

TEST SPECIFICATIONS						Date:		Select Routing:																									
Rangeview Pipeline Gathering System Hydrostatic Pressure Test						31-Jan-2017																											
Bihain Well Connect						Test Number: 1		of 1																									
Project Name: Bihain Well Connect			Project I.D. / AFE Number 16W019A			Facility Name or Number Bihain Well Pad																											
Installation Location (M.P. or S.S.): 0+00 to 10+52.3		State: CO	County/Parish: Weld	Class Location Designation	2	Selected Design Pressure	1480	Planned MAOP	1400																								
Project Description:																																	
Hydrostatic pressure test of the 4" well connect pipeline.																																	
Testing at 1.25*MAOP = 1850 minimum test pressure. 2222 psig Target Test Pressure at Chart Location																																	
Max Test Pressure for ANSI 600 Valves and Fittings is 2660 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 <input type="checkbox"/> STRENGTH TEST <input checked="" type="checkbox"/> FABRICATION <input type="checkbox"/> NEW CONSTRUCTION <input checked="" type="checkbox"/> REPLACEMENT <input type="checkbox"/> RETEST <input type="checkbox"/> REFERENCE DRAWINGS ATTACHED <input type="checkbox"/>																																	
POST-INSTALLATION TEST <input checked="" type="checkbox"/> PRE-INSTALLATION TEST <input type="checkbox"/>																																	
Test Design Criteria					Test Section - Reference Data																												
Minimum Component Characteristics			Test Pressure Calculations																														
Pipe Information			<input type="checkbox"/> Input minimum and maximum pressure of test <input type="checkbox"/> Input minimum and maximum %SMYS of test			Test Medium Water Test Duration 8 Hours (min) Section Length 1,052 Ft. Section Fill Volume 730 Gal Max. Elevation Change 15 Ft.																											
Valve/Flange ANSI Class Rating 600# Valves/Fittings			<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Pressure (psig)</th> <th>% PIPE SMYS</th> </tr> </thead> <tbody> <tr> <td>Max. Test Pressure (Pipe)</td> <td>2595</td> <td>59.7%</td> </tr> <tr> <td>Max. Test Pressure (Valves and Fittings)</td> <td>2660</td> <td>61.2%</td> </tr> <tr> <td>Min.</td> <td>1850</td> <td>42.6%</td> </tr> </tbody> </table>				Pressure (psig)	% PIPE SMYS	Max. Test Pressure (Pipe)	2595	59.7%	Max. Test Pressure (Valves and Fittings)	2660	61.2%	Min.	1850	42.6%	Station Equations: <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>Back</td> <td>0+00</td> <td>0+00</td> <td>0+00</td> </tr> <tr> <td>Ahead</td> <td>0+00</td> <td>0+00</td> <td>0+00</td> </tr> </tbody> </table>					1	2	3	Back	0+00	0+00	0+00	Ahead	0+00	0+00	0+00
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Test Pressures																																	
Location	Station	Elevation (feet)	Max. psig.	% SMYS @ Max.	Min. psig.	% SMYS @ Min.	Variance psig.	Target psig.	% SMYS @Target																								
BEGIN -	0+00	4614	2,589	59.6%	1,850	42.6%	739	2,219	51.1%																								
HIGH ELEVATION	0+00	4614	2,589	59.6%	1,850	42.6%	739	2,219	51.1%																								
LOW ELEVATION	10+48	4599	2,595	59.7%	1,856	42.7%	739	2,225	51.2%																								
END	10+52.3	4607	2,592	59.6%	1,853	42.6%	739	2,222	51.1%																								
Chart Location (Test Point)	10+52.3	4607	2,592	59.6%	1,853	42.6%	739	2,222	51.1%																								
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.																																	
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PRE-TEST SPECIFIED / REVIEWED BY:			TEST PERFORMED / ACCEPTED BY:			POST-TEST REVIEWED BY:																											
Originator (Signature)	Date:	Test Performed by (Signature):			Date:	Compliance (signature)		Date:																									
Designed Reviewed if applicable (Signature)	Date:	Company Name (for Contractor or for Employee):			Date:	Engineering or Operations (Signature)		Date:																									
Compliance (Signature)	Date:	Witnessed & Accepted by Company Representative:			Date:	Actual MAOP																											



