



Company: Whiting Oil & Gas
Site: Horsetail 02D
Well: 0204
Project: Weld County, Colorado (NAD 83)
Rig: Pioneer 54



ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	KOP, 2.00°/100' Build
1778.96	9.58	56.31	1776.73	22.16	33.23	-18.87	39.94	Hold 9.58° Inc, 56.31° Azm
4361.51	9.58	56.31	4323.27	260.57	390.81	-221.85	469.71	Begin 2.00°/100' Drop
4840.47	0.00	0.00	4800.00	282.73	424.04	-240.71	509.65	Begin Vertical Hold
5044.01	0.00	0.00	5003.54	282.73	424.04	-240.71	509.65	Begin 10.00°/100' Build
5944.01	90.00	180.00	5576.50	-290.23	424.04	329.60	1082.61	Begin 90.00° Lateral
10050.33	90.00	180.00	5576.50	-4396.55	424.04	4416.96	5188.93	PBHL

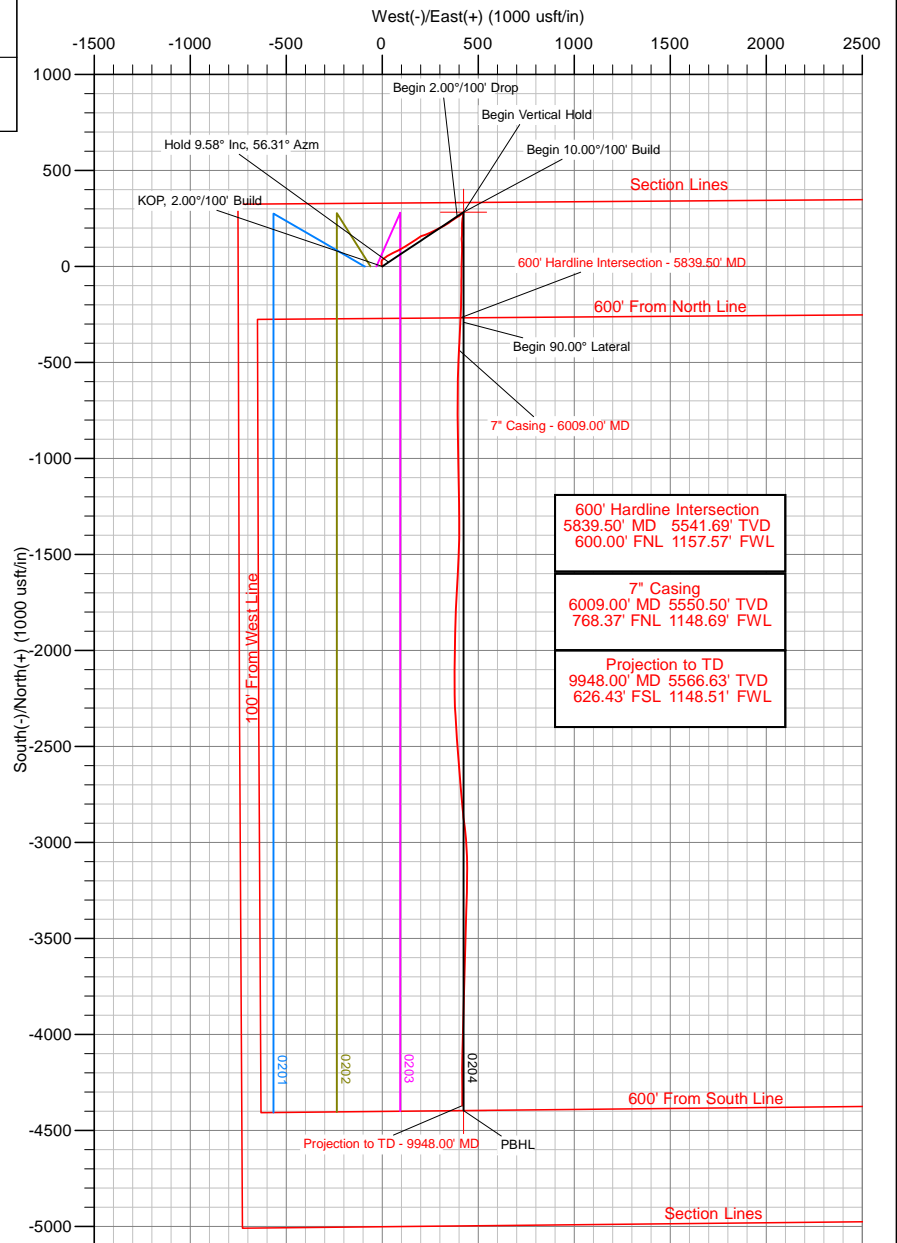
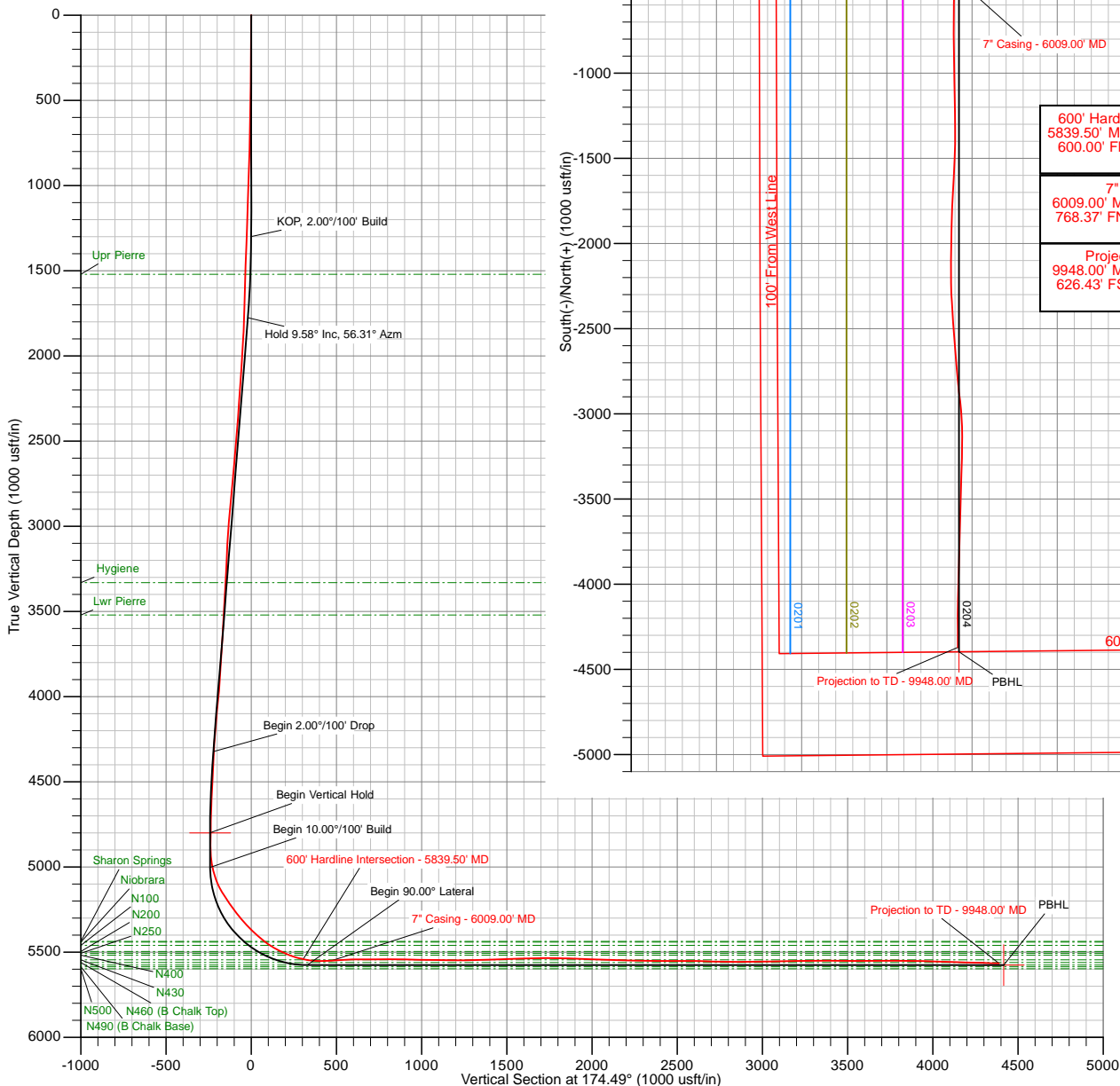


