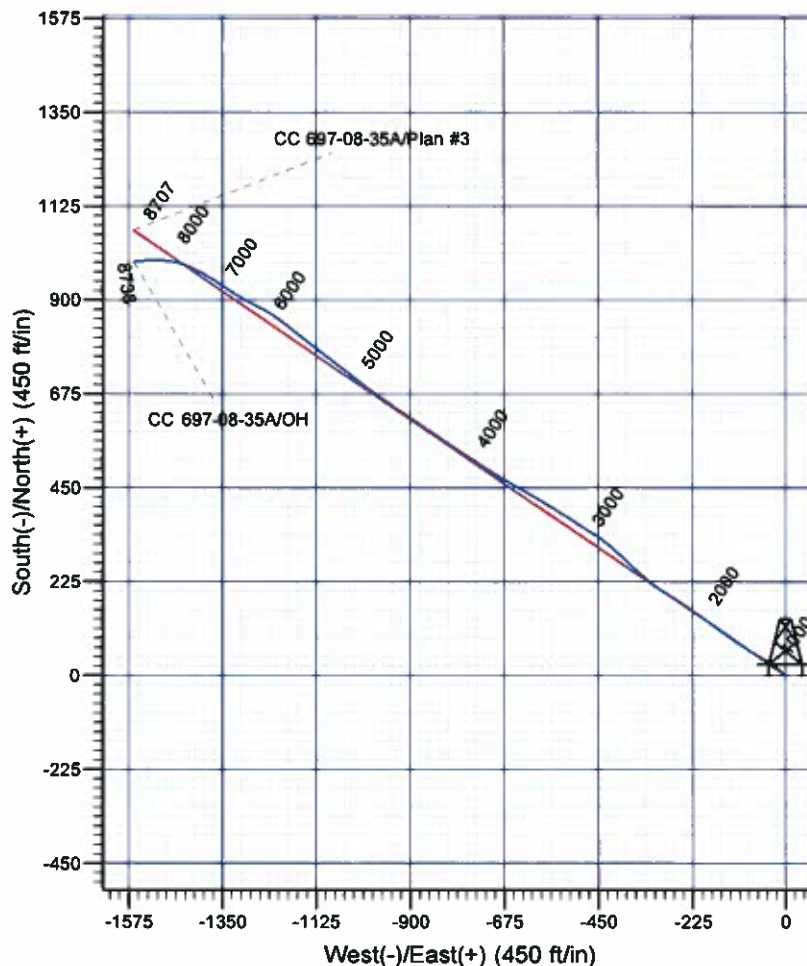
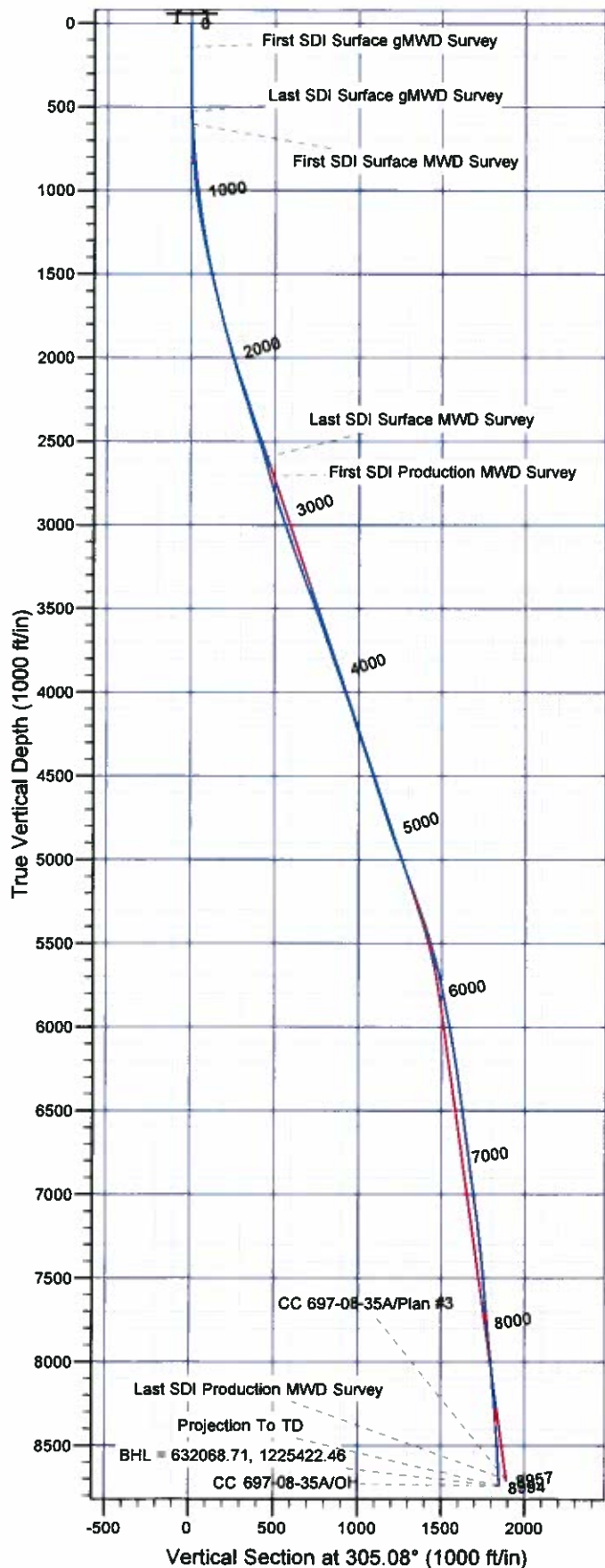




