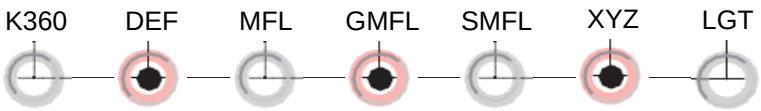


2013

Pipeline Inspection Report

T.D. Williamson
Pipeline Performance™

Company Name

Hiland Crude, LLC

Project Name

Trenton Station Launch to Receive

Pipe Size

8"

Inspection Date(s)

Sep 29, 2013

Report Date(s)

Dec 3, 2013

TDW Regional Office

TDW Services, Inc.

Executive Summary - GMFL Inspection

RUN INFORMATION

Hiland Crude, LLC
Heber Briceno

Trenton Station Launch to Receive
8" Crude

	Launcher	Receiver
Location:	Trenton Station Launch	Receive
Date/Time:	9/29/2013 7:20:08 PM	9/29/2013 11:27:15 PM
Stationing:	0+00	371+78
GPS - LAT:	48.112301299	48.134315659
GPS - LONG:	-103.771945428	-103.890504562

Duration of run - Hours: 4.12
Pipeline Length: 37,681.00 ft
On-site Representative: Jesse Child
Contact: Heber Briceno

Average Velocity: 2.54 ft/sec
Maximum Velocity: 3.32 ft/sec
Data Analyst: Ben Stehling

Tool Tracking By: Cherokee Pipeline Services

INSPECTION FINDINGS

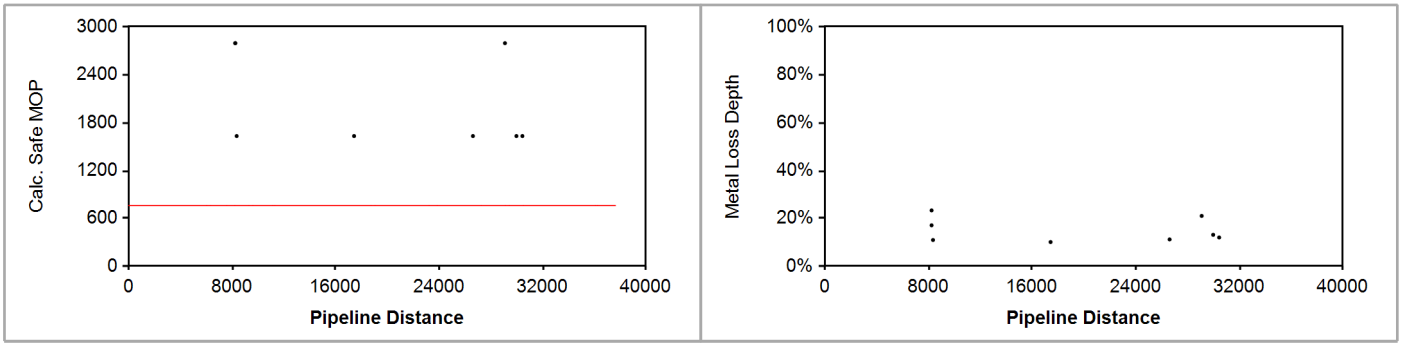
Current Established Maximum
Operating Pressure of Pipeline: 750 psi

Criteria Used: ASME B31G: Modified
Defect Interaction Rule: 1 inch between pits

Welds Detected: 886 **Valves Detected:** 2 **Fittings Detected:** 0 **Markers Detected:** 8 **Gains Detected:** 0
Casings Detected: 0 **Tees Detected:** 2 **Flanges Detected:** 6 **Repairs Detected:** 0 **Deformations Detected:** 5

P'<P*: 0 **M/L pits:** 8 **M/L grouping:** 8

Internal groups: 0 **External groups:** 8



** The number of anomalies where P' (calculated safe max. pressure for an anomaly) is less than P (current established maximum pressure of pipeline) - see ASME B31G*

INSPECTION DETAILS

A total of 8 metal loss groups (0 Internal/8 External) were detected on the inspection survey, of which the deepest is reported at 23%. Using an established maximum operating pressure of 750 psi, 0 of the metal loss features appear to be pressure reducing.

Inspection data was obtained for the full length (37,681 feet / 7.14 miles) of the survey. The quality of the inspection data is satisfactory for a comprehensive assessment of this pipeline segment.

The inspection tool for this project included TDW XYZ Mapping module consisting of a high resolution Inertial Measurement Unit (IMU). The precision navigation data recorded by the IMU along with survey data supplied for specified control points and AGM locations provides a calculation of X, Y and Z coordinates for all objects and features listed in this report. The reported Latitude and Longitude are in NAD83 datum format. Z coordinates are Orthometric heights reported in feet. The final accuracy of reported coordinates is dependent upon the accuracy of the survey points and distance between these points, as well as uniform tool speed; however, the Survey Data Provided for AGM/Control Points is not at the required Sub-Centimeter accuracy level as specified in the document: XYZ Survey Data Requirements (D1902 Rev D).

Executive Summary - Deformation

RUN INFORMATION

Hiland Crude, LLC
Heber Briceno

Trenton Station Launch to Trenton Station Receive
8" Crude

	Launcher	Receiver
Location:	Trenton Station Launch	Trenton Station Receive
Date/Time:	9/28/2013 10:24:57 PM	9/29/2013 2:48:14 PM
Stationing:	0+00	371+78
GPS - LAT:	48.112301299	48.134315659
GPS - LONG:	-103.771945428	-103.890504562

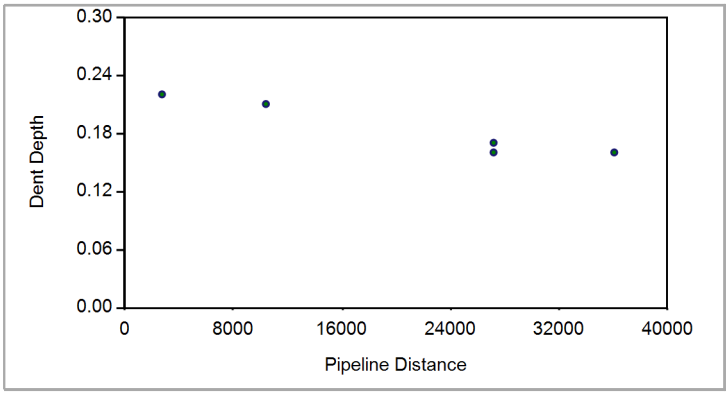
Duration of run - Hours: 4.39
Pipeline Length: 37,681.00 ft
On-site Representative: Jesse Child

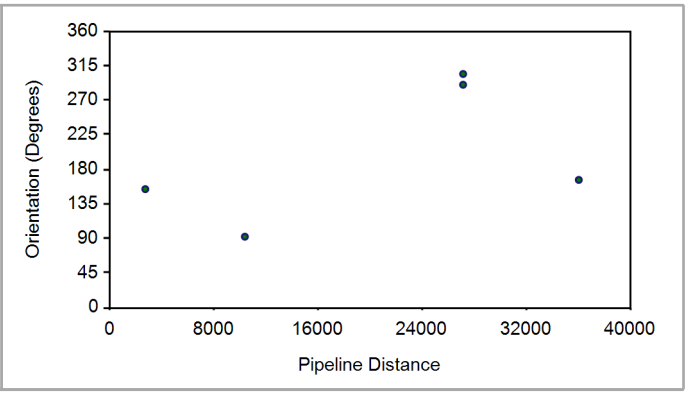
Average Velocity: 2.39 ft/sec
Maximum Velocity: 3.07 ft/sec
Data Analyst: Ben Stehling

Tool Tracking By: Cherokee Pipeline Services

INSPECTION FINDINGS

Deformations Detected: 5 **Ovalities Detected:** 0 **Expansions Detected:** 0 **Heavy Weld Detected:** 0 **Valves Detected:** 2





INSPECTION DETAILS

Inspection data was obtained for the full length (37,681 feet / 7.14 miles) of the survey. The quality of the inspection data is satisfactory for a comprehensive assessment of this pipeline segment.

A total of 5 deformations (5 dents) were detected on the inspection survey, of which the deepest is reported at 0.22 inch.

DEF sensor coverage, 96.8%; however, the data was acceptable for analysis.

Metal Loss - Immediate Prioritized Repairs

ID#	Distance (ft)	Depth	Length	Width	Orientation	PSI (P')	% of Est. psi (P'/P)	Latitude	Longitude	Altitude

Nothing found in this pipeline inspection meets the criteria for Immediate Repair conditions relating to METAL LOSS.

Metal Loss - 180 Day Prioritized Repairs

ID#	Distance (ft)	Depth	Length	Width	Orientation	PSI (P')	% of Est. psi (P'/P)	Latitude	Longitude	Altitude

Nothing in the inspection meets the criteria for 180 Day Repair conditions relating to METAL LOSS.

Dent - Immediate Prioritized Repairs

ID#	Distance (ft)	Depth (in)	Depth (%)	Orientation	Metal Loss	On a Weld	Ovality	Description

Nothing found in the pipeline inspection meets the criteria for Immediate Repair conditions relating to DENTS.

Sorted by depth then distance

Dent - 60 Day Prioritized Repairs

ID#	Distance (ft)	Depth (in)	Depth (%)	Orientation	Metal Loss	On a Weld	Ovality	Description

Nothing in the inspection meets of the criteria for 60 Day Repair conditions relating to DENTS.

Sorted by depth then distance

Dent - 180 Day Prioritized Repairs

ID#	Distance (ft)	Depth (in)	Depth (%)	Orientation	Metal Loss	On a Weld	Ovality	Description

Nothing in the inspection meets of the criteria for 180 Day Repair conditions relating to DENTS.

Sorted by depth then distance

Metal Loss Summary

DEFINITIONS

This Metal Loss Summary Report provides information regarding indicated anomalies found in this inspection. Anomalies detected during the inspection are sized and assigned a length, width, and depth. The specified formula for determining remaining-strength of the anomaly is then applied to the predicted sizes. The predicted size accuracy is described in the contract specifications.

The Metal Loss Summary Report is a listing of metal loss indications in the pipeline, sorted first by the calculated safe maximum operating pressure (P') ascending, then by depth descending. As an aid in locating these anomalies, the upstream and downstream references are included, as well as distances from the defect to the reference.

ID#	Each location is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Dist.	Given in either feet or meters, based on contractual agreements, this is the absolute distance from launch.
Depth	Predicted depth of the defect as a percentage of nominal wall.
Length	Predicted length of the defect, reported in either inches or millimeters.
Width	Predicted width of the defect, reported in either inches or millimeters.
ID/OD	Determination whether the defect exists on the inside (INT) or outside (EXT) surface of the pipe.
Orientation: Deg / O'Clock	Orientation is reported in degrees and o'clock (0 degrees/12:00 at top of pipe) as viewed looking downstream.
P'	Based on the specified formula for determining remaining-strength, it is the predicted safe maximum allowable pressure for the defect (P').
% Est. Press. (P'/P)	Percent of maximum established pressure, this is calculated by dividing the calculated safe pressure of the defect (P') by the current established maximum operating pressure of the pipeline (P). For TDW reporting, P is either established MOP provided by the customer or the calculated pressure rating for the pipe (P). Percentages less than 100% are considered pressure reducing.
Aboveground References	The name of the closest upstream and downstream references, usually either an AGM or a Valve.
Distance from Defect	The distance to the upstream and downstream reference listed in the previous column. Used for locating defects in the field.

See Appendix C for Dig Sheet Preparation

Metal Loss Summary

ID#	Dist (ft)	Depth	Length	Width	ID/OD	Orientation Deg	Orientation O'clock	P'	% Est. Press. (P'/P)	Above-Ground References		Distance from Defect
40000006	29,979.6	13.2%	0.74	0.68	EXT	16	12:30	1632.2	100.0	**U/S:**	AGM 050, Sta. 277+44, ROW -- Han #8043	1856.35
										D/S:	AGM 060, Sta. 345+56, ROW -- Survey Point	5037.47
40000007	30,442.1	12.1%	0.75	0.70	EXT	135	4:30	1632.2	100.0	**U/S:**	AGM 050, Sta. 277+44, ROW -- Han #8043	2318.85
										D/S:	AGM 060, Sta. 345+56, ROW -- Survey Point	4574.96
40000004	26,617.8	11.2%	0.31	0.45	EXT	338	11:15	1632.2	100.0	**U/S:**	AGM 040, Sta. 221+07, Well Drive Way -- Han #8836	4138.05
										D/S:	AGM 050, Sta. 277+44, ROW -- Han #8043	1505.38
40000002	8,345.9	11.0%	0.45	0.66	EXT	132	4:15	1632.2	100.0	**U/S:**	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	2169.38
										D/S:	AGM 020, Sta. 132+53, ROW -- Han #8473	5169.45
40000003	17,425.3	10.1%	0.45	0.56	EXT	334	11:00	1632.2	100.0	**U/S:**	AGM 020, Sta. 132+53, ROW -- Han #8473	3910.02
										D/S:	AGM 030, Sta. 186+33, 145th Ave NW -- Han #8802	1510.24
40000001	8,235.7	23.4%	0.78	0.42	EXT	346	11:30	2795.5	100.0	**U/S:**	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	2059.22
										D/S:	AGM 020, Sta. 132+53, ROW -- Han #8473	5279.61
40000005	29,092.9	21.1%	0.66	0.38	EXT	357	11:45	2795.5	100.0	**U/S:**	AGM 050, Sta. 277+44, ROW -- Han #8043	969.70
										D/S:	AGM 060, Sta. 345+56, ROW -- Survey Point	5924.11
40000000	8,235.1	17.1%	0.70	0.41	EXT	352	11:30	2795.5	100.0	**U/S:**	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	2058.60
										D/S:	AGM 020, Sta. 132+53, ROW -- Han #8473	5280.23

This report shows a maximum of 100 metal loss groups.

Type	Number
Metal Loss	8

Sorted by pressure (P'), then depth

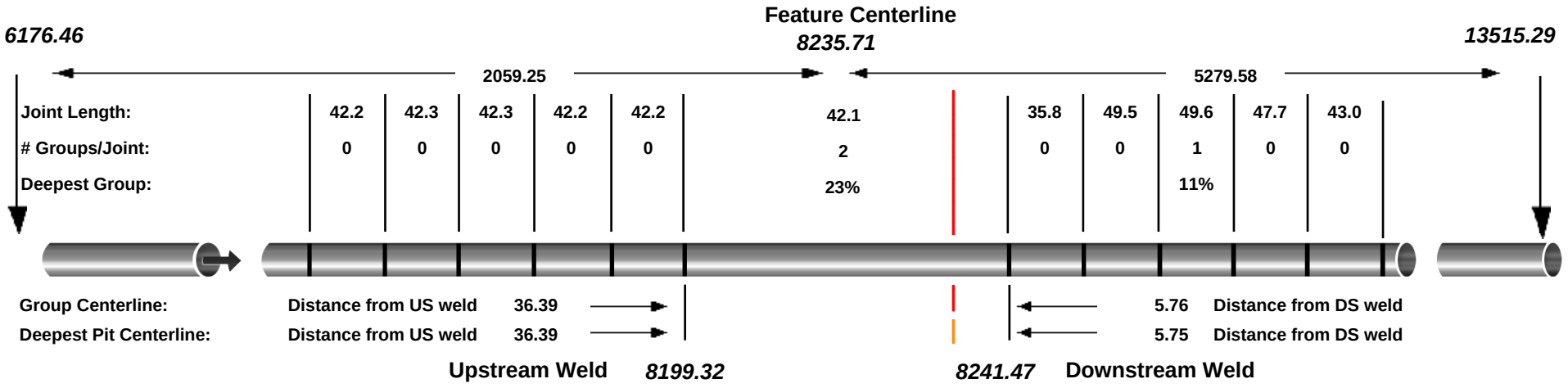
Criteria: ASME B31G: Modified

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

GROUP - Dig Site Information Report

UPSTREAM REFERENCE
AGM 010, Sta. 62+05, 49th St NW -- Han #8043

DOWNSTREAM REFERENCE
AGM 020, Sta. 132+53, ROW -- Han #8473



Feature Information

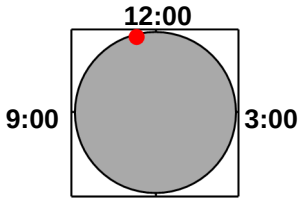
ID:	**40000001**	Distance from Launcher:	***8235.71***	***Feature Description***	
Time:	**22207.38**	Orientation on Pipe Wall:	**11:30**	**Metal Loss - EXTERNAL**	
				Wall Thickness:	**0.322**
Latitude:	**48.12835813**	Longitude:	**-103.77780056**	Altitude:	**2027.750**

Upstream Locations		Downstream Locations	
591.11	Bend left - 65 deg., 6D	2197.75	Bend left - 90 deg., 5D
4928.19	Bend right - 90 deg., 6D	9052.17	Bend right - 48 deg., 3D
5857.06	Bend left - 90 deg., 6D	9249.36	Bend left - 48 deg., 3D
8199.96	Bend right - 90 deg., 6D	20815.92	Bend left - 48 deg., 3D
8211.94	Bend up - 45 deg., 3D	21656.04	Bend left - 50 deg., 3D

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

GROUP

Depth: **23%**
Length: **0.776**
Width: **0.423**
ERF: **0.268**
Safe Operating Pressure: **2796 psi**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

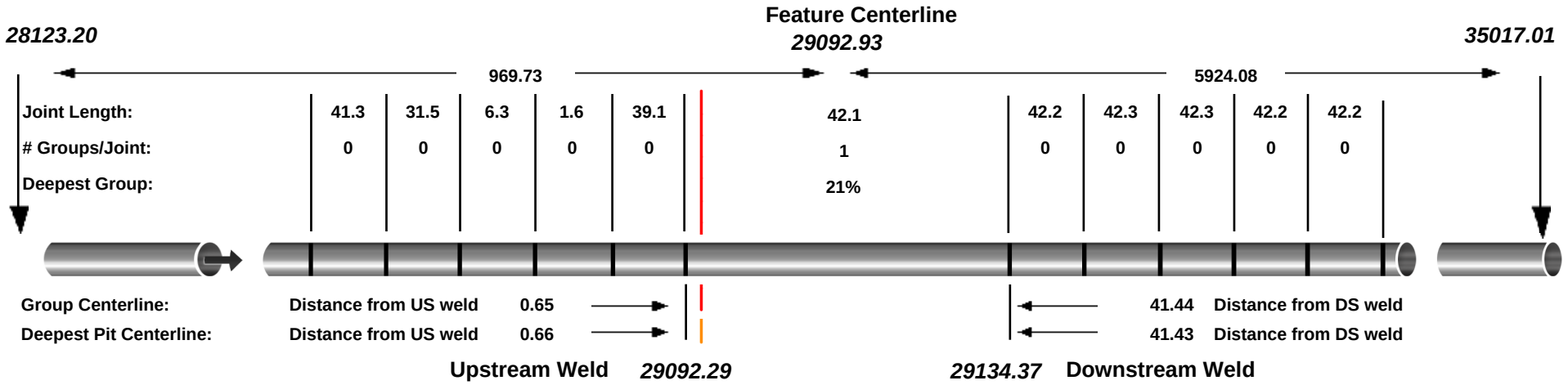
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

GROUP - Dig Site Information Report

UPSTREAM REFERENCE
AGM 050, Sta. 277+44, ROW -- Han #8043

DOWNSTREAM REFERENCE
AGM 060, Sta. 345+56, ROW -- Survey Point



Feature Information

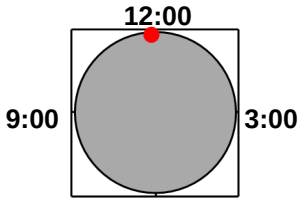
ID:	**40000005**	Distance from Launcher:	***29092.93***	***Feature Description***	
Time:	**29943.98**	Orientation on Pipe Wall:	**11:45**	**Metal Loss - EXTERNAL**	
				Wall Thickness:	**0.322**
Latitude:	**48.12963089**	Longitude:	**-103.85714846**	Altitude:	**2231.122**

Upstream Locations		Downstream Locations	
41.30	Bend left - 48 deg., 3D	798.82	Bend left - 50 deg., 3D
11607.86	Bend left - 48 deg., 3D	8554.40	Bend up - 45 deg., 3D
11805.05	Bend right - 48 deg., 3D	8575.50	Bend down - 45 deg., 3D
18659.47	Bend left - 90 deg., 5D	8583.49	Flange
21448.33	Bend left - 65 deg., 6D	8584.18	Tee at 90 deg.

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

GROUP

Depth: **21%**
Length: **0.662**
Width: **0.377**
ERF: **0.268**
Safe Operating Pressure: **2796 psi**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

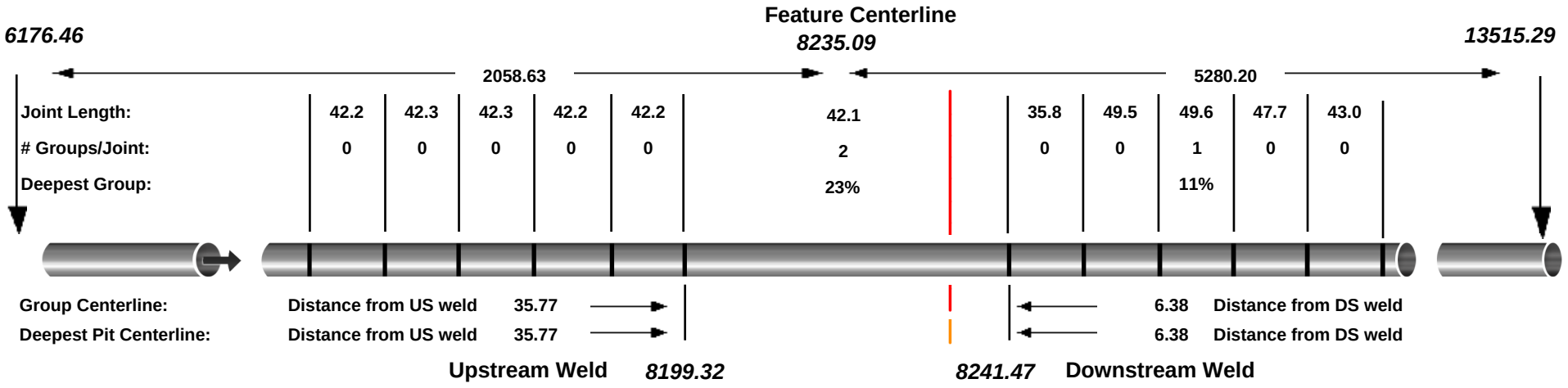
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

GROUP - Dig Site Information Report

UPSTREAM REFERENCE
AGM 010, Sta. 62+05, 49th St NW -- Han #8043

DOWNSTREAM REFERENCE
AGM 020, Sta. 132+53, ROW -- Han #8473



Feature Information

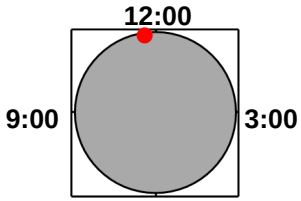
ID:	**40000000**	Distance from Launcher:	***8235.09***	***Feature Description***	
Time:	**22207.18**	Orientation on Pipe Wall:	**11:30**	**Metal Loss - EXTERNAL**	
				Wall Thickness:	**0.322**
Latitude:	**48.12835860**	Longitude:	**-103.77779811**	Altitude:	**2027.734**

Upstream Locations		Downstream Locations	
590.49	Bend left - 65 deg., 6D	2198.37	Bend left - 90 deg., 5D
4927.57	Bend right - 90 deg., 6D	9052.79	Bend right - 48 deg., 3D
5856.44	Bend left - 90 deg., 6D	9249.98	Bend left - 48 deg., 3D
8199.34	Bend right - 90 deg., 6D	20816.54	Bend left - 48 deg., 3D
8211.32	Bend up - 45 deg., 3D	21656.66	Bend left - 50 deg., 3D

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

GROUP

Depth: **17%**
Length: **0.700**
Width: **0.411**
ERF: **0.268**
Safe Operating Pressure: **2796 psi**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

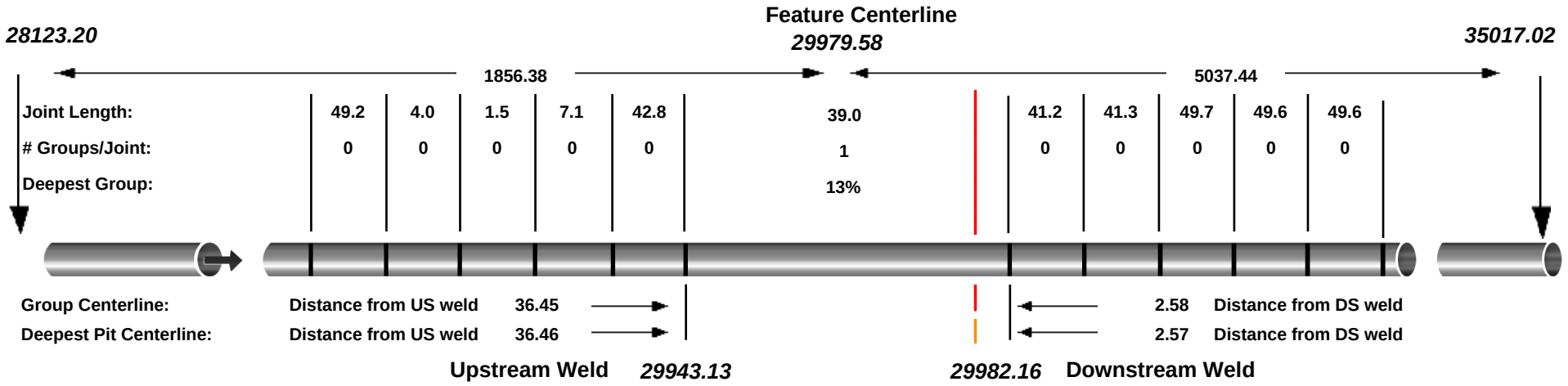
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

GROUP - Dig Site Information Report

UPSTREAM REFERENCE
AGM 050, Sta. 277+44, ROW -- Han #8043

DOWNSTREAM REFERENCE
AGM 060, Sta. 345+56, ROW -- Survey Point



Feature Information

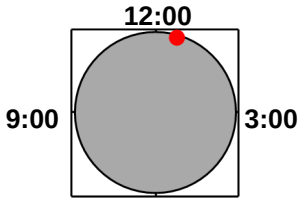
ID:	**40000006**	Distance from Launcher:	***29979.58***	***Feature Description***	
Time:	**30309.19**	Orientation on Pipe Wall:	**12:30**	**Metal Loss - EXTERNAL**	
				Wall Thickness:	**0.188**
Latitude:	**48.13117523**	Longitude:	**-103.85980512**	Altitude:	**2244.272**

Upstream Locations		Downstream Locations	
87.83	Bend left - 50 deg., 3D	7667.75	Bend up - 45 deg., 3D
927.95	Bend left - 48 deg., 3D	7688.85	Bend down - 45 deg., 3D
12494.51	Bend left - 48 deg., 3D	7696.84	Flange
12691.70	Bend right - 48 deg., 3D	7697.53	Tee at 90 deg.
19546.12	Bend left - 90 deg., 5D	7699.11	Pipe Support

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

GROUP

Depth: **13%**
Length: **0.744**
Width: **0.684**
ERF: **0.460**
Safe Operating Pressure: **1632 psi**

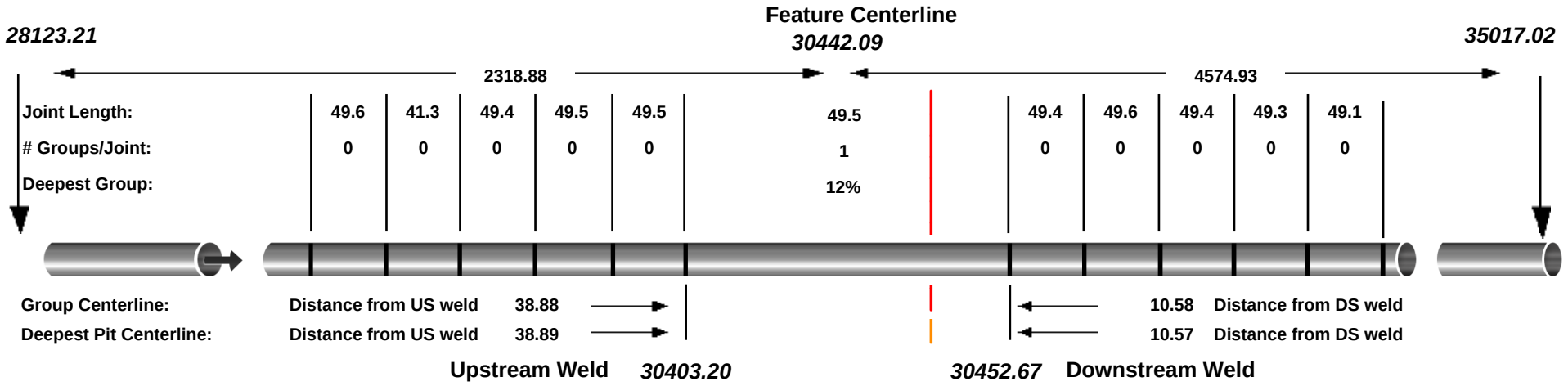
1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

Generated: 12/3/2013

GROUP - Dig Site Information Report

UPSTREAM REFERENCE
AGM 050, Sta. 277+44, ROW -- Han #8043

DOWNSTREAM REFERENCE
AGM 060, Sta. 345+56, ROW -- Survey Point



Feature Information

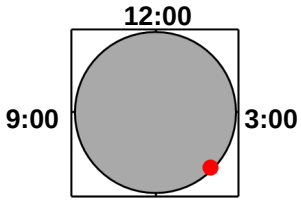
ID:	**40000007**	Distance from Launcher:	***30442.09***	***Feature Description***	
Time:	**30503.74**	Orientation on Pipe Wall:	**4:30**	**Metal Loss - EXTERNAL**	
				Wall Thickness:	**0.188**
Latitude:	**48.13124333**	Longitude:	**-103.86168616**	Altitude:	**2255.126**

Upstream Locations		Downstream Locations	
550.34	Bend left - 50 deg., 3D	7205.24	Bend up - 45 deg., 3D
1390.46	Bend left - 48 deg., 3D	7226.34	Bend down - 45 deg., 3D
12957.02	Bend left - 48 deg., 3D	7234.33	Flange
13154.21	Bend right - 48 deg., 3D	7235.02	Tee at 90 deg.
20008.63	Bend left - 90 deg., 5D	7236.60	Pipe Support

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

GROUP

Depth: **12%**
Length: **0.749**
Width: **0.702**
ERF: **0.460**
Safe Operating Pressure: **1632 psi**

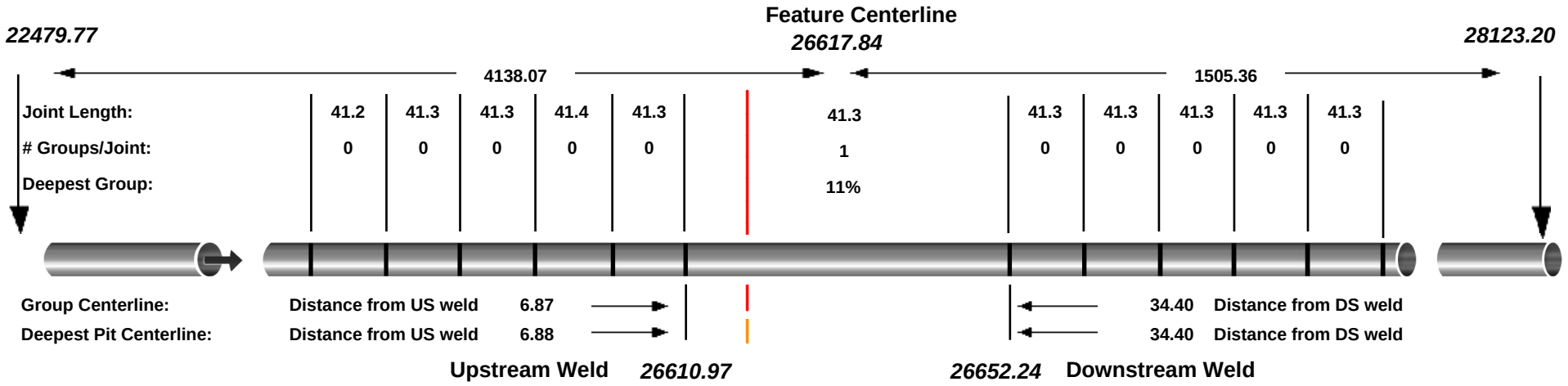
1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

GROUP - Dig Site Information Report

UPSTREAM REFERENCE
AGM 040, Sta. 221+07, Well Drive Way -- Han #8836

DOWNSTREAM REFERENCE
AGM 050, Sta. 277+44, ROW -- Han #8043



Feature Information

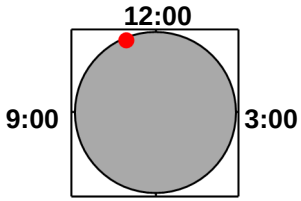
ID:	**40000004**	Distance from Launcher:	***26617.84***	***Feature Description***	
Time:	**28877.15**	Orientation on Pipe Wall:	**11:15**	**Metal Loss - EXTERNAL**	
				Wall Thickness:	**0.188**
Latitude:	**48.12608828**	Longitude:	**-103.84927284**	Altitude:	**2286.832**

Upstream Locations		Downstream Locations	
9132.77	Bend left - 48 deg., 3D	2433.79	Bend left - 48 deg., 3D
9329.96	Bend right - 48 deg., 3D	3273.91	Bend left - 50 deg., 3D
16184.38	Bend left - 90 deg., 5D	11029.49	Bend up - 45 deg., 3D
18973.24	Bend left - 65 deg., 6D	11050.59	Bend down - 45 deg., 3D
23310.32	Bend right - 90 deg., 6D	11058.58	Flange

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

GROUP

Depth: **11%**
Length: **0.313**
Width: **0.446**
ERF: **0.460**
Safe Operating Pressure: **1632 psi**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

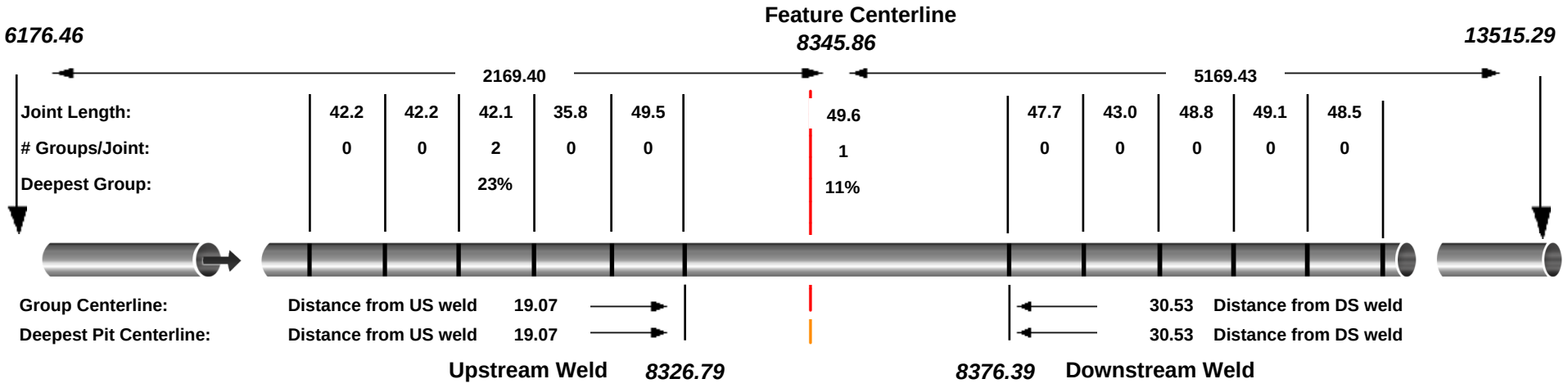
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

