RCP, Inc

801 Louisiana, Ste.200
Houston, Texas 77002
Redacted

October 18, 2011

Pacific Gas and Electric Company
350 N. Wiget
Walnut Creek, CA 94598
Attention: Redacted

Test Contractor:	ARB, Inc. -- 0629-53-3500 T-17
Asset Owner:	Pacific Gas and Electric Company -- 41497371
Construction Contractor:	ARB, Inc. -- 0629-53-3500 T-17
Test Section:	PG&E T-17 L-105N, MP 28.64 - 30.63
Test Date:	October 18, 2011
Certificate Number:	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63

To whom it may concern,

This letter is to certify that the hydrostatic test performed on pipe owned by Pacific Gas and Electric Company and tested by ARB, Inc. met the requirements of the Code of Federal Regulations, Title 49, Part 192, Subpart J (Class 3).

The test segment was subjected to a spike pressure test of 388 psig for 30 minutes, without observed leakage or yielding of the pipe segment. The 30 minute spike test and subsequent pressure reduction with volume bleed was included and is part of the 8.33 hour test duration period.

This hydrostatic test was completed successfully. Pressure was maintained on the test facilities in excess of 8.33 continuous hours without evidence of a leak failure. Water was the test medium. At the highest elevation point in the test section, the calculated test pressure was 357 psig and the MAOP per 49 CFR Part 192, Subpart J can be as high as 410 psig. The MAOP established by this test is sufficient to qualify for PG&E's desired MAOP of 198 psig.

Pressure decreased 31 psi during the test. 9,216.00 ounces of fluid was intentionally released from the test section Net corrected volumetric change from beginning of the test to the end of the test is calculated to be 3,534.34 ounces, loss, which is equivalent to a 0.72 °F change in pipe temperature and within the error attributed to the temperature measurement instrumentation utilized.

Test pressure did not remain steady even though no leaks were observed. The volumetric loss is attributed to the error characteristic of the temperature measurement instrumentation utilized.

Sincerely,

Redacted

cc. file

Hydrostatic Test Certification

RCP

Company	Pacific Gas and Electric Company	Job Number	41497371
Construction Co.	ARB, Inc.	Job Number	0629-53-3500 T-17
Hydro. Test Co.	ARB, Inc.	Project No.	0629-53-3500 T-17
Test Section	PG&E T-17 L-105N, MP 28.64 - 30.63		
File Name	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63		

Hydrostatic Test Pressure

APPLICABLE CODE FOR CERTIFICATION: Test Date: 18-Oct-11

Code of Federal Regulations, Title 49, Part 192, Subpart J (Class 3)

This is to certify that the pipeline or pipeline section(s) described below was hydrostatically pressure tested in accordance with the following procedure:

Pipeline:	PG&E T-17 L-105N, MP 28.64 - 30.63		
From:	0+00	To:	105+57

Pipe Data

Segment	Length	Diameter	Wall Thickness	Specification	100% SMYS
1	25 ft	30.000 in.	0.375 in.	API5L-X65, DSAW, Arc Weld, Steel	1,625 psi
2	6 ft	24.000 in.	0.375 in.	API5L-X60, DSAW, Arc Weld, Steel	1,875 psi
3	92 ft	26.000 in.	0.375 in.	API5L-X65, DSAW, Arc Weld, Steel	1,875 psi
4	26 ft	26.000 in.	0.375 in.	API5L-X65, DSAW, Arc Weld, Steel	1,875 psi
5	25 ft	6.625 in.	0.280 in.	API5L-Grade B, SM, Arc Weld, Steel	2,958 psi
6	29 ft	4.500 in.	0.237 in.	API5L-Grade B, SM, Arc Weld, Steel	3,687 psi
7	29 ft	1.315 in.	0.313 in.	API5L-Grade B, SM, Arc Weld, Steel	16,635 psi
8	7,193 ft	30.000 in.	0.313 in.	API5L-X42, DSAW, Arc Weld, Steel	875 psi
9	56 ft	30.000 in.	0.313 in.	API5L-X52, DSAW, Arc Weld, Steel	1,083 psi
10	3,286 ft	26.000 in.	0.281 in.	API5L-Grade B, SM, Arc Weld, Steel	757 psi
11	2 ft	4.500 in.	0.141 in.	24ksmys, SM, Arc Weld, Steel	1,504 psi
12	296 ft	3.500 in.	0.216 in.	API5L-Grade B, SM, Arc Weld, Steel	4,320 psi
13	101 ft	2.375 in.	0.154 in.	API5L-Grade B, SM, Arc Weld, Steel	4,539 psi
14	344 ft	1.315 in.	0.113 in.	API5L-Grade B, SM, Arc Weld, Steel	6,015 psi
15	12 ft	30.000 in.	0.500 in.	API5L-X65, DSAW, Arc Weld, Steel	2,167 psi
16	12 ft	30.000 in.	0.500 in.	API5L-X65, DSAW, Arc Weld, Steel	2,167 psi

Initial Test Conditions

Pressure at Test Point:	388 psig	Date/Time:	10/18/11 4:25 AM	Pipe Temperature Unrestrained:	69.0 °F
Ambient Temperature:	64.0 °F			Restrained:	68.0 °F
		Elevation @ Test Point:	18.0 ft	Location:	0+00
Pressure @ High Point (Cal/Measure):	388 psig	Elevation @ High Point:	18.0 ft	Location:	0+00
Pressure @ Low Point (Cal/Measure):	396 psig	Elevation @ Low Point:	0.0 ft	Location:	57+32

Final Test Conditions

Pressure at Test Point:	357 psig	Date/Time:	10/18/11 12:45 PM	Pipe Temperature Unrestrained:	66.0 °F
Ambient Temperature:	74.0 °F			Restrained:	69.0 °F
		Elevation @ Test Point:	18.0 ft	Location:	0+00
Pressure @ High Point (Cal/Measure):	357 psig	Elevation @ High Point:	18.0 ft	Location:	0+00
Pressure @ Low Point (Cal/Measure):	365 psig	Elevation @ Low Point:	0.0 ft	Location:	57+32
Total Fluid Injected:				Volume loss	
Total Fluid Withdrawn:	9216.00 fluid ounces				
Net Change in Volume of the Test Section ± (+ Gain, - Loss):	(3,534.34) oz	loss		(0.0079)%	(0.722) °F equivalent
Test Duration:	8.33 hours				

Minimum Test Pressure:	Test Point	355 psig	Max Elevation	355 psig	Min Elevation 363 psig
Maximum Test Pressure:		388 psig		388 psig	396 psig
% SMYS :		2.4%		17.9%	
Test Segment Observed % SMYS :			Minimum	2.4%	Maximum 52.0%
				Minimum Test Pressure (Calculated/Measured):	357 psig
[1]Maximum Allowable Operating Pressure:				DOT Part 192 Test Factor= 1.50	238 psig

Were leaks observed?	**No**	Explain:
Acceptable Hydrostatic Test?	**Yes**	The test segment was subjected to a spike pressure test of 388 psig for 30 minutes, without observed leakage or yielding of the pipe segment. The 30 minute spike test and subsequent pressure reduction with volume bleed was included and is part of the 8.33 hour test duration period. No leaks were observed during the test period. The test section included 11,307 feet of buried and 227 feet of exposed pipe. Pressure lost 31 psi during the test. The buried pipe segment gained 1°F fluid temperature and the exposed pipe segment lost 3°F. 9,216.00 ounces of fluid was intentionally released from the test section Net corrected volumetric change from beginning of the test to the end of the test is calculated to be 3,534.34 ounces, loss, which is equivalent to a 0.72 °F change in pipe temperature and within the error attributed to the temperature measurement instrumentation utilized. Test pressure did not remain steady even though no leaks were observed. The volumetric loss is attributed to the error characteristic of the temperature measurement instrumentation utilized.
Remarks	[1] The MAOP established by this test is sufficient to qualify for PG&E's desired MAOP of 198 psig.	

