

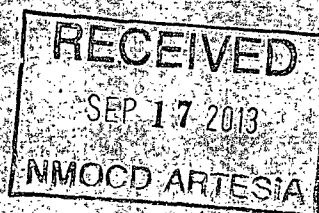


PO Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

15-41423

July 2, 2013

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



Attn: Kanicia Castillo

Re: **Firefox 4 Federal Com No 005H**

Please find enclosed a copy of the survey from 0' to 8,170' ran on the above referenced well.

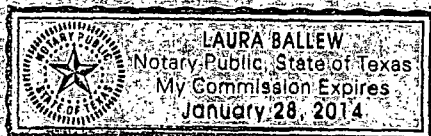
If I can be of any further service, please do not hesitate to call me at 800-606-4976.

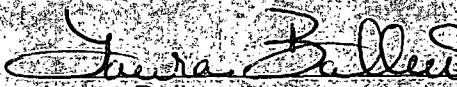
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 2nd day of July
A.D. 2013 by Keith Havelka




Laura Ballew
Notary Public, State of Texas



Company: COG Operating (Concho) LLC
Lease/Well: Firefox 4 Federal Com/No 005H
Location: S4 T19s R31e
Rig Name: Patriot 6
State/County: New Mexico/Eddy
Latitude: 32.68, Longitude: -103.88
GRID North is 0.24 Degrees East of True North
VS-Azi: 0.00 Degrees



RKB : 17 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ...ederal com #5h gyro survey.ut

Minimum Curvature Method

Report Date/Time: 7/2/2013 / 12:27

Vaughn Energy Services

(432) 563-5444

Gardendale, TX 79758

Surveyor: Dustin Wedel

Firefox 4 Federal Com No 005H / API 30-015-41423

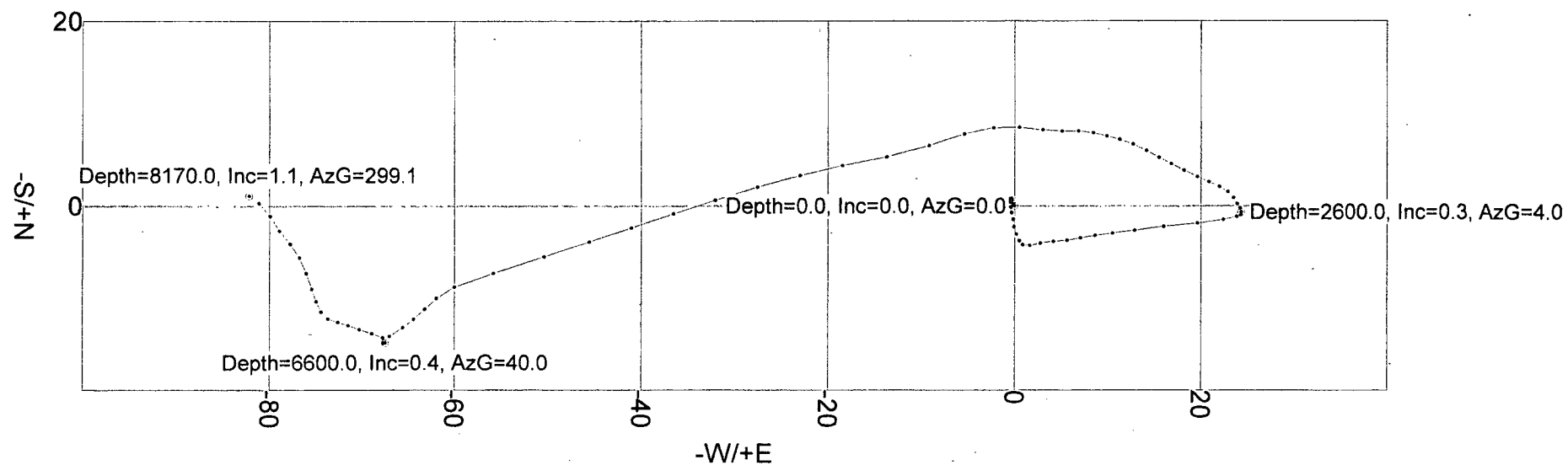
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.25	320.36	100.00	0.17	-0.14	0.22	320.36	0.25
200.00	0.26	0.73	200.00	0.57	-0.28	0.63	333.73	0.18
300.00	0.06	268.46	300.00	0.79	-0.33	0.85	337.53	0.27
400.00	0.09	233.62	400.00	0.74	-0.44	0.86	329.22	0.06
500.00	0.33	170.88	500.00	0.41	-0.46	0.61	311.43	0.30
600.00	0.31	181.76	600.00	-0.15	-0.42	0.45	250.45	0.07
700.00	0.40	163.09	699.99	-0.75	-0.33	0.82	203.64	0.15
800.00	0.46	172.49	799.99	-1.48	-0.18	1.49	186.73	0.09
900.00	0.45	172.82	899.99	-2.27	-0.07	2.27	181.84	0.01
1000.00	0.50	154.58	999.98	-3.06	0.16	3.07	176.92	0.16
1100.00	0.41	157.37	1099.98	-3.79	0.49	3.82	172.61	0.09
1200.00	0.27	119.40	1199.98	-4.24	0.84	4.32	168.82	0.26
1300.00	0.63	83.28	1299.98	-4.29	1.59	4.58	159.70	0.44
1400.00	0.74	75.03	1399.97	-4.06	2.75	4.91	145.86	0.15
1500.00	0.88	88.26	1499.96	-3.87	4.14	5.67	133.05	0.23
1600.00	0.81	82.82	1599.95	-3.76	5.61	6.75	123.82	0.10
1700.00	0.89	77.08	1699.94	-3.50	7.07	7.89	116.32	0.12
1800.00	0.94	82.21	1799.93	-3.21	8.64	9.22	110.40	0.10

