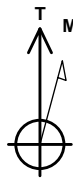


WHITING PETROLEUM CORPORATION

Project: Weld County, CO  
Site: Horsetail #07F PAD  
Well: 1808  
Wellbore: OH  
Design: OH



Azimuths to True North  
Magnetic North: 7.58°  
  
Magnetic Field  
Strength: 52901.5snT  
Dip Angle: 67.35°  
Date: 3/4/2016  
Model: HDGM



LINE CALLS  
SHL: 2549' FNL, 2329' FWL  
Sec 7-T10N-R57W  
  
PBHL: 100' FSL, 2434' FWL  
Sec 18-T10N-R57W  
  
BHL: 48' FSL, 2450' FWL  
Sec 18-T10N-R57W

PROJECT DETAILS: Weld County, CO  
  
Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Colorado Northern Zone  
Datum: GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)

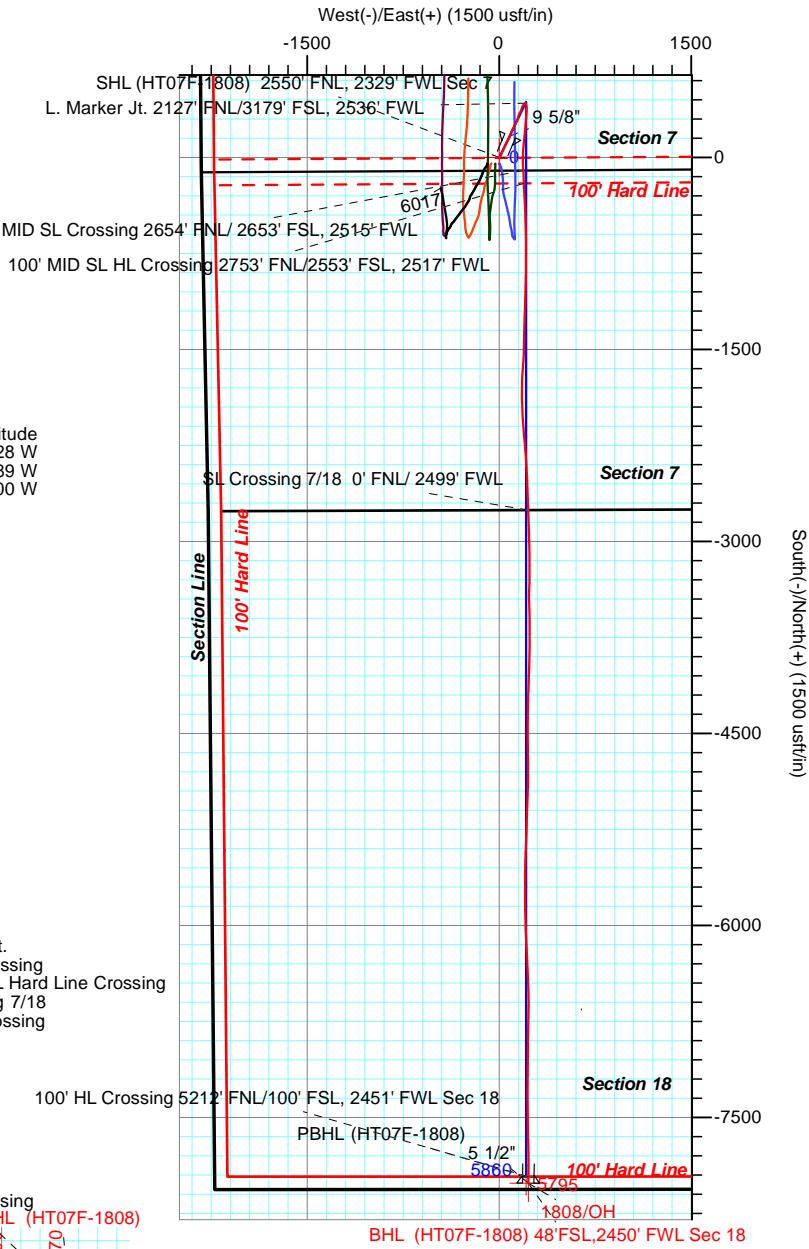
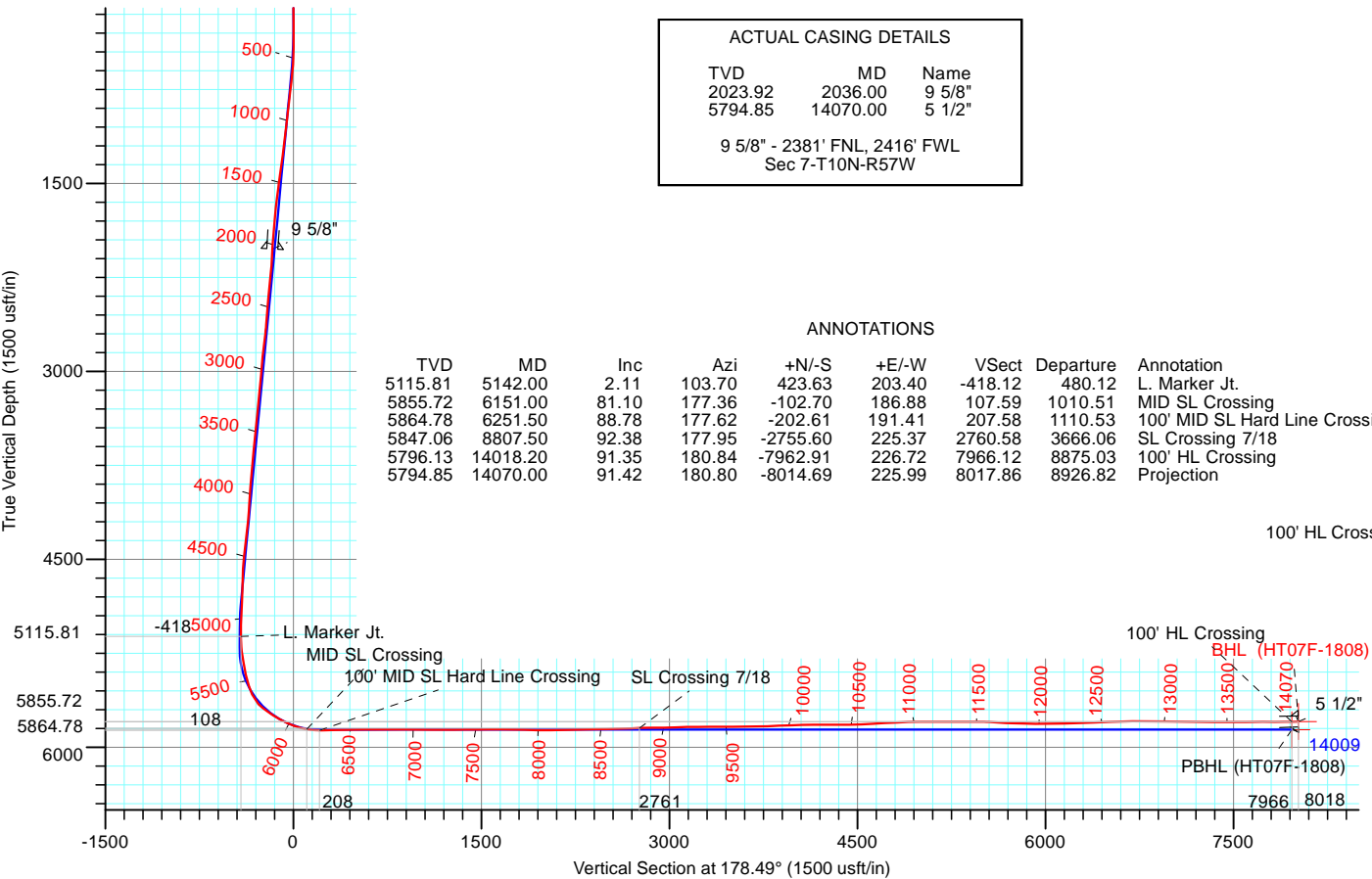
DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL (HT07F-1808)	0.00	0.00	0.00	1558396.15	3471481.48	40° 51' 13.449 N	103° 47' 44.228 W
BHL (HT07F-1808)	5794.85	-8014.69	225.99	1550387.28	3471861.47	40° 49' 54.258 N	103° 47' 41.289 W
PBHL (HT07F-1808)	5860.00	-7962.71	209.77	1550438.94	3471844.25	40° 49' 54.772 N	103° 47' 41.500 W

