



3001537842

May 12, 2014

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

NM OIL CONSERVATION
ARTESIA DISTRICT

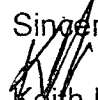
JUN 24 2014

RECEIVED

Attn: Kanicia Castillo

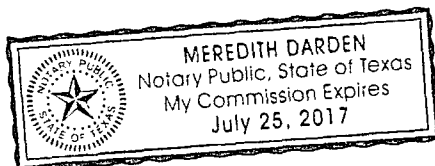
RE: **JR's Horz Federal Com No. 003H**

Please find enclosed a copy of the survey from 0.00' to 8050.00' ran on the above referenced well.

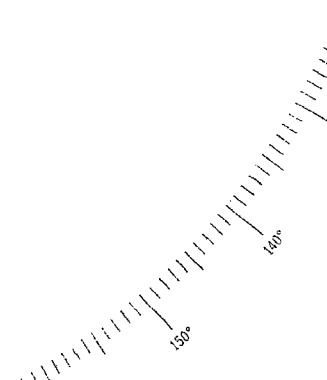
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 12th day of May,
A.D., 2014, by Keith Havelka.




Meredith Darden
Notary Public, State of Texas





Company: COG Operating, LLC (Concho)
 Lease/Well: JR's Horz Federal Com/No. 003H
 Location: About 10.12 Miles from Malaga
 Rig Name: Patriot 2
 State/County: New Mexico/Eddy
 Latitude: 32.06, Longitude: -103.97
 GRID North is 0.19 Degrees East of True North
 VS-Azi: 0.00 Degrees



NM OIL CONSERVATION
 ARTESIA DISTRICT
 JUN 24 2014
 RECEIVED

Depth Reference : 17 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ...federal com 3h_gyro survey.ut

Minimum Curvature Method

Report Date/Time: 5/12/2014 / 09:11

VES Survey International

West, Texas

(432) 563-5444

Surveyor: Gene Heiss

JR's Horz Federal Com No. 003H / API 30-015-37842

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	0.13	175.09	100.00	-0.11	0.01	-0.11	0.11	175.09	0.13
200.00	0.54	207.41	200.00	-0.64	-0.20	-0.64	0.67	197.26	0.44
300.00	0.81	201.83	299.99	-1.72	-0.68	-1.72	1.85	201.60	0.27
400.00	0.98	184.52	399.98	-3.22	-1.01	-3.22	3.38	197.38	0.32
500.00	1.09	182.90	499.96	-5.03	-1.12	-5.03	5.15	192.61	0.11
600.00	1.12	188.18	599.94	-6.94	-1.31	-6.94	7.07	190.70	0.11
700.00	1.34	176.65	699.92	-9.08	-1.38	-9.08	9.19	188.66	0.33
800.00	1.11	192.37	799.90	-11.20	-1.52	-11.20	11.30	187.74	0.41
900.00	1.92	170.88	899.86	-13.80	-1.46	-13.80	13.87	186.05	0.98
1000.00	1.87	164.62	999.81	-17.02	-0.77	-17.02	17.04	182.58	0.21
1100.00	1.34	166.99	1099.77	-19.73	-0.07	-19.73	19.73	180.20	0.53
1200.00	0.53	169.79	1199.76	-21.33	0.28	-21.33	21.33	179.26	0.81
1300.00	0.24	177.92	1299.75	-22.00	0.37	-22.00	22.00	179.05	0.30
1400.00	0.75	327.66	1399.75	-21.65	0.02	-21.65	21.65	179.94	0.96
1500.00	0.87	330.41	1499.74	-20.44	-0.70	-20.44	20.45	181.96	0.12
1600.00	0.74	328.84	1599.73	-19.23	-1.41	-19.23	19.29	184.18	0.13
1700.00	0.84	321.33	1699.72	-18.11	-2.20	-18.11	18.24	186.92	0.15
1800.00	0.85	300.81	1799.71	-17.15	-3.30	-17.15	17.47	190.88	0.30

