

30-015-41439

BOPCO, L P

Eddy County, NM (NAD27 NME)

PLU Big Sinks 23-25-30 USA

#1H

WB2/Job #1310463

Design: Surveys (Latshaw 14)

Standard Survey Report

04 April, 2014





Phoenix Technology Services

Survey Report

30015-41439



Company:	BOPCO, L.P.	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3383.00usft (Latshaw 14)
Site:	PLU Big Sinks 23-25-30 USA	MD Reference:	KB @ 3383.00usft (Latshaw 14)
Well:	#1H	North Reference:	Grid
Wellbore:	WB2/Job #1310463	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Latshaw 14)	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 23-25-30 USA					
Site Position:			Northing:		408,632.20 usft		Latitude:		32° 7' 21.19180 N		
From:		Map		Easting:		647,221.80 usft		Longitude:		103° 51' 28.02580 W	
Position Uncertainty:		0.00 usft		Slot Radius:		13-3/16 "		Grid Convergence:		0.25 °	

Well:	#1H					
Well Position	+N/-S	0.00 usft	Northing:	408,632.20 usft	Latitude:	32° 7' 21.19180 N
	+E/-W	0.00 usft	Easting:	647,221.80 usft	Longitude:	103° 51' 28.02580 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,361.00 usft

Wellbore		WB2/Job #1310463			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	01/14/14	7.39	59.98	48,266

Design:	Surveys (Latshaw 14)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	8,673.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	177.97	

Survey Program*		Date	04/04/14		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
1,241.00	8,673.00	Phoenix WB1 MWD Survey (WB1/Job #13	MWD	MWD - Standard	
8,673.00	17,120.00	Phoenix WB2 MWD Survey (WB2/Job #13	MWD	MWD - Standard	

Survey:	Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate
	(usft)	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)
	1,210.00	2.53	0.00	1,209.77	0.00	0.00	0.00	0.00	0.00	0.00
	1,241.00	2.50	17.60	1,240.74	1.33	0.20	-1.32	2.48	-0.10	56.77
	1,336.00	2.40	13.60	1,335.65	5.24	1.30	-5.19	0.21	-0.11	-4.21
	1,525.00	2.30	14.00	1,524.49	12.76	3.15	-12.64	0.05	-0.05	0.21
	1,716.00	1.70	27.40	1,715.37	19.00	5.38	-18.79	0.40	-0.31	7.02
	1,810.00	1.60	43.10	1,809.34	21.19	6.92	-20.93	0.49	-0.11	16.70
	2,001.00	0.20	123.60	2,000.31	22.96	9.02	-22.62	0.83	-0.73	42.15
	2,191.00	0.40	82.90	2,190.31	22.85	9.95	-22.49	0.15	0.11	-21.42
	2,381.00	0.40	84.40	2,380.30	23.00	11.27	-22.59	0.01	0.00	0.79
	2,571.00	1.70	113.10	2,570.27	21.96	14.52	-21.43	0.72	0.68	15.11



Phoenix Technology Services

Survey Report



Company:	BOPCO, L.P.	Coordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3383.00usft (Latshaw 14)
Site:	PLU Big Sinks 23-25-30' USA	MD Reference:	KB @ 3383.00usft (Latshaw 14)
Well:	#1H	North Reference:	Grid
Wellbore:	WB2/Job #1310463	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Latshaw 14)	Database:	GCR DB