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18-Oct-11

Dead Weight Log Sheet

Owner Company	Pacific Gas and Electric Company	Job Number	41497371
Construction Co.	ARB, Inc.	Job Number	0629-53-3500 T-17
Testing Co.	ARB, Inc.	Project No.	0629-53-3500 T-17
Test Section	PG&E T-17 L-105N, MP 28.64 - 30.63		
File Name	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63		

Date **18-Oct-11**

Test Log

Log No.	Test Period		Test Pressure	Temperature °F			Remarks		
	Date	Time		Ambient	Pipe				
					Unrestrained	Restrained	Comment	Bleed	Inject
1	10/18/11	4:00 AM	253 psig	65 °F	69 °F	68 °F	Start Spike		
2	10/18/11	4:01 AM	263 psig	65 °F	69 °F	68 °F	Inject		2,914 oz.
3	10/18/11	4:02 AM	273 psig	65 °F	69 °F	68 °F	Inject		2,667 oz.
4	10/18/11	4:03 AM	283 psig	65 °F	69 °F	68 °F	Inject		2,927 oz.
5	10/18/11	4:04 AM	293 psig	65 °F	69 °F	68 °F	Inject		2,918 oz.
6	10/18/11	4:05 AM	303 psig	65 °F	69 °F	68 °F	Inject		3,165 oz.
7	10/18/11	4:06 AM	313 psig	65 °F	69 °F	68 °F	Inject		2,927 oz.
8	10/18/11	4:07 AM	323 psig	65 °F	69 °F	68 °F	Inject		2,470 oz.
9	10/18/11	4:08 AM	333 psig	65 °F	69 °F	68 °F	Inject		2,726 oz.
10	10/18/11	4:09 AM	343 psig	65 °F	69 °F	68 °F	Inject		2,763 oz.
11	10/18/11	4:10 AM	353 psig	65 °F	69 °F	68 °F	Inject		2,708 oz.
12	10/18/11	4:11 AM	363 psig	65 °F	69 °F	68 °F	Inject		2,859 oz.
13	10/18/11	4:12 AM	373 psig	65 °F	69 °F	68 °F	Inject		3,014 oz.
14	10/18/11	4:13 AM	383 psig	65 °F	69 °F	68 °F	Inject		3,033 oz.
15	10/18/11	4:24 AM	388 psig	65 °F	69 °F	68 °F	Inject		1,788 oz.
16	10/18/11	4:25 AM	388 psig	64 °F	69 °F	68 °F	On Test		
17	10/18/11	4:35 AM	388 psig	64 °F	69 °F	68 °F			
18	10/18/11	4:45 AM	388 psig	63 °F	69 °F	68 °F			
19	10/18/11	4:55 AM	387 psig	63 °F	69 °F	68 °F	End Spike		
20	10/18/11	4:56 AM	377 psig	63 °F	69 °F	68 °F	Bleed	2,880 oz.	
21	10/18/11	4:57 AM	367 psig	63 °F	69 °F	68 °F	Bleed	2,880 oz.	
22	10/18/11	4:58 AM	357 psig	63 °F	69 °F	68 °F	Bleed	2,880 oz.	
23	10/18/11	5:05 AM	355 psig	63 °F	69 °F	68 °F	Bleed	576 oz.	
24	10/18/11	5:15 AM	355 psig	63 °F	69 °F	68 °F			
25	10/18/11	5:30 AM	356 psig	63 °F	69 °F	68 °F			
26	10/18/11	5:45 AM	356 psig	63 °F	69 °F	68 °F			
27	10/18/11	6:00 AM	356 psig	62 °F	68 °F	68 °F			
28	10/18/11	6:15 AM	356 psig	62 °F	68 °F	68 °F			
29	10/18/11	6:30 AM	356 psig	62 °F	68 °F	68 °F			
30	10/18/11	6:45 AM	356 psig	62 °F	68 °F	68 °F			
31	10/18/11	7:00 AM	356 psig	62 °F	68 °F	68 °F			
32	10/18/11	7:15 AM	356 psig	62 °F	68 °F	68 °F			
33	10/18/11	7:30 AM	356 psig	62 °F	67 °F	68 °F			
34	10/18/11	7:45 AM	356 psig	62 °F	67 °F	68 °F			
35	10/18/11	8:00 AM	356 psig	63 °F	67 °F	68 °F			
36	10/18/11	8:15 AM	356 psig	63 °F	67 °F	68 °F			
37	10/18/11	8:30 AM	356 psig	63 °F	67 °F	68 °F			
38	10/18/11	8:45 AM	356 psig	63 °F	67 °F	68 °F			
39	10/18/11	9:00 AM	356 psig	63 °F	66 °F	68 °F			
40	10/18/11	9:15 AM	356 psig	63 °F	66 °F	68 °F			
41	10/18/11	9:30 AM	356 psig	63 °F	66 °F	68 °F			
42	10/18/11	9:45 AM	356 psig	64 °F	66 °F	69 °F			
43	10/18/11	10:00 AM	356 psig	64 °F	66 °F	69 °F			
44	10/18/11	10:15 AM	356 psig	64 °F	65 °F	69 °F			
45	10/18/11	10:30 AM	356 psig	65 °F	65 °F	69 °F			
46	10/18/11	10:45 AM	356 psig	66 °F	65 °F	69 °F			
47	10/18/11	11:00 AM	356 psig	66 °F	65 °F	69 °F			
48	10/18/11	11:15 AM	356 psig	67 °F	65 °F	69 °F			

Dead Weight Log Sheet

Owner Company	Pacific Gas and Electric Company	Job Number	41497371
Construction Co.	ARB, Inc.	Job Number	0629-53-3500 T-17
Testing Co.	ARB, Inc.	Project No.	0629-53-3500 T-17
Test Section	PG&E T-17 L-105N, MP 28.64 - 30.63		
File Name	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63		

Date **18-Oct-11**

Test Log

Log No.	Test Period		Test Pressure	Temperature °F			Remarks		
	Date	Time		Ambient	Pipe				
					Unrestrained	Restrained	Comment	Bleed	Inject
49	10/18/11	11:30 AM	356 psig	69 °F	65 °F	69 °F			
50	10/18/11	11:45 AM	356 psig	69 °F	65 °F	69 °F			
51	10/18/11	12:00 PM	357 psig	70 °F	66 °F	69 °F			
52	10/18/11	12:15 PM	357 psig	71 °F	66 °F	69 °F			
53	10/18/11	12:30 PM	357 psig	73 °F	66 °F	69 °F			
54	10/18/11	12:45 PM	357 psig	74 °F	66 °F	69 °F	End of Test		
							Spike Test		38,880.0 oz.
							Hydrostatic Test	9,216.0 oz.	

