

Results of Directional Survey

API number:	30-025-41049		
OGRID:		Operator:	COG OPERATING LLC
		Property:	BOONE 16 STATE COM # 2H

surface	ULSTR:	O	16	T 21S	R 33E
				190 FSL	1980 FEL

BH Loc	ULSTR:	B	16	T 21S	R 33E
16163	MD	11612.1	TVD	335 FNL	2045 FEL
				4945 FSL	

Top Perf/OH	ULSTR:	O	16	T 21S	R 33E
11907	MD	11701.7	TVD	697 FSL	1926 FEL

Bot Perf/OH	ULSTR:	B	16	T 21S	R 33E
16042	MD	11614.2	TVD	456 FNL	2036 FEL
				4824 FSL	

	MD	N/S	E/W	VD
	11877	478.42	55.53	11657.14
TOP PERFS/OH	11907	507.29	54.13	11701.69
	11907	507.29	54.13	11701.69
	15997	4589.21	-52.42	11614.83
BOT PERFS/OH	16042	4634.14	-55.99	11614.24
	16116	4708.02	-61.87	11613.28

NEXT TO LAST	16116	4708.02	-61.87	11613.28
LAST READING	16163	4754.93	-64.53	11612.09
TD	16163	4754.93	-64.53	11612.09

Surface Location	190	FS	1980	FE
Projected BHL	4945	FS	2045	FE
Location of				
Top Perfs/OH	697	FS	1926	FE
Bottom Perfs/OH	4824	FS	2036	FE

SUMMARY of Subsurface Locations

Surface Location	O-16-21S-33E	190	FS	1980	FE	Vert. Depth
Top Perfs/OH	O-16-21S-33E	697	FS	1926	FE	11701.69
Bottom Perfs/OH	B-16-21S-33E	4824	FS	2036	FE	11614.24
Projected TD	B-16-21S-33E	4945	FS	2045	FE	11612.09

NOV 05 2013

**McVAY DRILLING COMPANY**

P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

COG OPERATING, LL**RECEIVED****JUN 27 2013****ARTESIA WEST**

Well Name and Num: Boone 16 State Com #2H
Location: Sec 16, T21S, R33E
Operator: COG
Drilling Contractor: McVay Drilling Company

The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

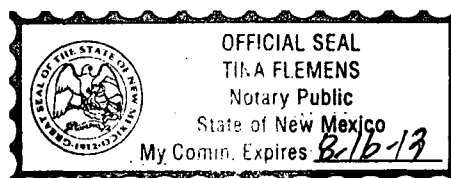
<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
1.70	242	2.50	5196	1.32	11148		
0.70	740	2.20	5313	1.06	11212		
1.30	1249	1.70	5542	18.80	11340		
1.20	1725	0.50	6041	32.40	11467		
0.26	1809	0.20	6525	59.10	11752		
1.06	2378	1.40	7003	62.30	11873		
1.32	2568	0.09	7480	77.03	11907		
2.64	2853	1.20	7891	91.63	12373		
3.40	3137	1.40	8366	92.95	12929		
3.61	3581	1.10	8842	90.13	13299		
3.61	3708	1.60	9315	93.21	13763		
1.32	4467	0.05	9524	93.12	14225		
1.30	4657	1.90	10012	88.55	14691		
2.20	4752	2.76	10489	94.26	15248		
5.80	4942	2.70	10616	93.65	15432		
4.40	5101	0.90	10967	90.92	15902		
3.60	5133	1.60	11449	91.45	16116		

HOBBS OCD**AUG 28 2013****RECEIVED**

By: *Harold Crane*

Subscribed and sworn to before me this 25th day of June, 2013

Tina Flemens
Notary Public, Lea County, New Mexico





A GYRO TECHNOLOGIES INC. COMPANY

PO Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

June 14, 2013

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

HOBBS OCD

AUG 28 2013

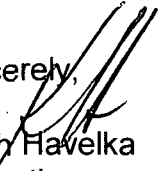
Attn: Kanicia Castillo

RECEIVED

RE: **Boone 16 State Com No. 002H**

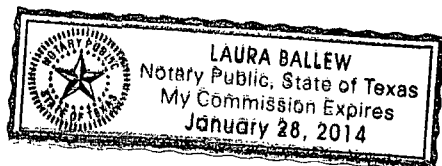
Please find enclosed a copy of the survey from 0.00' to 11200.00' ran on the above referenced well.

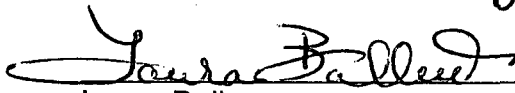
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 14th day of June, A.D., 2013, by Keith Havelka.





Laura Ballew
Notary Public, State of Texas

Company: COG Operating, LLC (Concho)
Lease/Well: Boone 16 State Com/No. 002H



Rig Name: McVay Drilling #7
State/County: New Mexico/LEA
Latitude: 32.47, Longitude: -103.58
GRID North is 0.41 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : 17 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 6/14/2013 / 11:38

