



March 26, 2015

30-025-40899

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

HOBBS OCD

JUN 01 2015

RECEIVED

Attn: Kanicia Castillo

RE: Pan Head Fee 12H

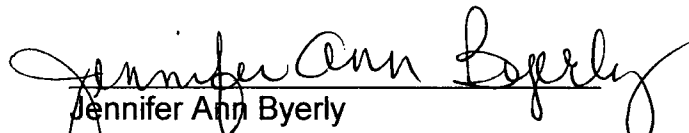
Please find enclosed a copy of the survey from 0' to 5126' ran on the above referenced well.

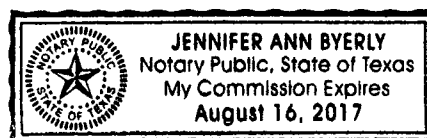
Sincerely, 

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 26 day of March,
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas



JUN 08 2015



Company: Concho
Lease/Well: Pan Head Fee /12H

Location: Sec11 T17S R32E

Rig Name: United 43

State/County: New Mexico/Lea

Latitude: 32.86, Longitude: -103.74

GRID North is 0.32 Degrees East of True North

VS-Azi: 0.00 Degrees



Depth Reference : RKB=12.5 Feet

DRILLOG HS GYRO SURVEY CALCULATIONS

Filename: ...fee #12h gyro survey 2_mrg.ut

Minimum Curvature Method

Report Date/Time: 3/26/2015 / 14:24

VES Survey International

West Texas

(432) 563-5444

Surveyor: Chris Bankson

Pan Head Fee 12H / API 30-025-40899

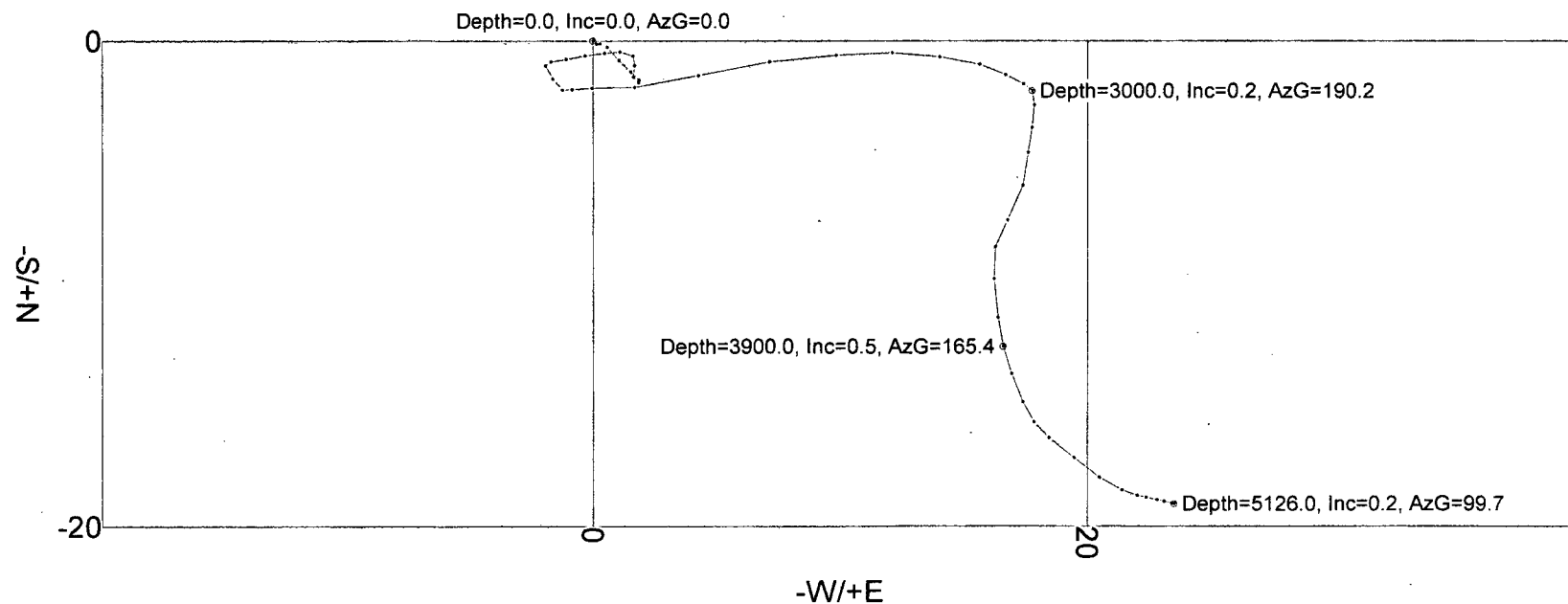
HOBBS OCD
JUN 01 2015
RECEIVED

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	0.20	135.95	100.00	-0.13	0.12	-0.13	0.17	135.95	0.20
200.00	0.16	12.94	200.00	-0.12	0.27	-0.12	0.30	113.22	0.31
300.00	0.44	136.14	300.00	-0.26	0.57	-0.26	0.63	114.61	0.54
400.00	0.40	140.94	400.00	-0.81	1.06	-0.81	1.33	127.46	0.05
500.00	0.39	129.28	499.99	-1.29	1.54	-1.29	2.01	130.08	0.08
600.00	0.14	141.63	599.99	-1.60	1.87	-1.60	2.47	130.56	0.25
700.00	0.12	256.53	699.99	-1.73	1.85	-1.73	2.53	133.02	0.22
800.00	0.33	337.67	799.99	-1.49	1.64	-1.49	2.22	132.21	0.33
900.00	0.30	36.92	899.99	-1.02	1.69	-1.02	1.97	121.00	0.31
1000.00	0.32	309.33	999.99	-0.63	1.63	-0.63	1.75	111.04	0.43
1100.00	0.37	269.02	1099.99	-0.45	1.09	-0.45	1.18	112.56	0.24
1200.00	0.36	262.11	1199.99	-0.50	0.46	-0.50	0.68	137.42	0.04
1300.00	0.56	261.48	1299.98	-0.62	-0.33	-0.62	0.70	208.40	0.20
1400.00	0.35	255.37	1399.98	-0.77	-1.11	-0.77	1.35	235.38	0.22
1500.00	0.38	266.23	1499.98	-0.87	-1.74	-0.87	1.94	243.51	0.08
1600.00	0.22	140.23	1599.98	-1.03	-1.95	-1.03	2.21	242.11	0.54
1700.00	0.49	156.37	1699.97	-1.57	-1.66	-1.57	2.29	226.51	0.29
1800.00	0.26	106.11	1799.97	-2.03	-1.27	-2.03	2.39	212.00	0.39

