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SORENSEN,G.C. Washington Public Power Supply System
RECIP.NAME RECIPIENT AFFILIATION
SCHWENCER,A. Licensing Branch 2

SUBJECT: Forwards addl data re results of operability testing performed on purge & vent valves.Package should replace data in Attachment H of 831219 submittal.

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Washington Public Power Supply System
P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

May 18, 1984
G02-84-300

Docket No 50-397

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Licensing Branch No. 2
Division of Licensing
U.S Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Schwencer:

Subject: NUCLEAR PROJECT NO. 2
QUALIFICATION AND OPERATION OF WNP-2
CONTAINMENT VENT AND PURGE VALVES

Reference: Letter, G02-83-1170, G. C. Sorensen (Supply System) to A. Schwencer (NRC), "Qualification and Operation of WNP-2 Containment Purge and Vent Valves", dated December 19, 1983

This letter transmits additional data concerning the results of operability testing performed on the WNP-2 purge and vent valves. This information was recently requested by Mr. Rudy Hodor of Brookhaven National Laboratory.

The attached package should replace data in Attachment H of our December 19, 1983, submittal. Test data on one valve had inadvertently been omitted.

Should you have any further questions, please contact Mr. P. L. Powell, Manager, WNP-2 Licensing.

Very truly yours,

G. C. Sorensen, Manager
Regulatory Programs

DAA/sms
Attachment

cc: R Auluck - NRC
WS Chin - BPA
F Eltawila - NRC
R Hodor - Brookhaven NL
D Hoffman - NRC
AD Toth - NRC Site
R Wright - NRC

A034
1/1

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ATTACHMENT TO LETTER G02-84-300

ATTACHMENT H - REVISED 5/2/84

QUALIFICATION OF PURGE AND VENT VALVES AT WNP-2

PACKAGE REPLACES DATA IN ATTACHMENT H OF VOLUME V

PREVIOUSLY SUBMITTED TO NRC ON LETTER

G02-83-1170, DECEMBER 19, 1983

PREPARED BY: Milon Meyer 5-11-84
Milon Meyer

REVIEWED BY: Dennis Armstrong 5/11/84
Dennis Armstrong

APPROVED BY: J.E. Rhoads 5/14/84
J.E. Rhoads

Volume V, Attachment H

In-Situ Test Results

Demonstration of valve assembly operability was exhibited by both stress analysis and the conduct of operability testing. The purpose of this attachment is to complement the discussion of operability presented in Volume I, Section 6.0, of this report with final as-built piping analysis accelerations.

Discussion of Valve Accelerations/Loading

Eleven BIF butterfly valves at WNP-2 were divided into three categories. Those similar in size and function were grouped. Eight of these (two groups) are the purge and vent valves, which are the subject of this report, and three valves (CSP-V-5, -6, and -9) are part of the vacuum relief system. One valve from each group was chosen based on accessibility and tested to envelop loads.

Initial test plans were established from as-designed piping analysis loads. Since some final as-built piping accelerations were provided after the initial test plans, the applied test loads may not be the same. A comparison of final as-built piping loads, Exhibit 1, to static test loads shows that test conditions envelop the predicted seismic/hydrodynamic loading. Supporting calculations for determination of static test loads are provided in Exhibit 2.

Test Plan/Results

As previously discussed, the test consisted of applying a static load to the outboard end of the air/spring cylinder. This static load was applied to the pneumatic cylinders by using a cable supported platform loaded with lead bricks. Measurement of total applied load was made with a load cell linked into the cable. Test plans and results are provided by Exhibit 3 and 4.

Summary of Exhibits

- Exhibit 1 - Test Load/Acceleration Summary
- Exhibit 2 - Supporting Calculations for Determination of Test Loads
- Exhibit 3 - Static In-Situ Test of CSP-AO-1
- Exhibit 4 - Static In-Situ Test of CEP-AO-4A
- Exhibit 5 - Summary of Final As-built Piping Accelerations

EXHIBIT 1

Test Load/Acceleration Summary

30" Valve with 10" Cylinder - Fail Close Configuration

Dynamic Valve Operator Loading Using Final As-built Piping Accelerations		Static Test Conditions	
EPN	G-Level	Test "g"	Equivalent Static Load
CEP-V-1A	2.9	4.44	1110 lb.
CEP-V-2A	2.41		
CSP-V-1	4.32		
CSP-V-2	4.29		

24" Valve with 8" Cylinder - Fail Close Configuration

Dynamic Valve Operator Loading Using Final As-built Piping Accelerations		Static Test Conditions	
EPN	G-Level	Test "g"	Equivalent Static Load
CEP-V-3A	1.55	5.12	820 lb.
CEP-V-4A	2.28		
CSP-V-3	4.92		
CSP-V-4	5.08		

24" Valve with 8" Cylinder - Fail Open Configuration

Valve EPNs CSP-V-5, CSP-V-6, and CSP-V-9 are vacuum breaker valves and not considered part of the purge and vent system.

EXHIBIT 2 - 018001

WASHINGTON PUBLIC POWER SUPPLY SYSTEM

CALCULATION COVER SHEET

SHEET 1 OF 10

PROJECT	DISCIPLINE	CALC. NO.
02	EQUIPMENT QUALIFICATION	EQ-02-83-018001-2
CONTRACT	**SPECIFICATION**	**QUALITY CLASS**
		I
SYSTEM NO.	**EQUIPMENT PIECE NO.**	
	CSP-AO-3 ; CSP-AO-5 ; CSP-AO-1	

SUBJECT

DETERMINATION OF OPERABILITY TEST LOAD.