Vaughn Energy Services
Fort Worth ,TX
817- 741-3610

Surveyor: Jason Wilson
Boone 16 State Com No. 002H / API 30-025-41049

HOBBS OCD

AUG 28 2013

RECEIVED

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W 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	****
100.00	0.48	226.51	100.00	-0.29	-0.31	0.42	226.51	0.48
200.00	0.78	211.69	199.99	-1.16	-0.97	1.51	219.91	0.33
300.00	0.68	209.68	299.98	-2.25	-1.62	2.77	215.73	0.10
400.00	0.57	207.61	399.98	-3.21	-2.14	3.86	213.75	0.11
500.00	0.32	206.60	499.98	-3.90	-2.50	4.63	212.66	0.26
600.00	0.11	54.43	599.98	-4.09	-2.55	4.82	211.90	0.41
700.00	0.54	47.30	699.97	-3.71	-2.12	4.28	209.72	0.44
800.00	0.57	44.94	799.97	-3.04	-1.42	3.36	205.05	0.03
900.00	0.58	41.86	899.96	-2.31	-0.73	2.43	197.58	0.03
1000.00	0.14	39.86	999.96	-1.84	-0.31	1.86	189.66	0.44
1100.00	0.31	263.31	1099.96	-1.77	-0.50	1.84	195.79	0.43
1200.00	0.32	264.77	1199.96	-1.83	-1.05	2.11	209.82	0.01
1300.00	0.41	265.51	1299.96	-1.88	-1.68	2.52	221.79	0.09
1400.00	0.45	246.51	1399.95	-2.07	-2.40	3.17	229.26	0.15
1500.00	0.56	245.05	1499.95	-2.43	-3.20	4.02	232.81	0.11
1600.00	0.51	244.31	1599.95	-2.83	-4.04	4.93	235.04	0.05
1700.00	0.51	240.35	1699.94	-3.24	-4.84	5.82	236.16	0.04
1800.00	0.23	239.63	1799.94	-3.57	-5.40	6.47	236.55	0.29

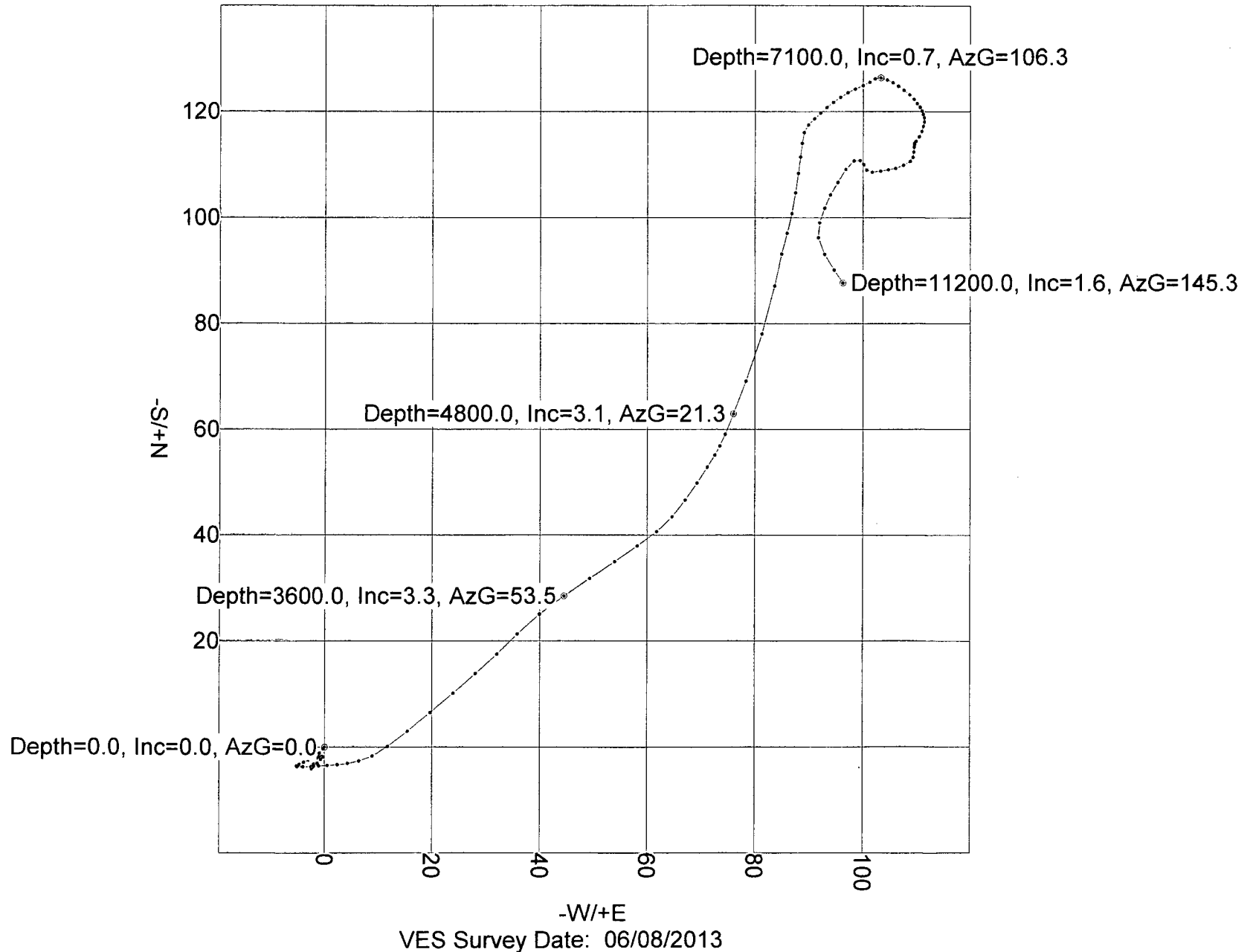
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.40	94.08	1899.94	-3.69	-5.22	6.39	234.73	0.60
2000.00	0.81	89.54	1999.93	-3.71	-4.16	5.58	228.29	0.41
2100.00	0.90	87.15	2099.92	-3.67	-2.67	4.54	216.11	0.10
2200.00	0.91	86.51	2199.91	-3.58	-1.09	3.74	197.00	0.02
2300.00	0.95	85.57	2299.90	-3.47	0.53	3.51	171.29	0.04
2400.00	1.11	84.70	2399.88	-3.31	2.33	4.05	144.91	0.16
2500.00	1.13	81.17	2499.86	-3.07	4.27	5.26	125.74	0.07
2600.00	1.36	75.63	2599.84	-2.62	6.40	6.91	112.31	0.26
2700.00	1.66	64.02	2699.80	-1.69	8.85	9.01	100.83	0.42
2800.00	2.25	53.41	2799.74	0.11	11.73	11.73	89.46	0.69
2900.00	3.12	51.12	2899.63	2.99	15.42	15.71	79.04	0.88
3000.00	3.23	50.13	2999.48	6.50	19.70	20.75	71.74	0.12
3100.00	3.25	48.93	3099.32	10.17	24.00	26.07	67.04	0.07
3200.00	3.08	47.47	3199.17	13.85	28.12	31.35	63.78	0.20
3300.00	3.08	46.20	3299.02	17.52	32.03	36.51	61.33	0.07
3400.00	3.11	43.96	3398.88	21.33	35.85	41.72	59.25	0.13
3500.00	3.21	52.11	3498.73	25.00	39.94	47.12	57.96	0.46
3600.00	3.33	53.45	3598.56	28.45	44.49	52.80	57.40	0.15
3700.00	3.35	55.85	3698.39	31.82	49.24	58.62	57.13	0.14
3800.00	3.12	56.41	3798.24	34.96	53.92	64.26	57.04	0.23
3900.00	2.80	53.33	3898.10	37.93	58.15	69.42	56.89	0.36
4000.00	2.37	52.36	3998.00	40.65	61.74	73.92	56.64	0.43
4100.00	2.29	38.62	4097.92	43.47	64.63	77.89	56.07	0.56
4200.00	2.29	36.57	4197.84	46.64	67.07	81.69	55.18	0.08
4300.00	2.16	31.94	4297.76	49.84	69.25	85.33	54.26	0.22
4400.00	1.93	32.67	4397.70	52.86	71.16	88.64	53.39	0.24
4500.00	1.15	30.36	4497.66	55.14	72.57	91.14	52.77	0.78
4600.00	1.09	24.86	4597.64	56.87	73.48	92.91	52.26	0.12
4700.00	1.69	22.91	4697.61	59.09	74.45	95.05	51.56	0.60
4800.00	3.05	21.33	4797.53	62.92	75.99	98.66	50.38	1.37
4900.00	4.51	19.77	4897.30	69.10	78.29	104.43	48.57	1.46
5000.00	6.30	17.57	4996.86	78.03	81.28	112.67	46.17	1.80
5100.00	4.47	10.85	5096.41	87.09	83.67	120.77	43.85	1.93
5200.00	2.59	13.61	5196.22	93.12	84.94	126.04	42.37	1.89
5300.00	2.10	15.43	5296.13	97.08	85.95	129.66	41.52	0.50
5400.00	2.25	10.72	5396.06	100.77	86.81	133.01	40.74	0.24
5500.00	2.31	8.95	5495.98	104.69	87.49	136.43	39.88	0.09
5600.00	1.92	7.37	5595.91	108.34	88.01	139.58	39.09	0.40
5700.00	1.64	6.75	5695.87	111.42	88.40	142.23	38.43	0.28

