30-015-40359

JW DRILLING INC. Oil Well Drilling Contractor

Post Office Box 160 Artesia, New Mexico 88211-0160 Office (575) 748-8704 Fax (575) 748-8719

September 25, 2012

COG Operating, LLC
One Concho Center 600 W. Illinois Avenue
Midland , Texas 79701

Re: Sec. 11, T-17-S, R-29-E
Submarine 11 Fed Com # 2 H
Eddy County, New Mexico

Attn: Jim Evans

The following is a Deviation Survey on the referenced well in Eddy County, New Mexico:

221' - 0.5°	1326' - 0.75°	2225' - 0.75°	3130' - 0.25°	4096' - 0.5°
500' - 1.5°	1753' - 0.5°	2662' - 0.75°	3630' - 0.75°	4564' - 1°
864' - 0.5°				

Sincerely,

Gary W. Chappell
Contracts Manager

STATE OF NEW MEXICO)
)
COUNTY OF EDDY)

The foregoing was acknowledged before me this 25th day of September, 2012 by Gary W. Chappell.

Barbara M. Johnson
NOTARY PUBLIC

Official Seal
BARBARA M. JOHNSON
Notary Public
State of New Mexico
My Commission Expires 1-20-16

Company: COG Operating LLC (Concho)
Lease/Well: Submarine 11 Federal Com / No. 002H
Location: S11 T17s R29e
Rig Name: JW #2
State/County: New Mexico / Eddy
Latitude: 32.85
GRID North is 0.15 Degrees East of True North
VS-Azi: 0.00 Degrees

RKB : 18.5'

DRILLOG HA GYRO SURVEY CALCULATIONS
Filename: ...11 fed com #2h gyro survey.ut
Minimum Curvature Method
Report Date/Time: 10/1/2012 / 16:22

Vaughn Energy Services
Gardendale, Texas
432-563-5444
Surveyor: Dustin Wedel

Submarine 11 Federal Com No. 002H / API 30-015-40359

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	0.32	196.32	100.00	-0.27	-0.08	0.28	196.32	0.32
200.00	1.25	219.65	199.99	-1.39	-0.86	1.63	211.74	0.96
300.00	1.43	222.59	299.96	-3.15	-2.40	3.96	217.32	0.18
400.00	1.28	221.40	399.93	-4.90	-3.98	6.31	219.08	0.15
500.00	1.02	216.76	499.91	-6.45	-5.25	8.32	219.14	0.27
600.00	0.58	216.81	599.90	-7.57	-6.09	9.71	218.80	0.45
700.00	0.10	196.75	699.90	-8.05	-6.41	10.29	218.53	0.49
800.00	0.21	88.32	799.90	-8.13	-6.26	10.26	217.59	0.25
900.00	0.28	97.52	899.90	-8.15	-5.84	10.03	215.60	0.08
1000.00	0.31	135.99	999.90	-8.38	-5.42	9.98	212.88	0.19
1100.00	0.47	91.47	1099.90	-8.58	-4.82	9.84	209.33	0.33
1200.00	0.38	89.88	1199.89	-8.59	-4.08	9.51	205.39	0.09
1300.00	0.26	78.22	1299.89	-8.54	-3.52	9.24	202.38	0.14
1400.00	0.28	111.98	1399.89	-8.59	-3.07	9.12	199.66	0.16
1500.00	0.17	111.72	1499.89	-8.73	-2.71	9.14	197.23	0.11
1600.00	0.25	117.31	1599.89	-8.89	-2.38	9.20	194.98	0.09
1700.00	0.29	152.62	1699.89	-9.21	-2.07	9.44	192.66	0.17
1800.00	0.34	151.97	1799.89	-9.69	-1.81	9.86	190.60	0.06