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	1.24	82.80	1899.91	-2.97	10.52	10.93	105.74	0.30
2000.00	1.51	82.04	1999.88	-2.65	12.90	13.17	101.61	0.27
2100.00	2.08	83.02	2099.83	-2.25	16.00	16.16	97.99	0.58
2200.00	2.08	85.67	2199.76	-1.89	19.61	19.70	95.50	0.10
2300.00	1.17	75.84	2299.72	-1.50	22.41	22.47	93.83	0.95
2400.00	0.50	77.06	2399.71	-1.15	23.83	23.86	92.77	0.67
2500.00	0.08	6.45	2499.71	-0.99	24.26	24.28	92.33	0.48
2600.00	0.29	4.02	2599.71	-0.67	24.29	24.30	91.57	0.21
2700.00	0.24	329.77	2699.71	-0.23	24.20	24.20	90.55	0.16
2800.00	0.42	324.79	2799.71	0.25	23.88	23.88	89.40	0.18
2900.00	0.44	330.12	2899.70	0.89	23.48	23.49	87.84	0.05
3000.00	0.56	309.17	2999.70	1.53	22.91	22.96	86.18	0.21
3100.00	0.71	294.81	3099.69	2.09	21.97	22.07	84.56	0.22
3200.00	0.71	295.28	3199.69	2.61	20.86	21.02	82.85	0.01
3300.00	0.86	293.95	3299.68	3.18	19.61	19.87	80.78	0.16
3400.00	0.95	297.22	3399.66	3.87	18.18	18.59	77.98	0.11
3500.00	0.83	298.43	3499.65	4.59	16.81	17.42	74.71	0.13
3600.00	0.84	296.25	3599.64	5.26	15.52	16.38	71.26	0.03
3700.00	0.96	299.36	3699.63	6.00	14.13	15.35	66.99	0.13
3800.00	0.87	293.99	3799.62	6.72	12.70	14.37	62.11	0.12
3900.00	0.85	285.60	3899.60	7.23	11.28	13.40	57.34	0.13
4000.00	0.80	282.38	3999.59	7.58	9.88	12.45	52.50	0.07
4100.00	0.90	284.24	4099.58	7.93	8.43	11.57	46.78	0.10
4200.00	0.96	270.56	4199.57	8.13	6.84	10.62	40.08	0.23
4300.00	1.07	269.21	4299.55	8.12	5.07	9.57	31.98	0.11
4400.00	1.32	277.57	4399.53	8.26	3.00	8.79	19.96	0.30
4500.00	1.56	274.63	4499.50	8.52	0.50	8.54	3.36	0.26
4600.00	1.62	264.30	4599.46	8.49	-2.27	8.79	345.05	0.29
4700.00	2.06	252.96	4699.41	7.82	-5.39	9.50	325.44	0.57
4800.00	2.55	250.21	4799.33	6.54	-9.20	11.29	305.42	0.51
4900.00	2.82	259.33	4899.22	5.33	-13.72	14.72	291.25	0.51
5000.00	2.69	258.05	4999.10	4.39	-18.43	18.95	283.40	0.15
5100.00	2.71	255.42	5098.99	3.31	-23.01	23.25	278.19	0.13
5200.00	2.72	253.03	5198.88	2.02	-27.57	27.64	274.20	0.11
5300.00	2.69	252.02	5298.77	0.61	-32.07	32.08	271.09	0.06
5400.00	2.72	251.87	5398.66	-0.85	-36.56	36.57	268.66	0.04
5500.00	2.75	250.28	5498.55	-2.40	-41.07	41.14	266.65	0.08
5600.00	2.65	252.14	5598.43	-3.92	-45.52	45.69	265.08	0.13
5700.00	3.18	251.40	5698.30	-5.51	-50.36	50.66	263.75	0.53

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	3.42	252.14	5798.14	-7.31	-55.83	56.30	262.54	0.24
5900.00	1.68	246.93	5898.04	-8.80	-60.01	60.66	261.66	1.75
6000.00	0.95	222.85	5998.01	-9.99	-61.93	62.73	260.84	0.90
6100.00	1.02	229.37	6097.99	-11.18	-63.17	64.15	259.97	0.13
6200.00	0.83	226.09	6197.98	-12.26	-64.37	65.52	259.22	0.20
6300.00	0.93	241.13	6297.97	-13.15	-65.60	66.91	258.66	0.25
6400.00	1.06	232.83	6397.95	-14.10	-67.05	68.52	258.12	0.19
6500.00	0.23	175.46	6497.95	-14.86	-67.78	69.39	257.63	0.96
6600.00	0.38	40.01	6597.95	-14.81	-67.54	69.15	257.63	0.57
6700.00	0.63	300.97	6697.94	-14.27	-67.80	69.28	258.11	0.78
6800.00	0.81	283.64	6797.94	-13.82	-68.95	70.32	258.66	0.28
6900.00	0.85	291.67	6897.93	-13.38	-70.33	71.59	259.23	0.12
7000.00	0.62	286.44	6997.92	-12.95	-71.54	72.70	259.74	0.23
7100.00	0.71	290.99	7097.91	-12.58	-72.63	73.71	260.17	0.10
7200.00	0.57	286.26	7197.91	-12.22	-73.69	74.69	260.58	0.14
7300.00	0.76	336.23	7297.90	-11.48	-74.43	75.31	261.24	0.59
7400.00	0.66	334.67	7397.89	-10.35	-74.95	75.66	262.14	0.10
7500.00	0.98	343.72	7497.88	-9.00	-75.43	75.97	263.19	0.34
7600.00	1.09	337.27	7597.86	-7.30	-76.04	76.39	264.52	0.16
7700.00	1.02	336.84	7697.85	-5.60	-76.76	76.97	265.83	0.07
7800.00	1.08	314.52	7797.83	-4.12	-77.79	77.90	266.97	0.41
7900.00	1.04	328.17	7897.81	-2.68	-78.94	78.98	268.05	0.26
8000.00	1.10	326.60	7997.80	-1.12	-79.94	79.95	269.20	0.06
8100.00	1.06	313.41	8097.78	0.32	-81.14	81.14	270.22	0.25
8170.00	1.11	299.14	8167.77	1.09	-82.20	82.21	270.76	0.39