GROUP - Dig Site Information Report

UPSTREAM REFERENCE
AGM 010, Sta. 62+05, 49th St NW -- Han #8043

DOWNSTREAM REFERENCE
AGM 020, Sta. 132+53, ROW -- Han #8473



Feature Information

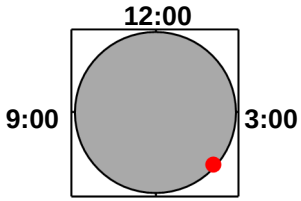
ID:	**40000002**	Distance from Launcher:	***8345.86***	***Feature Description***	
Time:	**22244.32**	Orientation on Pipe Wall:	**4:15**	**Metal Loss - EXTERNAL**	
				Wall Thickness:	**0.188**
Latitude:	**48.12826864**	Longitude:	**-103.77822975**	Altitude:	**2031.899**

Upstream Locations		Downstream Locations	
701.26	Bend left - 65 deg., 6D	2087.60	Bend left - 90 deg., 5D
5038.34	Bend right - 90 deg., 6D	8942.02	Bend right - 48 deg., 3D
5967.21	Bend left - 90 deg., 6D	9139.21	Bend left - 48 deg., 3D
8310.11	Bend right - 90 deg., 6D	20705.77	Bend left - 48 deg., 3D
8322.09	Bend up - 45 deg., 3D	21545.89	Bend left - 50 deg., 3D

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

GROUP

Depth: **11%**
Length: **0.446**
Width: **0.659**
ERF: **0.460**
Safe Operating Pressure: **1632 psi**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

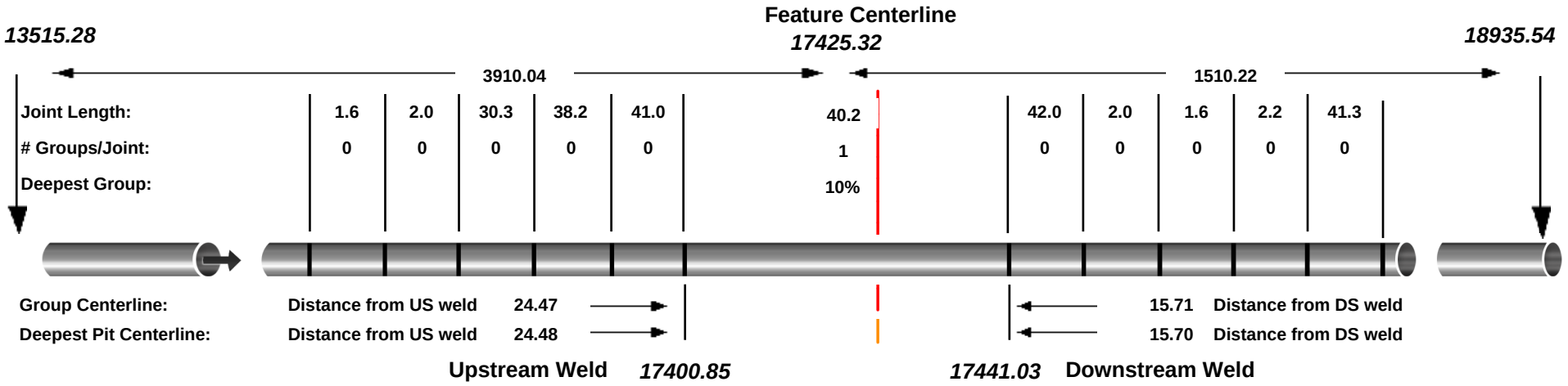
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

GROUP - Dig Site Information Report

UPSTREAM REFERENCE
AGM 020, Sta. 132+53, ROW -- Han #8473

DOWNSTREAM REFERENCE
AGM 030, Sta. 186+33, 145th Ave NW -- Han #8802



Feature Information

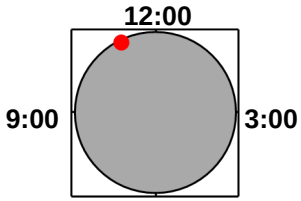
ID:	**40000003**	Distance from Launcher:	***17425.32***	***Feature Description***	
Time:	**25326.50**	Orientation on Pipe Wall:	**11:00**	**Metal Loss - EXTERNAL**	
				Wall Thickness:	**0.188**
Latitude:	**48.12871295**	Longitude:	**-103.81411514**	Altitude:	**2193.387**

Upstream Locations		Downstream Locations	
137.44	Bend right - 48 deg., 3D	59.75	Bend left - 48 deg., 3D
6991.86	Bend left - 90 deg., 5D	11626.31	Bend left - 48 deg., 3D
9780.72	Bend left - 65 deg., 6D	12466.43	Bend left - 50 deg., 3D
14117.80	Bend right - 90 deg., 6D	20222.01	Bend up - 45 deg., 3D
15046.67	Bend left - 90 deg., 6D	20243.11	Bend down - 45 deg., 3D

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

GROUP

Depth: **10%**
Length: **0.450**
Width: **0.561**
ERF: **0.460**
Safe Operating Pressure: **1632 psi**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

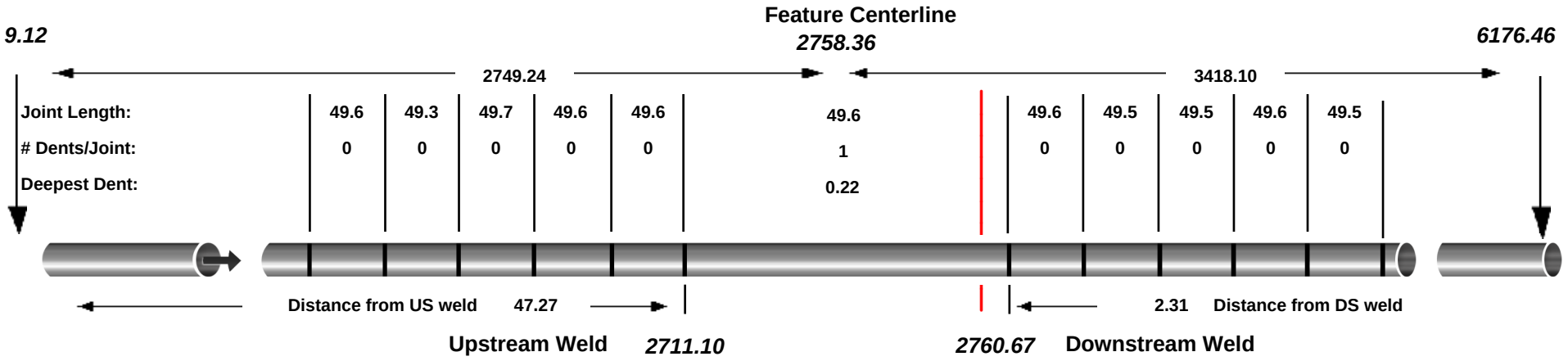
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

DENT - Dig Site Information Report

UPSTREAM REFERENCE
Pipe Entering Ground, Trenton Station --Han #8027

DOWNSTREAM REFERENCE
AGM 010, Sta. 62+05, 49th St NW -- Han #8043



Feature Information

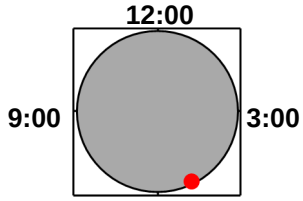
ID:	**14000000**	Distance from Launcher:	***2758.36***	***Feature Description***	
Time:	**20448.64**	Orientation on Pipe Wall:	**5:00**	**DENT**	
				Wall Thickness:	**0.188**
Latitude:	**48.11872130**	Longitude:	**-103.77362344**	Altitude:	**2055.702**
Additional Information:	**TDW Correlated Deformation**				

Upstream Locations		Downstream Locations	
379.71	Bend left - 90 deg., 6D	549.16	Bend right - 90 deg., 6D
2722.61	Bend right - 90 deg., 6D	4886.24	Bend left - 65 deg., 6D
2734.59	Bend up - 45 deg., 3D	7675.10	Bend left - 90 deg., 5D
2746.63	Bend down - 45 deg., 3D	14529.52	Bend right - 48 deg., 3D
2753.94	Flange	14726.71	Bend left - 48 deg., 3D

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

DENT
Depth: **0.22**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

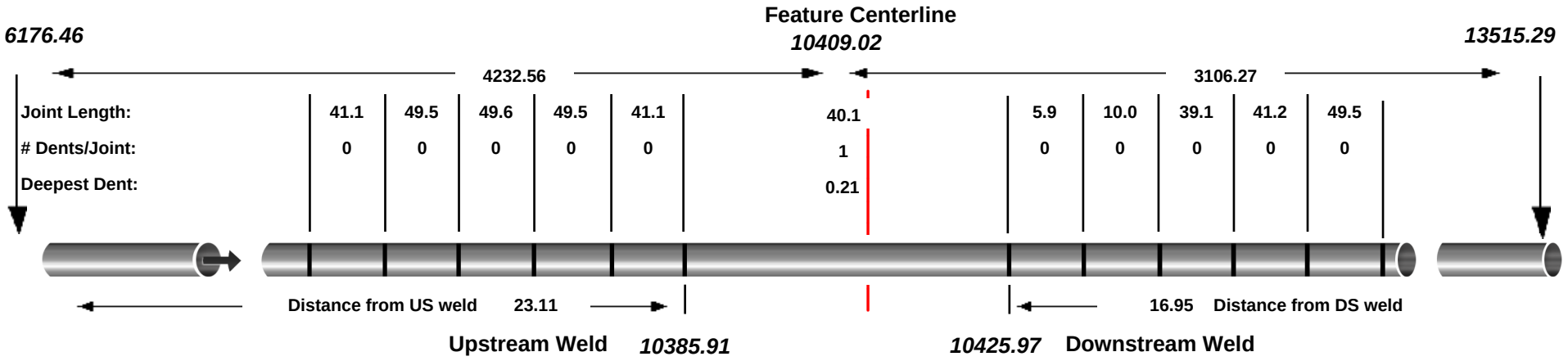
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

DENT - Dig Site Information Report

UPSTREAM REFERENCE
AGM 010, Sta. 62+05, 49th St NW -- Han #8043

DOWNSTREAM REFERENCE
AGM 020, Sta. 132+53, ROW -- Han #8473



Feature Information

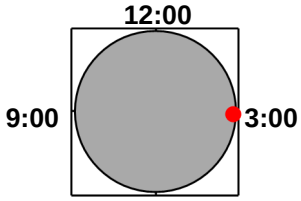
ID:	**14000001**	Distance from Launcher:	***10409.02***	***Feature Description***	
Time:	**22940.29**	Orientation on Pipe Wall:	**3:00**	**DENT**	
				Wall Thickness:	**0.188**
Latitude:	**48.12934410**	Longitude:	**-103.78597706**	Altitude:	**1981.077**
Additional Information:	**TDW Correlated Deformation**				

Upstream Locations		Downstream Locations	
2764.42	Bend left - 65 deg., 6D	24.44	Bend left - 90 deg., 5D
7101.50	Bend right - 90 deg., 6D	6878.86	Bend right - 48 deg., 3D
8030.37	Bend left - 90 deg., 6D	7076.05	Bend left - 48 deg., 3D
10373.27	Bend right - 90 deg., 6D	18642.61	Bend left - 48 deg., 3D
10385.25	Bend up - 45 deg., 3D	19482.73	Bend left - 50 deg., 3D

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

DENT
Depth: **0.21**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

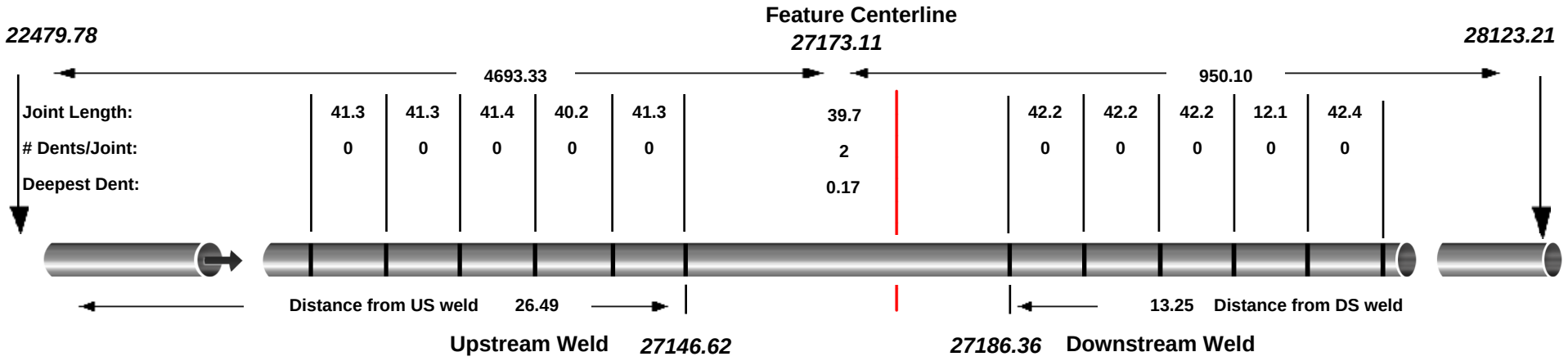
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

DENT - Dig Site Information Report

UPSTREAM REFERENCE
AGM 040, Sta. 221+07, Well Drive Way -- Han #8836

DOWNSTREAM REFERENCE
AGM 050, Sta. 277+44, ROW -- Han #8043



Feature Information

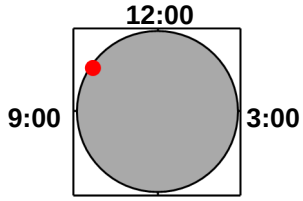
ID:	**14000003**	Distance from Launcher:	***27173.11***	***Feature Description***	
Time:	**29118.84**	Orientation on Pipe Wall:	**10:00**	**DENT**	
				Wall Thickness:	**0.188**
Latitude:	**48.12624631**	Longitude:	**-103.85151937**	Altitude:	**2261.286**
Additional Information:	**TDW Correlated Deformation**				

Upstream Locations		Downstream Locations	
9688.04	Bend left - 48 deg., 3D	1878.52	Bend left - 48 deg., 3D
9885.23	Bend right - 48 deg., 3D	2718.64	Bend left - 50 deg., 3D
16739.65	Bend left - 90 deg., 5D	10474.22	Bend up - 45 deg., 3D
19528.51	Bend left - 65 deg., 6D	10495.32	Bend down - 45 deg., 3D
23865.59	Bend right - 90 deg., 6D	10503.31	Flange

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

DENT
Depth: **0.17**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

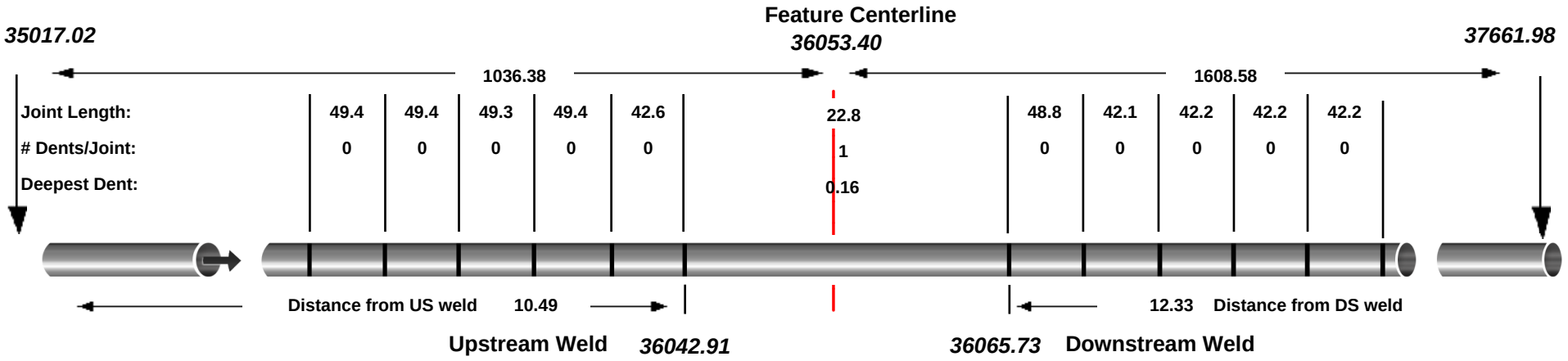
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

DENT - Dig Site Information Report

UPSTREAM REFERENCE
AGM 060, Sta. 345+56, ROW -- Survey Point

DOWNSTREAM REFERENCE
Pipe Exiting Ground, ROW -- Han #8027



Feature Information

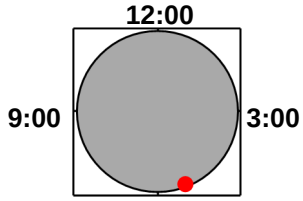
ID:	**14000004**	Distance from Launcher:	***36053.40***	***Feature Description***	
Time:	**32859.06**	Orientation on Pipe Wall:	**5:15**	**DENT**	
				Wall Thickness:	**0.188**
Latitude:	**48.13431602**	Longitude:	**-103.88389984**	Altitude:	**2175.010**
Additional Information:	**TDW Correlated Deformation**				

Upstream Locations		Downstream Locations	
6161.65	Bend left - 50 deg., 3D	1593.93	Bend up - 45 deg., 3D
7001.77	Bend left - 48 deg., 3D	1615.03	Bend down - 45 deg., 3D
18568.33	Bend left - 48 deg., 3D	1623.02	Flange
18765.52	Bend right - 48 deg., 3D	1623.71	Tee at 90 deg.
25619.94	Bend left - 90 deg., 5D	1625.29	Pipe Support

(relative distance from Feature Centerline)

Feature Orientation

as looking downstream



12:00 is top of pipe

DENT
Depth: **0.16**

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

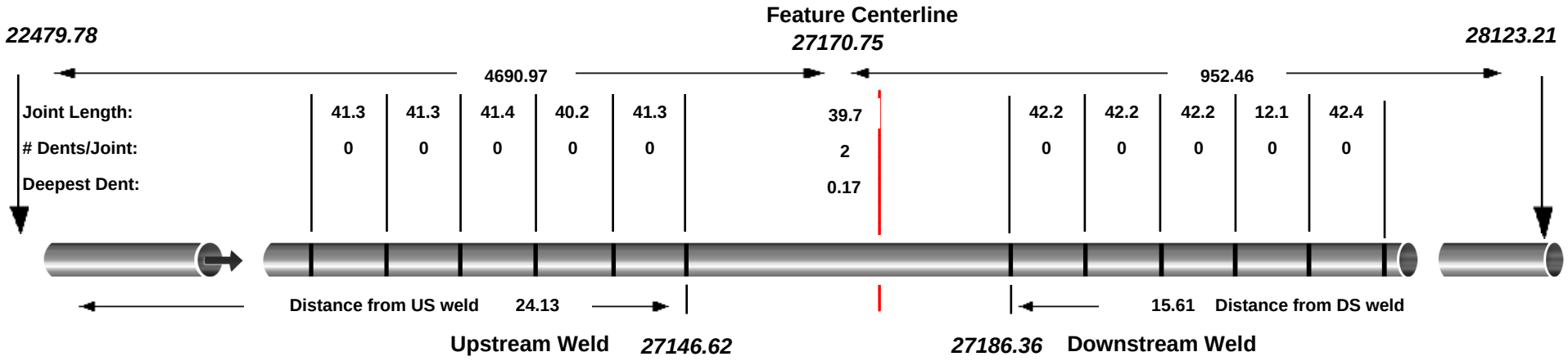
Generated: 12/3/2013

TDW Services, Inc.
Hiland Crude, LLC
Trenton Station Launch to Receive

DENT - Dig Site Information Report

UPSTREAM REFERENCE
AGM 040, Sta. 221+07, Well Drive Way -- Han #8836

DOWNSTREAM REFERENCE
AGM 050, Sta. 277+44, ROW -- Han #8043

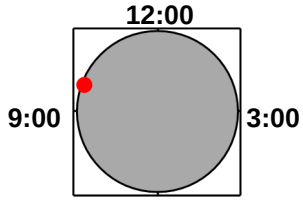


Feature Information

ID:	**14000002**	Distance from Launcher:	***27170.75***	***Feature Description***	
Time:	**29117.78**	Orientation on Pipe Wall:	**9:30**	**DENT**	
				Wall Thickness:	**0.188**
Latitude:	**48.12624497**	Longitude:	**-103.85151006**	Altitude:	**2261.646**
Additional Information:	**TDW Correlated Deformation**				

Feature Orientation

as looking downstream



12:00 is top of pipe

DENT
Depth: **0.16**

Upstream Locations		Downstream Locations	
9685.68	Bend left - 48 deg., 3D	1880.88	Bend left - 48 deg., 3D
9882.87	Bend right - 48 deg., 3D	2721.00	Bend left - 50 deg., 3D
16737.29	Bend left - 90 deg., 5D	10476.58	Bend up - 45 deg., 3D
19526.15	Bend left - 65 deg., 6D	10497.68	Bend down - 45 deg., 3D
23863.23	Bend right - 90 deg., 6D	10505.67	Flange

(relative distance from Feature Centerline)

1. Measurements on this sheet are in ft / in
2. All numbers in italics are Distance from Launch

Generated: 12/3/2013

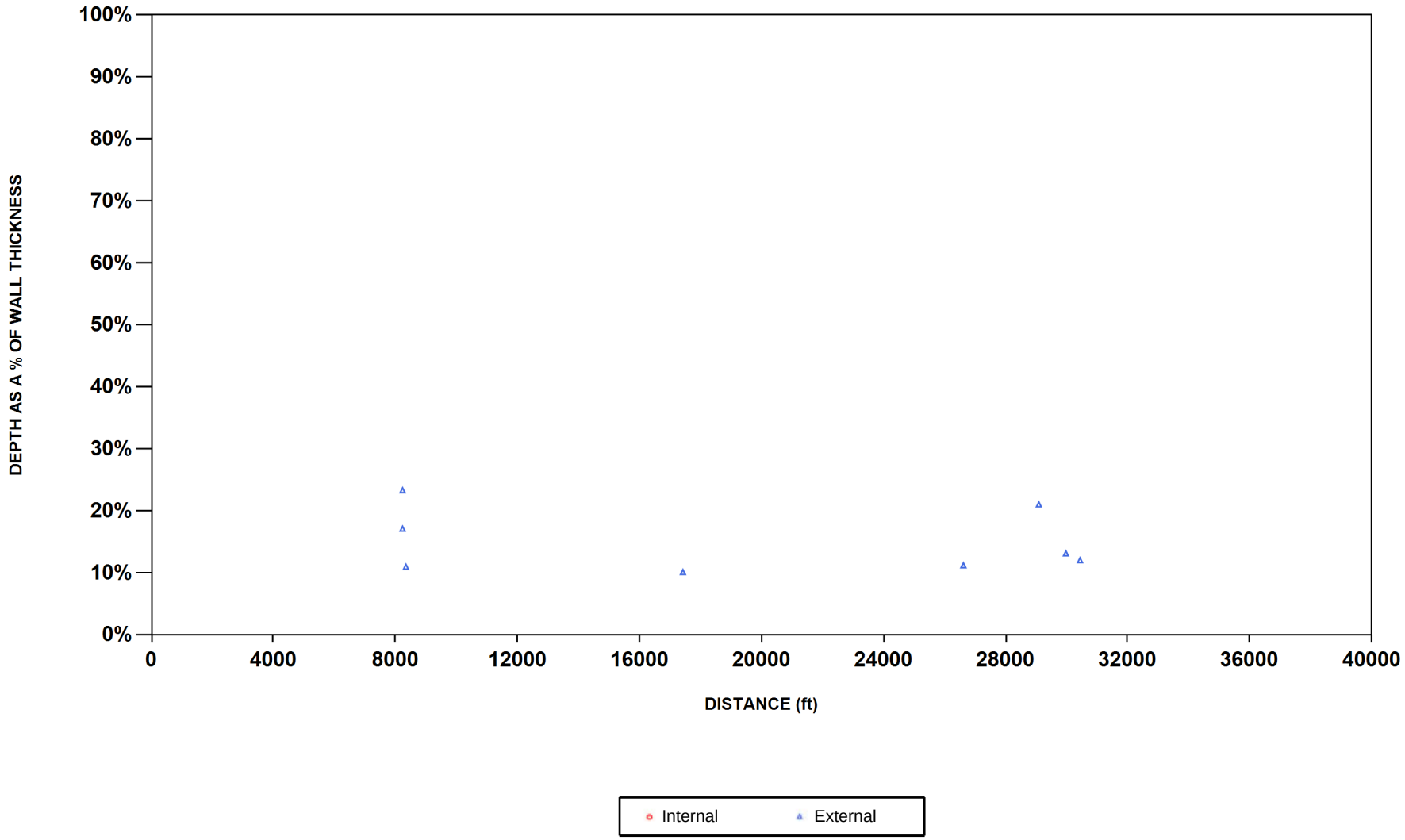
Charts

The Pipeline Summary report provides an overview of the pipeline condition.

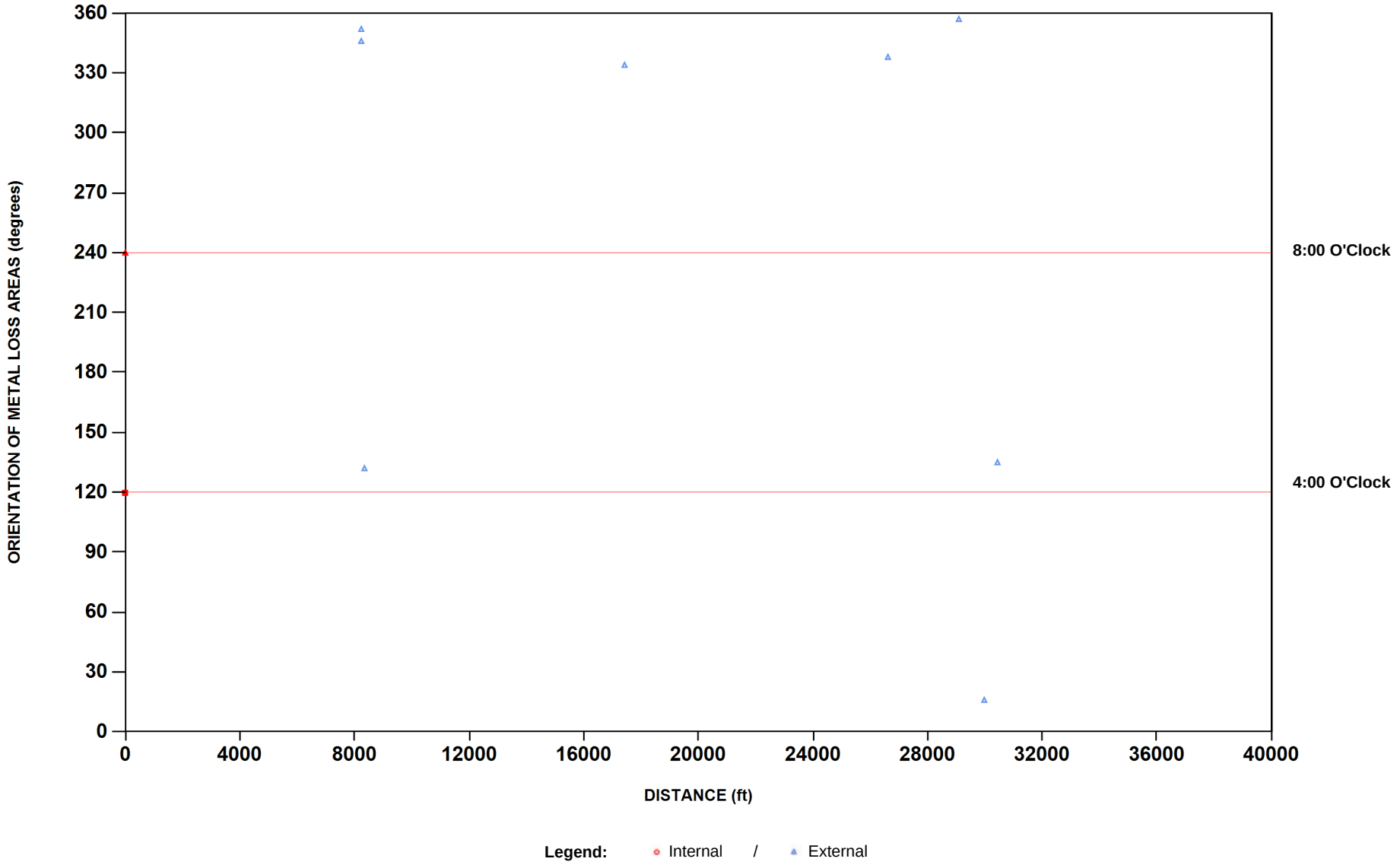
The following charts are utilized in this report:

Metal Loss Depth	This chart highlights the predicted depths of defects as a percentage of wall thickness compared to distance. Areas of concentrated metal loss are easily detected as defects group.
Metal Loss Orientation	The distance from launch is plotted against the orientation of the defect. Orientation is based on 360° in a circle, with 0°or 360° marking the top of the pipe (180° the bottom). Displaying the orientation of defects around the circumference of the pipeline may aid in determining the type of corrosion mechanism present. For example, the majority of defects along the bottom of the pipe might indicate internal channel corrosion.
Metal Loss - Calculated Safe Max. Operating Pressure	The calculated safe maximum operating pressure of each defect is plotted compared to distance.
Velocity - MFL	Displays the speed of the tool relative to distance during the inspection. The specified contractual velocity of the inspection tool is 10 feet per second. If the tool exceeds this speed, the data collected by the tool may be degraded.
Defect Depth Histogram	Displays the total number of defects (pressure reducing groups/defects and non-pressure reducing groups /defects (where P'<P)) by predicted depth of the defect as a percentage of nominal wall.
Dent Depth	This chart highlights the predicted depths of deformations in inches or mm compared to distance.
Dent Orientation	The distance from launch is plotted against the orientation of the deformation indications. Orientation is based on 360° in a circle, with 0°or 360° marking the top of the pipe (180° the bottom).
Velocity - DEF	Displays the speed of the tool relative to distance during the inspection. The specified contractual velocity of the inspection tool is 10 feet per second. If the tool exceeds this speed, the data collected by the tool may be degraded.