measured Depth FT	incl Angle Deg	Drit 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	1.03	303.52	1899.70	-16.27	-4.69	-16.27	16.94	196.06	0.18
2000.00	1.13	306.08	1999.68	-15.20	-6.23	-15.20	16.42	202.31	0.11
2100.00	0.52	280.18	2099.67	-14.53	-7.48	-14.53	16.35	207.24	0.70
2200.00	0.51	284.88	2199.66	-14.34	-8.36	-14.34	16.60	210.25	0.04
2300.00	0.74	292.51	2299.66	-13.98	-9.38	-13.98	16.83	213.87	0.24
2400.00	0.32	59.82	2399.66	-13.59	-9.73	-13.59	16.72	215.60	0.96
2500.00	1.24	94.58	2499.65	-13.54	-8.41	-13.54	15.94	211.85	0.99
2600.00	1.47	103.78	2599.62	-13.93	-6.08	-13.93	15.20	203.60	0.32
2700.00	1.95	109.35	2699.57	-14.80	-3.23	-14.80	15.15	192.32	0.50
2800.00	2.19	115.21	2799.51	-16.18	0.10	-16.18	16.18	179.63	0.32
2900.00	1.49	117.13	2899.46	-17.59	2.99	-17.59	17.84	170.34	0.70
3000.00	1.18	116.04	2999.43	-18.63	5.08	-18.63	19.31	164.76	0.32
3100.00	1.00	111.10	3099.41	-19.40	6.81	-19.40	20.56	160.64	0.19
3200.00	1.05	112.23	3199.39	-20.06	8.48	-20.06	21.78	157.09	0.05
3300.00	1.04	116.84	3299.38	-20.81	10.13	-20.81	23.15	154.04	0.08
3400.00	0.61	103.47	3399.37	-21.35	11.46	-21.35	24.23	151.78	0.47
3500.00	0.55	134.93	3499.36	-21.81	12.31	-21.81	25.04	150.56	0.32
3600.00	0.46	154.56	3599.36	-22.50	12.82	-22.50	25.89	150.34	0.19
3700.00	0.52	142.23	3699.35	-23.22	13.27	-23.22	26.74	150.26	0.13
3800.00	0.73	157.13	3799.35	-24.17	13.79	-24.17	27.83	150.29	0.26
3900.00	0.43	162.09	3899.34	-25.12	14.16	-25.12	28.83	150.59	0.30
4000.00	0.52	180.78	3999.34	-25.93	14.27	-25.93	29.59	151.18	0.18
4100.00	0.37	171.93	4099.34	-26.70	14.31	-26.70	30.29	151.82	0.16
4200.00	0.56	179.15	4199.33	-27.51	14.36	-27.51	31.04	152.44	0.20
4300.00	0.44	180.67	4299.33	-28.39	14.36	-28.39	31.81	153.16	0.13
4400.00	0.82	207.86	4399.32	-29.40	14.02	-29.40	32.57	154.50	0.47
4500.00	0.44	172.12	4499.32	-30.41	13.74	-30.41	33.38	155.68	0.53
4600.00	0.25	180.65	4599.32	-31.02	13.79	-31.02	33.95	156.02	0.20
4700.00	0.30	220.49	4699.32	-31.43	13.62	-31.43	34.26	156.57	0.19
4800.00	0.67	190.55	4799.31	-32.21	13.34	-32.21	34.86	157.49	0.43
4900.00	0.62	212.86	4899.31	-33.23	12.95	-33.23	35.66	158.72	0.25
5000.00	0.86	203.64	4999.30	-34.37	12.35	-34.37	36.52	160.23	0.27
5100.00	0.79	204.17	5099.29	-35.68	11.77	-35.68	37.57	161.74	0.07
5200.00	1.12	179.01	5199.27	-37.28	11.51	-37.28	39.02	162.84	0.53
5300.00	1.50	179.73	5299.25	-39.56	11.53	-39.56	41.21	163.75	0.37
5400.00	1.74	177.98	5399.21	-42.39	11.59	-42.39	43.94	164.70	0.25
5500.00	1.93	170.55	5499.16	-45.57	11.92	-45.57	47.10	165.34	0.30
5600.00	1.75	179.99	5599.10	-48.76	12.20	-48.76	50.26	165.95	0.35
5700.00	1.63	180.01	5699.06	-51.71	12.20	-51.71	53.13	166.73	0.12

measured Depth FT	inci Angle Deg	Drit 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	1.64	178.89	5799.02	-54.57	12.23	-54.57	55.92	167.37	0.04
5900.00	1.64	181.94	5898.98	-57.43	12.21	-57.43	58.71	168.00	0.09
6000.00	1.67	184.22	5998.94	-60.31	12.05	-60.31	61.51	168.70	0.07
6100.00	1.94	192.10	6098.89	-63.42	11.59	-63.42	64.47	169.65	0.37
6200.00	1.79	194.51	6198.83	-66.59	10.84	-66.59	67.47	170.75	0.17
6300.00	1.87	182.45	6298.78	-69.74	10.38	-69.74	70.51	171.53	0.39
6400.00	1.63	178.69	6398.74	-72.80	10.34	-72.80	73.53	171.91	0.27
6500.00	1.56	182.88	6498.70	-75.59	10.31	-75.59	76.29	172.23	0.14
6600.00	1.90	193.90	6598.65	-78.55	9.84	-78.55	79.17	172.86	0.47
6700.00	1.46	184.64	6698.61	-81.43	9.34	-81.43	81.97	173.46	0.51
6800.00	1.86	175.74	6798.57	-84.32	9.36	-84.32	84.84	173.67	0.47
6900.00	2.88	159.24	6898.48	-88.28	10.37	-88.28	88.89	173.30	1.22
7000.00	5.32	154.81	6998.22	-94.82	13.23	-94.82	95.74	172.06	2.46
7100.00	4.95	155.39	7097.82	-102.94	17.00	-102.94	104.33	170.62	0.37
7200.00	2.93	162.11	7197.58	-109.29	19.58	-109.29	111.03	169.84	2.07
7300.00	0.88	181.89	7297.52	-112.49	20.34	-112.49	114.31	169.75	2.12
7400.00	0.88	193.76	7397.51	-114.00	20.13	-114.00	115.77	169.98	0.18
7500.00	1.07	199.26	7497.49	-115.63	19.64	-115.63	117.29	170.36	0.22
7600.00	1.24	213.29	7597.47	-117.42	18.74	-117.42	118.91	170.93	0.33
7700.00	1.26	234.95	7697.45	-118.96	17.24	-118.96	120.20	171.75	0.47
7800.00	1.31	237.78	7797.42	-120.20	15.37	-120.20	121.18	172.71	0.08
7900.00	1.41	233.31	7897.39	-121.54	13.42	-121.54	122.28	173.70	0.14
8000.00	1.78	223.74	7997.36	-123.40	11.36	-123.40	123.92	174.74	0.46
8050.00	2.03	216.06	8047.33	-124.68	10.30	-124.68	125.10	175.28	0.71



