WOLF CREEK
NUCLEAR OPERATING
CORPORATION

April 24, 1987

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

Letter: WM 87-0070
Re: Docket No. 50-482
Ref: Letter dated 8/5/86 from PWO'Connor, NRC, to GLKoester, KG&E
Subj: Additional Information Concerning the Wolf Creek Generating Station Inservice Testing Program for Pumps and Valves

Gentlemen:

The enclosed information is being provided per your request to aid in the NRC's review of the Wolf Creek Generating Station (WCGS) Inservice Testing Program for Pumps and Valves. Enclosure 1 provides additional information concerning check valve testing to assist in the review of Items D.1, I.1, J.1, and K.1 identified in the reference. Enclosure 2 provides a listing of actual measured valve stroke times versus maximum limiting values to assist the review of Item A.12 identified in the reference.

A copy of this submittal is being provided to Mr. H. L. Magleby of EG&G Idaho, Inc. If you have any questions concerning this submittal, please contact me or Mr. O. L. Maynard of my staff.

Very truly yours,

B D Withers

Bart D. Withers,
President and Chief
Executive Officer

BDW:jad

Enclosures

cc: PO'Connor (2)
JCummins
RMartin
HMagleby

A047
1/1

**ADDITIONAL INFORMATION CONCERNING
CHECK VALVE TESTING
for
WOLF CREEK GENERATING STATION**

This information is being provided as a result of a conversation with the Staff in January, 1987 concerning two specific items in the Wolf Creek Generating Station (WCGS) Inservice Testing Program for Pumps and Valves. One item involves satisfying check valve full stroke testing requirements of ASME Section XI without disassembling the valves for each test. The second item involves satisfying ASME Section XI requirements for two check valves which are in series.

Full Stroke Testing of Check Valves

There are 136 check valves which are required to be full stroke tested in the open direction. Normally, design accident flow or full stroke calculated flow is established through these valves to perform this test. However, for 12 (8.8%) check valves, establishing these flows is not possible due to system configuration or inability to simulate the required accident conditions.

Four check valves are in the containment spray system (EN-V003, V004, V009, and V010). Establishing the required flow through these valves, by initiating containment spray, is impractical. Disassembly of these valves to verify proper operation is also undesirable. Disassembly and reassembly of check valves several times throughout their design lifetimes greatly increases the probability of inadvertent damage to the valve seating surfaces and to other internal components. The probability of inadvertent errors in reassembly is also increased which could degrade the performance of the check valves. Check valve disassembly and reassembly during refueling outages also increases the manpower loading required during the outage and consumes needed talent at a time when many other safety related maintenance and inspection activities are being performed.

These containment spray check valves are currently partial stroke tested quarterly by establishing recirculation flow to the Refueling Water Storage Tank through the valves. Per ASME Section XI IWV-3522(b), initiation of flow through the valve ensures that the disk moves promptly away from the seat when the closing pressure differential is removed. Confirmation that the disk moves away from the seat is accomplished by observation of substantially free flow through the valve as indicated by appropriate pressure indications in the system, or by other positive means. In this case this is accomplished by flow instrumentation.

The remaining eight check valves are in the flow path from the accumulators to the injection point in the reactor coolant system cold legs. EP-8956A, B, C, and D are accumulator outlet check valves and BB-8948A, B, C, and D are cold leg injection check valves. It is not possible to establish design accident flow from the accumulators because accident conditions requiring accumulator injection cannot be simulated.

It is estimated that each valve would take a minimum of 16 hours to disassemble, inspect, and reassemble. Completing valves BB-8948A, B, C, and D would result in an exposure of aproximately 15.2 man-rem for each valve. Contact exposure on the valve is approximately 1000 mR/hr. Exposure for completing valves EP-8956A, B, C, and D would be approximately 1.14 man-rem for each valve. Contact exposure is not known.

These eight check valves are currently being tested during refueling outages by establishing flow through the valves. Per IWV-3522(b), initiation of flow through the valve ensures that the disk moves promptly away from the seat when the closing pressure differential is removed. Confirmation that the disk moves away from the seat is accomplished by observation of substantially free flow through the valve as indicated by appropriate pressure indications in the system, or by other positive means. Flow through these check valves is observed by flow instrumentation for valves BB-8948A, B, C, and D and by pressure/level instrumentation for valves EP-8956A, B, C, and D.

Testing of Check Valves in Series

Each of two steam lines feeding the turbine driven auxiliary feed pump turbine contains a pair of check valves in series (FC-V001 and V024, and FC-V002 and V025). Currently each pair is tested to be closed by observing no leakage, as if it were a single component.

Testing of each valve individually will require disassembling and inspecting the valve internals. Since these four check valves are identical and experience similar service conditions, one of the four valves will be disassembled during each refueling outage and the internals will be inspected. The Wolf Creek Generating Station Inservice Testing Program for Pumps and Valves will be changed to reflect the new testing method prior to the next scheduled test due date.

MEASURED VALVE STROKE TIMES

VERSUS MAXIMUM LIMITING VALUES

FOR

WOLF CREEK GENERATING STATION

VALVE NO.	AB HV-11	AB HV-12	AB HV-14	AB HV-15	AB HV-17	AB HV-18	AB HV-20
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	5	10	5	10	5	10	5
HISTORY OF STROKE TIMES (SECS.)	3.4	7.58	8.51 *	5.89	31.44 *	8.36	48.12*
	3.06	7.17	3.06	6.04	55.7*	8.66	3.31
	3.77	5.33	3.162	4.37	3.15	5.12	3.12
	3.7	9.9	4.01	5.4	3.72	7.9	3.67
	3.25	5.2	3	4.2	3.37	5.2	3.62
	4.19		3.73		3.51		3.4
	3.31		4.11		3.64		3.11
	3.5		3.39		2.69		3.69
	3.31		3.45		3.48		3.63
					3.42		3.45
					3.55		3.26
					3.94		
					3.2		
					2.59		

* Valve exceeded it's maximum allowed stroke time. Corrective actions were taken in accordance with plant procedures.

VALVE NO.	AB HV-21	AB HV-48	AB HV-49	AB HV-5	AB HV-6	AB LV-10	AB LV-7
STROKE TEST	CLOSE	CLOSE	CLOSE	OPEN	OPEN	CLOSE	CLOSE
MAXIMUM STROKE TIME	10	5	5	10	10	5	5
HISTORY OF STROKE TIMES	6.84	2.81	1.78	4.61	5.51	2.22	2.99
	7.08	1.75	1.84	4.31	5.06	2.48	4.86
	6.15	2.36	3.06	4.29	4.92	2.44	3.95
	4.69	2.86	4.12	4.48	4.94	2.44	3.78
	6.25	2.66	3.67	4.47	5.01	2.39	4
	6.1	2.04	3.2	4.59	4.91	2.53	4.19
		2.29	1.48	4.8	5.08	1.78	3.88
		1.42			5.31	2.66	4.33
		2.15					3.67

VALVE NO.	AB LV-8	AB LV-9	AB PV-1	AB PV-1	AB PV-2	AB PU-2	AB PV-3
STROKE TEST	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	5	5	20	20	20	20	20
HISTORY OF STROKE TIMES	4.22	4.4	13.72	18.91	11.06	10.28	10.9
	4.11	5.98 *	11.99	17.4	11.56	7.5	11.86
	4.12	4.83	13.59	11.2	12.19	7.36	11.8
	4.34	5.03 *	13.17	11.11	12.04	7.28	12.55
	4.4	4.92	12.48	10.42	12.77	8.92	12.94
	3.88	4.91					10.06
	3.94	4.97					10.75
	4.01	4.42					
		4.78					
		3.81					

* Valve exceeded it's maximum allowed stroke time. Corrective actions were taken in accordance with plant procedures.

