APPENDIX 1

Test 1.

Date 5/25/00
Used Pneumatic Pump to pump water into the 8-5/8" x 5-1/2" annulus
The pressure observed at surface on the 8-5/8" x 5-1/2" annulus and the corresponding pressure response on the other annului and Tubing were as given below.

Yield stress of mud used	12	lbs/ 100 sq.ft
Gel Strength of mud used	125	lbs/ 100 sq.ft

When pumped from the 8-5/8" x 5-1/2"

Pressure to break fluid based on Yield stress	46.8 psi
Pressure to break fluid based on Gel Strength	487.8 psi

When pumped from the 1.9"

Pressure to break fluid based on Yield stress	67.6 psi
Pressure to break fluid based on Gel Strength	704.5 psi

Time Start	Water Volume Pumped (milliliter)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
14:50	-	26.4	85	85	15.83	20
	490	35.9	85	85	16.50	20
	670	45.8	85	85	16.00	20
	710	54.4	85	85	16.76	20
	820	65.5	85	85	16.48	20
	1,090	73.0	100	100	14.21	20
	1,010	82.7	105	105	15.82	20
	1,340	95.0	108	108	20.87	25
	3,420	102.0	125	125	31.30	35
	*NR	150.0	170	170	91.90	95
	*NR	200.0	220	220	140.20	145
	*NR	250.0	270	270	194.50	205
	*25810	300.0	320	320	251.50	255

* Cumulative volume pumped is 25,810 ml
NR _No record

Bleeding of Pressure from 8-5/8" x 5-1/2" Annulus

Time Start	Water Volume Bled off (milliliter)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
	0	237.8	278	278	241.4	250
	0	232.2	268	268	236.7	250

Test 2. Bleeding of Pressure from 8-5/8" x 5-1/2" Annulus after waiting for 1 hour

Expected GS	65 lbs/100 sq ft
Expected Yield Stress	12 lbs/100 sq ft

Time Start	Water Volume Bled off (milliliter)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
16:45	-	198.6	260	260	208.4	220
	310	196.0	250	250	206.4	220
	540	195.2	240	240	205.7	220
	560	193.0	230	230	205.0	215
	710	192.6	220	220	204.4	215
	900	190.3	210	210	202.3	210

APPENDIX 2

Date **5/26/00**

Pulsation Test Using CTES Pulsation Unit
Applied Pressure Pulse (water) through the 8-5/8" x 5-1/2" Annulus

Test -3

Pulse Pr. (psi)	Pressurization (Sec)	Waiting (Sec)
60	20	20

Time Start	Water Volume Bled off (milliliter)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
	0	3.8	84	84	23.57	27
	1080	8.8	64	64	23.90	26

Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
9.56	6.36	52.0	64	64	21.80	26
	6.17	58.5	64	64	21.88	26
	5.08	60.0	64	64	22.20	26
	4.96	60.4	64	64	22.20	26
	5.85	60.5	64	64	21.98	26
	4.55	60.7	76	76	21.20	26
	6.59	60.2	80	80	21.50	26
	6.42	60.7	82	82	21.60	26
	6.38	60.5	84	84	21.20	26
	3.25	60.6	84	84	21.55	26
	5.73	60.9	86	86	21.70	26
	6.03	61.4	86	86	21.55	26
	4.61	62.4	87	87	21.55	26
	3.65	61.8	87	87	21.55	26
	4.65	61.6	88	88	21.80	26
	4.67	61.6	89	89	21.88	26
	5.49	61.9	90	90	21.88	26
	5.85	61.2	90	90	22.22	26
	6.06	61.3	91	91	22.22	26
	5.36	62.1	91	91	22.56	26

Stopped Pulsation at 10:05 Hrs.
Bled off pressure from tubing to zero. Volume of slurry recovered 1880 ml @10:15
Changed gauge on tubing from 0 -100 psi to 0-60 psi @ 10:20 Hrs

Test -4

Pulse Pr. (psi)	Pressurization (Sec)	Waiting (Sec)
60	20	20

Time Start	Water Volume Pumped (milliliter)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
10:15	0	4.2	86	86	-2.19	0
10:22	0	4.3	86	86	-1.60	0

Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
10:27	No record	61.2	90	90	-3.00	0
		61.7	90	90	-3.00	0
		60.4	91	91	-3.00	0
		60.5	91	91	-3.00	0
		60.3	91	91	-3.00	0
		60.3	92	92	-2.70	0
		60.4	92	92	-2.60	0
		61.4	92	92	-2.80	0
		61.3	92	92	-2.60	0
		61.3	92	92	-2.60	0

Test -5

Pulse Pr. (psi)	Pressurization (Sec)	Waiting (Sec)
66.5	20	20

Closed valve at 10:44 Hrs
Test Pulse 66.5 psi 67.5 psi in 8-5/8" x 5-1/2" annulus

Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
10:45						
	3.59	65.1	91	91	-2.00	0
	6.02	65.4	92	92	-2.30	0
	4.94	67.7	93	93	-2.00	0
	5.5	65.8	94	94	-2.00	0
	4.46	66.9	96	96	-1.70	0
	5.01	66.9	96	96	-3.00	0
	5.19	65.2	96	96	-2.80	0
	5.39	67.4	97	97	-2.80	0
	4.77	65.5	98	98	-3.00	0
	5.56	65.3	98	98	-2.70	0
Stopped at		10:54 Hrs				
10.55	4.90	65.6	97	97	-2.70	0
	6.58	66.3	98	98	-2.70	0
	5.01	65.6	98	98	-3.00	0
	5.2	65.7	99	99	-2.70	0
	5.04	65.3	99	99	-2.70	0
	3.51	65.8	99	99	-2.70	0
	6.01	65.8	99	99	-2.70	0
	5.63	65.5	100	100	-2.70	0
	5.44	65.2	100	100	-2.70	0
	5.66	66.8	100	100	-2.70	0
Stopped at		11:03 Hrs				