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	1.33	8.42	5795.83	114.00	88.73	144.46	37.90	0.31
5900.00	1.04	11.85	5895.81	116.03	89.09	146.29	37.52	0.31
6000.00	0.94	43.93	5995.80	117.50	89.84	147.92	37.40	0.55
6100.00	0.92	45.41	6095.78	118.66	90.98	149.53	37.48	0.03
6200.00	0.88	47.09	6195.77	119.75	92.12	151.08	37.57	0.05
6300.00	0.91	49.35	6295.76	120.78	93.28	152.61	37.68	0.05
6400.00	0.86	52.44	6395.75	121.76	94.48	154.11	37.81	0.07
6500.00	0.96	55.44	6495.73	122.69	95.76	155.64	37.97	0.11
6600.00	0.91	59.98	6595.72	123.56	97.14	157.18	38.17	0.09
6700.00	0.88	63.94	6695.71	124.30	98.51	158.60	38.40	0.07
6800.00	0.92	67.99	6795.70	124.93	99.95	159.99	38.66	0.08
6900.00	0.69	56.91	6895.69	125.56	101.20	161.27	38.87	0.28
7000.00	0.67	54.74	6995.68	126.23	102.19	162.41	38.99	0.03
7100.00	0.72	106.26	7095.67	126.40	103.27	163.22	39.25	0.61
7200.00	0.71	110.82	7195.67	126.00	104.45	163.67	39.66	0.06
7300.00	0.68	122.32	7295.66	125.46	105.53	163.95	40.07	0.14
7400.00	0.70	125.36	7395.65	124.79	106.53	164.08	40.49	0.04
7500.00	0.78	127.25	7495.64	124.03	107.57	164.18	40.93	0.09
7600.00	0.74	130.18	7595.63	123.20	108.60	164.24	41.40	0.06
7700.00	0.62	142.84	7695.63	122.35	109.42	164.15	41.81	0.19
7800.00	0.53	144.08	7795.62	121.55	110.02	163.95	42.15	0.09
7900.00	0.49	145.79	7895.62	120.82	110.54	163.75	42.46	0.04
8000.00	0.44	158.13	7995.61	120.10	110.92	163.49	42.72	0.11
8100.00	0.35	161.48	8095.61	119.46	111.16	163.18	42.94	0.09
8200.00	0.42	164.65	8195.61	118.81	111.36	162.84	43.14	0.07
8300.00	0.45	187.80	8295.61	118.07	111.40	162.33	43.34	0.18
8400.00	0.55	197.91	8395.60	117.22	111.20	161.57	43.49	0.13
8500.00	0.59	198.61	8495.60	116.27	110.89	160.67	43.64	0.04
8600.00	0.71	210.14	8595.59	115.25	110.41	159.60	43.77	0.17
8700.00	0.52	220.04	8695.59	114.37	109.81	158.56	43.83	0.22
8800.00	0.03	233.05	8795.58	114.01	109.50	158.08	43.84	0.48
8900.00	0.09	179.33	8895.58	113.91	109.48	157.99	43.86	0.07
9000.00	0.14	180.09	8995.58	113.72	109.48	157.85	43.91	0.05
9100.00	0.37	183.91	9095.58	113.27	109.45	157.52	44.02	0.24
9200.00	0.64	185.39	9195.58	112.39	109.38	156.83	44.22	0.26
9300.00	0.57	189.32	9295.57	111.35	109.25	155.99	44.45	0.08
9400.00	0.58	238.37	9395.57	110.59	108.73	155.09	44.51	0.48
9500.00	1.11	240.58	9495.56	109.85	107.46	153.67	44.37	0.52
9600.00	0.73	258.94	9595.54	109.26	106.00	152.22	44.13	0.47

