

TEST SPECIFICATIONS

Saddle Butte Rockies Midstream, LLC - Hydrostatic Pressure Test

G Leg Phase 2 Part 1- Station 518+09 and South to G Leg Phase 1

Date: 17-Mar-2017 Select Routing:

17-Mar-2017

Test Number: 1 of 1

Project Name: G Leg Phase 2 Project I.D. / AFE Number 15C024A Facility Name or Number G Leg Phase 2

Installation Location (M.P. or S.S.):	State:	County/Parish:	Class Location Designation	1	Selected Design Pressure	1480	Planned MAOP	1400
318+87.2 to 518+09	CO	Weld						

Project Description:

Hydrostatic pressure test of the 8" G Leg Phase 2 Part 1 pipeline.

Testing at 1.25*MAOP = 1850 psig minimum test pressure. **2195 psig Target Test Pressure at Chart Location**

Max Test Pressure for ANSI 600 Valves and Fittings is 2545 psig where they are located.

Test shall be compliant with all test specifications in Exhibit D "Pipeline Construction Specifications" and all other Construction Documents.

LEAK ONLY TEST STRENGTH TEST FABRICATION NEW CONSTRUCTION REPLACEMENT RETEST REFERENCE DRAWINGS ATTACHED
 POST-INSTALLATION TEST PRE-INSTALLATION TEST

Test Design Criteria

Minimum Component Characteristics	Test Pressure Calculations							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>O.D.</td><td style="text-align: center;">8.625</td></tr> <tr><td>Wall Thickness</td><td style="text-align: center;">0.219</td></tr> <tr><td>SMYS</td><td style="text-align: center;">52,000</td></tr> </table>	O.D.	8.625	Wall Thickness	0.219	SMYS	52,000	<input type="text"/> Input minimum and maximum pressure of test <input type="text"/> Input minimum and maximum %SMYS of test	
O.D.	8.625							
Wall Thickness	0.219							
SMYS	52,000							
Valve/Flange ANSI Class Rating 600# Valves/Fittings	Pressure (psig)	% PIPE SMYS						
	Max. Test Pressure (Pipe)	2514 95.2%						
	Max. Test Pressure (Valves and Fittings)	2545 96.4%						
	Min.	1850 70.1%						

Test Section - Reference Data

Test Medium	Water	
Test Duration	8	Hours (min)
Section Length	19,922	Ft.
Section Fill Volume	60,461	Gal
Max. Elevation Change	199	Ft.
Station Equations:	1	2
Back	0+00	0+00
Ahead	0+00	0+00

Test Pressures

Location	Station	Elevation (feet)	Max. psig.	% SMYS @ Max.	Min. psig.	% SMYS @ Min.	Variance psig.	Target psig.	% SMYS @Target
BEGIN -	318+87.2	5000	2,439	92.3%	1,861	70.5%	578	2,149	81.4%
HIGH ELEVATION	335+00	5025	2,428	91.9%	1,850	70.1%	578	2,138	81.0%
LOW ELEVATION	456+00	4826	2,514	95.2%	1,936	73.3%	578	2,225	84.3%
END	518+09	4877	2,492	94.4%	1,914	72.5%	578	2,203	83.4%
Chart Location (Test Point)	509+20	4895	2,484	94.1%	1,906	72.2%	578	2,195	83.1%

REMARKS:

ASME B16.5 2.6 System Hydrostatic Testing 2003:

Flanged joints and flanged fittings may be subjected to system hydrostatic tests at a pressure of 1.5 times the 38°C (100°F) rating rounded off to the next higher 1 bar (25 psi) increment. Testing at any higher pressure is the responsibility of the user, taking into account the requirements of the applicable code or regulation.

Test shall be compliant with all test specifications in Exhibit D "Pipeline Construction Specifications" and all other Construction Documents.

PRE-TEST SPECIFIED / REVIEWED BY: TEST PERFORMED / ACCEPTED BY: POST-TEST REVIEWED BY:

Originator (Signature)	Date:	Test Performed by (Signature):	Date:	Compliance (signature)	Date:
		<i>[Signature]</i>	3-20-17		
Designed Reviewed if applicable (Signature)	Date:	Company Name (for Contractor or for Employee):	Date:	Engineering or Operations (Signature)	Date:
		<i>North winds of Wyoming</i>	2-20-17		
Compliance (Signature)	Date:	Witnessed & Accepted by Company Representative:	Date:	Actual MAOP	
		<i>[Signature]</i>	3-20-17		

3-20-17



April 2006

MOP Establishment and Pressure Testing of Pipelines
TG1601.190

PAGE 1 OF 9

LIQUID PIPELINE
PRESSURE TEST
REPORT

Pressure Test Number 1

MOP of tested facility is 1400 PSIG

Company: Saddle Butte Operations Area: _____

Project: G Leg Phase 2 AFE: 15C024A

Pipeline: _____

Section: G Leg Phase 2 Part 1

Station or Milepost From: 318+87 To: 518+09



INSTRUCTIONS

In this worksheet, cells containing formulas are protected against input.
Cells with **BLUE** text labels allow or require input.