Test -6

Pulse Pr. (psi)	Pressurization (Sec)	Waiting (Sec)				
85	20	20				
	Intermediate		Tubing			
Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus	SurfacePressure in 2-7/8" x 1.9" Annulus	SurfacePressure in 1.9" Tubing Tubing	
					Digital Gauge	Analog
11.05	5.33	85	102		-2.7	0
	6.92	85	103		-2.7	0
	6.18	85	104		-2.7	0
	6.08	86.3	110		-2.35	0
	6.75	85.8	112		-2.35	0
	6.46	86.1	115		-2.7	0
	5.61	85.3	114		-2.35	0
	6.84	85.6	114		-2.05	0
	7.1	85.3	115		-2.01	0
	5.02	85.4	117		-1.68	0
11.12	5.47	84.2	117		-1.68	0.5
	7.55	83.6	117		-1	0.5
	5.34	54.3	116		-1	0.8
	5.86	84.5	118		-1	1
	4.94	85.2	118		-0.6	1.25
	5.44	85.3	118		-0.6	1.5
	5.54	84.3	118		-0.6	1.7
	5.47	85.3	119		-0.4	1.9
	4.23	86.2	119		0	2
	5.87	86.2	119		-0.3	2.5

Test -7

Pulse Pr. (psi)	Pressurization (Sec)	Waiting (Sec)				
85	40	40				
Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus	SurfacePressure in 2-7/8" x 1.9" Annulus	SurfacePressure in 1.9" Tubing Tubing	
					Digital Gauge	Analog
11.22	6.97	87.5	121		0.67	3.7
	6.91	87.3	123		0.67	4
	5.5	88.4	124		2	5
	6.02	87.8	124		3.7	6.25
	5.57	87.4	124		4.7	8
	5.1	87.8	124		7	10
	5.4	87.3	124		9	12
	5.3	87.8	124		11	14
	5.56	87.8	124		13	16
11.35	5.09	87.3	124		15	18

Test -8

	Pulse Pr. (psi) 85	Pressurization (Sec) 80	Waiting (Sec) 20			
Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus	SurfacePressure in 2-7/8" x 1.9" Annulus	SurfacePressure in 1.9" Tubing Tubing	
					Digital Gauge	Analog
11.37	5.82	88.9	127		22	18.8
	5.63	88.4	125		26.5	23
	5.35	88.6	127		30	26.6
	5.12	88.5	126		33	29.9
	4.79	88.2	128		37	33.6
	4.65	88.8	128		38	34.9
	5.35	88.4	128		39	35.6
	4.46	88.3	129		40.5	37.3
	4.81	88.6	130		42	38
	4.74	88.5	130		42.5	38.7
	4.76	88.5	129		43	39.7
	5.37	88.2	129		43	40
	4.76	89.1	129		43.5	40
	5.1	88.6	128		43.5	40.7
	4.93	88.3	129		43.5	40.4

Test -9

	Pulse Pr. (psi) 85	Pressurization (Sec) 100	Waiting (Sec) 50			
Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus	SurfacePressure in 2-7/8" x 1.9" Annulus	SurfacePressure in 1.9" Tubing Tubing	
					Digital Gauge	Analog
12.07	4.74	88.7	129		44	40.5
	6.05	89.1	129		44	40.4
	4.81	89.1	129		44.5	41
	4.89	89.1	129		44.3	41.4
	4.78	89.1	129		44.5	41.6

Test -10

Pulse Pr. (psi)	Pressurization (Sec)	Waiting (Sec)
110	80	40

Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus	SurfacePressure in 2-7/8" x 1.9" Annulus	SurfacePressure in 1.9" Tubing Tubing	
					Digital Gauge	Analog
12:26	4.86	110	86		44.5	41.4
	6.78	112	150		45	40.7
	5.67	112.5	152		46	41.7
	5.30	112.8	152		50.5	47
	5.27	112.9	153		54	51.5
	5.33	112.9	153		57.5	54.4
	5.72	112	153		59.5	67.5
	5.76	112.9	154		62	58.9
	5.90	112.8	154		64	60.2
	5.31	112.9	154		64	61.4
	5.77	113	154		65.1	62.6
Bleeded 1560 cc water from intermediate annulus the pressure reduced to 64 psi						

Test -11

Pulse Pr. (psi)	Pressurization (Sec)	Waiting (Sec)
110	60	40

Before Pulsation Test - 11

Time Start	Water Volume Bled Off (milliliter)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing Tubing	
					Digital Gauge	Analog
12:57	0	4.6	66	66	45.09	56
	2160	4.6	67	67	-1.30	0

Bled off from tubing

Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing Tubing	
					Digital Gauge	Analog
13:05	5.77	112.3	146.0	146.0	0.67	4
	7.14	112.8	146.0	146.0	17.50	19
	5.59	112.2	149.0	149.0	33.00	40
	6.21	112.3	150.5	150.5	55.00	57
	5.01	112.5	151.0	151.0	59.50	63
	5.63	112.4	154.0	154.0	63.30	66
	5.31	112.9	154.0	154.0	65.30	67
	5.95	112.9	155.0	155.0	65.80	69
	6.27	113.0	155.0	155.0	66.30	70
	5.86	112.4	154.0	154.0	66.30	70
Stopped at		13:20 Hrs				

Test -12

Pulse Pr. (psi)	Pressurization (Sec)	Waiting (Sec)
134	60	40

Time Start	Water Volume Pumped (gallons)	SurfacePressure in 8-5/8" x 5-1/2" Annulus(Psi)	SurfacePressure in 5-1/2" x 2-7/8" Annulus(Psi)	SurfacePressure in 2-7/8" x 1.9" Annulus(Psi)	SurfacePressure in 1.9" Tubing(Psi)	
					Digital Gauge	Analog
13:26	6.08	138.0	178.0	178.0	67.70	75
	7.96	138.0	180.0	180.0	82.80	86
	6.81	138.5	180.0	180.0	86.70	90
	6.26	138.6	181.0	181.0	87.80	91
	7.08	138.6	181.0	181.0	87.10	91
Stopped at		13:36 Hrs				

APPENDIX 3

Test 13.