Vaughn Energy Services
(432) 563-5444
Gardendale, TX 79758
Surveyor: Dustin Wedel
Firefox 4 Federal Com No 005H / API 30-015-41423



COG Firefox 4 Federal Com #5H Gyro + MWD Tie In - 13375ft Survey **Geodetic Report** (Non-Def Survey)



Report Date: July 02, 2013 - 08:55 AM
Client: COG
Field: NM Eddy County (NAD 27)
Structure / Slot: COG Firefox 4 Federal Com #5H / COG Firefox 4 Federal Com #5H
Well: Firefox 4 Federal Com #5H
Borehole: COG Firefox 4 Federal Com #5H
UWI / API#: Unknown / Unknown
Survey Name: COG Firefox 4 Federal Com #5H Gyro + MWD Tie In - 13375ft
Survey Date: June 25, 2013
Tort / AHD / DDI / ERD Ratio: 159.523 * / 4949.233 ft / 6.075 / 0.557
Coordinate Reference System: NAD27 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 41' 2.10747", W 103° 52' 53.96324"
Location Grid N/E Y/X: N 612816.500 ftUS, E 638968.800 ftUS
CRS Grid Convergence Angle: 0.2439 *
Grid Scale Factor: 0.99993121

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 93.180 * (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: RKB
TVD Reference Elevation: 3573.000 ft above MSL
Seabed / Ground Elevation: 3555.000 ft above MSL
Magnetic Declination: 7.626 *
Total Gravity Field Strength: 998.5106mgn (9.80665 Based)
Total Magnetic Field Strength: 48644.497 nT
Magnetic Dip Angle: 60.500 *
Declination Date: June 25, 2013
Magnetic Declination Model: BGGM 2013
North Reference: Grid North
Grid Convergence Used: 0.2439 *
Total Corr Mag North->Grid North: 7.3825 *
Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Tie-In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	612816.50	638968.80	N 32 41 2.11	W 103 52 53.96
	100.00	0.25	320.36	100.00	-0.15	0.17	-0.14	0.25	612816.67	638968.66	N 32 41 2.11	W 103 52 53.96
	200.00	0.26	0.73	200.00	-0.31	0.56	-0.28	0.18	612817.08	638968.52	N 32 41 2.11	W 103 52 53.97
	300.00	0.06	268.46	300.00	-0.37	0.79	-0.32	0.27	612817.29	638968.48	N 32 41 2.12	W 103 52 53.97
	400.00	0.09	233.62	400.00	-0.48	0.74	-0.44	0.05	612817.24	638968.36	N 32 41 2.11	W 103 52 53.97
	500.00	0.33	170.88	500.00	-0.48	0.41	-0.46	0.30	612816.91	638968.34	N 32 41 2.11	W 103 52 53.97
	600.00	0.31	181.76	600.00	-0.41	-0.15	-0.42	0.06	612816.35	638968.38	N 32 41 2.11	W 103 52 53.97
	700.00	0.40	163.09	699.99	-0.29	-0.75	-0.33	0.15	612815.75	638968.47	N 32 41 2.10	W 103 52 53.97
	800.00	0.46	172.49	799.99	-0.09	-1.48	-0.17	0.09	612815.02	638968.63	N 32 41 2.09	W 103 52 53.97
	900.00	0.45	172.82	899.99	0.05	-2.27	-0.07	0.01	612814.23	638968.73	N 32 41 2.09	W 103 52 53.96
	1000.00	0.50	154.58	999.98	0.33	-3.05	0.16	0.16	612813.45	638968.96	N 32 41 2.08	W 103 52 53.96
	1100.00	0.41	157.37	1099.98	0.70	-3.78	0.49	0.09	612812.72	638969.29	N 32 41 2.07	W 103 52 53.96
	1200.00	0.27	119.40	1199.98	1.07	-4.22	0.83	0.26	612812.28	638969.63	N 32 41 2.07	W 103 52 53.95
	1300.00	0.63	83.28	1299.98	1.82	-4.27	1.58	0.44	612812.23	638970.38	N 32 41 2.07	W 103 52 53.94
	1400.00	0.74	75.03	1399.97	2.97	-4.04	2.75	0.15	612812.46	638971.55	N 32 41 2.07	W 103 52 53.93
	1500.00	0.88	88.26	1499.96	4.35	-3.85	4.14	0.23	612812.65	638972.94	N 32 41 2.07	W 103 52 53.91
	1600.00	0.81	82.82	1599.95	5.81	-3.74	5.61	0.11	612812.76	638974.41	N 32 41 2.07	W 103 52 53.90
	1700.00	0.89	77.08	1699.94	7.25	-3.48	7.07	0.12	612813.02	638975.87	N 32 41 2.07	W 103 52 53.88
	1800.00	0.94	82.21	1799.93	8.81	-3.19	8.64	0.10	612813.31	638977.44	N 32 41 2.08	W 103 52 53.86
	1900.00	1.24	82.80	1899.91	10.68	-2.95	10.53	0.30	612813.55	638979.33	N 32 41 2.08	W 103 52 53.84
	2000.00	1.51	82.04	1999.88	13.03	-2.63	12.91	0.27	612813.87	638981.71	N 32 41 2.08	W 103 52 53.81
	2100.00	2.08	83.02	2099.83	16.11	-2.23	16.01	0.57	612814.27	638984.81	N 32 41 2.08	W 103 52 53.78
	2200.00	2.08	85.67	2199.76	19.70	-1.87	19.62	0.10	612814.63	638988.42	N 32 41 2.09	W 103 52 53.73
	2300.00	1.17	75.84	2299.72	22.47	-1.48	22.42	0.95	612815.02	638991.22	N 32 41 2.09	W 103 52 53.70
	2400.00	0.50	77.06	2399.71	23.86	-1.14	23.84	0.67	612815.37	638992.64	N 32 41 2.10	W 103 52 53.68
	2500.00	0.08	6.45	2499.71	24.29	-0.97	24.27	0.48	612815.53	638993.07	N 32 41 2.10	W 103 52 53.68
	2600.00	0.29	4.02	2599.71	24.30	-0.65	24.30	0.21	612815.85	638993.09	N 32 41 2.10	W 103 52 53.68
	2700.00	0.24	329.77	2699.71	24.18	-0.21	24.21	0.16	612816.29	638993.01	N 32 41 2.10	W 103 52 53.68
	2800.00	0.42	324.79	2799.71	23.84	0.27	23.89	0.18	612816.77	638992.69	N 32 41 2.11	W 103 52 53.68
	2900.00	0.44	330.12	2899.70	23.40	0.90	23.49	0.04	612817.40	638992.29	N 32 41 2.12	W 103 52 53.69
	3000.00	0.56	309.17	2999.70	22.80	1.54	22.92	0.22	612818.04	638991.72	N 32 41 2.12	W 103 52 53.70
	3100.00	0.71	294.81	3099.69	21.83	2.11	21.98	0.22	612818.61	638990.78	N 32 41 2.13	W 103 52 53.71
	3200.00	0.71	295.28	3199.69	20.68	2.63	20.86	0.01	612819.13	638989.65	N 32 41 2.13	W 103 52 53.72
	3300.00	0.86	293.95	3299.68	19.40	3.20	19.61	0.15	612819.70	638988.41	N 32 41 2.14	W 103 52 53.73
	3400.00	0.95	297.22	3399.66	17.94	3.89	18.19	0.10	612820.39	638986.99	N 32 41 2.15	W 103 52 53.75
	3500.00	0.83	298.43	3499.65	16.53	4.61	16.81	0.12	612821.11	638985.61	N 32 41 2.15	W 103 52 53.77
	3600.00	0.84	296.25	3599.64	15.20	5.28	15.52	0.03	612821.78	638984.32	N 32 41 2.16	W 103 52 53.78
	3700.00	0.96	299.36	3699.63	13.77	6.02	14.13	0.13	612822.52	638982.93	N 32 41 2.17	W 103 52 53.80
	3800.00	0.87	293.99	3799.62	12.31	6.74	12.71	0.12	612823.23	638981.51	N 32 41 2.17	W 103 52 53.81
	3900.00	0.85	285.60	3899.60	10.88	7.24	11.30	0.13	612823.74	638980.10	N 32 41 2.18	W 103 52 53.83
	4000.00	0.80	282.38	3999.59	9.47	7.59	9.90	0.07	612824.09	638978.70	N 32 41 2.18	W 103 52 53.85
	4100.00	0.90	284.24	4099.58	8.01	7.94	8.46	0.10	612824.43	638977.26	N 32 41 2.19	W 103 52 53.86
	4200.00	0.96	270.56	4199.57	6.40	8.14	6.86	0.23	612824.64	638975.66	N 32 41 2.19	W 103 52 53.88
	4300.00	1.07	269.21	4299.55	4.63	8.13	5.09	0.11	612824.63	638973.89	N 32 41 2.19	W 103 52 53.90
	4400.00	1.32	277.57	4399.53	2.55	8.27	3.01	0.30	612824.77	638971.81	N 32 41 2.19	W 103 52 53.93
	4500.00	1.56	274.63	4499.50	0.04	8.53	0.52	0.25	612825.03	638969.32	N 32 41 2.19	W 103 52 53.96
	4600.00	1.62	264.30	4599.46	-2.72	8.50	-2.25	0.29	612825.00	638966.55	N 32 41 2.19	W 103 52 53.99
	4700.00	2.06	252.96	4699.41	-5.80	7.83	-5.37	0.57	612824.33	638963.43	N 32 41 2.19	W 103 52 54.03
	4800.00	2.55	250.21	4799.33	-9.53	6.56	-9.18	0.50	612823.05	638959.62	N 32 41 2.17	W 103 52 54.07
	4900.00	2.82	259.33	4899.22	-13.97	5.35	-13.70	0.50	612821.85	638955.11	N 32 41 2.16	W 103 52 54.12
	5000.00	2.69	258.05	4999.11	-18.62	4.41	-18.41	0.14	612820.90	638950.39	N 32 41 2.15	W 103 52 54.18
	5100.00	2.71	255.42	5099.99	-23.14	3.32	-22.99	0.13	612819.82	638945.81	N 32 41 2.14	W 103 52 54.23
	5200.00	2.72	253.03	5198.88	-27.62	2.04	-27.55	0.11	612818.54	638941.25	N 32 41 2.13	W 103 52 54.29
	5300.00	2.69	252.02	5298.77	-32.04	0.62	-32.05	0.06	612817.12	638936.75	N 32 41 2.11	W 103 52 54.34
	5400.00	2.72	251.87	5398.66	-36.43	-0.84	-36.54	0.03	612815.66	638932.26	N 32 41 2.10	W 103 52 54.39
	5500.00	2.75	250.28	5498.55	-40.86	-2.39	-41.05	0.08	612814.11	638927.75	N 32 41 2.09	W 103 52 54.44
	5600.00	2.65	252.14	5598.43	-45.22	-3.91	-45.51	0.13	612812.59	638923.29	N 32 41 2.07	W 103 52 54.50
	5700.00	3.18	251.40	5698.30	-49.96	-5.50	-50.34	0.53	612811.00	638918.46	N 32 41 2.06	W 103 52 54.55

