



**PART 1 – TEST DESIGN DATA (TO BE PREPARED BY PROJECT ENGINEER/ESTIMATOR)**

<b>Test Description</b>													
Line Number or Station Name DFM 3002-01 & DF3449						Division/District Diablo			Job Number 41919143				
Purpose of Test Test Existing 4" & 3"						MAOP to be Established by this Test <u>283</u> PSIG							
Description of Pipe being Tested (include reference drawings, field stationing, and mile points) T-022A-12, Location D. Nitrogen Test Existing 4" & 3" DFM 3002-01 & DF3449 from MLV-26.53 to Plaza No. 2 Regulator Station. (Refer to DWG 41919143 - Sheets 1-6 of 6) * Assumed Values per PG&E Technical Guidance Specification, Resolving Unknown Pipeline Features, 12/05/2012. † %SMYS @ MAOP does not include Joint Efficiency Factor (E)													
<input type="checkbox"/> New Facility (no spike test required) <input checked="" type="checkbox"/> Existing Facility Will spike test be performed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (explain on right)						If no spike test for existing facility, explain:							
<b>Static Head Calculation</b>													
Maximum Elevation <u>290</u> FT						For Water _ (Elev. Diff.) x 0.433 = _ PSIG							
Minimum Elevation <u>290</u> FT						For Other Test Medium <u>0</u>							
Elevation Difference <u>0</u> FT						Contact the responsible engineer for guidance on completing this field.							
<b>Pipe to be Tested</b>													
Size		API or ASTM Spec	SMYS (psi)	Long Seam (ERW, DSAW, SMLS etc.)	JF (E)	Footage to be Tested	Actual Footage	Location Class	Most Restrictive Design Factor	% of SMYS			
OD (in.)	WT (in.)									At MAOP	At Min. Test Press.	At Max. Test Press.	
4.500	0.148*	---	28000*	FBW*	0.6	8'	4.71'	3	0.5	15.37 <sup>†</sup>	32.58 <sup>†</sup>	36.38 <sup>†</sup>	
3.500	0.148*	---	28000*	FBW*	0.6	110'	113.6'	3	0.5	11.95 <sup>†</sup>	25.34 <sup>†</sup>	28.29 <sup>†</sup>	
2.375	0.154*	---	28000*	FBW*	0.6	2'	4.17'	3	0.5	7.79 <sup>†</sup>	16.52 <sup>†</sup>	18.45 <sup>†</sup>	
4.500	0.237*	---	35000*	ELBOW	1.0	2 EA	2 ea	3	0.5	7.68	16.27	18.17	
3.500	0.216*	---	35000*	ELBOW	1.0	2 EA	2 ea	3	0.5	6.55	13.89	15.51	
2.375	0.154*	---	35000*	ELBOW	1.0	2 EA	2 ea	3	0.5	6.23	13.22	14.76	
All fittings included in the test (except those listed above) are the same wall thickness and grade as the pipe <input checked="" type="checkbox"/>													
Pipe specs verified in field <input checked="" type="checkbox"/> Signature of person supervising test <i>Scott Powell</i>													
Component(s) limiting test pressure/Control Point exceptions 4.500" OD x 0.148" WT*, 28000 SMYS*, FBW*													
<b>Test Specifications (include a spike test when testing existing facilities)</b>													
Test Factor <u>2.12</u>	[1A]	Min. Test Pressure at Max. Elev. <u>600</u> PSIG					[1B]	Max. Test Pressure at Min. Elev. <u>670</u> PSIG					
Spike Test (complete only for spike test)	[1C]	Spike Factor <u>1.1</u>					[1D]	Spike Pressure at Max. Elev. Box [1A] x [1C] = <u>660</u> PSIG					
	[1E]	Spike Pressure at Min. Elev. <u>660</u> PSIG					[1F]	Max. Post-Spike Pressure at Min. Elev. Box [1E] x 0.95 = <u>627</u> PSIG					
Test Medium to be Used <u>Nitrogen</u>			Minimum Test Duration <u>1</u> Hour			<ul style="list-style-type: none"> <li>Under 30% SMYS: 1 hour minimum</li> <li>30% SMYS and over: 8 hours minimum</li> <li>Pre-installation Test: Refer to A-34, Attachment A</li> <li>Spike Test: 15 minutes minimum (included in test)</li> </ul>							
<b>Signatures</b>													
Prepared by (signature) <i>Dirk Ayala</i>				Print Name and Phone Number DIRK AYALA 530-635-2423				Date <u>4/21/14</u>		LAN ID D1A8			
Approved by (signature) <i>Don Fink</i>				Print Name DONAVON FINK 714-273-1044				Date <u>4-21-14</u>		LAN ID D1F7			
Test Supervised by (signature) <i>Scott Powell</i>				Time and Date Test Pressure Reached (from Part 2) <u>0302 hr 8-8-2014</u>			Time and Date Test Ended (from Part 2) <u>0418 hr 8-8-2014</u>			Actual Duration of Test (from Part 2) <u>1 hr - 16 min.</u>			



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<b>Test Description</b>													
Line Number or Station Name DFM 3002-01 & DF3449						Division/District Diablo			Job Number 41919143				
Purpose of Test Test Existing 4" & 3"						MAOP to be Established by this Test <u>283</u> PSIG							
Description of Pipe being Tested (include reference drawings, field stationing, and mile points) T-022A-12, Location D. Nitrogen Test Existing 4" & 3" DFM 3002-01 & DF3449 from MLV-26.53 to Plaza No. 2 Regulator Station. (Refer to DWG 41919143 - Sheets 1-6 of 6) * Assumed Values per PG&E Technical Guidance Specification, Resolving Unknown Pipeline Fearures, 12/05/2012.													
<input type="checkbox"/> New Facility (no spike test required) <input checked="" type="checkbox"/> Existing Facility Will spike test be performed? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (explain on right)						If no spike test for existing facility, explain:							
<b>Static Head Calculation</b>													
Maximum Elevation <u>290</u> FT						For Water _ (Elev. Diff.) x 0.433 = _ PSIG							
Minimum Elevation <u>290</u> FT						For Other Test Medium <u>0</u>							
Elevation Difference <u>0</u> FT						Contact the responsible engineer for guidance on completing this field.							
<b>Pipe to be Tested</b>													
Size		API or ASTM Spec	SMYS (psi)	Long Seam (ERW, DSAW, SMLS etc.)	JF (E)	Footage to be Tested	Actual Footage	Location Class	Most Restrictive Design Factor	% of SMYS			
OD (in.)	WT (in.)									At MAOP	At Min. Test Press.	At Max. Test Press.	
<u>3.5</u>	<u>2.375</u>	<u>0.216</u>	<u>30000*</u>	<u>Reducer</u>	<u>1.0</u>	<u>1ea</u>	<u>1ea</u>	<u>3</u>	<u>0.5</u>	<u>7.64/7.27</u>	<u>16.26/15.42</u>	<u>18.09/17.22</u>	
4.500	0.237*	---	30000*	REDUCER	1.0	2 EA	1ea	3	0.5	8.96	18.99	21.20	
X 2.375	X 0.154*									7.27	15.42	17.22	
4.500	0.237*	---	30000*	TEE	1.0	2 EA	2ea	3	0.5	8.96	18.99	21.20	
3.500	0.216*	---	30000*	TEE	1.0	1 EA	1ea	3	0.5	7.64	16.20	18.09	
3.500	0.216*	---	30000*	TEE	1.0	2 EA	2ea	3	0.5	7.64	16.20	18.09	
X 2.375	X 0.154*									7.27	15.42	17.22	
<u>4.5</u>	<u>3.5</u>	<u>0.237</u>	<u>30000*</u>	<u>Reducer</u>	<u>1.0</u>	<u>1ea</u>	<u>1ea</u>	<u>3</u>	<u>0.5</u>	<u>8.96</u>	<u>18.99</u>	<u>21.20</u>	
										<u>7.64</u>	<u>16.20</u>	<u>18.09</u>	
All fittings included in the test (except those listed above) are the same wall thickness and grade as the pipe <input checked="" type="checkbox"/>													
Pipe specs verified in field <input checked="" type="checkbox"/> Signature of person supervising test <u>Scott Powell</u>													
Component(s) limiting test pressure/Control Point exceptions 4.500" OD x 0.148" WT*, 28000 SMYS*, FBW*													
<b>Test Specifications (include a spike test when testing existing facilities)</b>													
Test Factor <u>2.12</u>	[1A]	Min. Test Pressure at Max. Elev. <u>600</u> PSIG					[1B]	Max. Test Pressure at Min. Elev. <u>670</u> PSIG					
Spike Test (complete only for spike test)	[1C]	Spike Factor <u>1.1</u>					[1D]	Spike Pressure at Max. Elev. Box [1A] x [1C] = <u>660</u> PSIG					
	[1E]	Spike Pressure at Min. Elev. <u>660</u> PSIG					[1F]	Max. Post-Spike Pressure at Min. Elev. Box [1E] x 0.95 = <u>627</u> PSIG					
Test Medium to be Used <u>Nitrogen</u>			Minimum Test Duration <u>1 Hour</u>										
<ul style="list-style-type: none"> <li>Under 30% SMYS: 1 hour minimum</li> <li>30% SMYS and over: 8 hours minimum</li> <li>Pre-installation Test: Refer to A-34, Attachment A</li> <li>Spike Test: 15 minutes minimum (included in test)</li> </ul>													
<b>Signatures</b>													
Prepared by (signature) <u>Dirk Ayala</u>			Print Name and Phone Number DIRK AYALA 530-635-2423				Date <u>4/21/14</u>		LAN ID D1A8				
Approved by (signature) <u>Don Fink</u>			Print Name DONAVON FINK 714-273-1044				Date <u>4-21-14</u>		LAN ID D1F7				
Test Supervised by (signature) <u>Scott Powell</u>			Time and Date Test Pressure Reached (from Part 2) <u>0302 hr 8-8-2014</u>			Time and Date Test Ended (from Part 2) <u>0418 hr 8-8-2014</u>			Actual Duration of Test (from Part 2) <u>1hr - 16 min.</u>				



**Gas Pipeline Facilities Strength Test Pressure Report**  
(For Pipeline Facilities Designed to Operate over 100 PSIG)

Sheet 3 of 3  
Test Number 4 of 4  
STPR Revision Number 0

**PART 2 – TEST DATA (TO BE PREPARED BY PERSON SUPERVISING TEST AT TIME OF TEST)**

<b>Test Elevation</b>			
Elevation at Test Point <u>290</u> FT		Max. Elevation in Test Section <u>290</u> FT	Min. Elevation in Test Section <u>290</u> FT
[2A]	Static Head b/t Test Point and Max. Elev. <u>0</u> PSIG		[2B] Static Head b/t Test Point and Min. Elev. <u>0</u> PSIG
<b>No Spike Test: Calculations and Test Results (complete for strength test without a spike test)</b>			
Min. Required Test Pressure at Test Point Box [1A] + Box [2A] = _____ PSIG		Max. Allowable Test Pressure at Test Point Box [1B] - Box [2B] = _____ PSIG	Pressure Range During Test _____ PSIG
[2C]	Min. Test Pressure Indicated _____ PSIG	[2D]	Max. Test Pressure Indicated _____ PSIG
Calculated Min. Test Pressure at Max. Elev. Box [2C] - Box [2A] = _____ PSIG		Calculated Max. Test Pressure at Min. Elev. Box [2D] + Box [2B] = _____ PSIG	
<b>Spike Test: Calculations and Test Results (complete for strength test with a spike test)</b>			
Spike Pressure at Test Point Box [1E] - Box [2B] = <u>660</u> PSIG		Min. Required Test Pressure at Test Point Box [1A] + Box [2A] = <u>600</u> PSIG	Max. Post-Spike Pressure at Test Point Box [1F] - Box [2B] = <u>627</u> PSIG
[2E]	Spike Pressure Indicated <u>660</u> PSIG	[2F]	Min. Test Pressure Indicated <u>613</u> PSIG
Calculated Spike Pressure at Min. Elev. Box [2E] + Box [2B] = <u>660</u> PSIG		Calculated Min. Test Pressure at Max. Elev. Box [2F] - Box [2A] = <u>613</u> PSIG	Calculated Max. Post-Spike Pressure at Min. Elev. Box [2G] + Box [2B] = <u>616</u> PSIG
<b>Test Acceptance</b>			
Were Leaks Observed? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		If yes, explain:	
Acceptable Strength Test? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		If no, explain:	
Report strength test failures to Regulatory Compliance			
Test Medium Used	Time and Date Test Pressure Reached	Time and Date Test Ended	Actual Duration of Test
<u>Nitrogen</u>	<u>0302hr 8-8-2014</u>	<u>0418hr 8-8-2014</u>	<u>1hr - 16 min.</u>
<b>Test Instruments</b>			
Make, Range, and Serial No. of Pressure Recording Device <u>TechCal, 0-2000, 03399</u>			Date Last Calibrated <u>5-23-2014</u>
Make, Range and Serial No. of Dead Weight Tester A dead weight tester and/or an electronic pressure recorder is required for tests of any pipe segment equal to or greater than 90% of SMYS. <u>Ametek, 25-3000, HL6406</u>			Date Last Calibrated <u>3-18-2014</u>
<b>Signatures</b>			
Test Supervised by (signature) <u>Scott Powell</u>	Print Name <u>Scott Powell</u>	Date <u>8-8-2014</u>	LAN ID <u>SSP4</u>
Testing Contractor (if third party) <u>ARB Inc.</u>			
Approved by (signature) <u>[Signature]</u>	Print Name <u>AZIZAH TARIQ</u>	Date <u>8-23-14</u>	LAN ID <u>AXTB</u>

**Attachments**

- Test chart
- Schematic piping sketch
- Test log with pressure noted every 5 minutes

**Distribution**

- Gas Job Closeout Desk, 6121 Bollinger Canyon Road, Building Z1, San Ramon, CA 94583