5/29/00		Outer Annulus	Intermediate	Tubing		
Time Start	**Water Volume Pumped (cc)**	**SurfacePressure in 8-5/8" x 5-1/2" Annulus Digital (psi)**	**SurfacePressure in 5-1/2" x 2-7/8" Annulus (psi)**	**SurfacePressure in 1.9" Tubing Digital Gauge**	**Analog**	**Remarks**
15:35	0	3.1	58	0.33		**Pressurization from**
	5000	3.1	58	10		**tubing after 2 hours**
	2000	3.1	58	20		**static**
	2000	3.1	58	30		
		3.1	58	45		
	2500	3.1	58	50		
		3.1	58	60		
		3.1	58	70		
		3.1	58	80		
		3.2	60	90		
	1500	3.2	62	100		
		3.2	66	110		
	2000	3.2	98	120		
	2000	3.2	126	130		
	2600	7.4	124	127		Tubing pressure began
	1400	9.6	123	120.5		to drop whilst pressurin
		12.4	122	117		observed response in
	3500	16.2	126	120.5		outer annulus
		18.7	128	122		
	3000	23	132	126		
		27.3	136	130		
	4000	30.4	140	133		
	3000	40	147	137.7		
16:08	3000	48.4	153	142.4		
		56.8	178	180.4		No vol measured
		70	188	189		pressurized to increase
		80	196	195.6		pressure
		84.6	200	199		
16:20	0	94.4	182	144		**Bleeding from tubing**
	800	94	182	94		
	300	93.9	178	69		
	540	93.6	165	58		
	720	93.3	154	50		
	1400	92.7	139	40		
	1540	92	127	30.9		
	1100	91.6	120	15.9		
		91	115	15.5		
16:30	750	90.8	108	0		
Bled off pressure on outer annulus						
18:30	No record	5.4	60	3.03		

APPENDIX 4

Test 14.

		Outer Annulus		Intermediate	Tubing		Date 05/30/2000
Time Start	**Water Volume Pumped**	**SurfacePressure in 8-5/8" x 5-1/2" Annulus**		**SurfacePressu 5-1/2" x 2-7/8" Annulus**	**SurfacePressure in 1.9" Tubing Tubing**		**Remarks**
		Digital	**Analog**		**Digital G**	**Analog**	
	(cc)	(psi)	(psi)	(psi)	(psi)	(psi)	
1435	0	9.9	10	62	4.3	8.5	Static test Pumping
	2700	20	20.3	62	4.3	8.5	through annulus
	3600	30	30	62	4.37	8.5	after 20 hrs
	3000	40	40	62	4.7	8.5	
	2400	50	50	62	5.38	8.5	
	2300	60	60	63	4.7	8.5	
	2050	70	70	68	4.03	8.5	
	2020	80	70	74	3.7	8.5	
	2580	90	90	94	4.6	8.5	
1518	2200	100	100	110	4.7	8.5	Stopped and changed
1520	1950	110	110	120	4.98	8.5	pressure gauge on outer
	1450	120	120	128	4.7	8.5	annulus from (0-100psi)
	1500	130	130	138	5.7	10	to (0-200psi)
	1850	140	140	145	8.7	12	
	2280	144	144	150	29.3	36	Observed slow change
	1000	146.1	146	158	52.8	58	in outer annulus pressure
	1000	149.2	149	162	63.3	70	when tubing started
	850	154.2	154	169	74	80	responding
	1050	160.3	160	176	81.4	89	
	1050	170.2	170	181	89.5	97	
1547	1000	180.2	180	195	97.9	105	
	37830						

Time Start	**Water Volume Pumped**	**SurfacePressure in 8-5/8" x 5-1/2" Annulus**		**SurfacePressu 5-1/2" x 2-7/8" Annulus**	**SurfacePressure in 1.9" Tubing**		**Remarks**
		Digital	**Analog**		**Digital**	**Analog**	Bleeding from annulus
		180.2		195	97.9	105	
1558	0	155.5		199	116	120	stabilized
	1000	133		198	116	120	
	1000	113		196	116	120	
	1000	107.1		195	116	121	
	1000	97.6		194	116	121	
	1000	89.1		192	116	121	
	1000	78.6		191	116	121	
	1000	72.1		190	115.8	121	
	1000	65.8		187	115.8	121	
	1000	60.2		184	115.5	121	
	1000	55		178	115.1	121	
	1000	49.8		172	115.1	121	
	1000	45.3		168	115.1	121	
	1000	41.1		162	115.1	121	
	1000	37.5		158	114.8	121	
	1000	33.6		152	114.8	121	
	1000	30.4		148	114.8	121	
	1000	27.4		143	114.4	121	
	1000	24.6		139	114.4	121	
	1000	22		134	114.4	121	
	1000	19.5		130	114.4	121	
	1000	16.8		127	114.1	121	
	1000	14.3		123	111.8	121	
	1000	11.2		120	109.4	118	
	1000	9		112	106	117	
	1000	6.5		108	102	116	
	1000	4.2		106	97.6	112	
	1000	2.2		101	93.6	108	
	1000	0.7		98	89.6	106	
16.17	1300	0.1		86	77.4	100	

APPENDIX 5

Test 15.

Outer Annulus Intermediate Tubing Date 06/01/2000

Time Start	Water Volume Pumped	SurfacePress 8-5/8" x 5-1/2" Annulus Digital	SurfacePressure 5-1/2" x 2-7/8" Annulus	SurfacePressure in 1.9" Tubing Tubing		Remarks
				Digital Gauge	Analog	
		(psi)	(psi)	(psi)	(psi)	
10.30	0	54	110	76.44	82	Static test Pumping
	400	64.2	110	76.77	82	through annulus
	400	74	110	77.11	82	**8-5/8" x 5-1/2"**
	550	84	110	77.11	82	after (42) hrs
	550	94	110	77.11	82	
	550	104	112	77.11	82	
	570	114	114	77.11	82	
	810	124	115	77.45	83	
	900	134	118	76.77	83	
	1570	144	138	77.45	84	
	1570	154	158	77.17	84	
	1300	164	170	77.4	84	
	1150	174	181	77.2	84	
	1000	184	190	77.7	84	
11.00	850	194	202	77.78	84	**Stopped and changed**
	1000	204	210	81.19	90	**pr gauge on 8-5/8"X5-1/2"**
	1000	214	215	86.9	94	**Annulus**
	750	224	225	91.25	98	
	1550	234	240	105.7	112	
	1000	244	250	123	130	
	1100	254	262	140.4	148	
	1000	264	275	155.2	162	
	1000	274	282	170.3	178	
	1100	284	297	183.8	192	
11.22	500	289	304	191.6	198	**End**

