

Results of Directional Survey

API number:	30-025-41560		
OGRID:		Operator:	COG PRODUCTION, LLC
		Property:	KING TUT FEDERAL # 4H

surface	ULSTR:	A	30	T	24S	R	32E
				190	FNL	330	FEL

BH Loc	ULSTR:	P	31	T	24S	R	32E
18222	MD	8475.3	TVD	337	FSL	399	FEL
				10223	FNL	399	FEL

Top Perf/OH	ULSTR:	A	30	T	24S	R	32E
8663	MD	8443.7	TVD	673	FNL	359	FEL

Bot Perf/OH	ULSTR:	P	31	T	24S	R	32E
18050	MD	8481.2	TVD	509	FSL	403	FEL
				10051	FNL	403	FEL

	MD	N/S	E/W	VD
	8639	-460.48	-24.89	8437.31
TOP PERFS/OH	8663	-483.24	-29.02	8443.70
	8663	-483.24	-29.02	8443.70
	18001	-9812.17	-74.08	8482.35
BOT PERFS/OH	18050	-9861.15	-73.31	8481.20
	18095	-9906.13	-72.60	8480.14

NEXT TO LAST	18176	-9987.05	-70.41	8477.24
LAST READING	18222	-10032.99	-68.97	8475.32
TD	18222	-10032.99	-68.97	8475.32

Surface Location	190	FN	330	FE
Projected BHL	10223	FN	399	FE
Location of				
Top Perfs/OH	673	FN	359	FE
Bottom Perfs/OH	10051	FN	403	FE

SUMMARY of Subsurface Locations

Surface Location	A-30-24S-32E	190	FN	330	FE	Vert. Depth
Top Perfs/OH	A-30-24S-32E	673	FN	359	FE	8443.70
Bottom Perfs/OH	P-31-24S-32E	10051	FN	403	FE	8481.20
Projected TD	P-31-24S-32E	10223	FN	399	FE	8475.32

OCT 17 2014

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Tut Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Site:	King Tut Federal	MD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Well:	King Tut Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

HOBBS OCD

OCT 09 2014

Project	Lea County, New Mexico		
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		

RECEIVED

RECEIVED

Site		King Tut Federal				
Site Position:		Northing:	435,225.50	usft	Latitude:	32.19499500
From:	Map	Easting:	694,114.20	usft	Longitude:	-103.70582159
Position Uncertainty:	0.00	usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.33 °

Well	King Tut Federal Well No. 4H					
Well Position	+N/-S	0.00 usft	Northing:	435,225.50 usft	Latitude:	32.19499500
	+E/-W	0.00 usft	Easting:	694,114.20 usft	Longitude:	-103.70582159
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,547.70 usft

Wellbore	Original hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/7/2014	7.29	60.07	48,294

Design	Surveys Original hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	180.55	

Survey Program		Date	7/10/2014	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
191.00	4,468.00	Teledrift surveys (Original hole)	MWD	MWD - Standard
4,565.00	18,222.00	MWD (Original hole)	MWD	MWD - Standard

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Map	Map	Latitude	Longitude
Depth	(°)	(°)	Depth	(usft)	(usft)	Northing	Easting		
(usft)			(usft)			(usft)	(usft)		
0.00	0.00	0.00	0.00	0.00	0.00	435,225.50	694,114.20	32.19499500	-103.70582159
191.00	0.90	309.00	190.99	0.94	-1.17	435,226.44	694,113.03	32.19499762	-103.70582534
Teledrift surveys									
330.00	0.60	42.50	329.98	2.17	-1.52	435,227.67	694,112.67	32.19500099	-103.70582647
414.00	0.80	27.50	413.98	3.01	-0.95	435,228.51	694,113.24	32.19500330	-103.70582462
504.00	0.70	18.50	503.97	4.09	-0.49	435,229.59	694,113.71	32.19500626	-103.70582310
673.00	1.50	27.50	672.94	7.03	0.86	435,232.53	694,115.05	32.19501432	-103.70581868
787.00	1.20	15.50	786.91	9.51	1.87	435,235.01	694,116.06	32.19502110	-103.70581538
867.00	1.20	43.00	866.89	10.93	2.66	435,236.43	694,116.86	32.19502499	-103.70581278

