requested further information for four items within Reference (1) and (3). Reference (6) provided the information requested by Reference (5).

This Letter and Attachments provide ANPP's final report for completion of each item in the subject bulletin.

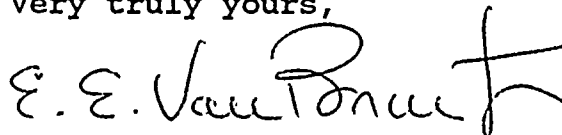
8801200042 880115
PDR ADOCK 05000528
Q DCD



U. S. Nuclear Regulatory Commission
Page 2

If you have any questions or require additional information, do not hesitate to call.

Very truly yours,

A handwritten signature in dark ink, appearing to read "E. E. Van Brunt, Jr.", with a stylized flourish at the end.

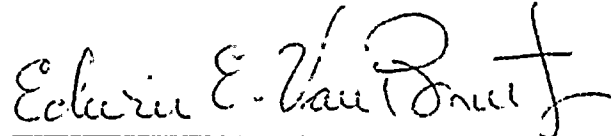
E. E. Van Brunt, Jr.
Executive Vice President
Project Director

EEVB/JBK/dlm
Attachments


cc: O. M. De Michele (all w/a)
A. C. Gehr
E. A. Licitra
J. B. Martin
J. R. Ball

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Edwin E. Van Brunt, Jr., represent that I am Executive Vice President, Project Director of Arizona Nuclear Power Project, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.


Edwin E. Van Brunt, Jr.

Sworn to before me this 15 day of January, 1988. *n. mador 1/15/88*


Notary Public

My Commission Expires:

My Commission Expires April 6, 1991

ATTACHMENT A
ANPP RESPONSES TO BULLETIN ITEMS

1461K/0049K

For motor-operated valves in the high pressure coolant injection/core spray and emergency feedwater systems (RCIC for BWRs) that are required to be tested for operational readiness in accordance with 10 CFR 50.55a(g), develop and implement a program to ensure that valve operator switches are selected, set and maintained properly. This should include the following components:

NRC Item a

- a. Review and document the design basis for the operation of each valve. This documentation should include the maximum differential pressure expected during both opening and closing the valve for both normal and abnormal events to the extent that these valve operations and events are included in the existing, approved design basis, (i.e., the design basis documented in pertinent license submittals such as FSAR analyses and fully-approved operating and emergency procedures, etc.). When determining the maximum differential pressure, those single equipment failures and inadvertent equipment operations (such as inadvertent valve closures or openings) that are within the plant design basis should be assumed.

PVNGS Response

ANPP has completed the design basis review for the operation of each motor-operated valve in the Auxiliary Feedwater (AFW) and High Pressure Safety Injection (HPSI) systems for Palo Verde Units 1, 2, and 3. The system valve data summary for each unit is presented in Attachment B.

The Differential Pressure values for each valve listed in Attachment B were determined by a review of the design basis events documented in the PVNGS FSAR/CESSAR, and the normal and emergency operating procedures. Particular derivations and assumptions are documented in calculations for the AFW system and HPSI system. For the AFW system, the maximum differential pressure for each valve is determined using the most severe design basis event (i.e., the design basis event which imposes maximum differential pressure at the valve) coupled with sufficient conservatism (e.g., frictionless flow). For the HPSI system, the maximum differential pressure is also determined using the most severe design basis event coupled with sufficient conservatism.

Water hammer due to valve closure is considered to not be a concern with respect to developing the differential pressures for each IEB 85-03 motor-operated valve. Based on flowrates at time of valve closure and slow valve closure times, any flow induced water hammer pressure waves are believed to be low magnitude and within the design limits of the piping system.

This position is consistent with the analysis described in NUREG-0582, "Water Hammer in Nuclear Power Plants." Therefore, water hammer effects were not included in the maximum differential pressure calculations.

NRC Item b

- b. Using the results from item a above, establish the correct switch settings. This shall include a program to review and revise, as necessary, the methods for selecting and setting all switches (i.e., torque, torque bypass, position limit, overload) for each valve operation (opening and closing).

If the licensee determines that a valve is inoperable, the licensee shall also make an appropriate justification for continued operation in accordance with the applicable technical specification.

PVNGS Response

Using the results from Item a, switch settings for each motor-operated valve were determined using a switch setting procedure. The final switch settings are provided in Attachment B for each motor-operated valve.

NRC Item c

- c. Individual valve settings shall be changed, as appropriate, to those established in item b, above. Whether the valve setting is changed or not, the valve will be demonstrated to be operable by testing the valve at the maximum differential pressure determined in item a above with the exception that testing motor-operated valves under conditions simulating a break in the line containing the valve is not required. Otherwise, justification should include the alternative to maximum differential pressure testing which will be used to verify the correct settings.

Note: This bulletin is not intended to establish a requirement for valve testing for the condition simulating a break in the line containing the valve. However, to the extent that such valve operation is relied upon in the design basis, a break in the line containing the valve should be considered in the analyses prescribed in items a and b above. The resulting switch settings for pipe break conditions should be verified, to the extent practical, by the same methods that would be used to verify other settings (if any) that are not tested at the maximum differential pressure.

Each valve shall be stroke tested, to the extent practical, to verify that the settings defined in item b above have been properly implemented even if testing with differential cannot be performed.

PVNGS Response

Individual valve settings were changed, as appropriate, to those established in Item b and in accordance with switch setting policies established in ANPP procedures.

A MOVATS static test was performed on all motor-operated valves within the scope of Bulletin 85-03. A differential pressure test was performed on a representative sample for each valve group listed in Attachment D. Each valve group consists of valves of the same type, size, motor actuator size and actuator motor voltage. Attachment B indicates the specific valves which were differential pressure tested and other pertinent information for each motor-operated valve. Attachment C provides a summary of the abnormalities which were corrected as a result of the Bulletin.

NRC Item d

- d. Prepare or revise procedures to ensure that correct switch settings are determined and maintained throughout the life of the plant.* Ensure that applicable industry recommendations are considered in the preparation of these procedures.

PVNGS Response

Procedures for correct motor-operator switch setting determination, and maintenance of this information throughout the life of the plant, have been established as part of ANPP's "Valve Motor Operator Monitoring and Test Program."

* This item is intended to be completely consistent with action item 3.2, "Post-Maintenance Testing (All Other Safety-Related Components)," of Generic Letter 83-28, "Required Action Based on Generic Implications of Salem ATWS Events." These procedures should include provisions to monitor valve performance to ensure the switch settings are correct. This is particularly important if the torque or torque bypass switch setting has been significantly raised above that required.

NRC Item e

- e. Within 180 days of the date of this bulletin, submit a written report to the NRC that: (1) reports the results of item a and (2) contains the program to accomplish items b through d above including a schedule for completion of these items.
 - 1. For plants with an OL, the schedule shall ensure that these items are completed as soon as practical and within two years from the date of this bulletin.
 - 2. For plants with a CP, this schedule shall ensure that these items are completed before the scheduled date for OL issuance or within two years from the date of this bulletin, whichever is later.

PVNGS Response

- (1) ANPP has completed the design basis review for the operation of each motor-operated valve in the AFW and HPSI systems.
- (2) Items a through d have been completed and are summarized in this report.

NRC Item f

- f. Provide a written report on completion of the above program. This report should provide (1) a verification of completion of the request 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. The NRC staff intends to use this data to assist in the resolution of Generic Issue II.E.6.1. This report shall be submitted to the NRC within 60 days of completion of the program. Table 2 should be expanded, if appropriate, to include a summary of all data required to evaluate the response to this bulletin.

PVNGS Response

ANPP submits this letter as a final report for completion of Items a through d. Summaries of findings and data are contained in Attachments B and C.

NRC Question

Although no specific request or requirement is intended, the time required to complete each action item above would be helpful to the NRC in evaluating the cost of this bulletin.

PVNGS Response

As of May 23, 1986, the estimated time expenditure on each action item is summarized below:

Item a:

ANPP - Over 1500 man-hours
Vendors - Over 1500 man-hours

Item b:

ANPP - Over 1500 man-hours*
Vendors - Over 1200 man-hours

Item c:

ANPP - Over 1500 man-hours
Vendors - Over 1100 man-hours

Item d:

ANPP - 800 man-hours
Vendors - 400 man-hours

Item e:

ANPP - 400 man-hours
Vendors - 200 man-hours

*Includes time expenditure for NRC IE Module 35743
Motor-Operated Valve Maintenance Program begun in Fall of 1983.

