K360 DEF MFL GMFL SMFL XYZ LGT

2013

Pipeline Inspection Report

T.D. Williamson
Pipeline Performance™

Company Name

Hiland Crude, LLC

Project Name

Camp Creek to Dore Junction

Pipe Size

8"

Inspection Date(s)

Sep 18, 2013

Report Date(s)

Nov 26, 2013

TDW Regional Office

TDW Services, Inc.

Executive Summary - GMFL Inspection

RUN INFORMATION

Hiland Crude, LLC — *Camp Creek to Dore Junction*

Heber Briceno — *8" Crude*

	Launcher	Receiver
Location:	Camp Creek	Dore Junction
Date/Time:	9/18/2013 3:00:30 PM	9/18/2013 6:37:42 PM
Stationing:	0+00	602+13
GPS - LAT:	47.921070025	47.924069738
GPS - LONG:	-103.563171869	-103.783659416

Duration of run - Hours: 3.62 **Average Velocity:** 4.61 ft/sec **Tool Tracking By:** Cherokee Pipeline Services

Pipeline Length: 60,129.00 ft **Maximum Velocity:** 5.33 ft/sec

On-site Representative: Eric Johnson **Data Analyst:** Ben Stehling

Contact: Heber Briceno

INSPECTION FINDINGS

Current Established Maximum **Criteria Used:** ASME B31G: Modified

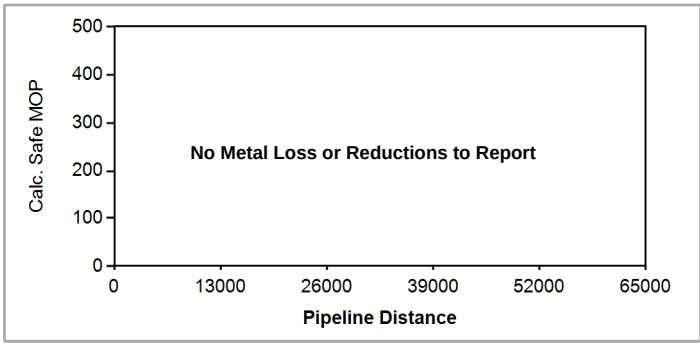
Operating Pressure of Pipeline: 750 psi **Defect Interaction Rule:** 1 inch between pits

Welds Detected: 1,352 **Valves Detected:** 3 **Fittings Detected:** 1 **Markers Detected:** 10 **Gains Detected:** 0

Casings Detected: 0 **Tees Detected:** 3 **Flanges Detected:** 6 **Repairs Detected:** 0 **Deformations Detected:** 0

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

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



No Metal Loss or Reductions to Report

** 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 0 metal loss groups (0 Internal/0 External) were detected on the inspection survey, of which the deepest is reported at 0%. 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 (60,129 feet / 11.39 miles) of the survey. The quality of the inspection data is satisfactory for a comprehensive assessment of this pipeline segment.

GMFL sensor coverage, 97%, IDOD sensor coverage, 91%. Tool rotation is good through the affected areas. Client was notified of the incomplete sensor coverage and accepted the run. Tool speed is 100% within tolerance.

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

Camp Creek to Dore Junction
8" Crude

	Launcher	Receiver
Location:	Camp Creek	Dore Junction
Date/Time:	9/17/2013 7:01:24 PM	9/17/2013 10:20:46 PM
Stationing:	0+00	602+13
GPS - LAT:	47.921070025	47.924069738
GPS - LONG:	-103.563171869	-103.783659416

Duration of run - Hours: 3.32
Pipeline Length: 59,934.00 ft
On-site Representative: Eric Johnson

Average Velocity: 5.01 ft/sec
Maximum Velocity: 5.8 ft/sec
Data Analyst: Ben Stehling

Tool Tracking By: Cherokee Pipeline Services

INSPECTION FINDINGS

Deformations Detected: 0 **Ovalities Detected:** 0 **Expansions Detected:** 0 **Heavy Weld Detected:** 0 **Valves Detected:** 3

No dents found meeting minimum report parameters	**No dents found meeting minimum report parameters**

INSPECTION DETAILS

Inspection data was obtained for the full length (59,934 feet / 11.35 miles) of the survey. The quality of the inspection data is satisfactory for a comprehensive assessment of this pipeline segment.

A total of 0 deformations were detected on the inspection survey.

DEF sensor coverage, 96% with one failed sensor throughout the run; 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.

Sorted by depth then distance

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.										

Sorted by depth then distance

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
No indications of Metal Loss anomalies appear in this pipeline inspection											

Sorted by pressure (P'), then depth

Criteria: ASME B31G: Modified

Charts

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

The following charts are utilized in this report:

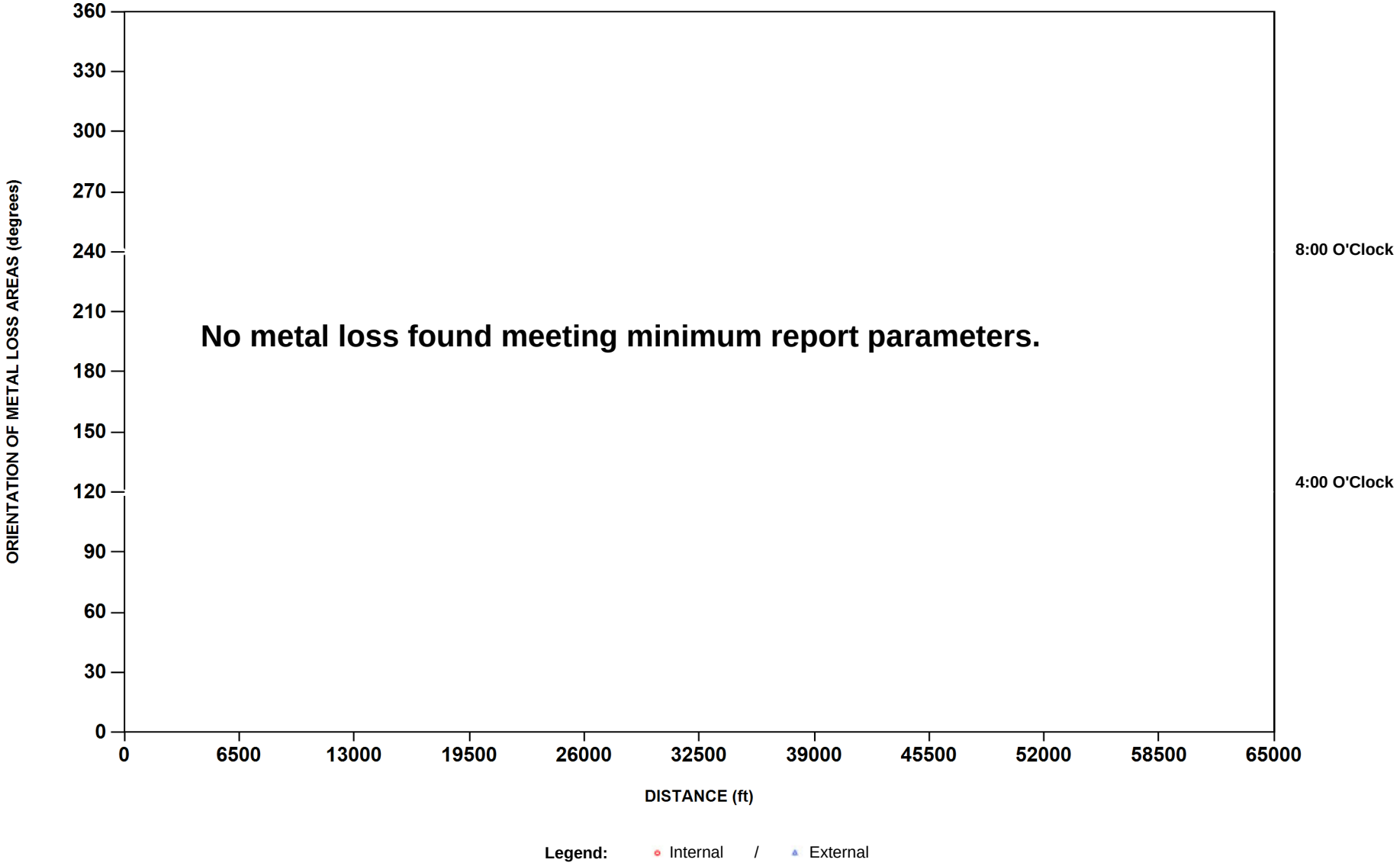
Metal Loss Depth	This chart highlights the predicted depths of defects as a percentage of wall thickness compared to distance. Areas of concentrated metal loss are easily detected as defects group.
Metal Loss Orientation	The distance from launch is plotted against the orientation of the defect. Orientation 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

No metal loss found meeting minimum report parameters.

Internal External

Metal Loss Orientation Graph



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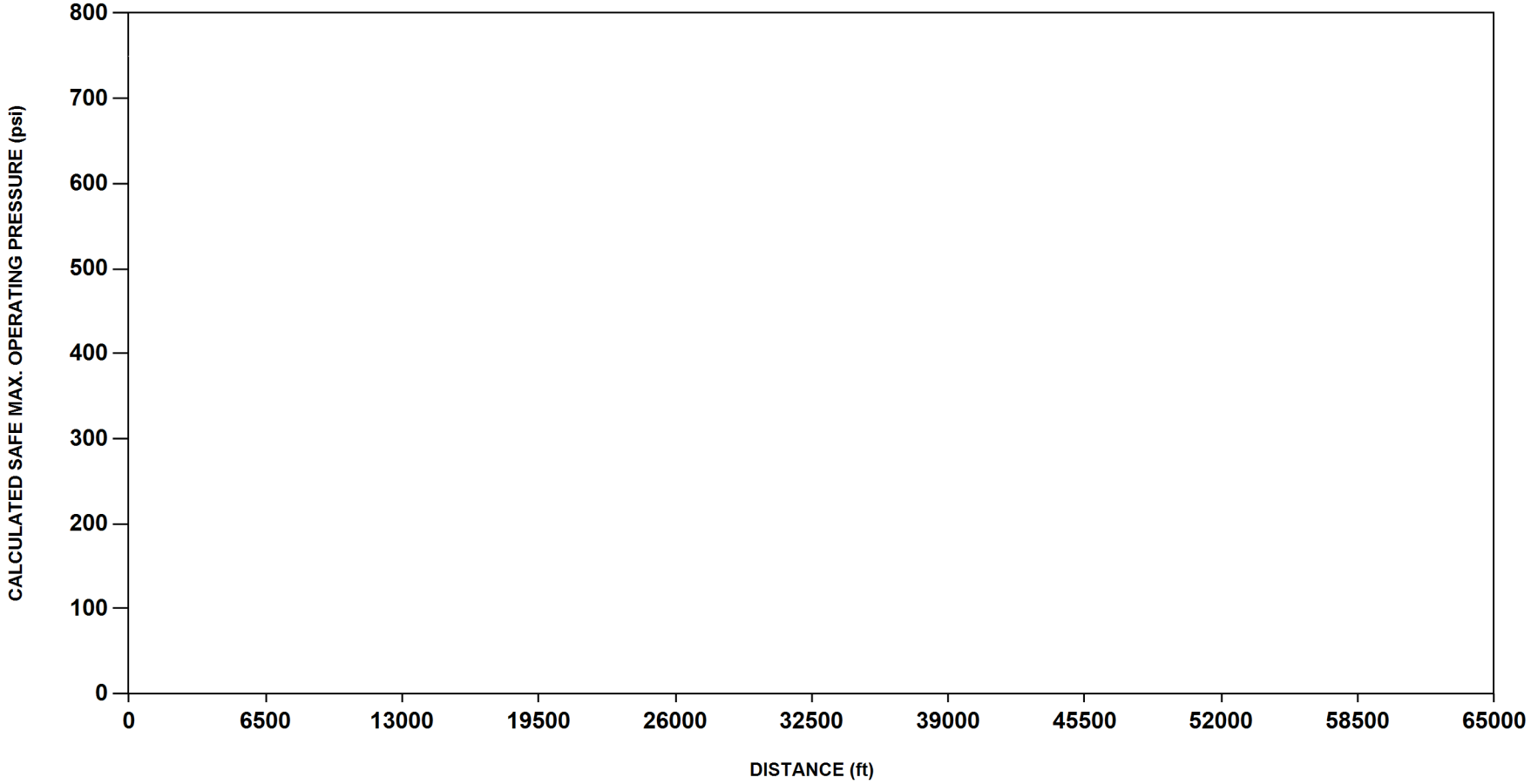
Camp Creek to Dore Junction

Metal Loss - Calculated Safe Max. Operating Pressure Graph



Metal Loss - Calculated Safe Max. Operating Pressure Graph

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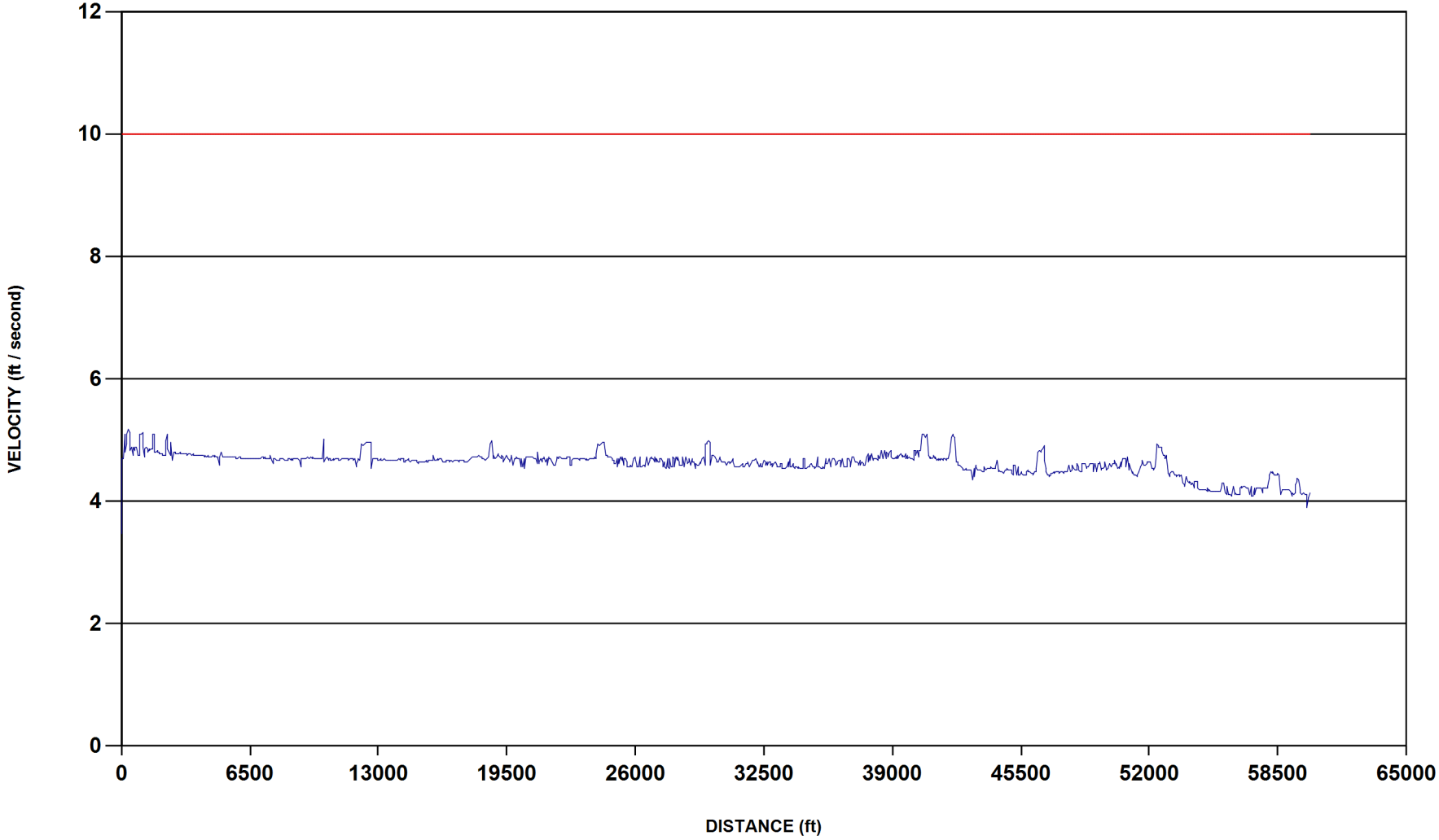
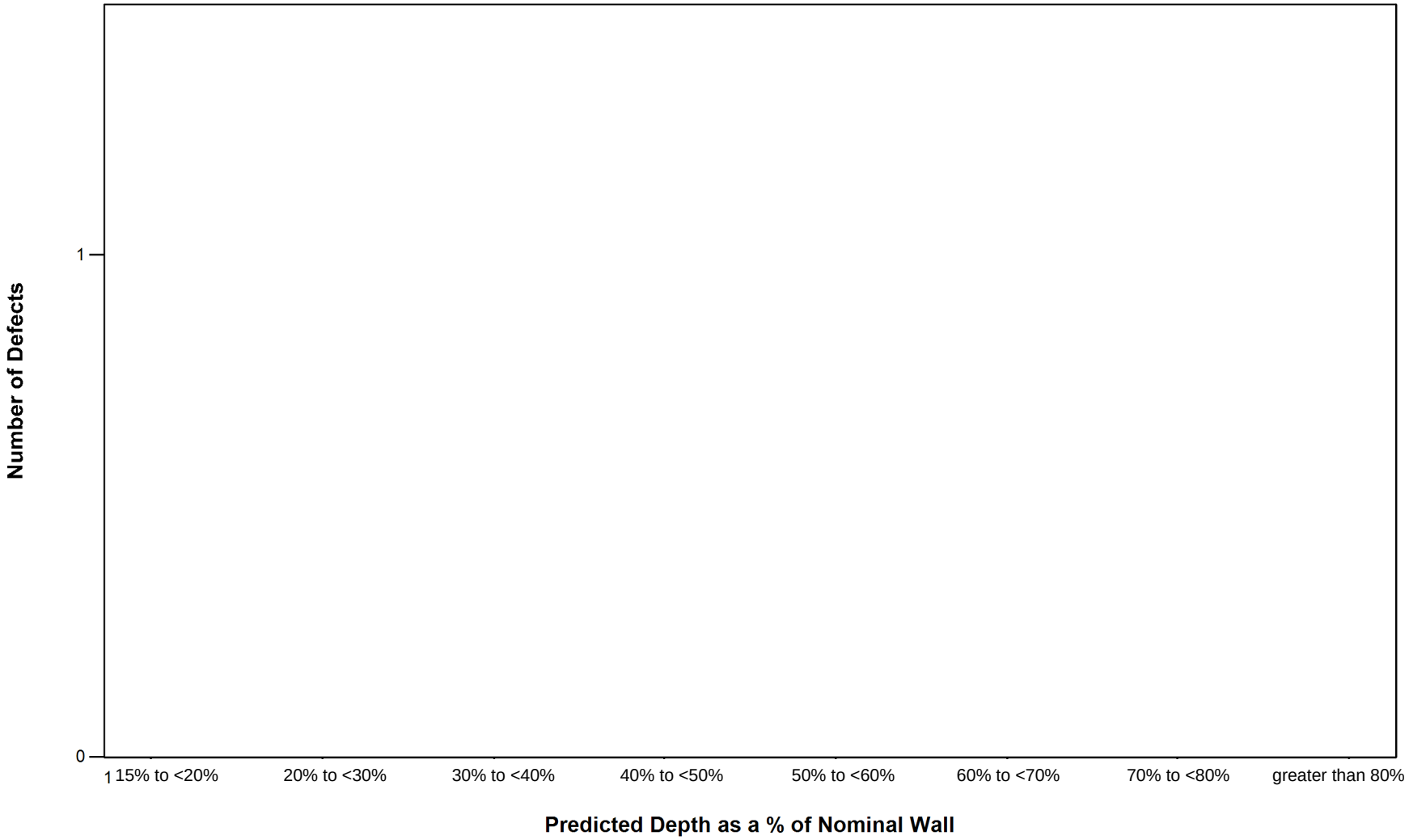
Velocity Graph - MFL



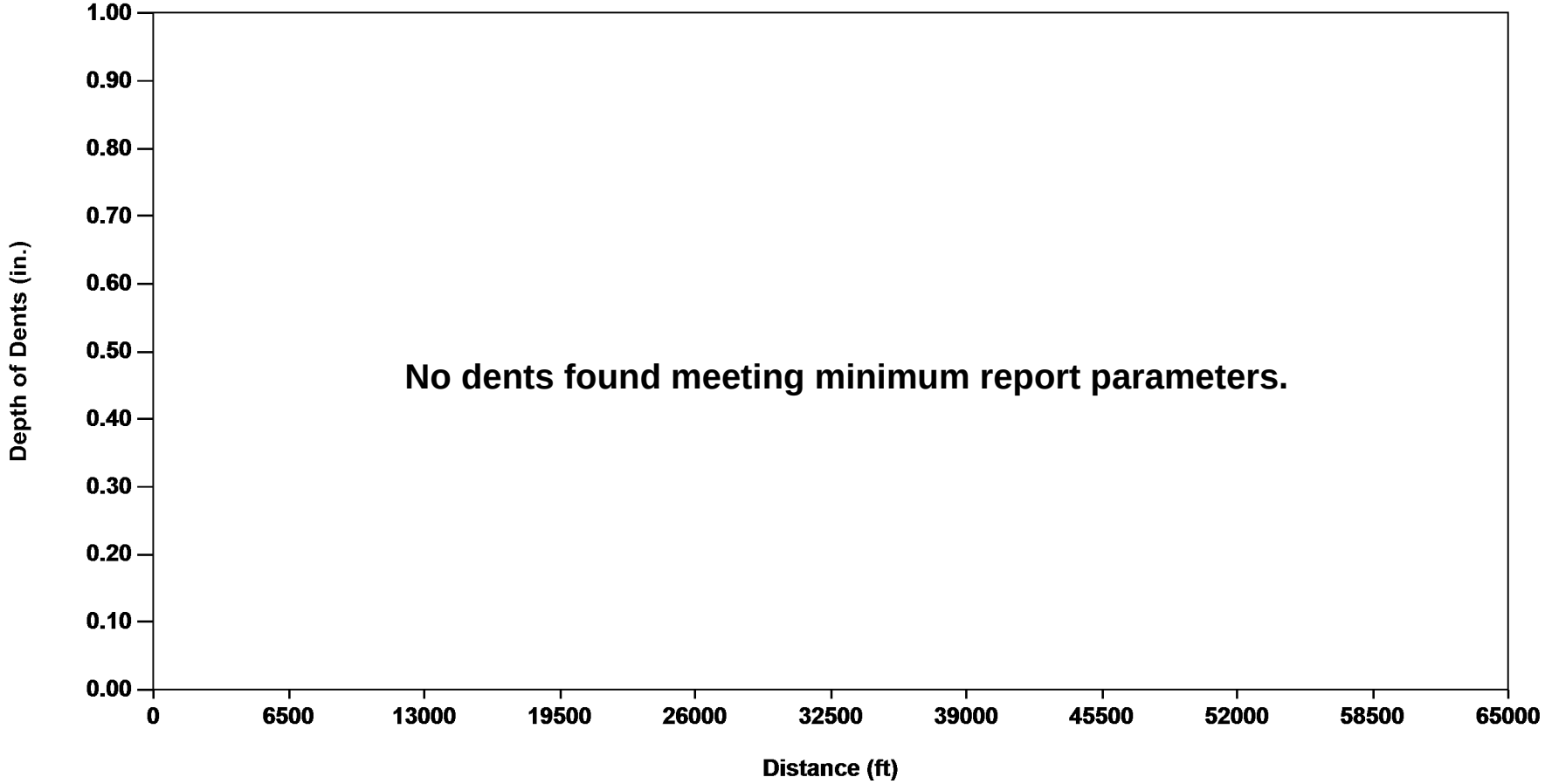
Velocity Graph - MFL

Defect Depth Histogram

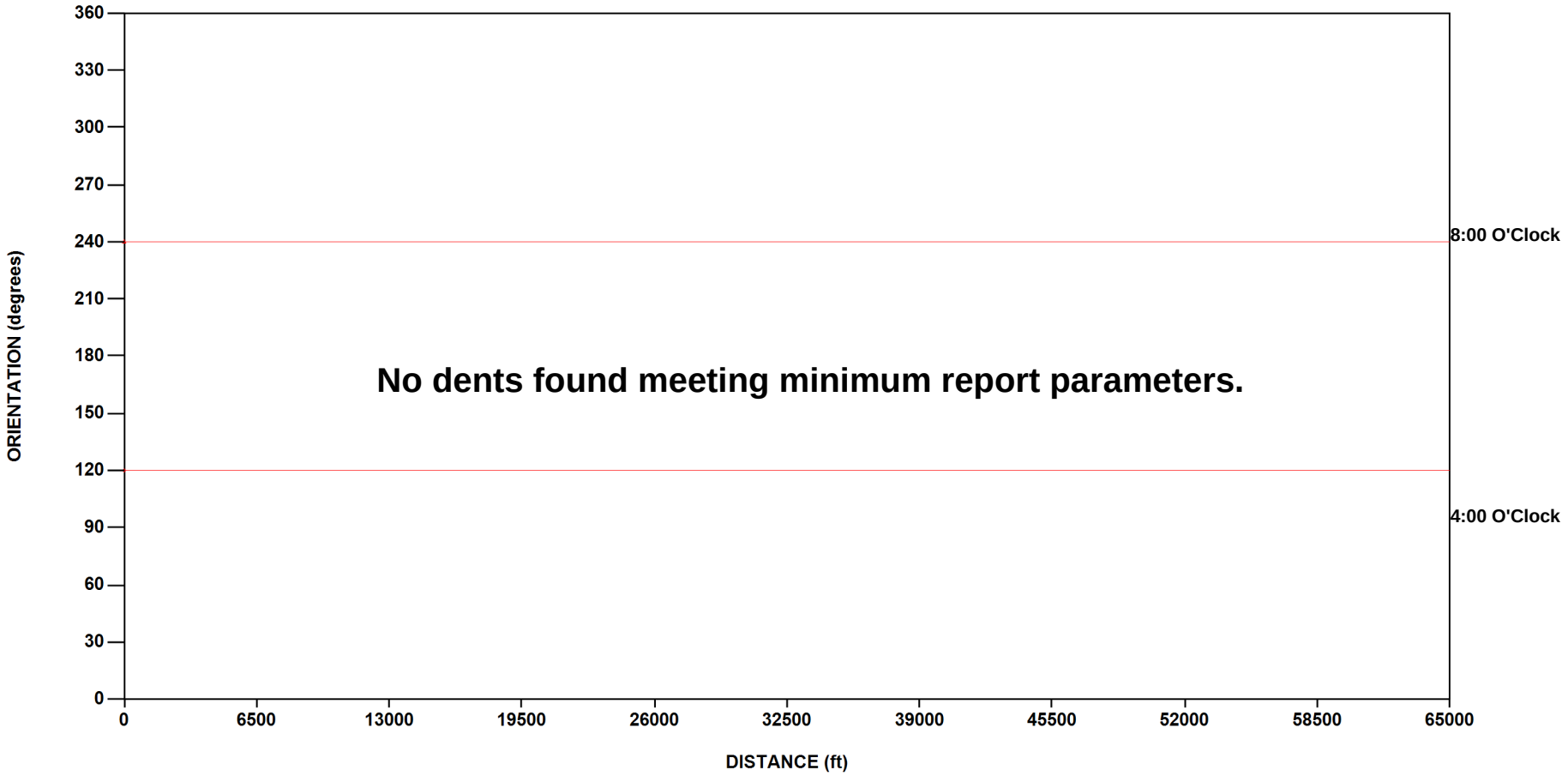


Total Defects: Non-Pressure-Reducing Groups Pressure-Reducing Groups (where P' < P)