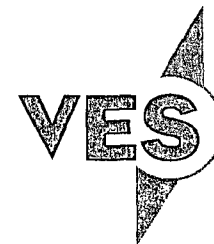
VES Survey International

West, Texas

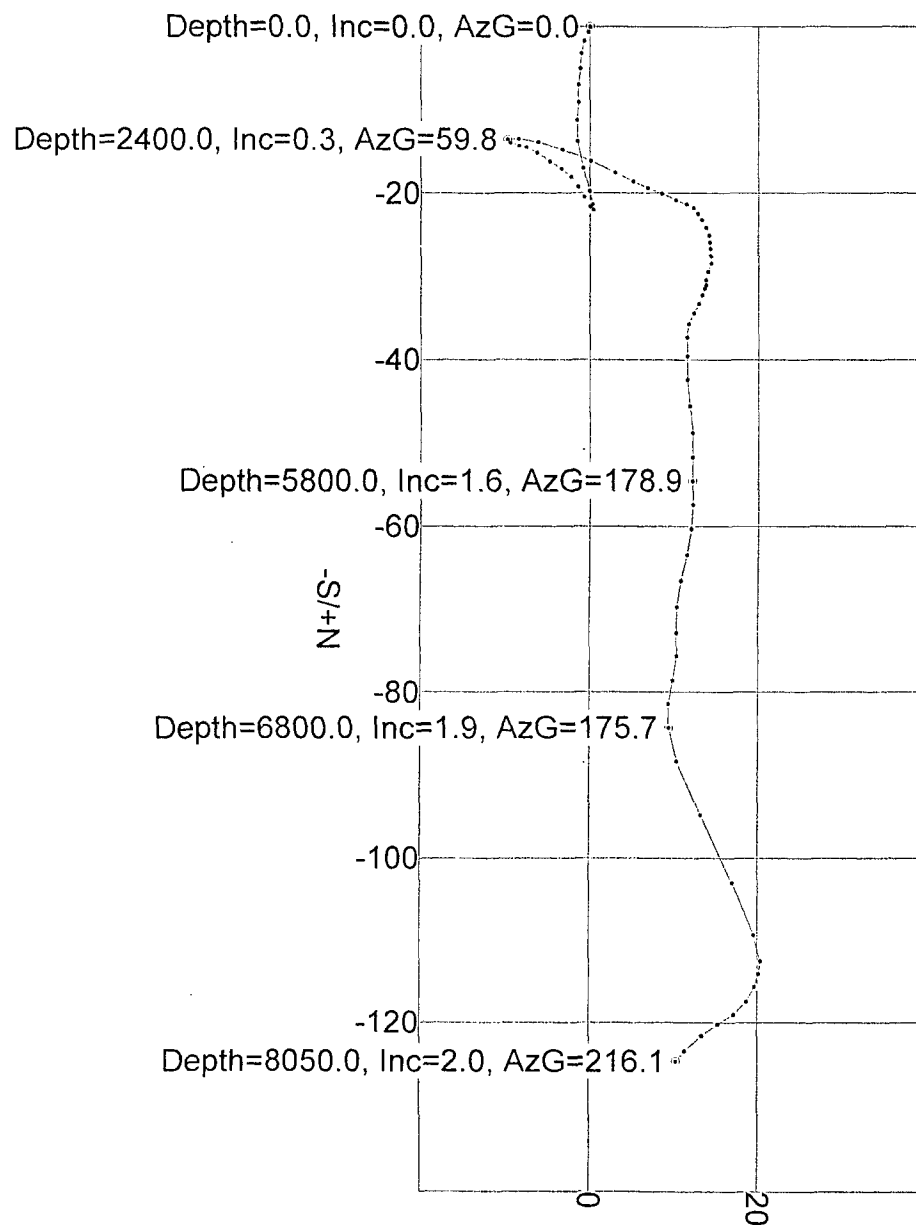
(432) 563-5444

Surveyor: Gene Heiss

JR's Horz Federal Com No. 003H / API 30-015-37842



SURVEY
INTERNATIONAL



VES Survey Date: 05/02/2014



Survey Report - Geographic



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well JR's Horz Federal Com Well No. 3H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=2990+17 @ 3007.00usft (Patriot 2)
Site:	JR's Horz Federal Com	MD Reference:	RKB=2990+17 @ 3007.00usft (Patriot 2)
Well:	JR's Horz Federal Com Well No. 3H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Database