Were leaks observed during the test period? Exposed and buried pipe, no leaks observed.

High Test Pressure:	388 psig
Low Test Pressure:	355 psig

Pipe Segment Volume Calculations

Company	Pacific Gas and Electric Company	Job Number	41497371
Construction Co.	ARB, Inc.	Job Number	0629-53-3500 T-17
Hydro. Test Co.	ARB, Inc.	Project No.	0629-53-3500 T-17
Test Section	PG&E T-17 L-105N, MP 28.64 - 30.63	WATER	
File Name	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63		

General Pipe Data

Description	Segment 1	2	3	4	5	6	7	8
Restrained or Unrestrained?	Unrestrained	Unrestrained	Unrestrained	Unrestrained	Unrestrained	Unrestrained	Restrained	Restrained
Outside Diameter	30.000 in.	24.000 in.	26.000 in.	26.000 in.	6.625 in.	4.500 in.	1.315 in.	30.000 in.
Wall Thickness	0.375 in.	0.375 in.	0.375 in.	0.375 in.	0.280 in.	0.237 in.	0.313 in.	0.313 in.
Inside Diameter	29.250 in.	23.250 in.	25.250 in.	25.250 in.	6.065 in.	4.026 in.	0.690 in.	29.375 in.
Spec./Grade	API5L-X65	API5L-X60	API5L-X65	API5L-X65	API5L-Grade B	API5L-Grade B	API5L-Grade B	API5L-X42
Length Unrestrained	25 ft	6 ft	92 ft	26 ft	25 ft	29 ft		
Length Restrained							29 ft	7,193 ft
Temperature -- On Test	69 °F	69 °F	69.0 °F	69.0 °F	69.0 °F	69.0 °F	68.0 °F	68.0 °F
Temperature -- End of Test	66 °F	66 °F	66.0 °F	66.0 °F	66.0 °F	66.0 °F	69.0 °F	69.0 °F
Pressure -- On Test	388 psig	388 psig	388 psig	388 psig	388 psig	388 psig	388 psig	388 psig
Pressure -- End of Test	357 psig	357 psig	357 psig	357 psig	357 psig	357 psig	357 psig	357 psig

Unrestrained Pipe

Vo	4,947.70 gal / 633,305 oz.	Vtp1	4,955.14 gal / 634,258 oz.	Vtp2	4,955.69 gal / 634,328 oz.

Vo Unrestrained	866 gal	132 gal	2,393 gal	676 gal	38 gal	19 gal		
Fwp 1	1.001187	1.001187	1.001187	1.001187	1.001187	1.001187		
Fpp 1	1.001261	1.001002	1.001089	1.001089	1.000350	1.000275		
Fpt 1	1.000164	1.000164	1.000164	1.000164	1.000164	1.000164		
Fwt 1	1.000929	1.000929	1.000929	1.000929	1.000929	1.000929		
Fpwt 1 = Fpt/Fwt	0.999236	0.999236	0.999236	0.999236	0.999236	0.999236		
Vtp 1 = Vo(Fwp)(Fpp)(Fpwt)	867.15 gal	132.52 gal	2,396.76 gal	677.35 gal	37.55 gal	19.19 gal		
Fwp 2	1.001092	1.001092	1.001092	1.001092	1.001092	1.001092		
Fpp 2	1.001160	1.000922	1.001002	1.001002	1.000322	1.000253		
Fpt 2	1.000109	1.000109	1.000109	1.000109	1.000109	1.000109		
Fwt 2	1.000582	1.000582	1.000582	1.000582	1.000582	1.000582		
Fpwt = Fpt/Fwt	0.999527	0.999527	0.999527	0.999527	0.999527	0.999527		
Vtp = Vo(Fwp)(Fpp)(Fpwt)	867.23 gal	132.53 gal	2,397.03 gal	677.42 gal	37.56 gal	19.19 gal		

Restrained Pipe

Vo	342,111.81 gal / 43,790,311 oz.	Vtp1	342,660.91 gal / 43,860,597 oz.	Vtp2	342,560.75 gal / 43,847,777 oz.

Vo Unrestrained							1 gal	253,236 gal
Fwp 1							1.001187	1.001187
Fpp 1							1.000055	1.001135
Fpt 1							1.000097	1.000097
Fwt 1							1.000803	1.000803
Fpwt 1 = Fpt/Fwt							0.999294	0.999294
Vtp 1 = Vo(Fwp)(Fpp)(Fpwt)							1 gal	253,645 gal
Fwp 2							1.001092	1.001092
Fpp 2							1.000056	1.001050
Fpt 2							1.000109	1.000109
Fwt 2							1.000929	1.000929
Fpwt = Fpt/Fwt							0.999181	0.999181
Vtp = Vo(Fwp)(Fpp)(Fpwt)							1 gal	253,571 gal

Combined Pipe

Vo	347,059.50 gal / 44,423,617 oz.	Vtp1	347,616.05 gal / 44,494,855 oz.	Vtp2	347,516.44 gal / 44,482,105 oz.

Pipe Segment Volume Calculations

Company	Pacific Gas and Electric Company
Construction Co.	ARB, Inc.
Hydro. Test Co.	ARB, Inc.
Test Section	PG&E T-17 L-105N, MP 28.64 - 30.63
File Name	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63

