

HOBBSOCD
APR 14 2015
RECEIVED



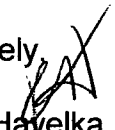
February 5, 2015

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

Attn: Kanicia Castillo

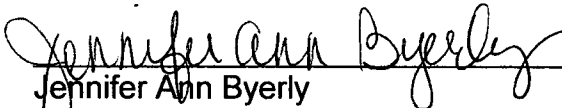
RE: King Air 8 Federal Com 4H

Please find enclosed a copy of the survey from 0' to 8581' ran on the above referenced well.

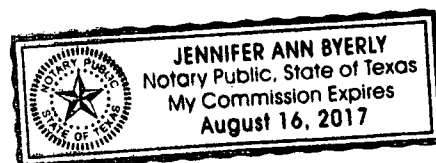
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 5 day of Feb,
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas

VES Survey International
P.O. Box 261021 Corpus Christi, TX 78426
T (361) 767-0602 F (361) 767-0612
www.vesurvey.com



APR 21 2015





Company: Concho
Lease/Well: King Air 8 Federal Com/4H

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.ut
Minimum Curvature Method
Report Date/Time: 2/5/2015 / 10:56

VES Survey International
Midland, Tx
(432)-563-5444
Surveyor: Tim Dillon
King Air 8 Federal Com 4H / API 30-025-42200

HOBBSOCD
APR 14 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	0.23	262.19	100.00	-0.03	-0.20	-0.03	0.20	262.19	0.23
200.00	0.04	298.02	200.00	-0.04	-0.42	-0.04	0.42	264.83	0.20
300.00	0.31	221.56	300.00	-0.23	-0.63	-0.23	0.67	250.32	0.31
400.00	0.42	252.42	400.00	-0.54	-1.16	-0.54	1.28	245.06	0.22
500.00	0.50	251.75	499.99	-0.79	-1.92	-0.79	2.08	247.74	0.08
600.00	0.35	209.64	599.99	-1.19	-2.49	-1.19	2.75	244.44	0.33
700.00	0.79	209.27	699.99	-2.05	-2.97	-2.05	3.61	235.36	0.44
800.00	1.20	209.68	799.97	-3.56	-3.82	-3.56	5.22	227.06	0.41
900.00	1.00	228.76	899.95	-5.04	-4.99	-5.04	7.09	224.75	0.41
1000.00	0.87	212.74	999.94	-6.25	-6.06	-6.25	8.70	224.11	0.29
1100.00	1.00	202.41	1099.93	-7.70	-6.80	-7.70	10.27	221.47	0.21
1200.00	1.09	196.66	1199.91	-9.42	-7.41	-9.42	11.99	218.19	0.14
1300.00	1.24	215.89	1299.89	-11.21	-8.32	-11.21	13.96	216.57	0.41
1400.00	1.03	229.37	1399.87	-12.67	-9.63	-12.67	15.92	217.24	0.34
1500.00	1.23	219.83	1499.85	-14.08	-11.00	-14.08	17.86	218.00	0.27
1600.00	1.36	213.19	1599.83	-15.89	-12.33	-15.89	20.12	217.81	0.20
1700.00	0.69	207.56	1699.81	-17.42	-13.26	-17.42	21.89	217.28	0.68
1800.00	1.18	77.99	1799.80	-17.73	-12.53	-17.73	21.71	215.24	1.70

