

Oxy Permian

Union County, NM

Bravo Dome 2232-321G

Bravo Dome 2232-321G

Lateral #1

Survey: MWD Survey #1

Standard Survey Report

17 October, 2011

Survey Report

Company:	Oxy Permian	Local Co-ordinate Reference:	Site Bravo Dome 2232-321G
Project:	Union County, NM	TVD Reference:	KB @ 4906.30ft
Site:	Bravo Dome 2232-321G	MD Reference:	KB @ 4906.30ft
Well:	Bravo Dome 2232-321G	North Reference:	Grid
Wellbore:	Lateral #1	Survey Calculation Method:	Minimum Curvature
Design:	Lateral #1	Database:	EDM 5000.1 Black Viper

Project	Union County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Bravo Dome 2232-321G, Sec 32, T-22-N, R-32-E		
Site Position:		Northing:	1,855,683.54 ft
From:	Map	Easting:	732,336.49 ft
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in
		Latitude:	36° 5' 51.237 N
		Longitude:	103° 32' 48.854 W
		Grid Convergence:	0.46 °

Well	Bravo Dome 2232-321G		
Well Position	+N/-S	0.00 ft	Northing: 1,855,683.54 ft
	+E/-W	0.00 ft	Easting: 732,336.49 ft
Position Uncertainty	0.00 ft	Wellhead Elevation:	4,906.30 ft
		Latitude:	36° 5' 51.237 N
		Longitude:	103° 32' 48.854 W
		Ground Level:	4,894.30 ft

Wellbore	Lateral #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF200510	9/15/2011	7.81
			Dip Angle (°)
			63.67
			Field Strength (nT)
			50,896

Design	Lateral #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	729.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			Direction (°)
			286.70

Survey Program	Date	10/13/2011		
From	To	Survey (Wellbore)	Tool Name	Description
(ft)	(ft)			
100.00	729.00	Gyro Survey #1 (OH)	SRG-GYRO-MS	surface readout gyro multishot
729.00	4,030.00	MWD Survey #1 (Lateral #1)	MWD	MWD - Standard

Survey										
Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate	
(ft)	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(°/100ft)	(°/100ft)	(°/100ft)	
729.00	0.49	306.96	728.99	0.69	-3.54	3.59	0.00	0.00	0.00	
805.00	0.70	299.80	804.98	1.11	-4.20	4.35	0.29	0.28	-9.42	
First MWD Survey										
900.00	0.40	288.50	899.98	1.51	-5.02	5.24	0.33	-0.32	-11.89	
995.00	0.70	305.00	994.97	1.95	-5.81	6.13	0.35	0.32	17.37	
1,089.00	1.00	334.80	1,088.96	3.02	-6.63	7.22	0.56	0.32	31.70	
1,184.00	0.90	355.30	1,183.95	4.51	-7.05	8.04	0.37	-0.11	21.58	
1,278.00	1.00	324.60	1,277.94	5.91	-7.58	8.96	0.54	0.11	-32.66	
1,375.00	1.10	294.10	1,374.92	6.98	-8.92	10.55	0.58	0.10	-31.44	
1,406.00	3.20	260.40	1,405.90	6.96	-10.05	11.62	7.63	6.77	-108.71	

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Well:	Bravo Dome 2232-321G	North Reference:	Grid
Wellbore:	Lateral #1	Survey Calculation Method:	Minimum Curvature
Design:	Lateral #1	Database:	EDM 5000.1 Black Viper

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)
1,438.00	5.80	254.90	1,437.80	6.39	-12.49	13.80	8.23	8.13	-17.19
1,469.00	8.70	255.70	1,468.55	5.40	-16.27	17.14	9.36	9.35	2.58
1,501.00	11.30	252.80	1,500.06	3.88	-21.61	21.82	8.27	8.13	-9.06
1,532.00	13.60	251.20	1,530.33	1.81	-27.97	27.31	7.50	7.42	-5.16
1,562.00	15.60	249.10	1,559.36	-0.77	-35.08	33.37	6.90	6.67	-7.00
1,593.00	17.80	246.80	1,589.05	-4.12	-43.33	40.31	7.41	7.10	-7.42
1,624.00	20.40	243.10	1,618.34	-8.44	-52.50	47.86	9.25	8.39	-11.94
1,655.00	22.90	238.90	1,647.15	-14.00	-62.49	55.83	9.48	8.06	-13.55
1,686.00	25.80	236.00	1,675.39	-20.89	-73.25	64.15	10.12	9.35	-9.35
1,717.00	28.70	235.30	1,702.95	-28.90	-84.96	73.07	9.41	9.35	-2.26
1,748.00	31.20	235.60	1,729.81	-37.67	-97.71	82.76	8.08	8.06	0.97
1,778.00	33.80	236.50	1,755.11	-46.67	-111.08	92.98	8.82	8.67	3.00
1,809.00	36.30	236.80	1,780.48	-56.46	-125.95	104.41	8.08	8.06	0.97
1,840.00	38.90	236.70	1,805.04	-66.83	-141.77	116.58	8.39	8.39	-0.32
1,870.00	41.30	235.30	1,827.99	-77.63	-157.78	128.81	8.55	8.00	-4.67
1,901.00	43.50	233.90	1,850.88	-89.75	-174.82	141.65	7.72	7.10	-4.52
1,932.00	45.80	232.30	1,872.93	-102.83	-192.23	154.57	8.26	7.42	-5.16
1,963.00	48.20	231.90	1,894.07	-116.76	-210.12	167.70	7.80	7.74	-1.29
1,993.00	50.10	232.40	1,913.70	-130.68	-228.04	180.86	6.46	6.33	1.67
2,023.00	52.00	232.80	1,932.56	-144.85	-246.57	194.54	6.42	6.33	1.33
2,054.00	53.90	233.20	1,951.23	-159.74	-266.33	209.19	6.21	6.13	1.29
2,085.00	55.90	233.30	1,969.06	-174.91	-286.65	224.29	6.46	6.45	0.32
2,115.00	57.80	233.20	1,985.46	-189.94	-306.78	239.24	6.34	6.33	-0.33
2,146.00	60.20	232.80	2,001.43	-205.93	-328.00	254.97	7.82	7.74	-1.29
2,177.00	62.40	232.40	2,016.31	-222.45	-349.59	270.91	7.19	7.10	-1.29
2,207.00	64.40	232.50	2,029.74	-238.79	-370.86	286.58	6.67	6.67	0.33
2,238.00	66.50	233.10	2,042.62	-255.84	-393.32	303.20	7.00	6.77	1.94
2,269.00	68.30	233.60	2,054.54	-272.92	-416.28	320.28	5.99	5.81	1.61
2,299.00	69.70	233.30	2,065.29	-289.60	-438.78	337.04	4.76	4.67	-1.00
2,330.00	71.40	233.50	2,075.61	-307.03	-462.25	354.50	5.52	5.48	0.65
2,360.00	73.40	233.20	2,084.68	-324.10	-485.19	371.57	6.73	6.67	-1.00
2,391.00	75.50	232.90	2,092.99	-342.05	-509.05	389.27	6.84	6.77	-0.97
2,422.00	77.10	232.30	2,100.33	-360.34	-532.98	406.93	5.49	5.16	-1.94
2,454.00	77.90	231.70	2,107.26	-379.58	-557.60	424.98	3.10	2.50	-1.88
2,559.00	80.80	236.60	2,126.67	-439.97	-641.21	487.71	5.35	2.76	4.67
2,592.00	80.40	236.10	2,132.06	-458.01	-668.32	508.49	1.92	-1.21	-1.52
2,622.00	83.40	235.50	2,136.29	-474.70	-692.88	527.21	10.19	10.00	-2.00
2,653.00	85.40	235.20	2,139.31	-492.24	-718.26	546.48	6.52	6.45	-0.97
2,684.00	88.10	235.50	2,141.07	-509.84	-743.71	565.81	8.76	8.71	0.97
2,714.00	90.00	234.30	2,141.57	-527.08	-768.25	584.36	7.49	6.33	-4.00
2,742.94	90.09	234.39	2,141.54	-543.95	-791.77	602.03	0.46	0.32	0.32
LP[BD2232-321G]									
2,745.00	90.10	234.40	2,141.54	-545.15	-793.44	603.29	0.46	0.32	0.32

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Design:	Lateral #1	Database:	EDM 5000.1 Black Viper

Survey									
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2,775.00	90.00	234.60	2,141.51	-562.57	-817.87	621.68	0.75	-0.33	0.67
2,806.00	90.20	234.50	2,141.46	-580.55	-843.12	640.70	0.72	0.65	-0.32
2,837.00	90.30	233.70	2,141.33	-598.73	-868.23	659.52	2.60	0.32	-2.58
2,867.00	90.80	234.20	2,141.04	-616.38	-892.49	677.68	2.36	1.67	1.67
2,898.00	90.80	234.60	2,140.60	-634.43	-917.69	696.64	1.29	0.00	1.29
2,929.00	89.00	234.40	2,140.66	-652.43	-942.93	715.63	5.84	-5.81	-0.65
2,939.78	88.79	234.26	2,140.87	-658.71	-951.68	722.21	2.33	-1.94	-1.29
EW HL									
2,960.00	88.40	234.00	2,141.36	-670.56	-968.06	734.50	2.33	-1.94	-1.29
2,991.00	89.20	234.80	2,142.01	-688.60	-993.26	753.45	3.65	2.58	2.58
3,022.00	90.00	235.90	2,142.23	-706.22	-1,018.76	772.81	4.39	2.58	3.55
3,052.00	90.90	235.40	2,141.99	-723.15	-1,043.53	791.67	3.43	3.00	-1.67
3,083.00	91.70	234.90	2,141.29	-740.86	-1,068.96	810.94	3.04	2.58	-1.61
3,114.00	91.90	235.40	2,140.31	-758.56	-1,094.39	830.21	1.74	0.65	1.61
3,144.00	92.20	237.20	2,139.24	-775.20	-1,119.33	849.31	6.08	1.00	6.00
3,175.00	91.60	238.10	2,138.21	-791.78	-1,145.51	869.62	3.49	-1.94	2.90
3,206.00	91.90	239.60	2,137.27	-807.80	-1,172.02	890.41	4.93	0.97	4.84
3,237.00	90.70	239.10	2,136.56	-823.60	-1,198.69	911.41	4.19	-3.87	-1.61
3,271.00	90.40	240.10	2,136.24	-840.81	-1,228.01	934.55	3.07	-0.88	2.94
3,301.00	89.90	240.10	2,136.16	-855.76	-1,254.02	955.16	1.67	-1.67	0.00
3,332.00	89.80	238.90	2,136.24	-871.50	-1,280.73	976.22	3.88	-0.32	-3.87
3,363.00	89.10	237.70	2,136.54	-887.78	-1,307.10	996.80	4.48	-2.26	-3.87
3,393.00	88.00	237.20	2,137.30	-903.92	-1,332.38	1,016.38	4.03	-3.67	-1.67
3,424.00	88.10	237.40	2,138.35	-920.66	-1,358.45	1,036.54	0.72	0.32	0.65
3,455.00	88.40	236.80	2,139.30	-937.49	-1,384.47	1,056.62	2.16	0.97	-1.94
3,485.00	89.50	237.10	2,139.85	-953.85	-1,409.61	1,076.00	3.80	3.67	1.00
3,516.00	90.30	236.40	2,139.90	-970.84	-1,435.53	1,095.94	3.43	2.58	-2.26
3,547.00	90.30	235.70	2,139.74	-988.16	-1,461.25	1,115.60	2.26	0.00	-2.26
3,580.00	89.80	235.50	2,139.71	-1,006.80	-1,488.47	1,136.32	1.63	-1.52	-0.61
3,611.00	90.40	235.40	2,139.66	-1,024.38	-1,514.01	1,155.72	1.96	1.94	-0.32
3,644.00	89.30	236.10	2,139.74	-1,042.95	-1,541.28	1,176.51	3.95	-3.33	2.12
3,675.00	88.70	236.70	2,140.28	-1,060.10	-1,567.10	1,196.31	2.74	-1.94	1.94
3,706.00	88.10	237.00	2,141.15	-1,077.05	-1,593.04	1,216.29	2.16	-1.94	0.97
3,738.00	88.40	235.20	2,142.13	-1,094.89	-1,619.59	1,236.59	5.70	0.94	-5.63
3,769.00	88.00	235.20	2,143.10	-1,112.57	-1,645.03	1,255.87	1.29	-1.29	0.00
3,801.00	87.20	235.20	2,144.44	-1,130.82	-1,671.29	1,275.78	2.50	-2.50	0.00
3,834.00	87.80	235.40	2,145.88	-1,149.59	-1,698.39	1,296.34	1.92	1.82	0.61
3,865.00	88.60	235.10	2,146.85	-1,167.25	-1,723.85	1,315.65	2.76	2.58	-0.97
3,897.00	88.60	235.50	2,147.64	-1,185.46	-1,750.15	1,335.61	1.25	0.00	1.25
3,928.00	86.30	236.00	2,149.01	-1,202.89	-1,775.75	1,355.12	7.59	-7.42	1.61
3,960.00	84.50	236.10	2,151.58	-1,220.70	-1,802.21	1,375.34	5.63	-5.63	0.31
4,030.00	83.06	236.10	2,159.17	-1,259.51	-1,859.96	1,419.51	2.06	-2.06	0.00
TD - PBHL#2[BD2232-321G] - EW HL2 - PBHL#1[BD2232-321G] - PBHL#4[BD2232-321G] - PBHL#5[BD2232-321G]									

Survey Report

Company:	Oxy Permian	Local Co-ordinate Reference:	Site Bravo Dome 2232-321G
Project:	Union County, NM	TVD Reference:	KB @ 4906.30ft
Site:	Bravo Dome 2232-321G	MD Reference:	KB @ 4906.30ft
Well:	Bravo Dome 2232-321G	North Reference:	Grid
Wellbore:	Lateral #1	Survey Calculation Method:	Minimum Curvature
Design:	Lateral #1	Database:	EDM 5000.1 Black Viper

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
805.00	804.98	1.11	-4.20	First MWD Survey
4,030.00	2,159.17	-1,259.51	-1,859.96	TD

Checked By: _____ Approved By: _____ Date: _____