VALVE NO.	AB PV-3	AB PV-4	AB PV-4	AE FV-39	AE FV-40	AE FV-41	AE FV-42
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	20	20	20	5	5	5	5
HISTORY OF STROKE TIMES	11.31	10.4	10.42	.62	.69	.73	.77
	15.11	8.5	13.59	.86	1.77	1.03	1.1
	15.8	9.51	14.83	.39	1.03	>5*	.91
	16.47	9.33	13.37	>5*	1.11	>5*	>5*
	19.88	9.36	13.67	1.56	1.29	>5*	1.86
	22.25*	10.2	10.11	1.2	.91	>5*	1.26
	11.53			1.03	>5*	1.14	1.08
	10.01			.97	1.25	1.34	.99
				1.44	1.14	1.14	1.48
				1.17		>5*	1.15
						1.03	
						>5*	
						.94	
						.8	

* Valve exceeded it's maximum allowed stroke time. Corrective actions were taken in accordance with plant procedures.

VALVE NO.	AE FV-43	AE FV-44	AE FV-45	AE FV-46	AL HV-30	ALHV-31	AL HV-32
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	OPEN	OPEN
MAXIMUM STROKE TIME	5	5	5	5	18	18	18
HISTORY OF STROKE TIMES	1.88	1.8	1.88	1.88	14.5	14.77	14.63
	1.83	2.19	1.91	2.08	14.56	14.5	14.98
	2	2.01	2.66	2.29	14.87	14.87	14.83
	2.04	1.94	1.92	1.92	14.95	14.91	14.86
	1.69				14.84	14.97	14.99
					15.09	14.97	14.69
					14.94	14.83	14.58
					14.83	15.31	16.59
					15.56	15.15	16.66
					16.56	15.09	16.69
					17.05	16.12	16.58
						16.01	16.61
						16.45	16.64
							16.64
							16.59

VALVE NO.	AL HV-33	AL HV-34		AL HV-35	AL HV-36	BB HV-13	BB HV-13
STROKE TEST	OPEN	CLOSE		CLOSE	CLOSE	CLOSE	OPEN
MAXIMUM STROKE TIME	18	35		35	35	35	35
HISTORY OF STROKE TIMES	14.88	24.31		25.03	19.94	24.58	23.84
	15.12	24.2		25.11	19.55	24.94	23.94
	14.83	24.8		25.36	20.09	23.9	25
	14.97	24.14		25.37	20.11	24.8	25.09
	14.99	26.2		25.33	24.25	25.31	21.78
	13.97	26.6		25.26	24.19		
	14.19	26.09		25.4	24.4		
	16.19	25.73		25.94	24.19		
	16.2	25.7		25.31	23.12		
	16.12	24.7		25.75	23.59		
	16			25.04			
	15.99			25.29			
	15.99			25.61			
	15.48						
	15.89						
	15.15						
	15.58						
	16.37						

VALVE NO.	BB HV-14	BB HV-14	BB HV-15	BB HV-15	BB HV-16	BB HV-16	BB HV8000A
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	35	35	35	35	35	35	15
HISTORY OF STROKE TIMES	24.61	23.25	27.02	25.29	24.73	23.69	7.2
	23.26	25.06	25.45	26.26	23.37	24.8	9.26
	23.2	24.5	25.29	26.26	24.36	24.56	9.34
	24.5	24.52	26.2	26.34	24.59	25.04	9.44
	24.56	24.62	26.86	26.18	25.86	24.77	9.59
							9.58
							7.75
							7.81
							7.73
							9.01
							9.22
							8.97

VALVE NO.	BB HV8000A	BB HV8000B	BB HV8000B	BB HV8001A	BB HV8001A	BB HV8001B	BB HV8001B
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	15	15	15	10	10	10	10
HISTORY OF STROKE TIMES	7.28	8.555	8.36	.265	.29	.42	.19
	9.19	8.51	8.44	.25	.25	.2	.39
	9.08	8.75	8.53	.25	.26	.19	.25
	9.31	8.55	8.45	.2	.44	.21	.26
	9.14	8.37	8.01				
	9.17	9.23	8.34				
	7.75	8.59	8.48				
	7.77	8.69	8.37				
	7.5	8.45	8.5				
	8.72	8.59	8.34				
	8.94	8.45	8.14				
	8.62	8.62	8.61				
		8.59	8.57				
		8.81	8.22				

VALVE NO.	BB HV 8002A	BB HV 8002 A	BB HV 8002B	BB HV 8002 B			BB HV 8037 A
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN			CLOSE
MAXIMUM STROKE TIME	10	10	10	10			15
HISTORY OF STROKE TIMES	.28	.44	.28	.15			5.22
	.25	.44	.25	.23			5.26
	.19	.25	.22	.33			5.37
	.23	.19	.27	.25			5.36
							5.08
							5.28
							5.26
							5.36
							5.26

VALVE NO.	BB HV-8037A	BB HV-8037B	BB HV-8037C	BB HV-8157A	BB HV-8157B	BB HV-8351A	BB HV-8351A
STROKE TEST	OPEN	CLOSE	OPEN	OPEN	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	15	15	15	15	15	10	10
HISTORY OF STROKE TIMES	5.83	5.77	6	7.53	8.44	7.83	7.28
	6.08	5.88	6.14	8.14	8.53	7.19	7.81
	5.86	5.66	6.06	7.4	8.55	7.34	7.59
	5.95	5.83	6.15	6.8	8.69	6.17	6.69
	5.91	5.62	5.88	6.83	8.4	7.72	7.03
	6.04	5.77	6.11	6.99	8.33		
	6	6.28	6.59	7	8.58		
	6.26	5.73	6.06	6.95	7.88		
	6.22	5.89	5.99	6.81	9.4		
				7.04			

VALVE NO.	BB HV-8351B	BB HV-8351B	BB HV-8351C	BB HV-8351C	BB HV-8351D	BB HV-8351D	BB FCV-455A
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	10	10	10	10	10	10	2
HISTORY OF STROKE TIMES	7.44	7.72	7.69	6.15	7.7	7.22	.94
	7.89	8.26	6.44	7.53	7.09	7.62	1.25
	7.39	7.66	6.4	7.72	7.22	6.7	1.56
	7.45	6.83	5.55	7.08	5.09	5.8	1.22
	5.91	5.86	5.48	6.73	7.81	6.7	.81
	6.4	6.88					1.23
							1.33
							.91

VALVE NO.	BB PCV 455 A	BB PCV 456 A	BB PCV 456 A	BB PV-8702 A	BB PV 8702 A	BB PV 8702 B	BB PV 8702
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	2	2	2	120	120	120	120
HISTORY OF STROKE TIMES	95	.94	.94	79.04	85.48	79	79
	1.08	1.23	1.26	78.88	79.37	75.23	76.06
	.77	.66	.95	78.73	79.22	75.5	75.97
	1.14	1.88	.81	80.24	79.39	75.26	75.72
	.8	.94	.62	78.59	79.23	76.66	75.69
	.73	.67	.72			75.42	76.09
	1.19	1.31	.94				
	.47						