Time Start	Water Vol Pumped	SurfacePress 8-5/8" x 5-1/2" Annulus Digital	SurfacePressure 5-1/2" x 2-7/8" Annulus	SurfacePressure in 1.9" Tubing Tubing		Remarks
				Digital Gauge	Analog	Bleeding from annulus
11.22		289	304	191.6		
11.27	0	257.5	306	212		Stabilized, test started
	1000	217	304	213.5		
	1000	195.3	302	213.5		
	1000	177.8	298	213.5		
	1000	164.3	296	213.5		
	1000	152.7	285	213.5		
	1000	143.3	276	212.8		
	1000	134.3	262	212.1		
	1000	125	258	211.8		
	1000	116.2	240	211.8		
	1000	107	230	211.8		
	1000	98.3	220	211.1		
	1000	89.6	210	205.7		
	1000	81.1	200	196.9		
	1000	73	190	185.5		
	1000	64.8	181	173.4		
	1000	58.1	170	163.9		
	1000	49.2	162	156.2		
	1000	40.8	155	150.8		
	1000	34	150	145		
	1000	28.6	144	139		
	1000	23	138	132		
	1000	16.6	133	127.5		
	1000	12.5	128	122.9		
	1000	9	122	117		
	1000	5.4	118	113.8		
	1000	2.9	114	108.4		
	1000	0.5	109	103.7		
	1000	0.1	103	95.3		
12.00	1000	0	96	76		

Test 16

Outer Annulus | Intermediate Tubing | Date 06/01/2000

Time Start	Water Vol Pumped	SurfacePressure in 8-5/8" x 5-1/2" Annulus Digital	Analog	SurfacePres 5-1/2" x 2-7/ Annulus	SurfacePressure in 1.9" Tubing Tubing Digital	Analog	Remarks
	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	
1400	0	8.4		98	70.3	77	Static test Pumping
	1000	18.4		98	70	77	through annulus
	1300	28.4		98	69.3	77	after 2 hrs
	1200	38.4		98	69	77	
	1000	48.4		98	69.3	77	
	910	58.4		100	69.3	77	
	820	68.4		102	69.2	77	
	880	78.4		103	69.2	77	
	850	88.4		104	69	77	
	860	98.4		106	69.3	77	
	910	108.4		109	69.3	77	
	890	118.4		114	69.3	77	
	1000	128.4		125	69.3	77	
	1340	138.4		140	69.7	77	
	1160	148.4		153	70	77	
	1150	158.4		164	70.3	77	
	1000	168.4		176	70.5	77	
	1070	178.4		186	71	77.5	
	1000	188.4		196	71	78	
	1000	198.4		210	73	80	
	1000	208.4		220	79.4	86	
	1000	218.4		230	92.2	100	
	1230	228.4		240	112	120	
	1000	238.4		250	130.3	138	
	1160	248.4		260	146.8	154	
	1000	258.4		270	161.5	168	
	1160	268.4		280	174.7	180	
1430	1000	278.4		295	187.9	198	End

Time Start	Water Vol Pumped	SurfacePressure in 8-5/8" x 5-1/2" Annulus Digital	Analog	SurfacePres 5-1/2" x 2-7/ Annulus	SurfacePressure in 1.9" Tubing Tubing Digital Ga	Analog	Remarks
		278.4		295	187.9	198	Bleeding from annulus
1432	0	264.2		300	205.7		stabilized
	1000	220		300	208.7		
	1000	199		298	209		
	1000	181.3		295	209.7		
	1000	168		290	209.7		
	1000	153		280	209.1		
	1000	142.2		275	209.1		
	1000	133.2		260	208.4		
	1000	124.8		250	208.1		
	1000	116.2		240	208.1		
	1000	107.8		230	208.1		
	1000	94.8		222	207.7		
	1000	86.6		215	206.7		
	1000	78.5		207	203.3		
	1000	71.2		199	196.3		
	1000	64.4		190	186		
	1000	57.4		180	177.6		
	1000	51.4		175	164.6		
	1000	45.2		165	157.9		
	1000	39.6		160	148.8		
	1000	34.1		152	141.4		
	1000	25.8		148	135.3		
	1000	20.6		140	130		
	1000	16.1		135	125		
	1000	12.5		130	120.2		
	1000	9.6		125	113.4		
	1000	6.8		120	107		
	1000	3.1		115	103.3		
	1000	1.3		112	99		
14.50	1300	0		107	91.6	End	

Test 17

Outer Annulus | Intermediate | Tubing | Date 06/01/2000

Time Start	Water Vol Pumped	SurfacePressure in 8-5/8" x 5-1/2" Annulus		SurfacePr 5-1/2" x 2- Annulus	SurfacePr 2-7/8" x 1. Annulus	SurfacePressure in 1.9" Tubing Tubing		Remarks
		Digital	Analog			Digital	Analog	
	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	
1500	0	3.9		96		70	76	Static test Pumping
	1500	14		96		69.4	76	through annulus
	1260	24		96		69.3	76	after 10 min
	1200	34		96		69.3	76	
	1000	44		98		69.3	76	
	1000	54		98		69.5	76	
	850	64		100		69.5	76	
	820	74		101		69.3	76	
	860	84		102		69.3	76	
	850	94		105		69.2	76	
	940	104		108		69	76	
	850	114		116		68.6	76	
	1350	124		128		68.6	76	
	1000	134		139		68.6	76	
	1000	144		149		68.6	76	
	1000	154		160		68.6	76	
	1200	164		170		68.6	76	
	1000	174		180		69	76	
	1000	184		190		70.3	77	
	1000	194		205		73.7	80	
	1400	204		215		82.6	90	
	900	214		225		91	98	
	1000	224		235		105.7	114	
	1120	234		245		119.7	126	
	1000	244		255		136.6	142	
	1220	254		265		151.6	157	
	1000	264		275		162.2	170	
	1250	274		285		171.4	182	
1517	1000	284		295		186.9	192	End