LIQUID PIPELINE
PRESSURE TEST
REPORT

Pressure Test Number 1

MOP of tested facility is PSIG

Company: Saddle Butte Operations Area: _____

Project: B. hain Well Connect AFE: 16W019A

Pipeline: B. hain Well Pad

Section: all

Station or Milepost From: 0+00 To: 10+52.3



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 <u>B. main Well Pad</u>		Elevation of Test Point <u>4607</u> Ft. (Elevation) <u>10+52</u> Ft. (Station)		High Point <u>4614</u> Ft. (Elevation) <u>0+00</u> Ft. (Station) Location Name		Low Point <u>4599</u> Ft. (Elevation) <u>10+48</u> Ft. (Station) Location Name	
Target MOP: Target Test Pressure Range 1st Min: Maximum: <u>2595</u> 2nd Min:		Test Duration: <u>8</u> hr High Point Low Point <u>4614</u> Ft. (Elevation) <u>2235</u> <u>0+00</u> Ft. (Station) Location Name		Start Point <u>4614</u> Ft. (Elevation) <u>0+00</u> Ft. (Station) Location Name		End Point <u>4607</u> Ft. (Elevation) <u>10+52</u> Ft. (Station) Location Name	

TEST LOG

DATE	TIME	PRESSURE	AMBIENT TEMP	BELOW GROUND TEMP	ABOVE GROUND TEMP	REMARKS
2-15-17	8:00	0	25	36	63	
	8:15	0	26	36	57	
	8:27	0	27	36	57	Build to 500
	8:36	502	27	36	57	
	8:44	503	29	30	57	Build to 1000
	8:45	999	29	30	57	
	9:00	999	31	31	57	Build to 1500
	9:00	1500	31	31	57	
	9:14	1500	33	31	57	Build to 2000
	9:15	2001	33	31	57	
	9:29	2001	35	31	57	Build to 2222 +
*	9:30	2235	35	31	57	* Begin Test* Sunny, nice,
	9:45	2237	35	31	57	no wind, heat on above ground pipe
	10:00	2241	37	31	57	
	10:15	2243	40	30	57	
	10:30	2245	44	30	57	
	10:45	2248	45	30	57	
	11:00	2251	46	30	57	
	11:15	2253	49	30	58	Sunny heat still on
	11:30	2254	51	29	60	
	11:45	2256	53	29	61	
	12:00	2257	55	28	63	
	12:15	2259	56	28	63	
	12:30	2261	58	27	64	
	12:45	2264	58	27	65	
	1:00	2266	59	26	67	Sunny no wind
	1:15	2268	60	25	69	
	1:30	2270	60	25	71	- half way -
	1:45	2273	61	25	72	
	2:00	2276	62	25	74	
	2:15	2279	62	25	75	
	2:30	2281	63	25	75	
	2:45	2283	64	25	75	
	3:00	2285	64	26	76	
	3:15	2288	64	26	76	
	3:30	2290	64	27	77	
	3:45	2291	64	27	77	
	4:00	2292	64	27	77	
	4:15	2294	64	26	77	



TEST LOG (CONTINUED)

DATE	TIME	PRESSURE	AMBIENT TEMP	BELOW GROUND TEMP	ABOVE GROUND TEMP	REMARKS
2-15-17	4:30 PM	2294	64	29	77	Sunny nice
	4:45	2295	64	29	75	
	5:00	2296	64	30	74	
	5:15	2297	62	38	72	Sundown Cooling of rapidly
	5:30	2298	61	38	69	
*	5:40	2299	60	38	65	* END TEST * Bleed to 2000
	5:41	2002	60	38	60	
	5:55	2005	58	31	60	Bleed to 1500
	5:57	1508	58	31	60	
	6:10	1510	55	32	63	Bleed to 1000
	6:11	1002	55	32	63	
	6:25	1004	53	32	66	Bleed to 500
	6:26	502	53	32	66	
	6:40	505	52	32	69	Bleed to 0
	6:45	0	51	32	67	
	7:00	0	49	32	68	



EQUIPMENT CALCULATED MOP SUMMARY WORKSHEET

1. Test Information:

Target MOP

Enter the desired MOP, if less than pipe internal design pressure.