ACTUAL CASING DETAILS  
  
TVD MD Name  
2023.92 2036.00 9 5/8"  
5794.85 14070.00 5 1/2"  
  
9 5/8" - 2381' FNL, 2416' FWL  
Sec 7-T10N-R57W

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
5115.81	5142.00	2.11	103.70	423.63	203.40	-418.12	480.12	L. Marker Jt.
5855.72	6151.00	81.10	177.36	-102.70	186.88	107.59	1010.51	MID SL Crossing
5864.78	6251.50	88.78	177.62	-202.61	191.41	207.58	1110.53	100' MID SL Hard Line Crossing
5847.06	8807.50	92.38	177.95	-2755.60	225.37	2760.58	3666.06	SL Crossing 7/18
5796.13	14018.20	91.35	180.84	-7962.91	226.72	7966.12	8875.03	100' HL Crossing
5794.85	14070.00	91.42	180.80	-8014.69	225.99	8017.86	8926.82	Projection



LEAM DRILLING SYSTEMS LLC  
2010 East Davis, Conroe, Texas 77301  
Phone: 936/756-7577, Fax: 936/756-7595

Design: OH (1808/OH)  
Horsetail #07F PAD  
Created By: Nora Tucker  
Date: 17:21, June 23 2016  
Approved: \_\_\_\_\_  
Date: \_\_\_\_\_

# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

<b>Project</b>	Weld County, CO,		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site	Horsetail #07F PAD				
Site Position:		Northing:	1,558,346.52 usft	Latitude:	40° 51' 12.971 N
From:	Map	Easting:	3,471,420.73 usft	Longitude:	103° 47' 45.031 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.10 °

Well	1808					
Well Position	+N/-S	0.00 usft	Northing:	1,558,396.15 usft	Latitude:	40° 51' 13.449 N
	+E/-W	0.00 usft	Easting:	3,471,481.48 usft	Longitude:	103° 47' 44.228 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	4,898.80 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	3/4/2016	7.58	67.35	52,902

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	178.49	

<b>Survey Program</b>	<b>Date</b>	6/23/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
232.00	14,023.00	Survey #1 (OH)	MWD+IFR1+MS+sag	Fixed:v2:crustal dec & 3-axis correction + sag	
14,070.00	14,070.00	Survey #2 (OH)	Project	Projection	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
232.00	0.97	148.28	231.99	-1.67	1.03	1.70	0.42	0.42	0.00	
323.00	0.63	156.90	322.98	-2.79	1.63	2.83	0.40	-0.37	9.47	
414.00	1.05	40.62	413.97	-2.61	2.37	2.67	1.59	0.46	-127.78	
506.00	3.04	24.20	505.91	0.25	3.92	-0.15	2.23	2.16	-17.85	
598.00	5.34	22.10	597.66	6.44	6.53	-6.27	2.51	2.50	-2.28	
690.00	7.30	25.05	689.10	15.71	10.62	-15.42	2.16	2.13	3.21	
781.00	7.54	24.59	779.33	26.37	15.55	-25.95	0.27	0.26	-0.51	
873.00	7.65	24.14	870.53	37.45	20.57	-36.90	0.14	0.12	-0.49	
964.00	7.31	25.40	960.75	48.21	25.53	-47.52	0.41	-0.37	1.38	

# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,056.00	7.10	25.00	1,052.03	58.65	30.44	-57.83	0.23	-0.23	-0.43
1,148.00	7.66	24.06	1,143.26	69.40	35.34	-68.44	0.62	0.61	-1.02
1,239.00	7.91	25.05	1,233.43	80.61	40.47	-79.52	0.31	0.27	1.09
1,331.00	8.46	24.48	1,324.49	92.50	45.95	-91.26	0.60	0.60	-0.62
1,423.00	8.77	26.48	1,415.45	104.94	51.88	-103.54	0.47	0.34	2.17
1,515.00	9.28	26.75	1,506.31	117.84	58.35	-116.26	0.56	0.55	0.29
1,606.00	7.76	29.11	1,596.30	129.76	64.64	-128.02	1.71	-1.67	2.59
1,697.00	7.71	30.42	1,686.48	140.40	70.72	-138.48	0.20	-0.05	1.44
1,790.00	5.82	29.40	1,778.82	149.88	76.19	-147.82	2.04	-2.03	-1.10
1,881.00	5.14	22.81	1,869.41	157.66	80.04	-155.50	1.02	-0.75	-7.24
1,975.00	4.38	22.96	1,963.08	164.85	83.07	-162.60	0.81	-0.81	0.16
2,036.00	4.08	22.92	2,023.92	168.99	84.83	-166.70	0.49	-0.49	-0.07
9 5/8"									
2,060.00	3.96	22.90	2,047.86	170.54	85.48	-168.23	0.49	-0.49	-0.08
2,123.00	3.79	19.84	2,110.71	174.50	87.03	-172.15	0.42	-0.27	-4.86
2,218.00	5.33	16.21	2,205.41	181.69	89.33	-179.28	1.65	1.62	-3.82
2,312.00	5.92	14.49	2,298.96	190.58	91.76	-188.09	0.65	0.63	-1.83
2,407.00	6.03	25.02	2,393.45	199.84	95.10	-197.27	1.16	0.12	11.08
2,525.00	4.96	23.76	2,510.90	210.13	99.78	-207.43	0.91	-0.91	-1.07
2,618.00	4.51	20.35	2,603.58	217.24	102.67	-214.46	0.57	-0.48	-3.67
2,713.00	7.60	29.26	2,698.04	226.22	107.04	-223.32	3.39	3.25	9.38
2,807.00	7.91	28.80	2,791.18	237.31	113.19	-234.25	0.34	0.33	-0.49
2,902.00	7.18	26.74	2,885.36	248.34	119.01	-245.12	0.82	-0.77	-2.17
2,996.00	6.29	26.15	2,978.71	258.21	123.93	-254.86	0.95	-0.95	-0.63
3,091.00	5.55	25.70	3,073.20	267.02	128.21	-263.55	0.78	-0.78	-0.47
3,185.00	4.82	26.14	3,166.82	274.66	131.92	-271.09	0.78	-0.78	0.47
3,280.00	6.29	27.29	3,261.37	282.87	136.07	-279.19	1.55	1.55	1.21
3,374.00	5.94	22.90	3,354.84	291.93	140.32	-288.13	0.62	-0.37	-4.67
3,468.00	5.72	17.57	3,448.35	300.88	143.63	-296.99	0.62	-0.23	-5.67
3,563.00	6.10	14.93	3,542.85	310.27	146.36	-306.30	0.49	0.40	-2.78
3,658.00	5.98	11.90	3,637.32	319.99	148.68	-315.96	0.36	-0.13	-3.19
3,752.00	6.60	20.83	3,730.75	329.83	151.61	-325.72	1.23	0.66	9.50
3,848.00	6.06	23.50	3,826.17	339.63	155.59	-335.41	0.64	-0.56	2.78
3,942.00	4.77	33.14	3,919.75	347.45	159.71	-343.12	1.67	-1.37	10.26
4,036.00	3.34	32.69	4,013.51	353.03	163.32	-348.60	1.52	-1.52	-0.48
4,130.00	4.45	22.23	4,107.29	358.71	166.18	-354.21	1.40	1.18	-11.13
4,224.00	6.40	24.74	4,200.87	366.85	169.75	-362.25	2.09	2.07	2.67
4,320.00	7.12	19.16	4,296.20	377.33	173.95	-372.61	1.01	0.75	-5.81
4,414.00	7.23	13.36	4,389.47	388.58	177.22	-383.78	0.78	0.12	-6.17
4,508.00	6.28	29.60	4,482.82	398.81	181.13	-393.90	2.26	-1.01	17.28
4,602.00	3.93	36.98	4,576.44	405.85	185.61	-400.82	2.59	-2.50	7.85
4,696.00	2.56	54.24	4,670.29	409.66	189.25	-404.53	1.77	-1.46	18.36
4,790.00	2.64	35.85	4,764.20	412.64	192.22	-407.43	0.89	0.09	-19.56

# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,883.00	3.03	31.32	4,857.08	416.47	194.75	-411.20	0.48	0.42	-4.87
4,977.00	2.96	44.82	4,950.96	420.32	197.76	-414.96	0.75	-0.07	14.36
5,072.00	2.26	54.84	5,045.86	423.14	201.02	-417.69	0.88	-0.74	10.55
5,142.00	2.11	103.70	5,115.81	423.63	203.40	-418.12	2.59	-0.22	69.81
L. Marker Jt.									
5,166.00	2.39	117.84	5,139.79	423.29	204.27	-417.76	2.59	1.18	58.90
5,260.00	7.12	163.58	5,233.47	416.78	207.65	-411.16	6.08	5.03	48.66
5,355.00	9.76	170.92	5,327.43	403.18	210.58	-397.49	3.00	2.78	7.73
5,450.00	13.32	178.21	5,420.50	384.28	212.20	-378.56	4.04	3.75	7.67
5,544.00	16.95	180.22	5,511.23	359.75	212.48	-354.02	3.90	3.86	2.14
5,615.00	23.20	178.20	5,577.88	335.39	212.88	-329.67	8.86	8.80	-2.85
5,709.00	43.55	186.48	5,656.01	284.15	209.78	-278.52	22.14	21.65	8.81
5,756.00	54.58	188.33	5,686.76	249.00	205.16	-243.51	23.65	23.47	3.94
5,803.00	55.03	188.01	5,713.84	210.98	199.70	-205.65	1.11	0.96	-0.68
5,849.00	55.06	187.06	5,740.20	173.61	194.76	-168.42	1.69	0.07	-2.07
5,895.00	60.00	182.44	5,764.90	134.96	191.59	-129.86	13.68	10.74	-10.04
5,942.00	64.47	183.89	5,786.79	93.44	189.28	-88.42	9.89	9.51	3.09
5,989.00	66.30	183.73	5,806.36	50.81	186.44	-45.88	3.91	3.89	-0.34
6,037.00	67.14	182.12	5,825.33	6.78	184.20	-1.92	3.54	1.75	-3.35
6,084.00	73.04	178.02	5,841.34	-37.38	184.17	42.22	14.99	12.55	-8.72
6,131.00	79.74	177.44	5,852.39	-83.00	185.98	87.87	14.31	14.26	-1.23
6,151.00	81.10	177.36	5,855.72	-102.70	186.88	107.59	6.80	6.79	-0.41
MID SL Crossing									
6,178.00	82.93	177.25	5,859.47	-129.41	188.14	134.32	6.80	6.79	-0.40
6,251.50	88.78	177.62	5,864.78	-202.61	191.41	207.58	7.97	7.96	0.51
100' MID SL Hard Line Crossing									
6,273.00	90.49	177.73	5,864.92	-224.09	192.28	229.08	7.97	7.96	0.50
6,296.00	90.84	177.62	5,864.65	-247.07	193.22	252.07	1.60	1.52	-0.48
6,390.00	90.96	177.47	5,863.18	-340.97	197.24	346.05	0.20	0.13	-0.16
6,484.00	91.51	176.86	5,861.15	-434.83	201.89	440.00	0.87	0.59	-0.65
6,578.00	91.50	178.70	5,858.68	-528.73	205.53	533.96	1.96	-0.01	1.96
6,670.00	89.86	178.53	5,857.59	-620.69	207.76	625.95	1.79	-1.78	-0.18
6,765.00	90.20	179.41	5,857.54	-715.67	209.46	720.94	0.99	0.36	0.93
6,859.00	88.36	181.03	5,858.72	-809.66	209.10	814.89	2.61	-1.96	1.72
6,954.00	89.29	180.80	5,860.67	-904.62	207.59	909.78	1.01	0.98	-0.24
7,048.00	90.16	182.05	5,861.12	-998.59	205.25	1,003.65	1.62	0.93	1.33
7,140.00	90.07	182.10	5,860.94	-1,090.53	201.92	1,095.47	0.11	-0.10	0.05
7,234.00	90.12	181.77	5,860.78	-1,184.48	198.74	1,189.30	0.36	0.05	-0.35
7,328.00	90.24	180.87	5,860.49	-1,278.45	196.58	1,283.19	0.97	0.13	-0.96
7,423.00	90.55	181.33	5,859.83	-1,373.43	194.75	1,378.09	0.58	0.33	0.48
7,515.00	91.00	180.83	5,858.59	-1,465.41	193.02	1,469.98	0.73	0.49	-0.54
7,610.00	89.56	182.97	5,858.12	-1,560.34	189.87	1,564.81	2.72	-1.52	2.25
7,704.00	90.01	185.00	5,858.47	-1,654.11	183.34	1,658.37	2.21	0.48	2.16
7,798.00	89.10	181.72	5,859.20	-1,747.93	177.83	1,752.01	3.62	-0.97	-3.49

# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,892.00	88.20	179.77	5,861.42	-1,841.89	176.61	1,845.91	2.28	-0.96	-2.07
7,986.00	88.96	178.68	5,863.75	-1,935.85	177.88	1,939.87	1.41	0.81	-1.16
8,082.00	90.98	175.90	5,863.80	-2,031.73	182.42	2,035.83	3.58	2.10	-2.90
8,176.00	90.67	175.78	5,862.45	-2,125.47	189.24	2,129.72	0.35	-0.33	-0.13
8,271.00	90.62	174.21	5,861.38	-2,220.10	197.52	2,224.54	1.65	-0.05	-1.65
8,363.00	91.74	176.90	5,859.48	-2,311.80	204.65	2,316.39	3.17	1.22	2.92
8,455.00	91.39	176.77	5,856.97	-2,403.62	209.73	2,408.31	0.41	-0.38	-0.14
8,546.00	91.08	176.18	5,855.01	-2,494.43	215.32	2,499.24	0.73	-0.34	-0.65
8,638.00	91.65	178.48	5,852.82	-2,586.30	219.61	2,591.18	2.57	0.62	2.50
8,730.00	91.91	177.86	5,849.96	-2,678.20	222.54	2,683.14	0.73	0.28	-0.67
8,807.50	92.38	177.95	5,847.06	-2,755.60	225.37	2,760.58	0.62	0.60	0.12
SL Crossing 7/18									
8,821.00	92.46	177.97	5,846.49	-2,769.08	225.85	2,774.07	0.62	0.60	0.12
8,913.00	89.82	178.39	5,844.66	-2,861.00	228.77	2,866.04	2.91	-2.87	0.46
9,004.00	91.03	178.71	5,843.98	-2,951.97	231.08	2,957.04	1.38	1.33	0.35
9,096.00	92.33	177.82	5,841.29	-3,043.89	233.86	3,048.99	1.71	1.41	-0.97
9,188.00	90.53	180.31	5,838.99	-3,135.83	235.36	3,140.95	3.34	-1.96	2.71
9,279.00	90.93	179.62	5,837.83	-3,226.83	235.41	3,231.91	0.88	0.44	-0.76
9,371.00	89.97	181.19	5,837.11	-3,318.82	234.76	3,323.85	2.00	-1.04	1.71
9,463.00	90.37	181.74	5,836.84	-3,410.79	232.41	3,415.73	0.74	0.43	0.60
9,555.00	90.48	177.00	5,836.15	-3,502.75	233.42	3,507.69	5.15	0.12	-5.15
9,646.00	90.77	179.23	5,835.16	-3,593.69	236.42	3,598.67	2.47	0.32	2.45
9,738.00	91.12	179.58	5,833.64	-3,685.67	237.37	3,690.65	0.54	0.38	0.38
9,829.00	91.31	180.90	5,831.71	-3,776.65	236.99	3,781.58	1.47	0.21	1.45
9,921.00	93.13	181.18	5,828.15	-3,868.56	235.32	3,873.42	2.00	1.98	0.30
10,013.00	91.95	180.96	5,824.07	-3,960.45	233.61	3,965.23	1.30	-1.28	-0.24
10,105.00	90.50	181.96	5,822.10	-4,052.40	231.26	4,057.09	1.91	-1.58	1.09
10,199.00	91.47	181.56	5,820.49	-4,146.34	228.38	4,150.92	1.12	1.03	-0.43
10,294.00	89.40	182.01	5,819.77	-4,241.29	225.42	4,245.75	2.23	-2.18	0.47
10,388.00	89.49	180.69	5,820.68	-4,335.25	223.20	4,339.63	1.41	0.10	-1.40
10,483.00	91.49	180.54	5,819.87	-4,430.24	222.18	4,434.56	2.11	2.11	-0.16
10,578.00	92.21	179.83	5,816.80	-4,525.19	221.88	4,529.46	1.06	0.76	-0.75
10,673.00	93.44	178.84	5,812.12	-4,620.06	222.98	4,624.33	1.66	1.29	-1.04
10,767.00	92.31	179.63	5,807.40	-4,713.93	224.23	4,718.21	1.47	-1.20	0.84
10,863.00	93.44	179.36	5,802.59	-4,809.81	225.07	4,814.07	1.21	1.18	-0.28
10,958.00	91.96	181.59	5,798.11	-4,904.69	224.29	4,908.90	2.82	-1.56	2.35
11,052.00	89.71	182.45	5,796.74	-4,998.62	220.97	5,002.70	2.56	-2.39	0.91
11,146.00	90.44	181.76	5,796.62	-5,092.55	217.52	5,096.51	1.07	0.78	-0.73
11,240.00	89.76	181.48	5,796.45	-5,186.51	214.86	5,190.37	0.78	-0.72	-0.30
11,335.00	90.93	182.40	5,795.88	-5,281.45	211.65	5,285.20	1.57	1.23	0.97
11,428.00	89.03	182.22	5,795.92	-5,374.37	207.90	5,377.99	2.05	-2.04	-0.19
11,523.00	90.37	182.93	5,796.41	-5,469.27	203.63	5,472.74	1.60	1.41	0.75
11,617.00	87.03	179.51	5,798.55	-5,563.20	201.63	5,566.58	5.08	-3.55	-3.64

# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
11,710.00	86.99	179.23	5,803.40	-5,656.07	202.65	5,659.44	0.30	-0.04	-0.30
11,802.00	87.87	180.42	5,807.52	-5,747.97	202.93	5,751.32	1.61	0.96	1.29
11,896.00	87.65	180.35	5,811.20	-5,841.90	202.30	5,845.20	0.25	-0.23	-0.07
11,990.00	89.36	178.41	5,813.65	-5,935.85	203.32	5,939.15	2.75	1.82	-2.06
12,084.00	91.30	178.01	5,813.11	-6,029.80	206.25	6,033.14	2.11	2.06	-0.43
12,179.00	91.65	177.64	5,810.66	-6,124.70	209.86	6,128.10	0.54	0.37	-0.39
12,274.00	91.82	177.42	5,807.79	-6,219.57	213.95	6,223.05	0.29	0.18	-0.23
12,369.00	92.09	176.72	5,804.54	-6,314.39	218.80	6,317.96	0.79	0.28	-0.74
12,463.00	91.78	178.28	5,801.37	-6,408.24	222.90	6,411.89	1.69	-0.33	1.66
12,557.00	92.97	177.64	5,797.48	-6,502.10	226.24	6,505.80	1.44	1.27	-0.68
12,651.00	90.95	179.56	5,794.26	-6,596.01	228.54	6,599.74	2.96	-2.15	2.04
12,746.00	90.46	180.86	5,793.09	-6,691.00	228.19	6,694.69	1.46	-0.52	1.37
12,841.00	89.58	181.55	5,793.06	-6,785.98	226.19	6,789.58	1.18	-0.93	0.73
12,935.00	90.15	181.16	5,793.28	-6,879.95	223.97	6,883.46	0.73	0.61	-0.41
13,030.00	88.36	181.42	5,794.51	-6,974.91	221.83	6,978.34	1.90	-1.88	0.27
13,125.00	88.94	179.51	5,796.75	-7,069.88	221.06	7,073.25	2.10	0.61	-2.01
13,218.00	89.86	178.54	5,797.73	-7,162.86	222.64	7,166.24	1.44	0.99	-1.04
13,313.00	89.10	181.96	5,798.59	-7,257.84	222.23	7,261.17	3.69	-0.80	3.60
13,406.00	90.42	180.04	5,798.98	-7,350.82	220.61	7,354.08	2.51	1.42	-2.06
13,501.00	89.91	179.60	5,798.71	-7,445.82	220.90	7,449.05	0.71	-0.54	-0.46
13,596.00	91.44	178.95	5,797.59	-7,540.80	222.11	7,544.03	1.75	1.61	-0.68
13,691.00	90.14	178.51	5,796.28	-7,635.76	224.21	7,639.02	1.44	-1.37	-0.46
13,785.00	89.54	179.57	5,796.54	-7,729.75	225.79	7,733.01	1.30	-0.64	1.13
13,880.00	89.68	178.60	5,797.19	-7,824.73	227.30	7,828.01	1.03	0.15	-1.02
13,974.00	90.66	181.17	5,796.91	-7,918.72	227.49	7,921.97	2.93	1.04	2.73
14,018.20	91.35	180.84	5,796.13	-7,962.91	226.72	7,966.12	1.73	1.55	-0.76
100' HL Crossing									
14,023.00	91.42	180.80	5,796.02	-7,967.71	226.65	7,970.91	1.73	1.55	-0.76
14,070.00	91.42	180.80	5,794.85	-8,014.69	225.99	8,017.86	0.00	0.00	0.00
Projection - 5 1/2"									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name		Casing Diameter (")	Hole Diameter (")
2,036.00	2,023.92	9 5/8"		9-5/8	12-1/4
14,070.00	5,794.85	5 1/2"		5-1/2	6

# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,142.00	5,115.81	423.63	203.40	L. Marker Jt.
6,151.00	5,855.72	-102.70	186.88	MID SL Crossing
6,251.50	5,864.78	-202.61	191.41	100' MID SL Hard Line Crossing
8,807.50	5,847.06	-2,755.60	225.37	SL Crossing 7/18
14,018.20	5,796.13	-7,962.91	226.72	100' HL Crossing
14,070.00	5,794.85	-8,014.69	225.99	Projection