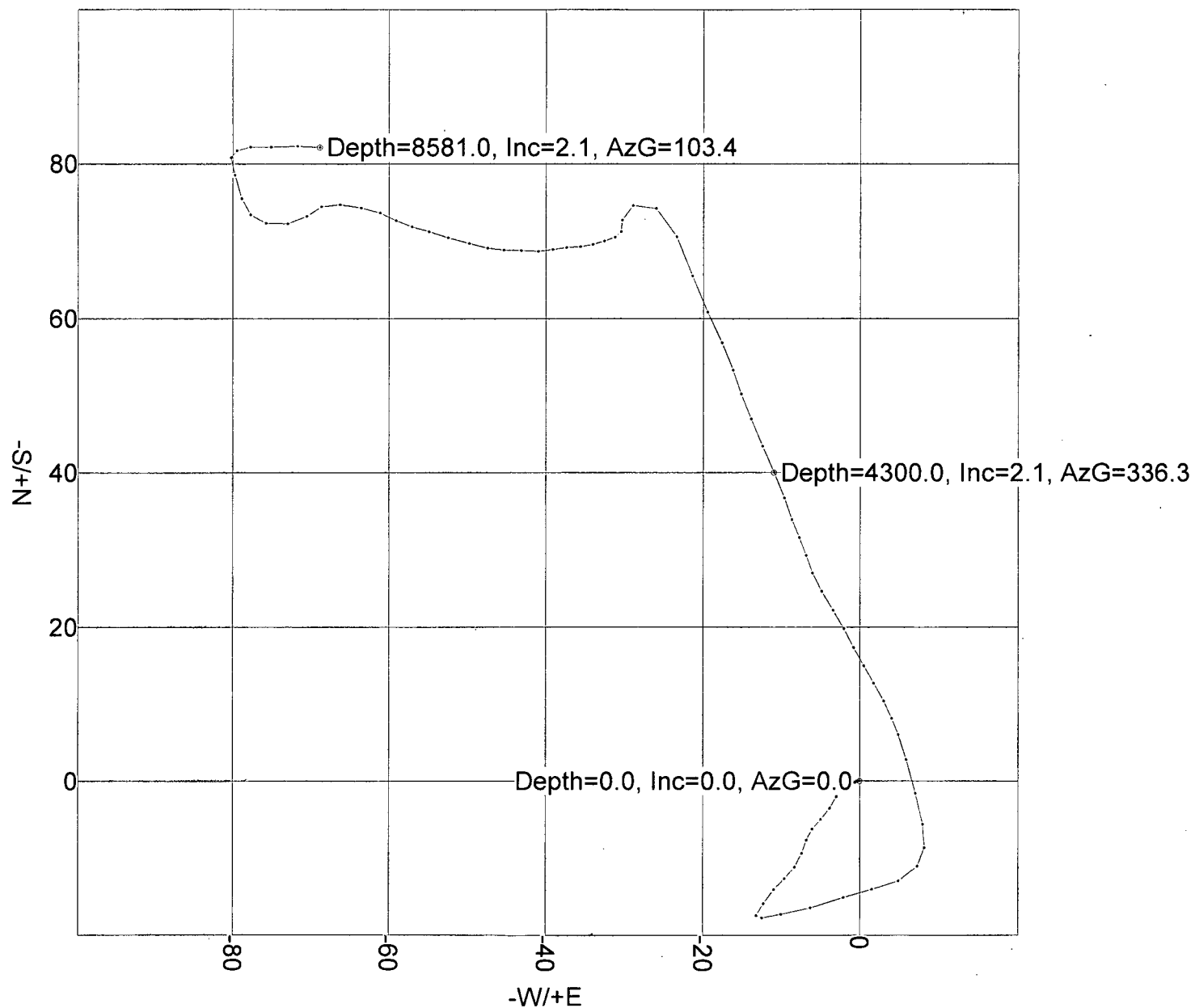
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	1.68	80.42	1899.77	-17.28	-10.08	-17.28	20.00	210.25	0.50
2000.00	2.77	75.98	1999.69	-16.45	-6.29	-16.45	17.61	200.94	1.10
2100.00	2.28	67.79	2099.60	-15.11	-2.11	-15.11	15.26	187.93	0.60
2200.00	2.07	80.28	2199.53	-14.05	1.52	-14.05	14.13	173.84	0.52
2300.00	2.05	64.58	2299.46	-12.98	4.91	-12.98	13.88	159.30	0.56
2400.00	1.61	35.34	2399.41	-11.07	7.33	-11.07	13.28	146.50	1.01
2500.00	1.42	4.26	2499.38	-8.69	8.23	-8.69	11.97	136.55	0.83
2600.00	2.08	349.81	2599.33	-5.66	8.00	-5.66	9.80	125.28	0.79
2700.00	2.66	345.15	2699.25	-1.63	7.09	-1.63	7.27	102.93	0.61
2800.00	2.56	345.20	2799.14	2.78	5.92	2.78	6.54	64.88	0.11
2900.00	1.35	336.87	2899.08	6.02	4.89	6.02	7.75	39.08	1.23
3000.00	1.25	339.18	2999.06	8.12	4.04	8.12	9.07	26.43	0.12
3100.00	1.59	333.21	3099.03	10.38	3.02	10.38	10.81	16.24	0.37
3200.00	1.47	329.96	3198.99	12.73	1.75	12.73	12.85	7.85	0.15
3300.00	1.50	331.96	3298.96	14.99	0.50	14.99	15.00	1.90	0.06
3400.00	1.60	330.52	3398.92	17.36	-0.80	17.36	17.38	357.36	0.11
3500.00	1.53	334.67	3498.88	19.78	-2.06	19.78	19.88	354.06	0.13
3600.00	1.65	327.01	3598.84	22.19	-3.41	22.19	22.45	351.26	0.24
3700.00	1.64	331.17	3698.80	24.65	-4.88	24.65	25.13	348.79	0.12
3800.00	1.37	337.48	3798.77	27.01	-6.03	27.01	27.67	347.41	0.32
3900.00	1.42	343.16	3898.74	29.30	-6.85	29.30	30.09	346.84	0.15
4000.00	1.46	334.55	3998.71	31.63	-7.75	31.63	32.57	346.23	0.22
4100.00	1.39	341.32	4098.68	33.93	-8.69	33.93	35.02	345.63	0.18
4200.00	2.02	340.61	4198.63	36.74	-9.66	36.74	37.99	345.26	0.63
4300.00	2.05	336.26	4298.57	40.04	-10.97	40.04	41.52	344.68	0.16
4400.00	2.22	336.51	4398.50	43.46	-12.46	43.46	45.21	344.00	0.17
4500.00	2.14	337.42	4498.43	46.97	-13.95	46.97	48.99	343.45	0.09
4600.00	1.83	340.19	4598.37	50.19	-15.21	50.19	52.45	343.14	0.33
4700.00	1.91	342.85	4698.31	53.29	-16.25	53.29	55.71	343.05	0.12
4800.00	2.48	334.59	4798.24	56.84	-17.67	56.84	59.52	342.73	0.64
4900.00	2.57	336.30	4898.14	60.84	-19.49	60.84	63.88	342.23	0.12
5000.00	3.23	339.07	4998.02	65.51	-21.40	65.51	68.92	341.91	0.67
5100.00	3.03	337.65	5097.87	70.59	-23.41	70.59	74.37	341.65	0.21
5200.00	2.30	306.88	5197.76	74.23	-26.02	74.23	78.66	340.69	1.58
5300.00	1.81	239.08	5297.71	74.63	-28.98	74.63	80.05	338.78	2.33
5400.00	1.23	180.80	5397.68	72.74	-30.35	72.74	78.82	337.36	1.56
5500.00	0.52	196.33	5497.67	71.23	-30.49	71.23	77.48	336.83	0.74
5600.00	0.78	246.24	5597.66	70.52	-31.24	70.52	77.13	336.11	0.59
5700.00	0.90	254.12	5697.65	70.03	-32.61	70.03	77.25	335.03	0.17

