

Results of Directional Survey

API number:	30-025-40260		
OGRID:		Operator:	COG OPERATING LLC
		Property:	LUSK DEEP UNIT A # 23H

surface	ULSTR:	P	19	T 19S	R 32E
				330 FSL	380 FEL

BH Loc	ULSTR:	A	19	T 19S	R 32E
13595 MD		9217.8	TVD	4945 FSL	488 FEL
				335 FNL	

Top Perf/OH	ULSTR:	P	19	T 19S	R 32E
9475 MD		9278.8	TVD	829 FSL	471 FEL

Bot Perf/OH	ULSTR:	A	19	T 19S	R 32E
13526 MD		9220.2	TVD	4877 FSL	484 FEL
				403 FNL	

	MD	N/S	E/W	VD
	9443	468.82	-89.86	9269.46
TOP PERFS/OH	9475	499.40	-90.56	9278.84
	9475	499.40	-90.56	9278.84
	13463	4483.77	-99.31	9222.52
BOT PERFS/OH	13526	4546.59	-103.54	9220.24
	13595	4615.39	-108.17	9217.75

NEXT TO LAST	13463	4483.77	-99.31	9222.52
LAST READING	13595	4615.39	-108.17	9217.75
TD	13595	4615.39	-108.17	9217.75

Surface Location	330	FS	380	FE
Projected BHL	4945	FS	488	FE
Location of				
Top Perfs/OH	829	FS	471	FE
Bottom Perfs/OH	4877	FS	484	FE

SUMMARY of Subsurface Locations

Surface Location	P-19-19S-32E	330	FS	380	FE	Vert. Depth
Top Perfs/OH	P-19-19S-32E	829	FS	471	FE	9278.84
Bottom Perfs/OH	A-19-19S-32E	4877	FS	484	FE	9220.24
Projected TD	A-19-19S-32E	4945	FS	488	FE	9217.75

MAR 27 2012

30-025-40260

OPERATOR: COG Operating, LLC.
WELL/LEASE: Lusk Deep Unit A # 23-H
COUNTY: Lea Co., New Mexico
Sec. 19, T19S, R32E

SUR: P-19-19s-32e, 330/S & 380/E
BHL: A-19-19s-32e, 4945/S & 488/E
API # 30-025-40260

**STATE OF NEW MEXICO
DEVIATION REPORT**

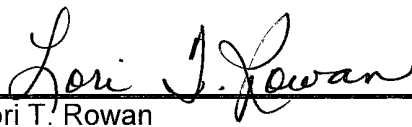
<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
385	1/4	3,483	1 1/4
748	1/2	3,835	2 1/4
1,180	1	3,863	3
1,490	4	4,058	2 3/4
1,801	2 3/4	4,281	1 1/4
1,897	2 1/2	4,434	2
1,992	1 3/4	4,482	1 1/2
2,088	2	5,168	1 1/2
2,133	1	5,648	1
2,278	1	6,028	1 1/4
2,374	1/2	6,458	1
2,501	1	6,922	1/4
2,755	1 1/2	7,013	1
2,883	1 1/2	7,300	1 3/4
3,010	1	7,600	3/4
3,137	1	8,011	2
3,264	1 3/4	8,207	1
3,388	1 1/4	8,502	2

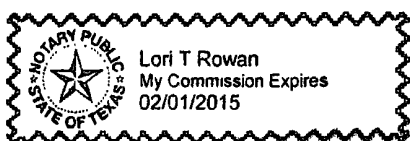
Patriot Drilling, LLC


M. Leroy Peterson, Executive Vice-
President

The foregoing instrument was acknowledged before me on this 3rd day of October, 2011 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2015


Lori T. Rowan
Notary Public for Ector Co., Texas



30-025-40260

COG OPERATING

Lusk

Lea County, NM

Lusk deep Unit "A" #23H

VH - Job #32K0911897

SUR: P-19-19s-32e, 330/S & 380/E
BHL: A-19-19s-32e, 4945/S & 488/E
API # 30-025-40260

Survey: Actual

SDI Standard Survey Report

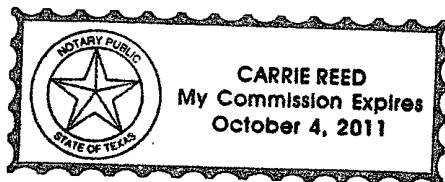
This survey is correct to the best of my knowledge and is supported by actual field data.

