



Company: COG Operating LLC (Concho)
Lease/Well: Dirty Dozen Federal Com / No. 004H
Location: S36 T19s R31s
Rig Name: Basic 46
State/County: New Mexico / Eddy
Latitude: 32.61
GRID North is 0.28 Degrees East of True North
VS-Azi: 100.15 Degrees



Depth Reference : RKB = 21'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ...ederal com #4h gyro survey.ut

Minimum Curvature Method

Report Date/Time: 8/3/2012 / 09:15

Vaughn Energy Services

Gardendale, Texas

432-563-5444

Surveyor: Colby Ware

Dirty Dozen Federal Com No. 004H / API 30-015-38150

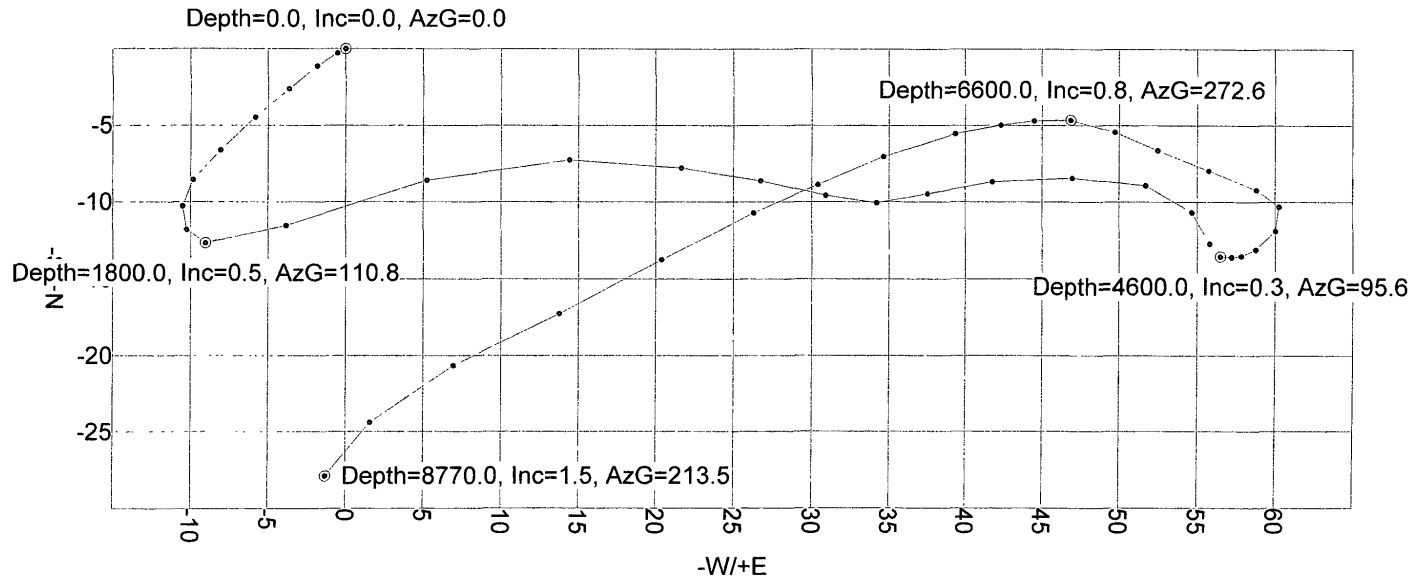
15-38150

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	****
200.00	0.34	242.09	200.00	-0.28	-0.53	0.60	242.09	0.17
400.00	0.55	233.82	399.99	-1.13	-1.83	2.15	238.44	0.11
600.00	0.80	229.15	599.98	-2.60	-3.66	4.49	234.58	0.13
800.00	0.84	228.96	799.96	-4.48	-5.82	7.34	232.42	0.02
1000.00	0.95	224.77	999.93	-6.62	-8.09	10.45	230.73	0.06
1200.00	0.55	216.73	1199.92	-8.56	-9.83	13.04	228.95	0.21
1400.00	0.54	186.18	1399.91	-10.27	-10.51	14.69	225.65	0.14
1600.00	0.38	147.13	1599.90	-11.78	-10.24	15.61	221.02	0.17
1800.00	0.50	110.83	1799.90	-12.65	-9.06	15.56	215.62	0.15
2000.00	2.67	71.87	1999.81	-11.51	-3.82	12.13	198.37	1.15
2200.00	2.79	72.51	2199.58	-8.60	5.24	10.07	148.64	0.07
2400.00	2.59	91.74	2399.37	-7.28	14.41	16.14	116.79	0.46
2600.00	1.58	98.16	2599.23	-7.80	21.65	23.01	109.82	0.52
2800.00	1.39	100.51	2799.17	-8.63	26.75	28.11	107.89	0.10
3000.00	1.06	106.07	2999.12	-9.59	30.91	32.37	107.23	0.17
3200.00	0.87	88.46	3199.09	-10.06	34.22	35.67	106.39	0.18
3400.00	1.06	73.17	3399.06	-9.49	37.51	38.69	104.19	0.16
3600.00	1.44	84.33	3599.02	-8.70	41.77	42.67	101.77	0.22