Project:	Eddy 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:	JR's Horz Federal Com				
Site Position:		Northing:	386,768.30 usft	Latitude:	32.06281709
From:	Map	Easting:	612,927.50 usft	Longitude:	-103.96879717
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.19 °

Well	JR's Horz Federal Com Well No. 3H					
Well Position	+N-S	0.00 usft	Northing:	386,768.30 usft	Latitude:	32.06281709
	+E-W	0.00 usft	Easting:	612,927.50 usft	Longitude:	-103.96879717
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	2,990.00 usft

Wellbore	Original hole				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/16/2014	7.41	59.90	48,196

Design:	Surveys Original hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	180.45	

Survey Program		Date	5/10/2014	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	8,050.00	Gyro (Original hole)	NS-GYRO-MS	North sensing gyrocompassing m/s
8,228.00	13,003.00	MWD TIP=8050 MD (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	386,768.30	612,927.50	32.06281709	-103.96879717
100.00	0.13	175.09	100.00	-0.11	0.01	386,768.19	612,927.51	32.06281678	-103.96879713
Gyro									
200.00	0.54	207.41	200.00	-0.64	-0.20	386,767.65	612,927.31	32.06281532	-103.96879781
300.00	0.81	201.83	299.99	-1.72	-0.68	386,766.58	612,926.83	32.06281237	-103.96879937
400.00	0.98	184.52	399.98	-3.23	-1.01	386,765.07	612,926.50	32.06280823	-103.96880045
500.00	1.09	182.90	499.96	-5.03	-1.12	386,763.27	612,926.38	32.06280328	-103.96880085
600.00	1.12	188.18	599.94	-6.95	-1.31	386,761.35	612,926.19	32.06279801	-103.96880147
700.00	1.34	176.65	699.92	-9.08	-1.38	386,759.22	612,926.12	32.06279214	-103.96880172
800.00	1.11	192.37	799.90	-11.20	-1.52	386,757.10	612,925.98	32.06278633	-103.96880219
900.00	1.92	170.88	899.86	-13.80	-1.46	386,754.50	612,926.04	32.06277918	-103.96880204

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well JR's Horz Federal Com Well No. 3H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=2990+17 @ 3007.00usft (Patriot 2)
Site:	JR's Horz Federal Com	MD Reference:	RKB=2990+17 @ 3007.00usft (Patriot 2)
Well:	JR's Horz Federal Com Well No. 3H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