Richard

Notarized this date 4th of October, 2011.

Carrie Reed

Notary Signature
County of Midland
State of Texas



MAR 27 2012

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Lusk deep Unit "A" #23H
Project:	Lusk	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Lusk deep Unit "A" #23H	North Reference:	Grid
Wellbore:	VH - Job #32K0911897	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0911897	Database:	EDM-Regulatory

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

Site:	Lea County, NM		
Site Position:		Northing:	608,010 37 usft
From:	Lat/Long	Easting:	668,500 03 usft
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 40' 13 174 N
		Longitude:	103° 47' 8 729 W
		Grid Convergence:	0 30 °

Well:	Lusk deep Unit "A" #23H, Directional (Pathfinder)		
Well Position	+N/-S	0 0 usft	Northing: 596,821 42 usft
	+E/-W	0 0 usft	Easting: 664,735 57 usft
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
		Latitude:	32° 38' 22 646 N
		Longitude:	103° 47' 53 427 W
		Ground Level:	0 0 usft

Wellbore		VH - Job #32K0911897			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/21/2011	7 69	60 53	48,841

Design:	VH - Job #32K0911897				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	0 0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0 0	0 0	0 0	359 60	

Survey Program	Date	10/23/2011		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100 0	8,700 0	Actual (VH - Job #32K0911897)	Keeper	Keeper Gyro

Survey								
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance	
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)	
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0	
100 0	0 18	291 34	100 0	0 1	-0 1	291 34	0 2	
200 0	0 14	353 31	200 0	0 2	-0 3	307 52	0 4	
300 0	0 29	344 52	300 0	0 6	-0 4	327 11	0 7	
400 0	0 49	31 07	400 0	1 2	-0 2	349 00	1 2	
500 0	0 50	3 91	500 0	2 0	0 0	0 43	2 0	
600 0	0 65	30 59	600 0	2 9	0 3	6 48	3 0	
700 0	0 51	8 56	700 0	3 9	0 7	10 10	3 9	
800 0	0 46	12 07	800 0	4 7	0 8	10 12	4 8	
900 0	0 48	338 76	900 0	5 5	0 8	8 00	5 5	
1,000 0	0 83	343 68	1,000 0	6 6	0 4	3 62	6 6	
1,100 0	1 69	341 54	1,099 9	8 7	-0 3	358 31	8 7	

