



# Enseco Survey Report

09 January, 2012

## Wexpro Company

Moffat County, Colorado  
Sec 4, T11N, R97W, 6 PM  
Carl Allen #37

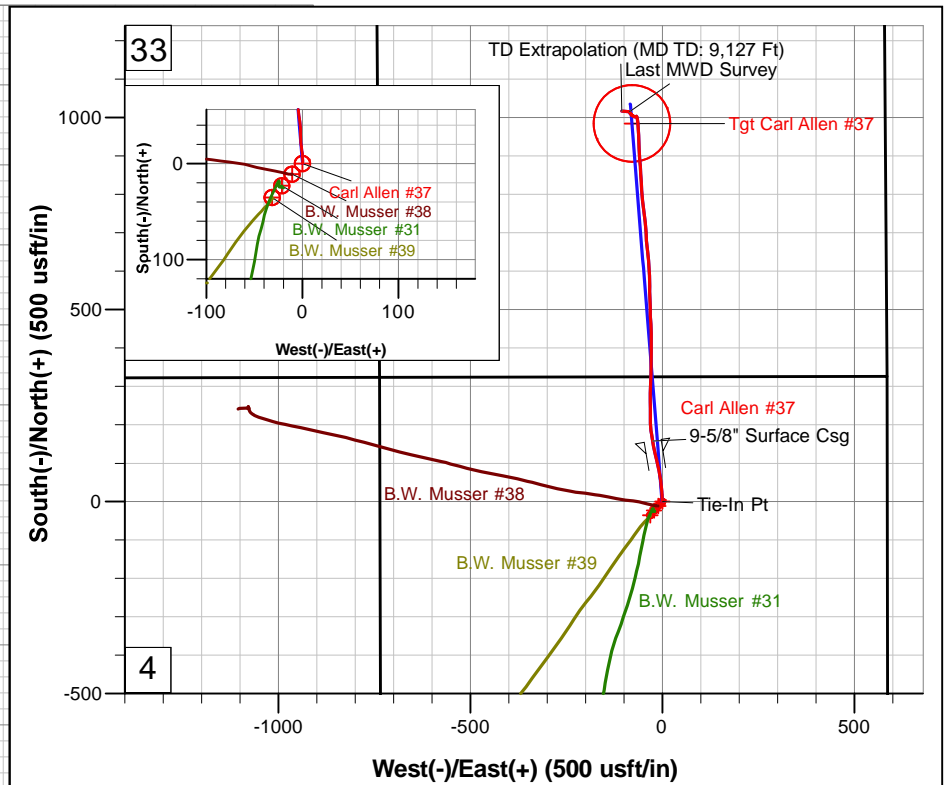
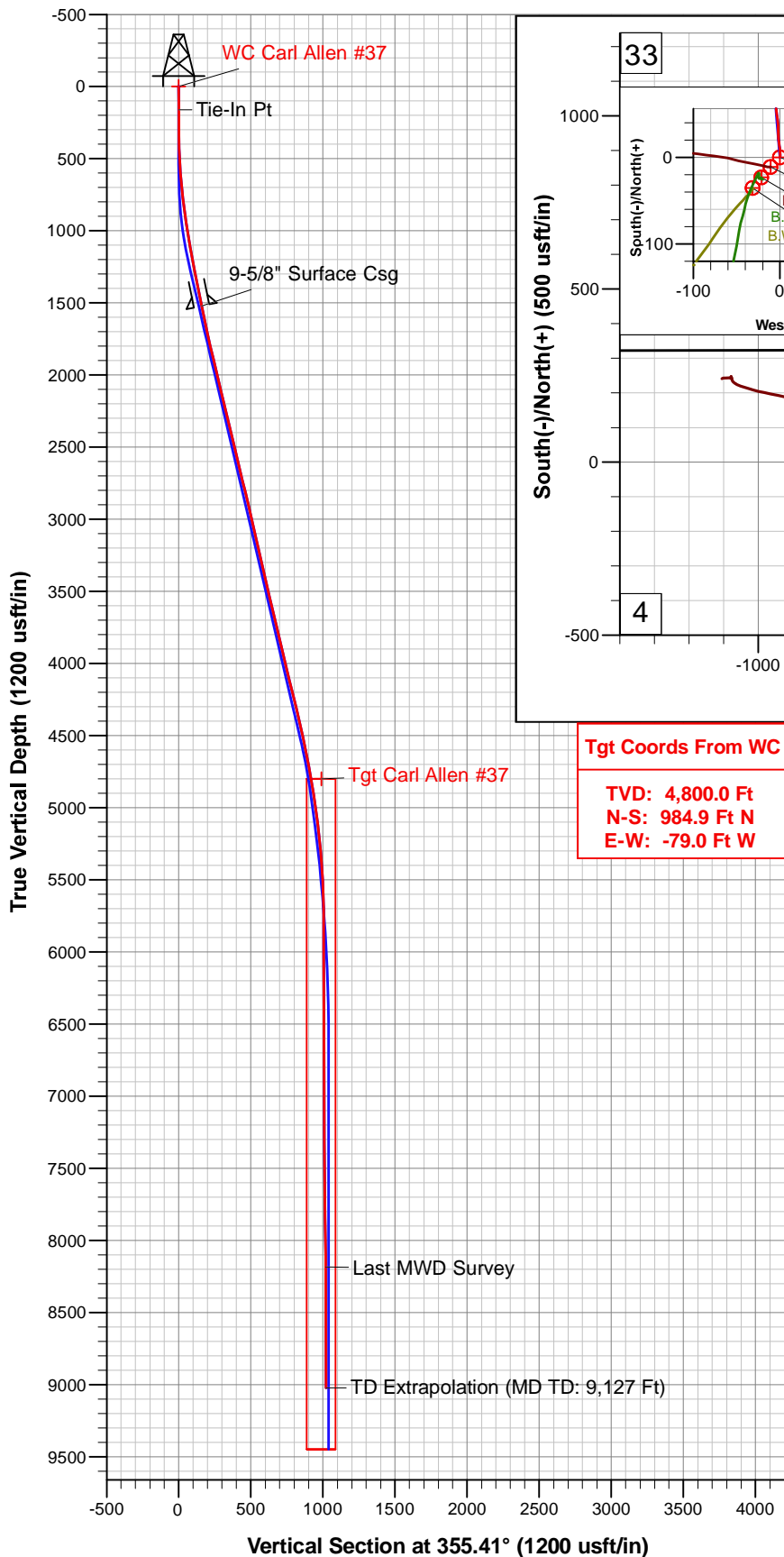
11286-159