Page 1 of 2

VES Survey Date: 07/27/2012

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
3800.00	1.54	90.12	3798.95	-8.46	46.96	47.72	100.21	0.09
4000.00	1.21	103.12	3998.89	-8.95	51.71	52.47	99.82	0.23
4200.00	0.89	144.14	4198.86	-10.68	54.67	55.70	101.05	0.40
4400.00	0.47	164.06	4398.85	-12.72	55.80	57.23	102.84	0.24
4600.00	0.27	95.63	4598.84	-13.55	56.49	58.09	103.49	0.22
4800.00	0.15	88.91	4798.84	-13.59	57.22	58.81	103.36	0.06
5000.00	0.21	78.74	4998.84	-13.51	57.85	59.40	103.15	0.04
5200.00	0.38	57.97	5198.84	-13.08	58.78	60.22	102.55	0.10
5400.00	0.62	38.42	5398.83	-11.88	60.02	61.18	101.19	0.15
5600.00	0.48	328.34	5598.82	-10.31	60.26	61.14	99.71	0.32
5800.00	0.61	291.00	5798.81	-9.22	58.83	59.55	98.91	0.18
6000.00	1.30	292.45	5998.78	-7.98	55.75	56.32	98.14	0.34
6200.00	0.74	291.28	6198.75	-6.65	52.46	52.88	97.22	0.28
6400.00	0.97	295.59	6398.73	-5.45	49.73	50.03	96.25	0.12
6600.00	0.78	272.62	6598.71	-4.66	46.84	47.07	95.68	0.20
6800.00	0.58	263.42	6798.69	-4.71	44.48	44.72	96.05	0.12
7000.00	0.66	262.07	6998.68	-4.99	42.32	42.62	96.72	0.04
7200.00	1.08	257.74	7198.66	-5.55	39.33	39.72	98.03	0.21
7400.00	1.75	248.82	7398.60	-7.05	34.65	35.36	101.50	0.35
7600.00	0.91	242.19	7598.54	-8.89	30.40	31.67	106.31	0.42
7800.00	1.65	248.37	7798.49	-10.70	26.31	28.40	112.13	0.38
8000.00	2.17	238.60	7998.38	-13.74	20.38	24.58	123.98	0.31
8200.00	2.13	245.39	8198.24	-17.26	13.77	22.08	141.43	0.13
8400.00	2.24	241.73	8398.09	-20.66	6.94	21.80	161.42	0.09
8600.00	1.54	225.63	8597.98	-24.39	1.58	24.44	176.29	0.44
8770.00	1.54	213.48	8767.92	-27.88	-1.30	27.91	182.67	0.19



CRESCENT

DIRECTIONAL DRILLING

Minimum Curvature Calculation

Client: Concho O&G
Well: Dirty Dozen Fed Com #4H
County: Eddy County
Rig: Basic #46

M.W.D. OPERATORS: Joseph Hunter Randy Huston
DIRECTIONAL DRILLERS: Mark Snelson / Steve Bibb
Tool Azimuth to Grid North: 7.32
Job #: PB-12420