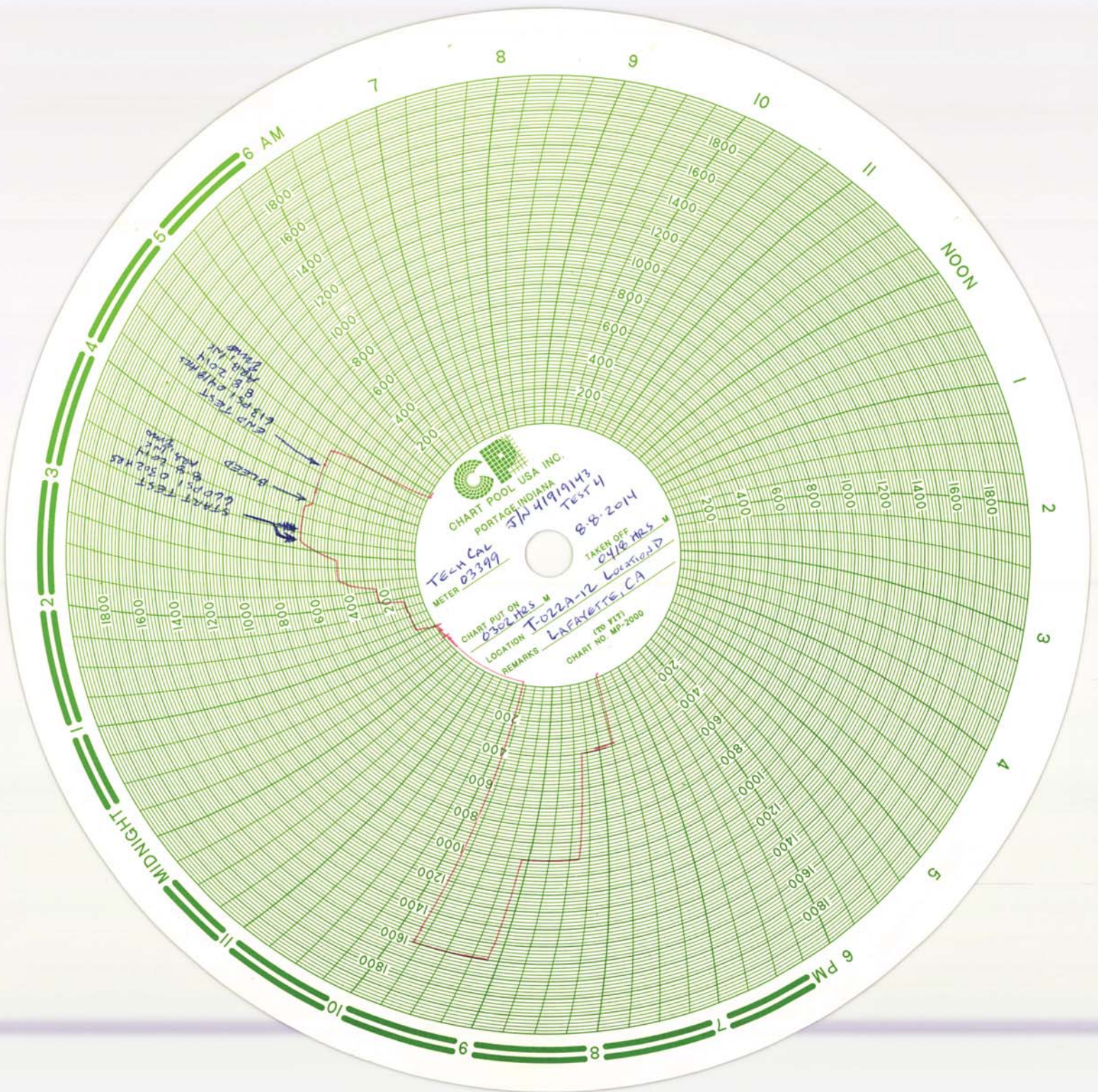


  
 CHART POOL USA INC.  
 PORTAGE, INDIANA

METER PUT ON 0302 hrs M  
 LOCATION T-022A-12 Lafayette, CA  
 REMARKS Locatiod D  
 CHART NO. MP-2000  
 METER 57041919143  
 TEST 4  
 8-8-2014  
 TAKEN OFF  
0418 hrs M

END TEST  
 6:18 PM 8/8/14  
 1000  
 800  
 600  
 400  
 200  
 0  
 START TEST  
 11:00 AM 8/8/14  
 BLEED  
 10:00 AM 8/8/14

STRENGTH TEST INFORMATION REV. 1

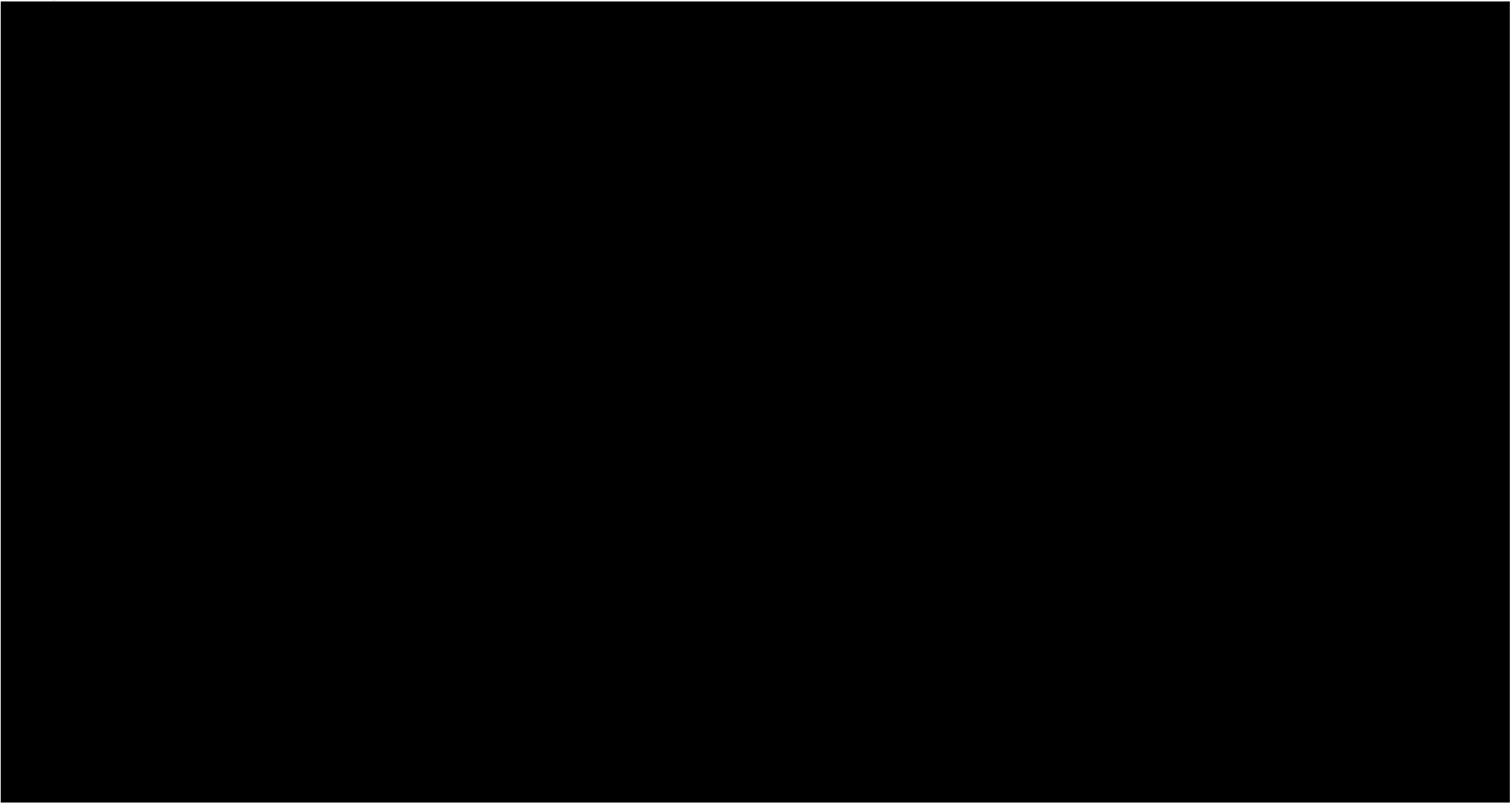
1. JOB # 41919143 TEST 4 LOCATION D MIN. PRESSURE LAFAYETTE CA  
 2. LOCATION T-022A-12 DURATION 1 Hr & 16 MINS SER.# 03399  
 3. DATE 8-8-2014 LAST CALIBRATED 5-23-2014 SER.# HL-6406  
 4. TIME 0302 HRS -0418 HRS TECH CAL LAST CALIBRATED 3-18-2014  
 5. RECORDING GA. MFG. AMETEK RANGE 0-2000 PSI  
 6. DEAD WGT MFG. AMETEK RANGE 25-3000 PSI  
 7. TEST FLUID NITROGEN  
 8. SIZE 4.500" W.T. 0.148" PIPE SPEC. 28,000 FBW LENGTH 9'-1" 4.71'  
 9. SIZE 3.500" W.T. 0.148" PIPE SPEC. 28,000 FBW LENGTH 14'-10" 113.6'  
 10. SUPERVISED Scott Powell DATE 8-8-2014  
 11. APPROVED [Signature] DATE 8-23-14

NO.	SIZE	W.T.	PIPE SPEC.	LENGTH
14.	SIZE <u>2.375"</u>	W.T. <u>0.154"</u>	PIPE SPEC. <u>28,000 FBW</u>	LENGTH <u>6'-1" 4.17'</u>
15.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
16.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
17.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
18.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
19.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
20.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
21.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
22.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
23.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
24.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
25.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
26.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____
27.	SIZE _____	W.T. _____	PIPE SPEC. _____	LENGTH _____



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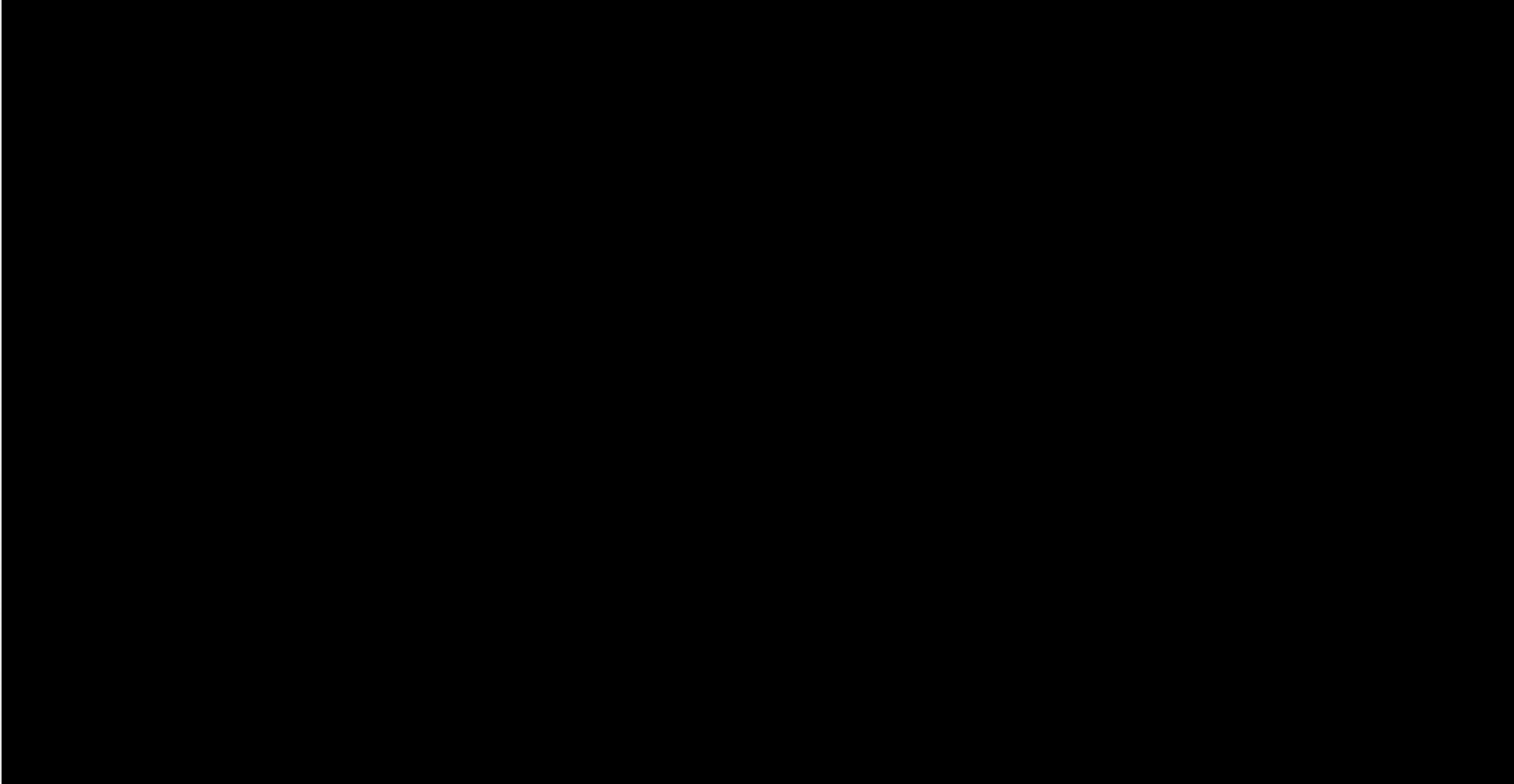
PROJECT DESCRIPTION: T-022A-12 CONTRACTOR: ARB PG&E JOB #: 41919143 SKETCH PREPARED DATE: 08-11-2014 SHEET: 1 OF 4  
JOB NAME: T-022A-12, L-191-1, MP 25.30 - 26.73 GSI J.N.: 0214-00199.0001 CREW NAME: MATT IRONS





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(925) 398-0106  
EMAIL: at@guidasurveying.com