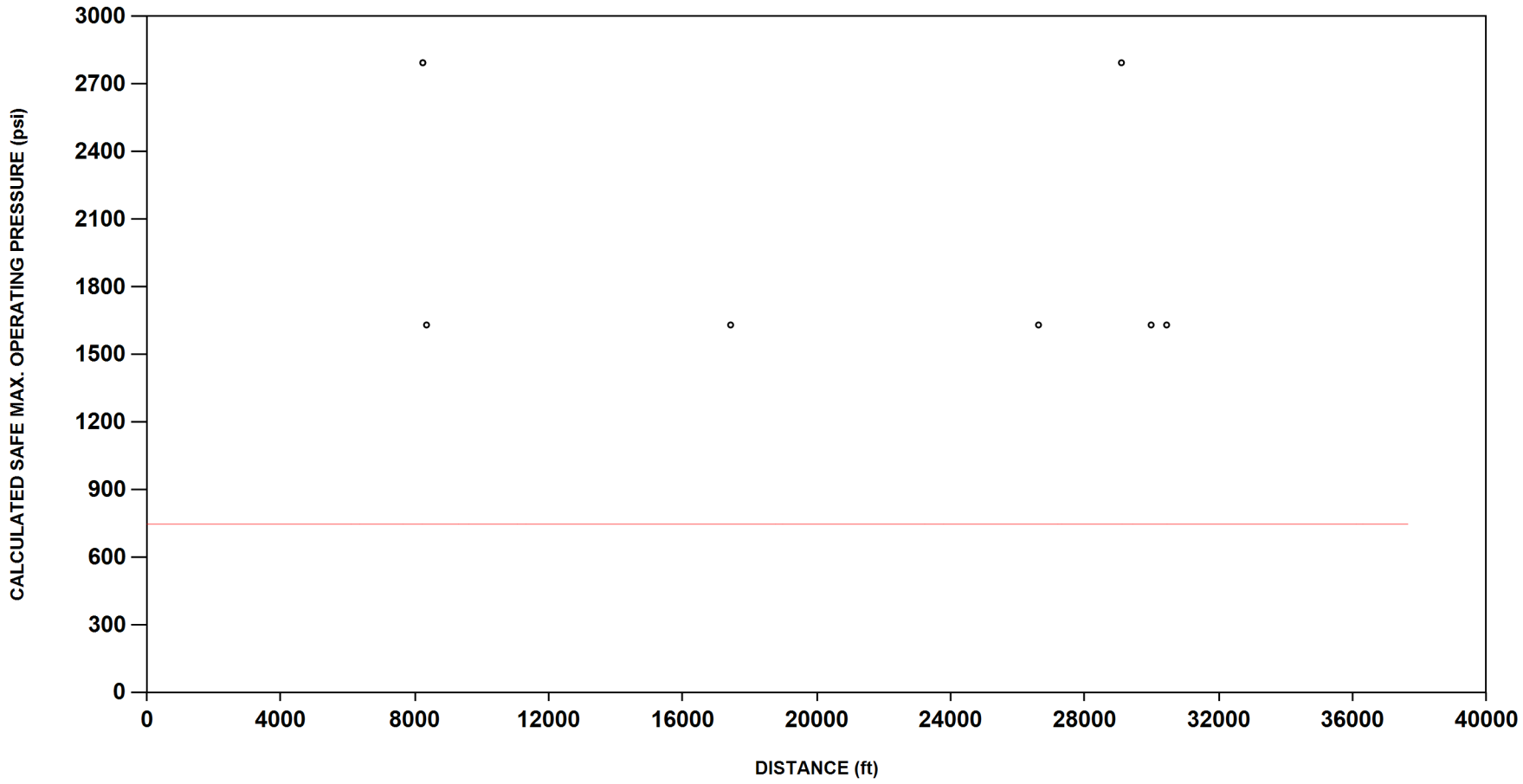
Metal Loss Depth Graph



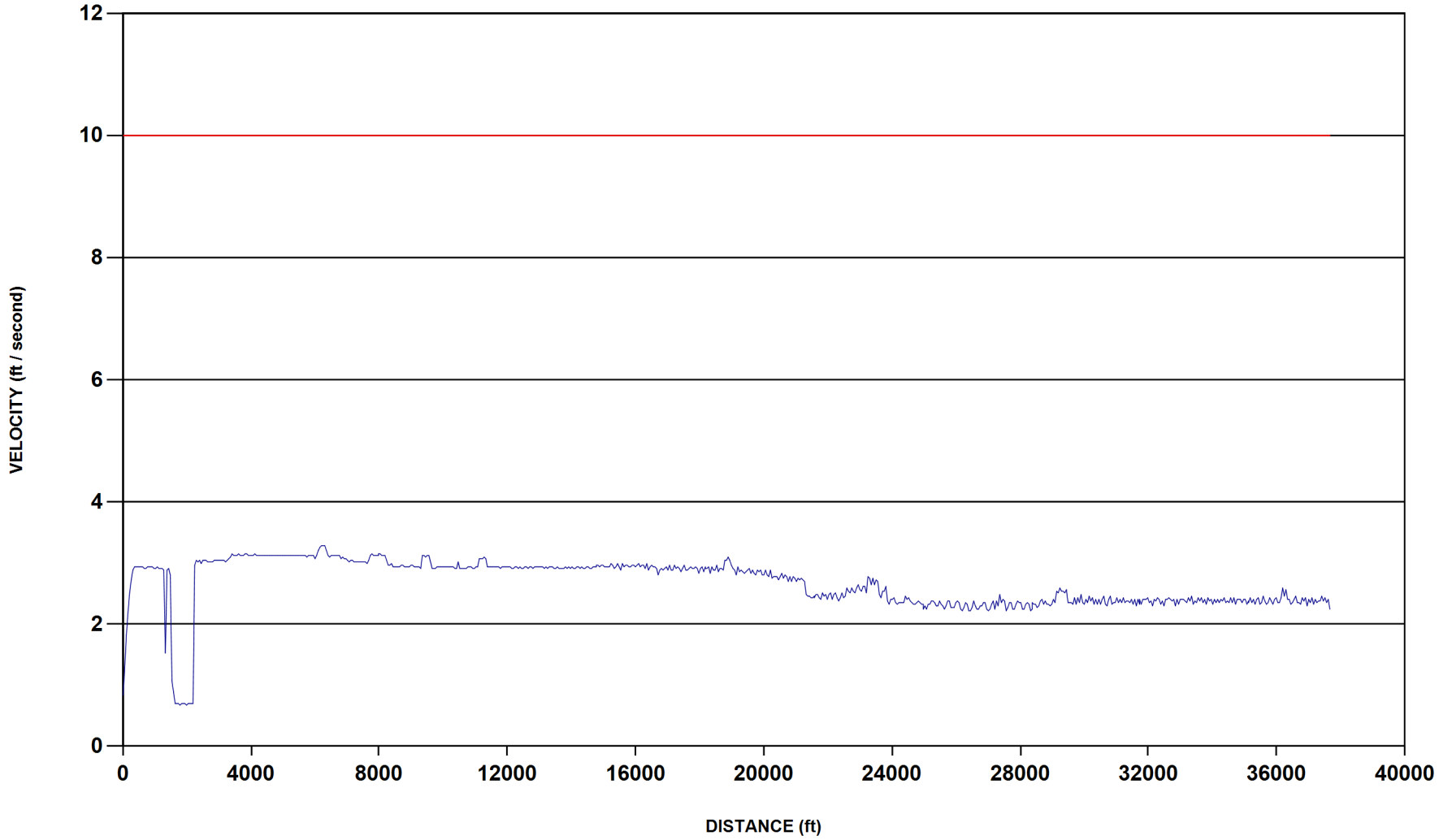
Metal Loss Orientation Graph



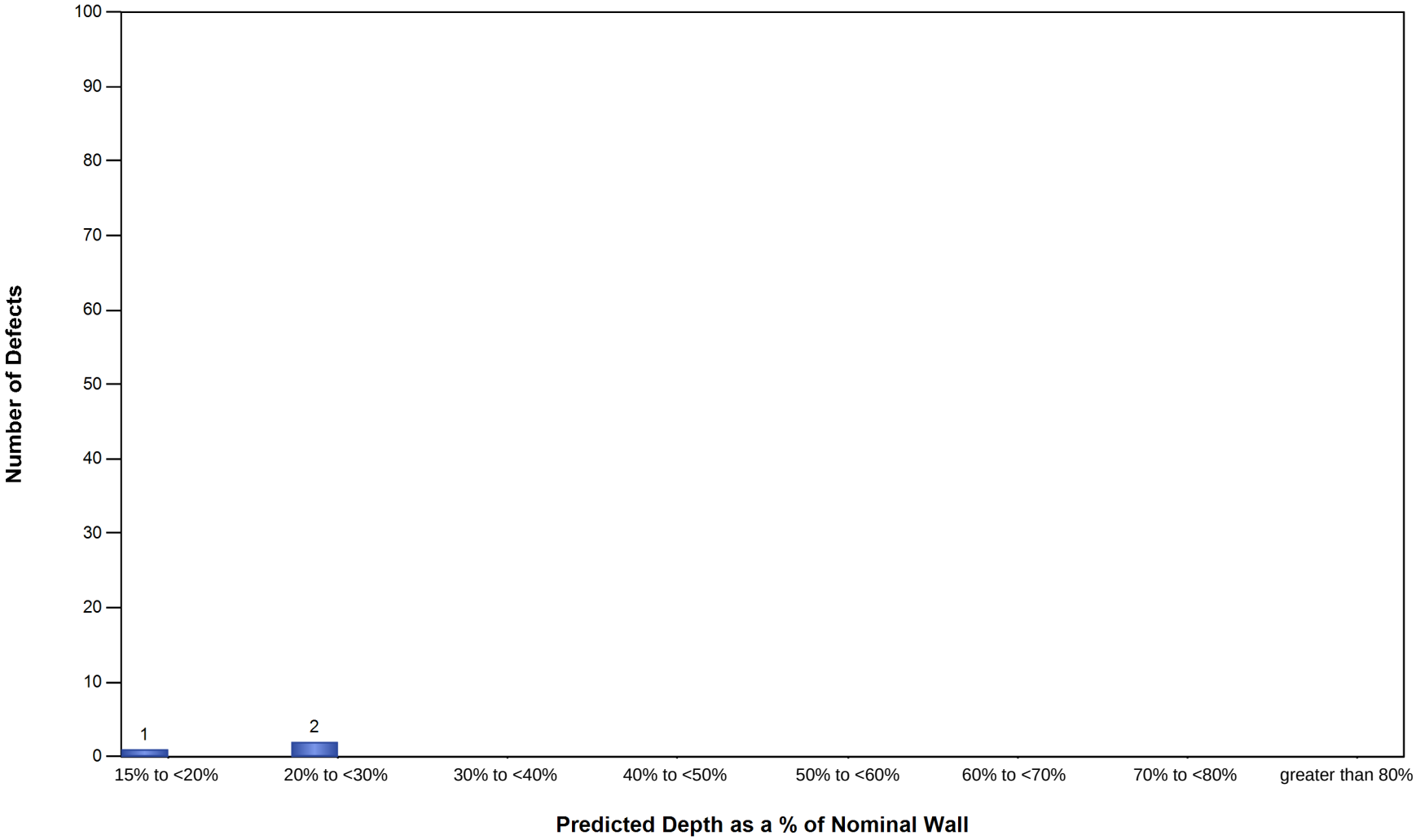
Metal Loss - Calculated Safe Max. Operating Pressure Graph



Velocity Graph - MFL



Defect Depth Histogram

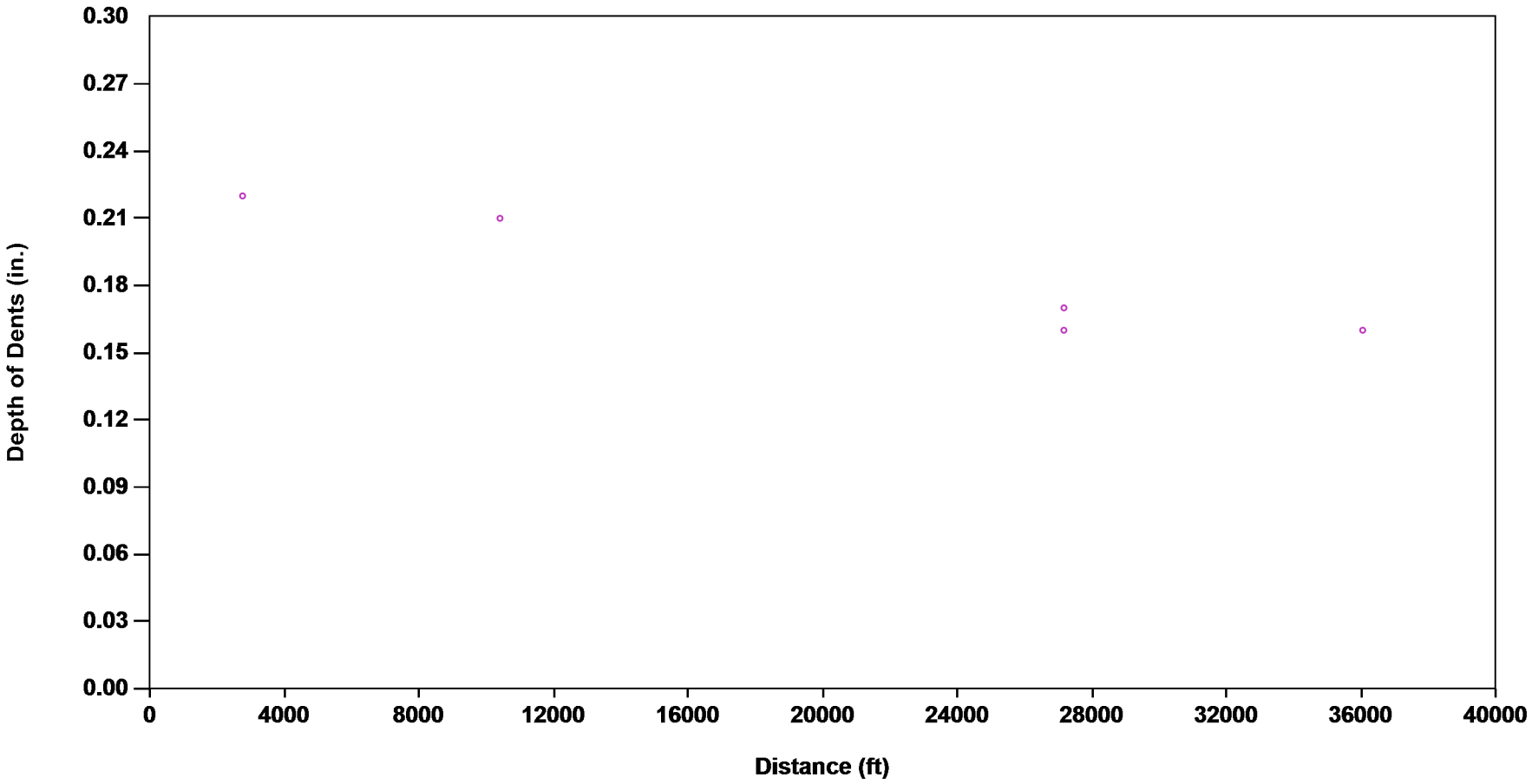


Total Defects: **8**

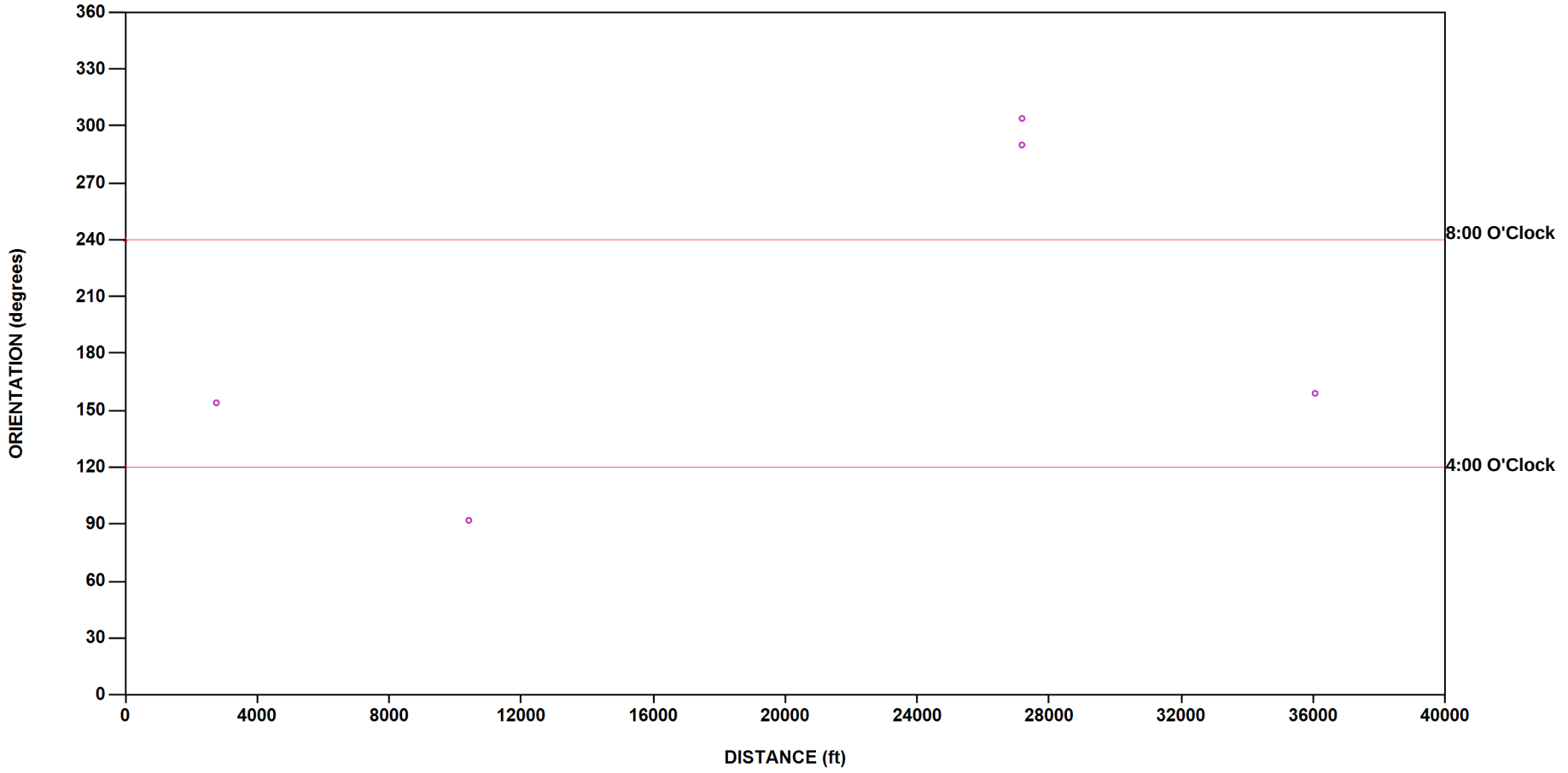
Non-Pressure-Reducing Groups

Pressure-Reducing Groups (where P' < P)

Dent Depth Graph



Dent Orientation Graph



TDW Services, Inc.
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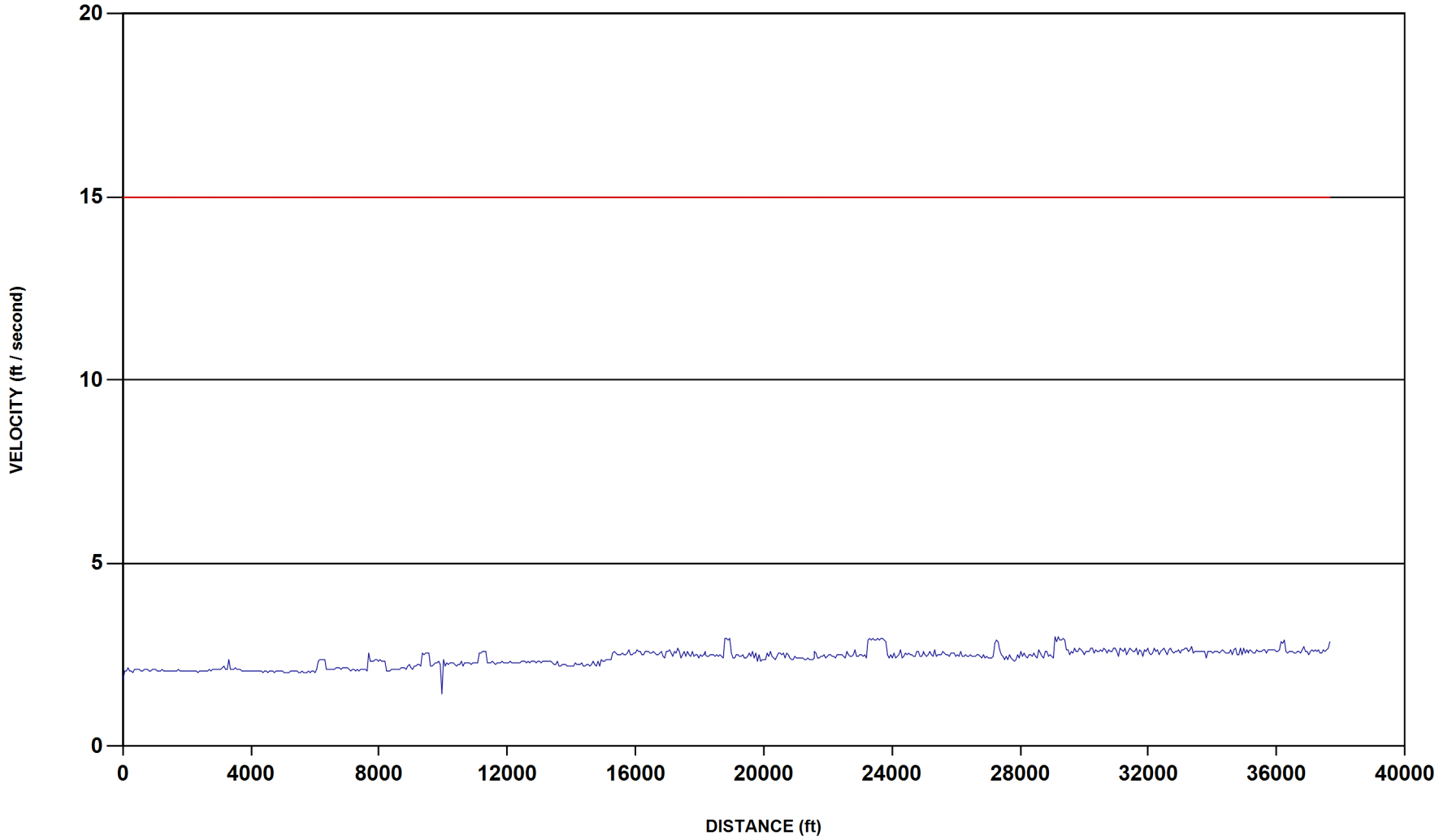
Trenton Station Launch to Receive

Velocity Graph - DEF



Locations Summary

DEFINITIONS

A location is a feature in the pipeline that can be used to correlate the inspection tool data to above ground references. Common location features include valves, fittings, flanges, tees, casings, repairs and aboveground markers (AGMs).

For example, a metal loss area could be referenced as being 200 feet down stream from a valve. Not all locations can be easily found from above ground. Some locations might not be useful if they are not above ground.

ID#	Each location is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Time	A reference time from the inspection tool. May also be used to locate features in the PIGTRAP software.
Distance	Given in either feet or meters, based on contractual agreements, this is the absolute distance measured by the tool from launch.
Joint #	This unique number identifies the girth weld number.
U/S Weld Dist.	The distance to the upstream (U/S) weld (in feet or meters).
D/S Weld Dist.	The distance to the downstream (D/S) weld (in feet or meters).
Description	Describes the location in greater detail. Possible entries include valves, flanges, fittings, tees, markers, etc.
Latitude	This shows the north/south position of the Location as supplied by the customer or recorded by an AGM box. For XYZ mapping runs, these values are the supplied survey points or were calculated by the tool.
Longitude	This shows the east/west position of the Location as supplied by the customer or recorded by an AGM box. For XYZ mapping runs, these values are the supplied survey points or were calculated by the tool.
Altitude	For XYZ mapping runs, this shows the elevation above sea level of the location as supplied by the customer or calculated by the tool.

Zeroes in Latitude and Longitude mean that no data was supplied by the customer. Calculated or estimated values can be viewed in the Pipe Listing report.

Locations Summary

ID#	Time	Dist (ft)	Joint #	U/S Weld Dist.	D/S Weld Dist.	Description	Latitude	Longitude	Altitude
10000001	18,712.78	0.0	110	1.6	1.6	Valve (Launcher), Sta. 0+00,Trenton Station	48.11230130	-103.77194543	2097.055
10000002	18,714.10	1.1	110	2.7	0.5	Flange	48.11230125	-103.77195364	2097.467
10000003	18,715.07	1.9	120	0.2	1.0	Pipe Support	48.11230121	-103.77195980	2097.775
10000004	18,716.75	3.4	130	0.2	1.0	Tee at 270 deg.	48.11230117	-103.77196974	2098.283
10000005	18,717.95	4.4	140	0.4	0.4	Flange	48.11230111	-103.77197730	2098.665
10000031	18,722.56	9.1	150	4.3	2.5	Pipe Entering Ground, Trenton Station --Han #8027	48.11230074	-103.77200552	2100.064
10000006	18,726.16	12.4	160	0.2	1.5	Bend down - 45 deg., 3D	48.11230069	-103.77201886	2099.852
10000007	18,738.85	24.5	180	0.0	1.5	Bend up - 45 deg., 3D	48.11230006	-103.77205450	2091.761
10000008	18,751.31	38.9	200	2.0	8.0	Bend right - 90 deg., 6D	48.11230352	-103.77211189	2091.925
10000009	20,324.76	2,381.9	690	1.7	8.0	Bend left - 90 deg., 6D	48.11869386	-103.77208742	2052.193
10000010	20,629.87	3,310.8	900	1.7	8.0	Bend right - 90 deg., 6D	48.11875858	-103.77587417	2062.248
10000011	21,543.69	6,176.5	1,490	40.3	1.9	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	48.12561048	-103.77236510	2026.713
10000012	22,019.43	7,646.9	1,820	0.2	6.1	Bend left - 65 deg., 6D	48.12881402	-103.77550203	2034.512
10000013	22,949.73	10,436.7	2,470	1.5	8.5	Bend left - 90 deg., 5D	48.12940408	-103.78604433	1980.686
10000014	23,994.61	13,515.3	3,140	19.7	21.5	AGM 020, Sta. 132+53, ROW -- Han #8473	48.12903008	-103.79835162	2126.583
10000015	25,279.77	17,288.6	4,110	0.1	1.5	Bend right - 48 deg., 3D	48.12850342	-103.81365139	2193.204
10000016	25,347.21	17,485.8	4,190	0.1	1.5	Bend left - 48 deg., 3D	48.12881749	-103.81430200	2198.305
10000017	25,842.80	18,935.5	4,560	2.2	39.8	AGM 030, Sta. 186+33, 145th Ave NW -- Han #8802	48.12943016	-103.82004938	2204.963
10000018	27,162.44	22,479.8	5,400	37.9	3.3	AGM 040, Sta. 221+07, Well Drive Way -- Han #8836	48.12602299	-103.83239771	2269.337
10000019	29,529.11	28,123.2	6,780	15.3	25.2	AGM 050, Sta. 277+44, ROW -- Han #8043	48.12762222	-103.85470879	2244.706
10000020	29,926.81	29,052.4	7,030	0.1	1.5	Bend left - 48 deg., 3D	48.12956793	-103.85701464	2236.493
10000021	30,272.74	29,892.4	7,240	0.1	1.4	Bend left - 50 deg., 3D	48.13117180	-103.85944854	2245.714
10000022	32,422.97	35,017.0	8,300	45.5	3.9	AGM 060, Sta. 345+56, ROW -- Survey Point	48.13423766	-103.87978551	2177.888
10000023	33,524.85	37,648.0	8,870	0.1	1.4	Bend up - 45 deg., 3D	48.13431872	-103.89039255	2211.830
10000032	33,531.18	37,662.0	8,890	7.1	6.3	Pipe Exiting Ground, ROW -- Han #8027	48.13431797	-103.89043435	2221.469
10000024	33,534.37	37,669.1	8,900	0.1	1.5	Bend down - 45 deg., 3D	48.13431748	-103.89045601	2224.063
10000025	33,537.49	37,676.4	8,920	0.5	0.5	Flange	48.13431642	-103.89048596	2221.994
10000026	33,537.91	37,677.4	8,930	0.2	1.0	Tee at 90 deg.	48.13431627	-103.89049021	2221.680
10000027	33,538.46	37,678.8	8,940	0.6	0.6	Pipe Support	48.13431602	-103.89049586	2221.258
10000028	33,538.83	37,679.8	8,950	0.4	2.7	Flange	48.13431583	-103.89049976	2220.967
10000029	33,539.28	37,680.8	8,950	1.5	1.6	Valve (Receiver), Sta. 371+78, Trenton Station	48.13431566	-103.89050456	2220.616

Locations Summary

Locations	Number
Bend	13
Casing	0
Flange	6
Fitting	0
Marker	8
Repair	0
Tee	2
Valve	2
Pipe Support	2

Casings Summary

DEFINITIONS

A casing is a section of larger diameter pipe through which the pipeline passes. Usually installed to protect a pipeline from excessive external loading, casings can also shield pipelines from protective cathodic protection currents. Therefore, the condition of a pipeline inside a casing can provide valuable information.

TDW MFL tools detect when a casing is not centered around the pipeline. These casings are referred to as being eccentric. The closer the casing is to the pipeline, the stronger the signal seen by the inspection tool. The tool will not detect if the casing is shorted to the pipe wall. The tool might see evidence of a short, such as metal loss.

This information may be useful in updating pipeline databases and alignment sheets.

Sometimes spacers are identified inside casings. These are mechanical devices used to center the pipeline inside the casing and are not considered harmful.

ID#	Each location is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Time	A reference time from the inspection tool. May also be used to locate features in the PIGTRAP software.
Distance Start, End	Given in either feet or meters, this is the absolute distance measured by the tool from launch to the beginning and ending of the casing.
Casing Length	The total predicted casing length (in feet or meters).
Eccentric (side)	Identifies one of four conditions associated with the casing: 1- no eccentricity (blank); 2- eccentric on upstream side (upstream); 3- eccentric on downstream side (downstream); 4- eccentric on both ends (both)
# of Metal Loss in Casing	Provides the number of metal loss groups identified inside the casing.
Max. Depth of Metal Loss	If metal loss is identified inside the casing, this column provides the maximum predicted depth of all metal loss features.
Above Ground References	The name of the closest upstream and downstream references, usually an Aboveground Marker or a Valve.
Distance from Start/Upstream Side of Casing	The distance from the Aboveground Reference (AGM or Valve) to the start (upstream) side of the casing.

Casings Summary

ID#	Time	Distance (ft) Start	Distance (ft) End	Casing Length (ft)	Eccentric (side)	# of Metal Loss in Casing	Max. Depth of Metal Loss	Above Ground References	Distance from Start/Upstream Side of Casing
No Casings appear in this pipeline inspection									

Deformation Summary

DEFINITIONS

The Deformation Summary Report lists all the deformations and dents detected during the inspection, sorted by depth of deformation (descending)

Dents may affect the integrity of the pipeline and are considered harmful. A dent with associated metal loss is potentially more significant than a dent alone.

ID#	Each Deformation is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Distance	Given in either feet or meters, based on contractual agreements, this is the absolute distance measured by the tool from launch.
Depth	Depth of the indication in inches or mm.
Orientation	The orientation of the deformation indication in degrees (top of pipe = 0) and clock position, as viewed facing downstream.
Sub Type	The sub type of deformation if other than dent (i.e. Heavy Weld, Ovality, Buckle, Expansion).
Min X Sec Dia	The minimum measured Cross-Section (ID) measured within the scope of the deformation.
Description	Text describing a deformation in greater detail. Any special conditions are noted.
On Weld	Determination whether the indication crosses a girth (or seam) weld.
Metal Loss	"Yes" is listed if there is any metal loss associated with a dent.
Above-Ground References	The name of the closest upstream and downstream references, usually either an AGM or a valve.
Distance from Defect	The distance to the upstream and downstream reference listed in the previous column. Used for locating defects in the field.

Deformation Summary

ID#	Distance (ft)	Depth (in)	Depth %	Orientation (Deg / O'Clock)		Sub Type	Min X Sec Dia	Description	On Weld	Metal Loss	Above-Ground References		Distance from Defect
14000000	2,758.4	0.22	2.8%	154	5:00		7.99	TDW Correlated Deformation			**U/S:**	Pipe Entering Ground, Trenton Station --Han #8027	2749.13
											D/S:	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	3418.21
14000001	10,409.0	0.21	2.6%	92	3:00		8.02	TDW Correlated Deformation			**U/S:**	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	4232.46
											D/S:	AGM 020, Sta. 132+53, ROW -- Han #8473	3106.37
14000003	27,173.1	0.17	2.1%	304	10:00		8.01	TDW Correlated Deformation			**U/S:**	AGM 040, Sta. 221+07, Well Drive Way -- Han #8836	4693.24
											D/S:	AGM 050, Sta. 277+44, ROW -- Han #8043	950.19
14000002	27,170.7	0.16	2.0%	290	9:30		8.02	TDW Correlated Deformation			**U/S:**	AGM 040, Sta. 221+07, Well Drive Way -- Han #8836	4690.89
											D/S:	AGM 050, Sta. 277+44, ROW -- Han #8043	952.54
14000004	36,053.4	0.16	2.0%	159	5:15		8.04	TDW Correlated Deformation			**U/S:**	AGM 060, Sta. 345+56, ROW -- Survey Point	1036.26
											D/S:	Pipe Exiting Ground, ROW -- Han #8027	1608.70

Type	Number
DENT	5

Gains (Metal in Close Proximity)

DEFINITIONS

The inspection tool may detect ferrous metal objects located close to or touching the pipeline. They appear as additional metal added to the pipe, and are referred to as gains. This table identifies gains detected during the inspection.

Clamps or anchors around the pipeline are considered gains. Some metal objects can be potentially harmful to the pipeline. They can damage the pipeline's protective coating, or over time may dent or cause damage to the pipeline.

ID#	Each location is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Distance	Given in either feet or meters, based on contractual agreements, this is the absolute distance measured by the tool from launch.
Length	The measured length of the gain measured in feet or meters.
Width	The measured width of the gain measured in inches or millimeters. When full circumference , this is usually typical of a clamp or banding around the circumference of the pipeline.
Depth in Gauss	The difference in gauss reading (magnetic strength) at the gain. The greater the number, the greater the mass of the object, or the closer the proximity to the pipeline, or both. This table is sorted with highest depth in gauss listed in a descending order.
Orientation: Degrees / O'Clock	The distance from launch is plotted against the orientation of the defect. Orientation is based on 360 degrees in a circle, with 0 / 360 degrees marking the top of the pipe (180 degrees the bottom).
Joint #	This unique number identifies the girth weld number.
U/S Weld Dist.	The distance to the upstream (U/S) weld (in feet or meters).
D/S Weld Dist.	The distance to the downstream (D/S) weld (in feet or meters).

Gains (Metal in Close Proximity)

ID#	Distance (ft)	Length (in)	Width (in)	Depth in Gauss	Orientation Degrees / O'Clock	Joint #	U/S Weld Dist.	D/S Weld Dist.

No Gains have been detected on this pipeline inspection

Nominal Wall Thickness

The following list provides locations along the pipeline where changes in wall thickness or pipe type occur. While the TDW inspection tool can easily detect changes in wall thickness, it cannot take direct thickness measurements. Therefore, where wall thicknesses are known, the tool can identify the locations where the thickness changes. Where wall thicknesses are not known, best efforts will be made to estimate thicknesses based on best available data.

ID#	Each wall thickness change ID is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Distance	Given in either feet or meters, based on contractual agreements, this is the absolute distance measured by the tool from launch.
Wall Thickness	The predicted wall thickness in inches or millimeters.
Pipetype	Type of pipe construction. Electric Resistance Weld (ERW), Seamless (SMLS), Lap Weld (LW), etc.
Yield Strength (SMYS)	Specified Minimum Yield Strength – A required strength level that measured yield stress of a pipe material must exceed, which is a function of pipe grade. The measured yield stress is the tensile stress required to produce a total elongation of 0.5 percent of a gage length as determined by an extensometer during a tensile test.
Safety Factor	(or design factor) Typically 0.72 per ASME B31.4 In setting the safety factor, due consideration has been given to and allowances made for the manufacturing tolerance and maximum allowable depth of imperfections provided for in the specifications.
Length of Segment	The length of the pipe for the specified wall thickness, measured in feet or meters.

Nominal Wall Thickness

ID#	Distance (ft)	Wall Thickness (in)	Pipetype	Yield Strength (SMYS)	Safety Factor	Length of Segment (ft)
11000000	-1.61	0.322	ERW	52000	0.72	45.31
11000001	43.70	0.188	ERW	52000	0.72	6050.27
11000002	6093.96	0.322	ERW	52000	0.72	253.23
11000003	6347.20	0.188	ERW	52000	0.72	1297.12
11000004	7644.32	0.322	ERW	52000	0.72	597.09
11000005	8241.41	0.188	ERW	52000	0.72	1085.84
11000006	9327.25	0.322	ERW	52000	0.72	262.7
11000007	9589.95	0.188	ERW	52000	0.72	1486.47
11000008	11076.42	0.322	ERW	52000	0.72	253.3
11000009	11329.72	0.188	ERW	52000	0.72	7434.78
11000010	18764.50	0.322	ERW	52000	0.72	210.82
11000011	18975.32	0.188	ERW	52000	0.72	4243.57
11000012	23218.88	0.322	ERW	52000	0.72	589.49
11000013	23808.37	0.188	ERW	52000	0.72	3377.92
11000014	27186.29	0.322	ERW	52000	0.72	138.65
11000015	27324.94	0.188	ERW	52000	0.72	1767.27
11000016	29092.22	0.322	ERW	52000	0.72	337.59
11000017	29429.81	0.188	ERW	52000	0.72	6684.67
11000018	36114.48	0.322	ERW	52000	0.72	168.66
11000019	36283.15	0.188	ERW	52000	0.72	1357.99
11000020	37641.14	0.322	ERW	52000	0.72	39.7

Wall Thickness	Pipetype	Total Length (ft)	Total Length (miles)	Percent of Total Distance
0.188	ERW	34,786	6.588	92.3%
0.322	ERW	2,897	0.549	7.7%

Repair Report

DEFINITIONS

This table lists all the repairs to the pipeline detected during the inspection.

Pipeline repairs that are typically detected include:

- Sleeves
- Half sole
- Patches
- Stopples
- Clamps
- Weld + End
- Clock Spring

ID#	Each repair is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Distance	Given in either feet or meters, based on contractual agreements, this is the absolute distance measured by the tool from launch.
Length	Gives the linear length of the repair.
Type of Repair	Describes the type of repair detected during the inspection.