<i>General Information</i>	<ul style="list-style-type: none"> • Complete this Report and attached necessary exhibits for all SBP installed pipelines or pipeline segments or those re-qualified for service. • Fill in all applicable information. If information is not applicable, write NA in the corresponding space on the Report.
<i>Pipe Data</i>	<ul style="list-style-type: none"> • Record the details for each pipe section tested, including lengths, line fill, pipe fittings, etc. • Add together pipe section lengths and line fill for a total pipe section length and line fill.
<i>Test Water Data</i>	<ul style="list-style-type: none"> • Enter water source information (i.e., from municipal supply, well, river, lake, pond) in the Test Log or notes section of the Report. • Source water temperature compared to ground temperature can assist with understanding the time for the water to stabilize.
<i>Pressure Calculations</i>	<ul style="list-style-type: none"> • Elevation of high and low points and the elevation of the test pressure measure sites is required for calculation of the target test pressures.
<i>Test Log</i>	<ul style="list-style-type: none"> • Fill out the Test Log at the time of the test. This is the actual log of the test. • From the start of filling the test section, record pressure readings from the calibrated test gauge or deadweight tester used in the test. • Record the test pressure and temperatures at intervals of 30 minutes to an hour and as necessary to represent the test pressure during the test period. • The below ground pipe temperature sensor should be placed away from exposed pipe and far enough from the water injection point so that water injected will not affect the readings. • In the Remarks column, enter start of test, end of test, and any remarks concerning unusual events, such as liquid added or withdrawn, weather conditions, etc.
<i>Notes</i>	<ul style="list-style-type: none"> • Enter all pertinent comments about the test, including such things as weather conditions, radical weather changes, equipment malfunctions, or any other noteworthy event that may affect testing.
<i>Profile</i>	<ul style="list-style-type: none"> • An elevation profile is required for any test section where the elevation varies more than 100 feet. The following items should be noted on the profile: <ul style="list-style-type: none"> - Location and elevation where test pressure measurements are taken - High and low points - Stationing or mileposts - Horizontal and vertical scale of the drawing • Elevation data is available in electronic format from the KPL mapping system. • If electronic elevation data is not available, take profile elevations from survey information or from U.S. Geological Service 7 1/2 minute topographical maps.
<i>Failure Log</i>	<ul style="list-style-type: none"> • Record each failure event that causes the line to be taken "off test". • Enter the date, time, and pressure at the time of failure. • List the apparent cause of the failure if the actual cause cannot be determined. Pipe seam failure or leaking flange, for example, could be entered as the cause of test failure. • Describe the repair method (i.e., changed-out pipe or tightened flange).
<i>Supplementary Documentation</i>	<ul style="list-style-type: none"> • Check each supplementary documentation attached as part of this test record (i.e., test charts and/or equipment certifications). • Write the corresponding Exhibit Number on the attached supplementary documentation.
<i>Certification</i>	<ul style="list-style-type: none"> • Signatures of the Company and Contractor representatives in charge of the test are MANDATORY.



PRESSURE CALCULATIONS

Location of Test Point G 2 Ph 4/ Wiedeman Interconnect	Elevation of Test Point 4895 Ft. (Elevation) 509+20 Ft. (Station)	High Point 5025 Ft. (Elevation) 335+00 Ft. (Station) _____ Location Name	Low Point 4826 Ft. (Elevation) 456+00 Ft. (Station) _____ Location Name
Target MOP: 1400 Target Test Pressure Range 1st Min: 1850 Maximum: 2514 2nd Min: 2195	Test Duration: 6 hr High Point Low Point	Start Point 5000 Ft. (Elevation) 316+87 Ft. (Station) _____ Location Name	End Point 4877 Ft. (Elevation) 518+09 Ft. (Station) _____ Location Name