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	1.87	164.62	999.81	-17.02	-0.76	386,751.28	612,926.74	32.06277030	-103.96879982
1,100.00	1.34	166.99	1,099.77	-19.74	-0.07	386,748.56	612,927.44	32.06276284	-103.96879760
1,200.00	0.53	169.79	1,199.76	-21.33	0.28	386,746.97	612,927.78	32.06275846	-103.96879650
1,300.00	0.24	177.92	1,299.75	-21.99	0.37	386,746.30	612,927.87	32.06275663	-103.96879622
1,400.00	0.75	327.66	1,399.75	-21.65	0.02	386,746.65	612,927.53	32.06275758	-103.96879732
1,500.00	0.87	330.41	1,499.74	-20.44	-0.70	386,747.86	612,926.80	32.06276092	-103.96879965
1,600.00	0.74	328.84	1,599.73	-19.22	-1.41	386,749.07	612,926.09	32.06276426	-103.96880192
1,700.00	0.84	321.33	1,699.72	-18.10	-2.20	386,750.20	612,925.30	32.06276736	-103.96880447
1,800.00	0.85	300.81	1,799.71	-17.15	-3.30	386,751.15	612,924.21	32.06276999	-103.96880799
1,900.00	1.03	303.52	1,899.70	-16.27	-4.68	386,752.03	612,922.82	32.06277241	-103.96881246
2,000.00	1.13	306.08	1,999.68	-15.19	-6.23	386,753.10	612,921.27	32.06277538	-103.96881744
2,100.00	0.52	280.18	2,099.67	-14.53	-7.47	386,753.77	612,920.03	32.06277721	-103.96882145
2,200.00	0.51	284.88	2,199.66	-14.34	-8.35	386,753.96	612,919.15	32.06277775	-103.96882427
2,300.00	0.74	292.51	2,299.66	-13.98	-9.38	386,754.32	612,918.13	32.06277876	-103.96882758
2,400.00	0.32	59.82	2,399.66	-13.59	-9.73	386,754.71	612,917.77	32.06277983	-103.96882873
2,500.00	1.24	94.58	2,499.65	-13.54	-8.41	386,754.76	612,919.09	32.06277996	-103.96882447
2,600.00	1.47	103.78	2,599.62	-13.93	-6.09	386,754.37	612,921.42	32.06277886	-103.96881697
2,700.00	1.95	109.35	2,699.57	-14.80	-3.24	386,753.50	612,924.27	32.06277645	-103.96880777
2,800.00	2.19	115.21	2,799.51	-16.17	0.10	386,752.12	612,927.60	32.06277263	-103.96879703
2,900.00	1.49	117.13	2,899.46	-17.58	2.98	386,750.72	612,930.49	32.06276874	-103.96878773
3,000.00	1.18	116.04	2,999.43	-18.63	5.07	386,749.67	612,932.57	32.06276584	-103.96878102
3,100.00	1.00	111.10	3,099.41	-19.39	6.80	386,748.91	612,934.31	32.06276372	-103.96877541
3,200.00	1.05	112.23	3,199.39	-20.05	8.47	386,748.25	612,935.97	32.06276189	-103.96877005
3,300.00	1.04	116.84	3,299.38	-20.81	10.13	386,747.49	612,937.63	32.06275979	-103.96876471
3,400.00	0.61	103.47	3,399.37	-21.34	11.45	386,746.96	612,938.96	32.06275831	-103.96876043
3,500.00	0.55	134.93	3,499.36	-21.81	12.31	386,746.49	612,939.81	32.06275703	-103.96875767
3,600.00	0.46	154.56	3,599.36	-22.51	12.82	386,745.79	612,940.33	32.06275510	-103.96875602
3,700.00	0.52	142.23	3,699.36	-23.23	13.27	386,745.07	612,940.78	32.06275311	-103.96875457
3,800.00	0.73	157.13	3,799.35	-24.17	13.80	386,744.12	612,941.30	32.06275051	-103.96875289
3,900.00	0.43	162.09	3,899.34	-25.12	14.16	386,743.18	612,941.66	32.06274791	-103.96875173
4,000.00	0.52	180.78	3,999.34	-25.93	14.27	386,742.37	612,941.77	32.06274568	-103.96875138
4,100.00	0.37	171.93	4,099.34	-26.70	14.31	386,741.60	612,941.81	32.06274356	-103.96875127
4,200.00	0.56	179.15	4,199.33	-27.51	14.36	386,740.79	612,941.87	32.06274133	-103.96875110
4,300.00	0.44	180.67	4,299.33	-28.38	14.36	386,739.92	612,941.87	32.06273893	-103.96875110
4,400.00	0.82	207.86	4,399.32	-29.40	14.03	386,738.90	612,941.53	32.06273614	-103.96875221
4,500.00	0.44	172.12	4,499.32	-30.41	13.74	386,737.89	612,941.25	32.06273336	-103.96875313
4,600.00	0.25	180.65	4,599.32	-31.01	13.79	386,737.29	612,941.30	32.06273171	-103.96875297
4,700.00	0.30	220.49	4,699.32	-31.43	13.62	386,736.87	612,941.13	32.06273057	-103.96875354
4,800.00	0.67	190.55	4,799.31	-32.20	13.34	386,736.10	612,940.85	32.06272844	-103.96875444
4,900.00	0.62	212.86	4,899.31	-33.23	12.94	386,735.07	612,940.45	32.06272562	-103.96875574
5,000.00	0.86	203.64	4,999.30	-34.37	12.35	386,733.92	612,939.85	32.06272248	-103.96875767
5,100.00	0.79	204.17	5,099.29	-35.69	11.77	386,732.61	612,939.27	32.06271887	-103.96875957
5,200.00	1.12	179.01	5,199.27	-37.30	11.50	386,731.00	612,939.00	32.06271446	-103.96876045
5,300.00	1.50	179.73	5,299.25	-39.58	11.52	386,728.72	612,939.03	32.06270817	-103.96876040
5,400.00	1.74	177.98	5,399.21	-42.41	11.58	386,725.89	612,939.09	32.06270040	-103.96876023
5,500.00	1.93	170.55	5,499.16	-45.59	11.91	386,722.71	612,939.42	32.06269166	-103.96875920
5,600.00	1.75	179.99	5,599.10	-48.77	12.19	386,719.52	612,939.69	32.06268290	-103.96875835
5,700.00	1.63	180.01	5,699.06	-51.72	12.19	386,716.57	612,939.69	32.06267479	-103.96875838
5,800.00	1.64	178.89	5,799.02	-54.58	12.22	386,713.72	612,939.72	32.06266695	-103.96875832
5,900.00	1.64	181.94	5,898.98	-57.44	12.20	386,710.86	612,939.70	32.06265908	-103.96875842
6,000.00	1.67	184.22	5,998.94	-60.32	12.04	386,707.98	612,939.55	32.06265116	-103.96875895
6,100.00	1.94	192.10	6,098.89	-63.43	11.58	386,704.87	612,939.08	32.06264262	-103.96876048
6,200.00	1.79	194.51	6,198.84	-66.60	10.83	386,701.70	612,938.34	32.06263392	-103.96876292
6,300.00	1.87	182.45	6,298.78	-69.74	10.37	386,698.56	612,937.88	32.06262528	-103.96876444
6,400.00	1.63	178.69	6,398.74	-72.79	10.34	386,695.51	612,937.84	32.06261690	-103.96876460