Dent Depth Graph



Dent Orientation Graph



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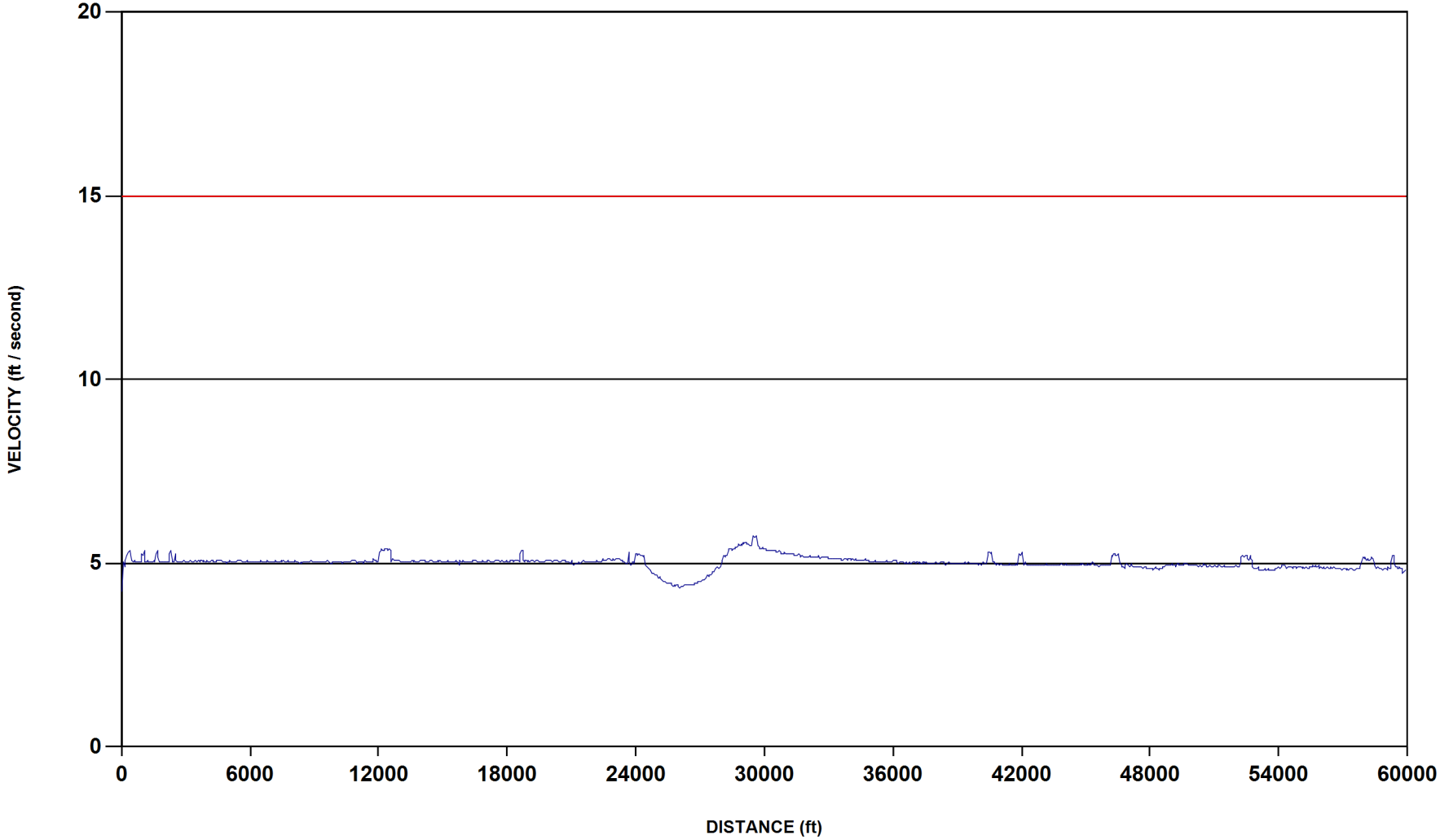
Camp Creek to Dore Junction

Velocity Graph - DEF



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	3,854.83	0.0	110	1.6	1.6	Valve (Launcher), Sta. 0+00, Camp Creek	47.92107003	-103.56317187	2132.697
10000002	3,855.16	1.1	110	2.7	0.5	Flange	47.92107015	-103.56317588	2133.269
10000003	3,855.73	3.4	120	1.7	2.1	Pipe Support	47.92107048	-103.56318403	2134.426
10000004	3,856.28	5.9	130	0.3	1.0	Tee at 270 deg.	47.92107082	-103.56319274	2135.667
10000005	3,856.73	8.2	140	1.5	1.0	Pipe Support	47.92107112	-103.56319990	2136.679
10000006	3,857.00	9.5	150	0.5	0.4	Flange	47.92107130	-103.56320430	2137.320
10000007	3,857.24	10.8	160	0.1	1.6	Bend down - 45 deg., 3D	47.92107148	-103.56320815	2137.717
10000008	3,859.19	21.0	180	0.1	1.5	Bend up - 45 deg., 3D	47.92107273	-103.56323283	2134.623
10000009	3,886.64	151.0	250	2.5	9.3	Bend left - 90 deg., 6D	47.92107564	-103.56376184	2135.309
10000010	3,939.99	418.9	320	1.6	8.4	Bend right - 90 deg., 6D	47.92034288	-103.56380444	2129.683
10000011	4,368.62	2,500.5	810	0.1	1.3	Bend left - 30 deg., 3D	47.92029258	-103.57226403	2130.129
10000012	4,903.57	5,042.7	1,360	0.3	7.1	Bend right - 70 deg., 5D	47.91477103	-103.57851311	2128.627
10000013	5,163.25	6,268.1	1,660	7.2	42.0	AGM 010, Sta. 66+52, Row -- Han #142	47.91519375	-103.58345337	2128.182
10000014	5,434.56	7,544.4	1,980	0.0	0.7	Bend left - 24 deg., 1.5D	47.91615101	-103.58844406	2139.951
10000015	5,754.74	9,045.0	2,320	0.1	1.0	Bend right - 35 deg., 3D	47.91695261	-103.59433299	2098.182
10000016	5,999.99	10,197.3	2,570	0.0	0.4	Bend left - 15 deg., 1.5D	47.91949827	-103.59708623	2071.890
10000017	6,001.41	10,204.4	2,590	0.1	1.6	Bend left - 40 deg., 3D	47.91951097	-103.59710773	2071.581
10000018	6,251.62	11,376.1	2,840	0.0	0.9	Bend left - 25 deg., 3D	47.91940455	-103.60186818	2017.072
10000019	6,312.77	11,663.4	2,910	35.4	14.1	AGM 020, Sta. 120+37, Row -- Survey Point	47.91906143	-103.60291766	2009.721
10000020	6,336.68	11,775.5	2,950	0.0	0.7	Bend left - 18 deg., 3D	47.91894473	-103.60333917	2011.170
10000021	6,338.06	11,782.2	2,970	0.0	0.5	Bend down - 12 deg., 3D	47.91893237	-103.60335973	2011.062
10000022	6,400.71	12,073.9	3,060	0.0	0.7	Bend right - 22 deg., 3D	47.91838617	-103.60419880	1959.317
10000023	6,861.61	14,261.1	3,560	0.0	0.4	Bend left - 14 deg., 3D	47.91580347	-103.61197027	1961.531
10000024	7,012.27	14,964.7	3,730	0.1	1.0	Bend right - 35 deg., 3D	47.91489991	-103.61448064	1964.409
10000025	7,189.75	15,791.7	3,940	0.0	0.5	Bend right - 16 deg., 3D	47.91569377	-103.61761045	1965.478
10000026	7,738.17	18,361.7	4,500	0.1	1.1	Bend left - 35 deg., 3D	47.92038057	-103.62503242	1995.641
10000027	7,821.41	18,759.8	4,590	34.4	5.5	AGM 030, Sta. 191+42, Two track -- Han #115	47.92036340	-103.62664925	2008.561
10000028	7,823.73	18,770.9	4,610	0.2	0.9	Tee at 270 deg.	47.92036367	-103.62669388	2009.080
10000029	8,308.37	21,051.0	5,130	0.0	1.1	Bend left - 35 deg., 3D	47.92032868	-103.63595722	2065.010
10000030	8,877.50	23,716.2	5,760	1.0	1.0	Valve	47.91752909	-103.64579024	2057.933
10000031	8,958.54	24,099.4	5,890	18.6	23.7	AGM 040, Sta. 243+93, Hwy 85 -- Han #142	47.91727546	-103.64729764	2047.815
10000032	9,292.91	25,680.6	6,240	13.1	24.1	Bend left - 23 deg., 56D	47.91753724	-103.65362294	2000.998
10000033	9,363.82	26,008.5	6,310	17.3	32.3	Bend left - 10 deg., 49D	47.91733824	-103.65491159	2037.522

Locations Summary

ID#	Time	Dist (ft)	Joint #	U/S Weld Dist.	D/S Weld Dist.	Description	Latitude	Longitude	Altitude
10000034	9,607.70	27,142.9	6,550	13.6	35.9	Bend right - 21 deg., 77D	47.91581060	-103.65890204	2047.531
10000035	9,979.68	28,868.7	6,900	9.8	39.8	Bend right - 15 deg., 74D	47.91568570	-103.66585501	2012.598
10000036	10,114.97	29,493.1	7,030	0.7	35.6	AGM 050, Sta. 298+31, Gravel Rd. -- Han #116	47.91610238	-103.66832075	2021.472
10000037	11,280.16	34,885.6	8,140	23.0	26.1	AGM 060, Sta. 352+17, Row -- Han #143	47.91621095	-103.69022074	2055.429
10000038	12,521.21	40,710.2	9,360	33.6	8.6	AGM 070, Sta. 409+72, 146th Ave. NW -- Han #115	47.92183219	-103.71221933	2116.919
10000039	13,297.14	44,300.9	10,120	0.1	1.6	Bend right - 45 deg., 3D	47.92422522	-103.72631633	2203.645
10000040	13,827.31	46,703.3	10,650	2.3	5.6	AGM 080, Sta. 469+20, 147th Ave. NW -- Han #143	47.92810118	-103.73395343	2227.909
10000041	14,406.22	49,319.7	11,190	24.0	25.5	Bend left - 15 deg., 63D	47.93138649	-103.74336844	2228.606
10000042	15,086.91	52,445.5	11,840	18.0	24.2	AGM 090, Sta. 525+85, CR 16 -- Han #116	47.92736736	-103.75444742	2280.524
10000043	15,496.07	54,279.0	12,230	22.3	27.2	Bend right - 21 deg., 73D	47.92449573	-103.76053397	2227.584
10000044	16,462.89	58,348.1	13,090	34.2	8.0	AGM 100, Sta. 584+49, 149th Ave NW -- Han #142	47.92451322	-103.77706022	2260.847
10000045	16,847.67	59,972.9	13,490	1.3	11.3	Bend left - 90 deg., 9D	47.92448423	-103.78366959	2220.333
10000046	16,880.60	60,104.9	13,540	0.1	1.4	Bend up - 45 deg., 3D	47.92412300	-103.78367650	2221.248
10000047	16,884.94	60,123.4	13,570	0.1	1.5	Bend down - 45 deg., 3D	47.92408636	-103.78366811	2233.305
10000048	16,885.24	60,124.6	13,580	0.5	0.6	Flange	47.92408298	-103.78366639	2233.470
10000049	16,885.49	60,125.7	13,590	0.2	0.9	Tee at 90 deg.	47.92407993	-103.78366473	2233.384
10000050	16,885.76	60,126.9	13,600	0.5	0.8	Pipe Support	47.92407637	-103.78366292	2233.283
10000051	16,885.84	60,127.2	13,600	0.9	0.4	Fitting on top of pipe	47.92407537	-103.78366241	2233.255
10000052	16,886.03	60,128.1	13,610	0.6	2.7	Flange	47.92407302	-103.78366115	2233.191
10000053	16,886.29	60,129.4	13,610	1.8	1.5	Valve (Receiver) AGM 110, Sta. 602+13, Dore Junction	47.92406974	-103.78365942	2233.114

Locations	Number
Bend	29
Casing	0
Flange	6
Fitting	1
Marker	10
Repair	0
Tee	3
Valve	3
Pipe Support	3

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
No Dents have been detected on this pipeline inspection											

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	-1.58	0.322	ERW	52000	0.72	23.39
11000001	21.80	0.188	ERW	52000	0.72	229.4
11000002	251.21	0.322	ERW	52000	0.72	172.68
11000003	423.89	0.188	ERW	52000	0.72	509.37
11000004	933.26	0.322	ERW	52000	0.72	126.14
11000005	1059.40	0.188	ERW	52000	0.72	502.85
11000006	1562.26	0.322	ERW	52000	0.72	126.45
11000007	1688.70	0.188	ERW	52000	0.72	534.48
11000008	2223.19	0.322	ERW	52000	0.72	126.15
11000009	2349.34	0.188	ERW	52000	0.72	9026.29
11000010	11375.63	0.322	ERW	52000	0.72	7.32
11000011	11382.95	0.188	ERW	52000	0.72	392.14
11000012	11775.09	0.322	ERW	52000	0.72	7.39
11000013	11782.48	0.188	ERW	52000	0.72	291.03
11000014	12073.51	0.322	ERW	52000	0.72	541.76
11000015	12615.27	0.188	ERW	52000	0.72	6025.74
11000016	18641.01	0.322	ERW	52000	0.72	124.24
11000017	18765.25	0.188	ERW	52000	0.72	4949.88
11000018	23715.14	0.322	ERW	52000	0.72	7.55
11000019	23722.69	0.188	ERW	52000	0.72	329.36
11000020	24052.04	0.322	ERW	52000	0.72	434.17
11000021	24486.21	0.188	ERW	52000	0.72	5042.46
11000022	29528.67	0.322	ERW	52000	0.72	250.84
11000023	29779.51	0.188	ERW	52000	0.72	10706.01
11000024	40485.52	0.322	ERW	52000	0.72	266.81
11000025	40752.33	0.188	ERW	52000	0.72	1177.67
11000026	41929.99	0.322	ERW	52000	0.72	254.55
11000027	42184.54	0.188	ERW	52000	0.72	4142.4
11000028	46326.94	0.322	ERW	52000	0.72	374.1
11000029	46701.04	0.188	ERW	52000	0.72	5616.69
11000030	52317.73	0.322	ERW	52000	0.72	615
11000031	52932.72	0.188	ERW	52000	0.72	5087.53
11000032	58020.26	0.322	ERW	52000	0.72	587.84
11000033	58608.10	0.188	ERW	52000	0.72	770.81
11000034	59378.91	0.322	ERW	52000	0.72	220.67
11000035	59599.58	0.188	ERW	52000	0.72	500.92
11000036	60100.49	0.322	ERW	52000	0.72	28.86

Nominal Wall Thickness

Wall Thickness	Pipetype	Total Length (ft)	Total Length (miles)	Percent of Total Distance
0.188	ERW	55,835	10.575	92.9%
0.322	ERW	4,296	0.814	7.1%

Repair Report

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	3854.83	0.00	Valve (Launcher), Sta. 0+00, Camp Creek	47.92107003	-103.56317187	2132.697
10000013	5163.25	6268.07	AGM 010, Sta. 66+52, Row -- Han #142	47.91519375	-103.58345337	2128.182
10000019	6312.77	11663.40	AGM 020, Sta. 120+37, Row -- Survey Point	47.91906143	-103.60291766	2009.721
10000027	7821.41	18759.83	AGM 030, Sta. 191+42, Two track -- Han #115	47.92036340	-103.62664925	2008.561
10000030	8877.50	23716.18	Valve	47.91752909	-103.64579024	2057.933
10000031	8958.54	24099.39	AGM 040, Sta. 243+93, Hwy 85 -- Han #142	47.91727546	-103.64729764	2047.815
10000036	10114.97	29493.12	AGM 050, Sta. 298+31, Gravel Rd. -- Han #116	47.91610238	-103.66832075	2021.472
10000037	11280.16	34885.57	AGM 060, Sta. 352+17, Row -- Han #143	47.91621095	-103.69022074	2055.429
10000038	12521.21	40710.15	AGM 070, Sta. 409+72, 146th Ave. NW -- Han #115	47.92183219	-103.71221933	2116.919
10000040	13827.31	46703.34	AGM 080, Sta. 469+20, 147th Ave. NW -- Han #143	47.92810118	-103.73395343	2227.909
10000042	15086.91	52445.54	AGM 090, Sta. 525+85, CR 16 -- Han #116	47.92736736	-103.75444742	2280.524
10000044	16462.89	58348.11	AGM 100, Sta. 584+49, 149th Ave NW -- Han #142	47.92451322	-103.77706022	2260.847
10000053	16886.29	60129.36	Valve (Receiver) AGM 110, Sta. 602+13, Dore Junction	47.92406974	-103.78365942	2233.114

TYPE	NUMBER
Valves	3
Markers	10

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	163.97	-30.56	Begin Run Tickle
12000001	17,894.32	60,168.00	End Run Tickle

Total	Number
Misc listings	2

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

Camp Creek to Dore Junction

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	-30.6	0	-	29.0	47.92106998	-103.56317184	2132.703							
11000000	WT CHANGE	-1.6	0	0.0	0.0	47.92106998	-103.56317184	2132.703				0.322	52000	0.72	
110	WELD	-1.6	110	0.0	3.1	47.92106998	-103.56317184	2132.703							
10000000	Flange	-1.1	110	0.5	2.6	47.92106998	-103.56317184	2132.703	0	12:00					
10000001	Valve (Launcher), Sta. 0+00, Camp Creek	0.0	110	1.6	1.6	47.92107003	-103.56317187	2132.697							
10000002	Flange	1.1	110	2.7	0.5	47.92107015	-103.56317588	2133.269	0	12:00					
120	WELD	1.6	120	0.0	3.8	47.92107022	-103.56317756	2133.503							
10000003	Pipe Support	3.4	120	1.7	2.1	47.92107048	-103.56318403	2134.426							
130	WELD	5.3	130	0.0	1.2	47.92107075	-103.56319098	2135.411							
10000004	Tee at 270 deg.	5.9	130	0.3	1.0	47.92107082	-103.56319274	2135.667	254	8:15					
140	WELD	6.6	140	0.0	2.5	47.92107091	-103.56319475	2135.944							
10000005	Pipe Support	8.2	140	1.5	1.0	47.92107112	-103.56319990	2136.679							
150	WELD	9.0	150	0.0	0.9	47.92107124	-103.56320276	2137.100							
10000006	Flange	9.5	150	0.5	0.4	47.92107130	-103.56320430	2137.320	0	12:00					
160	WELD	10.0	160	0.0	1.6	47.92107137	-103.56320567	2137.497							
10000007	Bend down - 45 deg., 3D	10.8	160	0.1	1.6	47.92107148	-103.56320815	2137.717	0	12:00					
170	WELD	11.6	170	0.0	8.6	47.92107160	-103.56321039	2137.688							
180	WELD	20.2	180	0.0	1.6	47.92107263	-103.56323047	2135.015							
10000008	Bend up - 45 deg., 3D	21.0	180	0.1	1.5	47.92107273	-103.56323283	2134.623	0	12:00					
11000001	WT CHANGE	21.8	180	0.0	0.0	47.92107283	-103.56323581	2134.419				0.188	52000	0.72	
190	WELD	21.8	190	0.0	6.7	47.92107283	-103.56323584	2134.419							
200	WELD	28.5	200	0.0	19.4	47.92107356	-103.56326260	2134.296							
210	WELD	47.9	210	0.0	9.2	47.92107549	-103.56334187	2134.160							
220	WELD	57.1	220	0.0	6.9	47.92107615	-103.56337958	2133.866							
230	WELD	64.0	230	0.0	32.4	47.92107660	-103.56340782	2133.711							
240	WELD	96.4	240	0.0	48.8	47.92107777	-103.56354019	2134.413							
250	WELD	145.3	250	0.0	11.8	47.92107893	-103.56373978	2135.185							
10000009	Bend left - 90 deg., 6D	151.0	250	2.5	9.3	47.92107564	-103.56376184	2135.309	0	12:00					
260	WELD	157.0	260	0.0	45.9	47.92106001	-103.56376730	2135.387							
270	WELD	203.0	270	0.0	48.2	47.92093356	-103.56377020	2134.492							
11000002	WT CHANGE	251.2	270	0.0	0.0	47.92080101	-103.56377520	2131.884				0.322	52000	0.72	
280	WELD	251.2	280	0.0	42.0	47.92080098	-103.56377520	2131.884							
290	WELD	293.2	290	0.0	42.0	47.92068587	-103.56378026	2130.406							
300	WELD	335.2	300	0.0	42.0	47.92057067	-103.56378634	2129.398							
310	WELD	377.2	310	0.0	36.6	47.92045568	-103.56379380	2127.943							
320	WELD	413.8	320	0.0	10.1	47.92035555	-103.56379916	2129.420							

Criteria: ASME B31G: Modified

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Camp Creek to Dore Junction

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)
10000010	Bend right - 90 deg., 6D	418.9	320	1.6	8.4	47.92034288	-103.56380444	2129.683	0 12:00					
11000003	WT CHANGE	423.9	320	0.0	0.0	47.92033983	-103.56382298	2130.281			0.188	52000	0.72	
330	WELD	423.9	330	0.0	27.6	47.92033983	-103.56382301	2130.282						
340	WELD	451.5	340	0.0	48.9	47.92034188	-103.56393420	2132.966						
350	WELD	500.3	350	0.0	49.4	47.92034495	-103.56413347	2135.804						
360	WELD	549.7	360	0.0	49.2	47.92034649	-103.56433495	2136.213						
370	WELD	598.8	370	0.0	49.1	47.92034730	-103.56453551	2135.835						
380	WELD	647.9	380	0.0	49.4	47.92034797	-103.56473591	2135.160						
390	WELD	697.3	390	0.0	49.5	47.92034701	-103.56493754	2135.223						
400	WELD	746.8	400	0.0	49.5	47.92034560	-103.56513949	2136.015						
410	WELD	796.3	410	0.0	49.4	47.92034383	-103.56534081	2137.547						
420	WELD	845.7	420	0.0	49.4	47.92034197	-103.56554224	2138.580						
430	WELD	895.2	430	0.0	38.1	47.92034117	-103.56574331	2139.634						
11000004	WT CHANGE	933.3	430	0.0	0.0	47.92034243	-103.56589851	2140.267			0.322	52000	0.72	
440	WELD	933.3	440	0.0	41.9	47.92034243	-103.56589855	2140.267						
450	WELD	975.2	450	0.0	42.2	47.92034556	-103.56606888	2140.154						
460	WELD	1,017.3	460	0.0	42.1	47.92034676	-103.56624026	2139.922						
11000005	WT CHANGE	1,059.4	460	0.0	0.0	47.92034754	-103.56641130	2138.948			0.188	52000	0.72	
470	WELD	1,059.5	470	0.0	29.2	47.92034754	-103.56641150	2138.947						
480	WELD	1,088.7	480	0.0	34.9	47.92034668	-103.56653039	2139.303						
490	WELD	1,123.6	490	0.0	43.2	47.92034555	-103.56667236	2140.068						
500	WELD	1,166.8	500	0.0	38.2	47.92034414	-103.56684764	2140.351						
510	WELD	1,205.0	510	0.0	30.8	47.92034309	-103.56700321	2140.400						
520	WELD	1,235.8	520	0.0	35.9	47.92034233	-103.56712815	2140.177						
530	WELD	1,271.8	530	0.0	45.6	47.92034197	-103.56727400	2139.517						
540	WELD	1,317.3	540	0.0	49.7	47.92034146	-103.56745904	2137.236						
550	WELD	1,367.1	550	0.0	49.6	47.92034084	-103.56766061	2135.029						
560	WELD	1,416.7	560	0.0	49.1	47.92034073	-103.56786179	2134.017						
570	WELD	1,465.8	570	0.0	49.4	47.92034027	-103.56806126	2133.804						
580	WELD	1,515.2	580	0.0	47.0	47.92033845	-103.56826233	2133.688						
11000006	WT CHANGE	1,562.3	580	0.0	0.0	47.92033887	-103.56845321	2132.915			0.322	52000	0.72	
590	WELD	1,562.3	590	0.0	42.0	47.92033887	-103.56845333	2132.915						
600	WELD	1,604.3	600	0.0	42.2	47.92034068	-103.56862389	2131.884						
610	WELD	1,646.5	610	0.0	42.2	47.92034118	-103.56879526	2132.217						
11000007	WT CHANGE	1,688.7	610	0.0	0.0	47.92034025	-103.56896645	2133.866			0.188	52000	0.72	
620	WELD	1,688.7	620	0.0	18.8	47.92034025	-103.56896657	2133.867						
630	WELD	1,707.5	630	0.0	44.9	47.92033915	-103.56904287	2134.649						

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)
640	WELD	1,752.4	640	0.0	49.4	47.92033645	-103.56922536	2136.078							
650	WELD	1,801.8	650	0.0	49.3	47.92033281	-103.56942621	2137.769							
660	WELD	1,851.1	660	0.0	49.4	47.92033001	-103.56962697	2138.059							
670	WELD	1,900.6	670	0.0	49.6	47.92032780	-103.56982801	2137.700							
680	WELD	1,950.1	680	0.0	49.6	47.92032432	-103.57002953	2137.145							
690	WELD	1,999.7	690	0.0	49.3	47.92032180	-103.57023115	2135.104							
700	WELD	2,049.0	700	0.0	49.1	47.92031976	-103.57043118	2131.720							
710	WELD	2,098.2	710	0.0	49.6	47.92031825	-103.57063043	2127.905							
720	WELD	2,147.8	720	0.0	49.6	47.92031602	-103.57083139	2124.289							
730	WELD	2,197.3	730	0.0	25.9	47.92031172	-103.57103279	2123.829							
11000008	WT CHANGE	2,223.2	730	0.0	0.0	47.92030936	-103.57113768	2124.565				0.322	52000	0.72	
740	WELD	2,223.2	740	0.0	42.0	47.92030935	-103.57113788	2124.569							
750	WELD	2,265.2	750	0.0	42.1	47.92030926	-103.57130821	2127.718							
760	WELD	2,307.3	760	0.0	42.1	47.92031101	-103.57147903	2131.059							
11000009	WT CHANGE	2,349.3	760	0.0	0.0	47.92031255	-103.57165010	2131.439				0.188	52000	0.72	
770	WELD	2,349.4	770	0.0	9.2	47.92031255	-103.57165026	2131.439							
780	WELD	2,358.6	780	0.0	49.5	47.92031258	-103.57168771	2131.272							
790	WELD	2,408.1	790	0.0	49.5	47.92030977	-103.57188908	2129.074							
800	WELD	2,457.6	800	0.0	42.2	47.92030228	-103.57209022	2129.144							
810	WELD	2,499.8	810	0.0	1.4	47.92029317	-103.57226138	2130.144							
10000011	Bend left - 30 deg., 3D	2,500.5	810	0.1	1.3	47.92029258	-103.57226403	2130.129	0	12:00					
820	WELD	2,501.2	820	0.0	10.1	47.92029160	-103.57226636	2130.105							
830	WELD	2,511.3	830	0.0	44.3	47.92027193	-103.57229609	2129.808							
840	WELD	2,555.6	840	0.0	49.6	47.92018557	-103.57242238	2127.110							
850	WELD	2,605.2	850	0.0	47.8	47.92008713	-103.57256112	2124.351							
860	WELD	2,653.0	860	0.0	49.3	47.91998930	-103.57269033	2123.320							
870	WELD	2,702.4	870	0.0	49.5	47.91988637	-103.57281999	2125.186							
880	WELD	2,751.8	880	0.0	49.5	47.91978171	-103.57294695	2128.489							
890	WELD	2,801.3	890	0.0	49.5	47.91967550	-103.57307084	2132.725							
900	WELD	2,850.9	900	0.0	49.7	47.91956852	-103.57319369	2135.271							
910	WELD	2,900.6	910	0.0	49.7	47.91946133	-103.57331681	2137.689							
920	WELD	2,950.3	920	0.0	49.6	47.91935487	-103.57344155	2140.049							
930	WELD	2,999.9	930	0.0	49.7	47.91924940	-103.57356758	2142.169							
940	WELD	3,049.5	940	0.0	49.5	47.91914366	-103.57369388	2143.877							
950	WELD	3,099.0	950	0.0	49.3	47.91903788	-103.57381893	2144.951							
960	WELD	3,148.3	960	0.0	49.5	47.91893244	-103.57394356	2146.349							
970	WELD	3,197.9	970	0.0	49.8	47.91882717	-103.57407007	2147.744							

