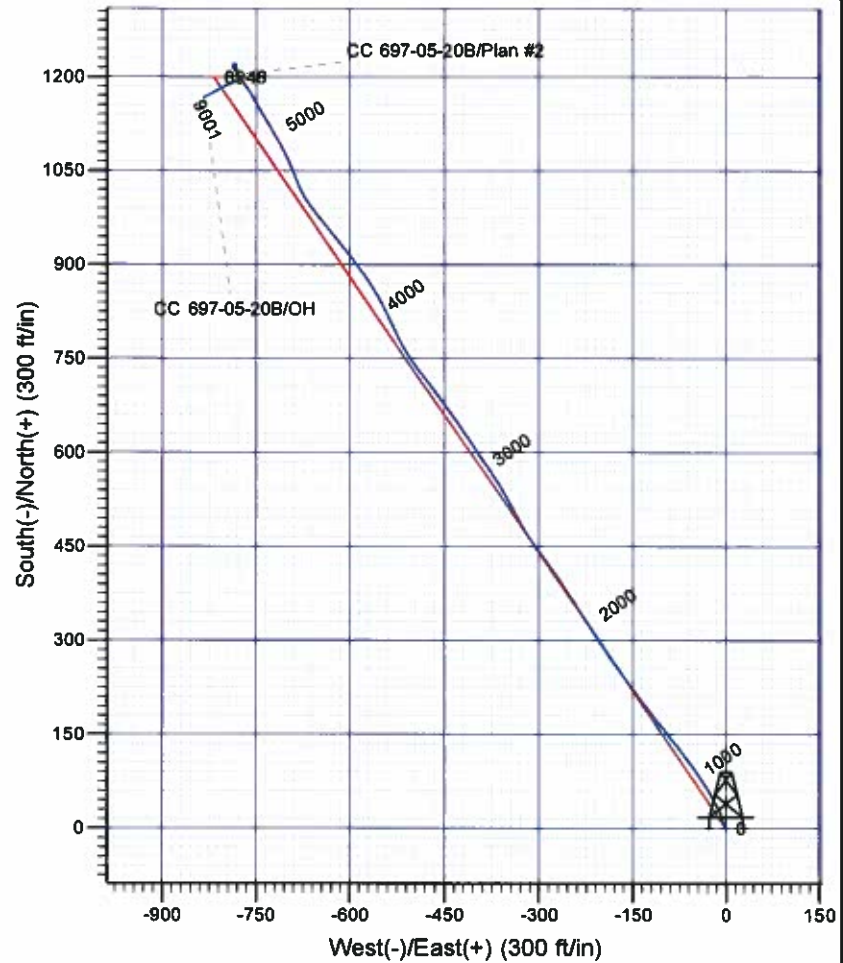
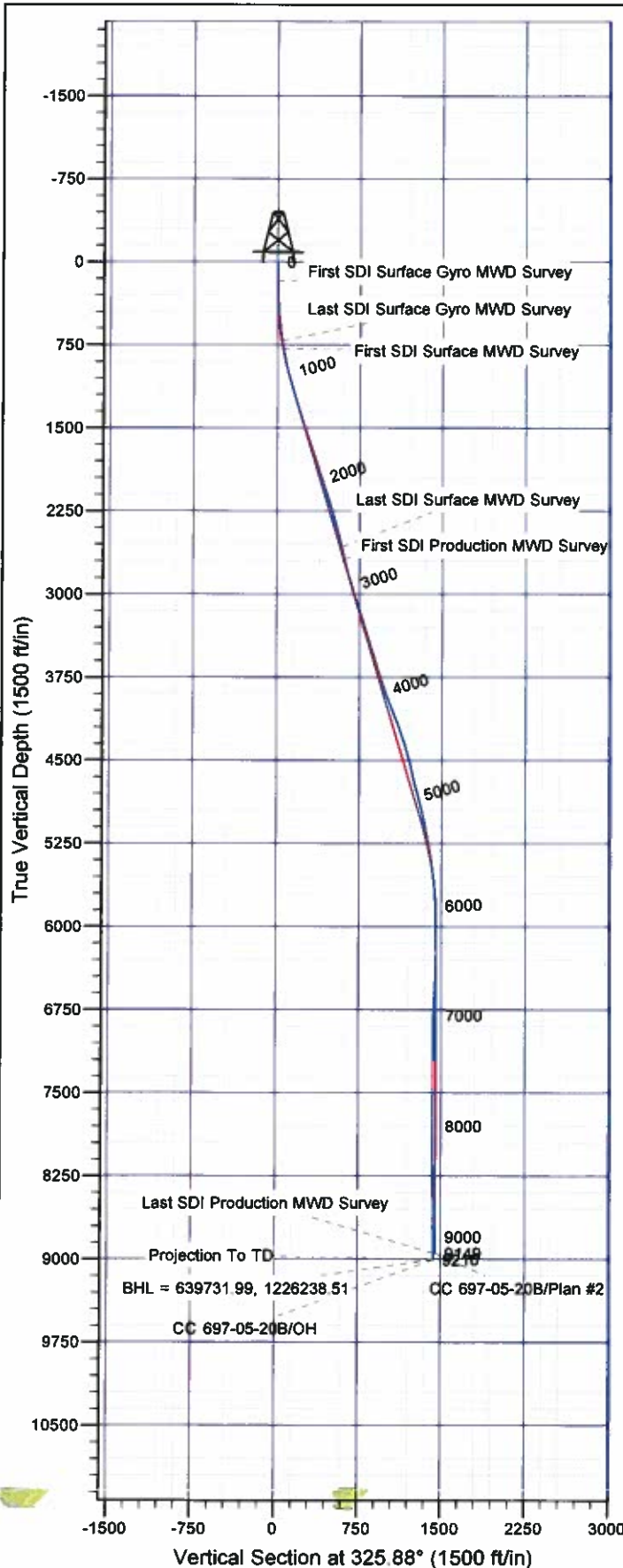




