

Results of Directional Survey

API number:	30-025-40705			
OGRID:		Operator:	COG OPERATING LLC	
		Property:	LUSK DEEP UNIT A	# 22H

surface	ULSTR:	C	17	T 19S	R 32E
				330 FNL	1650 FWL

BH Loc	ULSTR:	N	17	T 19S	R 32E
13670	MD	9267.3	TVD	339 FSL	1917 FWL
				4941 FNL	

Top Perf/OH	ULSTR:	C	17	T 19S	R 32E
9360	MD	9183.8	TVD	649 FNL	1579 FWL

Bot Perf/OH	ULSTR:	N	17	T 19S	R 32E
13614	MD	9266.9	TVD	395 FSL	1913 FWL
				4885 FNL	

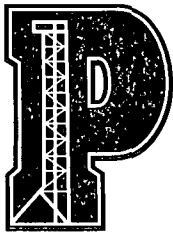
	MD	N/S	E/W	VD
	9348	-307.20	-71.20	9180.8
TOP PERFS/OH	9360	-318.83	-71.09	9183.80
	9380	-338.20	-70.90	9188.80
	13494	-4435.40	255.00	9266.10
BOT PERFS/OH	13614	-4555.13	263.32	9266.92
	13670	-4611.00	267.20	9267.30

NEXT TO LAST	13494	-4435.40	255.00	9266.10
LAST READING	13670	-4611.00	267.20	9267.30
TD	13670	-4611.00	267.20	9267.30

Surface Location	330	FN	1650	FW
Projected BHL	4941	FN	1917	FW
Location of				
Top Perfs/OH	649	FN	1579	FW
Bottom Perfs/OH	4885	FN	1913	FW

SUMMARY of Subsurface Locations

Surface Location	C-17-19S-32E	330	FN	1650	FW	Vert. Depth
Top Perfs/OH	C-17-19S-32E	649	FN	1579	FW	9183.80
Bottom Perfs/OH	N-17-19S-32E	4885	FN	1913	FW	9266.92
Projected TD	N-17-19S-32E	4941	FN	1917	FW	9267.30



PATRIOT DRILLING, LLC

OPERATOR:
WELL/LEASE:
COUNTY:

COG Operating, LLC
Lusk Deep Unit A # 22 H JAN 09 2013
Lea Co., New Mexico
Sec. 17, T19S, R32E

HOBBS OCD

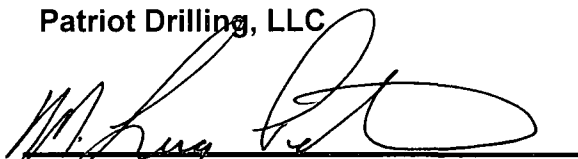
RECEIVED

**STATE OF NEW MEXICO
DEVIATION REPORT**

<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
337	1/4	5,301	2
698	1	5,404	2 1/4
1,096	3/4	5,492	2 1/2
1,254	1	5,690	2 1/4
1,444	3/4	5,938	2 1/2
1,634	1/2	6,194	1 3/4
2,110	3 1/4	6,512	2
2,125	3	6,829	2
2,316	3/4	7,242	2
2,507	1	7,525	2
2,602	1/2	7,652	3 1/2
2,792	1/2	7,863	3
3,048	3/4	7,957	2 3/4
3,302	3/4	7,929	2 1/2
3,558	1/2	8,306	1 1/2
3,804	3/4	8,403	1 1/2
4,115	3/4	8,496	1 1/2
4,489	1	8,747	3 1/4
4,858	1		

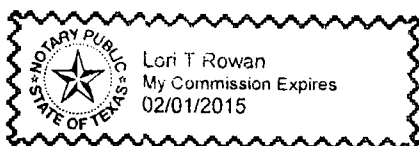
SUR: C-17-19s-32e, 330/N & 1650/W
BHL: N-17-19s-32e, 4941/N & 1917/W
API # 30-025-40705

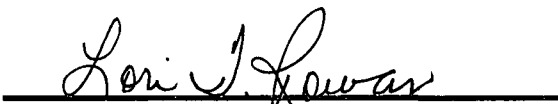
Patriot Drilling, LLC


M. Leroy Peterson, Executive Vice-
President

The foregoing instrument was acknowledged before me on this 9th day of October, 2012 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



A GYRO TECHNOLOGIES INC. COMPANY

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

October 4, 2012

HOBBS OCD

JAN 22 2013

RECEIVED

COG Operating LLC (Concho)
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanica Castillo

SUR: C-17-19s-32e, 330/N & 1650/W
BHL: N-17-19s-32e, 4941/N & 1917/W
API # 30-025-40705

RE: Lusk Deep Unit A No. 022H

Please find enclosed a copy of the survey from 0.00' to 8600.00' ran on the
above referenced well.

If I can be of any further service please do not hesitate to call me at 800-606-
4976.

Sincerely,

Keith Havelka
Operations



Company: COG Operating LLC (Concho)
Lease/Well: Lusk Deep Unit A / No. 022H

Rig Name: Patriot #6

State/County: New Mexico / Lea

Latitude: 32.67, Longitude: -103.79

GRID North is 0.29 Degrees East of True North

VS-Azi: 0.00 Degrees



Depth Reference : RKB = 17'