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
9700.00	0.80	259.32	9695.54	109.00	104.69	151.13	43.84	0.07
9800.00	0.90	261.40	9795.53	108.76	103.22	149.94	43.50	0.10
9900.00	0.91	263.00	9895.51	108.54	101.67	148.72	43.13	0.03
10000.00	0.68	335.84	9995.51	108.99	100.64	148.35	42.72	0.96
10100.00	0.62	325.96	10095.50	109.97	100.09	148.71	42.31	0.13
10200.00	0.56	312.42	10195.49	110.75	99.43	148.84	41.92	0.15
10300.00	1.01	244.39	10295.49	110.70	98.27	148.03	41.60	0.96
10400.00	1.65	210.44	10395.46	109.08	96.75	145.81	41.57	0.98
10500.00	1.58	211.33	10495.42	106.66	95.30	143.04	41.78	0.07
10600.00	1.56	209.25	10595.38	104.30	93.92	140.35	42.00	0.06
10700.00	1.60	197.82	10695.34	101.78	92.83	137.75	42.37	0.32
10800.00	1.71	198.09	10795.30	99.03	91.94	135.13	42.87	0.11
10900.00	1.62	171.55	10895.26	96.22	91.68	132.90	43.62	0.77
11000.00	2.24	150.90	10995.21	93.11	92.84	131.49	44.92	0.93
11100.00	1.73	147.56	11095.15	90.13	94.60	130.66	46.39	0.53
11200.00	1.64	145.30	11195.10	87.68	96.22	130.18	47.66	0.11



Vaughn Energy Services
Fort Worth, TX
817-741-3610
Surveyor: Jason Wilson
Boone 16 State Com No. 002H / API 30-025-41049



PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
BOONE 16 STATE COM 2H / API# 30-025-41049
LEA COUNTY, NM
Rig:McVAY 7
PathFinder Office Supervisor: JOSEPH HOGAN
PathFinder Field Engineers: H SANDIFER
G HETZ

Page 01/07
Tie-in Date: 05/25/2013
Date Completed: 06/22/2013

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.28.19.2402 N LON:103.34.29.6966 W
GRID Reference:NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 733896.0000 Y: 536262.0000
North Aligned To:GRID NORTH
Total Magnetic Correction: 6.95° EAST TO GRID
Vertical Section Plane: 359.57
Survey Vert. Reference: 17.00' Kelly Bushing To Ground
Altitude:3754.70' Ground To MSL

Survey Calculations by RX5 V6.04D using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
THE FOLLOWING ARE VAUGHN ENERGY SERVICES SURVEYS.										
100.00	0.48	226.51	100.00	0.00	-0.30	0.30 S	0.27 W	0.40@	222.36	0.00
200.00	0.78	211.69	200.00	100.00	-1.16	1.17 S	0.93 W	1.49@	218.68	0.34
300.00	0.68	209.68	299.99	100.00	-2.25	2.26 S	1.58 W	2.76@	215.03	0.10
400.00	0.57	207.61	399.98	100.00	-3.20	3.22 S	2.11 W	3.85@	213.25	0.11
500.00	0.32	206.60	499.98	100.00	-3.89	3.91 S	2.46 W	4.62@	212.24	0.25
600.00	0.11	54.43	599.98	100.00	-4.08	4.10 S	2.51 W	4.81@	211.48	0.42
700.00	0.54	47.30	699.98	100.00	-3.71	3.72 S	2.09 W	4.27@	209.26	0.43
800.00	0.57	44.94	799.97	100.00	-3.04	3.05 S	1.39 W	3.35@	204.46	0.04
900.00	0.58	41.86	899.97	100.00	-2.32	2.32 S	0.70 W	2.43@	196.76	0.03
1000.00	0.14	39.86	999.97	100.00	-1.85	1.85 S	0.28 W	1.88@	188.71	0.44
1100.00	0.31	263.31	1099.97	100.00	-1.79	1.79 S	0.47 W	1.85@	194.83	0.42
1200.00	0.32	264.77	1199.96	100.00	-1.84	1.85 S	1.02 W	2.11@	208.92	0.01
1300.00	0.41	265.51	1299.96	100.00	-1.89	1.90 S	1.66 W	2.52@	221.05	0.09
1400.00	0.45	246.51	1399.96	100.00	-2.07	2.09 S	2.37 W	3.16@	228.68	0.15
1500.00	0.56	245.05	1499.96	100.00	-2.43	2.45 S	3.18 W	4.01@	232.36	0.11
1600.00	0.51	244.31	1599.95	100.00	-2.82	2.85 S	4.02 W	4.93@	234.68	0.05
1700.00	0.51	240.35	1699.95	100.00	-3.22	3.26 S	4.81 W	5.81@	235.85	0.03
1800.00	0.23	239.63	1799.95	100.00	-3.54	3.58 S	5.37 W	6.45@	236.28	0.28
1900.00	0.40	94.08	1899.94	100.00	-3.67	3.71 S	5.19 W	6.38@	234.46	0.60
2000.00	0.81	89.54	1999.94	100.00	-3.70	3.73 S	4.14 W	5.57@	227.98	0.41
2100.00	0.90	87.15	2099.93	100.00	-3.66	3.68 S	2.65 W	4.54@	215.70	0.10
2200.00	0.91	86.51	2199.91	100.00	-3.59	3.60 S	1.07 W	3.75@	196.56	0.01
2300.00	0.95	85.57	2299.90	100.00	-3.49	3.48 S	0.55 E	3.53@	171.04	0.04
2400.00	1.11	84.70	2399.89	100.00	-3.35	3.33 S	2.34 E	4.07@	144.90	0.16
2500.00	1.13	81.17	2499.87	100.00	-3.12	3.09 S	4.28 E	5.28@	125.83	0.07