Vertical Section Angle: 100.14

Sur #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N/-S	+E/-W	DLS
Tie In	8770.00	1.54	213.48	8767.92	3.62	-27.88	-1.31	0.23
1	8777.00	1.60	206.30	8774.92	3.55	-28.05	-1.41	2.94
2	8809.00	1.60	204.70	8806.90	3.32	-28.85	-1.79	0.14
3	8841.00	1.40	194.20	8838.89	3.18	-29.64	-2.07	1.06
4	8871.00	3.10	124.00	8868.87	3.89	-30.45	-1.49	9.79
5	8903.00	6.90	116.10	8900.75	6.53	-31.78	0.95	12.04
6	8934.00	9.40	117.70	8931.43	10.74	-33.77	4.87	8.10
7	8965.00	13.30	117.40	8961.82	16.56	-36.59	10.28	12.58
8	8997.00	16.40	114.50	8992.75	24.45	-40.16	17.66	9.96
9	9028.00	20.30	114.20	9022.17	33.91	-44.18	26.55	12.58
10	9060.00	24.60	115.40	9051.73	45.73	-49.32	37.63	13.51
11	9090.00	28.20	117.20	9078.60	58.53	-55.24	49.58	12.29
12	9121.00	31.30	119.50	9105.51	73.14	-62.55	63.11	10.65
13	9151.00	33.90	120.20	9130.78	88.35	-70.60	77.13	8.76
14	9181.00	36.00	122.10	9155.37	104.39	-79.49	91.83	7.88
15	9213.00	38.80	122.10	9180.79	122.41	-89.82	108.29	8.75
16	9244.00	41.50	122.10	9204.48	140.95	-100.44	125.22	8.71
17	9275.00	44.70	122.80	9227.12	160.54	-111.81	143.09	10.44
18	9306.00	47.50	123.00	9248.61	181.14	-123.94	161.84	9.04
19	9338.00	50.50	123.90	9269.60	203.31	-137.25	181.99	9.61
20	9368.00	54.00	126.30	9287.97	224.81	-150.90	201.38	13.27
21	9400.00	57.90	127.90	9305.88	248.43	-166.90	222.52	12.87
22	9431.00	61.70	129.00	9321.47	272.01	-183.56	243.50	12.64
23	9462.00	66.30	129.30	9335.06	296.37	-201.14	265.10	14.86
24	9492.00	70.50	129.10	9346.10	320.74	-218.77	286.71	14.01
25	9524.00	74.20	129.10	9355.80	347.42	-238.00	310.37	11.56
26	9556.00	78.60	129.10	9363.32	374.63	-257.61	334.50	13.75
27	9586.00	83.00	129.00	9368.12	400.54	-276.26	357.49	14.67
28	9617.00	85.60	128.80	9371.20	427.58	-295.63	381.50	8.41

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DIRECTIONAL DRILLING

Minimum Curvature Calculation

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County: Eddy County
Rig: Basic #46

M.W.D. OPERATORS: Joseph Hunter Randy Huston
DIRECTIONAL DRILLERS: Mark Snelson / Steve Bibb
Tool Azimuth to Grid North: 7.32
Job #: PB-12420

Vertical Section Angle: 100.14

Sur #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver.Sect.	*N/-S	*E/-W	DLS
29	9648.00	87.30	129.10	9373.12	454.69	-315.08	405.56	5.57
30	9680.00	88.50	129.80	9374.29	482.58	-335.40	430.25	4.34
31	9712.00	88.90	130.20	9375.02	510.32	-355.96	454.76	1.77
32	9742.00	88.70	130.20	9375.64	536.28	-375.32	477.67	0.67
33	9836.00	89.90	130.70	9376.79	617.42	-436.30	549.19	1.38
34	9931.00	90.10	130.70	9376.79	699.23	-498.25	621.21	0.21
35	10025.00	89.90	128.30	9376.79	781.15	-558.04	693.74	2.56
36	10118.00	89.60	125.10	9377.20	864.32	-613.61	768.30	3.46
37	10211.00	90.30	121.40	9377.28	949.84	-664.59	846.06	4.05
38	10304.00	89.90	117.90	9377.12	1037.49	-710.59	926.87	3.79
39	10398.00	88.90	113.10	9378.10	1128.10	-751.04	1011.68	5.22
40	10491.00	88.30	108.00	9380.38	1219.51	-783.67	1098.70	5.52
41	10584.00	89.60	103.80	9382.08	1312.00	-809.14	1188.11	4.73
42	10677.00	90.60	99.40	9381.92	1404.95	-827.83	1279.19	4.85
43	10772.00	89.90	96.30	9381.50	1499.86	-840.81	1373.28	3.35
44	10864.00	90.10	97.00	9381.50	1591.69	-851.46	1464.66	0.79
45	10958.00	89.60	97.70	9381.75	1685.58	-863.48	1557.89	0.92
46	11050.00	89.40	98.40	9382.55	1777.51	-876.37	1648.98	0.79
47	11145.00	89.00	98.60	9383.88	1872.46	-890.41	1742.93	0.47
48	11237.00	90.30	98.40	9384.44	1964.42	-904.01	1833.91	1.43
49	11330.00	90.30	97.00	9383.95	2057.33	-916.47	1926.07	1.51
50	11424.00	90.80	96.40	9383.05	2151.16	-927.43	2019.42	0.83
51	11518.00	90.40	95.70	9382.07	2244.91	-937.34	2112.89	0.86
52	11611.00	90.40	94.90	9381.42	2337.58	-945.93	2205.49	0.86
53	11704.00	90.30	95.00	9380.85	2430.20	-953.95	2298.14	0.15

