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BOPCO, L P

Eddy County, NM (NAD27 NME)

PLU Big Sinks 24-25-30 USA

#1Y

WB3/Job #1311370

Design: WB3/Job #1311370

Phoenix Final Survey Report

12 November, 2013



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services
Phoenix Final Survey Report



Company:	BOPCO, LP	Local Co-ordinate Reference:	Well #1Y
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3323.00usft (Latshaw 14)
Site:	PLU Big Sinks 24-25-30 USA	MD Reference:	KB @ 3323.00usft (Latshaw 14)
Well:	#1Y	North Reference:	Grid
Wellbore:	WB3/Job #1311370	Survey Calculation Method:	Minimum Curvature
Design:	WB3/Job #1311370	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	PLU Big Sinks 24-25-30 USA		
Site Position:		Northing:	408,912.40 usft
From:	Map	Easting:	652,583.20 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 7' 23.72628 N
		Longitude:	103° 50' 25.66760 W
		Grid Convergence:	0.26 °

Well	#1Y		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 7' 23.74572 N
		Longitude:	103° 50' 25.06747 W
		Ground Level:	3,301.00 usft

Wellbore	WB3/Job #1311370		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010_14	10/27/13	7.41
		Dip Angle	59.99
		Field Strength	48,291

Design	WB3/Job #1311370		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	9,928.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
		Direction	180.79

Survey Program	Date 11/12/13		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
118.77	5,987.00	Gyrodata (WB1/Job #1311370)	NS-GYRO-MS
6,172.00	9,195.00	Survey 2 (WB1/Job #1311370)	MWD
9,195.00	9,928.00	Phoenix WB2 MWD Survey (WB2/Job #13)	MWD
9,928.00	14,363.00	Phoenix MWD Survey (WB3/Job #131137)	MWD
			Description
			North sensing gyrocompassing m/s
			MWD - Standard
			MWD - Standard
			MWD - Standard

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
118.77	0.22	103.66	118.77	-0.05	0.22	0.05	0.19
211.52	0.20	115.92	211.52	-0.17	0.54	0.16	0.05
303.46	0.32	116.92	303.46	-0.35	0.91	0.34	0.13
395.40	0.22	92.07	395.40	-0.48	1.32	0.46	0.17
487.34	0.34	89.59	487.34	-0.48	1.77	0.46	0.13
579.28	0.32	33.69	579.27	-0.26	2.18	0.23	0.34
671.22	0.12	28.41	671.21	0.03	2.37	-0.07	0.22
763.16	0.12	310.65	763.15	0.18	2.34	-0.21	0.16