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
BOONE 16 STATE COM 2H / API# 30-025-41049
LEA COUNTY, NM
RIG:McVAY 7

Page 02/07

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
2600.00	1.36	75.63	2599.84	100.00	-2.69	2.64 S	6.40 E	6.93@	112.43	0.26
2700.00	1.66	64.02	2699.81	100.00	-1.78	1.71 S	8.85 E	9.02@	100.96	0.43
2800.00	2.25	53.41	2799.75	100.00	0.00	0.09 N	11.73 E	11.73@	89.56	0.69
2900.00	3.12	51.12	2899.64	100.00	2.85	2.97 N	15.43 E	15.71@	79.11	0.88
3000.00	3.23	50.13	2999.49	100.00	6.33	6.48 N	19.71 E	20.75@	71.79	0.12
3100.00	3.25	48.93	3099.33	100.00	9.97	10.15 N	24.01 E	26.07@	67.08	0.07
3200.00	3.08	47.47	3199.17	100.00	13.62	13.83 N	28.12 E	31.34@	63.82	0.19
3300.00	3.08	46.20	3299.03	100.00	17.26	17.50 N	32.04 E	36.51@	61.35	0.07
3400.00	3.11	43.96	3398.88	100.00	21.05	21.32 N	35.87 E	41.72@	59.27	0.12
3500.00	3.21	52.11	3498.73	100.00	24.69	24.99 N	39.96 E	47.13@	57.98	0.46
3600.00	3.33	53.45	3598.57	100.00	28.10	28.44 N	44.50 E	52.81@	57.42	0.14
3700.00	3.35	55.85	3698.40	100.00	31.44	31.81 N	49.25 E	58.63@	57.14	0.14
3800.00	3.12	56.41	3798.24	100.00	34.55	34.95 N	53.94 E	64.27@	57.05	0.23
3900.00	2.80	53.33	3898.11	100.00	37.48	37.92 N	58.16 E	69.43@	56.90	0.36
4000.00	2.37	52.36	3998.00	100.00	40.17	40.64 N	61.76 E	73.93@	56.65	0.43
4100.00	2.29	38.62	4097.92	100.00	42.98	43.46 N	64.64 E	77.90@	56.09	0.56
4200.00	2.29	36.57	4197.84	100.00	46.12	46.63 N	67.08 E	81.69@	55.20	0.08
4300.00	2.16	31.94	4297.77	100.00	49.31	49.83 N	69.27 E	85.33@	54.27	0.22
4400.00	1.93	32.67	4397.70	100.00	52.31	52.85 N	71.17 E	88.65@	53.41	0.23
4500.00	1.15	30.36	4497.67	100.00	54.59	55.13 N	72.59 E	91.15@	52.78	0.78
4600.00	1.09	24.86	4597.65	100.00	56.31	56.86 N	73.50 E	92.92@	52.27	0.12
4700.00	1.69	22.91	4697.62	100.00	58.52	59.08 N	74.47 E	95.06@	51.57	0.60
4800.00	3.05	21.33	4797.53	100.00	62.35	62.92 N	76.01 E	98.67@	50.38	1.36
4900.00	4.51	19.77	4897.31	100.00	68.51	69.10 N	78.31 E	104.44@	48.58	1.46
5000.00	6.30	17.57	4996.86	100.00	77.42	78.03 N	81.30 E	112.68@	46.18	1.80
5100.00	4.47	10.85	5096.42	100.00	86.46	87.09 N	83.69 E	120.78@	43.86	1.93
5200.00	2.59	13.61	5196.22	100.00	92.47	93.11 N	84.95 E	126.04@	42.38	1.89
5300.00	2.10	15.43	5296.14	100.00	96.43	97.07 N	85.97 E	129.67@	41.53	0.50

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
BOONE 16 STATE COM 2H / API# 30-025-41049
LEA COUNTY, NM
RIG:McVAY 7

