



801 Louisiana, Ste.200
Houston, Texas 77002

Redacted

October 18, 2011

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

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,

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Test T-17 version 10 14 2011
Letter



Hydrostatic Test Certification

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:	Code of Federal Regulations, Title 49, Part 192, Subpart J (Class 3)	Test Date:	18-Oct-11
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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	1,063 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	
Ambient Temperature:	64.0 °F	Elevation @ Test Point:	18.0 ft	Unrestrained:	69.0 °F
Pressure @ High Point (Cal/Measure):	388 psig	Elevation @ High Point:	18.0 ft	Restrained:	68.0 °F
Pressure @ Low Point (Cal/Measure):	396 psig	Elevation @ Low Point:	0.0 ft	Location:	0+00
				Location:	0+00
				Location:	57+32

Final Test Conditions

Pressure at Test Point:	357 psig	Date/Time:	10/18/11 12:45 PM	Pipe Temperature	
Ambient Temperature:	74.0 °F	Elevation @ Test Point:	18.0 ft	Unrestrained:	66.0 °F
Pressure @ High Point (Cal/Measure):	357 psig	Elevation @ High Point:	18.0 ft	Restrained:	69.0 °F
Pressure @ Low Point (Cal/Measure):	365 psig	Elevation @ Low Point:	0.0 ft	Location:	0+00
				Location:	0+00
				Location:	57+32

Total Fluid Injected:

Total Fluid Withdrawn: 9216.00 fluid ounces

Volume loss

Net Change in Volume of the Test Section ± (+ Gain, - Loss):	(3,534.34) oz	loss	(0.0079)%	(0.722) °F equivalent
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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	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>

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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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		Test Log							
Log No.	Test Period		Test Pressure	Temperature °F			Remarks		
	Date	Time		Ambient	Pipe		Comment	Bleed	Inject
					Unrestrained	Restrained			
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			

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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		Comment	Bleed	Inject				
				Unrestrained	Restrained								
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.		<table border="1"> <tr> <td>High Test Pressure:</td> <td>388 psig</td> </tr> <tr> <td>Low Test Pressure:</td> <td>355 psig</td> </tr> </table>				High Test Pressure:	388 psig	Low Test Pressure:	355 psig
High Test Pressure:	388 psig												
Low Test Pressure:	355 psig												

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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	1.001180	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 43,860,587 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.	

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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 2 = Fpt/Fwt							0.999527	0.999527
Vtp 2 = 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 2 = Fpt/Fwt	0.999181	0.999181	0.999181	0.999181	0.999181	0.999181		
Vtp 2 = Vo(Fwp)(Fpp)(Fpwt)	1.974 gal	86,868 gal	1 gal	114 gal	18 gal	17 gal		

Combined Pipe								
Vo								
Vo Unrestrained								

Redacted



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		Vtp1	4,955.72 gal		Vtp2	4,955.21 gal	
	633,305 oz.			634,333 oz.			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	677.38 gal	37.55 gal	19.19 gal		

Restrained Pipe

Vo	342,111.81 gal		Vtp1	342,628.68 gal		Vtp2	342,590.96 gal	
	43,790,311 oz.			43,856,472 oz.			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		Vtp1	347,584.41 gal		Vtp2	347,546.17 gal	
	44,423,617 oz.			44,490,804 oz.			44,485,910 oz.	
1 °F Change	38.23 gal		4,893.95 oz.					

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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 Unrestrained							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	9	10	11	12	13	14	15	16
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	9	10	11	12	13	14	15	16
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	1.001138	
Fpp 1	1.001089	1.001050	1.000366	1.000189	1.000180	1.000138	1.000138	
Fpt 1	1.000097	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	1.000803	
Fpwt 1 = Fpt/Fwt	0.999294	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	1.001138	
Fpp 2	1.001093	1.001054	1.000370	1.000193	1.000184	1.000141	1.000141	
Fpt 2	1.000109	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	1.000929	
Fpwt = Fpt/Fwt	0.999181	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	9	10	11	12	13	14	15	16
1 °F Change								

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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