Repair Report

ID#	Distance (ft)	Length (ft)	Type of Repair

No Repairs have been detected on this pipeline inspection

AGM Information Summary

DEFINITIONS

This table includes all values and above ground marker sites in the inspection run.

ID#	Each location is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Time	A reference time from the inspection tool. May also be used to locate features in the PIGTRAP software.
Distance	Given in either feet or meters, based on contractual agreements, this is the absolute distance measured by the tool from launch.
Description	Describes the AGM in greater detail. Generally includes only valves and markers.
Latitude	This shows the north/south position of the Location as supplied by the customer or recorded by an AGM box. For XYZ mapping runs, these values are the supplied survey points or were calculated by the tool.
Longitude	This shows the east/west position of the Location as supplied by the customer or recorded by an AGM box. For XYZ mapping runs, these values are the supplied survey points or were calculated by the tool.
Altitude	For XYZ mapping runs, this shows the elevation above sea level of the location as supplied by the customer or calculated by the tool.

Zeroes in Latitude and Longitude mean that no data was supplied by the customer. Calculated or estimated values can be viewed in the Pipe Listing report.

AGM Information Summary

ID#	Time	Distance(ft)	Description	Latitude	Longitude	Altitude
10000001	18712.78	0.00	Valve (Launcher), Sta. 0+00,Trenton Station	48.11230130	-103.77194543	2097.055
10000031	18722.56	9.12	Pipe Entering Ground, Trenton Station --Han #8027	48.11230074	-103.77200552	2100.064
10000011	21543.69	6176.46	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	48.12561048	-103.77236510	2026.713
10000014	23994.61	13515.29	AGM 020, Sta. 132+53, ROW -- Han #8473	48.12903008	-103.79835162	2126.583
10000017	25842.80	18935.55	AGM 030, Sta. 186+33, 145th Ave NW -- Han #8802	48.12943016	-103.82004938	2204.963
10000018	27162.44	22479.77	AGM 040, Sta. 221+07, Well Drive Way -- Han #8836	48.12602299	-103.83239771	2269.337
10000019	29529.11	28123.20	AGM 050, Sta. 277+44, ROW -- Han #8043	48.12762222	-103.85470879	2244.706
10000022	32422.97	35017.02	AGM 060, Sta. 345+56, ROW -- Survey Point	48.13423766	-103.87978551	2177.888
10000032	33531.18	37661.98	Pipe Exiting Ground, ROW -- Han #8027	48.13431797	-103.89043435	2221.469
10000029	33539.28	37680.84	Valve (Receiver), Sta. 371+78, Trenton Station	48.13431566	-103.89050456	2220.616

TYPE	NUMBER
Valves	2
Markers	8

Miscellaneous

DEFINITIONS

There are occasions when special notations or circumstances require the addition of a note. These notes are included in this table for your reference.

ID#	Each miscellaneous note is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Time	A reference time from the inspection tool. May also be used to locate features in the PIGTRAP software.
Distance	Given in either feet or meters, based on contractual agreements, this is the absolute distance measured by the tool from launch.
Memo	A description of the entry.

MEMO EXAMPLES

Gap or dent in casing	When the casing is not welded, or when a gap occurs in the weld, this signature is detected by the tool, and identified with a Misc. remark.
Inclusion	An anomaly in the cross section of the pipeline. Inclusions may be detrimental if they protrude through the pipe wall.
Mill anomaly	The process of manufacturing pipe can often leave indications in the pipe wall. Typically these anomalies are not detrimental, and are identified for the benefit of the client.
Sensor problems	Noting locations where anomalous sensor readings occurred.
Tool stops/starts	All tools are setup on a time-based system. When the tool stops, it continues to record, although not moving. When the tool moves very slowly, it is possible that its movement is not detected, and therefore, reported distances may appear shorter than actual. Many stops and starts may affect the overall distance accuracy of the tool.

Miscellaneous

ID#	Time	Distance (ft)	Memo
12000000	163.78	-17.00	Begin Run Tickle
12000001	49,483.71	37,724.44	End Run Tickle

Total	Number
Misc listings	2

Other Anomalies

DEFINITIONS

This Report lists anomalies that appear in the data which do not fall into typical metal loss categories. Examples range from manufacturing/mill anomalies in the pipe body and seam weld to construction-related and girth weld anomalies. Predicted wall loss depth estimations as well as pressure calculations are not generally applicable to these features and therefore these values do not appear in this table.

ID#	Each item is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Feature Description / Comments	Classification of the feature along with any additional comments if applicable.
Dist (ft)	Given in either feet or meters, based on contractual agreements, this is the absolute distance from launch.
Length (in)	Predicted length of the defect, reported in either inches or millimeters.
Width (in)	Predicted width of the defect, reported in either inches or millimeters.
Gauss Delta	The difference between high and low gauss readings (magnetic strength) at the feature. This table is sorted with the highest gauss listed in a descending order. Gauss delta indicates relative disturbance of the magnetic field at that location and does not necessarily represent relative severety when comparing one feature to another.
ID/OD	Determination whether the defect exists on the inside (INT) or outside (EXT) surface of the pipe.
Anomaly / Seam Orientation	Orientation of both the feature and the seam weld in the joint of pipe is reported in o'clock (12:00 at top of pipe) as viewed looking downstream. If the pipe is determined to be seamless construction and therefore has no seam, "SMLS" will appear. "N/D" will be populated for joints where the seam is not detected.
Aboveground References	The name of the closest upstream and downstream references, usually either an AGM or a Valve.
Distance from Defect	The distance to the upstream and downstream reference listed in the previous column. Used for locating defects in the field.

Other Anomalies

ID#	Feature Description/Comments	Dist (ft)	Length	Width	Gauss Delta	ID/OD	Anomaly/Seam Orientation O'clock		Above-Ground References	Distance from Defect
20000010	Seam Variation	20,123.9	0.59	0.36	42	INT	12:15 / N/D	U/S:	AGM 030, Sta. 186+33, 145th Ave NW -- Han #8802	1188.32
								D/S:	AGM 040, Sta. 221+07, Well Drive Way -- Han #8836	2355.91
20000005	Seam Variation	12,353.3	0.82	0.60	42	INT	1:45 / N/D	U/S:	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	6176.76
								D/S:	AGM 020, Sta. 132+53, ROW -- Han #8473	1162.07
20000011	Seam Variation	20,124.7	0.71	0.45	34	INT	12:00 / N/D	U/S:	AGM 030, Sta. 186+33, 145th Ave NW -- Han #8802	1189.12
								D/S:	AGM 040, Sta. 221+07, Well Drive Way -- Han #8836	2355.10
20000001	Seam Variation	2,865.8	0.59	0.53	28	INT	11:00 / N/D	U/S:	Pipe Entering Ground, Trenton Station --Han #8027	2856.69
								D/S:	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	3310.65
20000018	Seam Variation	30,963.6	0.47	0.50	28	INT	9:00 / N/D	U/S:	AGM 050, Sta. 277+44, ROW -- Han #8043	2840.42
								D/S:	AGM 060, Sta. 345+56, ROW -- Survey Point	4053.39
20000006	Seam Variation	12,354.4	0.47	0.55	24	INT	1:45 / N/D	U/S:	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	6177.87
								D/S:	AGM 020, Sta. 132+53, ROW -- Han #8473	1160.96
20000020	Seam Variation	34,284.5	0.47	0.58	23	INT	2:30 / N/D	U/S:	AGM 050, Sta. 277+44, ROW -- Han #8043	6161.29
								D/S:	AGM 060, Sta. 345+56, ROW -- Survey Point	732.52
20000019	Seam Variation	34,281.3	0.59	0.61	20	INT	2:30 / N/D	U/S:	AGM 050, Sta. 277+44, ROW -- Han #8043	6158.09
								D/S:	AGM 060, Sta. 345+56, ROW -- Survey Point	735.72
20000007	Seam Variation	12,502.2	0.35	0.48	25	INT	12:45 / N/D	U/S:	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	6325.71
								D/S:	AGM 020, Sta. 132+53, ROW -- Han #8473	1013.11
20000000	Mill Anomaly	1,839.3	0.24	0.33	22	INT	2:45 / N/D	U/S:	Pipe Entering Ground, Trenton Station --Han #8027	1830.21
								D/S:	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	4337.13

Other Anomalies

ID#	Feature Description/Comments	Dist (ft)	Length	Width	Gauss Delta	ID/OD	Anomaly/Seam Orientation O'clock		Above-Ground References	Distance from Defect
20000008	Mill Anomaly	16,418.7	0.82	0.33	64	INT	4:45 / N/D	**U/S:**	AGM 020, Sta. 132+53, ROW -- Han #8473	2903.35
								D/S:	AGM 030, Sta. 186+33, 145th Ave NW -- Han #8802	2516.91
20000014	Mill Anomaly	29,956.9	0.35	0.34	31	INT	1:45 / N/D	**U/S:**	AGM 050, Sta. 277+44, ROW -- Han #8043	1833.68
								D/S:	AGM 060, Sta. 345+56, ROW -- Survey Point	5060.13
20000017	Mill Anomaly	30,607.1	1.18	0.35	12	INT	2:15 / N/D	**U/S:**	AGM 050, Sta. 277+44, ROW -- Han #8043	2483.84
								D/S:	AGM 060, Sta. 345+56, ROW -- Survey Point	4409.97

Other Anomalies Type	Number
Girth Weld Anomaly	0
Mill Anomaly	4
Seam Variation	9

Pipeline Listing

The Pipeline Listing Report presents all detected pipeline data in sequential order, beginning at launcher and ending at the receiver. The table includes welds, locations, metal loss defects, AGMs, wall thickness changes, etc.

ID#	Each item is automatically assigned a number in the software. This number is provided to assist the user of PIGTRAP software to more easily find any given defect.
Description	Describes the event at the particular location. Identifies the type of the descriptive, being a weld, location, pipe thickness change, etc.
Distance	Given in either feet or meters, based on contractual agreements, this is the absolute distance from launch.
Joint #	This unique number identifies the girth weld number.
U/S Weld	The distance to the upstream (U/S) weld (in feet or meters).
D/S Weld	The distance to the downstream (D/S) weld (in feet or meters).
Latitude	If GPS coordinates were provided for launch, receive and AGMs, this provides the predicted Latitude reading of the location from the first GPS reading based on INS readings obtained by the tool during the inspection.
Longitude	If GPS coordinates were provided for launch, receive and AGMs, this provides the predicted Longitude reading of the location from the first GPS reading based on INS readings obtained by the tool during the inspection.
Altitude	If GPS coordinates were provided for launch, receive and AGMs, this provides the predicted Altitude reading of the location from the first GPS reading based on INS readings obtained by the tool during the inspection.
Orientation: Deg. / O'Clock	Orientation is reported in degrees or o'clock (0 degrees/12:00 at top of pipe) as viewed looking downstream.
% Depth	Predicted depth of the defect as a percentage of nominal wall.
Length or WT (Pipe Thickness)	Predicted length of the defect, reported in either inches or millimeters – or if a wall thickness change, the new wall thickness begins at this point.
Width or YS (Yield Strength)	Predicted width of the defect, reported in either inches or millimeters – or if a wall thickness change, the new SMYS begins at this point.
P' (Calc. Safe Max. Operating Pressure) or SF (Safety Factor)	Calculated safe maximum operating pressure for the pipeline segment as calculated based on information provided by the Customer. TDW software uses either ASME B31G, MODIFIED ASME B31G or Z662-99 to calculate the calculated safe maximum allowable operating pressure (P') of the pipeline at a metal loss area.
(P'/P)	Percent of maximum established pressure, this is calculated by dividing the calculated safe pressure of the defect (P') by the current established maximum operating pressure of the pipeline (P). For TDW reporting, P is either established MOP provided by the customer or the calculated pressure rating for the pipe (P). Percentages less than 100% are considered pressure reducing.

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
12000000	Begin Run Tickle	-17.0	0	-	15.5	48.11230130	-103.77194555	2097.060							
11000000	WT CHANGE	-1.6	0	0.0	0.1	48.11230130	-103.77194555	2097.060				0.322	52000	0.72	
110	WELD	-1.6	110	0.0	3.1	48.11230130	-103.77194555	2097.060							
10000000	Flange	-1.1	110	0.5	2.7	48.11230130	-103.77194555	2097.060	0	12:00					
10000001	Valve (Launcher), Sta. 0+00,Trenton Station	0.0	110	1.6	1.6	48.11230130	-103.77194543	2097.055							
10000002	Flange	1.1	110	2.7	0.5	48.11230125	-103.77195364	2097.467	0	12:00					
120	WELD	1.6	120	0.0	1.2	48.11230123	-103.77195718	2097.643							
10000003	Pipe Support	1.9	120	0.2	1.0	48.11230121	-103.77195980	2097.775							
130	WELD	2.8	130	0.0	1.2	48.11230118	-103.77196584	2098.085							
10000004	Tee at 270 deg.	3.4	130	0.2	1.0	48.11230117	-103.77196974	2098.283	262	8:30					
140	WELD	4.0	140	0.0	0.9	48.11230114	-103.77197396	2098.500							
10000005	Flange	4.4	140	0.4	0.4	48.11230111	-103.77197730	2098.665	0	12:00					
150	WELD	4.9	150	0.0	6.7	48.11230107	-103.77198063	2098.828							
10000031	Pipe Entering Ground, Trenton Station --Han #8027	9.1	150	4.3	2.5	48.11230074	-103.77200552	2100.064							
160	WELD	11.6	160	0.0	1.6	48.11230070	-103.77201569	2100.044							
10000006	Bend down - 45 deg., 3D	12.4	160	0.2	1.5	48.11230069	-103.77201886	2099.852	0	12:00					
170	WELD	13.2	170	0.0	10.5	48.11230065	-103.77202148	2099.449							
180	WELD	23.7	180	0.0	1.6	48.11230007	-103.77205196	2092.103							
10000007	Bend up - 45 deg., 3D	24.5	180	0.0	1.5	48.11230006	-103.77205450	2091.761	0	12:00					
190	WELD	25.3	190	0.0	8.5	48.11230004	-103.77205755	2091.602							
200	WELD	33.7	200	0.0	10.0	48.11229994	-103.77209236	2091.744							
10000008	Bend right - 90 deg., 6D	38.9	200	2.0	8.0	48.11230352	-103.77211189	2091.925	0	12:00					
11000001	WT CHANGE	43.7	200	0.0	0.0	48.11231573	-103.77211690	2091.879				0.188	52000	0.72	
210	WELD	43.7	210	0.0	19.8	48.11231586	-103.77211690	2091.878							
220	WELD	63.5	220	0.0	49.4	48.11237009	-103.77211650	2091.948							
230	WELD	112.9	230	0.0	49.6	48.11250506	-103.77211727	2091.511							
240	WELD	162.5	240	0.0	49.6	48.11264029	-103.77211760	2091.167							
250	WELD	212.1	250	0.0	49.6	48.11277559	-103.77211640	2090.595							
260	WELD	261.8	260	0.0	49.4	48.11291085	-103.77211500	2089.928							
270	WELD	311.2	270	0.0	49.5	48.11304556	-103.77211210	2088.815							
280	WELD	360.7	280	0.0	49.5	48.11318030	-103.77210771	2087.462							
290	WELD	410.2	290	0.0	43.5	48.11331485	-103.77210610	2085.921							
300	WELD	453.7	300	0.0	49.6	48.11343351	-103.77210610	2085.102							
310	WELD	503.2	310	0.0	49.6	48.11356855	-103.77210560	2084.569							
320	WELD	552.8	320	0.0	49.6	48.11370344	-103.77210364	2083.660							

Criteria: ASME B31G: Modified

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
330	WELD	602.4	330	0.0	49.5	48.11383826	-103.77210190	2082.313							
340	WELD	652.0	340	0.0	49.5	48.11397335	-103.77209900	2081.227							
350	WELD	701.5	350	0.0	49.0	48.11410807	-103.77209710	2079.965							
360	WELD	750.5	360	0.0	49.5	48.11424182	-103.77209700	2078.753							
370	WELD	799.9	370	0.0	49.3	48.11437668	-103.77209810	2077.777							
380	WELD	849.3	380	0.0	49.5	48.11451152	-103.77209870	2077.130							
390	WELD	898.8	390	0.0	49.2	48.11464681	-103.77209800	2076.212							
400	WELD	948.0	400	0.0	48.9	48.11478102	-103.77209780	2075.534							
410	WELD	996.9	410	0.0	49.3	48.11491453	-103.77209768	2075.949							
420	WELD	1,046.2	420	0.0	49.6	48.11504925	-103.77209700	2074.513							
430	WELD	1,095.8	430	0.0	49.6	48.11518451	-103.77209640	2073.040							
440	WELD	1,145.4	440	0.0	49.3	48.11531990	-103.77209670	2072.251							
450	WELD	1,194.7	450	0.0	49.5	48.11545447	-103.77209700	2071.644							
460	WELD	1,244.3	460	0.0	49.2	48.11558969	-103.77209810	2070.739							
470	WELD	1,293.5	470	0.0	49.5	48.11572405	-103.77209820	2069.827							
480	WELD	1,343.0	480	0.0	49.5	48.11585923	-103.77209730	2068.530							
490	WELD	1,392.5	490	0.0	49.4	48.11599446	-103.77209680	2067.726							
500	WELD	1,441.9	500	0.0	49.3	48.11612926	-103.77209830	2066.489							
510	WELD	1,491.2	510	0.0	49.6	48.11626407	-103.77209990	2065.587							
520	WELD	1,540.8	520	0.0	49.5	48.11639932	-103.77209990	2064.645							
530	WELD	1,590.2	530	0.0	49.6	48.11653415	-103.77209720	2062.995							
540	WELD	1,639.8	540	0.0	49.7	48.11666932	-103.77209382	2061.469							
550	WELD	1,689.5	550	0.0	49.6	48.11680476	-103.77209415	2060.924							
560	WELD	1,739.1	560	0.0	49.6	48.11694031	-103.77209690	2060.359							
570	WELD	1,788.7	570	0.0	49.4	48.11707563	-103.77209630	2059.110							
580	WELD	1,838.2	580	0.0	49.6	48.11721052	-103.77209467	2058.205							
20000000	Mill Anomaly	1,839.3	580	1.2	48.4	48.11721374	-103.77209460	2058.180	89	2:45	-	0.24	0.33		
590	WELD	1,887.8	590	0.0	49.7	48.11734583	-103.77209300	2057.457							
600	WELD	1,937.5	600	0.0	49.6	48.11748138	-103.77209210	2056.637							
610	WELD	1,987.1	610	0.0	49.7	48.11761678	-103.77209270	2055.970							
620	WELD	2,036.8	620	0.0	49.6	48.11775227	-103.77209370	2055.429							
630	WELD	2,086.5	630	0.0	49.6	48.11788766	-103.77209340	2055.038							
640	WELD	2,136.1	640	0.0	49.7	48.11802328	-103.77209260	2054.739							
650	WELD	2,185.8	650	0.0	49.7	48.11815880	-103.77209010	2054.173							
660	WELD	2,235.4	660	0.0	49.6	48.11829435	-103.77208670	2053.961							
670	WELD	2,285.1	670	0.0	49.5	48.11842991	-103.77208460	2053.738							
680	WELD	2,334.6	680	0.0	42.3	48.11856548	-103.77208345	2053.004							

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
690	WELD	2,376.9	690	0.0	9.8	48.11868100	-103.77208230	2052.185							
10000009	Bend left - 90 deg., 6D	2,381.9	690	1.7	8.0	48.11869386	-103.77208742	2052.193	0	12:00					
700	WELD	2,386.7	700	0.0	27.0	48.11869717	-103.77210614	2052.323							
710	WELD	2,413.7	710	0.0	49.7	48.11869753	-103.77221709	2053.272							
720	WELD	2,463.3	720	0.0	49.6	48.11869864	-103.77241960	2053.608							
730	WELD	2,512.9	730	0.0	49.3	48.11870033	-103.77262208	2053.633							
740	WELD	2,562.2	740	0.0	49.7	48.11870223	-103.77282353	2054.262							
750	WELD	2,611.9	750	0.0	49.6	48.11870613	-103.77302597	2054.728							
760	WELD	2,661.4	760	0.0	49.6	48.11871177	-103.77322823	2054.543							
770	WELD	2,711.1	770	0.0	49.6	48.11871745	-103.77343048	2055.285							
14000000	DENT	2,758.4	770	47.2	2.4	48.11872130	-103.77362344	2055.702	154	5:00	2.8%				
780	WELD	2,760.7	780	0.0	49.6	48.11872152	-103.77363286	2055.716							
790	WELD	2,810.2	790	0.0	49.5	48.11872628	-103.77383508	2056.394							
800	WELD	2,859.8	800	0.0	49.5	48.11873069	-103.77403705	2057.422							
20000001	Seam Variation	2,865.8	800	6.0	43.5	48.11873128	-103.77406180	2057.448	333	11:00	-	0.59	0.53		
810	WELD	2,909.3	810	0.0	49.6	48.11873583	-103.77423887	2057.594							
820	WELD	2,959.0	820	0.0	49.5	48.11874051	-103.77444093	2057.735							
830	WELD	3,008.5	830	0.0	49.6	48.11874393	-103.77464310	2058.107							
840	WELD	3,058.1	840	0.0	49.6	48.11874755	-103.77484525	2058.551							
850	WELD	3,107.7	850	0.0	49.3	48.11875144	-103.77504749	2059.894							
860	WELD	3,157.0	860	0.0	49.6	48.11875338	-103.77524826	2060.937							
870	WELD	3,206.6	870	0.0	49.2	48.11875483	-103.77545068	2061.045							
880	WELD	3,255.8	880	0.0	43.4	48.11875554	-103.77565132	2061.029							
890	WELD	3,299.3	890	0.0	6.5	48.11875519	-103.77582855	2062.024							
900	WELD	3,305.8	900	0.0	9.7	48.11875501	-103.77585518	2062.163							
10000010	Bend right - 90 deg., 6D	3,310.8	900	1.7	8.0	48.11875858	-103.77587417	2062.248	0	12:00					
910	WELD	3,315.5	910	0.0	18.7	48.11877085	-103.77587910	2062.077							
920	WELD	3,334.2	920	0.0	46.4	48.11882291	-103.77587840	2061.859							
930	WELD	3,380.6	930	0.0	49.6	48.11894970	-103.77587895	2061.818							
940	WELD	3,430.2	940	0.0	48.1	48.11908530	-103.77587930	2061.689							
950	WELD	3,478.3	950	0.0	49.4	48.11921690	-103.77587910	2061.384							
960	WELD	3,527.7	960	0.0	49.4	48.11935202	-103.77587960	2061.407							
970	WELD	3,577.1	970	0.0	49.4	48.11948655	-103.77588340	2061.594							
980	WELD	3,626.6	980	0.0	49.5	48.11962135	-103.77588830	2062.347							
990	WELD	3,676.1	990	0.0	49.5	48.11975689	-103.77588930	2063.623							
1000	WELD	3,725.6	1000	0.0	49.5	48.11989254	-103.77588820	2065.718							
1010	WELD	3,775.2	1010	0.0	49.6	48.12002779	-103.77588569	2068.414							

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ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
1020	WELD	3,824.8	1020	0.0	49.4	48.12016332	-103.77588330	2070.453						
1030	WELD	3,874.1	1030	0.0	49.6	48.12029779	-103.77588200	2070.863						
1040	WELD	3,923.7	1040	0.0	49.6	48.12043315	-103.77588370	2070.948						
1050	WELD	3,973.2	1050	0.0	49.5	48.12056880	-103.77588480	2070.970						
1060	WELD	4,022.8	1060	0.0	49.6	48.12070419	-103.77588360	2071.286						
1070	WELD	4,072.3	1070	0.0	49.4	48.12083966	-103.77588230	2071.443						
1080	WELD	4,121.7	1080	0.0	49.5	48.12097446	-103.77588200	2071.665						
1090	WELD	4,171.2	1090	0.0	49.2	48.12110997	-103.77588100	2071.390						
1100	WELD	4,220.4	1100	0.0	49.6	48.12124491	-103.77587928	2071.075						
1110	WELD	4,270.1	1110	0.0	49.5	48.12138046	-103.77587990	2070.203						
1120	WELD	4,319.5	1120	0.0	49.5	48.12151573	-103.77587970	2069.741						
1130	WELD	4,369.0	1130	0.0	49.4	48.12165079	-103.77588140	2069.320						
1140	WELD	4,418.4	1140	0.0	49.6	48.12178603	-103.77588300	2068.932						
1150	WELD	4,468.1	1150	0.0	49.5	48.12192169	-103.77588270	2067.869						
1160	WELD	4,517.6	1160	0.0	49.6	48.12205705	-103.77588190	2066.294						
1170	WELD	4,567.2	1170	0.0	48.9	48.12219212	-103.77588090	2064.236						
1180	WELD	4,616.1	1180	0.0	49.6	48.12232535	-103.77588040	2062.161						
1190	WELD	4,665.7	1190	0.0	49.3	48.12246092	-103.77588050	2060.482						
1200	WELD	4,715.0	1200	0.0	49.5	48.12259556	-103.77587717	2058.547						
1210	WELD	4,764.5	1210	0.0	49.5	48.12273021	-103.77585990	2056.686						
1220	WELD	4,814.0	1220	0.0	49.6	48.12286010	-103.77580555	2055.037						
1230	WELD	4,863.6	1230	0.0	49.5	48.12297962	-103.77571116	2053.390						
1240	WELD	4,913.1	1240	0.0	49.5	48.12308458	-103.77558401	2052.207						
1250	WELD	4,962.6	1250	0.0	49.5	48.12317974	-103.77544010	2050.710						
1260	WELD	5,012.1	1260	0.0	49.6	48.12326902	-103.77528898	2049.510						
1270	WELD	5,061.7	1270	0.0	49.6	48.12335650	-103.77513428	2048.765						
1280	WELD	5,111.3	1280	0.0	48.3	48.12344441	-103.77498058	2047.675						
1290	WELD	5,159.6	1290	0.0	49.5	48.12353111	-103.77483158	2046.594						
1300	WELD	5,209.1	1300	0.0	49.4	48.12362018	-103.77467940	2045.344						
1310	WELD	5,258.5	1310	0.0	49.4	48.12371052	-103.77452955	2044.265						
1320	WELD	5,308.0	1320	0.0	49.5	48.12380144	-103.77438019	2042.990						
1330	WELD	5,357.5	1330	0.0	49.6	48.12389087	-103.77422894	2041.178						
1340	WELD	5,407.1	1340	0.0	49.5	48.12398097	-103.77407810	2038.749						
1350	WELD	5,456.5	1350	0.0	49.6	48.12407122	-103.77392769	2036.625						
1360	WELD	5,506.1	1360	0.0	49.4	48.12416149	-103.77377759	2034.454						
1370	WELD	5,555.5	1370	0.0	49.3	48.12425148	-103.77362746	2032.585						
1380	WELD	5,604.8	1380	0.0	49.5	48.12434054	-103.77347691	2030.585						

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Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
1390	WELD	5,654.3	1390	0.0	49.4	48.12443042	-103.77332562	2029.488						
1400	WELD	5,703.8	1400	0.0	49.5	48.12452015	-103.77317454	2028.515						
1410	WELD	5,753.3	1410	0.0	49.3	48.12461086	-103.77302458	2028.090						
1420	WELD	5,802.6	1420	0.0	49.2	48.12470268	-103.77287723	2028.351						
1430	WELD	5,851.8	1430	0.0	49.3	48.12479723	-103.77273402	2027.542						
1440	WELD	5,901.2	1440	0.0	49.2	48.12489710	-103.77259878	2027.849						
1450	WELD	5,950.4	1450	0.0	45.7	48.12500715	-103.77248424	2028.233						
1460	WELD	5,996.1	1460	0.0	49.5	48.12512149	-103.77241013	2028.418						
1470	WELD	6,045.5	1470	0.0	48.5	48.12525329	-103.77237052	2027.507						
11000002	WT CHANGE	6,094.0	1470	0.0	0.1	48.12538530	-103.77236980	2026.778			0.322	52000	0.72	
1480	WELD	6,094.0	1480	0.0	42.1	48.12538549	-103.77236980	2026.780						
1490	WELD	6,136.2	1490	0.0	42.2	48.12550053	-103.77236840	2026.624						
10000011	AGM 010, Sta. 62+05, 49th St NW -- Han #8043	6,176.5	1490	40.3	1.9	48.12561048	-103.77236510	2026.713						
1500	WELD	6,178.3	1500	0.0	42.2	48.12561564	-103.77236510	2026.717						
1510	WELD	6,220.6	1510	0.0	42.2	48.12573095	-103.77236860	2026.815						
1520	WELD	6,262.8	1520	0.0	42.2	48.12584635	-103.77237280	2027.527						
1530	WELD	6,305.0	1530	0.0	42.2	48.12596172	-103.77236968	2028.817						
11000003	WT CHANGE	6,347.2	1530	0.0	0.1	48.12607670	-103.77236490	2031.047			0.188	52000	0.72	
1540	WELD	6,347.3	1540	0.0	22.1	48.12607686	-103.77236490	2031.050						
1550	WELD	6,369.4	1550	0.0	49.3	48.12613709	-103.77236401	2032.497						
1560	WELD	6,418.7	1560	0.0	49.4	48.12627164	-103.77236670	2033.946						
1570	WELD	6,468.1	1570	0.0	49.3	48.12640680	-103.77237545	2034.931						
1580	WELD	6,517.4	1580	0.0	49.3	48.12653982	-103.77240682	2035.535						
1590	WELD	6,566.7	1590	0.0	49.5	48.12666310	-103.77248521	2035.892						
1600	WELD	6,616.1	1600	0.0	49.3	48.12677297	-103.77260198	2034.418						
1610	WELD	6,665.4	1610	0.0	49.3	48.12687165	-103.77273843	2033.300						
1620	WELD	6,714.7	1620	0.0	49.4	48.12696668	-103.77288102	2032.512						
1630	WELD	6,764.1	1630	0.0	49.4	48.12706179	-103.77302417	2032.740						
1640	WELD	6,813.5	1640	0.0	49.3	48.12715928	-103.77316410	2033.015						
1650	WELD	6,862.8	1650	0.0	49.4	48.12725825	-103.77330110	2034.148						
1660	WELD	6,912.2	1660	0.0	49.3	48.12735859	-103.77343652	2034.838						
1670	WELD	6,961.5	1670	0.0	49.4	48.12745860	-103.77357169	2035.612						
1680	WELD	7,010.9	1680	0.0	49.6	48.12755878	-103.77370752	2036.143						
1690	WELD	7,060.5	1690	0.0	49.6	48.12765940	-103.77384335	2037.106						
1700	WELD	7,110.1	1700	0.0	49.1	48.12775908	-103.77398075	2037.778						
1710	WELD	7,159.3	1710	0.0	49.5	48.12785677	-103.77411871	2038.182						

Criteria: ASME B31G: Modified

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
1720	WELD	7,208.7	1720	0.0	45.0	48.12795566	-103.77425614	2039.145							
1730	WELD	7,253.7	1730	0.0	49.5	48.12804597	-103.77438063	2038.248							
1740	WELD	7,303.3	1740	0.0	49.1	48.12814600	-103.77451733	2037.584							
1750	WELD	7,352.4	1750	0.0	49.5	48.12824417	-103.77465438	2037.510							
1760	WELD	7,401.8	1760	0.0	49.2	48.12834211	-103.77479381	2037.754							
1770	WELD	7,451.0	1770	0.0	49.4	48.12843779	-103.77493441	2036.873							
1780	WELD	7,500.4	1780	0.0	49.0	48.12853281	-103.77507694	2034.046							
1790	WELD	7,549.5	1790	0.0	49.4	48.12862708	-103.77521941	2033.795							
1800	WELD	7,598.8	1800	0.0	39.5	48.12872252	-103.77536252	2035.384							
1810	WELD	7,638.3	1810	0.0	6.0	48.12879898	-103.77547597	2034.913							
11000004	WT CHANGE	7,644.3	1810	0.0	0.1	48.12881068	-103.77549296	2034.656				0.322	52000	0.72	
1820	WELD	7,644.4	1820	0.0	6.3	48.12881080	-103.77549312	2034.653							
10000012	Bend left - 65 deg., 6D	7,646.9	1820	0.2	6.1	48.12881402	-103.77550203	2034.512	0	12:00					
1830	WELD	7,650.7	1830	0.0	41.8	48.12881211	-103.77551725	2034.297							
1840	WELD	7,692.5	1840	0.0	42.2	48.12877654	-103.77567895	2030.731							
1850	WELD	7,734.8	1850	0.0	42.3	48.12874513	-103.77584306	2025.548							
1860	WELD	7,777.0	1860	0.0	42.3	48.12871334	-103.77600778	2021.394							
1870	WELD	7,819.3	1870	0.0	42.2	48.12868029	-103.77617259	2020.381							
1880	WELD	7,861.5	1880	0.0	42.2	48.12864785	-103.77633800	2020.356							
1890	WELD	7,903.7	1890	0.0	42.2	48.12861727	-103.77650401	2020.301							
1900	WELD	7,945.9	1900	0.0	42.3	48.12858782	-103.77667022	2020.294							
1910	WELD	7,988.1	1910	0.0	42.2	48.12855584	-103.77683539	2020.197							
1920	WELD	8,030.3	1920	0.0	42.3	48.12851932	-103.77699845	2019.774							
1930	WELD	8,072.6	1930	0.0	42.3	48.12848266	-103.77716187	2019.902							
1940	WELD	8,114.9	1940	0.0	42.2	48.12845018	-103.77732708	2021.437							
1950	WELD	8,157.1	1950	0.0	42.2	48.12841778	-103.77749242	2023.659							
1960	WELD	8,199.3	1960	0.0	42.1	48.12838526	-103.77765759	2026.250							
40000000	Metal Loss - EXTERNAL	8,235.1	1960	35.7	6.4	48.12835860	-103.77779811	2027.734	352	11:30	17%	0.70	0.41	3014	100%
40000001	Metal Loss - EXTERNAL	8,235.7	1960	36.4	5.8	48.12835813	-103.77780056	2027.750	346	11:30	23%	0.78	0.42	3014	100%
11000005	WT CHANGE	8,241.4	1960	0.0	0.1	48.12835374	-103.77782288	2027.962				0.188	52000	0.72	
1970	WELD	8,241.5	1970	0.0	35.8	48.12835369	-103.77782312	2027.965							
1980	WELD	8,277.2	1980	0.0	49.5	48.12832541	-103.77796286	2030.348							
1990	WELD	8,326.8	1990	0.0	49.6	48.12828476	-103.77815578	2031.474							
40000002	Metal Loss - EXTERNAL	8,345.9	1990	19.0	30.6	48.12826864	-103.77822975	2031.899	132	4:15	11%	0.45	0.66	1760	100%
2000	WELD	8,376.4	2000	0.0	47.7	48.12824337	-103.77834844	2033.577							
2010	WELD	8,424.1	2010	0.0	43.0	48.12820634	-103.77853465	2034.649							
2020	WELD	8,467.0	2020	0.0	48.8	48.12817072	-103.77870144	2035.532							