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Design:	WB3/Job #1311370	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
794.84	0.16	292.60	794.83	0.22	2.28	-0.25	0.19	
889.88	0.09	275.86	889.87	0.28	2.08	-0.31	0.08	
984.92	0.21	273.59	984.91	0.30	1.83	-0.32	0.13	
1,079.96	0.49	267.58	1,079.95	0.29	1.25	-0.31	0.30	
1,155.00	0.56	262.79	1,154.99	0.23	0.57	-0.24	0.11	
1,230.00	0.44	253.29	1,229.99	0.10	-0.07	-0.10	0.19	
1,420.00	1.19	221.30	1,419.97	-1.59	-2.07	1.62	0.45	
1,608.00	2.07	243.01	1,607.89	-4.60	-6.39	4.68	0.56	
1,797.00	2.24	238.26	1,796.76	-8.09	-12.57	8.26	0.13	
1,988.00	1.76	208.03	1,987.64	-12.64	-17.12	12.88	0.60	
2,176.00	0.88	175.07	2,175.59	-16.63	-18.35	16.88	0.60	
2,366.00	0.57	18.10	2,365.59	-17.18	-17.93	17.43	0.75	
2,556.00	0.88	358.32	2,555.57	-14.83	-17.68	15.07	0.21	
2,745.00	0.70	351.20	2,744.56	-12.24	-17.90	12.48	0.11	
2,935.00	0.57	11.59	2,934.54	-10.16	-17.89	10.41	0.14	
3,126.00	0.44	359.99	3,125.54	-8.50	-17.70	8.74	0.09	
3,316.00	1.23	109.68	3,315.52	-8.46	-15.78	8.67	0.76	
3,506.00	1.89	124.97	3,505.45	-10.94	-11.29	11.09	0.41	
3,697.00	2.20	117.15	3,696.33	-14.42	-5.45	14.49	0.22	
3,887.00	1.14	68.90	3,886.25	-15.40	-0.44	15.41	0.88	
3,955.00	1.54	52.20	3,954.24	-14.60	0.91	14.58	0.82	
4,086.00	1.76	59.32	4,085.18	-12.49	4.03	12.44	0.23	
4,276.00	1.98	60.37	4,275.08	-9.38	9.40	9.25	0.12	
4,466.00	0.70	280.28	4,465.05	-7.55	11.11	7.40	1.35	
4,655.00	0.84	274.56	4,654.03	-7.23	8.59	7.11	0.08	
4,845.00	0.84	271.66	4,844.01	-7.08	5.81	7.00	0.02	
5,035.00	0.84	265.16	5,033.99	-7.16	3.03	7.12	0.05	
5,225.00	0.75	264.28	5,223.97	-7.40	0.41	7.40	0.05	
5,416.00	0.75	270.61	5,414.96	-7.51	-2.09	7.54	0.04	
5,606.00	0.53	257.07	5,604.94	-7.70	-4.19	7.75	0.14	
5,796.00	0.62	231.50	5,794.93	-8.53	-5.85	8.61	0.14	
5,987.00	0.66	229.04	5,985.92	-9.90	-7.49	10.00	0.03	
6,172.00	1.49	138.95	6,170.90	-12.41	-6.71	12.50	0.88	
6,267.00	11.12	86.21	6,265.24	-12.74	3.26	12.69	10.83	
6,362.00	9.63	70.39	6,358.71	-9.46	19.90	9.19	3.37	
6,455.00	7.21	75.32	6,450.70	-5.37	32.87	4.92	2.71	
6,550.00	3.12	87.80	6,545.29	-3.76	41.22	3.19	4.44	
6,645.00	2.02	79.62	6,640.20	-3.36	45.46	2.73	1.22	
6,740.00	0.53	314.20	6,735.18	-2.75	46.79	2.11	2.49	
6,836.00	0.44	300.84	6,831.18	-2.25	46.15	1.62	0.15	
6,930.00	0.48	302.51	6,925.17	-1.86	45.51	1.23	0.04	
7,025.00	0.44	289.94	7,020.17	-1.52	44.83	0.90	0.11	
7,120.00	0.48	261.82	7,115.17	-1.45	44.10	0.84	0.24	
7,216.00	0.44	261.64	7,211.16	-1.56	43.33	0.97	0.04	