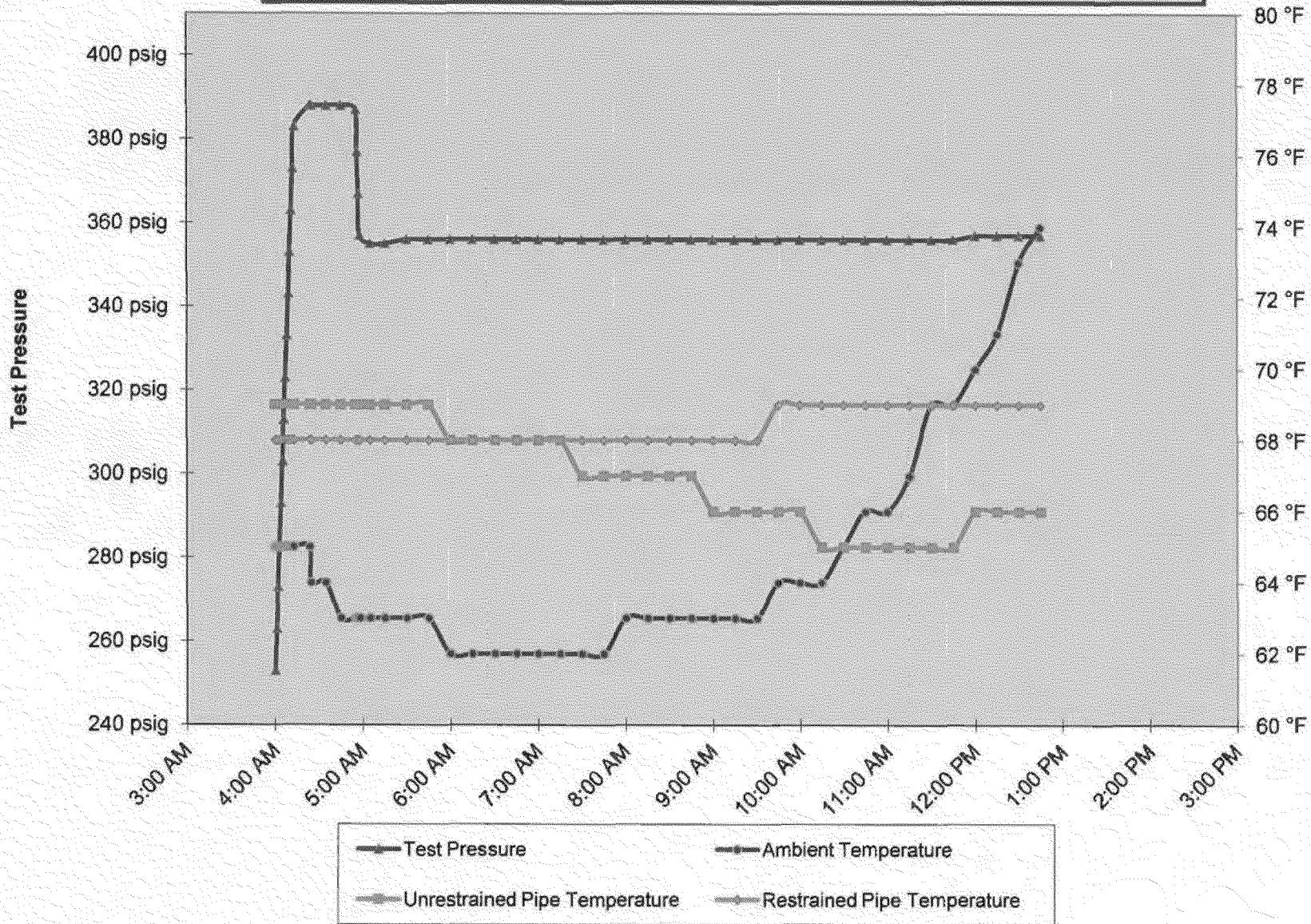
Hydrostatic Test Project Owner & Participants