Company:	COG Operating LLC	Local CO-ordinate Reference:	Well JR's Horz Federal Com Well No. 3H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=2990+17 @ 3007.00usft (Patriot 2)
Site:	JR's Horz Federal Com	MD Reference:	RKB=2990+17 @ 3007.00usft (Patriot 2)
Well:	JR's Horz Federal Com Well No. 3H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

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	1.56	182.88	6,498.70	-75.57	10.30	386,692.73	612,937.80	32.06260925	-103.96876474
6,600.00	1.90	193.90	6,598.65	-78.54	9.83	386,689.76	612,937.34	32.06260109	-103.96876628
6,700.00	1.46	184.64	6,698.61	-81.42	9.33	386,686.88	612,936.84	32.06259318	-103.96876793
6,800.00	1.86	175.74	6,798.57	-84.31	9.35	386,683.99	612,936.85	32.06258524	-103.96876791
6,900.00	2.88	159.24	6,898.48	-88.28	10.36	386,680.02	612,937.86	32.06257433	-103.96876469
7,000.00	5.32	154.81	6,998.22	-94.82	13.22	386,673.48	612,940.73	32.06255631	-103.96875551
7,100.00	4.95	155.39	7,097.82	-102.94	16.99	386,665.36	612,944.50	32.06253396	-103.96874343
7,200.00	2.93	162.11	7,197.58	-109.29	19.58	386,659.01	612,947.08	32.06251646	-103.96873517
7,300.00	0.88	181.89	7,297.52	-112.49	20.34	386,655.81	612,947.84	32.06250766	-103.96873275
7,400.00	0.88	193.76	7,397.51	-114.01	20.13	386,654.29	612,947.63	32.06250350	-103.96873344
7,500.00	1.07	199.26	7,497.49	-115.63	19.64	386,652.66	612,947.14	32.06249903	-103.96873504
7,600.00	1.24	213.29	7,597.47	-117.42	18.74	386,650.88	612,946.24	32.06249413	-103.96873797
7,700.00	1.26	234.95	7,697.45	-118.96	17.24	386,649.34	612,944.75	32.06248992	-103.96874281
7,800.00	1.31	237.78	7,797.42	-120.20	15.37	386,648.10	612,942.88	32.06248653	-103.96874885
7,900.00	1.41	233.31	7,897.39	-121.54	13.42	386,646.76	612,940.92	32.06248285	-103.96875517
8,000.00	1.78	223.74	7,997.36	-123.40	11.36	386,644.90	612,938.86	32.06247776	-103.96876184
8,050.00	2.03	216.06	8,047.33	-124.68	10.30	386,643.62	612,937.81	32.06247426	-103.96876527
8,228.00	2.50	212.90	8,225.19	-130.48	6.34	386,637.81	612,933.84	32.06245833	-103.96877813
MWD surveys									
8,260.00	2.60	212.90	8,257.16	-131.68	5.56	386,636.62	612,933.07	32.06245505	-103.96878064
8,291.00	4.60	208.70	8,288.09	-133.36	4.59	386,634.94	612,932.09	32.06245044	-103.96878382
8,323.00	7.60	199.20	8,319.91	-136.48	3.27	386,631.81	612,930.78	32.06244187	-103.96878809
8,354.00	9.30	204.80	8,350.57	-140.69	1.55	386,627.60	612,929.05	32.06243031	-103.96879370
8,386.00	10.60	195.60	8,382.09	-145.88	-0.33	386,622.42	612,927.18	32.06241608	-103.96879982
8,418.00	14.80	197.80	8,413.30	-152.61	-2.37	386,615.69	612,925.13	32.06239760	-103.96880648
8,449.00	15.70	201.60	8,443.21	-160.28	-5.12	386,608.02	612,922.38	32.06237654	-103.96881546