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Tut Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Site:	King Tut Federal	MD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Well:	King Tut Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
968.00	0.20	298.00	967.88	11.78	3.23	435,237.28	694,117.42	32.19502734	-103.70581094
1,062.00	0.00	106.50	1,061.88	11.86	3.08	435,237.36	694,117.28	32.19502755	-103.70581140
1,156.00	0.10	0.10	1,155.88	11.94	3.08	435,237.44	694,117.28	32.19502778	-103.70581140
1,344.00	0.20	324.50	1,343.88	12.37	2.89	435,237.87	694,117.09	32.19502897	-103.70581201
1,438.00	0.20	69.50	1,437.88	12.56	2.95	435,238.06	694,117.15	32.19502949	-103.70581182
1,532.00	0.40	270.50	1,531.88	12.62	2.78	435,238.12	694,116.97	32.19502966	-103.70581238
1,693.00	0.20	134.50	1,692.88	12.43	2.42	435,237.93	694,116.61	32.19502914	-103.70581355
1,713.00	0.40	22.50	1,712.88	12.47	2.47	435,237.97	694,116.66	32.19502924	-103.70581338
1,781.00	0.40	11.50	1,780.88	12.92	2.60	435,238.42	694,116.80	32.19503048	-103.70581293
2,161.00	0.20	58.50	2,160.87	14.57	3.43	435,240.07	694,117.63	32.19503500	-103.70581022
2,443.00	0.50	89.50	2,442.87	14.84	5.08	435,240.34	694,119.28	32.19503571	-103.70580488
2,725.00	1.30	154.50	2,724.84	11.96	7.69	435,237.46	694,121.89	32.19502776	-103.70579650
3,009.00	0.60	130.50	3,008.80	8.09	10.21	435,233.59	694,124.41	32.19501707	-103.70578844
3,103.00	1.60	83.50	3,102.78	7.92	11.89	435,233.42	694,126.08	32.19501657	-103.70578301
3,197.00	0.90	55.50	3,196.76	8.48	13.80	435,233.98	694,128.00	32.19501810	-103.70577682
3,291.00	0.30	71.50	3,290.75	8.98	14.64	435,234.48	694,128.84	32.19501945	-103.70577409
3,405.00	0.20	138.50	3,404.75	8.92	15.06	435,234.42	694,129.25	32.19501929	-103.70577275
3,592.00	0.40	137.00	3,591.75	8.20	15.72	435,233.70	694,129.91	32.19501730	-103.70577063
3,873.00	0.70	67.00	3,872.74	8.16	17.97	435,233.66	694,132.16	32.19501713	-103.70576336
4,134.00	0.20	166.50	4,133.73	8.34	19.54	435,233.84	694,133.74	32.19501760	-103.70575827
4,439.00	0.20	358.50	4,438.73	8.35	19.65	435,233.85	694,133.85	32.19501764	-103.70575791
4,468.00	0.00	351.00	4,467.73	8.40	19.65	435,233.90	694,133.85	32.19501778	-103.70575791
4,565.00	0.20	140.10	4,564.73	8.27	19.76	435,233.77	694,133.96	32.19501742	-103.70575756
MWD surveys									
4,627.00	0.40	121.40	4,626.73	8.08	20.01	435,233.58	694,134.21	32.19501688	-103.70575675
4,721.00	0.40	124.40	4,720.73	7.72	20.56	435,233.22	694,134.76	32.19501589	-103.70575497
4,815.00	0.60	131.10	4,814.72	7.21	21.21	435,232.71	694,135.40	32.19501448	-103.70575291
4,910.00	0.70	111.70	4,909.72	6.67	22.12	435,232.17	694,136.32	32.19501298	-103.70574996
5,004.00	0.80	105.90	5,003.71	6.28	23.28	435,231.78	694,137.48	32.19501188	-103.70574621
5,098.00	0.90	117.30	5,097.70	5.76	24.57	435,231.26	694,138.77	32.19501044	-103.70574206
5,192.00	0.80	117.00	5,191.69	5.12	25.81	435,230.62	694,140.01	32.19500867	-103.70573806
5,286.00	0.80	116.80	5,285.68	4.53	26.98	435,230.03	694,141.18	32.19500702	-103.70573429
5,380.00	0.70	105.90	5,379.67	4.08	28.12	435,229.57	694,142.32	32.19500575	-103.70573062
5,474.00	0.70	119.50	5,473.66	3.63	29.17	435,229.13	694,143.37	32.19500453	-103.70572722
5,568.00	0.70	126.50	5,567.66	3.01	30.13	435,228.51	694,144.33	32.19500280	-103.70572413
5,662.00	0.70	128.30	5,661.65	2.31	31.05	435,227.81	694,145.24	32.19500086	-103.70572119
5,756.00	0.60	128.40	5,755.64	1.65	31.88	435,227.15	694,146.08	32.19499903	-103.70571850
5,850.00	0.70	120.40	5,849.64	1.06	32.76	435,226.56	694,146.96	32.19499738	-103.70571566
5,944.00	0.80	118.50	5,943.63	0.45	33.84	435,225.95	694,148.03	32.19499570	-103.70571221
6,038.00	0.90	104.80	6,037.62	-0.05	35.13	435,225.45	694,149.32	32.19499430	-103.70570805
6,132.00	0.90	103.70	6,131.61	-0.41	36.56	435,225.09	694,150.75	32.19499328	-103.70570343
6,226.00	0.80	102.90	6,225.60	-0.73	37.91	435,224.76	694,152.11	32.19499237	-103.70569905
6,320.00	0.80	100.30	6,319.59	-1.00	39.20	435,224.50	694,153.39	32.19499163	-103.70569490
6,414.00	0.90	106.00	6,413.58	-1.32	40.55	435,224.18	694,154.75	32.19499073	-103.70569053
6,508.00	1.10	106.20	6,507.56	-1.77	42.13	435,223.73	694,156.33	32.19498945	-103.70568544
6,602.00	1.00	106.40	6,601.55	-2.26	43.78	435,223.24	694,157.98	32.19498809	-103.70568010
6,696.00	1.10	107.90	6,695.53	-2.77	45.43	435,222.73	694,159.63	32.19498667	-103.70567479
6,790.00	1.00	99.90	6,789.52	-3.19	47.10	435,222.31	694,161.29	32.19498549	-103.70566941
6,884.00	1.00	89.80	6,883.50	-3.32	48.72	435,222.18	694,162.92	32.19498509	-103.70566415
6,978.00	1.00	78.20	6,977.49	-3.15	50.35	435,222.35	694,164.54	32.19498553	-103.70565890
7,072.00	1.00	81.70	7,071.47	-2.87	51.96	435,222.63	694,166.16	32.19498629	-103.70565368
7,166.00	0.80	88.80	7,165.46	-2.73	53.43	435,222.77	694,167.63	32.19498663	-103.70564893
7,260.00	0.80	91.90	7,259.45	-2.74	54.74	435,222.76	694,168.94	32.19498659	-103.70564469