ATTACHMENT B
VALVE DATA SUMMARY
FOR
AFW AND HPSI
FOR PALO VERDE UNITS 1, 2 AND 3

Notes:

1. N.A. = The designation N.A. under the heading of maximum differential pressure indicates there is no safety impact in the specified mode of operation.
2. 1, 2, and 3 JAFHV 0054 (which is spring closed) has been determined to be outside the scope of IEB 85-03 since the safety related function is to close and this is accomplished with the stored energy of a spring and not the electric motor actuator.
3. No differential pressure test required due to system configuration. This MOV is required to close for system isolation during zero differential pressure conditions. Proper operation was verified during static testing.
4. The rating of the Limitorque SHC-04-7.5 is based on motor torque capability not valve operator thrust.
5. Due to conservative construction Limitorque allows actuator output thrust values to exceed published rated value by 10%.
6. During the performance of torque switch adjustment (TSA) a change in philosophy was adapted. At first specific thrust values were targeted requiring multiple tests. The later guideline was changed to adjust for required thrust plus margin up to actuator rating.
7. Abbreviations Defined

Aux F.W. Reg	Auxiliary Feed Water Regulator Valve
Aux F.W. Isol	Auxiliary Feed Water Isolation Valve
PPA to SG1	Pump A to Number 1 Steam Generator
PPB to SG2	Pump B to Number 2 Steam Generator
AFPP	Auxiliary Feed Water Pump
RWT	Refueling Water Storage Tank
HPSI	High Pressure Safety Injection

8. Torque switches are not actuated during the first 20 to 25% of valve stroke or rotation when the valve is moving in the open direction. This provides opening forces as high as those associated with the actuator motor stall torque. After initial opening, valve stroking force drops rapidly and lower torque switch settings are appropriate.
9. The closing forces for torque seating of the auxiliary feedwater isolation valves (1, 2, & 3 JAF-UV-0034, 0035, 0036, and 0037) as determined by test on 1JAFUV-0036 and 3JAFUV-0035 have been reduced by position stopping rather than torque seating ensuring these valves open (which is the safety-related function) during worst case accident conditions.

PVNGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

UNIT # 1

Valve Number	Valve Operator:		Maximum	As-Found	As-Left	Test Diff. Pres.	Satis-
Manufacturer	Manufacturer		Design	Torque Sw. Trip	Torque Sw. Trip	Measured Thrust	factory
Model	Model		Differential	Thurst Equiv't.	Thrust Equiv't.	Required For	Test
Type/Size	Motor RPM	Valve	Pressure (PSID):	Opening/Closing	Opening/Closing	Opening/Closing	Results
Body Rating	Ratings (LBS)	Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
1JAFBHV-0030	Limiterque	Aux FW Reg	1,740/1,740	4,350/3,850	5,220/6,700	See Valve No.	Yes
CCI	SMB-00-15	Valve: PPB to				1JAFAHV-0032	
EXG9-X3-X6P6	3600 RPM	SG1					
Globe/4"	14,000						
900 lb.							
1JAFBHV-0031	Limiterque	Aux FW Reg	1,740/1,740	5,600/4,560	6,120/6,680	See Valve No.	Yes
CCI	SMB-00-15	Valve: PPB				1JAFAHV-0032	
EXG9-X3-X6P6	3600 RPM	to SG2					
Globe/4"	14,000						
900 lb.							
1JAFAHV-0032	Limiterque	Aux. FW Reg	1,810/1,810	8,800/8,800	10,600/10,460	1800 PSID	
CCI	SMB-00-15	Valve: PPA					
EXG9-X3-X6P6	1900 RPM	to SG1				4846 lbs/4846 lbs	Yes
Globe/4"	14,000						
900 lb.							
1JAFCHV-0033	Limiterque	Aux FW Reg	1,810/1,810	8,680/15,340	12,810/11,680	See Valve No.	
CCI	SMB-00-15	Valve: PPA				1JAFAHV-0032	Yes
EXG9-X3-X6P6	1900 RPM	to SG2					
Globe/4"	14,000						
900 lb.							
1JAFBHV-0034	Limiterque	Aux FW Iso1	1,740/1,740	8,730/9,131	11,820/11,340	See Valve No.	
Anch/Dar	SMB-00-25	Valve: PPB			See Note 9	3JAFBHV-0035	Yes
5746	1700 RPM	to SG1					
Gate/6"	14,000						
900 lb.							

PVNGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

UNIT # 1

Valve Number	Valve Operator:		Maximum	As-Found	As-Left	Test Diff. Pres.	Satis-
Manufacturer	Manufacturer		Design	Torque Sw. Trip	Torque Sw. Trip	Measured Thrust	factory
Model	Model		Differential	Thurst Equiv't.	Thrust Equiv't.	Required For	Test
Type/Size	Motor RPM	Valve	Pressure (PSID):	Opening/Closing	Opening/Closing	Opening/Closing	Results
Body Rating	Ratings (LBS)	Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
1JAFBUIV-0035	Limiterorque	Aux FW Iso1	1,740/1,740	8,670/5,730	9,200/9,320	See Valve No.	
Anch-Dar	SMB-00-25	Valve: PPB			See Note 8&9	3JAFBUIV-0035	N.A.
5746	1700 RPM	to SG2					
Gate/6"	14,000						
900 lb.							
1JAFUIV-0036	Limiterorque	Aux FW Iso1	1,810./1,810	Spring Pk/5,605	9,500/9,840	1800 PSID	
Anch/Dar	SMB-00-25	Valve: PPA		Shift	See Note 9	8,620/10,160	Yes
5746	1900 RPM	to SG1					
Gate/6"	14,000						
900 lb.							
1JAFUIV-0037	Limiterorque	Aux FW Iso1	1,810/1,810	11,380/13,880	9,680/11,240	See Valve No.	
Anch/Dar	SMB-00-25	Valve: PPA				1JAFUIV-0036	Yes
5746	1900 RPM	to SG2					
Gate/6"	14,000						
900 lb.							
1JAFUIV-0054	Limiterorque	Aux FW	NA/1,355	7,040/7,400	7,020/7,360	See Note 2	Yes
Gimpel	SMB-000	Turbine Trip	Note 1				
GS-N	1900 RPM	Valve					
Globe/4"	8,000						
900 lb.							
1JSGUIV-0134	Limiterorque	SG2 Steam	1,355/NA	10,900/9,260	21,980/16,200	See Valve No.	
Anch/Dar	SB-0-40	To AF PP	Note 1			2JSGUIV-0138	Yes
	1900 RPM	Turbine					
Gate/6"	24,000						
900 lb.							

PVNGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

UNIT # 1

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip	As-Left Torque Sw. Trip	Test Diff. Pres.	Satisfactory
Manufacturer Model	Manufacturer Model			Thrust Equiv't.	Thrust Equiv't.	Measured Thrust Required For	Test Results
Type/Size	Motor RPM	Valve Function	Pressure (PSID):	Opening/Closing	Opening/Closing	Opening/Closing	
Body Rating	Ratings (LBS)		Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
1JSGAUV-0138	Limiter	SG2 Steam	1,355/NA	11,060/22,300	23,900/21,980	See Valve No.	
Anch/Dar	SB-0-40	To AF PP	Note 1			2JSGAUV-0138	Yes
Gate/6"	1900 RPM	Turbine					
900 lb.	24,000						

PVHGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

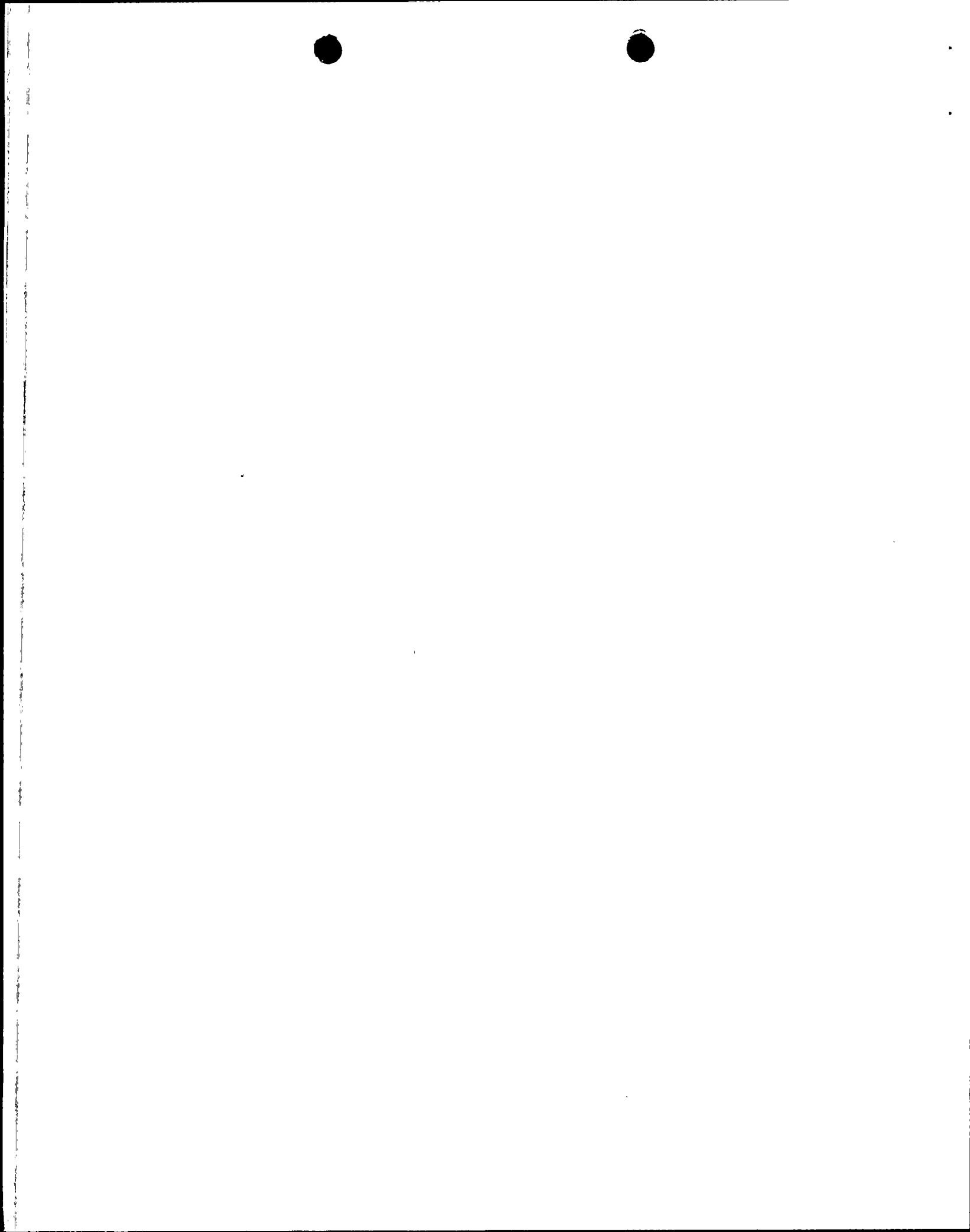
UNIT # 2

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip Thurst Equiv't.	As-Left Torque Sw. Trip Thurst Equiv't.	Test Diff. Pres. Measured Thrust Required For Opening/Closing	Satisfactory Test Results
Manufacturer Model Type/Size Body Rating	Manufacturer Model Motor RPM Ratings (LBS)	Valve Function	Pressure (PSID): Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
2JAFBHV-0030 CCI EXG9-X3-X6P6 Globe/4" 900 lb.	Limiterque SMB-00-15 3600 RPM 14,000	Aux FW Reg Valve: PPB to SG1	1,740/1,740	4,655/5,540	8,060/6,200	See Valve No. 1JAFAHV-0032	Yes
2JAFBHV-0031 CCI EXG9-X3-X6P6 Globe/4" 900 lb.	Limiterque SMB-00-15 3600 RPM 14,000	Aux FW Reg Valve: PPB to SG2	1,740/1,740	3,920/3,140	9,520/8,200	See Valve No. 1JAFAHV-0032	Yes
2JAFAHV-0032 CCI EXG9-X3-X6P6 Globe/4" 900 lb.	Limiterque SMB-00-15 1900 RPM 14,000	Aux. FW Reg Valve: PPA to SG1	1,810/1,810	7,200/8,000	11,740/13,000	See Valve No. 1JAFAHV-0032	Yes
2JAFCHV-0033 CCI EXG9-X3-X6P6 Globe/4" 900 lb.	Limiterque SMB-00-15 1900 RPM 14,000	Aux FW Reg Valve: PPA to SG2	1,810/1,810	9,093/11,045	12,500/12,820	See Valve No. 1JAFAHV-0032	Yes
2JAFBUV-0034 Anch/Dar 5746 Gate/6" 900 lb.	Limiterque SMB-00-25 1700 RPM 14,000	Aux FW Iso1 Valve: PPB to SG1	1,740/1,740	9,740/8,652	8,820/10,640 See Note 8&9	See Valve No. 3JAFBUV-0035	Yes

PVNGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

UNIT # 2

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque SW. Trip Thurst Equiv't.	As-Left Torque SW. Trip Thurst Equiv't.	Test Diff. Pres. Measured Thrust Required For Opening/Closing	Satisfactory Test Results
Manufacturer Model	Manufacturer Model	Valve Function	Pressure (PSID): Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
2JAFBUIV-0035	Limiterque	Aux FW Isol	1,740/1,740	14,651/12,351	10,660/10,500	See Valve No. 3JAFBUIV-0035	Yes
Anch-Dar	SMB-00-25	Valve: PPB			See Note 9		
5746	1700 RPM	to SG2					
Gate/6"	14,000						
900 lb.							
2JAFUIV-0036	Limiterque	Aux FW Isol	1,810/1,810	11,855/12,920	8,360/9,940	See Valve No. 1JAFUIV-0036	Yes
Anch/Dar	SMB-00-25	Valve: PPA			See Note 8&9		
5746	1900 RPM	to SG1					
Gate/6"	14,000						
900 lb.							
2JAFUIV-0037	Limiterque	Aux FW Isol	1,810/1,810	10,830/15,038	11,640/15,038	See Valve No. 1JAFUIV-0036	Yes
Anch/Dar	SMB-00-25	Valve: PPA			See Note 5		
5746	1900 RPM	to SG2					
Gate/6"	14,000						
900 lb.							
2JAFUIV-0054	Limiterque	Aux FW	NA/1,355	4,792/6,518	3,840/3,130	See Note 2	Yes
Gimpel	SMB-000	Turbine Trip	Note 1				
GS-N	1900 RPM	Valve					
Globe/4"	8,000						
900 lb.							
2JSGUIV-0134	Limiterque	SG1 Steam	1,355/NA	16,553/12,457	21,600/15,750	See Valve No. 2JSGUIV-0138	Yes
Anch/Dar	SB-0-40	to AF PP	Note 1				
5746	1900 RPM	Turbine					
Gate/6"	24,000						
900 lb.							



PVNGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

UNIT # 2

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thrust Equiv't. Opening/Closing	As-Left Torque Sw. Trip Thrust Equiv't. Opening/Closing	Test Diff. Pres. Measured Thrust Required For Opening/Closing	Satisfactory Test Results
Manufacturer Model	Manufacturer Model	Valve Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
2JSGAUV-0138	Limitorque	SG2 Steam	1,355/NA	16,680/18,220	22,060/17,020	1050 PSID	Yes
Anch/Dar	SB-0-40	To AF PP	Note 1			Test Data	
5746	1900 RPM	Turbine				Extrapolated to	
Gate/6"	24,000					1355 PSID	
900 lb.						11,086/6,020	

PVNGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

UNIT # 3

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	As-Left Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	Test Diff. Pres. Measured Thrust Required For Opening/Closing (LBS) / (LBS)	Satisfactory Test Results Yes/No
Manufacturer Model	Manufacturer Model	Valve Function					
Type/Size	Motor RPM						
Body Rating	Ratings (LBS)						
3JAFBHV-0030	Limiterorque	Aux FW Reg	1,740/1,740	4,210/5,130	4,732/5,250	See Valve No. 1JAFAHV-0032	Yes
CCI	SMB-00-15	Valve: PPB to					
EXG9-X3-X6P6	3600 RPM	SG1					
Globe/4"	14,000						
900 lb.							
3JAFBHV-0031	Limiterorque	Aux FW Reg	1,740/1,740	5,640/5,480	5,640/5,780	1,800 PSID	Yes
CCI	SMB-00-15	Valve: PPB				4940/5420	
EXG9-X3-X6P6	3600 RPM	to SG2					
Globe/4"	14,000						
900 lb.							
3JAFAHV-0032	Limiterorque	Aux. FW Reg	1,810/1,810	12,260/10,320	12,260/10,320	See Valve No. 1JAFAHV-0032	Yes
CCI	SMB-00-15	Valve: PPA					
EXG9-X3-X6P6	1900 RPM	to SG1					
Globe/4"	14,000						
900 lb.							
3JAFCHV-0033	Limiterorque	Aux FW Reg	1,810/1,810	9,340/14,140	16,720/17,560	See Valve No. 1JAFAHV-0032	Yes
CCI	SMB-00-15	Valve: PPA			See Note 5		
EXG9-X3-X6P6	1900 RPM	to SG2					
Globe/4"	14,000						
900 lb.							
3JAFBUV-0034	Limiterorque	Aux FW Iso1	1,740/1,740	9,200/14,140	12,340/12,000	See Valve No. 3JAFBUV-0035	Yes
Anch/Dar	SMB-00-25	Valve: PPB			See Note 9		
5746	1700 RPM	to SG1					
Gate/6"	14,000						
900 lb.							

PVNGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

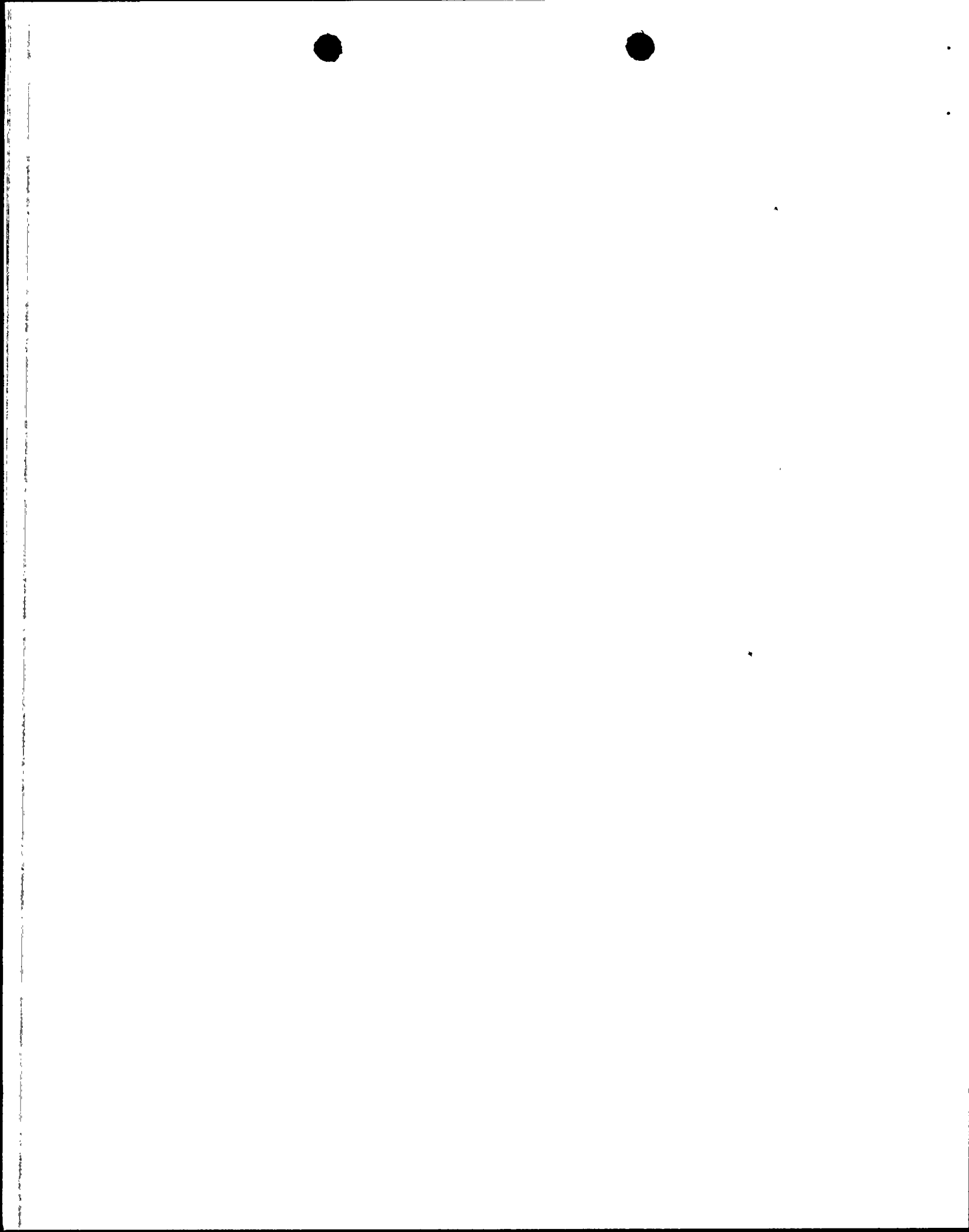
UNIT # 3

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	As-Left Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	Test Diff. Pres. Measured Thrust Required For Opening/Closing (LBS) / (LBS)	Satisfactory Test Results Yes/No
Manufacturer Model Type/Size Body Rating	Manufacturer Model Motor RPM Ratings (LBS)	Valve Function	Opening/Closing				
3JAFBUV-0035 Anch-Dar 5746 Gate/6" 900 lb.	Limitorque SHB-00-25 1700 RPM 14,000	Aux FW Iso1 Valve: PPB to SG2	1,740/1,740	12,320/15,120	10,260/10,540 See Note 9	1,800 PSID 9,375/13,350	Yes
3JAFCUV-0036 Anch/Dar 5746 Gate/6" 900 lb.	Limitorque SHB-00-25 1900 RPM 14,000	Aux FW Iso1 Valve: PPA to SG1	1,810/1,810	8,603/10,157	11,820/12,520 See Note 9	See Valve No. 1JAFCUV-0036	Yes
3JAFUUV-0037 Anch/Dar 5746 Gate/6" 900 lb.	Limitorque SHB-00-25 1900 RPM 14,000	Aux FW Iso1 Valve: PPA to SG2	1,810/1,810	9,480/8,200	12,240/12,100 See Note 9	See Valve No. 1JAFCUV-0036	Yes
3JAFHUV-0054 Gimpel GS-N Globe/4" 900 lb.	Limitorque SHB-000 1900 RPM 8,000	Aux FW Turbine Trip Valve	NA/1,355 Note 1	6,560/6,400	4,100/3,760	See Note 2	Yes
3JSGAUV-0134 Anch/Dar 5746 Gate/6" 900 lb.	Limitorque SB-0-40 1900 RPM 24,000	SG1 Steam to AF PP Turbine	1,355/NA Note 1	10,550/13,390	20,685/17,560	See Valve No. 2JSGAUV-0138	Yes

PVNGS AUXILIARY FEEDWATER SYSTEM VALVE DATA SUMMARY

UNIT # 3

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	As-Left Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	Test Diff. Pres. Measured Thrust Required For Opening/Closing (LBS) / (LBS)	Satisfactory Test Results Yes/No
Manufacturer Model	Manufacturer Model	Valve Function	Opening/Closing				
3JSGAUV-0138	Limitorque	SG2 Steam	1,355/NA	19,150/10,390	20,840/18,600	See Valve No. 2JSGAUV-0138	Yes
Anch/Dar	SB-0-40	To AF PP	Note 1				
5746	1900 RPM	Turbine					
Gate/6"	24,000						
900 lb.							



PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

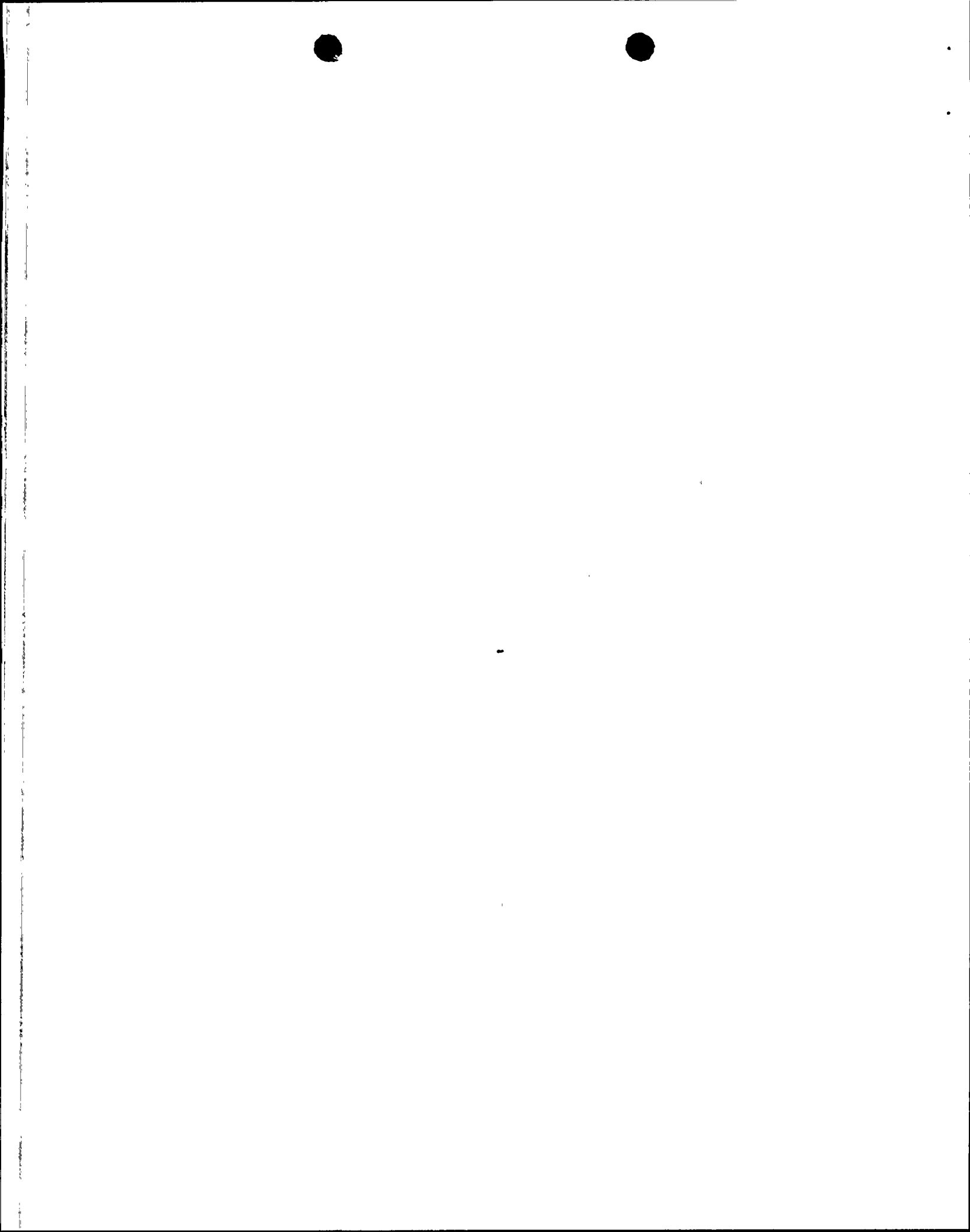
UNIT # 1

Valve Number	Valve Operator:		Maximum	As-Found	As-Left	Test Diff. Pres.	Satis-
Manufacturer	Manufacturer		Design	Torque Sw. Trip	Torque Sw. Trip	Measured Thrust	factory
Model	Model		Differential	Thurst Equiv't.	Thrust Equiv't.	Required For	Test
Type/Size	Motor RPM	Valve	Pressure (PSID):	Opening/Closing	Opening/Closing	Opening/Closing	Results
Body Rating	Ratings (LBS)	Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
1JCHBHV-0530 Borg-Warner 77890-1 Gate/20" 300 lb.	Limiterorque SB-1-60 3455 RPM 45,000	RWT Suction Isolation	NA/44 See Note 1	55,656/49,750	9,580/10,680	See Note 3 Stroke Test Performed	Yes
1JCHAHV-0531 Borg-Warner 77890-1 Gate/20" 300 lb.	Limiterorque SB-1-60 3455 RPM 45,000	RWT Suction Isolation	NA/44 See Note 1	56,300/50,340	25,574/24,140 See Note #6	See Note 3 Stroke Test Performed	Yes
1JSIAUV-0673 Posi-Seal 14336-3 Butterfly/24" 150 lb.	Limiterorque SMB-00-10 1700 RPM 14,000	Containment Sump Suction Isolation	57/NA See Note 1	1,296 ft-lbs/ 1,468 ft-lbs	1,468 ft-lbs/ 1,511 ft/lbs See Note 8	See Valve No. 3JSIAUV-0673	Yes
1JSIAUV-0674 Posi-Seal 14336-4 Butterfly/24" 150 lb.	Limiterorque SMB-00-10 1700 RPM 14,000	Containment Sump Suction Isolation	100/NA See Note 1	1,196 ft-lbs/ 999 ft-lbs	1,463 ft-lbs/ 1,451 ft-lbs See Note 8	See Valve No. 3JSIAUV-0673	Yes
1JSIBUV-0675 Posi-Seal 14336 Butterfly/24" 150 lb.	Limiterorque SMB-00-10 1700 RPM 14,000	Containment Sump Suction Isolation	57/NA See Note 1	1,236 ft-lbs/ 1,181 ft-lbs	1,422 ft-lbs/ 1,453 ft-lbs See Note 8	See Valve No. 3JSIAUV-0673	Yes

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 1

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip	As-Left Torque Sw. Trip	Test Diff. Pres.	Satisfactory
Manufacturer	Manufacturer			Thrust Equiv't.	Thrust Equiv't.	Measured Thrust Required For	Test Results
Model	Model	Valve Function	Pressure (PSID):	Opening/Closing	Opening/Closing	Opening/Closing	Results
Type/Size	Motor RPM		Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
Body Rating	Ratings (LBS)						
1JSIBUV-0676	Limitorque	Containment	100/NA	1,278 ft-lbs/	1,479 ft-lbs/	See Valve No.	
Posi-Seal	SMB-00-10	Sump	See Note 1	1,447 ft-lbs	1,545 ft-lbs	3JSIAUV-0673	Yes
14336-4	1700 RPM	Suction			See Note 8		
Butterfly/24"	14,000	Isolation					
1500 lb.							
1JSIAUV-0666	Limitorque	HPSI Pump	NA/1,966	9,700/10,260	9,700/10,260	See Valve No.	
Borg-Warner	SMC-04-7.5	Miniflow	See Note 1			3JSIBUV-0616	Yes
77620-2	1800 RPM	Recirc Line					
Y-Globe/2"	See Note 4	Isolation					
1500 lb.							
1JSIBUV-0667	Limitorque	HPSI Pump	NA/1,966	14,860/13,420	11,380/11,860	See Valve No.	
Borg-Warner	SMC-04-7.5	Miniflow	See Note 1			3JSIBUV-0616	Yes
77620-2	1800 RPM	Recirc Line					
Y-Globe/2"	See Note 4	Isolation					
1500 lb.							
1JSICHV-0321	Limitorque	Hot Leg	1,924/1,924	42,232/19,580	22,580/18,400	See Valve No.	
Borg-Warner	SMB-0-25	Injection				3JSIDHV-0331	Yes
79530	1900 RPM	Flow Control					
Y-Globe/3"	24,000						
1500 lb.							
1JSIDHV-0331	Limitorque	Hot Leg	1,925/1,924	30,060/44,826	9,000/13,960	See Valve No.	
Borg-Warner	SMB-0-25	Injection				3JSIDHV-0331	Yes
79530	1900 RPM	Flow Control					
Y-Globe/3"	24,000						
1500 lb.							



PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 1

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip	As-Left Torque Sw. Trip	Test Diff. Pres. Measured Thrust	Satisfactory Test Results
Manufacturer	Manufacturer		Pressure (PSID):	Opening/Closing	Opening/Closing	Opening/Closing	
Model	Model	Valve Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
Type/Size	Motor RPM						
Body Rating	Ratings (LBS)						
1JSIAHV-0604	Limiterque	Hot Leg	1,945/1,400	5,880/6,400	9,000/13,960	See Valve No. 3JSIAHV-0604	Yes
Borg-Warner	SMB-00-10	Injection					
77910	1800 RPM	Flow Control					
Gate/3"	14,000						
1500 lb.							
1JSIBHV-0609	Limiterque	Hot Leg	1,945/1,400	5,640/5,700	12,660/13,900	See Valve No. 3JSIAHV-0604	Yes
Borg-Warner	SMB-00-10	Injection					
77910	1800 RPM	Flow Control					
Gate/3"	14,000						
1500 lb.							
1JSIAHV-0698	Limiterque	HPSI Train	1,100/1,100	15,940/16,380	14,360/13,080	See Valve No. 3JSIAHV-0698	Yes
Borg-Warner	SMB-0-10	Isolation					
77740	1700 RPM						
Gate/4"	24,000						
1500 lb.							
1JSIBHV-0699	Limiterque	HPSI Train	1,100/1,100	17,900/18,020	18,520/17,720	See Valve No. 3JSIAHV-0698	Yes
Borg-Warner	SMB-0-10	Isolation					
77740	1700 RPM						
Gate/4"	24,000						
1500 lb.							
1JSIBUV-0616	Limiterque	HPSI Header	1,924/1,924	11,280/10,320	11,280/10,320	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner	SHC-04-7.5	Isolation and					
77620-2	1800 RPM	Throttling					
Y-Globe/2"	See Note 4						
1500 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 1