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
1900.00	0.23	66.02	1899.97	-2.01	-0.87	-2.01	2.19	203.36	0.17
2000.00	0.72	92.27	1999.97	-1.95	-0.06	-1.95	1.95	181.62	0.52
2100.00	1.28	87.03	2099.95	-1.92	1.69	-1.92	2.56	138.70	0.57
2200.00	1.75	73.59	2199.92	-1.43	4.27	-1.43	4.50	108.54	0.59
2300.00	1.63	85.04	2299.87	-0.88	7.15	-0.88	7.20	96.99	0.36
2400.00	1.45	83.06	2399.84	-0.60	9.82	-0.60	9.84	93.50	0.19
2500.00	1.17	92.78	2499.81	-0.50	12.10	-0.50	12.11	92.36	0.35
2600.00	1.04	97.17	2599.79	-0.66	14.02	-0.66	14.04	92.70	0.16
2700.00	0.84	105.70	2699.78	-0.97	15.62	-0.97	15.65	93.56	0.24
2800.00	0.47	123.58	2799.77	-1.40	16.67	-1.40	16.73	94.79	0.42
2900.00	0.47	110.55	2899.77	-1.77	17.40	-1.77	17.49	95.80	0.11
3000.00	0.17	190.18	2999.77	-2.06	17.75	-2.06	17.87	96.62	0.47
3100.00	0.51	166.44	3099.77	-2.65	17.83	-2.65	18.03	98.44	0.36
3200.00	0.61	201.55	3199.76	-3.57	17.74	-3.57	18.10	101.39	0.35
3300.00	0.61	176.50	3299.76	-4.60	17.58	-4.60	18.17	104.65	0.26
3400.00	0.99	195.68	3399.75	-5.96	17.38	-5.96	18.38	108.91	0.46
3500.00	0.82	213.42	3499.73	-7.38	16.76	-7.38	18.31	113.77	0.32
3600.00	0.59	192.21	3599.73	-8.47	16.26	-8.47	18.33	117.53	0.34
3700.00	0.95	175.62	3699.72	-9.80	16.21	-9.80	18.95	121.16	0.43
3800.00	0.88	172.66	3799.71	-11.39	16.37	-11.39	19.95	124.83	0.09
3900.00	0.52	165.36	3899.70	-12.59	16.59	-12.59	20.82	127.20	0.36
4000.00	0.80	161.36	3999.69	-13.70	16.93	-13.70	21.77	128.98	0.28
4100.00	0.63	155.87	4099.68	-14.86	17.38	-14.86	22.87	130.54	0.18
4200.00	0.46	145.12	4199.68	-15.70	17.83	-15.70	23.75	131.36	0.20
4300.00	0.58	129.73	4299.67	-16.35	18.45	-16.35	24.65	131.54	0.19
4400.00	0.91	128.13	4399.67	-17.17	19.47	-17.17	25.96	131.40	0.33
4500.00	0.58	129.70	4499.66	-17.98	20.48	-17.98	27.26	131.28	0.34
4600.00	0.63	111.44	4599.65	-18.50	21.39	-18.50	28.28	130.87	0.20
4700.00	0.11	103.48	4699.65	-18.73	21.99	-18.73	28.89	130.42	0.53
4800.00	0.31	101.36	4799.65	-18.80	22.35	-18.80	29.21	130.07	0.20
4900.00	0.21	103.56	4899.65	-18.90	22.80	-18.90	29.61	129.66	0.10
5000.00	0.11	105.30	4999.65	-18.97	23.07	-18.97	29.87	129.43	0.10
5100.00	0.26	103.75	5099.65	-19.05	23.38	-19.05	30.16	129.17	0.15
5126.00	0.17	99.69	5125.65	-19.07	23.48	-19.07	30.25	129.08	0.34



VES Survey International
West Texas
(432) 563-5444
Surveyor: Chris Bankson
Pan Head Fee 12H / API 30-025-40899



VES Survey Date: 3/19/2015

JUN 01 2015 1 of 2

WELL NAME AND NUMBER Pan Head Fee No. 12H **RECEIVED**
 LOCATION Section 11, T17S, R32E, Unit D, 330 FNL, 990 FWL, Lea County
 OPERATOR COG Operating LLC
 DRILLING CONTRACTOR United Drilling, Inc.

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

Degrees @ Depth	Degrees @ Depth	Degrees @ Depth
.4° @ 272'	7.3° @ 5263'	61.8° @ 5860'
.3° @ 575'	3.7° @ 5286'	64.0° @ 5892'
.4° @ 898'	16.0° @ 5325'	66.6° @ 5923'
.1° @ 1009'	20.8° @ 5357'	69.5° @ 5955'
.2° @ 1244'	24.7° @ 5388'	72.0° @ 5986'
1.0° @ 1426'	27.5° @ 5420'	73.9° @ 6018'
.5° @ 1867'	29.9° @ 5451'	76.1° @ 6049'
.7° @ 2223'	32.2° @ 5482'	78.2° @ 6081'
1.4° @ 2457'	34.2° @ 5514'	80.4° @ 6113'
.4° @ 2771'	39.1° @ 5577'	81.5° @ 6144'
.5° @ 3200'	41.8° @ 5609'	83.2° @ 6176'
.8° @ 3615'	44.0° @ 5640'	85.2° @ 6207'
.9° @ 4004'	45.7° @ 5672'	86.9° @ 6239'
.8° @ 4409'	47.9° @ 5903'	90.7° @ 6332'
.2° @ 4818'	50.6° @ 5734'	89.5° @ 6334'
.3° @ 5159'	54.1° @ 5766'	89.0° @ 6395'
.2° @ 5168'	57.1° @ 5797'	89.5° @ 6427'
.8° @ 5200'	59.8° @ 5829'	89.7° @ 6521'

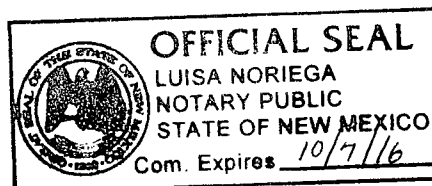
Drilling Contractor- UNITED DRILLING, INC.

