

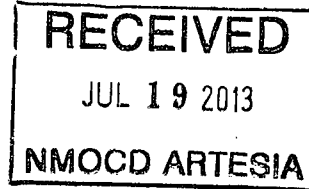
Bopco L P

Eddy County, NM (NAD27 NME)

Poker Lake Unit

#331H

Wellbore #1 / Job #1310361



30-015-41039

Survey: Phoenix MWD Surveys

Phoenix Final Survey Report

09 May, 2013





Phoenix Technology Services

Phoenix Final Survey Report



Company:	Bopco L P	Local Co-ordinate Reference:	Well #331H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3467.00usft (McVay 5)
Site:	Poker Lake Unit	MD Reference:	KB @ 3467.00usft (McVay 5)
Well:	#331H	North Reference:	Grid
Wellbore:	Wellbore #1 / Job #1310361	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 5)	Database:	GCR DB

Project:	Eddy County, NM (NAD27 NME)		
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:	Poker Lake Unit		
Site Position:		Northing:	435,896.68 usft
From:	Map	Easting:	646,110.12 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 11' 51.053521 N
		Longitude:	103° 51' 39.561423 W
		Grid Convergence:	0.25 °

Well:	#331H		
Well Position	+N/-S	0.00 usft	Northing: 455,789.39 usft
	+E/-W	0.00 usft	Easting: 642,366.40 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 15' 8.073598 N
		Longitude:	103° 52' 22.137537 W
		Ground Level:	3,448.00 usft

Wellbore:	Wellbore #1 / Job #1310361		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010_14	03/25/13	7.51
			Dip Angle
			(°)
			60.12
			Field Strength
			(nT)
			48,423

Design:	Surveys (McVay 5)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			132.02

Survey Program	Date	05/09/13		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100.00	6,961.51	Gyrodata Gyro Surveys (Wellbore #1 / Job	NS-GYRO-MS	North sensing gyrocompassing m/s
7,044.00	14,453.00	Phoenix MWD Surveys (Wellbore #1 / Job	MWD	MWD - Standard

Survey	MD	Inc	Azi (azimuth)	TVD	N/S	E/W	V. Sec	DLeg
	(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(%/100usft)
	6,961.51	1.24	168.48	6,960.37	-60.84	4.58	44.13	0.00
Tie-on to Gyro Survey								
	7,043.00	2.20	150.60	7,041.82	-63.06	5.53	46.32	1.34
	7,044.00	2.28	149.98	7,042.82	-63.10	5.55	46.36	8.60
Phoenix First MWD Survey								
	7,075.00	4.90	141.30	7,073.76	-64.67	6.69	48.25	8.60
	7,106.00	8.40	138.80	7,104.54	-67.40	9.01	51.81	11.33
	7,138.00	12.50	137.30	7,136.01	-71.71	12.89	57.58	12.84
	7,170.00	16.90	135.60	7,166.95	-77.58	18.50	65.68	13.81
	7,201.00	20.00	133.40	7,196.35	-84.44	25.51	75.48	10.25
	7,233.00	22.50	131.30	7,226.18	-92.25	34.08	87.07	8.17