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,761.00	2.20	83.40	2,760.16	21.27	20.74	-20.53	0.58	0.26	-15.63
2,951.00	3.00	84.40	2,949.96	22.18	29.31	-21.13	0.42	0.42	0.53
3,046.00	2.90	88.00	3,044.84	22.50	34.18	-21.28	0.22	-0.11	3.79
3,141.00	2.20	103.30	3,139.75	22.17	38.36	-20.80	1.02	-0.74	16.11
3,237.00	1.90	114.10	3,235.68	21.09	41.61	-19.61	0.51	-0.31	11.25
3,332.00	1.60	92.60	3,330.64	20.39	44.37	-18.81	0.75	-0.32	-22.63
3,426.00	1.00	100.00	3,424.62	20.19	46.49	-18.53	0.66	-0.64	7.87
3,522.00	1.50	114.50	3,520.59	19.52	48.45	-17.79	0.61	0.52	15.10
3,617.00	0.90	119.50	3,615.57	18.64	50.24	-16.85	0.64	-0.63	5.26
3,712.00	1.70	121.00	3,710.55	17.55	52.09	-15.69	0.84	0.84	1.58
3,807.00	1.60	168.50	3,805.51	15.52	53.57	-13.61	1.40	-0.11	50.00
3,901.00	1.80	177.30	3,899.47	12.76	53.90	-10.84	0.35	0.21	9.36
3,990.00	1.70	182.00	3,988.43	10.05	53.92	-8.13	0.20	-0.11	5.28
4,020.00	1.40	185.40	4,018.42	9.24	53.87	-7.32	1.05	-1.00	11.33
4,115.00	1.10	177.20	4,113.39	7.17	53.80	-5.26	0.37	-0.32	-8.63
4,209.00	1.10	167.50	4,207.38	5.39	54.04	-3.47	0.20	0.00	-10.32
4,301.00	0.90	165.20	4,299.36	3.83	54.42	-1.90	0.22	-0.22	-2.50
4,396.00	1.10	171.70	4,394.35	2.20	54.74	-0.26	0.24	0.21	6.84
4,491.00	1.10	167.30	4,489.33	0.41	55.07	1.54	0.09	0.00	-4.63
4,586.00	1.00	179.10	4,584.32	-1.31	55.28	3.27	0.25	-0.11	12.42
4,681.00	0.90	175.90	4,679.30	-2.88	55.35	4.84	0.12	-0.11	-3.37
4,776.00	0.80	183.60	4,774.29	-4.29	55.36	6.25	0.16	-0.11	8.11
4,871.00	0.80	192.60	4,869.28	-5.60	55.18	7.55	0.13	0.00	9.47
4,966.00	0.70	194.10	4,964.28	-6.81	54.89	8.75	0.11	-0.11	1.58
5,061.00	0.80	205.80	5,059.27	-7.97	54.46	9.89	0.19	0.11	12.32
5,156.00	0.80	206.20	5,154.26	-9.16	53.88	11.06	0.01	0.00	0.42
5,251.00	0.90	213.00	5,249.25	-10.38	53.18	12.26	0.15	0.11	7.16
5,346.00	0.90	219.20	5,344.24	-11.58	52.30	13.43	0.10	0.00	6.53
5,442.00	1.00	214.00	5,440.22	-12.86	51.36	14.67	0.14	0.10	-5.42
5,537.00	1.00	219.20	5,535.21	-14.19	50.37	15.97	0.10	0.00	5.47
5,632.00	0.90	213.60	5,630.19	-15.45	49.43	17.20	0.14	-0.11	-5.89
5,727.00	1.20	206.50	5,725.18	-16.97	48.58	18.68	0.34	0.32	-7.47
5,822.00	1.30	198.00	5,820.16	-18.88	47.80	20.56	0.22	0.11	-8.95
5,917.00	0.90	219.10	5,915.14	-20.49	47.00	22.14	0.59	-0.42	22.21
6,011.00	0.90	220.80	6,009.13	-21.62	46.05	23.24	0.03	0.00	1.81
6,107.00	1.10	207.80	6,105.11	-23.00	45.12	24.59	0.31	0.21	-13.54
6,202.00	1.30	247.30	6,200.09	-24.23	43.71	25.76	0.88	0.21	41.58
6,298.00	0.70	269.10	6,296.08	-24.66	42.11	26.13	0.73	-0.63	22.71
6,393.00	1.00	270.70	6,391.07	-24.65	40.71	26.08	0.32	0.32	1.68
6,487.00	1.00	264.70	6,485.05	-24.72	39.07	26.09	0.11	0.00	-6.38
6,582.00	1.10	263.80	6,580.04	-24.90	37.34	26.20	0.11	0.11	-0.95
6,677.00	1.00	264.10	6,675.02	-25.08	35.60	26.32	0.11	-0.11	0.32
6,773.00	0.70	261.60	6,771.01	-25.25	34.19	26.45	0.31	-0.31	-2.60



Phoenix Technology Services

Survey Report



Company:	BORCO, LIP	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3383.00usft (Latshaw 14)
Site:	PLU Big Sinks 23-25-30 USA	MD Reference:	KB @ 3383.00usft (Latshaw 14)
Well:	#1H	North Reference:	Grid
Wellbore:	WB2/Job #1310463	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Latshaw 14)	Database:	GCR DB