General Pipe Data								
Description								
	9	10	11	12	13	14	15	16
Restrained or Unrestrained?	Restrained	Restrained	Restrained	Restrained	Restrained	Restrained	Unrestrained	Unrestrained
Outside Diameter	30.000 in.	26.000 in.	4.500 in.	3.500 in.	2.375 in.	1.315 in.	30.000 in.	30.000 in.
Wall Thickness	0.313 in.	0.281 in.	0.141 in.	0.216 in.	0.154 in.	0.113 in.	0.500 in.	0.500 in.
Inside Diameter	29.375 in.	25.438 in.	4.218 in.	3.068 in.	2.067 in.	1.089 in.	29.000 in.	29.000 in.
Spec./Grade	API5L-X52	API5L-Grade B	24ksmys	API5L-Grade B	API5L-Grade B	API5L-Grade B	API5L-X65	API5L-X65
Length Unrestrained							12 ft	12 ft
Length Restrained	56 ft	3,286 ft	2 ft	296 ft	101 ft	344 ft		
Temperature -- On Test	68.0 °F	68.0 °F	68.0 °F	68.0 °F	68.0 °F	68.0 °F	69.0 °F	69.0 °F
Temperature -- End of Test	69.0 °F	69.0 °F	69.0 °F	69.0 °F	69.0 °F	69.0 °F	66.0 °F	66.0 °F
Pressure -- On Test	388 psig	388 psig	388 psig	388 psig	388 psig	388 psig	388 psig	388 psig
Pressure -- End of Test	357 psig	357 psig	357 psig	357 psig	357 psig	357 psig	357 psig	357 psig
Unrestrained Pipe								
Vo								
Vo Unrestrained							412 gal	412 gal
Fwp 1							1.001187	1.001187
Fpp 1							1.000938	1.000938
Fpt 1							1.000164	1.000164
Fwt 1							1.000929	1.000929
Fpwt 1 = Fpt/Fwt							0.999236	0.999236
Vtp 1 = Vo(Fwp)(Fpp)(Fpwt)							412.31 gal	412.31 gal
Fwp 2							1.001092	1.001092
Fpp 2							1.000863	1.000863
Fpt 2							1.000109	1.000109
Fwt 2							1.000582	1.000582
Fpwt = Fpt/Fwt							0.999527	0.999527
Vtp = Vo(Fwp)(Fpp)(Fpwt)							412.36 gal	412.36 gal
Restrained Pipe								
Vo								
Vo Unrestrained	1,972 gal	86,755 gal	1 gal	114 gal	18 gal	17 gal		
Fwp 1	1.001187	1.001187	1.001187	1.001187	1.001187	1.001187		
Fpp 1	1.001135	1.001094	1.000381	1.000196	1.000187	1.000142		
Fpt 1	1.000097	1.000097	1.000097	1.000097	1.000097	1.000097		
Fwt 1	1.000803	1.000803	1.000803	1.000803	1.000803	1.000803		
Fpwt 1 = Fpt/Fwt	0.999294	0.999294	0.999294	0.999294	0.999294	0.999294		
Vtp 1 = Vo(Fwp)(Fpp)(Fpwt)	1,975 gal	86,891 gal	1 gal	114 gal	18 gal	17 gal		
Fwp 2	1.001092	1.001092	1.001092	1.001092	1.001092	1.001092		
Fpp 2	1.001050	1.001013	1.000356	1.000186	1.000178	1.000137		
Fpt 2	1.000109	1.000109	1.000109	1.000109	1.000109	1.000109		
Fwt 2	1.000929	1.000929	1.000929	1.000929	1.000929	1.000929		
Fpwt = Fpt/Fwt	0.999181	0.999181	0.999181	0.999181	0.999181	0.999181		
Vtp = Vo(Fwp)(Fpp)(Fpwt)	1,974 gal	86,866 gal	1 gal	114 gal	18 gal	17 gal		
Combined Pipe								
Vo								

Pipe Segment Volume Allowance Calculations

Company	Pacific Gas and Electric Company	Job Number	41497371
Construction Co.	ARB, Inc.	Job Number	0629-53-3500 T-17
Hydro. Test Co.	ARB, Inc.	Project No.	0629-53-3500 T-17
Test Section	PG&E T-17 L-105N, MP 28.64 - 30.63	WATER	
File Name	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63		

General Pipe Data

Description	Segment 1	2	3	4	5	6	7	8
Restrained or Unrestrained?	Unrestrained	Unrestrained	Unrestrained	Unrestrained	Unrestrained	Unrestrained	Restrained	Restrained
Outside Diameter	30.000 in.	24.000 in.	26.000 in.	26.000 in.	6.625 in.	4.500 in.	1.315 in.	30.000 in.
Wall Thickness	0.375 in.	0.375 in.	0.375 in.	0.375 in.	0.280 in.	0.237 in.	0.313 in.	0.313 in.
Inside Diameter	29.250 in.	23.250 in.	25.250 in.	25.250 in.	6.065 in.	4.026 in.	0.690 in.	29.375 in.
Spec./Grade	API5L-X65	API5L-X60	API5L-X65	API5L-X65	API5L-Grade B	API5L-Grade B	API5L-Grade B	API5L-X42
Length Unstrained	25 ft	6 ft	92 ft	26 ft	25 ft	29 ft		
Length Restrained							29 ft	7,193 ft
Temperature -- On Test	67 °F	67 °F	67 °F	67 °F	67 °F	67 °F	68 °F	68 °F
Temperature -- End of Test	68 °F	68 °F	68 °F	68 °F	68 °F	68 °F	69 °F	69 °F
Pressure -- On Test	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig
Pressure -- End of Test	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig

Unrestrained Pipe

Vo	4,947.70 gal / 633,305 oz.		Vtp1	4,955.72 gal / 634,333 oz.		Vtp2	4,955.21 gal / 634,267 oz.	
Vo Unrestrained	866 gal	132 gal	2,393 gal	676 gal	38 gal	19 gal		
Fwp 1	1.001138	1.001138	1.001138	1.001138	1.001138	1.001138		
Fpp 1	1.001209	1.000961	1.001044	1.001044	1.000336	1.000263		
Fpt 1	1.000127	1.000127	1.000127	1.000127	1.000127	1.000127		
Fwt 1	1.000681	1.000681	1.000681	1.000681	1.000681	1.000681		
Fpwt 1 = Fpt/Fwt	0.999447	0.999447	0.999447	0.999447	0.999447	0.999447		
Vtp 1 = Vo(Fwp)(Fpp)(Fpwt)	867.24 gal	132.53 gal	2,397.05 gal	677.43 gal	37.55 gal	19.19 gal		
Fwp 2	1.001138	1.001138	1.001138	1.001138	1.001138	1.001138		
Fpp 2	1.001209	1.000961	1.001044	1.001044	1.000336	1.000263		
Fpt 2	1.000146	1.000146	1.000146	1.000146	1.000146	1.000146		
Fwt 2	1.000803	1.000803	1.000803	1.000803	1.000803	1.000803		
Fpwt = Fpt/Fwt	0.999343	0.999343	0.999343	0.999343	0.999343	0.999343		
Vtp = Vo(Fwp)(Fpp)(Fpwt)	867.15 gal	132.52 gal	2,396.80 gal	677.36 gal	37.55 gal	19.19 gal		

Restrained Pipe

Vo	342,111.81 gal / 43,790,311 oz.		Vtp1	342,628.68 gal / 43,856,472 oz.		Vtp2	342,590.96 gal / 43,851,643 oz.	
Vo Restrained							1 gal	253,236 gal
Fwp 1							1.001138	1.001138
Fpp 1							1.000054	1.001089
Fpt 1							1.000097	1.000097
Fwt 1							1.000803	1.000803
Fpwt 1 = Fpt/Fwt							0.999294	0.999294
Vtp 1 = Vo(Fwp)(Fpp)(Fpwt)							1 gal	253,621 gal
Fwp 2							1.001138	1.001138
Fpp 2							1.000057	1.001093
Fpt 2							1.000109	1.000109
Fwt 2							1.000929	1.000929
Fpwt = Fpt/Fwt							0.999181	0.999181
Vtp = Vo(Fwp)(Fpp)(Fpwt)							1 gal	253,593 gal

Combined Pipe

Vo	347,059.50 gal / 44,423,617 oz.	Vtp1	347,584.41 gal / 44,490,804 oz.	Vtp2	347,546.17 gal / 44,485,910 oz.
1 °F Change	38.23 gal	4,893.95 oz.			