Survey: Final Surveys to TD (MD TD @ 9,127 Ft)





**Wexpro Company**  
**Project: Moffat County, Colorado**  
**Site: Sec 4, T11N, R97W, 6 PM**  
**Well: Carl Allen #37**  
**Wellbore: 11286-159**  
**Design: Final Surveys**



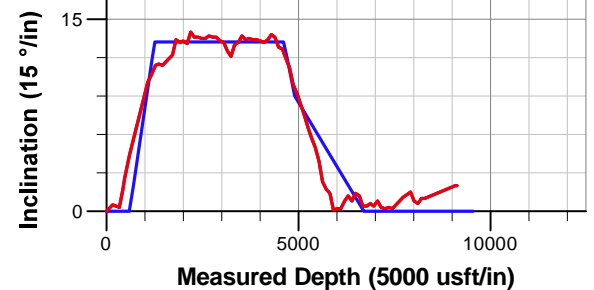
**Tgt Coords From WC**

**TVD: 4,800.0 Ft**  
**N-S: 984.9 Ft N**  
**E-W: -79.0 Ft W**

**Ref Information: Well Center**

Geodetic System: US State Plane 1983  
 Ellipsoid: GRS 1980  
 Zone: Colorado Northern Zone  
 Northing: 1600567.78  
 Easting: 2229604.95  
 Latitude: 40° 56' 55.179 N  
 Longitude: 108° 17' 20.969 W