# LEAM Drilling Systems LLC

## Survey Report - Geographic

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

<b>Project</b>	Weld County, CO,		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		

Site		Horsetail #07F PAD			
Site Position:		Northing:	1,558,346.52 usft	Latitude:	40° 51' 12.971 N
From:	Map	Easting:	3,471,420.73 usft	Longitude:	103° 47' 45.031 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.10 °

Well	1808					
Well Position	+N/-S	0.00 usft	Northing:	1,558,396.15 usft	Latitude:	40° 51' 13.449 N
	+E/-W	0.00 usft	Easting:	3,471,481.48 usft	Longitude:	103° 47' 44.228 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	4,898.80 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	3/4/2016	7.58	67.35	52,902

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	178.49	

<b>Survey Program</b>	<b>Date</b>	6/23/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
232.00	14,023.00	Survey #1 (OH)	MWD+IFR1+MS+sag	Fixed:v2:crustal dec & 3-axis correction + sag	
14,070.00	14,070.00	Survey #2 (OH)	Project	Projection	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Map Northing (usft)</b>	<b>Map Easting (usft)</b>	<b>Latitude</b>	<b>Longitude</b>	
0.00	0.00	0.00	0.00	0.00	0.00	1,558,396.15	3,471,481.48	40° 51' 13.449 N	103° 47' 44.228 W	
232.00	0.97	148.28	231.99	-1.67	1.03	1,558,394.50	3,471,482.54	40° 51' 13.433 N	103° 47' 44.215 W	
323.00	0.63	156.90	322.98	-2.79	1.63	1,558,393.40	3,471,483.17	40° 51' 13.422 N	103° 47' 44.207 W	
414.00	1.05	40.62	413.97	-2.61	2.37	1,558,393.58	3,471,483.90	40° 51' 13.424 N	103° 47' 44.198 W	
506.00	3.04	24.20	505.91	0.25	3.92	1,558,396.48	3,471,485.39	40° 51' 13.452 N	103° 47' 44.177 W	
598.00	5.34	22.10	597.66	6.44	6.53	1,558,402.72	3,471,487.89	40° 51' 13.513 N	103° 47' 44.143 W	
690.00	7.30	25.05	689.10	15.71	10.62	1,558,412.06	3,471,491.79	40° 51' 13.605 N	103° 47' 44.090 W	
781.00	7.54	24.59	779.33	26.37	15.55	1,558,422.82	3,471,496.52	40° 51' 13.710 N	103° 47' 44.026 W	
873.00	7.65	24.14	870.53	37.45	20.57	1,558,433.99	3,471,501.32	40° 51' 13.820 N	103° 47' 43.961 W	
964.00	7.31	25.40	960.75	48.21	25.53	1,558,444.84	3,471,506.07	40° 51' 13.926 N	103° 47' 43.896 W	
1,056.00	7.10	25.00	1,052.03	58.65	30.44	1,558,455.37	3,471,510.79	40° 51' 14.029 N	103° 47' 43.832 W	



# LEAM Drilling Systems LLC

## Survey Report - Geographic

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
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<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,148.00	7.66	24.06	1,143.26	69.40	35.34	1,558,466.22	3,471,515.48	40° 51' 14.135 N	103° 47' 43.768 W
1,239.00	7.91	25.05	1,233.43	80.61	40.47	1,558,477.52	3,471,520.39	40° 51' 14.246 N	103° 47' 43.702 W
1,331.00	8.46	24.48	1,324.49	92.50	45.95	1,558,489.52	3,471,525.64	40° 51' 14.363 N	103° 47' 43.630 W
1,423.00	8.77	26.48	1,415.45	104.94	51.88	1,558,502.07	3,471,531.34	40° 51' 14.486 N	103° 47' 43.553 W
1,515.00	9.28	26.75	1,506.31	117.84	58.35	1,558,515.09	3,471,537.55	40° 51' 14.614 N	103° 47' 43.469 W
1,606.00	7.76	29.11	1,596.30	129.76	64.64	1,558,527.13	3,471,543.61	40° 51' 14.732 N	103° 47' 43.387 W
1,697.00	7.71	30.42	1,686.48	140.40	70.72	1,558,537.88	3,471,549.49	40° 51' 14.837 N	103° 47' 43.308 W
1,790.00	5.82	29.40	1,778.82	149.88	76.19	1,558,547.47	3,471,554.78	40° 51' 14.930 N	103° 47' 43.237 W
1,881.00	5.14	22.81	1,869.41	157.66	80.04	1,558,555.32	3,471,558.47	40° 51' 15.007 N	103° 47' 43.187 W
1,975.00	4.38	22.96	1,963.08	164.85	83.07	1,558,562.57	3,471,561.37	40° 51' 15.078 N	103° 47' 43.147 W
2,036.00	4.08	22.92	2,023.92	168.99	84.83	1,558,566.74	3,471,563.04	40° 51' 15.119 N	103° 47' 43.125 W
9 5/8"									
2,060.00	3.96	22.90	2,047.86	170.54	85.48	1,558,568.30	3,471,563.67	40° 51' 15.135 N	103° 47' 43.116 W
2,123.00	3.79	19.84	2,110.71	174.50	87.03	1,558,572.29	3,471,565.14	40° 51' 15.174 N	103° 47' 43.096 W
2,218.00	5.33	16.21	2,205.41	181.69	89.33	1,558,579.53	3,471,567.30	40° 51' 15.245 N	103° 47' 43.066 W
2,312.00	5.92	14.49	2,298.96	190.58	91.76	1,558,588.46	3,471,569.56	40° 51' 15.333 N	103° 47' 43.034 W