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)
980	WELD	3,247.6	980	0.0	50.0	47.91872177	-103.57419706	2148.751						
990	WELD	3,297.6	990	0.0	49.8	47.91861549	-103.57432465	2149.240						
1000	WELD	3,347.4	1000	0.0	49.6	47.91850926	-103.57445051	2149.910						
1010	WELD	3,397.0	1010	0.0	49.5	47.91840354	-103.57457665	2151.624						
1020	WELD	3,446.5	1020	0.0	49.5	47.91829863	-103.57470336	2152.601						
1030	WELD	3,496.0	1030	0.0	49.2	47.91819336	-103.57482958	2152.338						
1040	WELD	3,545.2	1040	0.0	49.5	47.91808828	-103.57495402	2151.715						
1050	WELD	3,594.7	1050	0.0	49.2	47.91798208	-103.57507865	2151.286						
1060	WELD	3,643.9	1060	0.0	49.5	47.91787583	-103.57520135	2150.986						
1070	WELD	3,693.4	1070	0.0	48.4	47.91776886	-103.57532482	2150.801						
1080	WELD	3,741.8	1080	0.0	49.4	47.91766458	-103.57544596	2150.481						
1090	WELD	3,791.1	1090	0.0	49.6	47.91755773	-103.57556867	2150.630						
1100	WELD	3,840.7	1100	0.0	49.3	47.91744997	-103.57569098	2150.434						
1110	WELD	3,890.0	1110	0.0	49.5	47.91734328	-103.57581336	2150.159						
1120	WELD	3,939.5	1120	0.0	49.4	47.91723610	-103.57593615	2149.967						
1130	WELD	3,988.8	1130	0.0	49.3	47.91712904	-103.57605857	2149.069						
1140	WELD	4,038.1	1140	0.0	49.4	47.91702258	-103.57618143	2147.975						
1150	WELD	4,087.5	1150	0.0	49.0	47.91691627	-103.57630543	2147.126						
1160	WELD	4,136.5	1160	0.0	48.0	47.91680981	-103.57642728	2147.045						
1170	WELD	4,184.5	1170	0.0	49.2	47.91670632	-103.57654763	2149.911						
1180	WELD	4,233.7	1180	0.0	49.3	47.91660033	-103.57667163	2151.591						
1190	WELD	4,283.0	1190	0.0	49.0	47.91649398	-103.57679547	2151.107						
1200	WELD	4,332.0	1200	0.0	49.4	47.91638834	-103.57691858	2151.056						
1210	WELD	4,381.3	1210	0.0	44.7	47.91628210	-103.57704278	2150.754						
1220	WELD	4,426.1	1220	0.0	49.4	47.91618555	-103.57715504	2150.644						
1230	WELD	4,475.4	1230	0.0	48.4	47.91607794	-103.57727710	2149.497						
1240	WELD	4,523.9	1240	0.0	48.2	47.91596989	-103.57739101	2147.564						
1250	WELD	4,572.0	1250	0.0	49.3	47.91585988	-103.57749877	2145.460						
1260	WELD	4,621.3	1260	0.0	49.5	47.91574644	-103.57760695	2143.326						
1270	WELD	4,670.8	1270	0.0	45.9	47.91563227	-103.57771418	2141.133						
1280	WELD	4,716.7	1280	0.0	49.3	47.91552692	-103.57781500	2138.366						
1290	WELD	4,766.0	1290	0.0	49.4	47.91541334	-103.57792279	2136.700						
1300	WELD	4,815.3	1300	0.0	49.4	47.91529912	-103.57803000	2134.180						
1310	WELD	4,864.8	1310	0.0	37.9	47.91518470	-103.57813674	2131.242						
1320	WELD	4,902.6	1320	0.0	36.4	47.91509707	-103.57821829	2129.427						
1330	WELD	4,939.1	1330	0.0	30.5	47.91501255	-103.57829660	2127.654						
1340	WELD	4,969.5	1340	0.0	31.0	47.91494175	-103.57836166	2126.664						

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)
1350	WELD	5,000.5	1350	0.0	39.6	47.91486909	-103.57842560	2126.937							
1360	WELD	5,040.1	1360	0.0	7.4	47.91477560	-103.57850504	2128.572							
10000012	Bend right - 70 deg., 5D	5,042.7	1360	0.3	7.1	47.91477103	-103.57851311	2128.627	0	12:00					
1370	WELD	5,047.5	1370	0.0	17.1	47.91477115	-103.57853254	2128.814							
1380	WELD	5,064.6	1380	0.0	42.9	47.91477817	-103.57860210	2129.481							
1390	WELD	5,107.5	1390	0.0	31.0	47.91479454	-103.57877488	2129.143							
1400	WELD	5,138.5	1400	0.0	45.2	47.91480550	-103.57890010	2128.845							
1410	WELD	5,183.8	1410	0.0	32.6	47.91482113	-103.57908249	2129.839							
1420	WELD	5,216.3	1420	0.0	38.7	47.91483233	-103.57921379	2130.542							
1430	WELD	5,255.0	1430	0.0	40.1	47.91484515	-103.57937012	2131.389							
1440	WELD	5,295.1	1440	0.0	40.8	47.91485777	-103.57953184	2132.628							
1450	WELD	5,335.9	1450	0.0	40.7	47.91487001	-103.57969682	2133.376							
1460	WELD	5,376.6	1460	0.0	49.3	47.91488109	-103.57986127	2133.469							
1470	WELD	5,426.0	1470	0.0	49.4	47.91489321	-103.58006118	2132.633							
1480	WELD	5,475.4	1480	0.0	49.4	47.91490345	-103.58026112	2129.171							
1490	WELD	5,524.8	1490	0.0	49.4	47.91491399	-103.58046098	2125.853							
1500	WELD	5,574.2	1500	0.0	32.3	47.91492535	-103.58066075	2121.997							
1510	WELD	5,606.5	1510	0.0	37.8	47.91493238	-103.58079127	2119.297							
1520	WELD	5,644.3	1520	0.0	49.3	47.91494067	-103.58094382	2116.503							
1530	WELD	5,693.6	1530	0.0	29.8	47.91495273	-103.58114337	2118.616							
1540	WELD	5,723.5	1540	0.0	49.6	47.91496071	-103.58126361	2121.593							
1550	WELD	5,773.0	1550	0.0	39.7	47.91497460	-103.58146335	2126.056							
1560	WELD	5,812.7	1560	0.0	49.3	47.91498495	-103.58162411	2128.472							
1570	WELD	5,862.0	1570	0.0	49.3	47.91499954	-103.58182366	2130.649							
1580	WELD	5,911.3	1580	0.0	48.6	47.91501782	-103.58202319	2131.500							
1590	WELD	5,959.8	1590	0.0	49.4	47.91503938	-103.58221831	2131.555							
1600	WELD	6,009.2	1600	0.0	49.3	47.91506408	-103.58241619	2131.383							
1610	WELD	6,058.5	1610	0.0	49.1	47.91508818	-103.58261403	2130.524							
1620	WELD	6,107.7	1620	0.0	39.3	47.91511038	-103.58281151	2130.273							
1630	WELD	6,147.0	1630	0.0	18.3	47.91512890	-103.58296946	2130.072							
1640	WELD	6,165.3	1640	0.0	48.2	47.91513769	-103.58304292	2129.957							
1650	WELD	6,213.5	1650	0.0	47.4	47.91516161	-103.58323614	2129.037							
1660	WELD	6,260.9	1660	0.0	49.2	47.91518930	-103.58342472	2128.244							
10000013	AGM 010, Sta. 66+52, Row -- Han #142	6,268.1	1660	7.2	42.0	47.91519375	-103.58345337	2128.182							
1670	WELD	6,310.1	1670	0.0	45.8	47.91521868	-103.58362059	2127.556							
1680	WELD	6,355.9	1680	0.0	49.0	47.91524536	-103.58380246	2127.192							

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)
1690	WELD	6,404.9	1690	0.0	49.1	47.91527350	-103.58399780	2127.432						
1700	WELD	6,454.1	1700	0.0	49.3	47.91530426	-103.58419257	2129.291						
1710	WELD	6,503.4	1710	0.0	49.4	47.91533640	-103.58438813	2130.972						
1720	WELD	6,552.8	1720	0.0	49.5	47.91536852	-103.58458387	2132.492						
1730	WELD	6,602.3	1730	0.0	49.4	47.91540140	-103.58477957	2133.788						
1740	WELD	6,651.7	1740	0.0	49.5	47.91543626	-103.58497428	2135.703						
1750	WELD	6,701.1	1750	0.0	48.7	47.91547250	-103.58516860	2137.224						
1760	WELD	6,749.8	1760	0.0	49.1	47.91550861	-103.58535943	2139.067						
1770	WELD	6,798.9	1770	0.0	49.5	47.91554571	-103.58555189	2140.125						
1780	WELD	6,848.5	1780	0.0	49.5	47.91558409	-103.58574522	2140.331						
1790	WELD	6,898.0	1790	0.0	36.2	47.91562266	-103.58593854	2140.899						
1800	WELD	6,934.1	1800	0.0	35.5	47.91565067	-103.58607966	2140.667						
1810	WELD	6,969.6	1810	0.0	36.7	47.91567847	-103.58621785	2140.641						
1820	WELD	7,006.3	1820	0.0	29.3	47.91570725	-103.58636089	2140.872						
1830	WELD	7,035.6	1830	0.0	49.2	47.91573035	-103.58647506	2140.527						
1840	WELD	7,084.8	1840	0.0	27.7	47.91576956	-103.58666634	2140.212						
1850	WELD	7,112.6	1850	0.0	49.6	47.91579175	-103.58677386	2139.760						
1860	WELD	7,162.1	1860	0.0	32.4	47.91583044	-103.58696682	2139.629						
1870	WELD	7,194.6	1870	0.0	37.0	47.91585551	-103.58709296	2139.212						
1880	WELD	7,231.6	1880	0.0	29.4	47.91588363	-103.58723723	2139.506						
1890	WELD	7,261.0	1890	0.0	32.0	47.91590595	-103.58735202	2139.543						
1900	WELD	7,292.9	1900	0.0	31.7	47.91592990	-103.58747683	2139.852						
1910	WELD	7,324.6	1910	0.0	44.0	47.91595370	-103.58760075	2139.977						
1920	WELD	7,368.6	1920	0.0	31.0	47.91598763	-103.58777218	2139.921						
1930	WELD	7,399.6	1930	0.0	33.5	47.91601281	-103.58789247	2139.969						
1940	WELD	7,433.1	1940	0.0	33.9	47.91604200	-103.58802169	2140.082						
1950	WELD	7,467.1	1950	0.0	35.6	47.91607351	-103.58815183	2139.836						
1960	WELD	7,502.7	1960	0.0	35.3	47.91610841	-103.58828699	2139.673						
1970	WELD	7,538.0	1970	0.0	6.1	47.91614465	-103.58841988	2139.796						
1980	WELD	7,544.0	1980	0.0	0.8	47.91615075	-103.58844252	2139.942						
10000014	Bend left - 24 deg., 1.5D	7,544.4	1980	0.0	0.7	47.91615101	-103.58844406	2139.951	0 12:00					
1990	WELD	7,544.8	1990	0.0	38.7	47.91615116	-103.58844568	2139.960						
2000	WELD	7,583.5	2000	0.0	36.4	47.91614739	-103.58860420	2140.131						
2010	WELD	7,619.9	2010	0.0	49.1	47.91614548	-103.58875294	2140.216						
2020	WELD	7,669.0	2020	0.0	49.5	47.91614324	-103.58895359	2140.315						
2030	WELD	7,718.5	2030	0.0	49.5	47.91614054	-103.58915553	2140.694						
2040	WELD	7,768.0	2040	0.0	49.4	47.91613666	-103.58935739	2140.853						

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)
2050	WELD	7,817.5	2050	0.0	49.4	47.91613286	-103.58955904	2140.387							
2060	WELD	7,866.9	2060	0.0	49.3	47.91613008	-103.58976036	2139.918							
2070	WELD	7,916.2	2070	0.0	49.5	47.91612949	-103.58996142	2139.531							
2080	WELD	7,965.6	2080	0.0	49.5	47.91613115	-103.59016309	2139.756							
2090	WELD	8,015.1	2090	0.0	49.4	47.91613563	-103.59036515	2140.159							
2100	WELD	8,064.4	2100	0.0	49.5	47.91614257	-103.59056601	2139.771							
2110	WELD	8,113.9	2110	0.0	49.5	47.91615047	-103.59076697	2137.077							
2120	WELD	8,163.3	2120	0.0	49.4	47.91615845	-103.59096786	2133.282							
2130	WELD	8,212.7	2130	0.0	49.0	47.91616810	-103.59116789	2128.378							
2140	WELD	8,261.8	2140	0.0	49.2	47.91618082	-103.59136659	2124.223							
2150	WELD	8,311.0	2150	0.0	49.0	47.91619913	-103.59156497	2120.514							
2160	WELD	8,360.0	2160	0.0	49.1	47.91622720	-103.59176056	2120.037							
2170	WELD	8,409.1	2170	0.0	49.5	47.91626914	-103.59195070	2120.164							
2180	WELD	8,458.5	2180	0.0	49.4	47.91632009	-103.59213726	2120.909							
2190	WELD	8,507.9	2190	0.0	49.5	47.91637599	-103.59232072	2120.173							
2200	WELD	8,557.4	2200	0.0	49.5	47.91643247	-103.59250420	2120.123							
2210	WELD	8,606.8	2210	0.0	43.8	47.91648785	-103.59268814	2119.642							
2220	WELD	8,650.6	2220	0.0	11.5	47.91653586	-103.59285161	2118.464							
2230	WELD	8,662.1	2230	0.0	43.3	47.91654830	-103.59289459	2117.984							
2240	WELD	8,705.4	2240	0.0	49.4	47.91659398	-103.59305728	2116.068							
2250	WELD	8,754.8	2250	0.0	49.5	47.91664610	-103.59324320	2113.063							
2260	WELD	8,804.3	2260	0.0	49.5	47.91669828	-103.59342871	2109.293							
2270	WELD	8,853.7	2270	0.0	44.2	47.91675134	-103.59361383	2106.126							
2280	WELD	8,897.9	2280	0.0	47.4	47.91679697	-103.59378011	2104.114							
2290	WELD	8,945.3	2290	0.0	47.8	47.91684688	-103.59395882	2101.756							
2300	WELD	8,993.1	2300	0.0	45.4	47.91689733	-103.59413814	2100.028							
2310	WELD	9,038.4	2310	0.0	6.0	47.91694536	-103.59430846	2098.423							
2320	WELD	9,044.4	2320	0.0	1.1	47.91695175	-103.59433103	2098.200							
10000015	Bend right - 35 deg., 3D	9,045.0	2320	0.1	1.0	47.91695261	-103.59433299	2098.182	0	12:00					
2330	WELD	9,045.6	2330	0.0	44.5	47.91695365	-103.59433464	2098.170							
2340	WELD	9,090.1	2340	0.0	49.4	47.91705371	-103.59444014	2097.592							
2350	WELD	9,139.5	2350	0.0	49.3	47.91716347	-103.59455802	2097.405							
2360	WELD	9,188.8	2360	0.0	49.4	47.91727234	-103.59467737	2096.311							
2370	WELD	9,238.2	2370	0.0	49.5	47.91738209	-103.59479506	2094.766							
2380	WELD	9,287.7	2380	0.0	49.5	47.91749100	-103.59491476	2092.885							
2390	WELD	9,337.1	2390	0.0	49.3	47.91759946	-103.59503481	2091.010							
2400	WELD	9,386.5	2400	0.0	49.6	47.91770741	-103.59515446	2088.554							

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)
2410	WELD	9,436.1	2410	0.0	49.6	47.91781599	-103.59527423	2086.557							
2420	WELD	9,485.7	2420	0.0	49.0	47.91792518	-103.59539296	2084.779							
2430	WELD	9,534.7	2430	0.0	49.7	47.91803361	-103.59550911	2082.895							
2440	WELD	9,584.4	2440	0.0	49.5	47.91814391	-103.59562555	2081.315							
2450	WELD	9,633.9	2450	0.0	49.2	47.91825359	-103.59574236	2081.132							
2460	WELD	9,683.1	2460	0.0	48.8	47.91836174	-103.59586088	2080.292							
2470	WELD	9,731.9	2470	0.0	49.5	47.91846819	-103.59597893	2076.953							
2480	WELD	9,781.3	2480	0.0	49.6	47.91857780	-103.59609562	2073.554							
2490	WELD	9,830.9	2490	0.0	49.5	47.91868827	-103.59621104	2071.134							
2500	WELD	9,880.3	2500	0.0	49.4	47.91879829	-103.59632758	2068.827							
2510	WELD	9,929.7	2510	0.0	49.1	47.91890756	-103.59644519	2067.471							
2520	WELD	9,978.8	2520	0.0	49.5	47.91901545	-103.59656335	2067.456							
2530	WELD	10,028.3	2530	0.0	49.6	47.91912453	-103.59668263	2067.574							
2540	WELD	10,077.9	2540	0.0	49.7	47.91923375	-103.59680194	2068.358							
2550	WELD	10,127.6	2550	0.0	46.8	47.91934329	-103.59692081	2070.029							
2560	WELD	10,174.3	2560	0.0	22.8	47.91944708	-103.59703206	2071.532							
2570	WELD	10,197.1	2570	0.0	0.4	47.91949784	-103.59708570	2071.892							
10000016	Bend left - 15 deg., 1.5D	10,197.3	2570	0.0	0.4	47.91949827	-103.59708623	2071.890	0	12:00					
2580	WELD	10,197.6	2580	0.0	6.0	47.91949873	-103.59708680	2071.887							
2590	WELD	10,203.6	2590	0.0	1.6	47.91950985	-103.59710506	2071.645							
10000017	Bend left - 40 deg., 3D	10,204.4	2590	0.1	1.6	47.91951097	-103.59710773	2071.581	0	12:00					
2600	WELD	10,205.2	2600	0.0	39.3	47.91951140	-103.59711082	2071.482							
2610	WELD	10,244.6	2610	0.0	48.8	47.91950607	-103.59726981	2066.277							
2620	WELD	10,293.3	2620	0.0	49.2	47.91949995	-103.59746737	2060.415							
2630	WELD	10,342.5	2630	0.0	49.0	47.91949413	-103.59766673	2056.803							
2640	WELD	10,391.5	2640	0.0	49.5	47.91948880	-103.59786618	2055.238							
2650	WELD	10,441.0	2650	0.0	49.5	47.91948390	-103.59806768	2053.833							
2660	WELD	10,490.4	2660	0.0	49.1	47.91947845	-103.59826919	2053.416							
2670	WELD	10,539.6	2670	0.0	49.5	47.91947206	-103.59846875	2054.005							
2680	WELD	10,589.0	2680	0.0	49.4	47.91946548	-103.59866997	2055.625							
2690	WELD	10,638.4	2690	0.0	49.4	47.91945876	-103.59887119	2055.543							
2700	WELD	10,687.8	2700	0.0	49.5	47.91945279	-103.59907255	2055.349							
2710	WELD	10,737.2	2710	0.0	49.4	47.91944758	-103.59927402	2054.451							
2720	WELD	10,786.6	2720	0.0	49.2	47.91944268	-103.59947530	2054.522							
2730	WELD	10,835.8	2730	0.0	49.0	47.91943829	-103.59967562	2052.913							
2740	WELD	10,884.8	2740	0.0	49.5	47.91943391	-103.59987469	2050.304							
2750	WELD	10,934.3	2750	0.0	49.5	47.91942917	-103.60007516	2045.252							

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)
2760	WELD	10,983.8	2760	0.0	49.4	47.91942414	-103.60027589	2040.556							
2770	WELD	11,033.2	2770	0.0	49.1	47.91941999	-103.60047610	2035.315							
2780	WELD	11,082.3	2780	0.0	49.3	47.91941553	-103.60067529	2031.589							
2790	WELD	11,131.6	2790	0.0	49.4	47.91941002	-103.60087556	2027.906							
2800	WELD	11,180.9	2800	0.0	49.4	47.91940572	-103.60107608	2024.640							
2810	WELD	11,230.4	2810	0.0	49.5	47.91940283	-103.60127688	2023.163							
2820	WELD	11,279.9	2820	0.0	49.7	47.91940091	-103.60147851	2022.751							
2830	WELD	11,329.6	2830	0.0	46.0	47.91940157	-103.60168002	2020.793							
11000010	WT CHANGE	11,375.6	2830	0.0	0.0	47.91940474	-103.60186628	2017.113				0.322	52000	0.72	
2840	WELD	11,375.6	2840	0.0	1.0	47.91940474	-103.60186636	2017.111							
10000018	Bend left - 25 deg., 3D	11,376.1	2840	0.0	0.9	47.91940455	-103.60186818	2017.072	0	12:00					
2850	WELD	11,376.6	2850	0.0	6.4	47.91940427	-103.60187002	2017.034							
11000011	WT CHANGE	11,383.0	2850	0.0	0.0	47.91939715	-103.60189350	2016.689				0.188	52000	0.72	
2860	WELD	11,383.0	2860	0.0	47.0	47.91939711	-103.60189361	2016.687							
2870	WELD	11,429.9	2870	0.0	49.6	47.91934317	-103.60206699	2014.551							
2880	WELD	11,479.5	2880	0.0	49.3	47.91928427	-103.60224831	2013.677							
2890	WELD	11,528.9	2890	0.0	49.6	47.91922426	-103.60242783	2012.137							
2900	WELD	11,578.4	2900	0.0	49.5	47.91916391	-103.60260789	2009.597							
2910	WELD	11,628.0	2910	0.0	49.5	47.91910333	-103.60278758	2008.280							
10000019	AGM 020, Sta. 120+37, Row -- Survey Point	11,663.4	2910	35.4	14.1	47.91906143	-103.60291766	2009.721							
2920	WELD	11,677.5	2920	0.0	49.5	47.91904521	-103.60296955	2010.190							
2930	WELD	11,726.9	2930	0.0	42.2	47.91899237	-103.60315486	2011.326							
2940	WELD	11,769.1	2940	0.0	6.0	47.91895114	-103.60331502	2011.246							
11000012	WT CHANGE	11,775.1	2940	0.0	0.0	47.91894524	-103.60333782	2011.173				0.322	52000	0.72	
2950	WELD	11,775.1	2950	0.0	0.8	47.91894522	-103.60333789	2011.173							
10000020	Bend left - 18 deg., 3D	11,775.5	2950	0.0	0.7	47.91894473	-103.60333917	2011.170	0	12:00					
2960	WELD	11,775.9	2960	0.0	6.0	47.91894415	-103.60334047	2011.166							
2970	WELD	11,781.9	2970	0.0	0.6	47.91893284	-103.60335899	2011.077							
10000021	Bend down - 12 deg., 3D	11,782.2	2970	0.0	0.5	47.91893237	-103.60335973	2011.062	0	12:00					
11000013	WT CHANGE	11,782.5	2970	0.0	0.0	47.91893189	-103.60336051	2011.019				0.188	52000	0.72	
2980	WELD	11,782.5	2980	0.0	6.1	47.91893185	-103.60336057	2011.016							
2990	WELD	11,788.6	2990	0.0	48.4	47.91892081	-103.60337821	2009.725							
3000	WELD	11,837.0	3000	0.0	49.2	47.91883294	-103.60352020	1999.288							
3010	WELD	11,886.2	3010	0.0	48.9	47.91874167	-103.60366092	1988.701							
3020	WELD	11,935.1	3020	0.0	49.5	47.91865059	-103.60379937	1976.852							
3030	WELD	11,984.6	3030	0.0	49.2	47.91855676	-103.60394039	1968.152							

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Camp Creek to Dore Junction

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)
3040	WELD	12,033.8	3040	0.0	32.4	47.91846222	-103.60408177	1963.257							
3050	WELD	12,066.2	3050	0.0	7.3	47.91840050	-103.60417612	1959.885							
11000014	WT CHANGE	12,073.5	3050	0.0	0.0	47.91838685	-103.60419731	1959.347				0.322	52000	0.72	
3060	WELD	12,073.6	3060	0.0	0.8	47.91838679	-103.60419744	1959.344							
10000022	Bend right - 22 deg., 3D	12,073.9	3060	0.0	0.7	47.91838617	-103.60419880	1959.317	0	12:00					
3070	WELD	12,074.3	3070	0.0	6.1	47.91838560	-103.60420019	1959.289							
3080	WELD	12,080.4	3080	0.0	30.4	47.91837934	-103.60422297	1958.895							
3090	WELD	12,110.8	3090	0.0	42.1	47.91834642	-103.60433617	1957.153							
3100	WELD	12,153.0	3100	0.0	42.1	47.91829518	-103.60448842	1952.603							
3110	WELD	12,195.1	3110	0.0	42.1	47.91824147	-103.60463829	1947.457							
3120	WELD	12,237.3	3120	0.0	42.2	47.91819341	-103.60479408	1947.254							
3130	WELD	12,279.4	3130	0.0	42.2	47.91815531	-103.60495571	1946.083							
3140	WELD	12,321.6	3140	0.0	41.6	47.91811661	-103.60511684	1945.567							
3150	WELD	12,363.2	3150	0.0	41.5	47.91807584	-103.60527494	1946.659							
3160	WELD	12,404.7	3160	0.0	42.1	47.91803749	-103.60543361	1949.277							
3170	WELD	12,446.8	3170	0.0	42.1	47.91800694	-103.60559846	1952.012							
3180	WELD	12,488.9	3180	0.0	42.1	47.91798291	-103.60576596	1953.851							
3190	WELD	12,531.0	3190	0.0	42.1	47.91796070	-103.60593388	1955.170							
3200	WELD	12,573.2	3200	0.0	42.1	47.91794039	-103.60610270	1956.284							
11000015	WT CHANGE	12,615.3	3200	0.0	0.0	47.91791841	-103.60627082	1956.730				0.188	52000	0.72	
3210	WELD	12,615.3	3210	0.0	38.1	47.91791839	-103.60627098	1956.730							
3220	WELD	12,653.4	3220	0.0	40.3	47.91789631	-103.60642284	1956.745							
3230	WELD	12,693.7	3230	0.0	49.1	47.91786962	-103.60658228	1956.688							
3240	WELD	12,742.8	3240	0.0	48.1	47.91783710	-103.60677620	1957.241							
3250	WELD	12,790.9	3250	0.0	49.5	47.91780747	-103.60696692	1957.325							
3260	WELD	12,840.4	3260	0.0	49.5	47.91777429	-103.60716193	1958.044							
3270	WELD	12,889.9	3270	0.0	49.2	47.91774118	-103.60735707	1957.407							
3280	WELD	12,939.0	3280	0.0	49.5	47.91770757	-103.60755032	1957.084							
3290	WELD	12,988.5	3290	0.0	49.6	47.91767290	-103.60774445	1957.821							
3300	WELD	13,038.1	3300	0.0	49.4	47.91763940	-103.60793989	1958.701							
3310	WELD	13,087.5	3310	0.0	49.5	47.91760472	-103.60813424	1958.761							
3320	WELD	13,137.0	3320	0.0	49.5	47.91756672	-103.60832730	1958.242							
3330	WELD	13,186.5	3330	0.0	49.5	47.91752528	-103.60851888	1959.399							
3340	WELD	13,236.0	3340	0.0	49.7	47.91747805	-103.60870750	1959.581							
3350	WELD	13,285.7	3350	0.0	49.6	47.91741742	-103.60888753	1959.940							
3360	WELD	13,335.3	3360	0.0	49.5	47.91733946	-103.60905231	1959.961							
3370	WELD	13,384.8	3370	0.0	49.6	47.91725030	-103.60920332	1960.402							