# Scientific Drilling

Company: OXY USA RMAT  
 Project: Garfield County, CO NAD27  
 Site: Cascade Creek 697-05C Pad  
 Well: CC 697-05-20B  
 Wellbore: OH  
 Design: OH



## Well Details: CC 697-05-20B

+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	638540.05	1227036.92	39° 33' 16.526 N	108° 14' 30.061 W	O

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-05-20B - Slot O, True North  
 Vertical (TVD) Reference: GL 8423' & RKB 30' @ 8453.00ft (H&P 353)  
 Section (VS) Reference: Slot - O(0.00N, 0.00E)  
 Measured Depth Reference: GL 8423' & RKB 30' @ 8453.00ft (H&P 353)  
 Calculation Method: Minimum Curvature

## PROJECT DETAILS: Garfield County, CO NAD27

Geodetic System: US State Plane 1927 (Exact solution)  
 Datum: NAD 1927 (NADCON CONUS)  
 Ellipsoid: Clarke 1866  
 Zone: Colorado Central 502

System Datum: Mean Sea Level

Plan: OH

15:09, December 29 2011  
 Created By: Rex Hall

# **OXY USA RMAT**

**Garfield County, CO NAD27**

**Cascade Creek 697-05C Pad**

**CC 697-05-20B - Slot O**

**OH**

**Design: OH**

## **Standard Survey Report**

**29 December, 2011**

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-20B - Slot O
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8423' & RKB 30' @ 8453.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 697-05C Pad	<b>MD Reference:</b>	GL 8423' & RKB 30' @ 8453.00ft (H&P 353)
<b>Well:</b>	CC 697-05-20B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

<b>Project</b>	Garfield County, CO NAD27		
<b>Map System:</b>	US State Plane 1927 (Exact solution)	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	NAD 1927 (NADCON CONUS)		
<b>Map Zone:</b>	Colorado Central 502		

Site		Cascade Creek 697-05C Pad, Sec. 5 T6S R97W			
Site Position:		Northing:	637,463.43 usft	Latitude:	39° 33' 5.626 N
From:	Map	Easting:	1,226,150.07 usft	Longitude:	108° 14' 40.963 W
Position Uncertainty:	0.00 ft	Slot Radius:	0.000 in	Grid Convergence:	-1.73 °

Well	CC 697-05-20B - Slot O					
Well Position	+N/-S	0.00 ft	Northing:	638,540.05 usft	Latitude:	39° 33' 16.526 N
	+E/-W	0.00 ft	Easting:	1,227,036.92 usft	Longitude:	108° 14' 30.061 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,423.00 ft

<b>Wellbore</b>	OH
-----------------	----

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	12/16/10	10.51	65.77	52,312

<b>Design</b>	OH
---------------	----

Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	325.88

Survey Program		Date	12/29/11	
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
175.00	715.00	Survey #1 - Surface Gyro MWD (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4
783.00	2,655.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA
2,762.00	9,210.00	Survey #3 - Production MWD (OH)	MWD-SDI	MWD - Standard ISCWSA