Azimuths to True North
Magnetic North: 7.88°

Magnetic Field
Strength: 53136.4snT
Dip Angle: 67.47°
Date: 10/08/2014
Model: WMM_2010

US State Plane 1983
Colorado Northern Zone

Created By: TNM
Date: 12:39, October 14 2014
Plan: Design #1



600' Hardline Intersection 5839.50' MD 5541.69' TVD 600.00' FNL 1157.57' FWL
7' Casing 6009.00' MD 5550.50' TVD 768.37' FNL 1148.69' FWL
Projection to TD 9948.00' MD 5566.63' TVD 626.43' FSL 1148.51' FWL



Whiting Oil & Gas

Weld County, Colorado (NAD 83)

Horsetail 02D

0204

Wellbore #1

Survey: MS MWD

Standard Survey Report

14 October, 2014



Company:	Whiting Oil & Gas	Local Co-ordinate Reference:	Well 0204
Project:	Weld County, Colorado (NAD 83)	TVD Reference:	WELL @ 4796.50usft (Pioneer 54)
Site:	Horsetail 02D	MD Reference:	WELL @ 4796.50usft (Pioneer 54)
Well:	0204	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	Conroe Server Database

Project	Weld County, Colorado (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Well	0204			
Well Position	+N-S	0.00 usft	Northing:	1,566,448.16 usft
	+E-W	0.00 usft	Easting:	3,490,792.35 usft
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft
			Latitude:	40° 52' 29.251 N
			Longitude:	103° 43' 30.889 W
			Ground Level:	4,778.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	WMM_2010	10/08/14	7.88	67.47	53,136

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)	
	0.00	0.00	0.00	174.49	

Survey Program	Date	10/14/14			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
418.00	9,948.00	MS MWD (Wellbore #1)	MWD	MWD - Standard	

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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
418.00	0.70	335.60	417.99	2.33	-1.05	-2.42	0.17	0.17	0.00	
788.00	1.60	353.30	787.91	9.51	-2.59	-9.72	0.26	0.24	4.78	
1,068.00	1.90	358.00	1,067.78	18.04	-3.21	-18.26	0.12	0.11	1.68	
1,254.00	2.00	0.32	1,253.67	24.36	-3.30	-24.57	0.07	0.05	1.25	
1,347.00	2.20	12.40	1,346.61	27.73	-2.91	-27.88	0.52	0.22	12.99	
1,441.00	2.20	26.10	1,440.54	31.11	-1.73	-31.13	0.56	0.00	14.57	
1,534.00	3.10	40.10	1,533.44	34.64	0.68	-34.41	1.19	0.97	15.05	
1,707.00	2.90	55.10	1,706.21	40.72	7.28	-39.83	0.47	-0.12	8.67	
1,755.00	2.60	54.50	1,754.15	42.05	9.16	-40.97	0.63	-0.63	-1.25	
1,816.00	4.20	60.70	1,815.04	43.94	12.24	-42.57	2.69	2.62	10.16	
1,908.00	7.40	54.30	1,906.56	49.05	19.99	-46.90	3.54	3.48	-6.96	
2,001.00	7.40	55.20	1,998.79	55.96	29.77	-52.85	0.12	0.00	0.97	
2,093.00	9.90	63.10	2,089.74	62.92	41.69	-58.63	3.00	2.72	8.59	
2,186.00	9.80	61.70	2,181.37	70.29	55.79	-64.61	0.28	-0.11	-1.51	



Company:	Whiting Oil & Gas	Local Co-ordinate Reference:	Well 0204
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Site:	Horsetail 02D	MD Reference:	WELL @ 4796.50usft (Pioneer 54)
Well:	0204	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	Conroe Server Database