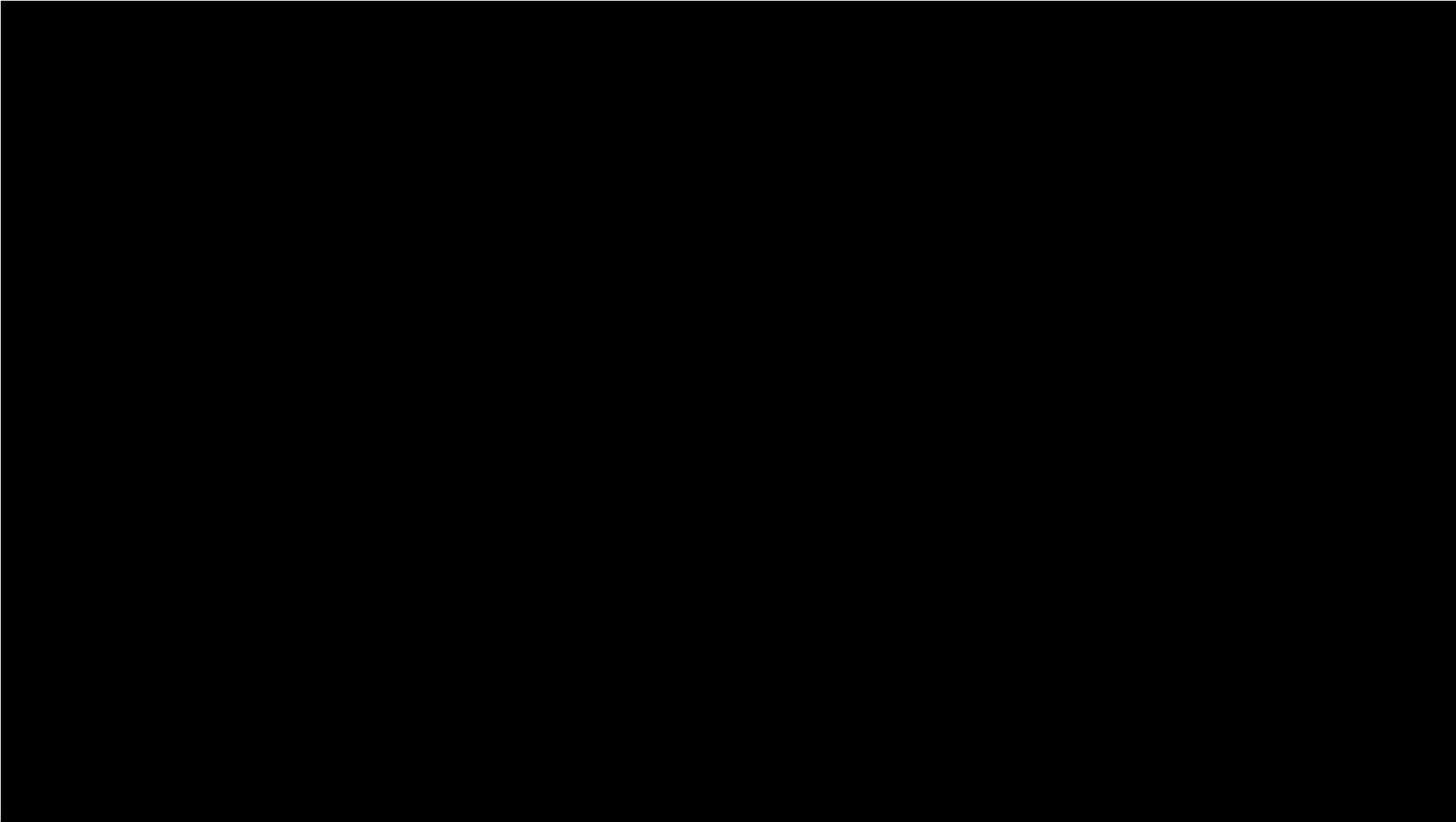
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JOB NAME: T-022A-12, L-191-1, MP 25.30 - 26.73 GSI J.N.: 0214-00199.0001 CREW NAME: MATT IRONS





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EMAIL: [at@guidasurveying.com](mailto:at@guidasurveying.com)

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JOB NAME: T-022A-12, L-191-1, MP.25.30 - 26.73 GSI J.N.: 0214-00199.0001 CREW NAME: MATT IRONS

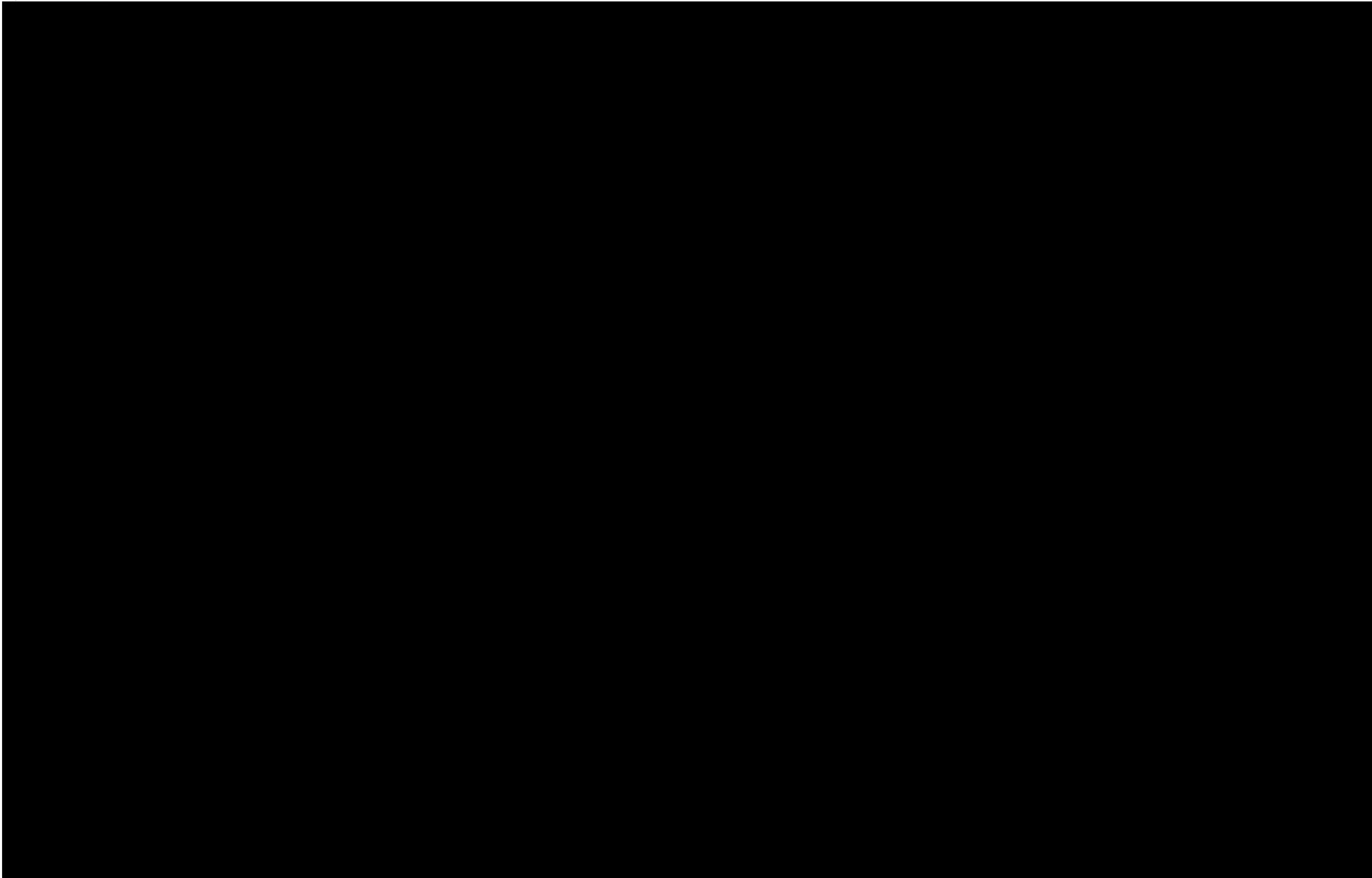


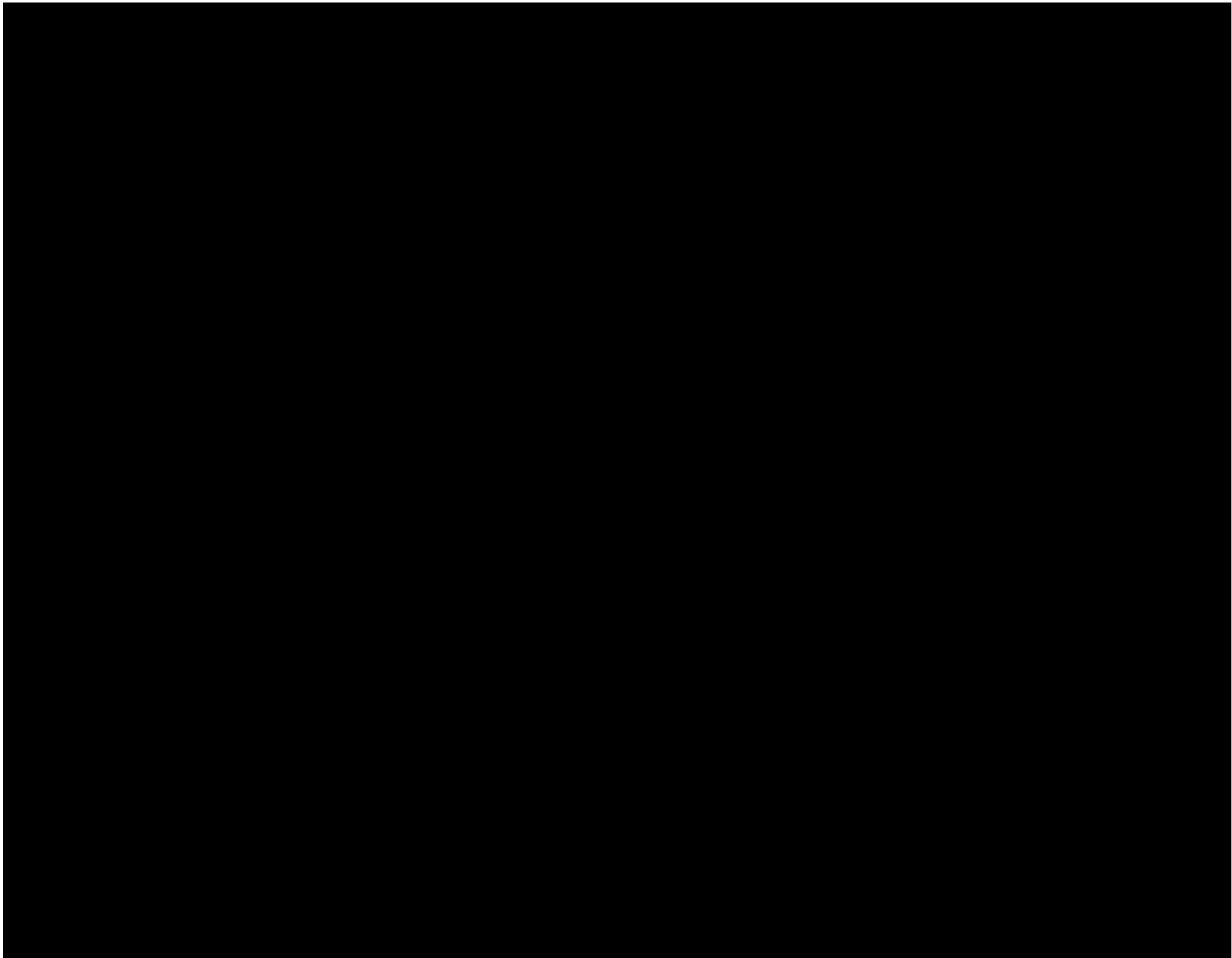


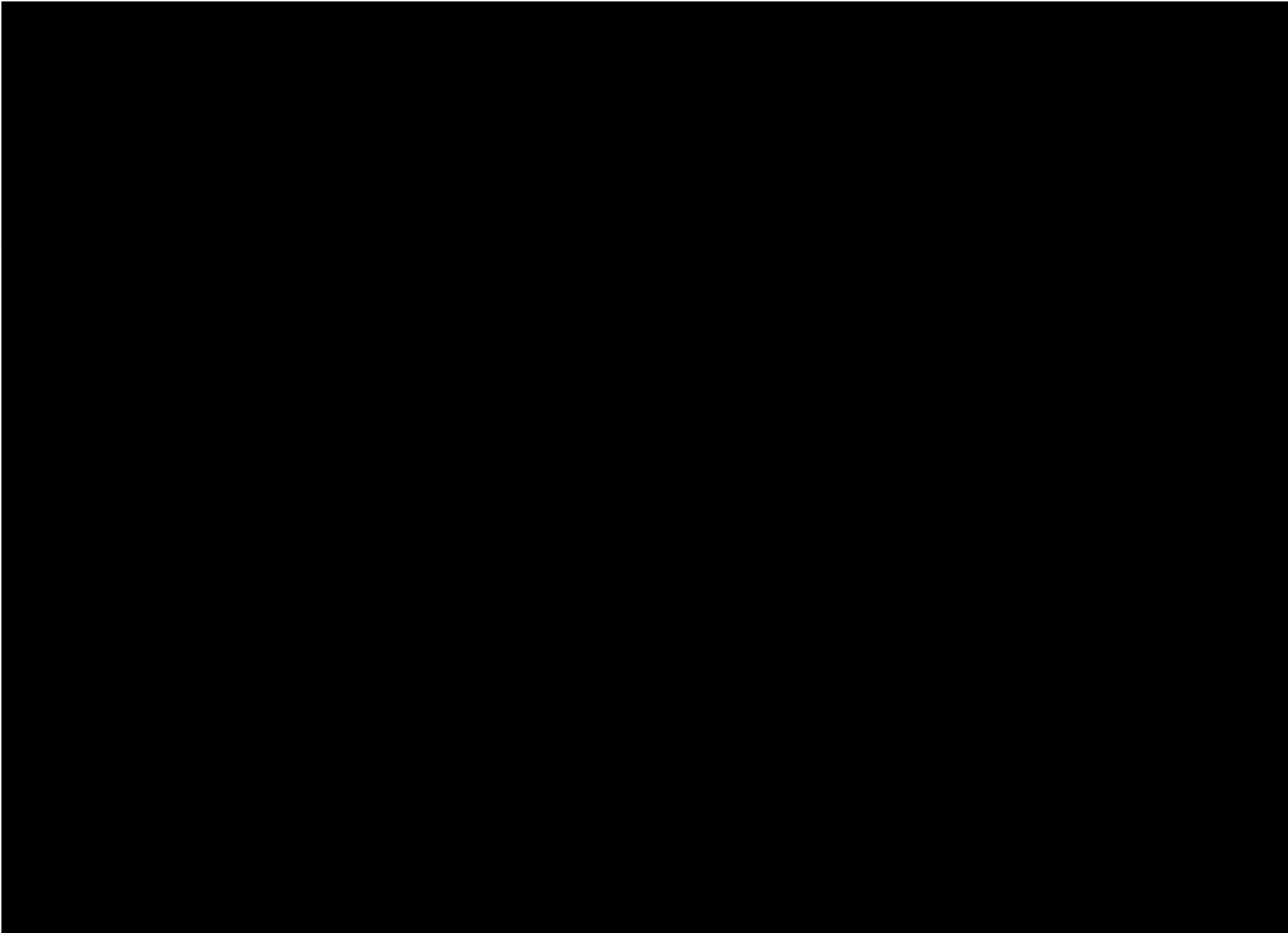


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PROJECT DESCRIPTION: T-022A-12 CONTRACTOR: ARB PG&E JOB #: 41919143 SKETCH PREPARED DATE: 08-11-2014 SHEET: 4 OF 4  
JOB NAME: T-022A-12, L-191-1, MP 25.30 - 26.73 GSI J.N.: 0214-00199.0001 CREW NAME: MATT IRONS