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Lusk deep Unit "A" #23H
Project:	Lusk	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Lusk deep Unit "A" #23H	North Reference:	Grid
Wellbore:	VH - Job #32K0911897	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0911897	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,200 0	2 67	340 48	1,199 9	12 3	-1 5	353 02	12 3	
1,300 0	4 12	343 52	1,299 7	17 9	-3 3	349 56	18 2	
1,400 0	5 52	345 60	1,399 3	26 0	-5 5	348 03	26 6	
1,500 0	7 43	347 00	1,498 7	37 0	-8 2	347 54	37 8	
1,600 0	6 84	357 76	1,597 9	49 2	-9 9	348 68	50 2	
1,700 0	5 15	12 03	1,697 4	59 5	-9 1	351 27	60 2	
1,800 0	2 45	37 06	1,797 2	65 6	-6 9	353 98	66 0	
1,900 0	2 08	55 14	1,897 1	68 4	-4 1	356 53	68 5	
2,000 0	1 67	115 07	1,997 0	68 8	-1 3	358 89	68 8	
2,100 0	1 88	102 39	2,097 0	67 8	1 6	1 34	67 9	
2,200 0	0 39	183 28	2,197 0	67 1	3 2	2 70	67 2	
2,300 0	0 38	96 31	2,297 0	66 8	3 5	2 98	66 9	
2,400 0	0 44	15 00	2,397 0	67 1	3 9	3 33	67 2	
2,500 0	0 80	6 44	2,497 0	68 2	4 1	3 43	68 3	
2,600 0	0 93	10 13	2,596 9	69 7	4 3	3 54	69 8	
2,700 0	1 29	10 77	2,696 9	71 6	4 7	3 72	71 7	
2,800 0	1 45	9 43	2,796 9	73 9	5 1	3 93	74 1	
2,900 0	1 73	15 80	2,896 9	76 6	5 7	4 25	76 8	
3,000 0	1 37	31 65	2,996 8	79 1	6 7	4 87	79 4	
3,100 0	0 91	180 49	3,096 8	79 3	7 4	5 30	79 7	
3,200 0	1 53	188 44	3,196 8	77 2	7 1	5 29	77 5	
3,300 0	1 61	193 25	3,296 8	74 5	6 6	5 09	74 8	
3,400 0	1 24	197 90	3,396 7	72 1	6 0	4 74	72 4	
3,500 0	1 32	205 59	3,496 7	70 0	5 1	4 20	70 2	
3,600 0	2 90	211 45	3,596 6	66 9	3 3	2 85	66 9	
3,700 0	2 41	232 55	3,696 5	63 4	0 3	0 31	63 4	
3,800 0	2 00	273 64	3,796 5	62 2	-3 1	357 18	62 3	
3,900 0	2 52	285 02	3,896 4	62 9	-6 9	353 71	63 3	
4,000 0	2 76	286 03	3,996 3	64 2	-11 4	349 95	65 2	
4,100 0	2 55	291 39	4,096 2	65 6	-15 8	346 50	67 5	
4,200 0	2 13	299 90	4,196 1	67 4	-19 4	343 91	70 1	
4,300 0	1 39	319 80	4,296 0	69 2	-21 8	342 50	72 6	
4,400 0	1 52	332 61	4,396 0	71 3	-23 2	341 96	75 0	
4,500 0	1 60	336 57	4,496 0	73 8	-24 4	341 71	77 7	
4,600 0	1 36	326 02	4,595 9	76 1	-25 6	341 39	80 3	
4,700 0	1 33	335 93	4,695 9	78 1	-26 7	341 10	82 6	
4,800 0	1 37	330 21	4,795 9	80 2	-27 8	340 87	84 9	
4,900 0	1 48	329 11	4,895 8	82 3	-29 1	340 55	87 3	
5,000 0	1 58	344 55	4,995 8	84 8	-30 1	340 45	90 0	
5,100 0	1 59	346 19	5,095 8	87 5	-30 8	340 60	92 7	
5,200 0	1 62	356 95	5,195 7	90 2	-31 2	340 92	95 5	
5,300 0	1 37	347 29	5,295 7	92 8	-31 5	341 22	98 0	
5,400 0	1 23	349 64	5,395 7	95 0	-32 0	341 39	100 3	
5,500 0	1 28	335 90	5,495 6	97 1	-32 6	341 41	102 4	

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Lusk deep Unit "A" #23H
Project:	Lusk	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Lusk deep Unit "A" #23H	North Reference:	Grid
Wellbore:	VH - Job #32K0911897	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0911897	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
5,600 0	0 98	333 68	5,595 6	98 9	-33 5	341 29	104 4	
5,700 0	0 80	345 35	5,695 6	100 3	-34 0	341 26	105 9	
5,800 0	0 82	352 25	5,795 6	101 7	-34 3	341 36	107 3	
5,900 0	0 86	347 21	5,895 6	103 1	-34 6	341 47	108 8	
6,000 0	0 72	359 85	5,995 6	104 5	-34 7	341 61	110 1	
6,100 0	0 75	358 19	6,095 6	105 8	-34 8	341 81	111 4	
6,200 0	0 95	10 86	6,195 6	107 3	-34 6	342 11	112 7	
6,300 0	0 61	14 27	6,295 6	108 6	-34 3	342 45	113 9	
6,400 0	0 59	12 97	6,395 6	109 6	-34 1	342 72	114 8	
6,500 0	0 58	0 38	6,495 5	110 6	-34 0	342 92	115 7	
6,600 0	0 71	3 44	6,595 5	111 7	-33 9	343 10	116 8	
6,700 0	0 59	357 91	6,695 5	112 9	-33 9	343 27	117 9	
6,800 0	0 55	357 93	6,795 5	113 9	-34 0	343 39	118 8	
6,900 0	0 57	317 80	6,895 5	114 7	-34 3	343 35	119 7	
7,000 0	0 66	326 88	6,995 5	115 6	-35 0	343 17	120 7	
7,100 0	0 81	320 48	7,095 5	116 6	-35 7	342 97	121 9	
7,200 0	1 48	331 10	7,195 5	118 3	-36 8	342 72	123 9	
7,300 0	1 16	327 66	7,295 5	120 2	-38 0	342 48	126 1	
7,400 0	0 48	294 22	7,395 5	121 3	-38 9	342 22	127 4	
7,500 0	0 59	309 53	7,495 5	121 8	-39 7	341 96	128 1	
7,600 0	0 49	356 62	7,595 4	122 5	-40 1	341 89	128 9	
7,700 0	0 29	92 71	7,695 4	122 9	-39 9	342 04	129 2	
7,800 0	1 47	95 36	7,795 4	122 8	-38 3	342 67	128 7	
7,900 0	1 21	98 26	7,895 4	122 5	-36 0	343 63	127 7	
8,000 0	1 05	129 53	7,995 4	121 8	-34 3	344 29	126 5	
8,100 0	1 21	208 29	8,095 4	120 3	-34 0	344 20	125 0	
8,200 0	1 31	213 72	8,195 3	118 4	-35 2	343 45	123 5	
8,300 0	1 27	218 86	8,295 3	116 6	-36 5	342 61	122 2	
8,400 0	1 56	220 14	8,395 3	114 7	-38 1	341 63	120 9	
8,500 0	1 52	223 11	8,495 3	112 7	-39 9	340 52	119 5	
8,600 0	1 78	235 83	8,595 2	110 8	-42 1	339 22	118 6	
8,700 0	2 01	242 67	8,695 2	109 2	-44 9	337 64	118 0	