Criteria: ASME B31G: Modified

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
2030	WELD	8,515.8	2030	0.0	49.1	48.12813435	-103.77889350	2036.730						
2040	WELD	8,564.9	2040	0.0	48.5	48.12810259	-103.77908825	2038.507						
2050	WELD	8,613.5	2050	0.0	49.3	48.12806946	-103.77928016	2040.537						
2060	WELD	8,662.7	2060	0.0	7.2	48.12803582	-103.77947493	2040.426						
2070	WELD	8,670.0	2070	0.0	40.1	48.12803073	-103.77950349	2040.658						
2080	WELD	8,710.1	2080	0.0	49.7	48.12800369	-103.77966190	2042.194						
2090	WELD	8,759.8	2090	0.0	49.6	48.12797440	-103.77985986	2042.743						
2100	WELD	8,809.4	2100	0.0	49.6	48.12795945	-103.78005892	2036.834						
2110	WELD	8,858.9	2110	0.0	49.5	48.12796742	-103.78025616	2026.379						
2120	WELD	8,908.5	2120	0.0	49.6	48.12799040	-103.78045026	2015.373						
2130	WELD	8,958.0	2130	0.0	48.9	48.12802067	-103.78064142	2003.971						
2140	WELD	9,006.9	2140	0.0	47.6	48.12805366	-103.78082990	1994.429						
2150	WELD	9,054.5	2150	0.0	49.6	48.12808629	-103.78101473	1987.121						
2160	WELD	9,104.1	2160	0.0	49.4	48.12811865	-103.78120982	1981.675						
2170	WELD	9,153.5	2170	0.0	49.3	48.12815019	-103.78140523	1977.689						
2180	WELD	9,202.8	2180	0.0	49.5	48.12818265	-103.78160020	1975.178						
2190	WELD	9,252.3	2190	0.0	39.6	48.12821859	-103.78179514	1974.130						
2200	WELD	9,291.9	2200	0.0	35.4	48.12824126	-103.78195272	1973.753						
11000006	WT CHANGE	9,327.3	2200	0.0	0.1	48.12824793	-103.78209583	1972.355			0.322	52000	0.72	
2210	WELD	9,327.3	2210	0.0	41.8	48.12824794	-103.78209606	1972.351						
2220	WELD	9,369.1	2220	0.0	42.2	48.12825714	-103.78226258	1965.018						
2230	WELD	9,411.3	2230	0.0	42.2	48.12828100	-103.78243011	1962.686						
2240	WELD	9,453.5	2240	0.0	42.2	48.12830181	-103.78259891	1965.086						
2250	WELD	9,495.7	2250	0.0	42.2	48.12832416	-103.78276788	1966.091						
2260	WELD	9,537.9	2260	0.0	42.2	48.12834896	-103.78293597	1968.894						
2270	WELD	9,580.2	2270	0.0	9.8	48.12837074	-103.78310503	1970.075						
11000007	WT CHANGE	9,589.9	2270	0.0	0.1	48.12837540	-103.78314436	1970.440			0.188	52000	0.72	
2280	WELD	9,590.0	2280	0.0	36.7	48.12837543	-103.78314460	1970.442						
2290	WELD	9,626.8	2290	0.0	41.2	48.12839291	-103.78329176	1973.543						
2300	WELD	9,668.0	2300	0.0	41.3	48.12841323	-103.78345681	1976.335						
2310	WELD	9,709.2	2310	0.0	49.5	48.12843296	-103.78362257	1976.487						
2320	WELD	9,758.8	2320	0.0	49.6	48.12845629	-103.78382225	1977.684						
2330	WELD	9,808.4	2330	0.0	49.4	48.12847944	-103.78402161	1977.822						
2340	WELD	9,857.7	2340	0.0	49.5	48.12850385	-103.78421981	1976.841						
2350	WELD	9,907.2	2350	0.0	49.6	48.12852967	-103.78441860	1975.563						
2360	WELD	9,956.9	2360	0.0	49.6	48.12855909	-103.78461641	1974.907						
2370	WELD	10,006.5	2370	0.0	49.5	48.12859601	-103.78481084	1974.916						

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ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
2380	WELD	10,056.1	2380	0.0	49.5	48.12864628	-103.78499896	1974.879							
2390	WELD	10,105.5	2390	0.0	49.5	48.12871590	-103.78517243	1974.806							
2400	WELD	10,155.0	2400	0.0	41.1	48.12880438	-103.78532533	1974.494							
2410	WELD	10,196.2	2410	0.0	49.5	48.12888619	-103.78544110	1974.901							
2420	WELD	10,245.6	2420	0.0	49.6	48.12898985	-103.78557139	1975.725							
2430	WELD	10,295.3	2430	0.0	49.5	48.12909641	-103.78569639	1978.072							
2440	WELD	10,344.8	2440	0.0	41.1	48.12920354	-103.78581905	1980.043							
2450	WELD	10,385.9	2450	0.0	40.1	48.12929310	-103.78592105	1980.610							
14000001	DENT	10,409.0	2450	23.0	17.1	48.12934410	-103.78597706	1981.077	92	3:00	2.6%				
2460	WELD	10,426.0	2460	0.0	5.9	48.12938213	-103.78601682	1980.729							
2470	WELD	10,431.9	2470	0.0	10.0	48.12939562	-103.78603018	1980.602							
10000013	Bend left - 90 deg., 5D	10,436.7	2470	1.5	8.5	48.12940408	-103.78604433	1980.686	0	12:00					
2480	WELD	10,442.0	2480	0.0	39.1	48.12939988	-103.78606363	1981.391							
2490	WELD	10,481.0	2490	0.0	41.2	48.12934126	-103.78619439	1988.160							
2500	WELD	10,522.3	2500	0.0	49.5	48.12927931	-103.78633088	1996.900							
2510	WELD	10,571.8	2510	0.0	41.2	48.12920214	-103.78648961	2009.662							
2520	WELD	10,613.0	2520	0.0	41.3	48.12913375	-103.78661697	2019.752							
2530	WELD	10,654.3	2530	0.0	49.5	48.12906383	-103.78674360	2029.213							
2540	WELD	10,703.8	2540	0.0	49.4	48.12899563	-103.78691453	2037.413							
2550	WELD	10,753.2	2550	0.0	46.4	48.12897689	-103.78711444	2039.016							
2560	WELD	10,799.6	2560	0.0	49.3	48.12898325	-103.78730394	2040.229							
2570	WELD	10,848.9	2570	0.0	49.5	48.12900117	-103.78750374	2041.951							
2580	WELD	10,898.4	2580	0.0	49.5	48.12901859	-103.78770466	2043.758							
2590	WELD	10,947.9	2590	0.0	49.6	48.12904084	-103.78790391	2046.977							
2600	WELD	10,997.5	2600	0.0	49.5	48.12905557	-103.78810435	2051.040							
2610	WELD	11,047.0	2610	0.0	29.5	48.12906849	-103.78830507	2050.560							
11000008	WT CHANGE	11,076.4	2610	0.0	0.1	48.12908168	-103.78842315	2048.270				0.322	52000	0.72	
2620	WELD	11,076.5	2620	0.0	42.1	48.12908171	-103.78842339	2048.266							
2630	WELD	11,118.6	2630	0.0	42.2	48.12908951	-103.78858977	2039.407							
2640	WELD	11,160.8	2640	0.0	42.2	48.12908375	-103.78875912	2035.645							
2650	WELD	11,203.0	2650	0.0	42.2	48.12907715	-103.78892528	2046.665							
2660	WELD	11,245.3	2660	0.0	42.3	48.12907332	-103.78908745	2061.319							
2670	WELD	11,287.5	2670	0.0	42.2	48.12907183	-103.78925762	2067.866							
11000009	WT CHANGE	11,329.7	2670	0.0	0.1	48.12905919	-103.78942808	2070.773				0.188	52000	0.72	
2680	WELD	11,329.8	2680	0.0	5.8	48.12905917	-103.78942832	2070.776							
2690	WELD	11,335.6	2690	0.0	49.7	48.12905706	-103.78945162	2071.156							
2700	WELD	11,385.3	2700	0.0	49.6	48.12904202	-103.78965250	2075.524							

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ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
2710	WELD	11,434.9	2710	0.0	49.5	48.12903996	-103.78985530	2078.174							
2720	WELD	11,484.4	2720	0.0	49.6	48.12904232	-103.79005794	2079.509							
2730	WELD	11,534.0	2730	0.0	49.5	48.12904201	-103.79026046	2081.607							
2740	WELD	11,583.6	2740	0.0	49.3	48.12904222	-103.79046270	2083.849							
2750	WELD	11,632.9	2750	0.0	49.7	48.12904124	-103.79066445	2086.037							
2760	WELD	11,682.5	2760	0.0	49.4	48.12904069	-103.79086665	2088.381							
2770	WELD	11,731.9	2770	0.0	49.4	48.12904055	-103.79106794	2090.459							
2780	WELD	11,781.3	2780	0.0	49.4	48.12904189	-103.79126943	2092.361							
2790	WELD	11,830.7	2790	0.0	49.0	48.12904296	-103.79147109	2094.640							
2800	WELD	11,879.6	2800	0.0	49.0	48.12904277	-103.79167160	2096.589							
2810	WELD	11,928.7	2810	0.0	49.7	48.12904196	-103.79187202	2098.096							
2820	WELD	11,978.4	2820	0.0	49.6	48.12904063	-103.79207494	2099.896							
2830	WELD	12,028.0	2830	0.0	49.7	48.12903956	-103.79227760	2101.481							
2840	WELD	12,077.7	2840	0.0	49.5	48.12903957	-103.79248070	2103.056							
2850	WELD	12,127.1	2850	0.0	49.6	48.12904048	-103.79268239	2104.609							
2860	WELD	12,176.8	2860	0.0	49.4	48.12904154	-103.79288482	2106.145							
2870	WELD	12,226.2	2870	0.0	49.0	48.12904201	-103.79308633	2106.656							
2880	WELD	12,275.2	2880	0.0	49.4	48.12904136	-103.79328647	2106.616							
2890	WELD	12,324.6	2890	0.0	49.3	48.12903935	-103.79348840	2107.095							
20000005	Seam Variation	12,353.3	2890	28.7	20.7	48.12903862	-103.79360576	2107.797	59	1:45	-	0.82	0.60		
20000006	Seam Variation	12,354.4	2890	29.8	19.6	48.12903860	-103.79361024	2107.818	58	1:45	-	0.47	0.55		
2900	WELD	12,373.9	2900	0.0	49.3	48.12903845	-103.79369015	2107.954							
2910	WELD	12,423.2	2910	0.0	49.3	48.12903892	-103.79389190	2107.871							
2920	WELD	12,472.5	2920	0.0	49.6	48.12903967	-103.79409346	2108.346							
20000007	Seam Variation	12,502.2	2920	29.7	19.9	48.12903980	-103.79421491	2108.510	23	12:45	-	0.35	0.48		
2930	WELD	12,522.1	2930	0.0	49.6	48.12903929	-103.79429625	2108.249							
2940	WELD	12,571.7	2940	0.0	49.4	48.12903721	-103.79449864	2107.595							
2950	WELD	12,621.1	2950	0.0	49.3	48.12903432	-103.79469996	2108.318							
2960	WELD	12,670.4	2960	0.0	49.3	48.12903170	-103.79490144	2111.520							
2970	WELD	12,719.7	2970	0.0	49.6	48.12903066	-103.79510295	2113.829							
2980	WELD	12,769.3	2980	0.0	49.5	48.12903132	-103.79530542	2114.094							
2990	WELD	12,818.7	2990	0.0	49.4	48.12903178	-103.79550782	2115.454							
3000	WELD	12,868.1	3000	0.0	49.7	48.12903100	-103.79570949	2116.178							
3010	WELD	12,917.8	3010	0.0	49.3	48.12902994	-103.79591221	2117.062							
3020	WELD	12,967.1	3020	0.0	49.3	48.12902903	-103.79611328	2118.771							
3030	WELD	13,016.4	3030	0.0	49.5	48.12902877	-103.79631486	2118.684							
3040	WELD	13,066.0	3040	0.0	41.3	48.12902900	-103.79651746	2118.149							

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ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
3050	WELD	13,107.3	3050	0.0	41.3	48.12902897	-103.79668626	2118.298						
3060	WELD	13,148.6	3060	0.0	41.3	48.12902870	-103.79685474	2119.595						
3070	WELD	13,189.8	3070	0.0	41.2	48.12902856	-103.79702338	2122.166						
3080	WELD	13,231.1	3080	0.0	41.3	48.12903010	-103.79719207	2123.064						
3090	WELD	13,272.4	3090	0.0	49.7	48.12903278	-103.79736024	2123.493						
3100	WELD	13,322.0	3100	0.0	49.6	48.12903457	-103.79756291	2123.827						
3110	WELD	13,371.6	3110	0.0	41.4	48.12903386	-103.79776504	2124.071						
3120	WELD	13,413.0	3120	0.0	41.3	48.12903227	-103.79793379	2124.642						
3130	WELD	13,454.3	3130	0.0	41.3	48.12903076	-103.79810241	2126.098						
3140	WELD	13,495.6	3140	0.0	41.3	48.12903025	-103.79827090	2126.442						
10000014	AGM 020, Sta. 132+53, ROW -- Han #8473	13,515.3	3140	19.7	21.5	48.12903008	-103.79835162	2126.583						
3150	WELD	13,536.8	3150	0.0	41.3	48.12903009	-103.79843948	2126.812						
3160	WELD	13,578.2	3160	0.0	41.3	48.12903091	-103.79860801	2126.796						
3170	WELD	13,619.5	3170	0.0	41.2	48.12903206	-103.79877624	2127.415						
3180	WELD	13,660.6	3180	0.0	41.2	48.12903312	-103.79894441	2127.901						
3190	WELD	13,701.9	3190	0.0	41.3	48.12903359	-103.79911282	2128.411						
3200	WELD	13,743.1	3200	0.0	41.3	48.12903427	-103.79928138	2129.164						
3210	WELD	13,784.5	3210	0.0	41.4	48.12903477	-103.79944994	2130.273						
3220	WELD	13,825.8	3220	0.0	41.4	48.12903483	-103.79961846	2131.347						
3230	WELD	13,867.2	3230	0.0	41.3	48.12903408	-103.79978671	2132.204						
3240	WELD	13,908.5	3240	0.0	41.3	48.12903220	-103.79995508	2133.202						
3250	WELD	13,949.8	3250	0.0	41.3	48.12903043	-103.80012333	2135.551						
3260	WELD	13,991.2	3260	0.0	41.3	48.12903028	-103.80029160	2137.622						
3270	WELD	14,032.5	3270	0.0	41.3	48.12903136	-103.80045989	2139.143						
3280	WELD	14,073.8	3280	0.0	41.3	48.12903141	-103.80062821	2140.057						
3290	WELD	14,115.0	3290	0.0	41.2	48.12903097	-103.80079671	2140.766						
3300	WELD	14,156.3	3300	0.0	41.3	48.12903223	-103.80096487	2141.651						
3310	WELD	14,197.6	3310	0.0	41.3	48.12903440	-103.80113351	2142.151						
3320	WELD	14,238.8	3320	0.0	41.3	48.12903713	-103.80130197	2142.234						
3330	WELD	14,280.2	3330	0.0	41.4	48.12903986	-103.80147030	2142.878						
3340	WELD	14,321.5	3340	0.0	41.3	48.12904206	-103.80163876	2144.908						
3350	WELD	14,362.9	3350	0.0	41.3	48.12904257	-103.80180696	2146.857						
3360	WELD	14,404.2	3360	0.0	41.3	48.12904193	-103.80197571	2147.799						
3370	WELD	14,445.5	3370	0.0	41.3	48.12904160	-103.80214434	2148.567						
3380	WELD	14,486.8	3380	0.0	41.3	48.12904126	-103.80231270	2149.400						
3390	WELD	14,528.1	3390	0.0	41.2	48.12903930	-103.80248117	2150.494						

Criteria: ASME B31G: Modified

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
3400	WELD	14,569.3	3400	0.0	41.2	48.12903792	-103.80264968	2152.000						
3410	WELD	14,610.5	3410	0.0	41.3	48.12903604	-103.80281811	2153.816						
3420	WELD	14,651.8	3420	0.0	41.3	48.12903562	-103.80298643	2154.795						
3430	WELD	14,693.1	3430	0.0	41.3	48.12903605	-103.80315478	2154.959						
3440	WELD	14,734.4	3440	0.0	41.3	48.12903512	-103.80332337	2154.486						
3450	WELD	14,775.7	3450	0.0	41.3	48.12903167	-103.80349145	2154.317						
3460	WELD	14,817.0	3460	0.0	41.3	48.12902717	-103.80366021	2154.954						
3470	WELD	14,858.3	3470	0.0	41.3	48.12902288	-103.80382852	2155.572						
3480	WELD	14,899.6	3480	0.0	41.3	48.12901860	-103.80399690	2156.807						
3490	WELD	14,940.9	3490	0.0	41.3	48.12901387	-103.80416513	2158.047						
3500	WELD	14,982.1	3500	0.0	41.3	48.12900870	-103.80433342	2159.224						
3510	WELD	15,023.4	3510	0.0	41.3	48.12900230	-103.80450182	2159.880						
3520	WELD	15,064.7	3520	0.0	41.3	48.12899376	-103.80466988	2160.693						
3530	WELD	15,106.0	3530	0.0	41.3	48.12898504	-103.80483794	2161.306						
3540	WELD	15,147.3	3540	0.0	41.3	48.12897687	-103.80500579	2162.413						
3550	WELD	15,188.6	3550	0.0	41.3	48.12896977	-103.80517342	2164.128						
3560	WELD	15,229.9	3560	0.0	41.3	48.12896295	-103.80534107	2166.354						
3570	WELD	15,271.2	3570	0.0	41.3	48.12895714	-103.80550896	2168.283						
3580	WELD	15,312.5	3580	0.0	41.3	48.12895027	-103.80567685	2169.952						
3590	WELD	15,353.7	3590	0.0	41.2	48.12894251	-103.80584488	2170.884						
3600	WELD	15,394.9	3600	0.0	41.2	48.12893347	-103.80601299	2172.013						
3610	WELD	15,436.1	3610	0.0	41.2	48.12892544	-103.80618069	2172.873						
3620	WELD	15,477.3	3620	0.0	41.3	48.12891789	-103.80634867	2173.279						
3630	WELD	15,518.7	3630	0.0	41.3	48.12891142	-103.80651681	2173.978						
3640	WELD	15,560.0	3640	0.0	41.4	48.12890549	-103.80668461	2175.159						
3650	WELD	15,601.4	3650	0.0	41.3	48.12889943	-103.80685276	2176.122						
3660	WELD	15,642.6	3660	0.0	41.3	48.12889309	-103.80702060	2176.993						
3670	WELD	15,683.9	3670	0.0	41.3	48.12888630	-103.80718842	2178.141						
3680	WELD	15,725.3	3680	0.0	41.3	48.12887901	-103.80735620	2180.031						
3690	WELD	15,766.5	3690	0.0	41.3	48.12887118	-103.80752408	2181.678						
3700	WELD	15,807.8	3700	0.0	41.2	48.12886409	-103.80769207	2182.678						
3710	WELD	15,849.0	3710	0.0	41.2	48.12885716	-103.80786031	2182.865						
3720	WELD	15,890.2	3720	0.0	41.3	48.12885079	-103.80802845	2182.412						
3730	WELD	15,931.5	3730	0.0	41.3	48.12884436	-103.80819621	2181.693						
3740	WELD	15,972.9	3740	0.0	41.4	48.12883814	-103.80836421	2181.485						
3750	WELD	16,014.2	3750	0.0	41.3	48.12883159	-103.80853240	2181.930						
3760	WELD	16,055.6	3760	0.0	41.3	48.12882445	-103.80870054	2182.682						

Criteria: ASME B31G: Modified

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
3770	WELD	16,096.9	3770	0.0	41.3	48.12881733	-103.80886839	2184.383							
3780	WELD	16,138.1	3780	0.0	41.3	48.12880912	-103.80903628	2185.900							
3790	WELD	16,179.4	3790	0.0	41.3	48.12880005	-103.80920406	2186.511							
3800	WELD	16,220.7	3800	0.0	41.2	48.12879063	-103.80937141	2186.693							
3810	WELD	16,261.9	3810	0.0	41.2	48.12878113	-103.80953890	2187.284							
3820	WELD	16,303.2	3820	0.0	41.3	48.12877248	-103.80970597	2183.553							
3830	WELD	16,344.5	3830	0.0	41.3	48.12876263	-103.80986717	2172.681							
3840	WELD	16,385.8	3840	0.0	41.3	48.12875277	-103.81002737	2160.861							
20000008	Mill Anomaly	16,418.7	3840	32.8	8.5	48.12874517	-103.81015625	2152.899	145	4:45	-	0.82	0.33		
3850	WELD	16,427.1	3850	0.0	41.3	48.12874327	-103.81018989	2151.189							
3860	WELD	16,468.5	3860	0.0	41.3	48.12873331	-103.81035474	2144.012							
3870	WELD	16,509.8	3870	0.0	41.3	48.12872304	-103.81052068	2138.095							
3880	WELD	16,551.1	3880	0.0	41.3	48.12871262	-103.81068688	2132.774							
3890	WELD	16,592.4	3890	0.0	41.2	48.12870272	-103.81085348	2128.516							
3900	WELD	16,633.7	3900	0.0	9.6	48.12869399	-103.81101975	2124.081							
3910	WELD	16,643.3	3910	0.0	40.9	48.12869153	-103.81105824	2122.646							
3920	WELD	16,684.2	3920	0.0	40.9	48.12867904	-103.81122221	2116.989							
3930	WELD	16,725.1	3930	0.0	41.0	48.12866596	-103.81138788	2118.434							
3940	WELD	16,766.1	3940	0.0	41.3	48.12865584	-103.81155375	2123.665							
3950	WELD	16,807.5	3950	0.0	41.3	48.12864388	-103.81172015	2127.718							
3960	WELD	16,848.8	3960	0.0	6.2	48.12863195	-103.81188716	2131.207							
3970	WELD	16,855.0	3970	0.0	6.6	48.12863022	-103.81191205	2131.819							
3980	WELD	16,861.5	3980	0.0	21.2	48.12862834	-103.81193869	2132.430							
3990	WELD	16,882.7	3990	0.0	35.0	48.12862226	-103.81202417	2134.384							
4000	WELD	16,917.7	4000	0.0	18.7	48.12861297	-103.81216533	2138.586							
4010	WELD	16,936.5	4010	0.0	39.2	48.12860868	-103.81224124	2140.450							
4020	WELD	16,975.6	4020	0.0	41.3	48.12860008	-103.81239944	2144.696							
4030	WELD	17,016.9	4030	0.0	41.3	48.12859207	-103.81256494	2152.034							
4040	WELD	17,058.2	4040	0.0	41.3	48.12858376	-103.81273031	2159.875							
4050	WELD	17,099.5	4050	0.0	41.3	48.12856758	-103.81289077	2171.328							
4060	WELD	17,140.8	4060	0.0	40.8	48.12855256	-103.81305547	2178.795							
4070	WELD	17,181.6	4070	0.0	26.1	48.12854257	-103.81322062	2183.310							
4080	WELD	17,207.7	4080	0.0	47.7	48.12853621	-103.81332643	2185.847							
4090	WELD	17,255.4	4090	0.0	29.4	48.12851938	-103.81351886	2190.172							
4100	WELD	17,284.8	4100	0.0	3.0	48.12850481	-103.81363662	2192.861							
4110	WELD	17,287.8	4110	0.0	1.6	48.12850324	-103.81364833	2193.161							
10000015	Bend right - 48 deg., 3D	17,288.6	4110	0.1	1.5	48.12850342	-103.81365139	2193.204	0	12:00					

Pipeline Listing

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Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
4120	WELD	17,289.4	4120	0.0	2.0	48.12850422	-103.81365433	2193.217							
4130	WELD	17,291.4	4130	0.0	30.3	48.12850717	-103.81366110	2193.186							
4140	WELD	17,321.6	4140	0.0	38.2	48.12855315	-103.81376370	2192.964							
4150	WELD	17,359.9	4150	0.0	41.0	48.12860835	-103.81389607	2193.362							
4160	WELD	17,400.8	4160	0.0	40.2	48.12867093	-103.81403452	2193.155							
40000003	Metal Loss - EXTERNAL	17,425.3	4160	24.5	15.7	48.12871295	-103.81411514	2193.387	334	11:00	10%	0.45	0.56	1760	100%
4170	WELD	17,441.0	4170	0.0	42.0	48.12874080	-103.81416571	2194.305							
4180	WELD	17,483.0	4180	0.0	2.0	48.12881301	-103.81429303	2198.105							
4190	WELD	17,485.0	4190	0.0	1.6	48.12881656	-103.81429918	2198.270							
10000016	Bend left - 48 deg., 3D	17,485.8	4190	0.1	1.5	48.12881749	-103.81430200	2198.305	0	12:00					
4200	WELD	17,486.6	4200	0.0	2.2	48.12881782	-103.81430506	2198.312							
4210	WELD	17,488.7	4210	0.0	41.3	48.12881768	-103.81431392	2198.296							
4220	WELD	17,530.0	4220	0.0	41.2	48.12881354	-103.81448264	2198.270							
4230	WELD	17,571.2	4230	0.0	41.2	48.12881118	-103.81465091	2199.243							
4240	WELD	17,612.5	4240	0.0	41.2	48.12880665	-103.81481901	2202.040							
4250	WELD	17,653.7	4250	0.0	41.3	48.12879889	-103.81498718	2201.885							
4260	WELD	17,695.0	4260	0.0	41.4	48.12879225	-103.81515474	2198.403							
4270	WELD	17,736.3	4270	0.0	41.4	48.12878851	-103.81532294	2199.061							
4280	WELD	17,777.7	4280	0.0	41.4	48.12878906	-103.81549061	2203.528							
4290	WELD	17,819.0	4290	0.0	41.4	48.12879615	-103.81565830	2206.396							
4300	WELD	17,860.4	4300	0.0	41.4	48.12881279	-103.81582501	2205.693							
4310	WELD	17,901.8	4310	0.0	41.3	48.12884318	-103.81598647	2203.913							
4320	WELD	17,943.1	4320	0.0	41.3	48.12888209	-103.81614460	2203.614							
4330	WELD	17,984.4	4330	0.0	41.3	48.12892214	-103.81630163	2205.786							
4340	WELD	18,025.7	4340	0.0	41.3	48.12896248	-103.81645890	2206.916							
4350	WELD	18,067.0	4350	0.0	41.3	48.12900481	-103.81661509	2207.261							
4360	WELD	18,108.3	4360	0.0	41.2	48.12904873	-103.81677035	2207.574							
4370	WELD	18,149.5	4370	0.0	41.3	48.12909223	-103.81692600	2207.889							
4380	WELD	18,190.8	4380	0.0	41.3	48.12913588	-103.81708140	2208.921							
4390	WELD	18,232.1	4390	0.0	41.4	48.12917968	-103.81723694	2208.756							
4400	WELD	18,273.4	4400	0.0	41.4	48.12922286	-103.81739268	2207.673							
4410	WELD	18,314.8	4410	0.0	41.3	48.12926298	-103.81755003	2206.848							
4420	WELD	18,356.1	4420	0.0	41.3	48.12929940	-103.81770901	2208.745							
4430	WELD	18,397.3	4430	0.0	41.3	48.12932940	-103.81787113	2210.759							
4440	WELD	18,438.6	4440	0.0	41.4	48.12935220	-103.81803602	2211.852							
4450	WELD	18,480.0	4450	0.0	41.3	48.12936869	-103.81820275	2212.483							
4460	WELD	18,521.3	4460	0.0	41.2	48.12938176	-103.81837039	2213.372							

Criteria: ASME B31G: Modified

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
4470	WELD	18,562.5	4470	0.0	41.3	48.12939358	-103.81853796	2213.558						
4480	WELD	18,603.8	4480	0.0	41.3	48.12940552	-103.81870550	2213.626						
4490	WELD	18,645.1	4490	0.0	41.3	48.12941857	-103.81887317	2213.640						
4500	WELD	18,686.4	4500	0.0	41.3	48.12943275	-103.81904016	2214.301						
4510	WELD	18,727.7	4510	0.0	36.8	48.12944574	-103.81920779	2214.260						
11000010	WT CHANGE	18,764.5	4510	0.0	0.1	48.12945619	-103.81935659	2213.635			0.322	52000	0.72	
4520	WELD	18,764.6	4520	0.0	42.1	48.12945621	-103.81935687	2213.634						
4530	WELD	18,806.7	4530	0.0	42.2	48.12946205	-103.81952845	2213.182						
4540	WELD	18,848.9	4540	0.0	42.2	48.12945402	-103.81969933	2210.014						
4550	WELD	18,891.1	4550	0.0	42.2	48.12944184	-103.81986948	2206.632						
4560	WELD	18,933.3	4560	0.0	42.0	48.12943049	-103.82004030	2204.961						
10000017	AGM 030, Sta. 186+33, 145th Ave NW -- Han #8802	18,935.5	4560	2.2	39.8	48.12943016	-103.82004938	2204.963						
11000011	WT CHANGE	18,975.3	4560	0.0	0.1	48.12942750	-103.82021072	2202.364			0.188	52000	0.72	
4570	WELD	18,975.4	4570	0.0	10.7	48.12942750	-103.82021095	2202.356						
4580	WELD	18,986.0	4580	0.0	40.9	48.12942748	-103.82025398	2201.133						
4590	WELD	19,027.0	4590	0.0	41.0	48.12942739	-103.82041907	2196.097						
4600	WELD	19,068.0	4600	0.0	41.1	48.12941265	-103.82058324	2192.050						
4610	WELD	19,109.1	4610	0.0	41.1	48.12935666	-103.82072507	2187.449						
4620	WELD	19,150.2	4620	0.0	41.3	48.12927799	-103.82084370	2184.663						
4630	WELD	19,191.5	4630	0.0	41.4	48.12919548	-103.82095846	2185.084						
4640	WELD	19,232.8	4640	0.0	41.3	48.12911188	-103.82107137	2187.442						
4650	WELD	19,274.2	4650	0.0	41.3	48.12902854	-103.82118482	2187.027						
4660	WELD	19,315.4	4660	0.0	41.3	48.12894606	-103.82129895	2184.100						
4670	WELD	19,356.7	4670	0.0	41.3	48.12886383	-103.82141354	2181.844						
4680	WELD	19,398.0	4680	0.0	41.4	48.12878262	-103.82153028	2180.705						
4690	WELD	19,439.3	4690	0.0	31.1	48.12870147	-103.82164721	2181.486						
4700	WELD	19,470.4	4700	0.0	45.5	48.12863942	-103.82173374	2182.125						
4710	WELD	19,516.0	4710	0.0	49.4	48.12854717	-103.82185848	2182.712						
4720	WELD	19,565.3	4720	0.0	41.4	48.12844686	-103.82199340	2185.316						
4730	WELD	19,606.7	4730	0.0	41.4	48.12836472	-103.82210857	2188.865						
4740	WELD	19,648.1	4740	0.0	41.4	48.12828327	-103.82222515	2191.216						
4750	WELD	19,689.5	4750	0.0	41.4	48.12820205	-103.82234201	2194.519						
4760	WELD	19,730.8	4760	0.0	41.4	48.12812055	-103.82245770	2198.161						
4770	WELD	19,772.2	4770	0.0	41.3	48.12803776	-103.82257196	2200.509						
4780	WELD	19,813.4	4780	0.0	49.4	48.12795502	-103.82268656	2200.690						

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ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
4790	WELD	19,862.8	4790	0.0	41.3	48.12785547	-103.82282235	2199.695							
4800	WELD	19,904.1	4800	0.0	41.3	48.12777246	-103.82293594	2201.434							
4810	WELD	19,945.4	4810	0.0	41.3	48.12769051	-103.82305142	2204.022							
4820	WELD	19,986.7	4820	0.0	41.3	48.12760965	-103.82316859	2206.541							
4830	WELD	20,028.0	4830	0.0	41.4	48.12752884	-103.82328582	2209.532							
4840	WELD	20,069.3	4840	0.0	49.5	48.12744811	-103.82340300	2212.466							
4850	WELD	20,118.8	4850	0.0	49.3	48.12735020	-103.82354169	2215.162							
20000010	Seam Variation	20,123.9	4850	5.0	44.3	48.12734015	-103.82355577	2215.442	8	12:15	-	0.59	0.36		
20000011	Seam Variation	20,124.7	4850	5.8	43.5	48.12733854	-103.82355802	2215.487	7	12:00	-	0.71	0.45		
4860	WELD	20,168.2	4860	0.0	49.3	48.12725210	-103.82367899	2217.599							
4870	WELD	20,217.4	4870	0.0	41.3	48.12715456	-103.82381714	2219.953							
4880	WELD	20,258.7	4880	0.0	44.9	48.12707296	-103.82393291	2223.229							
4890	WELD	20,303.7	4890	0.0	41.3	48.12698404	-103.82405883	2227.294							
4900	WELD	20,345.0	4900	0.0	41.3	48.12690250	-103.82417519	2229.368							
4910	WELD	20,386.2	4910	0.0	41.3	48.12682103	-103.82429060	2234.100							
4920	WELD	20,427.6	4920	0.0	49.2	48.12673937	-103.82440404	2240.816							
4930	WELD	20,476.8	4930	0.0	49.3	48.12664074	-103.82453823	2246.012							
4940	WELD	20,526.1	4940	0.0	49.5	48.12654181	-103.82467407	2249.196							
4950	WELD	20,575.6	4950	0.0	49.4	48.12644419	-103.82481407	2250.908							
4960	WELD	20,625.0	4960	0.0	41.2	48.12634990	-103.82495859	2252.971							
4970	WELD	20,666.2	4970	0.0	41.3	48.12627524	-103.82508441	2254.846							
4980	WELD	20,707.5	4980	0.0	41.2	48.12620696	-103.82521808	2256.176							
4990	WELD	20,748.8	4990	0.0	41.2	48.12614838	-103.82536149	2256.446							
5000	WELD	20,790.0	5000	0.0	41.2	48.12610082	-103.82551418	2256.718							
5010	WELD	20,831.2	5010	0.0	41.3	48.12607178	-103.82567699	2256.585							
5020	WELD	20,872.6	5020	0.0	41.3	48.12605536	-103.82584398	2256.599							
5030	WELD	20,913.8	5030	0.0	41.4	48.12604468	-103.82601147	2256.057							
5040	WELD	20,955.2	5040	0.0	41.4	48.12603741	-103.82617955	2256.022							
5050	WELD	20,996.6	5050	0.0	41.2	48.12603323	-103.82634764	2255.767							
5060	WELD	21,037.8	5060	0.0	41.3	48.12603216	-103.82651603	2255.682							
5070	WELD	21,079.1	5070	0.0	41.3	48.12603320	-103.82668462	2255.737							
5080	WELD	21,120.4	5080	0.0	41.3	48.12603437	-103.82685298	2256.144							
5090	WELD	21,161.6	5090	0.0	41.2	48.12603483	-103.82702137	2257.460							
5100	WELD	21,202.8	5100	0.0	41.2	48.12603418	-103.82718976	2259.120							
5110	WELD	21,244.1	5110	0.0	41.3	48.12603228	-103.82735836	2259.588							
5120	WELD	21,285.3	5120	0.0	41.3	48.12602984	-103.82752671	2259.870							
5130	WELD	21,326.6	5130	0.0	41.4	48.12602765	-103.82769477	2260.258							