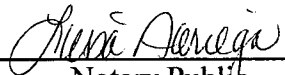
By: 
 (Angel Salazar)

Title: Vice President

Subscribed and sworn to before me this 2nd day of April 2015.

My Commission Expires:



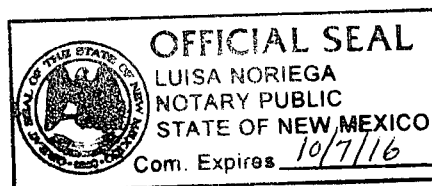

 Notary Public
Chaves NM
 County State

JUN 01 2015

WELL NAME AND NUMBER Pan Head Fee No. 12HLOCATION Section 11, T17S, R32E, Unit D, 330 FNL, 990 FWL, Lea CountyOPERATOR COG Operating LLCDRILLING CONTRACTOR United Drilling, Inc.

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

Degrees @ Depth	Degrees @ Depth	Degrees @ Depth
89.1° @ 6616'	89.6° @ 8316'	87.5° @ 10206'
88.5° @ 6710'	89.5° @ 8410'	87.9° @ 10300'
88.0° @ 6804'	89.5° @ 8505'	87.8° @ 10395'
89.5° @ 6899'	89.8° @ 8599'	88.2° @ 10489'
90.0° @ 6993'	89.9° @ 8694'	88.4° @ 10584'
91.6° @ 7087'	90.0° @ 8788'	88.4° @ 10678'
92.4° @ 7182'	89.7° @ 8883'	88.0° @ 10773'
92.5° @ 7276'	90.0° @ 8977'	88.7° @ 10867'
92.5° @ 7370'	89.0° @ 9072'	89.3° @ 10961'
91.7° @ 7495'	88.6° @ 9355'	89.0° @ 11056'
89.9° @ 7559'	89.0° @ 9450'	89.4° @ 11150'
89.2° @ 7654'	89.1° @ 9544'	90.2° @ 11244'
88.2° @ 7748'	89.0° @ 9639'	90.4° @ 11339'
87.9° @ 7843'	89.2° @ 9733'	
88.8° @ 7937'	89.4° @ 9828'	
88.4° @ 8032'	88.7° @ 9922'	
90.3° @ 8127'	88.6° @ 10017'	
90.7° @ 8221'	86.5° @ 10111'	

Drilling Contractor- UNITED DRILLING, INC.By: Angel Salazar
(Angel Salazar)Title: Vice PresidentSubscribed and sworn to before me this 2nd day of April 2015.

My Commission Expires:

Luisa Noriega
Notary Public
Chaves NM
County State



HOBBS OGD

JUN 01 2015

RECEIVED

State of New Mexico
County of Lea

I, Donald D. Mason, certify that: I am employed by Terra Directional Services LLC; that I did on the day(s) of 03/19/2015 through 03/29/2015 conduct or supervise the taking of a MWD survey from a depth of 5168 feet to a depth 11400 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Terra Directional Services LLC; that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho Oil & Gas for the Pan Head Fee #12H Well API 30-025-40899 in Lea County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Terra Directional Services LLC.

Donald D. Mason
President

State of Texas
County of Burnet

Before me, a notary public, on this day personally appeared Donald D. Mason, known to me to be the person whose name is subscribed to the foregoing document and, being by me first duly sworn, declared that the statements therein contained are true and correct.

Notary Public's Signature



Customer Name: COG
 Well Name: Pan Head Fee 12H
 API Number: 30-025-40899
 County / Parish: Lea Co, NM

M.W.D. Operator: Justin Campos
 Directional Driller: John Overton
 Total Magnetic Correction: 6.93
 Job #: NM-520

Vertical Section: 179.86

Tie In Survey(s) Provided By:

VES

	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N / -S	+E / -W	Dist.	Angle	DLS
Tie - In										
0	5126.00	0.17	99.69	5125.65	-19.07	-19.07	23.48	30.25	129.08	0.34
1	5168.00	0.20	152.70	5167.65	19.20	-19.15	23.58	30.37	129.08	0.40
2	5200.00	0.80	186.10	5199.65	19.47	-19.42	23.58	30.54	129.47	2.01
3	5231.00	3.70	192.00	5230.62	20.67	-20.61	23.35	31.14	131.44	9.37
4	5263.00	7.30	186.80	5262.47	23.70	-23.64	22.89	32.91	135.92	11.35
5	5294.00	11.50	182.70	5293.05	28.74	-28.69	22.51	36.46	141.88	13.71
6	5325.00	16.00	182.20	5323.15	36.10	-36.05	22.20	42.33	148.37	14.52
7	5357.00	20.80	182.00	5353.51	46.19	-46.14	21.83	51.04	154.67	15.00
8	5388.00	24.70	181.00	5382.09	58.17	-58.12	21.53	61.98	159.67	12.64
9	5420.00	27.50	181.80	5410.82	72.24	-72.19	21.18	75.23	163.65	8.82
10	5451.00	29.90	183.90	5438.01	87.10	-87.05	20.43	89.42	166.79	8.40
11	5482.00	32.20	185.90	5464.57	103.03	-102.98	19.05	104.73	169.52	8.13
12	5514.00	34.20	188.20	5491.35	120.41	-120.37	16.90	121.55	172.01	7.38
13	5546.00	36.40	189.00	5517.46	138.68	-138.65	14.13	139.37	174.18	7.03
14	5577.00	39.10	189.70	5541.97	157.40	-157.37	11.04	157.76	175.99	8.82
15	5609.00	41.80	190.50	5566.32	177.83	-177.81	7.40	177.96	177.62	8.59
16	5640.00	44.00	190.80	5589.03	198.55	-198.55	3.50	198.58	178.99	7.13
17	5672.00	45.70	189.30	5611.71	220.76	-220.77	-0.44	220.77	180.11	6.26
18	5703.00	47.90	187.80	5632.93	243.10	-243.11	-3.79	243.14	180.89	7.92
19	5734.00	50.60	185.80	5653.17	266.41	-266.43	-6.56	266.51	181.41	9.99
20	5766.00	54.10	183.10	5672.71	291.66	-291.68	-8.52	291.80	181.67	12.81
21	5797.00	57.10	181.30	5690.23	317.21	-317.24	-9.49	317.38	181.71	10.80
22	5829.00	59.80	181.40	5706.97	344.47	-344.50	-10.13	344.64	181.68	8.44
23	5860.00	61.80	182.70	5722.09	371.51	-371.54	-11.10	371.70	181.71	7.42
24	5892.00	64.00	183.30	5736.67	399.95	-399.98	-12.60	400.18	181.80	7.07
25	5923.00	66.60	182.80	5749.62	428.07	-428.10	-14.09	428.34	181.89	8.51
26	5955.00	69.50	182.20	5761.58	457.71	-457.75	-15.39	458.01	181.93	9.23
27	5986.00	72.00	182.20	5771.80	486.95	-487.00	-16.51	487.27	181.94	8.06
28	6018.00	73.90	182.80	5781.18	517.51	-517.56	-17.84	517.87	181.97	6.20
29	6049.00	76.10	182.80	5789.21	547.42	-547.46	-19.31	547.80	182.02	7.10
30	6081.00	78.20	181.80	5796.32	578.58	-578.64	-20.56	579.00	182.03	7.24
31	6113.00	80.40	182.00	5802.26	610.01	-610.06	-21.60	610.44	182.03	6.90
32	6144.00	81.50	182.70	5807.14	640.59	-640.65	-22.86	641.06	182.04	4.19
33	6176.00	83.20	182.40	5811.40	672.27	-672.33	-24.27	672.77	182.07	5.39
34	6207.00	85.20	181.70	5814.53	703.09	-703.15	-25.37	703.61	182.07	6.83
35	6239.00	86.90	181.70	5816.74	734.99	-735.06	-26.32	735.53	182.05	5.31
36	6270.00	88.30	181.80	5818.04	765.95	-766.02	-27.26	766.50	182.04	4.53
37	6301.00	89.90	181.30	5818.52	796.93	-797.00	-28.10	797.50	182.02	5.41
38	6332.00	90.70	181.00	5818.36	827.92	-827.99	-28.72	828.49	181.99	2.76
39	6364.00	89.50	179.60	5818.30	859.92	-859.99	-28.89	860.48	181.92	5.76
40	6395.00	89.00	178.80	5818.71	890.91	-890.99	-28.46	891.44	181.83	3.04