Time Start	Water Vol Pumped	SurfacePressure in 8-5/8" x 5-1/2" Annulus		SurfacePr 5-1/2" x 2- Annulus	SurfacePr 2-7/8" x 1. Annulus	SurfacePressure in 1.9" Tubing Tubing		Remarks
		Digital	Analog			Digital Ga	Analog	Bleeding from annulus
		284		295		186.9	192	
1519	0	271.9		310		215		stabilized
	1000	225		310		217		
	1000	203		307		218		
	1000	188.5		305		218		
	1000	170		300		218		
	1000	156		295		218		
	1000	148.1		280		218		
	1000	140		270		218		
	1000	130.6		260		218		
	1000	121.7		245		218		
	1000	111.3		235		217.5		
	1000	100.8		225		216.5		
	1000	92		215		211.5		
	1000	84.4		210		204.4		
	1000	78		200		193.3		
	1000	70.8		196		183		
	1000	61		180		172		
	1000	55		175		164.6		
	1000	48.5		165		156.5		
	1000	42		154		147.5		
	1000	33.6		146		140.6		
	1000	28		142		134.7		
	1000	23.7		136		127.6		
	1000	19.4		130		121.5		
	1000	14.6		124		114.4		
	1000	10.9		118		109.2		
	1000	7.5		114		104		
	1000	4.8		110		98.7		
	1000	1.3		107		94.9		
	1000	0.1		103		90.9		
1531	1000	0		95		77.1	End	

Test 18.

Pressure Transmission Test after 67 hours Static

Outer Annulus Intermediate Tubing Date 06/05/2000

Time Start	Water Volu Pumped	SurfacePressu 8-5/8" x 5-1/2" Annulus Digital	SurfacePressu 5-1/2" x 2-7/8" Annulus	SurfacePressure in 1.9" Tubing Digital	Analog	Remarks
	ml	(psi)	(psi)	(psi)	(psi)	
10.47	0	51.4	119	57.24	61	
10.49	240	60	119	57.24	61	Started Static test Pumping
	420	70	119	57.24	61	through annulus
	460	80	119	57.24	61	after 67 hours
	450	90	120	57.4	61	
	570	100	120	57.24	61	
	570	110	122	57.24	61	
	500	120	122	57.24	61	
	580	130	123	57.24	61	
	700	140	125	57.29	61	
	1150	150	134	57.58	61	
	1440	160	152	57.58	61	
	1210	170	168	57.58	61	
	1000	180	178	57.53	62	
	1100	190	188	57.24	62	* Change csg gauge from
	1110	200	205	57.58	62	0-200 to 0-600psi.
	1100	210	215	59.6	66	New gauge reading
	1150	220	225	73.07	82	4psi more
	1510	230	235	107.7	*	* Change tbg gauge from
	1200	240	250	131.5	134	0-100 to 0-200psi.
	980	250	257	144.8	150	
	780	260	270	154.2	158	
	1150	270	280	164.3	168	
	1000	280	290	176.7	180	
	900	290	300	186.5	190	Analog
	1010	300	310	193.3	*	Tbg gauge closed
	1000	310	320	208.4		Pressure>200psi
	1000	320	332	220.2		
12.08	950	330	342	230.3		End
	25230					

Bleeding from 8-5/8" x 5-1/2" Annulus

Time Start	Water Volu Pumped	SurfacePressu 8-5/8" x 5-1/2" Annulus Digital	SurfacePressu 5-1/2" x 2-7/8" Annulus	SurfacePressure in 1.9" Tubing Digital Ga	Tubing Analog	Remarks Bleeding from annulus
12.16	0	312.5	350	246.5		stabilized
	1000	254	345	246.5		
	1000	234	345	246.8		
	1000	215.6	340	246.8		
	1000	197.6	335	246.8		
	1000	184	335	246.8		
	1000	173.3	325	246.5		
	1000	163.3	310	246.5		
	1000	154.3	300	245.8		
	1000	144.3	290	245.4		
	1000	133.3	280	245.1		
	1000	123.2	265	244.4		
	1000	113.9	255	243.8		
	1000	104.4	245	243.8		
	1000	94.2	235	244.4		
	1000	84.4	225	235.7		
	1000	76.8	215	226.9		
	1000	69.2	205	216.1		
	1000	60	195	204.4		
	1000	49.3	190	193.9		
	1000	41.2	180	187.2		
	1000	33.3	170	175.7		
	1000	27.3	165	166.6		
	1000	20.9	150	156.2		
	1000	15.2	145	147.4		
	1000	10.2	140	139.7		
	1000	5.4	135	132.5		
	1000	2.3	125	125.6		
	1000	0	120	117.8		
12.33	1000	-0.8	110	101.6	End	

APPENDIX 6

Test 19.

Effect of holding 45psi pressure differential on 8-5/8" x 5-1/2" annulus for 30 minutes after 22 hours static

Outer Annu Intermediate Tubing Date 06/02/2000

Time Start	Water Volu Pumped	SurfacePr 8-5/8" x 5- Annulus Digital	SurfacePress 5-1/2" x 2-7/8' Annulus	SurfacePressure in 1.9" Tubing		Remarks
				Digital	Analog	
	(psi)	(psi)	(psi)	(psi)	(psi)	
13.47	0	27.4	97	60.6	69	Static test Pumping
13.48	5500	87.4	102	61.6	70	through annulus
13.49		82.3	102	61.62	70	
13.50		80.9	102	61.2	70	
13.51		79.9	102	61.2	70	
13.52	450	87.7	102	61.6	70	
13.53		84.1	103	61.62	70	
13.54		83.3	103	61.62	68	
13.55		82.7	103.5	61.95	68	
13.56		82.1	104	91.96	68	
13.57		81.7	104	61.96	68	
13.58		81.3	104	61.9	68	
13.59		81	104	61.9	68	
14.00		80.8	104	61.6	68	
14.01	320	85.9	104	61.9	68	
14.02		84.5	104	61.96	68	
14.03		84	104	61.62	68	
14.04		83.6	104	61.62	68	
14.05		83.3	104	61.62	68	
14.06		83	104	61.96	68	
14.07		82.8	104	61.96	68	
14.08		82.5	104	61.96	68	
14.09		82.3	104	61.96	68	
14.10		82.2	104	61.96	68	
14.11		81.9	104	61.96	68	
14.12		81.8	104	62.2	68	
14.13	240	85.4	104	62.2	68	
14.14		84.7	104	62.3	68	
14.15		84.4	104	62.3	68	
14.16		84.1	104	62.63	68	
14.17		83.9	104	62.63	68	
14.18		83.7	104	62.63	68	End

Test 20.