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)
3380	WELD	13,434.4	3380	0.0	49.2	47.91715348	-103.60934370	1960.612							
3390	WELD	13,483.5	3390	0.0	49.5	47.91705137	-103.60947320	1960.507							
3400	WELD	13,533.1	3400	0.0	49.5	47.91694518	-103.60959789	1960.277							
3410	WELD	13,582.6	3410	0.0	49.5	47.91683749	-103.60971985	1960.880							
3420	WELD	13,632.1	3420	0.0	48.6	47.91673120	-103.60984499	1961.570							
3430	WELD	13,680.7	3430	0.0	47.2	47.91663258	-103.60997830	1960.482							
3440	WELD	13,727.9	3440	0.0	47.2	47.91654536	-103.61012035	1958.157							
3450	WELD	13,775.2	3450	0.0	47.1	47.91646448	-103.61027026	1957.238							
3460	WELD	13,822.3	3460	0.0	49.4	47.91638808	-103.61042433	1957.687							
3470	WELD	13,871.7	3470	0.0	49.3	47.91631101	-103.61058977	1957.805							
3480	WELD	13,921.0	3480	0.0	49.5	47.91623564	-103.61075629	1957.488							
3490	WELD	13,970.6	3490	0.0	49.3	47.91615951	-103.61092271	1959.192							
3500	WELD	14,019.8	3500	0.0	49.1	47.91608419	-103.61108870	1962.057							
3510	WELD	14,068.9	3510	0.0	48.6	47.91601103	-103.61125607	1963.692							
3520	WELD	14,117.5	3520	0.0	49.2	47.91594557	-103.61142799	1964.573							
3530	WELD	14,166.7	3530	0.0	49.5	47.91589000	-103.61160995	1963.818							
3540	WELD	14,216.2	3540	0.0	38.6	47.91584354	-103.61179873	1962.992							
3550	WELD	14,254.8	3550	0.0	6.0	47.91580904	-103.61194648	1961.733							
3560	WELD	14,260.8	3560	0.0	0.5	47.91580371	-103.61196941	1961.539							
10000023	Bend left - 14 deg., 3D	14,261.1	3560	0.0	0.4	47.91580347	-103.61197027	1961.531	0	12:00					
3570	WELD	14,261.3	3570	0.0	48.9	47.91580324	-103.61197109	1961.523							
3580	WELD	14,310.2	3580	0.0	49.4	47.91573445	-103.61214297	1962.010							
3590	WELD	14,359.7	3590	0.0	49.2	47.91566065	-103.61231186	1963.476							
3600	WELD	14,408.9	3600	0.0	9.0	47.91558342	-103.61247593	1962.956							
3610	WELD	14,417.8	3610	0.0	37.8	47.91556897	-103.61250531	1962.976							
3620	WELD	14,455.6	3620	0.0	49.2	47.91550728	-103.61262866	1962.957							
3630	WELD	14,504.9	3630	0.0	49.3	47.91542613	-103.61278887	1964.239							
3640	WELD	14,554.2	3640	0.0	49.4	47.91534760	-103.61295220	1965.706							
3650	WELD	14,603.5	3650	0.0	49.3	47.91527433	-103.61312147	1966.779							
3660	WELD	14,652.8	3660	0.0	49.4	47.91521007	-103.61329843	1967.188							
3670	WELD	14,702.2	3670	0.0	49.5	47.91515567	-103.61348284	1966.848							
3680	WELD	14,751.7	3680	0.0	49.4	47.91510699	-103.61367041	1966.710							
3690	WELD	14,801.1	3690	0.0	48.9	47.91505769	-103.61385763	1966.851							
3700	WELD	14,850.0	3700	0.0	39.8	47.91500899	-103.61404279	1967.417							
3710	WELD	14,889.8	3710	0.0	48.7	47.91496979	-103.61419368	1965.567							
3720	WELD	14,938.4	3720	0.0	25.7	47.91492388	-103.61437987	1964.216							
3730	WELD	14,964.2	3730	0.0	1.1	47.91490025	-103.61447844	1964.392							

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)
10000024	Bend right - 35 deg., 3D	14,964.7	3730	0.1	1.0	47.91489991	-103.61448064	1964.409	0	12:00					
3740	WELD	14,965.2	3740	0.0	12.2	47.91489996	-103.61448284	1964.447							
3750	WELD	14,977.5	3750	0.0	49.0	47.91490679	-103.61453160	1965.465							
3760	WELD	15,026.4	3760	0.0	48.7	47.91493701	-103.61472675	1967.400							
3770	WELD	15,075.1	3770	0.0	48.6	47.91497695	-103.61491710	1967.331							
3780	WELD	15,123.7	3780	0.0	49.2	47.91502645	-103.61510163	1966.217							
3790	WELD	15,173.0	3790	0.0	9.0	47.91508014	-103.61528643	1965.377							
3800	WELD	15,181.9	3800	0.0	40.1	47.91508984	-103.61532014	1965.183							
3810	WELD	15,222.0	3810	0.0	49.2	47.91513330	-103.61547050	1965.888							
3820	WELD	15,271.2	3820	0.0	49.3	47.91518694	-103.61565443	1967.735							
3830	WELD	15,320.5	3830	0.0	49.3	47.91524411	-103.61583686	1968.968							
3840	WELD	15,369.8	3840	0.0	48.4	47.91530562	-103.61601650	1969.106							
3850	WELD	15,418.1	3850	0.0	49.4	47.91536879	-103.61618989	1969.167							
3860	WELD	15,467.5	3860	0.0	49.7	47.91543525	-103.61636517	1969.911							
3870	WELD	15,517.2	3870	0.0	49.5	47.91550238	-103.61654116	1970.190							
3880	WELD	15,566.7	3880	0.0	48.8	47.91556310	-103.61672110	1970.255							
3890	WELD	15,615.5	3890	0.0	49.4	47.91560830	-103.61690754	1969.623							
3900	WELD	15,664.9	3900	0.0	22.3	47.91564125	-103.61710182	1970.068							
3910	WELD	15,687.2	3910	0.0	49.0	47.91565374	-103.61719040	1969.942							
3920	WELD	15,736.2	3920	0.0	49.2	47.91567500	-103.61738685	1967.234							
3930	WELD	15,785.4	3930	0.0	6.0	47.91569167	-103.61758513	1965.593							
3940	WELD	15,791.5	3940	0.0	0.5	47.91569361	-103.61760954	1965.482							
10000025	Bend right - 16 deg., 3D	15,791.7	3940	0.0	0.5	47.91569377	-103.61761045	1965.478	0	12:00					
3950	WELD	15,792.0	3950	0.0	49.1	47.91569393	-103.61761136	1965.474							
3960	WELD	15,841.1	3960	0.0	49.3	47.91574094	-103.61779858	1965.600							
3970	WELD	15,890.3	3970	0.0	49.4	47.91579071	-103.61798498	1965.430							
3980	WELD	15,939.7	3980	0.0	32.7	47.91584261	-103.61817016	1965.707							
3990	WELD	15,972.4	3990	0.0	21.1	47.91587731	-103.61829242	1967.499							
4000	WELD	15,993.5	4000	0.0	16.4	47.91590081	-103.61837092	1968.338							
4010	WELD	16,009.9	4010	0.0	49.4	47.91591933	-103.61843164	1968.442							
4020	WELD	16,059.3	4020	0.0	49.4	47.91597532	-103.61861438	1968.307							
4030	WELD	16,108.6	4030	0.0	49.4	47.91603225	-103.61879633	1967.972							
4040	WELD	16,158.1	4040	0.0	49.3	47.91609259	-103.61897608	1968.003							
4050	WELD	16,207.4	4050	0.0	49.6	47.91615820	-103.61915069	1968.143							
4060	WELD	16,256.9	4060	0.0	49.5	47.91623016	-103.61932125	1969.014							
4070	WELD	16,306.4	4070	0.0	49.5	47.91630565	-103.61948849	1970.637							
4080	WELD	16,355.9	4080	0.0	44.3	47.91638289	-103.61965343	1972.725							

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)
4090	WELD	16,400.2	4090	0.0	49.2	47.91645424	-103.61979884	1974.420						
4100	WELD	16,449.4	4100	0.0	49.0	47.91654283	-103.61994938	1975.892						
4110	WELD	16,498.4	4110	0.0	49.3	47.91664202	-103.62008365	1976.614						
4120	WELD	16,547.7	4120	0.0	49.3	47.91674616	-103.62021145	1977.753						
4130	WELD	16,597.0	4130	0.0	49.3	47.91685271	-103.62033460	1979.965						
4140	WELD	16,646.2	4140	0.0	49.0	47.91696102	-103.62045395	1982.157						
4150	WELD	16,695.2	4150	0.0	49.4	47.91707182	-103.62056673	1983.988						
4160	WELD	16,744.7	4160	0.0	49.3	47.91718694	-103.62067354	1985.423						
4170	WELD	16,794.0	4170	0.0	49.4	47.91730473	-103.62077206	1986.584						
4180	WELD	16,843.3	4180	0.0	49.4	47.91742464	-103.62086525	1987.445						
4190	WELD	16,892.7	4190	0.0	49.7	47.91754564	-103.62095537	1988.103						
4200	WELD	16,942.4	4200	0.0	49.5	47.91766685	-103.62104712	1990.145						
4210	WELD	16,991.9	4210	0.0	49.5	47.91778756	-103.62113865	1990.428						
4220	WELD	17,041.4	4220	0.0	49.5	47.91790765	-103.62123143	1990.262						
4230	WELD	17,090.9	4230	0.0	49.3	47.91802762	-103.62132536	1989.425						
4240	WELD	17,140.2	4240	0.0	49.6	47.91814729	-103.62141697	1990.760						
4250	WELD	17,189.7	4250	0.0	46.7	47.91826788	-103.62150755	1993.650						
4260	WELD	17,236.5	4260	0.0	49.4	47.91837975	-103.62159866	1994.888						
4270	WELD	17,285.9	4270	0.0	49.6	47.91849348	-103.62170586	1995.041						
4280	WELD	17,335.5	4280	0.0	49.7	47.91860025	-103.62182862	1992.233						
4290	WELD	17,385.1	4290	0.0	49.5	47.91869966	-103.62196502	1988.528						
4300	WELD	17,434.6	4300	0.0	49.6	47.91879397	-103.62210892	1985.645						
4310	WELD	17,484.2	4310	0.0	48.7	47.91888620	-103.62225623	1982.856						
4320	WELD	17,532.9	4320	0.0	49.5	47.91897748	-103.62240039	1984.233						
4330	WELD	17,582.4	4330	0.0	34.3	47.91907067	-103.62254734	1984.735						
4340	WELD	17,616.7	4340	0.0	49.1	47.91913487	-103.62264942	1984.232						
4350	WELD	17,665.8	4350	0.0	47.7	47.91922811	-103.62279366	1985.128						
4360	WELD	17,713.5	4360	0.0	49.4	47.91931886	-103.62293385	1986.273						
4370	WELD	17,762.9	4370	0.0	49.2	47.91941272	-103.62307898	1986.691						
4380	WELD	17,812.1	4380	0.0	49.1	47.91950731	-103.62322198	1986.793						
4390	WELD	17,861.2	4390	0.0	49.5	47.91960083	-103.62336605	1987.752						
4400	WELD	17,910.6	4400	0.0	49.4	47.91969457	-103.62351202	1988.788						
4410	WELD	17,960.0	4410	0.0	49.1	47.91978788	-103.62365830	1989.254						
4420	WELD	18,009.2	4420	0.0	49.3	47.91987617	-103.62380963	1990.226						
4430	WELD	18,058.5	4430	0.0	49.4	47.91995300	-103.62397448	1990.328						
4440	WELD	18,107.9	4440	0.0	49.4	47.92002257	-103.62414696	1990.186						
4450	WELD	18,157.3	4450	0.0	48.8	47.92009054	-103.62432094	1990.643						

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)
4460	WELD	18,206.1	4460	0.0	49.4	47.92015861	-103.62449255	1992.001							
4470	WELD	18,255.6	4470	0.0	49.4	47.92022755	-103.62466587	1993.253							
4480	WELD	18,305.0	4480	0.0	48.5	47.92029725	-103.62483827	1994.155							
4490	WELD	18,353.5	4490	0.0	7.6	47.92036842	-103.62500441	1995.643							
4500	WELD	18,361.1	4500	0.0	1.2	47.92038000	-103.62503032	1995.654							
10000026	Bend left - 35 deg., 3D	18,361.7	4500	0.1	1.1	47.92038057	-103.62503242	1995.641	0	12:00					
4510	WELD	18,362.3	4510	0.0	42.3	47.92038091	-103.62503456	1995.626							
4520	WELD	18,404.5	4520	0.0	49.7	47.92037893	-103.62520731	1995.259							
4530	WELD	18,454.2	4530	0.0	49.7	47.92037556	-103.62540943	1995.671							
4540	WELD	18,503.9	4540	0.0	49.7	47.92037224	-103.62561117	1997.126							
4550	WELD	18,553.7	4550	0.0	49.8	47.92036969	-103.62581290	1998.484							
4560	WELD	18,603.4	4560	0.0	37.6	47.92036844	-103.62601471	2000.468							
11000016	WT CHANGE	18,641.0	4560	0.0	0.0	47.92036645	-103.62616763	2002.014				0.322	52000	0.72	
4570	WELD	18,641.0	4570	0.0	42.2	47.92036645	-103.62616771	2002.015							
4580	WELD	18,683.2	4580	0.0	42.2	47.92036363	-103.62633871	2003.966							
4590	WELD	18,725.4	4590	0.0	39.9	47.92036248	-103.62650991	2006.156							
10000027	AGM 030, Sta. 191+42, Two track -- Han #115	18,759.8	4590	34.4	5.5	47.92036340	-103.62664925	2008.561							
11000017	WT CHANGE	18,765.3	4590	0.0	0.0	47.92036359	-103.62667115	2008.847				0.188	52000	0.72	
4600	WELD	18,765.3	4600	0.0	5.0	47.92036359	-103.62667131	2008.848							
4610	WELD	18,770.3	4610	0.0	1.2	47.92036369	-103.62669155	2009.055							
10000028	Tee at 270 deg.	18,770.9	4610	0.2	0.9	47.92036367	-103.62669388	2009.080	257	8:30					
4620	WELD	18,771.4	4620	0.0	5.4	47.92036368	-103.62669611	2009.102							
4630	WELD	18,776.8	4630	0.0	12.5	47.92036358	-103.62671974	2009.390							
4640	WELD	18,789.3	4640	0.0	48.8	47.92036347	-103.62677057	2010.101							
4650	WELD	18,838.0	4650	0.0	49.0	47.92036241	-103.62696931	2011.819							
4660	WELD	18,887.0	4660	0.0	49.6	47.92035938	-103.62716845	2012.154							
4670	WELD	18,936.6	4670	0.0	49.5	47.92035903	-103.62737018	2014.427							
4680	WELD	18,986.1	4680	0.0	49.3	47.92035926	-103.62757199	2015.138							
4690	WELD	19,035.4	4690	0.0	49.6	47.92035866	-103.62777271	2016.314							
4700	WELD	19,085.0	4700	0.0	49.3	47.92035664	-103.62797445	2016.416							
4710	WELD	19,134.3	4710	0.0	49.5	47.92035605	-103.62817507	2015.605							
4720	WELD	19,183.8	4720	0.0	49.5	47.92035449	-103.62837639	2014.345							
4730	WELD	19,233.3	4730	0.0	49.6	47.92035314	-103.62857821	2015.715							
4740	WELD	19,282.9	4740	0.0	49.4	47.92035225	-103.62877998	2017.960							
4750	WELD	19,332.3	4750	0.0	49.5	47.92035249	-103.62898062	2020.522							
4760	WELD	19,381.8	4760	0.0	49.6	47.92035298	-103.62918235	2023.143							

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)
4770	WELD	19,431.4	4770	0.0	49.6	47.92035275	-103.62938355	2027.235						
4780	WELD	19,481.0	4780	0.0	49.6	47.92035264	-103.62958471	2032.025						
4790	WELD	19,530.6	4790	0.0	35.5	47.92035177	-103.62978605	2035.393						
4800	WELD	19,566.1	4800	0.0	49.6	47.92035081	-103.62993061	2034.484						
4810	WELD	19,615.7	4810	0.0	46.2	47.92034850	-103.63013125	2029.343						
4820	WELD	19,661.9	4820	0.0	36.9	47.92034787	-103.63031836	2024.848						
4830	WELD	19,698.8	4830	0.0	43.6	47.92034750	-103.63046837	2023.030						
4840	WELD	19,742.4	4840	0.0	41.6	47.92034753	-103.63064578	2022.140						
4850	WELD	19,784.1	4850	0.0	35.7	47.92034692	-103.63081516	2022.745						
4860	WELD	19,819.7	4860	0.0	44.1	47.92034618	-103.63096021	2024.635						
4870	WELD	19,863.8	4870	0.0	49.2	47.92034497	-103.63113917	2028.255						
4880	WELD	19,913.1	4880	0.0	49.5	47.92034450	-103.63133892	2033.242						
4890	WELD	19,962.5	4890	0.0	49.2	47.92034416	-103.63154014	2035.902						
4900	WELD	20,011.7	4900	0.0	49.5	47.92034422	-103.63174049	2036.541						
4910	WELD	20,061.2	4910	0.0	49.3	47.92034377	-103.63194172	2034.295						
4920	WELD	20,110.5	4920	0.0	49.3	47.92034248	-103.63214225	2032.924						
4930	WELD	20,159.8	4930	0.0	49.3	47.92034100	-103.63234225	2032.805						
4940	WELD	20,209.1	4940	0.0	49.6	47.92033997	-103.63254268	2035.081						
4950	WELD	20,258.6	4950	0.0	49.5	47.92033951	-103.63274378	2037.449						
4960	WELD	20,308.2	4960	0.0	49.4	47.92033870	-103.63294463	2040.753						
4970	WELD	20,357.6	4970	0.0	49.6	47.92033750	-103.63314505	2044.909						
4980	WELD	20,407.1	4980	0.0	49.7	47.92033597	-103.63334577	2049.545						
4990	WELD	20,456.8	4990	0.0	49.7	47.92033495	-103.63354674	2054.406						
5000	WELD	20,506.5	5000	0.0	49.6	47.92033476	-103.63374743	2059.855						
5010	WELD	20,556.1	5010	0.0	49.7	47.92033512	-103.63394798	2064.463						
5020	WELD	20,605.8	5020	0.0	49.8	47.92033393	-103.63414959	2066.667						
5030	WELD	20,655.6	5030	0.0	41.7	47.92033179	-103.63435146	2067.909						
5040	WELD	20,697.3	5040	0.0	4.8	47.92033036	-103.63452080	2067.245						
5050	WELD	20,702.1	5050	0.0	49.7	47.92033027	-103.63454050	2067.160						
5060	WELD	20,751.8	5060	0.0	49.6	47.92032923	-103.63474224	2068.974						
5070	WELD	20,801.4	5070	0.0	49.6	47.92032656	-103.63494363	2071.829						
5080	WELD	20,851.0	5080	0.0	49.3	47.92032455	-103.63514511	2072.469						
5090	WELD	20,900.3	5090	0.0	49.7	47.92032519	-103.63534558	2070.445						
5100	WELD	20,950.0	5100	0.0	49.3	47.92032661	-103.63554680	2066.582						
5110	WELD	20,999.3	5110	0.0	48.4	47.92032850	-103.63574709	2064.916						
5120	WELD	21,047.6	5120	0.0	2.8	47.92032901	-103.63594354	2065.062						
5130	WELD	21,050.4	5130	0.0	1.2	47.92032895	-103.63595491	2065.019						

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Camp Creek to Dore Junction

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)
10000029	Bend left - 35 deg., 3D	21,051.0	5130	0.0	1.1	47.92032868	-103.63595722	2065.010	0	12:00					
5140	WELD	21,051.6	5140	0.0	2.8	47.92032811	-103.63595944	2065.010							
5150	WELD	21,054.4	5150	0.0	31.6	47.92032399	-103.63596883	2065.075							
5160	WELD	21,085.9	5160	0.0	49.5	47.92027477	-103.63607551	2066.335							
5170	WELD	21,135.4	5170	0.0	49.6	47.92019789	-103.63624133	2068.959							
5180	WELD	21,185.1	5180	0.0	49.5	47.92011994	-103.63640557	2073.872							
5190	WELD	21,234.6	5190	0.0	49.6	47.92004236	-103.63656953	2079.601							
5200	WELD	21,284.2	5200	0.0	49.3	47.91996676	-103.63673687	2082.715							
5210	WELD	21,333.5	5210	0.0	45.7	47.91989190	-103.63690402	2083.126							
5220	WELD	21,379.1	5220	0.0	11.3	47.91982054	-103.63705647	2084.437							
5230	WELD	21,390.5	5230	0.0	36.2	47.91980265	-103.63709406	2084.942							
5240	WELD	21,426.7	5240	0.0	41.7	47.91974538	-103.63721403	2086.655							
5250	WELD	21,468.4	5250	0.0	14.5	47.91967989	-103.63735300	2087.351							
5260	WELD	21,482.8	5260	0.0	43.5	47.91965708	-103.63740116	2087.745							
5270	WELD	21,526.3	5270	0.0	40.3	47.91958872	-103.63754581	2089.154							
5280	WELD	21,566.6	5280	0.0	43.6	47.91952510	-103.63767957	2090.006							
5290	WELD	21,610.2	5290	0.0	42.8	47.91945647	-103.63782411	2090.123							
5300	WELD	21,653.0	5300	0.0	21.5	47.91939019	-103.63796772	2089.457							
5310	WELD	21,674.5	5310	0.0	18.1	47.91935758	-103.63804029	2088.983							
5320	WELD	21,692.6	5320	0.0	35.1	47.91932973	-103.63810113	2088.901							
5330	WELD	21,727.7	5330	0.0	49.6	47.91927538	-103.63821893	2089.955							
5340	WELD	21,777.3	5340	0.0	49.5	47.91919711	-103.63838358	2091.341							
5350	WELD	21,826.8	5350	0.0	49.6	47.91911989	-103.63854928	2091.111							
5360	WELD	21,876.4	5360	0.0	49.5	47.91904261	-103.63871549	2091.076							
5370	WELD	21,925.9	5370	0.0	49.6	47.91896565	-103.63888098	2091.047							
5380	WELD	21,975.5	5380	0.0	49.6	47.91888762	-103.63904603	2091.370							
5390	WELD	22,025.1	5390	0.0	49.6	47.91880871	-103.63921039	2091.102							
5400	WELD	22,074.7	5400	0.0	35.7	47.91873148	-103.63937607	2091.048							
5410	WELD	22,110.3	5410	0.0	42.7	47.91868145	-103.63950066	2090.083							
5420	WELD	22,153.0	5420	0.0	40.1	47.91863045	-103.63965708	2089.079							
5430	WELD	22,193.1	5430	0.0	44.2	47.91859255	-103.63981022	2088.819							
5440	WELD	22,237.3	5440	0.0	49.6	47.91856200	-103.63998404	2088.394							
5450	WELD	22,286.9	5450	0.0	43.7	47.91853492	-103.64018203	2087.433							
5460	WELD	22,330.7	5460	0.0	49.2	47.91851341	-103.64035704	2086.834							
5470	WELD	22,379.9	5470	0.0	49.0	47.91848707	-103.64055318	2084.421							
5480	WELD	22,428.8	5480	0.0	49.2	47.91845689	-103.64074676	2080.534							
5490	WELD	22,478.0	5490	0.0	45.6	47.91842371	-103.64094064	2080.252							

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)
5500	WELD	22,523.6	5500	0.0	49.8	47.91839132	-103.64111962	2080.453						
5510	WELD	22,573.4	5510	0.0	49.4	47.91835569	-103.64131403	2080.787						
5520	WELD	22,622.8	5520	0.0	49.8	47.91831952	-103.64150730	2080.007						
5530	WELD	22,672.6	5530	0.0	49.5	47.91828385	-103.64170227	2078.437						
5540	WELD	22,722.1	5540	0.0	49.4	47.91824851	-103.64189617	2076.764						
5550	WELD	22,771.5	5550	0.0	49.4	47.91821198	-103.64208900	2074.640						
5560	WELD	22,821.0	5560	0.0	49.3	47.91817525	-103.64228219	2072.896						
5570	WELD	22,870.3	5570	0.0	49.5	47.91813943	-103.64247550	2071.599						
5580	WELD	22,919.9	5580	0.0	47.5	47.91810405	-103.64266970	2070.499						
5590	WELD	22,967.4	5590	0.0	49.3	47.91806931	-103.64285596	2069.951						
5600	WELD	23,016.7	5600	0.0	49.4	47.91803344	-103.64304952	2069.454						
5610	WELD	23,066.1	5610	0.0	49.4	47.91799821	-103.64324332	2069.288						
5620	WELD	23,115.5	5620	0.0	49.3	47.91796290	-103.64343723	2067.959						
5630	WELD	23,164.8	5630	0.0	49.4	47.91792677	-103.64363002	2067.344						
5640	WELD	23,214.2	5640	0.0	49.4	47.91789187	-103.64382278	2072.280						
5650	WELD	23,263.6	5650	0.0	49.4	47.91785601	-103.64401600	2075.672						
5660	WELD	23,313.0	5660	0.0	46.5	47.91782002	-103.64420954	2076.699						
5670	WELD	23,359.5	5670	0.0	49.4	47.91778704	-103.64439239	2076.031						
5680	WELD	23,408.9	5680	0.0	49.6	47.91775161	-103.64458653	2074.909						
5690	WELD	23,458.5	5690	0.0	49.3	47.91771530	-103.64478066	2072.749						
5700	WELD	23,507.8	5700	0.0	49.6	47.91767877	-103.64497325	2069.165						
5710	WELD	23,557.4	5710	0.0	49.3	47.91764096	-103.64516657	2066.278						
5720	WELD	23,606.6	5720	0.0	49.4	47.91760562	-103.64535963	2062.240						
5730	WELD	23,656.0	5730	0.0	48.8	47.91757056	-103.64555304	2058.183						
5740	WELD	23,704.8	5740	0.0	4.1	47.91753678	-103.64574544	2057.960						
5750	WELD	23,708.9	5750	0.0	6.3	47.91753402	-103.64576159	2057.970						
11000018	WT CHANGE	23,715.1	5750	0.0	0.0	47.91752980	-103.64578616	2057.928			0.322	52000	0.72	
5760	WELD	23,715.2	5760	0.0	2.0	47.91752978	-103.64578631	2057.928						
10000030	Valve	23,716.2	5760	1.0	1.0	47.91752909	-103.64579024	2057.933						
5770	WELD	23,717.2	5770	0.0	5.5	47.91752838	-103.64579428	2057.933						
11000019	WT CHANGE	23,722.7	5770	0.0	0.0	47.91752454	-103.64581571	2057.928			0.188	52000	0.72	
5780	WELD	23,722.7	5780	0.0	27.5	47.91752452	-103.64581583	2057.928						
5790	WELD	23,750.2	5790	0.0	49.5	47.91750454	-103.64592384	2058.447						
5800	WELD	23,799.7	5800	0.0	49.4	47.91746863	-103.64611764	2060.620						
5810	WELD	23,849.1	5810	0.0	49.4	47.91743213	-103.64631063	2061.312						
5820	WELD	23,898.5	5820	0.0	44.5	47.91739570	-103.64650397	2058.269						
5830	WELD	23,943.0	5830	0.0	13.6	47.91736242	-103.64667785	2055.381						