Page 03/07

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
5400.00	2.25	10.72	5396.07	100.00	100.11	100.77 N	86.82 E	133.01@	40.75	0.23
5500.00	2.31	8.95	5495.99	100.00	104.03	104.69 N	87.50 E	136.44@	39.89	0.09
5600.00	1.92	7.37	5595.92	100.00	107.68	108.34 N	88.03 E	139.60@	39.10	0.39
5700.00	1.64	6.75	5695.87	100.00	110.76	111.42 N	88.41 E	142.24@	38.43	0.28
5800.00	1.33	8.42	5795.84	100.00	113.32	113.99 N	88.75 E	144.47@	37.90	0.31
5900.00	1.04	11.85	5895.81	100.00	115.36	116.03 N	89.11 E	146.30@	37.52	0.30
6000.00	0.94	43.93	5995.80	100.00	116.83	117.51 N	89.86 E	147.93@	37.41	0.56
6100.00	0.92	45.41	6095.79	100.00	117.97	118.66 N	91.00 E	149.54@	37.49	0.03
6200.00	0.88	47.09	6195.78	100.00	119.05	119.75 N	92.14 E	151.09@	37.58	0.05
6300.00	0.91	49.35	6295.76	100.00	120.08	120.79 N	93.30 E	152.63@	37.68	0.05
6400.00	0.86	52.44	6395.75	100.00	121.05	121.76 N	94.50 E	154.13@	37.82	0.07
6500.00	0.96	55.44	6495.74	100.00	121.97	122.69 N	95.79 E	155.66@	37.98	0.11
6600.00	0.91	59.98	6595.73	100.00	122.83	123.57 N	97.16 E	157.19@	38.18	0.09
6700.00	0.88	63.94	6695.71	100.00	123.56	124.30 N	98.54 E	158.62@	38.41	0.07
6800.00	0.92	67.99	6795.70	100.00	124.19	124.94 N	99.97 E	160.02@	38.67	0.08
6900.00	0.69	56.91	6895.69	100.00	124.81	125.57 N	101.22 E	161.29@	38.87	0.28
7000.00	0.67	54.74	6995.68	100.00	125.47	126.24 N	102.21 E	162.42@	38.99	0.03
7100.00	0.72	106.26	7095.68	100.00	125.62	126.40 N	103.29 E	163.23@	39.25	0.61
7200.00	0.71	110.82	7195.67	100.00	125.21	126.00 N	104.47 E	163.68@	39.66	0.06
7300.00	0.68	122.32	7295.66	100.00	124.67	125.46 N	105.55 E	163.96@	40.07	0.14
7400.00	0.70	125.36	7395.65	100.00	123.99	124.79 N	106.55 E	164.09@	40.49	0.04
7500.00	0.78	127.25	7495.65	100.00	123.22	124.03 N	107.59 E	164.19@	40.94	0.08
7600.00	0.74	130.18	7595.64	100.00	122.38	123.20 N	108.62 E	164.25@	41.40	0.06
7700.00	0.62	142.84	7695.63	100.00	121.53	122.35 N	109.44 E	164.16@	41.81	0.19
7800.00	0.53	144.08	7795.63	100.00	120.72	121.55 N	110.04 E	163.96@	42.16	0.09
7900.00	0.49	145.79	7895.62	100.00	119.98	120.82 N	110.55 E	163.77@	42.46	0.04
8000.00	0.44	158.13	7995.62	100.00	119.27	120.11 N	110.94 E	163.50@	42.73	0.11
8100.00	0.35	161.48	8095.62	100.00	118.62	119.46 N	111.18 E	163.19@	42.94	0.09

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
BOONE 16 STATE COM 2H / API# 30-025-41049
LEA COUNTY, NM
RIG:McVAY 7

Page 04/07

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
8200.00	0.42	164.65	8195.61	100.00	117.98	118.82 N	111.37 E	162.85@	43.15	0.07
8300.00	0.45	187.80	8295.61	100.00	117.24	118.08 N	111.42 E	162.34@	43.34	0.18
8400.00	0.55	197.91	8395.61	100.00	116.39	117.23 N	111.21 E	161.59@	43.49	0.13
8500.00	0.59	198.61	8495.60	100.00	115.45	116.29 N	110.90 E	160.69@	43.64	0.04
8600.00	0.71	210.14	8595.60	100.00	114.43	115.26 N	110.43 E	159.62@	43.77	0.18
8700.00	0.52	220.04	8695.59	100.00	113.55	114.38 N	109.82 E	158.57@	43.84	0.22
8800.00	0.03	233.05	8795.59	100.00	113.19	114.02 N	109.51 E	158.09@	43.85	0.49
8900.00	0.09	179.33	8895.59	100.00	113.10	113.92 N	109.49 E	158.01@	43.86	0.08
9000.00	0.14	180.09	8995.59	100.00	112.90	113.72 N	109.49 E	157.86@	43.91	0.05
9100.00	0.37	183.91	9095.59	100.00	112.45	113.28 N	109.47 E	157.53@	44.02	0.23
9200.00	0.64	185.39	9195.58	100.00	111.57	112.40 N	109.40 E	156.85@	44.22	0.27
9300.00	0.57	189.32	9295.58	100.00	110.53	111.35 N	109.26 E	156.00@	44.46	0.08
9400.00	0.58	238.37	9395.57	100.00	109.78	110.60 N	108.75 E	155.11@	44.52	0.48
9500.00	1.11	240.58	9495.56	100.00	109.04	109.85 N	107.48 E	153.68@	44.37	0.53
9600.00	0.73	258.94	9595.55	100.00	108.46	109.26 N	106.01 E	152.23@	44.14	0.48
9700.00	0.80	259.32	9695.54	100.00	108.22	109.00 N	104.70 E	151.14@	43.85	0.07
9800.00	0.90	261.40	9795.53	100.00	107.98	108.76 N	103.23 E	149.95@	43.51	0.10
9900.00	0.91	263.00	9895.52	100.00	107.78	108.54 N	101.67 E	148.72@	43.13	0.03
10000.00	0.68	335.84	9995.51	100.00	108.23	108.99 N	100.64 E	148.35@	42.72	0.96
10100.00	0.62	325.96	10095.50	100.00	109.22	109.98 N	100.09 E	148.71@	42.31	0.13
10200.00	0.56	312.42	10195.50	100.00	110.01	110.76 N	99.43 E	148.84@	41.92	0.15
10300.00	1.01	244.39	10295.49	100.00	109.96	110.70 N	98.27 E	148.03@	41.60	0.95
10400.00	1.65	210.44	10395.46	100.00	108.35	109.08 N	96.75 E	145.81@	41.57	0.99
10500.00	1.58	211.33	10495.42	100.00	105.94	106.66 N	95.30 E	143.04@	41.78	0.08
10600.00	1.56	209.25	10595.39	100.00	103.59	104.30 N	93.92 E	140.35@	42.00	0.06
10700.00	1.60	197.82	10695.35	100.00	101.08	101.78 N	92.83 E	137.75@	42.37	0.32
10800.00	1.71	198.09	10795.31	100.00	98.34	99.03 N	91.94 E	135.13@	42.87	0.11
10900.00	1.62	171.55	10895.27	100.00	95.53	96.22 N	91.68 E	132.90@	43.62	0.77