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N/S (usft)	E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,867.00	0.60	258.80	6,865.01	-25.43	33.14	26.59	0.11	-0.11	-2.98
6,962.00	0.40	238.10	6,960.00	-25.70	32.37	26.83	0.28	-0.21	-21.79
7,058.00	0.40	230.30	7,056.00	-26.09	31.83	27.20	0.06	0.00	-8.13
7,153.00	0.60	203.80	7,151.00	-26.76	31.37	27.85	0.32	0.21	-27.89
7,248.00	0.80	186.20	7,245.99	-27.87	31.10	28.96	0.31	0.21	-18.53
7,343.00	1.10	179.40	7,340.98	-29.45	31.04	30.53	0.34	0.32	-7.16
7,438.00	0.80	209.60	7,435.96	-30.93	30.72	32.00	0.60	-0.32	31.79
7,533.00	1.00	210.60	7,530.95	-32.22	29.97	33.27	0.21	0.21	1.05
7,627.00	0.70	278.90	7,624.94	-32.84	28.99	33.85	1.05	-0.32	72.66
7,722.00	0.90	268.20	7,719.93	-32.78	27.67	33.73	0.26	0.21	-11.26
7,817.00	0.90	268.30	7,814.92	-32.82	26.18	33.73	0.00	0.00	0.11
7,912.00	1.10	303.90	7,909.91	-32.33	24.67	33.19	0.67	0.21	37.47
8,007.00	0.60	349.20	8,004.90	-31.34	23.82	32.16	0.84	-0.53	47.68
8,102.00	0.70	353.80	8,099.89	-30.27	23.67	31.09	0.12	0.11	4.84
8,197.00	2.30	311.80	8,194.86	-28.42	22.18	29.19	1.94	1.68	-44.21
8,292.00	1.10	285.10	8,289.82	-26.92	19.88	27.60	1.48	-1.26	-28.11
8,387.00	1.00	276.00	8,384.80	-26.59	18.18	27.22	0.20	-0.11	-9.58
8,482.00	2.00	287.00	8,479.77	-26.02	15.77	26.56	1.09	1.05	11.58
8,578.00	1.30	326.40	8,575.73	-24.62	13.56	25.09	1.35	-0.73	41.04
8,673.00	1.30	315.40	8,670.71	-22.96	12.21	23.38	0.26	0.00	-11.58
Tie-on to WB1									
8,699.00	1.30	305.90	8,696.70	-22.58	11.76	22.98	0.83	0.00	-36.54
First Phoenix WB2 MWD Survey									
8,794.00	1.50	283.30	8,791.67	-21.66	9.68	21.99	0.61	0.21	-23.79
8,889.00	0.60	273.90	8,886.65	-21.34	7.97	21.61	0.96	-0.95	-9.89
8,983.00	0.40	254.70	8,980.65	-21.39	7.17	21.63	0.27	-0.21	-20.43
9,078.00	4.00	162.10	9,075.57	-24.63	7.87	24.90	4.25	3.79	-97.47
9,173.00	6.80	158.00	9,170.14	-33.00	10.99	33.37	2.97	2.95	-4.32
9,268.00	5.80	164.60	9,264.57	-42.84	14.37	43.33	1.30	-1.05	6.95
9,331.00	5.60	171.60	9,327.26	-48.95	15.67	49.48	1.15	-0.32	11.11
9,363.00	5.40	173.40	9,359.11	-51.99	16.07	52.53	0.83	-0.63	5.63
9,395.00	6.50	170.70	9,390.94	-55.28	16.53	55.83	3.55	3.44	-8.44
9,426.00	8.00	176.10	9,421.69	-59.16	16.96	59.73	5.31	4.84	17.42
9,458.00	10.70	178.60	9,453.26	-64.35	17.19	64.92	8.53	8.44	7.81
9,490.00	13.50	182.30	9,484.55	-71.06	17.11	71.62	9.08	8.75	11.56
9,521.00	15.90	179.80	9,514.53	-78.92	16.98	79.47	8.01	7.74	-8.06
9,553.00	18.50	180.50	9,545.10	-88.38	16.95	88.93	8.15	8.13	2.19
9,584.00	21.10	181.00	9,574.26	-98.88	16.81	99.42	8.40	8.39	1.61
9,617.00	23.70	181.20	9,604.77	-111.45	16.57	111.97	7.88	7.88	0.61
9,649.00	26.20	180.70	9,633.78	-124.95	16.35	125.45	7.84	7.81	-1.56
9,681.00	30.30	179.30	9,661.96	-140.09	16.36	140.58	12.98	12.81	-4.38
9,712.00	35.60	177.50	9,687.97	-156.94	16.85	157.44	17.38	17.10	-5.81
9,743.00	40.80	176.40	9,712.32	-176.07	17.88	176.60	16.92	16.77	-3.55
9,775.00	45.20	176.10	9,735.72	-197.84	19.31	198.40	13.76	13.75	-0.94