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)
5840	WELD	23,956.6	5840	0.0	6.3	47.91735219	-103.64673080	2054.269						
5850	WELD	23,962.9	5850	0.0	23.2	47.91734737	-103.64675540	2053.804						
5860	WELD	23,986.2	5860	0.0	49.4	47.91732974	-103.64684619	2052.922						
5870	WELD	24,035.5	5870	0.0	16.6	47.91729805	-103.64704128	2051.912						
11000020	WT CHANGE	24,052.0	5870	0.0	0.0	47.91729067	-103.64710736	2051.696			0.322	52000	0.72	
5880	WELD	24,052.1	5880	0.0	28.7	47.91729065	-103.64710752	2051.695						
5890	WELD	24,080.8	5890	0.0	42.3	47.91728072	-103.64722293	2049.885						
10000031	AGM 040, Sta. 243+93, Hwy 85 -- Han #142	24,099.4	5890	18.6	23.7	47.91727546	-103.64729764	2047.815						
5900	WELD	24,123.0	5900	0.0	42.2	47.91726950	-103.64739181	2043.984						
5910	WELD	24,165.3	5910	0.0	42.2	47.91726147	-103.64756197	2040.539						
5920	WELD	24,207.5	5920	0.0	42.3	47.91724954	-103.64773225	2039.898						
5930	WELD	24,249.8	5930	0.0	42.3	47.91723938	-103.64790300	2039.718						
5940	WELD	24,292.0	5940	0.0	42.3	47.91723703	-103.64807443	2038.673						
5950	WELD	24,334.3	5950	0.0	42.3	47.91724034	-103.64824591	2038.542						
5960	WELD	24,376.6	5960	0.0	42.2	47.91724434	-103.64841668	2041.156						
5970	WELD	24,418.8	5970	0.0	42.2	47.91724065	-103.64858670	2045.549						
5980	WELD	24,461.0	5980	0.0	25.2	47.91723344	-103.64875692	2048.761						
11000021	WT CHANGE	24,486.2	5980	0.0	0.0	47.91722734	-103.64885840	2049.082			0.188	52000	0.72	
5990	WELD	24,486.3	5990	0.0	22.6	47.91722733	-103.64885855	2049.082						
6000	WELD	24,508.8	6000	0.0	49.6	47.91721942	-103.64894938	2048.784						
6010	WELD	24,558.4	6010	0.0	49.3	47.91720659	-103.64914952	2047.031						
6020	WELD	24,607.7	6020	0.0	49.5	47.91720395	-103.64934931	2045.099						
6030	WELD	24,657.2	6030	0.0	46.5	47.91719937	-103.64955023	2042.798						
6040	WELD	24,703.7	6040	0.0	49.4	47.91719387	-103.64973857	2040.489						
6050	WELD	24,753.1	6050	0.0	49.6	47.91718818	-103.64993882	2037.310						
6060	WELD	24,802.7	6060	0.0	49.3	47.91718140	-103.65013991	2034.264						
6070	WELD	24,852.0	6070	0.0	49.7	47.91717399	-103.65033961	2034.945						
6080	WELD	24,901.7	6080	0.0	47.5	47.91716749	-103.65054124	2036.735						
6090	WELD	24,949.2	6090	0.0	49.4	47.91716214	-103.65073370	2039.385						
6100	WELD	24,998.6	6100	0.0	49.6	47.91715749	-103.65093400	2041.510						
6110	WELD	25,048.1	6110	0.0	49.6	47.91715823	-103.65113536	2041.821						
6120	WELD	25,097.7	6120	0.0	49.5	47.91716697	-103.65133593	2038.182						
6130	WELD	25,147.2	6130	0.0	49.4	47.91718294	-103.65153350	2030.254						
6140	WELD	25,196.6	6140	0.0	49.6	47.91720060	-103.65173000	2022.512						
6150	WELD	25,246.2	6150	0.0	49.3	47.91722087	-103.65192842	2017.304						
6160	WELD	25,295.5	6160	0.0	49.5	47.91724179	-103.65212558	2012.960						

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)
6170	WELD	25,345.1	6170	0.0	49.7	47.91726266	-103.65232362	2007.726							
6180	WELD	25,394.8	6180	0.0	49.4	47.91728811	-103.65252105	2003.507							
6190	WELD	25,444.1	6190	0.0	41.8	47.91732228	-103.65271529	2001.724							
6200	WELD	25,485.9	6200	0.0	26.2	47.91735509	-103.65287820	2001.209							
6210	WELD	25,512.1	6210	0.0	48.8	47.91737842	-103.65297893	2001.066							
6220	WELD	25,560.9	6220	0.0	49.5	47.91742739	-103.65316380	2000.330							
6230	WELD	25,610.4	6230	0.0	49.5	47.91747722	-103.65335140	2000.104							
6240	WELD	25,659.9	6240	0.0	37.3	47.91752226	-103.65354164	2000.565							
10000032	Bend left - 23 deg., 56D	25,680.6	6240	13.1	24.1	47.91753724	-103.65362294	2000.998	0	12:00					
6250	WELD	25,697.1	6250	0.0	43.3	47.91753300	-103.65368976	2001.691							
6260	WELD	25,740.4	6260	0.0	49.6	47.91751041	-103.65386032	2008.060							
6270	WELD	25,790.0	6270	0.0	49.6	47.91748037	-103.65405310	2017.769							
6280	WELD	25,839.7	6280	0.0	49.7	47.91744807	-103.65424724	2024.414							
6290	WELD	25,889.4	6290	0.0	49.6	47.91741693	-103.65444282	2029.265							
6300	WELD	25,939.0	6300	0.0	49.4	47.91738573	-103.65463869	2032.984							
6310	WELD	25,988.4	6310	0.0	49.6	47.91735281	-103.65483280	2036.185							
10000033	Bend left - 10 deg., 49D	26,008.5	6310	17.3	32.3	47.91733824	-103.65491159	2037.522	0	12:00					
6320	WELD	26,038.0	6320	0.0	49.6	47.91730454	-103.65501992	2037.327							
6330	WELD	26,087.6	6330	0.0	49.6	47.91724447	-103.65520089	2035.805							
6340	WELD	26,137.2	6340	0.0	49.6	47.91718304	-103.65538045	2033.116							
6350	WELD	26,186.8	6350	0.0	49.6	47.91712265	-103.65556096	2032.177							
6360	WELD	26,236.4	6360	0.0	49.7	47.91706185	-103.65574124	2032.756							
6370	WELD	26,286.1	6370	0.0	49.7	47.91700066	-103.65592138	2034.264							
6380	WELD	26,335.8	6380	0.0	49.7	47.91693921	-103.65610124	2035.501							
6390	WELD	26,385.5	6390	0.0	49.4	47.91687753	-103.65628038	2038.636							
6400	WELD	26,435.0	6400	0.0	49.2	47.91681656	-103.65645825	2042.039							
6410	WELD	26,484.2	6410	0.0	49.6	47.91675574	-103.65663605	2045.275							
6420	WELD	26,533.8	6420	0.0	49.5	47.91669521	-103.65681557	2047.726							
6430	WELD	26,583.2	6430	0.0	49.4	47.91663433	-103.65699477	2048.494							
6440	WELD	26,632.6	6440	0.0	49.6	47.91657154	-103.65717205	2048.687							
6450	WELD	26,682.1	6450	0.0	49.6	47.91650429	-103.65734724	2048.333							
6460	WELD	26,731.7	6460	0.0	49.3	47.91643262	-103.65751787	2046.956							
6470	WELD	26,781.1	6470	0.0	49.7	47.91635739	-103.65768375	2043.994							
6480	WELD	26,830.7	6480	0.0	49.0	47.91627983	-103.65784922	2040.671							
6490	WELD	26,879.7	6490	0.0	14.3	47.91620389	-103.65801191	2035.269							
6500	WELD	26,894.0	6500	0.0	30.2	47.91618177	-103.65805969	2033.813							
6510	WELD	26,924.2	6510	0.0	47.8	47.91613489	-103.65816021	2032.325							

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)
6520	WELD	26,972.0	6520	0.0	49.0	47.91606008	-103.65831894	2034.108							
6530	WELD	27,020.9	6530	0.0	49.6	47.91598491	-103.65848169	2040.068							
6540	WELD	27,070.5	6540	0.0	49.3	47.91591051	-103.65864880	2045.279							
6550	WELD	27,119.8	6550	0.0	49.5	47.91584016	-103.65881921	2048.065							
10000034	Bend right - 21 deg., 77D	27,142.9	6550	13.6	35.9	47.91581060	-103.65890204	2047.531	0	12:00					
6560	WELD	27,169.3	6560	0.0	49.5	47.91579481	-103.65900665	2045.447							
6570	WELD	27,218.8	6570	0.0	49.4	47.91578538	-103.65920680	2042.105							
6580	WELD	27,268.3	6580	0.0	49.5	47.91578498	-103.65940773	2039.180							
6590	WELD	27,317.8	6590	0.0	49.3	47.91578941	-103.65960874	2035.840							
6600	WELD	27,367.0	6600	0.0	49.5	47.91579679	-103.65980806	2030.569							
6610	WELD	27,416.5	6610	0.0	49.5	47.91580484	-103.66000841	2029.545							
6620	WELD	27,466.0	6620	0.0	49.3	47.91581298	-103.66020901	2032.445							
6630	WELD	27,515.3	6630	0.0	49.5	47.91582146	-103.66040918	2034.436							
6640	WELD	27,564.8	6640	0.0	49.2	47.91582922	-103.66060981	2038.377							
6650	WELD	27,614.0	6650	0.0	49.5	47.91583628	-103.66080885	2042.609							
6660	WELD	27,663.4	6660	0.0	49.5	47.91584364	-103.66100992	2044.310							
6670	WELD	27,712.9	6670	0.0	49.5	47.91585179	-103.66121073	2043.731							
6680	WELD	27,762.4	6680	0.0	49.5	47.91585989	-103.66141178	2041.714							
6690	WELD	27,811.9	6690	0.0	49.6	47.91586914	-103.66161092	2035.516							
6700	WELD	27,861.5	6700	0.0	49.5	47.91587905	-103.66181061	2029.859							
6710	WELD	27,911.0	6710	0.0	49.5	47.91588838	-103.66201072	2026.404							
6720	WELD	27,960.5	6720	0.0	49.6	47.91589707	-103.66221133	2024.901							
6730	WELD	28,010.1	6730	0.0	49.7	47.91590552	-103.66241232	2023.914							
6740	WELD	28,059.8	6740	0.0	49.6	47.91591385	-103.66261355	2021.940							
6750	WELD	28,109.4	6750	0.0	49.6	47.91592092	-103.66281408	2019.872							
6760	WELD	28,158.9	6760	0.0	49.5	47.91592762	-103.66301502	2019.111							
6770	WELD	28,208.5	6770	0.0	49.5	47.91593505	-103.66321585	2018.538							
6780	WELD	28,258.0	6780	0.0	49.6	47.91594146	-103.66341661	2018.530							
6790	WELD	28,307.5	6790	0.0	49.5	47.91594590	-103.66361797	2018.128							
6800	WELD	28,357.0	6800	0.0	49.5	47.91594797	-103.66381923	2017.518							
6810	WELD	28,406.5	6810	0.0	49.6	47.91593776	-103.66401947	2015.356							
6820	WELD	28,456.1	6820	0.0	49.5	47.91591400	-103.66421729	2011.852							
6830	WELD	28,505.7	6830	0.0	49.6	47.91588699	-103.66441306	2005.716							
6840	WELD	28,555.3	6840	0.0	49.6	47.91585884	-103.66460948	2003.859							
6850	WELD	28,604.9	6850	0.0	49.7	47.91582886	-103.66480602	2006.030							
6860	WELD	28,654.6	6860	0.0	49.6	47.91579799	-103.66500259	2005.972							
6870	WELD	28,704.2	6870	0.0	49.5	47.91576556	-103.66519847	2006.248							

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)
6880	WELD	28,753.8	6880	0.0	49.5	47.91573271	-103.66539379	2007.889							
6890	WELD	28,803.2	6890	0.0	49.2	47.91570328	-103.66559020	2010.553							
6900	WELD	28,852.4	6900	0.0	49.6	47.91568632	-103.66578855	2012.805							
10000035	Bend right - 15 deg., 74D	28,868.7	6900	9.8	39.8	47.91568570	-103.66585501	2012.598	0	12:00					
6910	WELD	28,902.0	6910	0.0	49.0	47.91570463	-103.66598731	2011.013							
6920	WELD	28,951.0	6920	0.0	49.2	47.91573869	-103.66618031	2011.415							
6930	WELD	29,000.2	6930	0.0	48.5	47.91577340	-103.66637403	2012.791							
6940	WELD	29,048.7	6940	0.0	49.5	47.91580612	-103.66656506	2015.601							
6950	WELD	29,098.2	6950	0.0	49.3	47.91583876	-103.66676082	2016.768							
6960	WELD	29,147.6	6960	0.0	49.4	47.91587138	-103.66695590	2017.914							
6970	WELD	29,197.0	6970	0.0	49.5	47.91590372	-103.66715155	2018.605							
6980	WELD	29,246.5	6980	0.0	49.1	47.91593710	-103.66734711	2018.756							
6990	WELD	29,295.7	6990	0.0	49.1	47.91596891	-103.66754159	2019.863							
7000	WELD	29,344.8	7000	0.0	49.3	47.91600051	-103.66773606	2020.143							
7010	WELD	29,394.2	7010	0.0	49.2	47.91603467	-103.66793085	2020.599							
7020	WELD	29,443.4	7020	0.0	49.0	47.91606854	-103.66812463	2020.839							
7030	WELD	29,492.4	7030	0.0	36.3	47.91610194	-103.66831788	2021.466							
10000036	AGM 050, Sta. 298+31, Gravel Rd. -- Han #116	29,493.1	7030	0.7	35.6	47.91610238	-103.66832075	2021.472							
11000022	WT CHANGE	29,528.7	7030	0.0	0.0	47.91612692	-103.66846068	2021.678				0.322	52000	0.72	
7040	WELD	29,528.7	7040	0.0	42.0	47.91612695	-103.66846084	2021.678							
7050	WELD	29,570.7	7050	0.0	42.1	47.91615620	-103.66862598	2020.350							
7060	WELD	29,612.9	7060	0.0	42.2	47.91617630	-103.66879414	2017.645							
7070	WELD	29,655.0	7070	0.0	42.2	47.91618514	-103.66896466	2014.734							
7080	WELD	29,697.2	7080	0.0	42.1	47.91618803	-103.66913579	2013.246							
7090	WELD	29,739.3	7090	0.0	40.2	47.91618924	-103.66930700	2012.092							
11000023	WT CHANGE	29,779.5	7090	0.0	0.0	47.91618896	-103.66947016	2011.796				0.188	52000	0.72	
7100	WELD	29,779.5	7100	0.0	7.3	47.91618895	-103.66947031	2011.796							
7110	WELD	29,786.9	7110	0.0	41.6	47.91618894	-103.66950015	2011.907							
7120	WELD	29,828.5	7120	0.0	49.6	47.91618908	-103.66966894	2013.556							
7130	WELD	29,878.0	7130	0.0	49.6	47.91618973	-103.66986991	2015.000							
7140	WELD	29,927.6	7140	0.0	49.5	47.91619306	-103.67007100	2017.433							
7150	WELD	29,977.2	7150	0.0	49.5	47.91619709	-103.67027176	2018.051							
7160	WELD	30,026.7	7160	0.0	49.5	47.91619929	-103.67047292	2018.406							
7170	WELD	30,076.2	7170	0.0	49.5	47.91619898	-103.67067385	2018.612							
7180	WELD	30,125.7	7180	0.0	49.6	47.91619687	-103.67087458	2018.629							
7190	WELD	30,175.3	7190	0.0	49.6	47.91619455	-103.67107584	2019.275							

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	30,224.9	7200	0.0	49.5	47.91619340	-103.67127751	2019.313						
7210	WELD	30,274.4	7210	0.0	49.4	47.91619354	-103.67147831	2020.506						
7220	WELD	30,323.8	7220	0.0	49.6	47.91619350	-103.67167965	2021.826						
7230	WELD	30,373.4	7230	0.0	49.5	47.91619428	-103.67188104	2022.584						
7240	WELD	30,423.0	7240	0.0	49.6	47.91619500	-103.67208235	2022.428						
7250	WELD	30,472.5	7250	0.0	49.3	47.91619570	-103.67228360	2021.994						
7260	WELD	30,521.8	7260	0.0	49.7	47.91619607	-103.67248397	2020.614						
7270	WELD	30,571.4	7270	0.0	49.6	47.91619517	-103.67268557	2018.717						
7280	WELD	30,621.1	7280	0.0	49.4	47.91619481	-103.67288708	2017.467						
7290	WELD	30,670.5	7290	0.0	49.6	47.91619486	-103.67308806	2018.133						
7300	WELD	30,720.2	7300	0.0	49.4	47.91619483	-103.67328980	2019.895						
7310	WELD	30,769.5	7310	0.0	46.6	47.91619517	-103.67349025	2019.159						
7320	WELD	30,816.2	7320	0.0	48.7	47.91619665	-103.67367980	2016.333						
7330	WELD	30,864.9	7330	0.0	49.3	47.91619908	-103.67387808	2016.449						
7340	WELD	30,914.2	7340	0.0	49.4	47.91619988	-103.67407831	2020.033						
7350	WELD	30,963.6	7350	0.0	48.9	47.91620235	-103.67427942	2020.676						
7360	WELD	31,012.5	7360	0.0	49.5	47.91620284	-103.67447842	2023.414						
7370	WELD	31,062.0	7370	0.0	49.4	47.91620339	-103.67468005	2025.495						
7380	WELD	31,111.4	7380	0.0	49.1	47.91620224	-103.67488120	2026.818						
7390	WELD	31,160.5	7390	0.0	49.6	47.91620098	-103.67508162	2027.120						
7400	WELD	31,210.1	7400	0.0	49.5	47.91619945	-103.67528345	2027.694						
7410	WELD	31,259.6	7410	0.0	47.1	47.91619800	-103.67548520	2028.185						
7420	WELD	31,306.7	7420	0.0	49.4	47.91619557	-103.67567664	2029.655						
7430	WELD	31,356.1	7430	0.0	49.5	47.91619317	-103.67587775	2030.086						
7440	WELD	31,405.7	7440	0.0	49.6	47.91619258	-103.67607906	2030.633						
7450	WELD	31,455.3	7450	0.0	49.4	47.91619377	-103.67628084	2031.171						
7460	WELD	31,504.6	7460	0.0	49.6	47.91619425	-103.67648137	2031.619						
7470	WELD	31,554.3	7470	0.0	49.7	47.91619418	-103.67668294	2031.642						
7480	WELD	31,603.9	7480	0.0	49.6	47.91619424	-103.67688471	2032.146						
7490	WELD	31,653.6	7490	0.0	49.7	47.91619465	-103.67708623	2032.643						
7500	WELD	31,703.3	7500	0.0	49.7	47.91619500	-103.67728818	2032.526						
7510	WELD	31,753.0	7510	0.0	49.6	47.91619417	-103.67749006	2033.900						
7520	WELD	31,802.6	7520	0.0	49.4	47.91619262	-103.67769163	2034.286						
7530	WELD	31,852.0	7530	0.0	49.6	47.91619079	-103.67789265	2035.516						
7540	WELD	31,901.6	7540	0.0	49.4	47.91618953	-103.67809436	2036.388						
7550	WELD	31,951.0	7550	0.0	49.6	47.91618908	-103.67829535	2036.471						
7560	WELD	32,000.6	7560	0.0	49.6	47.91619005	-103.67849699	2036.471						

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)
7570	WELD	32,050.3	7570	0.0	49.7	47.91619174	-103.67869864	2036.227						
7580	WELD	32,100.0	7580	0.0	49.7	47.91619262	-103.67890034	2035.398						
7590	WELD	32,149.7	7590	0.0	49.8	47.91619327	-103.67910217	2034.641						
7600	WELD	32,199.4	7600	0.0	48.6	47.91619429	-103.67930398	2033.535						
7610	WELD	32,248.1	7610	0.0	49.6	47.91619456	-103.67950083	2030.946						
7620	WELD	32,297.7	7620	0.0	49.5	47.91619577	-103.67970173	2027.287						
7630	WELD	32,347.2	7630	0.0	49.6	47.91619728	-103.67990274	2025.765						
7640	WELD	32,396.8	7640	0.0	49.7	47.91619765	-103.68010415	2025.390						
7650	WELD	32,446.5	7650	0.0	49.5	47.91619719	-103.68030575	2025.417						
7660	WELD	32,496.0	7660	0.0	49.7	47.91619640	-103.68050652	2025.614						
7670	WELD	32,545.7	7670	0.0	49.4	47.91619759	-103.68070802	2025.776						
7680	WELD	32,595.1	7680	0.0	49.6	47.91619910	-103.68090832	2025.603						
7690	WELD	32,644.7	7690	0.0	49.6	47.91619965	-103.68111014	2025.689						
7700	WELD	32,694.3	7700	0.0	49.6	47.91619862	-103.68131167	2025.432						
7710	WELD	32,743.9	7710	0.0	49.6	47.91619776	-103.68151347	2025.590						
7720	WELD	32,793.5	7720	0.0	49.4	47.91619705	-103.68171503	2025.972						
7730	WELD	32,842.9	7730	0.0	49.6	47.91619672	-103.68191557	2025.830						
7740	WELD	32,892.5	7740	0.0	49.6	47.91619670	-103.68211715	2025.974						
7750	WELD	32,942.1	7750	0.0	49.2	47.91619641	-103.68231854	2026.243						
7760	WELD	32,991.3	7760	0.0	49.0	47.91619601	-103.68251886	2026.243						
7770	WELD	33,040.3	7770	0.0	49.6	47.91619686	-103.68271835	2027.653						
7780	WELD	33,089.9	7780	0.0	49.3	47.91619681	-103.68291971	2027.844						
7790	WELD	33,139.2	7790	0.0	49.6	47.91619664	-103.68312021	2028.425						
7800	WELD	33,188.8	7800	0.0	49.5	47.91619597	-103.68332180	2028.914						
7810	WELD	33,238.3	7810	0.0	49.6	47.91619685	-103.68352339	2029.287						
7820	WELD	33,287.9	7820	0.0	49.2	47.91619743	-103.68372488	2029.980						
7830	WELD	33,337.0	7830	0.0	49.5	47.91619730	-103.68392528	2030.742						
7840	WELD	33,386.5	7840	0.0	49.2	47.91619643	-103.68412718	2031.348						
7850	WELD	33,435.7	7850	0.0	49.5	47.91619634	-103.68432773	2031.979						
7860	WELD	33,485.2	7860	0.0	49.5	47.91619778	-103.68452933	2032.279						
7870	WELD	33,534.7	7870	0.0	49.5	47.91619911	-103.68473106	2033.176						
7880	WELD	33,584.3	7880	0.0	49.5	47.91619946	-103.68493269	2034.813						
7890	WELD	33,633.8	7890	0.0	49.5	47.91619871	-103.68513387	2036.926						
7900	WELD	33,683.2	7900	0.0	49.2	47.91619809	-103.68533509	2038.692						
7910	WELD	33,732.4	7910	0.0	49.5	47.91619776	-103.68553512	2039.415						
7920	WELD	33,781.9	7920	0.0	49.3	47.91619719	-103.68573646	2040.247						
7930	WELD	33,831.2	7930	0.0	49.3	47.91619644	-103.68593679	2041.088						

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)
7940	WELD	33,880.5	7940	0.0	44.3	47.91619578	-103.68613725	2041.732						
7950	WELD	33,924.8	7950	0.0	49.5	47.91619599	-103.68631730	2041.077						
7960	WELD	33,974.3	7960	0.0	49.6	47.91619669	-103.68651877	2039.053						
7970	WELD	34,023.9	7970	0.0	49.3	47.91619687	-103.68672046	2038.238						
7980	WELD	34,073.2	7980	0.0	49.6	47.91619715	-103.68692136	2039.544						
7990	WELD	34,122.9	7990	0.0	48.7	47.91619747	-103.68712284	2040.414						
8000	WELD	34,171.5	8000	0.0	49.6	47.91619721	-103.68732051	2041.803						
8010	WELD	34,221.2	8010	0.0	49.3	47.91619606	-103.68752211	2043.255						
8020	WELD	34,270.5	8020	0.0	49.5	47.91619535	-103.68772261	2044.550						
8030	WELD	34,320.0	8030	0.0	49.4	47.91619482	-103.68792395	2046.412						
8040	WELD	34,369.4	8040	0.0	49.4	47.91619436	-103.68812472	2047.465						
8050	WELD	34,418.8	8050	0.0	49.3	47.91619442	-103.68832555	2048.657						
8060	WELD	34,468.1	8060	0.0	49.2	47.91619421	-103.68852580	2049.456						
8070	WELD	34,517.2	8070	0.0	49.4	47.91619460	-103.68872580	2049.487						
8080	WELD	34,566.6	8080	0.0	49.3	47.91619532	-103.68892670	2049.373						
8090	WELD	34,615.9	8090	0.0	49.3	47.91619528	-103.68912727	2049.570						
8100	WELD	34,665.2	8100	0.0	49.6	47.91619535	-103.68932760	2051.018						
8110	WELD	34,714.8	8110	0.0	49.3	47.91619564	-103.68952894	2052.957						
8120	WELD	34,764.0	8120	0.0	49.5	47.91619530	-103.68972912	2054.727						
8130	WELD	34,813.5	8130	0.0	49.1	47.91619471	-103.68993033	2055.697						
8140	WELD	34,862.6	8140	0.0	49.1	47.91619842	-103.69012927	2055.390						
10000037	AGM 060, Sta. 352+17, Row -- Han #143	34,885.6	8140	23.0	26.1	47.91621095	-103.69022074	2055.429						
8150	WELD	34,911.7	8150	0.0	49.5	47.91624021	-103.69031734	2054.685						
8160	WELD	34,961.1	8160	0.0	49.5	47.91630618	-103.69049309	2053.141						
8170	WELD	35,010.6	8170	0.0	49.3	47.91637568	-103.69066530	2054.396						
8180	WELD	35,059.9	8180	0.0	4.1	47.91644590	-103.69083624	2056.421						
8190	WELD	35,064.0	8190	0.0	49.0	47.91645183	-103.69085052	2056.582						
8200	WELD	35,112.9	8200	0.0	49.6	47.91652257	-103.69101910	2058.579						
8210	WELD	35,162.6	8210	0.0	49.6	47.91659436	-103.69118974	2060.712						
8220	WELD	35,212.1	8220	0.0	49.6	47.91666647	-103.69135990	2062.056						
8230	WELD	35,261.7	8230	0.0	49.6	47.91673785	-103.69153110	2062.903						
8240	WELD	35,311.2	8240	0.0	49.5	47.91680828	-103.69170280	2063.549						
8250	WELD	35,360.7	8250	0.0	49.6	47.91687996	-103.69187312	2064.450						
8260	WELD	35,410.4	8260	0.0	49.7	47.91695070	-103.69204504	2065.617						
8270	WELD	35,460.0	8270	0.0	49.6	47.91702175	-103.69221695	2066.579						
8280	WELD	35,509.6	8280	0.0	49.5	47.91709422	-103.69238683	2067.590						