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque SW. Trip Thrust Equiv't. Opening/Closing (LBS) / (LBS)	As-Left Torque SW. Trip Thrust Equiv't. Opening/Closing (LBS) / (LBS)	Test Diff. Pres. Measured Thrust Required For Opening/Closing (LBS) / (LBS)	Satisfactory Test Results Yes/No
Manufacturer Model Type/Size Body Rating	Manufacturer Model Motor RPM Ratings (LBS)	Valve Function	Opening/Closing				
1JSIAUV-0617 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SHC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	8,815/8,416	8,815/8,416	See Valve No. 3JSIBUV-0616	Yes
1JSIBUV-0626 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SHC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	8,420/7,340	8,815/8,620	See Valve No. 3JSIBUV-0616	Yes
1JSIAUV-0627 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SHC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	9,740/7,340	9,740/8,620	See Valve No. 3JSIBUV-0616	Yes
1JSIBUV-0636 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SHC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	10,980/10,200	10,980/10,200	See Valve No. 3JSIBUV-0616	Yes
1JSIAUV-0637 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SHC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	9,700/10,860	9,700/10,860	See Valve No. 3JSIBUV-0616	YES

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 1

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip	As-Left Torque Sw. Trip	Test Diff. Pres. Measured Thrust	Satisfactory Test Results
Manufacturer Model	Manufacturer Model	Valve Function	Pressure (PSID): Opening/Closing	Thrust Equiv't. Opening/Closing (LBS) / (LBS)	Thrust Equiv't. Opening/Closing (LBS) / (LBS)	Required For Opening/Closing (LBS) / (LBS)	Yes/No
1JSIBUV-0646	Limitorque	HPSI Header	1,924/1,924	11,900/12,329	11,900/12,329	See Valve No. 3JSIBUV-0616	YES
Borg-Warner	SMC-04-7.5	Isolation and					
77620-2	1800 RPM	Throttling					
Y-Globe/2"	See Note 4						
1500 lb.							
1JSIAUV-0647	Limitorque	HPSI Header	1,924/1,924	9,120/11,320	9,120/11,320	See Valve No. 3JSIBUV-0616	YES
Borg-Warner	SMC-04-7.5	Isolation and					
77620-2	1800 RPM	Throttling					
Y-Globe/2"	See Note 4						
1500 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 2

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thurst Equiv't. Opening/Closing	As-Left Torque Sw. Trip Thurst Equiv't. Opening/Closing	Test Diff. Pres. Measured Thrust Required For Opening/Closing	Satisfactory Test Results
Manufacturer Model	Manufacturer Model	Valve Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
2JCHBHV-0530	Limitorque SB-1-60	RWT Suction Isolation	NA/44 See Note 1	50,000/50,000	10,620/8,200	See Note 3 Stroke Test Performed	Yes
Borg-Warner 77890-1	3455 RPM						
Gate/20"	45,000						
300 lb.							
2JCHAHV-0531	Limitorque SB-1-60	RWT Suction Isolation	NA/44 See Note 1	20,492/28,685	10,140/7,380	See Note 3 Stroke Test Performed	Yes
Borg-Warner 77890-1	3455 RPM						
Gate/20"	45,000						
300 lb.							
2JSIAUV-0673	Limitorque SHB-00-10	Containment Sump Suction Isolation	57/NA See Note 1	1,185 ft-lbs/ 1,214 ft-lbs	1,532 ft-lbs/ 1,587 ft-lbs See Note 8	See Valve No. 3JSIAUV-0673	Yes
Posi-Seal 14336-3	1700 RPM						
Butterfly/24"	14,000						
150 lb.							
2JSIAUV-0674	Limitorque SHB-00-10	Containment Sump Suction Isolation	100/NA See Note 1	964 ft-lbs/ 877 ft-lbs	1,500 ft-lbs/ 1,569 ft-lbs See Note 8	See Valve No. 3JSIAUV-0673	Yes
Posi-Seal 14336-4	1700 RPM						
Butterfly/24"	14,000						
150 lb.							
2JSIBUV-0675	Limitorque SHB-00-10	Containment Sump Suction Isolation	57/NA See Note 1	1,410 ft-lbs/ 1,245 ft-lbs	1,418 ft-lbs/ 1,557 ft-lbs See Note 8	See Valve No. 3JSIAUV-0673	Yes
Posi-Seal 14336	1700 RPM						
Butterfly/24"							
150 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 2

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	As-Left Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	Test Diff. Pres. Measured Thrust Required For Opening/Closing (LBS) / (LBS)	Satisfactory Test Results Yes/No
Manufacturer Model	Manufacturer Model	Valve Function					
Type/Size	Motor RPM						
Body Rating	Ratings (LBS)						
2JSIBUV-0676	Limitorque	Containment	100/NA	769 ft-lbs/	1,870 ft-lbs/	See Valve No.	
Posi-Seal	SHB-00-10	Sump	See Note 1	1,296 ft-lbs	1,708 ft-lbs	3JSIAUV-0673	Yes
14336-4	1700 RPM	Suction			See Note 8		
Butterfly/24	14,000	Isolation					
150 lb.							
2JSIAUV-0666	Limitorque	HPSI Pump	NA/1,966	8,540/8,973	8,540/8,973	See Valve No.	
Borg-Warner	SMC-04-7.5	Miniflow	See Note 1			3JSIBUV-0616	Yes
77620-2	1800 RPM	Recirc Line					
Y-Globe/2"	See Note 4	Isolation					
1500 lb.							
2JSIBUV-0667	Limitorque	HPSI Pump	NA/1,966	8,447/8,660	8,447/8,660	See Valve No.	
Borg-Warner	SMC-04-7.5	Miniflow	See Note 1			3JSIBUV-0616	Yes
77620-2	1800 RPM	Recirc Line					
Y-Globe/2"	See Note 4	Isolation					
1500 lb.							
2JSIDHV-0321	Limitorque	Hot Leg	1,924/1,924	19,200/19,300	16,460/15,020	See Valve No.	
Borg-Warner	SHB-0-25	Injection				3JSIDHV-0331	Yes
79530	1900 RPM	Flow Control					
Y-Globe/3"	24,000						
1500 lb.							
2JSIDHV-0331	Limitorque	Hot Leg	1,924/1,924	29,930/24,293	25,080/25,940	See Valve No.	
Borg-Warner	SHB-0-25	Injection				3JSIDHV-0331	Yes
79530	1900 RPM	Flow Control			See Note 5		
Y-Globe/3"	24,000						
1500 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 2

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip	As-Left Torque Sw. Trip	Test Diff. Pres. Measured Thrust	Satisfactory Test Results
Manufacturer Model	Manufacturer Model	Valve Function	Pressure (PSID):	Thrust Equiv't. Opening/Closing	Thrust Equiv't. Opening/Closing	Required For Opening/Closing	Yes/No
Type/Size	Motor RPM		Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	
Body Rating	Ratings (LBS)						
2JSIAHV-0604	Limiterque	Hot Leg	1,945/1,400	1,685/1,665	9,460/14,120	See Valve No. 3JSIAHV-0604	Yes
Borg-Warner	SMB-00-10	Injection			See Note 5		
77910	1800 RPM	Flow Control					
Gate/3"	14,000						
1500 lb.							
2JSIBHV-0609	Limiterque	Hot Leg	1,945/1,400	6,640/9,002	12,760/14,320	See Valve No. 3JSIAHV-0604	Yes
Borg-Warner	SMB-00-10	Injection			See Note 5		
77910	1800 RPM	Flow Control					
Gate/3"	14,000						
1500 lb.							
2JSIAHV-0698	Limiterque	HPSI Train	1,100/1,100	27,500/27,500	12,920/13,200	See Valve No. 3JSIAHV-0698	Yes
Borg-Warner	SMB-0-10	Isolation					
77740	1700 RPM						
Gate/4"	24,000						
1500 lb.							
2JSIBHV-0699	Limiterque	HPSI Train	1,100/1,100	34,000/18,809	11,380/10,980	See Valve No. 3JSIAHV-0698	Yes
Borg-Warner	SMB-0-10	Isolation					
77740	1700 RPM						
Gate/4"	24,000						
1500 lb.							
2JSIBUV-0616	Limiterque	HPSI Header	1,924/1,924	9,140/8,980	9,140/8,980	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner	SHC-04-7.5	Isolation and					
77620-2	1800 RPM	Throttling					
Y-Globe/2"	See Note 4						
1500 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 2