VALVE NO.	BG HV-8100	BG HV-8104	BG HV-8105	BG HV-8106	BG HV-8110	BG HV-8110	BG HV-8111
STROKE TEST	CLOSE	OPEN	CLOSE	CLOSE	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	10	15	10	15	10	10	15
HISTORY OF STROKE TIMES	7.29	7.7	8.8	9.12	5.98	6.28	7.33
	7.53	7.84	8.56	8.81	6	6.55	7.29
	7.7	7.77	8.73	8.31	6.09	6.34	7.45
	7.29	7.59	8.77	8.29	5.89	6.55	7.25
	7.37	7.83	9	8.56	5.92	6.26	7.4
	6.44	7.73	9.33	8.69	5.89	6.2	7.37
	6.59	7.56	9.2	8.69	6.06	6.45	7.08
		7.64			6	6.28	7.2
		7.77			6.34	5.99	6.97
		7.69			5.97	6.37	6.61
		7.83			6.34	7.51	7.03
					7	7.69	7.66

VALVE NO.	BG HV-8111	BG HV-8112	BG HV-8152	BG HV-8153A	BG HV-8153A	BG HV-8153B	BG HV-8153B
STROKE TEST	OPEN	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	15	10	10	10	10	10	10
HISTORY OF STROKE TIMES	7.94	7.44	8.59	.25	.25	.25	.89
	7.95	7.61	8.26	:31	.47	.31	.25
	7.94	7.37	8.56	1.25	.39	1.09	.54
	8	7.53	8	1.45	.56	.89	.44
	7.91	7.44	7.55	1.31	.42	.95	.45
	7.8	6.95		1.36	.51	1.21	.64
	7.86	6.97		1.39	.45	.89	.51
	7.88			1.36	.4	.75	.59
	6.97			1.53	.37		
	7.44						
	7.7						
	7.77						

VALVE NO.	BG HV-8154A	BG HV-8154A	BG HV-8154B	BG HV-8154B	BG HV8160	BG HV-8357A	BG HV-8357
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	CLOSE	OPEN
MAXIMUM STROKE TIME	10	10	10	10	10	15	15
HISTORY OF STROKE TIMES	.25	.25	.25	.25	8.09	7.36	7.51
	.53	.48	.33	.64	8.23	7.22	7.22
	1.45	.33	1.36	.29	7.95	7.36	6.99
	1.53	.7	1.45	.51	7.99	7.39	7.2
	1.5	.66	1.39	.51		7.06	7.03
	1.45	.58	1.56	.39		7.59	7.31
	1.4	.51	1.26	.42		6.97	6.94
	1.58	.59	1.26	.59		7.19	7.17
	1.25	.47	1.47	.33		7.39	7.44
						6.8	6.84

VALVE NO.	BGHV-8357B	BGHV-8357B	BGLCV-112B	BGLCV-112C	BLHV-8047	BMHV-1	BMHV-19
STROKE TEST	CLOSE	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	15	15	10	10	10	10	5
HISTORY OF STROKE TIMES	7.63	7.45	6.88	5.94	7.44	4.34	.39
	7.58	7.42	6.15	6.14	7.62	4.09	.59
	7.44	7.39	5.8	5.58	8.2	5.11	.33
	7.28	7.39	5.8	5.59	8.48	4.4	.29
	7.26	7.32	6.03	5.81	9.31	4.29	.5
	7.28	7.42	4.67	5.04	6.55	4.26	.17
	7.4	7.47			7.73	4	.33
	7.26	7.36			8.36	3.94	.55
	7.64	7.47			9.91	4.09	.31
	7.17	7.04				3.7	.29
						3.96	

VALVE NO.	BM HV-2	BM HV-20	BM HV-21	BM HV-22	BM-HV-3	BM HV-35	BM HV-36
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	10	5	5	5	10	5	5
HISTORY OF STROKE TIMES	4.42	.26	.23	.29	5.86	.26	.31
	4.43	.53	.59	.75	5.11	.53	.53
	5.28	.47	.33	.36	5.75	.58	.4
	4.67	.29	.33	.29	4.92	.26	.33
	4.73	.42	.45	.31	4.64	.44	.44
	4.51	.19	.19	.23	4.92	.25	.26
	4.4	.33	.31	.2	5.08	.39	.34
	4.4	.51	.39	.37	5.15	.39	.36
	4.37	.28	.26	.37	5.31	.4	.25
	4.44	.23	.29	.33	5.28	.2	.22
					5.31		
					5.56		
					5.17		
					5.69		
					5.33		
					5.33		

VALVE NO.	BM HV-37	BM HV-38	BM HV-4	BM HV-65	BM HV-66	BM HV-67	BM HV-68
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	5	5	10	5	5	5	5
HISTORY OF STROKE TIMES	.28	.26	4.53	.23	.33	.28	.34
	.13	.81	4.24	.69	.53	.58	.78
	.31	.34	4.34	.31	.29	.28	.29
	.26	.29	4.99	.48	.26	.26	.33
	.36	.33	4.26	.34	.5	.55	.34
	.22	.19	3.77	.31	.2	.23	.17
	.29	.29	3.55	.25	.39	2.67	.25
	.36	.39	3.4	.28	.42	.39	.36
	.28	.25	3.48	.42	.42	.39	.25
	.23	.26	3.75	.31	.33	.69	.25
			3.73	.22		.37	
						.28	

VALVE NO.	BN HCV8800A	BN HCV8800B	BN HV-3	BN HV-3	BN HV-4	BN HV-4	BN HV-8806
STROKE TEST	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	10	10	75	75	75	75	15
HISTORY OF STROKE TIMES	8.53	8.44	52.2	57.95	53.73	55.7	9.09
	8.7	8.53	52.95	56.72	53.77	55.78	9.01
	7.7	7.9	52.69	56.14	53.5	55.39	8.78
	8.97	8.51	52.95	58.99	53.8	55.55	8.66
			52.72	55.69	53.55	56.09	8.94
			52.75	55.95	53.42	55.39	9
			52.94	55.95	53.78	55.69	8.88
			52.55	55.48	53.66	55.48	8.89
			52.94	56.06	52.61	53.73	8.94
			52.83	55.03	52.3	53.7	9
			52.37	56.22	51.66	54	9.06
			52.41	55.8	51.61	53.8	8.99
			52.67	55.91			

VALVE NO.	BN HV8806A	BN HV8806B	BN HV8806B	BN HV8812A	BN HV8812A	BN HV8812B	BN HV8812B
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	15	15	15	17	17	17	17
HISTORY OF STROKE TIMES	9.28	9.67	9.58	12.31	12.59	13.23	12.73
	9.19	9.39	9.58	12.23	12.62	12.73	12.89
	8.81	9.25	9.28	12.2	12.56	12.56	12.62
	8.69	9.17	9.19	12.01	12.58	12.4	12.5
	8.92	9.24	9.42	11.56	11.84	12.4	12.37
	9.04	9.45	9.48	11.94	12.15	1252	12.66
	9.55	9.23	9.12	11.88	12.37	12.64	12.61
	8.83	9.4	9.51	12.19	12.48	12.45	12.31
	8.89	9.36	9.5	11.88	12.08	12.56	12.59
	9	9.45	9.6	12.26	12.39	12.56	12.66
	9.01	9.88	9.61	12.12	12.42	12.9	12.7
	8.99			12.2	12.4	12.61	12.78
				12.08	12.36		