2,407.00	6.03	25.02	2,393.45	199.84	95.10	1,558,597.79	3,471,572.72	40° 51' 15.424 N	103° 47' 42.991 W
2,525.00	4.96	23.76	2,510.90	210.13	99.78	1,558,608.16	3,471,577.20	40° 51' 15.526 N	103° 47' 42.930 W
2,618.00	4.51	20.35	2,603.58	217.24	102.67	1,558,615.32	3,471,579.95	40° 51' 15.596 N	103° 47' 42.892 W
2,713.00	7.60	29.26	2,698.04	226.22	107.04	1,558,624.39	3,471,584.15	40° 51' 15.685 N	103° 47' 42.835 W
2,807.00	7.91	28.80	2,791.18	237.31	113.19	1,558,635.60	3,471,590.09	40° 51' 15.794 N	103° 47' 42.755 W
2,902.00	7.18	26.74	2,885.36	248.34	119.01	1,558,646.74	3,471,595.70	40° 51' 15.903 N	103° 47' 42.680 W
2,996.00	6.29	26.15	2,978.71	258.21	123.93	1,558,656.70	3,471,600.42	40° 51' 16.001 N	103° 47' 42.616 W
3,091.00	5.55	25.70	3,073.20	267.02	128.21	1,558,665.59	3,471,604.53	40° 51' 16.088 N	103° 47' 42.560 W
3,185.00	4.82	26.14	3,166.82	274.66	131.92	1,558,673.30	3,471,608.10	40° 51' 16.163 N	103° 47' 42.512 W
3,280.00	6.29	27.29	3,261.37	282.87	136.07	1,558,681.59	3,471,612.08	40° 51' 16.244 N	103° 47' 42.458 W
3,374.00	5.94	22.90	3,354.84	291.93	140.32	1,558,690.72	3,471,616.16	40° 51' 16.334 N	103° 47' 42.402 W
3,468.00	5.72	17.57	3,448.35	300.88	143.63	1,558,699.73	3,471,619.30	40° 51' 16.422 N	103° 47' 42.359 W
3,563.00	6.10	14.93	3,542.85	310.27	146.36	1,558,709.17	3,471,621.85	40° 51' 16.515 N	103° 47' 42.324 W
3,658.00	5.98	11.90	3,637.32	319.99	148.68	1,558,718.94	3,471,623.98	40° 51' 16.611 N	103° 47' 42.294 W
3,752.00	6.60	20.83	3,730.75	329.83	151.61	1,558,728.83	3,471,626.72	40° 51' 16.708 N	103° 47' 42.255 W
3,848.00	6.06	23.50	3,826.17	339.63	155.59	1,558,738.71	3,471,630.51	40° 51' 16.805 N	103° 47' 42.204 W
3,942.00	4.77	33.14	3,919.75	347.45	159.71	1,558,746.61	3,471,634.48	40° 51' 16.883 N	103° 47' 42.150 W
4,036.00	3.34	32.69	4,013.51	353.03	163.32	1,558,752.26	3,471,637.99	40° 51' 16.938 N	103° 47' 42.103 W
4,130.00	4.45	22.23	4,107.29	358.71	166.18	1,558,757.99	3,471,640.73	40° 51' 16.994 N	103° 47' 42.066 W
4,224.00	6.40	24.74	4,200.87	366.85	169.75	1,558,766.19	3,471,644.15	40° 51' 17.074 N	103° 47' 42.019 W
4,320.00	7.12	19.16	4,296.20	377.33	173.95	1,558,776.75	3,471,648.14	40° 51' 17.178 N	103° 47' 41.965 W
4,414.00	7.23	13.36	4,389.47	388.58	177.22	1,558,788.07	3,471,651.20	40° 51' 17.289 N	103° 47' 41.922 W
4,508.00	6.28	29.60	4,482.82	398.81	181.13	1,558,798.37	3,471,654.91	40° 51' 17.390 N	103° 47' 41.871 W
4,602.00	3.93	36.98	4,576.44	405.85	185.61	1,558,805.50	3,471,659.25	40° 51' 17.460 N	103° 47' 41.813 W
4,696.00	2.56	54.24	4,670.29	409.66	189.25	1,558,809.37	3,471,662.82	40° 51' 17.497 N	103° 47' 41.766 W
4,790.00	2.64	35.85	4,764.20	412.64	192.22	1,558,812.41	3,471,665.73	40° 51' 17.527 N	103° 47' 41.727 W
4,883.00	3.03	31.32	4,857.08	416.47	194.75	1,558,816.29	3,471,668.19	40° 51' 17.565 N	103° 47' 41.694 W
4,977.00	2.96	44.82	4,950.96	420.32	197.76	1,558,820.19	3,471,671.12	40° 51' 17.603 N	103° 47' 41.655 W
5,072.00	2.26	54.84	5,045.86	423.14	201.02	1,558,823.07	3,471,674.33	40° 51' 17.630 N	103° 47' 41.613 W
5,142.00	2.11	103.70	5,115.81	423.63	203.40	1,558,823.61	3,471,676.69	40° 51' 17.635 N	103° 47' 41.582 W
L. Marker Jt.									
5,166.00	2.39	117.84	5,139.79	423.29	204.27	1,558,823.29	3,471,677.57	40° 51' 17.632 N	103° 47' 41.570 W
5,260.00	7.12	163.58	5,233.47	416.78	207.65	1,558,816.84	3,471,681.08	40° 51' 17.568 N	103° 47' 41.526 W
5,355.00	9.76	170.92	5,327.43	403.18	210.58	1,558,803.30	3,471,684.27	40° 51' 17.433 N	103° 47' 41.488 W
5,450.00	13.32	178.21	5,420.50	384.28	212.20	1,558,784.44	3,471,686.25	40° 51' 17.246 N	103° 47' 41.467 W
5,544.00	16.95	180.22	5,511.23	359.75	212.48	1,558,759.92	3,471,687.01	40° 51' 17.004 N	103° 47' 41.463 W
5,615.00	23.20	178.20	5,577.88	335.39	212.88	1,558,735.58	3,471,687.88	40° 51' 16.763 N	103° 47' 41.458 W
5,709.00	43.55	186.48	5,656.01	284.15	209.78	1,558,684.28	3,471,685.75	40° 51' 16.257 N	103° 47' 41.499 W
5,756.00	54.58	188.33	5,686.76	249.00	205.16	1,558,649.05	3,471,681.81	40° 51' 15.910 N	103° 47' 41.559 W