Criteria: ASME B31G: Modified

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
5140	WELD	21,368.0	5140	0.0	41.3	48.12602643	-103.82786308	2260.928						
5150	WELD	21,409.3	5150	0.0	41.3	48.12602547	-103.82803147	2261.507						
5160	WELD	21,450.6	5160	0.0	41.3	48.12602391	-103.82819970	2260.468						
5170	WELD	21,491.9	5170	0.0	41.3	48.12602240	-103.82836810	2260.378						
5180	WELD	21,533.2	5180	0.0	41.3	48.12602109	-103.82853664	2260.207						
5190	WELD	21,574.4	5190	0.0	41.2	48.12602236	-103.82870496	2258.921						
5200	WELD	21,615.7	5200	0.0	41.3	48.12602438	-103.82887316	2257.968						
5210	WELD	21,656.9	5210	0.0	41.2	48.12602687	-103.82904179	2257.860						
5220	WELD	21,698.2	5220	0.0	41.3	48.12602919	-103.82921023	2257.537						
5230	WELD	21,739.5	5230	0.0	41.4	48.12603117	-103.82937874	2257.702						
5240	WELD	21,780.9	5240	0.0	41.3	48.12603313	-103.82954725	2258.168						
5250	WELD	21,822.2	5250	0.0	41.4	48.12603521	-103.82971562	2258.266						
5260	WELD	21,863.6	5260	0.0	41.3	48.12603723	-103.82988421	2258.256						
5270	WELD	21,904.9	5270	0.0	41.3	48.12603849	-103.83005273	2257.814						
5280	WELD	21,946.2	5280	0.0	41.4	48.12603892	-103.83022110	2257.141						
5290	WELD	21,987.6	5290	0.0	41.3	48.12603863	-103.83038982	2256.749						
5300	WELD	22,028.8	5300	0.0	41.2	48.12603783	-103.83055834	2256.591						
5310	WELD	22,070.1	5310	0.0	41.2	48.12603632	-103.83072670	2256.412						
5320	WELD	22,111.3	5320	0.0	41.3	48.12603571	-103.83089529	2256.309						
5330	WELD	22,152.6	5330	0.0	41.4	48.12603653	-103.83106411	2256.753						
5340	WELD	22,193.9	5340	0.0	41.4	48.12603683	-103.83123244	2257.498						
5350	WELD	22,235.3	5350	0.0	41.3	48.12603600	-103.83140087	2259.425						
5360	WELD	22,276.6	5360	0.0	41.3	48.12603441	-103.83156930	2261.264						
5370	WELD	22,317.9	5370	0.0	41.3	48.12603263	-103.83173768	2262.977						
5380	WELD	22,359.2	5380	0.0	41.3	48.12603125	-103.83190613	2264.215						
5390	WELD	22,400.6	5390	0.0	41.3	48.12602905	-103.83207473	2265.419						
5400	WELD	22,441.9	5400	0.0	41.2	48.12602570	-103.83224300	2267.557						
10000018	AGM 040, Sta. 221+07, Well Drive Way -- Han #8836	22,479.8	5400	37.9	3.3	48.12602299	-103.83239771	2269.337						
5410	WELD	22,483.1	5410	0.0	41.2	48.12602273	-103.83241129	2269.548						
5420	WELD	22,524.3	5420	0.0	41.4	48.12601965	-103.83257982	2271.720						
5430	WELD	22,565.7	5430	0.0	41.4	48.12601678	-103.83274819	2273.473						
5440	WELD	22,607.1	5440	0.0	41.4	48.12601526	-103.83291712	2274.414						
5450	WELD	22,648.5	5450	0.0	41.3	48.12601403	-103.83308594	2274.750						
5460	WELD	22,689.8	5460	0.0	41.3	48.12601355	-103.83325462	2274.434						
5470	WELD	22,731.1	5470	0.0	41.4	48.12601368	-103.83342343	2273.955						

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
5480	WELD	22,772.5	5480	0.0	41.4	48.12601311	-103.83359209	2273.537						
5490	WELD	22,813.8	5490	0.0	41.3	48.12601253	-103.83376094	2272.825						
5500	WELD	22,855.2	5500	0.0	41.3	48.12601303	-103.83392919	2271.044						
5510	WELD	22,896.4	5510	0.0	41.3	48.12601375	-103.83409754	2269.688						
5520	WELD	22,937.8	5520	0.0	41.4	48.12601463	-103.83426598	2269.857						
5530	WELD	22,979.1	5530	0.0	41.4	48.12601587	-103.83443467	2270.229						
5540	WELD	23,020.5	5540	0.0	41.4	48.12601679	-103.83460355	2270.535						
5550	WELD	23,061.9	5550	0.0	41.4	48.12601754	-103.83477202	2269.865						
5560	WELD	23,103.2	5560	0.0	41.4	48.12601769	-103.83494082	2267.987						
5570	WELD	23,144.6	5570	0.0	41.4	48.12601720	-103.83510947	2266.329						
5580	WELD	23,186.0	5580	0.0	33.0	48.12601583	-103.83527815	2265.283						
11000012	WT CHANGE	23,218.9	5580	0.0	0.1	48.12601408	-103.83541242	2264.051			0.322	52000	0.72	
5590	WELD	23,219.0	5590	0.0	42.1	48.12601408	-103.83541270	2264.046						
5600	WELD	23,261.0	5600	0.0	42.1	48.12601327	-103.83558364	2260.041						
5610	WELD	23,303.2	5610	0.0	42.1	48.12601612	-103.83575518	2256.947						
5620	WELD	23,345.3	5620	0.0	42.2	48.12601778	-103.83592554	2250.985						
5630	WELD	23,387.4	5630	0.0	42.2	48.12601982	-103.83609624	2245.913						
5640	WELD	23,429.6	5640	0.0	42.2	48.12602083	-103.83626772	2243.886						
5650	WELD	23,471.8	5650	0.0	42.1	48.12602250	-103.83644003	2244.403						
5660	WELD	23,513.9	5660	0.0	42.2	48.12602508	-103.83661172	2242.305						
5670	WELD	23,556.1	5670	0.0	42.3	48.12602842	-103.83678331	2239.657						
5680	WELD	23,598.4	5680	0.0	42.2	48.12603111	-103.83695555	2240.330						
5690	WELD	23,640.6	5690	0.0	42.2	48.12603478	-103.83712739	2243.575						
5700	WELD	23,682.8	5700	0.0	42.2	48.12603797	-103.83729874	2247.796						
5710	WELD	23,725.0	5710	0.0	42.2	48.12604169	-103.83747004	2252.461						
5720	WELD	23,767.2	5720	0.0	41.2	48.12604640	-103.83764012	2259.387						
11000013	WT CHANGE	23,808.4	5720	0.0	0.1	48.12604833	-103.83780425	2268.227			0.188	52000	0.72	
5730	WELD	23,808.4	5730	0.0	39.8	48.12604834	-103.83780452	2268.236						
5740	WELD	23,848.3	5740	0.0	37.4	48.12604878	-103.83796665	2271.129						
5750	WELD	23,885.6	5750	0.0	41.4	48.12604839	-103.83811890	2272.682						
5760	WELD	23,927.0	5760	0.0	41.3	48.12604849	-103.83828685	2276.185						
5770	WELD	23,968.3	5770	0.0	41.3	48.12604829	-103.83845526	2278.971						
5780	WELD	24,009.6	5780	0.0	41.4	48.12604850	-103.83862346	2282.816						
5790	WELD	24,051.0	5790	0.0	41.3	48.12604934	-103.83879179	2285.551						
5800	WELD	24,092.3	5800	0.0	41.2	48.12605049	-103.83895994	2288.126						
5810	WELD	24,133.6	5810	0.0	41.2	48.12605148	-103.83912824	2289.838						
5820	WELD	24,174.8	5820	0.0	41.2	48.12605218	-103.83929688	2290.994						

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
5830	WELD	24,216.0	5830	0.0	41.3	48.12605330	-103.83946558	2291.951						
5840	WELD	24,257.2	5840	0.0	41.3	48.12605363	-103.83963441	2292.110						
5850	WELD	24,298.5	5850	0.0	41.4	48.12605426	-103.83980338	2292.813						
5860	WELD	24,339.9	5860	0.0	41.3	48.12605553	-103.83997218	2293.919						
5870	WELD	24,381.2	5870	0.0	41.3	48.12605775	-103.84014075	2295.937						
5880	WELD	24,422.5	5880	0.0	41.3	48.12605956	-103.84030931	2296.638						
5890	WELD	24,463.8	5890	0.0	41.3	48.12606068	-103.84047833	2296.562						
5900	WELD	24,505.2	5900	0.0	41.3	48.12606157	-103.84064712	2296.626						
5910	WELD	24,546.5	5910	0.0	41.3	48.12606301	-103.84081596	2296.763						
5920	WELD	24,587.7	5920	0.0	41.2	48.12606525	-103.84098496	2297.356						
5930	WELD	24,628.9	5930	0.0	41.4	48.12606730	-103.84115376	2297.517						
5940	WELD	24,670.3	5940	0.0	41.3	48.12606804	-103.84132254	2298.330						
5950	WELD	24,711.6	5950	0.0	41.3	48.12606634	-103.84149132	2297.953						
5960	WELD	24,753.0	5960	0.0	41.3	48.12606425	-103.84165970	2298.013						
5970	WELD	24,794.3	5970	0.0	41.3	48.12606252	-103.84182854	2298.314						
5980	WELD	24,835.6	5980	0.0	41.3	48.12606162	-103.84199721	2298.956						
5990	WELD	24,876.9	5990	0.0	41.3	48.12606198	-103.84216601	2299.058						
6000	WELD	24,918.2	6000	0.0	41.3	48.12606264	-103.84233473	2299.851						
6010	WELD	24,959.5	6010	0.0	41.2	48.12606359	-103.84250331	2300.546						
6020	WELD	25,000.7	6020	0.0	41.2	48.12606577	-103.84267195	2300.402						
6030	WELD	25,041.9	6030	0.0	41.3	48.12606803	-103.84284058	2299.413						
6040	WELD	25,083.3	6040	0.0	41.4	48.12606995	-103.84300939	2298.758						
6050	WELD	25,124.6	6050	0.0	41.4	48.12607088	-103.84317805	2298.576						
6060	WELD	25,166.0	6060	0.0	41.4	48.12607015	-103.84334704	2299.021						
6070	WELD	25,207.4	6070	0.0	41.3	48.12606893	-103.84351591	2299.324						
6080	WELD	25,248.7	6080	0.0	41.3	48.12606795	-103.84368454	2300.043						
6090	WELD	25,290.0	6090	0.0	41.3	48.12606749	-103.84385276	2301.149						
6100	WELD	25,331.2	6100	0.0	41.3	48.12606748	-103.84402130	2301.774						
6110	WELD	25,372.5	6110	0.0	41.3	48.12606806	-103.84419013	2302.273						
6120	WELD	25,413.8	6120	0.0	41.2	48.12606884	-103.84435877	2301.802						
6130	WELD	25,455.0	6130	0.0	41.2	48.12606981	-103.84452717	2301.596						
6140	WELD	25,496.3	6140	0.0	41.3	48.12607133	-103.84469598	2301.519						
6150	WELD	25,537.5	6150	0.0	41.3	48.12607203	-103.84486473	2301.806						
6160	WELD	25,578.8	6160	0.0	41.4	48.12607215	-103.84503336	2302.364						
6170	WELD	25,620.2	6170	0.0	41.4	48.12607265	-103.84520205	2303.715						
6180	WELD	25,661.6	6180	0.0	41.3	48.12607304	-103.84537033	2304.820						
6190	WELD	25,702.9	6190	0.0	41.3	48.12607427	-103.84553863	2305.364						

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
6200	WELD	25,744.2	6200	0.0	41.3	48.12607697	-103.84570707	2304.974							
6210	WELD	25,785.4	6210	0.0	41.2	48.12607941	-103.84587555	2304.373							
6220	WELD	25,826.7	6220	0.0	41.2	48.12607949	-103.84604377	2303.746							
6230	WELD	25,867.9	6230	0.0	41.2	48.12607854	-103.84621205	2303.188							
6240	WELD	25,909.1	6240	0.0	41.2	48.12607792	-103.84638025	2302.530							
6250	WELD	25,950.3	6250	0.0	41.2	48.12607800	-103.84654876	2302.457							
6260	WELD	25,991.4	6260	0.0	41.3	48.12607883	-103.84671742	2302.736							
6270	WELD	26,032.8	6270	0.0	41.3	48.12607987	-103.84688620	2302.584							
6280	WELD	26,074.1	6280	0.0	41.3	48.12608075	-103.84705482	2303.041							
6290	WELD	26,115.4	6290	0.0	41.4	48.12608238	-103.84722356	2303.386							
6300	WELD	26,156.8	6300	0.0	41.3	48.12608392	-103.84739214	2304.483							
6310	WELD	26,198.0	6310	0.0	41.3	48.12608460	-103.84756085	2304.453							
6320	WELD	26,239.3	6320	0.0	41.3	48.12608519	-103.84772962	2303.829							
6330	WELD	26,280.6	6330	0.0	41.3	48.12608628	-103.84789839	2303.638							
6340	WELD	26,321.9	6340	0.0	41.2	48.12608846	-103.84806718	2303.253							
6350	WELD	26,363.1	6350	0.0	41.2	48.12608966	-103.84823546	2301.732							
6360	WELD	26,404.3	6360	0.0	41.2	48.12608939	-103.84840392	2300.522							
6370	WELD	26,445.6	6370	0.0	41.3	48.12608986	-103.84857185	2297.372							
6380	WELD	26,486.9	6380	0.0	41.3	48.12609157	-103.84873964	2293.851							
6390	WELD	26,528.3	6390	0.0	41.4	48.12609152	-103.84890783	2291.133							
6400	WELD	26,569.6	6400	0.0	41.3	48.12608999	-103.84907638	2289.196							
6410	WELD	26,611.0	6410	0.0	41.3	48.12608852	-103.84924478	2287.255							
40000004	Metal Loss - EXTERNAL	26,617.8	6410	6.9	34.4	48.12608828	-103.84927284	2286.832	338	11:15	11%	0.31	0.45	1760	100%
6420	WELD	26,652.2	6420	0.0	41.3	48.12608719	-103.84941299	2284.692							
6430	WELD	26,693.6	6430	0.0	41.3	48.12608619	-103.84958155	2282.760							
6440	WELD	26,734.8	6440	0.0	41.3	48.12608770	-103.84975030	2281.924							
6450	WELD	26,776.1	6450	0.0	41.3	48.12609331	-103.84991873	2280.666							
6460	WELD	26,817.4	6460	0.0	41.3	48.12610364	-103.85008656	2279.944							
6470	WELD	26,858.6	6470	0.0	41.3	48.12611621	-103.85025433	2279.194							
6480	WELD	26,899.9	6480	0.0	41.3	48.12612994	-103.85042168	2277.772							
6490	WELD	26,941.2	6490	0.0	41.3	48.12614406	-103.85058844	2275.044							
6500	WELD	26,982.5	6500	0.0	41.3	48.12615867	-103.85075530	2273.204							
6510	WELD	27,023.8	6510	0.0	41.4	48.12617464	-103.85092207	2271.822							
6520	WELD	27,065.2	6520	0.0	40.2	48.12619279	-103.85108834	2270.618							
6530	WELD	27,105.3	6530	0.0	41.3	48.12621115	-103.85124963	2269.141							
6540	WELD	27,146.6	6540	0.0	39.7	48.12623154	-103.85141462	2265.013							
14000002	DENT	27,170.7	6540	24.0	15.7	48.12624497	-103.85151006	2261.646	290	9:30	2.0%				

Criteria: ASME B31G: Modified

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
14000003	DENT	27,173.1	6540	26.4	13.4	48.12624631	-103.85151937	2261.286	304	10:00	2.1%				
11000014	WT CHANGE	27,186.3	6540	0.0	0.1	48.12625367	-103.85157149	2259.439				0.322	52000	0.72	
6550	WELD	27,186.4	6550	0.0	42.2	48.12625371	-103.85157177	2259.430							
6560	WELD	27,228.5	6560	0.0	42.2	48.12627752	-103.85173661	2251.674							
6570	WELD	27,270.7	6570	0.0	42.2	48.12630624	-103.85190232	2248.949							
6580	WELD	27,312.9	6580	0.0	12.1	48.12633859	-103.85206684	2252.952							
11000015	WT CHANGE	27,324.9	6580	0.0	0.1	48.12634852	-103.85211366	2253.876				0.188	52000	0.72	
6590	WELD	27,325.0	6590	0.0	42.4	48.12634857	-103.85211389	2253.880							
6600	WELD	27,367.4	6600	0.0	39.9	48.12638275	-103.85227916	2253.851							
6610	WELD	27,407.3	6610	0.0	41.3	48.12641433	-103.85243505	2252.184							
6620	WELD	27,448.7	6620	0.0	41.4	48.12645324	-103.85259364	2250.936							
6630	WELD	27,490.1	6630	0.0	41.4	48.12649916	-103.85274771	2249.715							
6640	WELD	27,531.4	6640	0.0	41.3	48.12655429	-103.85289478	2249.313							
6650	WELD	27,572.7	6650	0.0	41.3	48.12661825	-103.85303394	2249.069							
6660	WELD	27,614.0	6660	0.0	41.3	48.12668721	-103.85316773	2249.668							
6670	WELD	27,655.3	6670	0.0	41.3	48.12675931	-103.85329769	2249.031							
6680	WELD	27,696.5	6680	0.0	41.3	48.12683345	-103.85342512	2248.603							
6690	WELD	27,737.8	6690	0.0	41.2	48.12690844	-103.85355061	2247.797							
6700	WELD	27,779.0	6700	0.0	41.2	48.12698489	-103.85367462	2246.046							
6710	WELD	27,820.2	6710	0.0	41.0	48.12706227	-103.85379746	2244.775							
6720	WELD	27,861.2	6720	0.0	40.8	48.12713930	-103.85391872	2242.907							
6730	WELD	27,902.0	6730	0.0	41.3	48.12721617	-103.85403930	2242.097							
6740	WELD	27,943.3	6740	0.0	41.4	48.12729302	-103.85416268	2240.896							
6750	WELD	27,984.7	6750	0.0	40.6	48.12736923	-103.85428733	2241.649							
6760	WELD	28,025.4	6760	0.0	41.2	48.12744356	-103.85441080	2242.833							
6770	WELD	28,066.6	6770	0.0	41.3	48.12751853	-103.85453701	2243.841							
6780	WELD	28,107.9	6780	0.0	40.5	48.12759404	-103.85466260	2244.699							
10000019	AGM 050, Sta. 277+44, ROW -- Han #8043	28,123.2	6780	15.3	25.2	48.12762222	-103.85470879	2244.706							
6790	WELD	28,148.4	6790	0.0	43.0	48.12766840	-103.85478507	2244.797							
6800	WELD	28,191.4	6800	0.0	43.2	48.12774734	-103.85491594	2244.420							
6810	WELD	28,234.6	6810	0.0	41.3	48.12782705	-103.85504703	2244.404							
6820	WELD	28,275.9	6820	0.0	41.4	48.12790225	-103.85517296	2244.390							
6830	WELD	28,317.3	6830	0.0	41.4	48.12797712	-103.85529958	2245.213							
6840	WELD	28,358.6	6840	0.0	41.3	48.12805242	-103.85542492	2243.876							
6850	WELD	28,400.0	6850	0.0	41.3	48.12812704	-103.85555111	2241.872							
6860	WELD	28,441.3	6860	0.0	41.2	48.12820203	-103.85567723	2241.098							

Criteria: ASME B31G: Modified

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
6870	WELD	28,482.5	6870	0.0	41.3	48.12827665	-103.85580398	2241.310							
6880	WELD	28,523.8	6880	0.0	41.3	48.12835128	-103.85593055	2242.536							
6890	WELD	28,565.1	6890	0.0	41.3	48.12842731	-103.85605513	2244.840							
6900	WELD	28,606.4	6900	0.0	41.3	48.12850798	-103.85617349	2245.274							
6910	WELD	28,647.7	6910	0.0	41.2	48.12859347	-103.85628419	2244.946							
6920	WELD	28,688.9	6920	0.0	41.3	48.12868169	-103.85638963	2245.187							
6930	WELD	28,730.2	6930	0.0	41.3	48.12877122	-103.85649256	2244.776							
6940	WELD	28,771.6	6940	0.0	41.4	48.12886234	-103.85659216	2244.018							
6950	WELD	28,812.9	6950	0.0	41.4	48.12895697	-103.85668446	2244.621							
6960	WELD	28,854.4	6960	0.0	41.3	48.12905565	-103.85676692	2246.234							
6970	WELD	28,895.7	6970	0.0	41.3	48.12915868	-103.85683623	2245.816							
6980	WELD	28,937.0	6980	0.0	24.1	48.12926437	-103.85689359	2242.564							
6990	WELD	28,961.1	6990	0.0	11.3	48.12932715	-103.85692239	2240.822							
7000	WELD	28,972.4	7000	0.0	41.3	48.12935683	-103.85693492	2240.127							
7010	WELD	29,013.8	7010	0.0	31.5	48.12946575	-103.85697733	2237.847							
7020	WELD	29,045.2	7020	0.0	6.3	48.12954926	-103.85700732	2236.703							
7030	WELD	29,051.6	7030	0.0	1.6	48.12956612	-103.85701315	2236.548							
10000020	Bend left - 48 deg., 3D	29,052.4	7030	0.1	1.5	48.12956793	-103.85701464	2236.493	0	12:00					
7040	WELD	29,053.2	7040	0.0	39.1	48.12956935	-103.85701700	2236.411							
11000016	WT CHANGE	29,092.2	7040	0.0	0.1	48.12962961	-103.85714627	2231.229				0.322	52000	0.72	
7050	WELD	29,092.3	7050	0.0	42.1	48.12962973	-103.85714648	2231.219							
40000005	Metal Loss - EXTERNAL	29,092.9	7050	0.6	41.5	48.12963089	-103.85714846	2231.122	357	11:45	21%	0.66	0.38	3014	100%
7060	WELD	29,134.4	7060	0.0	42.2	48.12970928	-103.85726780	2225.181							
7070	WELD	29,176.6	7070	0.0	42.3	48.12979235	-103.85738737	2225.779							
7080	WELD	29,218.9	7080	0.0	42.3	48.12987599	-103.85750573	2225.630							
7090	WELD	29,261.1	7090	0.0	42.2	48.12995957	-103.85762394	2225.101							
7100	WELD	29,303.3	7100	0.0	42.2	48.13004404	-103.85774057	2224.029							
7110	WELD	29,345.5	7110	0.0	42.2	48.13012682	-103.85786023	2225.195							
7120	WELD	29,387.7	7120	0.0	42.2	48.13020925	-103.85797831	2230.901							
11000017	WT CHANGE	29,429.8	7120	0.0	0.1	48.13028695	-103.85810456	2230.952				0.188	52000	0.72	
7130	WELD	29,429.9	7130	0.0	48.8	48.13028707	-103.85810477	2230.948							
7140	WELD	29,478.7	7140	0.0	41.2	48.13037584	-103.85825359	2229.723							
7150	WELD	29,519.9	7150	0.0	41.2	48.13045347	-103.85837521	2228.992							
7160	WELD	29,561.1	7160	0.0	41.0	48.13053164	-103.85849568	2227.048							
7170	WELD	29,602.2	7170	0.0	49.4	48.13061051	-103.85861470	2228.233							
7180	WELD	29,651.6	7180	0.0	40.9	48.13070585	-103.85875788	2230.501							
7190	WELD	29,692.4	7190	0.0	47.5	48.13078427	-103.85887666	2232.440							

Pipeline Listing

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Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
7200	WELD	29,740.0	7200	0.0	49.4	48.13087603	-103.85901404	2234.198							
7210	WELD	29,789.4	7210	0.0	49.1	48.13097167	-103.85915424	2237.939							
7220	WELD	29,838.5	7220	0.0	49.2	48.13106818	-103.85929346	2242.125							
7230	WELD	29,887.7	7230	0.0	4.0	48.13116321	-103.85943427	2245.513							
7240	WELD	29,891.7	7240	0.0	1.5	48.13117090	-103.85944584	2245.702							
10000021	Bend left - 50 deg., 3D	29,892.4	7240	0.1	1.4	48.13117180	-103.85944854	2245.714	0	12:00					
7250	WELD	29,893.2	7250	0.0	7.1	48.13117214	-103.85945154	2245.709							
7260	WELD	29,900.3	7260	0.0	42.8	48.13117180	-103.85948069	2245.634							
7270	WELD	29,943.1	7270	0.0	39.0	48.13117255	-103.85965590	2244.809							
20000014	Mill Anomaly	29,956.9	7270	13.8	25.3	48.13117340	-103.85971220	2244.474	57	1:45	-	0.35	0.34		
40000006	Metal Loss - EXTERNAL	29,979.6	7270	36.4	2.6	48.13117523	-103.85980512	2244.272	16	12:30	13%	0.74	0.68	1760	100%
7280	WELD	29,982.2	7280	0.0	41.2	48.13117546	-103.85981563	2244.266							
7290	WELD	30,023.3	7290	0.0	41.3	48.13117907	-103.85998372	2244.053							
7300	WELD	30,064.6	7300	0.0	49.7	48.13118206	-103.86015242	2245.540							
7310	WELD	30,114.4	7310	0.0	49.6	48.13118478	-103.86035493	2247.190							
7320	WELD	30,164.0	7320	0.0	49.6	48.13118726	-103.86055707	2250.202							
7330	WELD	30,213.6	7330	0.0	41.3	48.13119042	-103.86075891	2254.927							
7340	WELD	30,254.9	7340	0.0	49.4	48.13119354	-103.86092738	2256.891							
7350	WELD	30,304.3	7350	0.0	49.5	48.13119887	-103.86112858	2259.056							
7360	WELD	30,353.7	7360	0.0	49.5	48.13120769	-103.86133026	2260.679							
7370	WELD	30,403.2	7370	0.0	49.5	48.13122447	-103.86153062	2258.781							
40000007	Metal Loss - EXTERNAL	30,442.1	7370	38.9	10.6	48.13124333	-103.86168616	2255.126	135	4:30	12%	0.75	0.70	1760	100%
7380	WELD	30,452.7	7380	0.0	49.4	48.13124912	-103.86172825	2253.949							
7390	WELD	30,502.0	7390	0.0	49.6	48.13127820	-103.86192377	2249.016							
7400	WELD	30,551.6	7400	0.0	49.4	48.13130833	-103.86212063	2247.682							
7410	WELD	30,601.0	7410	0.0	49.3	48.13133923	-103.86231676	2249.339							
20000017	Mill Anomaly	30,607.1	7410	6.0	43.2	48.13134310	-103.86234095	2249.497	68	2:15	-	1.18	0.35		
7420	WELD	30,650.3	7420	0.0	49.1	48.13137013	-103.86251249	2249.342							
7430	WELD	30,699.4	7430	0.0	49.2	48.13140094	-103.86270747	2247.387							
7440	WELD	30,748.5	7440	0.0	49.6	48.13143185	-103.86290304	2247.200							
7450	WELD	30,798.1	7450	0.0	49.3	48.13146198	-103.86310053	2248.724							
7460	WELD	30,847.4	7460	0.0	49.5	48.13149020	-103.86329719	2252.227							
7470	WELD	30,896.9	7470	0.0	49.4	48.13151849	-103.86349489	2255.449							
7480	WELD	30,946.3	7480	0.0	49.2	48.13154801	-103.86369209	2254.453							
20000018	Seam Variation	30,963.6	7480	17.3	31.9	48.13155856	-103.86376080	2253.539	270	9:00	-	0.47	0.50		
7490	WELD	30,995.5	7490	0.0	49.6	48.13157833	-103.86388677	2250.447							
7500	WELD	31,045.1	7500	0.0	41.4	48.13160902	-103.86408212	2244.224							

Criteria: ASME B31G: Modified

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)	Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
7510	WELD	31,086.5	7510	0.0	49.4	48.13163386	-103.86424530	2239.480						
7520	WELD	31,135.9	7520	0.0	49.4	48.13166347	-103.86444116	2236.338						
7530	WELD	31,185.3	7530	0.0	48.9	48.13169185	-103.86463837	2234.966						
7540	WELD	31,234.2	7540	0.0	49.6	48.13171859	-103.86483426	2236.092						
7550	WELD	31,283.8	7550	0.0	48.9	48.13174654	-103.86503240	2236.156						
7560	WELD	31,332.6	7560	0.0	49.3	48.13177538	-103.86522715	2236.259						
7570	WELD	31,382.0	7570	0.0	49.3	48.13180564	-103.86542379	2237.576						
7580	WELD	31,431.3	7580	0.0	49.4	48.13183492	-103.86562113	2238.799						
7590	WELD	31,480.7	7590	0.0	49.3	48.13186549	-103.86581823	2240.166						
7600	WELD	31,530.0	7600	0.0	49.6	48.13189608	-103.86601457	2240.568						
7610	WELD	31,579.6	7610	0.0	49.6	48.13192603	-103.86621136	2240.053						
7620	WELD	31,629.3	7620	0.0	49.5	48.13195508	-103.86640880	2237.293						
7630	WELD	31,678.8	7630	0.0	49.6	48.13198413	-103.86660614	2235.502						
7640	WELD	31,728.4	7640	0.0	49.4	48.13201378	-103.86680375	2237.479						
7650	WELD	31,777.8	7650	0.0	49.6	48.13204376	-103.86700092	2238.500						
7660	WELD	31,827.4	7660	0.0	43.3	48.13207468	-103.86719775	2236.208						
7670	WELD	31,870.7	7670	0.0	49.3	48.13210294	-103.86736939	2233.933						
7680	WELD	31,920.0	7680	0.0	49.6	48.13213670	-103.86756422	2231.543						
7690	WELD	31,969.6	7690	0.0	49.4	48.13217115	-103.86775991	2229.283						
7700	WELD	32,019.0	7700	0.0	49.5	48.13220317	-103.86795422	2224.063						
7710	WELD	32,068.6	7710	0.0	49.5	48.13223455	-103.86814651	2215.295						
7720	WELD	32,118.0	7720	0.0	49.3	48.13226609	-103.86834167	2210.198						
7730	WELD	32,167.4	7730	0.0	49.3	48.13229693	-103.86853717	2212.639						
7740	WELD	32,216.6	7740	0.0	49.4	48.13232751	-103.86873138	2219.685						
7750	WELD	32,266.1	7750	0.0	49.4	48.13235897	-103.86892802	2222.481						
7760	WELD	32,315.4	7760	0.0	49.2	48.13238917	-103.86912448	2221.759						
7770	WELD	32,364.6	7770	0.0	49.2	48.13241793	-103.86932059	2218.607						
7780	WELD	32,413.9	7780	0.0	49.0	48.13244815	-103.86951677	2217.232						
7790	WELD	32,462.8	7790	0.0	49.3	48.13248199	-103.86971088	2217.084						
7800	WELD	32,512.1	7800	0.0	49.6	48.13251865	-103.86990493	2219.319						
7810	WELD	32,561.7	7810	0.0	49.6	48.13255775	-103.87009897	2221.030						
7820	WELD	32,611.3	7820	0.0	49.4	48.13259884	-103.87029198	2223.838						
7830	WELD	32,660.6	7830	0.0	49.5	48.13263941	-103.87048415	2226.400						
7840	WELD	32,710.1	7840	0.0	49.5	48.13267883	-103.87067727	2228.927						
7850	WELD	32,759.6	7850	0.0	49.2	48.13271725	-103.87087132	2230.532						
7860	WELD	32,808.8	7860	0.0	49.4	48.13275764	-103.87106275	2231.650						
7870	WELD	32,858.2	7870	0.0	49.1	48.13280031	-103.87125407	2232.796						

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
7880	WELD	32,907.3	7880	0.0	48.9	48.13284013	-103.87144552	2233.658							
7890	WELD	32,956.2	7890	0.0	49.2	48.13287770	-103.87163732	2233.853							
7900	WELD	33,005.4	7900	0.0	49.4	48.13291348	-103.87183111	2233.867							
7910	WELD	33,054.7	7910	0.0	49.5	48.13295037	-103.87202453	2233.026							
7920	WELD	33,104.2	7920	0.0	49.0	48.13298778	-103.87221860	2231.839							
7930	WELD	33,153.2	7930	0.0	49.3	48.13302374	-103.87241131	2231.436							
7940	WELD	33,202.5	7940	0.0	49.6	48.13306089	-103.87260504	2230.887							
7950	WELD	33,252.2	7950	0.0	49.2	48.13309981	-103.87279923	2229.914							
7960	WELD	33,301.4	7960	0.0	49.1	48.13313871	-103.87299134	2226.844							
7970	WELD	33,350.5	7970	0.0	49.3	48.13317641	-103.87318380	2222.904							
7980	WELD	33,399.9	7980	0.0	49.6	48.13321278	-103.87337783	2222.005							
7990	WELD	33,449.5	7990	0.0	49.7	48.13325007	-103.87357259	2222.430							
8000	WELD	33,499.1	8000	0.0	49.4	48.13328615	-103.87376766	2225.120							
8010	WELD	33,548.6	8010	0.0	49.4	48.13332071	-103.87396250	2226.050							
8020	WELD	33,598.0	8020	0.0	49.1	48.13335364	-103.87415811	2226.217							
8030	WELD	33,647.1	8030	0.0	49.6	48.13338426	-103.87435289	2226.980							
8040	WELD	33,696.6	8040	0.0	49.6	48.13341388	-103.87455042	2227.478							
8050	WELD	33,746.2	8050	0.0	49.2	48.13344396	-103.87474790	2227.901							
8060	WELD	33,795.5	8060	0.0	49.3	48.13347455	-103.87494415	2228.239							
8070	WELD	33,844.7	8070	0.0	49.3	48.13350656	-103.87513972	2228.301							
8080	WELD	33,894.0	8080	0.0	49.6	48.13353855	-103.87533535	2227.445							
8090	WELD	33,943.6	8090	0.0	49.3	48.13356952	-103.87553214	2226.880							
8100	WELD	33,992.9	8100	0.0	49.2	48.13359798	-103.87572880	2225.558							
8110	WELD	34,042.1	8110	0.0	49.4	48.13362603	-103.87592524	2224.381							
8120	WELD	34,091.5	8120	0.0	49.4	48.13365403	-103.87612253	2222.978							
8130	WELD	34,140.8	8130	0.0	49.2	48.13368287	-103.87631921	2221.740							
8140	WELD	34,190.0	8140	0.0	49.5	48.13371156	-103.87651552	2220.631							
8150	WELD	34,239.5	8150	0.0	49.4	48.13374090	-103.87671291	2219.061							
20000019	Seam Variation	34,281.3	8150	41.8	7.7	48.13376558	-103.87687956	2218.154	76	2:30	-	0.59	0.61		
20000020	Seam Variation	34,284.5	8150	45.0	4.5	48.13376749	-103.87689231	2218.055	78	2:30	-	0.47	0.58		
8160	WELD	34,289.0	8160	0.0	49.6	48.13377017	-103.87691008	2217.906							
8170	WELD	34,338.6	8170	0.0	49.7	48.13380022	-103.87710763	2216.437							
8180	WELD	34,388.3	8180	0.0	49.4	48.13383065	-103.87730470	2214.596							
8190	WELD	34,437.7	8190	0.0	49.2	48.13386105	-103.87749996	2210.002							
8200	WELD	34,486.9	8200	0.0	49.3	48.13389196	-103.87769401	2204.938							
8210	WELD	34,536.2	8210	0.0	49.4	48.13392342	-103.87788974	2202.489							
8220	WELD	34,585.6	8220	0.0	49.7	48.13395487	-103.87808539	2203.250							