VALVE NO.	BN HV-8113	BN LCV-112D	BN LCV-112D	BN LCV-112E	BN LCV-112E	EC HV-11	EC HV-12
STROKE TEST	CLOSE	CLOSE	OPEN	CLOSE	OPEN	CLOSE	CLOSE
MAXIMUM STROKE TIME	15	15	15	15	15	75	75
HISTORY OF STROKE TIMES	6.83	9.2	9.28	9.51	9.55	55.06	57.29
	7.14	8.74	9	9.18	9.16	55.04	57.44
	7.4	8.67	8.76	9.04	9.04	55.33	57.55
	6.53	8.33	8.36	9.25	9.28	55.4	57.29
		9.01	8.78	9.29	9.33	55.37	57.53
		8.69	8.86			54.08	55.55
						54.5	60.61
						55.15	58.47
						55.19	58.61
						55.4	60.56
							6056
							60.69

VALVE NO.	EF HV-23	EF HV-24	EF HV-25	EF HV-26	EF HV-31	EF HV31	EF HV-32
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	40	40	40	40	30	30	30
HISTORY OF STROKE TIMES	29.72	26.8	29.95	29.33	26.26	26.25	27.99
	29.53	26.64	29.95	29.19	26.48	26.03	28.79
	28.47	26.73	29.86	29.47	26.4	25.09	29.81
	28.4	26.75	29.81	29.33	26.5	25.14	28.31
	28.06	29.43	29.78	29.07	26.19	25.14	28.2
	28.12	26.42	29.77	29.04	26.36	24.95	28.08
	27.95	26.56	30.8	29.15	26.35	27.44	28.17
	28.09	27.15	29.91	29.42	26.06	27.48	28.15
	27.92	27.14	29.88	29.66	25.19		28.22
	28	27.25	29.81	29.4	25.31		28.17
	27.86	26.66	29.13	29.47	25.23		28.28
	28.11	26.97	29.89	29.94	24.99		29
	27.88	27.03	29.73	29.12	27.53		28.56
	28	28	29	29.31	27.45		28.45
				29			

VALVE NO.	EF HV-32	EF HV-33	EF HV-33	EF HV-34	EF HV-34	EF HV-37	EF HV-37
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	30	30	30	30	30	40	40
HISTORY OF STROKE TIMES	28.08	29.58	29.62	26.77	26.86	24.5	25.12
	28.34	29.58	29.59	27.03	26.62	24.72	24.5
	28.2	29.65	26.26	27.01	25.62	24.59	24.17
	27.97	29.72	26.22	26.92	25.48	24.7	24.23
	28.25	29.66	26.26	26.91	25.34	24.5	24.48
	27.86	29.25	25.53	26.84	25.23	24.69	24.44
	28.62	29.75	27.59	26.83	27		24.15
	25.58	29.61	27.31	27.03	27.03		24.31
		26.12		27.56			25.51
		26.09		27.99			25.11
		26.17		25.58			24.7
		25.59		25.29			24.58
		27.69		25.17			24.49
		27.42		27			24.42
				26.99			

VALVE NO.	EF HV-38	EF HV-38	EF HV-39	EF HV-40	EF HV-41	EF HV-42	EF HV-43
STROKE TEST	CLOSE	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	40	40	40	40	40	40	5
HISTORY OF STROKE TIMES	29.5	29.5	28.01	29.26	28.15	30.22	3.17
	29.75	29.25	27.94	2888	28.06	28.48	2.94
	29.61	29.72	28.23	29.04	28.33	28.72	3.01
	29.73	29.64	28.25	29.09	28.15	28.95	3
	29.62	29.4	28.12	29	28.d	28.84	3.19
	29.61	29.53	28.23	28.87	28.29	28.61	3.12
		28.99	28.15	29.08	28.08	29.01	3.2
		29.08	27.69	2909	28.17	29.08	3.12
		29.56	28.25	2908	28.31	28.66	3.25
		29.08	28.23	2908	29.12	28.51	2.88
		29.5	29.12	2912	28.33	28.94	3.14
		29.53	28.33	29.92	27.95	29.73	3.01
		29.62	27.99	28.81		28.66	
		29.34					

VALVE NO.	EFHV-44	EFHV45	EF HV-45	EFHV-46	EFHV-46	EFHV-47	EF HV-4
STROKE TEST	CLOSE	CLOSE	OPEN	CLOSE	OPEN	CCLOSE	CLOSE
MAXIMUM STROKE TIME	5	30	30	30	30	30	30
HISTORY OF STROKE TIMES	2.25	28.78	28.67	28.75	28.84	13.92	15.28
	2.22	29.08	28.61	29.01	28.64	29.04	25.44
	2.64	29.04	28.67	28.69	28.97	29.03	25.31
	2.56	28.94	29.06	27.83	28.83	14.77	25.33
	2.88	28.67	28.72	28.99	28.77	14.86	15.36
	2.47	28.89	29.75	28.88	29.78	14.84	15.33
	2.53	28.75	28.81	28.97	28.69	14.44	15.25
	2.62	28.73	27.86	29.01	28.64	14.67	15.09
	2.48	28.8		28.83		15.36	15.03
	2.5	28.86		29.01		14.75	15.23
	2.29	28.89		28.8		14.81	15.08
	2.45	28.83		28.78		14.55	15.06
	2.53	27.92		29.97		14.42	14.94
		27.84		28.94		14.25	14.89
				28.8		27.86	27.44
						27.51	28.59
						27.62	28.09
							28.45

VALVE NO.	EFHV-49	EFHV-49	EFHV-50	EFHV-50			
STROKE TEST	CLOSE	OPEN	CLOSED	OPEN			
MAXIMUM STROKE TIME	30	30	30	30			
HISTORY OF STROKE TIMES	11.39	11.58	13.58	13.06			
	11.39	11.47	12.98	12.81			
	11.5	11.23	12.97	12.83			
	11.56	12.78	12.99	12.69			
	11.69	10.44	12.94	12.88			
	11.31	10.33	12.95	12.88			
	11.37	10.04	12.8	12.62			
	11.53	27.8	12.83	27.8			
	11.44	27.58	12.67	27.25			
	10.23	27.67	12.75	27.67			
	10.25		12.89				
	10.25		12.97				
	10.28		12.72				
	27.88		27.95				
	27.47		27.59				
	27.61		27.7				

VALVE NO.		EF HV-51	EF-HV-52	EF HV-59	EF-HV-60	EF HV-2[illegible]	EF HV-26
STROKE TEST		OPEN	OPEN	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME		75	75	60	60	40	40
HISTORY OF STROKE TIMES		57.5	57.72	26.44	20.59	29.22	29.4
		57.92	58.14	27.0	20.62	27.8	28.4
		57.7	58.15	26.78	20.49	29.01	29.22
		57.69	58.0	26.77	20.51	29.15	29.62
		57.81	58.06	26.62	20.55	28.31	29.4
		57.7	58.04	26.73	20.53	28.39	28.04
		57.53	57.92	26.73	21.51	28.25	28.45
		57.75	57.88	26.75	20.56	28.4	28.86
		57.55	57.99	26.55	20.53	28.26	28.97
		57.69	57.64	26.48	20.77	28.06	29.11
		57.77	58.23	26.55	20.34	28.25	29.83
		57.57	57.99	27.34	20.56	29.2	28.47
		57.75	51.86	24.89	20.51	28.34	
		58.39	57.89	28.34	20.89		
			57.69	26.59	20.31		