Effect of holding 60psi pressure differential on 8-5/8" x 5-1/2" annulus for 30 minutes

Time Start	Water Volume Pumped	8-5/8" x 5-1/2" Annulus Digital	SurfacePressure in 2-1/2" x 2-7/8" Annulus	SurfacePressure in 1.9" Tubing		Remarks
				Digital	Analog	Bleeding from annulus
	(cc)	(psi)	(psi)	(psi)	(psi)	
14.34	0	83	104	62.63	68	stabilized
14.35	1820	108	106	62.79	68	
14.36		104.8	108	62.97	68	
14.37		102.9	108	62.97	68	
14.38		101.7	108	62.9	68	
14.39	340	107.2	110	62.3	68	
14.4		104.8	110	63.15	68	
14.41		103.6	111	63	68	
14.42		102.7	112	63.3	68	
14.43		101.9	113	63.3	68	
14.44		101.3	114	63.3	68	
14.45	300	108	115	63.64	68	
14.46		105.2	116	63.64	68	
14.47		104	116	63.98	68	
14.48		103.3	117	64.31	68	
14.49		102.7	118	64.31	68	
14.5		102.1	118	64.31	68	
14.51		101.7	118	64.31	68	
14.52		107.8	119	63.98	68	
14.53		105.3	120	64.31	68	
14.54		104.5	120	63.98	68	
14.55		103	120	64.31	68	
14.56		102.9	121	63.98	68	
14.57		102.5	121	63.55	68	
14.58	170	107.4	121	63.3	68	
14.59		105.8	122	62.63	68	
15.00		105.1	122	61.96	68	
15.01		104.6	122	61.62	68	
15.02		104.2	122	61.26	68	
15.03		103.8	122	60.94	68	
15.04		103.4	122	60.94	End	

Test 21.

Effect of holding 85psi pressure differential on 8-5/8" x 5-1/2" annulus for 50 minutes after 18 hours static

Outer Annulus Intermediate Tubing Date 06/06/2000

Time Start	Water Volu Pumped	SurfacePressu 8-5/8" x 5-1/2" Annulus Digital	SurfacePres 5-1/2" x 2-7/8 Annulus	SurfacePressure in 1.9" Tubing Digital	Analog	Remarks
	ml	(psi)	(psi)	(psi)	(psi)	
12.43		54.3	95	6.7		
13.00	0	54.3	88	6.7		Started pumping
13.10		114	96	6.7		*Communication observed
13.15	7200	124	122	6.7		in water leg whilst pressuring
13.16		116.8	126	7.74		casing leg to 124psi
13.17		114.3	128	7.74		
13.18		112.6	130	7.74		
13.19		111.2	131	8.04		
13.20		110.5	132	8.08		
13.21	680	122	132	7.41		
13.22		120.7	134	6.73		
13.23		118	134	6.39		
13.24		116.5	135	6.73		
13.25	200	120	136	6.82		
13.26		119.1	137	7.07		
13.27	270	124.2	138	7.26		
13.28	100	123.3	138	7.41		
13.29		124.2	139	8.08		
13.30		123.6	139	8.47		
13.31		123.5	139	9.43		
13.32		123.6	138	10.1		
13.33		123.4	138	11.42		
13.34		123.8	137	12.79		
13.35		123.2	137	15.02		
13.36		123.2	136	16.5		
13.37		122.6	136	18.22		
13.38		123.8	136	20.87		
13.39		123.9	136	22.89		
13.40		123.2	136	24.91		
13.41		121.2	136	26.26		
13.42		124.2	136	27.94		
13.43		123.7	137	29.29		
13.44		122.2	138	31.21		
13.45		123	138	33		
13.46		123.4	138	34.95		
13.47		123	138	36.87		
13.48		123.8	140	38.38		
13.49		124.3	140	39.73		
13.50		124	140	40.74		
13.51		124.8	141	41.75		
13.52		124.2	142	42.76		
13.53		123.6	142	43.75		
13.54		123.9	142	44.44		
13.55		123.3	143	44.78		
13.56		123.1	143	45.12		
13.57		123	143	45.79		
13.58		123.1	143	46.46		
13.59		123	144	47.42		
14.00		123	144	47.48		
14.01		123.2	144	47.48		
14.02		123.3	144	47.81		
14.03		123.3	144	48.15		
14.04		123.6	144	48.15		End

APPENDIX 7

Test 22.

85psi pressure pulses on 8-5/8" x 5-1/2" annulus after 20 hours static
Pulse cycle = 2min/2min.

Outer Annulus | Intermediate | Tubing | Date 06/07/2000

Time Start	Number of pulses	SurfacePressure in 8-5/8" x 5-1/2" Annulus		SurfacePr 5-1/2" x 2- Annulus	SurfacePr 2-7/8" x 1.5 Annulus	SurfacePressure in 1.9" Tubing		Remarks
		Digital	Analog			Digital	Analog	
		(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	
10.12		113.7		145		50.51		
10.30	0	54		84		7.07		Bled off all strings to
	1	125		120		7.70		initial pressures as in
	2	125		124		9.70		one step pulse for basis
	3	124.6		134		12.70		of comparison
	4	124		141		25.90		
	5	124		145		43.70		
	6	124		148		50.50		
	7	124		148		53.46		
	8	124		150		54.50		
	9	124		151		55.22		
	10	124		150		56.00		

Test 23

45psi Pressure Pulses on 8-5/8" x 5-1/2" annulus
after 2 hours static. Pulse cycle = 1min/1min