TEST LOG

DATE	TIME	PRESSURE	AMBIENT TEMP	BELOW GROUND TEMP	ABOVE GROUND TEMP	REMARKS
3-20-17	7:30AM	0	43	50	56	
	7:45	0	44	50	56	
	7:55	0	44	50	56	Build to 500 PSI
	7:57	497	44	50	56	
	8:12	497	46	50	56	Build to 1000 PSI
	8:22	1001	47	50	55	
	8:37	1000	48	51	55	Build to 1500 PSI
	8:56	1501	51	51	56	
	9:11	1501	54	51	57	Build to 2000 PSI
	9:24	1999	58	51	59	Turned heat on in testing hood
	9:39	1999	64	50	61	Build to 2195 +
	9:45	2208	66	48	63	
*	10:00	2208	69	48	66	* BEGIN TEST *
	10:15	2208	70	48	67	Sunny, warm wind 6mph
	10:30	2208	71	47	70	All exposed piping is
	10:45	2208	72	47	72	covered and heated. Clouds
	11:00	2208	73	47	73	are expected around noon
	11:15	2208	74	47	75	Partly cloudy
	11:30	2208	75	46	77	
	11:45	2208	76	46	79	
	12:00	2209	76	46	81	Mostly cloudy
	12:15	2209	77	46	83	
	12:30	2209	77	46	85	
	12:45	2209	77	45	86	
	1:00	2209	77	45	87	
	1:15	2209	78	45	88	
	1:30	2209	78	45	89	
	1:45	2209	78	46	90	
	2:00	2209	78	46	90	cloudy
	2:15	2209	78	46	93	
	2:30	2209	79	46	95	
	2:45	2209	79	45	96	
	3:00	2209	79	45	97	
	3:15	2209	79	45	99	
	3:30	2209	79	45	99	cloudy
	3:45	2209	78	45	100	
	4:00	2209	78	45	101	
	4:15	2209	77	45	102	
	4:30	2209	77	45	102	



TEST LOG (CONTINUED)

DATE	TIME	PRESSURE	AMBIENT TEMP	BELOW GROUND TEMP	ABOVE GROUND TEMP	REMARKS
3-20-17	4:45 PM	2209	76	45	102	cloudy, no wind
	5:00	2210	75	45	102	
	5:15	2210	75	46	103	
	5:30	2210	74	46	104	
	5:45	2210	72	47	105	
*	6:00	2210	71	47	105	*END TEST* Turn off heat
	6:15	2210	71	47	105	Bleed to 2000
	6:20	1997	70	47	105	
	6:35	1997	69	47	97	Bleed to 1500
	6:41	1500	68	47	85	
	6:56	1500	65	47	77	Bleed to 1000
	7:00	995	65	47	73	
	7:15	995	62	47	67	Bleed to 500
	7:20	495	62	47	66	
	7:35	495	60	47	64	Bleed to 0
	7:40	0	60	48	64	
	7:55	0	58	48	61	



TEST EQUIPMENT

PRESSURE RECORDER 1:

Mfg. Barton
Model _____
Serial No. 202E-007
Range 0-3000 PSI
0-150° F
Notes: Cal on 11-12-16

PRESSURE RECORDER 2:

Mfg. _____
Model _____
Serial No. _____
Range _____
Notes: _____

DEADWEIGHT TESTER OR CALIBRATED TEST GAUGE:

Mfg. Crystal Engineering
Model XP2i
Serial No. 364359
Date of last Calibration 11-2-16
Calibrated by PMC
Range 0-5000 PSI
Notes: _____

TEMPERATURE RECORDER:

Mfg. Barton
Model _____
Serial No. 202A-121213
Range 0-150° F
Notes: Cal on 11-12-16

CALIBRATION OF TEMPERATURE RECORDER

Temperature recorder reading	Test mercury thermometer reading	Remarks

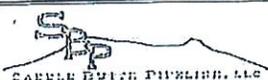
CALIBRATION OF PRESSURE RECORDER 1

Pressure recorder reading	Deadweight tester reading	Remarks

CALIBRATION OF PRESSURE RECORDER 2

Pressure recorder reading	Deadweight tester reading	Remarks

NOTES



EQUIPMENT CALCULATED MOP SUMMARY WORKSHEET

1. Test Information:

Date 3-20-17 Time 7:30 AM

Target MOP 1400 Test Point Location G2/Wiedeman Interconnect

Enter the desired MOP, Test Medium Water Test Duration 8 hrs

If less than pipe internal design pressure. Min. Test Press. at test site 125% of min. MOP + elev. 110%