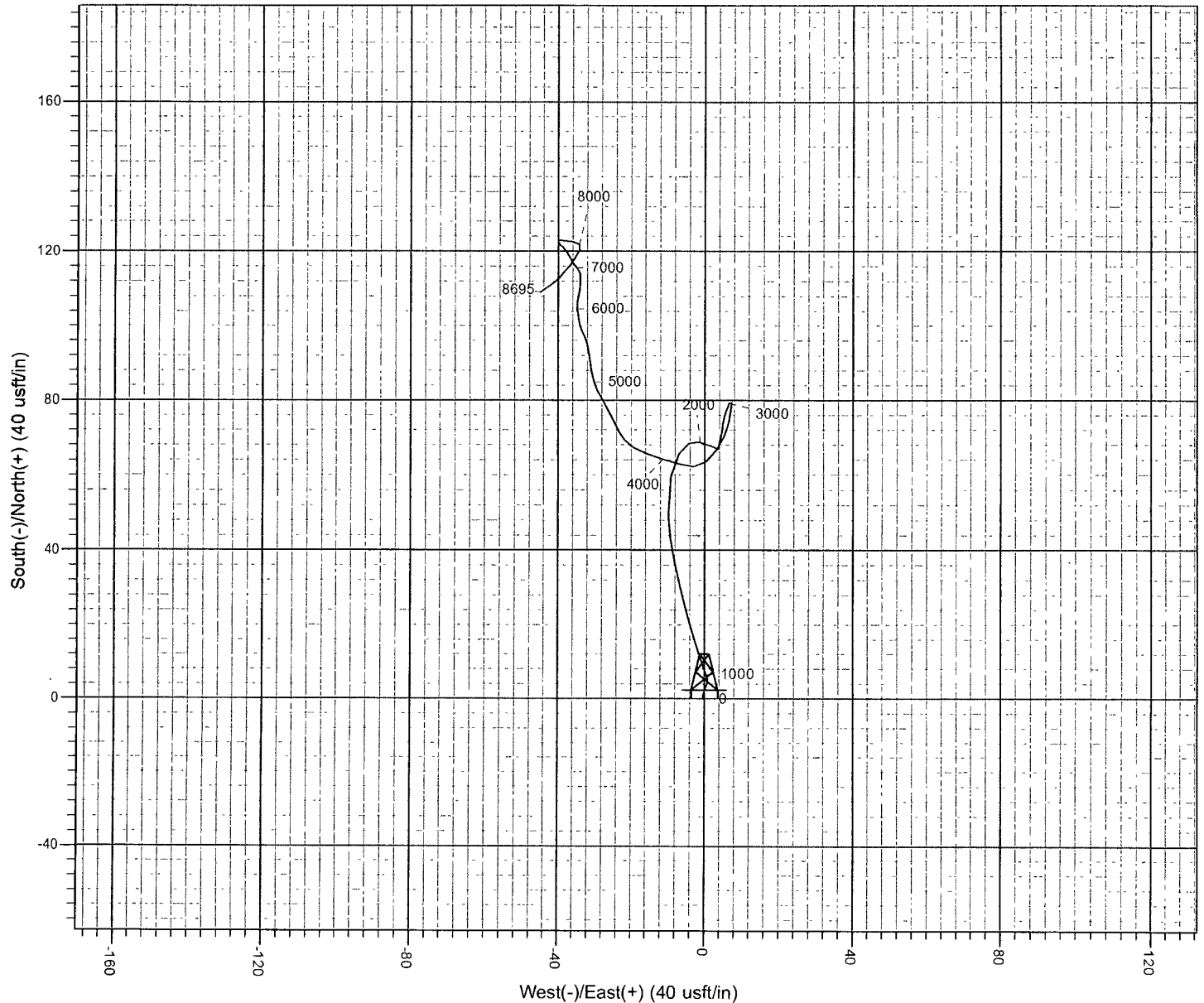
Project: Lusk
 Lea County, NM
 Well: Lusk deep Unit "A" #23H
 Wellbore: VH - Job #32K0911897
 Design: VH - Job #32K0911897