DRILLOG-HA GYRO SURVEY CALCULATIONS

Filename: gyro.survey.ut

Minimum Curvature Method

Report Date/Time: 10/4/2012 7:13:18

Vaughn Energy Services

Midland, Texas

432-563-5444

Surveyor: Jordan Rolando

Lusk Deep Unit A No. 022H / API 30-025-40705

HOBBS OCD

JAN 22 2013

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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	0.54	62.72	100.00	0.22	0.42	0.48	62.72	0.54
200.00	0.60	42.56	199.99	0.82	1.20	1.45	55.59	0.21
300.00	0.53	34.66	299.99	1.59	1.81	2.41	48.85	0.10
400.00	0.46	5.41	399.99	2.37	2.11	3.17	41.79	0.26
500.00	0.41	312.57	499.98	3.01	1.89	3.55	32.13	0.39
600.00	0.75	279.66	599.98	3.36	0.98	3.50	16.27	0.46
700.00	0.85	279.53	699.97	3.59	-0.40	3.61	353.72	0.10
800.00	0.91	279.40	799.96	3.84	-1.91	4.29	333.59	0.06
900.00	0.70	258.87	899.95	3.86	-3.29	5.07	319.55	0.35
1000.00	0.48	238.34	999.94	3.52	-4.24	5.51	309.65	0.30
1100.00	0.49	231.22	1099.94	3.03	-4.94	5.79	301.52	0.06
1200.00	0.45	224.11	1199.93	2.48	-5.55	6.07	294.07	0.07
1300.00	0.38	223.31	1299.93	1.95	-6.05	6.35	287.92	0.08
1400.00	0.26	222.51	1399.93	1.55	-6.42	6.61	283.57	0.12
1500.00	0.24	202.68	1499.93	1.19	-6.66	6.76	280.11	0.09
1600.00	0.23	182.85	1599.93	0.79	-6.75	6.79	276.66	0.08
1700.00	0.83	133.56	1699.92	0.09	-6.23	6.23	270.79	0.70
1800.00	1.43	94.27	1799.91	-0.51	-4.46	4.49	263.51	0.95

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	2.31	79.70	1899.85	-0.24	-1.23	1.25	258.95	0.99
2000.00	3.19	75.12	1999.74	0.84	3.45	3.55	76.37	0.91
2100.00	2.56	75.80	2099.61	2.10	8.30	8.56	75.82	0.63
2200.00	1.89	76.49	2199.53	3.03	12.06	12.44	75.90	0.67
2300.00	1.10	57.24	2299.50	3.93	14.47	15.00	74.79	0.92
2400.00	0.31	38.00	2399.49	4.66	15.44	16.13	73.19	0.81
2500.00	0.17	157.67	2499.49	4.74	15.66	16.37	73.16	0.42
2600.00	0.03	277.33	2599.49	4.61	15.70	16.36	73.63	0.18
2700.00	0.06	264.44	2699.49	4.61	15.63	16.29	73.57	0.03
2800.00	0.09	251.56	2799.49	4.58	15.50	16.16	73.55	0.04
2900.00	0.22	224.65	2899.49	4.41	15.29	15.91	73.90	0.15
3000.00	0.36	197.73	2999.49	3.98	15.05	15.57	75.21	0.19
3100.00	0.34	187.65	3099.49	3.39	14.92	15.30	77.21	0.07
3200.00	0.31	177.56	3199.48	2.83	14.89	15.16	79.26	0.06
3300.00	0.29	195.55	3299.48	2.31	14.83	15.01	81.16	0.10
3400.00	0.27	213.54	3399.48	1.86	14.63	14.75	82.75	0.09
3500.00	0.31	256.67	3499.48	1.60	14.24	14.33	83.58	0.22
3600.00	0.35	299.81	3599.48	1.69	13.71	13.81	82.96	0.25
3700.00	0.46	309.12	3699.48	2.10	13.13	13.29	80.92	0.13
3800.00	0.57	318.44	3799.47	2.72	12.49	12.78	77.70	0.14
3900.00	0.57	317.66	3899.47	3.46	11.82	12.32	73.68	0.01
4000.00	0.57	316.89	3999.46	4.19	11.15	11.91	69.41	0.01
4100.00	0.60	310.73	4099.46	4.89	10.42	11.51	64.85	0.07
4200.00	0.66	304.58	4199.45	5.56	9.55	11.05	59.81	0.09
4300.00	0.69	303.26	4299.45	6.21	8.57	10.59	54.06	0.04
4400.00	0.76	301.94	4399.44	6.90	7.50	10.19	47.42	0.07
4500.00	0.74	299.88	4499.43	7.57	6.38	9.90	40.15	0.03
4600.00	0.68	297.83	4599.42	8.16	5.30	9.73	32.99	0.07
4700.00	0.80	305.00	4699.41	8.84	4.20	9.79	25.43	0.15
4800.00	0.93	312.18	4799.40	9.79	3.03	10.24	17.22	0.16
4900.00	1.10	308.16	4899.39	10.92	1.68	11.05	8.75	0.19
5000.00	1.23	304.14	4999.36	12.12	0.03	12.12	0.16	0.16
5100.00	1.33	310.67	5099.34	13.48	-1.74	13.59	352.65	0.18
5200.00	1.43	317.21	5199.31	15.15	-3.47	15.54	347.11	0.19
5300.00	1.74	314.47	5299.27	17.13	-5.40	17.96	342.51	0.32
5400.00	2.01	311.72	5399.22	19.36	-7.79	20.87	338.08	0.28
5500.00	2.14	312.64	5499.15	21.79	-10.47	24.17	334.34	0.13
5600.00	2.23	313.55	5599.08	24.39	-13.24	27.75	331.49	0.10
5700.00	1.98	327.44	5699.01	27.18	-15.58	31.33	330.18	0.57