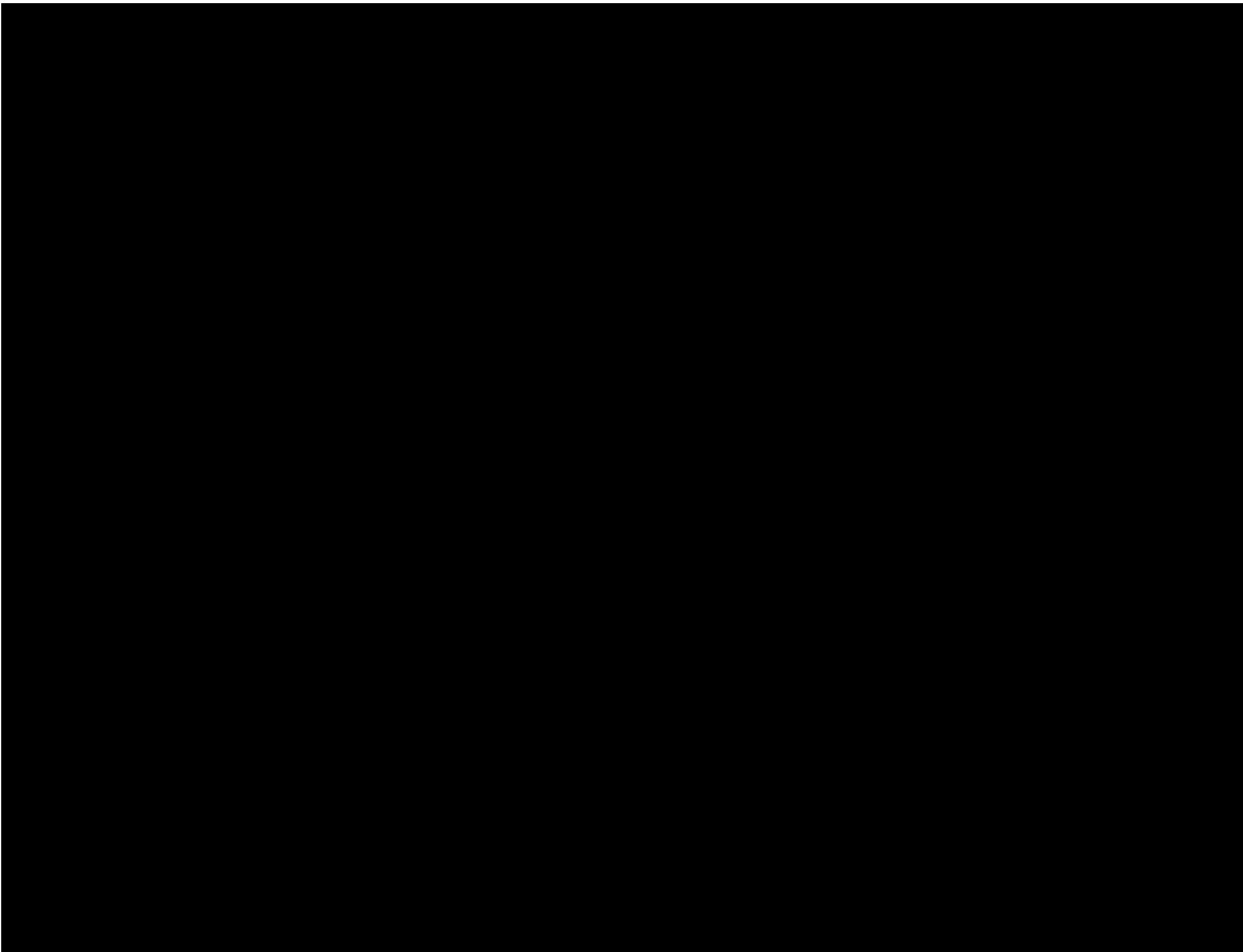


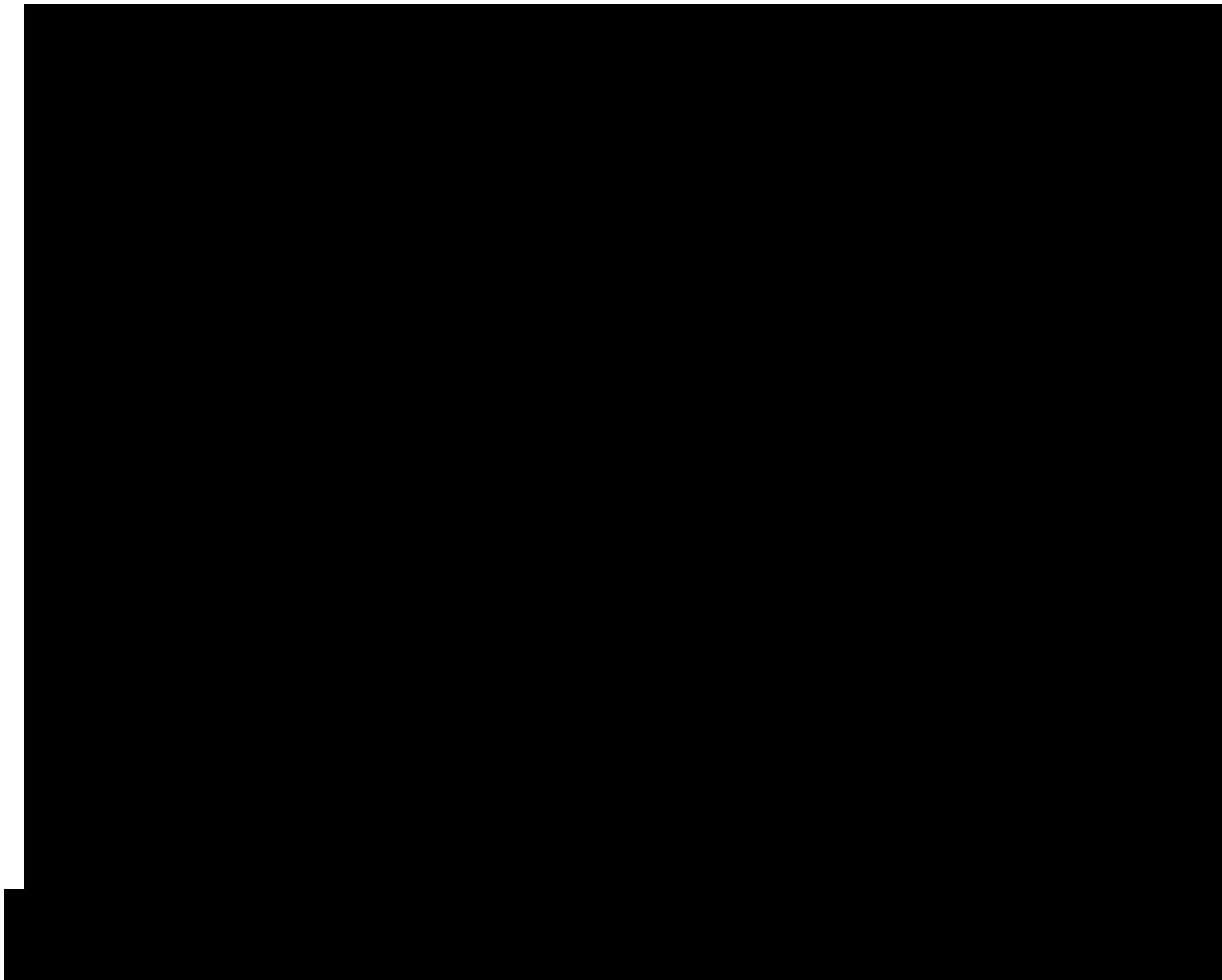




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Blue ink scribbles or markings on the left margin.





## HYDROSTATIC TEST LOG

Log No.	Time	Test Pressure (psig)	Temperature (°F)			Volume		Comments:	Model Check: Test Good?
			Ambient	Pipe		<input type="checkbox"/>	<input type="checkbox"/>		
				Restrained	Unrestrained	Bleed	Inject		
1.	0125 hrs	115	68	74	70			Start 1 <sup>st</sup> Leak Check	<input type="checkbox"/> Y <input type="checkbox"/> N
2.	0135 hrs	115	68	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
3.	0140 hrs	115	68	74	70			End 1 <sup>st</sup> Leak Check	<input type="checkbox"/> Y <input type="checkbox"/> N
4.	0147 hrs	250	68	74	70			Start 2 <sup>nd</sup> Leak Check	<input type="checkbox"/> Y <input type="checkbox"/> N
5.	0152 hrs	250	68	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
6.	0157 hrs	250	68	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
7.	0202 hrs	250	68	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
8.	0204 hrs	250	68	74	70			End 2 <sup>nd</sup> Leak Check	<input type="checkbox"/> Y <input type="checkbox"/> N
9.	0219 hrs	450	68	74	70			Start 3 <sup>rd</sup> Leak Check	<input type="checkbox"/> Y <input type="checkbox"/> N
10.	0224 hrs	450	68	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
11.	0229 hrs	449	68	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
12.	0234 hrs	448	67	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
13.	0239 hrs	448	67	74	70			End 3 <sup>rd</sup> Leak Check	<input type="checkbox"/> Y <input type="checkbox"/> N
14.	0302 hrs	660	67	74	70			Spike; On Test	<input type="checkbox"/> Y <input type="checkbox"/> N
15.	0307 hrs	660	67	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
16.	0312 hrs	660	67	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
17.	0317 hrs	660	67	74	70			End Spike; Bleed	<input type="checkbox"/> Y <input type="checkbox"/> N
18.	0322 hrs	659	67	74	70				<input type="checkbox"/> Y <input type="checkbox"/> N
19.	0333 hrs	615	67	74	69			End Bleed	<input type="checkbox"/> Y <input type="checkbox"/> N
20.	0338 hrs	616	67	74	69				<input type="checkbox"/> Y <input type="checkbox"/> N
21.	0343 hrs	616	67	74	69				<input type="checkbox"/> Y <input type="checkbox"/> N
22.	0348 hrs	615	66	74	69				<input type="checkbox"/> Y <input type="checkbox"/> N
23.	0353 hrs	615	66	74	69				<input type="checkbox"/> Y <input type="checkbox"/> N
24.	0358 hrs	615	66	74	69				<input type="checkbox"/> Y <input type="checkbox"/> N
25.	0403 hrs	614	66	74	69				<input type="checkbox"/> Y <input type="checkbox"/> N
26.	0408 hrs	614	66	74	69				<input type="checkbox"/> Y <input type="checkbox"/> N
27.	0413 hrs	613	66	74	69				<input type="checkbox"/> Y <input type="checkbox"/> N
28.	0418 hrs	613	66	74	69			End Test	<input type="checkbox"/> Y <input type="checkbox"/> N
29.									<input type="checkbox"/> Y <input type="checkbox"/> N
30.									<input type="checkbox"/> Y <input type="checkbox"/> N
31.									<input type="checkbox"/> Y <input type="checkbox"/> N
32.									<input type="checkbox"/> Y <input type="checkbox"/> N
33.									<input type="checkbox"/> Y <input type="checkbox"/> N
34.									<input type="checkbox"/> Y <input type="checkbox"/> N
35.									<input type="checkbox"/> Y <input type="checkbox"/> N
36.									<input type="checkbox"/> Y <input type="checkbox"/> N
37.									<input type="checkbox"/> Y <input type="checkbox"/> N
38.									<input type="checkbox"/> Y <input type="checkbox"/> N
39.									<input type="checkbox"/> Y <input type="checkbox"/> N
40.									<input type="checkbox"/> Y <input type="checkbox"/> N

Was a leak observed during Test Period?  Yes  No

If "Yes",  
Explain:

High Test Pressure: **660**  
Low Test Pressure: **613**

**Certification:**

**Date:** 8-8-2014

Test Supervisor:



Company Representative:



# HYDROSTATIC TEST LOG SHEET

Date

8-8-2014

Owner Company:	PG&E	Job Number:	41919143
Construction Co:	ARB, Inc.	Job Number:	41919143
Testing Co:	ARB, Inc.	Job Number:	41919143

Test Section	Name:	T-022A-12 Test 4 Existing 4" & 3" DFM 3002-01 & DF3449 (MLV-26.53to Plaza No 2 Reg. Sta.)		
		Station (0+00)	Elevation (Feet)	
	Test Location:	70+19	290	
	Begin:	70+19	290	
	End:	70+19	290	
	High Elevation:	70+19	290	
Low Elevation:	70+19	290		

Pipe Data	Section	Length (ft.)	O.D. (in.)	W.T. (in.)	Restrained (ft.)	Unrestrained (ft.)	Grade	Seam/Joint Type	
	1.	9'-1" 4.7	4.500	0.148		9'-1"	28,000	FBW	Arc Weld
	2.	114'-10" 113.6	3.500	0.148	114'-10"		28,000	FBW	Arc Weld
	3.	6'-1" 4.7	2.375	0.154		6'-1"	28,000	FBW	Arc Weld
	4.								
	5.								
	6.								
	7.								
	8.								
	9.								
	10.								
	11.								
	12.								
	13.								
	14.								
	15.								
	16.								
	17.								
	18.								
	19.								
20.									