Phoenix Technology Services

Survey Report



Company:	BOPCO, L.P.	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3383.00usft (Latshaw 14)
Site:	PLU Big Sinks 23-25-30 USA	MD Reference:	KB @ 3383.00usft (Latshaw 14)
Well:	#1H	North Reference:	Grid
Wellbore:	WB2/Job #1310463	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Latshaw 14)	Database:	GCR-DB

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,806.00	48.70	175.40	9,756.88	-220.43	20.99	221.04	11.41	11.29	-2.26
9,838.00	51.40	174.40	9,777.42	-244.86	23.18	245.53	8.77	8.44	-3.13
9,870.00	53.80	174.60	9,796.86	-270.17	25.61	270.90	7.52	7.50	0.63
9,901.00	55.70	175.50	9,814.75	-295.39	27.79	296.18	6.57	6.13	2.90
9,933.00	60.00	176.00	9,831.77	-322.40	29.80	323.25	13.50	13.44	1.56
9,965.00	65.00	176.40	9,846.55	-350.71	31.68	351.61	15.66	15.63	1.25
10,028.00	73.00	176.40	9,869.10	-409.36	35.37	410.36	12.70	12.70	0.00
10,123.00	72.00	175.60	9,897.67	-499.74	41.68	500.91	1.32	-1.05	-0.84
10,144.00	71.70	175.20	9,904.21	-519.63	43.29	520.84	2.31	-1.43	-1.90
10,236.00	74.30	175.00	9,931.11	-607.28	50.80	608.70	2.83	2.83	-0.22
10,267.00	77.60	175.00	9,938.63	-637.24	53.42	638.73	10.65	10.65	0.00
10,298.00	80.80	175.70	9,944.44	-667.59	55.89	669.15	10.56	10.32	2.26
10,328.00	83.10	177.20	9,948.64	-697.23	57.73	698.84	9.13	7.67	5.00
10,358.00	86.00	178.00	9,951.49	-727.06	58.98	728.70	10.02	9.67	2.67
10,452.00	92.60	182.20	9,952.64	-820.98	58.81	822.55	8.32	7.02	4.47
10,542.00	92.70	183.80	9,948.48	-910.76	54.11	912.11	1.78	0.11	1.78
10,634.00	90.40	185.10	9,945.99	-1,002.44	46.97	1,003.48	2.87	-2.50	1.41
10,726.00	89.90	185.10	9,945.75	-1,094.08	38.79	1,094.77	0.54	-0.54	0.00
10,819.00	88.90	185.90	9,946.72	-1,186.64	29.88	1,186.96	1.38	-1.08	0.86
10,913.00	90.30	184.90	9,947.38	-1,280.22	21.03	1,280.16	1.83	1.49	-1.06
11,005.00	90.20	184.10	9,946.98	-1,371.94	13.81	1,371.56	0.88	-0.11	-0.87
11,099.00	90.40	184.00	9,946.49	-1,465.70	7.18	1,465.03	0.24	0.21	-0.11
11,192.00	91.30	178.80	9,945.11	-1,558.63	4.90	1,557.82	5.67	0.97	-5.59
11,285.00	91.60	178.40	9,942.75	-1,651.57	7.18	1,650.79	0.54	0.32	-0.43
11,378.00	90.50	178.30	9,941.05	-1,744.51	9.85	1,743.77	1.19	-1.18	-0.11
11,471.00	89.40	180.70	9,941.13	-1,837.50	10.66	1,836.73	2.84	-1.18	2.58
11,563.00	91.10	179.90	9,940.73	-1,929.50	10.18	1,928.65	2.04	1.85	-0.87
11,655.00	91.40	180.50	9,938.72	-2,021.47	9.86	2,020.55	0.73	0.33	0.65
11,748.00	90.70	180.80	9,937.02	-2,114.45	8.81	2,113.44	0.82	-0.75	0.32
11,843.00	89.50	182.70	9,936.85	-2,209.40	5.91	2,208.22	2.37	-1.26	2.00
11,938.00	91.00	181.30	9,936.44	-2,304.34	2.59	2,302.98	2.16	1.58	-1.47
12,033.00	89.90	181.40	9,935.69	-2,399.31	0.35	2,397.81	1.16	-1.16	0.11
12,127.00	92.50	178.60	9,933.72	-2,493.27	0.35	2,491.71	4.06	2.77	-2.98
12,222.00	91.00	177.60	9,930.82	-2,588.17	3.50	2,586.67	1.90	-1.58	-1.05
12,316.00	92.00	178.40	9,928.36	-2,682.08	6.78	2,680.63	1.36	1.06	0.85
12,410.00	91.30	178.30	9,925.65	-2,776.00	9.49	2,774.59	0.75	-0.74	-0.11
12,505.00	89.80	174.90	9,924.74	-2,870.81	15.12	2,869.54	3.91	-1.58	-3.58
12,600.00	90.50	178.90	9,924.49	-2,965.65	20.25	2,964.51	4.27	0.74	4.21
12,695.00	90.30	178.90	9,923.83	-3,060.63	22.08	3,059.49	0.21	-0.21	0.00
12,789.00	92.00	181.40	9,921.94	-3,154.60	21.83	3,153.39	3.22	1.81	2.66
12,883.00	90.00	181.30	9,920.30	-3,248.56	19.62	3,247.21	2.13	-2.13	-0.11
12,978.00	90.90	181.60	9,919.56	-3,343.52	17.22	3,342.03	1.00	0.95	0.32
13,073.00	91.00	180.60	9,917.98	-3,438.49	15.39	3,436.88	1.06	0.11	-1.05