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	1.73	341.33	5798.96	30.06	-16.99	34.53	330.52	0.51
5900.00	1.77	326.71	5898.92	32.78	-18.32	37.55	330.80	0.45
6000.00	1.71	312.08	5998.87	35.07	-20.28	40.51	329.96	0.45
6100.00	1.65	310.63	6098.83	37.01	-22.48	43.30	328.73	0.08
6200.00	1.55	309.17	6198.79	38.80	-24.62	45.95	327.61	0.11
6300.00	1.51	310.31	6298.75	40.51	-26.67	48.50	326.64	0.05
6400.00	1.45	311.45	6398.72	42.20	-28.62	50.99	325.85	0.06
6500.00	1.47	307.68	6498.69	43.82	-30.59	53.44	325.08	0.10
6600.00	1.44	303.92	6598.66	45.31	-32.65	55.85	324.22	0.10
6700.00	1.37	300.60	6698.62	46.62	-34.73	58.13	323.32	0.11
6800.00	1.24	297.27	6798.60	47.72	-36.71	60.21	322.43	0.15
6900.00	1.47	291.41	6898.57	48.69	-38.87	62.30	321.40	0.27
7000.00	1.70	285.56	6998.53	49.55	-41.49	64.63	320.06	0.28
7100.00	2.03	279.94	7098.48	50.26	-44.66	67.24	318.37	0.37
7200.00	2.35	274.32	7198.41	50.72	-48.45	70.14	316.31	0.39
7300.00	2.58	262.51	7298.32	50.58	-52.73	73.06	313.81	0.55
7400.00	2.80	250.70	7398.21	49.48	-57.26	75.68	310.83	0.60
7500.00	3.08	252.23	7498.07	47.85	-62.13	78.42	307.60	0.29
7600.00	3.32	253.76	7597.92	46.22	-67.46	81.78	304.42	0.25
7700.00	3.32	256.38	7697.75	44.73	-73.05	85.66	301.48	0.15
7800.00	3.35	258.99	7797.58	43.49	-78.73	89.95	298.92	0.16
7900.00	2.80	245.99	7897.44	41.94	-83.83	93.74	296.58	0.89
8000.00	2.26	232.99	7997.34	39.76	-87.64	96.24	294.40	0.78
8100.00	1.43	312.19	8097.30	39.41	-90.14	98.37	293.61	2.44
8200.00	0.59	41.39	8197.29	40.63	-90.72	99.40	294.13	1.54
8300.00	0.86	46.67	8297.28	41.53	-89.83	98.97	294.81	0.28
8400.00	1.13	51.94	8397.27	42.65	-88.51	98.25	295.73	0.28
8500.00	1.14	22.37	8497.25	44.18	-87.35	97.89	296.83	0.58
8600.00	1.15	352.81	8597.23	46.10	-87.10	98.55	297.89	0.59



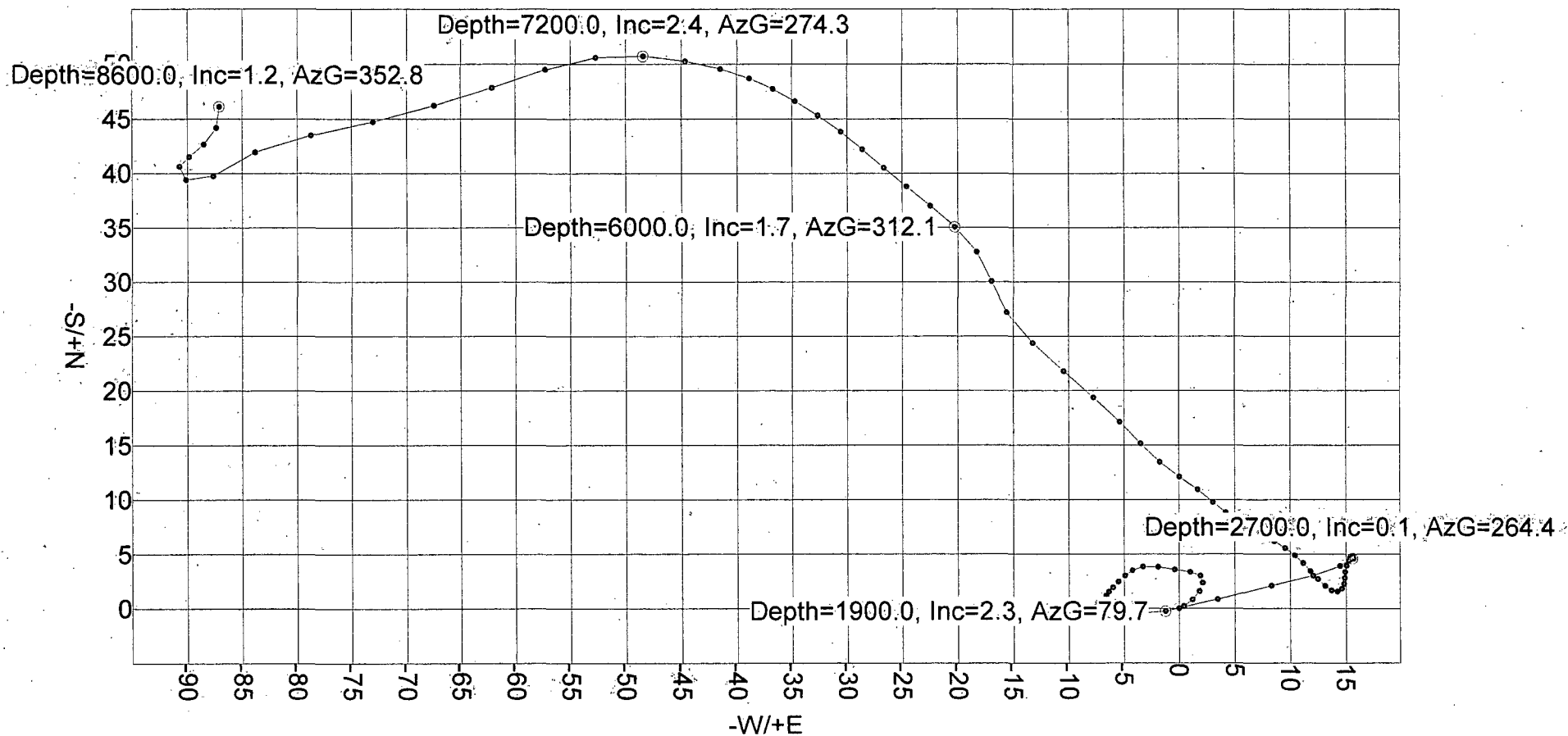
Vaughn Energy Services

Midland, Texas

432-563-5444

Surveyor: Jordan Rolando

Lusk Deep Unit A No. 022H / API 30-025-40705





A Schlumberger Company

COG Operating LLC

Lea County(NAD27)