Comments	MD	Incl	Azim	Grid	TVD	VSEC	NS	EW	DLS	Northing	Eastng	Latitude	Longitude
	(m)	(°)	(°)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(N/S...)	(E/W...)
	5800.00	3.42	252.14	5788.04	-55.32	-7.30	-55.81	-7.30	1.75	612807.71	638913.00	N 32.41	W 103.52 54.82
	5900.00	1.68	246.93	5888.04	-59.41	-8.79	-59.99	-8.79	1.75	612807.71	638913.00	N 32.41	W 103.52 54.82
	6000.00	0.95	222.85	5988.01	-61.26	-9.97	-61.91	-9.97	0.90	612806.53	638906.90	N 32.41	W 103.52 54.69
	6100.00	1.02	229.37	6087.99	-62.43	-11.16	-63.15	-11.16	0.13	612805.34	638905.66	N 32.41	W 103.52 54.70
	6200.00	0.83	241.13	6187.98	-63.75	-12.24	-64.34	-12.24	0.20	612804.26	638904.46	N 32.41	W 103.52 54.72
	6300.00	0.93	241.13	6287.97	-64.75	-13.14	-65.85	-13.14	0.25	612803.36	638903.23	N 32.41	W 103.52 54.73
	6400.00	1.06	232.83	6387.96	-66.14	-14.09	-67.02	-14.09	0.19	612802.41	638901.78	N 32.41	W 103.52 54.75
	6500.00	0.23	175.46	6487.95	-66.82	-14.85	-67.75	-14.85	0.96	612801.65	638901.06	N 32.41	W 103.52 54.76
	6600.00	0.36	140.01	6587.95	-66.88	-14.79	-67.52	-14.79	0.57	612801.71	638901.29	N 32.41	W 103.52 54.75
	6700.00	0.63	300.97	6687.85	-66.88	-14.26	-67.77	-14.26	0.79	612802.24	638901.03	N 32.41	W 103.52 54.76
	6800.00	0.81	283.64	6787.94	-68.06	-13.81	-68.93	-13.81	0.28	612802.69	638899.87	N 32.41	W 103.52 54.77
	6900.00	0.85	291.87	6887.93	-69.46	-13.37	-70.31	-13.37	0.12	612803.13	638898.50	N 32.41	W 103.52 54.79
	7000.00	0.62	286.44	6987.92	-70.69	-12.94	-71.52	-12.94	0.24	612803.56	638897.29	N 32.41	W 103.52 54.80
	7100.00	0.71	290.99	7087.91	-71.81	-12.60	-72.61	-12.60	0.10	612803.94	638896.19	N 32.41	W 103.52 54.81
	7200.00	0.57	286.26	7187.91	-72.88	-12.20	-73.67	-12.20	0.15	612804.30	638895.13	N 32.41	W 103.52 54.83
	7300.00	0.76	336.23	7287.90	-73.86	-11.46	-74.42	-11.46	0.59	612805.04	638894.39	N 32.41	W 103.52 54.83
	7400.00	0.66	334.87	7387.89	-74.24	-10.33	-74.93	-10.33	0.10	612806.17	638893.88	N 32.41	W 103.52 54.84
	7500.00	0.98	343.72	7487.88	-74.89	-8.99	-75.41	-8.99	0.34	612807.51	638893.39	N 32.41	W 103.52 54.85
	7600.00	1.09	337.27	7587.87	-75.50	-7.29	-76.02	-7.29	0.16	612808.21	638892.78	N 32.41	W 103.52 54.85
	7700.00	1.02	336.84	7687.85	-76.31	-5.59	-76.74	-5.59	0.07	612810.81	638892.07	N 32.41	W 103.52 54.86
	7800.00	1.08	314.52	7787.83	-77.41	-4.11	-77.76	-4.11	0.41	612812.39	638891.04	N 32.41	W 103.52 54.87
	7900.00	1.04	328.17	7887.81	-78.64	-2.68	-78.91	-2.68	0.26	612813.82	638889.89	N 32.41	W 103.52 54.89
	8000.00	1.10	326.80	7987.80	-79.73	-1.11	-79.92	-1.11	0.07	612815.39	638888.89	N 32.41	W 103.52 54.90
	8100.00	1.06	313.41	8087.78	-81.01	0.33	-81.12	0.33	0.25	612816.83	638887.69	N 32.41	W 103.52 54.91
	8200.00	1.11	299.14	8187.77	-82.12	1.10	-82.18	1.10	0.39	612817.60	638886.62	N 32.41	W 103.52 54.92
	8300.00	1.14	280.94	8287.76	-82.88	1.45	-82.93	1.45	0.39	612817.95	638885.88	N 32.41	W 103.52 54.93
	8400.00	1.67	282.98	8387.75	-83.64	1.87	-83.68	1.87	1.76	612818.17	638885.13	N 32.41	W 103.52 54.94
	8500.00	0.62	82.72	8487.74	-84.01	1.91	-84.03	1.91	6.33	612818.41	638884.78	N 32.41	W 103.52 54.95
	8600.00	4.40	8304.71	8587.70	-82.70	2.88	-82.71	2.88	12.80	612818.58	638884.09	N 32.41	W 103.52 54.93
	8700.00	8.39	8336.52	8687.66	-79.25	1.96	-79.26	1.96	11.35	612818.45	638883.54	N 32.41	W 103.52 54.89
	8800.00	11.70	8367.06	8787.59	-73.95	1.57	-73.97	1.57	11.94	612818.07	638883.83	N 32.41	W 103.52 54.83
	8900.00	15.30	8398.17	8887.48	-66.48	0.97	-66.53	0.97	11.25	612817.47	638882.28	N 32.41	W 103.52 54.74
	9000.00	18.99	8428.74	8987.38	-57.05	0.21	-57.13	0.21	11.53	612816.71	638891.68	N 32.41	W 103.52 54.63
	9100.00	94.55	8458.74	9087.28	-46.28	0.10	-46.36	0.10	10.77	612816.40	638922.44	N 32.41	W 103.52 54.51
	9200.00	21.72	8487.18	9187.18	-33.62	-0.29	-33.69	-0.29	11.04	612816.21	638935.11	N 32.41	W 103.52 54.36
	9300.00	27.52	8515.88	9287.14	-19.47	-0.99	-19.56	-0.99	8.01	612815.51	638948.24	N 32.41	W 103.52 54.19
	9400.00	30.42	8543.00	9387.08	-4.46	-2.01	-4.58	-2.01	9.61	612814.49	638964.22	N 32.41	W 103.52 54.02