Test Period	Date	8-8-2014	Time	0302 hrs	Test Medium	Water:	<input type="checkbox"/>
	Begin:	8-8-2014	0302 hrs	Nitrogen:		<input checked="" type="checkbox"/>	
	End:	8-8-2014	0418 hrs	Other:		<input type="checkbox"/>	

Test Instrumentation	Description	Calibration Checked	Serial Number	Date Calibrated/Certified	Installation Correct?
	Dead Weight Pressure Tester:	<input checked="" type="checkbox"/> Yes	HL-6406	3-18-2014	<input checked="" type="checkbox"/> Yes
	Pressure Recorder:	<input checked="" type="checkbox"/> Yes	03399	5-23-2014	<input checked="" type="checkbox"/> Yes
	Ambient Temperature Recorder:	<input checked="" type="checkbox"/> Yes	04349	5-23-2014	<input checked="" type="checkbox"/> Yes
	Restrained Pipe Temperature Recorder:	<input checked="" type="checkbox"/> Yes	04350	5-23-2014	<input checked="" type="checkbox"/> Yes
Unrestrained Pipe Temperature Recorder:	<input checked="" type="checkbox"/> Yes	04352	5-1-2014	<input checked="" type="checkbox"/> Yes	

Comments:



### Hydrostatic Test Log Sheet

Owner Company	Pacific Gas and Electric Company	Job Number	41919143 test 4
Construction Co.	ARB	Job Number	41919143 test 4
Testing Co.	ARB	Job Number	41919143 test 4

Test Section	Name	PG&E T-022A-12 , DFM 3002-01 & DF3449 , MLV-26.53 to Plaza No. 2 Reg Sta		
		Station (0+00)		Elevation (Feet)
	Test Location	70+19		290 ft
	Begin	70+19		290 ft
	End	70+19		290 ft
	High Elevation	70+19		290 ft
Low Elevation	70+19		290 ft	

Pipe Data	Section	Length (ft.)	O. D. (in.)	W.T. (in.)	Unrestrained (ft.)	Restrained (ft.)	Grade	Seam/Joint Type
		4.71' -9.00	4.500 in.	0.148 in.	9.1 ft		28ksmys	FBW, Arc Weld
		113.6' -114.00	3.500 in.	0.148 in.		114.8 ft	28ksmys	FBW, Arc Weld
		2.17' -6.00	2.375 in.	0.154 in.	6.1 ft		28ksmys	FBW, Arc Weld

Test Period	Date	Time	Test Medium	<input checked="" type="checkbox"/> Nitrogen	
	Begin	8-Aug-14			3:02
	End	8-Aug-14			4:18

Test Instrumentation	Description	Calibration Checked	Serial Number	Calibrated/Cert	Installation Correct
	Dead Weight Pressure Tester		HL-6406	3-18-14	<input checked="" type="checkbox"/> Yes
	Pressure Recorder	<input checked="" type="checkbox"/> Yes	03399	5-23-14	<input checked="" type="checkbox"/> Yes
	Ambient Temperature Recorder	<input checked="" type="checkbox"/> Yes	04349	5-23-14	<input checked="" type="checkbox"/> Yes
	Restrained Pipe Temperature Recorder	<input checked="" type="checkbox"/> Yes	04350	5-23-14	<input checked="" type="checkbox"/> Yes
Unrestrained Pipe Temperature Recorder	<input checked="" type="checkbox"/> Yes	04352	5-1-14	<input checked="" type="checkbox"/> Yes	

### Hydrostatic Test Log

Log No.	Time	Test Pressure (psig)	Temperature (°F)			Volume		Comments	Model Check: Is test good?
			Ambient	Pipe		<input checked="" type="checkbox"/> Ounces Bleed	<input type="checkbox"/> Gallons Inject		
				Unrestrained	Restrained				
1	8/8/14 3:02 AM	660 psig	67 °F	70 °F	74 °F			On Test	
2	8/8/14 3:07 AM	660 psig	67 °F	70 °F	74 °F				<input checked="" type="checkbox"/> Yes
3	8/8/14 3:12 AM	660 psig	67 °F	70 °F	74 °F				<input checked="" type="checkbox"/> Yes
4	8/8/14 3:17 AM	660 psig	67 °F	70 °F	74 °F				<input checked="" type="checkbox"/> Yes
5	8/8/14 3:33 AM	615 psig	67 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
6	8/8/14 3:38 AM	616 psig	67 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
7	8/8/14 3:43 AM	616 psig	67 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
8	8/8/14 3:48 AM	615 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
9	8/8/14 3:53 AM	615 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
10	8/8/14 3:58 AM	615 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
11	8/8/14 4:03 AM	614 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
12	8/8/14 4:08 AM	614 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
13	8/8/14 4:13 AM	613 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
14	8/8/14 4:18 AM	613 psig	66 °F	69 °F	74 °F			End of Test	<input checked="" type="checkbox"/> Yes
15									<input checked="" type="checkbox"/> Yes
16									<input checked="" type="checkbox"/> Yes

Was a leak observed during test period?  Yes  No

If "Yes", Explain: \_\_\_\_\_ High Test Pressure: 660 psig  
 Low Test Pressure: 613 psig

**Certification:**  
 Test Supervisor: Scott Powell Signature  
 Representative: James C. Knight Signature Date: 8-Aug-14





**RCP, Inc**

801 Louisiana, Ste.200  
Houston, Texas 77002  
(713)655-8080  
[idecker@rcp.com](mailto:idecker@rcp.com)

August 13, 2014

Pacific Gas and Electric Company  
6121 Bollinger Canyon road  
San Ramon , Ca. 94583  
Attention: Mark Cabral, Aziza Tarin

Test Contractor: ARB -- 41919143 test 4  
Asset Owner: Pacific Gas and Electric Company -- 41919143 test 4  
Construction Contractor: ARB -- 41919143 test 4  
Test Section: PG&E T-022A-12 , DFM 3002-01 & DF3449 , MLV-26.53 to Plaza No. 2 Reg Sta  
Test Date: August 8, 2014  
Certificate Number: RCP J00110 - T-022A-12 , DFM 3002-01 & DF3449, MLV-26.53 to Plaza No. 2 Reg Sta.

To whom it may concern,

This letter is to certify that the Nitrogen test performed on pipe owned by Pacific Gas and Electric Company and tested by ARB 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 660 psig (at the test point) for 15 minutes, without observed leakage. The 15 minute spike test was included and is part of the 1.27 hour test duration period.

This Nitrogen Pressure test was completed successfully. Pressure was maintained on the test facilities in excess of 1.27 continuous hours without evidence of a leak failure. Nitrogen was the test medium. At the highest elevation point in the test section, the calculated test pressure was 613 psig and the MAOP supported by the test, per DOT Part 192 Subpart J, can be as high as 408 psig. The MAOP established by this test is sufficient to qualify for Pacific Gas and Electric Company's desired MAOP of 283 psig.

No leaks were observed during the test period. The test section included 114 feet of buried and 9 feet of exposed pipe. Pressure lost 47 psi during the test. The buried pipe segment fluid temperature remained steady and the exposed pipe segment lost 1°F.

Test pressure remained steady and no leaks were observed.

Sincerely,

James E. Knight

cc. file



### Nitrogen Pressure Test Certification

Company	Pacific Gas and Electric Company	Job Number	41919143 test 4
Construction Co.	ARB	Job Number	41919143 test 4
Hydro. Test Co.	ARB	Project No.	41919143 test 4
Test Section	PG&E T-022A-12, DFM 3002-01 & DF3449, MLV-26.53 to Plaza No. 2 Reg Sta		
File Name	RCP J00110 - T-022A-12, DFM 3002-01 & DF3449, MLV-26.53 to Plaza No. 2 Reg Sta		

Test Fluid = Nitrogen

#### Nitrogen Test Pressure

APPLICABLE CODE FOR CERTIFICATION: Code of Federal Regulations, Title 49, Part 192, Subpart J (Class 3) Test Date: 8-Aug-14

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-022A-12, DFM 3002-01 & DF3449, MLV-26.53 to Plaza No. 2 Reg Sta  
From: To:

#### Pipe Data

Segment	Length	Diameter	Wall Thickness	Specification	100% SMYS
1	4.71	4.500 in.	0.148 in.	28ksmys, FBW, Arc Weld, Steel	1,842 psi
2	113.60	3.500 in.	0.148 in.	28ksmys, FBW, Arc Weld, Steel	2,368 psi
3	4.17	2.375 in.	0.154 in.	28ksmys, FBW, Arc Weld, Steel	3,631 psi

#### Initial Test Conditions

Pressure at Test Point:	660 psig	Date/Time:	8-Aug-2014 3:02	Pipe Temperature	
Ambient Temperature:	67.0 °F	Elevation @ Test Point:	290.0 ft	Unrestrained:	70.0 °F
Pressure @ High Point (Cal/Measure):	660 psig	Elevation @ High Point:	290.0 ft	Restrained:	74.0 °F
Pressure @ Low Point (Cal/Measure):	660 psig	Elevation @ Low Point:	290.0 ft	Location:	70+19

#### Final Test Conditions

Pressure at Test Point:	613 psig	Date/Time:	8-Aug-2014 4:18	Pipe Temperature	
Ambient Temperature:	66.0 °F	Elevation @ Test Point:	290.0 ft	Unrestrained:	69.0 °F
Pressure @ High Point (Cal/Measure):	613 psig	Elevation @ High Point:	290.0 ft	Restrained:	74.0 °F
Pressure @ Low Point (Cal/Measure):	613 psig	Elevation @ Low Point:	290.0 ft	Location:	70+19

#### Other

Test Duration: 1.27 hours

Minimum Test Pressure:	613 psig	Max Elevation	613 psig	Min Elevation	613 psig
Maximum Test Pressure:	660 psig		660 psig		660 psig
% SMYS:			18.2%		35.8%
Test Segment Observed % SMYS:		Minimum	18.2%	Maximum	35.8%
DOT Part 192 Maximum Allowable Operating Pressure	D <sub>r</sub>	Design MAOP	T <sub>r</sub>	Minimum Test Pressure (Calculated/Measured)	Test MAOP
	0.5	553 psig	1.5	613 psig	408 psig

The MAOP established by this test is sufficient to qualify for Pacific Gas and Electric Company's desired MAOP of 283 psig.

Is Test to Yield Utilized to Establish MAOP?	No	TTY MAOP @ High Elevation		TTY MAOP @ Test Point	
ASME B31.8S - Integrity Assessment Interval	5 years	Desired MAOP % SMYS	15.37%	ASME B31.8S Minimum Test Factor	1.70

Were leaks observed?	No	Explain:	
Acceptable Hydrostatic Test?	Yes	<p>The test segment was subjected to a spike pressure test of 660 psig (at the test point) for 15 minutes, without observed leakage. The 15 minute spike test was included and is part of the 1.27 hour test duration period.</p> <p>No leaks were observed during the test period. The test section included 114 feet of buried and 9 feet of exposed pipe. Pressure lost 47 psi during the test. The buried pipe segment fluid temperature remained steady and the exposed pipe segment lost 1°F.</p> <p>Test pressure remained steady and no leaks were observed.</p>	

Remarks

*James E. Knight*  
 James E. Knight  
 13-Aug-14





## Nitrogen Pressure Test Pipe Data Table

Pipe Type	Length	Restrained / Unrestrained	Outside Diameter	Wall Thickness	Specification & Grade	Pipe Yield Pressure	Material	Joint Type	Seam Type
1	4.71 ft	Unrestrained	4.500 in.	0.1480 in.	28ksmys	1,842 psig	Steel	Arc Weld	FBW
2	113.60 ft	Restrained	3.500 in.	0.1480 in.	28ksmys	2,368 psig	Steel	Arc Weld	FBW
3	4.17 ft	Unrestrained	2.375 in.	0.1540 in.	28ksmys	3,631 psig	Steel	Arc Weld	FBW

### Hydrostatic Test Project Owner & Participants

Owner Company	Pacific Gas and Electric Company	Job Number
Address	6121 Bollinger Canyon road San Ramon, Ca. 94583 Attention: Mark Cabral, Aziza Tarin	41919143 test 4
Construction Company	ARB	Job Number
Address	1875 Loveridge Road Pittsburg, CA 94565 Attention: T. Barnes	41919143 test 4
Hydrostatic Test Co.	ARB	Project No.
Address	1875 Loveridge Road Pittsburg, CA 94565 Attention: T. Barnes	41919143 test 4
Test Section	PG&E T-022A-12, DFM 3002-01 & DF3449, MLV-26.53 to Plaza No. 2 Reg Sta From: 70+19 To: 70+19	
File Name	RCP J00110 - T-022A-12, DFM 3002-01 & DF3449, MLV-26.53 to Plaza No. 2 Reg Sta.	

### Test Specifications

Test Factor	1.5	[1A]Minimum Test Pressure at Maximum Elevation	600 psig	[18]Maximum Test Pressure at Minimum Elevation	670 psig
ASME B31.8S – Integrity Assessment Interval		5 years	Desired MAOP % SMYS		15.37%
ASME B31.8S Minimum Test Factor		1.70	ASME B31.8S Minimum Test Factor		1.70
Spike Test	Yes	[1C]Spike Factor	1.1	[1D]Spike Pressure at Maximum Elevation	660 psig
[1E]Spike Pressure at Minimum Elevation		660 psig	[1F]Max. Post-Spike Pressure at Minimum Elevation @	95%	627 psig
Test Medium to Be Used		Nitrogen	Minimum Test Duration	1.00 hours	Spike Duration
					15 minutes

### Test Elevation

Elevation @ Test Point	290 ft	Location	70+19	[2A]Static Head Between Test Point and Maximum Elevation	
Maximum Elevation in Test Section	290 ft	Location	70+19	[2B]Static Head Between Test Point and Minimum Elevation	
Minimum Elevation in Test Section	290 ft	Location	70+19		

### No Spike Test: Calculations and Test Results

Min. Required Test Press At Test Point	NA	Max. Allowable Test Press at Test Point	NA	Pressure Range During Test	NA
[2C]Minimum Test Pressure Indicated	NA	[2D]Maximum Test Pressure Indicated	NA		
Calculated Min. Test Pressure at Max. Elevation	NA	Calculated Max. Test Pressure at Min. Elevation	NA		