41	6427.00	89.50	178.70	5819.13	922.90	-922.97	-27.76	923.39	181.72	1.59
42	6521.00	89.70	178.30	5819.79	1016.88	-1016.94	-25.30	1017.25	181.43	0.48
43	6616.00	89.10	178.00	5820.78	1111.83	-1111.88	-22.23	1112.11	181.15	0.71
44	6710.00	88.50	178.10	5822.75	1205.76	-1205.81	-19.04	1205.96	180.90	0.65
45	6804.00	88.00	177.50	5825.62	1299.65	-1299.70	-15.43	1299.79	180.68	0.83
46	6899.00	89.50	178.10	5827.69	1394.57	-1394.60	-11.78	1394.65	180.48	1.70
47	6993.00	90.00	178.80	5828.10	1488.54	-1488.56	-9.24	1488.59	180.36	0.92
48	7087.00	91.60	180.10	5826.79	1582.52	-1582.54	-8.34	1582.57	180.30	2.19
49	7182.00	92.40	181.40	5823.47	1677.45	-1677.48	-9.58	1677.50	180.33	1.61
50	7276.00	92.50	180.90	5819.46	1771.34	-1771.37	-11.46	1771.41	180.37	0.54
51	7370.00	92.50	181.00	5815.36	1865.23	-1865.27	-13.02	1865.31	180.40	0.11
52	7465.00	91.70	181.90	5811.87	1960.13	-1960.17	-15.42	1960.23	180.45	1.27
53	7559.00	89.90	182.40	5810.56	2054.04	-2054.09	-18.95	2054.18	180.53	1.99
54	7654.00	89.20	181.90	5811.31	2148.96	-2149.02	-22.51	2149.14	180.60	0.91
55	7748.00	88.20	181.30	5813.44	2242.89	-2242.96	-25.14	2243.10	180.64	1.24
56	7843.00	87.90	181.20	5816.67	2337.81	-2337.88	-27.21	2338.04	180.67	0.33
57	7937.00	88.80	181.00	5819.38	2431.75	-2431.82	-29.01	2432.00	180.68	0.98
58	8032.00	88.40	181.20	5821.70	2526.70	-2526.78	-30.84	2526.97	180.70	0.47
59	8127.00	90.30	178.50	5822.78	2621.68	-2621.76	-30.59	2621.94	180.67	3.48
60	8221.00	90.70	177.80	5821.96	2715.63	-2715.71	-27.55	2715.85	180.58	0.86
61	8316.00	89.60	178.50	5821.71	2810.59	-2810.65	-24.49	2810.76	180.50	1.37
62	8410.00	89.50	178.40	5822.45	2904.55	-2904.62	-21.94	2904.70	180.43	0.15
63	8505.00	89.50	178.50	5823.28	2999.52	-2999.58	-19.37	2999.64	180.37	0.11
64	8599.00	89.80	178.70	5823.85	3093.50	-3093.55	-17.08	3093.60	180.32	0.38
65	8694.00	89.90	178.80	5824.10	3188.48	-3188.53	-15.01	3188.56	180.27	0.15
66	8788.00	90.00	178.60	5824.18	3282.46	-3282.50	-12.87	3282.53	180.22	0.24
67	8883.00	89.70	178.20	5824.43	3377.43	-3377.46	-10.22	3377.48	180.17	0.53
68	8977.00	90.00	180.10	5824.68	3471.42	-3471.45	-8.83	3471.46	180.15	2.05
69	9072.00	89.00	180.40	5825.51	3566.41	-3566.44	-9.24	3566.45	180.15	1.10
70	9167.00	87.40	180.60	5828.49	3661.35	-3661.39	-10.07	3661.40	180.16	1.70
71	9261.00	87.20	180.60	5832.92	3755.24	-3755.28	-11.05	3755.30	180.17	0.21
72	9355.00	88.60	179.90	5836.36	3849.17	-3849.21	-11.46	3849.23	180.17	1.66
73	9450.00	89.00	179.70	5838.35	3944.15	-3944.19	-11.13	3944.21	180.16	0.47
74	9544.00	89.10	179.60	5839.91	4038.14	-4038.18	-10.56	4038.19	180.15	0.15
75	9639.00	89.00	179.50	5841.48	4133.12	-4133.16	-9.81	4133.17	180.14	0.15
76	9733.00	89.20	179.50	5842.96	4227.11	-4227.14	-8.99	4227.15	180.12	0.21
77	9828.00	89.40	179.50	5844.12	4322.10	-4322.13	-8.16	4322.14	180.11	0.21
78	9922.00	88.70	180.90	5845.68	4416.08	-4416.12	-8.49	4416.13	180.11	1.66
79	10017.00	88.60	181.70	5847.92	4511.03	-4511.07	-10.64	4511.08	180.14	0.85
80	10111.00	86.50	180.30	5851.94	4604.91	-4604.96	-12.28	4604.97	180.15	2.68
81	10206.00	87.50	179.60	5856.91	4699.78	-4699.83	-12.20	4699.84	180.15	1.28
82	10300.00	87.90	179.40	5860.68	4793.70	-4793.75	-11.38	4793.76	180.14	0.48
83	10395.00	87.80	179.50	5864.25	4888.64	-4888.68	-10.47	4888.69	180.12	0.15
84	10489.00	88.20	179.60	5867.53	4982.58	-4982.61	-9.73	4982.62	180.11	0.44
85	10584.00	88.40	179.60	5870.34	5077.53	-5077.57	-9.07	5077.58	180.10	0.21
86	10678.00	88.40	179.60	5872.97	5171.50	-5171.53	-8.41	5171.54	180.09	0.00
87	10773.00	88.00	178.80	5875.95	5266.44	-5266.47	-7.09	5266.48	180.08	0.94
88	10867.00	88.70	177.10	5878.66	5360.35	-5360.37	-3.73	5360.37	180.04	1.96
89	10961.00	89.30	176.20	5880.30	5454.18	-5454.20	1.77	5454.20	179.98	1.15
90	11056.00	89.00	177.30	5881.71	5549.03	-5549.03	7.15	5549.04	179.93	1.20
91	11150.00	89.40	176.80	5883.02	5642.91	-5642.90	11.99	5642.91	179.88	0.68
92	11244.00	90.20	178.20	5883.35	5736.83	-5736.80	16.09	5736.83	179.84	1.72
93	11339.00	90.40	178.20	5882.85	5831.78	-5831.75	19.07	5831.79	179.81	0.21
PTB	11400.00	90.40	178.20	5882.43	5892.76	-5892.72	20.99	5892.76	179.80	0.00