Maximum allowable % of SMYS = 100%

2. Pipe Specifications:

Pipe (#1) O.D. 8.625 MOP _____

Grade X-52 SMYS 52000 Seam Joint Factor _____

Wall thickness .219 Design Factor (F) _____

Length (ft.): 19,922 Volume _____

Max allowable test pressure, psig _____

3. Pipe Specifications:

Pipe (#2) O.D. _____ MOP _____

Grade _____ SMYS _____ Seam Joint Factor _____

Wall thickness _____ Design Factor (F) _____

Length (ft.): _____ Volume _____

Max allowable test pressure, psig _____

4. Pipe Specifications:

Pipe (#3) O.D. _____ MOP _____

Grade _____ SMYS _____ Seam Joint Factor _____

Wall thickness _____ Design Factor (F) _____

Length (ft.): _____ Volume _____

Max allowable test pressure, psig _____

5. Pipe Specifications:

Pipe (#4) O.D. _____ MOP _____

Grade _____ SMYS _____ Seam Joint Factor _____

Wall thickness _____ Design Factor (F) _____

Length (ft.): _____ Volume _____

Max allowable test pressure, psig _____

6. Pipe Specifications:

Pipe (#5) O.D. _____ MOP _____

Grade _____ SMYS _____ Seam Joint Factor _____

Wall thickness _____ Design Factor (F) _____

Length (ft.): _____ Volume _____

Max allowable test pressure, psig _____

7. Pipe Specifications:

Pipe (#6) O.D. _____ MOP _____

Grade _____ SMYS _____ Seam Joint Factor _____

Wall thickness _____ Design Factor (F) _____

Length (ft.): _____ Volume _____

Max allowable test pressure, psig _____

8. Pipe Fittings Specifications:

Pipe Fitting O.D. _____ MOP _____

Manufacture Type _____ Grade _____ SMYS _____ Seam Joint Factor _____

Fitting Description _____ Wall thickness _____ Design Factor (F) _____

Max allowable test pressure, psig _____

9. Pipe Fittings Specifications:

Pipe Fitting O.D. _____ MOP _____

Manufacture Type _____ Grade _____ SMYS _____ Seam Joint Factor _____

Fitting Description _____ Wall thickness _____ Design Factor (F) _____

Max allowable test pressure, psig _____

10. Pipe Fittings Specifications:

Pipe Fitting O.D. _____ MOP _____

Manufacture Type _____ Grade _____ SMYS _____ Seam Joint Factor _____

Fitting Description _____ Wall thickness _____ Design Factor (F) _____

Max allowable test pressure, psig _____



FAILURE LOG

FAILURE:

Date: _____ Time: _____ am / pm Failure Pressure: _____

Apparent Cause: _____

REPAIR:

Describe Repair Method: _____

FAILURE:

Date: _____ Time: _____ am / pm Failure Pressure: _____

Apparent Cause: _____

REPAIR:

Describe Repair Method: _____

FAILURE:

Date: _____ Time: _____ am / pm Failure Pressure: _____

Apparent Cause: _____

REPAIR:

Describe Repair Method: _____

FAILURE:

Date: _____ Time: _____ am / pm Failure Pressure: _____

Apparent Cause: _____

REPAIR:

Describe Repair Method: _____

FAILURE:

Date: _____ Time: _____ am / pm Failure Pressure: _____

Apparent Cause: _____

REPAIR:

Describe Repair Method: _____



The following marked exhibits are attached as a part of this Test Report:

- EXHIBIT NO. 1 Sketch of Tested Piping (including how section is isolated), with material list
- EXHIBIT NO. 2 Profile of pipeline section and/or segment
- EXHIBIT NO. 3 Pressure Chart, with pressure test number, date, test section name, Inspector name and signature
- EXHIBIT NO. 4 Temperature Chart, with pressure test number, date, test section name, Inspector name and signature
- EXHIBIT NO. 5 Pressure Recorder Certification Papers
- EXHIBIT NO. 6 Temperature Recorder Certification Papers
- EXHIBIT NO. 7 Deadweight or Calibrated Test Gauge Certification Papers
- EXHIBIT NO. 8 Field test data log, if hand written
- EXHIBIT NO. 9 Pressure Test Procedure, if applicable, with MOP Area Representative and Engineer signature approval

CERTIFICATION

I certify this pipeline or pipeline section has been tested and successfully met the terms of SBP MOP Establishment and Pressure Testing of Pipelines Technical Guideline and, where applicable, the contract document between SBP and its prime contractor.