	9500.00	33.24	8570.18	9487.00	12.41	-3.48	12.23	-3.48	8.93	612813.02	638981.03	N 32.41	W 103.52 53.82
	9600.00	95.42	8598.54	9587.00	30.54	-5.28	30.29	-5.28	8.30	612811.22	638998.09	N 32.41	W 103.52 53.61
	9700.00	95.86	8621.15	9687.00	49.35	-7.22	49.03	-7.22	9.90	612809.28	639017.82	N 32.41	W 103.52 53.39
	9800.00	96.13	8645.50	9787.00	70.08	-9.39	69.87	-9.39	9.36	612807.11	639038.46	N 32.41	W 103.52 53.15
	9900.00	45.37	8668.65	9887.00	92.14	-11.73	91.63	-11.73	10.72	612804.77	639060.42	N 32.41	W 103.52 52.89
	10000.00	94.48	8688.65	9987.00	114.33	-13.80	114.33	-13.80	13.31	612802.70	639083.12	N 32.41	W 103.52 52.63
	10100.00	53.23	8708.65	10087.00	139.89	-15.47	139.25	-15.47	12.73	612801.03	639104.08	N 32.41	W 103.52 52.33
	10200.00	57.42	8727.84	10187.00	166.21	-16.95	165.53	-16.95	12.91	612799.55	639124.31	N 32.41	W 103.52 52.03
	10300.00	61.29	8743.84	10287.00	192.87	-18.75	192.13	-18.75	12.94	612797.75	639146.92	N 32.41	W 103.52 51.72
	10400.00	64.81	8758.14	10387.00	221.38	-21.23	220.54	-21.23	11.38	612795.27	639169.33	N 32.41	W 103.52 51.38
	10500.00	67.88	8770.58	10487.00	249.74	-24.02	248.80	-24.02	9.94	612792.48	639191.58	N 32.41	W 103.52 51.05
	10600.00	95.95	8781.75	10587.00	279.62	-27.08	278.62	-27.08	10.48	612789.42	639217.40	N 32.41	W 103.52 50.70
	10700.00	97.81	8791.21	10687.00	310.23	-30.19	309.03	-30.19	9.91	612786.32	639247.81	N 32.41	W 103.52 50.35
	10800.00	77.65	8798.94	10787.00	341.24	-33.31	339.92	-33.31	10.20	612783.19	639278.69	N 32.41	W 103.52 49.99
	10900.00	80.02	8804.94	10887.00	371.62	-36.32	370.18	-36.32	7.72	612780.18	639303.95	N 32.41	W 103.52 49.63
	11000.00	82.83	8814.29	10987.00	403.21	-38.97	403.33	-38.97	6.98	612777.53	639330.43	N 32.41	W 103.52 49.27
	11100.00	86.14	8824.92	11087.00	434.92	-40.80	434.33	-40.80	5.92	612775.70	639357.09	N 32.41	W 103.52 48.90
	11200.00	88.75	8836.52	11187.00	465.74	-42.14	464.12	-42.14	7.10	612774.37	639384.88	N 32.41	W 103.52 48.54
	11300.00	89.43	8843.78	11287.00	496.65	-43.45	495.86	-43.45	5.39	612773.05	639412.66	N 32.41	W 103.52 48.17
	11400.00	90.84	8848.91	11387.00	527.59	-44.76	526.80	-44.76	2.87	612771.73	639440.62	N 32.41	W 103.52 47.80
	11500.00	92.61	8855.79	11487.00	558.50	-46.07	557.71	-46.07	1.49	612770.41	639468.38	N 32.41	W 103.52 47.43
	11600.00	93.31	8862.83	11587.00	589.41	-47.38	588.62	-47.38	0.13	612769.09	639496.14	N 32.41	W 103.52 47.06
	11700.00	94.31	8869.95	11687.00	620.32	-48.69	619.63	-48.69	0.50	612767.77	639523.90	N 32.41	W 103.52 46.69
	11800.00	95.31	8877.07	11787.00	651.23	-49.99	650.44	-49.99	0.89	612766.45	639551.66	N 32.41	W 103.52 46.32
	11900.00	96.31	8884.19	11887.00	682.14	-51.29	681.35	-51.29	0.26	612765.13	639579.42	N 32.41	W 103.52 45.95
	12000.00	97.31	8891.31	11987.00	713.05	-52.59	712.26	-52.59	0.59	612763.81	639607.18	N 32.41	W 103.52 45.58
	12100.00	98.31	8898.43	12087.00	743.96	-53.89	743.17	-53.89	0.96	612762.49	639634.94	N 32.41	W 103.52 45.21
	12200.00	99.31	8905.55	12187.00	774.87	-55.19	774.08	-55.19	0.34	612761.17	639662.70	N 32.41	W 103.52 44.84
	12300.00	100.31	8912.67	12287.00	805.78	-56.49	804.99	-56.49	0.71	612759.85	639690.46	N 32.41	W 103.52 44.47
	12400.00	101.31	8919.79	12387.00	836.69	-57.79	835.90	-57.79	1.08	612758.53	639718.22	N 32.41	W 103.52 44.10
	12500.00	102.31	8926.91	12487.00	867.60	-59.09	866.81	-59.09	1.45	612757.21	639745.98	N 32.41	W 103.52 43.73
	12600.00	103.31	8934.03	12587.00	898.51	-60.39	897.72	-60.39	1.82	612755.89	639773.74	N 32.41	W 103.52 43.36
	12700.00	104.31	8941.15	12687.00	929.42	-61.69	928.63	-61.69	2.19	612754.57	639801.50	N 32.41	W 103.52 42.99
	12800.00	105.31	8948.27	12787.00	960.33	-62.99	959.54	-62.99	2.56	612753.25	639829.26	N 32.41	W 103.52 42.62
	12900.00	106.31	8955.39	12887.00	991.24	-64.29	990.45	-64.29	2.93	612751.93	639857.02	N 32.41	W 103.52 42.25
	13000.00	107.31	8962.51	12987.00	1022.15	-65.59	1021.36	-65.59	3.30	612750.61	639884.78	N 32.41	W 103.52 41.88
	13100.00	108.31	8969.63	13087.00	1053.06	-66.89	1052.27	-66.89	3.67	612749.29	639912.54	N 32.41	W 103.52 41.51
	13200.00	109.31	8976.75	13187.00									