HOBBS OCD

JUN 01 2015

RECEIVED

COG Operating LLC

Lea County, NM

Pan Head Fee #12H

SHL: 330' FNL, 990' FWL, T17S, R32E, Unit D

EOC: 6122.7' MD, 5825.0' TVD, 538.7' S , 12.0' W, 538.7' VS

BHL: 966' FNL, 966' FWL , T17S, R32E, Unit D

Design: BHL: 966' FNL, 966' FWL , T17S, R32E, Unit D

Standard Survey Report

30 March, 2015





TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 330' FNL, 990' FWL, T17S, R32E, Unit D
Project:	Lea County, NM	TVD Reference:	KB @ 4175.0usft (United 43)
Site:	Pan Head Fee #12H	MD Reference:	KB @ 4175.0usft (United 43)
Well:	SHL: 330' FNL, 990' FWL, T17S, R32E, Unit D	North Reference:	Grid
Wellbore:	BHL: 966' FNL, 966' FWL, T17S, R32E, Unit D	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 966' FNL, 966' FWL, T17S, R32E, Unit D	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM		
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	Pan Head Fee #12H		
Site Position:	From: Map	Northing:	675,380.80 usft
		Easting:	681,600.10 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 51' 19.109 N
		Longitude:	103° 44' 31.076 W
		Grid Convergence:	0.32 °

Well	SHL: 330' FNL, 990' FWL, T17S, R32E, Unit D		
Well Position	+N/-S	0.0 usft	Northing: 675,380.80 usft
	+E/-W	0.0 usft	Easting: 681,600.10 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Ground Level:	4,163.0 usft
		Latitude:	32° 51' 19.109 N
		Longitude:	103° 44' 31.076 W

Wellbore	BHL: 966' FNL, 966' FWL, T17S, R32E, Unit D		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	3/9/2015	(°)
			7.25
			Dip Angle: (°)
			60.65
			Field Strength (nT)
			48,598

Design	BHL: 966' FNL, 966' FWL, T17S, R32E, Unit D		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°)
			179.86

Survey Program	Date: 3/30/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.0	5,126.0	GYRO #1 (BHL: 966' FNL, 966' FWL, T17S)	Good_gyro
5,168.0	11,400.0	MWD #2 (BHL: 966' FNL, 966' FWL, T17S)	MWD
			Description
			Good Gyro
			MWD - Standard

Survey										
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)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
100.0	0.20	135.95	100.0	-0.1	0.1	0.1	0.20	0.20	0.00	
200.0	0.16	12.94	200.0	-0.1	0.3	0.1	0.32	-0.04	-123.01	
300.0	0.44	136.14	300.0	-0.3	0.6	0.3	0.54	0.28	123.20	
400.0	0.40	140.94	400.0	-0.8	1.1	0.8	0.05	-0.04	4.80	
500.0	0.39	129.28	500.0	-1.3	1.5	1.3	0.08	-0.01	-11.66	
600.0	0.14	141.63	600.0	-1.6	1.9	1.6	0.26	-0.25	12.35	
700.0	0.12	256.53	700.0	-1.7	1.9	1.7	0.22	-0.02	114.90	
800.0	0.33	337.67	800.0	-1.5	1.6	1.5	0.33	0.21	81.14	