Phoenix Technology Services

Survey Report



Company:	BOPCO, L.P.	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3383.00usft (Latshaw 14)
Site:	PLU Big Sinks 23-25-30 USA	MD Reference:	KB @ 3383.00usft (Latshaw 14)
Well:	#1H	North Reference:	Grid
Wellbore:	WB2/Job #1310463	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Latshaw 14)	Database:	GCR DB

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N/S (usft)	E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
13,167.00	89.70	178.30	9,917.41	-3,532.47	16.29	3,530.83	2.81	-1.38	-2.45
13,261.00	91.70	179.20	9,916.26	-3,626.44	18.34	3,624.81	2.33	2.13	0.96
13,355.00	90.70	179.50	9,914.29	-3,720.41	19.41	3,718.76	1.11	-1.06	0.32
13,450.00	90.50	179.00	9,913.29	-3,815.40	20.65	3,813.73	0.57	-0.21	-0.53
13,545.00	90.10	179.80	9,912.80	-3,910.39	21.65	3,908.70	0.94	-0.42	0.84
13,639.00	89.30	179.70	9,913.29	-4,004.39	22.06	4,002.65	0.86	-0.85	-0.11
13,734.00	92.50	180.00	9,911.80	-4,099.36	22.31	4,097.58	3.38	3.37	0.32
13,828.00	92.30	180.20	9,907.86	-4,193.28	22.14	4,191.43	0.30	-0.21	0.21
13,922.00	92.00	180.30	9,904.33	-4,287.21	21.73	4,285.29	0.34	-0.32	0.11
14,017.00	91.30	180.50	9,901.60	-4,382.17	21.07	4,380.17	0.77	-0.74	0.21
14,112.00	90.40	180.30	9,900.19	-4,477.16	20.41	4,475.07	0.97	-0.95	-0.21
14,206.00	89.50	180.50	9,900.27	-4,571.15	19.75	4,568.98	0.98	-0.96	0.21
14,301.00	88.50	181.00	9,901.93	-4,666.13	18.51	4,663.85	1.18	-1.05	0.53
14,396.00	90.20	181.60	9,903.01	-4,761.09	16.35	4,758.68	1.90	1.79	0.63
14,491.00	89.70	180.90	9,903.09	-4,856.07	14.28	4,853.53	0.91	-0.53	-0.74
14,585.00	88.70	181.00	9,904.40	-4,950.05	12.72	4,947.39	1.07	-1.06	0.11
14,680.00	90.80	182.30	9,904.82	-5,045.00	9.99	5,042.19	2.60	2.21	1.37
14,774.00	90.30	182.40	9,903.92	-5,138.92	6.13	5,135.91	0.54	-0.53	0.11
14,868.00	89.40	182.50	9,904.16	-5,232.83	2.11	5,229.62	0.96	-0.96	0.11
14,963.00	88.60	182.30	9,905.82	-5,327.73	-1.86	5,324.32	0.87	-0.84	-0.21
15,057.00	88.50	179.60	9,908.20	-5,421.68	-3.42	5,418.15	2.87	-0.11	-2.87
15,152.00	88.50	178.00	9,910.69	-5,516.62	-1.43	5,513.11	1.68	0.00	-1.68
15,247.00	89.90	178.40	9,912.01	-5,611.56	1.55	5,608.10	1.53	1.47	0.42
15,342.00	90.20	179.90	9,911.93	-5,706.55	2.96	5,703.07	1.61	0.32	1.58
15,437.00	89.90	179.70	9,911.85	-5,801.55	3.29	5,798.02	0.38	-0.32	-0.21
15,531.00	90.70	180.00	9,911.35	-5,895.55	3.54	5,891.97	0.91	0.85	0.32
15,626.00	89.10	179.10	9,911.52	-5,990.54	4.28	5,986.93	1.93	-1.68	-0.95
15,720.00	89.80	179.00	9,912.42	-6,084.52	5.84	6,080.91	0.75	0.74	-0.11
