

WHITING PETROLEUM CORPORATION

Project: Weld County, CO  
Site: Horsetail #07F PAD  
Well: 1807  
Wellbore: OH  
Design: OH



Azimuths to True North  
Magnetic North: 7.58°  
  
Magnetic Field  
Strength: 52898.8snT  
Dip Angle: 67.35°  
Date: 3/12/2016  
Model: HDGM



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)

LINE CALLS  
SHL: 2548' FNL, 2269' FWL  
Sec 7-T10N-R57W  
  
PBHL: 100' FSL, 2110' FWL  
Sec 18-T10N-R57W  
  
BHL: 49' FSL, 2103' FWL, Sec 18

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL( HT07F-1807)	0.00	0.00	0.00	1558396.09	3471421.44	40° 51' 13.460 N	103° 47' 45.010 W
PBHL (HT07F-1807)	5760.00	-7963.81	-54.52	1550432.71	3471519.97	40° 49' 54.772 N	103° 47' 45.719 W
BHL (HT07F-1807)	5763.45	-8014.91	-60.11	1550381.51	3471515.36	40° 49' 54.267 N	103° 47' 45.792 W

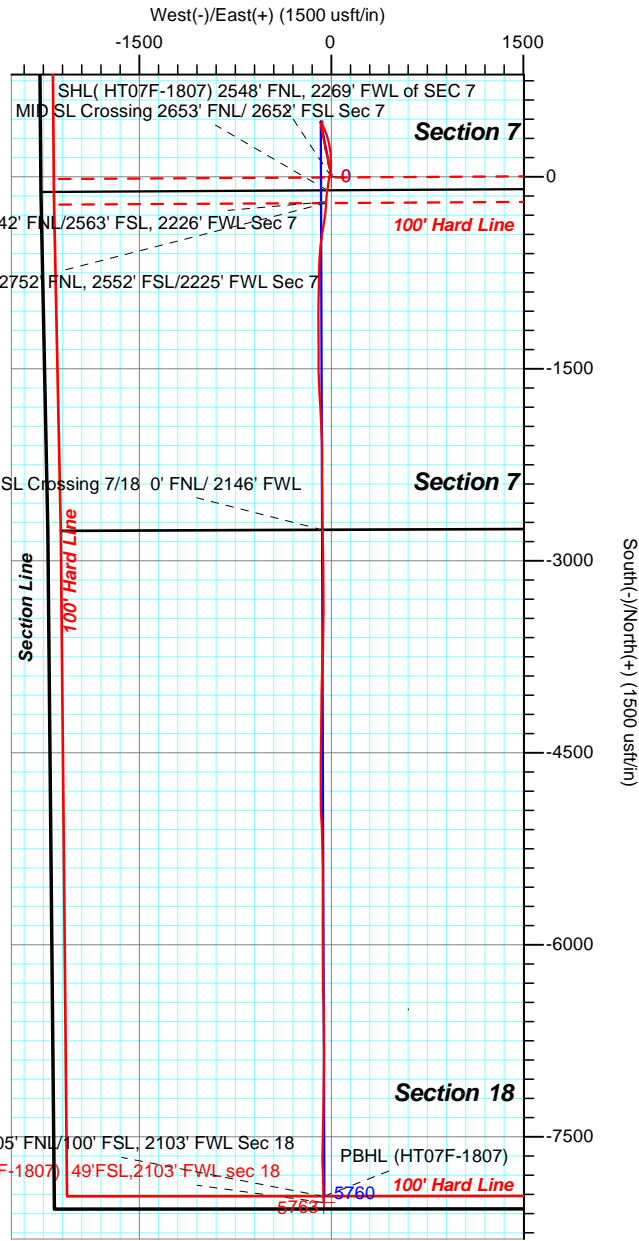
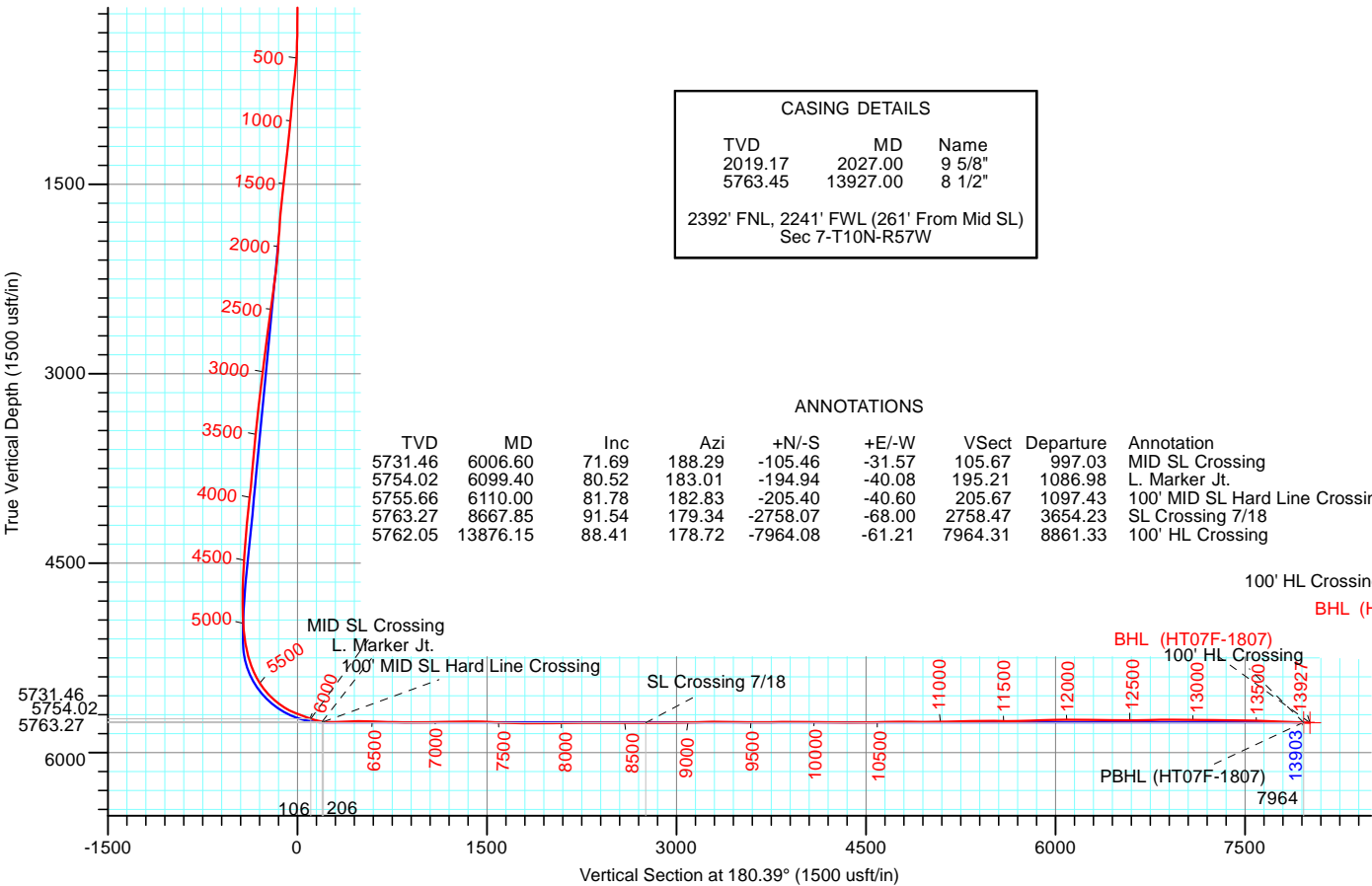
CASING DETAILS