8,481.00	17.10	197.80	8,473.91	-168.78	-8.16	386,599.52	612,919.35	32.06235318	-103.96882534
8,513.00	20.20	193.50	8,504.23	-178.64	-10.89	386,589.66	612,916.62	32.06232612	-103.96883425
8,545.00	23.90	192.80	8,533.88	-190.33	-13.61	386,577.96	612,913.89	32.06229399	-103.96884318
8,576.00	27.30	193.20	8,561.83	-203.38	-16.63	386,564.92	612,910.88	32.06225815	-103.96885306
8,608.00	31.10	195.30	8,589.76	-218.51	-20.49	386,549.79	612,907.02	32.06221661	-103.96886568
8,640.00	34.80	198.10	8,616.61	-235.16	-25.51	386,533.14	612,902.00	32.06217086	-103.96888206
8,672.00	39.60	196.00	8,642.10	-253.66	-31.16	386,514.64	612,896.35	32.06212007	-103.96890051
8,703.00	45.20	191.40	8,664.98	-273.96	-36.06	386,494.34	612,891.44	32.06206432	-103.96891655
8,735.00	51.20	186.90	8,686.31	-297.49	-39.81	386,470.80	612,887.70	32.06199965	-103.96892890
8,767.00	57.40	181.90	8,704.98	-323.38	-41.75	386,444.92	612,885.75	32.06192850	-103.96893547
8,799.00	63.50	179.50	8,720.76	-351.20	-42.08	386,417.10	612,885.43	32.06185203	-103.96893681
8,824.00	69.10	179.10	8,730.80	-374.08	-41.80	386,394.22	612,885.71	32.06178913	-103.96893616
8,856.00	74.10	179.10	8,740.90	-404.43	-41.32	386,363.87	612,886.19	32.06170569	-103.96893495
8,888.00	75.80	179.10	8,749.21	-435.33	-40.83	386,332.97	612,886.67	32.06162075	-103.96893372
8,920.00	78.10	178.80	8,756.43	-466.50	-40.26	386,301.80	612,887.24	32.06153507	-103.96893221
8,951.00	81.10	178.80	8,762.03	-496.98	-39.62	386,271.32	612,887.88	32.06145127	-103.96893048
8,983.00	84.10	178.40	8,766.15	-528.70	-38.85	386,239.60	612,888.66	32.06136406	-103.96892833
9,015.00	87.40	178.10	8,768.52	-560.59	-37.87	386,207.71	612,889.63	32.06127638	-103.96892553
9,047.00	90.30	177.70	8,769.16	-592.56	-36.70	386,175.74	612,890.80	32.06118849	-103.96892209
9,078.00	91.10	177.70	8,768.79	-623.53	-35.46	386,144.77	612,892.05	32.06110333	-103.96891841
9,173.00	92.20	177.70	8,766.05	-718.41	-31.65	386,049.89	612,895.86	32.06084246	-103.96890715
9,269.00	91.80	178.80	8,762.70	-814.31	-28.72	385,953.99	612,898.79	32.06057882	-103.96889873
9,364.00	88.50	180.20	8,762.45	-909.29	-27.89	385,859.01	612,899.62	32.06031771	-103.96889709
9,459.00	89.00	179.80	8,764.52	-1,004.27	-27.89	385,764.03	612,899.62	32.06005662	-103.96889813
9,554.00	91.70	179.50	8,763.94	-1,099.25	-27.31	385,669.05	612,900.20	32.05979549	-103.96889729
9,649.00	90.30	179.80	8,762.29	-1,194.23	-26.73	385,574.06	612,900.78	32.05953438	-103.96889645
9,744.00	89.00	181.20	8,762.87	-1,289.22	-27.56	385,479.07	612,899.95	32.05927326	-103.96890017
9,839.00	89.70	181.90	8,763.94	-1,384.18	-30.12	385,384.12	612,897.38	32.05901224	-103.96890949
9,934.00	87.80	183.30	8,766.02	-1,479.06	-34.43	385,289.24	612,893.07	32.05875147	-103.96892443