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
5800.00	0.84	251.06	5797.64	69.58	-34.06	69.58	77.47	333.92	0.07
5900.00	0.99	266.81	5897.63	69.29	-35.62	69.29	77.91	332.79	0.29
6000.00	1.03	266.35	5997.61	69.18	-37.38	69.18	78.64	331.62	0.03
6100.00	1.02	256.10	6097.60	68.91	-39.14	68.91	79.26	330.40	0.18
6200.00	1.11	269.08	6197.58	68.68	-40.98	68.68	79.98	329.18	0.26
6300.00	1.41	276.47	6297.56	68.81	-43.17	68.81	81.23	327.89	0.35
6400.00	1.15	265.89	6397.53	68.87	-45.40	68.87	82.49	326.61	0.35
6500.00	1.27	285.33	6497.51	69.10	-47.47	69.10	83.83	325.51	0.43
6600.00	1.51	283.54	6597.48	69.70	-49.83	69.70	85.68	324.44	0.24
6700.00	1.66	287.07	6697.44	70.43	-52.50	70.43	87.85	323.30	0.18
6800.00	1.28	289.34	6797.41	71.23	-54.94	71.23	89.96	322.36	0.38
6900.00	1.28	283.54	6897.38	71.86	-57.09	71.86	91.78	321.54	0.13
7000.00	1.24	299.75	6997.36	72.66	-59.11	72.66	93.67	320.87	0.36
7100.00	1.36	292.89	7097.33	73.66	-61.14	73.66	95.73	320.30	0.19
7200.00	1.51	278.29	7197.30	74.31	-63.54	74.31	97.77	319.47	0.40
7300.00	1.59	279.58	7297.26	74.73	-66.22	74.73	99.85	318.46	0.09
7400.00	1.26	243.18	7397.24	74.47	-68.57	74.47	101.23	317.36	0.95
7500.00	1.31	229.21	7497.21	73.22	-70.42	73.22	101.59	316.12	0.32
7600.00	1.80	261.62	7597.18	72.25	-72.84	72.25	102.59	314.77	0.99
7700.00	1.45	284.17	7697.14	72.33	-75.63	72.33	104.65	313.72	0.73
7800.00	1.27	317.10	7797.11	73.45	-77.61	73.45	106.85	313.42	0.79
7900.00	1.54	339.80	7897.08	75.52	-78.82	75.52	109.16	313.77	0.61
8000.00	2.11	346.36	7997.03	78.57	-79.72	78.57	111.93	314.58	0.60
8100.00	0.55	351.21	8097.00	80.83	-80.23	80.83	113.88	315.21	1.56
8200.00	1.08	64.05	8196.99	81.71	-79.46	81.71	113.97	315.80	1.05
8300.00	1.14	85.98	8296.97	82.19	-77.62	82.19	113.05	316.64	0.42
8400.00	1.88	92.93	8396.94	82.18	-74.99	82.18	111.25	317.62	0.77
8500.00	2.01	83.31	8496.88	82.30	-71.61	82.30	109.09	318.97	0.35
8581.00	2.09	103.42	8577.83	82.12	-68.76	82.12	107.11	320.06	0.89

8



VES Survey International
Midland, Tx
(432)-563-5444
Surveyor: Tim Dillon
King Air 8 Federal Com 4H / API 30-025-42200



V.E.S. Survey Date: 1/25/2015

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Air 8 Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Site:	King Air 8 Federal	MD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Well:	King Air 8 Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	Dbase Nov0914

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		

Site		King Air 8 Federal			
Site Position:		Northing:	607,069.40 usft	Latitude:	32.66777225
From:	Map	Easting:	666,180.40 usft	Longitude:	-103.79331138
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.29 °

Well	King Air 8 Federal Well No. 4H, Surf Loc: 982 FSL 982 FWL Sect 8					
Well Position	+N/-S	0.00 usft	Northing:	607,069.40 usft	Latitude:	32.66777225
	+E/-W	0.00 usft	Easting:	666,180.40 usft	Longitude:	-103.79331138
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,610.50 usft

Wellbore	Original hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/31/2014	7.28	60.47	48,503

