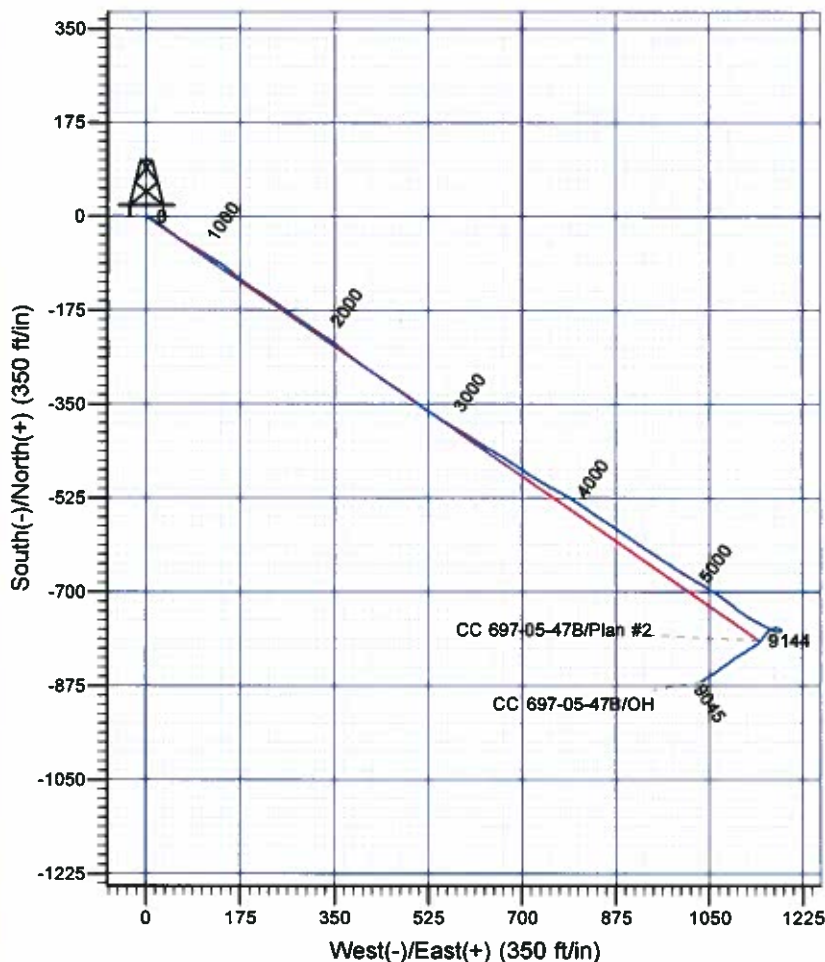
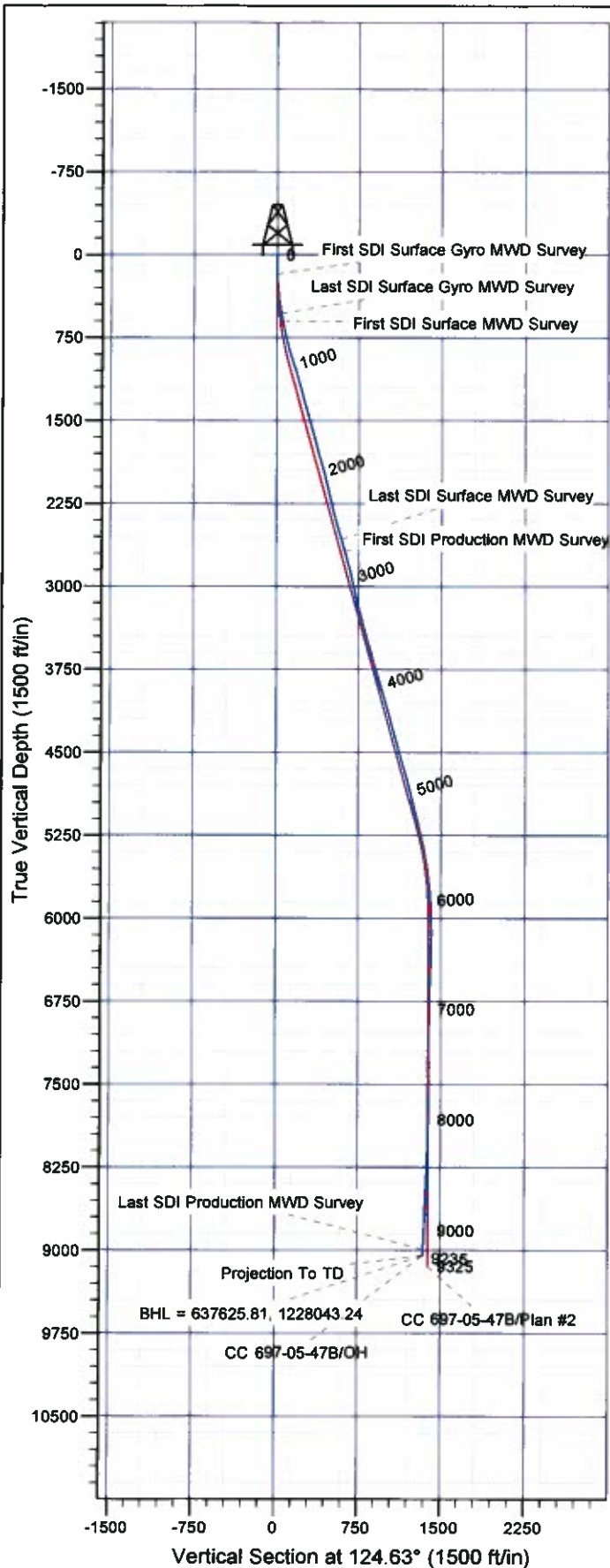