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Tool Azimuth to Grid North: 7.32
Job #: PB-12420

Vertical Section Angle: 100.14

Sur #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver.Sect.	+N/-S	+E/-W	DLS
54	11796.00	90.80	95.20	9379.97	2521.84	-962.13	2389.78	0.59
55	11889.00	91.00	95.60	9378.51	2614.51	-970.88	2482.35	0.48
56	11985.00	90.80	96.10	9377.00	2710.23	-980.67	2577.84	0.56
57	12078.00	91.10	97.10	9375.46	2803.03	-991.35	2670.21	1.12
58	12204.00	90.60	97.00	9373.59	2928.84	-1006.82	2795.24	0.40
59	12266.00	90.60	97.00	9372.94	2990.74	-1014.37	2856.78	0.00
60	12361.00	90.80	97.10	9371.78	3085.59	-1026.03	2951.05	0.24
61	12453.00	90.30	97.10	9370.89	3177.46	-1037.40	3042.34	0.54
62	12516.00	89.40	96.40	9371.06	3240.35	-1044.81	3104.90	1.81
63	12548.00	89.60	96.60	9371.34	3272.28	-1048.43	3136.70	0.88
64	12636.00	88.50	94.70	9372.80	3360.00	-1057.09	3224.25	2.49
65	12730.00	88.50	95.20	9375.26	3453.58	-1065.20	3317.87	0.53
66	12823.00	88.90	96.10	9377.37	3546.27	-1074.35	3410.39	1.06
67	12917.00	88.70	96.30	9379.34	3640.02	-1084.50	3503.82	0.30
68	13011.00	88.90	96.60	9381.30	3733.81	-1095.06	3597.21	0.38
69	13105.00	89.70	95.90	9382.45	3827.58	-1105.29	3690.64	1.13
70	13198.00	89.60	96.40	9383.02	3920.36	-1115.25	3783.10	0.55
71	13291.00	89.60	94.70	9383.67	4013.05	-1124.25	3875.66	1.83
72	13385.00	90.10	95.00	9383.92	4106.65	-1132.20	3969.32	0.62
73	13478.00	90.40	95.60	9383.51	4199.32	-1140.79	4061.92	0.72
74	13571.00	89.90	95.70	9383.27	4292.03	-1149.94	4154.47	0.55
75	13663.00	89.70	95.90	9383.59	4383.77	-1159.24	4246.00	0.31
76	13758.00	90.80	96.40	9383.17	4478.54	-1169.42	4340.45	1.27
77	13849.00	89.70	95.70	9382.78	4569.30	-1179.01	4430.94	1.43
78	13943.00	89.70	95.90	9383.27	4663.03	-1188.51	4524.46	0.21
79	14038.00	89.40	93.50	9384.02	4757.59	-1196.29	4619.13	2.55
80	14132.00	90.10	93.50	9384.43	4850.96	-1202.03	4712.95	0.74
81	14226.00	88.90	92.40	9385.25	4944.21	-1206.87	4806.82	1.73
82	14320.00	90.10	92.70	9386.07	5037.39	-1211.05	4900.72	1.32

Minimum Curvature Calculation

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Tool Azimuth to Grid North: 7.32
Job #: PB-12420

Sur #	Meas Depth	Inc.	Azm.	T.V.D.	Ver.Sect.	+N/-S	+E/-W	D.L.S.
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