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	355.85	

Survey Program	Date	2/6/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	8,581.00	Gryo (Original hole)	NS-GYRO-MS	North sensing gyrocompassing m/s	
8,653.00	13,834.00	MWD (Original hole)	MWD	MWD - Standard	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	607,069.40	666,180.40	32.66777225	-103.79331138
100.00	0.23	262.19	100.00	-0.03	-0.20	607,069.38	666,180.21	32.66777218	-103.79331203
Gryo									
200.00	0.04	298.02	200.00	-0.04	-0.43	607,069.37	666,179.98	32.66777216	-103.79331278
300.00	0.31	221.56	300.00	-0.22	-0.64	607,069.18	666,179.77	32.66777165	-103.79331346
400.00	0.42	252.42	400.00	-0.54	-1.17	607,068.87	666,179.24	32.66777079	-103.79331519
500.00	0.50	251.75	499.99	-0.78	-1.93	607,068.62	666,178.47	32.66777013	-103.79331767
600.00	0.35	209.64	599.99	-1.19	-2.50	607,068.22	666,177.91	32.66776903	-103.79331952
700.00	0.79	209.27	699.99	-2.05	-2.98	607,067.35	666,177.42	32.66776665	-103.79332112
800.00	1.20	209.68	799.97	-3.56	-3.84	607,065.84	666,176.56	32.66776251	-103.79332392
900.00	1.00	228.76	899.95	-5.05	-5.02	607,064.35	666,175.39	32.66775845	-103.79332776

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Air 8 Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Site:	King Air 8 Federal	MD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Well:	King Air 8 Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	Dbase Nov0914

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,000.00	0.87	212.74	999.94	-6.26	-6.08	607,063.14	666,174.32	32.66775512	-103.79333125
1,100.00	1.00	202.41	1,099.93	-7.71	-6.83	607,061.69	666,173.58	32.66775116	-103.79333369
1,200.00	1.09	196.66	1,199.91	-9.43	-7.43	607,059.98	666,172.97	32.66774645	-103.79333568
1,300.00	1.24	215.89	1,299.89	-11.21	-8.34	607,058.19	666,172.07	32.66774155	-103.79333866
1,400.00	1.03	229.37	1,399.87	-12.68	-9.65	607,056.73	666,170.75	32.66773755	-103.79334296
1,500.00	1.23	219.83	1,499.85	-14.09	-11.02	607,055.32	666,169.38	32.66773369	-103.79334744
1,600.00	1.36	213.19	1,599.82	-15.90	-12.36	607,053.50	666,168.04	32.66772871	-103.79335181
1,700.00	0.69	207.56	1,699.81	-17.43	-13.29	607,051.97	666,167.12	32.66772453	-103.79335485
1,800.00	1.18	77.99	1,799.80	-17.75	-12.56	607,051.65	666,167.84	32.66772364	-103.79335249
1,900.00	1.68	80.42	1,899.77	-17.29	-10.11	607,052.11	666,170.30	32.66772487	-103.79334451
2,000.00	2.77	75.98	1,999.69	-16.46	-6.32	607,052.94	666,174.09	32.66772709	-103.79333219
2,100.00	2.28	67.79	2,099.60	-15.12	-2.13	607,054.28	666,178.27	32.66773071	-103.79331856
2,200.00	2.07	80.28	2,199.52	-14.07	1.49	607,055.34	666,181.89	32.66773357	-103.79330677
2,300.00	2.05	64.58	2,299.46	-13.00	4.89	607,056.41	666,185.29	32.66773647	-103.79329572
2,400.00	1.61	35.34	2,399.41	-11.08	7.31	607,058.32	666,187.72	32.66774169	-103.79328780
2,500.00	1.42	4.26	2,499.38	-8.70	8.22	607,060.70	666,188.62	32.66774823	-103.79328482
2,600.00	2.08	349.81	2,599.33	-5.68	7.99	607,063.73	666,188.39	32.66775654	-103.79328552
2,700.00	2.66	345.15	2,699.25	-1.65	7.07	607,067.75	666,187.48	32.66776762	-103.79328843
2,800.00	2.56	345.20	2,799.14	2.75	5.91	607,072.16	666,186.31	32.66777974	-103.79329214