Azimuths to Grid North
 True North -0 29°
 Magnetic North 7 40°
 Magnetic Field
 Strength 48841 1snT
 Dip Angle 60 53°
 Date 9/21/2011
 Model IGRF2010

WELL DETAILS: Lusk deep Unit "A" #23H
 WELL @ 0.0usft (Original Well Elev)
 Ground Level 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0 0	0.0	596821.42	664735.57	32° 38' 22.646 N	103° 47' 53.427 W	



PROJECT DETAILS: Lusk
 Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

SITE DETAILS: Lea County, NM
 Site Centre Latitude: 32° 40' 13.174 N
 Longitude: 103° 47' 8.729 W
 Positional Uncertainty: 0.0
 Convergence 0.30
 Local North: Grid

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC.
LUSK DEEP UNIT A #23H
LEA COUNTY, NEW MEXICO
Rig: PATRIOT # 6
PathFinder Office Supervisor: STEVE BIBB
PathFinder Field Engineers: P.DAS
J.EASLEY

Survey Horiz. Reference: WELLHEAD
Ref Coordinates: LAT: 32.38.22.6461 N LON: 103.47.53.4275 W
GRID Reference: NAD83 new mexico east Transverse Mercator
Ref GRID Coord: X: 706069.4500 Y: 596841.0200
North Aligned To: GRID NORTH
Total Magnetic Correction: 7.40° EAST TO GRID
Vertical Section Plane: 359.60
Survey Vert. Reference: 17.50' Kelly Bushing To Ground
Altitude: 3560.80' Ground To MSL