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Wellbore:	Wellbore #1 / Job #1310361	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 5)	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
7,264.00	24.60	130.20	7,254.59	-100.33	43.47	99.45	6.92
7,295.00	26.20	129.80	7,282.60	-108.87	53.66	112.74	5.19
7,327.00	27.50	129.60	7,311.14	-118.10	64.78	127.18	4.07
7,358.00	29.30	129.50	7,338.41	-127.49	76.15	141.91	5.81
7,390.00	30.80	129.40	7,366.11	-137.67	88.52	157.92	4.69
7,421.00	32.40	129.70	7,392.51	-148.02	101.04	174.15	5.19
7,452.00	34.30	129.90	7,418.41	-158.93	114.13	191.18	6.14
7,483.00	36.70	130.40	7,443.64	-170.53	127.89	209.17	7.80
7,514.00	39.70	130.70	7,468.00	-183.00	142.46	228.33	9.70
7,547.00	42.90	130.00	7,492.79	-197.09	159.05	250.10	9.80
7,577.00	45.50	129.30	7,514.30	-210.44	175.16	270.99	8.82
7,609.00	48.20	129.00	7,536.18	-225.17	193.26	294.31	8.47
7,640.00	51.80	128.70	7,556.10	-240.07	211.75	318.01	11.64
7,671.00	55.60	127.60	7,574.45	-255.49	231.40	342.93	12.59
7,702.00	58.60	126.60	7,591.29	-271.19	252.16	368.86	10.05
7,732.00	61.50	127.00	7,606.26	-286.76	272.97	394.75	9.74
7,764.00	64.80	127.40	7,620.72	-304.02	295.71	423.19	10.37
7,795.00	66.90	127.70	7,633.40	-321.26	318.13	451.39	6.83
7,827.00	68.00	128.40	7,645.67	-339.47	341.40	480.87	3.99
7,858.00	68.50	128.00	7,657.16	-357.28	364.03	509.60	2.01
7,889.00	68.40	127.80	7,668.54	-374.99	386.78	538.36	0.68
7,913.00	67.90	127.70	7,677.48	-388.63	404.40	560.57	2.12
8,014.00	71.70	127.80	7,712.34	-446.65	479.33	655.08	3.76
8,045.00	76.80	127.80	7,720.76	-464.93	502.90	684.83	16.45
8,075.00	81.90	127.00	7,726.30	-482.83	526.31	714.20	17.20
8,106.00	86.90	126.40	7,729.32	-501.26	551.04	744.91	16.24
8,137.00	89.50	129.10	7,730.30	-520.23	575.54	775.81	12.09
8,168.00	89.90	129.60	7,730.46	-539.88	599.51	806.77	2.07
8,262.00	87.70	127.90	7,732.43	-598.70	672.79	900.59	2.96
8,352.00	87.20	127.80	7,736.43	-653.87	743.79	990.26	0.57
8,444.00	91.00	130.90	7,737.88	-712.18	814.90	1,082.12	5.33
8,534.00	90.80	131.40	7,736.46	-771.39	882.66	1,172.10	0.60
8,628.00	90.10	132.10	7,735.73	-833.98	952.79	1,266.10	1.05
8,723.00	89.90	132.20	7,735.73	-897.73	1,023.22	1,361.09	0.24
8,819.00	90.30	133.00	7,735.56	-962.71	1,093.88	1,457.09	0.93
8,915.00	90.20	133.90	7,735.14	-1,028.73	1,163.57	1,553.06	0.94
9,011.00	90.00	134.90	7,734.97	-1,095.90	1,232.16	1,648.97	1.06
9,106.00	89.50	134.80	7,735.39	-1,162.90	1,299.51	1,743.86	0.54
9,201.00	88.40	133.60	7,737.13	-1,229.12	1,367.61	1,838.77	1.71
9,296.00	87.30	133.30	7,740.69	-1,294.40	1,436.52	1,933.67	1.20
9,391.00	86.90	133.40	7,745.50	-1,359.53	1,505.52	2,028.52	0.43
9,486.00	86.80	132.20	7,750.72	-1,423.98	1,575.11	2,123.37	1.27
9,581.00	87.70	131.10	7,755.28	-1,487.04	1,646.02	2,218.25	1.50
9,676.00	90.00	132.90	7,757.18	-1,550.59	1,716.59	2,313.23	3.07



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Design:	Surveys (McVay 5)	Database:	GCR DB