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

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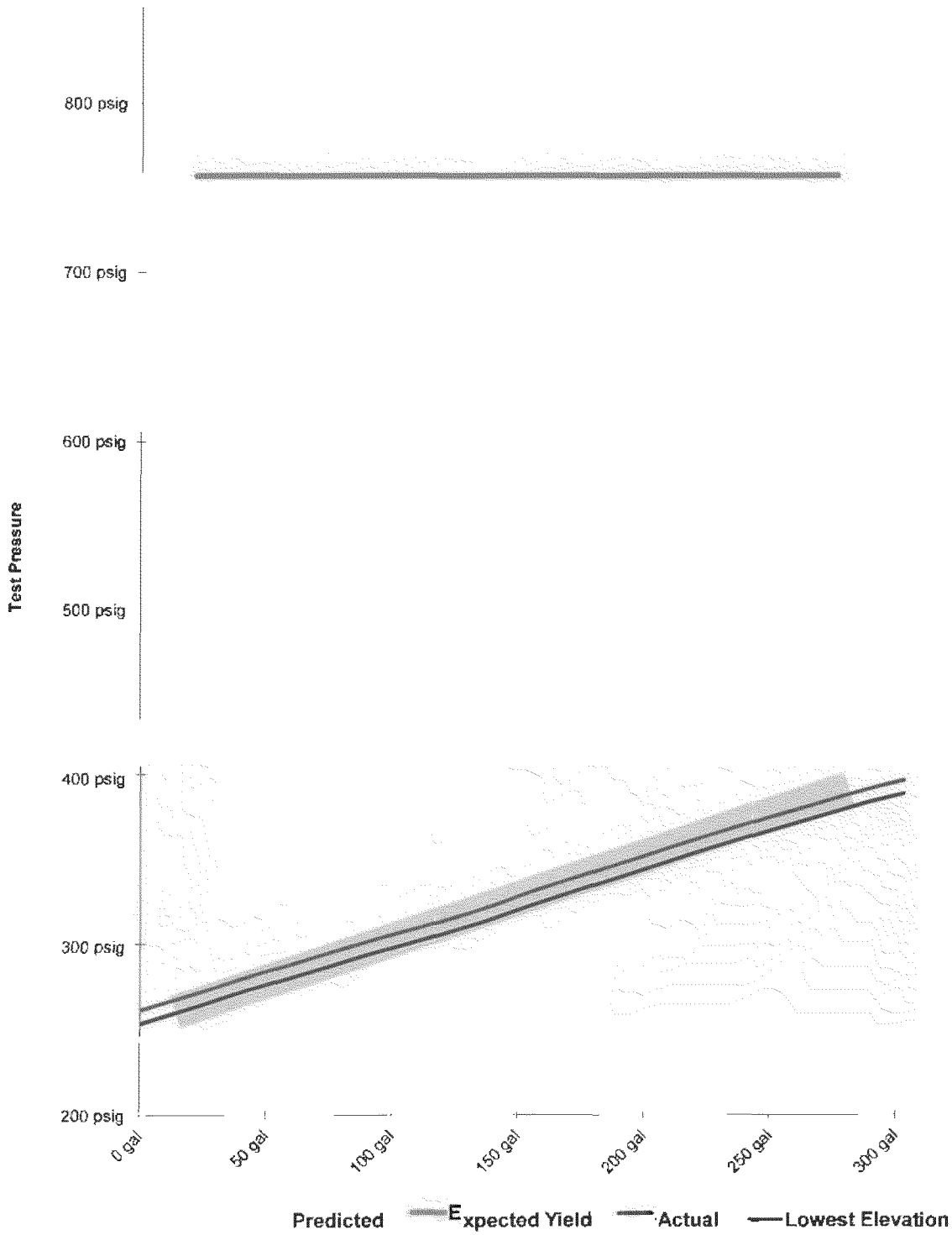
PG&E T-17 L-105N, MP 28.64 - 30.63



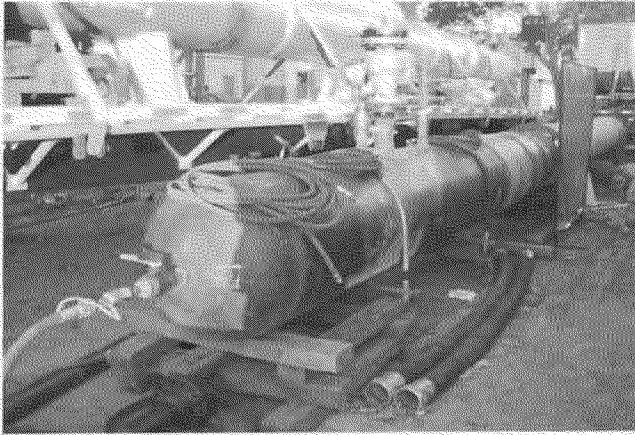
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Test T-17 version 10 14 2011
PlotT