# Scientific Drilling

Company: OXY USA RMAT  
 Project: Garfield County, CO NAD27  
 Site: Cascade Creek 697-08-53 Pad  
 Well: CC 697-08-35A  
 Wellbore: OH  
 Design: OH



## Well Details: CC 697-08-35A

TVD Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.00 0.00 631030.37 1226955.07 39° 32' 2.313 N 108° 14' 28.213 W K

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-08-35A - Slot K, True North  
 Vertical (TVD) Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
 Section (VS) Reference: Slot - K(0.00N, 0.00E)  
 Measured Depth Reference: GL 8379' & RKB 30' @ 8409.00ft (H&P 330)  
 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

15:30, December 31 2011  
 Created By: Rex Hall

# **OXY USA RMAT**

**Garfield County, CO NAD27**

**Cascade Creek 697-08-53 Pad**

**CC 697-08-35A - Slot K**

**OH**

**Design: OH**

## **Standard Survey Report**

**31 December, 2011**

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-35A - Slot K
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>MD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Well:</b>	CC 697-08-35A	<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 697-08-53 Pad, Sec. 8 T6S R97W				
Site Position:		Northing:	630,837.78 usft	Latitude:	39° 32' 0.393 N
From:	Map	Easting:	1,226,897.42 usft	Longitude:	108° 14' 28.874 W
Position Uncertainty:	0.00 ft	Slot Radius:	0.000 in	Grid Convergence:	-1.73 °

Well	CC 697-08-35A - Slot K					
Well Position	+N/-S	0.00 ft	Northing:	631,030.37 usft	Latitude:	39° 32' 2.313 N
	+E/-W	0.00 ft	Easting:	1,226,955.07 usft	Longitude:	108° 14' 28.213 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	8,379.00 ft

<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>
	IGRF2005-10	09/01/10	10.54	65.76	52,329

<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) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00		305.08

<b>Survey Program</b>	<b>Date</b>	12/16/11			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
140.00	528.00	Survey #1 - Surface Gyro MWD (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
602.00	2,652.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,766.00	8,994.00	Survey #3 - Production MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	

<b>Survey</b>									
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
140.00	0.00	320.01	140.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>First SDI Surface gMWD Survey</b>									
171.00	0.09	325.28	171.00	0.02	-0.01	0.02	0.29	0.29	0.00
260.00	0.00	75.50	260.00	0.08	-0.05	0.09	0.10	-0.10	0.00
349.00	0.18	23.73	349.00	0.21	0.00	0.12	0.20	0.20	0.00
439.00	0.18	0.35	439.00	0.48	0.06	0.22	0.08	0.00	-25.98
528.00	1.14	295.66	527.99	1.00	-0.74	1.18	1.21	1.08	-72.69