15,815.00	90.20	178.70	9,912.42	-6,179.50	7.75	6,175.90	0.53	0.42	-0.32
15,909.00	90.50	178.40	9,911.85	-6,273.47	10.13	6,269.89	0.45	0.32	-0.32
16,004.00	90.60	178.50	9,910.94	-6,368.43	12.70	6,364.88	0.15	0.11	0.11
16,099.00	90.90	178.40	9,909.69	-6,463.39	15.27	6,459.87	0.33	0.32	-0.11
16,193.00	90.70	176.70	9,908.38	-6,557.29	19.29	6,553.86	1.82	-0.21	-1.81
16,288.00	90.50	175.40	9,907.38	-6,652.06	25.83	6,648.80	1.38	-0.21	-1.37
16,382.00	91.00	176.90	9,906.15	-6,745.83	32.14	6,742.74	1.68	0.53	1.60
16,476.00	91.40	176.50	9,904.19	-6,839.66	37.55	6,836.69	0.60	0.43	-0.43
16,570.00	90.30	176.80	9,902.79	-6,933.48	43.04	6,930.66	1.21	-1.17	0.32
16,664.00	92.40	178.20	9,900.58	-7,027.36	47.14	7,024.62	2.68	2.23	1.49
16,758.00	93.00	179.00	9,896.15	-7,121.23	49.44	7,118.51	1.06	0.64	0.85
16,853.00	92.50	179.80	9,891.59	-7,216.11	50.43	7,213.37	0.99	-0.53	0.84
16,947.00	92.30	179.30	9,887.65	-7,310.03	51.17	7,307.25	0.57	-0.21	-0.53
17,041.00	92.70	178.90	9,883.55	-7,403.93	52.64	7,401.14	0.60	0.43	-0.43
17,069.00	92.90	178.90	9,882.19	-7,431.89	53.18	7,429.10	0.71	0.71	0.00



Phoenix Technology Services

Survey Report



Company:	BOPCO, L.P.	Local Coordinate Reference:	Well #1H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3383.00usft (Latshaw 14)
Site:	PLU Big Sinks 23-25-30 USA	MD Reference:	KB @ 3383.00usft (Latshaw 14)
Well:	#1H	North Reference:	Grid
Wellbore:	WB2/Job #1310463	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Latshaw 14)	Database:	GCR DB

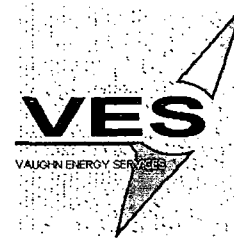
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Last Phoenix WB2 MWD Survey									
17,120.00	92.90	178.90	9,879.61	-7,482.81	54.16	7,480.03	0.00	0.00	0.00
Projection to TD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,673.00	8,670.71	-22.96	12.21	Tie-on to WB1
8,699.00	8,696.70	-22.58	11.76	First Phoenix WB2 MWD Survey
17,069.00	9,882.19	-7,431.89	53.18	Last Phoenix WB2 MWD Survey
17,120.00	9,879.61	-7,482.81	54.16	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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Company: BOPCO
Lease/Well: PLU Big Sinks 23-25-30 USA/No 001H



Rig Name: Latshaw 14
State/County: New Mexico/Eddy
Latitude: 32.07, Longitude: -103.51
GRID North is 0.44 Degrees East of True North
VS-Azi: 0.00 Degrees

NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 09 2014

RECEIVED

Depth Reference : RKB = 22 Feet

30-015-41439

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ...3 25 30 usa 1h_gyro survey.ut