TVD	MD	Name
2019.17	2027.00	9 5/8"
5763.45	13927.00	8 1/2"

2392' FNL, 2241' FWL (261' From Mid SL)  
Sec 7-T10N-R57W

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	Vsect	Departure	Annotation
5731.46	6006.60	71.69	188.29	-105.46	-31.57	105.67	997.03	MID SL Crossing
5754.02	6099.40	80.52	183.01	-194.94	-40.08	195.21	1086.98	L. Marker Jt.
5755.66	6110.00	81.78	182.83	-205.40	-40.60	205.67	1097.43	100' MID SL Hard Line Crossing
5763.27	8667.85	91.54	179.34	-2758.07	-68.00	2758.47	3654.23	SL Crossing 7/18
5762.05	13876.15	88.41	178.72	-7964.08	-61.21	7964.31	8861.33	100' HL Crossing



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

Design: OH (1807/OH)  
Horsetail #07F PAD  
Created By: Nora Tucker  
Date: 10:49, June 06 2016  
Approved: \_\_\_\_\_  
Date: \_\_\_\_\_

WHITING PETROLEUM CORPORATION

Project: Weld County, CO  
Site: Horsetail #07F PAD  
Well: 1807  
Wellbore: OH  
Design: OH



Azimuths to True North  
Magnetic North: 7.58°  
  
Magnetic Field  
Strength: 52898.8snT  
Dip Angle: 67.35°  
Date: 3/12/2016  
Model: HDGM