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 330' FNL, 990' FWL, T17S, R32E, Unit D
Project:	Lea County, NM	TVD Reference:	KB @ 4175.0usft (United 43)
Site:	Pan Head Fee #12H	MD Reference:	KB @ 4175.0usft (United 43)
Well:	SHL: 330' FNL, 990' FWL, T17S, R32E, Unit D	North Reference:	Grid
Wellbore:	BHL: 966' FNL, 966' FWL, T17S, R32E, Unit D	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 966' FNL, 966' FWL, T17S, R32E, Unit D	Database:	EDM 5000.1 Single User 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)
900.0	0.30	36.92	900.0	-1.0	1.7	1.0	0.31	-0.03	59.25
1,000.0	0.32	309.33	1,000.0	-0.6	1.6	0.6	0.43	0.02	-87.59
1,100.0	0.37	269.02	1,100.0	-0.4	1.1	0.4	0.24	0.05	-40.31
1,200.0	0.36	262.11	1,200.0	-0.5	0.5	0.5	0.05	-0.01	-6.91
1,300.0	0.56	261.48	1,300.0	-0.6	-0.3	0.6	0.20	0.20	-0.63
1,400.0	0.35	255.37	1,400.0	-0.8	-1.1	0.8	0.22	-0.21	-6.11
1,500.0	0.38	266.23	1,500.0	-0.9	-1.7	0.9	0.08	0.03	10.86
1,600.0	0.22	140.23	1,600.0	-1.0	-1.9	1.0	0.54	-0.16	-126.00
1,700.0	0.49	156.37	1,700.0	-1.6	-1.7	1.6	0.29	0.27	16.14
1,800.0	0.26	106.11	1,800.0	-2.0	-1.3	2.0	0.38	-0.23	-50.26
1,900.0	0.23	66.02	1,900.0	-2.0	-0.9	2.0	0.17	-0.03	-40.09
2,000.0	0.72	92.27	2,000.0	-1.9	-0.1	1.9	0.52	0.49	26.25
2,100.0	1.28	87.03	2,100.0	-1.9	1.7	1.9	0.57	0.56	-5.24
2,200.0	1.75	73.59	2,199.9	-1.4	4.3	1.4	0.59	0.47	-13.44
2,300.0	1.63	85.04	2,299.9	-0.9	7.2	0.9	0.36	-0.12	11.45
2,400.0	1.45	83.06	2,399.8	-0.6	9.8	0.6	0.19	-0.18	-1.98
2,500.0	1.17	92.78	2,499.8	-0.5	12.1	0.5	0.36	-0.28	9.72
2,600.0	1.04	97.17	2,599.8	-0.7	14.0	0.7	0.16	-0.13	4.39
2,700.0	0.84	105.70	2,699.8	-1.0	15.6	1.0	0.24	-0.20	8.53
2,800.0	0.47	123.58	2,799.8	-1.4	16.7	1.4	0.42	-0.37	17.88
2,900.0	0.47	110.55	2,899.8	-1.8	17.4	1.8	0.11	0.00	-13.03
3,000.0	0.17	190.18	2,999.8	-2.1	17.8	2.1	0.47	-0.30	79.63
3,100.0	0.51	166.44	3,099.8	-2.6	17.8	2.7	0.36	0.34	-23.74
3,200.0	0.61	201.55	3,199.8	-3.6	17.7	3.6	0.35	0.10	35.11
3,300.0	0.61	176.50	3,299.8	-4.6	17.6	4.6	0.26	0.00	-25.05
3,400.0	0.99	195.68	3,399.7	-5.9	17.4	6.0	0.46	0.38	19.18
3,500.0	0.82	213.42	3,499.7	-7.4	16.8	7.4	0.33	-0.17	17.74
3,600.0	0.59	192.21	3,599.7	-8.5	16.3	8.5	0.34	-0.23	-21.21
3,700.0	0.95	175.62	3,699.7	-9.8	16.2	9.8	0.42	0.36	-16.59
3,800.0	0.88	172.66	3,799.7	-11.4	16.4	11.4	0.08	-0.07	-2.96
3,900.0	0.52	165.36	3,899.7	-12.6	16.6	12.6	0.37	-0.36	-7.30
4,000.0	0.80	161.36	3,999.7	-13.7	16.9	13.7	0.28	0.28	-4.00
4,100.0	0.63	155.87	4,099.7	-14.9	17.4	14.9	0.18	-0.17	-5.49
4,200.0	0.46	145.12	4,199.7	-15.7	17.8	15.7	0.20	-0.17	-10.75
4,300.0	0.58	129.73	4,299.7	-16.3	18.4	16.4	0.18	0.12	-15.39
4,400.0	0.91	128.13	4,399.7	-17.2	19.5	17.2	0.33	0.33	-1.60
4,500.0	0.58	129.70	4,499.7	-18.0	20.5	18.0	0.33	-0.33	1.57
4,600.0	0.63	111.44	4,599.7	-18.5	21.4	18.5	0.20	0.05	-18.26
4,700.0	0.11	103.48	4,699.6	-18.7	22.0	18.8	0.52	-0.52	-7.96
4,800.0	0.31	101.36	4,799.6	-18.8	22.3	18.8	0.20	0.20	-2.12
4,900.0	0.21	103.56	4,899.6	-18.9	22.8	18.9	0.10	-0.10	2.20
5,000.0	0.11	105.30	4,999.6	-19.0	23.0	19.0	0.10	-0.10	1.74



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL 330' FNL 990' FWL T17S R32E Unit D
Project:	Lea County NM	TVD Reference:	KB @ 4175.0usft (United 43)
Site:	Pan Head Fee #12H	MD Reference:	KB @ 4175.0usft (United 43)
Well:	SHL 330' FNL 990' FWL T17S R32E Unit D	North Reference:	Grid
Wellbore:	BHL 966' FNL 966' FWL T17S R32E Unit D	Survey Calculation Method:	Minimum Curvature
Design:	BHL 966' FNL 966' FWL T17S R32E Unit D	Database:	EDM 5000.1 Single User Db