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well JR's Horz Federal Com Well No. 3H
Project:	Eddy County, New Mexico	TVD Reference:	RKB=2990+17 @ 3007.00usft (Patriot 2)
Site:	JR's Horz Federal Com	MD Reference:	RKB=2990+17 @ 3007.00usft (Patriot 2)
Well:	JR's Horz Federal Com Well No. 3H	North Reference:	Grid
Wellbore:	Original hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original hole	Database:	EDM 5000.1 Ddatabase

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/S (usft)	+E/W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,030.00	89.00	183.00	8,768.70	-1,574.87	-39.71	385,193.43	612,887.80	32.05848812	-103.96894250
10,125.00	88.00	182.30	8,771.18	-1,669.74	-44.10	385,098.56	612,883.41	32.05822738	-103.96895770
10,220.00	89.00	181.60	8,773.67	-1,764.65	-47.33	385,003.65	612,880.18	32.05796650	-103.96896917
10,315.00	90.80	179.90	8,773.84	-1,859.63	-48.57	384,908.67	612,878.93	32.05770540	-103.96897422
10,410.00	91.70	179.50	8,771.76	-1,954.61	-48.07	384,813.69	612,879.43	32.05744431	-103.96897365
10,505.00	92.20	178.40	8,768.53	-2,049.53	-46.33	384,718.77	612,881.17	32.05718334	-103.96896906
10,600.00	90.10	177.70	8,766.62	-2,144.45	-43.10	384,623.85	612,884.40	32.05692237	-103.96895967
10,696.00	88.90	178.10	8,767.46	-2,240.38	-39.58	384,527.92	612,887.92	32.05665862	-103.96894936
10,791.00	89.70	178.10	8,768.62	-2,335.32	-36.44	384,432.98	612,891.07	32.05639760	-103.96894023
10,886.00	88.20	178.10	8,770.36	-2,430.25	-33.29	384,338.05	612,894.22	32.05613661	-103.96893110
10,981.00	89.00	178.40	8,772.68	-2,525.18	-30.39	384,243.12	612,897.12	32.05587563	-103.96892277
11,076.00	89.40	177.40	8,774.01	-2,620.10	-26.91	384,148.20	612,900.60	32.05561465	-103.96891257
11,172.00	90.30	177.00	8,774.26	-2,715.99	-22.22	384,052.31	612,905.29	32.05535102	-103.96889848
11,267.00	91.10	176.00	8,773.10	-2,810.80	-16.42	383,957.50	612,911.09	32.05509032	-103.96888079
11,367.00	91.00	179.60	8,771.27	-2,910.69	-12.58	383,857.60	612,914.92	32.05481568	-103.96886949
11,462.00	91.60	179.10	8,769.11	-3,005.66	-11.50	383,762.64	612,916.00	32.05455460	-103.96886705
11,557.00	89.80	179.70	8,767.95	-3,100.65	-10.51	383,667.65	612,917.00	32.05429348	-103.96886488
11,652.00	90.30	179.50	8,767.87	-3,195.64	-9.84	383,572.66	612,917.66	32.05403232	-103.96886377
11,748.00	90.80	179.20	8,766.95	-3,291.63	-8.75	383,476.67	612,918.75	32.05376844	-103.96886130
11,843.00	90.90	178.90	8,765.54	-3,386.61	-7.18	383,381.69	612,920.32	32.05350733	-103.96885725
11,938.00	91.00	181.70	8,763.96	-3,481.58	-7.68	383,286.71	612,919.83	32.05324624	-103.96885989
12,033.00	90.00	183.30	8,763.13	-3,576.49	-11.82	383,191.81	612,915.68	32.05298540	-103.96887430
12,128.00	88.30	182.00	8,764.54	-3,671.37	-16.21	383,096.93	612,911.29	32.05272460	-103.96888951
12,223.00	89.00	181.90	8,766.78	-3,766.29	-19.44	383,002.01	612,908.06	32.05246370	-103.96890098
12,318.00	89.90	182.40	8,767.69	-3,861.21	-23.01	382,907.08	612,904.50	32.05220278	-103.96891351
12,414.00	91.10	182.10	8,766.86	-3,957.14	-26.78	382,811.16	612,900.73	32.05193913	-103.96892672
12,509.00	90.90	182.60	8,765.20	-4,052.04	-30.67	382,716.26	612,896.83	32.05167827	-103.96894033
12,606.00	88.30	180.40	8,765.88	-4,148.99	-33.21	382,619.31	612,894.29	32.05141177	-103.96894958
12,701.00	88.70	180.20	8,768.36	-4,243.96	-33.71	382,524.34	612,893.80	32.05115072	-103.96895222
12,796.00	90.10	180.70	8,769.36	-4,338.95	-34.45	382,429.35	612,893.05	32.05088960	-103.96895566
12,891.00	91.00	179.70	8,768.44	-4,433.94	-34.79	382,334.36	612,892.72	32.05062846	-103.96895776
12,957.00	91.70	179.70	8,766.89	-4,499.92	-34.44	382,268.38	612,893.06	32.05044708	-103.96895737
13,003.00	91.70	179.70	8,765.53	-4,545.90	-34.20	382,222.40	612,893.30	32.05032068	-103.96895709
Survey projected to 13003.00 MD									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/S (usft)	+E/W (usft)		
100.00	100.00	-0.11	0.01	Gyro	
8,228.00	8,225.19	-130.48	6.34	MWD surveys	
13,003.00	8,765.53	-4,545.90	-34.20	Survey projected to 13003.00 MD	

COG Operating LLC



Well: JR's Horz Federal Com Well No. 3H
 Site: JR's Horz Federal Com
 Project: Eddy County, New Mexico
 Design: rev1
 Rig: Patriot 2

SECTION DETAILS

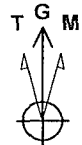
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	8050.00	2.03	216.06	8047.33	-124.68	10.30	0.00	0.00	124.59	Survey @ 8050.00 MD
2	8309.21	2.03	216.06	8306.38	-132.10	4.90	0.00	0.00	132.06	KOP Begin 12"/100' build/turn
3	9045.47	90.00	180.40	8770.00	-609.29	-8.01	12.00	-35.68	609.33	Begin 90.00° lateral
4	12982.48	90.00	180.40	8770.00	-4546.20	-35.50	0.00	0.00	4546.34	PBHL/TD

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
100.00	100.00	0.13	175.09	-0.11	0.01	0.11	0.11	Gyro
8225.19	8228.00	2.50	212.90	-130.48	6.34	130.43	178.86	MWD surveys
8765.52	13003.00	91.70	179.70	-4545.90	-34.20	4546.03	4603.14	Survey projected to 13003.00 MD

Surface Location: RKB=2990+17 @ 3007.00usft (Patriot 2)
 US State Plane 1927 (Exact solution)
 New Mexico East 3001

Northing: 386768.30 Easting: 612927.50 Latitude: 32.06281709 Longitude: -103.96879716
 Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Add 7.22°



Azinuths to Grid North
 True North: -0.19°
 Magnetic North: 7.21°

Magnetic Field
 Strength: 48195.8snT
 Dip Angle: 59.90°
 Date: 4/16/2014
 Model: IGRF2010