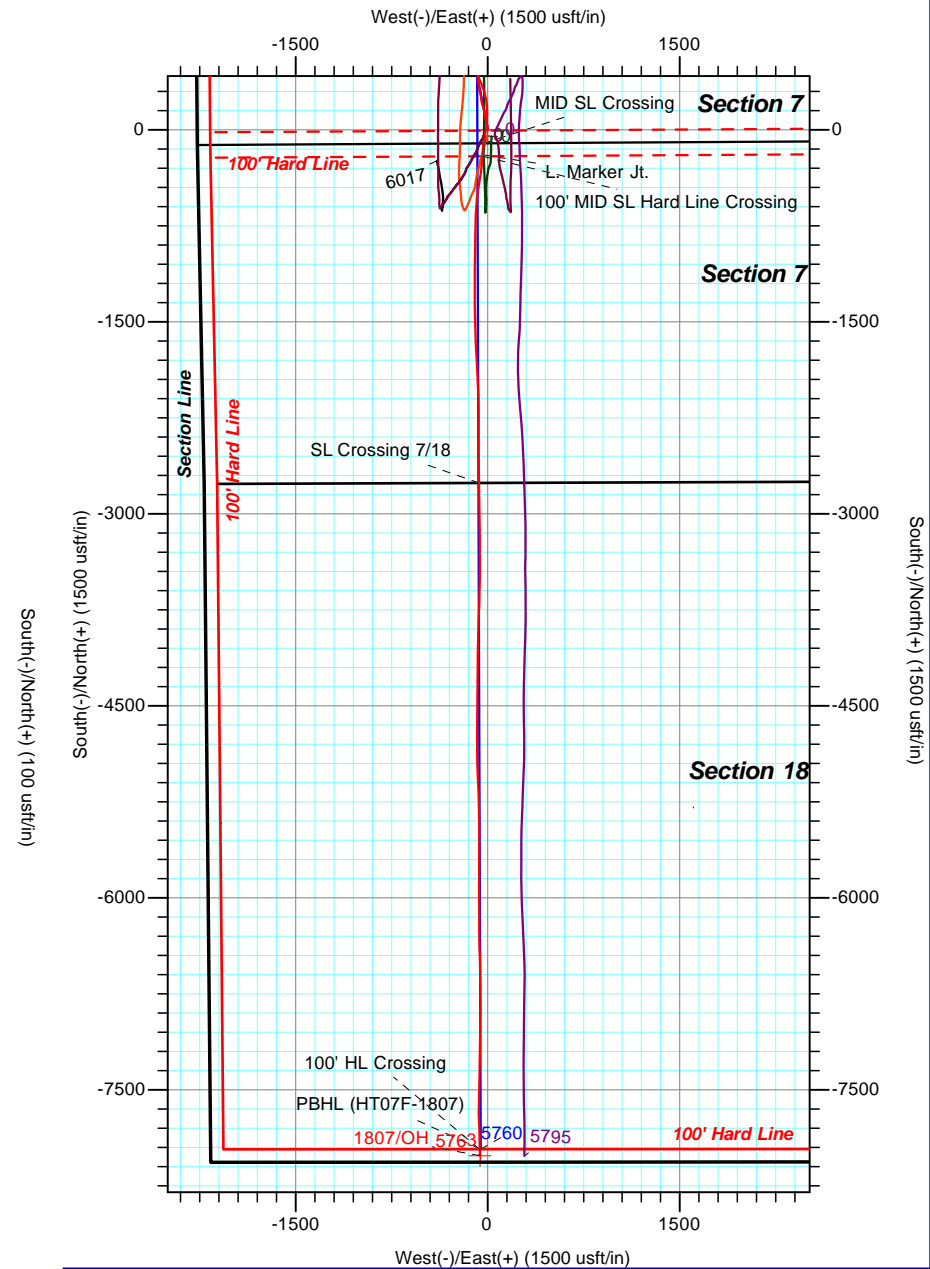
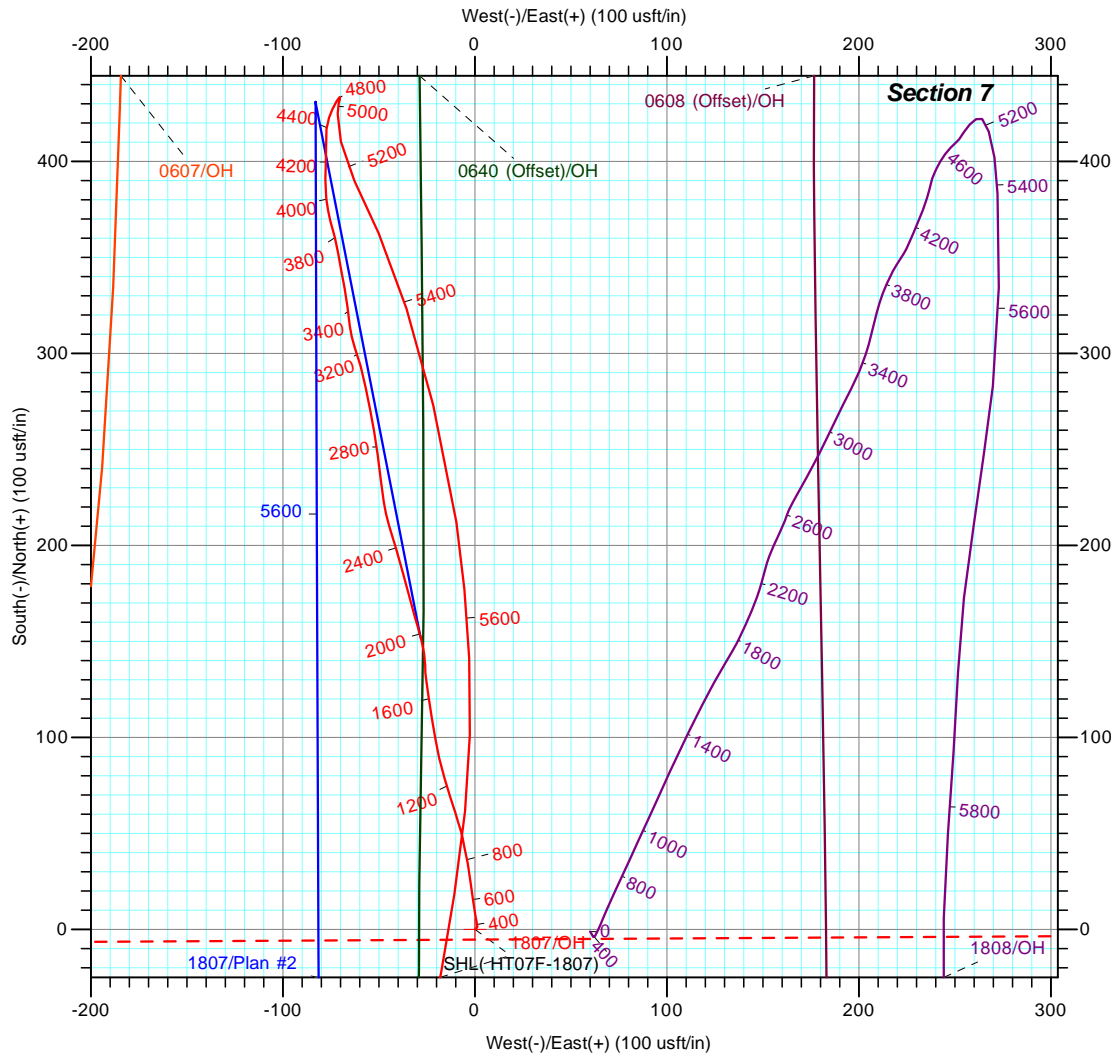
PROJECT DETAILS: Weld County, CO