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-35A - Slot K
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>MD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Well:</b>	CC 697-08-35A	<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 gMWD Survey</b>									
602.00	1.85	297.57	601.97	1.87	-2.46	3.09	0.96	0.96	2.58
<b>First SDI Surface MWD Survey</b>									
694.00	2.02	317.78	693.92	3.76	-4.87	6.14	0.76	0.18	21.97
786.00	3.17	322.09	785.82	6.97	-7.52	10.16	1.27	1.25	4.68
875.00	4.66	311.54	874.61	11.31	-11.74	16.10	1.85	1.67	-11.85
965.00	6.24	304.07	964.20	16.47	-18.52	24.63	1.92	1.76	-8.30
1,060.00	8.09	303.63	1,058.46	23.07	-28.37	36.47	1.95	1.95	-0.46
1,155.00	10.55	303.28	1,152.20	31.54	-41.21	51.85	2.59	2.59	-0.37
1,249.00	10.46	299.85	1,244.62	40.51	-55.80	68.95	0.67	-0.10	-3.65
1,344.00	11.52	299.41	1,337.88	49.46	-71.55	86.98	1.12	1.12	-0.46
1,439.00	13.01	302.40	1,430.71	59.85	-88.84	107.10	1.70	1.57	3.15
1,534.00	13.63	302.31	1,523.15	71.56	-107.33	128.96	0.65	0.65	-0.09
1,628.00	14.60	304.78	1,614.31	84.24	-126.42	151.87	1.21	1.03	2.63
1,723.00	13.72	305.57	1,706.43	97.63	-145.42	175.11	0.95	-0.93	0.83
1,818.00	14.25	304.60	1,798.61	110.82	-164.21	198.07	0.61	0.56	-1.02
1,912.00	15.04	305.13	1,889.55	124.41	-183.70	221.83	0.85	0.84	0.56
2,007.00	16.53	306.53	1,980.97	139.54	-204.65	247.67	1.62	1.57	1.47
2,102.00	17.41	306.09	2,071.83	155.96	-226.99	275.39	0.94	0.93	-0.46
2,196.00	16.71	304.25	2,161.70	171.85	-249.53	302.97	0.94	-0.74	-1.96
2,291.00	17.32	301.35	2,252.54	186.89	-272.89	330.73	1.10	0.64	-3.05
2,385.00	17.50	301.96	2,342.23	201.66	-296.83	358.81	0.27	0.19	0.65
2,480.00	18.73	308.64	2,432.53	218.74	-320.87	388.30	2.54	1.29	7.03
2,575.00	17.32	311.54	2,522.87	237.65	-343.37	417.57	1.76	-1.48	3.05
2,652.00	16.27	313.65	2,596.58	252.69	-359.75	439.63	1.58	-1.36	2.74
<b>Last SDI Surface MWD Survey</b>									
2,766.00	15.12	314.43	2,706.33	274.12	-381.93	470.09	1.03	-1.01	0.68
<b>First SDI Production MWD Survey</b>									
2,861.00	16.36	313.73	2,797.77	292.05	-400.44	495.55	1.32	1.31	-0.74
2,956.00	18.20	308.46	2,888.48	310.53	-421.73	523.59	2.54	1.94	-5.55
3,050.00	19.43	304.50	2,977.46	328.51	-446.11	553.88	1.89	1.31	-4.21
3,145.00	18.91	302.30	3,067.19	345.69	-472.15	585.06	0.94	-0.55	-2.32
3,240.00	20.40	303.54	3,156.66	363.06	-498.96	616.99	1.63	1.57	1.31
3,335.00	19.61	302.48	3,245.92	380.77	-526.21	649.46	0.91	-0.83	-1.12
3,430.00	20.14	302.30	3,335.27	398.07	-553.48	681.72	0.56	0.56	-0.19
3,524.00	21.28	301.60	3,423.19	415.66	-581.69	714.91	1.24	1.21	-0.74
3,619.00	19.96	299.84	3,512.10	432.76	-610.44	748.27	1.53	-1.39	-1.85
3,713.00	19.43	299.32	3,600.60	448.40	-637.99	779.80	0.59	-0.56	-0.55
3,808.00	18.73	298.26	3,690.39	463.36	-665.20	810.67	0.82	-0.74	-1.12
3,903.00	19.70	301.95	3,780.09	479.06	-692.22	841.80	1.64	1.02	3.88
3,997.00	19.61	303.18	3,868.62	496.07	-718.87	873.39	0.45	-0.10	1.31
4,092.00	19.08	303.27	3,958.25	513.32	-745.19	904.84	0.56	-0.56	0.09
4,187.00	18.64	303.01	4,048.15	530.10	-770.91	935.53	0.47	-0.46	-0.27
4,281.00	18.03	302.92	4,137.38	546.19	-795.72	965.08	0.65	-0.65	-0.10



# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-35A - Slot K
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>MD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Well:</b>	CC 697-08-35A	<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)
4,376.00	19.17	304.50	4,227.42	563.02	-820.91	995.37	1.31	1.20	1.66
4,471.00	18.29	304.50	4,317.39	580.30	-846.05	1,025.88	0.93	-0.93	0.00
4,566.00	19.43	305.73	4,407.29	597.97	-871.17	1,056.58	1.27	1.20	1.29
4,661.00	18.64	303.27	4,497.09	615.53	-896.69	1,087.56	1.19	-0.83	-2.59
4,755.00	16.97	303.54	4,586.59	631.35	-920.68	1,116.29	1.78	-1.78	0.29
4,850.00	17.85	303.80	4,677.23	647.11	-944.34	1,144.70	0.93	0.93	0.27
4,945.00	18.11	305.03	4,767.59	663.68	-968.53	1,174.03	0.48	0.27	1.29
5,039.00	20.14	306.70	4,856.40	681.74	-993.47	1,204.81	2.24	2.16	1.78
5,134.00	20.84	308.46	4,945.39	702.03	-1,019.81	1,238.03	0.98	0.74	1.85
5,229.00	19.79	308.98	5,034.48	722.65	-1,045.55	1,270.95	1.12	-1.11	0.55
5,323.00	20.58	307.75	5,122.71	742.78	-1,070.98	1,303.33	0.95	0.84	-1.31
5,418.00	20.66	307.23	5,211.62	763.14	-1,097.53	1,336.75	0.21	0.08	-0.55
5,513.00	19.87	307.49	5,300.74	783.11	-1,123.68	1,369.63	0.84	-0.83	0.27
5,608.00	19.08	308.11	5,390.30	802.52	-1,148.71	1,401.27	0.86	-0.83	0.65
5,702.00	16.53	308.19	5,479.79	820.27	-1,171.31	1,429.97	2.71	-2.71	0.09
5,797.00	14.95	307.75	5,571.23	836.13	-1,191.63	1,455.71	1.67	-1.66	-0.46
5,892.00	12.84	309.34	5,663.44	850.32	-1,209.48	1,478.48	2.26	-2.22	1.67
5,987.00	11.78	302.57	5,756.26	862.24	-1,225.82	1,498.69	1.88	-1.12	-7.13
6,081.00	11.87	298.00	5,848.27	871.94	-1,242.44	1,517.87	1.00	0.10	-4.86
6,176.00	11.08	297.91	5,941.37	880.80	-1,259.13	1,536.63	0.83	-0.83	-0.09
6,270.00	10.11	295.98	6,033.77	888.64	-1,274.53	1,553.73	1.10	-1.03	-2.05
6,365.00	9.50	300.02	6,127.38	896.22	-1,288.82	1,569.78	0.97	-0.64	4.25
6,460.00	8.97	300.72	6,221.15	903.92	-1,301.97	1,584.97	0.57	-0.56	0.74
6,555.00	8.09	299.76	6,315.10	911.02	-1,314.14	1,599.01	0.94	-0.93	-1.01
6,649.00	8.44	304.24	6,408.12	918.19	-1,325.59	1,612.50	0.78	0.37	4.77
6,744.00	8.27	304.94	6,502.11	926.02	-1,336.95	1,626.30	0.21	-0.18	0.74
6,839.00	7.12	302.66	6,596.26	933.11	-1,347.51	1,639.01	1.25	-1.21	-2.40
6,933.00	6.77	300.11	6,689.57	939.04	-1,357.21	1,650.35	0.50	-0.37	-2.71
7,028.00	7.74	301.87	6,783.81	945.23	-1,367.48	1,662.32	1.05	1.02	1.85
7,123.00	8.09	301.51	6,877.90	952.10	-1,378.62	1,675.38	0.37	0.37	-0.38
7,217.00	8.18	300.90	6,970.96	958.99	-1,389.99	1,688.65	0.13	0.10	-0.65
7,312.00	8.00	298.35	7,065.01	965.60	-1,401.61	1,701.95	0.42	-0.19	-2.68
7,407.00	6.95	298.53	7,159.20	971.48	-1,412.48	1,714.23	1.11	-1.11	0.19
7,502.00	6.77	295.54	7,253.52	976.64	-1,422.58	1,725.46	0.42	-0.19	-3.15
7,596.00	6.07	291.32	7,346.93	980.84	-1,432.21	1,735.75	0.90	-0.74	-4.49
7,691.00	5.72	289.65	7,441.43	984.26	-1,441.35	1,745.20	0.41	-0.37	-1.76
7,786.00	4.66	287.01	7,536.04	986.98	-1,449.50	1,753.43	1.14	-1.12	-2.78
7,880.00	5.45	285.08	7,629.67	989.25	-1,457.46	1,761.25	0.86	0.84	-2.05
7,975.00	5.63	279.19	7,724.23	991.17	-1,466.41	1,769.68	0.63	0.19	-6.20
8,070.00	5.80	277.87	7,818.76	992.57	-1,475.77	1,778.14	0.23	0.18	-1.39
8,164.00	6.68	276.20	7,912.20	993.82	-1,485.91	1,787.16	0.96	0.94	-1.78
8,259.00	6.33	274.18	8,006.59	994.79	-1,496.63	1,796.49	0.44	-0.37	-2.13
8,354.00	6.07	271.72	8,101.03	995.33	-1,506.87	1,805.18	0.39	-0.27	-2.59