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Tut Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Site:	King Tut Federal	MD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Well:	King Tut Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
7,354.00	0.60	95.20	7,353.45	-2.81	55.89	435,222.69	694,170.08	32.19498638	-103.70564099
7,448.00	0.60	111.00	7,447.44	-3.03	56.84	435,222.47	694,171.03	32.19498576	-103.70563792
7,542.00	0.60	114.40	7,541.44	-3.41	57.75	435,222.09	694,171.94	32.19498470	-103.70563499
7,636.00	0.70	113.40	7,635.43	-3.84	58.72	435,221.66	694,172.92	32.19498350	-103.70563185
7,730.00	0.70	106.20	7,729.42	-4.23	59.80	435,221.27	694,173.99	32.19498242	-103.70562837
7,800.00	0.60	114.80	7,799.42	-4.50	60.54	435,221.00	694,174.74	32.19498166	-103.70562597
7,856.00	3.30	179.50	7,855.38	-6.24	60.82	435,219.26	694,175.02	32.19497688	-103.70562510
7,887.00	8.50	185.20	7,886.21	-9.41	60.62	435,216.09	694,174.82	32.19496815	-103.70562581
7,919.00	11.60	186.40	7,917.71	-14.97	60.05	435,210.53	694,174.24	32.19495290	-103.70562776
7,950.00	14.60	186.40	7,947.90	-21.95	59.27	435,203.55	694,173.46	32.19493372	-103.70563043
7,981.00	17.50	187.30	7,977.69	-30.46	58.24	435,195.04	694,172.43	32.19491035	-103.70563391
8,013.00	20.70	189.00	8,007.93	-40.82	56.74	435,184.68	694,170.94	32.19488189	-103.70563894
8,044.00	22.80	190.20	8,036.72	-52.14	54.82	435,173.36	694,169.02	32.19485079	-103.70564537
8,075.00	24.70	190.60	8,065.09	-64.42	52.57	435,161.08	694,166.76	32.19481708	-103.70565289
8,107.00	26.90	191.30	8,093.90	-78.09	49.92	435,147.41	694,164.11	32.19477954	-103.70566171
8,138.00	30.20	191.30	8,121.13	-92.62	47.01	435,132.88	694,161.21	32.19473965	-103.70567137
8,169.00	33.20	190.70	8,147.50	-108.61	43.91	435,116.89	694,158.11	32.19469575	-103.70568170
8,201.00	35.50	189.70	8,173.92	-126.38	40.72	435,099.12	694,154.91	32.19464696	-103.70569236
8,232.00	37.50	188.70	8,198.84	-144.58	37.77	435,080.92	694,151.97	32.19459697	-103.70570222
8,263.00	39.30	190.30	8,223.13	-163.57	34.59	435,061.93	694,148.79	32.19454482	-103.70571287
8,295.00	41.20	191.00	8,247.55	-183.89	30.77	435,041.61	694,144.96	32.19448903	-103.70572561
8,326.00	43.60	192.10	8,270.44	-204.36	26.58	435,021.14	694,140.77	32.19443281	-103.70573954
8,357.00	46.40	192.90	8,292.36	-225.76	21.83	434,999.74	694,136.03	32.19437407	-103.70575529
8,389.00	49.50	192.80	8,313.79	-248.92	16.55	434,976.57	694,130.74	32.19431048	-103.70577280
8,420.00	52.60	192.30	8,333.28	-272.45	11.31	434,953.04	694,125.51	32.19424589	-103.70579017