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
BOONE 16 STATE COM 2H / API# 30-025-41049
LEA COUNTY, NM
RIG:McVAY 7

Page 05/07

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
11000.00	2.24	150.90	10995.21	100.00	92.41	93.11 N	92.84 E	131.49@	44.92	0.92
** TIED INTO VAUGHN ENERGY SERVICES GYRO SURVEY AT 11100'MD.										
11100.00	1.73	147.56	11095.15	100.00	89.42	90.13 N	94.60 E	130.66@	46.39	0.52
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
11116.00	1.32	162.69	11111.14	16.00	89.04	89.75 N	94.78 E	130.53@	46.56	3.57
11148.00	1.32	173.77	11143.14	32.00	88.32	89.03 N	94.93 E	130.15@	46.84	0.80
11180.00	1.58	177.01	11175.13	32.00	87.51	88.22 N	95.00 E	129.65@	47.12	0.85
11212.00	1.06	167.97	11207.12	32.00	86.78	87.49 N	95.08 E	129.21@	47.38	1.75
11244.00	3.69	356.40	11239.10	32.00	87.52	88.23 N	95.08 E	129.71@	47.14	14.82
11276.00	8.97	355.00	11270.89	32.00	91.03	91.75 N	94.80 E	131.93@	45.94	16.50
11308.00	13.81	354.21	11302.25	32.00	97.33	98.04 N	94.19 E	135.96@	43.85	15.13
11340.00	18.82	353.24	11332.96	32.00	106.27	106.97 N	93.20 E	141.88@	41.07	15.68
11371.00	23.74	352.36	11361.83	31.00	117.43	118.13 N	91.78 E	149.59@	37.85	15.90
11403.00	27.61	352.89	11390.67	32.00	131.19	131.87 N	90.01 E	159.66@	34.31	12.11
11435.00	29.63	353.42	11418.76	32.00	146.43	147.09 N	88.18 E	171.50@	30.94	6.36
11467.00	32.45	353.85	11446.17	32.00	162.84	163.49 N	86.35 E	184.89@	27.84	8.84
11499.00	36.14	352.71	11472.60	32.00	180.75	181.39 N	84.24 E	200.00@	24.91	11.70
11532.00	38.34	354.34	11498.87	33.00	200.61	201.23 N	81.99 E	217.29@	22.17	7.31
11564.00	39.83	354.71	11523.71	32.00	220.71	221.31 N	80.07 E	235.35@	19.89	4.71
11596.00	43.18	353.45	11547.67	32.00	241.81	242.40 N	77.87 E	254.60@	17.81	10.79
11628.00	48.28	352.64	11570.00	32.00	264.57	265.14 N	75.09 E	275.57@	15.81	16.04
11660.00	52.58	351.94	11590.39	32.00	289.03	289.58 N	71.78 E	298.34@	13.92	13.54
11691.00	54.87	352.24	11608.73	31.00	313.81	314.33 N	68.34 E	321.67@	12.27	7.43
11722.00	56.89	353.53	11626.11	31.00	339.29	339.79 N	65.17 E	345.99@	10.86	7.37
11752.00	59.18	354.82	11642.00	30.00	364.63	365.11 N	62.59 E	370.44@	9.73	8.46
11783.00	62.34	355.64	11657.14	31.00	391.60	392.06 N	60.34 E	396.68@	8.75	10.45
11814.00	65.60	356.82	11670.74	31.00	419.40	419.85 N	58.51 E	423.91@	7.93	11.06
11846.00	68.50	357.12	11683.22	32.00	448.84	449.28 N	56.96 E	452.87@	7.23	9.10
11877.00	72.02	357.25	11693.68	31.00	477.99	478.42 N	55.53 E	481.63@	6.62	11.36

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
BOONE 16 STATE COM 2H / API# 30-025-41049
LEA COUNTY, NM
RIG:McVAY 7

