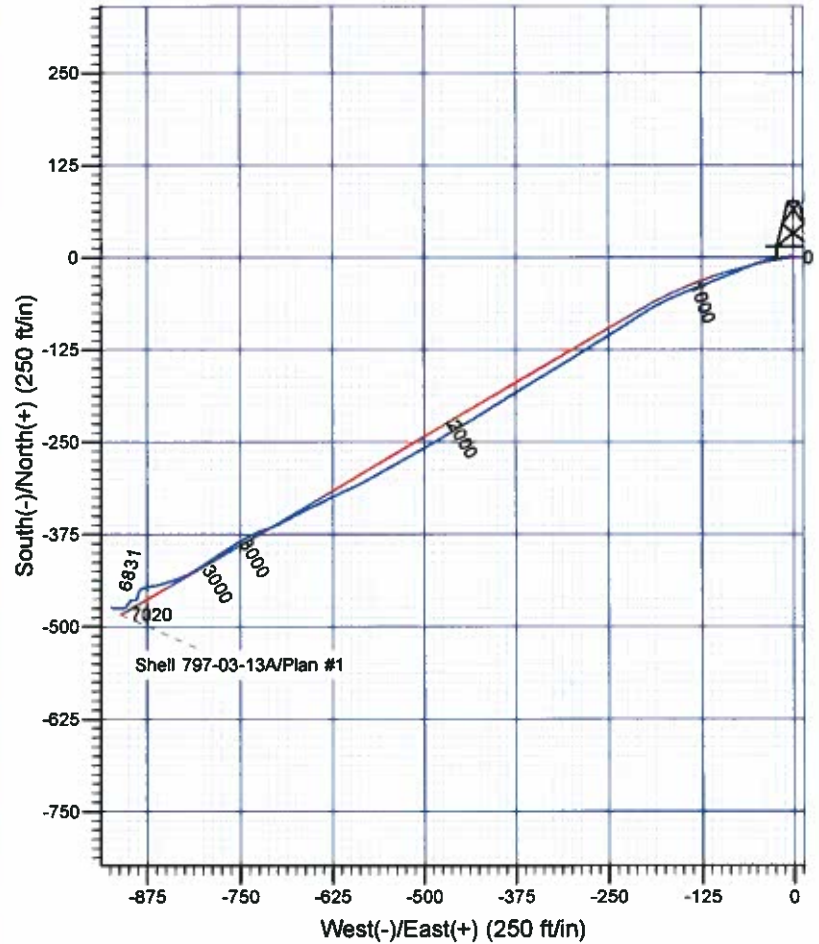
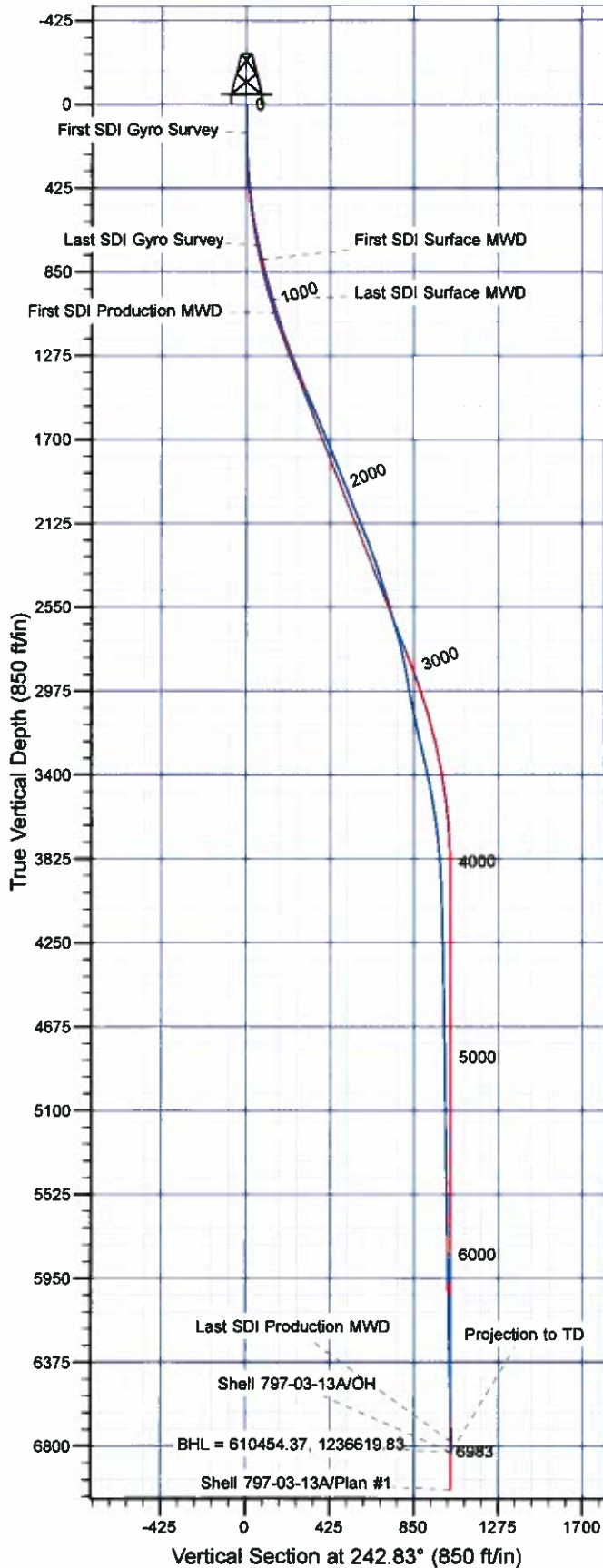




# Scientific Drilling

Company: OXY USA RMAT  
 Project: Garfield County, CO NAD27  
 Site: Shell 797-03A Pad  
 Well: Shell 797-03-13A  
 Wellbore: OH  
 Design: OH



## Well Details: Shell 797-03-13A

TVD Reference: GL 6485' & RKB 30' @ 6515.00ft (H&P)		Easting		Latitude		Longitude		Slot
+N/-S	+E/-W	North	East	Lat	Long	Lat	Long	N
0.00	0.00	610900.51	1237556.74	39° 28' 46.582 N	108° 12' 5.320 W			

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Shell 797-03-13A - Slot N, True North  
 Vertical (TVD) Reference: GL 6485' & RKB 30' @ 6515.00ft (H&P)  
 Section (VS) Reference: Slot - N(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

14:13, May 30 2012  
 Created By: Janie Collins

# **OXY USA RMAT**

**Garfield County, CO NAD27**

**Shell 797-03A Pad**

**Shell 797-03-13A - Slot N**

**OH**

**Design: OH**

## **Standard Survey Report**

**30 May, 2012**

# Scientific Drilling International

## Survey Report

Company: OXY USA RMAT		Local Co-ordinate Reference:		Well Shell 797-03-13A - Slot N	
Project: Garfield County, CO NAD27		TVD Reference:		GL 6485' & RKB 30' @ 6515.00ft (H&P)	
Site: Shell 797-03A Pad		MD Reference:		GL 6485' & RKB 30' @ 6515.00ft (H&P)	
Well: Shell 797-03-13A		North Reference:		True	
Wellbore: OH		Survey Calculation Method:		Minimum Curvature	
Design: OH		Database:		Rockies Compass Server	

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

Site		Shell 797-03A Pad									
Site Position:		Northing:		610,902.00 usft		Latitude:		39° 28' 46.610 N			
From:		Lat/Long		Easting:		1,237,601.62 usft		Longitude:		108° 12' 4.748 W	
Position Uncertainty:		0.00 ft		Slot Radius:		13.200 in		Grid Convergence:		-1.70 °	

Well		Shell 797-03-13A - Slot N											
Well Position		+N/-S		0.00 ft		Northing:		610,900.51 usft		Latitude:		39° 28' 48.582 N	
		+E/-W		0.00 ft		Easting:		1,237,556.74 usft		Longitude:		108° 12' 5.320 W	
Position Uncertainty		0.00 ft		Wellhead Elevation:		ft		Ground Level:		6,485.00 ft			

Wellbore		OH									
Magnetics		Model Name		Sample Date		Declination (°)		Dip Angle (°)		Field Strength (nT)	
		IGRF2010		2012/01/18		10.37		65.67		52,150	

Design		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		242.83			

Survey Program		Date		2012/05/30					
From (ft)		To (ft)		Survey (Wellbore)		Tool Name		Description	
142.00		719.00		Survey #1 - Gyro Survey (OH)		SDI Standard Keeper 103		SDI Standard Wireline Keeper ver 1.0.3	
794.00		1,003.00		Survey #2 - Surface MWD (OH)		MWD-SDI		MWD - Standard ISCWSA	
1,076.00		6,983.00		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	
142.00		0.53		4.04		142.00		0.66		0.05		-0.34		0.37		0.37		0.00	
First SDI Gyro Survey																			
173.00		0.88		305.88		173.00		0.94		-0.14		-0.31		2.42		1.13		-187.68	
264.00		3.96		263.67		263.91		1.00		-3.83		2.95		3.69		3.38		-46.36	
354.00		4.57		263.14		353.66		0.23		-10.48		9.22		0.68		0.68		-0.59	
445.00		6.95		264.90		444.19		-0.69		-19.56		17.72		2.62		2.62		1.93	
537.00		8.09		254.36		535.40		-2.93		-31.34		29.22		1.94		1.24		-11.46	
628.00		10.47		252.77		625.21		-7.11		-45.40		43.64		2.63		2.62		-1.75	

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-13A - Slot N
<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 797-03-13A	<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)
719.00	12.23	247.32	714.43	-13.28	-62.20	61.40	2.26	1.93	-5.99
<b>Last SDI Gyro Survey</b>									
794.00	13.98	248.78	787.47	-19.62	-77.97	78.33	2.37	2.33	1.95
<b>First SDI Surface MWD</b>									
888.00	14.77	247.72	878.53	-28.27	-99.65	101.56	0.89	0.84	-1.13
983.00	16.97	248.25	989.90	-38.00	-123.73	127.43	2.32	2.32	0.56
1,003.00	17.15	248.69	989.02	-40.15	-129.19	133.27	1.11	0.90	2.20
<b>Last SDI Surface MWD</b>									
1,076.00	17.49	247.32	1,058.71	-48.29	-149.34	154.91	0.73	0.47	-1.88
<b>First SDI Production MWD</b>									
1,171.00	17.94	243.59	1,149.21	-60.31	-175.61	183.78	1.28	0.47	-3.93
1,266.00	20.58	237.35	1,238.89	-75.83	-202.78	215.03	3.52	2.78	-6.57
1,360.00	22.07	237.00	1,326.45	-94.36	-231.51	249.05	1.59	1.59	-0.37
1,455.00	22.95	237.70	1,414.22	-113.98	-262.13	285.25	0.97	0.93	0.74
1,550.00	23.65	238.41	1,501.47	-133.86	-294.02	322.70	0.79	0.74	0.75
1,645.00	22.86	239.11	1,588.75	-153.31	-326.09	360.11	0.88	-0.83	0.74
1,739.00	22.77	238.41	1,675.40	-172.22	-357.25	396.47	0.30	-0.10	-0.74
1,834.00	21.90	237.62	1,763.27	-191.33	-387.87	432.44	0.97	-0.92	-0.83
1,929.00	22.07	238.32	1,851.36	-210.19	-418.02	467.88	0.33	0.18	0.74
2,024.00	21.98	238.67	1,939.43	-228.81	-448.40	503.40	0.17	-0.09	0.37
2,118.00	21.98	240.25	2,026.59	-246.69	-478.70	538.52	0.63	0.00	1.68
2,213.00	21.98	242.10	2,114.69	-263.83	-509.84	574.06	0.73	0.00	1.95
2,308.00	21.90	239.20	2,202.81	-281.22	-540.77	609.52	1.14	-0.08	-3.05
2,402.00	19.70	241.57	2,290.68	-297.74	-569.77	642.86	2.51	-2.34	2.52
2,497.00	17.59	245.00	2,380.69	-311.43	-596.86	673.21	2.50	-2.22	3.61
2,592.00	17.23	245.00	2,471.34	-323.45	-622.63	701.62	0.38	-0.38	0.00
2,686.00	16.71	243.86	2,561.25	-335.28	-647.38	729.04	0.66	-0.55	-1.21
2,781.00	16.18	243.68	2,652.36	-347.17	-671.50	755.93	0.56	-0.56	-0.19
2,876.00	13.89	240.95	2,744.11	-358.58	-693.34	780.57	2.52	-2.41	-2.87
2,971.00	10.46	252.64	2,836.97	-366.69	-711.54	800.47	4.43	-3.61	12.31
3,065.00	9.82	248.66	2,929.50	-372.15	-727.15	816.85	1.01	-0.68	-4.23
3,160.00	11.64	237.76	3,022.85	-380.22	-742.81	834.46	2.86	1.92	-11.47
3,255.00	12.65	239.22	3,115.72	-390.65	-759.85	854.39	1.11	1.06	1.54
3,349.00	12.79	234.39	3,207.41	-401.98	-777.15	874.96	1.14	0.15	-5.14
3,444.00	12.37	235.87	3,300.13	-413.81	-794.13	895.46	0.56	-0.44	1.56
3,539.00	12.30	241.05	3,392.94	-424.42	-811.40	915.67	1.17	-0.07	5.45
3,633.00	11.15	245.75	3,484.98	-433.00	-828.45	934.76	1.59	-1.22	5.00
3,728.00	8.06	253.09	3,578.64	-438.71	-843.20	950.49	3.49	-3.25	7.73
3,823.00	7.10	253.21	3,672.81	-442.34	-855.20	962.82	1.01	-1.01	0.13
3,917.00	6.42	259.50	3,766.16	-444.98	-865.93	973.57	1.07	-0.72	6.69
4,012.00	4.31	259.41	3,860.74	-446.80	-874.66	982.08	2.22	-2.22	-0.09
4,107.00	2.20	258.07	3,955.58	-447.70	-879.94	987.28	2.23	-2.22	-3.52
4,201.00	1.14	233.22	4,049.54	-448.69	-882.44	989.95	1.31	-1.13	-24.31
4,296.00	1.14	231.02	4,144.52	-449.85	-883.93	991.81	0.05	0.00	-2.32



# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-13A - Slot N
<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 797-03-13A	<b>North Reference:</b>	True
<b>Wellbore:</b>	OH	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	OH	<b>Database:</b>	Rockdes 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)
4,391.00	1.37	224.72	4,239.50	-451.25	-885.46	993.82	0.28	0.24	-6.63
4,486.00	1.02	195.29	4,334.48	-452.88	-886.49	995.47	0.73	-0.37	-30.98
4,580.00	1.85	192.44	4,428.45	-455.17	-887.03	997.00	0.89	0.88	-3.03
4,675.00	1.58	193.14	4,523.40	-457.94	-887.66	998.82	0.29	-0.28	0.74
4,770.00	2.11	199.65	4,618.36	-460.86	-888.55	1,000.94	0.60	0.56	6.85
4,864.00	1.23	226.89	4,712.32	-463.18	-889.87	1,003.18	1.24	-0.94	28.98
4,959.00	0.97	285.16	4,807.30	-463.67	-891.39	1,004.75	1.15	-0.27	61.34
5,054.00	0.97	282.53	4,902.29	-463.28	-892.95	1,005.97	0.05	0.00	-2.77
5,148.00	0.79	250.89	4,996.28	-463.32	-894.34	1,007.22	0.54	-0.19	-33.66
5,243.00	0.70	256.16	5,091.27	-463.67	-895.52	1,008.43	0.12	-0.09	5.55
5,338.00	0.53	240.95	5,186.26	-464.03	-896.47	1,009.44	0.25	-0.18	-16.01
5,433.00	0.97	219.86	5,281.25	-464.86	-897.37	1,010.62	0.54	0.46	-22.20
5,527.00	0.62	187.52	5,375.25	-465.97	-897.94	1,011.64	0.59	-0.37	-34.40
5,622.00	0.70	224.61	5,470.24	-466.89	-898.42	1,012.48	0.45	0.08	39.04
5,717.00	0.79	224.34	5,565.23	-467.78	-899.28	1,013.65	0.09	0.09	-0.28
5,811.00	0.79	214.59	5,659.22	-468.77	-900.10	1,014.84	0.14	0.00	-10.37
5,906.00	1.06	225.05	5,754.21	-469.93	-901.10	1,016.25	0.33	0.28	11.01
6,001.00	0.97	204.83	5,849.20	-471.28	-902.06	1,017.72	0.39	-0.09	-21.28
6,095.00	1.14	214.59	5,943.18	-472.78	-902.92	1,019.17	0.26	0.18	10.38
6,125.04	1.02	218.72	5,973.21	-473.23	-903.26	1,019.68	0.47	-0.40	13.77
<b>Shell 797-03-13A Tgt</b>									
6,190.00	0.79	231.73	6,038.17	-473.96	-903.97	1,020.65	0.47	-0.36	20.02
6,285.00	1.76	252.91	6,133.14	-474.79	-905.88	1,022.73	1.12	1.02	22.29
6,379.00	1.41	260.38	6,227.11	-475.41	-908.40	1,025.25	0.43	-0.37	7.95
6,474.00	1.32	276.02	6,322.08	-475.49	-910.64	1,027.28	0.40	-0.09	16.46
6,568.00	1.58	277.17	6,416.05	-475.22	-913.00	1,029.26	0.28	0.28	1.22
6,663.00	1.58	283.41	6,511.01	-474.75	-915.58	1,031.33	0.18	0.00	6.57
6,758.00	1.67	270.49	6,605.98	-474.43	-918.24	1,033.56	0.40	0.09	-13.60
6,853.00	1.14	274.53	6,700.95	-474.35	-920.56	1,035.59	0.57	-0.56	4.25
6,929.00	1.23	284.20	6,776.93	-474.09	-922.11	1,036.84	0.29	0.12	12.72
<b>Last SDI Production MWD</b>									
6,983.00	1.23	284.20	6,830.92	-473.80	-923.23	1,037.71	0.00	0.00	0.00
<b>Projection to TD - BHL = 610454.37, 1236619.83</b>									

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-13A - Slot N
<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 797-03-13A	<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)	
142.00	142.00	0.66	0.05	First SDI Gyro Survey
719.00	714.43	-13.28	-62.20	Last SDI Gyro Survey
794.00	787.47	-19.62	-77.97	First SDI Surface MWD
1,003.00	989.02	-40.15	-129.19	Last SDI Surface MWD
1,076.00	1,058.71	-48.29	-149.34	First SDI Production MWD
6,929.00	6,776.93	-474.09	-922.11	Last SDI Production MWD
6,983.00	6,830.92	-473.80	-923.23	Projection to TD
6,983.00	6,830.92	-473.80	-923.23	BHL = 610454.37, 1236619.83

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------