ACTION REQUIRED

☐ SAR CHANGE ☐ SPEC. CHANGE ☒ OTHER (IDENTIFY BELOW)

DESIGN ADEQUACY

ATTACHMENTS

☐ COMPUTER PRINTOUT ☐ VERIFICATION CHECKLIST

OTHER (IDENTIFY)

VERIFICATION REQUIREMENT	YES	NO	REASON	APPROVED/DATE
	☐	☒	TDP-3.32	

TYPE OF CALCULATION

☐ PRELIMINARY

☐ FINAL

REMARKS

SUPERSEDES

SUPERSEDED BY

REV. NO.	REVISION DESCRIPTION	CALCULATION BY	DATE	CHECKED	DATE	APPROVED	DATE
0	ORIGINAL	J.M. Stockton	11/2/83	L.C. FERNANDEZ	11/4/83	[signature]	12/5/83

WP-603 R4

2 0 0 8 2 6

REVISION INDICATIONS

QID 018001

A) OPERABILITY TEST CSP-AO-5

8" DIA CYLINDER AIR OPERATOR - FAIL OPEN

OPERATOR WEIGHT - 420# (ACTUAL WEIGHT - ②)

THIS ANALYSIS WILL DETERMINE THE LOAD AND POINT OF APPLICATION TO QUALIFY CSP-AO-5, -6, AND -9 (QID 018001) FOR OPERABILITY UNDER FAULTED CONDITIONS.

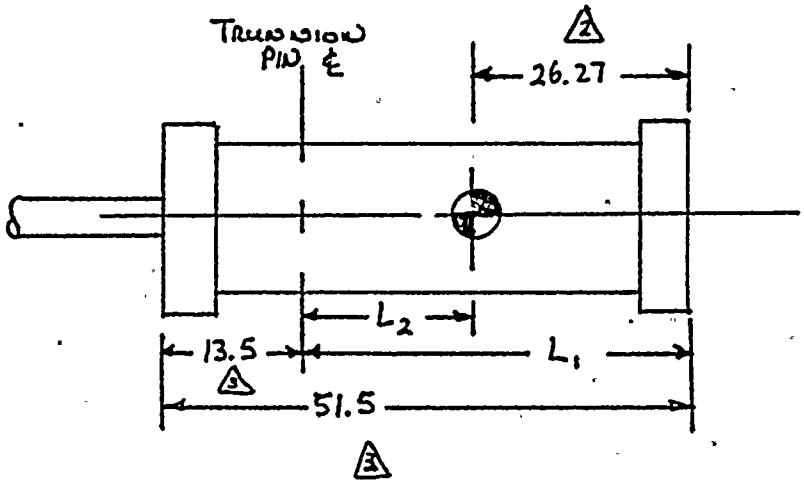


FIG. 1

$$\overrightarrow{F_{CG}}_{⑤} = g_{max} \text{ (TABLE 1)} \text{ (CYLINDER WEIGHT)}$$

$$= 8.74\,(420) = 3671\ \#$$

$$\overrightarrow{F_{TEST}}_{⑤} = \overrightarrow{F_{CG}}\,\frac{L_2}{L_1}$$

CHECKED (INITIALS/DATE)

LCF 11/4/83

REVISION INDICATIONS

FROM THE LOAD COMPARATIVE SHEETS AND THE PLANT WALKDOWNS (QID 361104 AND QID 361106), THE SRSS OF THE TWO AXES WHICH EFFECT THE OPERATOR WEAK AXIS ARE DETERMINED

TABLE 1

QID	EPN	g max
361104	CSP-V-3	4.92
	CSP-V-4	5.12
	CEP-V-3A	1.55
	CEP-V-4A	2.28
	CSP-V-5	8.74
	CSP-V-6	6.73
	CSP-V-9	3.18
361106	CSP-V-1	4.44
	CSP-V-2	4.29
	CEP-V-1A	2.90
	CEP-V-2A	2.41

FOR CSP-AO-5

$L_1 = 51.5 - 13.5 = 38''$

$L_2 = L_1 - 26.27 = 38 - 26.27 = 11.73$

$\Rightarrow \overrightarrow{F_{TEST}}_{(5)} = \frac{(3671)(11.73)}{38} \cong 1140^{\#}$

SEE PAGE 8 OF 10 FOR POINT OF APPLICATION.

CHECKED (INITIALS/DATE)

LCF 11/4/83

REVISION INDICATIONS

B) OPERABILITY TEST CSP-AO-4

8" DIA CYLINDER AIR OPERATOR - FAIL CLOSED

OPERATOR WEIGHT - 420# (ACTUAL WEIGHT - △)

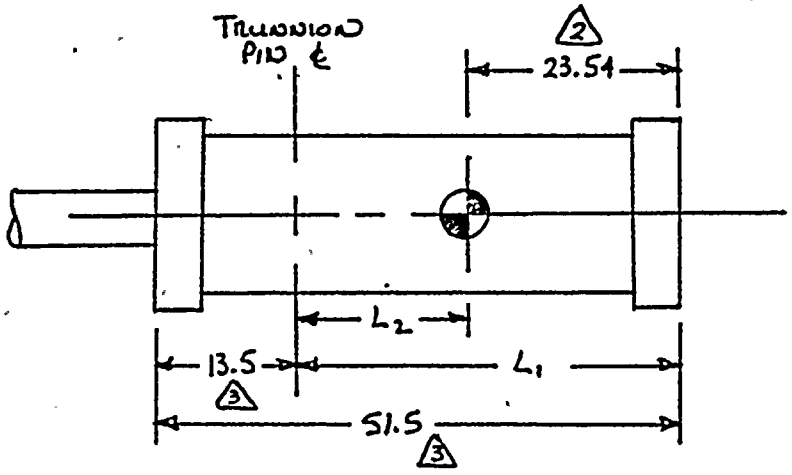


FIG 2

$\overrightarrow{F_{CG④}} = g_{max}$ (CYLINDER WEIGHT) (TABLE 1)

$= (5.12)(420) \cong 2150\#$

$L_1 = 51.5 - 13.5 = 38"$

$L_2 = L_1 - 23.54 = 38 - 23.54 = 14.46"$

$\overrightarrow{F_{TEST④}} = \overrightarrow{F_{CG④}} \frac{L_2}{L_1} = \frac{(2150)(14.46)}{38} \cong \underline{820\#}$

SEE PAGE 9 OF 10 FOR POINT OF APPLICATION.