VALVE NO.	EF-HV-87	EF-HV-88	EF-HV-91	EF-HV-92	EF-HV-97	EF-HV-98	EF-PDV-19
STROKE TEST	CLOSE	CLOSE	OPEN	OPEN	CLOSE	CLOSE	OPEN
MAXIMUM STROKE TIME	5	5	30	30	30	30	30
HISTORY OF STROKE TIMES	0.33	0.47	16.0	16.05	19.56	13.11	14.[illegible]
	0.81	0.8	15.56	16.01	14.8	12.72	15.77
	0.4	0.4	14.56	14.92	16.09	11.39	13.89
	0.62	0.55	16.19	16.14	14.17	11.25	15.29
	0.45	0.411	15.36	16.89	14.56	11.25	13.72
	0.22	0.31	15.4	15.0	14.97	12.11	16.6
	0.44	0.53	14.34	12.0	14.01	11.5	13.31
	0.69	0.44	14.22	15.39	15.73	11.29	14.0
	0.51	0.25	15.19	15.88	11.17	11.38	13.15
	0.34	0.48	14.84	16.45	17.4	12.69	13.56
	0.48		17.22	16.55	15.4	14.12	14.33
	>5 *		15.14	15.84	15.03	14.03	28.7
			20.0	16.64	15.26	13.91	14.1
			13.83	15.8	14.36	13.99	13.99
				16.15	15.62		14.66
				16.36	14.67		12.56

* Valve exceeded it's maximum allowed stroke time. Corrective actions are being taken in accordance with plant procedures. Valve was tagged out of service.

VALVE NO.	EF FOV-20	EG HV-101	EG HV-102	EG HV-11	EG HV-12	EG HV-124	EG HV-134
STROKE TEST	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	30	70	70	23	23	37	37
HISTORY OF STROKE TIMES	13.11	55.14	54.59	11.29	8.2	27.22	27.44
	14.62	54.62	54.36	17.22	17.25	26.69	27.34
	12.92	54.36	54.03	17.15	17.14	27.22	28.23
	13.69	54.55	54.44	17.14	17.19	27.19	27.73
	14.0	54.7	54.3	17.11	17.14	27.15	27.72
	13.89	55.17	54.92	17.29	17.4	27.51	27.61
	15.08	55.09	54.78	17.15	17.14	27.15	27.95
	13.4	54.92	54.64	17.23	16.23	27.2	27.75
	14.7	53.95	55.28	17.2	17.2	27.26	27.81
	15.62	53.97	55.97	17.28	17.12	27.2	27.8
	14.72	54.0	56.35	17.2	17.23	27.42	27.78
	17.81	53.97				21.56	28.66
	14.25						

VALVE NO.	EG-HV-127	EG HV-127	EG HV-13	EG HV-130	EG HV-130	EG HV-131	EG HV-131
STROKE TEST	CLOSE	OPEN	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	30	30	23	30	30	30	30
HISTORY OF STROKE TIMES	25.45	25.8	17.34	26.03	26.26	25.14	25.4
	25.04	25.2	17.36	25.26	25.8	24.69	24.82
	25.25	25.61	17.28	25.65	26.21	25.08	24.84
	25.41	25.59	16.09	25.94	26.62	23.62	25.32
	25.31	25.62	17.08	25.72	26.03	25.12	25.34
	25.33	25.7	17.47	25.94	25.84	25.06	25.39
	25.09	25.37	17.09	25.7	26.14	24.81	25.12
	25.37	25.69	17.29	26.72	25.86	25.06	25.34
	25.4	26.47	17.34	25.8	26.1	25.19	25.42
	25.5	25.6	18.3	25.77	26.12	25.1	25.5
	25.4	25.73	17.28	25.12	25.84	25.12	25.34
	24.31	25.36	17.36			25.06	25.42

VALVE NO.	EG HV-132	EG HV-132	EG HV-133	EG HV-133	EG HV-14	EG HV-15	EG HV-1..
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	OPEN	CLOSE	CLOSE
MAXIMUM STROKE TIME	30	30	30	30	28	72	72
HISTORY OF STROKE TIMES	20	25.34	17.66	18.67	18.47	55.69	57.04
	20.23	22.14	17.04	20.64	18.08	55.34	56.51
	19.27	25.29	17.14	20.62	17.53	55.09	56.55
	20.48	25.28	16.71	19	17.56	55.23	56.53
	19.95	25.31	16.59	18.92	17.58	56	57
	19.84	25.29	16.73	18.98	17.47	55.8	53.2
	20.12	23.8	16.5	18.92	17.5	55.2	55.88
	19.57	22.44	16.73	19.01	17.56	55.19	56.42
	20	23.2	16.53	18.81	17.08	55.64	51.62
	20.19	23.53	16.7	18.9	17.1	55.39	53.42
	20.34	25.67	16.69	18.89	17.04	55.31	52.31
			19.29	20.8	17.14	56.04	53.88

VALVE NO.	EG HV-53	EG HV-54	EG HV-58	EG HV-59	EG HV-60	EG HV-61	EG HV-67
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	70	70	30	30	30	30	30
HISTORY OF STROKE TIMES	56.64	49.12	25.97	25.73	25.84	18.14	[illegible]
	56.41	48.61	25.12	25.23	25.53	19.78	20.19
	56.26	49.4	25.42	25.83	26.03	>30 *	20.28
	56.22	48.85	25.48	25.7	25.71	18.35	20.26
	56.23	50.58	25.59	25.69	25.86	18.25	20.58
	56.33	48.42	25.42	25.64	25.73	18.37	20.03
	56.73	48.33	25.42	25.75	25.77	18.22	20.37
			25.19	25.37	25.56	18.01	19.8
			25.42	25.78	25.84	18.36	20.3
			25.47	25.75	25.59	18.33	20.28
			25.3	25.7	25.9	18.6	22.78
			25.48	25.86	25.81	18.34	
			26.44	26.59	22.17	18.37	
						20.36	

* Valve exceeded it's maximum allowed stroke time. Corrective actions were taken in accordance with plant procedures.

VALVE NO.	EG HV-69A	EG HV-69B	EG HV-70A	EG HV-70B	EG HV-71	EG HV-72	EG HV-73
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	OPEN
MAXIMUM STROKE TIME	15	15	15	15	35	28	28
HISTORY OF STROKE TIMES	6.67	4.75	6.0	6.7	26.62	20.12	20.2
	6.7	4.28	5.75	6.61	24.12	20.17	20.11
	5.5	6.63	6.73	6.62	24.23	19.93	20.0
	4.69	4.4	6.0	6.29	24.37	20.02	20.06
	7.22	4.26	6.15	7.35	24.31	20.09	20.06
	6.88	4.0	4.62	5.14	24.34	20.15	20.01
	4.75	4.45	6.12	7.14	24.15	19.83	19.73
	6.7	4.33	6.47	8.0	24.39	19.99	20.09
	7.06	4.29	8.21	8.19	24.28	21.81	20.15
	5.97	8.23			24.3	20.1	20.0
	9.17	4.31			24.39	20.11	20.22
					26.78	20.03	20.2

VALVE NO.	EG HV-73	EG HV-73	EG HV-74	EG HV-74	EG HV-75	EG HV-75	EG RV-1C
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	28	28	28	28	28	28	5
HISTORY OF STROKE TIMES	20.59	20.61	19.75	19.72	20.31	20.23	2.69
	20.34	20.37	19.54	19.73	20.19	20.08	2.66
	20.32	20.3	19.52	19.58	20.08	20.1	2.86
	20.44	20.47	19.54	19.67	20.12	20.28	2.72
	20.44	20.39	19.91	19.66	20.22	20.4	2.7
	20.11	20.12	19.45	19.29	19.83	19.77	2.75
	20.39	20.45	19.89	19.69	20.15	20.09	2.69
	21.21	20.48	19.77	19.67	20.23	20.12	2.9
	20.4	20.5	19.6	19.8	21.0	20.1	2.75
	20.45	20.73	19.61	19.64	20.28	20.17	2.81
	20.37	20.42	19.84	19.62	20.26	20.12	