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
175.00	0.88	327.92	174.99	1.14	-0.71	1.34	0.50	0.50	0.00
<b>First SDI Surface Gyro MWD Survey</b>									
265.00	1.23	324.76	264.98	2.51	-1.64	3.00	0.39	0.39	-3.51
355.00	3.43	342.69	354.90	5.87	-3.00	6.54	2.55	2.44	19.92
445.00	4.05	346.11	444.71	11.53	-4.56	12.10	0.73	0.69	3.80
535.00	6.33	338.12	534.33	19.22	-7.17	19.93	2.65	2.53	-6.88
625.00	7.57	335.13	623.67	29.20	-11.52	30.64	1.43	1.38	-3.32
715.00	8.80	331.44	712.75	40.63	-17.30	43.34	1.49	1.37	-4.10

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-20B - Slot O
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8423' & RKB 30' @ 8453.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 697-05C Pad	<b>MD Reference:</b>	GL 8423' & RKB 30' @ 8453.00ft (H&P 353)
<b>Well:</b>	CC 697-05-20B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
<b>Last SDI Surface Gyro MWD Survey</b>									
783.00	8.88	330.78	779.94	49.78	-22.35	53.75	0.19	0.12	-0.97
<b>First SDI Surface MWD Survey</b>									
874.00	11.34	328.74	869.53	63.56	-30.42	69.68	2.73	2.70	-2.24
964.00	13.72	324.98	957.38	79.86	-41.14	89.19	2.79	2.64	-4.18
1,061.00	16.53	324.46	1,051.01	100.52	-55.76	114.49	2.90	2.90	-0.54
1,155.00	16.88	323.22	1,141.04	122.33	-71.71	141.50	0.53	0.37	-1.32
1,250.00	16.09	319.97	1,232.14	143.46	-88.44	168.37	1.28	-0.83	-3.42
1,344.00	16.71	321.03	1,322.31	163.94	-105.31	194.79	0.73	0.66	1.13
1,439.00	18.03	322.43	1,412.98	186.21	-122.87	223.08	1.46	1.39	1.47
1,533.00	19.52	324.10	1,501.97	210.46	-140.95	253.30	1.68	1.59	1.78
1,628.00	18.73	321.38	1,591.73	235.24	-159.77	284.37	1.25	-0.83	-2.86
1,722.00	18.38	324.81	1,680.85	259.14	-177.73	314.23	1.22	-0.37	3.65
1,817.00	17.67	326.13	1,771.19	283.35	-194.40	343.62	0.86	-0.75	1.39
1,911.00	18.20	326.92	1,860.62	307.50	-210.36	372.57	0.62	0.56	0.84
2,006.00	17.85	328.15	1,950.96	332.30	-226.15	401.95	0.54	-0.37	1.29
2,101.00	18.20	326.83	2,041.29	357.08	-241.95	431.33	0.57	0.37	-1.39
2,195.00	18.47	327.44	2,130.52	381.92	-257.99	460.89	0.35	0.29	0.65
2,289.00	17.06	325.33	2,220.04	405.81	-273.85	489.57	1.65	-1.50	-2.24
2,384.00	15.83	322.70	2,311.15	427.58	-289.63	516.44	1.51	-1.29	-2.77
2,478.00	15.30	323.75	2,401.70	447.78	-304.73	541.64	0.64	-0.56	1.12
2,573.00	14.51	328.41	2,493.51	468.03	-318.38	566.05	1.51	-0.83	4.91
2,655.00	13.28	329.64	2,573.11	484.91	-328.52	585.71	1.54	-1.50	1.50
<b>Last SDI Surface MWD Survey</b>									
2,762.00	12.17	331.25	2,677.48	505.40	-340.16	609.21	1.09	-1.04	1.50
<b>First SDI Production MWD Survey</b>									
2,856.00	14.94	331.98	2,768.85	524.79	-350.62	631.12	2.95	2.95	0.78
2,951.00	18.49	329.48	2,859.82	548.58	-364.02	658.34	3.81	3.74	-2.63
3,045.00	16.54	324.80	2,949.47	572.36	-379.31	686.60	2.56	-2.07	-4.98
3,139.00	18.27	327.35	3,039.16	595.70	-394.97	714.71	2.01	1.84	2.71
3,234.00	18.03	326.30	3,129.43	620.47	-411.16	744.30	0.43	-0.25	-1.11
3,329.00	17.67	326.04	3,219.86	644.66	-427.38	773.42	0.39	-0.38	-0.27
3,423.00	16.53	324.80	3,309.70	667.42	-443.05	801.06	1.27	-1.21	-1.32
3,518.00	18.38	324.28	3,400.33	690.63	-459.59	829.54	1.95	1.95	-0.55
3,613.00	17.85	322.96	3,490.62	714.41	-477.10	859.06	0.71	-0.56	-1.39
3,707.00	16.44	323.05	3,580.44	736.54	-493.78	886.73	1.50	-1.50	0.10
3,803.00	16.88	329.55	3,672.42	759.41	-509.01	914.21	1.99	0.46	6.77
3,897.00	19.17	333.95	3,761.80	785.05	-522.71	943.12	2.83	2.44	4.68
3,992.00	19.26	334.12	3,851.51	813.16	-536.40	974.07	0.11	0.09	0.18
4,086.00	20.66	333.51	3,939.86	841.95	-550.56	1,005.85	1.51	1.49	-0.65
4,181.00	21.90	325.60	4,028.40	871.58	-568.05	1,040.18	3.29	1.31	-8.33
4,275.00	21.46	322.17	4,115.75	899.62	-588.50	1,074.87	1.43	-0.47	-3.65
4,370.00	20.49	322.17	4,204.46	926.48	-609.36	1,108.81	1.02	-1.02	0.00
4,464.00	19.35	319.80	4,292.83	951.37	-629.50	1,140.71	1.49	-1.21	-2.52



# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-20B - Slot O
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8423' & RKB 30' @ 8453.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 697-05C Pad	<b>MD Reference:</b>	GL 8423' & RKB 30' @ 8453.00ft (H&P 353)
<b>Well:</b>	CC 697-05-20B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

### Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,559.00	16.27	322.17	4,383.27	973.91	-647.82	1,169.65	3.33	-3.24	2.49
4,654.00	14.16	322.43	4,474.94	993.63	-663.07	1,194.53	2.22	-2.22	0.27
4,748.00	13.63	332.19	4,566.20	1,012.55	-675.25	1,217.02	2.55	-0.56	10.38
4,843.00	13.72	338.60	4,658.51	1,032.94	-684.59	1,239.14	1.60	0.09	6.75
4,937.00	14.86	338.25	4,749.60	1,054.51	-693.12	1,261.78	1.22	1.21	-0.37
5,032.00	15.74	333.59	4,841.24	1,077.37	-703.37	1,286.45	1.59	0.93	-4.91
5,126.00	13.81	330.17	4,932.12	1,098.52	-714.62	1,310.28	2.25	-2.05	-3.64
5,221.00	12.31	329.29	5,024.66	1,117.07	-725.43	1,331.70	1.59	-1.58	-0.93
5,315.00	11.26	328.23	5,116.68	1,133.48	-735.38	1,350.87	1.14	-1.12	-1.13
5,410.00	10.73	329.99	5,209.94	1,149.03	-744.69	1,368.96	0.66	-0.56	1.85
5,505.00	10.11	329.20	5,303.37	1,163.85	-753.38	1,386.10	0.67	-0.65	-0.83
5,599.00	9.58	330.25	5,395.99	1,177.73	-761.49	1,402.14	0.60	-0.56	1.12
5,693.00	7.65	321.99	5,488.93	1,189.45	-769.22	1,416.18	2.43	-2.05	-8.79
5,788.00	6.33	331.48	5,583.22	1,199.03	-775.62	1,427.70	1.84	-1.39	9.99
5,882.00	3.61	339.66	5,676.86	1,206.36	-779.12	1,435.74	2.98	-2.89	8.70
5,977.00	3.34	337.81	5,771.68	1,211.73	-781.20	1,441.35	0.31	-0.28	-1.95
6,071.00	1.49	357.06	5,865.60	1,215.48	-782.30	1,445.07	2.12	-1.97	20.48
6,166.00	1.06	358.64	5,960.57	1,217.60	-782.39	1,446.87	0.45	-0.45	1.66
6,260.00	1.06	329.38	6,054.56	1,219.21	-782.85	1,448.47	0.57	0.00	-31.13
6,355.00	1.14	320.94	6,149.54	1,220.70	-783.89	1,450.29	0.19	0.08	-8.88
6,449.00	1.32	236.47	6,243.53	1,220.83	-785.38	1,451.23	1.76	0.19	-89.86
6,544.00	1.85	200.62	6,338.49	1,218.79	-786.84	1,450.36	1.16	0.56	-37.74
6,638.00	2.29	162.21	6,432.43	1,215.58	-786.80	1,447.68	1.51	0.47	-40.86
6,733.00	3.78	142.43	6,527.30	1,211.29	-784.31	1,442.73	1.89	1.57	-20.82
6,827.00	4.13	139.09	6,621.08	1,206.28	-780.20	1,436.28	0.45	0.37	-3.55
6,922.00	2.02	142.08	6,715.94	1,202.37	-776.93	1,431.21	2.23	-2.22	3.15
7,016.00	0.79	147.53	6,809.91	1,200.52	-775.57	1,428.91	1.31	-1.31	5.80
7,111.00	0.97	72.91	6,904.90	1,200.20	-774.45	1,428.02	1.13	0.19	-78.55
7,205.00	1.23	79.33	6,998.88	1,200.62	-772.69	1,427.38	0.31	0.28	6.83
7,300.00	0.88	89.96	7,093.86	1,200.81	-770.96	1,426.57	0.42	-0.37	11.19
7,395.00	0.70	90.75	7,188.85	1,200.81	-769.65	1,425.83	0.19	-0.19	0.83
7,489.00	0.35	114.48	7,282.85	1,200.68	-768.82	1,425.25	0.43	-0.37	25.24
7,583.00	0.44	200.97	7,376.85	1,200.22	-768.68	1,424.80	0.58	0.10	92.01
7,678.00	0.35	256.43	7,471.85	1,199.82	-769.10	1,424.69	0.40	-0.09	58.38
7,772.00	0.70	229.36	7,565.84	1,199.37	-769.81	1,424.73	0.45	0.37	-28.80
7,867.00	0.62	226.28	7,660.84	1,198.64	-770.62	1,424.58	0.09	-0.08	-3.24
7,962.00	0.97	231.90	7,755.83	1,197.79	-771.63	1,424.44	0.38	0.37	5.92
8,056.00	1.41	237.09	7,849.81	1,196.67	-773.23	1,424.41	0.48	0.47	5.52
8,150.00	1.67	246.76	7,943.77	1,195.50	-775.45	1,424.69	0.39	0.28	10.29
8,245.00	1.85	245.35	8,038.73	1,194.32	-778.12	1,425.20	0.19	0.19	-1.48
8,339.00	1.67	252.30	8,132.68	1,193.27	-780.80	1,425.84	0.30	-0.19	7.39
8,434.00	1.85	248.34	8,227.64	1,192.28	-783.55	1,426.56	0.23	0.19	-4.17
8,528.00	2.46	245.18	8,321.57	1,190.87	-786.79	1,427.21	0.66	0.65	-3.36