Pipe Segment Volume Allowance Calculations

Company	Pacific Gas and Electric Company
Construction Co.	ARB, Inc.
Hydro. Test Co.	ARB, Inc.
Test Section	PG&E T-17 L-105N, MP 28.64 - 30.63
File Name	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63

General Pipe Data								
Description	9	10	11	12	13	14	15	16
Restrained or Unrestrained?	Restrained	Restrained	Restrained	Restrained	Restrained	Restrained	Unrestrained	Unrestrained
Outside Diameter	30.000 in.	26.000 in.	4.500 in.	3.500 in.	2.375 in.	1.315 in.	30.000 in.	30.000 in.
Wall Thickness	0.313 in.	0.281 in.	0.141 in.	0.216 in.	0.154 in.	0.113 in.	0.500 in.	0.500 in.
Inside Diameter	29.375 in.	25.438 in.	4.218 in.	3.068 in.	2.067 in.	1.089 in.	29.000 in.	29.000 in.
Spec./Grade	API5L-X52	API5L-Grade B	24ksmys	API5L-Grade B	API5L-Grade B	API5L-Grade B	API5L-X65	API5L-X65
Length Unstrained							12 ft	12 ft
Length Restrained	56 ft	3,286 ft	2 ft	296 ft	101 ft	344 ft		
Temperature -- On Test	68 °F	68 °F	68 °F	68 °F	68 °F	68 °F	67 °F	67 °F
Temperature -- End of Test	69 °F	69 °F	69 °F	69 °F	69 °F	69 °F	68 °F	68 °F
Pressure -- On Test	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig
Pressure -- End of Test	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig	372 psig
Unrestrained Pipe								
Vo								
Vo Unrestrained							412 gal	412 gal
Fwp 1							1.001138	1.001138
Fpp 1							1.000899	1.000899
Fpt 1							1.000127	1.000127
Fwt 1							1.000681	1.000681
Fpwt 1 = Fpt/Fwt							0.999447	0.999447
Vtp 1 = Vo(Fwp)(Fpp)(Fpwt)							412.36 gal	412.36 gal
Fwp 2							1.001138	1.001138
Fpp 2							1.000899	1.000899
Fpt 2							1.000146	1.000146
Fwt 2							1.000803	1.000803
Fpwt = Fpt/Fwt							0.999343	0.999343
Vtp = Vo(Fwp)(Fpp)(Fpwt)							412.32 gal	412.32 gal
Restrained Pipe								
Vo								
Vo Restrained	1,972 gal	86,755 gal	1 gal	114 gal	18 gal	17 gal		
Fwp 1	1.001138	1.001138	1.001138	1.001138	1.001138	1.001138		
Fpp 1	1.001089	1.001050	1.000366	1.000189	1.000180	1.000138		
Fpt 1	1.000097	1.000097	1.000097	1.000097	1.000097	1.000097		
Fwt 1	1.000803	1.000803	1.000803	1.000803	1.000803	1.000803		
Fpwt 1 = Fpt/Fwt	0.999294	0.999294	0.999294	0.999294	0.999294	0.999294		
Vtp 1 = Vo(Fwp)(Fpp)(Fpwt)	1,975 gal	86,883 gal	1 gal	114 gal	18 gal	17 gal		
Fwp 2	1.001138	1.001138	1.001138	1.001138	1.001138	1.001138		
Fpp 2	1.001093	1.001054	1.000370	1.000193	1.000184	1.000141		
Fpt 2	1.000109	1.000109	1.000109	1.000109	1.000109	1.000109		
Fwt 2	1.000929	1.000929	1.000929	1.000929	1.000929	1.000929		
Fpwt = Fpt/Fwt	0.999181	0.999181	0.999181	0.999181	0.999181	0.999181		
Vtp = Vo(Fwp)(Fpp)(Fpwt)	1,974 gal	86,874 gal	1 gal	114 gal	18 gal	17 gal		
Combined Pipe								
Vo								
1 °F Change								

RCP

Hydrostatic Test Pipe Data Table

Pipe Type	Length	Restrained / Unrestrained	Outside Diameter	Wall Thickness	Specification & Grade	Pipe Yield Pressure	Material	Joint Type	Seam Type
1	25 ft	Unrestrained	30.000 in.	0.3750 in.	API5L-X65	1,625 psig	Steel	Arc Weld	DSAW
2	6 ft	Unrestrained	24.000 in.	0.3750 in.	API5L-X60	1,875 psig	Steel	Arc Weld	DSAW
3	92 ft	Unrestrained	26.000 in.	0.3750 in.	API5L-X65	1,875 psig	Steel	Arc Weld	DSAW
4	26 ft	Unrestrained	26.000 in.	0.3750 in.	API5L-X65	1,875 psig	Steel	Arc Weld	DSAW
5	25 ft	Unrestrained	6.625 in.	0.2800 in.	API5L-Grade B	2,958 psig	Steel	Arc Weld	SM
6	29 ft	Unrestrained	4.500 in.	0.2370 in.	API5L-Grade B	3,687 psig	Steel	Arc Weld	SM
7	29 ft	Restrained	1.315 in.	0.3125 in.	API5L-Grade B	16,635 psig	Steel	Arc Weld	SM
8	7,193 ft	Restrained	30.000 in.	0.3125 in.	API5L-X42	875 psig	Steel	Arc Weld	DSAW
9	56 ft	Restrained	30.000 in.	0.3125 in.	API5L-X52	1,083 psig	Steel	Arc Weld	DSAW
10	3,286 ft	Restrained	26.000 in.	0.2810 in.	API5L-Grade B	757 psig	Steel	Arc Weld	SM
11	2 ft	Restrained	4.500 in.	0.1410 in.	24ksmys	1,504 psig	Steel	Arc Weld	SM
12	296 ft	Restrained	3.500 in.	0.2160 in.	API5L-Grade B	4,320 psig	Steel	Arc Weld	SM
13	101 ft	Restrained	2.375 in.	0.1540 in.	API5L-Grade B	4,539 psig	Steel	Arc Weld	SM
14	344 ft	Restrained	1.315 in.	0.1130 in.	API5L-Grade B	6,015 psig	Steel	Arc Weld	SM
15	12 ft	Unrestrained	30.000 in.	0.5000 in.	API5L-X65	2,167 psig	Steel	Arc Weld	DSAW
16	12 ft	Unrestrained	30.000 in.	0.5000 in.	API5L-X65	2,167 psig	Steel	Arc Weld	DSAW