VALVE NO.	EG AV-4	EG TV-29	EG TV-30	EJ FCV-610	EJ FCV-610	EJ FCV-611	EJ FCV-611
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	5	50	50	15	15	15	15
HISTORY OF STROKE TIMES	2.53	11.88	12.88	7.67	8.75	8.19	8.26
	2.48	12.17	12.82	7.61	6.89	8.4	8.0
	2.52	11.67	12.62	7.56	8.72	8.45	8.25
	2.45	12.06	13.17	7.58	8.06	8.21	7.94
	2.55	12.25	12.7	7.45	7.95	8.28	8.29
	2.39	12.7	12.82	7.58	8.33	8.28	8.31
	2.48	12.11	12.86	7.58		9.65	
	2.4	11.8	12.2	7.62		8.09	
	2.5	11.75	11.66	7.61		8.14	
	2.67	11.62	13.09	7.56		7.75	
				7.56		8.01	

VALVE NO.	EJ HCV-2225	EJ HCV-2226A	EJ HCV-2226B			E-J HV-23	EJ-HV-14
STROKE TEST	CLOSE	CLOSE	CLOSE			CLOSE	CLOSE
MAXIMUM STROKE TIME	10	10	10			5	5
HISTORY OF STROKE TIMES	0.95	0.81	0.84			0.29	0.26
	0.88	0.33	0.81			0.37	0.4
	1.04	0.97	1.03			0.4	0.61
	0.89	0.61	1.22			0.34	0.72
	0.81	0.61	1.19			0.47	0.61
	0.94	0.75	1.22			0.47	0.64
	0.81	0.35	0.97			0.08	0.33
	0.89	0.44	1.33			0.39	0.48
	0.91	0.47	1.23			0.4	0.55
	1.01	1.8	1.14			0.3	0.44
	0.89	0.45	1.25				0.5
	0.8		1.11				

VALVE NO.	EJ HV-25	EJ HV-26	EJ HV-8701A	EJ HV-8701A	EJ HV-8701B	EJ HV-8701B	EJ HV-8716A
STROKE TEST	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	5	5	120	120	120	120	15
HISTORY OF STROKE TIMES	0.33	0.25	75.66	76.0	78.0	81.0	11.19
	0.36	0.32	75.7	76.09	77.34	80.55	11.0
	0.62	0.56	75.33	75.28	77.92	80.33	11.06
	0.44	0.25	75.4	76.06	77.4	80.51	8.97
	0.72	0.47	75.36	75.99	78.01	80.86	9.47
	0.51	0.55					
	0.25	0.47					
	0.37	0.25					
	0.42	0.37					
	0.25	0.45					
		0.41					
		0.25					

VALVE NO.	EJ HV-8716A	EJ HV-8716B	EJ HV-8716C	EJ HV-8804A	EJ HV-8804B	EJ HV-8809A	EJ HV-8809A
STROKE TEST	OPEN	CLOSE	OPEN	OPEN	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	15	15	15	15	15	15	15
HISTORY OF STROKE TIMES	11.23	11.06	11.29	9.53	9.39	10.02	10.01
	11.25	11.12	11.25	9.67	9.36	10.25	10.26
	11.01	11.13	11.08	9.99	9.11	10.14	10.12
	10.95	11.01	11.33	9.33	9.23	10.03	10.15
	11.86	9.0	10.75	9.45		10.26	10.04
				9.55		9.92	10.03

VALVE NO.	EJ HV-2209B	EJ HV-2209A	EJ-HV-2211A	EJ HV-2211A	EJ HV-2211B	EJ HV-2211B	EJ HV-2211A
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	15	15	17	17	17	17	17
HISTORY OF STROKE TIMES	10.42	10.34	10.8	10.9	10.17	10.56	10.11
	10.47	10.34	10.77	10.75	10.31	10.69	10.12
	10.19	10.4	10.69	10.72	10.67	9.64	9.95
	10.11	10.17	11.97	12.66	10.26	10.88	9.86
	10.22	10.47			12.48	10.55	10.2
	10.47	10.19					10.06

VALVE NO.	ET HV-3941	Em HV-8801A	Em HV-8801A	Em HV-8801A	Em HV-8801B	Em HV-8802A	Em HV-8802A
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	15	10	10	10	10	15	15
HISTORY OF STROKE TIMES	10.61	7.55	9.49	9.64	9.5	6.39	6.56
	10.59	7.53	9.2	9.4	9.4	6.04	6.09
	10.9	7.84	9.26	9.48	9.25	5.89	6.2
	10.71	9.33	9.4	9.51	9.39	6.04	6.53
	10.64	9.77	9.31	9.51	9.2	5.97	7.01
	10.41	9.67	9.12	9.53	9.5	6.26	6.58
		9.64	9.35	9.72	9.41	6.4	6.03
		9.66	9.33	9.31	9.25	5.81	6.09
		9.69	9.4	9.67	9.4		
		9.61	9.11	9.53	9.36		
		9.62	9.33	9.43	9.31		
		9.75	9.37				
		9.61	9.26				

VALVE NO.	Em HV-8202B	Em HV-8802B	Em HV-8803A	Em HV-8803B	Em HV-8703B	Em HV-8703A	Em HV-8707A
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	OPEN
MAXIMUM STROKE TIME	15	15	15	15	15	15	15
HISTORY OF STROKE TIMES	6.25	7.2	9.15	9.23	6.31	6.34	5.52
	6.25	7.07	9.14	9.29	6.22	6.12	5.51
	6.5	6.77	9.33	8.88	6.58	6.12	5.11
	6.33	7.0	9.34	9.01	6.67	6.23	5.42
	6.11	7.03	9.25	9.31	6.48	6.33	5.36
	6.34	7.09	9.37	9.11	6.62	6.2	5.11
	6.28	7.14	9.03	9.04	6.58	6.03	5.39
	6.31	6.75	9.11	8.8	6.4	6.03	5.47
			9.29	9.01	6.5	6.11	6.1
			9.31	9.11	6.55	6.19	5.31
			9.2	9.0			

VALVE NO.	Em HV-8201B	Em HV-8214A	Em HV-8214B	Em HV-8221A	Em HV-8221B	Em HV-8223	Em HV-8224
STROKE TEST	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	15	15	15	15	15	10	10
HISTORY OF STROKE TIMES	5.26	8.0	8.11	8.44	7.22	0.58	0.51
	5.14	7.94	8.09	8.34	7.25	0.62	0.51
	5.53	7.64	7.77	8.47	6.97	0.55	0.58
	5.23	7.88	8.09	8.57	7.59	0.55	0.48
	5.12	7.86	7.99	8.7	7.26	0.72	0.56
	4.94	7.59	7.81	8.61	6.86	0.58	0.61
	5.22	7.81	8.03	8.66	6.88	0.69	0.58
	5.22	7.9	8.01	8.61	7.25	0.45	0.54
	5.1	7.42	8.1	8.8	7.14	0.7	0.6
	5.23		7.69	8.31	7.5	0.56	0.53
					7.4		