# Scientific Drilling

Company: OXY USA RMAT  
 Project: Garfield County, CO NAD27  
 Site: Cascade Creek 697-05C Pad  
 Well: CC 697-05-47B  
 Wellbore: OH  
 Design: OH



Well Details: CC 697-05-47B

+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	638522.97	1227034.09	39° 33' 16.357 N	108° 14' 30.091 W	L

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well CC 697-05-47B - Slot L, True North  
 Vertical (TVD) Reference: GL 8423' & RKB 30' @ 8453.00ft (H&P 353)  
 Section (VS) Reference: Slot - L(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

14:33, December 30 2011  
 Created By: Rex Hall

# **OXY USA RMAT**

**Garfield County, CO NAD27**

**Cascade Creek 697-05C Pad**

**CC 697-05-47B - Slot L**

**OH**

**Design: OH**

## **Standard Survey Report**

**30 December, 2011**

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-47B - Slot L
<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 697-05-47B	<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		

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

Well	CC 697-05-47B - Slot L					
Well Position	+N/-S	0.00 ft	Northing:	638,522.97 usft	Latitude:	39° 33' 16.357 N
	+E/-W	0.00 ft	Easting:	1,227,034.09 usft	Longitude:	108° 14' 30.091 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	2010/12/16	10.51	65.77	52,312

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

<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	124.63

Survey Program		Date	2011/12/30		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
173.00	534.00	Survey #1 - Surface Gyro MWD (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
603.00	2,653.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
2,763.00	9,235.00	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
173.00	1.58	113.64	172.98	-0.96	2.19	2.34	0.91	0.91	0.00
<b>First SDI Surface Gyro MWD Survey</b>									
263.00	3.52	113.64	262.88	-2.56	5.85	6.27	2.16	2.16	0.00
354.00	6.25	123.13	353.55	-6.39	12.56	13.97	3.12	3.00	10.43
444.00	9.15	122.43	442.73	-12.91	22.71	26.02	3.22	3.22	-0.78
534.00	10.56	130.52	531.40	-22.10	35.02	41.37	2.19	1.57	8.99
<b>Last SDI Surface Gyro MWD Survey</b>									