CHECKED (INITIALS/DATE)

LCF 11/4/83

REVISION INDICATIONS

c) OPERABILITY TEST CSP-AO-1

10" DIA CYLINDER AIR OPERATOR - FAIL CLOSED

OPERATOR WEIGHT - 593 # (2)

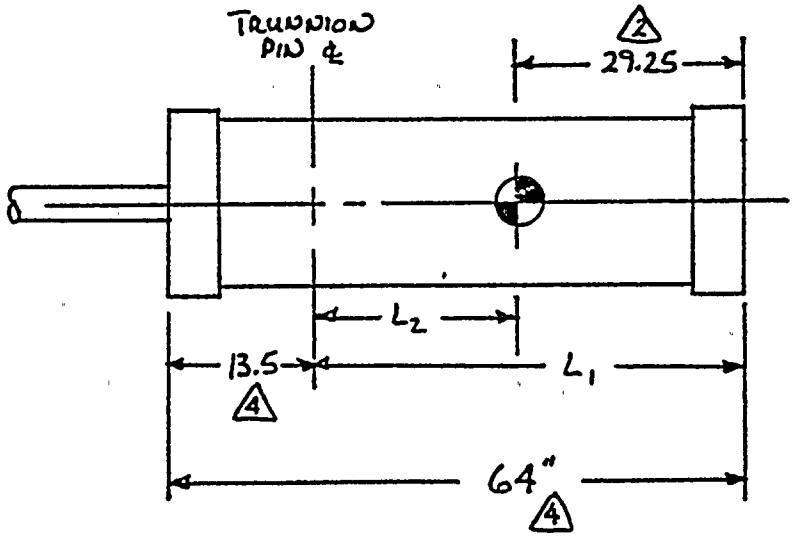


FIG 3

$\overrightarrow{F_{CG_{①}}} = g_{max}$ (TABLE 1) (CYLINDER WEIGHT)

$= (4.44)(593) = 2633\ \#$

$L_1 = 64 - 13.5 = 50.5"$

$L_2 = L_1 - 29.25 = 50.5 - 29.25 = 21.25$

$\overrightarrow{F_{TEST_{①}}} = \overrightarrow{F_{CG_{①}}} \frac{L_2}{L_1} = \frac{(2633)(21.25)}{50.5} \cong \underline{1110\ \#}$

SEE PAGE 10 OF 10 FOR POINT OF APPLICATION

CHECKED (INITIALS/DATE)

LCF 11/4/83

REVISION INDICATIONS

IF POSSIBLE, CSP-AO-1 WILL BE QUALIFIED BY THE TEST ON CSP-AO-4. IN ORDER FOR TEST OF AO-3 TO ENVELOPE AO-1, THE TEST LOAD MUST BE INCREASED AS FOLLOWS:

$$\overrightarrow{F_{TEST_{④}}} = F_{CG_{①}} \frac{L_1}{L_2}$$

$$= \frac{(2633)(14.46)}{38} \simeq \underline{\underline{1005}}\ \#$$

CHECKED (INITIALS/DATE)

LCF 11/4/83

REVISION INDICATIONS

REFERENCES

1. WNP-2 FINAL LOADS STUDY, QID-018001 AO's AND THEIR RESPECTIVE VALVE ASSEMBLIES

2. EQUIPMENT SEISMIC/HYDRODYNAMIC REQUALIFICATION 8", 10", 12" BORE AIR CYLINDER OPERATORS QID 018001, # 1P.01/F CYGNA ENERGY SERVICES 5/20/83

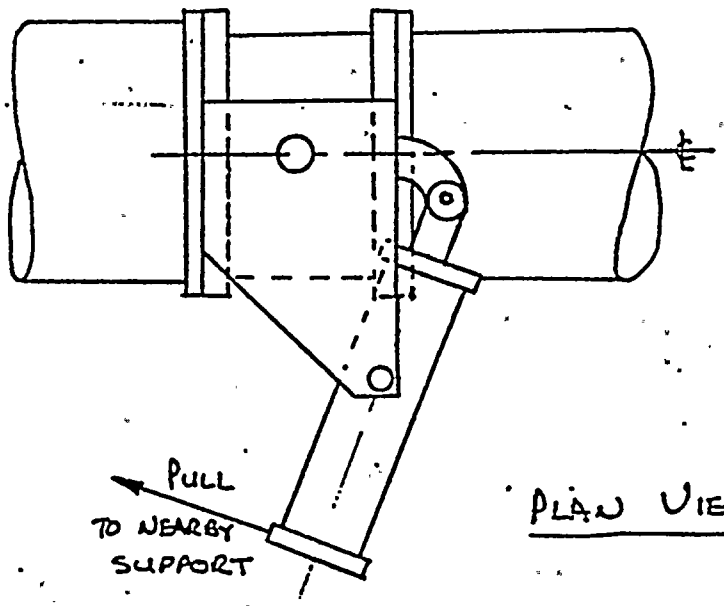
3. MILLER FLUID POWER DRAWING C-26096 8" BORE CYLINDER MODEL A83-B