MOP Area Representative

By: _____ Date: _____
(Please print) (Signature)

Engineer

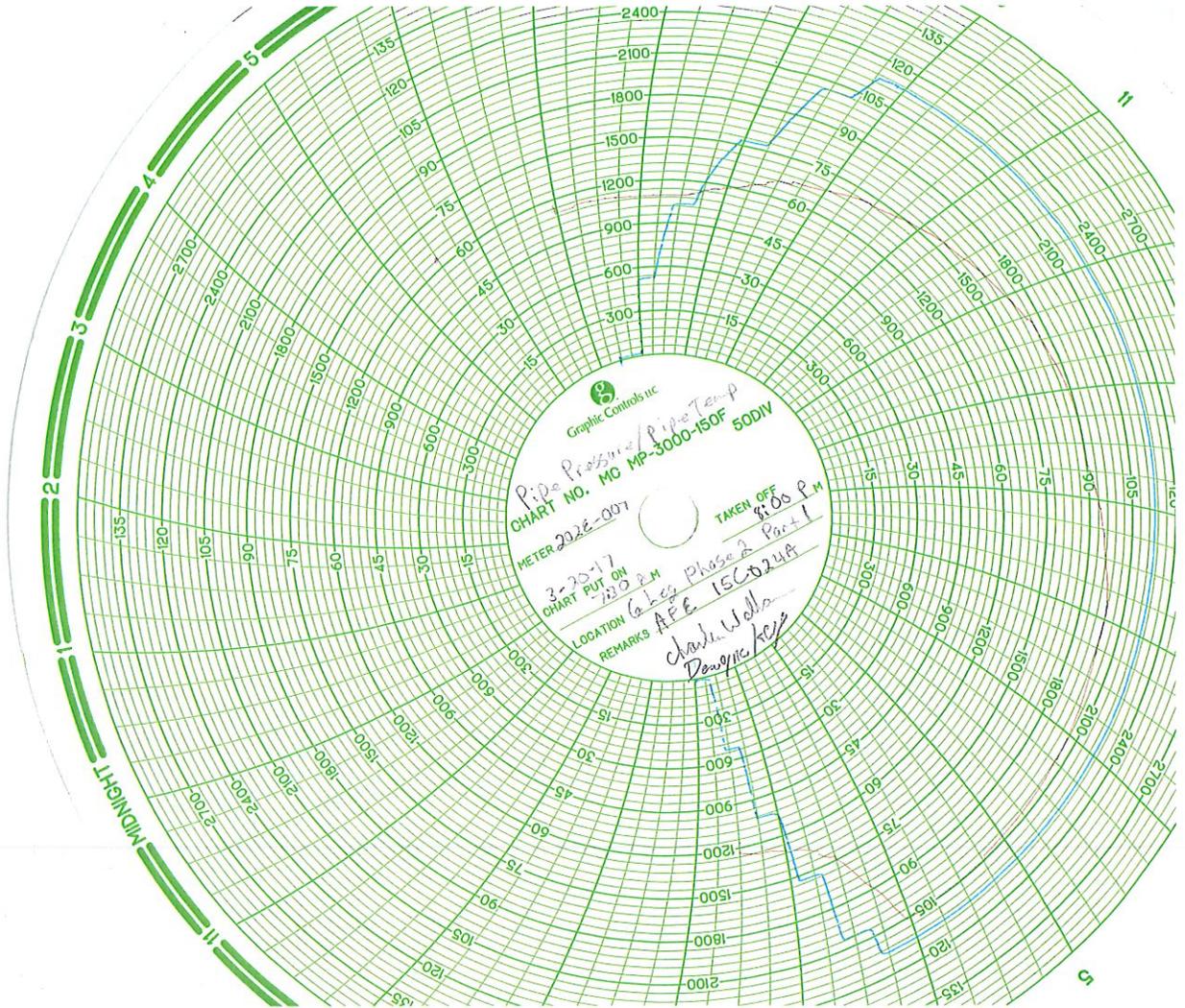
By: _____ Date: _____
(Please print) (Signature)

Inspector

By: Charles Wallace Charles Wallace Date: 3-20-17
(Please print) (Signature)

Name of Testing Contractor

North winds of Wyoming
By: Dewey Kays Dewey Kays Date: 3-20-17
(Please print) (Signature)