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)	
2,278.00	11.50	67.20	2,271.78	77.56	71.14	-70.37	2.15	1.85	5.98	
2,371.00	11.20	61.80	2,362.96	85.42	87.65	-76.61	1.19	-0.32	-5.81	
2,463.00	11.30	57.10	2,453.20	94.54	103.09	-84.20	1.00	0.11	-5.11	
2,555.00	11.60	61.80	2,543.37	103.81	118.81	-91.92	1.06	0.33	5.11	
2,647.00	11.50	60.00	2,633.51	112.76	134.90	-99.29	0.41	-0.11	-1.96	
2,739.00	11.60	58.10	2,723.64	122.24	150.70	-107.20	0.43	0.11	-2.07	
2,832.00	10.90	56.00	2,814.86	132.09	165.93	-115.55	0.87	-0.75	-2.26	
2,924.00	11.00	51.60	2,905.18	142.41	180.02	-124.47	0.91	0.11	-4.78	
3,016.00	10.00	57.40	2,995.65	152.17	193.63	-132.87	1.58	-1.09	6.30	
3,108.00	10.00	71.20	3,086.26	159.05	207.92	-138.35	2.60	0.00	15.00	
3,201.00	10.00	68.70	3,177.85	164.58	223.09	-142.40	0.47	0.00	-2.69	
3,293.00	9.20	66.00	3,268.56	170.47	237.25	-146.91	1.00	-0.87	-2.93	
3,385.00	9.60	65.40	3,359.32	176.66	250.94	-151.75	0.45	0.43	-0.65	
3,478.00	9.60	64.80	3,451.02	183.19	265.01	-156.90	0.11	0.00	-0.65	
3,571.00	9.40	65.10	3,542.75	189.69	278.91	-162.03	0.22	-0.22	0.32	
3,663.00	8.60	62.90	3,633.61	195.98	291.85	-167.06	0.95	-0.87	-2.39	
3,756.00	9.20	63.20	3,725.49	202.50	304.68	-172.31	0.65	0.65	0.32	
3,847.00	9.90	60.80	3,815.23	209.60	318.00	-178.10	0.88	0.77	-2.64	
3,940.00	9.10	60.40	3,906.96	217.13	331.37	-184.31	0.86	-0.86	-0.43	
4,032.00	11.30	54.60	3,997.50	225.95	345.05	-191.77	2.64	2.39	-6.30	
4,125.00	10.60	55.80	4,088.80	236.04	359.55	-200.42	0.79	-0.75	1.29	
4,218.00	9.80	55.60	4,180.33	245.32	373.16	-208.35	0.86	-0.86	-0.22	
4,310.00	8.80	54.60	4,271.12	253.82	385.35	-215.64	1.10	-1.09	-1.09	
4,401.00	6.80	67.40	4,361.28	259.92	396.00	-220.70	2.90	-2.20	14.07	
4,493.00	5.70	52.30	4,452.74	264.81	404.65	-224.73	2.14	-1.20	-16.41	
4,586.00	4.70	41.60	4,545.36	270.48	410.83	-229.78	1.49	-1.08	-11.51	
4,679.00	2.50	40.30	4,638.17	274.88	414.67	-233.79	2.37	-2.37	-1.40	
4,771.00	1.90	48.80	4,730.10	277.41	417.12	-236.08	0.74	-0.65	9.24	
4,864.00	1.70	48.00	4,823.06	279.35	419.30	-237.80	0.22	-0.22	-0.86	
4,956.00	1.60	130.50	4,915.03	279.43	421.29	-237.69	2.37	-0.11	89.67	
4,986.00	6.50	172.90	4,944.95	277.47	421.82	-235.69	18.09	16.33	141.33	
5,017.00	10.10	179.30	4,975.62	273.01	422.07	-231.22	11.97	11.61	20.65	
5,048.00	12.80	187.70	5,006.00	266.89	421.65	-225.17	10.22	8.71	27.10	
5,079.00	15.30	192.70	5,036.07	259.49	420.29	-217.94	8.96	8.06	16.13	
5,110.00	19.00	188.90	5,065.69	250.52	418.61	-209.16	12.46	11.94	-12.26	
5,141.00	22.80	184.30	5,094.65	239.54	417.37	-198.35	13.34	12.26	-14.84	
5,171.00	27.90	181.90	5,121.75	226.72	416.71	-185.66	17.34	17.00	-8.00	
5,202.00	32.00	182.60	5,148.61	211.25	416.09	-170.33	13.27	13.23	2.26	
5,233.00	33.40	180.80	5,174.69	194.52	415.60	-153.71	5.50	4.52	-5.81	
5,262.00	34.60	180.80	5,198.74	178.30	415.37	-137.59	4.14	4.14	0.00	
5,293.00	34.50	180.80	5,224.27	160.72	415.13	-120.12	0.32	-0.32	0.00	
5,323.00	36.20	180.10	5,248.74	143.37	414.99	-102.86	5.83	5.67	-2.33	
5,354.00	38.50	179.40	5,273.38	124.56	415.08	-84.13	7.54	7.42	-2.26	
5,384.00	38.80	178.90	5,296.81	105.83	415.36	-65.46	1.44	1.00	-1.67	