Hydrostatic Test Project Owner & Participants

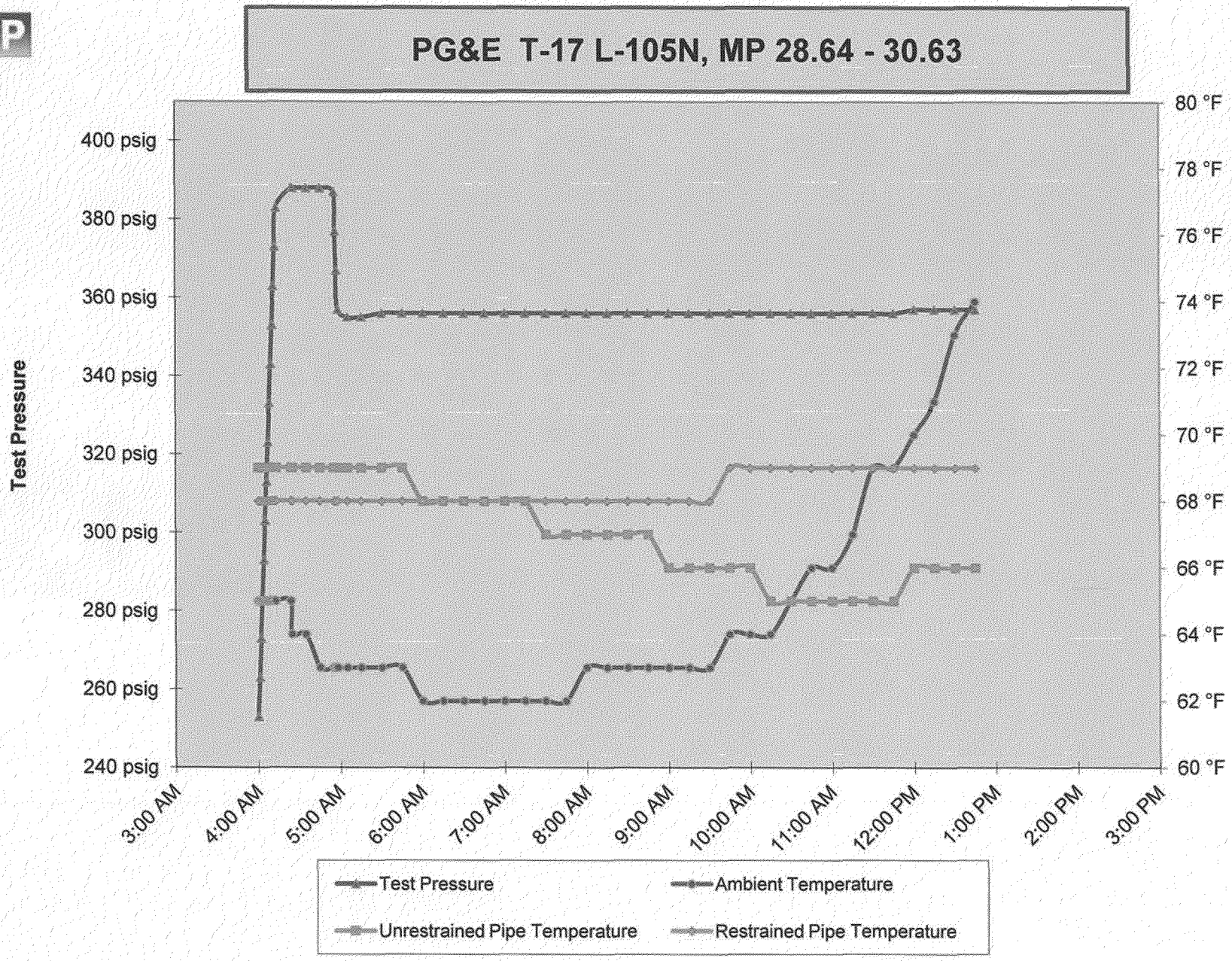
Owner Company	Pacific Gas and Electric Company	Job Number
Address	350 N. Wiget Walnut Creek, CA 94598 Attention: Redacted	41497371
Construction Company	ARB, Inc.	Job Number
Address	1875 Loveridge Road Pittsburg, CA 94565 Attention: Redacted	0629-53-3500 T-17
Hydrostatic Test Co.	ARB, Inc.	Project No.
Address	1875 Loveridge Road Pittsburg, CA 94565 Attention: Redacted	0629-53-3500 T-17
Test Section	PG&E T-17 L-105N, MP 28.64 - 30.63 From: 0+00 To: 105+57	
File Name	RCP 61362 - T-17 L-105N, MP 28.64 - 30.63	

Part II – Test Data (TO BE PREPARED BY PERSON SUPERVISING TEST AT TIME OF TEST)

Note: Minimum test pressure and duration are not to be changed without written approval.

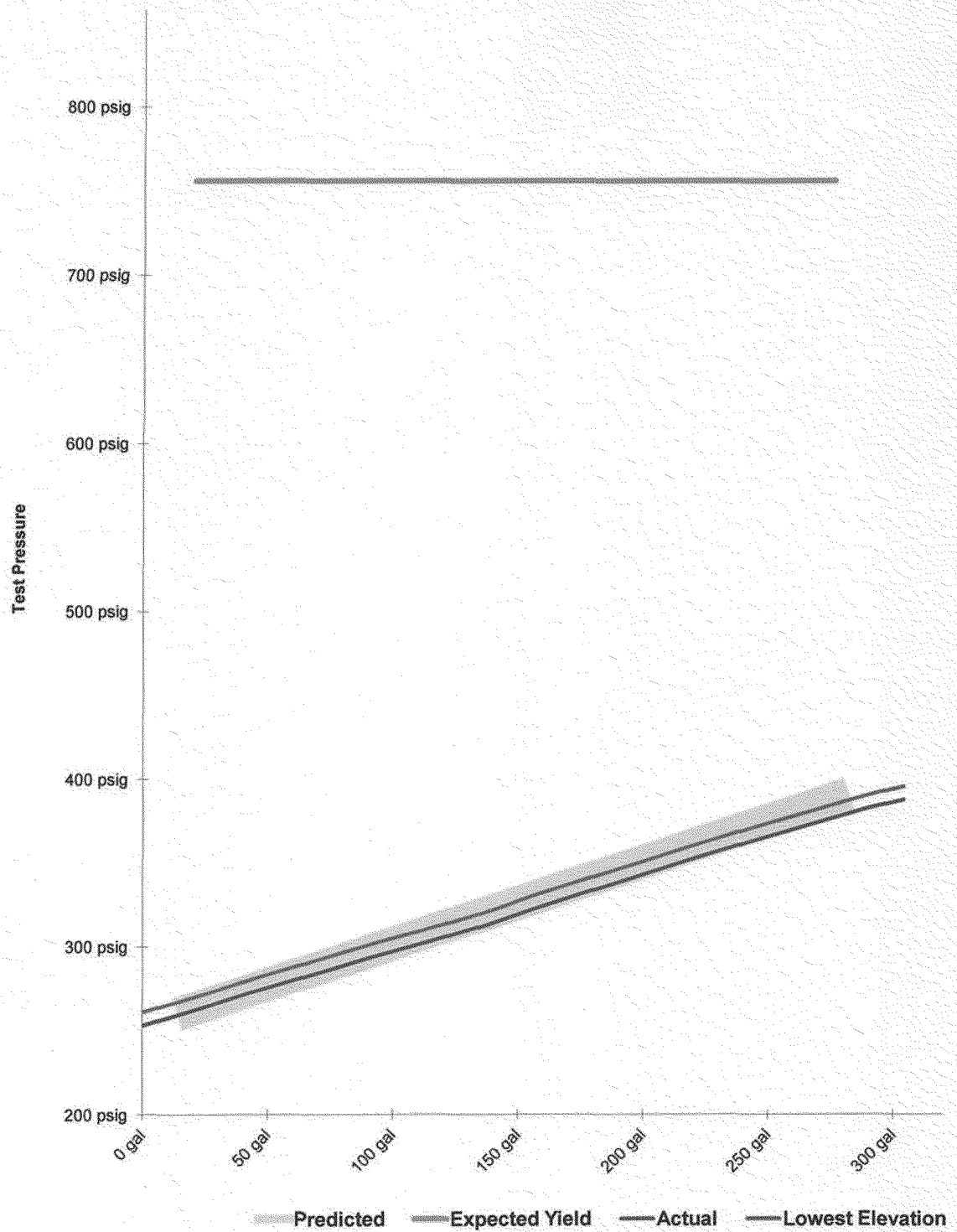
Time and Date Test Pressure Reached	10/18/11 4:25 AM	Elevation at Test Point	18 ft	Min. Required Test Press At Test Point (1)	337.00 psig	Max. Allowable Test Press at Test Point (4)	405.20 psig
Time and Date Test Ended	10/18/11 12:45 PM	Max. Elevation in Test Section	18 ft	Min. Indicated Test Pressure (2)	355.00 psig	Max. Indicated Test Pressure (5)	388.00 psig
Actual Duration of Test	8 hours 20 minutes	Min. Elevation in Test Section	0 ft	Min. Test Pressure at Max. Elevation (3)	355.00 psig	Max. Test Pressure at Min. Elevation (6)	395.80 psig