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
8230	WELD	34,635.2	8230	0.0	49.3	48.13398742	-103.87828208	2205.511							
8240	WELD	34,684.5	8240	0.0	49.2	48.13402163	-103.87847659	2204.324							
8250	WELD	34,733.7	8250	0.0	49.4	48.13405646	-103.87866973	2199.690							
8260	WELD	34,783.1	8260	0.0	49.7	48.13408979	-103.87886393	2195.043							
8270	WELD	34,832.8	8270	0.0	49.3	48.13412174	-103.87905869	2188.987							
8280	WELD	34,882.1	8280	0.0	40.3	48.13415219	-103.87925323	2183.175							
8290	WELD	34,922.5	8290	0.0	49.0	48.13417743	-103.87941176	2178.121							
8300	WELD	34,971.5	8300	0.0	49.3	48.13420869	-103.87960540	2174.582							
10000022	AGM 060, Sta. 345+56, ROW -- Survey Point	35,017.0	8300	45.5	3.9	48.13423766	-103.87978551	2177.888							
8310	WELD	35,020.9	8310	0.0	49.4	48.13424011	-103.87980068	2178.278							
8320	WELD	35,070.3	8320	0.0	49.3	48.13427144	-103.87999693	2180.595							
8330	WELD	35,119.6	8330	0.0	49.5	48.13430172	-103.88019328	2181.653							
8340	WELD	35,169.0	8340	0.0	48.9	48.13433436	-103.88038966	2181.488							
8350	WELD	35,218.0	8350	0.0	49.4	48.13436804	-103.88058327	2181.578							
8360	WELD	35,267.4	8360	0.0	49.3	48.13440104	-103.88077859	2181.352							
8370	WELD	35,316.7	8370	0.0	49.5	48.13443380	-103.88097396	2182.596							
8380	WELD	35,366.2	8380	0.0	48.5	48.13446533	-103.88117001	2183.980							
8390	WELD	35,414.7	8390	0.0	50.5	48.13449681	-103.88136250	2185.322							
8400	WELD	35,465.2	8400	0.0	49.3	48.13452943	-103.88156313	2185.513							
8410	WELD	35,514.5	8410	0.0	49.5	48.13455706	-103.88175983	2185.141							
8420	WELD	35,564.0	8420	0.0	49.3	48.13457550	-103.88196001	2184.940							
8430	WELD	35,613.3	8430	0.0	49.3	48.13458409	-103.88216054	2183.212							
8440	WELD	35,662.6	8440	0.0	41.4	48.13458123	-103.88236135	2180.781							
8450	WELD	35,704.0	8450	0.0	49.5	48.13457316	-103.88252948	2178.105							
8460	WELD	35,753.5	8460	0.0	49.4	48.13455392	-103.88272900	2176.317							
8470	WELD	35,802.9	8470	0.0	49.4	48.13452478	-103.88292520	2174.689							
8480	WELD	35,852.3	8480	0.0	49.4	48.13448802	-103.88311899	2174.580							
8490	WELD	35,901.7	8490	0.0	49.3	48.13444604	-103.88331101	2174.334							
8500	WELD	35,951.0	8500	0.0	49.4	48.13440130	-103.88350112	2174.189							
8510	WELD	36,000.3	8510	0.0	42.6	48.13435831	-103.88369223	2174.547							
8520	WELD	36,042.9	8520	0.0	22.8	48.13432384	-103.88385857	2175.182							
14000004	DENT	36,053.4	8520	10.4	12.4	48.13431602	-103.88389984	2175.010	159	5:15	2.0%				
8530	WELD	36,065.7	8530	0.0	48.8	48.13430777	-103.88394868	2174.483							
11000018	WT CHANGE	36,114.5	8530	0.0	0.1	48.13429355	-103.88414566	2171.002				0.322	52000	0.72	
8540	WELD	36,114.6	8540	0.0	42.1	48.13429356	-103.88414594	2170.997							
8550	WELD	36,156.6	8550	0.0	42.2	48.13430130	-103.88431716	2168.708							

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
8560	WELD	36,198.8	8560	0.0	42.2	48.13430944	-103.88448856	2171.939							
8570	WELD	36,241.0	8570	0.0	42.2	48.13431741	-103.88465957	2175.535							
11000019	WT CHANGE	36,283.1	8570	0.0	0.1	48.13432333	-103.88483065	2177.805				0.188	52000	0.72	
8580	WELD	36,283.2	8580	0.0	49.1	48.13432334	-103.88483093	2177.805							
8590	WELD	36,332.3	8590	0.0	43.1	48.13432702	-103.88503124	2179.386							
8600	WELD	36,375.4	8600	0.0	48.8	48.13432659	-103.88520657	2179.798							
8610	WELD	36,424.1	8610	0.0	49.4	48.13432726	-103.88540550	2179.213							
8620	WELD	36,473.5	8620	0.0	49.2	48.13433008	-103.88560666	2180.348							
8630	WELD	36,522.7	8630	0.0	49.5	48.13433028	-103.88580767	2181.881							
8640	WELD	36,572.1	8640	0.0	49.6	48.13433005	-103.88600960	2183.855							
8650	WELD	36,621.7	8650	0.0	49.6	48.13433038	-103.88621223	2186.394							
8660	WELD	36,671.3	8660	0.0	49.6	48.13433189	-103.88641449	2188.648							
8670	WELD	36,720.9	8670	0.0	49.5	48.13433445	-103.88661713	2191.307							
8680	WELD	36,770.4	8680	0.0	49.7	48.13433706	-103.88681831	2194.838							
8690	WELD	36,820.1	8690	0.0	49.6	48.13433882	-103.88702073	2198.442							
8700	WELD	36,869.8	8700	0.0	49.6	48.13434083	-103.88722254	2203.210							
8710	WELD	36,919.4	8710	0.0	49.6	48.13434238	-103.88742467	2205.953							
8720	WELD	36,968.9	8720	0.0	49.3	48.13434528	-103.88762693	2206.471							
8730	WELD	37,018.3	8730	0.0	49.4	48.13434852	-103.88782832	2207.443							
8740	WELD	37,067.6	8740	0.0	49.3	48.13435078	-103.88802999	2209.105							
8750	WELD	37,116.9	8750	0.0	49.4	48.13434978	-103.88822996	2204.389							
8760	WELD	37,166.3	8760	0.0	49.4	48.13434687	-103.88843110	2200.139							
8770	WELD	37,215.7	8770	0.0	49.5	48.13434403	-103.88863272	2198.881							
8780	WELD	37,265.2	8780	0.0	48.8	48.13434159	-103.88883466	2198.194							
8790	WELD	37,314.0	8790	0.0	49.6	48.13434067	-103.88903355	2196.135							
8800	WELD	37,363.6	8800	0.0	49.5	48.13433955	-103.88923565	2196.446							
8810	WELD	37,413.1	8810	0.0	49.4	48.13433783	-103.88943726	2200.348							
8820	WELD	37,462.5	8820	0.0	49.5	48.13433388	-103.88963784	2205.388							
8830	WELD	37,512.0	8830	0.0	49.4	48.13432922	-103.88983837	2212.040							
8840	WELD	37,561.4	8840	0.0	49.3	48.13432610	-103.89003990	2214.090							
8850	WELD	37,610.7	8850	0.0	30.5	48.13432277	-103.89024093	2212.117							
11000020	WT CHANGE	37,641.1	8850	0.0	0.1	48.13431942	-103.89036447	2211.557				0.322	52000	0.72	
8860	WELD	37,641.2	8860	0.0	6.0	48.13431941	-103.89036483	2211.557							
8870	WELD	37,647.2	8870	0.0	1.6	48.13431876	-103.89038954	2211.591							
10000023	Bend up - 45 deg., 3D	37,648.0	8870	0.1	1.4	48.13431872	-103.89039255	2211.830	0	12:00					
8880	WELD	37,648.8	8880	0.0	6.1	48.13431869	-103.89039506	2212.246							
8890	WELD	37,654.8	8890	0.0	13.5	48.13431843	-103.89041330	2216.498							

Criteria: ASME B31G: Modified

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Trenton Station Launch to Receive

ID#	Description	Distance (ft)	Joint #	U/S Weld	D/S Weld	Latitude	Longitude	Altitude	Orientation (Deg / O'Clock)		Depth (%)	Length or WT	Width or YS	P' or SF	(P'/P)
10000032	Pipe Exiting Ground, ROW -- Han #8027	37,662.0	8890	7.1	6.3	48.13431797	-103.89043435	2221.469							
8900	WELD	37,668.3	8900	0.0	1.6	48.13431756	-103.89045310	2223.954							
10000024	Bend down - 45 deg., 3D	37,669.1	8900	0.1	1.5	48.13431748	-103.89045601	2224.063	0	12:00					
8910	WELD	37,669.9	8910	0.0	6.0	48.13431738	-103.89045924	2223.944							
8920	WELD	37,676.0	8920	0.0	0.9	48.13431649	-103.89048402	2222.139							
10000025	Flange	37,676.4	8920	0.5	0.5	48.13431642	-103.89048596	2221.994	0	12:00					
8930	WELD	37,676.9	8930	0.0	1.2	48.13431636	-103.89048791	2221.852							
10000026	Tee at 90 deg.	37,677.4	8930	0.2	1.0	48.13431627	-103.89049021	2221.680	81	2:30					
8940	WELD	37,678.1	8940	0.0	1.2	48.13431616	-103.89049270	2221.492							
10000027	Pipe Support	37,678.8	8940	0.6	0.6	48.13431602	-103.89049586	2221.258							
8950	WELD	37,679.3	8950	0.0	3.1	48.13431592	-103.89049776	2221.113							
10000028	Flange	37,679.8	8950	0.4	2.7	48.13431583	-103.89049976	2220.967	0	12:00					
10000029	Valve (Receiver), Sta. 371+78, Trenton Station	37,680.8	8950	1.5	1.6	48.13431566	-103.89050456	2220.616							
10000030	Flange	37,681.9	8950	2.6	0.5	48.13431566	-103.89050458	2220.614	0	12:00					
8960	WELD	37,682.4	8960	0.0	-	48.13431566	-103.89050458	2220.614							
12000001	End Run Tickle	37,724.4	8960	42.0	-	48.13431566	-103.89050458	2220.614							

Type	Number
DEFORMATION	5
GAINS	0
GROUPED PITS	8
LOCATIONS	33
MILL ANOMALY	4
MISC	2
SEAM VARIATION	9
WT CHANGES	21
WELDS	886

General Inline Inspection Terms

GLOSSARY

AGM (Aboveground Marker)	A portable device placed at an above ground reference point that both detects and records the passage of an in-line inspection tool. AGMs are typically reported using a marker number followed by the aboveground reference point description of the location device (box) placement.
ABOVE-GROUND REFERENCE POINTS	The above ground reference point is a permanent reference on or above the pipeline, which can be used to locate features in the pipeline. Reference points can be valves, fences, test stations, markers posts, or other permanent features.
ACCELEROMETERS	Part of the INS package of the in-line inspection tool. Each TDW tool contains 3 axis-aligned accelerometers measuring orientation and shock.
ANCHOR, WEIGHT OR HANGAR	Non-welded full encirclement pipeline features typically evenly spaced across water crossings. These are usually not detrimental unless associated metal loss is detected.
ANOMALY	Any kind of imperfection or defect that may be present in the wall of the pipe. This includes coating or welding.
APPURTENANCE	A component that is attached to the pipeline; e.g., valve, tee, casing, instrument connection.
ASME B31G, MODIFIED ASME B31G, or DNV RP-F101	Commonly used analysis criterion for metal loss anomalies in a pipeline. TDW software may use ASME B31G, MODIFIED ASME B31G, or DNV RP-F101 to calculate the safe maximum allowable operating pressure or failure pressure at an area of metal loss. These formulas utilize only length and depth - they do not take into consideration the width of the anomaly. The MODIFIED ASME B31G more closely approximates the values obtained via the RSTRENG calculations, which is less conservative than the standard ASME B31G calculation. See also DNV RP-F101.
BEND	A physical pipe configuration that changes pipeline direction.
BEND RADIUS	The radius of the bend in the pipe as related to the pipe diameter (D). Example: A 3-D bend would have a radius of 3 times the diameter of the pipe measured to the centerline of the pipe.
BORE RESTRICTION	Any reduction of the cross-section of the pipe that may restrict the passage of an ILI pig.
BUCKLE	A condition where the pipeline has undergone sufficient plastic deformation to cause permanent wrinkling or deformation of the pipe wall or the pipe's cross section.
BURST PRESSURE	The pressure at which the nominal hoop stress in the wall of a pipe equals the specified minimum yield stress of the pipe grade. It is calculated by 2st/D where s = SMYS, t = nominal wall thickness, D = nominal outside diameter of pipe.
CALIBRATION DIG	An exploratory excavation to compare findings of an in-line inspection system to actual conditions with the purpose of improving data analysis.
CASING ANOMALY	When the casing is not welded, or when a gap occurs in the weld, this signature is detected by the tool, and identified with a miscellaneous remark.
CHARACTERIZATION	The process of quantifying the size, shape, orientation, and location of an anomaly, defect, or critical defect after it has been detected.
CHECK VALVE	A valve that prevents reverse flow.
CLAMP	Non-welded full encirclement pipeline feature not located at a bridge or water crossing, in some cases a type of temporary repair.
COMPONENT	Any physical part of the pipeline , other than line pipe, including but not limited to valves, welds, tees, flanges, fitting, taps, branch connections, outlets, supports and anchors.

General Inline Inspection Terms

CONTROL POINT	Control points are know locations used to provide coordinate updates to aid the final processing of the inertial data gathered from the instruments onboard the inspection vehicle.
CORROSION (External)	Metal loss due to electrochemical, galvanic, microbiological, or other attack on the pipe due to environmental conditions surrounding the pipe.
CORROSION (Internal)	Metal loss due to chemical or other attack on the steel from liquids on the inside of the pipe. Electrochemical attack can also occur in local cells, but this is less frequent.
DATA ANALYSIS	The process through which indications are evaluated to classify, characterize and size them as non-relevant conditions, pipeline components, anomalies, imperfections, or defects.
DATUM	A datum is a set of reference points on the earth's surface against which position measurements are made. Horizontal datums are used for describing a point on the earth's surface, in latitude and longitude or another coordinate system. While hundreds of reference datums exists some examples of horizontal datums include, NAD27, NAD83, and WGS84. Vertical datums are tidal, based on sea levels referencing geodetic datums such as NAVD88, or geodetic, based on the same ellipsoid models of the earth used for computing horizontal datums.
DNV RP-F101	An analysis procedure that differs from the commonly used ASME B31G criterion. Developed by the Norwegian company Det Norske Veritas, this method is employed for European and Asian pipelines. The DNV algorithm is generally considered to be more conservative than ASME B31G.
DEFECT	An anomaly for which an analysis, such as ASME B31G, would indicate that the pipe is approaching failure as the nominal hoop stress approaches the specified minimum yield stress (SMYS).
DEFORMATION PIG	A pig designed to record conditions such as dents, wrinkles, ovalities, bend radius and angle by making measurements of the inside surface of the pipeline.
DENTS	Dents are depressions in the pipeline that may be detected by the inline inspection tool. MFL tools may be able to detect dents, but may not be able to accurately size them.
DETECTION THRESHOLD	A characteristic dimension or dimensions of an anomaly that must be exceeded to achieve a stated probability of detection.
DOT192	Part 192 of the Code for Federal Regulations (CFR) Title 49 that addresses Gas Transmission Pipelines.
DOT195	Part 195 of the Code for Federal Regulations (CFR) Title 49 that addresses Transportation of Hazardous Liquids by Pipeline.
ECCENTRIC CASINGS	TDW tools detect when a casing is not centered on the pipeline. These casings are referred to as being eccentric. The closer the casing is to the pipeline, the stronger the signal seen by the inspection tool. The tool may not detect if the casing is shorted to the pipe wall. The tool might see evidence of a short, such as metal loss.
ESTIMATED REPAIR FACTOR (ERF)	The ratio of pipeline design pressure or in some cases MOP to the safe maximum operating pressure (P').
ERW (Electric Resistance Weld)	Describes a process used to form steel from a sheet into tubular form (pipe). Welds are formed by resistance heating of two edges of a metal sheet and then forcing them together to create a solid-state weld.
EXPANSION	Local increase of pipe diameter during service which indicates the yield stress of the pipe at that location has been surpassed.

General Inline Inspection Terms

FAILURE PRESSURE RATIO (FPR)	The ratio of the predicted failure pressure calculated by an analysis criterion (e.g. ASME B31G, RSTRENG, etc.) to the MAOP
FEATURE	Any physical object detected by an in-line inspection system. Features may be anomalies, components, or some other item.
FITTING	A branch connection attached to the pipeline which is smaller than the nominal pipe size that alters flow or diverts product (e.g. tap, offtake, split-tee, weld-o-let, thread-o-let).
GAIN (Metal in Close Proximity)	The inspection tool may detect ferrous metal objects located close to or touching the pipeline. They appear as additional metal added to the pipe and are referred to as gains. Clamps or anchors are considered gains as well as features such as puddle welds or CP connections. Generally, repairs such as patches or sleeves are called out as repairs even though they show appear in the data as gains.
GIRTH WELD	A circumferential weld joining two joints of pipe.
GIS	Geographic Information System is any system that captures, stores, analyzes, manages, and presents data that are linked to location. GIS is the merging of cartography and database technology.
GOUGE	Elongated grooves or cavities caused by mechanical removal of metal.
GPS (Global Positioning System)	The navigational system utilizing satellite technology to provide a user an exact position on the earth's surface. When coupled with known surface locations such as valves and AGMs, an ILI tool's INS or IMU can approximate or calculate the centerline of a pipeline.
GYROSCOPES (Gyros)	Electronic sensors used to measure change in direction of in-line inspection tool during inspection process. Displayed as pitch and yaw in PIGTRAP.
GROUP	A group is several pits that are grouped together using specific interaction rules. If a pit is a mountain peak, then a group is a mountain range. The reason for groups is so that the overall extent of the metal loss area can be evaluated. Most formulas for calculating the strength of the pipe wall around metal loss look at the overall length of metal loss after interaction rules have been applied to pits.
HALF SOLE	A device used to repair a pipeline by welding a small section over half the circumference of the pipe over the defect, literally half of a sleeve.
HALL SENSORS	A sensor that directly measures the remaining magnetic field strength not absorbed by the pipe.
HCA (High Consequence Area)	A criterion for pipelines designed by the Code of Federal Regulations which define what program and practices operators must use to manage pipeline integrity if the pipeline is located near a commercially navigable waterway, a high population area, or an unusually sensitive area.
HEAT AFFECTED ZONE (HAZ)	The region around a weld which has been metallurgically affected during the welding process.
HEAVY WELD	A girth weld in which the root pass or a portion of the root pass intrudes further than normal into the ID of the pipe. Not usually considered detrimental.
HIGH RESOLUTION	A term used to describe the function of TDW tools for use in MFL or Deformation analysis schemes. Both MFL and Deformation tools are considered high resolution.
IMPERFECTION	An anomaly with dimension and characteristics that do not exceed acceptable limits.

General Inline Inspection Terms

IMU (Inertial Measurement Unit)	Inertial measurement unit, or IMU, is the main component of inertial guidance systems. An IMU works by sensing motion including the type, rate, and direction of that motion using a combination of accelerometers and gyroscopes.
INCLUSION	An anomaly in the cross section of the pipeline caused by manufacturing processes. Inclusions may be detrimental if they protrude through the pipe wall. Refer to mill anomaly.
INDICATION	Any measured signal or response from an inspection of a pipe different than the normal baseline signal.
INS (Inertial Navigation System)	Refers to a system of accelerometers and gyroscopes to track the movement and orientation of the inspection tool through bends, turns, etc.
INTERACTION RULES	Specifications that establish spacing criteria between anomalies or defects (pits). If the indications or defects are proximate to one another within the criteria , the anomaly or defect is treated as a single larger unit or group for engineering analysis purposes.
INSPECTION	The use of a non-destructive inspection technique.
JOINT	A single section of pipe that is welded to others to make up a pipeline.
LACK OF FUSION (LOF)	In a weld, any area or zone that lacks complete melting and coalescence of a portion of the weld.
LAUNCHER	Refers to the beginning of the inspection; an oversize section of pipe equipped with sealing door through which the inspection tool is loaded into the pipeline.
LOCATION	A location is a feature in the pipeline that can be used to correlate the inspection tool data to above ground references. Common location features include valves, fitting, flanges, tees, casings, repairs and AGMs. For example, a metal loss area could be referenced as being 200 feet downstream from a valve. Not all locations can be easily found from aboveground.
LATITUDE & LONGITUDE	Latitude is the angular distance north or south from the earth's equator measured through 90 degrees. Longitude is the arc or portion of the earth's equator intersected between the meridian of a given place and the prime meridian and is expressed either in degrees or in time. Latitude and longitude are reported as GPS coordinates. Predicted GPS for features are provided in the Pipeline Listing section.
MAOP (Maximum Allowable Operating Pressure)	(or Design Pressure) The maximum internal pressure permitted in the operation of a pipeline as defined by the Code of Federal Regulations.
MAPPING PIG	An ILI tool that uses an IMU to collect data that can be analyzed to produce an elevation and plan view of the pipeline route.
MEASUREMENT THRESHOLD	A characteristic's dimension or dimensions above which anomaly measurements can be made.
MECHANICAL DAMAGE	A generic term used to describe combinations of dents gouges, and/or cold work caused by the application of external force. Damage includes coating, movement of metal and high residual stress.
METAL LOSS	Any of a number of types of anomalies in pipe in which metal has been removed from the pipe surface, usually due to corrosion or gouging.
MFL (Magnetic Flux Leakage)	An inspection technique in which a magnetic field is applied to a pipe section and measurements are taken of a magnetic flux density at the pipe surface. Changes in measured flux density indicate the presence of a possible defect.

General Inline Inspection Terms

MILL ANOMALY	The process of manufacturing pipe can often leave indications in the pipe wall. Typically these anomalies are not detrimental, and are identified for the benefit of the client.
MINIMUM BORE	The minimum measured Internal Diameter of the pipe at any particular point. Also referred to as minimum cross-section.
MISALIGNMENT	A girth weld anomaly where the two joints of pipe were not aligned properly prior to welding. Sometimes referred to as a hi-lo.
MOP (Maximum Operating Pressure)	The established maximum internal pressure expected during the operation of a pipeline, which cannot normally exceed the maximum allowable operating pressure (MAOP).
ODOMETER	Wheels on in-line inspection tool, which rotate along the pipe to measure the distance the tool has traveled.
ORIENTATION	The location of the reference around the circumference of the pipe, as viewed in the direction of flow (downstream). The value is represented in degrees 0-360° rotating clockwise around pipe. (0° = top of pipe, 90° = 3:00)
OVALITY	A condition in which a circular pipe forms into an ellipse, usually as the result of external forces.
P	Calculated pressure rating for the pipe. Per ASME B31G, it is the greater of either the established MOP for liquid lines (MAOP for gas lines), or 2stFT/D, where S = SMYS, F = appropriate design factor from ASME B31G, T = Temperature derating factor, D = nominal outside diameter of pipe, and t = nominal wall thickness. See ASME B31G. In application, this variable is identical per DNV RP-F101, however it is calculated using different formulas and factors.
P' (Calculated safe maximum operating pressure)	Calculated safe maximum operating pressure for the pipeline segment as calculated based on information provided by the Customer. TDW software uses ASME B31G, MODIFIED ASME B31G, or DNV RP-F101 to calculate the safe maximum allowable operating pressure (P') of the pipeline at a metal loss area for liquid lines. The calculation also takes into consideration a temperature factor, for use when the line is at elevated temperature, and a safety factor. The default values used in calculations are a temperature factor of 1, and a safety factor of 72% (80% for Canada).
Pfail (Calculated failure pressure)	Calculated maximum operating pressure for the pipeline segment as calculated based on information provided by the Customer. TDW software uses ASME B31G, MODIFIED ASME B31G, or DNV RP-F101 to calculate the failure pressure (Pfail) of the pipeline at a metal loss area for gas lines. The calculation also takes into consideration a temperature factor, for use when the line is at elevated temperature, and a safety factor. The default values used in calculations are a temperature factor of 1, and a safety factor of 100%.
P'/P	Percent of maximum established pressure, this is calculated by dividing the calculated safe pressure of the defect (P') by the current established maximum operating pressure of the pipeline (P). For TDW reporting, P is either established MOP provided by the customer or the calculated pressure rating for the pipe (P). Percentages less than 100% are considered pressure-reducing.
Pfail/MAOP	Percent of MAOP, this is calculated by dividing the calculated failure pressure of the defect (Pfail) by the current MAOP of the pipeline (P). For TDW reporting, P is either established MAOP provided by the customer or the calculated pressure rating for the pipe (P).
PATCH	A device used to repair a pipeline by welding a small section of pipe on top of the defect.
PIG	A generic term signifying any independent, self-contained device, tool or vehicle that moves through the interior of the pipeline for purposes of inspecting, batching, dimensioning, or cleaning.

General Inline Inspection Terms

PIGTRAP	Pipeline Inspection Graphical Test Reporting and Analysis Program (PIGTRAP). Proprietary software developed by TDW Inc. for viewing data collected by the inspection tool.
PIPE SUPPORT	Any device used to support an aboveground pipeline.
PIT	Localized concentrated-cell corrosion on the external or internal surfaces that results from generation of a potential (voltage) difference set up by variations in oxygen concentrations within and outside the pit. The oxygen-starved pit acts as anode and the pipe surface acts as the cathode. If several pits are in close proximity to each other, they may be grouped together using interaction rules as one group.
PLANAR	An NDT term indicating a feature has two-dimensional characteristics like a fissure. Sometimes referred to as crack-like.
RSTRENG	A computer program designed to calculate the calculated safe maximum operating pressure (P') of corroded pipe. RSTRENG results are approximated when Modified B31G criteria is used.
REBOUNDING	The process of changing the dent depth and shape by internal pressure in the pipe. Generally, dents due to third-party contact will re-round, while dents due to rocks will not unless the rock causing the dent is removed.
RECEIVER	Refers to the ending of the inspection; an oversize section of pipe equipped with sealing door through which the inspection tool is retrieved from the pipeline.
REPORTING THRESHOLD	A parameter that defines whether or not an anomaly will be reported. The parameter may be a limiting value on the depth, width, or length of the anomaly or feature.
RESIDUAL DENT DEPTH	The dent depth measured under a particular set of conditions, e.g., in pressurized or un-pressurized pipeline. While maximum dent depth does not change, the residual or measured dent depth changes with pressure and loading. Also referred to as the measured dent depth.
RUPTURE PRESSURE RATIO (RPR)	The ratio of the predicted failure pressure calculated by an analysis criterion (e.g. ASME B31G, RSTRENG, etc.) to the pressure at specified minimum yield strength (SMYS)
SAFETY FACTOR	(or Design Factor) Typically 0.72 for liquid lines per ASME B31G (0.80 in Canada) . In setting the safety factor, due consideration has been given to and allowances made for the manufacturing tolerance and maximum allowable depth of imperfections provided for in the specifications. DNV RP-F101 uses a slightly different Total Usage Factor, which is entered as the Safety Factor in PIGTRAP. The typical 0.72 factor becomes 0.648 when applying the DNV modeling factor of 0.9.
SEAMLESS	Pipe that is manufactured by means of extrusion. This process typically creates significantly more variation in pipe wall thickness than ERW pipe.
SEAM VARIATION	Non-detrimental irregularity due to the manufacturing of the seam weld. An example is excess or variance in trim.
SEAM WELD (or SEAM)	The longitudinal or spirally-oriented weld in pipe connecting two edges of a formed plate which was created at the pipe mill.
SLEEVE	A device used to repair a pipeline by welding a small section of pipe over the full circumference of the pipe over the top of the defect.
SpirALL™ Magnetic Flux Leakage	A tool system that unites a conventional axial MFL and a unique spiral MFL tool section into one tool combining the benefits of each for enhanced defect characterization and sizing.

General Inline Inspection Terms

Spiral MFL (SMFL)	A unique type of MFL tool section that creates an oblique, near-45 degree magnetic field within the pipe wall. This allows detection and characterization of long and narrow metal loss or seam features on par with circumferential or transverse MFL tools.
SPACER	A device used to maintain space between a casing and a pipeline.
SMYS (Specified Minimum Yield Strength)	A required strength level that measured yield stress of a pipe material must exceed, which is reported as pipe grade. The measured yield stress is the tensile stress required to produce a total elongation of 0.5 percent of a gage length as determined by an extensometer during a tensile test.
STITCHING	Intermittent or repeating lack of fusion in a seam weld.
TEMPERATURE FACTOR	Typically 1.0 unless the metal temperature is expected to exceed a normal temperature range of -20°F (-30°C) to 250°F (120°C).
THIRD PARTY DAMAGE	Damage to a pipeline system by an outside party. See mechanical damage.
TRACKING	The process used to monitor the progress of the inspection tool through the pipeline. AGM boxes are placed at aboveground marker reference locations to record the passage of the inspection tool.
TRAP	Pipeline facility for launching and receiving tools and pigs.
VOLUMETRIC	A term indicating a feature has three-dimensional characteristic similar to a typical corrosion pit.
WELD ANOMALY	Any area or zone in a weld that lacks complete melting and fusion of a portion of the weld which could have occurred during the welding process or caused by corrosion.
WRINKLE	A smooth and localized bulge visible on the outside wall of the pipe.
WRINKLE BEND	A field bend that contains smooth and localized bulges on the inner radius of the bend, sometimes formed when pipe is cold bent.

Appendix A

1. The Graphs, Dig Sheets, and Tables used in this report were generated using a standalone reporting engine from data contained in a Microsoft Access™ database.

2. If the end user has Microsoft™Access on their computer, they have complete access to the inspection database. The database file which has an extension of *.mdb (Microsoft™ database) is stored in the same directory as the tool data. Although the printed reports and report spreadsheet were generated by a standalone reporting engine, using Access the user can customize some basic graphs or tables contained in the database. Alternatively, the data can be exported to a spreadsheet if preferred.

3. The PigTrap™ software, included with this report, provides the user with an easy way to view the data collected by the TDW in-line inspection tool and can also be helpful when trying to locate certain features or specific sections of pipe. The software can be run off various media or installed onto a network or hard drive. Please refer to Appendix B for installation requirements and instructions.

4. For dig sheet creation, please refer to Appendix C.

5. TDW inspection tools are designed to detect various features and anomalies within a pipeline. These various features and anomalies are added to the database using PigTrap™ software by qualified Data Analysts.

6. Database Numbering System: All entries in the database have a unique number assigned to them. The table below lists the number range of each category of database records.

7. All records are numbered sequentially from the beginning of the pipeline section to the end of the pipeline section. By default Welds begin at 110 and are incremented by 10 from one weld to the next. This can be altered to match customer weld or joint numbering by request.

Welds	110	to	9,999,999
Locations	10,000,000	to	10,999,999
Pipe	11,000,000	to	11,999,999
Misc	12,000,000	to	12,999,999
Gains	13,000,000	to	13,999,999
Deformations	14,000,000	to	14,999,999
Bore Restrictions	15,000,000	to	15,999,999
Pits or Other Defects	20,000,000	to	39,999,999
Groups (of Pits)	40,000,000	to	49,999,999
Seam Welds	51,000,000	to	51,999,999

8. All other records are incremented by 1 from one record to the next. For example, the first Location record would be numbered 10,000,000, the second record would be 10,000,001, and the third record would be 10,000,002, etc. Depending on information sent out previous to the final report, numbering may change during analysis of the run.

Appendix B

The PigTrap™ software allows the user to view all of the data collected during the Magpie/TDW inline inspection survey. Installation requires the disk(s) or external drive that accompany the inspection report.

System Requirements

Before you install and run PigTrap™ please verify that the computer you are installing to meets the minimum requirements needed to successfully open and operate PigTrap™.

Windows OS

- Microsoft® Windows 7, Vista®; Windows® XP Professional, Home Edition
  - o Administrator rights required
- 2.0 GHz Intel® Core™ 2 Duo Processor or higher
- 2 GB RAM or more
- 1 GB available hard drive space plus additional necessary for the run size.
- Qualified hardware-accelerated OpenGL graphics card, 32-bit color, and 256MB of VRAM (latest manufacturer drivers strongly recommended also).
- Microsoft® Access 2003 or higher
- Microsoft® .NET Framework 3.5 Service pack 1
- Microsoft® Visual C++ 2008 SP1 Redistributable Package (x86)
- Microsoft® Report Viewer 2008 SP1

What electronic data accompanied the inspection report

The CD, DVD, or external drive supplied by T.D. Williamson, Inc. for this PigTrap™ inspection of your pipeline contains the following types of files. For CD or DVDs the first disk will contain these files while accompanying disks (if any) contain raw tool data only. External drives will contain this information in the Final Report folder on the external drive under the run name folder.

