



**Scientific
Drilling**

Directional Survey Certification

7327 West Barton Road

Casper, WY 82604

(307)-472-6621 Fax (307) 472-5439

Operator	_____ OXY USA RMAT _____
Well Name & No.	_____ Shell 797-03-38 _____
County & State	_____ Garfield County, CO _____
SDI Job No.	_____ 42DEFK10121331 _____
Rig	_____ Nabors M-37 _____

I, _____ Rex Hall _____, having personal knowledge of all the facts, hereby
certify that the attached directional survey run from a measured depth of _____ 0 _____ feet to a
measured depth of _____ 7250 _____ feet is true and correct as determined from all available records.

Signature

19-Jan-11

Date

Rex Hall

Grand Junction Drilling Engineer

Scientific Drilling - Rocky Mountain District

OXY USA RMAT

Garfield County, CO NAD27

Shell 797-03B Pad

Shell 797-03-38 - Slot U

OH

Design: OH

Standard Survey Report

19 January, 2011

Scientific Drilling International

Survey Report

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well Shell 797-03-38 - Slot U
Project:	Garfield County, CO NAD27	TVD Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Site:	Shell 797-03B Pad	MD Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Well:	Shell 797-03-38	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

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 797-03B Pad, Sec 3 T7S R97W		
Site Position:		Northing:	610,470.20 usft
From:	Lat/Long	Easting:	1,237,588.64 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	39° 28' 42.340 N
		Longitude:	108° 12' 4.750 W
		Grid Convergence:	-1.70 °

Well	Shell 797-03-38 - Slot U,		
Well Position	+N/-S	0.00 ft	Northing: 610,454.45 usft
	+E/-W	0.00 ft	Easting: 1,237,603.63 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	ft
		Latitude:	39° 28' 42.189 N
		Longitude:	108° 12' 4.553 W
		Ground Level:	6,325.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2005-10	2008/09/15	10.78	65.77	52,511

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	193.11	

Survey Program	Date	2011/01/19			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
85.00	424.00	Survey #1 - Gyro MWD (OH)	Standard Keeper 103	Standard Wireline Keeper ver 1.0.3	
500.00	996.00	Survey #2 - Surface MWD (OH)	MWD-SDI	MWD - Standard ISCWSA	
1,092.00	7,250.00	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	
85.00	0.53	17.05	85.00	0.38	0.12	-0.39	0.62	0.62	0.00	
First SDI Surface Gyro MWD Survey										
114.00	0.00	169.54	114.00	0.50	0.15	-0.53	1.83	-1.83	0.00	
143.00	0.43	183.96	143.00	0.40	0.15	-0.42	1.48	1.48	0.00	
174.00	0.79	188.70	174.00	0.07	0.11	-0.09	1.17	1.16	15.29	
206.00	1.06	183.52	205.99	-0.45	0.06	0.42	0.88	0.84	-16.19	
237.00	1.32	187.82	236.99	-1.09	-0.01	1.06	0.89	0.84	13.87	
268.00	1.94	198.46	267.97	-1.94	-0.23	1.94	2.22	2.00	34.32	

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Site:	Shell 797-03B Pad	MD Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Well:	Shell 797-03-38	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