RCP



RCP

Spike Pressure Test
Stress Strain Curve -- PG&E T-17 L-105N, MP 28.64 - 30.63



10/19/2011

RCP

Spike Pressure Test
Stress Strain Curve -- PG&E T-17 L-105N, MP 28.64 - 30.63

Actual Pressure Volume Plot Data			Predicted Pressure Volume Plot Data	Slope	
Pressure	Strokes	Gallons	Gallons	Actual	Predicted
253 psig	0	0.00 gal		0	0.000
263 psig	637	22.76 gal	20.42 gal	2.276	2.042
273 psig	1220	43.60 gal	40.84 gal	2.083	2.042
283 psig	1860	66.47 gal	61.26 gal	2.287	2.042
293 psig	2498	89.27 gal	81.68 gal	2.280	2.042
303 psig	3190	114.00 gal	102.10 gal	2.473	2.042
313 psig	3830	136.87 gal	122.53 gal	2.287	2.042
323 psig	4370	156.16 gal	142.96 gal	1.930	2.043
333 psig	4966	177.46 gal	163.38 gal	2.130	2.043
343 psig	5570	199.05 gal	183.81 gal	2.158	2.043
353 psig	6162	220.20 gal	204.24 gal	2.116	2.043
363 psig	6787	242.54 gal	224.67 gal	2.233	2.043
373 psig	7446	266.09 gal	245.10 gal	2.355	2.043
383 psig	8109	289.78 gal	265.54 gal	2.369	2.043
388 psig	8500	303.75 gal	275.75 gal	2.794	2.043
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
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388 psig		303.75 gal	275.75 gal	0.000	0.000
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388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000
388 psig		303.75 gal	275.75 gal	0.000	0.000

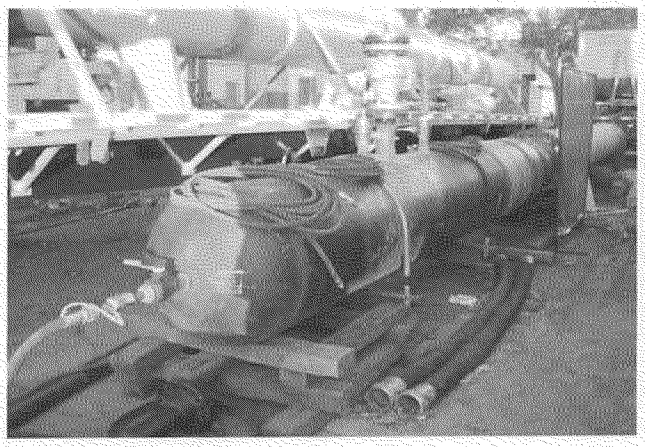
39250	0.056 gal/stroke
Pump Piston Diameter	1.250 in
Pump Piston Stroke	3.50 in
Pump Cylinders	3 ea
Volume check gal per stroke	0.036 gal/stroke
Volume Released (gallons)	22.50 gal
Pressure Reduced (psi)	10 psi
Maximum2	320 gal
Minimum2	0 gal
Maximum1	857 psig
Minimum1	200 psig
Gallons/Stroke Used	0.036 gal/stroke
Predicted Gallons/Stroke	0.032 gal/stroke
Pressure Increment	10 psi
Max Pressure	388 psig
Buried Pipe Temperature	68 °F
Exposed Pipe Temperature	69 °F

ASME B31.8 Appendix N-5

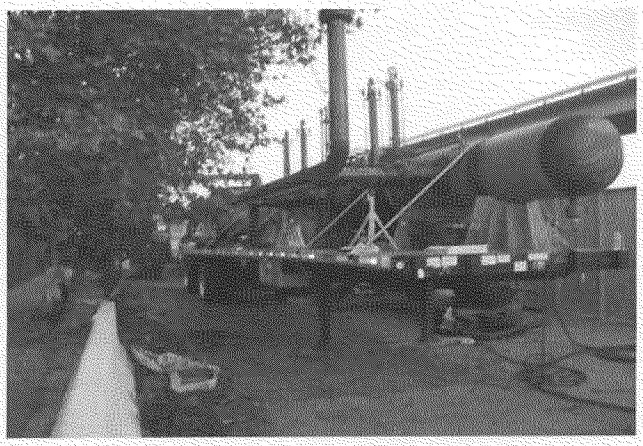
Average Actual Elastic Slope	2.229
Average Predicted Elastic Slope	2.043
Code Prescribed Minimum Yield Slope (less 10%) B31.8 N-5 (c)(2)	4.235
Established Minimum Yield Pressure B31.8 N-5 (c)(2)	388 psig
Maximum Allowed Volume (After Slope Deviation) B31.8 N-5 (c)(2)	418 gal
Volume (After Slope Deviation) B31.8 N-5 (c)(2)	0 gal