4. MILLER FLUID POWER DRAWING C-26095 10" BORE CYLINDER MODEL A83-B

CHECKED (INITIALS/DATE)

LCF 11/4/83

FUNCTIONAL TEST REQUIREMENTS



TEST LOADING SKETCH - NO SCALE

EPN CSP-AO-5 QID 018001 CONTRACT NO. 68

DESCRIPTION FAIL OPEN 8" BORE AIR OPERATOR BLDG. R ELEV 475

ACTUATOR WT. 420# MAX "g" 8.74

AIR PRESS. 100 PSIG or Volts — Amps — AC — DC —

ACTUATOR C.G. FROM PIPE C.L. N/A

OPER. TIME REQ'D. - OPEN _____ - CLOSED _____

ALLOWABLE SEAT LEAKAGE N/A REVERSE N/A

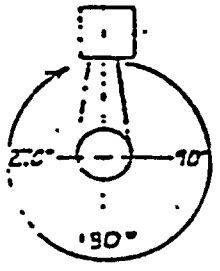
SYSTEM - TEST PRESS. N/A ± ___ PSIG - DIFF. PRESS. N/A ± ___ PSID

MAX. TEST LOAD 1140 + 25 / 0 LBS.

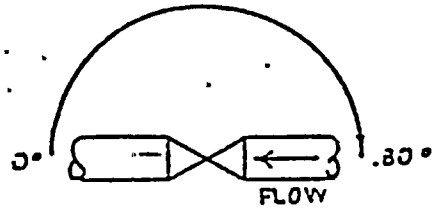
TEST LOAD DIRECTION - AXIAL * ± 4½° LATERAL * ± 4½°

Looking in Flow Direction

* SEE SKETCH



AXIAL



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11-3-83

Prepared by

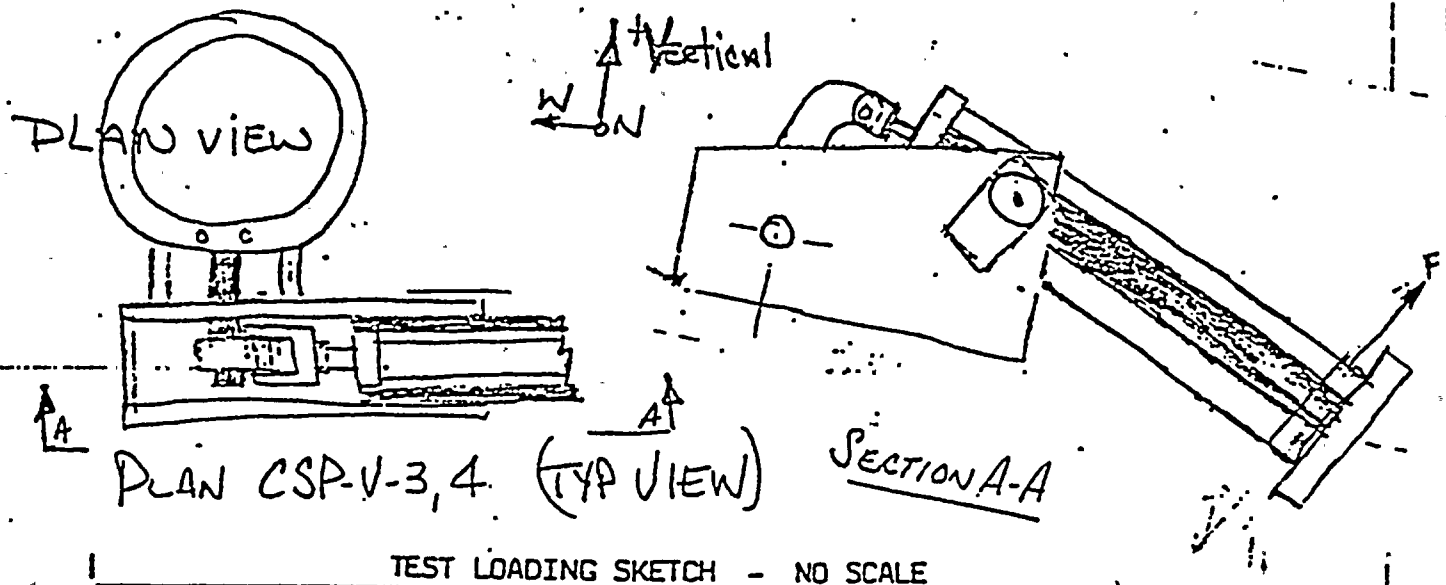
11/3/83

Date

2 0826 0832

PRELIMINARY

FUNCTIONAL TEST REQUIREMENTS



PLAN CSP-V-3,4 (TYP VIEW)

SECTION A-A

TEST LOADING SKETCH - NO SCALE

EPN 02-CSP-AO-3 | QID 018001 CONTRACT NO. _____

DESCRIPTION 8" Air CYLINDER BLDG. R ELEV 481

ACTUATOR WT. 399# MAX "g" 6.17

AIR PRESS. _____ or Volts _____ Amps _____ AC _____ DC _____

ACTUATOR C.G. FROM PIPE C.L. N/A

OPER. TIME REQ'D. - OPEN _____ - CLOSED _____

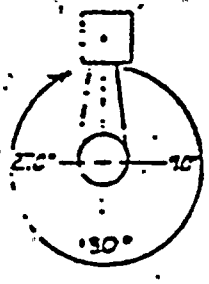
ALLOWABLE SEAT LEAKAGE _____ REVERSE _____

SYSTEM - TEST PRESS. ____ ± ____ PSIG - DIFF. PRESS. ____ ± ____ PSID

MAX. TEST LOAD 960 ± 5 LBS.