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-47B - Slot L
<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 697-05-47B	<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)
603.00	10.90	127.75	599.19	-30.21	44.98	54.18	0.90	0.49	-4.01
<b>First SDI Surface MWD Survey</b>									
694.00	11.17	122.39	688.51	-40.19	59.23	71.58	1.17	0.30	-5.89
784.00	13.89	118.44	776.36	-50.01	76.09	91.03	3.17	3.02	-4.39
874.00	17.23	122.30	863.05	-62.28	96.86	115.10	3.88	3.71	4.29
964.00	18.73	120.99	948.66	-76.85	120.52	142.84	1.73	1.67	-1.46
1,059.00	18.29	127.23	1,038.75	-93.72	145.47	172.95	2.14	-0.46	6.57
1,154.00	15.48	130.21	1,129.65	-110.93	167.02	200.47	3.09	-2.96	3.14
1,248.00	15.12	125.82	1,220.32	-126.20	186.54	225.21	1.29	-0.38	-4.67
1,343.00	15.04	121.60	1,312.05	-139.91	207.09	249.91	1.16	-0.08	-4.44
1,437.00	15.92	124.50	1,402.64	-153.60	228.10	274.98	1.25	0.94	3.09
1,532.00	16.09	122.04	1,493.96	-167.97	250.00	301.16	0.74	0.18	-2.59
1,626.00	16.18	128.28	1,584.27	-182.99	271.32	327.25	1.85	0.10	6.64
1,721.00	15.39	125.47	1,675.68	-198.51	291.98	353.06	1.16	-0.83	-2.96
1,815.00	14.33	121.69	1,766.54	-211.86	312.04	377.15	1.53	-1.13	-4.02
1,910.00	16.62	123.36	1,858.09	-225.51	333.39	402.48	2.46	2.41	1.76
2,005.00	15.48	130.21	1,949.39	-241.16	354.42	428.68	2.32	-1.20	7.21
2,099.00	14.25	128.37	2,040.25	-256.44	373.08	452.71	1.40	-1.31	-1.96
2,194.00	12.66	126.70	2,132.64	-269.93	390.59	474.78	1.72	-1.67	-1.76
2,288.00	13.72	125.12	2,224.16	-282.49	407.97	496.23	1.19	1.13	-1.68
2,382.00	13.89	124.33	2,315.44	-295.27	426.40	518.66	0.27	0.18	-0.84
2,477.00	15.30	122.13	2,407.37	-308.37	446.44	542.58	1.59	1.48	-2.32
2,571.00	17.32	125.38	2,497.59	-323.07	468.35	568.97	2.36	2.15	3.46
2,653.00	16.80	125.29	2,575.98	-336.98	487.97	593.02	0.63	-0.63	-0.11
<b>Last SDI Surface MWD Survey</b>									
2,763.00	15.41	126.87	2,681.66	-354.93	512.64	623.52	1.32	-1.26	1.44
<b>First SDI Production MWD Survey</b>									
2,857.00	14.86	123.89	2,772.40	-369.15	532.64	648.05	1.01	-0.59	-3.17
2,952.00	14.95	121.60	2,864.21	-382.36	553.19	672.47	0.63	0.09	-2.41
3,046.00	11.43	118.88	2,955.71	-393.22	571.68	693.85	3.80	-3.74	-2.89
3,141.00	11.78	121.78	3,048.77	-402.87	588.16	712.91	0.72	0.37	3.05
3,236.00	14.95	123.62	3,141.19	-414.77	606.62	734.85	3.37	3.34	1.94
3,330.00	15.92	120.63	3,231.80	-428.05	627.81	759.83	1.33	1.03	-3.18
3,425.00	13.89	119.93	3,323.60	-440.38	648.90	784.20	2.15	-2.14	-0.74
3,519.00	15.30	122.57	3,414.56	-452.68	669.13	807.84	1.66	1.50	2.81
3,614.00	17.41	123.36	3,505.71	-467.25	691.57	834.58	2.23	2.22	0.83
3,708.00	15.83	123.27	3,595.78	-482.02	714.04	861.45	1.68	-1.68	-0.10
3,803.00	16.18	121.16	3,687.10	-495.97	736.20	887.62	0.71	0.37	-2.22
3,897.00	16.09	117.47	3,777.40	-508.76	758.96	913.62	1.09	-0.10	-3.93
3,992.00	16.71	120.28	3,868.54	-521.72	782.44	940.30	1.06	0.65	2.96
4,086.00	17.50	123.54	3,958.38	-536.34	805.89	967.91	1.32	0.84	3.47
4,181.00	15.39	124.68	4,049.49	-551.41	828.16	994.80	2.25	-2.22	1.20
4,275.00	15.74	123.36	4,140.04	-565.52	849.07	1,020.02	0.53	0.37	-1.40
4,370.00	16.80	123.27	4,231.24	-580.13	871.31	1,046.62	1.12	1.12	-0.09



# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-47B - Slot L
<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 697-05-47B	<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)
4,464.00	14.60	126.00	4,321.72	-594.55	892.26	1,072.05	2.47	-2.34	2.90
4,559.00	14.77	122.92	4,413.62	-608.17	912.11	1,096.13	0.84	0.18	-3.24
4,654.00	15.65	124.24	4,505.29	-621.96	932.87	1,121.04	1.00	0.93	1.39
4,748.00	16.88	123.18	4,595.53	-636.57	954.77	1,147.37	1.35	1.31	-1.13
4,843.00	16.36	122.66	4,686.56	-651.33	977.58	1,174.53	0.57	-0.55	-0.55
4,937.00	13.72	121.69	4,777.33	-664.34	998.21	1,198.89	2.82	-2.81	-1.03
5,032.00	14.16	121.07	4,869.53	-676.25	1,017.75	1,221.74	0.49	0.46	-0.65
5,126.00	15.39	121.25	4,960.42	-688.66	1,038.26	1,245.67	1.31	1.31	0.19
5,221.00	14.07	121.78	5,052.30	-701.28	1,058.86	1,269.79	1.40	-1.39	0.56
5,315.00	14.25	127.14	5,143.45	-714.28	1,077.79	1,292.76	1.41	0.19	5.70
5,410.00	12.93	128.90	5,235.79	-728.02	1,095.39	1,315.04	1.46	-1.39	1.85
5,505.00	11.96	124.77	5,328.56	-740.30	1,111.75	1,335.49	1.39	-1.02	-4.35
5,599.00	10.38	117.91	5,420.78	-749.82	1,127.23	1,353.64	2.19	-1.68	-7.30
5,693.00	9.41	117.82	5,513.38	-757.37	1,141.51	1,369.68	1.03	-1.03	-0.10
5,788.00	7.65	115.63	5,607.32	-763.73	1,154.08	1,383.64	1.88	-1.85	-2.31
5,882.00	5.28	118.26	5,700.72	-768.49	1,163.53	1,394.12	2.54	-2.52	2.80
5,977.00	4.48	118.70	5,795.37	-772.34	1,170.64	1,402.15	0.84	-0.84	0.46
6,071.00	3.69	98.84	5,889.14	-774.57	1,176.85	1,408.53	1.71	-0.84	-21.13
6,166.00	2.46	73.96	5,984.00	-774.47	1,181.83	1,412.57	1.88	-1.29	-26.19
6,260.00	1.14	39.51	6,077.96	-773.20	1,184.36	1,413.93	1.76	-1.40	-36.65
6,355.00	1.06	344.05	6,172.94	-771.62	1,184.72	1,413.33	1.08	-0.08	-58.38
6,449.00	1.41	310.39	6,266.92	-770.04	1,183.60	1,411.51	0.84	0.37	-35.81
6,544.00	1.93	300.28	6,361.88	-768.47	1,181.33	1,408.75	0.63	0.55	-10.64
6,638.00	2.20	287.98	6,455.82	-767.12	1,178.25	1,405.44	0.55	0.29	-13.09
6,733.00	1.58	267.15	6,550.77	-766.62	1,175.21	1,402.66	0.96	-0.65	-21.93
6,827.00	1.23	247.29	6,644.74	-767.07	1,172.98	1,401.08	0.63	-0.37	-21.13
6,922.00	2.29	247.99	6,739.70	-768.18	1,170.28	1,399.49	1.12	1.12	0.74
7,016.00	2.81	248.16	6,833.60	-769.74	1,166.40	1,397.18	0.55	0.55	0.18
7,111.00	2.20	233.22	6,928.51	-771.70	1,162.78	1,395.32	0.94	-0.64	-15.73
7,205.00	1.49	217.67	7,022.46	-773.75	1,160.59	1,394.68	0.92	-0.76	-16.54
7,300.00	1.58	213.27	7,117.43	-775.82	1,159.11	1,394.64	0.16	0.09	-4.63
7,395.00	1.67	222.15	7,212.39	-777.94	1,157.47	1,394.49	0.28	0.09	9.35
7,489.00	1.76	228.65	7,306.35	-779.91	1,155.46	1,393.96	0.23	0.10	6.91
7,584.00	1.58	218.37	7,401.31	-781.90	1,153.55	1,393.52	0.37	-0.19	-10.82
7,678.00	1.85	208.53	7,495.27	-784.25	1,152.03	1,393.60	0.42	0.29	-10.47
7,772.00	2.73	210.28	7,589.19	-787.51	1,150.17	1,393.93	0.94	0.94	1.86
7,867.00	3.08	219.86	7,684.07	-791.43	1,147.40	1,393.87	0.63	0.37	10.08
7,962.00	3.43	234.28	7,778.92	-795.05	1,143.45	1,392.68	0.93	0.37	15.18
8,056.00	4.31	237.27	7,872.70	-798.60	1,138.20	1,390.38	0.96	0.94	3.18
8,150.00	4.66	237.79	7,966.41	-802.54	1,132.00	1,387.51	0.37	0.37	0.55
8,245.00	5.28	237.53	8,061.06	-806.95	1,125.04	1,384.30	0.65	0.65	-0.27
8,339.00	5.80	238.23	8,154.62	-811.77	1,117.36	1,380.71	0.56	0.55	0.74
8,434.00	6.33	240.08	8,249.09	-816.91	1,108.74	1,376.54	0.59	0.56	1.95