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Site:	PLU Big Sinks 24-25-30 USA	MD Reference:	KB @ 3323.00usft (Latshaw 14)
Well:	#1Y	North Reference:	Grid
Wellbore:	WB3/Job #1311370	Survey Calculation Method:	Minimum Curvature
Design:	WB3/Job #1311370	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	EW (usft)	V. Sec (usft)	DLeg (°/100usft)	
7,310.00	0.62	234.05	7,305.16	-1.91	42.56	1.33	0.33	
7,405.00	0.75	206.10	7,400.15	-2.77	41.87	2.20	0.37	
7,500.00	0.92	199.94	7,495.14	-4.05	41.34	3.48	0.20	
7,595.00	1.10	195.29	7,590.13	-5.65	40.84	5.08	0.21	
7,691.00	1.01	285.64	7,686.12	-6.31	39.78	5.76	1.56	
7,786.00	1.05	277.90	7,781.10	-5.96	38.11	5.44	0.15	
7,881.00	0.92	264.28	7,876.09	-5.92	36.49	5.41	0.28	
7,976.00	0.84	265.25	7,971.08	-6.05	35.04	5.57	0.09	
8,071.00	0.92	263.58	8,066.07	-6.19	33.59	5.73	0.09	
8,166.00	0.97	267.44	8,161.05	-6.32	32.03	5.87	0.09	
8,261.00	1.01	273.95	8,256.04	-6.29	30.39	5.87	0.13	
8,356.00	0.97	273.07	8,351.03	-6.19	28.75	5.80	0.05	
8,451.00	0.84	274.12	8,446.01	-6.10	27.25	5.72	0.14	
8,546.00	1.23	287.40	8,541.00	-5.75	25.58	5.39	0.48	
8,615.00	1.32	286.34	8,609.98	-5.30	24.12	4.97	0.13	
8,657.00	1.49	284.23	8,651.97	-5.03	23.12	4.71	0.42	
8,689.00	3.69	207.41	8,683.94	-5.84	22.24	5.53	11.41	
8,721.00	8.66	195.29	8,715.75	-9.08	21.13	8.79	15.97	
8,752.00	12.75	191.51	8,746.20	-14.69	19.84	14.41	13.38	
8,784.00	16.53	189.49	8,777.16	-22.64	18.38	22.39	11.92	
8,816.00	19.60	187.38	8,807.58	-32.46	16.94	32.22	9.81	
8,847.00	22.11	186.85	8,836.54	-43.41	15.58	43.19	8.12	
8,879.00	25.14	187.73	8,865.86	-56.12	13.94	55.93	9.53	
8,911.00	28.00	188.52	8,894.47	-70.29	11.92	70.12	9.01	
8,942.00	28.92	186.15	8,921.73	-84.94	10.03	84.79	4.70	
8,974.00	31.12	183.51	8,949.44	-100.89	8.70	100.76	8.02	
9,006.00	34.29	178.85	8,976.36	-118.16	8.37	118.04	12.64	
9,037.00	37.23	176.83	9,001.52	-136.26	9.07	136.12	10.22	
9,069.00	40.35	176.74	9,026.46	-156.28	10.19	156.12	9.75	
9,100.00	43.82	176.92	9,049.46	-177.02	11.34	176.84	11.20	
9,132.00	46.51	177.62	9,072.02	-199.68	12.42	199.49	8.55	
9,164.00	50.15	178.76	9,093.29	-223.57	13.16	223.37	11.68	
9,195.00	53.89	178.94	9,112.36	-247.99	13.65	247.78	12.07	
9,225.00	56.40	179.00	9,129.51	-272.61	14.10	272.39	8.37	
9,257.00	55.60	176.30	9,147.40	-299.11	15.18	298.87	7.43	
9,289.00	54.30	173.10	9,165.78	-325.19	17.59	324.92	9.14	
9,321.00	58.50	173.40	9,183.49	-351.65	20.73	351.33	13.15	
9,352.00	62.50	171.60	9,198.75	-378.39	24.25	378.02	13.86	
9,384.00	66.40	170.60	9,212.55	-406.91	28.72	406.48	12.51	
9,414.00	70.20	172.20	9,223.64	-434.47	32.89	433.97	13.60	
9,445.00	74.60	172.10	9,233.01	-463.73	36.92	463.18	14.20	
9,477.00	79.60	172.00	9,240.16	-494.61	41.23	494.00	15.63	
9,509.00	84.40	171.30	9,244.61	-525.96	45.84	525.27	15.16	
9,540.00	89.60	171.80	9,246.23	-556.57	50.38	555.82	16.85	