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)



LINE CALLS  
SHL: 2548' FNL, 2269' FWL  
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PBHL: 100' FSL, 2110' FWL  
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BHL: 49' FSL, 2103' FWL, Sec 18

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TVD	MD	Name
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5763.45	13927.00	8 1/2"
2392' FNL, 2241' FWL (261' From Mid SL) Sec 7-T10N-R57W		



# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1807
<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>	1807	<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	1807					
Well Position	+N/-S	0.00 usft	Northing:	1,558,396.09 usft	Latitude:	40° 51' 13.460 N
	+E/-W	0.00 usft	Easting:	3,471,421.44 usft	Longitude:	103° 47' 45.010 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	3/12/2016	7.58	67.35	52,899

<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	180.39	

<b>Survey Program</b>	<b>Date</b>	6/6/2016			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
232.00	13,879.00	Survey #1 (OH)	MWD+IFR1+MS+sag	Fixed:v2:crustal dec & 3-axis correction + sag	
13,927.00	13,927.00	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
<b>SHL( HT07F-1807)</b>									
232.00	0.62	50.33	232.00	0.80	0.97	-0.81	0.27	0.27	0.00
323.00	0.31	356.89	322.99	1.36	1.33	-1.37	0.55	-0.34	-58.73
414.00	1.81	348.99	413.97	3.02	1.04	-3.03	1.65	1.65	-8.68
506.00	4.05	351.65	505.85	7.66	0.29	-7.66	2.44	2.43	2.89
598.00	5.67	350.71	597.51	15.36	-0.91	-15.35	1.76	1.76	-1.02
690.00	6.30	353.40	689.01	24.86	-2.22	-24.84	0.75	0.68	2.92
781.00	5.89	349.11	779.50	34.40	-3.68	-34.38	0.67	-0.45	-4.71
873.00	5.92	348.71	871.01	43.69	-5.50	-43.65	0.06	0.03	-0.43