TEST LOAD DIRECTION - AXIAL * ± ____ ° LATERAL * ± ____ °

Looking in Flow Direction SEE SKETCH



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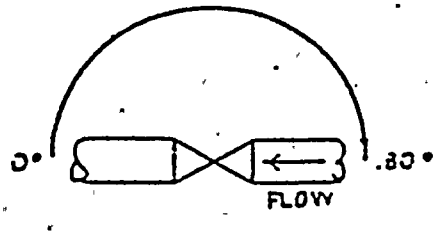


LATERAL

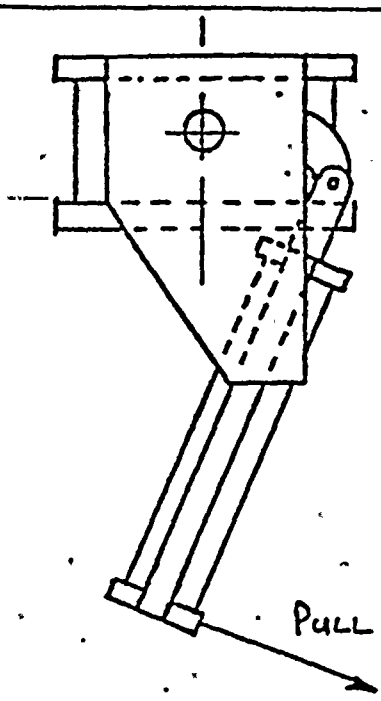
Prepared by

6/1/83
Date

PRELIMINARY

Rev. C
Attachment 1
Page 1 of 1
EQ-02-83-018001-C
PAGE 10 of 10

FUNCTIONAL TEST REQUIREMENTS



CSP-A0-1 TEST LOADING SKETCH - NO SCALE

EPN [redacted] QID 018001 CONTRACT NO. 68

DESCRIPTION FAIL CLOSED - 10" BORE AIR OPERATOR BLDG. R ELEV 558

ACTUATOR WT. 593 # MAX "g" 4.44

AIR PRESS. 100 PSIG or Volts — Amps — AC — DC —

ACTUATOR C.G. FROM PIPE C.L. N/A

OPER. TIME REQ'D. - OPEN _____ - CLOSED _____

ALLOWABLE SEAT LEAKAGE N/A REVERSE N/A

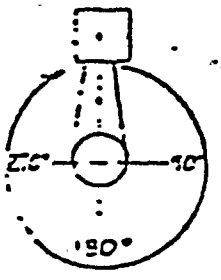
SYSTEM - TEST PRESS. N/A ± ___ PSIG - DIFF. PRESS. N/A ± ___ PSID

MAX. TEST LOAD 1110 + 25 − 0 LBS.

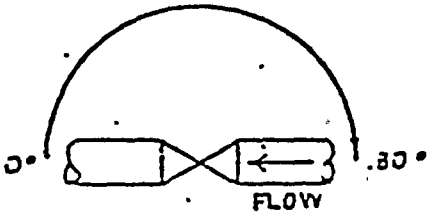
TEST LOAD DIRECTION - AXIAL * ± 4½° LATERAL * ± 4½°