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9,771.00	90.10	134.40	7,757.10	-1,616.16	1,785.33	2,408.18	1.58
9,867.00	90.90	133.90	7,756.26	-1,683.03	1,854.21	2,504.11	0.98
9,962.00	90.20	132.90	7,755.35	-1,748.29	1,923.23	2,599.08	1.28
10,057.00	90.10	132.00	7,755.10	-1,812.41	1,993.33	2,694.08	0.95
10,152.00	89.40	129.30	7,755.52	-1,874.29	2,065.39	2,789.04	2.94
10,248.00	92.40	129.20	7,754.01	-1,935.02	2,139.72	2,884.90	3.13
10,343.00	90.60	127.90	7,751.52	-1,994.20	2,213.98	2,979.69	2.34
10,438.00	91.00	129.00	7,750.19	-2,053.27	2,288.38	3,074.49	1.23
10,532.00	89.30	125.80	7,749.95	-2,110.35	2,363.04	3,168.17	3.85
10,627.00	90.00	127.70	7,750.53	-2,167.19	2,439.15	3,262.77	2.13
10,722.00	91.10	130.80	7,749.62	-2,227.28	2,512.71	3,357.64	3.46
10,817.00	89.40	131.50	7,749.20	-2,289.79	2,584.24	3,452.62	1.94
10,912.00	89.80	135.60	7,749.87	-2,355.23	2,653.07	3,547.56	4.34
11,008.00	89.60	137.80	7,750.37	-2,425.09	2,718.91	3,643.24	2.30
11,103.00	90.70	138.90	7,750.12	-2,496.07	2,782.04	3,737.65	1.64
11,198.00	89.40	137.90	7,750.04	-2,567.11	2,845.11	3,832.06	1.73
11,294.00	90.90	137.30	7,749.79	-2,638.00	2,909.84	3,927.60	1.68
11,389.00	88.30	132.60	7,750.45	-2,705.09	2,977.05	4,022.44	5.65
11,484.00	88.30	132.90	7,753.27	-2,769.55	3,046.78	4,117.39	0.32
11,579.00	87.90	134.20	7,756.42	-2,834.97	3,115.59	4,212.31	1.43
11,674.00	86.80	132.90	7,760.81	-2,900.35	3,184.37	4,307.17	1.79
11,770.00	86.70	132.90	7,766.25	-2,965.59	3,254.58	4,403.00	0.10
11,864.00	87.20	131.40	7,771.25	-3,028.58	3,324.17	4,496.86	1.68
11,960.00	87.30	130.80	7,775.86	-3,091.62	3,396.43	4,592.74	0.63
12,053.00	88.20	130.30	7,779.51	-3,152.03	3,467.04	4,685.64	1.11
12,148.00	88.20	130.50	7,782.49	-3,213.57	3,539.35	4,780.55	0.21
12,243.00	91.70	131.80	7,782.58	-3,276.07	3,610.87	4,875.52	3.93
12,338.00	90.60	131.50	7,780.67	-3,339.19	3,681.84	4,970.50	1.20
12,433.00	89.10	130.80	7,780.92	-3,401.70	3,753.37	5,065.49	1.74
12,529.00	89.60	132.60	7,782.01	-3,465.56	3,825.04	5,161.48	1.95
12,624.00	89.10	131.30	7,783.09	-3,529.06	3,895.69	5,256.47	1.47
12,719.00	88.90	131.10	7,784.74	-3,591.62	3,967.16	5,351.44	0.30
12,814.00	88.90	131.30	7,786.57	-3,654.19	4,038.62	5,446.42	0.21
12,910.00	88.80	131.40	7,788.49	-3,717.60	4,110.67	5,542.39	0.15
13,004.00	88.70	131.50	7,790.55	-3,779.81	4,181.11	5,636.36	0.15
13,099.00	88.40	132.00	7,792.95	-3,843.05	4,251.97	5,731.33	0.61
13,194.00	88.00	132.90	7,795.93	-3,907.13	4,322.03	5,826.28	1.04
13,289.00	90.90	133.60	7,796.85	-3,972.22	4,391.21	5,921.24	3.14
13,384.00	90.00	133.10	7,796.10	-4,037.43	4,460.29	6,016.21	1.08
13,479.00	89.00	131.90	7,796.93	-4,101.60	4,530.33	6,111.20	1.64
13,574.00	88.80	127.10	7,798.75	-4,162.00	4,603.60	6,206.07	5.06
13,669.00	89.00	126.90	7,800.58	-4,219.16	4,679.45	6,300.68	0.30
13,764.00	89.70	123.60	7,801.65	-4,273.98	4,757.02	6,395.00	3.55
13,859.00	93.50	126.70	7,799.00	-4,328.63	4,834.64	6,489.25	5.16