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-08-35A - Slot K
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Site:</b>	Cascade Creek 697-08-53 Pad	<b>MD Reference:</b>	GL 8379' & RKB 30' @ 8409.00ft (H&P 330)
<b>Well:</b>	CC 697-08-35A	<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)
8,448.00	5.89	270.40	8,194.52	995.51	-1,516.66	1,813.29	0.24	-0.19	-1.40
8,543.00	5.36	269.08	8,289.06	995.47	-1,525.97	1,820.89	0.57	-0.56	-1.39
8,638.00	5.36	263.98	8,383.65	994.94	-1,534.82	1,827.82	0.50	0.00	-5.37
8,732.00	4.92	263.98	8,477.27	994.05	-1,543.19	1,834.17	0.47	-0.47	0.00
8,827.00	4.48	263.98	8,571.95	993.24	-1,550.94	1,840.03	0.46	-0.46	0.00
8,921.00	4.13	262.75	8,665.69	992.42	-1,557.94	1,845.30	0.39	-0.37	-1.31
8,938.00	4.22	261.35	8,682.64	992.25	-1,559.17	1,846.21	0.80	0.53	-8.24
<b>Last SDI Production MWD Survey</b>									
8,994.00	4.22	261.35	8,738.49	991.63	-1,563.24	1,849.19	0.00	0.00	0.00
<b>BHL = 632068.71, 1225422.46 - Projection To TD</b>									

### Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
140.00	140.00	0.00	0.00	First SDI Surface gMWD Survey
528.00	527.99	1.00	-0.74	Last SDI Surface gMWD Survey
602.00	601.97	1.87	-2.46	First SDI Surface MWD Survey
2,652.00	2,596.58	252.69	-359.75	Last SDI Surface MWD Survey
2,766.00	2,706.33	274.12	-381.93	First SDI Production MWD Survey
8,938.00	8,682.64	992.25	-1,559.17	Last SDI Production MWD Survey
8,994.00	8,738.49	991.63	-1,563.24	BHL = 632068.71, 1225422.46
8,994.00	8,738.49	991.63	-1,563.24	Projection To TD

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