Outer Annulus | Intermedia Tubing | Date 06/07/2000

Time Start	Number of pulses	SurfacePressure in 8-5/8" x 5-1/2" Annulus		SurfacePr 5-1/2" x 2- Annulus	SurfacePressure in 1.9" Tubing		Remarks
		Digital	Analog		Digital	Analog	
		(psi)	(psi)	(psi)	(psi)	(psi)	
13.45	0	0		58	0		Pulsation started
	1	46		58	0		
	2	44		58	0		
	3	45		58	0		
	4	46		58	0		
	5	46		58	0		
	6	44		58	0		Change analog (0-200psi)
	7	44.1		58	0		gauge to digital (0-6000psi)
	8	45.1		58	0		on outer annulus
	9	44		58	0		
	10	44.8		58	0		
	11	44.9		58	0		Average volume of water
	12	45.2		58	0		pumped per cycle=7447cc
	13	44.4		58	0		
	14	44.7		58	0		
	15	45.8		58	0		
	16	45.2		58	0		
	17	43.8		58	0		
	18	45.8		58	0		
	19	44.8		58	0		
	20	45.2		58	0		

APPENDIX 8 - EXPERIMENTAL DESIGN

Preparation of cement-like slurry

1. Fill Tank #1 with 121.42 bbl of fresh water.
2. Add 13.3 lbs of caustic soda and stir thoroughly till all NaOH is completely dissolved.
3. Measure pH of water. (approx. 9.5 – 10.5)
4. Mix 3693.3 lbs (37sacks) bentonite in the pH water and stir thoroughly till completely mixed. Leave to pre-hydrate for at least 2 hours.
5. Add 18.47 lbs of PAC slowly whilst stirring. Stir thoroughly for about 30 minutes until completely mixed.
6. Add 50.57 lbs (5.5 gal) of Aldacide-G to slurry and stir thoroughly.
7. Measure density and rheological properties.

Full scale test of loss of pressure transmission

1. Establish circulation for about 10 minutes with water. (Down tubing, out casing/tubing annulus using wellhead valve # 7 as per sketch in Figure 28)
2. Test lines against Swaco choke to 1500 psi for 15 minutes.
3. Switch suction to pit of polymer/bentonite slurry.
4. Pump as slowly as practical through T to plastic drain tank until get slurry to tank. Let tank drain to trough. Should require ±4.6 barrels or ±66 strokes. Switch T to pump down tubing.
5. Reset stroke counter to zero. Pump 6.4 bbl (95 strokes) of slurry through string. Pump slowly taking returns through the Swaco choke and observes pump and tubing pressures.
6. Close tubing valve #9 and casing/tubing annulus by closing valve ahead of Swaco choke.
7. Connect to 8-5/8" x 5-1/2" casing annulus using valve # 6
8. Open valve ahead of Swaco choke and pump in as slowly as practical through valve #6. Should require ±82.6 barrels (1230 strokes) to fill the (8-5/8" x 5-1/2") annulus.
9. Close casing valve #7 by closing valve ahead of Swaco choke.

10. Close all valves on tree. Pressurize 8-5/8" x 5-1/2" annulus in 10 psi increments and record pressure on all four string gauges. Continue to pressurize in 10 psi increments until 10 psi increase per increment is achieved on the tubing.
11. Observe well for about 16-20 hours noting pressures at the gauges. Pressurize 8-5/8" x 5-1/2" annulus in 10 psi increments and record pressure on all four string gauges. Continue to pressurize in 10 psi increments until 10 psi increase per increment is achieved on the tubing.
12. *Predicted pressure to initiate pressure communication based on gel strength = 100 lbf/100 sq. ft would be:*

- In Tubing considering gel strength = 564 psi
- In Annulus considering gel strength = 390 psi

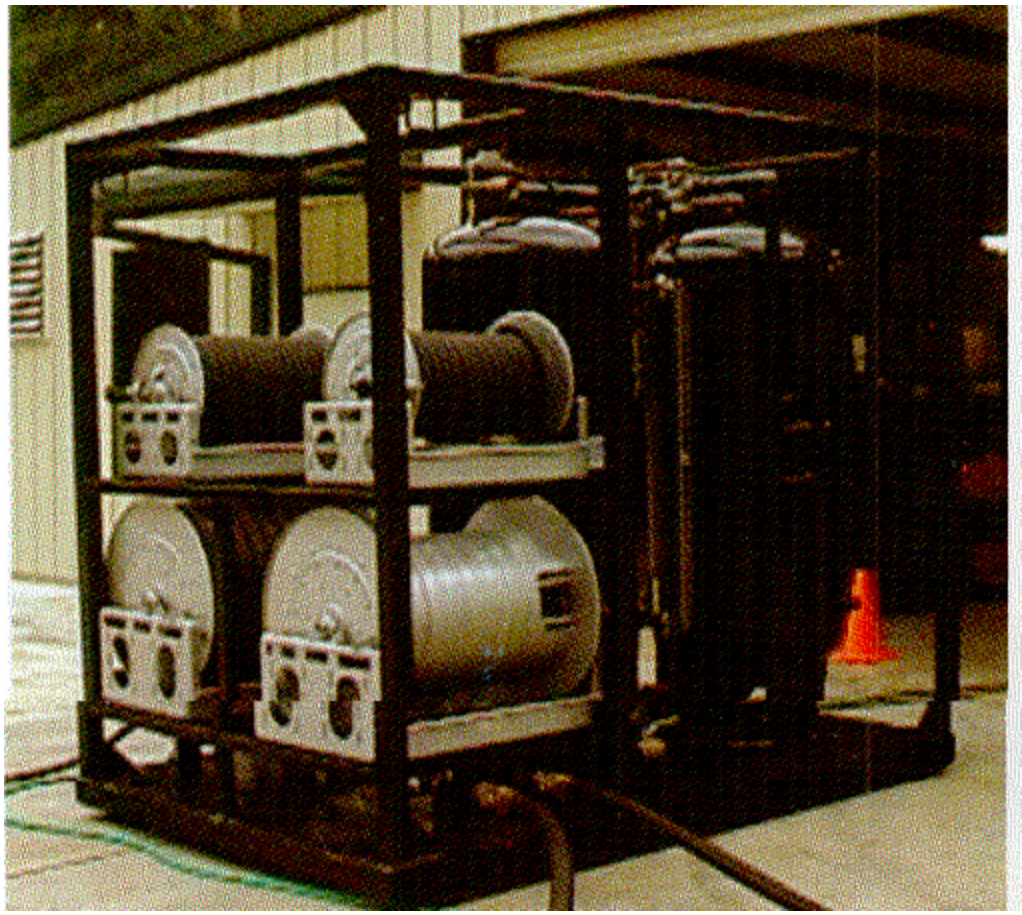
But we expect the following based on yield stress = 20 lbf/100 sq. ft, which was the controlling parameter in prior experiments:

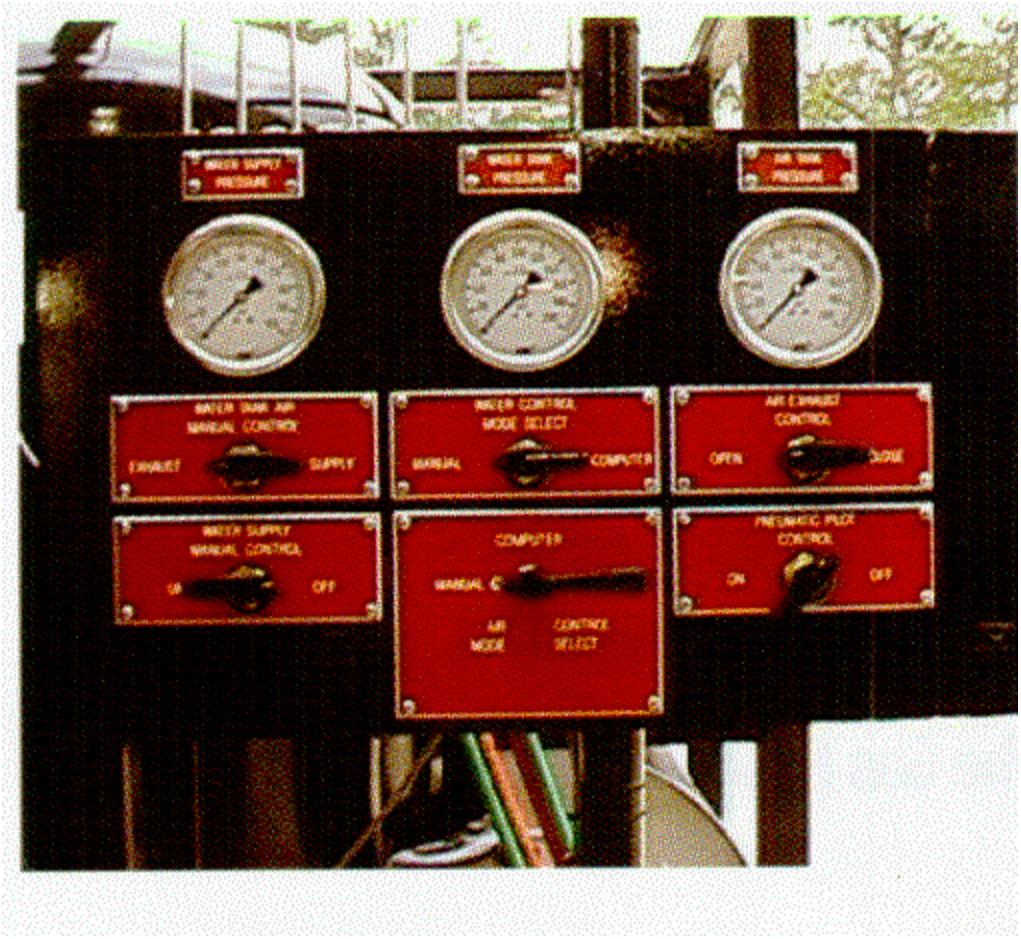
- In Tubing considering yield stress = 112.7 psi
- In Annulus considering yield stress = 78 psi

13. If pressure to see response is greater than predicted from yield stress, wait 16-20 hrs for gel to rebuild.
14. Connect the pulsation unit on to the 8-5/8" x 5-1/2" annulus. Start applying pulsation in the annulus and observe pressure on all the gauges. Repeat the tests at different frequencies.
15. Connect the pulsation unit on to the 1.9" tubing top. Start applying pulsation in the tubing and observe pressure on all the gauges. Repeat the tests at different frequencies.
16. Apply a small gas cushion at the top of the tubing to give about 50-100 psi on the tubing with with the annulus open. Let sit stationary for at least 30 minutes (maybe several hours), then bleed ½ the pressure from the tubing. Watch that pressure is constant at 25-50 psi on the tubing. The annulus fluid level should not have fallen, i.e. we are demonstrating lack of pressure transmission. Then pulse the 8-5/8" x 5-1/2" annulus (there should be no effect). Then pulse a water-filled annulus. The pulse should be strong enough to restore pressure equilibrium on the tubing (we'll have a good idea from steps 13 and 14). The pressure on the tubing should increase (to as much as 73 psi and with up to 0.16 bbls. of water injected into the annulus. THIS IS INTENDED TO BE A SIMPLE DEMONSTRATION OF HOW PULSATION CAN MAINTAIN OR RESTORE PRESSURE TRANSMISSION.

17. Break circulation and repeat pulsation if previous indication that pressure differential to initiate pressure transmission with this fluid increase with time (we don't think that it will with this fluid). If so, this would potentially show whether pulsation inhibits this effect.
18. Line up mud pump to Tank #3 (containing water)
19. Flush surface lines with water taking returns into Tank #1
20. Reverse circulate string slurry taking returns into Tank #1. (Measure rheological properties of returned mud during reverse circulation)
21. Note mud pump and tubing pressures.

APPENDIX 9 - CTES Pulsation Unit




WATER SUPPLY PRESSURE
WATER TANK PRESSURE
AIR TANK PRESSURE
WATER TANK AIR MANUAL CONTROL
EXHAUST
SUPPLY
WATER CONTROL MODE SELECT
MANUAL
COMPUTER
AIR EXHAUST CONTROL
OPEN
CLOSE
WATER SUPPLY MANUAL CONTROL
ON
OFF
COMPUTER
MANUAL
AIR CONTROL MODE SELECT
PNEUMATIC PLUG CONTROL
ON
OFF