VALVE NO.	EM HV-8235	EM HV-8236	EM HV-8237A	EM HV-8237B	EM HV-8378	EM HV-8379	EM HV-8843
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	10	10	15	15	15	15	10
HISTORY OF STROKE TIMES	7.0	7.55	8.36	8.28	8.08	7.99	0.55
	7.14	7.12	8.28	8.17	8.23	8.4	0.58
	7.01	6.58	8.53	8.28	8.01	7.86	0.4
	6.99	7.22	8.42	8.36	8.34	7.83	0.59
	7.03	7.25	8.29	8.22	7.86	7.66	0.66
	6.99	6.84	8.47	8.55	8.0	7.75	0.58
	6.92	6.72	8.25	8.14	7.91	7.57	0.51
	6.96	6.42	8.34	8.34	7.91	7.56	0.7
	6.75	6.64	8.47	8.39	7.81	7.73	0.7

VALVE NO.	EM-HV-3271	EM-HV-3281	EM-HV-XXXX	EM-HV-XXXX	EN-HV-1	EN-HV-1	EN-HV-12
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	10	10	5	10	30	30	18
HISTORY OF STROKE TIMES	1.03	0.3	1.66	0.91	24.45	26.0	11.48
	1.14	0.84	1.36	0.72	24.62	26.03	11.62
	0.95	0.81	1.36	0.84	24.61	26.01	11.48
	0.94	0.76	1.53	0.89	26.17	27.43	11.56
	1.11	0.33	1.58	0.72	26.06	26.91	11.62
	1.08	1.14	1.61	0.86			11.29
	0.36	0.73	1.41	0.8			11.42
	1.02	0.83	1.3	0.94			11.51
	1.0	0.9	1.62	0.9			11.47
	0.99	0.64		1.0			11.58
							11.48
							11.47
							11.39
							11.59
							11.51
							11.4
							11.42
							11.33

VALVE NO.	EN HV-12	EN HV-15	EN HV-16	EN HV-16	EN HV-14	EN HV-6	EN HV-6
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	18	10	10	10	10	18	18
HISTORY OF STROKE TIMES	11.78	4.53	4.95	4.73	4.23	11.4	11.99
	11.36	3.86	4.92	4.09	4.83	11.42	11.87
	11.39	3.87	4.88	4.09	4.62	11.45	11.86
	11.99	4.04	4.83	4.25	4.7	11.15	11.86
	11.84		4.91		4.67	11.36	11.58
	11.45		4.97		4.72	11.36	11.66
	11.8		4.59		4.78	11.45	11.86
	11.76		4.55		4.72	11.48	11.84
	11.83		4.4		4.84	11.7	11.4
	12.11				4.78	11.56	11.89
	11.87				4.62	11.55	11.92
	11.78					11.59	12.0
	11.77					11.66	11.89
	12.01					11.5	11.78
	12.34					11.83	12.25
	11.75					11.59	11.84
	11.91						
	11.72						

VALVE NO.	EN HV-7	EN HV-7	EP HV-8202A	EP HV-8202A	EP HV-8208B	EP HV-8208B	EP HV-8204C
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	30	30	12	12	12	12	12
HISTORY OF STROKE TIMES	10.78	21.89	11.0	10.8	10.97	10.55	11.77
	13.53	21.86	11.01	10.94	10.92	10.64	10.75
	20.54	21.77	10.83	10.44	10.77	10.25	10.73
	20.73	26.89					10.75
	27.14	25.8					
	24.31						

VALVE NO.	EPHV-3303C	EPHV-3303D	EPHV-3303D	EPHV-3303C	EPHV-8950A	EPHV-8950B	[illegible]
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	12	12	12	10	10	10	[illegible]
HISTORY OF STROKE TIMES	11.25	10.5	10.6	1.92	0.81	0.81	[illegible]
	10.97	10.55	10.39	1.75	0.67	0.44	[illegible]
	11.0	10.42	10.09	1.53	0.19	0.22	[illegible]
	11.0			1.26	0.72	0.81	[illegible]
				1.45			
				1.22			
				1.31			
				1.29			
				1.26			
				1.39			

VALVE NO.	EP HV-3950B	EP HV-3950C	EP HV-3950C	EP HV-3950D	EP HV-3950D	EP HV-3950E	EP HV-3950E
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	10	10	10	10	10	10	10
HISTORY OF STROKE TIMES	0.58	0.48	0.72	1.23	0.46	0.55	0.7
	0.5	0.28	0.37	0.33	0.26	0.53	0.25
	0.2	0.2	0.2	0.23	0.22	0.22	0.17
	0.32	0.67	0.39	0.31	0.26	0.35	0.26

VALVE NO.	EP HV-8950E	EP HV-8950F	FC FV-310	FC HV-312		GS HV-12	GS HV-11
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN		CLOSE	[illegible]
MAXIMUM STROKE TIME	10	10	5	15		5	5
HISTORY OF STROKE TIMES	0.66	0.67	1.75	7.69		0.66	0.53
	0.34	0.61	1.0	7.97		0.23	0.34
	0.29	0.34	2.17	8.66		0.34	0.25
	0.2	0.2	1.28	8.97		0.4	0.37
	0.36	0.25	1.17	8.64		0.44	0.33
			1.15	9.88		0.56	0.47
			1.17	8.81		0.42	0.34
				7.44		0.28	0.25
				8.5		0.48	0.48
				7.8			
				8.01			

VALVE NO.	GS HV-13	GS HV-13	GS HV-14	GS HV-14	GS HV-17	GS HV-17	GS HV-17
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	5	5	5	5	5	5	5
HISTORY OF STROKE TIMES	0.56	0.45	0.5	0.45	0.42	0.67	0.52
	0.28	0.29	0.22	0.29	0.31	0.28	0.31
	0.45	0.31	0.34	0.26	0.42	0.25	0.4
	0.47	0.34	0.51	0.37	0.33	0.36	0.33
	0.26	0.37	0.4	0.28	0.33	0.33	0.41
	0.45	0.23	0.42	0.31	0.39	0.31	0.42
	0.31	0.45	0.31	0.37	0.31	0.37	0.36
	0.25	0.28	0.2	0.22	0.26	0.22	0.26
	0.4	0.36	0.39	0.37	0.34	0.33	0.42

VALVE NO.	GS HV18	GS HV-2C	GS HV-2C	GS HV-21	GS-HV-21	GS HV-3	GS HV-3
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
MAXIMUM STROKE TIME	5	5	5	5	5	5	5
HISTORY OF STROKE TIMES	0.39	2.89	3.69	2.97	3.17	0.53	0.56
	0.29	3.2	3.59	3.2	3.12	0.29	0.29
	0.25	3.84	3.67	3.64	3.95	0.36	0.28
	0.36	3.83	3.57	3.2	3.12	0.28	0.31
	0.26	3.83	3.77	3.44	3.12	0.23	0.31
	0.31	3.78	3.06	3.2	3.66	0.4	0.26
	0.31	3.97	3.8	3.11	3.26	0.23	0.28
	0.22	3.84		3.19		0.39	0.33
	0.37	3.86		3.03			
		3.91		3.14			
		3.61		3.25			
		3.72		3.17			
				3.15			

VALVE NO.		GS HV-31	GS HV-32	GS HV-33	GS HV-34		GS HV-3[illegible]
STROKE TEST		CLOSE	CLOSE	CLOSE	CLOSE		CLOSE
MAXIMUM STROKE TIME		5	5	5	5		5
HISTORY OF STROKE TIMES		0.53	0.42	0.48	0.47		0.61
		0.42	0.25	0.4	0.25		0.29
		0.4	0.36	0.4	0.39		0.47
		0.41	0.36	0.36	0.45		0.36
		0.28	0.26	0.36	0.31		0.26
		0.39	0.34	0.39	0.34		0.44
		0.34	0.55	0.42	0.4		0.53
		0.86	0.37	0.5	0.34		0.42