Ground Elevation: 6576.0  
 KB Elevation: Actual Kb @ 6604.0usft (SST-88)



**ANNOTATIONS**

TVD	MD	Inc	Azm	Vs	Annotation
161.0	161.0	0.50	10.20	0.7	Tie-In Pt
1521.2	1534.0	11.62	350.57	159.4	9-5/8" Surface Csg
8183.7	8289.0	1.00	314.00	1019.2	Last MWD Survey
9021.4	9127.0	2.00	257.35	1022.3	TD Ext (MD TD: 9,127 Ft)

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Carl Allen #37
<b>Company:</b>	Wexpro Company	<b>TVD Reference:</b>	Actual Kb @ 6604.0usft (SST-88)
<b>Project:</b>	Moffat County, Colorado	<b>MD Reference:</b>	Actual Kb @ 6604.0usft (SST-88)
<b>Site:</b>	Sec 4, T11N, R97W, 6 PM	<b>North Reference:</b>	True
<b>Well:</b>	Carl Allen #37	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	11286-159		
<b>Design:</b>	Final Surveys		

<b>Project</b>	Moffat County, Colorado		
<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		Using geodetic scale factor

<b>Site</b>	Sec 4, T11N, R97W, 6 PM   Site Reference Pt.: Musser #39		
<b>Site Position:</b>		<b>Northing:</b>	1,600,533.49 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,229,572.32 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16"
		<b>Latitude:</b>	40° 56' 54.830 N
		<b>Longitude:</b>	108° 17' 21.380 W
		<b>Grid Convergence:</b>	-1.80 °

<b>Well</b>	Carl Allen #37		
<b>Well Position</b>	<b>+N/-S</b>	35.3 usft	<b>Northing:</b>
	<b>+E/-W</b>	31.5 usft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b>	6,604.0 usft
		<b>Latitude:</b>	40° 56' 55.179 N
		<b>Longitude:</b>	108° 17' 20.969 W
		<b>Ground Level:</b>	6,576.0 usft

<b>Wellbore</b>	11286-159				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	22-Nov-2011	10.62	66.86	52,942

<b>Design</b>	Final Surveys			
<b>Audit Notes:</b>				
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>
				0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	355.41

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Carl Allen #37
<b>Company:</b>	Wexpro Company	<b>TVD Reference:</b>	Actual Kb @ 6604.0usft (SST-88)
<b>Project:</b>	Moffat County, Colorado	<b>MD Reference:</b>	Actual Kb @ 6604.0usft (SST-88)
<b>Site:</b>	Sec 4, T11N, R97W, 6 PM	<b>North Reference:</b>	True
<b>Well:</b>	Carl Allen #37	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	11286-159		
<b>Design:</b>	Final Surveys		

Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	6,604.00	0.0	0.0	0.0	0.00	0.00	0.00
<b>Tie-In Pt</b>										
161.0	0.50	10.20	161.0	6,443.00	0.7	0.1	0.7	0.31	0.31	0.00
251.0	0.40	37.50	251.0	6,353.00	1.3	0.4	1.3	0.26	-0.11	30.33
342.0	0.30	356.00	342.0	6,262.01	1.8	0.6	1.8	0.29	-0.11	-45.60
434.0	1.70	345.80	434.0	6,170.02	3.4	0.2	3.4	1.53	1.52	-11.09
525.0	3.30	1.10	524.9	6,079.11	7.3	-0.1	7.3	1.89	1.76	16.81
617.0	4.50	350.20	616.7	5,987.32	13.5	-0.6	13.5	1.53	1.30	-11.85
708.0	5.70	357.90	707.3	5,896.69	21.5	-1.4	21.6	1.52	1.32	8.46
798.0	6.70	357.20	796.8	5,807.21	31.3	-1.8	31.3	1.11	1.11	-0.78
894.0	7.90	354.40	892.0	5,711.99	43.4	-2.7	43.5	1.30	1.25	-2.92
989.0	9.00	352.30	986.0	5,618.03	57.3	-4.4	57.4	1.20	1.16	-2.21
1,084.0	10.10	349.00	1,079.7	5,524.34	72.8	-7.0	73.1	1.29	1.16	-3.47
1,180.0	10.70	347.00	1,174.1	5,429.92	89.8	-10.6	90.3	0.73	0.62	-2.08
1,275.0	11.40	347.40	1,267.3	5,336.68	107.5	-14.6	108.3	0.74	0.74	0.42
1,370.0	11.50	346.70	1,360.4	5,243.57	125.9	-18.8	127.0	0.18	0.11	-0.74
1,465.0	11.40	350.70	1,453.5	5,150.46	144.4	-22.5	145.7	0.84	-0.11	4.21
<b>9-5/8" Surface Csg</b>										
1,534.0	11.62	350.57	1,521.2	5,082.85	158.0	-24.8	159.4	0.32	0.31	-0.19
1,624.0	11.90	350.40	1,609.3	4,994.74	176.1	-27.8	177.7	0.32	0.31	-0.19
1,720.0	12.20	356.70	1,703.2	4,900.85	195.9	-30.0	197.7	1.40	0.31	6.56
1,815.0	13.40	0.10	1,795.8	4,808.21	217.0	-30.6	218.7	1.49	1.26	3.58
1,911.0	13.20	359.40	1,889.2	4,714.78	239.1	-30.7	240.7	0.27	-0.21	-0.73
2,006.0	13.30	359.50	1,981.7	4,622.31	260.8	-30.9	262.5	0.11	0.11	0.11
2,102.0	13.10	0.80	2,075.2	4,528.85	282.7	-30.8	284.3	0.37	-0.21	1.35
2,197.0	14.00	1.30	2,167.5	4,436.50	305.0	-30.4	306.5	0.96	0.95	0.53
2,293.0	13.60	1.80	2,260.7	4,343.27	327.9	-29.8	329.2	0.43	-0.42	0.52
2,388.0	13.60	1.30	2,353.1	4,250.93	350.2	-29.2	351.4	0.12	0.00	-0.53