# LEAM Drilling Systems LLC

## Survey Report - Geographic

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,803.00	55.03	188.01	5,713.84	210.98	199.70	1,558,610.93	3,471,677.09	40° 51' 15.534 N	103° 47' 41.630 W
5,849.00	55.06	187.06	5,740.20	173.61	194.76	1,558,573.47	3,471,672.86	40° 51' 15.165 N	103° 47' 41.694 W
5,895.00	60.00	182.44	5,764.90	134.96	191.59	1,558,534.77	3,471,670.44	40° 51' 14.783 N	103° 47' 41.735 W
5,942.00	64.47	183.89	5,786.79	93.44	189.28	1,558,493.22	3,471,668.93	40° 51' 14.373 N	103° 47' 41.765 W
5,989.00	66.30	183.73	5,806.36	50.81	186.44	1,558,450.54	3,471,666.91	40° 51' 13.952 N	103° 47' 41.802 W
6,037.00	67.14	182.12	5,825.33	6.78	184.20	1,558,406.47	3,471,665.51	40° 51' 13.516 N	103° 47' 41.831 W
6,084.00	73.04	178.02	5,841.34	-37.38	184.17	1,558,362.32	3,471,666.33	40° 51' 13.080 N	103° 47' 41.832 W
6,131.00	79.74	177.44	5,852.39	-83.00	185.98	1,558,316.74	3,471,669.02	40° 51' 12.629 N	103° 47' 41.808 W
6,151.00	81.10	177.36	5,855.72	-102.70	186.88	1,558,297.06	3,471,670.30	40° 51' 12.435 N	103° 47' 41.797 W
MID SL Crossing									
6,178.00	82.93	177.25	5,859.47	-129.41	188.14	1,558,270.39	3,471,672.07	40° 51' 12.171 N	103° 47' 41.780 W
6,251.50	88.78	177.62	5,864.78	-202.61	191.41	1,558,197.26	3,471,676.75	40° 51' 11.448 N	103° 47' 41.738 W
100' MID SL Hard Line Crossing									
6,273.00	90.49	177.73	5,864.92	-224.09	192.28	1,558,175.80	3,471,678.03	40° 51' 11.235 N	103° 47' 41.726 W
6,296.00	90.84	177.62	5,864.65	-247.07	193.22	1,558,152.84	3,471,679.41	40° 51' 11.008 N	103° 47' 41.714 W
6,390.00	90.96	177.47	5,863.18	-340.97	197.24	1,558,059.04	3,471,685.24	40° 51' 10.080 N	103° 47' 41.662 W
6,484.00	91.51	176.86	5,861.15	-434.83	201.89	1,557,965.28	3,471,691.69	40° 51' 9.153 N	103° 47' 41.601 W
6,578.00	91.50	178.70	5,858.68	-528.73	205.53	1,557,871.47	3,471,697.13	40° 51' 8.225 N	103° 47' 41.554 W
6,670.00	89.86	178.53	5,857.59	-620.69	207.76	1,557,779.57	3,471,701.12	40° 51' 7.317 N	103° 47' 41.525 W
6,765.00	90.20	179.41	5,857.54	-715.67	209.46	1,557,684.64	3,471,704.66	40° 51' 6.378 N	103° 47' 41.503 W
6,859.00	88.36	181.03	5,858.72	-809.66	209.10	1,557,590.66	3,471,706.10	40° 51' 5.449 N	103° 47' 41.507 W
6,954.00	89.29	180.80	5,860.67	-904.62	207.59	1,557,495.68	3,471,706.41	40° 51' 4.511 N	103° 47' 41.527 W
7,048.00	90.16	182.05	5,861.12	-998.59	205.25	1,557,401.69	3,471,705.88	40° 51' 3.583 N	103° 47' 41.558 W
7,140.00	90.07	182.10	5,860.94	-1,090.53	201.92	1,557,309.70	3,471,704.32	40° 51' 2.674 N	103° 47' 41.601 W
7,234.00	90.12	181.77	5,860.78	-1,184.48	198.74	1,557,215.71	3,471,702.95	40° 51' 1.746 N	103° 47' 41.642 W
7,328.00	90.24	180.87	5,860.49	-1,278.45	196.58	1,557,121.72	3,471,702.59	40° 51' 0.817 N	103° 47' 41.670 W
7,423.00	90.55	181.33	5,859.83	-1,373.43	194.75	1,557,026.72	3,471,702.59	40° 50' 59.879 N	103° 47' 41.694 W
7,515.00	91.00	180.83	5,858.59	-1,465.41	193.02	1,556,934.73	3,471,702.63	40° 50' 58.970 N	103° 47' 41.717 W
7,610.00	89.56	182.97	5,858.12	-1,560.34	189.87	1,556,839.75	3,471,701.30	40° 50' 58.032 N	103° 47' 41.758 W
7,704.00	90.01	185.00	5,858.47	-1,654.11	183.34	1,556,745.87	3,471,696.57	40° 50' 57.106 N	103° 47' 41.843 W
7,798.00	89.10	181.72	5,859.20	-1,747.93	177.83	1,556,651.96	3,471,692.87	40° 50' 56.179 N	103° 47' 41.914 W
7,892.00	88.20	179.77	5,861.42	-1,841.89	176.61	1,556,557.99	3,471,693.45	40° 50' 55.250 N	103° 47' 41.930 W
7,986.00	88.96	178.68	5,863.75	-1,935.85	177.88	1,556,464.07	3,471,696.53	40° 50' 54.322 N	103° 47' 41.914 W
8,082.00	90.98	175.90	5,863.80	-2,031.73	182.42	1,556,368.30	3,471,702.91	40° 50' 53.374 N	103° 47' 41.855 W
8,176.00	90.67	175.78	5,862.45	-2,125.47	189.24	1,556,274.71	3,471,711.53	40° 50' 52.448 N	103° 47' 41.766 W
8,271.00	90.62	174.21	5,861.38	-2,220.10	197.52	1,556,180.25	3,471,721.63	40° 50' 51.513 N	103° 47' 41.658 W
8,363.00	91.74	176.90	5,859.48	-2,311.80	204.65	1,556,088.71	3,471,730.52	40° 50' 50.607 N	103° 47' 41.566 W
8,455.00	91.39	176.77	5,856.97	-2,403.62	209.73	1,555,997.00	3,471,737.36	40° 50' 49.700 N	103° 47' 41.499 W
8,546.00	91.08	176.18	5,855.01	-2,494.43	215.32	1,555,906.32	3,471,744.70	40° 50' 48.803 N	103° 47' 41.427 W
8,638.00	91.65	178.48	5,852.82	-2,586.30	219.61	1,555,814.55	3,471,750.75	40° 50' 47.895 N	103° 47' 41.371 W
8,730.00	91.91	177.86	5,849.96	-2,678.20	222.54	1,555,722.72	3,471,755.45	40° 50' 46.987 N	103° 47' 41.333 W
8,807.50	92.38	177.95	5,847.06	-2,755.60	225.37	1,555,645.39	3,471,759.77	40° 50' 46.222 N	103° 47' 41.296 W
SL Crossing 7/18									
8,821.00	92.46	177.97	5,846.49	-2,769.08	225.85	1,555,631.93	3,471,760.51	40° 50' 46.089 N	103° 47' 41.290 W
8,913.00	89.82	178.39	5,844.66	-2,861.00	228.77	1,555,540.07	3,471,765.20	40° 50' 45.181 N	103° 47' 41.252 W
9,004.00	91.03	178.71	5,843.98	-2,951.97	231.08	1,555,449.17	3,471,769.25	40° 50' 44.282 N	103° 47' 41.222 W
9,096.00	92.33	177.82	5,841.29	-3,043.89	233.86	1,555,357.32	3,471,773.80	40° 50' 43.374 N	103° 47' 41.186 W
9,188.00	90.53	180.31	5,838.99	-3,135.83	235.36	1,555,265.42	3,471,777.06	40° 50' 42.465 N	103° 47' 41.166 W
9,279.00	90.93	179.62	5,837.83	-3,226.83	235.41	1,555,174.45	3,471,778.87	40° 50' 41.566 N	103° 47' 41.165 W
9,371.00	89.97	181.19	5,837.11	-3,318.82	234.76	1,555,082.46	3,471,779.98	40° 50' 40.657 N	103° 47' 41.174 W
9,463.00	90.37	181.74	5,836.84	-3,410.79	232.41	1,554,990.46	3,471,779.40	40° 50' 39.748 N	103° 47' 41.204 W
9,555.00	90.48	177.00	5,836.15	-3,502.75	233.42	1,554,898.53	3,471,782.18	40° 50' 38.840 N	103° 47' 41.191 W
9,646.00	90.77	179.23	5,835.16	-3,593.69	236.42	1,554,807.67	3,471,786.92	40° 50' 37.941 N	103° 47' 41.152 W
9,738.00	91.12	179.58	5,833.64	-3,685.67	237.37	1,554,715.72	3,471,789.64	40° 50' 37.032 N	103° 47' 41.140 W
9,829.00	91.31	180.90	5,831.71	-3,776.65	236.99	1,554,624.75	3,471,791.01	40° 50' 36.133 N	103° 47' 41.145 W