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)
8290	WELD	35,559.1	8290	0.0	49.1	47.91716581	-103.69255692	2068.663						
8300	WELD	35,608.2	8300	0.0	49.5	47.91723687	-103.69272637	2069.636						
8310	WELD	35,657.7	8310	0.0	49.6	47.91730802	-103.69289732	2069.168						
8320	WELD	35,707.4	8320	0.0	49.6	47.91737868	-103.69306944	2070.599						
8330	WELD	35,757.0	8330	0.0	49.4	47.91744994	-103.69324104	2072.101						
8340	WELD	35,806.4	8340	0.0	49.5	47.91752138	-103.69341183	2072.946						
8350	WELD	35,856.0	8350	0.0	49.3	47.91759105	-103.69358435	2073.469						
8360	WELD	35,905.3	8360	0.0	49.6	47.91765050	-103.69376332	2075.582						
8370	WELD	35,954.9	8370	0.0	49.7	47.91769099	-103.69395526	2078.355						
8380	WELD	36,004.6	8380	0.0	49.3	47.91772615	-103.69414972	2080.759						
8390	WELD	36,053.9	8390	0.0	49.6	47.91775845	-103.69434419	2082.576						
8400	WELD	36,103.5	8400	0.0	49.5	47.91779023	-103.69454025	2082.479						
8410	WELD	36,153.0	8410	0.0	49.4	47.91782308	-103.69473487	2078.476						
8420	WELD	36,202.4	8420	0.0	49.5	47.91785767	-103.69492820	2073.504						
8430	WELD	36,251.9	8430	0.0	49.2	47.91789517	-103.69512178	2073.091						
8440	WELD	36,301.1	8440	0.0	46.3	47.91793245	-103.69531397	2075.216						
8450	WELD	36,347.3	8450	0.0	49.2	47.91796687	-103.69549457	2078.103						
8460	WELD	36,396.5	8460	0.0	49.5	47.91800490	-103.69568573	2082.557						
8470	WELD	36,446.0	8470	0.0	42.7	47.91804293	-103.69587795	2087.049						
8480	WELD	36,488.7	8480	0.0	49.6	47.91807619	-103.69604315	2091.123						
8490	WELD	36,538.3	8490	0.0	49.6	47.91811701	-103.69623511	2093.250						
8500	WELD	36,587.9	8500	0.0	49.6	47.91815792	-103.69642740	2094.321						
8510	WELD	36,637.5	8510	0.0	49.7	47.91820022	-103.69661866	2096.338						
8520	WELD	36,687.2	8520	0.0	48.1	47.91824279	-103.69681000	2098.140						
8530	WELD	36,735.3	8530	0.0	49.6	47.91828616	-103.69699418	2100.332						
8540	WELD	36,784.9	8540	0.0	49.6	47.91833160	-103.69718350	2103.103						
8550	WELD	36,834.5	8550	0.0	49.4	47.91837771	-103.69737253	2105.944						
8560	WELD	36,883.9	8560	0.0	49.7	47.91842575	-103.69756004	2108.393						
8570	WELD	36,933.6	8570	0.0	49.4	47.91847758	-103.69774648	2109.472						
8580	WELD	36,983.0	8580	0.0	49.4	47.91853114	-103.69793034	2109.125						
8590	WELD	37,032.4	8590	0.0	49.7	47.91858622	-103.69811319	2110.055						
8600	WELD	37,082.1	8600	0.0	49.6	47.91864067	-103.69829791	2110.846						
8610	WELD	37,131.7	8610	0.0	49.3	47.91869446	-103.69848307	2111.603						
8620	WELD	37,181.0	8620	0.0	45.0	47.91874812	-103.69866686	2112.027						
8630	WELD	37,226.0	8630	0.0	49.5	47.91879772	-103.69883440	2112.686						
8640	WELD	37,275.5	8640	0.0	49.3	47.91885225	-103.69901856	2114.448						
8650	WELD	37,324.8	8650	0.0	46.3	47.91890589	-103.69920240	2115.842						

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)
8660	WELD	37,371.1	8660	0.0	49.3	47.91895745	-103.69937439	2116.003						
8670	WELD	37,420.4	8670	0.0	49.5	47.91901396	-103.69955653	2114.707						
8680	WELD	37,470.0	8680	0.0	49.4	47.91907007	-103.69973984	2113.716						
8690	WELD	37,519.4	8690	0.0	49.3	47.91912554	-103.69992342	2114.618						
8700	WELD	37,568.7	8700	0.0	49.5	47.91918059	-103.70010662	2115.750						
8710	WELD	37,618.3	8710	0.0	49.4	47.91923597	-103.70029066	2116.231						
8720	WELD	37,667.7	8720	0.0	49.5	47.91929129	-103.70047451	2116.742						
8730	WELD	37,717.2	8730	0.0	49.5	47.91934623	-103.70065877	2117.624						
8740	WELD	37,766.7	8740	0.0	49.5	47.91940125	-103.70084278	2119.015						
8750	WELD	37,816.2	8750	0.0	49.4	47.91945629	-103.70102674	2120.713						
8760	WELD	37,865.7	8760	0.0	49.6	47.91951070	-103.70121110	2122.093						
8770	WELD	37,915.2	8770	0.0	49.5	47.91956495	-103.70139578	2123.468						
8780	WELD	37,964.7	8780	0.0	49.4	47.91961892	-103.70158024	2125.027						
8790	WELD	38,014.1	8790	0.0	49.3	47.91967322	-103.70176433	2127.468						
8800	WELD	38,063.5	8800	0.0	49.5	47.91972835	-103.70194727	2128.912						
8810	WELD	38,112.9	8810	0.0	49.5	47.91978474	-103.70213000	2129.416						
8820	WELD	38,162.4	8820	0.0	49.4	47.91984115	-103.70231237	2129.687						
8830	WELD	38,211.8	8830	0.0	49.3	47.91989788	-103.70249408	2131.285						
8840	WELD	38,261.1	8840	0.0	49.3	47.91995463	-103.70267548	2133.397						
8850	WELD	38,310.4	8850	0.0	49.2	47.92000908	-103.70285844	2136.032						
8860	WELD	38,359.6	8860	0.0	49.4	47.92005575	-103.70304510	2139.416						
8870	WELD	38,409.0	8870	0.0	49.5	47.92009247	-103.70323776	2141.820						
8880	WELD	38,458.5	8880	0.0	40.8	47.92012809	-103.70343154	2142.870						
8890	WELD	38,499.2	8890	0.0	13.4	47.92015656	-103.70359115	2144.095						
8900	WELD	38,512.7	8900	0.0	44.7	47.92016554	-103.70364393	2144.349						
8910	WELD	38,557.3	8910	0.0	49.4	47.92019559	-103.70381957	2144.749						
8920	WELD	38,606.7	8920	0.0	49.3	47.92022904	-103.70401363	2145.911						
8930	WELD	38,656.0	8930	0.0	49.4	47.92026520	-103.70420609	2147.324						
8940	WELD	38,705.4	8940	0.0	49.5	47.92030215	-103.70439903	2148.932						
8950	WELD	38,754.9	8950	0.0	49.5	47.92033826	-103.70459277	2150.423						
8960	WELD	38,804.4	8960	0.0	49.6	47.92037486	-103.70478634	2150.987						
8970	WELD	38,854.0	8970	0.0	49.5	47.92041261	-103.70497969	2152.127						
8980	WELD	38,903.6	8980	0.0	45.0	47.92045047	-103.70517290	2153.146						
8990	WELD	38,948.5	8990	0.0	49.2	47.92048527	-103.70534797	2153.174						
9000	WELD	38,997.7	9000	0.0	35.0	47.92052456	-103.70553958	2151.896						
9010	WELD	39,032.7	9010	0.0	23.3	47.92055304	-103.70567578	2151.219						
9020	WELD	39,056.0	9020	0.0	49.0	47.92057193	-103.70576618	2151.250						

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)
9030	WELD	39,105.0	9030	0.0	49.4	47.92060938	-103.70595742	2152.731						
9040	WELD	39,154.4	9040	0.0	49.4	47.92064460	-103.70615157	2152.309						
9050	WELD	39,203.8	9050	0.0	49.1	47.92068171	-103.70634531	2151.916						
9060	WELD	39,252.9	9060	0.0	49.5	47.92072049	-103.70653748	2152.155						
9070	WELD	39,302.4	9070	0.0	49.4	47.92075788	-103.70673062	2151.923						
9080	WELD	39,351.8	9080	0.0	49.4	47.92079505	-103.70692438	2151.102						
9090	WELD	39,401.2	9090	0.0	49.2	47.92083116	-103.70711793	2148.177						
9100	WELD	39,450.4	9100	0.0	49.5	47.92086698	-103.70731115	2146.161						
9110	WELD	39,499.9	9110	0.0	49.5	47.92090300	-103.70750461	2142.934						
9120	WELD	39,549.4	9120	0.0	49.6	47.92093990	-103.70769806	2139.511						
9130	WELD	39,599.0	9130	0.0	49.5	47.92097735	-103.70789125	2135.642						
9140	WELD	39,648.5	9140	0.0	48.7	47.92101527	-103.70808409	2131.867						
9150	WELD	39,697.2	9150	0.0	49.3	47.92105341	-103.70827327	2128.515						
9160	WELD	39,746.5	9160	0.0	49.3	47.92109191	-103.70846534	2127.097						
9170	WELD	39,795.8	9170	0.0	49.5	47.92112983	-103.70865779	2126.441						
9180	WELD	39,845.3	9180	0.0	49.2	47.92116771	-103.70885135	2127.589						
9190	WELD	39,894.5	9190	0.0	49.5	47.92120498	-103.70904348	2127.403						
9200	WELD	39,944.0	9200	0.0	49.5	47.92124244	-103.70923681	2127.328						
9210	WELD	39,993.5	9210	0.0	49.6	47.92127946	-103.70943006	2128.188						
9220	WELD	40,043.1	9220	0.0	49.6	47.92131760	-103.70962343	2126.773						
9230	WELD	40,092.7	9230	0.0	49.3	47.92135590	-103.70981670	2125.357						
9240	WELD	40,142.0	9240	0.0	49.6	47.92139392	-103.71000856	2123.617						
9250	WELD	40,191.6	9250	0.0	49.5	47.92143211	-103.71020153	2122.258						
9260	WELD	40,241.1	9260	0.0	46.6	47.92147073	-103.71039398	2120.505						
9270	WELD	40,287.7	9270	0.0	49.5	47.92150695	-103.71057507	2119.844						
9280	WELD	40,337.3	9280	0.0	49.5	47.92154478	-103.71076778	2119.321						
9290	WELD	40,386.8	9290	0.0	49.5	47.92158253	-103.71096076	2119.409						
9300	WELD	40,436.3	9300	0.0	49.3	47.92162024	-103.71115362	2119.855						
11000024	WT CHANGE	40,485.5	9300	0.0	0.0	47.92165546	-103.71134640	2119.353			0.322	52000	0.72	
9310	WELD	40,485.5	9310	0.0	22.0	47.92165549	-103.71134651	2119.353						
9320	WELD	40,507.6	9320	0.0	42.2	47.92167138	-103.71143289	2119.138						
9330	WELD	40,549.8	9330	0.0	42.3	47.92170271	-103.71159781	2117.576						
9340	WELD	40,592.0	9340	0.0	42.3	47.92173551	-103.71176189	2115.488						
9350	WELD	40,634.3	9350	0.0	42.2	47.92176934	-103.71192559	2116.082						
9360	WELD	40,676.5	9360	0.0	42.2	47.92180540	-103.71208847	2116.107						

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)
10000038	AGM 070, Sta. 409+72, 146th Ave. NW -- Han #115	40,710.2	9360	33.6	8.6	47.92183219	-103.71221933	2116.919						
9370	WELD	40,718.7	9370	0.0	33.7	47.92183859	-103.71225266	2116.964						
11000025	WT CHANGE	40,752.3	9370	0.0	0.0	47.92186348	-103.71238410	2116.734			0.188	52000	0.72	
9380	WELD	40,752.4	9380	0.0	45.7	47.92186350	-103.71238426	2116.733						
9390	WELD	40,798.1	9390	0.0	49.5	47.92189751	-103.71256317	2115.760						
9400	WELD	40,847.6	9400	0.0	49.6	47.92193526	-103.71275632	2114.975						
9410	WELD	40,897.3	9410	0.0	49.6	47.92197530	-103.71294884	2113.433						
9420	WELD	40,946.9	9420	0.0	49.6	47.92201215	-103.71314270	2112.534						
9430	WELD	40,996.5	9430	0.0	49.2	47.92204895	-103.71333631	2113.586						
9440	WELD	41,045.7	9440	0.0	49.4	47.92208513	-103.71352903	2114.083						
9450	WELD	41,095.1	9450	0.0	49.4	47.92212153	-103.71372267	2113.800						
9460	WELD	41,144.6	9460	0.0	49.7	47.92215861	-103.71391581	2113.438						
9470	WELD	41,194.3	9470	0.0	49.6	47.92219651	-103.71410952	2113.318						
9480	WELD	41,243.9	9480	0.0	49.3	47.92223404	-103.71430348	2113.048						
9490	WELD	41,293.2	9490	0.0	49.6	47.92227123	-103.71449570	2113.018						
9500	WELD	41,342.8	9500	0.0	49.6	47.92230973	-103.71468898	2112.918						
9510	WELD	41,392.4	9510	0.0	49.5	47.92234879	-103.71488227	2112.345						
9520	WELD	41,441.9	9520	0.0	49.6	47.92238737	-103.71507549	2112.126						
9530	WELD	41,491.5	9530	0.0	49.6	47.92242499	-103.71526909	2111.883						
9540	WELD	41,541.1	9540	0.0	49.6	47.92246204	-103.71546322	2111.763						
9550	WELD	41,590.7	9550	0.0	49.7	47.92249931	-103.71565732	2111.357						
9560	WELD	41,640.4	9560	0.0	49.4	47.92253646	-103.71585156	2110.092						
9570	WELD	41,689.7	9570	0.0	49.7	47.92257251	-103.71604449	2109.781						
9580	WELD	41,739.4	9580	0.0	49.7	47.92260930	-103.71623852	2108.780						
9590	WELD	41,789.1	9590	0.0	49.5	47.92264655	-103.71643269	2108.782						
9600	WELD	41,838.6	9600	0.0	49.5	47.92268159	-103.71662670	2109.321						
9610	WELD	41,888.1	9610	0.0	42.0	47.92271780	-103.71681993	2111.507						
11000026	WT CHANGE	41,930.0	9610	0.0	0.0	47.92274998	-103.71698237	2113.210			0.322	52000	0.72	
9620	WELD	41,930.0	9620	0.0	36.4	47.92275002	-103.71698256	2113.209						
9630	WELD	41,966.4	9630	0.0	42.3	47.92277840	-103.71712403	2112.657						
9640	WELD	42,008.7	9640	0.0	42.3	47.92281129	-103.71728826	2111.089						
9650	WELD	42,051.0	9650	0.0	42.3	47.92284995	-103.71744956	2108.775						
9660	WELD	42,093.2	9660	0.0	42.2	47.92289242	-103.71760871	2107.933						
9670	WELD	42,135.5	9670	0.0	42.2	47.92293515	-103.71776783	2108.659						
9680	WELD	42,177.7	9680	0.0	6.9	47.92297629	-103.71792777	2110.013						

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Camp Creek to Dore Junction

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)
11000027	WT CHANGE	42,184.5	9680	0.0	0.0	47.92298278	-103.71795363	2110.278			0.188	52000	0.72	
9690	WELD	42,184.6	9690	0.0	38.2	47.92298281	-103.71795375	2110.280						
9700	WELD	42,222.8	9700	0.0	49.3	47.92301967	-103.71809843	2113.403						
9710	WELD	42,272.1	9710	0.0	49.5	47.92306907	-103.71828484	2115.465						
9720	WELD	42,321.5	9720	0.0	49.6	47.92311728	-103.71847253	2115.904						
9730	WELD	42,371.1	9730	0.0	49.7	47.92316032	-103.71866331	2116.864						
9740	WELD	42,420.7	9740	0.0	49.7	47.92319596	-103.71885808	2117.526						
9750	WELD	42,470.4	9750	0.0	49.6	47.92322637	-103.71905472	2117.941						
9760	WELD	42,520.0	9760	0.0	49.5	47.92325538	-103.71925121	2118.885						
9770	WELD	42,569.5	9770	0.0	49.5	47.92328387	-103.71944772	2120.267						
9780	WELD	42,619.0	9780	0.0	49.3	47.92331397	-103.71964375	2121.306						
9790	WELD	42,668.3	9790	0.0	49.7	47.92334478	-103.71983820	2122.720						
9800	WELD	42,717.9	9800	0.0	49.4	47.92337481	-103.72003504	2124.002						
9810	WELD	42,767.3	9810	0.0	49.6	47.92340380	-103.72023073	2125.584						
9820	WELD	42,817.0	9820	0.0	49.5	47.92343471	-103.72042714	2127.252						
9830	WELD	42,866.5	9830	0.0	49.4	47.92346770	-103.72062249	2129.434						
9840	WELD	42,915.9	9840	0.0	49.3	47.92350100	-103.72081696	2130.995						
9850	WELD	42,965.2	9850	0.0	49.4	47.92353318	-103.72101143	2133.621						
9860	WELD	43,014.7	9860	0.0	49.4	47.92356418	-103.72120649	2137.125						
9870	WELD	43,064.0	9870	0.0	49.0	47.92359540	-103.72140164	2138.940						
9880	WELD	43,113.0	9880	0.0	48.7	47.92362793	-103.72159456	2140.072						
9890	WELD	43,161.8	9890	0.0	49.5	47.92366061	-103.72178649	2140.951						
9900	WELD	43,211.3	9900	0.0	49.5	47.92369270	-103.72198188	2141.138						
9910	WELD	43,260.8	9910	0.0	49.4	47.92372319	-103.72217722	2143.793						
9920	WELD	43,310.2	9920	0.0	49.5	47.92375372	-103.72237190	2146.653						
9930	WELD	43,359.6	9930	0.0	49.6	47.92378537	-103.72256669	2149.746						
9940	WELD	43,409.2	9940	0.0	49.5	47.92381735	-103.72276132	2153.290						
9950	WELD	43,458.7	9950	0.0	49.3	47.92384774	-103.72295588	2157.467						
9960	WELD	43,508.0	9960	0.0	49.3	47.92387855	-103.72314995	2162.297						
9970	WELD	43,557.3	9970	0.0	49.5	47.92390968	-103.72334338	2167.715						
9980	WELD	43,606.8	9980	0.0	49.6	47.92394090	-103.72353858	2172.127						
9990	WELD	43,656.4	9990	0.0	49.7	47.92397236	-103.72373377	2176.289						
10000	WELD	43,706.1	10000	0.0	49.4	47.92400352	-103.72392897	2181.362						
10010	WELD	43,755.5	10010	0.0	49.4	47.92403362	-103.72412381	2186.056						
10020	WELD	43,804.9	10020	0.0	49.8	47.92405930	-103.72431888	2192.970						
10030	WELD	43,854.7	10030	0.0	49.7	47.92407981	-103.72451827	2196.443						
10040	WELD	43,904.4	10040	0.0	49.8	47.92409535	-103.72471865	2198.034						

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)
10050	WELD	43,954.2	10050	0.0	49.5	47.92411039	-103.72491972	2197.766							
10060	WELD	44,003.7	10060	0.0	49.7	47.92412485	-103.72511980	2197.893							
10070	WELD	44,053.4	10070	0.0	49.6	47.92413836	-103.72532046	2198.580							
10080	WELD	44,103.1	10080	0.0	49.6	47.92415164	-103.72552102	2201.193							
10090	WELD	44,152.7	10090	0.0	49.1	47.92416702	-103.72572129	2203.333							
10100	WELD	44,201.8	10100	0.0	49.6	47.92418573	-103.72591869	2204.853							
10110	WELD	44,251.4	10110	0.0	48.7	47.92420730	-103.72611727	2204.253							
10120	WELD	44,300.1	10120	0.0	1.6	47.92422456	-103.72631336	2203.671							
10000039	Bend right - 45 deg., 3D	44,300.9	10120	0.1	1.6	47.92422522	-103.72631633	2203.645	0	12:00					
10130	WELD	44,301.7	10130	0.0	11.8	47.92422648	-103.72631896	2203.598							
10140	WELD	44,313.5	10140	0.0	42.2	47.92425137	-103.72634935	2202.721							
10150	WELD	44,355.7	10150	0.0	49.4	47.92433870	-103.72645991	2199.471							
10160	WELD	44,405.1	10160	0.0	49.4	47.92444152	-103.72658873	2196.674							
10170	WELD	44,454.5	10170	0.0	49.4	47.92454614	-103.72671556	2196.374							
10180	WELD	44,503.9	10180	0.0	49.5	47.92465182	-103.72684009	2198.520							
10190	WELD	44,553.4	10190	0.0	49.7	47.92475904	-103.72696127	2201.910							
10200	WELD	44,603.0	10200	0.0	49.6	47.92486600	-103.72708421	2205.549							
10210	WELD	44,652.6	10210	0.0	49.6	47.92497263	-103.72720876	2206.514							
10220	WELD	44,702.2	10220	0.0	49.3	47.92507774	-103.72733558	2207.004							
10230	WELD	44,751.5	10230	0.0	49.5	47.92518301	-103.72746043	2207.946							
10240	WELD	44,801.0	10240	0.0	49.4	47.92529022	-103.72758368	2208.000							
10250	WELD	44,850.4	10250	0.0	49.4	47.92539689	-103.72770677	2205.973							
10260	WELD	44,899.8	10260	0.0	49.4	47.92550342	-103.72782918	2204.676							
10270	WELD	44,949.3	10270	0.0	49.3	47.92561005	-103.72795234	2202.598							
10280	WELD	44,998.6	10280	0.0	49.5	47.92571571	-103.72807702	2202.501							
10290	WELD	45,048.1	10290	0.0	49.6	47.92582290	-103.72819929	2205.648							
10300	WELD	45,097.7	10300	0.0	48.6	47.92593175	-103.72831743	2209.971							
10310	WELD	45,146.3	10310	0.0	21.7	47.92603300	-103.72844390	2213.697							
10320	WELD	45,168.0	10320	0.0	20.5	47.92607252	-103.72850932	2213.947							
10330	WELD	45,188.6	10330	0.0	49.1	47.92610629	-103.72857589	2213.661							
10340	WELD	45,237.6	10340	0.0	49.1	47.92617839	-103.72874352	2212.831							
10350	WELD	45,286.7	10350	0.0	49.1	47.92624369	-103.72891801	2212.604							
10360	WELD	45,335.9	10360	0.0	49.6	47.92630518	-103.72909577	2212.792							
10370	WELD	45,385.5	10370	0.0	49.6	47.92636842	-103.72927403	2211.994							
10380	WELD	45,435.1	10380	0.0	49.6	47.92643277	-103.72945031	2207.171							
10390	WELD	45,484.7	10390	0.0	49.6	47.92649951	-103.72962467	2202.745							
10400	WELD	45,534.4	10400	0.0	49.7	47.92656626	-103.72979924	2199.297							

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)
10410	WELD	45,584.1	10410	0.0	49.8	47.92663186	-103.72997586	2199.571						
10420	WELD	45,633.9	10420	0.0	49.8	47.92669621	-103.73015348	2202.873						
10430	WELD	45,683.7	10430	0.0	49.5	47.92676105	-103.73033022	2207.040						
10440	WELD	45,733.2	10440	0.0	49.7	47.92682671	-103.73050540	2209.827						
10450	WELD	45,783.0	10450	0.0	49.7	47.92689234	-103.73068168	2212.304						
10460	WELD	45,832.7	10460	0.0	49.7	47.92695819	-103.73085779	2213.037						
10470	WELD	45,882.4	10470	0.0	49.8	47.92702332	-103.73103491	2212.652						
10480	WELD	45,932.2	10480	0.0	49.4	47.92708875	-103.73121192	2211.481						
10490	WELD	45,981.6	10490	0.0	49.8	47.92715322	-103.73138805	2210.353						
10500	WELD	46,031.4	10500	0.0	49.4	47.92721806	-103.73156527	2209.997						
10510	WELD	46,080.7	10510	0.0	49.6	47.92728282	-103.73174113	2210.311						
10520	WELD	46,130.3	10520	0.0	49.6	47.92734831	-103.73191749	2209.846						
10530	WELD	46,179.9	10530	0.0	49.7	47.92741285	-103.73209383	2208.115						
10540	WELD	46,229.6	10540	0.0	49.3	47.92747820	-103.73227079	2208.604						
10550	WELD	46,278.9	10550	0.0	48.1	47.92754286	-103.73244621	2210.419						
11000028	WT CHANGE	46,326.9	10550	0.0	0.0	47.92760652	-103.73261688	2211.696			0.322	52000	0.72	
10560	WELD	46,327.0	10560	0.0	42.2	47.92760658	-103.73261701	2211.696						
10570	WELD	46,369.2	10570	0.0	42.2	47.92766330	-103.73276626	2211.223						
10580	WELD	46,411.4	10580	0.0	42.3	47.92772001	-103.73291570	2211.455						
10590	WELD	46,453.7	10590	0.0	42.2	47.92777640	-103.73306483	2214.715						
10600	WELD	46,495.8	10600	0.0	42.2	47.92783112	-103.73321540	2217.150						
10610	WELD	46,538.1	10610	0.0	42.3	47.92788841	-103.73336423	2216.456						
10620	WELD	46,580.3	10620	0.0	42.3	47.92794422	-103.73351436	2217.753						
10630	WELD	46,622.6	10630	0.0	42.2	47.92799799	-103.73366533	2221.148						
10640	WELD	46,664.8	10640	0.0	36.3	47.92805238	-103.73381484	2226.462						
11000029	WT CHANGE	46,701.0	10640	0.0	0.0	47.92809826	-103.73394500	2227.805			0.188	52000	0.72	
10650	WELD	46,701.1	10650	0.0	7.9	47.92809830	-103.73394511	2227.806						
10000040	AGM 080, Sta. 469+20, 147th Ave. NW -- Han #143	46,703.3	10650	2.3	5.6	47.92810118	-103.73395343	2227.909						
10660	WELD	46,708.9	10660	0.0	49.4	47.92810804	-103.73397352	2228.205						
10670	WELD	46,758.4	10670	0.0	41.3	47.92816849	-103.73415284	2229.121						
10680	WELD	46,799.7	10680	0.0	41.4	47.92822087	-103.73430145	2227.829						
10690	WELD	46,841.1	10690	0.0	41.3	47.92827370	-103.73444933	2223.913						
10700	WELD	46,882.4	10700	0.0	41.3	47.92832566	-103.73459796	2220.260						
10710	WELD	46,923.8	10710	0.0	41.4	47.92837859	-103.73474578	2217.524						
10720	WELD	46,965.1	10720	0.0	49.5	47.92843196	-103.73489378	2218.488						

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)
10730	WELD	47,014.6	10730	0.0	49.6	47.92849545	-103.73507075	2223.144						
10740	WELD	47,064.2	10740	0.0	49.6	47.92855935	-103.73524668	2229.581						
10750	WELD	47,113.8	10750	0.0	49.7	47.92862259	-103.73542377	2233.943						
10760	WELD	47,163.4	10760	0.0	49.6	47.92868535	-103.73560239	2235.944						
10770	WELD	47,213.0	10770	0.0	49.3	47.92874782	-103.73578151	2236.166						
10780	WELD	47,262.4	10780	0.0	49.3	47.92880987	-103.73595962	2237.383						
10790	WELD	47,311.7	10790	0.0	49.6	47.92887323	-103.73613653	2239.952						
10800	WELD	47,361.3	10800	0.0	49.4	47.92893636	-103.73631475	2242.433						
10810	WELD	47,410.7	10810	0.0	49.6	47.92899913	-103.73649224	2245.074						
10820	WELD	47,460.3	10820	0.0	49.5	47.92906238	-103.73667024	2247.940						
10830	WELD	47,509.8	10830	0.0	49.7	47.92912371	-103.73684931	2249.552						
10840	WELD	47,559.6	10840	0.0	49.4	47.92918624	-103.73702818	2250.593						
10850	WELD	47,608.9	10850	0.0	49.5	47.92924946	-103.73720513	2250.579						
10860	WELD	47,658.5	10860	0.0	49.6	47.92931422	-103.73738217	2250.301						
10870	WELD	47,708.1	10870	0.0	49.4	47.92937784	-103.73756038	2250.399						
10880	WELD	47,757.5	10880	0.0	49.7	47.92944068	-103.73773789	2251.578						
10890	WELD	47,807.2	10890	0.0	49.7	47.92950341	-103.73791677	2251.887						
10900	WELD	47,856.9	10900	0.0	49.6	47.92956673	-103.73809527	2251.995						
10910	WELD	47,906.5	10910	0.0	49.5	47.92963054	-103.73827294	2252.667						
10920	WELD	47,956.0	10920	0.0	49.5	47.92969396	-103.73845098	2252.548						
10930	WELD	48,005.5	10930	0.0	49.6	47.92975715	-103.73862937	2251.758						
10940	WELD	48,055.1	10940	0.0	49.6	47.92982090	-103.73880713	2251.319						
10950	WELD	48,104.7	10950	0.0	49.8	47.92988624	-103.73898371	2250.111						
10960	WELD	48,154.5	10960	0.0	49.7	47.92995263	-103.73915962	2248.970						
10970	WELD	48,204.3	10970	0.0	49.7	47.93001748	-103.73933698	2247.775						
10980	WELD	48,253.9	10980	0.0	49.6	47.93008333	-103.73951300	2245.853						
10990	WELD	48,303.6	10990	0.0	44.7	47.93015018	-103.73968807	2243.437						
11000	WELD	48,348.3	11000	0.0	48.7	47.93021074	-103.73984581	2242.642						
11010	WELD	48,397.0	11010	0.0	49.7	47.93027689	-103.74001722	2240.160						
11020	WELD	48,446.7	11020	0.0	49.3	47.93034419	-103.74019242	2240.330						
11030	WELD	48,496.0	11030	0.0	49.7	47.93040816	-103.74036759	2243.277						
11040	WELD	48,545.7	11040	0.0	49.6	47.93046912	-103.74054784	2245.247						
11050	WELD	48,595.3	11050	0.0	49.5	47.93052892	-103.74072857	2245.748						
11060	WELD	48,644.7	11060	0.0	49.7	47.93058954	-103.74090842	2244.653						
11070	WELD	48,694.5	11070	0.0	49.5	47.93065181	-103.74108794	2243.323						
11080	WELD	48,744.0	11080	0.0	49.5	47.93071326	-103.74126719	2241.689						
11090	WELD	48,793.5	11090	0.0	49.6	47.93077371	-103.74144707	2240.037						