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)
299.00	2.46	195.21	298.95	-3.08	-0.57	3.12	1.72	1.68	-10.48
331.00	3.17	196.08	330.91	-4.59	-0.99	4.69	2.22	2.22	2.72
424.00	5.63	191.07	423.63	-11.54	-2.58	11.82	2.67	2.65	-5.39
Last SDI Surface Gyro MWD Survey									
500.00	7.83	192.88	499.10	-20.24	-4.45	20.73	2.91	2.89	2.38
First SDI Surface MWD Survey									
593.00	9.15	193.23	591.08	-33.62	-7.55	34.46	1.42	1.42	0.38
687.00	10.64	192.97	683.68	-49.35	-11.21	50.61	1.59	1.59	-0.28
780.00	12.49	192.35	774.79	-67.54	-15.29	69.25	1.99	1.99	-0.67
874.00	14.77	194.55	866.14	-89.07	-20.48	91.40	2.49	2.43	2.34
967.00	17.15	193.14	955.54	-113.90	-26.57	116.96	2.59	2.56	-1.52
996.00	17.76	192.62	983.21	-122.38	-28.51	125.66	2.17	2.10	-1.79
Last SDI Surface MWD Survey									
1,092.00	17.32	189.80	1,074.75	-150.75	-34.14	154.57	1.00	-0.46	-2.94
First SDI Production MWD Survey									
1,187.00	17.94	191.91	1,165.29	-179.01	-39.57	183.32	0.94	0.65	2.22
1,282.00	19.70	191.12	1,255.20	-209.04	-45.68	213.95	1.87	1.85	-0.83
1,377.00	23.92	192.00	1,343.38	-243.60	-52.77	249.22	4.46	4.44	0.93
1,472.00	24.97	193.76	1,429.87	-281.92	-61.55	288.53	1.35	1.11	1.85
1,568.00	27.08	193.23	1,516.13	-322.88	-71.37	330.65	2.21	2.20	-0.55
1,663.00	29.55	192.53	1,599.76	-366.80	-81.40	375.70	2.62	2.60	-0.74
1,758.00	32.45	194.81	1,681.18	-414.32	-93.00	424.62	3.29	3.05	2.40
1,853.00	33.85	194.24	1,760.72	-464.61	-106.02	476.55	1.51	1.47	-0.60
1,948.00	35.35	195.87	1,838.91	-516.69	-120.05	530.46	1.86	1.58	1.72
2,044.00	37.99	194.55	1,915.91	-572.01	-135.07	587.74	2.87	2.75	-1.38
2,140.00	40.71	193.58	1,990.14	-631.05	-149.85	648.60	2.90	2.83	-1.01
2,235.00	43.18	193.58	2,060.79	-692.77	-164.75	712.09	2.60	2.60	0.00
2,330.00	45.46	193.23	2,128.76	-757.34	-180.14	778.46	2.41	2.40	-0.37
2,425.00	45.37	192.35	2,195.44	-823.32	-195.11	846.11	0.67	-0.09	-0.93
2,521.00	44.41	192.70	2,263.46	-889.45	-209.81	913.86	1.03	-1.00	0.36
2,616.00	43.00	192.62	2,332.13	-953.50	-224.19	979.50	1.49	-1.48	-0.08
2,710.00	41.86	192.97	2,401.51	-1,015.34	-238.24	1,042.91	1.24	-1.21	0.37
2,806.00	39.31	193.06	2,474.41	-1,076.19	-252.30	1,105.36	2.66	-2.66	0.09
2,902.00	37.11	193.32	2,549.84	-1,134.00	-265.84	1,164.74	2.30	-2.29	0.27
2,997.00	35.09	193.93	2,626.59	-1,188.40	-279.02	1,220.71	2.16	-2.13	0.64
3,093.00	34.12	192.53	2,705.61	-1,241.46	-291.51	1,275.23	1.31	-1.01	-1.46
3,189.00	33.33	190.77	2,785.46	-1,293.66	-302.28	1,328.50	1.31	-0.82	-1.83
3,284.00	34.82	192.09	2,864.14	-1,345.82	-312.83	1,381.70	1.75	1.57	1.39
3,380.00	33.68	192.18	2,943.49	-1,398.64	-324.19	1,435.72	1.19	-1.19	0.09
3,476.00	32.89	193.85	3,023.75	-1,449.97	-336.05	1,488.40	1.26	-0.82	1.74
3,572.00	31.83	193.67	3,104.84	-1,499.88	-348.27	1,539.78	1.11	-1.10	-0.19
3,668.00	30.69	194.99	3,186.90	-1,548.14	-360.59	1,589.58	1.39	-1.19	1.38
3,763.00	27.52	192.18	3,269.90	-1,593.03	-371.49	1,635.77	3.63	-3.34	-2.96
3,859.00	22.95	194.55	3,356.72	-1,632.85	-380.88	1,676.68	4.87	-4.76	2.47

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Survey Report

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Project:	Garfield County, CO NAD27	TVD Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Site:	Shell 797-03B Pad	MD Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Well:	Shell 797-03-38	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

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)
3,954.00	21.81	194.73	3,444.56	-1,667.84	-390.02	1,712.84	1.20	-1.20	0.19
4,048.00	19.70	190.86	3,532.46	-1,700.30	-397.45	1,746.13	2.68	-2.24	-4.12
4,144.00	15.21	191.91	3,624.01	-1,728.53	-403.10	1,774.90	4.69	-4.68	1.09
4,239.00	11.61	192.26	3,716.41	-1,750.07	-407.70	1,796.93	3.79	-3.79	0.37
4,334.00	5.63	191.91	3,810.29	-1,763.98	-410.70	1,811.16	6.29	-6.29	-0.37
4,429.00	3.61	203.25	3,904.98	-1,771.29	-412.84	1,818.76	2.32	-2.13	11.94
4,524.00	5.45	195.78	3,999.68	-1,778.38	-415.25	1,826.21	2.03	1.94	-7.86
4,620.00	7.56	193.14	4,095.06	-1,788.92	-417.92	1,837.09	2.22	2.20	-2.75
4,714.00	7.21	193.58	4,188.28	-1,800.67	-420.71	1,849.17	0.38	-0.37	0.47
4,810.00	7.65	193.32	4,283.47	-1,812.75	-423.60	1,861.58	0.46	0.46	-0.27
4,906.00	7.21	192.79	4,378.67	-1,824.84	-426.41	1,874.00	0.46	-0.46	-0.55
5,000.00	8.44	187.87	4,471.79	-1,837.43	-428.66	1,886.76	1.49	1.31	-5.23
5,095.00	8.44	195.43	4,565.76	-1,851.05	-431.47	1,900.67	1.17	0.00	7.96
5,191.00	7.74	196.40	4,660.81	-1,864.05	-435.17	1,914.17	0.74	-0.73	1.01
5,286.00	7.39	194.64	4,754.98	-1,876.09	-438.52	1,926.66	0.44	-0.37	-1.85
5,381.00	6.68	195.34	4,849.26	-1,887.33	-441.52	1,938.29	0.75	-0.75	0.74
5,477.00	7.56	190.77	4,944.52	-1,898.92	-444.18	1,950.18	1.09	0.92	-4.76
5,572.00	7.65	197.98	5,038.69	-1,911.08	-447.30	1,962.72	1.01	0.09	7.59
5,667.00	6.68	196.48	5,132.95	-1,922.39	-450.82	1,974.54	1.04	-1.02	-1.58
5,762.00	6.68	193.67	5,227.30	-1,933.06	-453.69	1,985.58	0.34	0.00	-2.96
5,858.00	6.07	192.97	5,322.71	-1,943.43	-456.15	1,996.24	0.64	-0.64	-0.73
5,953.00	5.63	192.88	5,417.21	-1,952.87	-458.32	2,005.92	0.46	-0.46	-0.09
6,048.00	5.98	205.62	5,511.73	-1,961.87	-461.49	2,015.41	1.40	0.37	13.41
6,143.00	6.51	202.20	5,606.17	-1,971.32	-465.67	2,025.56	0.68	0.56	-3.60
6,239.00	6.16	195.78	5,701.58	-1,981.32	-469.13	2,036.08	0.82	-0.36	-6.69
6,334.00	5.89	193.93	5,796.06	-1,990.95	-471.69	2,046.05	0.35	-0.28	-1.95
6,429.00	7.30	179.43	5,890.43	-2,001.72	-472.80	2,056.79	2.29	1.48	-15.26
6,524.00	8.09	181.01	5,984.58	-2,014.44	-472.86	2,069.19	0.86	0.83	1.66
6,619.00	6.86	180.31	6,078.77	-2,026.80	-473.01	2,081.26	1.30	-1.29	-0.74
6,714.00	6.24	178.11	6,173.15	-2,037.63	-472.87	2,091.78	0.70	-0.65	-2.32
6,807.00	6.16	179.17	6,265.60	-2,047.67	-472.63	2,101.50	0.15	-0.09	1.14
6,902.00	6.77	176.97	6,360.00	-2,058.36	-472.26	2,111.83	0.69	0.64	-2.32
6,998.00	5.98	175.13	6,455.40	-2,068.99	-471.53	2,122.02	0.85	-0.82	-1.92
7,093.00	5.80	173.28	6,549.90	-2,078.69	-470.55	2,131.24	0.28	-0.19	-1.95
7,189.00	4.84	172.05	6,645.49	-2,087.52	-469.42	2,139.59	1.01	-1.00	-1.28
Last SDI Production MWD Survey									
7,250.00	4.84	172.05	6,706.27	-2,092.62	-468.71	2,144.39	0.00	0.00	0.00
Projection To TD - BHL = 608376.70, 1237072.91									

Scientific Drilling International

Survey Report

Company:	OXY USA RMAT	Local Co-ordinate Reference:	Well Shell 797-03-38 - Slot U
Project:	Garfield County, CO NAD27	TVD Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Site:	Shell 797-03B Pad	MD Reference:	GL 6325' & RKB 22' @ 6347.00ft (M37)
Well:	Shell 797-03-38	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Rockies-R5000.1

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
85.00	85.00	0.38	0.12	First SDI Surface Gyro MWD Survey	
424.00	423.63	-11.54	-2.58	Last SDI Surface Gyro MWD Survey	
500.00	499.10	-20.24	-4.45	First SDI Surface MWD Survey	
996.00	983.21	-122.38	-28.51	Last SDI Surface MWD Survey	
1,092.00	1,074.75	-150.75	-34.14	First SDI Production MWD Survey	
7,189.00	6,645.49	-2,087.52	-469.42	Last SDI Production MWD Survey	
7,250.00	6,706.27	-2,092.62	-468.71	Projection To TD	
7,250.00	6,706.27	-2,092.62	-468.71	BHL = 608376.70, 1237072.91	

Checked By: _____ Approved By: _____ Date: _____