# LEAM Drilling Systems LLC

## Survey Report

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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>	1807	<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)
964.00	4.74	344.09	961.62	51.91	-7.45	-51.86	1.38	-1.30	-5.08
1,056.00	6.04	341.97	1,053.21	60.17	-9.99	-60.10	1.43	1.41	-2.30
1,148.00	5.70	342.75	1,144.72	69.13	-12.84	-69.05	0.38	-0.37	0.85
1,239.00	7.03	343.25	1,235.16	78.78	-15.79	-78.67	1.46	1.46	0.55
1,331.00	6.70	347.71	1,326.50	89.42	-18.55	-89.29	0.68	-0.36	4.85
1,423.00	6.78	349.77	1,417.87	100.01	-20.66	-99.86	0.28	0.09	2.24
1,515.00	6.33	350.72	1,509.27	110.36	-22.44	-110.20	0.50	-0.49	1.03
1,606.00	6.20	351.27	1,599.72	120.16	-24.00	-120.00	0.16	-0.14	0.60
1,697.00	5.73	353.16	1,690.23	129.53	-25.29	-129.36	0.56	-0.52	2.08
1,789.00	4.25	359.61	1,781.88	137.50	-25.86	-137.32	1.72	-1.61	7.01
1,881.00	3.90	350.32	1,873.65	143.99	-26.40	-143.81	0.81	-0.38	-10.10
1,975.00	5.07	345.88	1,967.36	151.17	-27.96	-150.98	1.30	1.24	-4.72
2,027.00	4.67	344.39	2,019.17	155.44	-29.09	-155.24	0.81	-0.77	-2.86
9 5/8"									
2,058.00	4.43	343.38	2,050.07	157.80	-29.77	-157.60	0.81	-0.77	-3.27
2,122.00	4.13	344.96	2,113.89	162.40	-31.07	-162.18	0.50	-0.47	2.47
2,217.00	7.75	345.16	2,208.37	171.89	-33.60	-171.66	3.81	3.81	0.21
2,311.00	8.58	343.98	2,301.41	184.76	-37.16	-184.50	0.90	0.88	-1.26
2,406.00	8.16	344.54	2,395.40	198.07	-40.91	-197.79	0.45	-0.44	0.59
2,500.00	7.66	342.24	2,488.51	210.47	-44.60	-210.16	0.63	-0.53	-2.45
2,594.00	7.76	351.45	2,581.66	222.71	-47.46	-222.38	1.32	0.11	9.80
2,688.00	7.52	354.28	2,674.83	235.11	-49.01	-234.77	0.47	-0.26	3.01
2,782.00	7.43	351.08	2,768.03	247.23	-50.57	-246.88	0.45	-0.10	-3.40
2,877.00	7.41	351.72	2,862.23	259.36	-52.40	-259.00	0.09	-0.02	0.67
2,971.00	7.30	347.71	2,955.46	271.19	-54.55	-270.82	0.56	-0.12	-4.27
3,066.00	6.75	348.32	3,049.75	282.56	-56.96	-282.16	0.58	-0.58	0.64
3,160.00	6.63	345.05	3,143.11	293.21	-59.48	-292.80	0.42	-0.13	-3.48
3,255.00	6.44	341.17	3,237.49	303.55	-62.61	-303.12	0.51	-0.20	-4.08
3,350.00	6.78	352.71	3,331.86	314.16	-65.05	-313.71	1.44	0.36	12.15
3,443.00	6.09	352.38	3,424.28	324.49	-66.40	-324.03	0.74	-0.74	-0.35
3,538.00	5.74	349.90	3,518.77	334.16	-67.90	-333.69	0.46	-0.37	-2.61
3,633.00	5.59	349.37	3,613.31	343.39	-69.58	-342.91	0.17	-0.16	-0.56
3,727.00	5.41	350.38	3,706.87	352.26	-71.17	-351.77	0.22	-0.19	1.07
3,823.00	4.69	344.77	3,802.50	360.51	-72.96	-360.00	0.91	-0.75	-5.84
3,917.00	6.63	345.64	3,896.04	369.47	-75.31	-368.95	2.07	2.06	0.93
4,011.00	5.71	353.53	3,989.50	379.38	-77.19	-378.84	1.33	-0.98	8.39
4,035.00	5.53	354.95	4,013.38	381.71	-77.42	-381.18	0.95	-0.75	5.92
4,129.00	5.64	0.21	4,106.93	390.85	-77.80	-390.31	0.56	0.12	5.60
4,223.00	5.40	2.53	4,200.50	399.88	-77.59	-399.35	0.35	-0.26	2.47
4,318.00	5.26	359.30	4,295.09	408.70	-77.45	-408.17	0.35	-0.15	-3.40
4,413.00	4.54	4.42	4,389.74	416.81	-77.21	-416.27	0.89	-0.76	5.39
4,507.00	3.06	22.45	4,483.53	422.84	-75.97	-422.31	2.01	-1.57	19.18
4,600.00	3.05	22.28	4,576.40	427.42	-74.08	-426.90	0.01	-0.01	-0.18