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)
11100	WELD	48,843.1	11100	0.0	49.7	47.93083452	-103.74162749	2240.812							
11110	WELD	48,892.8	11110	0.0	49.7	47.93089670	-103.74180662	2240.289							
11120	WELD	48,942.4	11120	0.0	49.5	47.93095990	-103.74198529	2238.298							
11130	WELD	48,991.9	11130	0.0	50.4	47.93102327	-103.74216258	2235.936							
11140	WELD	49,042.3	11140	0.0	49.6	47.93108622	-103.74234472	2233.534							
11150	WELD	49,091.9	11150	0.0	49.5	47.93114784	-103.74252486	2233.178							
11160	WELD	49,141.4	11160	0.0	49.4	47.93121080	-103.74270311	2234.145							
11170	WELD	49,190.8	11170	0.0	49.5	47.93127575	-103.74287917	2233.883							
11180	WELD	49,240.4	11180	0.0	49.5	47.93133653	-103.74305896	2233.650							
11190	WELD	49,289.9	11190	0.0	49.5	47.93137948	-103.74324897	2231.629							
10000041	Bend left - 15 deg., 63D	49,319.7	11190	24.0	25.5	47.93138649	-103.74336844	2228.606	0	12:00					
11200	WELD	49,339.4	11200	0.0	49.6	47.93137534	-103.74344582	2225.392							
11210	WELD	49,389.0	11210	0.0	49.5	47.93133446	-103.74363517	2217.500							
11220	WELD	49,438.6	11220	0.0	49.7	47.93128571	-103.74382135	2211.712							
11230	WELD	49,488.2	11230	0.0	49.4	47.93123335	-103.74400526	2204.872							
11240	WELD	49,537.6	11240	0.0	49.9	47.93117954	-103.74418809	2202.501							
11250	WELD	49,587.5	11250	0.0	49.8	47.93112226	-103.74437014	2207.590							
11260	WELD	49,637.2	11260	0.0	49.7	47.93106269	-103.74454870	2215.403							
11270	WELD	49,687.0	11270	0.0	49.7	47.93100098	-103.74472690	2220.627							
11280	WELD	49,736.7	11280	0.0	49.7	47.93093934	-103.74490611	2222.546							
11290	WELD	49,786.3	11290	0.0	49.7	47.93088010	-103.74508737	2222.528							
11300	WELD	49,836.1	11300	0.0	49.6	47.93082240	-103.74527015	2222.147							
11310	WELD	49,885.7	11310	0.0	49.7	47.93076550	-103.74545297	2222.514							
11320	WELD	49,935.4	11320	0.0	49.7	47.93070754	-103.74563538	2222.944							
11330	WELD	49,985.1	11330	0.0	49.3	47.93064991	-103.74581839	2223.269							
11340	WELD	50,034.4	11340	0.0	40.6	47.93059376	-103.74600052	2222.966							
11350	WELD	50,075.0	11350	0.0	41.7	47.93054909	-103.74615145	2222.238							
11360	WELD	50,116.7	11360	0.0	49.6	47.93050506	-103.74630758	2220.777							
11370	WELD	50,166.3	11370	0.0	49.6	47.93045710	-103.74649607	2220.100							
11380	WELD	50,215.9	11380	0.0	49.7	47.93041898	-103.74668970	2220.021							
11390	WELD	50,265.6	11390	0.0	49.7	47.93038931	-103.74688655	2220.390							
11400	WELD	50,315.2	11400	0.0	49.8	47.93036167	-103.74708358	2217.053							
11410	WELD	50,365.0	11410	0.0	49.3	47.93031639	-103.74727108	2209.685							
11420	WELD	50,414.3	11420	0.0	49.6	47.93025380	-103.74744639	2203.165							
11430	WELD	50,464.0	11430	0.0	49.6	47.93018440	-103.74761970	2203.486							
11440	WELD	50,513.6	11440	0.0	49.6	47.93011418	-103.74779204	2202.223							
11450	WELD	50,563.2	11450	0.0	49.3	47.93004556	-103.74796622	2201.289							

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)
11460	WELD	50,612.6	11460	0.0	49.6	47.92997884	-103.74813924	2206.377						
11470	WELD	50,662.2	11470	0.0	48.1	47.92991216	-103.74831162	2214.726						
11480	WELD	50,710.3	11480	0.0	49.7	47.92984628	-103.74847935	2220.169						
11490	WELD	50,760.0	11490	0.0	48.1	47.92977542	-103.74865088	2223.372						
11500	WELD	50,808.1	11500	0.0	39.9	47.92970585	-103.74881621	2224.042						
11510	WELD	50,848.0	11510	0.0	49.7	47.92964612	-103.74895180	2223.990						
11520	WELD	50,897.7	11520	0.0	49.7	47.92957209	-103.74912059	2225.075						
11530	WELD	50,947.5	11530	0.0	49.7	47.92950034	-103.74929170	2226.259						
11540	WELD	50,997.2	11540	0.0	49.6	47.92942728	-103.74946107	2228.125						
11550	WELD	51,046.8	11550	0.0	49.3	47.92935342	-103.74962891	2230.927						
11560	WELD	51,096.1	11560	0.0	49.7	47.92927963	-103.74979499	2234.049						
11570	WELD	51,145.8	11570	0.0	49.4	47.92920481	-103.74996300	2237.209						
11580	WELD	51,195.2	11580	0.0	49.6	47.92913193	-103.75013157	2238.998						
11590	WELD	51,244.8	11590	0.0	49.4	47.92905982	-103.75030231	2240.372						
11600	WELD	51,294.2	11600	0.0	49.6	47.92898796	-103.75047184	2242.572						
11610	WELD	51,343.9	11610	0.0	49.4	47.92891569	-103.75064203	2246.311						
11620	WELD	51,393.3	11620	0.0	49.7	47.92884406	-103.75081218	2247.338						
11630	WELD	51,443.0	11630	0.0	49.7	47.92877037	-103.75098140	2245.455						
11640	WELD	51,492.7	11640	0.0	49.5	47.92869485	-103.75114874	2242.542						
11650	WELD	51,542.1	11650	0.0	49.7	47.92861835	-103.75131429	2242.259						
11660	WELD	51,591.8	11660	0.0	49.1	47.92854074	-103.75147960	2244.058						
11670	WELD	51,641.0	11670	0.0	49.7	47.92846308	-103.75164216	2245.590						
11680	WELD	51,690.6	11680	0.0	49.7	47.92838422	-103.75180602	2246.623						
11690	WELD	51,740.4	11690	0.0	49.8	47.92830657	-103.75197074	2248.372						
11700	WELD	51,790.1	11700	0.0	49.5	47.92822852	-103.75213534	2250.331						
11710	WELD	51,839.6	11710	0.0	49.6	47.92815186	-103.75230026	2252.116						
11720	WELD	51,889.2	11720	0.0	49.6	47.92807553	-103.75246684	2253.234						
11730	WELD	51,938.9	11730	0.0	49.6	47.92799849	-103.75263251	2254.592						
11740	WELD	51,988.5	11740	0.0	49.3	47.92792228	-103.75279877	2256.346						
11750	WELD	52,037.8	11750	0.0	49.7	47.92784797	-103.75296537	2259.617						
11760	WELD	52,087.5	11760	0.0	49.8	47.92777419	-103.75313433	2262.901						
11770	WELD	52,137.3	11770	0.0	49.3	47.92770142	-103.75330485	2265.908						
11780	WELD	52,186.6	11780	0.0	49.9	47.92763525	-103.75347859	2269.942						
11790	WELD	52,236.5	11790	0.0	49.7	47.92757522	-103.75365966	2272.488						
11800	WELD	52,286.2	11800	0.0	31.6	47.92751841	-103.75384246	2274.933						
11000030	WT CHANGE	52,317.7	11800	0.0	0.0	47.92748384	-103.75395936	2276.540			0.322	52000	0.72	
11810	WELD	52,317.8	11810	0.0	25.2	47.92748380	-103.75395950	2276.542						

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)
11820	WELD	52,342.9	11820	0.0	42.3	47.92745771	-103.75405394	2278.020						
11830	WELD	52,385.2	11830	0.0	42.3	47.92741547	-103.75421349	2279.494						
11840	WELD	52,427.5	11840	0.0	42.3	47.92738079	-103.75437696	2281.029						
10000042	AGM 090, Sta. 525+85, CR 16 -- Han #116	52,445.5	11840	18.0	24.2	47.92736736	-103.75444742	2280.524						
11850	WELD	52,469.8	11850	0.0	42.2	47.92734676	-103.75454075	2279.255						
11860	WELD	52,511.9	11860	0.0	42.3	47.92729442	-103.75469272	2276.663						
11870	WELD	52,554.2	11870	0.0	42.2	47.92722746	-103.75483215	2275.138						
11880	WELD	52,596.4	11880	0.0	42.3	47.92716210	-103.75497349	2274.039						
11890	WELD	52,638.7	11890	0.0	42.2	47.92709729	-103.75511520	2272.504						
11900	WELD	52,680.9	11900	0.0	42.1	47.92702367	-103.75524682	2270.050						
11910	WELD	52,723.0	11910	0.0	42.2	47.92695316	-103.75538127	2266.419						
11920	WELD	52,765.3	11920	0.0	42.2	47.92688857	-103.75552321	2263.715						
11930	WELD	52,807.5	11930	0.0	42.3	47.92682668	-103.75566790	2261.449						
11940	WELD	52,849.7	11940	0.0	42.2	47.92676424	-103.75581066	2256.706						
11950	WELD	52,891.9	11950	0.0	40.8	47.92669166	-103.75594372	2255.100						
11000031	WT CHANGE	52,932.7	11950	0.0	0.0	47.92662724	-103.75607932	2255.645			0.188	52000	0.72	
11960	WELD	52,932.8	11960	0.0	30.5	47.92662718	-103.75607945	2255.644						
11970	WELD	52,963.3	11970	0.0	49.7	47.92658211	-103.75618378	2255.036						
11980	WELD	53,013.0	11980	0.0	49.6	47.92650366	-103.75634838	2253.811						
11990	WELD	53,062.6	11990	0.0	49.6	47.92642445	-103.75651230	2253.259						
12000	WELD	53,112.2	12000	0.0	49.6	47.92634584	-103.75667656	2253.152						
12010	WELD	53,161.8	12010	0.0	49.5	47.92626806	-103.75684217	2253.417						
12020	WELD	53,211.3	12020	0.0	49.4	47.92619136	-103.75700853	2253.848						
12030	WELD	53,260.8	12030	0.0	49.6	47.92611501	-103.75717454	2252.724						
12040	WELD	53,310.4	12040	0.0	49.7	47.92603803	-103.75734043	2251.749						
12050	WELD	53,360.1	12050	0.0	49.7	47.92596067	-103.75750647	2250.671						
12060	WELD	53,409.8	12060	0.0	49.6	47.92588348	-103.75767220	2248.937						
12070	WELD	53,459.4	12070	0.0	49.6	47.92580565	-103.75783717	2247.679						
12080	WELD	53,509.0	12080	0.0	49.6	47.92572644	-103.75800068	2246.302						
12090	WELD	53,558.6	12090	0.0	49.7	47.92564705	-103.75816362	2244.780						
12100	WELD	53,608.3	12100	0.0	49.6	47.92556663	-103.75832561	2242.223						
12110	WELD	53,657.9	12110	0.0	49.5	47.92548714	-103.75848780	2237.895						
12120	WELD	53,707.4	12120	0.0	49.6	47.92540771	-103.75864920	2233.491						
12130	WELD	53,757.0	12130	0.0	49.1	47.92532837	-103.75881214	2230.053						
12140	WELD	53,806.2	12140	0.0	49.5	47.92524954	-103.75897325	2227.196						
12150	WELD	53,855.6	12150	0.0	49.7	47.92517019	-103.75913584	2225.429						

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)
12160	WELD	53,905.3	12160	0.0	46.4	47.92508993	-103.75929880	2224.230							
12170	WELD	53,951.7	12170	0.0	49.4	47.92501521	-103.75945148	2223.678							
12180	WELD	54,001.1	12180	0.0	49.5	47.92493541	-103.75961332	2223.606							
12190	WELD	54,050.6	12190	0.0	49.5	47.92485644	-103.75977677	2223.914							
12200	WELD	54,100.1	12200	0.0	48.5	47.92477655	-103.75993888	2223.940							
12210	WELD	54,148.6	12210	0.0	49.6	47.92469777	-103.76009709	2223.710							
12220	WELD	54,198.2	12220	0.0	49.6	47.92461749	-103.76025978	2223.889							
12230	WELD	54,247.8	12230	0.0	49.5	47.92453971	-103.76042510	2225.441							
10000043	Bend right - 21 deg., 73D	54,279.0	12230	22.3	27.2	47.92449573	-103.76053397	2227.584	0	12:00					
12240	WELD	54,297.2	12240	0.0	49.3	47.92448229	-103.76060479	2229.547							
12250	WELD	54,346.5	12250	0.0	49.6	47.92446516	-103.76080310	2232.622							
12260	WELD	54,396.0	12260	0.0	49.6	47.92446454	-103.76100476	2232.432							
12270	WELD	54,445.6	12270	0.0	49.3	47.92446816	-103.76120609	2229.450							
12280	WELD	54,495.0	12280	0.0	49.3	47.92447021	-103.76140658	2225.871							
12290	WELD	54,544.3	12290	0.0	49.6	47.92447091	-103.76160675	2222.897							
12300	WELD	54,593.9	12300	0.0	49.3	47.92447170	-103.76180860	2225.092							
12310	WELD	54,643.2	12310	0.0	49.7	47.92447440	-103.76200869	2228.316							
12320	WELD	54,692.9	12320	0.0	43.6	47.92447540	-103.76221020	2231.711							
12330	WELD	54,736.4	12330	0.0	6.3	47.92447280	-103.76238690	2232.839							
12340	WELD	54,742.7	12340	0.0	49.2	47.92447259	-103.76241222	2233.012							
12350	WELD	54,791.9	12350	0.0	49.6	47.92447424	-103.76261251	2233.497							
12360	WELD	54,841.5	12360	0.0	49.6	47.92447829	-103.76281410	2233.425							
12370	WELD	54,891.1	12370	0.0	49.4	47.92448099	-103.76301576	2233.843							
12380	WELD	54,940.5	12380	0.0	49.4	47.92448276	-103.76321674	2234.708							
12390	WELD	54,989.9	12390	0.0	49.7	47.92448307	-103.76341764	2234.435							
12400	WELD	55,039.6	12400	0.0	49.7	47.92448311	-103.76361935	2233.132							
12410	WELD	55,089.3	12410	0.0	49.7	47.92448414	-103.76382101	2232.069							
12420	WELD	55,139.0	12420	0.0	49.7	47.92448644	-103.76402274	2231.536							
12430	WELD	55,188.7	12430	0.0	49.7	47.92448875	-103.76422421	2230.953							
12440	WELD	55,238.3	12440	0.0	49.7	47.92449108	-103.76442587	2230.710							
12450	WELD	55,288.1	12450	0.0	49.8	47.92449134	-103.76462764	2230.894							
12460	WELD	55,337.8	12460	0.0	49.8	47.92448920	-103.76482994	2231.801							
12470	WELD	55,387.6	12470	0.0	49.6	47.92448642	-103.76503169	2234.149							
12480	WELD	55,437.3	12480	0.0	49.6	47.92448569	-103.76523366	2234.660							
12490	WELD	55,486.9	12490	0.0	49.3	47.92448441	-103.76543531	2235.906							
12500	WELD	55,536.2	12500	0.0	49.6	47.92448475	-103.76563602	2236.537							
12510	WELD	55,585.8	12510	0.0	49.6	47.92448652	-103.76583766	2236.512							

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)
12520	WELD	55,635.4	12520	0.0	49.3	47.92448827	-103.76603932	2236.077						
12530	WELD	55,684.7	12530	0.0	49.3	47.92448917	-103.76623961	2237.692						
12540	WELD	55,734.0	12540	0.0	49.6	47.92449015	-103.76643995	2239.288						
12550	WELD	55,783.5	12550	0.0	49.5	47.92449036	-103.76664147	2240.752						
12560	WELD	55,833.1	12560	0.0	49.3	47.92448950	-103.76684307	2242.032						
12570	WELD	55,882.4	12570	0.0	49.7	47.92448886	-103.76704375	2242.754						
12580	WELD	55,932.0	12580	0.0	49.7	47.92448999	-103.76724563	2242.312						
12590	WELD	55,981.7	12590	0.0	49.7	47.92449099	-103.76744743	2242.611						
12600	WELD	56,031.4	12600	0.0	49.4	47.92449176	-103.76764930	2244.008						
12610	WELD	56,080.8	12610	0.0	49.5	47.92449340	-103.76785008	2242.443						
12620	WELD	56,130.3	12620	0.0	48.7	47.92449460	-103.76805104	2239.132						
12630	WELD	56,179.0	12630	0.0	49.6	47.92449509	-103.76824909	2238.971						
12640	WELD	56,228.6	12640	0.0	49.7	47.92449558	-103.76845066	2240.671						
12650	WELD	56,278.3	12650	0.0	49.6	47.92449569	-103.76865216	2244.267						
12660	WELD	56,327.8	12660	0.0	48.7	47.92449498	-103.76885341	2247.778						
12670	WELD	56,376.5	12670	0.0	49.5	47.92449465	-103.76905100	2248.554						
12680	WELD	56,426.0	12680	0.0	49.7	47.92449486	-103.76925163	2246.911						
12690	WELD	56,475.7	12690	0.0	49.6	47.92449536	-103.76945306	2243.323						
12700	WELD	56,525.3	12700	0.0	49.5	47.92449580	-103.76965447	2239.896						
12710	WELD	56,574.8	12710	0.0	49.7	47.92449747	-103.76985525	2237.604						
12720	WELD	56,624.5	12720	0.0	49.5	47.92449886	-103.77005748	2238.012						
12730	WELD	56,673.9	12730	0.0	49.6	47.92450025	-103.77025834	2240.087						
12740	WELD	56,723.6	12740	0.0	49.3	47.92450069	-103.77045970	2243.079						
12750	WELD	56,772.8	12750	0.0	49.7	47.92450179	-103.77065904	2247.522						
12760	WELD	56,822.5	12760	0.0	49.7	47.92450250	-103.77085969	2252.700						
12770	WELD	56,872.2	12770	0.0	47.5	47.92450502	-103.77106080	2256.907						
12780	WELD	56,919.7	12780	0.0	6.3	47.92450572	-103.77125334	2259.290						
12790	WELD	56,925.9	12790	0.0	45.4	47.92450513	-103.77127879	2259.417						
12800	WELD	56,971.4	12800	0.0	47.8	47.92450096	-103.77146372	2260.409						
12810	WELD	57,019.2	12810	0.0	49.5	47.92450146	-103.77165828	2261.393						
12820	WELD	57,068.7	12820	0.0	45.7	47.92450447	-103.77185981	2262.170						
12830	WELD	57,114.5	12830	0.0	49.3	47.92450620	-103.77204577	2262.536						
12840	WELD	57,163.8	12840	0.0	49.2	47.92450784	-103.77224594	2263.238						
12850	WELD	57,213.0	12850	0.0	49.6	47.92451000	-103.77244596	2264.395						
12860	WELD	57,262.6	12860	0.0	49.6	47.92451181	-103.77264740	2266.085						
12870	WELD	57,312.2	12870	0.0	49.7	47.92451402	-103.77284881	2267.428						
12880	WELD	57,361.9	12880	0.0	49.2	47.92451632	-103.77305058	2267.858						

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)
12890	WELD	57,411.1	12890	0.0	49.6	47.92451776	-103.77325046	2267.354						
12900	WELD	57,460.7	12900	0.0	49.5	47.92451954	-103.77345224	2267.575						
12910	WELD	57,510.2	12910	0.0	49.5	47.92452024	-103.77365383	2266.732						
12920	WELD	57,559.7	12920	0.0	49.6	47.92452175	-103.77385549	2266.713						
12930	WELD	57,609.3	12930	0.0	49.6	47.92452376	-103.77405689	2265.728						
12940	WELD	57,658.9	12940	0.0	49.6	47.92452671	-103.77425853	2264.229						
12950	WELD	57,708.5	12950	0.0	49.7	47.92452793	-103.77446030	2263.884						
12960	WELD	57,758.2	12960	0.0	49.0	47.92452843	-103.77466212	2265.690						
12970	WELD	57,807.2	12970	0.0	49.6	47.92452885	-103.77486184	2267.228						
12980	WELD	57,856.8	12980	0.0	49.6	47.92452951	-103.77506350	2267.700						
12990	WELD	57,906.5	12990	0.0	49.7	47.92452729	-103.77526546	2267.679						
13000	WELD	57,956.1	13000	0.0	49.6	47.92452501	-103.77546715	2265.679						
13010	WELD	58,005.8	13010	0.0	14.5	47.92452406	-103.77566896	2263.416						
11000032	WT CHANGE	58,020.3	13010	0.0	0.0	47.92452412	-103.77572769	2262.504			0.322	52000	0.72	
13020	WELD	58,020.3	13020	0.0	40.3	47.92452412	-103.77572789	2262.501						
13030	WELD	58,060.6	13030	0.0	42.2	47.92452338	-103.77589162	2260.960						
13040	WELD	58,102.8	13040	0.0	42.2	47.92452044	-103.77606318	2259.607						
13050	WELD	58,145.0	13050	0.0	42.2	47.92451804	-103.77623457	2259.661						
13060	WELD	58,187.2	13060	0.0	42.2	47.92451785	-103.77640608	2261.719						
13070	WELD	58,229.4	13070	0.0	42.2	47.92451674	-103.77657752	2262.281						
13080	WELD	58,271.7	13080	0.0	42.2	47.92451339	-103.77674914	2261.599						
13090	WELD	58,313.9	13090	0.0	42.2	47.92451232	-103.77692112	2261.243						
10000044	AGM 100, Sta. 584+49, 149th Ave NW -- Han #142	58,348.1	13090	34.2	8.0	47.92451322	-103.77706022	2260.847						
13100	WELD	58,356.1	13100	0.0	42.3	47.92451364	-103.77709272	2260.866						
13110	WELD	58,398.4	13110	0.0	42.3	47.92451532	-103.77726475	2261.312						
13120	WELD	58,440.7	13120	0.0	42.3	47.92451614	-103.77743653	2260.150						
13130	WELD	58,482.9	13130	0.0	42.3	47.92451559	-103.77760819	2260.671						
13140	WELD	58,525.2	13140	0.0	42.3	47.92451261	-103.77778016	2262.056						
13150	WELD	58,567.5	13150	0.0	40.6	47.92451061	-103.77795203	2262.049						
11000033	WT CHANGE	58,608.1	13150	0.0	0.0	47.92450943	-103.77811719	2262.614			0.188	52000	0.72	
13160	WELD	58,608.1	13160	0.0	49.3	47.92450943	-103.77811732	2262.614						
13170	WELD	58,657.4	13170	0.0	49.6	47.92450849	-103.77831788	2261.033						
13180	WELD	58,707.0	13180	0.0	49.3	47.92450751	-103.77851972	2260.383						
13190	WELD	58,756.3	13190	0.0	49.6	47.92450854	-103.77872072	2259.520						
13200	WELD	58,806.0	13200	0.0	49.7	47.92450937	-103.77892296	2259.382						

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)
13210	WELD	58,855.7	13210	0.0	49.4	47.92450902	-103.77912512	2258.484						
13220	WELD	58,905.0	13220	0.0	49.5	47.92450783	-103.77932632	2257.252						
13230	WELD	58,954.5	13230	0.0	49.4	47.92450596	-103.77952792	2255.857						
13240	WELD	59,003.9	13240	0.0	49.4	47.92450357	-103.77972875	2252.503						
13250	WELD	59,053.3	13250	0.0	49.4	47.92450167	-103.77992905	2247.775						
13260	WELD	59,102.7	13260	0.0	49.5	47.92449958	-103.78012969	2243.434						
13270	WELD	59,152.2	13270	0.0	48.7	47.92449748	-103.78033126	2241.760						
13280	WELD	59,200.9	13280	0.0	49.4	47.92449673	-103.78052973	2241.154						
13290	WELD	59,250.3	13290	0.0	49.4	47.92449600	-103.78073100	2242.476						
13300	WELD	59,299.7	13300	0.0	48.7	47.92449532	-103.78093232	2243.181						
13310	WELD	59,348.5	13310	0.0	30.5	47.92449437	-103.78113094	2241.428						
11000034	WT CHANGE	59,378.9	13310	0.0	0.0	47.92449395	-103.78125486	2240.251			0.322	52000	0.72	
13320	WELD	59,378.9	13320	0.0	42.2	47.92449395	-103.78125498	2240.251						
13330	WELD	59,421.1	13330	0.0	42.2	47.92449347	-103.78142639	2236.935						
13340	WELD	59,463.3	13340	0.0	42.2	47.92449531	-103.78159704	2231.550						
13350	WELD	59,505.5	13350	0.0	39.4	47.92449547	-103.78176862	2230.706						
13360	WELD	59,544.9	13360	0.0	42.2	47.92449200	-103.78192902	2232.173						
13370	WELD	59,587.1	13370	0.0	12.5	47.92449092	-103.78210060	2233.911						
11000035	WT CHANGE	59,599.6	13370	0.0	0.0	47.92449112	-103.78215156	2233.666			0.188	52000	0.72	
13380	WELD	59,599.6	13380	0.0	8.9	47.92449112	-103.78215168	2233.665						
13390	WELD	59,608.5	13390	0.0	5.5	47.92449136	-103.78218796	2233.491						
13400	WELD	59,614.0	13400	0.0	38.3	47.92449146	-103.78221006	2233.436						
13410	WELD	59,652.2	13410	0.0	49.7	47.92449211	-103.78236619	2233.146						
13420	WELD	59,701.9	13420	0.0	49.7	47.92449252	-103.78256831	2229.689						
13430	WELD	59,751.6	13430	0.0	49.7	47.92449323	-103.78277056	2225.952						
13440	WELD	59,801.3	13440	0.0	49.6	47.92449259	-103.78297257	2223.187						
13450	WELD	59,850.9	13450	0.0	49.3	47.92449134	-103.78317456	2222.736						
13460	WELD	59,900.2	13460	0.0	49.6	47.92449038	-103.78337530	2222.180						
13470	WELD	59,949.8	13470	0.0	14.1	47.92448986	-103.78357748	2221.672						
13480	WELD	59,963.9	13480	0.0	2.6	47.92448958	-103.78363476	2220.951						
13490	WELD	59,966.5	13490	0.0	12.5	47.92448956	-103.78364537	2220.806						
10000045	Bend left - 90 deg., 9D	59,972.9	13490	1.3	11.3	47.92448423	-103.78366959	2220.333	0 12:00					
13500	WELD	59,979.1	13500	0.0	34.6	47.92446845	-103.78367680	2219.822						
13510	WELD	60,013.7	13510	0.0	42.8	47.92437316	-103.78367820	2218.550						
13520	WELD	60,056.4	13520	0.0	44.1	47.92425601	-103.78367790	2220.158						
11000036	WT CHANGE	60,100.5	13520	0.0	0.0	47.92413504	-103.78367660	2221.092			0.322	52000	0.72	
13530	WELD	60,100.5	13530	0.0	3.7	47.92413496	-103.78367660	2221.092						

Pipeline Listing

TDW Services, Inc.