Date 2-16-2017 Time 7:00 Am

Test Point Location B. hain WC

Test Medium Water Test Duration 8 hr

Specific Gravity of Test Medium _____

Min. Test Press. at test site 125% of min. MOP + elev. 110%

Maximum allowable % of SMYS = 100%

2. Pipe Specifications:

Manufacture Type _____

Pipe (#1) O.D. 4.5 MOP _____

Grade X52 SMYS _____ Seam Joint Factor _____

Wall thickness .188 Design Factor (F) _____

Length (ft.): 1052.3 Volume _____

Max allowable test pressure, psig _____

3. Pipe Specifications:

Manufacture Type _____

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:

Manufacture Type _____

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:

Manufacture Type _____

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:

Manufacture Type _____

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:

Manufacture Type _____

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:

Manufacture Type _____

Fitting Description _____

Pipe Fitting O.D. _____ MOP _____

Grade _____ SMYS _____ Seam Joint Factor _____

Wall thickness _____ Design Factor (F) _____

Max allowable test pressure, psig _____

9. Pipe Fittings Specifications:

Manufacture Type _____

Fitting Description _____

Pipe Fitting O.D. _____ MOP _____

Grade _____ SMYS _____ Seam Joint Factor _____

Wall thickness _____ Design Factor (F) _____

Max allowable test pressure, psig _____

10. Pipe Fittings Specifications:

Manufacture Type _____

Fitting Description _____

Pipe Fitting O.D. _____ MOP _____

Grade _____ SMYS _____ Seam Joint Factor _____

Wall thickness _____ Design Factor (F) _____

Max allowable test pressure, psig _____



EQUIPMENT CALCULATED MOP SUMMARY WORKSHEET
(continued)

11. Manufactured: _____ Weldolet, etc. O.D. _____ Working Pressure _____
Manufacture Type _____ Grade _____
Fitting Description _____
Max allowable test pressure, psig _____

12. Manufactured: _____ Pipe Flanges O.D. _____ Working Pressure _____
Manufacture Type _____ Class _____
Temperature Derating Factor (T) _____
Max allowable test pressure, psig _____

13. Manufactured: _____ Pipe Flanges O.D. _____ Working Pressure _____
Manufacture Type _____ Class _____
Temperature Derating Factor (T) _____
Max allowable test pressure, psig _____

14. Manufactured: _____ Block Valve Size _____ Working Pressure _____
Manufacture Type _____ Class _____
Temperature Derating Factor (T) _____
Max allowable test pressure, psig _____

15. Calculated MOPs (psi):
Test Pressure Range @Test Site, psig _____ 125% to psig _____ 110% to psig _____
Note: Add psi to min. test range
Maximum test pressure at test site, psig _____

CALCULATED TARGET MOP OF PIPELINE SECTION _____ 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: _____



SUPPLEMENTARY DOCUMENTATION

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 _____ Date: 2/15/17
(Please print) (Signature)

Name of Testing Contractor

By: Northwind of Wyoming _____ Date: 2/15/17
(Please print) (Signature)