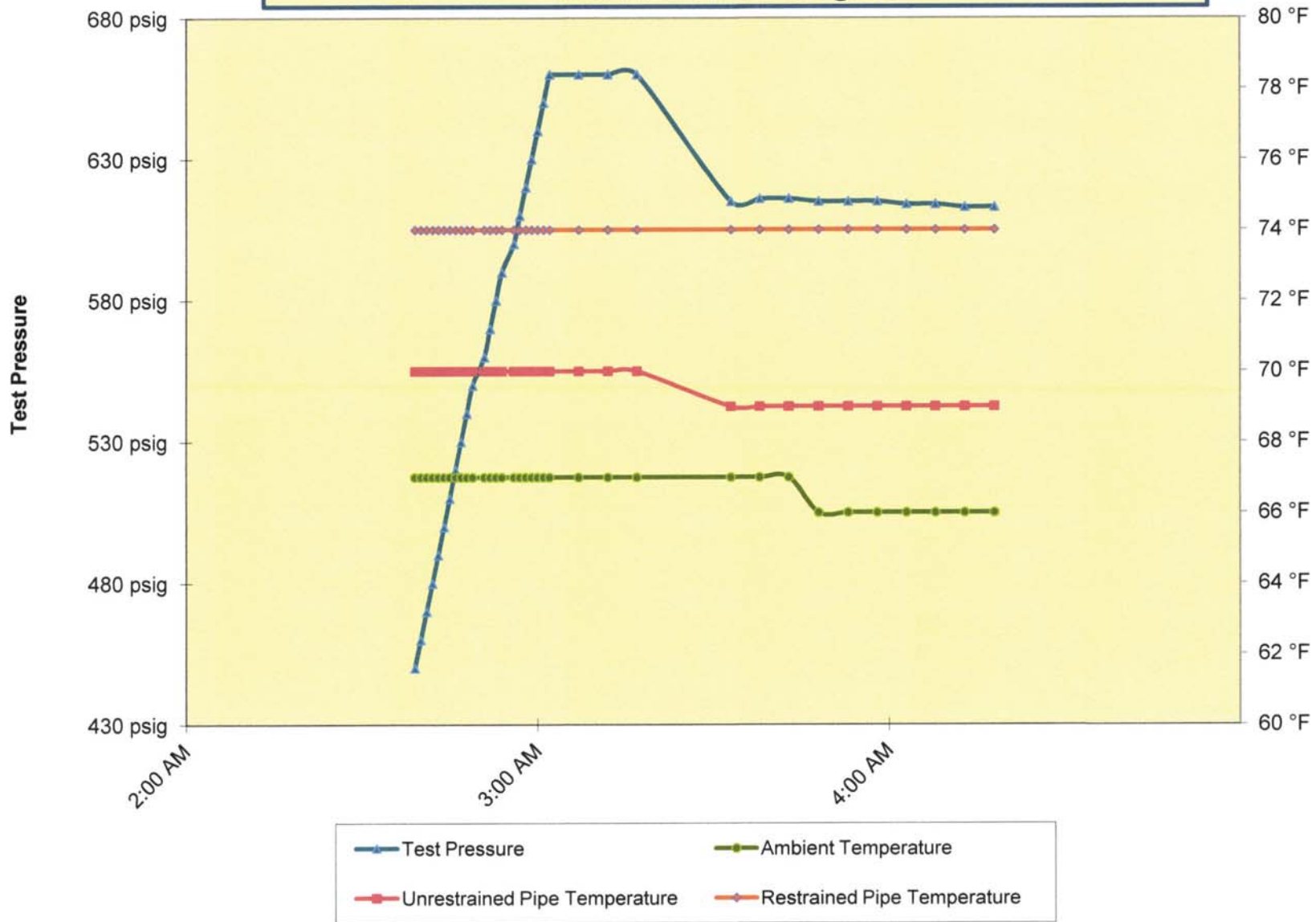
### Spike Test: Calculations and Test Results

Spike Pressure at Test point	660 psig	Min. Required Test Press At Test Point	600 psig	Max. Post-Spike Pressure at Test Point	627 psig	Pressure Range After Spike Test	27 psig
[2E]Spike Pressure Indicated	660 psig	[2F]Minimum Test Pressure Indicated	613 psig	[2G]Max. Post-Spike Test Pressure Indicated	616 psig		
Calculated Spike Pressure at Min. Elevation	660 psig	Calculated Min. Test Pressure at Max. Elevation	613 psig	Calculated Max. Post Spike Pressure at Min. Elevation	616 psig		

### Test Acceptance

Time and Date Test Pressure Reached	8-Aug-2014 3:02	Time and Date Test Ended	8-Aug-2014 4:18	Actual Duration of Test	1 hours 16 minutes
Hydrostatic Test Date:	8-Aug-2014 2:39	Code of Federal Regulations, Title 49, Part 192, Subpart J (Class 3)			
Test Fluid Density	3.10 lb/ft <sup>3</sup>	Pacific Gas and Electric Company's desired MAOP			283 psig
Ramp Hold Pressure	450 psig	Target Test Pressure	615 psig		

**PG&E T-022A-12 , DFM 3002-01 & DF3449 , MLV-26.53  
to Plaza No. 2 Reg Sta**





Test 022A-12 test 4 dual pressure recorders and deadweights in test trailer



Test 022A-12 test 4 excavations on both sides of intersection



**Test 022A-12 test 4 unrestrained pipe temp. recorder**



**Test 022A-12 test 4 restrained temp. recorder**



### Hydrostatic Test Log Sheet

Owner Company		Pacific Gas and Electric Company			Job Number		41919143 test 4	
Construction Co.		ARB			Job Number		41919143 test 4	
Testing Co.		ARB			Job Number		41919143 test 4	
Test Section	Name	PG&E T-022A-12, DFM 3002-01 & DF3449, MLV-26.53 to Plaza No. 2 Reg Sta						
		Station (0+00)			Elevation (Feet)			
	Test Location	70+19			290 ft			
	Begin	70+19			290 ft			
	End	70+19			290 ft			
	High Elevation	70+19			290 ft			
Low Elevation	70+19			290 ft				
Pipe Data	Section	Length (ft.)	O. D. (in.)	W.T. (in.)	Unrestrained (ft.)	Restrained (ft.)	Grade	Seam/Joint Type
		4.71	4.500 in.	0.148 in.	4.7 ft		28ksmys	FBW, Arc Weld
		113.60	3.500 in.	0.148 in.		113.6 ft	28ksmys	FBW, Arc Weld
		4.17	2.375 in.	0.154 in.	4.2 ft		28ksmys	FBW, Arc Weld
Test Period		Date		Time		Test Medium	<input checked="" type="checkbox"/> Nitrogen	
	Begin	8-Aug-14		3:02				
	End	8-Aug-14		4:18				
Test Instrumentation	Description			Calibration Checked	Serial Number		Calibrated/Cert	Installation Correct
	Dead Weight Pressure Tester							<input checked="" type="checkbox"/> Yes
	Pressure Recorder			<input checked="" type="checkbox"/> Yes				<input checked="" type="checkbox"/> Yes
	Ambient Temperature Recorder			<input checked="" type="checkbox"/> Yes				<input checked="" type="checkbox"/> Yes
	Restrained Pipe Temperature Recorder			<input checked="" type="checkbox"/> Yes				<input checked="" type="checkbox"/> Yes
	Unrestrained Pipe Temperature Recorder			<input checked="" type="checkbox"/> Yes				<input checked="" type="checkbox"/> Yes

### Hydrostatic Test Log

Log No.	Time	Test Pressure (psig)	Temperature (°F)			Volume		Comments	Model Check: Is test good?
			Ambient	Pipe		<input checked="" type="checkbox"/> Ounces Bleed	<input type="checkbox"/> Gallons Inject		
				Unrestrained	Restrained				
1	8/8/14 3:02 AM	660 psig	67 °F	70 °F	74 °F			On Test	
2	8/8/14 3:07 AM	660 psig	67 °F	70 °F	74 °F				<input checked="" type="checkbox"/> Yes
3	8/8/14 3:12 AM	660 psig	67 °F	70 °F	74 °F				<input checked="" type="checkbox"/> Yes
4	8/8/14 3:17 AM	660 psig	67 °F	70 °F	74 °F				<input checked="" type="checkbox"/> Yes
5	8/8/14 3:33 AM	615 psig	67 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
6	8/8/14 3:38 AM	616 psig	67 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
7	8/8/14 3:43 AM	616 psig	67 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
8	8/8/14 3:48 AM	615 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
9	8/8/14 3:53 AM	615 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
10	8/8/14 3:58 AM	615 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
11	8/8/14 4:03 AM	614 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
12	8/8/14 4:08 AM	614 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
13	8/8/14 4:13 AM	613 psig	66 °F	69 °F	74 °F				<input checked="" type="checkbox"/> Yes
14	8/8/14 4:18 AM	613 psig	66 °F	69 °F	74 °F			End of Test	<input checked="" type="checkbox"/> Yes
15									<input checked="" type="checkbox"/> Yes
16									<input checked="" type="checkbox"/> Yes

Was a leak observed during test Period?  Yes  No

If "Yes", Explain:

High Test Pressure: 660 psig  
Low Test Pressure: 613 psig

#### Certification:

Test Supervisor: \_\_\_\_\_

Signature

Representative: \_\_\_\_\_

Date: 8-Aug-14

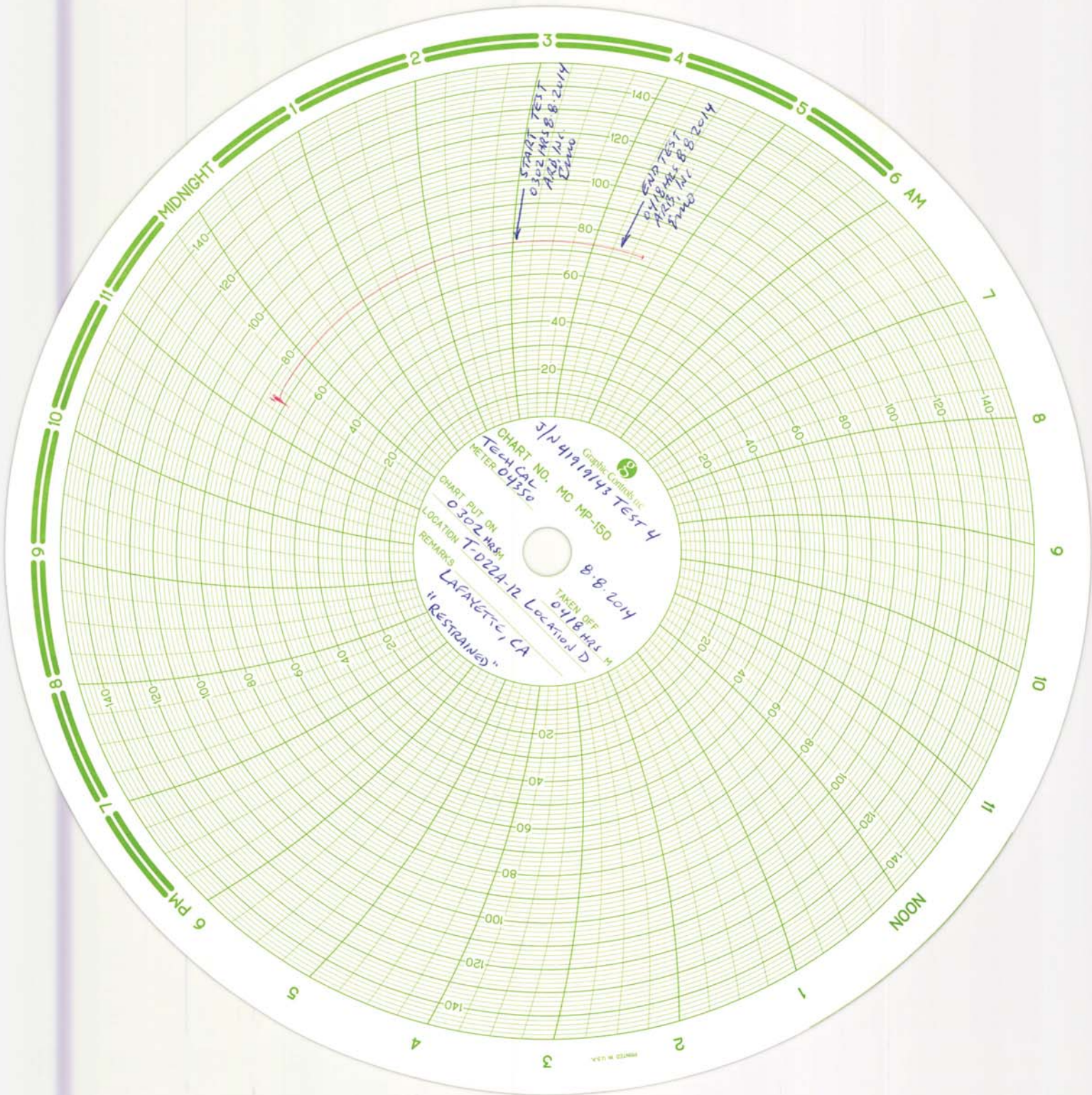
Signature *James Knight*





START TEST  
0302 HRS 8-8-2014  
END TEST  
0418 HRS 8-8-2014

CHART NO. 5/2-41919143-TEST 4  
METER 01352  
CHART RUN ON MC MP-150  
LOCATION T-022A-12 Location D  
REMARKS "UNRECORDED"  
LAFAYETTE, CA  
TAKEN OFF 0318 HRS 8-8-2014