2,900.00	1.35	336.87	2,899.08	6.00	4.87	607,075.40	666,185.28	32.66778867	-103.79329544
3,000.00	1.25	339.18	2,999.06	8.10	4.02	607,077.50	666,184.43	32.66779446	-103.79329817
3,100.00	1.59	333.21	3,099.03	10.36	3.01	607,079.76	666,183.42	32.66780068	-103.79330143
3,200.00	1.47	329.96	3,198.99	12.71	1.74	607,082.11	666,182.15	32.66780715	-103.79330551
3,300.00	1.50	331.96	3,298.96	14.97	0.49	607,084.37	666,180.89	32.66781340	-103.79330955
3,400.00	1.60	330.52	3,398.92	17.34	-0.82	607,086.74	666,179.59	32.66781993	-103.79331375
3,500.00	1.53	334.67	3,498.88	19.76	-2.07	607,089.17	666,178.33	32.66782661	-103.79331780
3,600.00	1.65	327.01	3,598.84	22.18	-3.43	607,091.58	666,176.98	32.66783326	-103.79332216
3,700.00	1.64	331.17	3,698.80	24.64	-4.90	607,094.04	666,175.50	32.66784005	-103.79332691
3,800.00	1.37	337.48	3,798.77	27.00	-6.05	607,096.40	666,174.35	32.66784654	-103.79333060
3,900.00	1.42	343.16	3,898.74	29.29	-6.87	607,098.69	666,173.54	32.66785285	-103.79333322
4,000.00	1.46	334.55	3,998.71	31.62	-7.77	607,101.03	666,172.63	32.66785929	-103.79333612
4,100.00	1.39	341.32	4,098.68	33.92	-8.71	607,103.33	666,171.69	32.66786562	-103.79333913
4,200.00	2.02	340.61	4,198.63	36.73	-9.68	607,106.14	666,170.72	32.66787336	-103.79334224
4,300.00	2.05	336.26	4,298.57	40.03	-10.99	607,109.44	666,169.42	32.66788245	-103.79334643
4,400.00	2.22	336.51	4,398.50	43.45	-12.48	607,112.85	666,167.92	32.66789185	-103.79335122
4,500.00	2.14	337.42	4,498.43	46.95	-13.97	607,116.35	666,166.44	32.66790149	-103.79335600
4,600.00	1.83	340.19	4,598.37	50.17	-15.23	607,119.58	666,165.18	32.66791038	-103.79336004
4,700.00	1.91	342.85	4,698.31	53.27	-16.26	607,122.67	666,164.14	32.66791890	-103.79336334
4,800.00	2.48	334.59	4,798.24	56.81	-17.68	607,126.22	666,162.72	32.66792867	-103.79336790
4,900.00	2.57	336.30	4,898.14	60.82	-19.51	607,130.23	666,160.90	32.66793971	-103.79337377
5,000.00	3.23	339.07	4,998.01	65.51	-21.42	607,134.91	666,158.99	32.66795261	-103.79337990
5,100.00	3.03	337.65	5,097.87	70.58	-23.43	607,139.99	666,156.98	32.66796659	-103.79338635
5,200.00	2.30	306.88	5,197.76	74.23	-26.04	607,143.63	666,154.37	32.66797666	-103.79339477
5,300.00	1.81	239.08	5,297.71	74.62	-29.00	607,144.03	666,151.41	32.66797778	-103.79340438
5,400.00	1.23	180.80	5,397.68	72.74	-30.37	607,142.14	666,150.04	32.66797262	-103.79340886
5,500.00	0.52	196.33	5,497.67	71.23	-30.51	607,140.63	666,149.89	32.66796847	-103.79340935
5,600.00	0.78	246.24	5,597.66	70.52	-31.26	607,139.92	666,149.14	32.66796653	-103.79341180
5,700.00	0.90	254.12	5,697.65	70.03	-32.64	607,139.43	666,147.76	32.66796520	-103.79341629
5,800.00	0.84	251.06	5,797.64	69.58	-34.09	607,138.98	666,146.32	32.66796398	-103.79342101
5,900.00	0.99	266.81	5,897.63	69.29	-35.65	607,138.70	666,144.76	32.66796322	-103.79342607
6,000.00	1.03	266.35	5,997.61	69.19	-37.40	607,138.59	666,143.00	32.66796295	-103.79343179
6,100.00	1.02	256.10	6,097.60	68.92	-39.17	607,138.32	666,141.24	32.66796223	-103.79343751
6,200.00	1.11	269.08	6,197.58	68.69	-41.00	607,138.09	666,139.41	32.66796163	-103.79344347
6,300.00	1.41	276.47	6,297.55	68.81	-43.19	607,138.21	666,137.22	32.66796200	-103.79345059
6,400.00	1.15	265.89	6,397.53	68.88	-45.41	607,138.28	666,134.99	32.66796221	-103.79345781