Lusk Deep Unit A

#22H

OH

Design: OH

Pathfinder X&Y Report

08 October, 2012

HOBBS OCD

JAN 22 2013

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SUR: C-17-19s-32e, 330/N & 1650/W
BHL: N-17-19s-32e, 4941/N & 1917/W
API # 30-025-40705



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #22H
Project:	Lea County (NAD27)	TVD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Well:	#22H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project:	Lea County (NAD27)	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:	Lusk Deep Unit A		
Site Position:		Northing:	599,927.400 usft
From:	Map	Easting:	665,577.000 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32.648150
		Longitude:	-103.795390
		Grid Convergence:	0.29 °

Well		#22H				
Well Position	+N/-S	0.0 usft	Northing:	606,684.700 usft	Latitude:	32.666704
	+E/-W	0.0 usft	Easting:	666,969.500 usft	Longitude:	-103.790754
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,610.0 usft	

Wellbore						OH
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength	
			(°)	(°)	(nT)	
	IGRF200510	8/7/2012	7.57	60.56	48,783	

Design					OH
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	177.01	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #22H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Well:	#22H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey Program	Date: 10/5/2012			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	8,600.0	Gyro #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s
8,716.0	13,670.0	MWD #2 (OH)	MWD	MWD - Standard

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	D Leg (°/100usft)	Latitude (°)	Longitude (°)
0.0	0.00	0.00	0.0	-3,627.0	0.0	0.0	0.0	0.00	32.67	-103.79
100.0	0.54	62.72	100.0	-3,527.0	0.2	0.4	-0.2	0.54	32.67	-103.79
200.0	0.60	42.56	200.0	-3,427.0	0.8	1.2	-0.8	0.21	32.67	-103.79
300.0	0.53	34.66	300.0	-3,327.0	1.6	1.8	-1.5	0.10	32.67	-103.79
400.0	0.46	5.41	400.0	-3,227.0	2.4	2.1	-2.3	0.26	32.67	-103.79
500.0	0.41	312.57	500.0	-3,127.0	3.0	1.9	-2.9	0.39	32.67	-103.79
600.0	0.75	279.66	600.0	-3,027.0	3.4	1.0	-3.3	0.46	32.67	-103.79
700.0	0.85	279.53	700.0	-2,927.0	3.6	-0.4	-3.6	0.10	32.67	-103.79
800.0	0.91	279.40	800.0	-2,827.0	3.8	-1.9	-3.9	0.06	32.67	-103.79
900.0	0.70	258.87	899.9	-2,727.1	3.9	-3.3	-4.0	0.35	32.67	-103.79
1,000.0	0.48	238.34	999.9	-2,627.1	3.5	-4.3	-3.7	0.30	32.67	-103.79
1,100.0	0.49	231.22	1,099.9	-2,527.1	3.0	-4.9	-3.3	0.06	32.67	-103.79
1,200.0	0.45	224.11	1,199.9	-2,427.1	2.5	-5.6	-2.8	0.07	32.67	-103.79
1,300.0	0.38	223.31	1,299.9	-2,327.1	2.0	-6.1	-2.3	0.07	32.67	-103.79
1,400.0	0.26	222.51	1,399.9	-2,227.1	1.5	-6.4	-1.9	0.12	32.67	-103.79
1,500.0	0.24	202.68	1,499.9	-2,127.1	1.2	-6.7	-1.5	0.09	32.67	-103.79
1,600.0	0.23	182.85	1,599.9	-2,027.1	0.8	-6.8	-1.1	0.08	32.67	-103.79
1,700.0	0.83	133.56	1,699.9	-1,927.1	0.1	-6.2	-0.4	0.70	32.67	-103.79
1,800.0	1.43	94.27	1,799.9	-1,827.1	-0.5	-4.5	0.3	0.95	32.67	-103.79
1,900.0	2.31	79.70	1,899.9	-1,727.1	-0.2	-1.2	0.2	0.99	32.67	-103.79
2,000.0	3.19	75.12	1,999.7	-1,627.3	0.8	3.4	-0.7	0.91	32.67	-103.79

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #22H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17 @ 3627.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17 @ 3627.0usft (Original Well Elev)
Well:	#22H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLag (°/100usft)	Latitude (°)	Longitude (°)
2,100.0	2.56	75.80	2,099.6	-1,527.4	2.1	8.3	-1.7	0.63	32.67	-103.79
2,200.0	1.89	76.49	2,199.5	-1,427.5	3.0	12.0	-2.4	0.67	32.67	-103.79
2,300.0	1.10	57.24	2,299.5	-1,327.5	3.9	14.5	-3.2	0.93	32.67	-103.79
2,400.0	0.31	38.00	2,399.5	-1,227.5	4.7	15.4	-3.9	0.81	32.67	-103.79
2,500.0	0.17	157.67	2,499.5	-1,127.5	4.8	15.7	-3.9	0.42	32.67	-103.79
2,600.0	0.03	277.33	2,599.5	-1,027.5	4.6	15.7	-3.8	0.19	32.67	-103.79
2,700.0	0.06	264.44	2,699.5	-927.5	4.6	15.6	-3.8	0.03	32.67	-103.79
2,800.0	0.09	251.56	2,799.5	-827.5	4.6	15.5	-3.8	0.03	32.67	-103.79
2,900.0	0.22	224.65	2,899.5	-727.5	4.4	15.3	-3.6	0.15	32.67	-103.79
3,000.0	0.36	197.73	2,999.5	-627.5	4.0	15.0	-3.2	0.19	32.67	-103.79
3,100.0	0.34	187.65	3,099.5	-527.5	3.4	14.9	-2.6	0.06	32.67	-103.79
3,200.0	0.31	177.56	3,199.5	-427.5	2.8	14.9	-2.1	0.06	32.67	-103.79
3,300.0	0.29	195.55	3,299.5	-327.5	2.3	14.8	-1.5	0.10	32.67	-103.79
3,400.0	0.27	213.54	3,399.5	-227.5	1.9	14.6	-1.1	0.09	32.67	-103.79
3,500.0	0.31	256.67	3,499.5	-127.5	1.6	14.2	-0.9	0.22	32.67	-103.79
3,600.0	0.35	299.81	3,599.5	-27.5	1.7	13.7	-1.0	0.25	32.67	-103.79
3,700.0	0.46	309.12	3,699.5	72.5	2.1	13.1	-1.4	0.13	32.67	-103.79
3,800.0	0.57	318.44	3,799.5	172.5	2.7	12.5	-2.1	0.14	32.67	-103.79
3,900.0	0.57	317.66	3,899.5	272.5	3.5	11.8	-2.9	0.01	32.67	-103.79
4,000.0	0.57	316.89	3,999.5	372.5	4.2	11.1	-3.6	0.01	32.67	-103.79
4,100.0	0.60	310.73	4,099.5	472.5	4.9	10.4	-4.4	0.07	32.67	-103.79
4,200.0	0.66	304.58	4,199.5	572.5	5.6	9.5	-5.1	0.09	32.67	-103.79
4,300.0	0.69	303.26	4,299.4	672.4	6.2	8.6	-5.8	0.03	32.67	-103.79
4,400.0	0.76	301.94	4,399.4	772.4	6.9	7.5	-6.5	0.07	32.67	-103.79
4,500.0	0.74	299.88	4,499.4	872.4	7.6	6.4	-7.3	0.03	32.67	-103.79
4,600.0	0.68	297.83	4,599.4	972.4	8.2	5.3	-7.9	0.07	32.67	-103.79
4,700.0	0.80	305.00	4,699.4	1,072.4	8.9	4.2	-8.6	0.15	32.67	-103.79