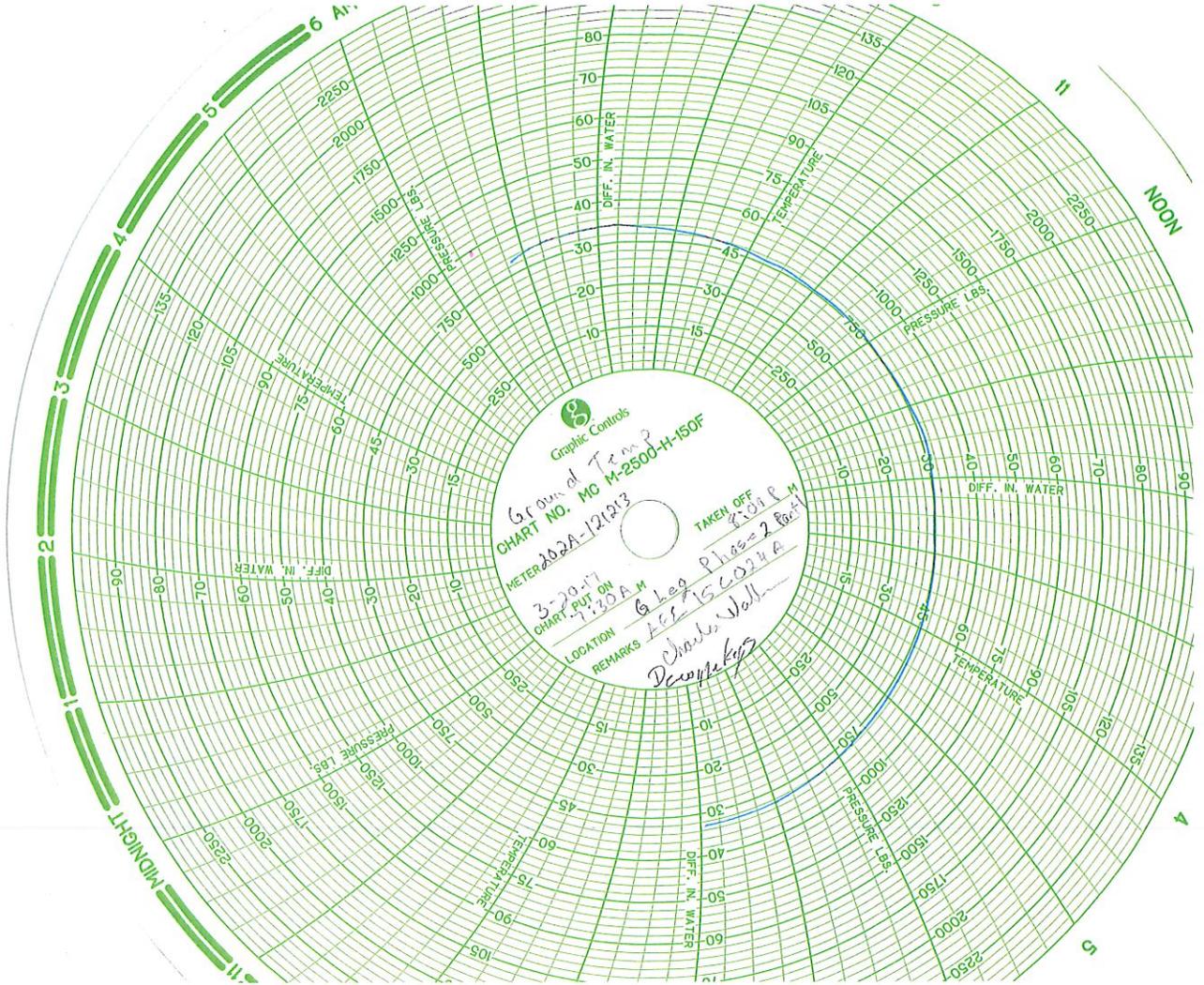
Graphic Controls Inc

Pipe Pressure/Temp
CHART NO. MC MP-3000-150F 50DIV

METER 202E-007
3-20-17
CHART PUT ON 11:30 AM

TAKEN OFF 8:00 P.M.

LOCATION Cable Phase 2 Part 1
REMARKS APE 15C-D24A
Charles Wells
Design/tech





Non-Conformance Report

PROCESS MEASUREMENT COMPANY

2475 W. 2ND AVE 34A DENVER, CO , 80223

303-937-7226 Fax: 303-936-2731

www.pmc-calibration.com

Calibration Performed By:

PMC-DENVER
2475 W. 2ND AVE 34A
DENVER, CO , 80223

For:

PIPELINE SUPPLY AND SERVICE
9700 E 104TH AVE

I.D.: CR-2

Description: PRESSURE GAGE

Manufacturer: CRYSTAL

Gage Type:

Temp./RH: 71.9 F / 21.8

Cal. Interval: 12 MONTHS

Serial Number: 364359

Model Number: XP2I

Performed By: MATTHEW KNOWLES

Cal. Due Date: 11/2/2017

Calibration Result: ADJ.