Page 06/07

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
11907.00	77.03	357.20	11701.69	30.00	506.86	507.29 N	54.13 E	510.16@	6.09	16.70
11938.00	80.02	357.06	11707.85	31.00	537.21	537.62 N	52.61 E	540.19@	5.59	9.66
11969.00	81.78	357.62	11712.75	31.00	567.80	568.20 N	51.18 E	570.50@	5.15	5.95
12000.00	83.19	358.64	11716.81	31.00	598.52	598.91 N	50.18 E	601.01@	4.79	5.60
12030.00	85.47	0.23	11719.77	30.00	628.37	628.76 N	49.89 E	630.74@	4.54	9.25
12062.00	88.46	1.94	11721.47	32.00	660.31	660.71 N	50.49 E	662.64@	4.37	10.76
12092.00	91.63	3.16	11721.44	30.00	690.27	690.67 N	51.83 E	692.62@	4.29	11.32
12185.00	93.12	2.91	11717.59	93.00	783.01	783.46 N	56.75 E	785.51@	4.14	1.62
12278.00	94.44	2.38	11711.46	93.00	875.68	876.16 N	61.03 E	878.28@	3.98	1.53
12373.00	91.63	1.59	11706.43	95.00	970.45	970.96 N	64.32 E	973.09@	3.79	3.07
12466.00	88.37	0.97	11706.43	93.00	1063.39	1063.92 N	66.39 E	1065.99@	3.57	3.57
12558.00	90.84	1.68	11707.06	92.00	1155.34	1155.89 N	68.52 E	1157.92@	3.39	2.79
12651.00	91.54	0.18	11705.13	93.00	1248.29	1248.85 N	70.03 E	1250.81@	3.21	1.78
12744.00	92.33	359.22	11701.99	93.00	1341.24	1341.80 N	69.54 E	1343.60@	2.97	1.34
12837.00	93.74	359.30	11697.07	93.00	1434.10	1434.65 N	68.34 E	1436.28@	2.73	1.52
12929.00	92.95	0.45	11691.70	92.00	1525.94	1526.50 N	68.14 E	1528.02@	2.56	1.51
13022.00	90.13	0.36	11689.20	93.00	1618.89	1619.45 N	68.80 E	1620.91@	2.43	3.03
13114.00	91.10	359.57	11688.21	92.00	1710.88	1711.44 N	68.74 E	1712.82@	2.30	1.36
13207.00	92.51	359.04	11685.28	93.00	1803.83	1804.39 N	67.62 E	1805.65@	2.15	1.62
13299.00	90.13	358.51	11683.16	92.00	1895.79	1896.34 N	65.65 E	1897.47@	1.98	2.65
13392.00	91.19	358.86	11682.09	93.00	1988.77	1989.30 N	63.52 E	1990.32@	1.83	1.20
13483.00	92.33	358.86	11679.30	91.00	2079.72	2080.24 N	61.71 E	2081.15@	1.70	1.25
13576.00	90.66	358.34	11676.87	93.00	2172.67	2173.18 N	59.44 E	2173.99@	1.57	1.88
13669.00	91.80	357.02	11674.88	93.00	2265.59	2266.08 N	55.67 E	2266.76@	1.41	1.88
13763.00	93.21	356.05	11670.77	94.00	2359.37	2359.81 N	50.00 E	2360.34@	1.21	1.82
13855.00	91.10	356.76	11667.31	92.00	2451.16	2451.56 N	44.23 E	2451.96@	1.03	2.42
13948.00	91.80	356.40	11664.96	93.00	2544.00	2544.36 N	38.69 E	2544.66@	0.87	0.85
14041.00	90.92	355.88	11662.75	93.00	2636.81	2637.13 N	32.43 E	2637.32@	0.70	1.10

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING LLC
BOONE 16 STATE COM 2H / API# 30-025-41049
LEA COUNTY, NM
RIG:McVAY 7

Page 07/07

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL		Closure		DLS (dg/100ft)
						Rectangular Offsets (ft)	Offsets (ft)	Dist (ft)	Dir (deg)	
14133.00	92.24	355.79	11660.21	92.00	2728.57	2728.85 N	25.75 E	2728.97@	0.54	1.44
14225.00	93.12	354.21	11655.91	92.00	2820.18	2820.39 N	17.74 E	2820.45@	0.36	1.96
14318.00	90.92	355.17	11652.63	93.00	2912.78	2912.93 N	9.14 E	2912.94@	0.18	2.58
14412.00	91.71	355.17	11650.47	94.00	3006.47	3006.57 N	1.23 E	3006.57@	0.02	0.84
14505.00	90.22	355.17	11648.91	93.00	3099.19	3099.22 N	6.60 W	3099.23@	359.88	1.60
14598.00	88.90	356.23	11649.62	93.00	3191.97	3191.95 N	13.57 W	3191.98@	359.76	1.82
14691.00	88.55	357.46	11651.69	93.00	3284.84	3284.79 N	18.69 W	3284.84@	359.67	1.37
14785.00	89.69	359.22	11653.14	94.00	3378.80	3378.73 N	21.41 W	3378.80@	359.64	2.23
14877.00	90.66	358.51	11652.85	92.00	3470.79	3470.71 N	23.24 W	3470.79@	359.62	1.31
14970.00	91.98	357.81	11650.71	93.00	3563.73	3563.64 N	26.22 W	3563.73@	359.58	1.61
15062.00	92.15	359.74	11647.40	92.00	3655.66	3655.55 N	28.19 W	3655.66@	359.56	2.10
15155.00	93.12	359.13	11643.12	93.00	3748.56	3748.45 N	29.10 W	3748.56@	359.56	1.23
15248.00	94.26	358.95	11637.14	93.00	3841.36	3841.24 N	30.66 W	3841.36@	359.54	1.24
15341.00	92.77	358.78	11631.43	93.00	3934.18	3934.04 N	32.50 W	3934.18@	359.53	1.61
15432.00	93.65	358.95	11626.34	91.00	4025.03	4024.88 N	34.30 W	4025.03@	359.51	0.98
15524.00	92.77	359.30	11621.19	92.00	4116.88	4116.73 N	35.70 W	4116.88@	359.50	1.03
15617.00	90.13	358.51	11618.83	93.00	4209.83	4209.67 N	37.47 W	4209.84@	359.49	2.96
15712.00	90.40	357.28	11618.39	95.00	4304.79	4304.60 N	40.96 W	4304.80@	359.45	1.33
15807.00	91.01	357.55	11617.23	95.00	4399.72	4399.50 N	45.25 W	4399.73@	359.41	0.70
15902.00	90.92	356.58	11615.63	95.00	4494.61	4494.36 N	50.11 W	4494.64@	359.36	1.03
15997.00	90.04	357.02	11614.83	95.00	4589.50	4589.21 N	55.42 W	4589.54@	359.31	1.04
16116.00	91.45	356.76	11613.28	119.00	4708.35	4708.02 N	61.87 W	4708.43@	359.25	1.20
STRAIGHT LINE PROJECTION TO BIT AT 16163'MD.										
16163.00	91.45	356.76	11612.09	47.00	4755.28	4754.93 N	64.53 W	4755.37@	359.22	0.00

** The survey data at tie-in point was furnished by a recognized survey company and entered as submitted. Survey stations above the tie-in point represent recalculated data by PathFinder Energy Services, Inc. and may reflect minor changes due to rounding differences between survey programs. Only survey stations taken by qualified PathFinder personnel are subject to certification.