Survey										
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)	
5,100.0	0.26	103.75	5,099.6	-19.0	23.4	19.1	0.15	0.15	-1.55	
5,126.0	0.17	99.69	5,125.6	-19.1	23.5	19.1	0.35	-0.35	-15.62	
TIE-IN to VES Gyro										
5,168.0	0.20	152.70	5,167.6	-19.1	23.5	19.2	0.40	0.07	126.21	
5,200.0	0.80	186.10	5,199.6	-19.4	23.6	19.5	2.01	1.88	104.38	
5,231.0	3.70	192.00	5,230.6	-20.6	23.3	20.7	9.37	9.35	19.03	
5,263.0	7.30	186.80	5,262.5	-23.6	22.9	23.7	11.35	11.25	-16.25	
5,294.0	11.50	182.70	5,293.0	-28.7	22.5	28.7	13.71	13.55	-13.23	
5,325.0	16.00	182.20	5,323.1	-36.0	22.2	36.1	14.52	14.52	-1.61	
5,357.0	20.80	182.00	5,353.5	-46.1	21.8	46.2	15.00	15.00	-0.63	
5,388.0	24.70	181.00	5,382.1	-58.1	21.5	58.2	12.64	12.58	-3.23	
5,420.0	27.50	181.80	5,410.8	-72.2	21.2	72.2	8.82	8.75	2.50	
5,451.0	29.90	183.90	5,438.0	-87.0	20.4	87.1	8.40	7.74	6.77	
5,482.0	32.20	185.90	5,464.6	-103.0	19.0	103.0	8.13	7.42	6.45	
5,514.0	34.20	188.20	5,491.3	-120.4	16.9	120.4	7.38	6.25	7.19	
5,546.0	36.40	189.00	5,517.5	-138.6	14.1	138.7	7.03	6.88	2.50	
5,577.0	39.10	189.70	5,542.0	-157.4	11.0	157.4	8.82	8.71	2.26	
5,609.0	41.80	190.50	5,566.3	-177.8	7.4	177.8	8.59	8.44	2.50	
5,640.0	44.00	190.80	5,589.0	-198.5	3.5	198.5	7.13	7.10	0.97	
5,672.0	45.70	189.30	5,611.7	-220.8	-0.5	220.8	6.26	5.31	-4.69	
5,703.0	47.90	187.80	5,632.9	-243.1	-3.8	243.1	7.92	7.10	-4.84	
5,734.0	50.60	185.80	5,653.2	-266.4	-6.6	266.4	9.99	8.71	-6.45	
5,766.0	54.10	183.10	5,672.7	-291.7	-8.5	291.6	12.81	10.94	-8.44	
5,797.0	57.10	181.30	5,690.2	-317.2	-9.5	317.2	10.80	9.68	-5.81	
5,829.0	59.80	181.40	5,707.0	-344.5	-10.2	344.5	8.44	8.44	0.31	
5,860.0	61.80	182.70	5,722.1	-371.5	-11.1	371.5	7.42	6.45	4.19	
5,892.0	64.00	183.30	5,736.7	-400.0	-12.6	399.9	7.07	6.88	1.88	
5,923.0	66.60	182.80	5,749.6	-428.1	-14.1	428.1	8.51	8.39	-1.61	
5,955.0	69.50	182.20	5,761.6	-457.7	-15.4	457.7	9.23	9.06	-1.88	
5,986.0	72.00	182.20	5,771.8	-487.0	-16.5	486.9	8.06	8.06	0.00	
6,018.0	73.90	182.80	5,781.2	-517.5	-17.9	517.5	6.20	5.94	1.88	
6,049.0	76.10	182.80	5,789.2	-547.5	-19.3	547.4	7.10	7.10	0.00	
6,081.0	78.20	181.80	5,796.3	-578.6	-20.6	578.6	7.24	6.56	-3.13	
6,113.0	80.40	182.00	5,802.3	-610.0	-21.6	610.0	6.90	6.88	0.63	
6,144.0	81.50	182.70	5,807.1	-640.6	-22.9	640.6	4.19	3.55	2.26	
6,176.0	83.20	182.40	5,811.4	-672.3	-24.3	672.3	5.39	5.31	-0.94	
6,207.0	85.20	181.70	5,814.5	-703.1	-25.4	703.1	6.83	6.45	-2.26	
6,239.0	86.90	181.70	5,816.7	-735.0	-26.3	735.0	5.31	5.31	0.00	
6,270.0	88.30	181.80	5,818.0	-766.0	-27.3	765.9	4.53	4.52	0.32	
6,301.0	89.90	181.30	5,818.5	-797.0	-28.1	796.9	5.41	5.16	-1.61	
6,332.0	90.70	181.00	5,818.4	-828.0	-28.8	827.9	2.76	2.58	-0.97	
6,364.0	89.50	179.60	5,818.3	-860.0	-28.9	859.9	5.76	-3.75	-4.38	
6,395.0	89.00	178.80	5,818.7	-891.0	-28.5	890.9	3.04	-1.61	-2.58	