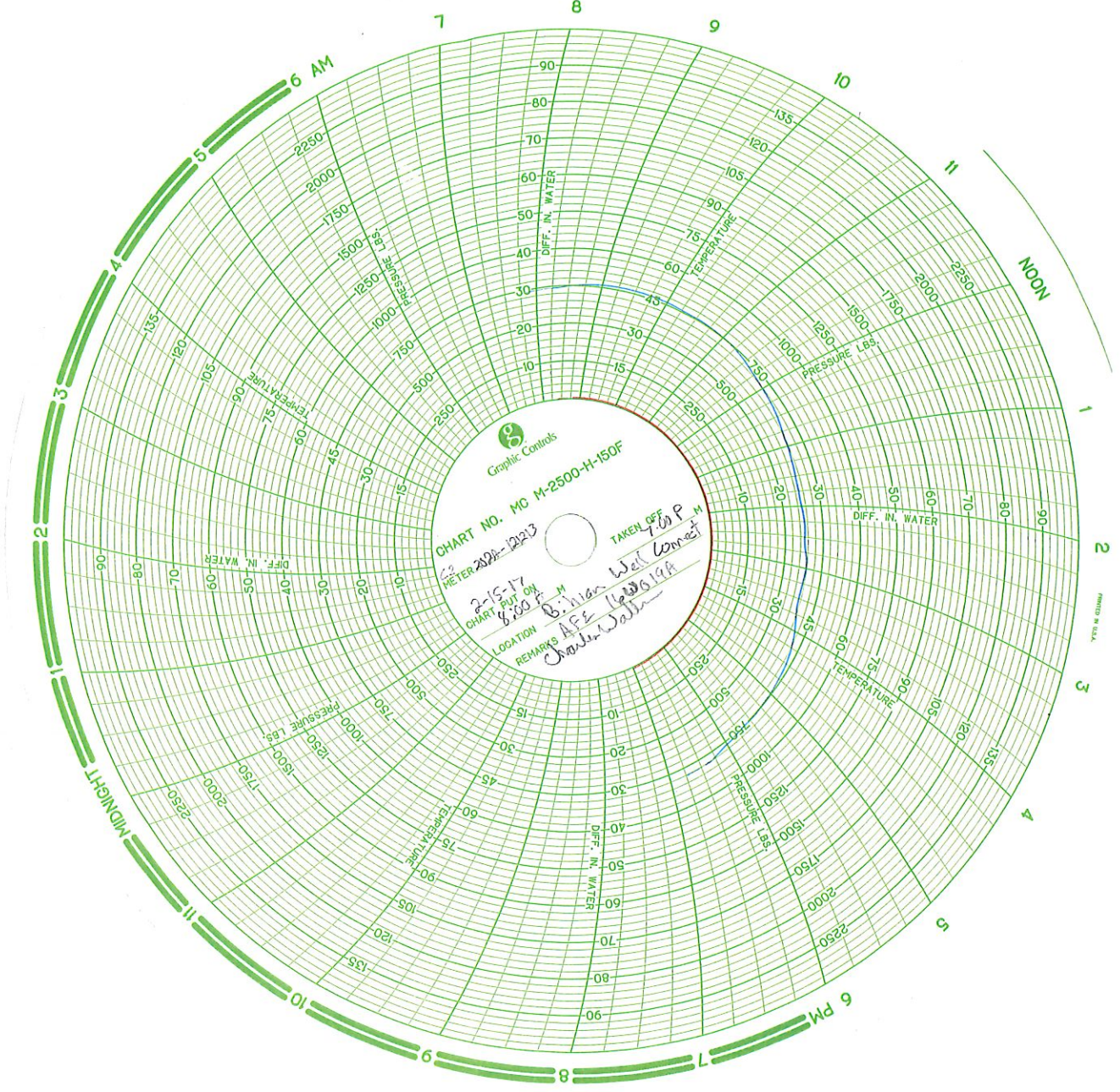


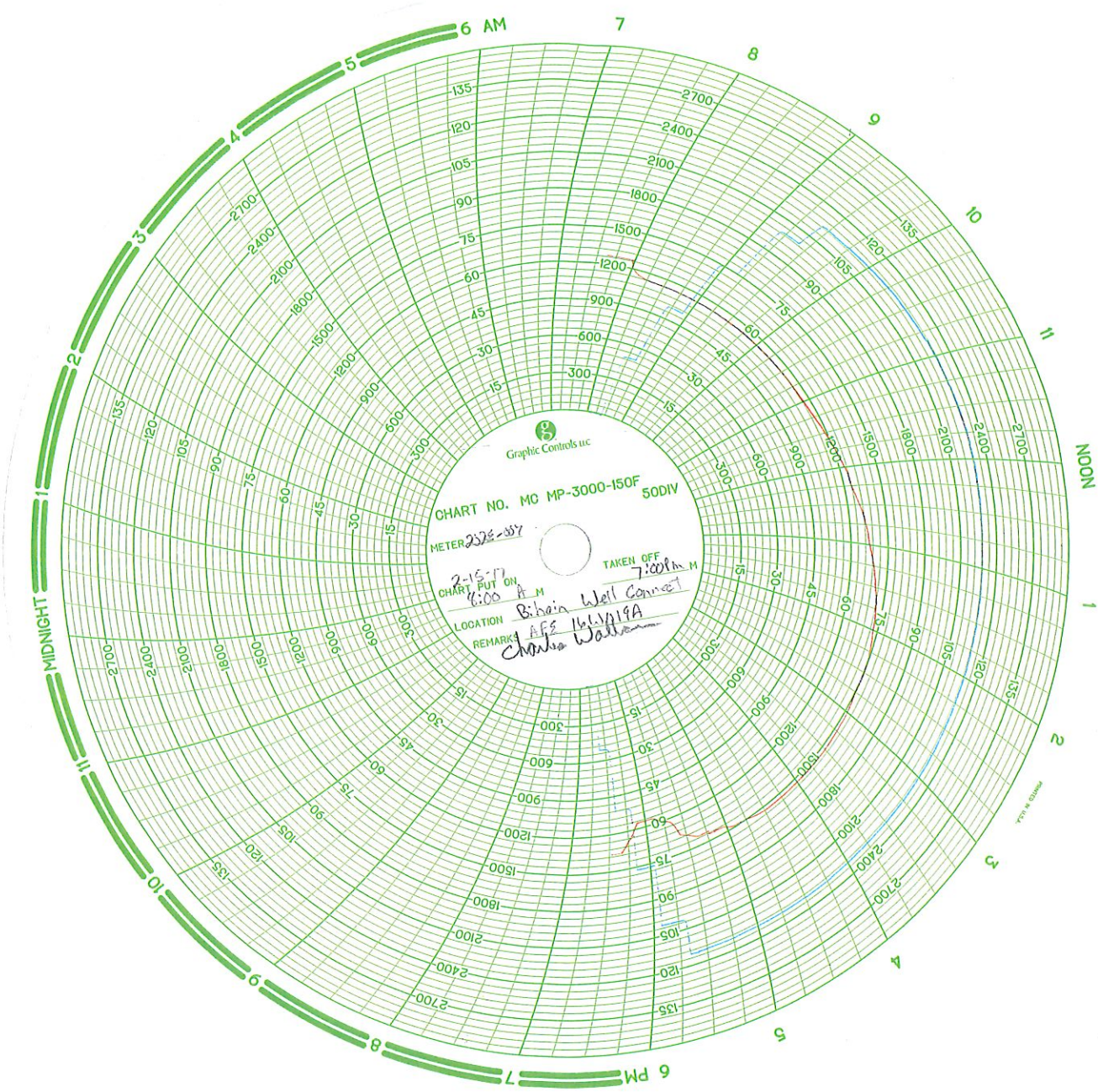
CHART NO. MC M-2500-H-150F
 METER 202-1223

TAKEN OFF 7:00 P M
 CHART PUT ON 8:00 P M
 LOCATION B. Inman West Corner
 REMARKS AFE 12/26/98
 Charles Johnson

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Graphic Controls Inc.

CHART NO. MC MP-3000-150F 50DIV

METER 2028-387

CHART PUT ON 2-15-17 6:00 A.M.

TAKEN OFF 7:00 P.M.

LOCATION B.heim Well Connect

REMARKS AFS 16-119A
C. W. Wall

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.

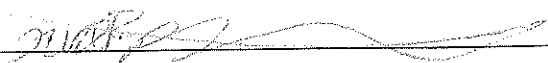
BASED ON INTERNATIONAL STANDARDS OF GRAVITY: (980.665 cm./sq.).

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





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	0-2C 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 – 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.).

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

CALIBRATED BY: NICK BEDFORD