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #22H
Project:	Lea County (NAD27)	TVD Reference:	KB = 17 @ 3627.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17 @ 3627.0usft (Original Well Elev)
Well:	#22H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	EW (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)
4,800.0	0.93	312.18	4,799.4	1,172.4	9.8	3.0	-9.6	0.17	32.67	-103.79
4,900.0	1.10	308.16	4,899.4	1,272.4	11.0	1.7	-10.9	0.18	32.67	-103.79
5,000.0	1.23	304.14	4,999.4	1,372.4	12.1	0.0	-12.1	0.15	32.67	-103.79
5,100.0	1.33	310.67	5,099.3	1,472.3	13.5	-1.8	-13.6	0.18	32.67	-103.79
5,200.0	1.43	317.21	5,199.3	1,572.3	15.2	-3.5	-15.3	0.19	32.67	-103.79
5,300.0	1.74	314.47	5,299.3	1,672.3	17.2	-5.4	-17.4	0.32	32.67	-103.79
5,400.0	2.01	311.72	5,399.2	1,772.2	19.4	-7.8	-19.8	0.28	32.67	-103.79
5,500.0	2.14	312.64	5,499.2	1,872.2	21.8	-10.5	-22.3	0.13	32.67	-103.79
5,600.0	2.23	313.55	5,599.1	1,972.1	24.4	-13.3	-25.1	0.10	32.67	-103.79
5,700.0	1.98	327.44	5,699.0	2,072.0	27.2	-15.6	-28.0	0.57	32.67	-103.79
5,800.0	1.73	341.33	5,799.0	2,172.0	30.1	-17.0	-31.0	0.51	32.67	-103.79
5,900.0	1.77	326.71	5,898.9	2,271.9	32.8	-18.4	-33.7	0.45	32.67	-103.79
6,000.0	1.71	312.08	5,998.9	2,371.9	35.1	-20.3	-36.1	0.45	32.67	-103.79
6,100.0	1.65	310.63	6,098.8	2,471.8	37.1	-22.5	-38.2	0.07	32.67	-103.79
6,200.0	1.55	309.17	6,198.8	2,571.8	38.8	-24.6	-40.1	0.11	32.67	-103.79
6,300.0	1.51	310.31	6,298.8	2,671.8	40.6	-26.7	-41.9	0.05	32.67	-103.79
6,400.0	1.45	311.45	6,398.7	2,771.7	42.2	-28.7	-43.7	0.07	32.67	-103.79
6,500.0	1.47	307.68	6,498.7	2,871.7	43.9	-30.6	-45.4	0.10	32.67	-103.79
6,600.0	1.44	303.92	6,598.7	2,971.7	45.4	-32.7	-47.0	0.10	32.67	-103.79
6,700.0	1.37	300.60	6,698.6	3,071.6	46.7	-34.7	-48.4	0.11	32.67	-103.79
6,800.0	1.24	297.27	6,798.6	3,171.6	47.8	-36.7	-49.6	0.15	32.67	-103.79
6,900.0	1.47	291.41	6,898.6	3,271.6	48.7	-38.9	-50.7	0.27	32.67	-103.79
7,000.0	1.70	285.56	6,998.5	3,371.5	49.6	-41.5	-51.7	0.28	32.67	-103.79
7,100.0	2.03	279.94	7,098.5	3,471.5	50.3	-44.7	-52.6	0.38	32.67	-103.79
7,200.0	2.35	274.32	7,198.4	3,571.4	50.8	-48.5	-53.2	0.39	32.67	-103.79
7,300.0	2.58	262.51	7,298.3	3,671.3	50.6	-52.8	-53.3	0.56	32.67	-103.79
7,400.0	2.80	250.70	7,398.2	3,771.2	49.5	-57.3	-52.4	0.59	32.67	-103.79

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #22H
Project:	Lea County (NAD27)	TVD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Well:	#22H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLag (°/100usft)	Latitude (°)	Longitude (°)
7,500.0	3.08	252.23	7,498.1	3,871.1	47.9	-62.2	-51.1	0.29	32.67	-103.79
7,600.0	3.32	253.76	7,597.9	3,970.9	46.3	-67.5	-49.7	0.25	32.67	-103.79
7,700.0	3.32	256.38	7,697.7	4,070.7	44.8	-73.1	-48.5	0.15	32.67	-103.79
7,800.0	3.35	258.99	7,797.6	4,170.6	43.5	-78.8	-47.6	0.15	32.67	-103.79
7,900.0	2.80	245.99	7,897.4	4,270.4	42.0	-83.9	-46.3	0.88	32.67	-103.79
8,000.0	2.26	232.99	7,997.3	4,370.3	39.8	-87.7	-44.3	0.78	32.67	-103.79
8,100.0	1.43	312.19	8,097.3	4,470.3	39.5	-90.2	-44.1	2.44	32.67	-103.79
8,200.0	0.59	41.39	8,197.3	4,570.3	40.7	-90.8	-45.4	1.54	32.67	-103.79
8,300.0	0.86	46.67	8,297.3	4,670.3	41.6	-89.9	-46.2	0.28	32.67	-103.79
8,400.0	1.13	51.94	8,397.3	4,770.3	42.7	-88.6	-47.3	0.28	32.67	-103.79
8,500.0	1.14	22.37	8,497.2	4,870.2	44.2	-87.4	-48.7	0.58	32.67	-103.79
8,600.0	1.15	352.81	8,597.2	4,970.2	46.1	-87.1	-50.6	0.58	32.67	-103.79
8,716.0	0.62	314.80	8,713.2	5,086.2	47.7	-87.7	-52.3	0.66	32.67	-103.79
KOP: 8716.0 MD: 8713.2 TVD: 47.7 N: -87.7 E										
8,747.0	3.08	191.93	8,744.2	5,117.2	47.0	-88.0	-51.6	11.15	32.67	-103.79
8,779.0	6.77	187.09	8,776.1	5,149.1	44.3	-88.4	-48.9	11.59	32.67	-103.79
8,811.0	10.82	186.13	8,807.7	5,180.7	39.5	-89.0	-44.1	12.66	32.67	-103.79
8,842.0	14.77	184.55	8,837.9	5,210.9	32.6	-89.6	-37.3	12.79	32.67	-103.79
8,874.0	18.73	179.36	8,868.6	5,241.6	23.4	-89.9	-28.1	13.22	32.67	-103.79
8,906.0	23.48	175.49	8,898.4	5,271.4	11.9	-89.3	-16.6	15.46	32.67	-103.79
8,937.0	26.64	173.93	8,926.5	5,299.5	-1.1	-88.1	-3.5	10.41	32.67	-103.79
8,969.0	29.02	174.00	8,954.8	5,327.8	-16.0	-86.5	11.5	7.44	32.67	-103.79
9,000.0	32.27	175.32	8,981.4	5,354.4	-31.7	-85.1	27.2	10.71	32.67	-103.79
9,032.0	36.14	176.90	9,007.9	5,380.9	-49.7	-83.9	45.2	12.41	32.67	-103.79
9,064.0	40.80	176.99	9,033.0	5,406.0	-69.5	-82.8	65.1	14.56	32.67	-103.79
9,095.0	45.20	176.11	9,055.6	5,428.6	-90.6	-81.5	86.3	14.32	32.67	-103.79
9,127.0	48.63	175.32	9,077.5	5,450.5	-113.9	-79.8	109.6	10.87	32.67	-103.79

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #22H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Well:	#22H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V-Sec (usft)	D Leg (7/100usft)	Latitude (°)	Longitude (°)
9,159.0	52.41	175.32	9,097.8	5,470.8	-138.6	-77.8	134.3	11.81	32.67	-103.79
9,190.0	57.24	176.02	9,115.7	5,488.7	-163.8	-75.9	159.6	15.69	32.67	-103.79
9,221.0	61.82	176.46	9,131.4	5,504.4	-190.5	-74.1	186.3	14.82	32.67	-103.79
9,252.0	64.28	177.95	9,145.4	5,518.4	-218.1	-72.8	214.0	9.02	32.67	-103.79
9,285.0	66.83	179.01	9,159.1	5,532.1	-248.1	-72.0	244.0	8.26	32.67	-103.79
9,316.0	69.47	179.36	9,170.6	5,543.6	-276.9	-71.6	272.8	8.58	32.67	-103.79
9,348.0	73.42	179.36	9,180.8	5,553.8	-307.2	-71.2	303.1	12.34	32.67	-103.79
9,380.0	77.47	179.36	9,188.8	5,561.8	-338.2	-70.9	334.0	12.66	32.67	-103.79
9,411.0	79.49	179.01	9,195.0	5,568.0	-368.5	-70.4	364.4	6.61	32.67	-103.79
9,443.0	80.81	178.30	9,200.5	5,573.5	-400.0	-69.7	395.9	4.67	32.67	-103.79
9,475.0	81.78	176.64	9,205.4	5,578.4	-431.6	-68.3	427.5	5.96	32.67	-103.79
9,506.0	83.19	175.76	9,209.4	5,582.4	-462.3	-66.3	458.2	5.35	32.67	-103.79
9,538.0	84.50	175.58	9,212.8	5,585.8	-494.0	-63.9	490.0	4.13	32.67	-103.79
9,570.0	85.12	175.76	9,215.7	5,588.7	-525.8	-61.5	521.9	2.02	32.67	-103.79
LP: 9570.0 MD: 9215.7 TVD: 5255.8 N: -61.5 E										
9,601.0	85.12	175.23	9,218.4	5,591.4	-556.6	-59.0	552.8	1.70	32.67	-103.79
9,633.0	85.74	175.23	9,220.9	5,593.9	-588.4	-56.4	584.6	1.94	32.67	-103.79
9,664.0	87.14	175.05	9,222.8	5,595.8	-619.2	-53.8	615.6	4.55	32.67	-103.79
9,696.0	88.11	175.23	9,224.2	5,597.2	-651.1	-51.0	647.5	3.08	32.66	-103.79
9,728.0	88.20	175.58	9,225.2	5,598.2	-683.0	-48.5	679.5	1.13	32.66	-103.79
9,759.0	88.90	176.20	9,226.0	5,599.0	-713.9	-46.3	710.5	3.02	32.66	-103.79
9,791.0	89.78	175.93	9,228.4	5,599.4	-745.8	-44.1	742.5	2.88	32.66	-103.79
9,886.0	89.08	174.96	9,227.3	5,600.3	-840.5	-36.5	837.4	1.26	32.66	-103.79
9,981.0	88.99	174.00	9,228.9	5,601.9	-935.0	-27.4	932.3	1.01	32.66	-103.79
10,076.0	88.02	172.77	9,231.4	5,604.4	-1,029.4	-16.4	1,027.1	1.65	32.66	-103.79
10,171.0	89.87	175.84	9,233.1	5,606.1	-1,123.9	-7.0	1,122.0	3.77	32.66	-103.79
10,266.0	89.52	175.40	9,233.6	5,606.6	-1,218.6	0.2	1,216.9	0.59	32.66	-103.79