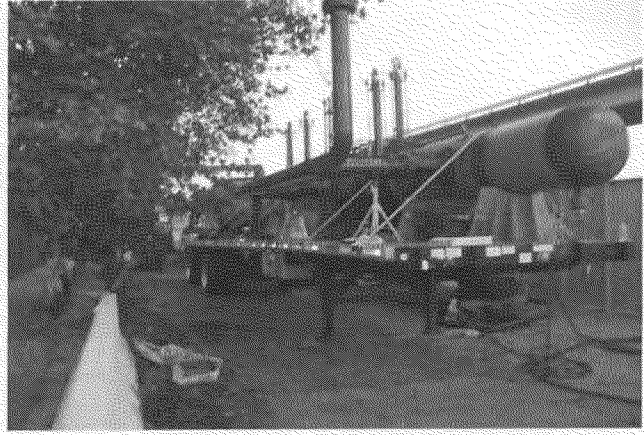
**Spike Pressure Test
Stress Strain Curve -- PG&E T-17 L-105N, MP 28.64 - 30.63**



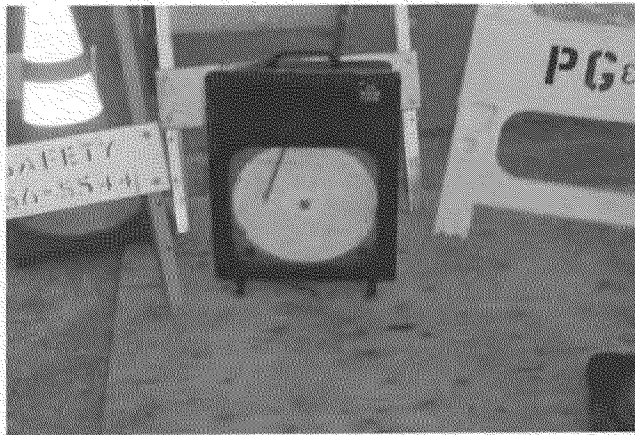
Actual Pressure Volume Plot Data			Predicted Pressure Volume Plot Data	Slope		Spike Pressure Test Stress Strain Curve -- PG&E T-17 L-105N, MP 28.64 - 30.63	
Pressure	Strokes	Gallons	Gallons	Actual	Predicted		
253 psig	0	0.00 gal		0	0.000	39250	0.056 gal/stroke
263 psig	837	22.76 gal	20.42 gal	2.276	2.042	Pump Piston Diameter	1.250 in
273 psig	1220	43.60 gal	40.84 gal	2.083	2.042	Pump Piston Stroke	3.50 in
283 psig	1860	66.47 gal	61.26 gal	2.287	2.042	Pump Cylinders	3 ea
293 psig	2498	89.27 gal	81.68 gal	2.280	2.042	Volume check gal per stroke	0.036 gal/stroke
303 psig	3190	114.00 gal	102.10 gal	2.473	2.042	Volume Released (gallons)	22.50 gal
313 psig	3630	136.87 gal	122.53 gal	2.287	2.042	Pressure Reduced (psi)	10 psi
323 psig	4370	156.16 gal	142.96 gal	1.930	2.043	Maximum2	320 gal
333 psig	4966	177.46 gal	163.38 gal	2.130	2.043	Minimum2	0 gal
343 psig	5570	199.05 gal	183.81 gal	2.158	2.043	Maximum1	857 psig
353 psig	6162	220.20 gal	204.24 gal	2.116	2.043	Minimum1	200 psig
363 psig	6787	242.54 gal	224.67 gal	2.233	2.043	Gallons/Stroke Used	0.036 gal/stroke
373 psig	7446	266.09 gal	245.10 gal	2.355	2.043	Predicted Gallons/Stroke	0.032 gal/stroke
383 psig	8109	289.78 gal	265.54 gal	2.369	2.043	Pressure Increment	10 psi
388 psig	8500	303.75 gal	275.75 gal	2.794	2.043	Max Pressure	388 psig
388 psig		303.75 gal	275.75 gal	0.000	0.000	Buried Pipe Temperature	68 °F
388 psig		303.75 gal	275.75 gal	0.000	0.000	Exposed Pipe Temperature	69 °F
388 psig		303.75 gal	275.75 gal	0.000	0.000	ASME B31.8 Appendix N-5	
388 psig		303.75 gal	275.75 gal	0.000	0.000	Average Actual Elastic Slope	2.229
388 psig		303.75 gal	275.75 gal	0.000	0.000	Average Predicted Elastic Slope	2.043
388 psig		303.75 gal	275.75 gal	0.000	0.000	Code Prescribed Minimum Yield Slope (less 10%) B31.8 N-5 (c)(2)	4.235
388 psig		303.75 gal	275.75 gal	0.000	0.000	Established Minimum Yield Pressure B31.8 N-5 (c)(2)	388 psig
388 psig		303.75 gal	275.75 gal	0.000	0.000	Maximum Allowed Volume (After Slope Deviation) B31.8 N-5 (c)(2)	418 gal
388 psig		303.75 gal	275.75 gal	0.000	0.000	Volume (After Slope Deviation) B31.8 N-5 (c)(2)	0 gal
388 psig		303.75 gal	275.75 gal	0.000	0.000	Redacted	
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	10/18/2011	
388 psig		303.75 gal	275.75 gal	0.000	0.000	Date	