START TEST  
0302 HRS  
80 MPH  
80

END TEST  
0418 HRS  
80 MPH  
80

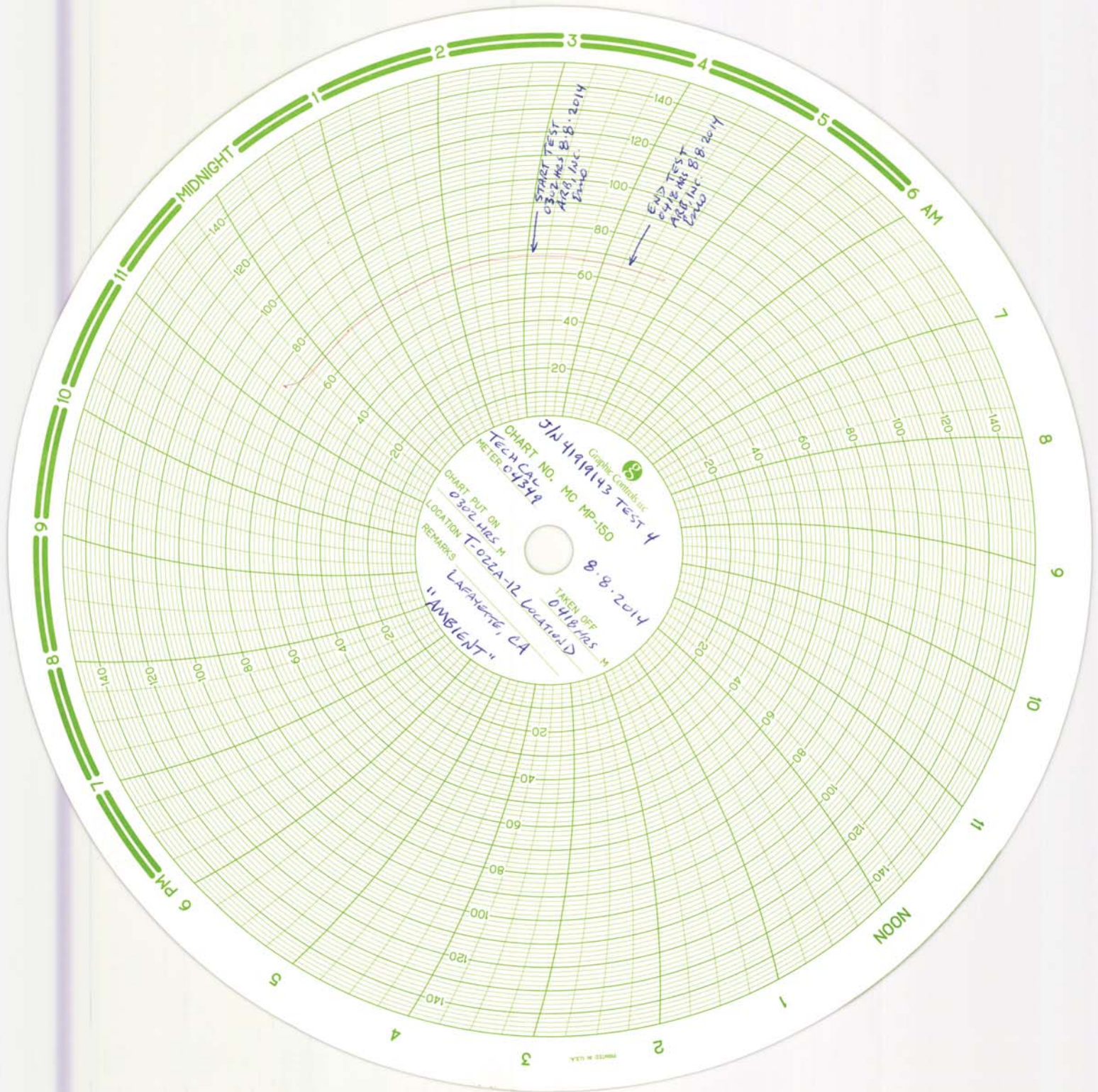
3/N419143 TEST 4  
Graphic Controls Inc.  
CHART NO. MC MP-150  
TECH CAL. METER 04350  
CHART PUT ON 0302 HRS  
LOCATION T-022A-12  
REMARKS "RESTRAINED"  
LAFAYETTE, CA  
TAKEN OFF 0418 HRS  
8-8-2014

MIDNIGHT

6 AM

NOON

6 PM



# TECHNICAL SERVICES GROUP

2900 Main St Alameda Ca 94501 Phone (510)522-8326 Fax (510)522-3136

## Certificate of Calibration

ARB, INC. PITTSBURG  
1875 LOVRIDGE ROAD  
PITTSBURG  
CALIFORNIA 94565

Customer ID # 3773

File # 1329

Instrument Type DEAD WEIGHT   
TESTER

Range 25-3000

Units PSIG

Resolution AS RATED

Mfg. AMETEK

Model HL36

Cal By R.K. STRAHL

Current Cal Cycle (Months) 12

Previous Cal Cycle 12

Standards Used AMETEK DM-T-150 S/N 8681  
DUE 3/3/2015 NIST 40568.001

Certificate Number: 2802598

Rated Accuracy .1%

Pass/Fail as Found PASS

Pass/Fail as Left PASS

1st (Mfg) S/N HL6406

2nd S/N N/A

Cal Date 3/18/2014

Cal Due 3/18/2015

Notes

TECHNICAL SERVICES GROUP CERTIFIES THAT THIS INSTRUMENT  
HAS BEEN CALIBRATED TRACEABLE TO THE NATIONAL INSTITUTE  
OF STANDARDS AND TECHNOLOGY AND CONFORMS TO ISO 10012  
AND ANSI / NCSL Z-540. UNLESS OTHERWISE SPECIFIED  
MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE  
OR 1 MINOR DIVISION.



# CALIBRATION DATA SHEET

## PRESSURE / TEMPERATURE

LAST REVISION: 9/24/2013

2900 MAIN ST ALAMEDA CA 94501 PHONE (510) 522-8326 FAX (510) 522-3136

CUSTOMER **ARB**

TSG JOB # **3773** TSG ITEM \_\_\_\_\_ CUST. P. O. # \_\_\_\_\_ SHIPPING # **41725** DESCRIPTION: PRESSURE  TEMP  TEST GAGE  ASSIGNED C-T # \_\_\_\_\_  
 RECORDER  OTHER **0544 WT 7574**

1ST SERIAL # **HL6406** 2ND SERIAL # \_\_\_\_\_ MANUFACTURER **AMETEK** MODEL **HL 36** RANGE **25-3000** RESOLUTION \_\_\_\_\_ DIGITAL \_\_\_\_\_ ANALOG \_\_\_\_\_

CASE SIZE \_\_\_\_\_ CONNECTION TYPE  BOTTOM  BACK  CONNECTION SIZE  1/8"  1/4"  3/8"  OTHER \_\_\_\_\_ THREAD TYPE  NPT  TUBE  UN  ISO  RATED ACCURACY % **0.1** NIST TRACEABLE # \_\_\_\_\_  
 PRESSURE: 40568.001 TEMPERATURE: TE188, TE192, TE195

EXISTING CAL CYCLE \_\_\_\_\_ CAL CYCLE UPDATE **YR** LAST CAL DATE **8/13** CAL DATE **3/18/14** RECALIBRATE **3/18/15**

TECHNICIAN **R.K. STRAIN** BADGE # **1502** TEMPERATURE DEG. F **68 - 72** RELATIVE HUMIDITY % **< 60 %** CALIBRATION PROCEDURE **G-A1, SCP-01, SCP-02, SCP-03**

CONDITION				STANDARDS USED				TECHNICAL SERVICES GROUP CERTIFIES THAT THIS INSTRUMENT HAS BEEN CALIBRATED TRACEABLE TO NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY AND CONFORMS TO ISO 10012 AND ANSI / NCSL Z-540 UNLESS OTHERWISE SPECIFIED MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE OR 1 MINOR DIVISION
AS RECEIVED		AS RETURNED		MFG.	MODEL	SERIAL #	RECALIBRATE	
GOOD <input checked="" type="checkbox"/>	DAMAGED <input type="checkbox"/>	IN TOL. <input type="checkbox"/>	OUT OF TOL. <input checked="" type="checkbox"/>	AMETEK	DM-T-50	8681	3/3/2015	
IN TOL. <input checked="" type="checkbox"/>	OUT OF TOL. <input type="checkbox"/>	LIMITED <input type="checkbox"/>	B.E.R. <input type="checkbox"/>	EUTECHNICS	4600	100049	7/31/2014	
		REPAIRED BEFORE TEST <input type="checkbox"/>	PCS. CALIB. <input type="checkbox"/>					

PARAMETER	RANGE	STANDARD VALUE	OBSERVED INDICATION	CORRECTED INDICATION	TOLERANCE	PASS	FAIL
PRESSURE : PSIG <input checked="" type="checkbox"/>							
PSID _____							
PSIA _____							
IN Hg _____							
IN H2O _____							
OTHER _____							
VACUUM : IN Hg _____							
OTHER _____							
TEMPERATURE : DEG F _____							
DEG C _____							
OTHER _____							
	<b>25-3000</b>	<b>500.0 PSI</b>	<b>500.0 PSI</b>	<b>1%</b>		<input checked="" type="checkbox"/>	
	<b>25 PSI</b>	<b>1000.0 PSI</b>	<b>999.9 PSI</b>		<input checked="" type="checkbox"/>		
		<b>2000.0 PSI</b>	<b>1999.9 PSI</b>		<input checked="" type="checkbox"/>		
		<b>2500.0 PSI</b>	<b>2499.8 PSI</b>		<input checked="" type="checkbox"/>		
		<b>3000.0 PSI</b>	<b>2999.7 PSI</b>		<input checked="" type="checkbox"/>		

DETERMINATION OF IMPACT / NOTES :

*R.K. Strain*  
 TSG CALIBRATION SUP. / QUALITY ASSURANCE SUP.

# TECHNICAL SERVICES GROUP

2900 Main St Alameda CA 94501 Phone (510)522-8326 Fax (510)522-3136

## Certificate of Calibration

ARB, INC. PITTSBURG  
1875 LOVRIDGE ROAD  
PITTSBURG  
CALIFORNIA 94565

Customer ID # 3773

File # 1329

Instrument Type RECORDER, ✓  
PRESSURE

Range 0-2000 ✓

Units PSIG

Resolution 40

Mfg. TECHCAL

Model 1B200

Cal By J.P. 082277

Current Cal Cycle (Months) 12

Previous Cal Cycle 12

Standards Used AMETEK DM-T-150 S/N 8681  
DUE 3/29/2016 NIST 45209.001

Certificate Number: 2802960

Rated Accuracy 1% ✓

Pass/Fail as Found PASS

Pass/Fail as Left PASS

1st (Mfg) S/N 03399 ✓

2nd S/N N/A

Cal Date 5/23/2014 ✓

Cal Due 5/23/2015

Notes

TECHNICAL SERVICES GROUP CERTIFIES THAT THIS INSTRUMENT  
HAS BEEN CALIBRATED TRACEABLE TO THE NATIONAL INSTITUTE  
OF STANDARDS AND TECHNOLOGY AND CONFORMS TO ISO 10012  
AND ANSI / NCSL Z-540. UNLESS OTHERWISE SPECIFIED  
MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE  
OR 1 MINOR DIVISION.



# CALIBRATION DATA SHEET PRESSURE / TEMPERATURE

LAST REVISION: 4/16/2014

2900 MAIN ST ALAMEDA CA 94501 PHONE (510) 522-8326 FAX (510) 522-3136

CUSTOMER **ARB** TSG JOB TSG ITEM CUST. P. O. # SHIPPING # DESCRIPTION: PRESS.  TEMP  TEST GAGE  ASSIGNED G-T # **2802960**  
 RECORDER  OTHER

1ST SERIAL # **03399** 2ND SERIAL # \_\_\_\_\_ MANUFACTURER **TechCal** MODEL **1B200** RANGE **0-2000** RESOLUTION **40** DIGITAL  ANALOG

CASE SIZE **7/8** CONNECTION TYPE BOTTOM  BACK  CONNECTION SIZE 1/8"  1/4"  1/2"  OTHER \_\_\_\_\_ THREAD TYPE NPT  TUBE  UN  ISO  RATED ACCURACY % **1%** NIST TRACEABLE # \_\_\_\_\_  
 PRESSURE: 45209.001 TEMPERATURE: TE188, TE192, TE195

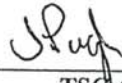
EXISTING CAL CYCLE **12 mo** CAL CYCLE UPDATE \_\_\_\_\_ LAST CAL DATE **12/13** CAL DATE **5-22-14** RECALIBRATE **5-22-15**

TECHNICIAN **J.P.** BADGE # **082277** TEMPERATURE DEG. F **68 - 72** RELATIVE HUMIDITY % **< 60 %** CALIBRATION PROCEDURE **G-A1, SCP-01, SCP-02, SCP-03**

CONDITION				STANDARDS USED				TECHNICAL SERVICES GROUP CERTIFIES THAT THIS INSTRUMENT HAS BEEN CALIBRATED TRACEABLE TO NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY AND CONFORMS TO ISO 10012 AND ANSI / NCSL Z-540 UNLESS OTHERWISE SPECIFIED MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE OR 1 MINOR DIVISION
AS RECEIVED		AS RETURNED		MFG.	MODEL	SERIAL #	RECALIBRATE	
GOOD <input checked="" type="checkbox"/>	DAMAGED _____	IN TOL. <input checked="" type="checkbox"/>	OUT OF TOL. _____	AMETEK	DM-T-50	8681	3/29/2016	
IN TOL. <input checked="" type="checkbox"/>	OUT OF TOL. _____	LIMITED _____	B.E.R. _____	EUTECHNICS	4600	100049	7/31/2014	
		REPAIRED BEFORE TEST _____	PCS. CALIB. <b>1</b>					

PARAMETER	RANGE .	STANDARD VALUE	OBSERVED INDICATION	CORRECTED INDICATION	TOLERANCE	PASS	FAIL
PRESSURE / PSIG <input checked="" type="checkbox"/>					<b>1%</b>		
PSID _____	<b>0</b>	<b>0</b>	<b>0</b>	<b>—</b>		<input checked="" type="checkbox"/>	
PSIA _____	<b>520</b>	<b>520</b>	<b>516</b>	<b>—</b>		<input checked="" type="checkbox"/>	
IN Hg _____	<b>1000</b>	<b>1000</b>	<b>989</b>	<b>—</b>		<input checked="" type="checkbox"/>	
IN H2O _____	<b>1520</b>	<b>1520</b>	<b>1510</b>	<b>—</b>		<input checked="" type="checkbox"/>	
OTHER _____	<b>2000</b>	<b>2000</b>	<b>1990</b>	<b>—</b>		<input checked="" type="checkbox"/>	
VACUUM: IN Hg _____							
OTHER _____							
TEMPERATURE: DEG F _____							
DEG C _____							
OTHER _____							

DETERMINATION OF IMPACT / NOTES : \_\_\_\_\_

  
 TSG CALIBRATION SUP. / QUALITY ASSURANCE SUP.

Ambient

# TECHNICAL SERVICES GROUP

2900 Main St Alameda CA 94501 Phone (510)522-8326 Fax (510)522-3136

## Certificate of Calibration

ARB, INC. PITTSBURG  
1875 LOVRIDGE ROAD  
PITTSBURG  
CALIFORNIA 94565

Customer ID # 3773

File # 1329

Instrument Type RECORDER,  
TEMPERATURE

Range 0-150 ✓

Units DEG F

Resolution 2

Mfg. TECHCAL

Model 1BT00

Cal By J.P. 082277

Current Cal Cycle (Months) 12

Previous Cal Cycle 12

Standards Used EUTECHNICS 139200-1.2 S/N  
100049 DUE 7/31/2014 NIST  
TE188, TE192, TE195

Certificate Number: 2802954

Rated Accuracy 1% ✓

Pass/Fail as Found PASS

Pass/Fail as Left PASS

1st (Mfg) S/N 04349 ✓

2nd S/N N/A

Cal Date 5/23/2014 ✓

Cal Due 5/23/2015

Notes

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HAS BEEN CALIBRATED TRACEABLE TO THE NATIONAL INSTITUTE  
OF STANDARDS AND TECHNOLOGY AND CONFORMS TO ISO 10012  
AND ANSI / NCSL Z-540. UNLESS OTHERWISE SPECIFIED  
MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE  
OR 1 MINOR DIVISION.