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #22H
Project:	Lea County(NAD27)	TVD Reference:	KB = 17 @ 3627.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17 @ 3627.0usft (Original Well Elev)
Well:	#22H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Latitude (°)	Longitude (°)
10,361.0	89.16	174.61	9,234.7	5,607.7	-1,313.2	8.5	1,311.9	0.91	32.66	-103.79
10,456.0	89.16	173.74	9,236.1	5,609.1	-1,407.7	18.1	1,406.7	0.92	32.66	-103.79
10,551.0	90.04	175.40	9,236.8	5,609.8	-1,502.3	27.1	1,501.6	1.98	32.66	-103.79
10,645.0	89.16	176.81	9,237.4	5,610.4	-1,596.1	33.5	1,595.6	1.77	32.66	-103.79
10,740.0	88.55	175.76	9,239.3	5,612.3	-1,690.8	39.7	1,690.6	1.28	32.66	-103.79
10,835.0	88.37	175.93	9,241.9	5,614.9	-1,785.6	46.6	1,785.5	0.26	32.66	-103.79
10,930.0	89.34	176.99	9,243.8	5,616.8	-1,880.4	52.4	1,880.5	1.51	32.66	-103.79
11,025.0	88.90	175.58	9,245.3	5,618.3	-1,975.1	58.6	1,975.5	1.55	32.66	-103.79
11,120.0	88.20	176.37	9,247.7	5,620.7	-2,069.9	65.2	2,070.5	1.11	32.66	-103.79
11,215.0	90.13	176.11	9,249.0	5,622.0	-2,164.7	71.5	2,165.4	2.05	32.66	-103.79
11,310.0	90.84	175.05	9,248.2	5,621.2	-2,259.4	78.8	2,260.4	1.34	32.66	-103.79
11,405.0	89.87	176.64	9,247.6	5,620.6	-2,354.1	85.7	2,355.4	1.96	32.66	-103.79
11,500.0	89.34	175.58	9,248.3	5,621.3	-2,448.9	92.1	2,450.4	1.25	32.66	-103.79
11,594.0	89.96	174.09	9,248.9	5,621.9	-2,542.5	100.6	2,544.3	1.72	32.66	-103.79
11,689.0	90.13	172.50	9,248.8	5,621.8	-2,636.8	111.7	2,639.1	1.68	32.66	-103.79
11,784.0	89.34	176.20	9,249.2	5,622.2	-2,731.4	121.0	2,734.0	3.98	32.66	-103.79
11,879.0	90.13	176.46	9,249.7	5,622.7	-2,826.2	127.1	2,829.0	0.88	32.66	-103.79
11,974.0	90.48	174.88	9,249.2	5,622.2	-2,920.9	134.3	2,923.9	1.70	32.66	-103.79
12,069.0	89.43	176.55	9,249.2	5,622.2	-3,015.6	141.4	3,018.9	2.08	32.66	-103.79
12,164.0	89.60	175.49	9,250.1	5,623.1	-3,110.4	148.0	3,113.9	1.13	32.66	-103.79
12,259.0	86.79	175.14	9,253.0	5,626.0	-3,205.0	155.7	3,208.8	2.98	32.66	-103.79
12,354.0	86.70	174.09	9,258.4	5,631.4	-3,299.4	164.6	3,303.5	1.11	32.66	-103.79
12,448.0	87.58	175.84	9,263.1	5,636.1	-3,393.0	172.9	3,397.4	2.08	32.66	-103.79
12,543.0	87.67	174.61	9,267.1	5,640.1	-3,487.5	180.8	3,492.2	1.30	32.66	-103.79
12,638.0	88.90	175.76	9,269.9	5,642.9	-3,582.2	188.7	3,587.1	1.77	32.66	-103.79
12,733.0	88.72	175.40	9,271.9	5,644.9	-3,676.9	196.0	3,682.1	0.42	32.66	-103.79
12,828.0	89.16	176.28	9,273.6	5,646.6	-3,771.6	202.9	3,777.0	1.04	32.66	-103.79

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #22H
Project:	Lea County (NAD27)	TVD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Site:	Lusk Deep Unit A	MD Reference:	KB = 17' @ 3627.0usft (Original Well Elev)
Well:	#22H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLog (°/100usft)	Latitude (°)	Longitude (°)
12,923.0	89.69	175.76	9,274.6	5,647.6	-3,866.4	209.5	3,872.0	0.78	32.66	-103.79
13,018.0	91.10	175.23	9,273.9	5,646.9	-3,961.1	217.0	3,967.0	1.59	32.66	-103.79
13,113.0	91.98	174.35	9,271.4	5,644.4	-4,055.6	225.6	4,061.9	1.31	32.66	-103.79
13,208.0	91.19	175.32	9,268.8	5,641.8	-4,150.2	234.2	4,156.8	1.32	32.66	-103.79
13,304.0	90.22	176.46	9,267.6	5,640.6	-4,246.0	241.0	4,252.7	1.56	32.66	-103.79
13,399.0	91.01	175.32	9,266.6	5,639.6	-4,340.7	247.9	4,347.7	1.46	32.65	-103.79
13,494.0	89.60	176.02	9,266.1	5,639.1	-4,435.4	255.0	4,442.7	1.66	32.65	-103.79
13,670.0	89.60	176.02	9,267.3	5,640.3	-4,611.0	267.2	4,618.7	0.00	32.65	-103.79
PROJECTED BHL - 13670.0 MD, 9267.3 TVD, -4611.0 N, 267.2 E PBHL (#22H)										