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well CC 697-05-47B - Slot L
<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 697-05-47B	<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)
8,528.00	6.33	239.73	8,342.51	-822.11	1,099.77	1,372.11	0.04	0.00	-0.37
8,623.00	6.42	233.05	8,436.93	-827.94	1,091.00	1,368.21	0.79	0.09	-7.03
8,718.00	7.12	232.52	8,531.26	-834.71	1,082.08	1,364.72	0.74	0.74	-0.56
8,812.00	7.21	231.90	8,624.53	-841.90	1,072.82	1,361.18	0.13	0.10	-0.66
8,907.00	6.07	236.83	8,718.89	-848.32	1,063.92	1,357.52	1.34	-1.20	5.19
9,001.00	5.72	237.97	8,812.39	-853.53	1,055.79	1,353.78	0.39	-0.37	1.21
9,095.00	5.72	238.14	8,905.93	-858.49	1,047.84	1,350.06	0.02	0.00	0.18
9,180.00	5.98	236.65	8,990.48	-863.16	1,040.55	1,346.71	0.35	0.31	-1.75
<b>Last SDI Production MWD Survey</b>									
9,235.00	5.98	236.65	9,045.18	-866.31	1,035.76	1,344.56	0.00	0.00	0.00
<b>Projection To TD - BHL = 637625.81, 1228043.24</b>									

### Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
173.00	172.98	-0.96	2.19	First SDI Surface Gyro MWD Survey
534.00	531.40	-22.10	35.02	Last SDI Surface Gyro MWD Survey
603.00	599.19	-30.21	44.98	First SDI Surface MWD Survey
2,653.00	2,575.98	-336.98	487.97	Last SDI Surface MWD Survey
2,763.00	2,681.66	-354.93	512.64	First SDI Production MWD Survey
9,180.00	8,990.48	-863.16	1,040.55	Last SDI Production MWD Survey
9,235.00	9,045.18	-866.31	1,035.76	Projection To TD
9,235.00	9,045.18	-866.31	1,035.76	BHL = 637625.81, 1228043.24

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