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
	11761.00	89.34	94.11	8878.75	3095.33	-171.57	3090.57	1.71	612644.95	642059.15	N 32 41 0.28	W 103 52 17.81
	11824.00	90.04	93.75	8879.09	3158.32	-175.88	3153.42	1.25	612640.63	642121.99	N 32 41 0.23	W 103 52 17.08
	11919.00	90.84	93.67	8878.36	3253.31	-182.03	3248.22	0.85	612634.48	642216.79	N 32 41 0.17	W 103 52 15.97
	12014.00	90.31	92.35	8877.41	3348.30	-187.02	3343.08	1.50	612629.49	642311.64	N 32 41 0.11	W 103 52 14.88
	12109.00	89.78	93.14	8877.33	3443.30	-191.57	3437.97	1.00	612624.94	642406.52	N 32 41 0.07	W 103 52 13.75
	12203.00	90.84	92.96	8876.83	3537.30	-196.57	3531.83	1.14	612619.94	642500.38	N 32 41 0.01	W 103 52 12.65
	12298.00	90.92	93.05	8875.37	3632.29	-201.55	3626.69	0.13	612614.96	642595.23	N 32 40 59.96	W 103 52 11.54
	12394.00	90.13	92.96	8874.49	3728.28	-206.58	3722.55	0.83	612609.93	642691.09	N 32 40 59.90	W 103 52 10.42
	12489.00	89.25	93.23	8875.00	3823.28	-211.71	3817.41	0.97	612604.80	642785.94	N 32 40 59.85	W 103 52 9.31
	12584.00	90.57	92.26	8875.15	3918.27	-216.26	3912.30	1.72	612600.25	642880.82	N 32 40 59.80	W 103 52 8.20
	12678.00	90.22	92.96	8874.50	4012.26	-220.54	4006.20	0.83	612595.97	642974.72	N 32 40 59.75	W 103 52 7.10
	12773.00	89.34	93.31	8874.87	4107.26	-225.74	4101.05	1.00	612590.78	643069.56	N 32 40 59.70	W 103 52 5.99
	12868.00	89.52	92.96	8875.81	4202.26	-230.93	4195.91	0.41	612585.58	643164.41	N 32 40 59.64	W 103 52 4.88
	12963.00	89.96	92.08	8876.24	4297.25	-235.11	4290.81	1.04	612581.41	643259.31	N 32 40 59.60	W 103 52 3.77
	13058.00	89.78	92.79	8876.46	4392.24	-239.14	4385.73	0.77	612577.37	643354.22	N 32 40 59.55	W 103 52 2.66
Final Survey	13185.00	91.63	92.61	8874.90	4519.22	-245.13	4512.57	1.46	612571.39	643481.05	N 32 40 59.49	W 103 52 1.18
Projection To Bit	13375.00	91.63	92.61	8869.49	4709.13	-253.77	4702.30	0.00	612562.74	643670.76	N 32 40 59.40	W 103 51 58.96