Minimum Curvature Method

Report Date/Time: 2/18/2014 / 13:23

Vaughn Energy Services

Midland, Texas

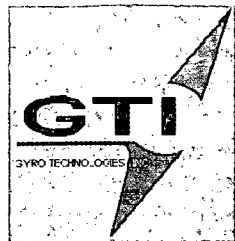
432-563-5444

Surveyor: Gene Heiss

PLU Big Sinks 23-25-30 USA No 001H / API 30-015-41639

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.25	259.96	100.00	-0.04	-0.22	-0.04	0.22	259.96	0.25
200.00	0.34	305.03	200.00	0.09	-0.68	0.09	0.68	277.88	0.24
300.00	0.45	309.70	300.00	0.52	-1.22	0.52	1.33	292.89	0.12
400.00	0.42	317.55	399.99	1.04	-1.78	1.04	2.06	300.39	0.07
500.00	0.68	324.03	499.99	1.80	-2.38	1.80	2.98	307.10	0.26
600.00	0.78	332.58	599.98	2.88	-3.04	2.88	4.18	313.47	0.14
700.00	0.80	331.18	699.97	4.09	-3.68	4.09	5.51	317.99	0.03
800.00	0.71	342.04	799.96	5.30	-4.21	5.30	6.77	321.49	0.17
900.00	1.30	341.56	899.95	6.97	-4.77	6.97	8.44	325.63	0.59
1000.00	1.60	345.06	999.91	9.40	-5.49	9.40	10.88	329.72	0.31
1100.00	1.88	359.88	1099.87	12.39	-5.85	12.39	13.70	334.72	0.53
1200.00	2.33	8.71	1199.80	16.04	-5.55	16.04	16.97	340.93	0.56
1300.00	2.20	13.82	1299.72	19.92	-4.78	19.92	20.48	346.51	0.24
1400.00	2.20	15.26	1399.65	23.63	-3.82	23.63	23.93	350.82	0.06
1500.00	2.30	23.23	1499.57	27.32	-2.52	27.32	27.44	354.73	0.33
1600.00	1.99	26.66	1599.50	30.72	-0.95	30.72	30.73	358.23	0.34
1700.00	1.79	31.39	1699.45	33.60	0.64	33.60	33.61	1.10	0.26
1800.00	1.37	45.39	1799.41	35.77	2.31	35.77	35.84	3.69	0.57
1900.00	0.84	54.67	1899.39	37.03	3.75	37.03	37.22	5.79	0.56
2000.00	0.43	76.94	1999.38	37.54	4.71	37.54	37.83	7.16	0.47

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
2100.00	0.24	59.21	2099.38	37.73	5.26	37.73	38.10	7.94	0.21
2200.00	0.37	85.19	2199.38	37.87	5.77	37.87	38.31	8.66	0.19
2300.00	0.46	74.77	2299.38	38.00	6.48	38.00	38.55	9.68	0.12
2400.00	0.27	90.43	2399.38	38.11	7.11	38.11	38.76	10.57	0.21
2500.00	0.60	105.64	2499.37	37.96	7.85	37.96	38.77	11.68	0.34
2600.00	1.51	98.17	2599.36	37.64	9.66	37.64	38.86	14.40	0.92
2700.00	1.58	86.66	2699.32	37.53	12.35	37.53	39.51	18.21	0.32
2800.00	2.39	76.01	2799.26	38.11	15.75	38.11	41.24	22.45	0.88
2900.00	2.84	80.33	2899.15	39.03	20.21	39.03	43.96	27.38	0.49
3000.00	2.90	82.84	2999.03	39.76	25.17	39.76	47.06	32.33	0.14
3100.00	2.87	89.87	3098.90	40.09	30.18	40.09	50.18	36.98	0.36
3200.00	2.00	101.27	3198.81	39.75	34.40	39.75	52.57	40.87	0.99
3300.00	1.63	111.79	3298.76	38.88	37.43	38.88	53.97	43.91	0.50
3400.00	1.28	100.29	3398.73	38.15	39.85	38.15	55.17	46.24	0.46
3500.00	1.17	109.35	3498.71	37.62	41.91	37.62	56.31	48.09	0.22
3600.00	1.09	110.85	3598.69	36.94	43.76	36.94	57.27	49.83	0.08
3700.00	1.37	132.34	3698.67	35.80	45.53	35.80	57.92	51.83	0.53
3800.00	1.48	155.54	3798.64	33.82	46.95	33.82	57.86	54.23	0.58
3900.00	1.78	179.33	3898.60	31.09	47.50	31.09	56.77	56.79	0.74
3932.00	1.82	176.59	3930.58	30.09	47.53	30.09	56.26	57.67	0.30