Cal Date: 11/2/2016

Equipment Used To Calibrate Equipment:

Company	I.D.	Description	Last Cal.	Cal. Due Date
02-PMC-DENVER	PMCD-064	TEMP/ HUMIDITY METER	5/16/2016	5/16/2017
03-PMC-OMAHA	PMCO-134	DEAD WEIGHT TEST SET 0-20	5/3/2016	5/3/2017

Procedures Used In Event:

Company	Procedure Name	Description	Revision Level	Revision Date
PROCESS MEASUREI	SCP05-022	PRESSURE AND VACUUM GAUGES	0	2/9/2015

PSS-COMPANIES



9700 E. 104TH AVE, UNIT F- HENDERSON, CO 80640 - Phone (303)857-7986 - Fax (303)389-4945

CALIBRATION CERTIFICATE

CERTIFICATE NUMBER: CO

Details +/-: 1.0% ACCURACY

DATE CALIBRATED: 11/12/2016
DUE DATE: 11/12/2017

INDICATED TEMPERATURE RANGE: # 0 – 150°F
INDICATED PRESSURE RANGE: #0 – 2500 PSI
SERIAL NO: 202A-121213
MANUFACTURER: BARTON/ 12" RECORDER

TYPE OF INSTRUMENT CALIBRATED: TEMPERATURE / PRESSURE RECORDER

INSTRUMENT FINDINGS/STATUS: UNIT IS IN TOLERANCE/ INSTRUMENT MEETS OR EXCEEDS SPECIFICATIONS.

BASED ON INTERNATIONAL STANDARDS OF GRAVITY: (980.665 cm./sq.).

TYPE OF STANDARD USED TO CALIBRATE: REFINERY DEADWEIGHT TEST UNIT SPT (35225-3) SERIAL No. 5268: KESSLER TEST THERMOMETERS: SERIAL NO, CALIBRATION DATE: SEPTEMBER 14, 2015

ALL STANDARD DIRECTLY TRACEABLE TO NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGIES TEST NO: (N.I.S.T.) 2.6/172490 & 6.6/139577.

CALCULATED USING MASS VALUES, AREA, AO, AND STATED GRAVITY.
ROOM TEMPERATURE/HUMIDITY (AT TIME OF TEST): 66°F / 25%.

CALIBRATED BY: NICK BEDFORD

PSS-COMPANIES



9700 E. 104TH AVE, UNIT F- HENDERSON, CO 80640 - Phone (303)857-7986 - Fax (303)389-4945

CALIBRATION CERTIFICATE

CERTIFICATE NUMBER: CO

Details +/- 1.0% ACCURACY

DATE CALIBRATED: 11/12/2016

DUE DATE: 11/12/2017

INDICATED TEMPERATURE RANGE: # 0 – 150°F

INDICATED PRESSURE RANGE: #0 – 3000 PSI

SERIAL NO: 202E-007

MANUFACTURER: BARTON/ 12" RECORDER

TYPE OF INSTRUMENT CALIBRATED: TEMPERATURE / PRESSURE RECORDER

INSTRUMENT FINDINGS/STATUS: UNIT IS IN TOLERANCE/ INSTRUMENT MEETS OR EXCEEDS SPECIFICATIONS.

BASED ON INTERNATIONAL STANDARDS OF GRAVITY: (980.665 cm./sq.).