Survey Type: Non-Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

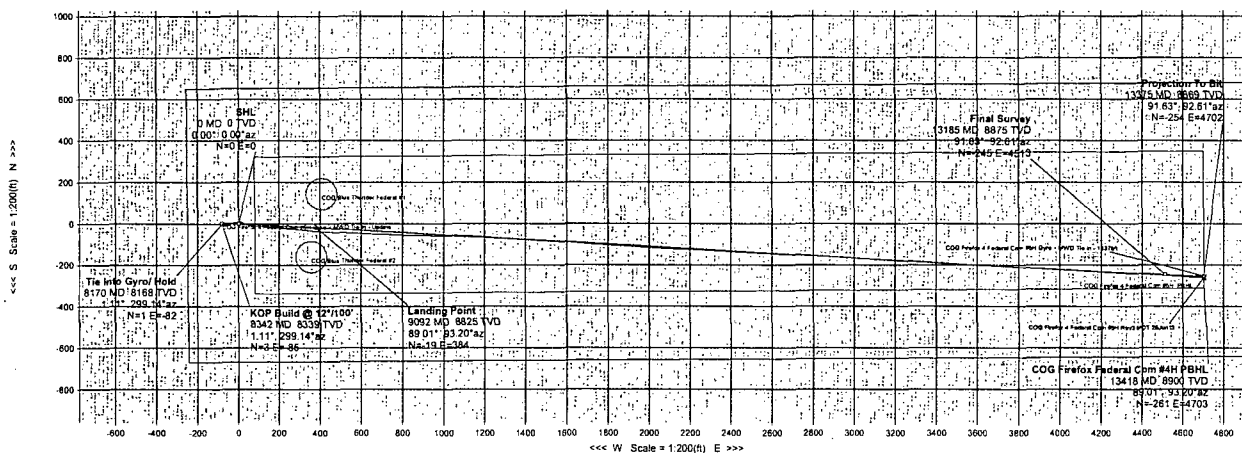
Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	18.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	COG Firefox 4 Federal Com #5H / COG Firefox 4 Federal Com #5H Gyro + MWD Tie In - 13375ft
	18.000	8170.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT	COG Firefox 4 Federal Com #5H / COG Firefox 4 Federal Com
	8170.000	13375.000	Act Stns	30.000	30.000	SLB_MWD-STD	COG Firefox 4 Federal Com #5H / COG Firefox 4 Federal Com