8,451.00	55.20	191.70	8,351.54	-296.95	6.11	434,928.55	694,120.30	32.19417863	-103.70580746
8,471.00	56.64	191.89	8,362.75	-313.17	2.72	434,912.33	694,116.92	32.19413411	-103.70581871
330 Hard line intercept @ 8471 MD									
8,483.00	57.50	192.00	8,369.27	-323.02	0.64	434,902.48	694,114.83	32.19410706	-103.70582563
8,514.00	59.40	191.60	8,385.49	-348.88	-4.77	434,876.62	694,109.43	32.19403606	-103.70584358
8,545.00	61.90	190.80	8,400.68	-375.38	-10.01	434,850.12	694,104.18	32.19396329	-103.70586104
8,577.00	64.70	189.60	8,415.06	-403.52	-15.07	434,821.98	694,099.13	32.19388604	-103.70587792
8,608.00	68.80	189.60	8,427.30	-431.60	-19.82	434,793.90	694,094.38	32.19380893	-103.70589380
8,639.00	73.50	190.30	8,437.31	-460.48	-24.89	434,765.02	694,089.31	32.19372961	-103.70591073
8,663.00	75.60	190.30	8,443.70	-483.24	-29.02	434,742.26	694,085.17	32.19366711	-103.70592453
8,694.00	78.10	190.40	8,450.75	-512.93	-34.45	434,712.57	694,079.75	32.19358558	-103.70594262
8,726.00	80.80	190.50	8,456.61	-543.87	-40.15	434,681.63	694,074.04	32.19350064	-103.70596165
8,757.00	83.60	189.50	8,460.82	-574.11	-45.49	434,651.39	694,068.71	32.19341759	-103.70597945
8,788.00	84.60	189.00	8,464.01	-604.55	-50.44	434,620.95	694,063.75	32.19333401	-103.70599605
8,820.00	86.20	188.40	8,466.57	-636.08	-55.27	434,589.42	694,058.93	32.19324742	-103.70601224
8,851.00	88.10	188.00	8,468.11	-666.72	-59.68	434,558.78	694,054.51	32.19316325	-103.70602709
8,882.00	89.80	187.80	8,468.68	-697.42	-63.94	434,528.08	694,050.25	32.19307893	-103.70604144
8,977.00	87.50	184.30	8,470.92	-791.84	-73.95	434,433.66	694,040.24	32.19281954	-103.70607557
9,071.00	87.10	181.70	8,475.35	-885.60	-78.86	434,339.90	694,035.33	32.19256189	-103.70609322
9,165.00	89.10	180.70	8,478.47	-979.52	-80.83	434,245.98	694,033.36	32.19230374	-103.70610135
9,259.00	90.30	178.00	8,478.96	-1,073.50	-79.77	434,151.99	694,034.43	32.19204539	-103.70609968
9,353.00	90.30	177.00	8,478.47	-1,167.41	-75.67	434,058.09	694,038.53	32.19178718	-103.70608820
9,447.00	91.00	178.30	8,477.40	-1,261.33	-71.81	433,964.17	694,042.38	32.19152897	-103.70607751
9,541.00	91.10	179.80	8,475.68	-1,355.29	-70.25	433,870.21	694,043.94	32.19127064	-103.70607424
9,635.00	90.00	180.50	8,474.77	-1,449.29	-70.50	433,776.21	694,043.70	32.19101227	-103.70607681
9,729.00	89.40	179.10	8,475.27	-1,543.28	-70.17	433,682.22	694,044.02	32.19075389	-103.70607752
9,823.00	90.90	178.70	8,475.02	-1,637.26	-68.37	433,588.24	694,045.83	32.19049552	-103.70607346
9,917.00	91.30	178.30	8,473.22	-1,731.21	-65.91	433,494.29	694,048.29	32.19023723	-103.70606728