# LEAM Drilling Systems LLC

## Survey Report - Geographic

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,921.00	93.13	181.18	5,828.15	-3,868.56	235.32	1,554,532.83	3,471,791.11	40° 50' 35.225 N	103° 47' 41.167 W
10,013.00	91.95	180.96	5,824.07	-3,960.45	233.61	1,554,440.92	3,471,791.16	40° 50' 34.317 N	103° 47' 41.189 W
10,105.00	90.50	181.96	5,822.10	-4,052.40	231.26	1,554,348.95	3,471,790.58	40° 50' 33.409 N	103° 47' 41.219 W
10,199.00	91.47	181.56	5,820.49	-4,146.34	228.38	1,554,254.97	3,471,789.50	40° 50' 32.480 N	103° 47' 41.257 W
10,294.00	89.40	182.01	5,819.77	-4,241.29	225.42	1,554,159.98	3,471,788.37	40° 50' 31.542 N	103° 47' 41.296 W
10,388.00	89.49	180.69	5,820.68	-4,335.25	223.20	1,554,065.99	3,471,787.96	40° 50' 30.614 N	103° 47' 41.324 W
10,483.00	91.49	180.54	5,819.87	-4,430.24	222.18	1,553,971.00	3,471,788.77	40° 50' 29.675 N	103° 47' 41.338 W
10,578.00	92.21	179.83	5,816.80	-4,525.19	221.88	1,553,876.06	3,471,790.28	40° 50' 28.737 N	103° 47' 41.342 W
10,673.00	93.44	178.84	5,812.12	-4,620.06	222.98	1,553,781.23	3,471,793.21	40° 50' 27.800 N	103° 47' 41.327 W
10,767.00	92.31	179.63	5,807.40	-4,713.93	224.23	1,553,687.40	3,471,796.27	40° 50' 26.872 N	103° 47' 41.311 W
10,863.00	93.44	179.36	5,802.59	-4,809.81	225.07	1,553,591.56	3,471,798.95	40° 50' 25.925 N	103° 47' 41.300 W
10,958.00	91.96	181.59	5,798.11	-4,904.69	224.29	1,553,496.68	3,471,799.99	40° 50' 24.987 N	103° 47' 41.310 W
11,052.00	89.71	182.45	5,796.74	-4,998.62	220.97	1,553,402.71	3,471,798.48	40° 50' 24.059 N	103° 47' 41.353 W
11,146.00	90.44	181.76	5,796.62	-5,092.55	217.52	1,553,308.72	3,471,796.84	40° 50' 23.131 N	103° 47' 41.398 W
11,240.00	89.76	181.48	5,796.45	-5,186.51	214.86	1,553,214.73	3,471,795.98	40° 50' 22.203 N	103° 47' 41.433 W
11,335.00	90.93	182.40	5,795.88	-5,281.45	211.65	1,553,119.74	3,471,794.59	40° 50' 21.265 N	103° 47' 41.475 W
11,428.00	89.03	182.22	5,795.92	-5,374.37	207.90	1,553,026.77	3,471,792.63	40° 50' 20.346 N	103° 47' 41.524 W
11,523.00	90.37	182.93	5,796.41	-5,469.27	203.63	1,552,931.80	3,471,790.19	40° 50' 19.409 N	103° 47' 41.579 W
11,617.00	87.03	179.51	5,798.55	-5,563.20	201.63	1,552,837.85	3,471,789.99	40° 50' 18.481 N	103° 47' 41.605 W
11,710.00	86.99	179.23	5,803.40	-5,656.07	202.65	1,552,745.02	3,471,792.80	40° 50' 17.563 N	103° 47' 41.592 W
11,802.00	87.87	180.42	5,807.52	-5,747.97	202.93	1,552,653.14	3,471,794.84	40° 50' 16.655 N	103° 47' 41.588 W
11,896.00	87.65	180.35	5,811.20	-5,841.90	202.30	1,552,559.22	3,471,796.02	40° 50' 15.727 N	103° 47' 41.596 W
11,990.00	89.36	178.41	5,813.65	-5,935.85	203.32	1,552,465.30	3,471,798.84	40° 50' 14.799 N	103° 47' 41.583 W
12,084.00	91.30	178.01	5,813.11	-6,029.80	206.25	1,552,371.43	3,471,803.58	40° 50' 13.870 N	103° 47' 41.545 W
12,179.00	91.65	177.64	5,810.66	-6,124.70	209.86	1,552,276.61	3,471,809.01	40° 50' 12.933 N	103° 47' 41.498 W
12,274.00	91.82	177.42	5,807.79	-6,219.57	213.95	1,552,181.84	3,471,814.92	40° 50' 11.995 N	103° 47' 41.445 W
12,369.00	92.09	176.72	5,804.54	-6,314.39	218.80	1,552,087.13	3,471,821.60	40° 50' 11.058 N	103° 47' 41.382 W
12,463.00	91.78	178.28	5,801.37	-6,408.24	222.90	1,551,993.38	3,471,827.50	40° 50' 10.131 N	103° 47' 41.329 W
12,557.00	92.97	177.64	5,797.48	-6,502.10	226.24	1,551,899.60	3,471,832.65	40° 50' 9.204 N	103° 47' 41.285 W
12,651.00	90.95	179.56	5,794.26	-6,596.01	228.54	1,551,805.75	3,471,836.74	40° 50' 8.276 N	103° 47' 41.255 W
12,746.00	90.46	180.86	5,793.09	-6,691.00	228.19	1,551,710.77	3,471,838.22	40° 50' 7.337 N	103° 47' 41.260 W
12,841.00	89.58	181.55	5,793.06	-6,785.98	226.19	1,551,615.78	3,471,838.05	40° 50' 6.399 N	103° 47' 41.286 W
12,935.00	90.15	181.16	5,793.28	-6,879.95	223.97	1,551,521.78	3,471,837.63	40° 50' 5.470 N	103° 47' 41.315 W
13,030.00	88.36	181.42	5,794.51	-6,974.91	221.83	1,551,426.79	3,471,837.32	40° 50' 4.532 N	103° 47' 41.343 W
13,125.00	88.94	179.51	5,796.75	-7,069.88	221.06	1,551,331.83	3,471,838.38	40° 50' 3.593 N	103° 47' 41.353 W
13,218.00	89.86	178.54	5,797.73	-7,162.86	222.64	1,551,238.90	3,471,841.75	40° 50' 2.675 N	103° 47' 41.332 W
13,313.00	89.10	181.96	5,798.59	-7,257.84	222.23	1,551,143.93	3,471,843.16	40° 50' 1.736 N	103° 47' 41.337 W
13,406.00	90.42	180.04	5,798.98	-7,350.82	220.61	1,551,050.93	3,471,843.32	40° 50' 0.818 N	103° 47' 41.359 W
13,501.00	89.91	179.60	5,798.71	-7,445.82	220.90	1,550,955.96	3,471,845.45	40° 49' 59.879 N	103° 47' 41.355 W
13,596.00	91.44	178.95	5,797.59	-7,540.80	222.11	1,550,861.02	3,471,848.47	40° 49' 58.940 N	103° 47' 41.339 W
13,691.00	90.14	178.51	5,796.28	-7,635.76	224.21	1,550,766.11	3,471,852.40	40° 49' 58.002 N	103° 47' 41.312 W
13,785.00	89.54	179.57	5,796.54	-7,729.75	225.79	1,550,672.17	3,471,855.78	40° 49' 57.073 N	103° 47' 41.291 W
13,880.00	89.68	178.60	5,797.19	-7,824.73	227.30	1,550,577.23	3,471,859.13	40° 49' 56.135 N	103° 47' 41.271 W
13,974.00	90.66	181.17	5,796.91	-7,918.72	227.49	1,550,483.26	3,471,861.12	40° 49' 55.206 N	103° 47' 41.269 W
14,018.20	91.35	180.84	5,796.13	-7,962.91	226.72	1,550,439.07	3,471,861.20	40° 49' 54.770 N	103° 47' 41.279 W
100' HL Crossing									
14,023.00	91.42	180.80	5,796.02	-7,967.71	226.65	1,550,434.27	3,471,861.22	40° 49' 54.722 N	103° 47' 41.280 W
14,070.00	91.42	180.80	5,794.85	-8,014.69	225.99	1,550,387.29	3,471,861.47	40° 49' 54.258 N	103° 47' 41.289 W
Projection - 5 1/2"									

# LEAM Drilling Systems LLC

## Survey Report - Geographic

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1808
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Site:</b>	Horsetail #07F PAD	<b>MD Reference:</b>	GE 4898.8' + KB 21' @ 4919.80usft (Unit #406)
<b>Well:</b>	1808	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	EDM 5000.1 Multi User Db

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name		Casing Diameter (")	Hole Diameter (")
2,036.00	2,023.92	9 5/8"		9-5/8	12-1/4
14,070.00	5,794.85	5 1/2"		5-1/2	6

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
5,142.00	5,115.81	423.63	203.40	L. Marker Jt.	
6,151.00	5,855.72	-102.70	186.88	MID SL Crossing	
6,251.50	5,864.78	-202.61	191.41	100' MID SL Hard Line Crossing	
8,807.50	5,847.06	-2,755.60	225.37	SL Crossing 7/18	
14,018.20	5,796.13	-7,962.91	226.72	100' HL Crossing	
14,070.00	5,794.85	-8,014.69	225.99	Projection	