2,483.0	13.50	0.20	2,445.4	4,158.57	372.5	-28.9	373.6	0.29	-0.11	-1.16
2,579.0	13.50	0.80	2,538.8	4,065.23	394.9	-28.7	395.9	0.15	0.00	0.62
2,674.0	13.70	359.70	2,631.1	3,972.89	417.2	-28.6	418.2	0.34	0.21	-1.16
2,770.0	13.60	358.50	2,724.4	3,879.60	439.9	-29.0	440.8	0.31	-0.10	-1.25
2,865.0	13.60	357.80	2,816.7	3,787.27	462.2	-29.7	463.1	0.17	0.00	-0.74
2,960.0	13.30	357.40	2,909.1	3,694.87	484.3	-30.6	485.2	0.33	-0.32	-0.42
3,056.0	13.20	358.60	3,002.6	3,601.43	506.3	-31.4	507.2	0.30	-0.10	1.25
3,151.0	12.50	358.30	3,095.2	3,508.81	527.4	-32.0	528.3	0.74	-0.74	-0.32
3,246.0	12.10	358.10	3,188.0	3,415.99	547.6	-32.6	548.5	0.42	-0.42	-0.21
3,342.0	13.00	359.90	3,281.7	3,322.28	568.5	-33.0	569.3	1.02	0.94	1.87
3,437.0	13.20	358.50	3,374.2	3,229.75	590.0	-33.3	590.8	0.39	0.21	-1.47
3,533.0	13.70	355.00	3,467.6	3,136.38	612.3	-34.5	613.1	0.99	0.52	-3.65
3,628.0	13.40	355.70	3,560.0	3,044.03	634.5	-36.3	635.3	0.36	-0.32	0.74
3,724.0	13.50	353.50	3,653.3	2,950.66	656.7	-38.4	657.7	0.54	0.10	-2.29
3,819.0	13.40	355.70	3,745.7	2,858.27	678.7	-40.5	679.8	0.55	-0.11	2.32
3,915.0	13.40	355.10	3,839.1	2,764.88	700.9	-42.3	702.0	0.14	0.00	-0.62
4,010.0	13.30	355.00	3,931.6	2,672.45	722.7	-44.2	723.9	0.11	-0.11	-0.11
4,106.0	13.20	353.00	4,025.0	2,579.00	744.6	-46.5	745.9	0.49	-0.10	-2.08
4,201.0	13.40	352.10	4,117.4	2,486.55	766.3	-49.3	767.8	0.30	0.21	-0.95
4,297.0	13.80	355.50	4,210.8	2,393.24	788.7	-51.8	790.3	0.93	0.42	3.54
4,392.0	13.60	356.20	4,303.1	2,300.94	811.1	-53.4	812.8	0.27	-0.21	0.74
4,487.0	12.80	356.70	4,395.5	2,208.45	832.8	-54.7	834.5	0.85	-0.84	0.53
4,583.0	12.70	356.20	4,489.2	2,114.82	853.9	-56.0	855.7	0.16	-0.10	-0.52
4,678.0	11.90	356.20	4,582.0	2,022.00	874.1	-57.4	875.9	0.84	-0.84	0.00
4,773.0	11.20	355.50	4,675.1	1,928.93	893.1	-58.8	894.9	0.75	-0.74	-0.74
4,869.0	9.90	359.40	4,769.4	1,834.55	910.6	-59.6	912.5	1.54	-1.35	4.06