# LEAM Drilling Systems LLC

## Survey Report

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<b>Well:</b>	1807	<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)
4,695.00	2.77	34.58	4,671.28	431.65	-71.82	-431.15	0.72	-0.29	12.95
4,789.00	0.17	87.06	4,765.24	433.52	-70.39	-433.04	2.84	-2.77	55.83
4,882.00	1.44	184.94	4,858.23	432.37	-70.35	-431.88	1.58	1.37	105.25
4,975.00	0.92	210.36	4,951.21	430.56	-70.83	-430.07	0.78	-0.56	27.33
5,070.00	6.08	183.10	5,046.01	424.87	-71.49	-424.38	5.56	5.43	-28.69
5,164.00	11.82	168.18	5,138.83	410.47	-69.78	-409.98	6.54	6.11	-15.87
5,259.00	14.58	155.18	5,231.34	390.08	-62.77	-389.64	4.25	2.91	-13.68
5,354.00	22.58	155.05	5,321.31	362.65	-50.04	-362.30	8.42	8.42	-0.14
5,449.00	29.81	163.45	5,406.53	323.41	-35.59	-323.16	8.54	7.61	8.84
5,543.00	37.69	165.40	5,484.63	273.12	-21.67	-272.97	8.46	8.38	2.07
5,637.00	45.37	171.72	5,554.97	212.10	-9.59	-212.03	9.30	8.17	6.72
5,685.00	49.15	174.65	5,587.55	177.11	-5.43	-177.06	9.06	7.88	6.10
5,731.00	53.64	177.45	5,616.25	141.26	-2.98	-141.23	10.86	9.76	6.09
5,779.00	58.42	181.23	5,643.07	101.47	-2.56	-101.46	11.91	9.96	7.88
5,825.00	62.52	185.76	5,665.74	61.55	-5.03	-61.52	12.36	8.91	9.85
5,873.00	68.40	189.00	5,685.67	18.28	-10.67	-18.21	13.70	12.25	6.75
5,918.00	69.96	190.21	5,701.67	-23.19	-17.69	23.31	4.28	3.47	2.69
5,966.00	69.95	189.83	5,718.12	-67.59	-25.53	67.77	0.74	-0.02	-0.79
6,006.60	71.69	188.29	5,731.46	-105.46	-31.57	105.67	5.58	4.29	-3.78
MID SL Crossing									
6,011.00	71.88	188.13	5,732.83	-109.60	-32.17	109.81	5.58	4.30	-3.74
6,059.00	76.42	184.86	5,745.94	-155.46	-37.37	155.71	11.51	9.46	-6.81
6,099.40	80.52	183.01	5,754.02	-194.94	-40.08	195.21	11.10	10.15	-4.58
L. Marker Jt.									
6,106.00	81.19	182.71	5,755.07	-201.45	-40.41	201.72	11.10	10.16	-4.51
6,110.00	81.78	182.83	5,755.66	-205.40	-40.60	205.67	15.09	14.79	3.06
100' MID SL Hard Line Crossing									
6,154.00	88.29	184.16	5,759.47	-249.13	-43.27	249.42	15.09	14.79	3.02
6,200.00	93.03	187.55	5,758.94	-294.86	-47.96	295.18	12.67	10.30	7.37
6,295.00	92.75	189.74	5,754.15	-388.66	-62.22	389.07	2.32	-0.29	2.31
6,389.00	90.05	188.23	5,751.85	-481.47	-76.90	481.98	3.29	-2.87	-1.61
6,484.00	88.36	184.02	5,753.17	-575.89	-87.03	576.47	4.77	-1.78	-4.43
6,577.00	87.32	183.48	5,756.67	-668.63	-93.11	669.24	1.26	-1.12	-0.58
6,670.00	89.31	181.01	5,759.41	-761.50	-96.75	762.14	3.41	2.14	-2.66
6,764.00	88.88	180.86	5,760.89	-855.48	-98.28	856.13	0.48	-0.46	-0.16
6,859.00	90.42	180.49	5,761.47	-950.47	-99.40	951.12	1.67	1.62	-0.39
6,953.00	92.51	180.30	5,759.07	-1,044.43	-100.05	1,045.08	2.23	2.22	-0.20
7,047.00	90.06	179.79	5,756.96	-1,138.40	-100.12	1,139.05	2.66	-2.61	-0.54
7,140.00	90.34	179.68	5,756.64	-1,231.39	-99.69	1,232.04	0.32	0.30	-0.12
7,233.00	92.59	179.56	5,754.26	-1,324.36	-99.08	1,325.00	2.42	2.42	-0.13
7,328.00	88.83	180.15	5,753.08	-1,419.33	-98.84	1,419.97	4.01	-3.96	0.62
7,422.00	85.53	179.73	5,757.71	-1,513.20	-98.74	1,513.84	3.54	-3.51	-0.45
7,514.00	88.33	177.50	5,762.63	-1,605.03	-96.52	1,605.65	3.89	3.04	-2.42
7,609.00	88.73	176.40	5,765.07	-1,699.86	-91.46	1,700.45	1.23	0.42	-1.16

# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1807
<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>	1807	<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)	
7,703.00	88.70	176.44	5,767.18	-1,793.66	-85.60	1,794.20	0.05	-0.03	0.04	
7,797.00	90.27	177.66	5,768.02	-1,887.52	-80.76	1,888.03	2.12	1.67	1.30	
7,891.00	90.80	177.66	5,767.15	-1,981.44	-76.92	1,981.92	0.56	0.56	0.00	
7,986.00	90.79	177.11	5,765.83	-2,076.33	-72.59	2,076.78	0.58	-0.01	-0.58	
8,081.00	90.76	179.89	5,764.54	-2,171.28	-70.10	2,171.71	2.93	-0.03	2.93	
8,175.00	90.22	180.36	5,763.74	-2,265.28	-70.31	2,265.70	0.76	-0.57	0.50	
8,271.00	90.53	180.02	5,763.11	-2,361.27	-70.62	2,361.70	0.48	0.32	-0.35	
8,365.00	90.07	179.84	5,762.62	-2,455.27	-70.51	2,455.70	0.53	-0.49	-0.19	
8,460.00	89.34	179.60	5,763.11	-2,550.27	-70.05	2,550.69	0.81	-0.77	-0.25	
8,554.00	88.84	179.43	5,764.60	-2,644.25	-69.25	2,644.66	0.56	-0.53	-0.18	
8,649.00	92.05	179.33	5,763.86	-2,739.23	-68.22	2,739.63	3.38	3.38	-0.11	
8,667.85	91.54	179.34	5,763.27	-2,758.07	-68.00	2,758.47	2.72	-2.72	0.03	
SL Crossing 7/18										
8,743.00	89.49	179.36	5,762.60	-2,833.21	-67.15	2,833.60	2.72	-2.72	0.03	
8,838.00	88.71	179.36	5,764.09	-2,928.19	-66.09	2,928.57	0.82	-0.82	0.00	
8,933.00	91.82	178.38	5,763.65	-3,023.16	-64.21	3,023.53	3.43	3.27	-1.03	
9,029.00	93.02	178.08	5,759.60	-3,119.03	-61.25	3,119.37	1.29	1.25	-0.31	
9,104.00	91.20	180.15	5,756.84	-3,193.96	-60.09	3,194.29	3.67	-2.43	2.76	
9,196.00	89.65	180.72	5,756.15	-3,285.95	-60.79	3,286.29	1.80	-1.68	0.62	
9,287.00	89.20	180.13	5,757.07	-3,376.94	-61.47	3,377.28	0.82	-0.49	-0.65	
9,379.00	89.06	180.40	5,758.46	-3,468.93	-61.89	3,469.27	0.33	-0.15	0.29	
9,470.00	89.24	180.54	5,759.81	-3,559.92	-62.64	3,560.26	0.25	0.20	0.15	
9,562.00	89.61	181.26	5,760.74	-3,651.90	-64.08	3,652.25	0.88	0.40	0.78	
9,654.00	91.77	183.18	5,759.63	-3,743.82	-67.65	3,744.19	3.14	2.35	2.09	
9,745.00	90.49	182.15	5,757.84	-3,834.70	-71.88	3,835.10	1.81	-1.41	-1.13	
9,837.00	89.33	181.01	5,757.98	-3,926.66	-74.41	3,927.07	1.77	-1.26	-1.24	
9,929.00	89.49	180.64	5,758.93	-4,018.64	-75.74	4,019.07	0.44	0.17	-0.40	
10,021.00	89.31	180.27	5,759.89	-4,110.64	-76.47	4,111.06	0.45	-0.20	-0.40	
10,112.00	91.14	181.38	5,759.53	-4,201.62	-77.78	4,202.05	2.35	2.01	1.22	
10,204.00	88.78	180.62	5,759.60	-4,293.60	-79.38	4,294.04	2.69	-2.57	-0.83	
10,296.00	89.06	180.62	5,761.33	-4,385.58	-80.38	4,386.02	0.30	0.30	0.00	
10,387.00	90.63	180.68	5,761.58	-4,476.57	-81.41	4,477.02	1.73	1.73	0.07	
10,482.00	92.51	180.35	5,758.98	-4,571.52	-82.27	4,571.98	2.01	1.98	-0.35	
10,577.00	90.41	180.23	5,756.55	-4,666.49	-82.75	4,666.94	2.21	-2.21	-0.13	
10,672.00	91.08	179.59	5,755.32	-4,761.48	-82.60	4,761.93	0.98	0.71	-0.67	
10,767.00	88.73	179.79	5,755.48	-4,856.47	-82.08	4,856.92	2.48	-2.47	0.21	
10,862.00	89.96	178.84	5,756.56	-4,951.45	-80.95	4,951.89	1.64	1.29	-1.00	
10,957.00	89.82	176.81	5,756.75	-5,046.38	-77.34	5,046.79	2.14	-0.15	-2.14	
11,051.00	91.42	178.10	5,755.73	-5,140.28	-73.17	5,140.66	2.19	1.70	1.37	
11,146.00	92.04	177.08	5,752.86	-5,235.15	-69.18	5,235.50	1.26	0.65	-1.07	
11,240.00	91.77	179.55	5,749.73	-5,329.05	-66.41	5,329.38	2.64	-0.29	2.63	
11,334.00	89.16	180.67	5,748.97	-5,423.04	-66.59	5,423.36	3.02	-2.78	1.19	
11,427.00	88.97	180.22	5,750.49	-5,516.02	-67.32	5,516.35	0.53	-0.20	-0.48	
11,522.00	90.22	180.04	5,751.16	-5,611.02	-67.53	5,611.35	1.33	1.32	-0.19	

