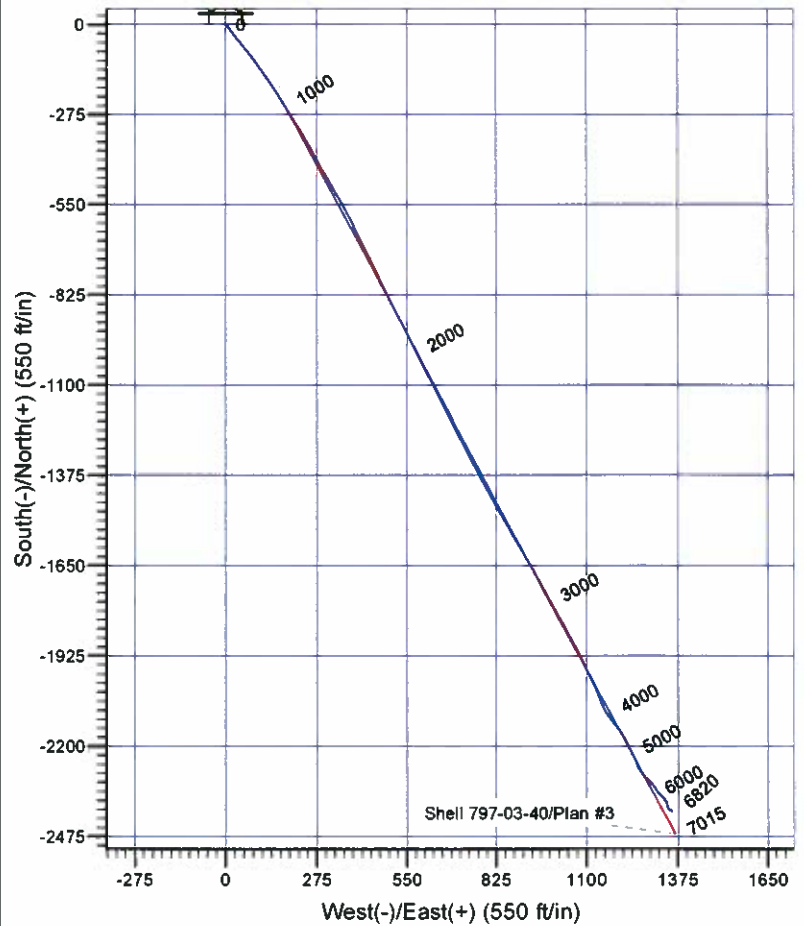
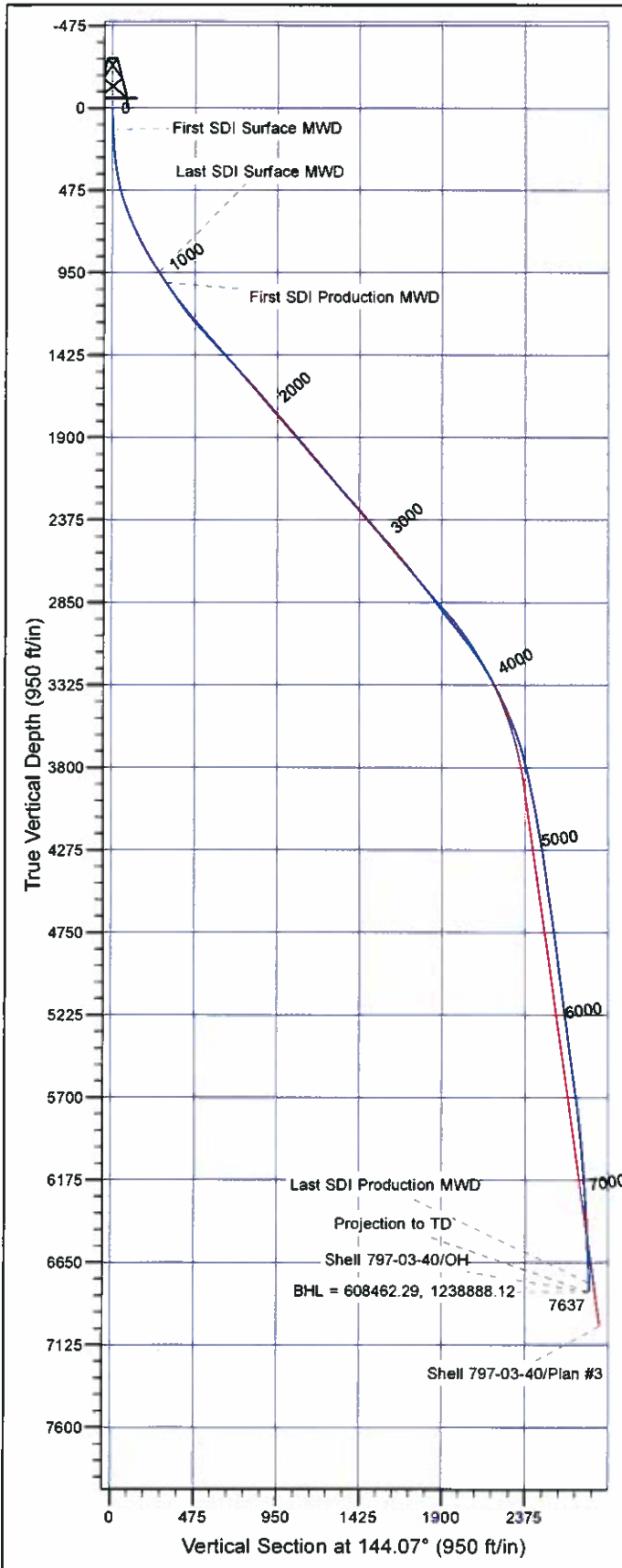