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Air 8 Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Site:	King Air 8 Federal	MD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Well:	King Air 8 Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	Dbase Nov0914

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,500.00	1.27	285.33	6,497.51	69.10	-47.48	607,138.50	666,132.92	32.66796285	-103.79346453
6,600.00	1.51	283.54	6,597.48	69.70	-49.83	607,139.10	666,130.57	32.66796453	-103.79347216
6,700.00	1.66	287.07	6,697.44	70.43	-52.50	607,139.84	666,127.91	32.66796659	-103.79348081
6,800.00	1.28	289.34	6,797.41	71.23	-54.94	607,140.63	666,125.47	32.66796881	-103.79348872
6,900.00	1.28	283.54	6,897.38	71.86	-57.08	607,141.26	666,123.33	32.66797057	-103.79349566
7,000.00	1.24	299.75	6,997.36	72.66	-59.10	607,142.06	666,121.30	32.66797279	-103.79350223
7,100.00	1.36	292.89	7,097.33	73.66	-61.13	607,143.06	666,119.27	32.66797557	-103.79350882
7,200.00	1.51	278.29	7,197.30	74.31	-63.53	607,143.71	666,116.87	32.66797739	-103.79351660
7,300.00	1.59	279.58	7,297.26	74.73	-66.20	607,144.13	666,114.20	32.66797859	-103.79352527
7,400.00	1.26	243.18	7,397.24	74.46	-68.55	607,143.87	666,111.85	32.66797789	-103.79353291
7,500.00	1.31	229.21	7,497.21	73.22	-70.40	607,142.62	666,110.01	32.66797450	-103.79353893
7,600.00	1.80	261.62	7,597.17	72.24	-72.82	607,141.65	666,107.59	32.66797185	-103.79354681
7,700.00	1.45	284.17	7,697.14	72.33	-75.60	607,141.73	666,104.81	32.66797211	-103.79355584
7,800.00	1.27	317.10	7,797.11	73.45	-77.58	607,142.85	666,102.83	32.66797522	-103.79356226
7,900.00	1.54	339.80	7,897.08	75.52	-78.80	607,144.92	666,101.61	32.66798094	-103.79356619
8,000.00	2.11	346.36	7,997.03	78.57	-79.70	607,147.97	666,100.71	32.66798933	-103.79356906
8,100.00	0.55	351.21	8,097.00	80.83	-80.20	607,150.24	666,100.20	32.66799556	-103.79357067
8,200.00	1.08	64.05	8,196.99	81.72	-79.43	607,151.12	666,100.98	32.66799799	-103.79356814
8,300.00	1.14	85.98	8,296.97	82.20	-77.59	607,151.61	666,102.82	32.66799929	-103.79356215
8,400.00	1.88	92.93	8,396.94	82.19	-74.96	607,151.59	666,105.45	32.66799921	-103.79355360
8,500.00	2.01	83.31	8,496.88	82.31	-71.58	607,151.71	666,108.83	32.66799950	-103.79354262
8,581.00	2.09	103.42	8,577.83	82.13	-68.73	607,151.54	666,111.67	32.66799897	-103.79353337
8,653.00	2.10	111.10	8,649.78	81.35	-66.22	607,150.76	666,114.18	32.66799679	-103.79352523
MWD surveys									
8,684.00	1.90	101.60	8,680.76	81.04	-65.19	607,150.45	666,115.21	32.66799593	-103.79352188
8,716.00	2.70	44.60	8,712.74	81.47	-64.14	607,150.88	666,116.26	32.66799710	-103.79351846
8,748.00	6.20	19.60	8,744.64	83.64	-63.03	607,153.04	666,117.37	32.66800303	-103.79351482
8,779.00	10.20	9.10	8,775.32	87.93	-62.04	607,157.33	666,118.37	32.66801481	-103.79351152
8,811.00	14.20	3.80	8,806.59	94.65	-61.33	607,164.05	666,119.08	32.66803326	-103.79350910
8,842.00	17.30	0.10	8,836.42	103.05	-61.07	607,172.45	666,119.34	32.66805636	-103.79350812
8,874.00	20.30	359.60	8,866.71	113.36	-61.10	607,182.77	666,119.31	32.66808471	-103.79350805
8,906.00	23.30	358.40	8,896.42	125.24	-61.31	607,194.65	666,119.09	32.66811736	-103.79350855
8,938.00	26.10	357.30	8,925.49	138.60	-61.82	607,208.01	666,118.58	32.66815409	-103.79350998
8,969.00	28.70	356.30	8,953.01	152.84	-62.62	607,222.25	666,117.78	32.66819325	-103.79351235
9,001.00	30.40	355.40	8,980.85	168.58	-63.77	607,237.99	666,116.84	32.66823653	-103.79351581
9,032.00	33.70	355.20	9,007.12	184.98	-65.12	607,254.38	666,115.29	32.66828161	-103.79351993
9,064.00	37.00	355.00	9,033.22	203.42	-66.70	607,272.82	666,113.70	32.66833232	-103.79352476
9,096.00	39.70	355.70	9,058.31	223.21	-68.31	607,292.61	666,112.10	32.66838674	-103.79352965
9,127.00	41.40	356.30	9,081.86	243.31	-69.71	607,312.72	666,110.69	32.66844201	-103.79353388
9,159.00	43.30	357.70	9,105.51	264.84	-70.83	607,334.24	666,109.57	32.66850120	-103.79353718
9,187.00	45.60	358.60	9,125.50	284.43	-71.46	607,353.84	666,108.94	32.66855507	-103.79353890
9,218.00	48.50	0.70	9,146.62	307.12	-71.59	607,376.52	666,108.81	32.66861743	-103.79353895
9,250.00	51.70	2.80	9,167.15	331.65	-70.83	607,401.05	666,109.57	32.66868485	-103.79353607
9,282.00	54.10	1.70	9,186.45	357.15	-69.83	607,426.55	666,110.57	32.66875492	-103.79353241
9,317.00	58.20	359.80	9,205.94	386.21	-69.47	607,455.61	666,110.94	32.66883479	-103.79353073
9,349.00	64.10	358.40	9,221.37	414.22	-69.91	607,483.62	666,110.49	32.66891179	-103.79353173
9,381.00	69.70	358.00	9,233.92	443.63	-70.84	607,513.03	666,109.56	32.66899263	-103.79353425
9,410.00	76.20	0.00	9,242.42	471.33	-71.32	607,540.74	666,109.09	32.66906879	-103.79353534
9,442.00	81.30	359.60	9,248.66	502.71	-71.43	607,572.11	666,108.98	32.66915503	-103.79353518
9,473.00	83.20	359.80	9,252.84	533.42	-71.59	607,602.82	666,108.82	32.66923946	-103.79353519
9,505.00	85.00	0.10	9,256.13	565.25	-71.62	607,634.65	666,108.79	32.66932695	-103.79353476
9,537.00	87.20	1.00	9,258.31	597.17	-71.31	607,666.58	666,109.10	32.66941469	-103.79353323
9,568.00	89.80	1.40	9,259.12	628.15	-70.66	607,697.56	666,109.75	32.66949983	-103.79353061
9,600.00	91.40	1.00	9,258.79	660.14	-69.99	607,729.55	666,110.42	32.66958775	-103.79352790
9,632.00	92.40	0.70	9,257.73	692.12	-69.51	607,761.52	666,110.89	32.66967564	-103.79352583