# CALIBRATION DATA SHEET

## PRESSURE / TEMPERATURE

LAST REVISION: 4/16/2014

2900 MAIN ST ALAMEDA CA 94501 PHONE (510) 522-8326 FAX (510) 522-3136

CUSTOMER <b>ARB</b>		TSG JOB	TSG ITEM	CUST. P. O. #	SHIPPING #	DESCRIPTION: PRESS. <input type="checkbox"/> TEMP <input checked="" type="checkbox"/> TEST GAGE <input type="checkbox"/> RECORDED <input checked="" type="checkbox"/> OTHER	ASSIGNED G.T.# <b>0802954</b>
1ST SERIAL # <b>04349</b>	2ND SERIAL #	MANUFACTURER <b>Tech Cal</b>		MODEL <b>1BT00</b>	RANGE <b>0-150</b>	RESOLUTION <b>2</b>	DIGITAL <input type="checkbox"/> ANALOG <input checked="" type="checkbox"/>
CASE SIZE	CONNECTION TYPE BOTTOM <input type="checkbox"/> BACK <input type="checkbox"/>	CONNECTION SIZE 1/8" <input type="checkbox"/> 1/4" <input type="checkbox"/> 1/2" <input type="checkbox"/> OTHER		THREAD TYPE NPT <input type="checkbox"/> TUBE <input type="checkbox"/> UN <input type="checkbox"/> ISO <input type="checkbox"/>	RATED ACCURACY % <b>1%</b>	NIST TRACEABLE # PRESSURE: 45209.001 TEMPERATURE: TE188, TE192, TE195	
EXISTING CAL CYCLE <b>12 mo</b>	CAL CYCLE UPDATE		LAST CAL DATE <b>1/14</b>	CAL DATE <b>5-23-14</b>	RECALIBRATE <b>5-23-15</b>		
TECHNICIAN <b>J.P.</b>		BADGE # <b>082277</b>	TEMPERATURE DEG. F 68 - 72	RELATIVE HUMIDITY % < 60 %	CALIBRATION PROCEDURE G-A1, SCP-01, SCP-02, SCP-03		

CONDITION				STANDARDS USED			
AS RECEIVED		AS RETURNED		MFG.	MODEL	SERIAL #	RECALIBRATE
GOOD <input checked="" type="checkbox"/>	DAMAGED	IN TOL. <input checked="" type="checkbox"/>	OUT OF TOL.	AMETEK	DM-T-50	8681	3/29/2016
IN TOL. <input checked="" type="checkbox"/>	OUT OF TOL.	LIMITED	B.E.R.	EUTECHNICS	4600	100049	7/31/2014
		REPAIRED BEFORE TEST	PCS. CALIB. <b>1</b>				

TECHNICAL SERVICES GROUP CERTIFIES THAT THIS INSTRUMENT HAS BEEN CALIBRATED TRACEABLE TO NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY AND CONFORMS TO ISO 10012 AND ANSI / NCSL Z-540 UNLESS OTHERWISE SPECIFIED MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE OR 1 MINOR DIVISION

PARAMETER	RANGE	STANDARD VALUE	OBSERVED INDICATION	CORRECTED INDICATION	TOLERANCE	PASS	FAIL
PRESSURE :							
PSIG	<b>0</b>				<b>1%</b>		
PSID		<b>32°</b>	<b>32°</b>	<b>32°</b>		<input checked="" type="checkbox"/>	
PSIA							
IN Hg		<b>70°</b>	<b>70°</b>	<b>70°</b>		<input checked="" type="checkbox"/>	
IN H2O							
OTHER							
VACUUM :							
IN Hg		<b>150°</b>	<b>150°</b>	<b>150°</b>		<input checked="" type="checkbox"/>	
OTHER							
TEMPERATURE :							
DEG F <input checked="" type="checkbox"/>							
DEG C <input checked="" type="checkbox"/>							
OTHER							

DETERMINATION OF IMPACT / NOTES :

TSG CALIBRATION SUP. / QUALITY ASSURANCE SUP.

Restrained



# TECHNICAL SERVICES GROUP

2900 Main St Alameda CA 94501 Phone (510)522-8326 Fax (510)522-3136

## Certificate of Calibration

ARB, INC. PITTSBURG  
1875 LOVRIDGE ROAD  
PITTSBURG  
CALIFORNIA 94565

Customer ID = 3773

File = 1329

Instrument Type  
**RECORDER,  
TEMPERATURE**

Range 0-150 ✓

Units DEG F

Resolution 2

Mfg TECHCAL

Model 1BT00

Cal By J.P. 082277

Current Cal Cycle (Months) 12

Previous Cal Cycle 12

Standards Used  
EUTECHNICS 139200-1.2 S/N  
100049 DUE 7/31/2014 NIST  
TE188, TE192, TE195

Certificate Number: **2802952**

Rated Accuracy 1% ✓

Pass/Fail as Found **PASS**

Pass/Fail as Left **PASS**

1st (Mfg) S.N. **04350** ✓

2nd S.N. **N/A**

Cal Date **5/23/2014** ✓

Cal Due **5/23/2015**

Notes

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AND ANSI/NCSL Z-540. UNLESS OTHERWISE SPECIFIED  
MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE  
OR 1 MINOR DIVISION.**



# CALIBRATION DATA SHEET

## PRESSURE / TEMPERATURE

LAST REVISION: 4/16/2014

2900 MAIN ST ALAMEDA CA 94501 PHONE (510) 522-8326 FAX (510) 522-3136

CUSTOMER **ARB** TSG JOB TSG ITEM CUST. P. O. # SHIPPING # DESCRIPTION: PRESS.  TEMP.  TEST GAGE  ASSIGNED G.T.# **2802952**  
 RECORDER  OTHER

1ST SERIAL # **04350** 2ND SERIAL # \_\_\_\_\_ MANUFACTURER **Tech Cal** MODEL **1BT00** RANGE **0-150°** RESOLUTION **2** DIGITAL  ANALOG

CASE SIZE CONNECTION TYPE BOTTOM  BACK  CONNECTION SIZE 1/8"  1/4"  1/2"  OTHER \_\_\_\_\_ THREAD TYPE NPT  TUBE  UN  ISO  RATED ACCURACY % NIST TRACEABLE #  
 PRESSURE: 45209.001 TEMPERATURE: TE188, TE192, TE195

EXISTING CAL CYCLE **2 mo** CAL CYCLE UPDATE \_\_\_\_\_ LAST CAL DATE **12/13** CAL DATE **5-23-14** RECALIBRATE **5-23-15**

TECHNICIAN **J.P.** BADGE # **082277** TEMPERATURE DEG. F **68 - 72** RELATIVE HUMIDITY % **< 60 %** CALIBRATION PROCEDURE **G-A1, SCP-01, SCP-02, SCP-03**

CONDITION				STANDARDS USED				TECHNICAL SERVICES GROUP CERTIFIES THAT THIS INSTRUMENT HAS BEEN CALIBRATED TRACEABLE TO NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY AND CONFORMS TO ISO 10012 AND ANSI / NCSL Z-540 UNLESS OTHERWISE SPECIFIED MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE OR 1 MINOR DIVISION
AS RECEIVED		AS RETURNED		MFG.	MODEL	SERIAL #	RECALIBRATE	
GOOD <input checked="" type="checkbox"/>	DAMAGED <input type="checkbox"/>	IN TOL. <input checked="" type="checkbox"/>	OUT OF TOL. <input type="checkbox"/>	AMETEK	DM-T-50	8681	3/29/2016	
IN TOL. <input checked="" type="checkbox"/>	OUT OF TOL. <input type="checkbox"/>	LIMITED <input type="checkbox"/>	B.E.R. <input type="checkbox"/>	EUTECHNICS	4600	100049	7/31/2014	
		REPAIRED BEFORE TEST <input type="checkbox"/>	PCS. CALIB. <input type="checkbox"/>					

PARAMETER	RANGE	STANDARD VALUE	OBSERVED INDICATION	CORRECTED INDICATION	TOLERANCE	PASS	FAIL
PRESSURE :							
PSIG _____					<b>1%</b>		
PSID _____	<b>0</b>	<b>32°</b>	<b>32°</b>			<input checked="" type="checkbox"/>	
PSIA _____		<b>70°</b>	<b>70°</b>			<input checked="" type="checkbox"/>	
IN Hg _____		<b>150°</b>	<b>150°</b>			<input checked="" type="checkbox"/>	
IN H2O _____	<b>0-150</b>						
OTHER _____							
VACUUM :							
IN Hg _____							
OTHER _____							
TEMPERATURE :							
DEG F <input checked="" type="checkbox"/>							
DEG C <input checked="" type="checkbox"/>							
OTHER _____							

DETERMINATION OF IMPACT / NOTES : \_\_\_\_\_

TSG CALIBRATION SUP. / QUALITY ASSURANCE SUP.

UNRESTRAINED



# TECHNICAL SERVICES GROUP

2900 Main St Alameda CA 94501 Phone (510)522-8326 Fax (510)522-3136

## Certificate of Calibration

ARB, INC. PITTSBURG  
1875 LOVRIDGE ROAD  
PITTSBURG  
CALIFORNIA 94565

Customer ID # 3773

File # 1329

Instrument Type **RECORDER, TEMPERATURE** ✓

Range **0-150** ✓

Units **DEG F**

Resolution **2**

Mfg. **TECH-CAL**

Model **1BT00**

Cal By **R.K. STRAHL**

Current Cal Cycle (Months) **12**

Previous Cal Cycle **N/A**

Standards Used **FLUKE 515A SN 10520  
6/13/14 NIST F26700**

Certificate Number: **2401712**

Rated Accuracy **1%** ✓

Pass Fail as Found **PASS**

Pass Fail as Left **PASS**

1st (Mfg) S/N **04352** ✓

2nd S/N **N/A**

Cal Date **5/1/2014** ✓

Cal Due **5/1/2015**

Notes

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OF STANDARDS AND TECHNOLOGY AND CONFORMS TO ISO 10012  
AND ANSI / NCSL Z-540. UNLESS OTHERWISE SPECIFIED  
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OR 1 MINOR DIVISION.**



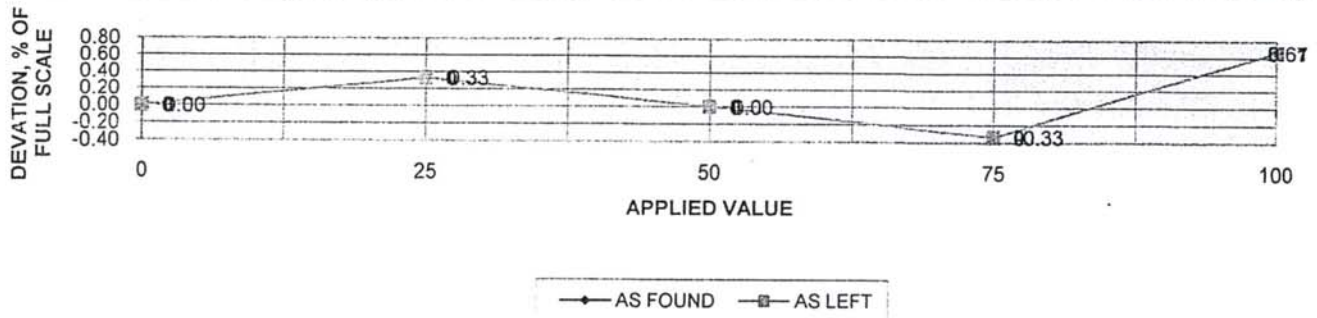
# CALIBRATION DATA SHEET PRESSURE / TEMPERATURE

2900 MAIN ST ALAMEDA, CA 94501 PHONE (510) 522-8326 FAX (510) 522-3136

CUSTOMER: ARB  
 MFG.: TECH CAL  
 RANGE: MIN 0 MAX 150  
 PRESS.: X  
 TEMP.: X  
 VACUUM:  
 TSG JOB & ITEM #: 3773  
 MODEL: 1BT00  
 UNITS: DEG F  
 RESOLUTION: 2  
 RATED ACCURACY, % FULL SCALE: 1.00 %  
 INSTRUMENT DISCIPTION: RECORDER  
 CASE SIZE: N/A  
 CONN. SIZE: N/A  
 CONN. LOCATION: N/A  
 THREAD TYPE: N/A  
 CERTIFICATE NO.: 2401712  
 CAL BY: R.K. STRAHL  
 CAL DATE: 5/1/2014  
 CAL DUE: 5/1/2015  
 MFG S/N:  
 2ND S/N:  
 04352  
 N/A  
 STANDARDS USED:  
 MFG. MODEL S/N RECAL N.I.S.T #  
 X AMATEK DM-T-150 8681 3/3/2014 40568.001  
 X FLUKE 515A 10520 6/13/2014 F26700

### CALIBRATION DETAIL

% SPAN	APPLIED VALUE	OBSERVED INDICATION		ERROR		% DEVIATION		PASS / FAIL	
		AS FOUND	AS LEFT	AS FOUND	AS LEFT	AS FOUND	AS LEFT	AS FOUND	AS LEFT
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS	PASS
25	37.50	38.00	38.00	0.50	0.50	0.33	0.33	PASS	PASS
50	75.00	75.00	75.00	0.00	0.00	0.00	0.00	PASS	PASS
75	112.50	112.00	112.00	-0.50	-0.50	-0.33	-0.33	PASS	PASS
100	150.00	151.00	151.00	1.00	1.00	0.67	0.67	PASS	PASS



IMPACT / NOTES :

TECHNICAL SERVICES GROUP CERTIFIES THAT THIS INSTRUMENT HAS BEEN CALIBRATED TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY AND CONFORMS TO ISO 10012 AND ANSI / NCSL Z-540. UNLESS OTHERWISE SPECIFIED MEASUREMENT UNCERTAINTIES ARE LESS THAN 1/4 OF TOLERANCE OR 1 MINOR DIVISION

*[Signature]*  
 TSG CALIBRATION / Q.A. SUPERVISOR