VALVE NO.	GS HV-37	GS HV-38	GS HV-39	GS HV-4	GS HV-4	GS HV-5	GS HV-5
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	OPE-
MAXIMUM STROKE TIME	5	5	5	5	5	5	5
HISTORY OF STROKE TIMES	0.48	0.5	0.59	0.45	0.58	0.45	0.4
	0.26	0.23	0.33	0.34	0.33	0.28	0.34
	0.39	0.34	0.4	0.45	0.33	0.25	0.3
	0.45	0.34	0.28	0.31	0.28	0.37	0.29
	0.25	0.29	0.28	0.29	0.26	0.23	0.23
	0.39	0.22	0.25	0.42	0.29	0.31	0.28
	0.4	0.44	0.5	0.31	0.26	0.37	0.31
	0.33	0.31	0.44	0.31	0.4	0.27	0.28

VALVE NO.	GS HV-8	GS HV-8	GS HV-9	GS HV-9	GT HZ-11	GT HZ-12	GT HZ-4
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	5	5	5	5	3	3	3
HISTORY OF STROKE TIMES	0.45	0.39	0.44	0.58	2.03	2.06	2.55
	0.24	0.36	0.29	0.26	2.58	2.29	2.67
	0.4	0.26	0.4	0.26	2.37	2.12	2.69
	0.29	0.34	0.37	0.33	2.91	1.86	2.81
	0.23	0.28	0.23	0.23	2.53	2.53	2.53
	0.25	0.2	0.25	0.23	2.7	2.08	2.42
	0.33	0.25	0.39	0.25	2.56	2.33	2.39
	0.35	0.31	0.36	0.28	2.92	1.92	2.69
					2.03	2.31	2.56
					2.26	2.11	2.57
					2.51	2.42	2.66
					2.61	2.47	2.62
					2.84		

VALVE NO.	GT HZ-5	GT HZ-6	GT HZ-7	GT HZ-8	GT HZ-9	HB HV-7126	HB HV-7136
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	3	10	10	10	10	10	10
HISTORY OF STROKE TIMES	2.23	5.31	4.92	5.53	5.36	0.8	3.5
	2.34	4.61	5.31	5.34	1.24	1.51	3.4
	2.72	5.71	3.92	4.51	4.67	0.99	3.04
	2.37	4.97	4.19	6.32	4.76	0.83	2.81
	2.69	4.39	4.88	4.64	4.61	1.25	3.03
	2.7	1.24	1.26	3.29	3.67	0.99	3.31
	2.55	4.8	4.86	5.04	4.97	0.75	3.06
	2.73	4.52	4.55	4.31	2.91	0.73	2.88
	2.69	4.36	4.23	4.73	4.78		3.33
	2.56	4.28	4.75	4.15	4.5		
	2.64	4.25	3.97	4.67			

VALVE NO.	HB HV-7150	HB HV-7176	KA FV-19	KA HV-30	KC HV-253	KJ HV-1	KJ HV-101
STROKE TEST	CLOSE	CLOSE	CLOSE	OPEN	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	10	10	5	15	30	15	15
HISTORY OF STROKE TIMES	0.67	2.81	3.10	9.27	19.72	3.75	8.89
	0.81	2.73	2.7	8.39	19.84	3.6	9.0
	0.64	2.5	3.56	8.39	19.97	3.64	8.81
	0.5	2.64	2.73	8.36	19.78	3.6	8.77
	0.8	2.77	3.01	9.53	20.0	3.33	8.69
	0.66	3.72			19.81	3.43	8.84
	0.66	2.07			19.73	3.53	8.86
	0.73	2.95			19.56	3.73	8.86
					19.78	3.42	8.25
					19.86	3.7	8.58
					19.8	3.61	8.4
					19.8	3.7	

VALVE NO.	KJ HV-1C2	KJ HV-2	LF FV-95	LF FV-96	LE HV-105	LF HV-106	SJ HV-12
STROKE TEST	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE	CLOSE
MAXIMUM STROKE TIME	15	15	30	4	35	35	5
HISTORY OF STROKE TIMES	8.9	9.61	23.53	1.72	24.22	24.4	0.5
	8.8	9.6	24.01	0.97	25.11	26.03	0.56
	8.88	9.67	23.89	1.62	24.2	25.04	0.61
	9.0	9.6	23.84	1.89	23.31	23.77	0.58
	8.73	8.43	22.91	3.22	24.78	24.75	0.23
	8.69	9.62	23.8	2.2	24.28	24.69	0.55
	8.73	9.55	23.95	2.31	24.36	24.73	0.7
	9.03	9.7	23.84	2.23	24.39	24.56	0.7
	8.99	8.4	24.0	2.61	24.11	24.77	0.61
	9.08	8.47	23.75	2.58	26.0	25.0	—
	9.01	8.8	23.84	1.73	26.03	24.88	
	8.5		26.39	2.48	25.44	24.64	
			26.15	2.06	26.01		
				2.29	25.47		

VALVE NO.	SJ HV-127	SJ HV-127	SJ HV-128	SJ HV-128	SJ HV-129	SJ HV-129	SJ HV-1
STROKE TEST	CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
MAXIMUM STROKE TIME	5	5	5	5	5	5	5
HISTORY OF STROKE TIMES	0.53	0.34	0.61	0.31	0.34	0.34	0.51
	1.53	0.31	0.45	0.36	0.33	0.37	0.51
	0.33	0.29	0.47	0.44	0.42	0.45	0.63
	0.47	0.42	0.7	0.4	0.41	0.44	0.53
	0.45		0.56		0.42		0.55
	0.69		0.51		0.51		0.55
	0.42		0.53		0.41		0.62
	0.62		0.67		0.8		0.64
	0.56		0.62		0.44		

VALVE NO.	SJ HV-130	SJ HV-130	SJ HV-131	SJ HV-132	SJ HV-12	SJ HV-19	SJ HV-20
STROKE TEST	CLOSE	OPEN	CLOSE	CLOSE	CLOSE	CLOSE	OPEN
MAXIMUM STROKE TIME	5	5	5	5	5	5	5
HISTORY OF STROKE TIMES	0.39	0.26	0.51	0.59	0.28	0.36	0.34
	0.39	0.25	0.47	0.31	0.29	0.33	0.42
	0.5	0.39	0.64	0.67	0.5	0.7	0.44
	0.65	0.4	0.55	0.44	0.29	0.4	0.62
	0.55		0.59	0.33	0.4	0.53	
	0.5		0.47	0.23	0.33	0.42	
	0.29		0.62	0.66	0.25	0.44	
	0.73		0.57	0.47	0.29	0.39	
	0.5				0.5		
					0.42		
					0.42		

VALVE NO.	SJ HV-4	SJ HV-5	SJ HV-5	SJ HV-6	SJ HV-6		
STROKE TEST	OPEN	CLOSE	OPEN	CLOSE	OPEN		
MAXIMUM STROKE TIME	5	5	5	5	5		
HISTORY OF STROKE TIMES	0.4	0.47	0.33	0.45	0.5		
	0.31	0.48	0.37	0.37	0.2		
	0.23	0.56	0.5	0.36	0.23		
	0.51	0.56	0.26	0.4	0.33		
		0.48		0.51	0.81		
		0.31		2.37			
		0.61		0.62			
		0.56		0.42			
		0.61		0.42			
				0.67			