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Carl Allen #37
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<b>Project:</b>	Moffat County, Colorado	<b>MD Reference:</b>	Actual Kb @ 6604.0usft (SST-88)
<b>Site:</b>	Sec 4, T11N, R97W, 6 PM	<b>North Reference:</b>	True
<b>Well:</b>	Carl Allen #37	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	11286-159		
<b>Design:</b>	Final Surveys		

Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,964.0	9.20	356.20	4,863.1	1,740.87	926.4	-60.2	928.2	0.92	-0.74	-3.37
5,059.0	8.40	357.40	4,957.0	1,646.99	940.9	-61.0	942.8	0.86	-0.84	1.26
5,155.0	7.50	356.40	5,052.1	1,551.91	954.2	-61.7	956.0	0.95	-0.94	-1.04
5,250.0	6.50	357.40	5,146.4	1,457.62	965.7	-62.3	967.6	1.06	-1.05	1.05
5,345.0	5.70	358.50	5,240.8	1,363.16	975.8	-62.7	977.7	0.85	-0.84	1.16
5,441.0	5.00	356.70	5,336.4	1,267.58	984.7	-63.1	986.6	0.75	-0.73	-1.87
5,536.0	3.90	354.40	5,431.1	1,172.86	992.1	-63.6	994.0	1.17	-1.16	-2.42
5,632.0	2.30	341.40	5,527.0	1,077.01	997.2	-64.6	999.1	1.81	-1.67	-13.54
5,727.0	1.70	346.50	5,621.9	982.06	1,000.3	-65.5	1,002.4	0.66	-0.63	5.37
5,823.0	1.40	322.80	5,717.9	886.10	1,002.7	-66.5	1,004.8	0.73	-0.31	-24.69
5,918.0	0.10	98.50	5,812.9	791.11	1,003.6	-67.1	1,005.7	1.55	-1.37	142.84
6,013.0	0.20	355.40	5,907.9	696.11	1,003.7	-67.1	1,005.9	0.26	0.11	-108.53
6,109.0	0.20	238.10	6,003.9	600.11	1,003.8	-67.2	1,006.0	0.36	0.00	-122.19
6,204.0	0.80	242.60	6,098.9	505.11	1,003.4	-68.0	1,005.6	0.63	0.63	4.74
6,299.0	1.20	247.70	6,193.9	410.13	1,002.7	-69.5	1,005.1	0.43	0.42	5.37
6,395.0	0.80	276.00	6,289.9	314.14	1,002.4	-71.1	1,004.9	0.65	-0.42	29.48
6,490.0	1.40	274.30	6,384.8	219.16	1,002.6	-72.9	1,005.2	0.63	0.63	-1.79
6,586.0	1.20	308.90	6,480.8	123.18	1,003.3	-74.8	1,006.1	0.83	-0.21	36.04
6,681.0	0.40	6.90	6,575.8	28.19	1,004.3	-75.6	1,007.1	1.10	-0.84	61.05
6,776.0	0.40	325.10	6,670.8	-66.81	1,004.9	-75.7	1,007.7	0.30	0.00	-44.00
6,872.0	0.60	312.80	6,766.8	-162.80	1,005.5	-76.3	1,008.4	0.24	0.21	-12.81
6,968.0	0.40	270.60	6,862.8	-258.80	1,005.8	-77.0	1,008.8	0.42	-0.21	-43.96
7,063.0	0.80	290.40	6,957.8	-353.79	1,006.1	-77.9	1,009.1	0.47	0.42	20.84
7,158.0	0.30	101.70	7,052.8	-448.79	1,006.2	-78.3	1,009.3	1.16	-0.53	180.32
7,254.0	0.20	37.30	7,148.8	-544.79	1,006.3	-78.0	1,009.3	0.29	-0.10	-67.08
7,350.0	0.30	125.90	7,244.8	-640.79	1,006.3	-77.7	1,009.3	0.37	0.10	92.29
7,445.0	0.20	246.10	7,339.8	-735.79	1,006.1	-77.6	1,009.1	0.46	-0.11	126.53
7,540.0	0.50	284.60	7,434.8	-830.79	1,006.1	-78.2	1,009.2	0.38	0.32	40.53
7,636.0	0.80	314.50	7,530.8	-926.78	1,006.7	-79.1	1,009.8	0.46	0.31	31.15
7,731.0	1.10	306.40	7,625.8	-1,021.77	1,007.7	-80.3	1,010.9	0.35	0.32	-8.53
7,826.0	1.30	318.20	7,720.7	-1,116.75	1,009.0	-81.7	1,012.4	0.33	0.21	12.42
7,922.0	1.50	318.00	7,816.7	-1,212.72	1,010.8	-83.3	1,014.2	0.21	0.21	-0.21
8,017.0	0.80	24.30	7,911.7	-1,307.70	1,012.3	-83.8	1,015.8	1.46	-0.74	69.79
8,113.0	0.60	338.10	8,007.7	-1,403.70	1,013.4	-83.7	1,016.9	0.60	-0.21	-48.12
8,208.0	1.00	324.70	8,102.7	-1,498.69	1,014.5	-84.4	1,018.0	0.46	0.42	-14.11
<b>Last MWD Survey</b>										
8,289.0	1.00	314.00	8,183.7	-1,579.67	1,015.6	-85.3	1,019.2	0.23	0.00	-13.21
9,092.0	2.00	257.35	8,986.4	-2,382.43	1,017.4	-104.0	1,022.5	0.21	0.12	-7.05
<b>TD Extrapolation (MD TD: 9,127 Ft)</b>										
9,127.0	2.00	257.35	9,021.4	-2,417.40	1,017.1	-105.2	1,022.3	0.00	0.00	0.00

Survey Annotations				
Local Coordinates				
MD (usft)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Comment
161.0	161.0	0.7	0.1	Tie-In Pt
1,534.0	1,521.2	158.0	-24.8	9-5/8" Surface Csg
8,289.0	8,183.7	1,015.6	-85.3	Last MWD Survey
9,127.0	9,021.4	1,017.1	-105.2	TD Extrapolation (MD TD: 9,127 Ft)