Looking in Flow Direction

* SEE SKETCH



AXIAL



LATERAL

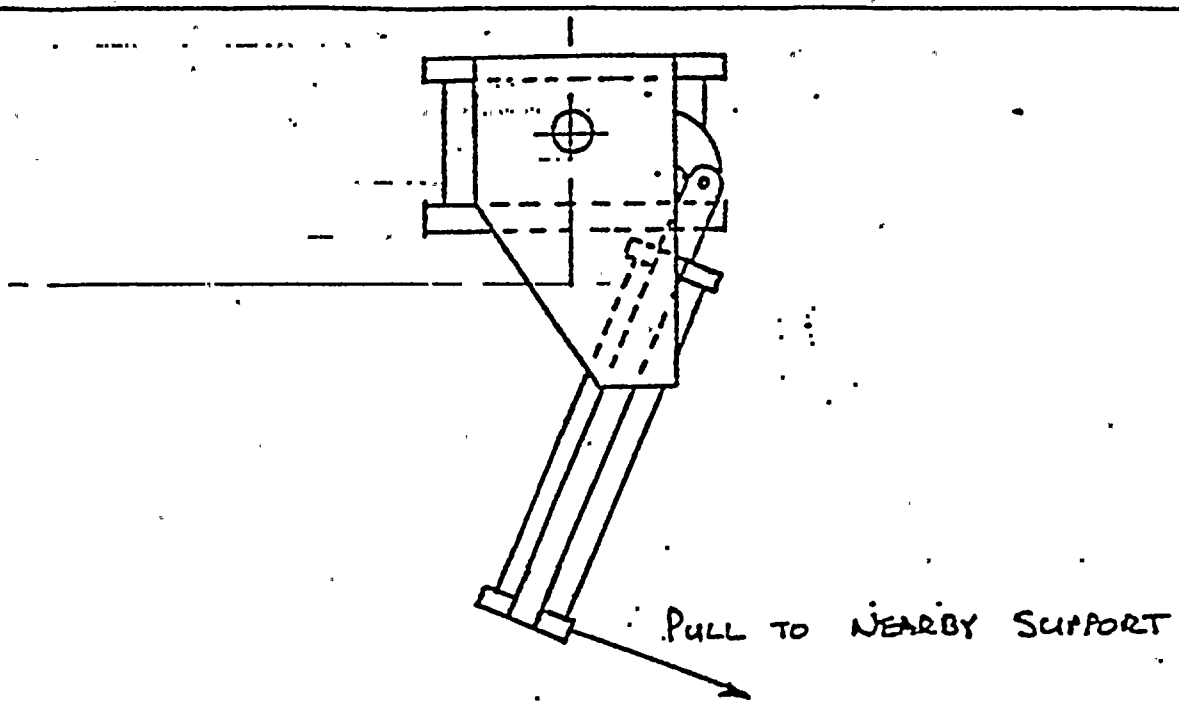
Prepared by

11/3/83
Date

2 0 8 2 3 6 0 8 3 4

EXHIBIT 3

FUNCTIONAL TEST REQUIREMENTS



CSP-A0-1 TEST LOADING SKETCH - NO SCALE

EPN ~~CSP-A0-1~~ QID 018001 CONTRACT NO. 68

DESCRIPTION FAIL CLOSED - 10" BORE AIR OPERATOR BLDG. R ELEV 558

ACTUATOR WT. 593 # MAX "g" 4.44

AIR PRESS. 100 PSIG or Volts — Amps — AC — DC —

ACTUATOR C.G. FROM PIPE C.L. N/A

OPER. TIME REQ'D. - OPEN _____ - CLOSED _____

ALLOWABLE SEAT LEAKAGE N/A REVERSE N/A

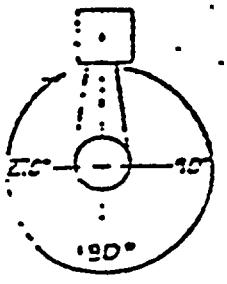
SYSTEM - TEST PRESS. N/A ± ___ PSIG - DIFF. PRESS. N/A ± ___ PSID

MAX. TEST LOAD 1110 + 25 − 0 LBS.

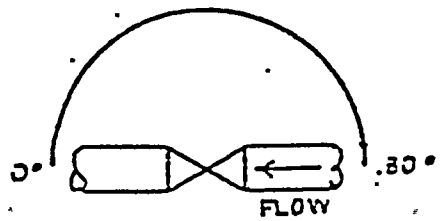
TEST LOAD DIRECTION - AXIAL * ± 4½° LATERAL * ± 4½°

Looking in Flow Direction

* SEE SKETCH



AXIAL



LATERAL

Prepared by

11/3/83
Date

Rev. 1

TEST SUMMARY

Title In-Place Valve Functional Testing

No. SIT-S304.1-3

System Engineer R. JABLOŃSKI

Date 11-7-83

Project WNP-2

CSP-AO-1

REMARKS

0930 BRIEFED TEST CREW AND SHIFT SUPERVISOR OF TEST. COMMENCED SETUP OF TEST EQUIPMENT.

1000 STROKED VALVE UNDER NO LOAD CONDITIONS RESULTS WERE AS FOLLOWS:

OPEN	CLOSE
7.05 SEC	6.3 SEC.

1010 ADDED 200 LBS LOAD AND STROKED VALVE.

1015 ADDED LOAD AT 100 LBS INCREMENTS STROKED VALVE AND RECORDED RESULTS AS FOLLOWS.

	OPEN	CLOSE
300 LBS	7.6	4.8
400 LBS	9.09	4.1
500 LBS	10.6	2.8
600 LBS	13.1	3.8
700 LBS	10.4	4.5

THE VALVE WOULD NOT STROKE WITHOUT MANUALLY LIFTING THE LOAD UP AND DOWN. WHEN THIS WAS DONE THE VALVE DID STROKE HOWEVER THE STROKE TIMES WERE NOT APPLICABLE AS THE STROKE WAS DEPENDENT ON MANUAL LIFTING OF LOAD.

RECORD COPY

TEST SUMMARY

Page 2 of 2

Title In-Place Valve Functional Testing

No. SIT-S304.1-3

System Engineer R. JABLONSKI

Date 11-7-83

Project WNP-2

REMARKS

1030 Applied 800, 900, 1000 and 1100 Lb Load and stroked valve. Results were same as mentioned above. The Load needed to be manually vibrated.

1045 Removed Load and stroked valve. Results were:

OPEN	CLOSE
7.1 Sec	4.9 Sec.

1100 Removed Test Equipment Returned Syste To Normal.

VALVE operated satisfactorily as long as a cyclic load was applied as simulated by manually vibrating the load. Valve would not function under static load

11-7-83

RECORD COPY

8612160216

DATA SHEET

EPN CSP-AO-1

		INITIALS/DATE
	Prerequisites have been met and system is lined up for testing	RJ 11-7-83
6.1	Seat leakage equipment installed	N/A
6.2	Air pressure reduced to N/A PSIG	N/A
6.3	Torque switches operable	N/A
6.4	Reduced voltage applied N/A volts	N/A
6.5	Electrical and valve lineup completed	RJ 11-7-83
6.6	Pretest seat leakage N/A	N/A

6.7

Time (seconds)	OPENING 7.05	CLOSING 6.3	
Volts			I.D. NO.
			Cal. Due
Amps start			I.D. NO.
Amps run			Cal. Due
Amps torque			

6.8 System Press. _____ PSIG
Differential Press. _____ PSID

I.D. NO. 41459
Cal. Due 3-30-84

6.9 50% static load 500 LBS.

RJ 11-7-83

6.10, 6.11

Time (seconds)	OPENING 10.6	CLOSING 2.8	
Volts			I.D. NO.
			Cal. Due
Amps start			I.D. NO.
			Cal. Due
Amps run			
Amps torque			

RECORD COPY

DATA SHEET

EPN CSP-AO-1

INITIALS/DATE

6.12 75% static load 800 LBS.