Hiland Crude, LLC

Camp Creek to Dore Junction

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)
13540	WELD	60,104.2	13540	0.0	1.6	47.92412502	-103.78367650	2221.104							
10000046	Bend up - 45 deg., 3D	60,104.9	13540	0.1	1.4	47.92412300	-103.78367650	2221.248	0	12:00					
13550	WELD	60,105.7	13550	0.0	6.8	47.92412118	-103.78367640	2221.616							
13560	WELD	60,112.5	13560	0.0	10.0	47.92410832	-103.78367612	2226.318							
13570	WELD	60,122.6	13570	0.0	1.6	47.92408830	-103.78366918	2232.922							
10000047	Bend down - 45 deg., 3D	60,123.4	13570	0.1	1.5	47.92408636	-103.78366811	2233.305	0	12:00					
13580	WELD	60,124.2	13580	0.0	1.0	47.92408414	-103.78366698	2233.459							
10000048	Flange	60,124.6	13580	0.5	0.6	47.92408298	-103.78366639	2233.470	0	12:00					
13590	WELD	60,125.2	13590	0.0	1.1	47.92408147	-103.78366555	2233.428							
10000049	Tee at 90 deg.	60,125.7	13590	0.2	0.9	47.92407993	-103.78366473	2233.384	80	2:30					
13600	WELD	60,126.3	13600	0.0	1.3	47.92407811	-103.78366381	2233.332							
10000050	Pipe Support	60,126.9	13600	0.5	0.8	47.92407637	-103.78366292	2233.283							
10000051	Fitting on top of pipe	60,127.2	13600	0.9	0.4	47.92407537	-103.78366241	2233.255	349	11:30					
13610	WELD	60,127.6	13610	0.0	3.3	47.92407438	-103.78366189	2233.228							
10000052	Flange	60,128.1	13610	0.6	2.7	47.92407302	-103.78366115	2233.191	0	12:00					
10000053	Valve (Receiver) AGM 110, Sta. 602+13, Dore Junction	60,129.4	13610	1.8	1.5	47.92406974	-103.78365942	2233.114							
10000054	Flange	60,130.4	13610	2.9	0.4	47.92407003	-103.78365955	2233.111	0	12:00					
13620	WELD	60,130.8	13620	0.0	-	47.92407003	-103.78365955	2233.111							
12000001	End Run Tickle	60,168.0	13620	37.2	-	47.92407003	-103.78365955	2233.111							

Type	Number
DEFORMATION	0
GAINS	0
GROUPED PITS	0
LOCATIONS	55
MISC	2
WT CHANGES	37
WELDS	1352

Criteria: ASME B31G: Modified

General Inline Inspection Terms

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.

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.

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.

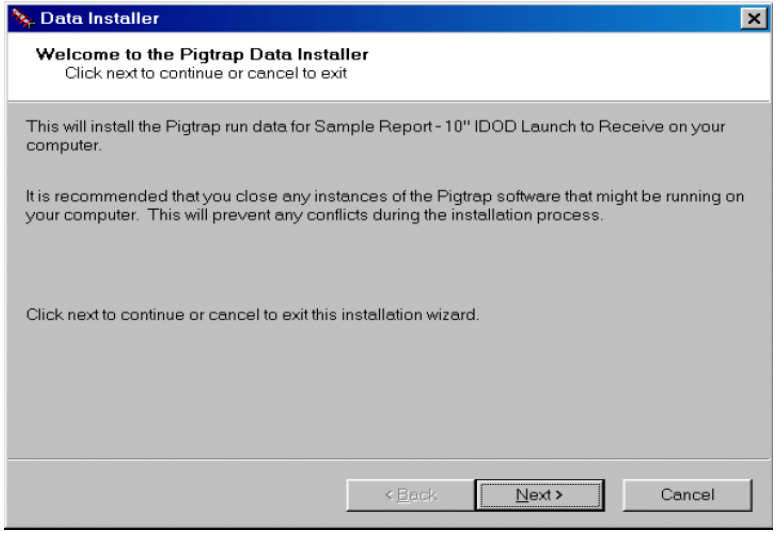
- Database – .MBD (Microsoft Data Base) Files of this type may be viewed through Microsoft Access. This file contains the analysis of the inspection.
- .rsf – This is a PigTrap™ reference file which holds specific settings for the run to be viewed.
- Spreadsheet – .XLS (Microsoft Excel) A Pipeline Listing 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.

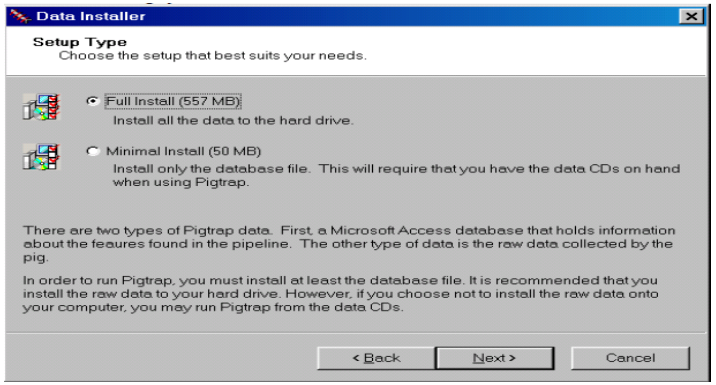


Note: If you want to install only the Pigtrap™ software and not the run data (advanced users only), choose Cancel and go to the Pigtrap™ Installation steps on page 3.

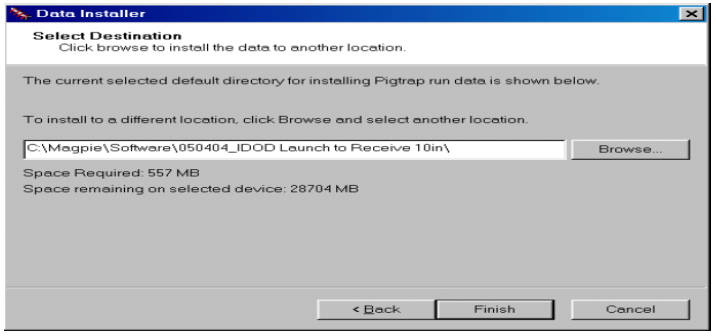
3. Click Next to continue installing the run data.

Appendix B

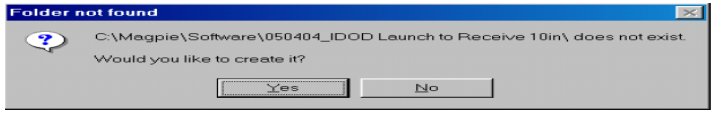
4. Choose the type of install you would like to perform: Full Install (recommended) or Minimal Install. The size of the installation is shown next to each type of installation. The database file must be installed for PigTrap™ to operate properly, but you may choose to not install the raw data. If you 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.



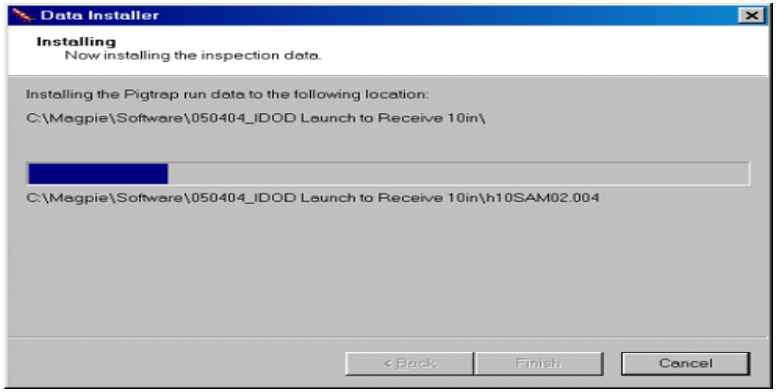
5. Choose the installation location on your computer for the data files. The default and recommended location is C:\Magpie\Software. The location inside this folder is based on the trap date, name, and size of the run. If you would like to specify another location, click the Browse... button. Click Finish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



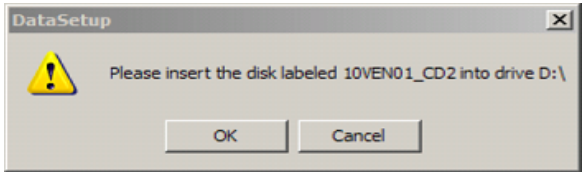
6. If the installation folder does not already exist, then you will be prompted to create it. Click Yes to create the new folder.



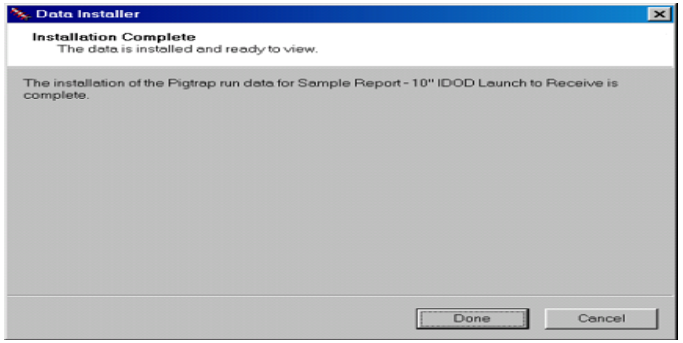
7. The following progress bar will appear. There may be a short delay while the database is being copied. Be patient, this is normal.



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.



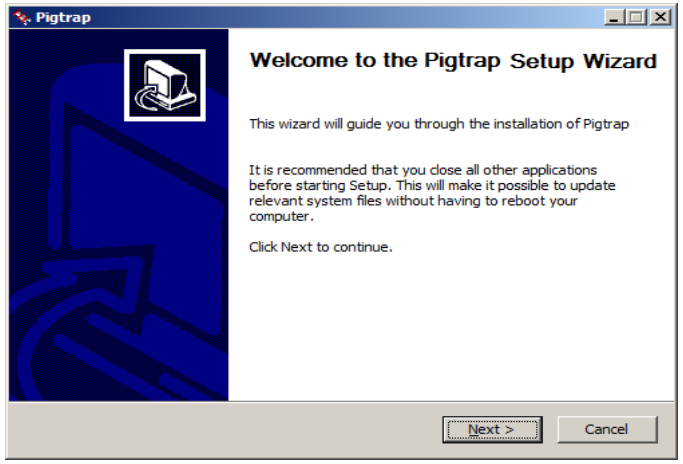
10. After clicking Done in the Data Installer PigTrap™ Installation will automatically launch.

Appendix B

PigTrap™ Installation

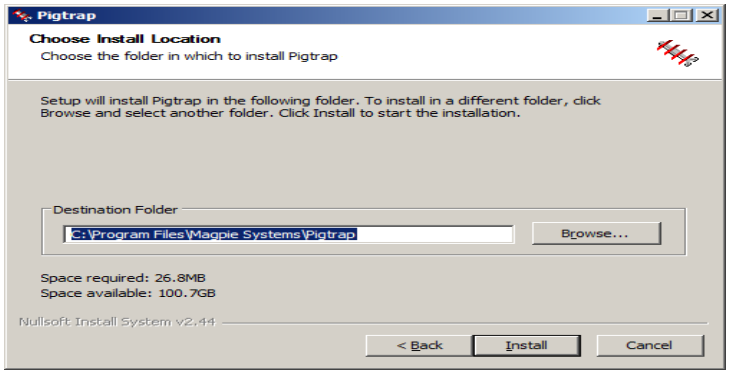
Note: CD and DVDs follow a slightly different installation process. Steps 1 and 2 are for external drives, if you are installing from CDs or DVDs please skip to step 3.

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.

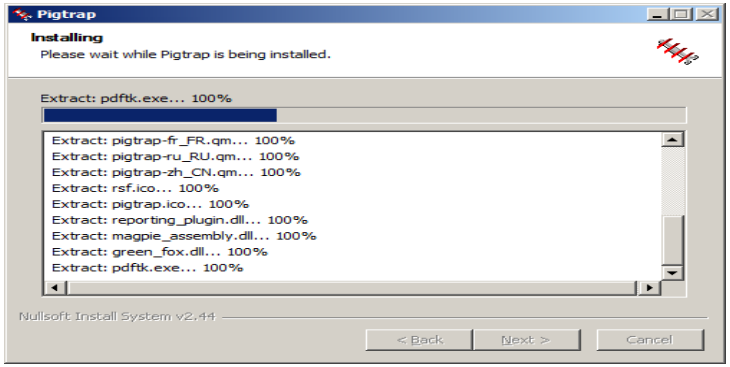


4. The Software License Agreement will appear. Read the agreement select I Agree to continue. You must accept the agreement to install PigTrap™.

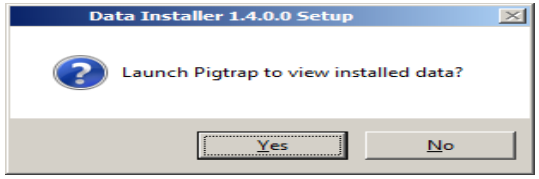
5. Choose the installation location on your computer for the PigTrap™ software. The default and recommended location is C:\Magpie\Software. Click Install to continue.



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.



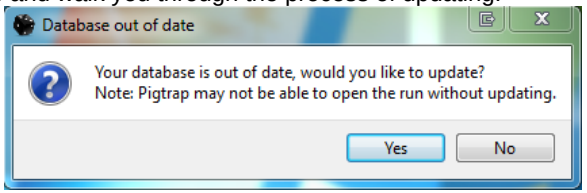
Appendix B

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.

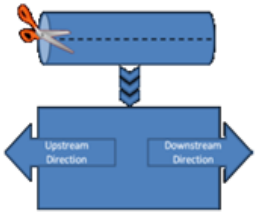
PigTrap™ was designed so you would have the ability to review previous TDW/Magpie inspection data when needed. However, you may need to acquire an updated Microsoft Access Data-base from one of our TDW representatives. When opening previous data in PigTrap™ you may encounter the message, "Your database 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.

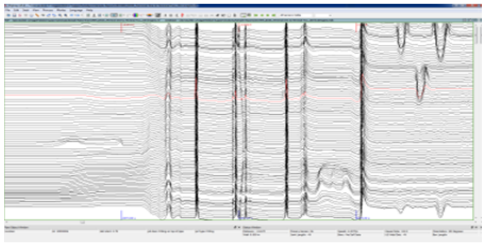


We packed so much into the new PigTrap™ the older reference files just couldn't hold it all so a new one may need to be created. Once the new reference file finishes, you will be able to freely navigate around in PigTrap™.

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

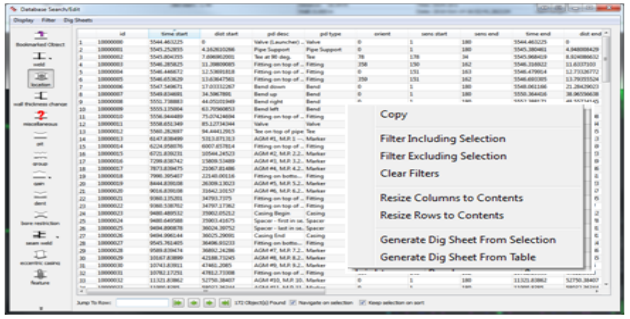
The horizontal scrollbar at the bottom of the main view moves the view upstream or downstream. Clicking on the left arrow moves upstream while clicking on the right arrow moves downstream.

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.

Sensor Buttons
Grayscale Backdrop
Color Backdrop
Thermal Backdrop
Sensor Trace
Odometer Buttons
Tool Speed Trace
IDOD Buttons
IDOD Backdrop
IDOD Trace
INS Buttons
Pitch/Yaw Bends
Raw INS Trace
Marker Trips
Weld Trace
Welds
Locations
Wall Thickness
Miscellaneous
Pits
Groups
Gains
Dents
Bore Restrictions
Seam Welds
Spiral Welds
Eccentric Casings
Bookmarks
Calibration event

Main

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

Open
Save
Open Database
Run Settings
Jump to Time
Jump to Distance
Find (DSE)
Undo Last View
Redo Last View
Zoom out
Zoom in
Auto Scroll u/s
Auto Scroll d/s

Database Navigation

These buttons navigate to features listed in the DSE.

Find by Time
Find by List
Jump to First
Jump to Previous
Jump to Next
Jump to Last

Sensor Visibility

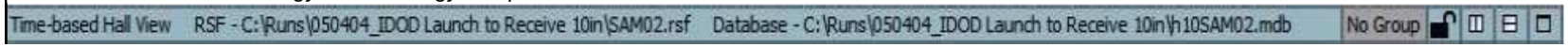
PigTrap™ allows user to zoom in on specific set of sensors, this dialog will display what sensors are currently being viewed. To return to viewing all sensors simply zoom out (-).

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.



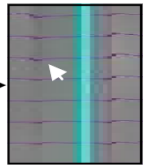
Display view
Technology
View Specifics
RSF Path
Database Path
Grouped Views
Lock View
Split Horizontal
Split Vertical
Maximize

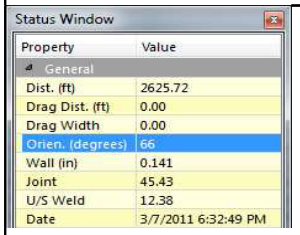
Displayed Information and Shortcuts

Pipe Object and Status Windows

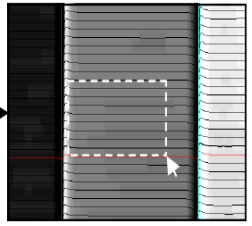
The Pipe Object and Status Windows will be defaulted to the right side of PigTrap™. Both windows can be docked and undocked by double clicking the title bar, left clicking and dragging or clicking the undock button located in the top right corner. As PigTrap™ has the ability to display multiple datasets 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.

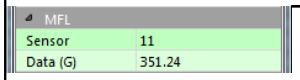
The pipe object window will display information about a highlighted feature, such as a weld, providing the weld ID and Distance. Features are highlighted when the cursor is placed upstream of an object and the object becomes highlighted with a teal color.



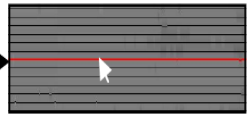


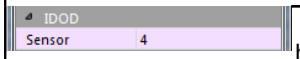
The General section of the Status Window will display information pertaining to all datasets. The information is dependent on the cursor location, displaying the current distance, orientation, wall thickness, joint length, up stream weld and date and time. The drag distance and drag width is populated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



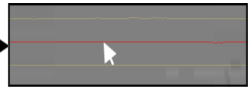


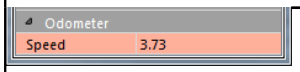
The MFL window will display information for the current highlighted sensor. The highlighted sensor will be a red line over the entire sensor. These sensors can be turned on and off using the Esc key.



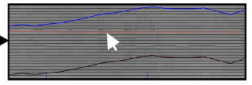


The IDOD window will display information for the current highlighted IDOD sensor. The IDOD sensors can be turned on by pressing the tilde (~) key.





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



Status Bar

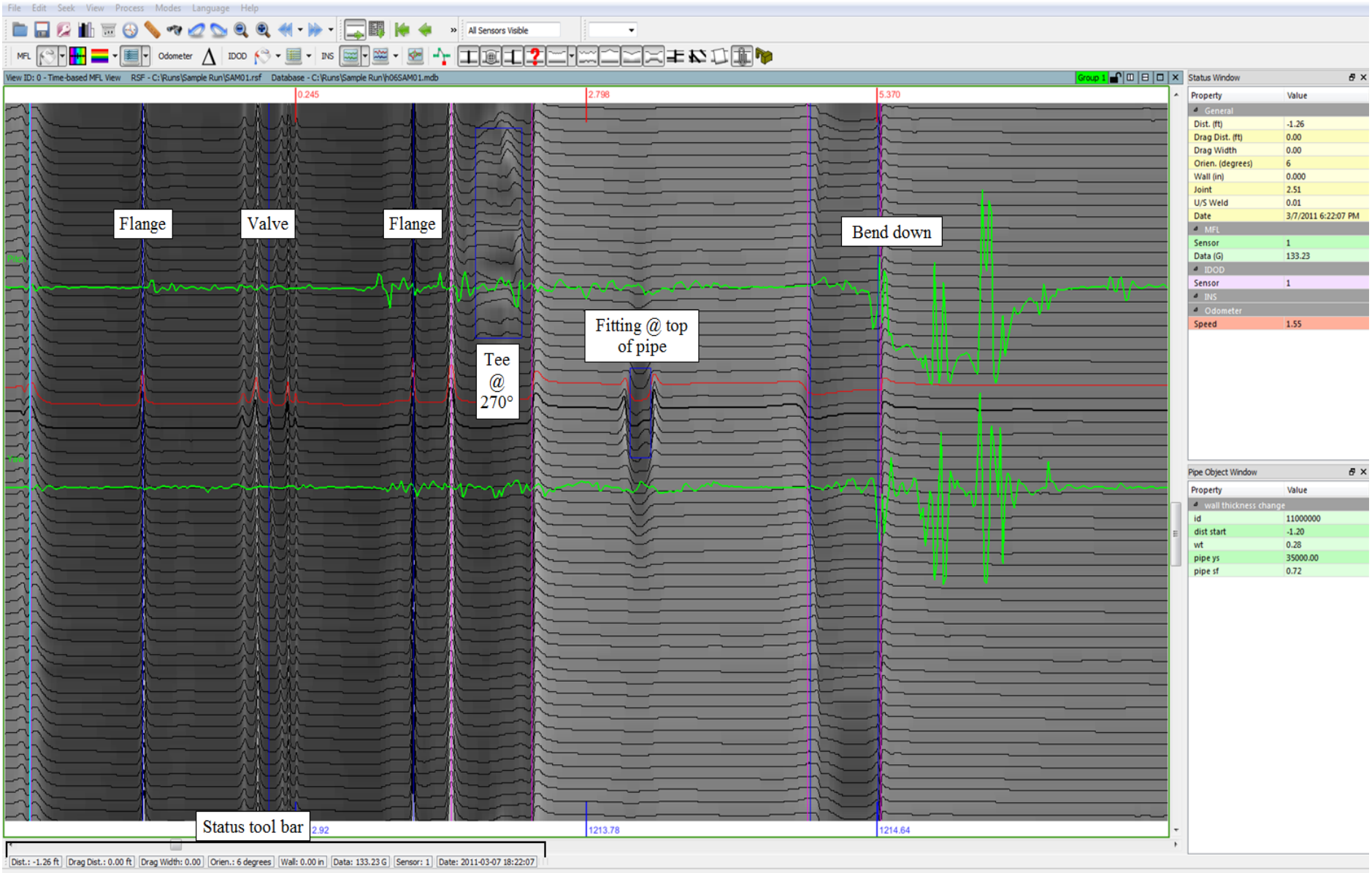
The Status Bar is located at the bottom left of PigTrap™ and contains much of the same information as the General section of the Status Window. It can also be customized by right clicking and selecting what information to display. The order can also be adjusted by clicking and dragging a section above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

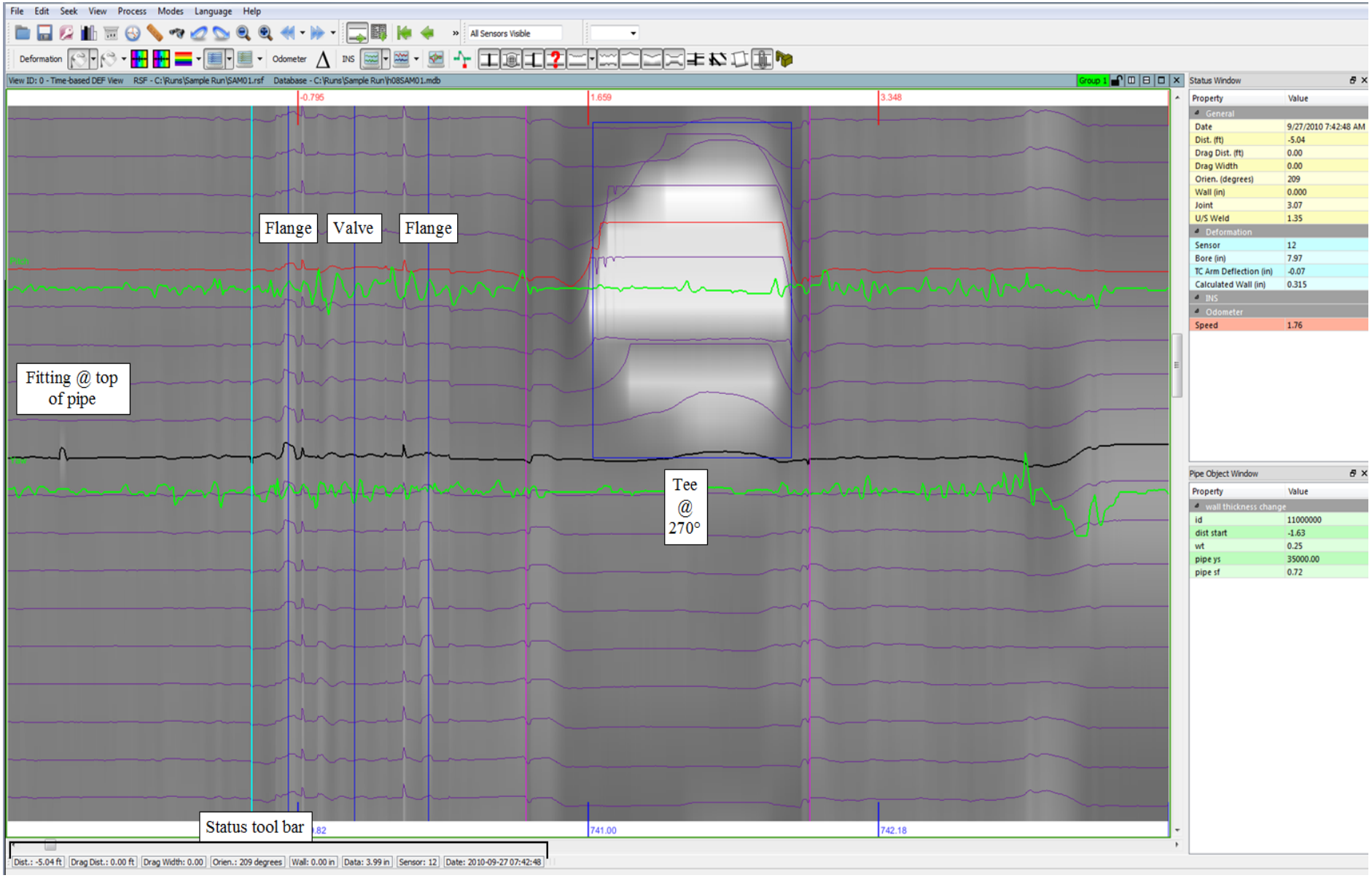
Appendix B

PigTrap™ MFL Runs



Appendix B

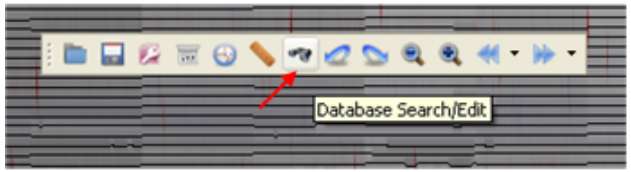
PigTrap™ DEF Runs



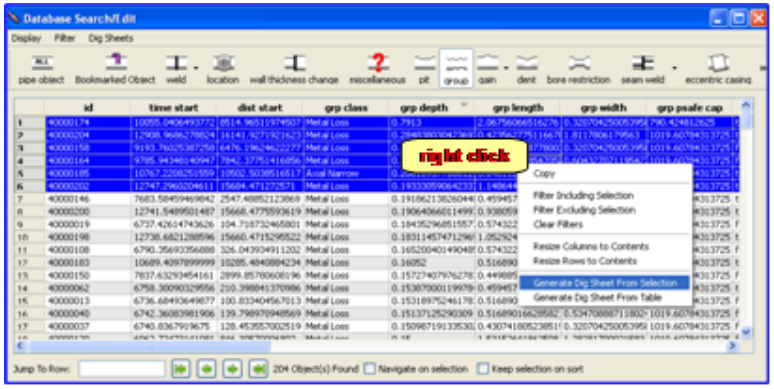
The user can view and print dig sheets for any anomaly or feature detected in the pipeline including Metal Loss (Groups or Pits), Dents, Locations, Gains, Wall Thickness changes, Welds, Miscellaneous notes, etc.

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.