# LEAM Drilling Systems LLC

## Survey Report

<b>Company:</b>	WHITING PETROLEUM CORPORATION	<b>Local Co-ordinate Reference:</b>	Well 1807
<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>	1807	<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)
11,616.00	91.49	179.61	5,749.76	-5,705.00	-67.25	5,705.33	1.43	1.35	-0.46
11,710.00	92.33	179.58	5,746.63	-5,798.95	-66.58	5,799.27	0.89	0.89	-0.03
11,802.00	91.72	180.49	5,743.37	-5,890.89	-66.64	5,891.21	1.19	-0.66	0.99
11,895.00	92.34	179.48	5,740.08	-5,983.83	-66.61	5,984.14	1.27	0.67	-1.09
11,989.00	89.24	180.63	5,738.78	-6,077.81	-66.70	6,078.12	3.52	-3.30	1.22
12,083.00	89.51	179.39	5,739.81	-6,171.80	-66.72	6,172.11	1.35	0.29	-1.32
12,178.00	89.67	179.46	5,740.49	-6,266.79	-65.77	6,267.09	0.18	0.17	0.07
12,273.00	89.09	178.77	5,741.52	-6,361.77	-64.30	6,362.06	0.95	-0.61	-0.73
12,368.00	88.23	177.99	5,743.74	-6,456.71	-61.62	6,456.98	1.22	-0.91	-0.82
12,462.00	90.85	178.84	5,744.49	-6,550.66	-59.02	6,550.91	2.93	2.79	0.90
12,556.00	90.97	177.91	5,743.00	-6,644.61	-56.35	6,644.84	1.00	0.13	-0.99
12,650.00	90.84	179.97	5,741.52	-6,738.58	-54.61	6,738.79	2.20	-0.14	2.19
12,745.00	91.64	180.63	5,739.46	-6,833.55	-55.11	6,833.77	1.09	0.84	0.69
12,840.00	89.19	181.43	5,738.77	-6,928.53	-56.82	6,928.75	2.71	-2.58	0.84
12,934.00	88.86	181.34	5,740.37	-7,022.48	-59.09	7,022.72	0.36	-0.35	-0.10
13,029.00	89.47	180.23	5,741.76	-7,117.46	-60.39	7,117.71	1.33	0.64	-1.17
13,124.00	90.22	180.05	5,742.01	-7,212.46	-60.62	7,212.71	0.81	0.79	-0.19
13,218.00	88.48	181.04	5,743.08	-7,306.45	-61.52	7,306.70	2.13	-1.85	1.05
13,312.00	89.13	181.30	5,745.04	-7,400.41	-63.43	7,400.67	0.74	0.69	0.28
13,405.00	89.93	181.26	5,745.80	-7,493.38	-65.51	7,493.65	0.86	0.86	-0.04
13,500.00	88.23	181.67	5,747.33	-7,588.33	-67.94	7,588.62	1.84	-1.79	0.43
13,596.00	87.54	179.14	5,750.87	-7,684.26	-68.62	7,684.55	2.73	-0.72	-2.64
13,690.00	87.53	178.29	5,754.91	-7,778.14	-66.51	7,778.42	0.90	-0.01	-0.90
13,784.00	87.64	178.23	5,758.88	-7,872.02	-63.66	7,872.27	0.13	0.12	-0.06
13,875.99	88.40	178.72	5,762.05	-7,963.92	-61.22	7,964.15	0.99	0.83	0.54
PBHL (HT07F-1807)									
13,876.15	88.41	178.72	5,762.05	-7,964.08	-61.21	7,964.31	0.99	0.83	0.54
100' HL Crossing									
13,879.00	88.43	178.74	5,762.13	-7,966.93	-61.15	7,967.16	0.99	0.83	0.54
13,927.00	88.43	178.74	5,763.45	-8,014.90	-60.10	8,015.12	0.00	0.00	0.00
8 1/2" - BHL (HT07F-1807)									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
2,027.00	2,019.17	9 5/8"	9-5/8	12-1/4	
13,927.00	5,763.45	8 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 1807
<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>	1807	<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)	
6,006.60	5,731.46	-105.46	-31.57	MID SL Crossing
6,099.40	5,754.02	-194.94	-40.08	L. Marker Jt.
6,110.00	5,755.66	-205.40	-40.60	100' MID SL Hard Line Crossing
8,667.85	5,763.27	-2,758.07	-68.00	SL Crossing 7/18
13,876.15	5,762.05	-7,964.08	-61.21	100' HL Crossing