I.D. NO. 41459
Cal. Due 3-30-84
[illegible] 11-7-83

6.13, 6.14	OPENING	CLOSING
Time (seconds)	N/A	N/A
Volts		
Amps start		
Amps run		
Amps torque		

I.D. NO.
Cal. Due
I.D. NO.
/

6.15 100% static load 11000 LBS.

I.D. NO. 41459
Cal. Due 3-30-84
[illegible] 11-7-83

6.16, 6.17	OPENING	CLOSING
Time (seconds)	N/A	N/A
Volts		
Amps start		
Amps run		
Amps torque		

I.D. NO.
Cal. Due
I.D. NO.
Cal. Due
/

6.18, 6.19	OPENING	CLOSING
Time (seconds)	N/A	N/A
Volts		
Amps start		
Amps run		
Amps torque		

I.D. NO.
Cal. Due
I.D. NO.
Cal. Due
/

RECORD COPY

DATA SHEET

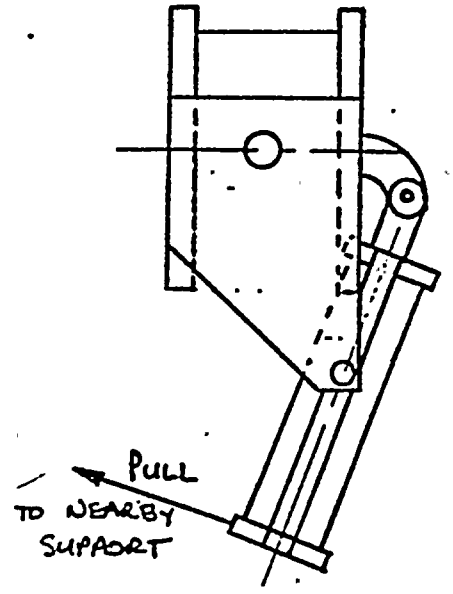
EPN CSP-AO-1

	OPENING	CLOSING	INITIALS/DATE
6.20 Time (seconds)	7.1	4.9	
Volts			I.D. NO.
			Cal. Due
Amps start			I.D. NO.
Amps run			Cal. Due
Amps torque			/
6.21 Post test seat leakage			N/A /
6.22 Reverse seat leakage			N/A /
6.23 Packing gland leakage			N/A /
6.24 Valve normal power or air restored			[illegible] 11-2-83
6.25 Load fixture removed			[illegible] 11-2-83
6.26 Leak test equipment removed			N/A /
6.27 Torque switch bypass wiring restored			N/A

[signature] 11-7-83
Verified by Date

RECORD COPY

FUNCTIONAL TEST REQUIREMENTS



TEST LOADING SKETCH - NO SCALE

EPN CEP-AO-4A QID 018001 CONTRACT NO. 68

DESCRIPTION FAIL CLOSED- 8" BORE AIR OPERATOR BLDG. R ELEV 495

ACTUATOR WT. 420# MAX "g" 5.12

AIR PRESS. 100 PSIG or Volts — Amps — AC — DC —

ACTUATOR C.G. FROM PIPE C.L. N/A

OPER. TIME REQ'D. - OPEN _____ - CLOSED _____

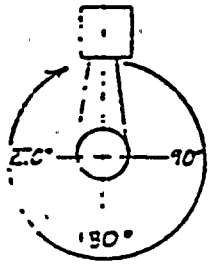
ALLOWABLE SEAT LEAKAGE _____ REVERSE _____

SYSTEM - TEST PRESS. N/A ± ___ PSIG - DIFF. PRESS. N/A ± ___ PSID

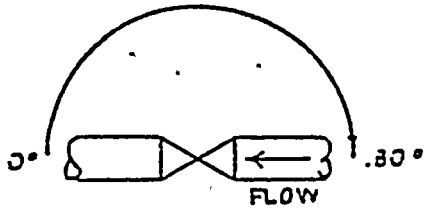
MAX. TEST LOAD 820 1005 + 25 LBS.

TEST LOAD DIRECTION - AXIAL 0 * ± 4½° LATERAL * ± 4½°

Looking in Flow Direction * SEE SKETCH



AXIAL



LATERAL

Prepared By

11/2/83
Date

DYNAMOMETER 41459
CAL DUE DATE 3-30-84

DATA SHEET

EPN CEP-V-4A

		INITIALS/DATE
	Prerequisites have been met and system is lined up for testing	EDD 11/4/83
6.1	Seat leakage equipment installed	N/A /
6.2	Air pressure reduced to N/A PSIG	N/A /
6.3	Torque switches operable	EDD 11/4/83
6.4	Reduced voltage applied N/A volts	N/A /
6.5	Electrical and valve lineup completed	N/A /
6.6	Pretest seat leakage N/A	N/A /

6.7

	OPENING	CLOSING	
Time (seconds)			SEE TEST SUMMARY
Volts			I.D. NO.
			Cal. Due
Amps start			I.D. NO.
Amps run			
			Cal. Due
Amps torque			/

6.8 System Press. N/A PSIG
Differential Press. _____ PSID — /

6.9 50% static load _____ LBS. — I.D. NO. _____ Cal. Due _____ /

6.10, 6.11

	OPENING	CLOSING	
Time (seconds)			
Volts			I.D. NO.
			Cal. Due
Amps start			I.D. NO.
			Cal. Due
Amps run			
Amps torque			/

RECORD COPY

DATA SHEET

EPN _____ INITIALS/DATE

6.12 75% static load _____ LBS. I.D. NO. _____
Cal. Due _____
_____ /

6.13, 6.14	OPENING	CLOSING	
Time (seconds)	_____	_____	
Volts	_____	_____	I.D. NO. _____
			Cal. Due _____
Amps start	_____	_____	I.D. NO. _____
Amps run	_____	_____	
Amps torque	_____	_____	_____ /