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thrust Equiv't. Opening/Closing	As-Left Torque Sw. Trip Thrust Equiv't. Opening/Closing	Test Diff. Pres. Measured Thrust Required For Opening/Closing	Satisfactory Test Results
Manufacturer Model	Manufacturer Model	Valve Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
2JSIAUV-0617	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	9,900/9,743	9,900/9,743	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner 77620-2 Y-Globe/2" 1500 lb.							
2JSIBUV-0626	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	10,934/10,589	10,934/10,589	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner 77620-2 Y-Globe/2" 1500 lb.							
2JSIAUV-0627	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	11,460/10,740	11,460/10,740	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner 77620-2 Y-Globe/2" 1500 lb.							
2JSIBUV-0636	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	8,560/8,740	8,560/8,740	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner 77620-2 Y-Globe/2" 1500 lb.							
2JSIAUV-0637	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	10,143/9820	10,013/9,805	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner 77620-2 Y-Globe/2" 1500 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 2

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	As-Left Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	Test Diff. Pres. Measured Thrust Required For Opening/Closing (LBS) / (LBS)	Satisfactory Test Results Yes/No
2JSIBUV-0646	Limitorque	HPSI Header	1,924/1,924	7,821/7,163	8,443/9,030	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner	SMC-04-7.5	Isolation and					
77620-2	1800 RPM	Throttling					
Y-Globe/2"	See Note 4						
1500 lb.							
2JSIAUV-0647	Limitorque	HPSI Header	1,924/1,924	9,765/9,009	9,100/10,120	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner	SMC-04-7.5	Isolation and					
77620-2	1800 RPM	Throttling					
Y-Globe/2"	See Note 4						
1500 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 3

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip	As-Left Torque Sw. Trip	Test Diff. Pres.	Satisfactory
Manufacturer	Manufacturer			Thrust Equiv't.	Thrust Equiv't.	Measured Thrust	Test
Model	Model	Valve	Pressure (PSID):	Opening/Closing	Opening/Closing	Required For	Results
Type/Size	Motor RPM	Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	Opening/Closing	Yes/No
Body Rating	Ratings (LBS)					(LBS) / (LBS)	
3JCHBHV-0530	Limiterque	RWT Suction	NA/44	70,400/77,450	8,958/9,720	See Note 3	Yes
Borg-Warner	SB-1-60	Isolation	See Note 1			Stroke Test	
77890-1	3455 RPM					Performed	
Gate/20"	45,000						
300 lb.							
3JCHAHV-0531	Limiterque	RWT Suction	NA/44	41,450/35,350	10,784/10,784	See Note 3	Yes
Borg-Warner	SB-1-60	Isolation	See Note 1			Stroke Test	
77890-1	3455 RPM					Performed	
Gate/20"	45,000						
300 lb.							
3JSIAUV-0673	Limiterque	Containment	57/NA	1,319 ft-lbs/	1,820 ft-lbs/	95 PSID	Yes
Posi-Seal	SMB-00-10	Sump	See Note 1	1,208 ft-lbs	1,803 ft-lbs	2,016 ft-lbs/	
14336-3	1700 RPM	Suction			See Note 8	333 ft-lbs	
Butterfly/24	14,000	Isolation					
150 lb.							
3JSIAUV-0674	Limiterque	Containment	100/NA	504 ft-lbs/	1,688 ft-lbs/	See Valve No.	Yes
Posi-Seal	SMB-00-10	Sump	See Note 1	672 ft-lbs	1,616 ft-lbs	3JSIAUV-0673	
14336-4	1700 RPM	Suction			See Note 8		
Butterfly/24	14,000	Isolation					
150 lb.							
3JSIBUV-0675	Limiterque	Containment	57/NA	1,256 ft-lbs/	1,688 ft-lbs/	See Valve No.	Yes
Posi-Seal	SMB-00-10	Sump	See Note 1	1,013 ft-lbs	1,567 ft-lbs	3JSIAUV-0673	
14336	1700 RPM	Suction			See Note 8		
Butterfly/24	14,000	Isolation					
150 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