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Well:	0204	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	Conroe Server Database

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)
5,415.00	40.70	179.60	5,320.64	86.01	415.61	-45.70	6.30	6.13	2.26
5,445.00	43.50	180.80	5,342.90	65.90	415.54	-25.69	9.71	9.33	4.00
5,476.00	46.30	181.20	5,364.85	44.02	415.15	-3.95	9.08	9.03	1.29
5,507.00	48.20	181.80	5,385.90	21.27	414.56	18.64	6.29	6.13	1.94
5,538.00	48.20	181.60	5,406.56	-1.83	413.87	41.57	0.48	0.00	-0.65
5,569.00	50.40	180.80	5,426.77	-25.33	413.38	64.91	7.36	7.10	-2.58
5,600.00	54.10	180.70	5,445.75	-49.83	413.06	89.27	11.94	11.94	-0.32
5,630.00	57.80	180.40	5,462.54	-74.69	412.82	113.98	12.36	12.33	-1.00
5,661.00	60.90	180.70	5,478.34	-101.35	412.57	140.50	10.03	10.00	0.97
5,692.00	63.40	180.70	5,492.82	-128.76	412.23	167.74	8.06	8.06	0.00
5,723.00	65.90	181.10	5,506.10	-156.76	411.79	195.58	8.15	8.06	1.29
5,754.00	69.20	181.10	5,517.93	-185.41	411.24	224.04	10.65	10.65	0.00
5,785.00	72.60	181.80	5,528.08	-214.69	410.50	253.11	11.17	10.97	2.26
5,815.00	76.10	182.30	5,536.17	-243.55	409.46	281.74	11.78	11.67	1.67
5,839.50	77.84	182.30	5,541.69	-267.40	408.51	305.39	7.10	7.10	0.00
600' Hardline Intersection - 5839.50' MD									
5,846.00	78.30	182.30	5,543.03	-273.75	408.25	311.69	7.10	7.10	0.00
5,877.00	82.10	182.40	5,548.31	-304.27	407.00	341.94	12.26	12.26	0.32
5,908.00	86.20	183.10	5,551.47	-335.07	405.52	372.46	13.42	13.23	2.26
5,939.00	89.40	183.00	5,552.66	-366.00	403.87	403.08	10.33	10.32	-0.32
5,970.00	92.00	183.00	5,552.28	-396.95	402.25	433.74	8.39	8.39	0.00
5,997.00	92.90	183.20	5,551.13	-423.88	400.79	460.41	3.41	3.33	0.74
6,009.00	93.12	183.05	5,550.50	-435.85	400.14	472.26	2.23	1.83	-1.27
7" Casing - 6009.00' MD									
6,068.00	94.20	182.30	5,546.73	-494.66	397.39	530.53	2.23	1.83	-1.27
6,160.00	90.10	181.00	5,543.28	-586.54	394.74	621.73	4.67	-4.46	-1.41
6,253.00	90.10	180.10	5,543.12	-679.53	393.85	714.21	0.97	0.00	-0.97
6,345.00	90.10	180.00	5,542.96	-771.53	393.77	805.78	0.11	0.00	-0.11
6,438.00	89.30	179.20	5,543.44	-864.53	394.42	898.41	1.22	-0.86	-0.86
6,530.00	88.70	179.20	5,545.05	-956.50	395.71	990.08	0.65	-0.65	0.00
6,622.00	89.00	179.00	5,546.89	-1,048.47	397.15	1,081.76	0.39	0.33	-0.22
6,714.00	89.20	178.80	5,548.34	-1,140.45	398.92	1,173.48	0.31	0.22	-0.22
6,806.00	91.20	179.50	5,548.02	-1,232.43	400.28	1,265.17	2.30	2.17	0.76
6,898.00	91.40	178.80	5,545.93	-1,324.40	401.65	1,356.84	0.79	0.22	-0.76
6,991.00	91.10	181.70	5,543.90	-1,417.36	401.24	1,449.34	3.13	-0.32	3.12
7,083.00	93.00	181.20	5,540.61	-1,509.27	398.91	1,540.60	2.14	2.07	-0.54
7,176.00	92.20	183.70	5,536.39	-1,602.08	394.94	1,632.60	2.82	-0.86	2.69
7,267.00	88.80	182.90	5,535.60	-1,692.91	389.70	1,722.51	3.84	-3.74	-0.88
7,360.00	89.70	183.10	5,536.82	-1,785.78	384.84	1,814.48	0.99	0.97	0.22
7,454.00	87.50	180.90	5,539.11	-1,879.68	381.56	1,907.63	3.31	-2.34	-2.34
7,544.00	88.20	181.50	5,542.49	-1,969.60	379.67	1,996.95	1.02	0.78	0.67
7,637.00	88.10	181.10	5,545.49	-2,062.52	377.56	2,089.25	0.44	-0.11	-0.43
7,730.00	88.40	179.30	5,548.33	-2,155.48	377.24	2,181.74	1.96	0.32	-1.94