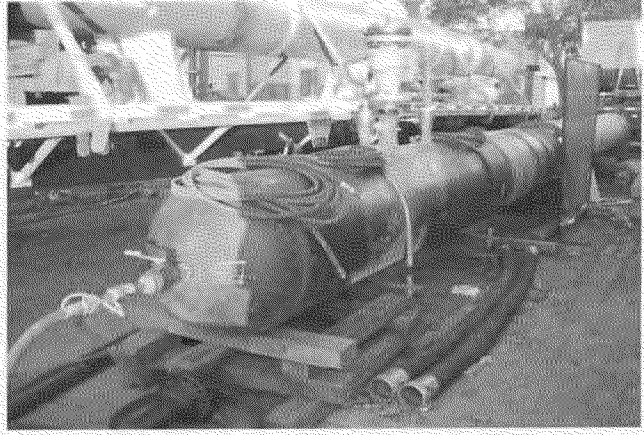
T-17 Test Header



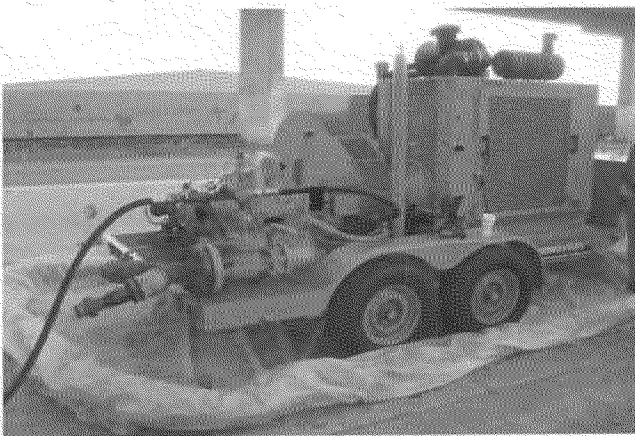
Bridle Included in Test (Test 2).