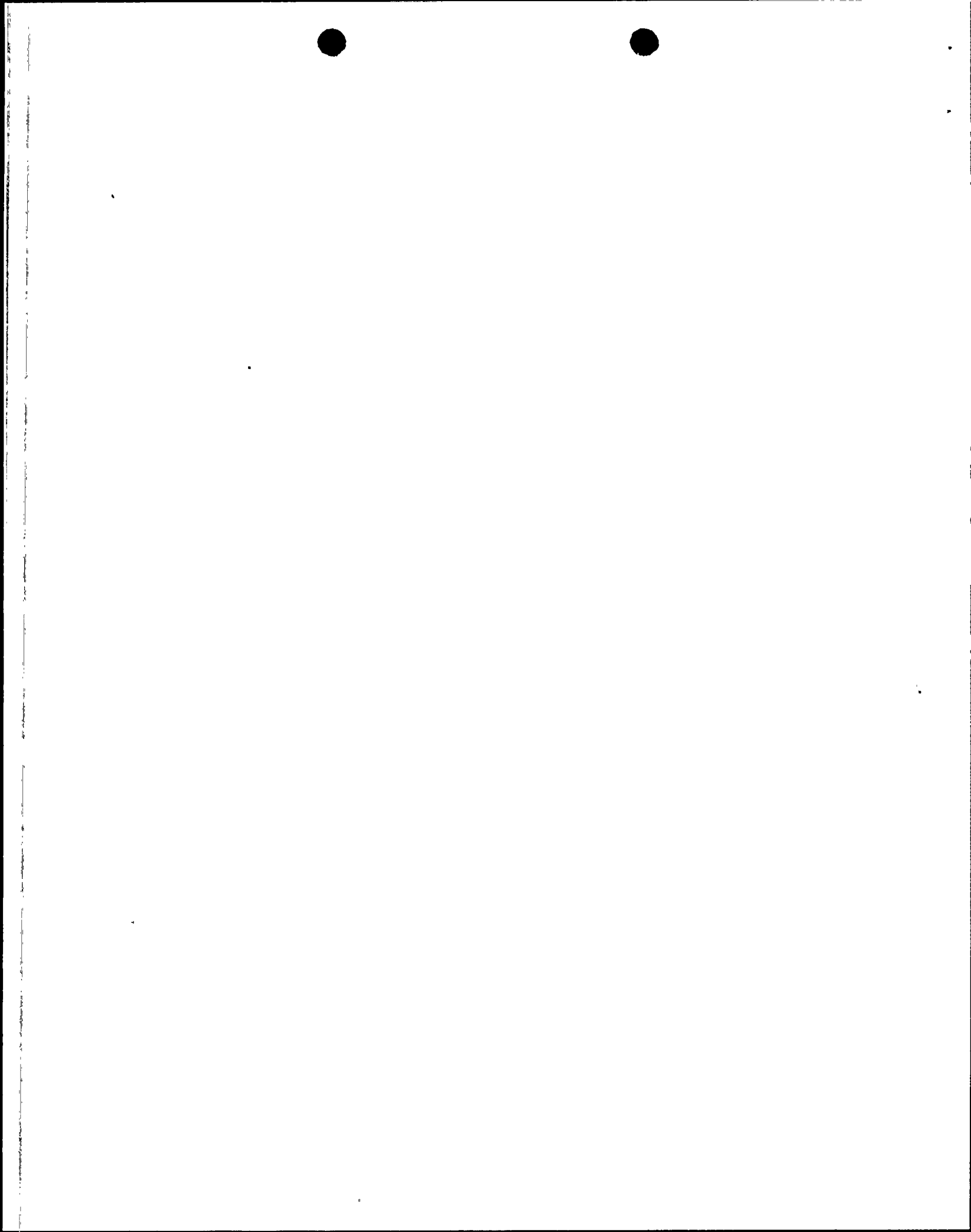
UNIT # 3

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip	As-Left Torque Sw. Trip	Test Diff. Pres. Measured Thrust	Satisfactory
Manufacturer	Manufacturer			Thurst Equiv't.	Thrust Equiv't.	Required For	Test
Model	Model	Valve	Pressure (PSID):	Opening/Closing	Opening/Closing	Opening/Closing	Results
Type/Size	Motor RPM	Function	Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	(LBS) / (LBS)	Yes/No
Body Rating	Ratings (LBS)						
3JSIBUV-0676	Limiterque	Containment	100/NA	1,056 ft-lbs/	1,515 ft-lbs/	See Valve No.	
Posi-Seal	SMB-00-10	Sump	See Note 1	1,233 ft-lbs	1,466 ft-lbs	3JSIAUV-0673	Yes
14336-4	1700 RPM	Suction			See Note 8		
Butterfly/24	14,000	Isolation					
1500 lb.							
3JSIAUV-0666	Limiterque	HPSI Pump	NA/1,966	8,440/7,040	8,960/8,780	See Valve No.	
Borg-Warner	SMC-04-7.5	Miniflow	See Note 1			3JSIBUV-0616	Yes
77620-2	1800 RPM	Recirc Line					
Y-Globe/2"	See Note 4	Isolation					
1500 lb.							
3JSIBUV-0667	Limiterque	HPSI Pump	NA/1,966	6,050/5,680	6,476/7,164	See Valve No.	
Borg-Warner	SMC-04-7.5	Miniflow	See Note 1			3JSIBUV-0616	Yes
77620-2	1800 RPM	Recirc Line					
Y-Globe/2"	See Note 4	Isolation					
1500 lb.							
3JSICHV-0321	Limiterque	Hot Leg	1,924/1,924	25,175/20,860	20,860/7580	See Valve No.	
Borg-Warner	SMB-0-25	Injection				3JSIDHV-0331	Yes
79530	1900 RPM	Flow Control					
Y-Globe/3"	24,000						
1500 lb.							
3JSIDHV-0331	Limiterque	Hot Leg	1,924/1,924	18,991/38,305	17,220/4,900	1,920 PSID	
Borg-Warner	SMB-0-25	Injection				10,320/2,500	Yes
79530	1900 RPM	Flow Control					
Y-Globe/3"	24,000						
1500 lb.							

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 3

Valve Number	Valve Operator:		Maximum Design Differential	As-Found Torque Sw. Trip	As-Left Torque Sw. Trip	Test Diff. Pres.	Satisfactory
Manufacturer	Manufacturer			Thrust Equiv't.	Thrust Equiv't.	Measured Thrust	Test
Model	Model	Valve Function	Pressure (PSID):	Opening/Closing	Opening/Closing	Required For	Results
Type/Size	Motor RPM		Opening/Closing	(LBS) / (LBS)	(LBS) / (LBS)	Opening/Closing	Yes/No
Body Rating	Ratings (LBS)					(LBS) / (LBS)	
3JSIAHV-0604	Limitorque	Hot Leg	1,945/1,400	9,150/10,345	8,000/13,780	1,920 PSID Open	
Borg-Warner	SHB-00-10	Injection				1,745 PSID	
77910	1800 RPM	Flow Control				Closed	
Gate/3"	14,000					Test Data	Yes
1500 lb.						Extrapolated to	
						1,945 PSID Open	
						7,800/12,580	
3JSIBHV-0609	Limitorque	Hot Leg	1,945/1,400	9,345/11,465	9,980/13,980	See Valve No.	
Borg-Warner	SHB-00-10	Injection				3JSIAHV-0604	Yes
77910	1800 RPM	Flow Control					
Gate/3"	14,000						
1500 lb.							
3JSIAHV-0698	Limitorque	HPSI Train	1,100/1,100	23,320/18,880	13,410/10,701	1,500 PSID	
Borg-Warner	SHB-0-10	Isolation					Yes
77740	1700 RPM					3,620/8,240	
Gate/4"	24,000						
1500 lb.							
3JSIBHV-0699	Limitorque	HPSI Train	1,100/1,100	26,991/19,478	12,220/11,800	See Valve No.	
Borg-Warner	SHB-0-10	Isolation				3JSIAHV-0698	Yes
77740	1700 RPM						
Gate/4"	24,000						
1500 lb.							
3JSIBUV-0616	Limitorque	HPSI Header	1,924/1,924	8,300/7,240	8,520/8,760	1835 PSID	
Borg-Warner	SHC-04-7.5	Isolation and				Test Data	
77620-2	1800 RPM	Throttling				Extrapolated to	Yes
Y-Globe/2"	See Note 4					1,924 PSID	
1500 lb.							
						905/6,450	



PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 3

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	As-Left Torque Sw. Trip Thurst Equiv't. Opening/Closing (LBS) / (LBS)	Test Diff. Pres. Measured Thrust Required For Opening/Closing (LBS) / (LBS)	Satisfactory Test Results Yes/No
Manufacturer Model Type/Size Body Rating	Manufacturer Model Motor RPM Ratings (LBS)	Valve Function	Opening/Closing				
3JSIAUV-0617 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	11,720/11,220	9,240/9,180	See Valve No. 3JSIBUV-0616	Yes
3JSIBUV-0626 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	8,692/7,922	8,961/8,942	See Valve No. 3JSIBUV-0616	Yes
3JSIAUV-0627 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	10,660/11,580	10,660/11,580	See Valve No. 3JSIBUV-0616	Yes
3JSIBUV-0636 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	7,940/8,730	6,800/9,830	See Valve No. 3JSIBUV-0616	Yes
3JSIAUV-0637 Borg-Warner 77620-2 Y-Globe/2" 1500 lb.	Limitorque SMC-04-7.5 1800 RPM See Note 4	HPSI Header Isolation and Throttling	1,924/1,924	7,220/7,740	9,080/8,920	See Valve No. 3JSIBUV-0616	Yes

PVNGS HIGH PRESSURE SAFETY INJECTION SYSTEM VALVE DATA SUMMARY

UNIT # 3

Valve Number	Valve Operator:		Maximum Design Differential Pressure (PSID):	As-Found Torque Sw. Trip Thrust Equiv't. Opening/Closing (LBS) / (LBS)	As-Left Torque Sw. Trip Thrust Equiv't. Opening/Closing (LBS) / (LBS)	Test Diff. Pres. Measured Thrust Required For Opening/Closing (LBS) / (LBS)	Satisfactory Test Results Yes/No
3JSIBUV-0646	Limitorque	HPSI Header	1,924/1,924	8,500/10,780	9,040/8,640	See Valve No. 3JSIBUV-0616	Yes
Borg-Warner	SMC-04-7.5	Isolation and					
77620-2	1800 RPM	Throttling					
Y-Globe/2"	See Note 4						
1500 lb.							
3JSIAUV-0647	Limitorque	HPSI Header	1,924/1,924	9,800/9,200	8,560/8,560	See Value No. 3JSIBUV-0616	Yes
Borg-Warner	SMC-04-7.5	Isolation and					
77620-2	1800 RPM	Throttling					
Y-Globe/2"	See Note 4						
1500 lb.							

ATTACHMENT C

SUMMARY TABLE OF ABNORMALITIES

Deficiency	Number of Occurrences
Bypass Switch Improperly Set	5
Incorrect Thrust	19
Unbalanced Torque Switch	6
Valve Backseated	9
High Motor Current	3
Torque Switch Abnormalities	23
Excessive Grease in Spring Pack	28
Loose Stem Nut Lock Nut	2
Spring Pack Abnormalities	14
Limit Switch Abnormalities	1

NOTE:

The data above is based on 99 MOVs in the 3 PVNGS Units.

ATTACHMENT D

PVNGS IEB 85-03 VALVE GROUPS

Borg-Warner Globe		Borg-Warner Gate		
2"	3"	3"	4"	20"
SIBUV-616*	SICHV-321	SIAHV-604*	SIABV-698*	CHBHV-530
SIBUV-617	SIDHV-331*	SIBHV-609	SIBHV-699	CHAHV-531
SIBUV-626				
SIAUV-627				
SIBUV-636				
SIAUV-637				
SIBUV-646				
SIAUV-647				
SIAUV-666				
SIBUV-667				See Note 3 On Attach- ment B

ANCH-DAR	GIMPEL	CCI	POSI-SEAL
6"	4"	4"	Butterfly 24"
AFAUV-034	AFAHV-054	AFBHV-030	SIAUV-673*
AFBHV-035*		AFBHV-031*	SIAUV-674
AFCUV-036*		AFAHV-032*	SIBUV-675
AFAUV-037		AFCHV-033	SIBUV-676
SGAUV-134	See Note 2 on		
SGAUV-138*	Attachment B		

*Each tag number indicated has been differential pressure tested.