Survey Calculations by RX5 V6.03E 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)
TIED INTO SCIENTIFIC DRILLING GYRO SURVEY										
8700.00	2.01	242.67	8695.16	0.00	109.43	109.12 N	44.89 W	117.99@	337.64	0.00
THE FOLLOWING ARE PATHFINDER MWD SURVEYS										
8775.00	2.64	247.96	8770.10	75.00	108.20	107.87 N	47.66 W	117.93@	336.16	0.89
8807.00	3.52	274.41	8802.05	32.00	108.01	107.67 N	49.32 W	118.43@	335.39	5.15
8838.00	5.80	311.50	8832.96	31.00	109.13	108.78 N	51.44 W	120.33@	334.69	11.83
8870.00	9.50	326.79	8864.67	32.00	112.44	112.06 N	54.10 W	124.44@	334.23	13.10
8902.00	13.28	333.06	8896.03	32.00	117.95	117.55 N	57.22 W	130.73@	334.05	12.41
8934.00	17.06	334.12	8926.91	32.00	125.47	125.05 N	60.93 W	139.11@	334.02	11.84
8966.00	20.58	336.14	8957.20	32.00	134.87	134.42 N	65.26 W	149.42@	334.11	11.19
8998.00	24.18	338.64	8986.78	32.00	146.16	145.67 N	69.92 W	161.58@	334.36	11.63
9030.00	27.79	341.69	9015.54	32.00	159.38	158.86 N	74.65 W	175.53@	334.83	12.03
9062.00	30.86	345.90	9043.44	32.00	174.46	173.91 N	79.00 W	191.01@	335.57	11.55
9093.00	34.38	349.49	9069.55	31.00	190.80	190.23 N	82.53 W	207.36@	336.55	12.95
9125.00	37.72	351.58	9095.42	32.00	209.40	208.81 N	85.61 W	225.68@	337.71	11.12
9157.00	41.42	353.35	9120.09	32.00	229.62	229.01 N	88.27 W	245.43@	338.92	12.09
9189.00	45.46	355.36	9143.32	32.00	251.53	250.90 N	90.42 W	266.70@	340.18	13.34
9221.00	49.77	357.33	9164.88	32.00	275.12	274.48 N	91.92 W	289.46@	341.49	14.21
9253.00	53.90	359.63	9184.66	32.00	300.26	299.63 N	92.57 W	313.60@	342.83	14.09
9285.00	57.51	1.48	9202.68	32.00	326.69	326.05 N	92.30 W	338.87@	344.19	12.25
9316.00	60.59	2.19	9218.63	31.00	353.25	352.62 N	91.45 W	364.29@	345.46	10.13
9348.00	64.37	1.68	9233.41	32.00	381.60	380.98 N	90.49 W	391.58@	346.64	11.90
9380.00	67.36	0.93	9246.49	32.00	410.79	410.17 N	89.83 W	419.89@	347.65	9.59
9412.00	68.15	360.00	9258.61	32.00	440.40	439.79 N	89.59 W	448.82@	348.49	3.65
9443.00	70.87	358.94	9269.46	31.00	469.44	468.82 N	89.86 W	477.36@	349.15	9.34
9475.00	75.01	358.46	9278.84	32.00	500.02	499.40 N	90.56 W	507.55@	349.72	13.02

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC.
LUSK DEEP UNIT A #23H
LEA COUNTY, NEW MEXICO
RIG: PATRIOT # 6

Page 02/03

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)
9507.00	79.67	358.30	9285.85	32.00	531.23	530.60 N	91.44 W	538.42@	350.22	14.57
9539.00	84.33	358.87	9290.31	32.00	562.90	562.27 N	92.22 W	569.78@	350.69	14.67
9564.00	85.56	359.22	9292.51	25.00	587.80	587.17 N	92.64 W	594.43@	351.03	5.11
9597.00	88.20	0.40	9294.30	33.00	620.75	620.12 N	92.75 W	627.02@	351.49	8.76
9661.00	88.90	359.72	9295.92	64.00	684.73	684.10 N	92.68 W	690.35@	352.28	1.52
9725.00	88.64	358.77	9297.30	64.00	748.71	748.08 N	93.52 W	753.90@	352.87	1.54
9820.00	90.84	358.97	9297.73	95.00	843.70	843.05 N	95.40 W	848.43@	353.54	2.33
9915.00	91.28	358.45	9295.97	95.00	938.67	938.01 N	97.53 W	943.07@	354.06	0.72
10011.00	92.33	359.34	9292.95	96.00	1034.61	1033.94 N	99.38 W	1038.71@	354.51	1.43
10106.00	90.75	359.52	9290.40	95.00	1129.57	1128.90 N	100.33 W	1133.35@	354.92	1.67
10201.00	90.57	358.42	9289.30	95.00	1224.56	1223.88 N	102.04 W	1228.12@	355.23	1.17
10297.00	89.60	0.98	9289.16	96.00	1320.55	1319.87 N	102.54 W	1323.84@	355.56	2.85
10392.00	88.81	359.08	9290.48	95.00	1415.53	1414.85 N	102.49 W	1418.56@	355.86	2.17
10487.00	89.60	0.76	9291.79	95.00	1510.52	1509.84 N	102.62 W	1513.32@	356.11	1.95
10583.00	90.75	0.40	9291.50	96.00	1606.50	1605.83 N	101.65 W	1609.05@	356.38	1.26
10678.00	89.78	358.00	9291.06	95.00	1701.49	1700.81 N	102.98 W	1703.93@	356.54	2.72
10773.00	91.19	358.55	9290.26	95.00	1796.46	1795.76 N	105.84 W	1798.88@	356.63	1.59
10869.00	91.80	357.43	9287.75	96.00	1892.39	1891.67 N	109.20 W	1894.82@	356.70	1.33
10964.00	91.19	357.30	9285.27	95.00	1987.28	1986.54 N	113.57 W	1989.78@	356.73	0.66
11060.00	91.63	0.65	9282.91	96.00	2083.23	2082.48 N	115.28 W	2085.67@	356.83	3.52
11154.00	92.07	0.54	9279.88	94.00	2177.17	2176.42 N	114.31 W	2179.42@	356.99	0.48
11249.00	92.59	2.32	9276.02	95.00	2272.04	2271.31 N	111.94 W	2274.07@	357.18	1.95
11345.00	93.56	3.07	9270.86	96.00	2367.76	2367.07 N	107.43 W	2369.50@	357.40	1.28
11440.00	92.15	2.37	9266.13	95.00	2462.50	2461.84 N	102.93 W	2463.99@	357.61	1.66
11536.00	91.63	2.50	9262.97	96.00	2558.33	2557.70 N	98.86 W	2559.61@	357.79	0.56
11631.00	91.36	2.30	9260.49	95.00	2653.18	2652.58 N	94.88 W	2654.28@	357.95	0.35
11727.00	91.28	2.04	9258.28	96.00	2749.06	2748.49 N	91.24 W	2750.00@	358.10	0.28
11822.00	91.71	0.37	9255.80	95.00	2843.99	2843.43 N	89.25 W	2844.83@	358.20	1.81