WELL	Firefox 4 Federal Com #5H	FIELD	NM Eddy County (NAD 27)	STRUCTURE	Patriot 6
Magnetic Parameters	Model: BOGM 2012	Dip: 69.46°	Dec: June 25, 2013	Surface Location	NA2011 New Mexico State Plane, Eastern Zone, US Feet
	Mag Dec: 7.62°	ES: 44523.7mT		Lat: N 32 41 2.107	Long: W 103 52 53.963
				Northing: 6388880.805	Easting: 638968.80.805
				Grid Conv: 0.144°	Scale Fact: 0.99991321
Master/Slave	Slave: Firefox 4 Federal Com #5H	TVD Ref: RCM/15728 above MSL		Plan: Rev 3 MDT 21 Jun 13	Srv Date: June 25, 2013

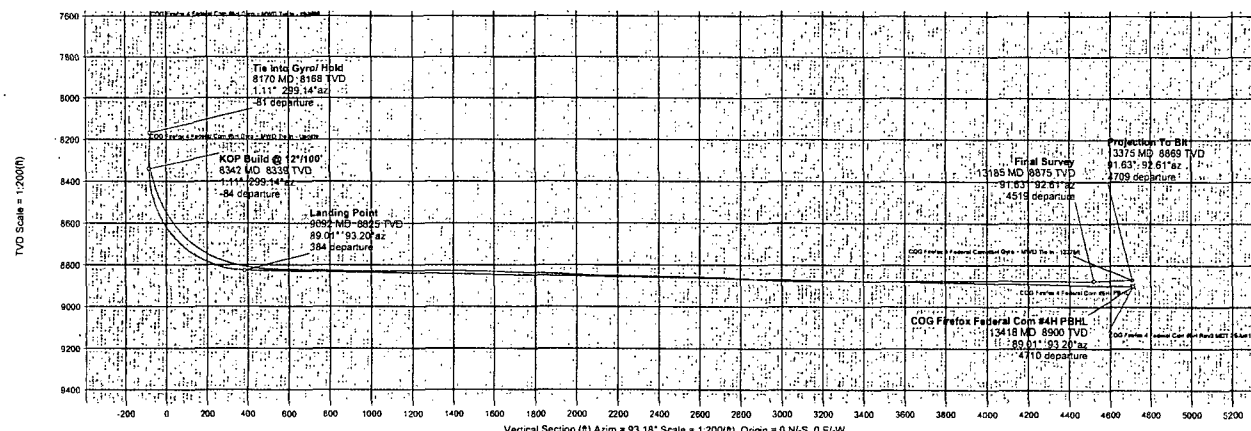
Legend

- COG Blue (Nadine) Feature #1
- COG Yellow (Nadine) Feature #2
- COG Blue (Nadine) Feature #3
- COG Yellow (Nadine) Feature #4
- COG Yellow (Nadine) Feature #5
- COG Yellow (Nadine) Feature #6
- COG Yellow (Nadine) Feature #7
- COG Yellow (Nadine) Feature #8
- COG Yellow (Nadine) Feature #9
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- COG Yellow (Nadine) Feature #11
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- COG Yellow (Nadine) Feature #15
- COG Yellow (Nadine) Feature #16
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- COG Yellow (Nadine) Feature #50
- COG Yellow (Nadine) Feature #51
- COG Yellow (Nadine) Feature #52
- COG Yellow (Nadine) Feature #53
- COG Yellow (Nadine) Feature #54
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- COG Yellow (Nadine) Feature #97
- COG Yellow (Nadine) Feature #98
- COG Yellow (Nadine) Feature #99
- COG Yellow (Nadine) Feature #100

Grid-North
Tot Corr (M->G)
7.3810°
Mag Dec (7.625°)
Grid Conv (0.244°)



Comments	Survey MDT (m)	Inclination (deg)	Azimuth (deg)	TVD (ft)	Sub-Sea TVD (ft)	VS (ft)	NS (ft)	EW (ft)	Northing (ft)	Easting (ft)	Latitude (deg)	Longitude (deg)	DLS (100m)	Tool Face (deg)
Tie Into Gyro/ Hold	8170.00	1.11	299.14	8167.77	4594.77	-82.12	1.10	-82.18	612817.60	638886.62	N 32 41 2.122	W 103 52 54.925	0.39	299.14
KOP Build @ 12°/100'	8341.57	1.11	299.14	8339.31	4766.31	-85.11	2.72	-85.09	612819.22	638883.72	N 32 41 2.138	W 103 52 54.959	0.00	93.20
Landing Point	9091.62	89.01	93.20	8825.00	5252.00	384.01	-19.43	383.53	612797.07	639352.30	N 32 41 1.899	W 103 52 49.477	12.00	0.00
COG Firefox Federal Com #4H PBHL	13418.42	89.01	93.20	8900.00	5327.00	4710.17	-260.92	4702.93	612555.60	643671.40	N 32 40 59.324	W 103 51 58.954	0.00	



Drawn By: Current User
Date Created: June 25, 2013 09:17:33 PM
Checked By:
Approved By:
Approved Date: