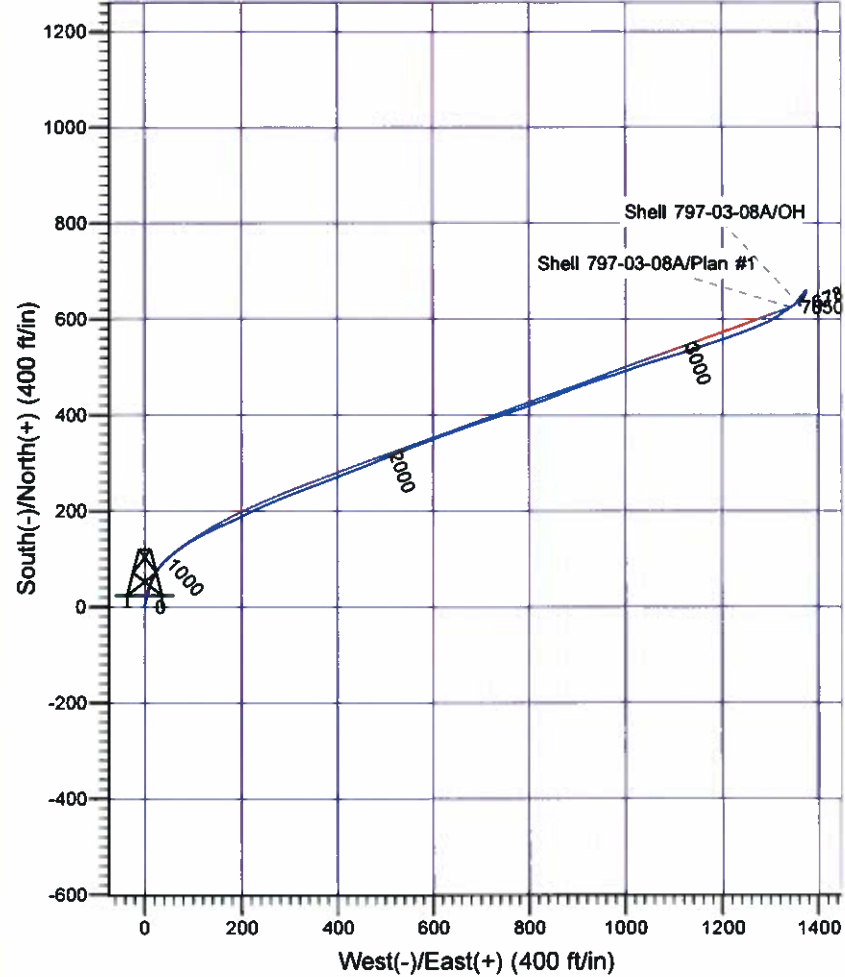
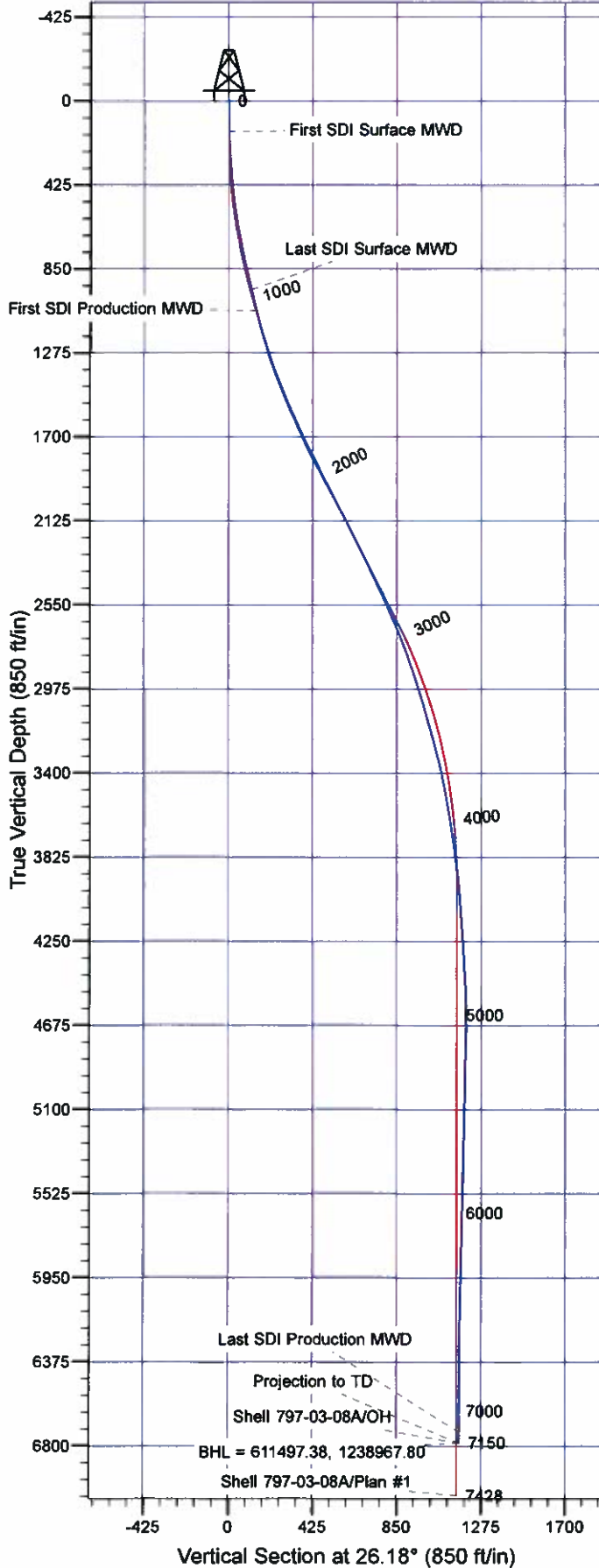




# Scientific Drilling

Company: OXY USA KMAI  
 Project: Garfield County, CO NAD27  
 Site: Shell 797-03A Pad  
 Well: Shell 797-03-08A  
 Wellbore: OH  
 Design: OH



## Well Details: Shell 797-03-08A

+N/-S	+E/-W	North	East	Latitude	Longitude	Slot
0.00	0.00	610910.28	1237586.35	39° 28' 46.687 N	108° 12' 4.946 W	J

## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Shell 797-03-08A - Slot J, True North  
 Vertical (TVD) Reference: GL 6485' & RKB 30' @ 6515.00ft (H&P)  
 Section (VS) Reference: Slot - J(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

11:26, June 19 2012  
 Created By: Janie Collins

# **OXY USA RMAT**

**Garfield County, CO NAD27**

**Shell 797-03A Pad**

**Shell 797-03-08A - Slot J**

**OH**

**Design: OH**

## **Standard Survey Report**

**19 June, 2012**

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-08A - Slot J
<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 797-03-08A	<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		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 797-03-08A - Slot J					
Well Position	+N-S	0.00 ft	Northing:	610,910.28 usft	Latitude:	39° 28' 46.687 N
	+E-W	0.00 ft	Easting:	1,237,586.35 usft	Longitude:	108° 12' 4.946 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	6,485.00 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>
	IGRF2010	2011/08/19	10.42	65.68	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) (ft)</b>	<b>+N-S (ft)</b>	<b>+E-W (ft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	26.18	

<b>Survey Program</b>	<b>Date</b>	2012/06/19		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
155.00	965.00	Survey #1 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA
1,076.00	7,150.00	Survey #2 - 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
155.00	1.85	1.97	154.97	2.50	0.09	2.28	1.19	1.19	0.00
<b>First SDI Surface MWD</b>									
247.00	3.03	14.07	246.89	6.34	0.73	6.01	1.39	1.28	13.15
337.00	4.19	19.65	336.71	11.75	2.41	11.61	1.35	1.29	6.20
428.00	5.98	12.87	427.35	19.50	4.59	19.52	2.07	1.97	-7.45
519.00	7.83	14.19	517.68	30.13	7.16	30.20	2.04	2.03	1.45
611.00	9.94	17.45	608.58	43.78	11.08	44.18	2.36	2.29	3.54
701.00	10.55	22.10	697.14	58.83	16.51	60.08	1.14	0.68	5.17
794.00	12.49	32.30	788.27	75.22	25.09	78.57	3.02	2.09	10.97

# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-08A - Slot J
<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 797-03-08A	<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)
889.00	13.72	42.32	880.81	92.24	38.16	99.61	2.71	1.29	10.55
965.00	14.07	51.46	954.59	104.66	51.46	116.62	2.92	0.46	12.03
<b>Last SDI Surface MWD</b>									
1,076.00	14.95	52.59	1,062.05	121.76	73.39	141.65	0.83	0.79	1.02
<b>First SDI Production MWD</b>									
1,171.00	17.50	57.95	1,153.27	136.79	95.23	164.77	3.11	2.68	5.64
1,266.00	20.84	63.13	1,242.99	152.01	122.42	190.43	3.94	3.52	5.45
1,361.00	24.01	65.86	1,330.80	167.56	155.14	218.82	3.51	3.34	2.87
1,455.00	25.68	64.45	1,416.10	184.17	190.97	249.53	1.88	1.78	-1.50
1,550.00	28.58	63.75	1,500.64	203.10	229.93	283.71	3.07	3.05	-0.74
1,645.00	30.07	67.09	1,583.47	222.42	272.24	319.72	2.33	1.57	3.52
1,740.00	31.66	70.43	1,665.02	240.03	317.66	355.57	2.46	1.67	3.52
1,834.00	32.80	68.14	1,744.53	257.78	364.54	392.18	1.78	1.21	-2.44
1,929.00	36.14	69.02	1,822.84	277.40	414.59	431.86	3.55	3.52	0.93
2,024.00	36.67	69.20	1,899.30	297.50	467.26	473.15	0.57	0.56	0.19
2,119.00	35.96	67.53	1,975.85	318.23	519.56	514.83	1.28	-0.75	-1.76
2,213.00	35.88	69.02	2,051.98	338.65	570.78	555.75	0.93	-0.09	1.59
2,308.00	35.09	69.99	2,129.33	357.96	622.44	595.87	1.02	-0.83	1.02
2,403.00	35.44	71.04	2,206.90	376.25	674.14	635.10	0.74	0.37	1.11
2,497.00	34.56	71.66	2,283.90	393.49	725.23	673.12	1.01	-0.94	0.66
2,592.00	33.94	70.52	2,362.43	410.82	775.81	710.98	0.94	-0.65	-1.20
2,687.00	32.71	69.46	2,441.81	428.67	824.85	748.64	1.43	-1.29	-1.12
2,781.00	31.92	68.58	2,521.25	446.66	871.77	785.48	0.98	-0.84	-0.94
2,876.00	31.48	70.78	2,602.08	463.99	918.57	821.69	1.30	-0.46	2.32
2,971.00	30.43	71.75	2,683.55	479.69	964.84	856.20	1.22	-1.11	1.02
3,066.00	28.31	69.90	2,766.33	494.97	1,008.85	889.33	2.43	-2.23	-1.95
3,160.00	26.56	72.27	2,849.76	509.03	1,049.80	920.01	2.19	-1.86	2.52
3,255.00	24.36	73.59	2,935.53	521.04	1,088.83	948.01	2.39	-2.32	1.39
3,350.00	23.39	71.75	3,022.40	532.48	1,125.54	974.47	1.29	-1.02	-1.94
3,444.00	21.90	71.04	3,109.15	544.02	1,159.84	999.96	1.61	-1.59	-0.76
3,539.00	20.66	70.95	3,197.67	555.24	1,192.44	1,024.42	1.31	-1.31	-0.09
3,634.00	19.70	69.90	3,286.84	566.22	1,223.32	1,047.89	1.08	-1.01	-1.11
3,728.00	17.67	70.16	3,375.88	576.50	1,251.62	1,069.61	2.16	-2.16	0.28
3,823.00	14.77	68.49	3,467.09	585.84	1,276.45	1,088.95	3.09	-3.05	-1.76
3,918.00	11.78	62.69	3,559.55	594.73	1,296.34	1,105.70	3.44	-3.15	-6.11
4,012.00	10.20	56.28	3,651.82	603.76	1,311.79	1,120.62	2.12	-1.68	-6.82
4,107.00	9.23	56.80	3,745.46	612.60	1,325.16	1,134.45	1.03	-1.02	0.55
4,202.00	8.71	55.93	3,839.30	620.80	1,337.49	1,147.25	0.57	-0.55	-0.92
4,297.00	6.33	55.75	3,933.47	627.78	1,347.78	1,158.05	2.51	-2.51	-0.19
4,391.00	4.57	38.70	4,027.05	633.62	1,354.41	1,166.22	2.52	-1.87	-18.14
4,486.00	4.40	38.52	4,121.76	639.42	1,359.04	1,173.47	0.18	-0.18	-0.19
4,581.00	3.69	35.27	4,216.52	644.77	1,363.08	1,180.05	0.79	-0.75	-3.42
4,675.00	3.43	34.92	4,310.34	649.54	1,366.44	1,185.82	0.28	-0.28	-0.37



# Scientific Drilling International

## Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-08A - Slot J
<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 797-03-08A	<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)
4,770.00	3.17	32.19	4,405.18	654.10	1,369.46	1,191.24	0.32	-0.27	-2.87
4,865.00	2.73	37.56	4,500.06	658.11	1,372.24	1,196.07	0.55	-0.46	5.65
4,959.00	1.23	64.80	4,594.00	660.32	1,374.52	1,199.05	1.84	-1.60	28.98
5,054.00	1.49	191.01	4,688.99	659.54	1,375.20	1,198.66	2.56	0.27	132.85
5,149.00	1.14	187.32	4,783.96	657.39	1,374.85	1,196.57	0.38	-0.37	-3.88
5,244.00	0.97	194.79	4,878.95	655.68	1,374.52	1,194.89	0.23	-0.18	7.86
5,338.00	1.32	188.38	4,972.93	653.83	1,374.16	1,193.08	0.40	0.37	-6.82
5,433.00	1.14	216.15	5,067.91	651.99	1,373.44	1,191.10	0.65	-0.19	29.23
5,528.00	1.41	226.61	5,162.88	650.42	1,372.04	1,189.08	0.37	0.28	11.01
5,622.00	1.32	202.88	5,256.86	648.63	1,370.78	1,186.91	0.60	-0.10	-25.24
5,717.00	1.14	197.60	5,351.83	646.72	1,370.06	1,184.89	0.22	-0.19	-5.56
5,811.00	1.23	207.71	5,445.81	644.94	1,369.31	1,182.95	0.24	0.10	10.76
5,906.00	1.41	198.40	5,540.79	642.93	1,368.47	1,180.78	0.29	0.19	-9.80
6,001.00	1.32	200.33	5,635.76	640.79	1,367.72	1,178.53	0.11	-0.09	2.03
6,095.00	1.23	227.31	5,729.74	639.09	1,366.60	1,176.51	0.64	-0.10	28.70
6,190.00	0.88	226.17	5,824.72	637.89	1,365.33	1,174.88	0.37	-0.37	-1.20
6,285.00	1.14	233.20	5,919.71	636.82	1,364.04	1,173.35	0.30	0.27	7.40
6,379.00	1.49	223.88	6,013.68	635.38	1,362.45	1,171.35	0.44	0.37	-9.91
6,389.59	1.49	222.51	6,024.27	635.18	1,362.26	1,171.09	0.34	-0.03	-12.97
<b>Shell 797-03-08A Tgt</b>									
6,474.00	1.49	211.49	6,108.65	633.44	1,360.95	1,168.94	0.34	0.00	-13.05
6,569.00	1.06	211.23	6,203.63	631.63	1,359.85	1,166.84	0.45	-0.45	-0.27
6,664.00	0.62	143.99	6,298.62	630.47	1,359.69	1,165.72	1.05	-0.46	-70.78
6,758.00	0.70	93.63	6,392.61	630.02	1,360.57	1,165.71	0.60	0.09	-53.57
6,853.00	0.88	122.55	6,487.61	629.59	1,361.76	1,165.85	0.45	0.19	30.44
6,948.00	0.44	139.42	6,582.60	628.92	1,362.61	1,165.62	0.50	-0.46	17.76
7,042.00	0.35	126.77	6,676.60	628.47	1,363.08	1,165.43	0.13	-0.10	-13.46
7,096.00	0.35	159.11	6,730.60	628.22	1,363.27	1,165.29	0.36	0.00	59.89
<b>Last SDI Production MWD</b>									
7,150.00	0.35	159.11	6,784.60	627.91	1,363.38	1,165.06	0.00	0.00	0.00
<b>Projection to TD - BHL = 611497.38, 1238967.80</b>									

### Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
155.00	154.97	2.50	0.09	First SDI Surface MWD
965.00	954.59	104.66	51.46	Last SDI Surface MWD
1,076.00	1,062.05	121.76	73.39	First SDI Production MWD
7,096.00	6,730.60	628.22	1,363.27	Last SDI Production MWD
7,150.00	6,784.60	627.91	1,363.38	Projection to TD
7,150.00	6,784.60	627.91	1,363.38	BHL = 611497.38, 1238967.80

**Scientific Drilling International**  
Survey Report

<b>Company:</b>	OXY USA RMAT	<b>Local Co-ordinate Reference:</b>	Well Shell 797-03-08A - Slot J
<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 797-03-08A	<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

Checked By: _____	Approved By: _____	Date: _____
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