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Tut Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Site:	King Tut Federal	MD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Well:	King Tut Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,011.00	91.30	177.60	8,471.08	-1,825.13	-62.54	433,400.37	694,051.65	32.18997902	-103.70605819
10,105.00	90.50	179.00	8,469.61	-1,919.07	-59.76	433,306.43	694,054.44	32.18972073	-103.70605094
10,199.00	90.10	179.60	8,469.11	-2,013.06	-58.61	433,212.44	694,055.59	32.18946235	-103.70604900
10,293.00	92.60	181.40	8,466.90	-2,107.02	-59.43	433,118.48	694,054.77	32.18920408	-103.70605342
10,387.00	89.10	181.10	8,465.51	-2,200.97	-61.48	433,024.53	694,052.72	32.18894585	-103.70606182
10,481.00	90.70	180.70	8,465.67	-2,294.96	-62.95	432,930.54	694,051.24	32.18868753	-103.70606836
10,575.00	88.90	181.70	8,466.00	-2,388.93	-64.92	432,836.57	694,049.27	32.18842924	-103.70607650
10,669.00	88.70	181.20	8,467.97	-2,482.88	-67.30	432,742.62	694,046.90	32.18817103	-103.70608596
10,763.00	89.40	181.00	8,469.53	-2,576.85	-69.10	432,648.65	694,045.09	32.18791275	-103.70609356
10,857.00	90.70	180.70	8,469.44	-2,670.84	-70.50	432,554.66	694,043.70	32.18765441	-103.70609984
10,951.00	89.50	180.50	8,469.28	-2,764.83	-71.48	432,460.67	694,042.71	32.18739606	-103.70610479
11,045.00	89.30	179.70	8,470.26	-2,858.82	-71.65	432,366.67	694,042.55	32.18713769	-103.70610709
11,139.00	90.20	179.90	8,470.67	-2,952.82	-71.32	432,272.68	694,042.88	32.18687930	-103.70610781
11,233.00	90.20	180.20	8,470.35	-3,046.82	-71.40	432,178.68	694,042.79	32.18662091	-103.70610984
11,327.00	90.50	179.70	8,469.77	-3,140.82	-71.32	432,084.68	694,042.88	32.18636252	-103.70611135
11,421.00	90.00	179.50	8,469.36	-3,234.82	-70.66	431,990.68	694,043.53	32.18610413	-103.70611100
11,515.00	90.30	179.00	8,469.12	-3,328.81	-69.43	431,896.69	694,044.76	32.18584574	-103.70610879
11,609.00	89.90	178.30	8,468.95	-3,422.78	-67.22	431,802.72	694,046.98	32.18558739	-103.70610341
11,703.00	91.10	178.20	8,468.13	-3,516.73	-64.35	431,708.77	694,049.85	32.18532909	-103.70609590
11,797.00	90.30	180.20	8,466.98	-3,610.71	-63.04	431,614.79	694,051.16	32.18507073	-103.70609343
11,891.00	89.80	181.20	8,466.90	-3,704.70	-64.18	431,520.80	694,050.01	32.18481238	-103.70609891
11,985.00	89.50	181.00	8,467.47	-3,798.68	-65.99	431,426.82	694,048.21	32.18455407	-103.70610652
12,079.00	90.10	180.70	8,467.80	-3,892.67	-67.38	431,332.83	694,046.81	32.18429574	-103.70611280
12,173.00	89.10	180.20	8,468.46	-3,986.66	-68.12	431,238.84	694,046.07	32.18403737	-103.70611695
12,267.00	90.20	180.00	8,469.03	-4,080.66	-68.29	431,144.84	694,045.91	32.18377899	-103.70611926