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 330' FNL: 990' FWL: T17S, R32E, Unit D
Project:	Lea County, NM	TVD Reference:	KB @ 4175.0usft (United 43)
Site:	Pan Head Fee #12H	MD Reference:	KB @ 4175.0usft (United 43)
Well:	SHL: 330' FNL: 990' FWL: T17S, R32E, Unit D	North Reference:	Grid
Wellbore:	BHL: 966' FNL: 966' FWL: T17S, R32E, Unit D	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 966' FNL: 966' FWL: T17S, R32E, Unit D	Database:	EDM 5000.1 Single User 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)
6,427.0	89.50	178.70	5,819.1	-923.0	-27.8	922.9	1.59	1.56	-0.31
6,521.0	89.70	178.30	5,819.8	-1,016.9	-25.3	1,016.9	0.48	0.21	-0.43
6,615.0	89.10	178.00	5,820.8	-1,110.9	-22.3	1,110.8	0.71	-0.64	-0.32
6,711.0	88.50	178.10	5,822.8	-1,206.8	-19.0	1,206.7	0.63	-0.63	0.10
6,804.0	88.00	177.50	5,825.6	-1,299.7	-15.5	1,299.6	0.84	-0.54	-0.65
6,899.0	89.50	178.10	5,827.7	-1,394.6	-11.8	1,394.6	1.70	1.58	0.63
6,993.0	90.00	178.80	5,828.1	-1,488.6	-9.3	1,488.5	0.92	0.53	0.74
7,087.0	91.60	180.10	5,826.8	-1,582.5	-8.4	1,582.5	2.19	1.70	1.38
7,182.0	92.40	181.40	5,823.5	-1,677.5	-9.6	1,677.4	1.61	0.84	1.37
7,276.0	92.50	180.90	5,819.5	-1,771.4	-11.5	1,771.3	0.54	0.11	-0.53
7,370.0	92.50	181.00	5,815.4	-1,865.3	-13.1	1,865.2	0.11	0.00	0.11
7,465.0	91.70	181.90	5,811.9	-1,960.2	-15.5	1,960.1	1.27	-0.84	0.95
7,559.0	89.90	182.40	5,810.6	-2,054.1	-19.0	2,054.0	1.99	-1.91	0.53
7,654.0	89.20	181.90	5,811.3	-2,149.0	-22.5	2,148.9	0.91	-0.74	-0.53
7,748.0	88.20	181.30	5,813.4	-2,242.9	-25.2	2,242.9	1.24	-1.06	-0.64
7,843.0	87.90	181.20	5,816.7	-2,337.9	-27.2	2,337.8	0.33	-0.32	-0.11
7,937.0	88.80	181.00	5,819.4	-2,431.8	-29.0	2,431.7	0.98	0.96	-0.21
8,032.0	88.40	181.20	5,821.7	-2,526.8	-30.9	2,526.7	0.47	-0.42	0.21
8,127.0	90.30	178.50	5,822.8	-2,621.7	-30.6	2,621.7	3.48	2.00	-2.84
8,221.0	90.70	177.80	5,822.0	-2,715.7	-27.6	2,715.6	0.86	0.43	-0.74
8,316.0	89.60	178.50	5,821.7	-2,810.6	-24.5	2,810.6	1.37	-1.16	0.74
8,410.0	89.50	178.40	5,822.4	-2,904.6	-22.0	2,904.5	0.15	-0.11	-0.11
8,505.0	89.50	178.50	5,823.3	-2,999.6	-19.4	2,999.5	0.11	0.00	0.11
8,599.0	89.80	178.70	5,823.8	-3,093.5	-17.1	3,093.5	0.38	0.32	0.21
8,694.0	89.90	178.80	5,824.1	-3,188.5	-15.0	3,188.5	0.15	0.11	0.11
8,788.0	90.00	178.60	5,824.2	-3,282.5	-12.9	3,282.4	0.24	0.11	-0.21
8,883.0	89.70	178.20	5,824.4	-3,377.5	-10.2	3,377.4	0.53	-0.32	-0.42
8,977.0	90.00	180.10	5,824.7	-3,471.4	-8.9	3,471.4	2.05	0.32	2.02
9,072.0	89.00	180.40	5,825.5	-3,566.4	-9.3	3,566.4	1.10	-1.05	0.32
9,167.0	87.40	180.60	5,828.5	-3,661.4	-10.1	3,661.3	1.70	-1.68	0.21
9,261.0	87.20	180.60	5,832.9	-3,755.3	-11.1	3,755.2	0.21	-0.21	0.00
9,355.0	88.60	179.90	5,836.4	-3,849.2	-11.5	3,849.2	1.66	1.49	-0.74
9,450.0	89.00	179.70	5,838.3	-3,944.2	-11.2	3,944.1	0.47	0.42	-0.21
9,544.0	89.10	179.60	5,839.9	-4,038.2	-10.6	4,038.1	0.15	0.11	-0.11
9,639.0	89.00	179.50	5,841.5	-4,133.1	-9.8	4,133.1	0.15	-0.11	-0.11
9,733.0	89.20	179.50	5,843.0	-4,227.1	-9.0	4,227.1	0.21	0.21	0.00
9,828.0	89.40	179.50	5,844.1	-4,322.1	-8.2	4,322.1	0.21	0.21	0.00
9,922.0	88.70	180.90	5,845.7	-4,416.1	-8.5	4,416.1	1.66	-0.74	1.49
10,017.0	88.60	181.70	5,847.9	-4,511.1	-10.7	4,511.0	0.85	-0.11	0.84
10,111.0	86.50	180.30	5,851.9	-4,604.9	-12.3	4,604.9	2.68	-2.23	-1.49
10,206.0	87.50	179.60	5,856.9	-4,699.8	-12.2	4,699.8	1.28	1.05	-0.74
10,300.0	87.90	179.40	5,860.7	-4,793.7	-11.4	4,793.7	0.48	0.43	-0.21



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 330' FNL: 990' FWL: T17S, R32E, Unit D
Project:	Lea County, NM	TVD Reference:	KB @ 4175.0usft (United 43)
Site:	Pan Head Fee #12H	MD Reference:	KB @ 4175.0usft (United 43)
Well:	SHL: 330' FNL: 990' FWL: T17S, R32E, Unit D	North Reference:	Grid
Wellbore:	BHL: 966' FNL: 966' FWL: T17S, R32E, Unit D	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 966' FNL: 966' FWL: T17S, R32E, Unit D	Database:	EDM 5000.1 Single User 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)
10,395.0	87.80	179.50	5,864.2	-4,888.7	-10.5	4,888.6	0.15	-0.11	0.11
10,489.0	88.20	179.60	5,867.5	-4,982.6	-9.8	4,982.6	0.44	0.43	0.11
10,584.0	88.40	179.60	5,870.3	-5,077.6	-9.1	5,077.5	0.21	0.21	0.00
10,678.0	88.40	179.60	5,873.0	-5,171.5	-8.4	5,171.5	0.00	0.00	0.00
10,773.0	88.00	178.80	5,876.0	-5,266.5	-7.1	5,266.4	0.94	-0.42	-0.84
10,867.0	88.70	177.10	5,878.7	-5,360.4	-3.8	5,360.3	1.96	0.74	-1.81
10,961.0	89.30	176.20	5,880.3	-5,454.2	1.7	5,454.2	1.15	0.64	-0.96
11,056.0	89.00	177.30	5,881.7	-5,549.0	7.1	5,549.0	1.20	-0.32	1.16
11,150.0	89.40	176.80	5,883.0	-5,642.9	12.0	5,642.9	0.68	0.43	-0.53
11,244.0	90.20	178.20	5,883.3	-5,736.8	16.1	5,736.8	1.72	0.85	1.49
11,339.0	90.40	178.20	5,882.9	-5,831.7	19.0	5,831.8	0.21	0.21	0.00
Final MWD Survey									
11,400.0	90.40	178.20	5,882.4	-5,892.7	21.0	5,892.7	0.00	0.00	0.00
Projection to Bit/TD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,126.0	5,125.6	-19.1	23.5	TIE-IN to VES Gyro
11,339.0	5,882.9	-5,831.7	19.0	Final MWD Survey
11,400.0	5,882.4	-5,892.7	21.0	Projection to Bit/TD

Checked By: _____ Approved By: _____ Date: _____