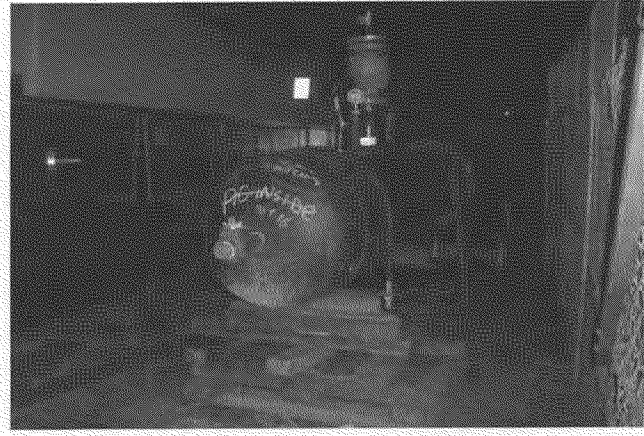
Test Restrained Chart Recorder



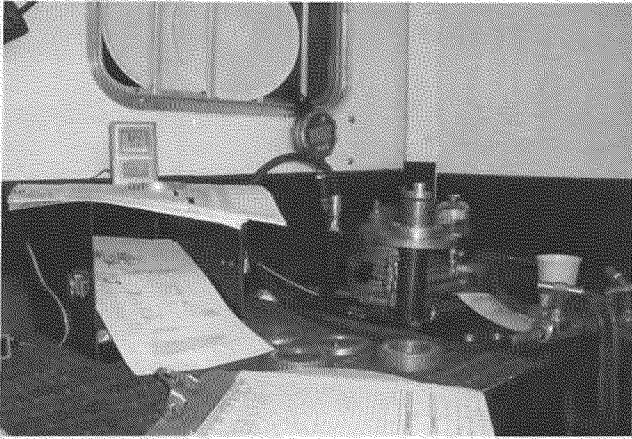
Test Head



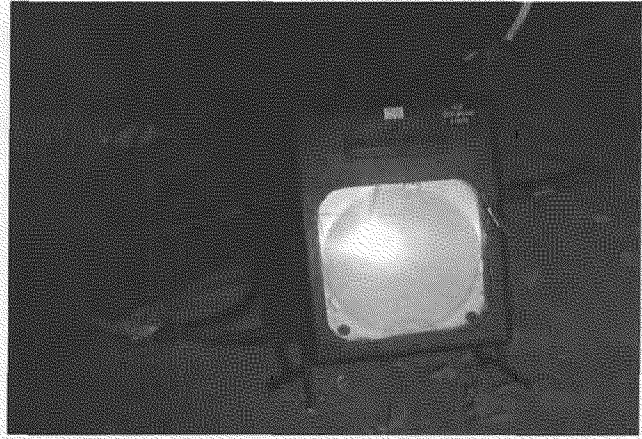
Test Pump



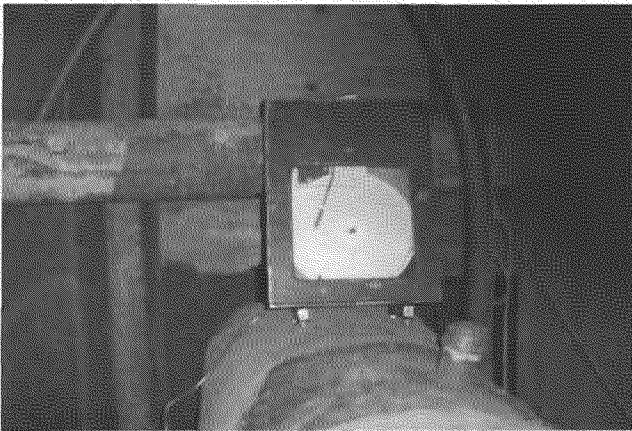
Test End



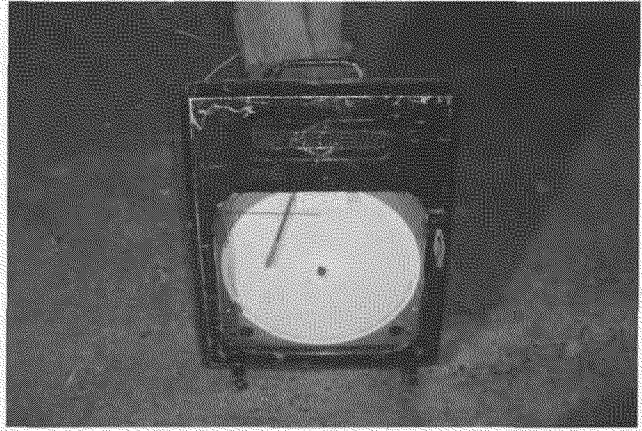
Deadweight Test Equipment



Pressure Chart Recorder



Restrained Temp Chart Recorder (Backup)



Unrestrained Temp Chart Recorder