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Site:	PLU Big Sinks 24-25-30 USA	MD Reference:	KB @ 3323.00usft (Latshaw 14)
Well:	#1Y	North Reference:	Gnd
Wellbore:	WB3/Job #1311370	Survey Calculation Method:	Minimum Curvature
Design:	WB3/Job #1311370	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
9,643.00	90.80	180.70	9,245.87	-659.24	57.11	658.39	8.72
9,738.00	90.50	182.80	9,244.79	-754.18	54.21	753.37	2.23
9,833.00	90.20	182.50	9,244.21	-849.08	49.82	848.31	0.45
9,928.00	89.50	182.30	9,244.46	-944.00	45.84	943.28	0.77
Tie-on to WB2							
9,994.00	86.30	184.00	9,246.88	-1,009.84	42.22	1,009.16	5.49
10,026.00	83.40	184.90	9,249.75	-1,041.61	39.75	1,040.97	9.49
10,121.00	85.40	186.90	9,259.02	-1,135.65	30.03	1,135.13	2.97
10,216.00	86.60	185.80	9,265.65	-1,229.83	19.55	1,229.45	1.71
10,311.00	88.80	182.90	9,269.46	-1,324.47	12.35	1,324.17	3.83
10,406.00	87.70	183.00	9,272.36	-1,419.30	7.46	1,419.06	1.16
10,501.00	88.70	181.00	9,275.35	-1,514.19	4.15	1,513.98	2.35
10,596.00	91.60	180.70	9,275.10	-1,609.16	2.74	1,608.97	3.07
10,691.00	90.60	180.50	9,273.27	-1,704.14	1.75	1,703.95	1.07
10,786.00	93.10	180.70	9,270.21	-1,799.08	0.75	1,798.90	2.64
10,882.00	92.50	180.20	9,265.52	-1,894.96	0.00	1,894.78	0.81
10,977.00	93.10	182.20	9,260.88	-1,989.82	-1.99	1,989.66	2.20
11,072.00	92.50	182.20	9,256.24	-2,084.64	-5.63	2,084.52	0.63
11,167.00	92.60	181.70	9,252.01	-2,179.49	-8.86	2,179.40	0.54
11,262.00	92.90	181.80	9,247.45	-2,274.33	-11.76	2,274.28	0.33
11,357.00	93.50	181.70	9,242.15	-2,369.14	-14.65	2,369.12	0.64
11,452.00	92.00	184.60	9,237.59	-2,463.87	-19.87	2,463.91	3.43
11,547.00	90.20	182.10	9,235.77	-2,558.68	-25.42	2,558.79	3.24
11,642.00	90.00	181.20	9,235.60	-2,653.64	-28.15	2,653.78	0.97
11,737.00	88.80	181.00	9,236.59	-2,748.62	-29.98	2,748.77	1.28
11,832.00	89.80	180.60	9,237.76	-2,843.60	-31.30	2,843.76	1.13
11,928.00	90.50	180.80	9,237.50	-2,939.59	-32.48	2,939.76	0.76
12,025.00	91.20	181.40	9,236.07	-3,036.56	-34.34	3,036.75	0.95
12,120.00	90.90	181.90	9,234.32	-3,131.51	-37.07	3,131.72	0.61
12,215.00	90.70	182.00	9,233.00	-3,226.44	-40.31	3,226.69	0.24
12,309.00	90.70	181.90	9,231.85	-3,320.38	-43.50	3,320.67	0.11
12,404.00	90.30	181.70	9,231.02	-3,415.33	-46.49	3,415.65	0.47
12,499.00	91.00	181.30	9,229.94	-3,510.29	-48.97	3,510.63	0.85
12,594.00	90.80	180.80	9,228.45	-3,605.26	-50.72	3,605.62	0.57
12,689.00	90.50	180.70	9,227.37	-3,700.25	-51.96	3,700.61	0.33
12,784.00	89.50	180.90	9,227.37	-3,795.24	-53.29	3,795.61	1.07
12,879.00	87.90	180.70	9,229.53	-3,890.20	-54.61	3,890.58	1.70
12,975.00	87.40	180.70	9,233.46	-3,986.11	-55.78	3,986.50	0.52
13,069.00	87.10	180.60	9,237.97	-4,080.00	-56.85	4,080.39	0.34
13,164.00	87.80	181.00	9,242.20	-4,174.89	-58.17	4,175.30	0.85
13,259.00	88.70	180.80	9,245.10	-4,269.84	-59.66	4,270.25	0.97
13,354.00	91.60	180.50	9,244.85	-4,364.82	-60.74	4,365.24	3.07
13,449.00	91.80	180.90	9,242.04	-4,459.77	-61.90	4,460.20	0.47
13,545.00	92.00	181.00	9,238.85	-4,555.71	-63.49	4,556.15	0.23



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13,640.00	90.90	181.10	9,236.45	-4,650.66	-65.23	4,651.12	1.16
13,735.00	89.60	180.80	9,236.03	-4,745.64	-66.81	4,746.11	1.40
13,830.00	87.90	180.30	9,238.11	-4,840.61	-67.72	4,841.08	1.87
13,925.00	90.60	180.40	9,239.35	-4,935.59	-68.30	4,936.06	2.84
14,020.00	89.70	180.00	9,239.10	-5,030.59	-68.63	5,031.06	1.04
14,115.00	89.60	179.90	9,239.68	-5,125.59	-68.55	5,126.05	0.15
14,210.00	89.40	179.80	9,240.51	-5,220.58	-68.30	5,221.03	0.24
14,305.00	89.80	179.80	9,241.17	-5,315.58	-67.97	5,316.01	0.42
Last Phoenix MWD Survey							
14,363.00	89.80	179.80	9,241.38	-5,373.58	-67.77	5,374.00	0.00
Projection to TD							

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,928.00	9,244.46	-944.00	45.84	Tie-on to WB2
14,305.00	9,241.17	-5,315.58	-67.97	Last Phoenix MWD Survey
14,363.00	9,241.38	-5,373.58	-67.77	Projection to TD

Checked By: _____ Approved By: _____ Date: _____