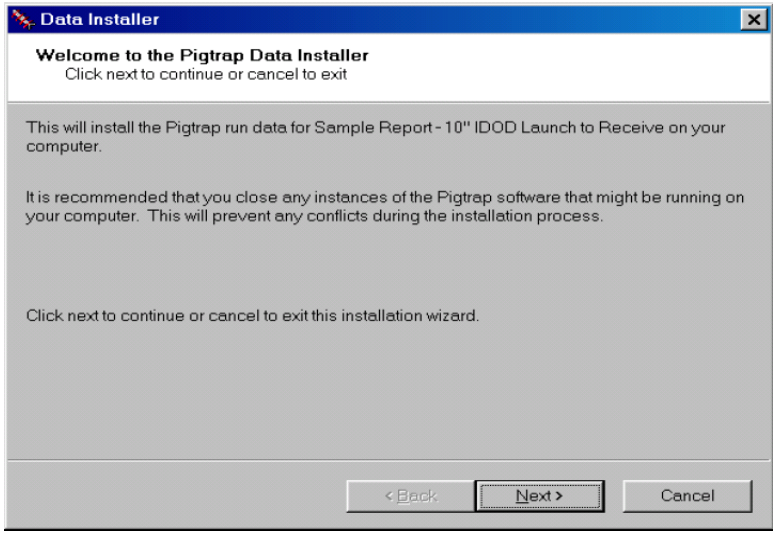
- Database – .MBD (Microsoft Data Base) Files of this type may be viewed through Microsoft Access. This file contains the analysis of the inspection.
- .rsf – This is a PigTrap™ reference file which holds specific settings for the run to be viewed.
- Spreadsheet – .XLS (Microsoft Excel) A Pipeline Listing is generated for your run in an Excel spreadsheet format. Each event at a particular location is identified and described. You may use Copy and Paste techniques to build your own custom formatted report.
- Setup.exe file – This file executes the installation of the data for the specific run contained on the disk(s) or external drive.
- h*.nnn, c*.nnn, i*.nnn, p*.nnn, t*.nnn, l*.nnn & o*.nnn – The raw tool data created on-board the inspection tool. These files are necessary for PigTrap™ to function properly. CD and DVDs have the option to install these files onto your computer, if chosen not to install them to your computer the disks must be used to view the run.

Run Data and PigTrap™ Installation

The inspection report will be accompanied by either CDs, DVDs, or an external drive containing all files necessary for installation. Installation for CDs and DVDs differs from external drives, if an external drive accompanied your final report please skip to PigTrap™ Installation.

CDs and DVDs

1. Insert Disk 1 from the report binder into your computer's CD/DVD drive.
2. Access the Setup.exe program located on the CD or DVD. This can be done by browsing to your computer's CD/DVD drive and double clicking Setup.exe. This will launch the Data Installer program.

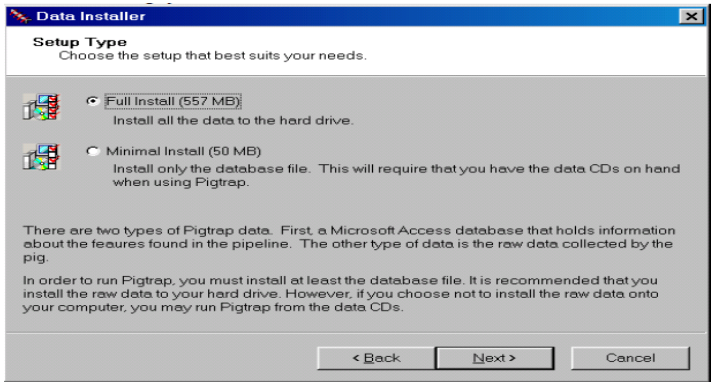


Note: If you want to install only the Pigtrap™ software and not the run data (advanced users only), choose Cancel and go to the Pigtrap™ Installation steps on page 3.

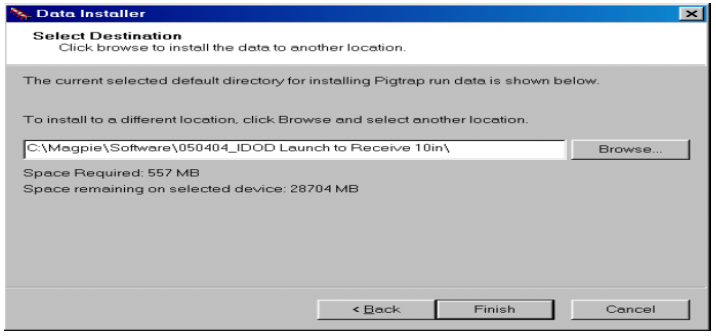
3. Click Next to continue installing the run data.

Appendix B

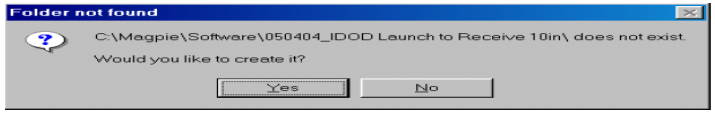
4. Choose the type of install you would like to perform: Full Install (recommended) or Minimal Install. The size of the installation is shown next to each type of installation. The database file must be installed for PigTrap™ to operate properly, but you may choose to not install the raw data. If you choose to not install all the data, you may need to change disks while viewing the data in PigTrap™. Click Next to continue after making your choice.



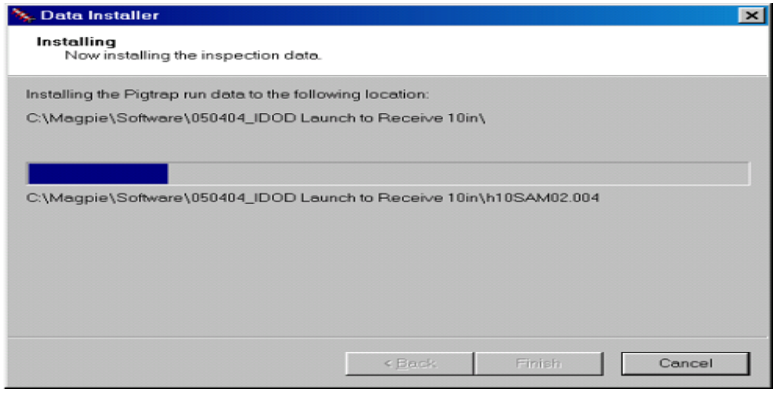
5. Choose the installation location on your computer for the data files. The default and recommended location is C:\Magpie\Software. The location inside this folder is based on the trap date, name, and size of the run. If you would like to specify another location, click the Browse... button. Click Finish to continue.



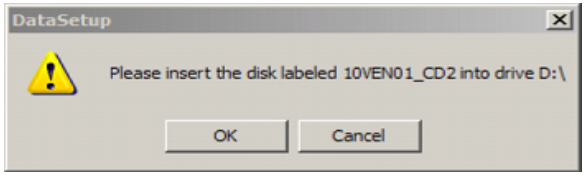
6. If the installation folder does not already exist, then you will be prompted to create it. Click Yes to create the new folder.



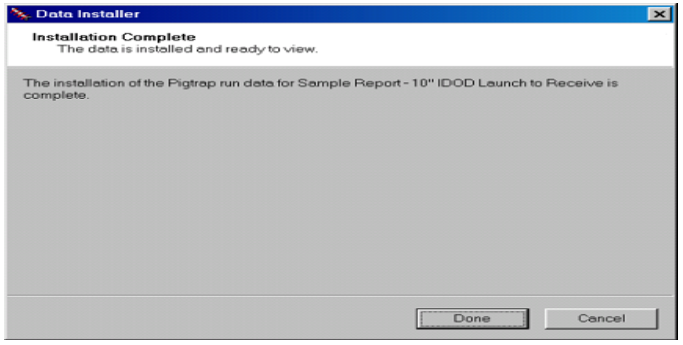
7. The following progress bar will appear. There may be a short delay while the database is being copied. Be patient, this is normal.



8. You may be prompted to insert other disks from the run distribution if data was supplied on more than one disk. Insert the required disk and click OK to continue. Repeat until all disks have been copied.



9. Click Done to complete the run data installation.



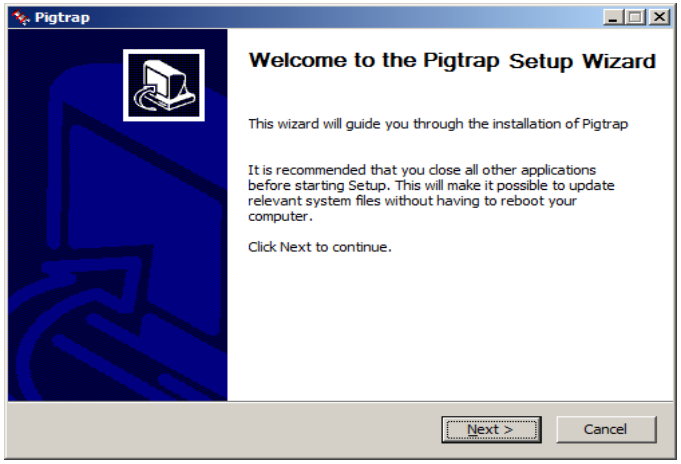
10. After clicking Done in the Data Installer PigTrap™ Installation will automatically launch.

Appendix B

PigTrap™ Installation

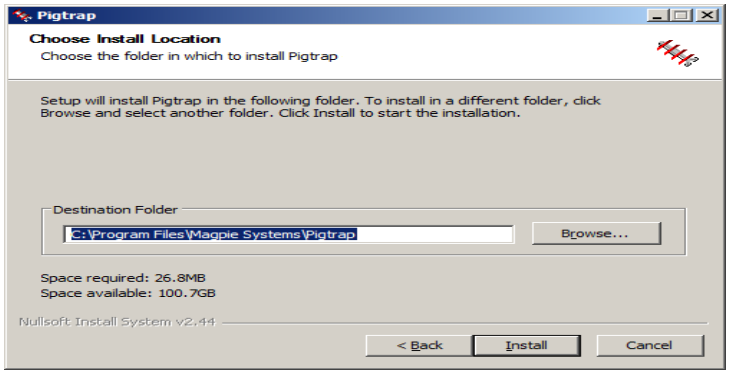
Note: CD and DVDs follow a slightly different installation process. Steps 1 and 2 are for external drives, if you are installing from CDs or DVDs please skip to step 3.

1. Plug the external drive into your computer.
2. Access the PigTrap™ setup.exe located on the external drive. This can be done by browsing to external drive and double clicking PigTrap™ setup.exe.
3. PigTrap™ Setup Wizard will launch. This will guide you through the installation of PigTrap™. Click Next to continue.

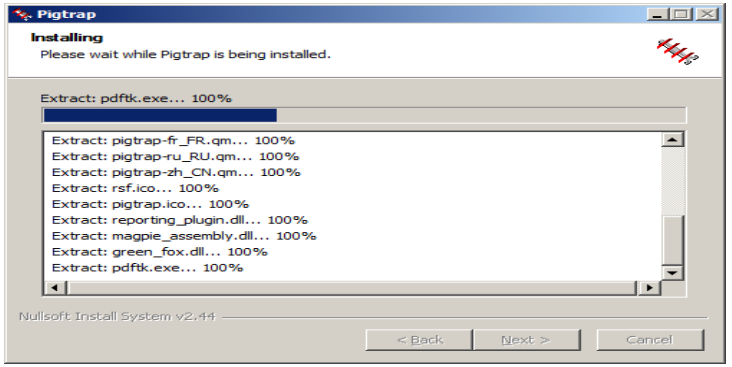


4. The Software License Agreement will appear. Read the agreement select I Agree to continue. You must accept the agreement to install PigTrap™.

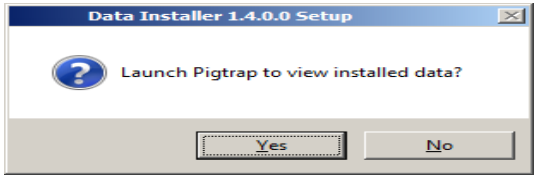
5. Choose the installation location on your computer for the PigTrap™ software. The default and recommended location is C:\Magpie\Software. Click Install to continue.



6. The following progress bar will appear while PigTrap™ installs all the necessary files. Once the installation has completed click Finish to close the wizard.



7. When prompted whether you would like to view the run data, click Yes to launch PigTrap™. Shortcuts are now on the desktop to the run and to PigTrap™. Once PigTrap™ opens with the data, choose save in the upper left of the data view.



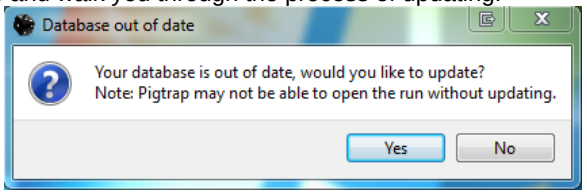
Appendix B

Opening and Viewing the Inspection Data

Viewing the inspection data in PigTrap™ can be done by using one of three different methods.

1. Double click on PigTrap™ .exe icon. Click on the Open Folder icon , then browse to the installed inspection data folder and select the desired .rsf or .mrsf file.
2. Double click on a run settings file (.rsf or .mrsf) that is associated with PigTrap™.
3. Drag and drop a run settings file (.rsf or .mrsf) on top of the PigTrap™ .exe file.

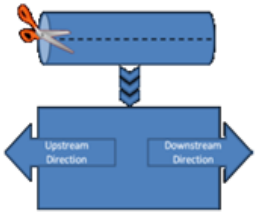
PigTrap™ was designed so you would have the ability to review previous TDW/Magpie inspection data when needed. However, you may need to acquire an updated Microsoft Access Data-base from one of our TDW representatives. When opening previous data in PigTrap™ you may encounter the message, "Your database is very old. You may need to update it." If this happens, don't panic. Chances are you will be able to view the data without any problems. If you can't, just contact your TDW representative and we can send you a newer database and walk you through the process of updating.

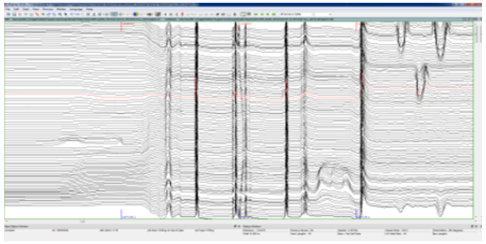


We packed so much into the new PigTrap™ the older reference files just couldn't hold it all so a new one may need to be created. Once the new reference file finishes, you will be able to freely navigate around in PigTrap™.

What am I looking at?

The data viewed in PigTrap™ is a 360 degree snapshot of the inside of the inspected pipe. This captured data is sliced down the middle and laid flat in the PigTrap™ main display. The horizontal lines represent sensor data collected from the pigging tool. Each line is one sensor. The left side of the screen is "upstream" while the right side of the screen is "downstream". So, as you scroll from left to right you are moving downstream from the launch valve.





Basic Navigation

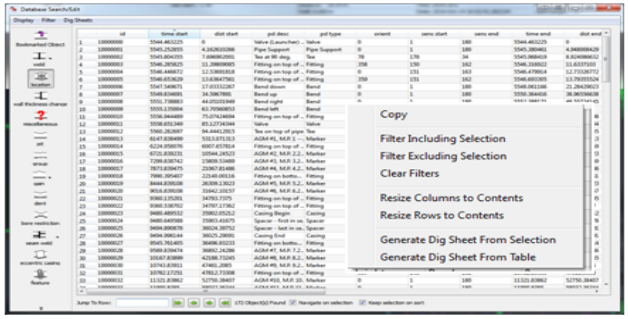
The horizontal scrollbar at the bottom of the main view moves the view upstream or downstream. Clicking on the left arrow moves upstream while clicking on the right arrow moves downstream.

The vertical scrollbar at the right side of the main view rolls the data vertically to a desired orientation of the view.

Zooming IN/OUT on the data is easily performed by clicking on the Zoom buttons.

Select the "Jump to Distance" icon from the run toolbar to enter a desired distance point to navigate in the inspection data. The option "View Width" sets how much viewable area to display (time based).

Click on the binoculars to open the Database/Search Edit (DSE). This displays a table of the pipe objects marked by the Data Analysis personnel. The buttons in the DSE allow for a high level filtering of specific types of marked pipe objects in the table. Right click on any pipe object to display a context menu of filtering, resize columns/rows and generate dig/feature sheets.



For example: Launch and Receive Valves can be found under "location" button, you'll also find Bends, Tees, Markers, etc.

For additional information regarding dig/feature sheet creation, see Appendix C.

Training

For detailed Pigtrap training, contact your TDW representative.

Appendix B

Trouble Shooting

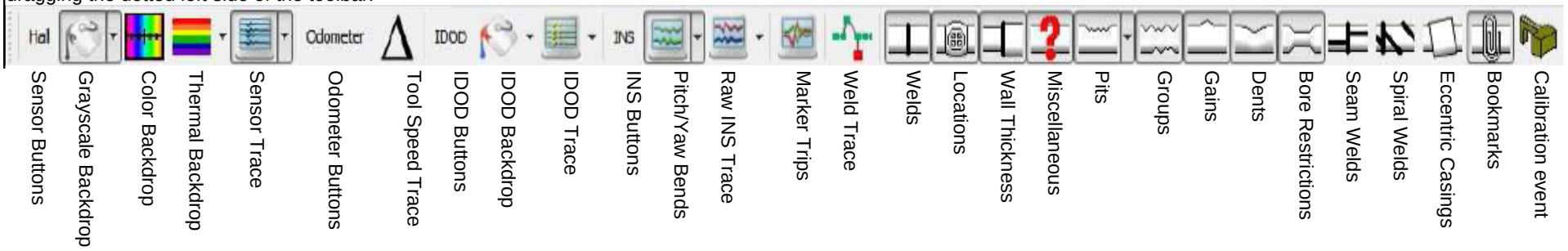
Issue	Possible Cause	Possible Solution
"Data files missing" message displayed on the Main view.	PigTrap™ is not able to load the necessary data file(s) because they are missing, not installed correctly, media/hardware damage (Dirty or scratched CD/DVD, drive failure).	Please reinstall the inspection data, check the run setting has the correct path to the files (Run Settings>Files>Data File Directory), clean the CD/DVD.
"Generate Dig Sheet" is not available from the DSE.	PigTrap™ is not installed correctly.	Please reinstall PigTrap™.
Main window title bar is not visible.	Full screen is enabled.	Press "F11" on the keyboard.
Not able to highlight pipe objects.	The color bit depth is not set correctly.	PigTrap™ requires a 32 bit color depth, please contact IT to assist in changing to the correct setting.
	One of the task specific modes is enabled.	Press the "Done" or "Cancel" buttons from the bottom left.
REF error message.	If this is the first time opening a run with PigTrap™ , it may attempt to create a reference file (.ref2). This message appears because a .ref2 file does not exist or it is corrupt.	Select OK to create a new ref2 file.
Can't see the sensor data.	Zoomed in very close.	Click on the Zoom OUT button.
	Sensors are not enabled.	Turn on the sensors from the Run Toolbar.
Can't find the Status/Database Window.	The Status/Database windows are not enabled	Go to View>Status Window and toggle the option ON
Crashes while opening.	The video card drivers are out of date.	Update the graphic card drivers. Note: Before installing the latest driver, you may need to uninstall the current drivers while in Windows safe mode. Can also turn off shaders.
	The .rsf is corrupt and needs replacing.	Reinstall the inspection data.
	Microsoft Visual C++2010 redistributable is corrupt or not installed.	This is typically installed the TDW Inspection data. It is possible to have a corrupt install and additional help may be required to correct the issue. Please contact your local IT department to assist with the prerequisite install.

Appendix B

Tool Bar Layouts and Functions

Run Toolbar

The run toolbar will contain button that will toggle different views, traces and features on and off. Some of the features will be technology specific, such as IDOD as proximity sensors are only present on MFL tools. The arrows next to some buttons will provide additional options related to the specific button. Each window can be undocked by clicking and dragging the dotted left side of the toolbar.



Main

The main toolbar contains navigation buttons that will aid in viewing run data and seeking to specific distances or locations.

Database Navigation

These buttons navigate to features listed in the DSE.

Sensor Visibility

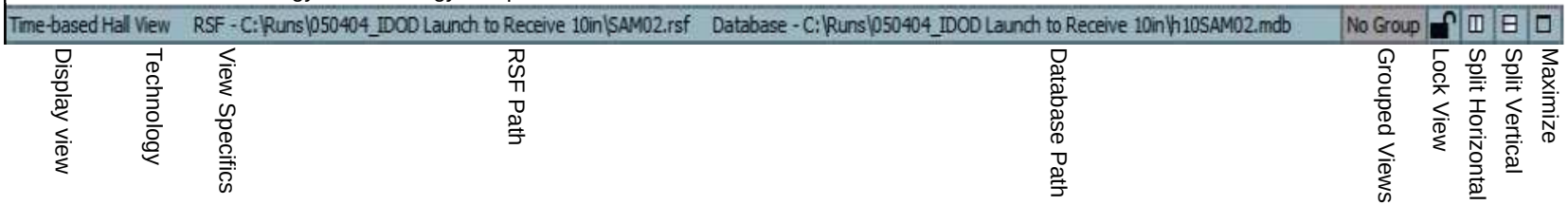
PigTrap™ allows user to zoom in on specific set of sensors, this dialog will display what sensors are currently being viewed. To return to viewing all sensors simply zoom out (-).

Quick Search

The quick search allows users to quickly search for features by typing in a certain criteria, such as '+valve' this will jump to the next downstream valve.

Run Details Status Bar

The run details status bar displays information regarding the view-type (time or distance), the location of the RSF and database and allows for the splitting of multiple views. Additional views can be split vertically or horizontally and even un-docked into a separate window using the button that appears after a view has been split. Locking a view will keep the current view in place. This feature will allow for multiple runs to be open in the same PigTrap™ for easier run to run or technology to technology comparison.



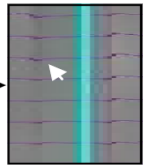
Appendix B

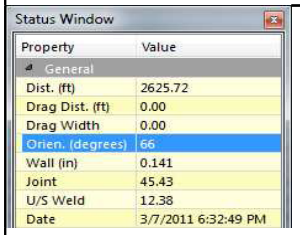
Displayed Information and Shortcuts

Pipe Object and Status Windows

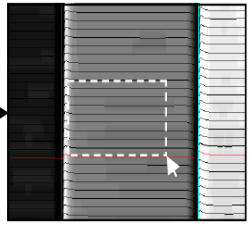
The Pipe Object and Status Windows will be defaulted to the right side of PigTrap™. Both windows can be docked and undocked by double clicking the title bar, left clicking and dragging or clicking the undock button located in the top right corner. As PigTrap™ has the ability to display multiple datasets the Status Window will update each section depending on which tool technology is selected (refer to the Run Details Status Bar on the Tool Bar Layout and Functions page). The information contained in each section of the Status Window can also be customized by right clicking on the desired section and selecting what data to display.

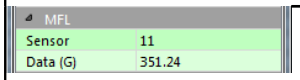
The pipe object window will display information about a highlighted feature, such as a weld, providing the weld ID and Distance. Features are highlighted when the cursor is placed upstream of an object and the object becomes highlighted with a teal color.



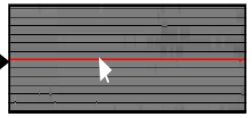


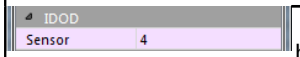
The General section of the Status Window will display information pertaining to all datasets. The information is dependent on the cursor location, displaying the current distance, orientation, wall thickness, joint length, up stream weld and date and time. The drag distance and drag width is populated when a box is drawn and can be useful when manually measuring lengths and widths.



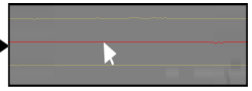


The MFL window will display information for the current highlighted sensor. The highlighted sensor will be a red line over the entire sensor. These sensors can be turned on and off using the Esc key.

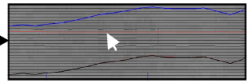




The IDOD window will display information for the current highlighted IDOD sensor. The IDOD sensors can be turned on by pressing the tilde (~) key.



The odometer section displays information about the speed for the current cursor location.



Status Bar

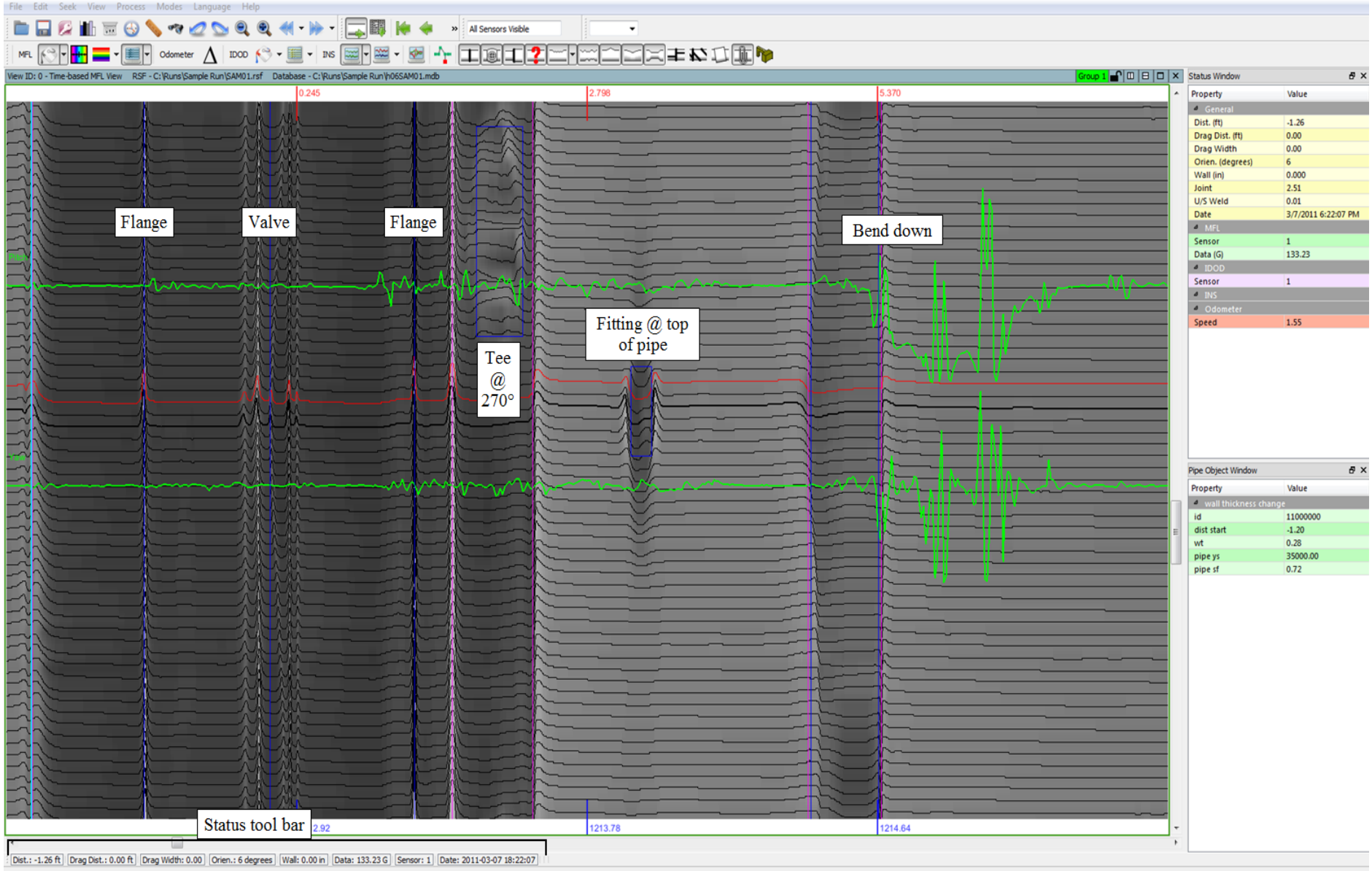
The Status Bar is located at the bottom left of PigTrap™ and contains much of the same information as the General section of the Status Window. It can also be customized by right clicking and selecting what information to display. The order can also be adjusted by clicking and dragging a section above or below other rows.

Keyboard Shortcuts

Ctrl + ŷ	Jump to Launch Valve
Ctrl + Ź	Jump to Receive Valve
Ÿ	Move Half Screen Downstream
Ŷ	Move Half Screen Upstream
Page Down	Move Full Screen Downstream
Page Up	Move Full Screen Upstream
ŷ	Rotate Orientation Up
Ź	Rotate Orientation Down
Mouse Wheel	Rotate Orientation
Ctrl + F	Open Database Search Edit (DSE)
Spacebar	Repeat Last DSE Find
Ctrl + Z	Undo Last View
Ctrl + Shift + Z	Redo Last View
Ctrl + D	Jump to Distance
Ctrl + T	Jump to Time
Ctrl + H	Open Deformation Cross Section
Ctrl + Ÿ	Jump to Downstream Marker Trip
Ctrl + Ŷ	Jump to Upstream Marker Trip
Alt + Double Click	Hide Status Windows
Esc	Turn Hall sensors on/off
Tilde (~)	Turn IDOD sensors on/off
M	Measure dragged box

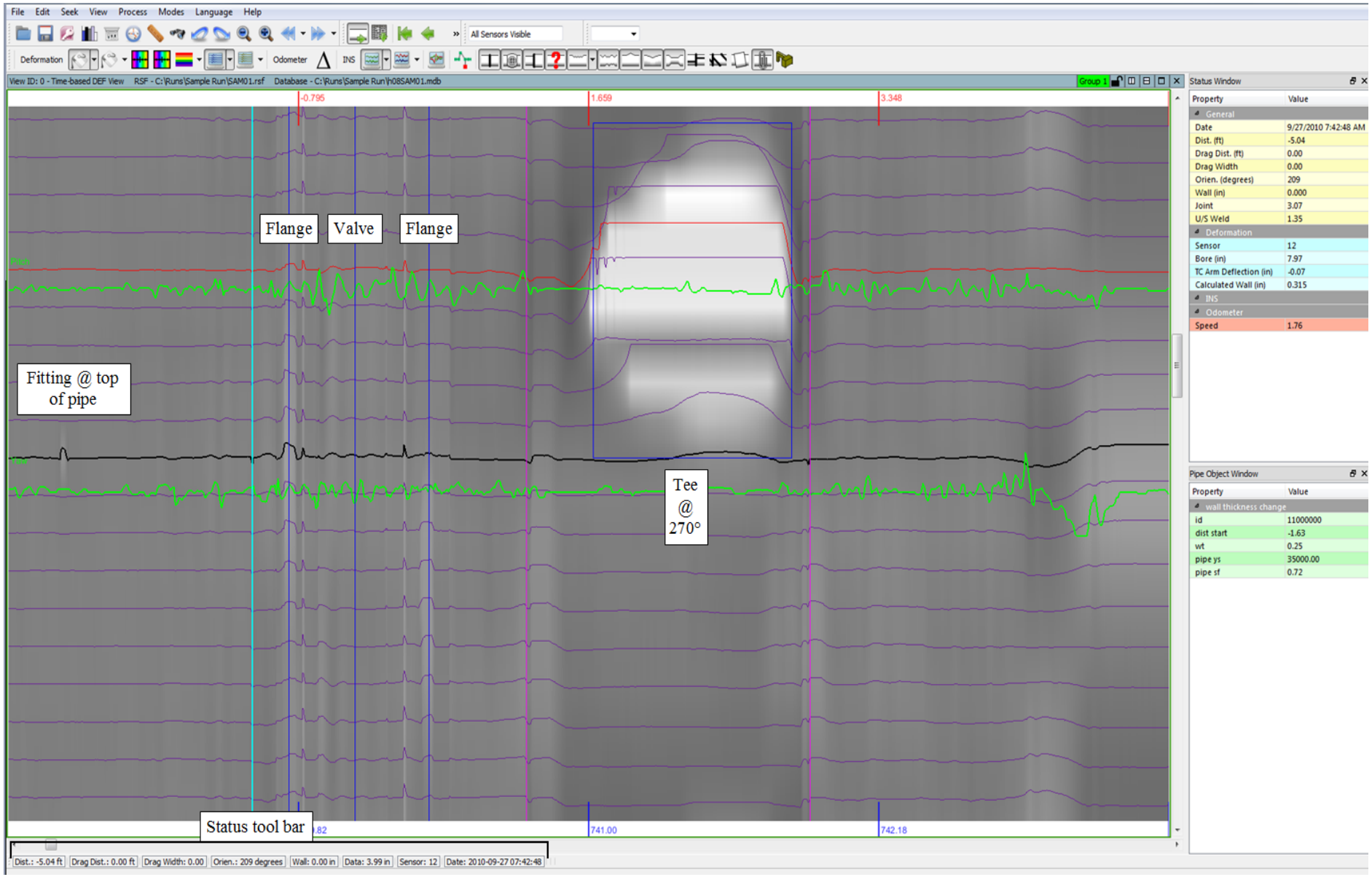
Appendix B

PigTrap™ MFL Runs



Appendix B

PigTrap™ DEF Runs

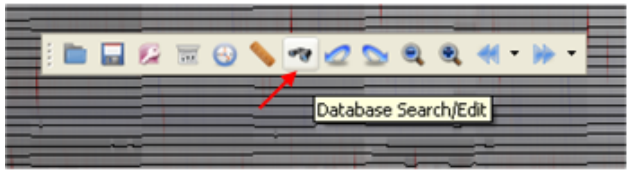


Appendix C

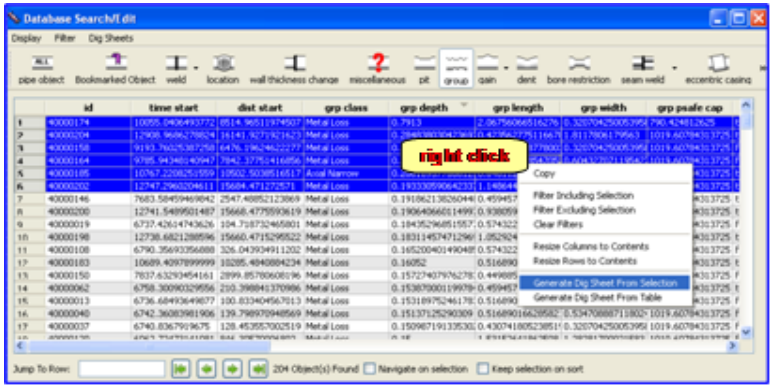
The user can view and print dig sheets for any anomaly or feature detected in the pipeline including Metal Loss (Groups or Pits), Dents, Locations, Gains, Wall Thickness changes, Welds, Miscellaneous notes, etc.

1. Open PigTrap™ to view the inspection data for the run. Please consult Appendix B if you need instructions on installing and viewing the raw data.

2. Click on the Database Search/Edit option either by clicking on the small binoculars icon in the toolbar or choosing the option under the Seek toolbar.



   a. This will bring up the Database Search/Edit (DSE) window.



3. You can choose what type of feature you want to list in the window by clicking on the icon in the margin.

4. Once the list populates with that type of object, you can filter or sort the data to find the object(s) for which you want to create dig sheets.

   a. Clicking on the header of the column will sort either ascending or descending. Click again to reverse the order.

   b. You may also use or create various filters by clicking on one of the two Filters buttons.

   c. There is also a Displayed Columns button which allows you to hide or show the various columns of data.

5. Right clicking in the table or choosing the Dig Sheets option in the top toolbar will allow you to create dig sheets one of two ways:

   a. Generate Dig Sheet From Selection – This will create a separate dig sheet for each of the highlighted rows in the list. Using the Ctrl key or the Shift key and clicking rows will allow for multiple row selection.

   b. Generate Dig Sheet From Table – This will create a separate dig sheet for every item in the list whether highlighted or not. Note that if the list contains a lot of features, this could lead to numerous dig sheets being created and may impact the short term performance of your computer while they are being generated.

6. The dig sheets you requested will automatically be previewed for easier printing as well as saved to a directory as a pdf file for printing later.

   a. To choose which directory the dig sheets are saved into, choose Report Creation Settings under the Dig Sheets option in the top toolbar.

7. Also under the Dig Sheets toolbar in the DSE window, you may change various dig sheet formatting preferences by clicking on Dig Sheet Settings option.