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Air 8 Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Site:	King Air 8 Federal	MD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Well:	King Air 8 Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	Dbase Nov0914

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,663.00	92.60	359.60	9,256.37	723.09	-69.43	607,792.49	666,110.97	32.66976077	-103.79352506
9,695.00	92.90	358.70	9,254.84	755.05	-69.91	607,824.45	666,110.50	32.66984862	-103.79352607
9,726.00	92.50	357.80	9,253.38	786.00	-70.85	607,855.40	666,109.55	32.66993371	-103.79352863
9,758.00	91.90	356.80	9,252.15	817.94	-72.36	607,887.34	666,108.05	32.67002152	-103.79353300
9,790.00	90.70	356.10	9,251.42	849.87	-74.34	607,919.27	666,106.06	32.67010931	-103.79353891
9,853.00	88.90	355.20	9,251.64	912.69	-79.12	607,982.09	666,101.29	32.67028204	-103.79355340
9,916.00	90.00	354.70	9,252.25	975.44	-84.66	608,044.84	666,095.74	32.67045460	-103.79357038
9,980.00	91.60	354.50	9,251.35	1,039.14	-90.69	608,108.55	666,089.72	32.67062980	-103.79358890
10,075.00	90.10	353.30	9,249.95	1,133.59	-100.78	608,203.00	666,079.62	32.67088954	-103.79362014
10,170.00	89.40	352.80	9,250.36	1,227.89	-112.28	608,297.30	666,068.13	32.67114890	-103.79365593
10,233.00	89.30	352.80	9,251.07	1,290.39	-120.17	608,359.80	666,060.23	32.67132080	-103.79368056
10,296.00	88.00	353.60	9,252.56	1,352.93	-127.63	608,422.33	666,052.78	32.67149280	-103.79370376
10,391.00	86.80	356.60	9,256.87	1,447.47	-135.73	608,516.88	666,044.67	32.67175278	-103.79372854
10,455.00	88.50	356.60	9,259.49	1,511.30	-139.53	608,580.71	666,040.88	32.67192829	-103.79373981
10,518.00	90.00	356.40	9,260.32	1,574.18	-143.37	608,643.58	666,037.03	32.67210117	-103.79375127
10,581.00	89.60	356.10	9,260.54	1,637.04	-147.49	608,706.45	666,032.91	32.67227402	-103.79376362
10,645.00	90.80	355.70	9,260.31	1,700.88	-152.07	608,770.28	666,028.34	32.67244954	-103.79377743
10,708.00	90.10	356.40	9,259.82	1,763.73	-156.41	608,833.13	666,024.00	32.67262235	-103.79379049
10,771.00	89.60	357.00	9,259.98	1,826.62	-160.03	608,896.02	666,020.37	32.67279528	-103.79380124
10,835.00	90.70	356.80	9,259.82	1,890.53	-163.50	608,959.93	666,016.91	32.67297098	-103.79381143
10,898.00	90.10	356.80	9,259.38	1,953.43	-167.01	609,022.83	666,013.39	32.67314392	-103.79382182
10,961.00	90.40	356.40	9,259.10	2,016.31	-170.75	609,085.72	666,009.66	32.67331683	-103.79383292
11,056.00	92.90	355.90	9,256.37	2,111.05	-177.12	609,180.46	666,003.28	32.67357733	-103.79385208
11,151.00	90.00	355.00	9,253.96	2,205.71	-184.66	609,275.11	665,995.75	32.67383762	-103.79387499
11,214.00	90.00	354.70	9,253.96	2,268.46	-190.31	609,337.86	665,990.09	32.67401017	-103.79389234
11,309.00	92.30	354.30	9,252.06	2,362.99	-199.41	609,432.40	665,980.99	32.67427014	-103.79392036
11,404.00	92.60	353.60	9,248.00	2,457.38	-209.42	609,526.78	665,970.99	32.67452971	-103.79395130
11,468.00	92.40	353.50	9,245.20	2,520.91	-216.60	609,590.32	665,963.80	32.67470445	-103.79397360
11,499.00	92.80	353.30	9,243.80	2,551.67	-220.16	609,621.08	665,960.24	32.67478906	-103.79398466
11,531.00	91.50	352.80	9,242.60	2,583.42	-224.03	609,652.82	665,956.38	32.67487636	-103.79399671
11,594.00	89.50	352.80	9,242.05	2,645.91	-231.92	609,715.32	665,948.48	32.67504825	-103.79402133
11,657.00	89.60	354.00	9,242.54	2,708.49	-239.17	609,777.90	665,941.24	32.67522037	-103.79404383
11,721.00	88.50	354.90	9,243.60	2,772.18	-245.35	609,841.59	665,935.05	32.67539551	-103.79406289
11,784.00	89.30	355.90	9,244.81	2,834.97	-250.41	609,904.37	665,930.00	32.67556816	-103.79407827
11,847.00	90.00	356.40	9,245.20	2,897.82	-254.64	609,967.23	665,925.77	32.67574099	-103.79409098
11,911.00	90.10	357.10	9,245.14	2,961.72	-258.26	610,031.12	665,922.14	32.67591667	-103.79410171
11,974.00	91.70	357.10	9,244.15	3,024.63	-261.45	610,094.03	665,918.95	32.67608963	-103.79411103
12,069.00	90.00	356.30	9,242.74	3,119.46	-266.92	610,188.86	665,913.49	32.67635036	-103.79412723
12,164.00	91.50	355.20	9,241.50	3,214.18	-273.96	610,283.59	665,906.45	32.67661083	-103.79414855
12,259.00	88.90	357.10	9,241.17	3,308.96	-280.34	610,378.36	665,900.07	32.67687142	-103.79416771
12,322.00	89.60	357.10	9,241.99	3,371.87	-283.52	610,441.27	665,896.88	32.67704439	-103.79417703
12,386.00	90.80	356.80	9,241.77	3,435.78	-286.93	610,505.18	665,893.48	32.67722010	-103.79418704
12,481.00	89.90	356.60	9,241.19	3,530.62	-292.40	610,600.02	665,888.01	32.67748086	-103.79420324
12,576.00	91.30	355.70	9,240.19	3,625.39	-298.77	610,694.80	665,881.63	32.67774146	-103.79422241
12,671.00	90.60	355.60	9,238.62	3,720.11	-305.98	610,789.51	665,874.43	32.67800189	-103.79424426
12,766.00	89.90	356.30	9,238.20	3,814.87	-312.69	610,884.27	665,867.72	32.67826245	-103.79426450
12,861.00	89.50	356.80	9,238.70	3,909.69	-318.41	610,979.10	665,862.00	32.67852318	-103.79428151
12,956.00	89.80	357.10	9,239.28	4,004.56	-323.46	611,073.96	665,856.95	32.67878400	-103.79429637
13,051.00	89.50	357.80	9,239.86	4,099.46	-327.69	611,168.86	665,852.72	32.67904492	-103.79430854
13,146.00	90.60	357.10	9,239.78	4,194.36	-331.91	611,263.77	665,848.49	32.67930584	-103.79432071
13,241.00	90.20	357.30	9,239.12	4,289.25	-336.55	611,358.65	665,843.85	32.67956670	-103.79433422
13,336.00	89.70	357.80	9,239.20	4,384.16	-340.61	611,453.56	665,839.79	32.67982764	-103.79434585
13,431.00	89.80	357.70	9,239.61	4,479.09	-344.34	611,548.49	665,836.06	32.68008862	-103.79435641
13,526.00	91.50	357.10	9,238.54	4,573.98	-348.65	611,643.38	665,831.75	32.68034950	-103.79436885
13,621.00	91.50	357.10	9,236.05	4,668.82	-353.46	611,738.23	665,826.95	32.68061027	-103.79438290