12,361.00	89.00	179.90	8,469.69	-4,174.66	-68.20	431,050.84	694,045.99	32.18352061	-103.70612076
12,455.00	90.40	180.00	8,470.18	-4,268.65	-68.12	430,956.85	694,046.07	32.18326223	-103.70612227
12,549.00	91.10	179.90	8,468.95	-4,362.64	-68.04	430,862.86	694,046.16	32.18300386	-103.70612377
12,643.00	89.80	180.20	8,468.21	-4,456.64	-68.12	430,768.86	694,046.07	32.18274548	-103.70612581
12,738.00	90.10	178.80	8,468.30	-4,551.63	-67.29	430,673.87	694,046.90	32.18248435	-103.70612492
12,832.00	87.90	179.00	8,469.94	-4,645.60	-65.49	430,579.90	694,048.71	32.18222603	-103.70612086
12,926.00	88.50	179.20	8,472.89	-4,739.54	-64.01	430,485.96	694,050.18	32.18196777	-103.70611786
13,020.00	89.20	181.00	8,474.78	-4,833.51	-64.18	430,391.99	694,050.02	32.18170945	-103.70612016
13,114.00	89.80	182.50	8,475.60	-4,927.46	-67.05	430,298.04	694,047.15	32.18145124	-103.70613121
13,208.00	90.20	182.40	8,475.60	-5,021.38	-71.07	430,204.12	694,043.13	32.18119315	-103.70614597
13,302.00	90.40	183.10	8,475.10	-5,115.27	-75.58	430,110.23	694,038.62	32.18093514	-103.70616231
13,396.00	90.50	183.60	8,474.37	-5,209.10	-81.07	430,016.40	694,033.13	32.18067728	-103.70618183
13,490.00	90.90	183.80	8,473.22	-5,302.90	-87.13	429,922.60	694,027.06	32.18041955	-103.70620321
13,584.00	90.00	182.70	8,472.48	-5,396.74	-92.46	429,828.76	694,021.73	32.18016167	-103.70622220
13,678.00	87.40	180.90	8,474.61	-5,490.66	-95.41	429,734.84	694,018.78	32.17990355	-103.70623351
13,772.00	86.80	180.70	8,479.37	-5,584.53	-96.73	429,640.97	694,017.47	32.17964554	-103.70623951
13,866.00	89.20	180.40	8,482.65	-5,678.46	-97.63	429,547.04	694,016.57	32.17938735	-103.70624420
13,960.00	89.20	180.60	8,483.96	-5,772.45	-98.45	429,453.05	694,015.75	32.17912901	-103.70624862
14,054.00	89.80	179.80	8,484.78	-5,866.44	-98.78	429,359.06	694,015.42	32.17887063	-103.70625145
14,148.00	90.20	179.70	8,484.78	-5,960.44	-98.36	429,265.06	694,015.83	32.17861224	-103.70625189
14,242.00	91.50	179.70	8,483.39	-6,054.43	-97.87	429,171.07	694,016.32	32.17835388	-103.70625207
14,336.00	92.30	180.00	8,480.27	-6,148.38	-97.63	429,077.12	694,016.57	32.17809563	-103.70625305
14,428.00	90.70	178.90	8,477.86	-6,240.34	-96.74	428,985.16	694,017.45	32.17784283	-103.70625193
14,522.00	90.70	178.80	8,476.71	-6,334.31	-94.86	428,891.19	694,019.34	32.17758448	-103.70624760
14,616.00	91.30	178.90	8,475.07	-6,428.28	-92.97	428,797.22	694,021.22	32.17732615	-103.70624327
14,710.00	90.50	179.30	8,473.60	-6,522.25	-91.49	428,703.25	694,022.70	32.17706780	-103.70624027
14,804.00	90.50	178.50	8,472.77	-6,616.23	-89.69	428,609.27	694,024.51	32.17680944	-103.70623621
14,898.00	91.10	178.20	8,471.46	-6,710.18	-86.98	428,515.32	694,027.21	32.17655114	-103.70622924

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Tut Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Site:	King Tut Federal	MD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Well:	King Tut Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,992.00	90.10	179.00	8,470.48	-6,804.15	-84.69	428,421.35	694,029.51	32.17629280	-103.70622358
15,086.00	88.90	179.70	8,471.30	-6,898.13	-83.62	428,327.37	694,030.57	32.17603443	-103.70622191
15,180.00	88.40	179.20	8,473.51	-6,992.10	-82.72	428,233.40	694,031.48	32.17577611	-103.70622076
15,274.00	89.30	178.60	8,475.40	-7,086.07	-80.91	428,139.43	694,033.28	32.17551779	-103.70621670
15,368.00	90.10	179.00	8,475.89	-7,180.04	-78.95	428,045.46	694,035.25	32.17525943	-103.70621211
15,462.00	90.60	178.80	8,475.32	-7,274.02	-77.14	427,951.48	694,037.05	32.17500106	-103.70620805
15,556.00	90.50	178.50	8,474.42	-7,367.99	-74.93	427,857.51	694,039.27	32.17474272	-103.70620266
15,650.00	89.90	177.70	8,474.09	-7,461.94	-71.81	427,763.56	694,042.38	32.17448442	-103.70619436
15,744.00	89.30	178.30	8,474.74	-7,555.88	-68.53	427,669.62	694,045.67	32.17422614	-103.70618553
15,838.00	89.70	179.80	8,475.56	-7,649.86	-66.97	427,575.64	694,047.22	32.17396778	-103.70618226
15,932.00	89.40	181.20	8,476.30	-7,743.85	-67.79	427,481.65	694,046.40	32.17370942	-103.70618668
16,026.00	88.00	181.80	8,478.43	-7,837.79	-70.25	427,387.71	694,043.94	32.17345123	-103.70619640
16,120.00	88.20	181.70	8,481.55	-7,931.70	-73.12	427,293.80	694,041.07	32.17319315	-103.70620744
16,214.00	88.60	181.70	8,484.18	-8,025.62	-75.91	427,199.88	694,038.29	32.17293502	-103.70621822
16,308.00	88.80	181.00	8,486.31	-8,119.57	-78.12	427,105.93	694,036.07	32.17267680	-103.70622715
16,402.00	89.00	180.50	8,488.11	-8,213.54	-79.35	427,011.96	694,034.84	32.17241850	-103.70623289
16,496.00	90.00	180.50	8,488.93	-8,307.53	-80.17	426,917.97	694,034.02	32.17216014	-103.70623731
16,590.00	90.50	180.40	8,488.52	-8,401.53	-80.91	426,823.97	694,033.28	32.17190177	-103.70624147
16,684.00	91.10	179.90	8,487.21	-8,495.52	-81.16	426,729.98	694,033.04	32.17164341	-103.70624403
16,778.00	91.80	179.40	8,484.83	-8,589.49	-80.58	426,636.01	694,033.61	32.17138510	-103.70624395
16,872.00	90.40	178.80	8,483.03	-8,683.45	-79.11	426,542.05	694,035.09	32.17112677	-103.70624095
16,966.00	89.80	178.70	8,482.86	-8,777.43	-77.06	426,448.07	694,037.14	32.17086841	-103.70623609
17,060.00	90.50	178.30	8,482.62	-8,871.40	-74.60	426,354.10	694,039.60	32.17061007	-103.70622991
17,155.00	91.30	179.00	8,481.13	-8,966.36	-72.36	426,259.14	694,041.84	32.17034900	-103.70622446
17,249.00	90.70	179.50	8,479.48	-9,060.34	-71.13	426,165.16	694,043.07	32.17009066	-103.70622226
17,343.00	90.50	179.70	8,478.50	-9,154.33	-70.47	426,071.17	694,043.72	32.16983227	-103.70622191
17,437.00	91.10	180.60	8,477.19	-9,248.32	-70.72	425,977.18	694,043.48	32.16957391	-103.70622447
17,531.00	90.60	180.80	8,475.79	-9,342.30	-71.87	425,883.20	694,042.33	32.16931559	-103.70622995
17,625.00	89.90	180.50	8,475.38	-9,436.29	-72.93	425,789.21	694,041.26	32.16905724	-103.70623517
17,719.00	88.70	180.50	8,476.53	-9,530.28	-73.75	425,695.22	694,040.44	32.16879889	-103.70623959
17,813.00	87.50	180.40	8,479.65	-9,624.22	-74.49	425,601.28	694,039.71	32.16854066	-103.70624375
17,907.00	89.10	179.80	8,482.44	-9,718.18	-74.65	425,507.32	694,039.54	32.16828240	-103.70624604
18,001.00	91.00	179.50	8,482.35	-9,812.17	-74.08	425,413.33	694,040.12	32.16802401	-103.70624596
18,095.00	91.70	178.70	8,480.14	-9,906.13	-72.60	425,319.37	694,041.59	32.16776571	-103.70624296
18,176.00	92.40	178.20	8,477.24	-9,987.05	-70.41	425,238.45	694,043.78	32.16754324	-103.70623741
18,222.00	92.40	178.20	8,475.32	-10,032.99	-68.97	425,192.51	694,045.22	32.16741694	-103.70623361

Survey projected to 18222.00 MD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
191.00	190.99	0.94	-1.17	Teledrift surveys
4,565.00	4,564.73	8.27	19.76	MWD surveys
8,471.00	8,362.75	-313.17	2.72	330 Hard line intercept @ 8471 MD
18,222.00	8,475.32	-10,032.99	-68.97	Survey projected to 18222.00 MD



Standard_report

HOBBS OCD

OCT 09 2014

N-ZONE

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Tut Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Site:	King Tut Federal	MD Reference:	RKB=3547.7+26 @ 3573.70usft (Independence 205)
Well:	King Tut Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
191.00	190.99	0.94	-1.17	Teledrift surveys
4,565.00	4,564.73	8.27	19.76	MWD surveys
8,471.00	8,362.75	-313.17	2.72	330 Hard line intercept @ 8471 MD
18,222.00	8,475.32	-10,032.99	-68.97	Survey projected to 18222.00 MD



COG Operating LLC

Well: King Tut Federal Well No. 4H
 Site: King Tut Federal
 Project: Lea County, New Mexico
 Design: rev2
 Rig: Independence 205

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	7166.00	0.80	88.80	7165.46	-2.73	53.43	0.00	0.00	2.22	Survey @ 7166.00 MD
2	7895.61	0.80	88.80	7895.00	-2.52	63.61	0.00	0.00	1.91	KOP Begin 10°/100' build/turn
3	7947.76	5.00	190.00	7947.08	-4.75	63.58	10.00	109.83	4.14	Begin 10°/100' build
4	8797.15	89.94	190.00	8470.10	-566.27	-35.43	10.00	0.00	566.58	Begin 3°/100' turn
5	9123.75	89.94	180.20	8470.44	-891.17	-64.43	3.00	-90.00	891.75	Begin 89.94° lateral
6	18272.34	89.94	180.20	8480.00	-10039.70	-96.70	0.00	0.00	0040.17	PBHL/TD

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
190.99	191.00	0.90	309.00	0.94	-1.17	-0.93	1.50	Teledrift surveys
4564.73	4565.00	0.20	140.10	8.27	19.76	-8.46	42.54	MWD surveys
8362.75	8471.00	56.64	191.89	-313.17	2.72	313.13	400.95	330 Hard line intercept @ 8471 MD
8475.32	18222.00	92.40	178.20	-10032.99	-68.97	10033.19	10129.42	Survey projected to 18222.00 MD

Surface Location: RKB=3547.7+26 @ 3573.70usft (Independence 205)
 US State Plane 1927 (Exact solution)

New Mexico East 3001

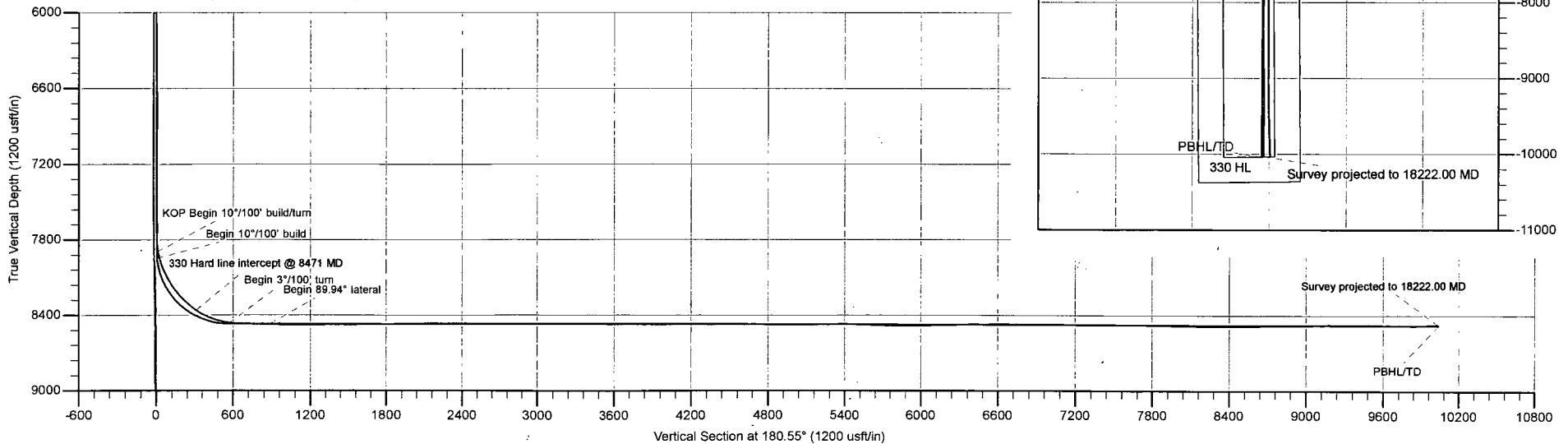
Northing 435225.50 Easting 694114.20 Latitude 32.19499501 Longitude -103.70582159
 Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Add 6.96°



Azimuths to Grid North
 True North: -0.33°
 Magnetic North: 6.96°

Magnetic Field
 Strength: 48294 GsnT
 Dip Angle: 60.07°
 Date: 5/7/2014
 Model: IGRF2010

N-ZONE



19:15, July 10, 2014