6.15 100% static load 800 LBS. I.D. NO. 41459
Cal. Due 3-30-84
_____ /

6.16, 6.17	OPENING	CLOSING	
Time (seconds)	_____	_____	
Volts	_____	_____	I.D. NO. _____
			Cal. Due _____
Amps start	_____	_____	I.D. NO. _____
			Cal. Due _____
Amps run	_____	_____	
Amps torque	_____	_____	_____ /

6.18, 6.19	OPENING	CLOSING	
Time (seconds)	_____	_____	
Volts	_____	_____	I.D. NO. _____
			Cal. Due _____
Amps start	_____	_____	I.D. NO. _____
			Cal. Due _____
Amps run	_____	_____	
Amps torque	_____	_____	_____ /

RECORD COPY

DATA SHEET

EPN _____ INITIALS/DATE

	OPENING	CLOSING	
6.20			
Time (seconds)	_____	_____	
Volts	_____	_____	I.D. NO. _____
			Cal. Due _____
Amps start	_____	_____	I.D. NO. _____
Amps run	_____	_____	Cal. Due _____
Amps torque	_____	_____	_____ /

6.21 Post test seat leakage _____ _____ /

6.22 Reverse seat leakage _____ _____ /

6.23 Packing gland leakage _____ _____ /

6.24 Valve normal power or air restored _____ /

6.25 Load fixture removed _____ /

6.26 Leak test equipment removed _____ /

6.27 Torque switch bypass wiring restored _____ /

_____ _____
Verified by Date

RECORD COPY

WPPSS

TEST SUMMARY

Title In-Place Valve Functional Testing

No. SLI-S304.1-3

System Engineer E. D. ~~DiFranco~~

Date Nov 4, 1983

Project WNP-2

CEP-V-4A

REMARKS

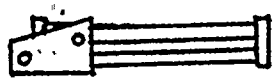
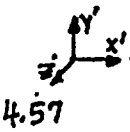
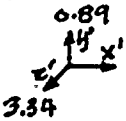
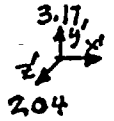
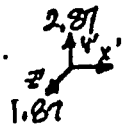
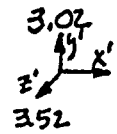
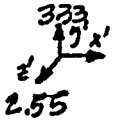
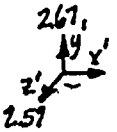
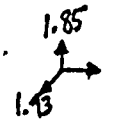
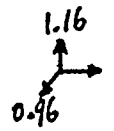
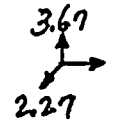
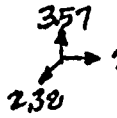
1. Briefed crew and set up valve operator for test.
2. Notified Shift manager of test.
3. Loaded 800# on operator and tried to stroke valve but it did not move.
4. Replaced fitting on ½" Swaglok air inlet line due to leak.
5. Tried to stroke with 800# on valve. Did not move.
6. Removed 300# and stroked with 500#. Did not move.
7. Removed 300# and stroked with 200#. Valve opened to 80%
8. Removed entire load and stroked valve open and held in open position. Added 400# to valve and closed. Would only close to 85%.
9. Hooked up air to back of spring
10. Removed load and stroked open and held open. Put 600# on valve and closed. Valve went shut but would not trip limit switch until load was jogged.
11. Removed load and stroked open and held open. Put 800# on valve and closed. Valve went to the 100% closed position.
12. Repeated test 8 with the same results. Spring returned actuator to within ≈ 1" of full stroke. Addition of manual vibration of load allowed actuator to achieve full stroke
Completed test ≈ 12:45

RECORD COPY

EXHIBIT 5

L.C. FERNANDEZ
11/14/83

SUMMARY OF FINAL AS-BUILT PIPING ACCELERATIONS

QID	EPN	GLOBAL X	Y	Z		$\sqrt{y^2+x'^2}$
361106	CEP-V-3A	4.57	1.26	0.90	 	1.55
	FC = FAIL CLOSE					
	CEP-V-4A	3.71	1.34	0.89		2.28
	FC					
	CSP-V-3	2.04	3.17	3.76		4.92
	FC					
	CSP-V-4	1.87	2.87	4.19		5.08
	FC					
	CSP-V-5	1.62	3.52	2.55		4.27
	FO = FAIL OPEN					
	CSP-V-6	2.55	3.33	5.85		3.62
	FO					
	CSP-V-9	2.57	1.73	2.67		3.18
	FO					
361104	CEP-V-1A SEE NOTE 1	1.93	2.23	1.85		2.90
	FC					
	CEP-V-2A SEE NOTE 1	0.96	2.11	1.16		2.41
	FC					
	CSP-V-1	1.46	3.67	1.74		4.32
	FC					
	CSP-V-2	1.44	3.57	1.90		4.29
	FC					

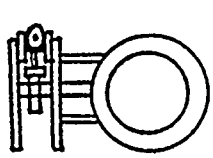
24" VALVE
8" CYL

REFERENCE: CYGNA ENERGY SERVICES, CALC. NO. OT.01.F, REV. 4, 11/83, VOLUME IV ATTACHMENT G.

30" VALVE
10" CYL

REFERENCE: CYGNA ENERGY SERVICES, CALC. NO. OS.01.F, REV. 2, 11/83, VOLUME III, ATTACHMENT F

NOTE 1
ORIENTATION ASSUMED:



NOTE 2:
FROM CES CALC OT.01.F, QID 361106, P 4.3.8 MAX ANGLE OF MOTION ≈ 14°
∴ AXIAL COMPONENT TO ADD TO WEAK AXIS = 5.85 SIN 14° = 1.42