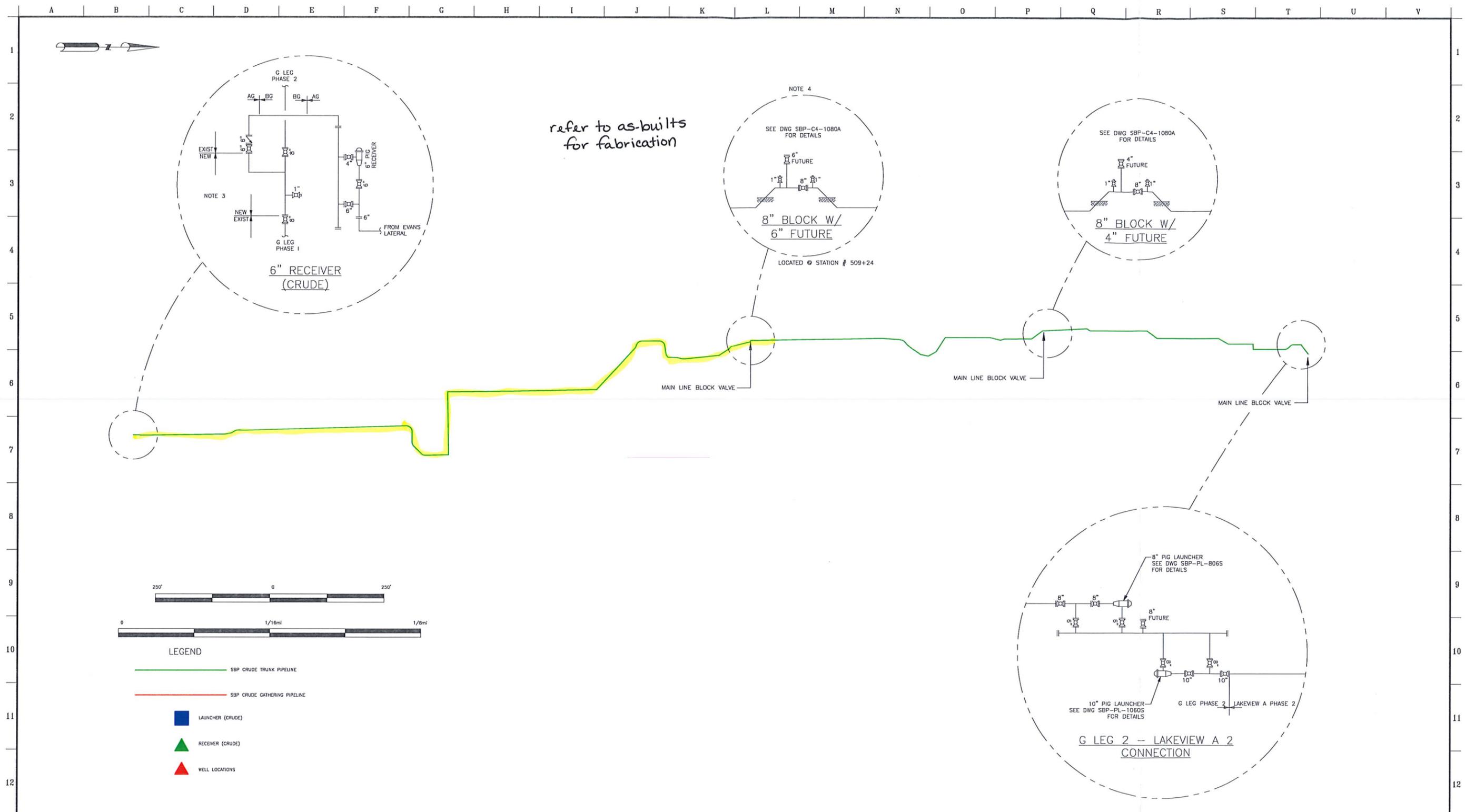
TYPE OF STANDARD USED TO CALIBRATE: REFINERY DEADWEIGHT TEST UNIT SPT. (35225-3) SERIAL No. 5268: KESSLER TEST THERMOMETERS; SERIAL NO. CALIBRATION DATE: SEPTEMBER 14, 2015

ALL STANDARD DIRECTLY TRACEABLE TO NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGIES TEST NO: (N.I.S.T.) 2.6/172490 & 6.6/139577.

CALCULATED USING MASS VALUES, AREA, AO, AND STATED GRAVITY.
ROOM TEMPERATURE/HUMIDITY (AT TIME OF TEST): 66°F / 25%.

CALIBRATED BY: NICK BEDFORD





NOTE:
 1. FLOW SCHEMATIC IS FOR GRAPHICAL REPRESENTATION ONLY.
 2. ALL GAS, WATER, AND UTILITY LINES SHOULD BE LOCATED PRIOR TO ANY EXCAVATING, TRENCHING OR DIGGING ANYWHERE ON OR NEAR THIS SITE.
 3. EXISTING 8" LAUNCHER TO BE REMOVED.
 4. BLOCK VALVE TO BE NORTH OF 6" FUTURE.

REFERENCE DRAWINGS		REVISIONS				ENGINEERING RECORD		
NO.	TITLE	NO.	FIRM	DATE	DESCRIPTION	BY	CHK.	APP.
0		0	SESI	9/21/16	ISSUED FOR RELEASE	PDE	DMN	
1		1	SESI	11/16/16	RE-ISSUED FOR RELEASE	BME	DMN	
2		2	SESI	01/05/17	ISSUED FOR CONSTRUCTION	BME	DMN	
3		3	SESI	03/02/17	RE-ISSUED FOR CONSTRUCTION	MRB	DMN	

SUMMIT ENGINEERING SERVICES
 44 Inverness Dr. E., Ste. E100
 Englewood, CO 80112
 303.768.9191 Office
 303.768.9292 Fax

BY	CHK.	APP.	DATE
DRN:	PDE		07/20/16
DES:			
CHK:			
APP:			
AFE No.			
SE&C JOB NO.			
PROJ. ENGR:			
SCALE: AS NOTED			

SADDLE BUTTE PIPELINE
 FLOW SCHEMATIC
 G LEG PHASE 2

PLOT SCALE: G_LEG_PHASE 2
 DWG. NO.: G_LEG_PHASE 2
 REV: 3