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		N/S (usft)	E/W (usft)	
8,716.0	8,713.2	47.7	-87.7	KOP - 8716.0 MD, 8713.2 TVD, 47.7 N, -87.7 E
9,570.0	9,215.7	-525.8	-61.5	LP - 9570.0 MD, 9215.7 TVD, -525.8 N, -61.5 E
13,670.0	9,267.3	-4,611.0	267.2	PROJECTED BHL - 13670.0 MD, 9267.3 TVD, -4611.0 N, 267.2 E

Checked By: _____	Approved By: _____	Date: _____
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Project: Lea County(NAD27)
Site: Lusk Deep Unit A
Well: #22H
Wellbore: OH
Plan: Post Gyro Plan #2 (#22H/OH)



Azimuths to Grid North
True North: -0.29°
Magnetic North: 7.28°

Magnetic Field
Strength: 48783.0nT
Dip Angle: 60.56°
Date: 8/7/2012
Model: IGRF200510



EOW

PROJECT DETAILS: Lea County(NAD27)
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
Local North: Grid

WELL DETAILS: #22H

Ground Elevation: 3610.9
RVD Elevation: KB = 17 @ 3627.0surf (Original Well Elev)
Rig Name: Original Well Elev

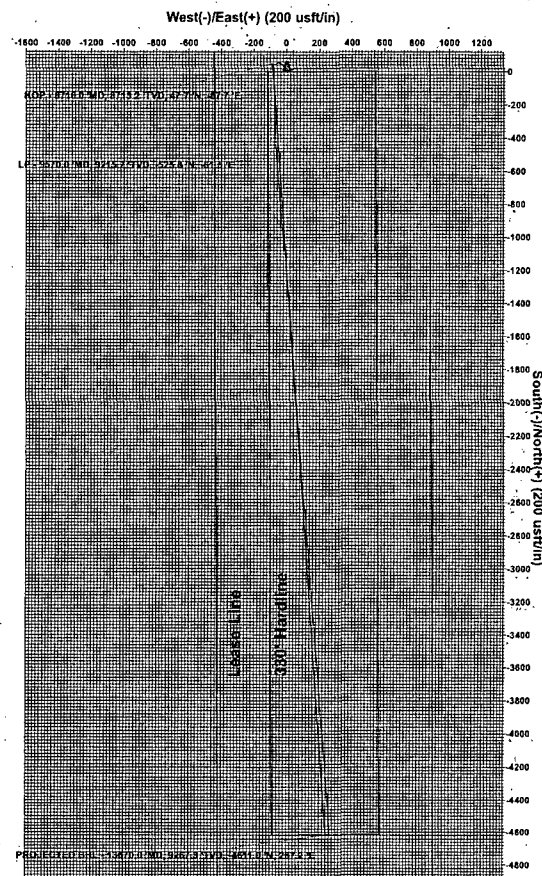
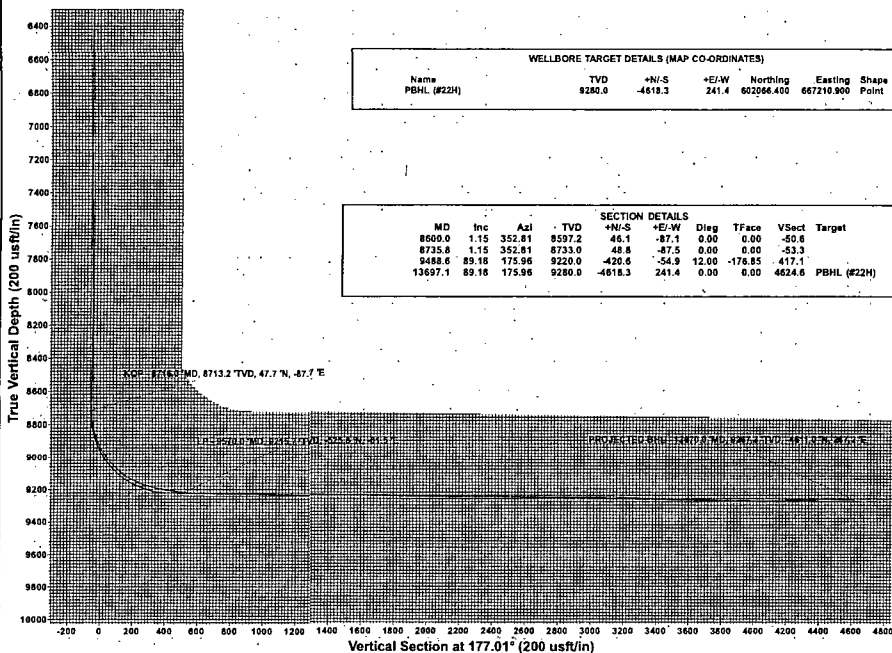
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Spot
0.0	0.0	606664.700	666969.500	32.666704	-103.790754	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (#22H)	9280.0	-4618.3	241.4	602066.400	667210.900	Point

SECTION DETAILS

MD	Inc	Asl	TVD	+N/-S	+E/-W	Dleg	TFace	VSeal	Target
8600.0	1.15	352.81	8597.2	48.1	-87.1	0.00	0.00	-50.6	
8735.8	1.15	352.81	8733.0	48.8	-87.5	0.00	0.00	-53.3	
9488.6	89.18	175.96	9220.0	-420.6	-54.9	12.00	-176.85	417.1	
13697.1	89.18	175.96	9280.0	-4618.3	241.4	0.00	0.00	4624.6	PBHL (#22H)



Plan: Post Gyro Plan #2 (#22H/OH)

Created By: Michael Tread Date: 8:56, October 08 2012

Checked: _____ Date: _____

CON Schlumberger LLC
Lea County(NAD27)
Datum: NAD 1927
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level
Local North: Grid