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC.
LUSK DEEP UNIT A #23H
LEA COUNTY, NEW MEXICO
RIG: PATRIOT # 6

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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)
11917.00	90.66	0.63	9253.83	95.00	2938.95	2938.41 N	88.42 W	2939.74@	358.28	1.14
12013.00	90.48	0.81	9252.88	96.00	3034.93	3034.39 N	87.21 W	3035.65@	358.35	0.27
12108.00	90.84	0.10	9251.78	95.00	3129.91	3129.38 N	86.46 W	3130.58@	358.42	0.84
12203.00	91.01	359.31	9250.25	95.00	3224.90	3224.37 N	86.95 W	3225.54@	358.46	0.85
12299.00	91.71	359.75	9247.97	96.00	3320.87	3320.34 N	87.73 W	3321.50@	358.49	0.86
12394.00	90.92	359.67	9245.79	95.00	3415.84	3415.31 N	88.21 W	3416.45@	358.52	0.84
12490.00	89.52	358.79	9245.42	96.00	3511.84	3511.30 N	89.50 W	3512.44@	358.54	1.72
12585.00	90.22	0.28	9245.64	95.00	3606.83	3606.29 N	90.28 W	3607.42@	358.57	1.73
12699.00	91.28	0.72	9244.15	114.00	3720.81	3720.28 N	89.28 W	3721.35@	358.63	1.01
12795.00	91.63	0.46	9241.71	96.00	3816.76	3816.24 N	88.29 W	3817.26@	358.67	0.45
12890.00	92.33	359.49	9238.43	95.00	3911.70	3911.18 N	88.33 W	3912.18@	358.71	1.26
12986.00	91.45	359.84	9235.26	96.00	4007.65	4007.13 N	88.90 W	4008.11@	358.73	0.99
13081.00	91.36	359.40	9232.93	95.00	4102.62	4102.10 N	89.52 W	4103.07@	358.75	0.47
13176.00	91.36	359.49	9230.68	95.00	4197.59	4197.06 N	90.44 W	4198.04@	358.77	0.09
13272.00	91.89	358.79	9227.95	96.00	4293.55	4293.01 N	91.89 W	4294.00@	358.77	0.92
13367.00	91.28	358.08	9225.33	95.00	4388.49	4387.94 N	94.48 W	4388.96@	358.77	0.98
13463.00	92.07	356.15	9222.52	96.00	4484.36	4483.77 N	99.31 W	4484.87@	358.73	2.17
STRAIGHT-LINE PROJECTION TO BIT @ 13595' MD.										
13595.00	92.07	356.15	9217.75	132.00	4616.03	4615.39 N	108.17 W	4616.66@	358.66	0.00