# Scientific Drilling

Company: OXY USA R/MAT  
 Project: Garfield County, CO NAD27  
 Site: Shell 797-03A Pad  
 Well: Shell 797-03-40  
 Wellbore: OH  
 Design: OH



## Well Details: Shell 797-03-40

TVD Reference: GL 6485' & RKB 30' @ 6515.00ft (6485.00)						Slot
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	A
0.00	0.00	610901.98	1237601.63	39° 28' 46.610 N	108° 12' 4.748 W	

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Shell 797-03-40 - Slot A, True North  
 Vertical (TVD) Reference: GL 6485' & RKB 30' @ 6515.00ft (H&P)  
 Section (VS) Reference: Slot - A(0.00N, 0.00E)  
 Measured Depth Reference: GL 6485' & RKB 30' @ 6515.00ft (H&P)  
 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

15:48, July 02 2012  
 Created By: Janie Collins

# **OXY USA RMAT**

**Garfield County, CO NAD27**

**Shell 797-03A Pad**

**Shell 797-03-40 - Slot A**

**OH**

**Design: OH**

## **Standard Survey Report**

**02 July, 2012**

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-40 - Slot A
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 6485' & RKB 30' @ 6515.00ft (H&P)
<b>Site:</b>	Shell 797-03A Pad	<b>MD Reference:</b>	GL 6485' & RKB 30' @ 6515.00ft (H&P)
<b>Well:</b>	Shell 797-03-40	<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>	Shell 797-03A Pad		
<b>Site Position:</b>		<b>Northing:</b>	610,902.00 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	1,237,601.62 usft
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13.200 in
		<b>Latitude:</b>	39° 28' 46.610 N
		<b>Longitude:</b>	108° 12' 4.748 W
		<b>Grid Convergence:</b>	-1.70 °

<b>Well</b>	Shell 797-03-40 - Slot A		
<b>Well Position</b>	+N/-S	0.00 ft	<b>Northing:</b> 610,901.99 usft
	+E/-W	0.00 ft	<b>Easting:</b> 1,237,601.62 usft
<b>Position Uncertainty</b>	0.00 ft	<b>Wellhead Elevation:</b>	ft
		<b>Latitude:</b>	39° 28' 46.610 N
		<b>Longitude:</b>	108° 12' 4.748 W
		<b>Ground Level:</b>	6,485.00 ft

<b>Wellbore</b>	OH		
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>
			(°)
	IGRF2010	2011/08/18	10.42
			<b>Dip Angle</b>
			(°)
			65.68
			<b>Field Strength</b>
			(nT)
			52.192

<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)</b>	<b>+N/-S</b>	<b>+E/-W</b>
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			<b>Direction</b>
			(°)
			144.07

<b>Survey Program</b>	<b>Date</b>	2012/07/02		
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
(ft)	(ft)			
124.00	1,003.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA
1,076.00	7,637.00	Survey #2 - Production MWD (OH)	MWD-SDI	MWD - Standard ISCWSA

<b>Survey</b>									
<b>Measured Depth</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Vertical Depth</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Vertical Section</b>	<b>Dogleg Rate</b>	<b>Build Rate</b>	<b>Turn Rate</b>
(ft)	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(°/100ft)	(°/100ft)	(°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
124.00	3.12	133.54	123.94	-2.33	2.45	3.32	2.52	2.52	0.00
<b>First SDI Surface MWD</b>									
155.00	3.09	139.87	154.89	-3.55	3.60	4.98	1.11	-0.10	20.42
247.00	4.77	136.42	246.67	-8.21	7.83	11.25	1.84	1.83	-3.75
337.00	8.00	148.14	336.11	-16.24	13.72	21.20	3.85	3.59	13.02
428.00	12.13	144.01	425.69	-29.36	22.68	37.09	4.60	4.54	-4.54
519.00	17.06	142.08	513.73	-47.64	36.51	60.00	5.44	5.42	-2.12
611.00	21.63	141.81	600.51	-71.63	55.30	90.45	4.97	4.97	-0.29
701.00	24.01	142.61	683.46	-99.22	76.68	125.33	2.67	2.64	0.89

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-40 - Slot A
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 6485' & RKB 30' @ 6515.00ft (H&P)
<b>Site:</b>	Shell 797-03A Pad	<b>MD Reference:</b>	GL 6485' & RKB 30' @ 6515.00ft (H&P)
<b>Well:</b>	Shell 797-03-40	<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)
798.00	27.08	144.45	770.97	-132.87	101.51	167.15	3.27	3.16	1.90
888.00	29.37	146.56	850.26	-167.96	125.58	209.69	2.78	2.54	2.34
983.00	33.24	147.35	931.42	-209.34	152.48	258.98	4.10	4.07	0.83
1,003.00	33.24	147.44	948.14	-218.57	158.39	269.92	0.25	0.00	0.45
<b>Last SDI Surface MWD</b>									
1,076.00	33.50	147.33	1,009.11	-252.39	180.03	310.01	0.37	0.36	-0.15
<b>First SDI Production MWD</b>									
1,170.00	34.65	149.00	1,088.97	-297.14	207.79	362.54	1.58	1.22	1.78
1,265.00	36.40	149.70	1,164.28	-344.63	235.93	417.50	1.89	1.84	0.74
1,360.00	40.80	151.11	1,238.51	-396.17	265.16	476.38	4.72	4.63	1.48
1,455.00	43.53	151.11	1,308.92	-452.00	295.97	539.67	2.87	2.87	0.00
1,550.00	42.56	149.79	1,378.35	-508.41	327.94	604.11	1.39	-1.02	-1.39
1,644.00	42.91	151.11	1,447.39	-563.90	359.39	667.50	1.02	0.37	1.40
1,739.00	43.09	154.10	1,516.88	-621.41	389.20	731.56	2.15	0.19	3.15
1,834.00	41.94	154.19	1,586.90	-679.18	417.19	794.76	1.21	-1.21	0.09
1,929.00	40.98	153.04	1,658.10	-735.53	445.14	856.79	1.29	-1.01	-1.21
2,023.00	41.15	154.98	1,728.97	-791.03	472.19	917.61	1.37	0.18	2.06
2,118.00	41.15	153.04	1,800.51	-847.21	499.59	979.17	1.34	0.00	-2.04
2,213.00	40.54	151.37	1,872.38	-902.17	528.55	1,040.68	1.32	-0.64	-1.76
2,307.00	41.15	153.48	1,943.49	-956.66	557.00	1,101.49	1.61	0.65	2.24
2,402.00	40.89	152.69	2,015.17	-1,012.26	585.22	1,163.07	0.61	-0.27	-0.83
2,497.00	39.57	151.73	2,087.69	-1,066.54	613.82	1,223.81	1.54	-1.39	-1.01
2,591.00	40.36	153.04	2,159.74	-1,120.04	641.80	1,283.55	1.23	0.84	1.39
2,686.00	42.74	153.57	2,230.83	-1,176.33	670.10	1,345.73	2.53	2.51	0.56
2,781.00	42.03	152.87	2,301.00	-1,233.50	698.95	1,408.96	0.90	-0.75	-0.74
2,875.00	40.45	152.87	2,371.68	-1,288.65	727.21	1,470.19	1.68	-1.68	0.00
2,970.00	42.03	151.29	2,443.12	-1,343.98	756.54	1,532.20	1.99	1.66	-1.66
3,065.00	41.06	151.73	2,514.22	-1,399.35	786.60	1,594.68	1.07	-1.02	0.46
3,160.00	39.57	150.76	2,586.65	-1,453.23	816.16	1,655.66	1.70	-1.57	-1.02
3,254.00	40.45	149.97	2,658.65	-1,505.76	846.04	1,715.72	1.08	0.94	-0.84
3,349.00	38.34	150.14	2,732.06	-1,558.00	876.14	1,775.69	2.22	-2.22	0.18
3,444.00	37.90	149.97	2,806.80	-1,608.82	905.41	1,834.01	0.48	-0.46	-0.18
3,538.00	35.88	149.09	2,881.98	-1,657.45	934.01	1,890.18	2.22	-2.15	-0.94
3,633.00	38.34	151.11	2,957.73	-1,707.14	962.55	1,947.16	2.89	2.59	2.13
3,728.00	37.90	151.02	3,032.47	-1,758.47	990.93	2,005.37	0.47	-0.46	-0.09
3,822.00	36.84	151.73	3,107.18	-1,808.55	1,018.26	2,061.96	1.22	-1.13	0.76
3,917.00	33.68	151.99	3,184.74	-1,856.90	1,044.13	2,116.29	3.33	-3.33	0.27
4,012.00	29.72	152.08	3,265.55	-1,900.98	1,067.54	2,165.72	4.17	-4.17	0.09
4,106.00	27.70	154.27	3,347.99	-1,941.25	1,087.93	2,210.30	2.42	-2.15	2.33
4,201.00	25.15	154.54	3,433.06	-1,979.38	1,106.20	2,251.89	2.69	-2.68	0.28
4,296.00	23.04	156.47	3,519.78	-2,014.65	1,122.30	2,289.90	2.37	-2.22	2.03
4,391.00	19.87	157.44	3,608.18	-2,046.61	1,135.92	2,323.78	3.36	-3.34	1.02
4,485.00	16.44	156.03	3,697.49	-2,073.53	1,147.46	2,352.34	3.68	-3.65	-1.50

**Scientific Drilling International**  
Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-40 - Slot A
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 6485' & RKB 30' @ 6515.00ft (H&P)
<b>Site:</b>	Shell 797-03A Pad	<b>MD Reference:</b>	GL 6485' & RKB 30' @ 6515.00ft (H&P)
<b>Well:</b>	Shell 797-03-40	<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)
4,580.00	13.63	154.89	3,789.23	-2,095.95	1,157.67	2,376.49	2.97	-2.96	-1.20
4,675.00	11.87	143.73	3,881.90	-2,113.97	1,168.20	2,397.26	3.18	-1.85	-11.75
4,770.00	11.78	135.91	3,974.89	-2,128.81	1,180.73	2,416.63	1.69	-0.09	-8.23
4,864.00	10.46	144.43	4,067.13	-2,142.65	1,192.37	2,434.66	2.24	-1.40	9.06
4,959.00	9.67	148.03	4,160.67	-2,156.43	1,201.61	2,451.25	1.06	-0.83	3.79
5,054.00	9.85	149.62	4,254.29	-2,170.21	1,209.95	2,467.29	0.34	0.19	1.67
5,148.00	7.91	153.48	4,347.16	-2,182.93	1,216.90	2,481.68	2.16	-2.06	4.11
5,243.00	7.65	153.04	4,441.29	-2,194.42	1,222.69	2,494.37	0.28	-0.27	-0.46
5,338.00	8.09	155.51	4,535.39	-2,206.14	1,228.33	2,507.17	0.58	0.46	2.60
5,432.00	8.18	154.01	4,628.45	-2,218.17	1,234.00	2,520.24	0.25	0.10	-1.60
5,527.00	8.44	155.24	4,722.45	-2,230.57	1,239.88	2,533.74	0.33	0.27	1.29
5,622.00	7.91	153.92	4,816.48	-2,242.78	1,245.67	2,547.02	0.59	-0.56	-1.39
5,716.00	7.74	161.92	4,909.61	-2,254.60	1,250.48	2,559.42	1.17	-0.18	8.51
5,811.00	7.47	155.42	5,003.78	-2,266.30	1,255.04	2,571.56	0.95	-0.28	-6.84
5,906.00	7.56	141.09	5,097.97	-2,276.78	1,261.53	2,583.86	1.97	0.09	-15.08
6,000.00	7.21	139.42	5,191.19	-2,286.07	1,269.25	2,595.91	0.44	-0.37	-1.78
6,095.00	7.47	138.54	5,285.41	-2,295.23	1,277.22	2,608.00	0.30	0.27	-0.93
6,189.00	7.39	135.20	5,378.62	-2,304.10	1,285.52	2,620.06	0.47	-0.09	-3.55
6,284.00	8.09	138.02	5,472.76	-2,313.40	1,294.30	2,632.74	0.84	0.74	2.97
6,379.00	8.09	142.59	5,566.81	-2,323.68	1,302.83	2,646.07	0.68	0.00	4.81
6,473.00	7.30	143.11	5,659.96	-2,333.71	1,310.44	2,658.65	0.84	-0.84	0.55
6,568.00	6.60	142.41	5,754.27	-2,342.86	1,317.39	2,670.15	0.74	-0.74	-0.74
6,663.00	6.51	138.63	5,848.65	-2,351.23	1,324.28	2,680.96	0.46	-0.09	-3.98
6,757.00	5.80	138.63	5,942.10	-2,358.80	1,330.94	2,691.00	0.76	-0.76	0.00
6,790.97	5.55	140.05	5,975.91	-2,361.34	1,333.13	2,694.34	0.85	-0.75	4.17
Rev Shell 797-03-40 Tgt									
6,852.00	5.10	142.94	6,036.67	-2,365.77	1,336.66	2,700.00	0.85	-0.73	4.74
6,947.00	4.22	160.34	6,131.36	-2,372.43	1,340.38	2,707.57	1.74	-0.93	18.32
7,042.00	4.04	173.96	6,226.12	-2,379.05	1,341.91	2,713.83	1.05	-0.19	14.34
7,136.00	3.61	156.74	6,319.91	-2,385.06	1,343.42	2,719.59	1.30	-0.46	-18.32
7,231.00	2.99	151.64	6,414.75	-2,389.99	1,345.78	2,724.96	0.72	-0.65	-5.37
7,326.00	2.64	117.10	6,509.65	-2,393.17	1,348.91	2,729.37	1.79	-0.37	-36.36
7,420.00	2.81	120.44	6,603.54	-2,395.32	1,352.82	2,733.41	0.25	0.18	3.55
7,515.00	1.93	135.64	6,698.46	-2,397.64	1,355.95	2,737.13	1.13	-0.93	16.00
7,583.00	1.67	138.10	6,766.42	-2,399.20	1,357.41	2,739.24	0.40	-0.38	3.62
Last SDI Production MWD									
7,637.00	1.67	138.10	6,820.40	-2,400.37	1,358.46	2,740.81	0.00	0.00	0.00
Projection to TD - BHL = 608462.29, 1238888.12 - Rev Shell 797-03-40 PBHL									

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-40 - Slot A
<b>Project:</b>	Garfield County, CO NAD27	<b>TVD Reference:</b>	GL 6485' & RKB 30' @ 6515.00ft (H&P)
<b>Site:</b>	Shell 797-03A Pad	<b>MD Reference:</b>	GL 6485' & RKB 30' @ 6515.00ft (H&P)
<b>Well:</b>	Shell 797-03-40	<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

### Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
124.00	123.94	-2.33	2.45	First SDI Surface MWD
1,003.00	948.14	-218.57	158.39	Last SDI Surface MWD
1,076.00	1,009.11	-252.39	180.03	First SDI Production MWD
7,583.00	6,766.42	-2,399.20	1,357.41	Last SDI Production MWD
7,637.00	6,820.40	-2,400.37	1,358.46	Projection to TD
7,637.00	6,820.40	-2,400.37	1,358.46	BHL = 608462.29, 1238888.12

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