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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)	
7,822.00	88.70	179.30	5,550.66	-2,247.44	378.36	2,273.38	0.33	0.33	0.00	
7,915.00	89.20	175.80	5,552.36	-2,340.32	382.34	2,366.22	3.80	0.54	-3.76	
8,007.00	90.10	176.50	5,552.93	-2,432.11	388.52	2,458.18	1.24	0.98	0.76	
8,100.00	90.50	176.30	5,552.44	-2,524.93	394.35	2,551.13	0.48	0.43	-0.22	
8,192.00	88.20	174.70	5,553.48	-2,616.63	401.57	2,643.10	3.05	-2.50	-1.74	
8,284.00	88.40	175.00	5,556.21	-2,708.22	409.83	2,735.05	0.39	0.22	0.33	
8,377.00	90.10	175.70	5,557.43	-2,800.90	417.36	2,828.03	1.98	1.83	0.75	
8,469.00	90.20	172.70	5,557.19	-2,892.42	426.66	2,920.02	3.26	0.11	-3.26	
8,560.00	91.30	174.50	5,556.00	-2,982.84	436.80	3,011.00	2.32	1.21	1.98	
8,653.00	90.70	179.40	5,554.37	-3,075.66	441.75	3,103.87	5.31	-0.65	5.27	
8,745.00	91.60	179.20	5,552.53	-3,167.64	442.87	3,195.52	1.00	0.98	-0.22	
8,838.00	90.10	182.30	5,551.15	-3,260.60	441.65	3,287.95	3.70	-1.61	3.33	
8,931.00	90.10	181.70	5,550.98	-3,353.55	438.41	3,380.15	0.65	0.00	-0.65	
9,023.00	89.30	181.20	5,551.47	-3,445.51	436.08	3,471.47	1.03	-0.87	-0.54	
9,115.00	90.60	182.30	5,551.55	-3,537.47	433.27	3,562.73	1.85	1.41	1.20	
9,207.00	89.50	181.60	5,551.47	-3,629.41	430.14	3,653.95	1.42	-1.20	-0.76	
9,300.00	89.90	181.40	5,551.95	-3,722.38	427.71	3,746.25	0.48	0.43	-0.22	
9,392.00	90.30	181.60	5,551.79	-3,814.35	425.30	3,837.56	0.49	0.43	0.22	
9,483.00	88.50	181.20	5,552.75	-3,905.31	423.08	3,927.89	2.03	-1.98	-0.44	
9,574.00	88.40	181.60	5,555.21	-3,996.25	420.85	4,018.20	0.45	-0.11	0.44	
9,666.00	87.90	181.60	5,558.18	-4,088.17	418.29	4,109.44	0.54	-0.54	0.00	
9,759.00	88.60	180.00	5,561.02	-4,181.11	416.99	4,201.83	1.88	0.75	-1.72	
9,852.00	88.20	179.60	5,563.61	-4,274.07	417.31	4,294.40	0.61	-0.43	-0.43	
9,898.00	88.20	179.80	5,565.06	-4,320.05	417.55	4,340.18	0.43	0.00	0.43	
9,948.00	88.20	179.80	5,566.63	-4,370.03	417.73	4,389.94	0.00	0.00	0.00	
Projection to TD - 9948.00' MD										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
5,839.50	5,541.69	-267.40	408.51	600' Hardline Intersection - 5839.50' MD	
6,009.00	5,550.50	-435.85	400.14	7" Casing - 6009.00' MD	
9,948.00	5,566.63	-3,167.64	442.87	Projection to TD - 9948.00' MD	