Redacted

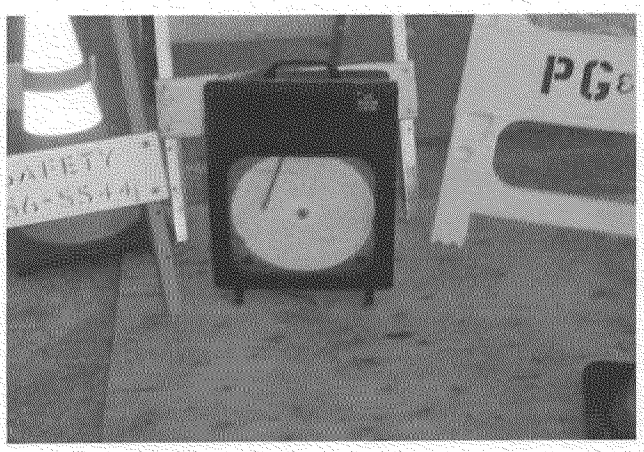
10/18/2011
Date



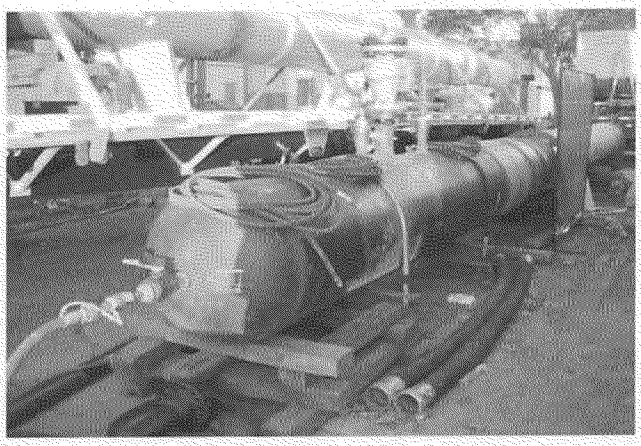
T-17 Test Header



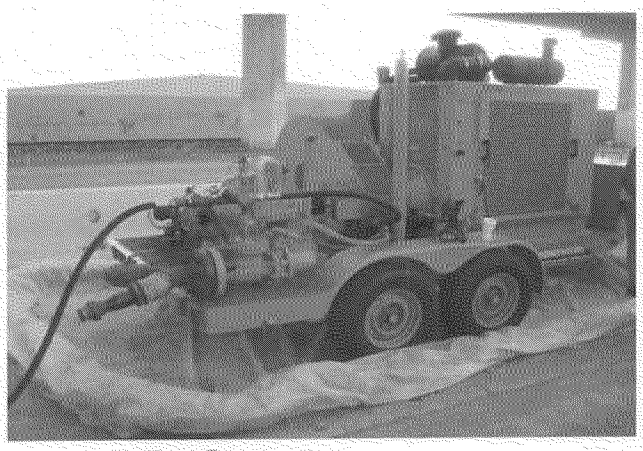
Bridle Included in Test (Test 2).



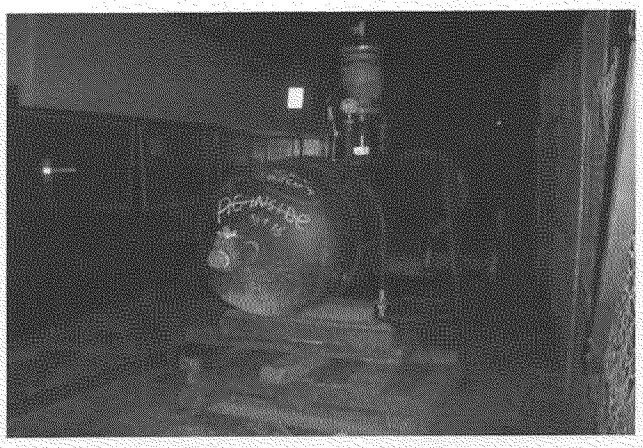
Test Restrained Chart Recorder



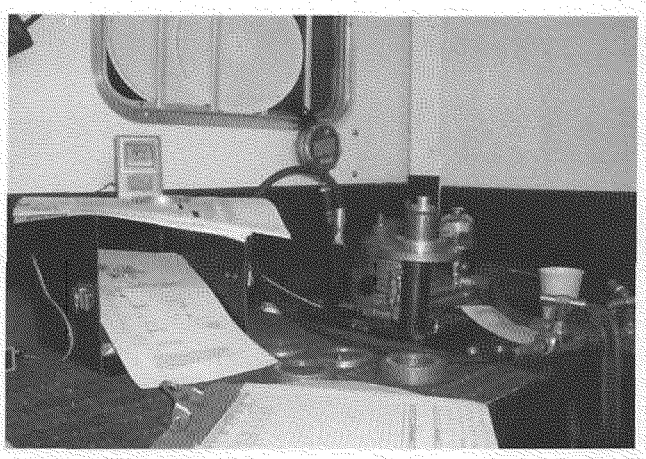
Test Head



Test Pump

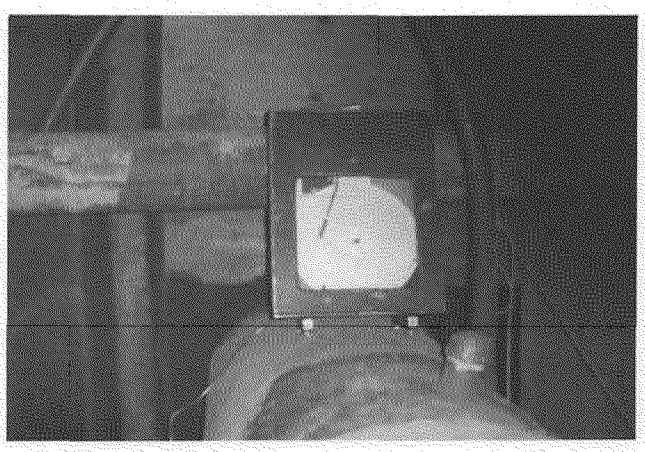


Test End

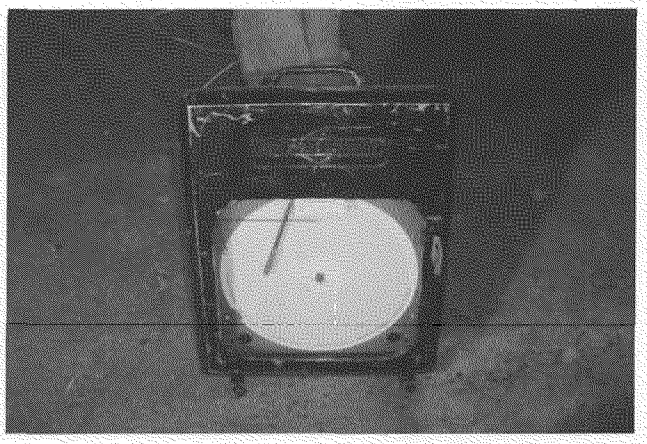


Deadweight Test Equipment

Pressure Chart Recorder



Restrained Temp Chart Recorder (Backup)



Unrestrained Temp Chart Recorder