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-20B - Slot O
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8423' & RKB 30' @ 8453.00ft (H&P 353)
<b>Site:</b>	Cascade Creek 697-05C Pad	<b>MD Reference:</b>	GL 8423' & RKB 30' @ 8453.00ft (H&P 353)
<b>Well:</b>	CC 697-05-20B	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockies Compass Server

### Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,623.00	2.81	249.83	8,416.47	1,189.21	-790.83	1,428.11	0.43	0.37	4.89
8,717.00	3.52	248.08	8,510.33	1,187.34	-795.67	1,429.27	0.76	0.76	-1.86
8,812.00	4.57	240.52	8,605.09	1,184.39	-801.67	1,430.19	1.24	1.11	-7.96
8,907.00	5.10	239.81	8,699.75	1,180.40	-808.61	1,430.79	0.56	0.56	-0.75
9,001.00	5.45	240.78	8,793.35	1,176.12	-816.12	1,431.45	0.38	0.37	1.03
9,095.00	5.63	244.21	8,886.91	1,171.94	-824.17	1,432.50	0.40	0.19	3.65
9,155.00	5.36	245.00	8,946.64	1,169.47	-829.36	1,433.37	0.47	-0.45	1.32
<b>Last SDI Production MWD Survey</b>									
9,210.00	5.36	245.00	9,001.40	1,167.30	-834.01	1,434.19	0.00	0.00	0.00
<b>Projection To TD - BHL = 639731.99, 1226238.51</b>									

### Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
175.00	174.99	1.14	-0.71	First SDI Surface Gyro MWD Survey
715.00	712.75	40.63	-17.30	Last SDI Surface Gyro MWD Survey
783.00	779.94	49.78	-22.35	First SDI Surface MWD Survey
2,655.00	2,573.11	484.91	-328.52	Last SDI Surface MWD Survey
2,762.00	2,677.48	505.40	-340.16	First SDI Production MWD Survey
9,155.00	8,946.64	1,169.47	-829.36	Last SDI Production MWD Survey
9,210.00	9,001.40	1,167.30	-834.01	Projection To TD
9,210.00	9,001.40	1,167.30	-834.01	BHL = 639731.99, 1226238.51

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_