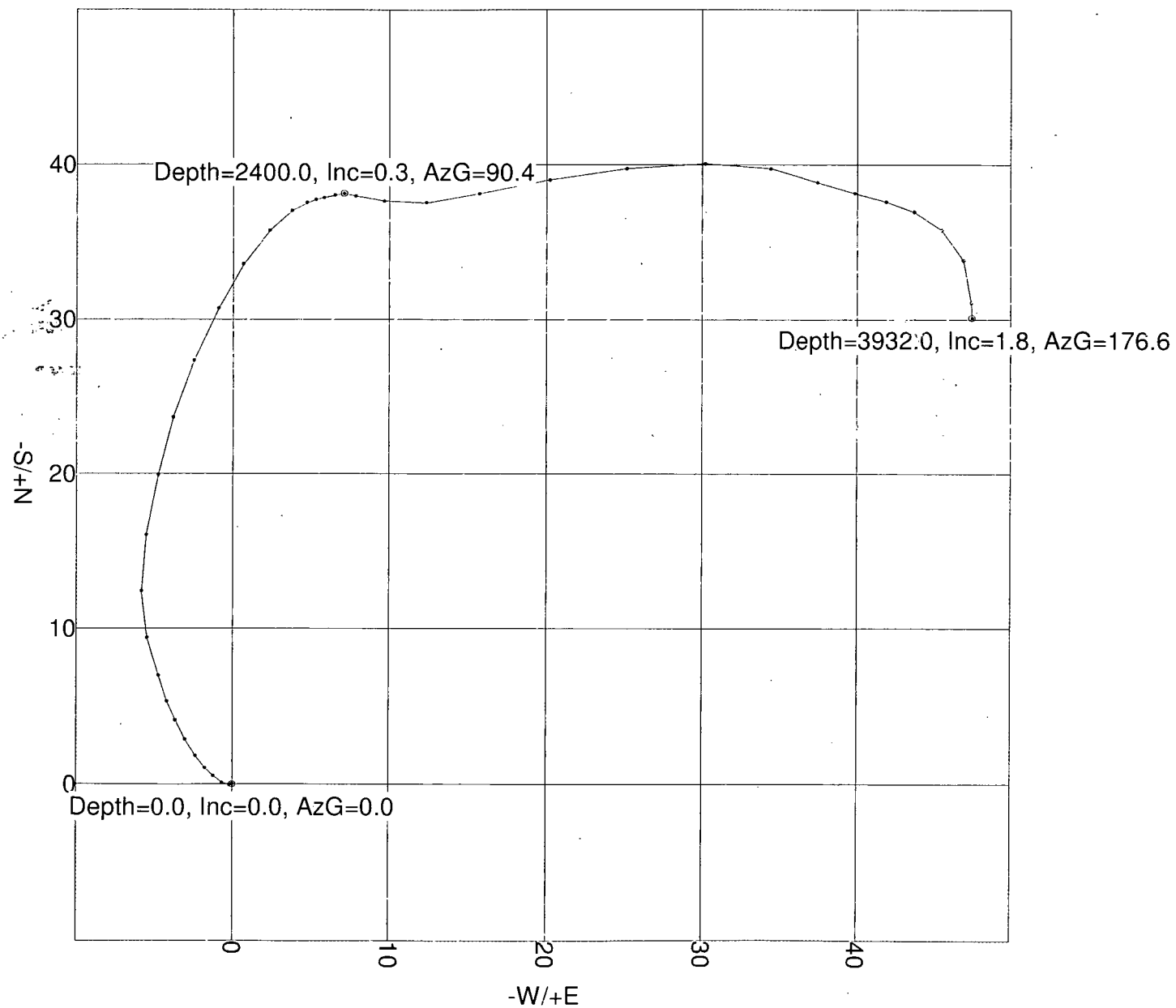
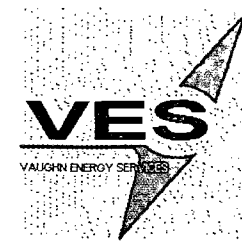
Vaughn Energy Services

Midland, Texas

432-563-5444

Surveyor: Gene Heiss

PLU Big Sinks 23-25-30 USA No 001H / API 30-015-41639



VES Survey Date: 01/31/2014