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well King Air 8 Federal Well No. 4H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Site:	King Air 8 Federal	MD Reference:	RKB=3610.5+18 @ 3628.50usft (Patriot 6)
Well:	King Air 8 Federal Well No. 4H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	Dbase Nov0914

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,716.00	90.20	356.80	9,234.64	4,763.68	-358.51	611,833.08	665,821.89	32.68087106	-103.79439776
13,834.00	90.20	356.80	9,234.23	4,881.49	-365.10	611,950.90	665,815.31	32.68119499	-103.79441722
Survey projected to 13834.00 MD									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
100.00	100.00	-0.03	-0.20	Gyro	
8,653.00	8,649.78	81.35	-66.22	MWD surveys	
13,834.00	9,234.23	4,881.49	-365.10	Survey projected to 13834.00 MD	



COG Operating LLC

Well: King Air 8 Federal Well No. 4H
 Site: King Air 8 Federal
 Project: Lea County, New Mexico
 Design: rev1
 Rig: Patriot 6

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	8581.00	2.09	103.42	8577.83	82.13	-68.73	0.00	0.00	86.89	Survey @ 8581.00 MD
2	8756.00	2.09	103.42	8752.71	80.65	-62.52	0.00	0.00	84.96	KOP Begin 12"/100' build/turn
3	9511.12	90.00	356.33	9235.00	558.18	-76.33	12.00	-107.08	562.24	Begin 90.00 lateral section
4	13854.86	90.00	356.33	9235.00	4893.00	-354.70	0.00	0.00	4905.84	PBHL/TD

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
100.00	100.00	0.23	262.19	-0.03	-0.20	-0.01	0.20	Gyro
8649.78	8653.00	2.10	111.10	81.35	-66.22	85.93	219.46	MWD surveys
9234.23	13834.00	90.20	356.80	4881.49	-365.10	4895.12	5034.57	Survey projected to 13834.00 MD

Surface Location: RKB=3610.5+18 @ 3628.50usft (Patriot 6)
 US State Plane 1927 (Exact solution)
 New Mexico East 3001

Northing: 607069.40
 Easting: 666180.40
 Latitude: 32.6677226
 Longitude: -103.79331138
 Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Add 6.99°



Azimuths to Grid North
 True North: -0.29°
 Magnetic North: 6.99°

Magnetic Field
 Strength: 48502.8nT
 Dip Angle: 60.47°
 Date: 12/31/2014
 Model: IGRF2010

N=ONE