VES Survey Date: 09/20/2012

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
1900.00	0.25	105.23	1899.89	-10.01	-1.46	10.12	188.31	0.25
2000.00	0.43	109.26	1999.88	-10.19	-0.90	10.23	185.03	0.18
2100.00	0.55	129.70	2099.88	-10.62	-0.17	10.63	180.93	0.21
2200.00	0.44	131.45	2199.88	-11.19	0.49	11.20	177.50	0.11
2300.00	0.50	120.90	2299.87	-11.67	1.15	11.73	174.35	0.11
2400.00	0.64	116.78	2399.87	-12.15	2.03	12.31	170.51	0.14
2500.00	0.25	91.63	2499.87	-12.40	2.75	12.70	167.51	0.42
2600.00	0.34	121.65	2599.86	-12.57	3.22	12.97	165.63	0.17
2700.00	0.26	156.68	2699.86	-12.93	3.56	13.41	164.61	0.19
2800.00	0.50	109.28	2799.86	-13.28	4.06	13.89	163.01	0.37
2900.00	0.49	113.08	2899.86	-13.60	4.86	14.44	160.32	0.03
3000.00	0.24	151.72	2999.86	-13.95	5.36	14.94	158.99	0.34
3100.00	0.15	183.66	3099.85	-14.27	5.45	15.27	159.10	0.14
3200.00	0.28	164.12	3199.85	-14.64	5.51	15.64	159.39	0.15
3300.00	0.20	184.99	3299.85	-15.05	5.56	16.05	159.73	0.12
3400.00	0.04	155.39	3399.85	-15.25	5.56	16.23	159.98	0.17
3500.00	0.14	121.92	3499.85	-15.35	5.68	16.37	159.70	0.11
3600.00	0.10	181.52	3599.85	-15.50	5.78	16.55	159.55	0.13
3700.00	0.38	191.27	3699.85	-15.92	5.72	16.91	160.24	0.28
3800.00	0.34	132.35	3799.85	-16.44	5.87	17.46	160.34	0.36
3900.00	0.22	180.20	3899.85	-16.83	6.09	17.90	160.10	0.25
4000.00	0.33	141.57	3999.85	-17.25	6.27	18.36	160.02	0.21
4100.00	0.43	150.07	4099.85	-17.80	6.64	19.00	159.55	0.11
4200.00	0.19	206.40	4199.84	-18.28	6.75	19.48	159.73	0.36
4300.00	0.25	218.73	4299.84	-18.60	6.54	19.72	160.63	0.08
4400.00	0.25	193.74	4399.84	-18.98	6.35	20.02	161.51	0.11
4500.00	0.35	163.81	4499.84	-19.49	6.38	20.50	161.86	0.18
4600.00	0.21	127.78	4599.84	-19.89	6.61	20.96	161.61	0.22
4700.00	0.29	90.46	4699.84	-20.01	7.01	21.20	160.68	0.17
4718.00	0.25	123.16	4717.84	-20.03	7.09	21.25	160.51	0.86

VES Survey Date: 09/20/2012

Archer

Company:	Concho Resources	**Job Number:**	03897-433-22	**Calculation Method**	Minimum Curvature
Well:	Submarine 11 FED 1 Com #2H	**Mag Decl.:**	7.56	**Proposed Azimuth**	90.4
Location:	Eddy County, New Mexico	**Dir Driller:**		**Depth Reference**	KBG
Rig:	JW #2	**MWD Eng:**	Raul Lopez	**Tie Into:**	Gyro Survey
Job Date:	09/20/12 - 09/30/12				

Survey Number	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates N/S (ft)	Coordinates E/W (ft)	Closure Distance (ft)	Closure Direction Azimuth	Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
Tie In	**4718.00**	**0.25**	**123.16**	0	**4717.8**	**7.23**	**20.00 S**	**7.10 E**					
1	4745	0.1	115.3	27	4744.80	7.30	20.04 S	7.17 E	21.29	160.31	0.56	-0.56	-29.11
2	4776	0.7	77.3	31	4775.80	7.51	20.01 S	7.38 E	21.33	159.76	2.01	1.94	-122.58
3	4807	3.0	68.3	31	4806.78	8.45	19.67 S	8.32 E	21.36	157.08	7.46	7.42	-29.03
4	4838	6.5	64.8	31	4837.67	10.78	18.62 S	10.66 E	21.46	150.21	11.32	11.29	-11.29
5	4870	10.7	62.4	32	4869.30	15.04	16.47 S	14.93 E	22.24	137.81	13.17	13.13	-7.50
6	4901	15.3	64.0	31	4899.50	21.25	13.35 S	21.16 E	25.02	122.24	14.88	14.84	5.16
7	4932	19.7	66.4	31	4929.06	29.69	9.46 S	29.63 E	31.11	107.71	14.38	14.19	7.74
8	4963	24.7	69.2	31	4957.75	40.51	5.07 S	40.48 E	40.80	97.13	16.48	16.13	9.03
9	4994	29.5	73.3	31	4985.34	53.86	0.57 S	53.86 E	53.86	90.61	16.61	15.48	13.23
10	5026	33.3	77.9	32	5012.66	69.98	3.54 N	70.00 E	70.09	87.11	14.03	11.88	14.38
11	5057	36.1	81.3	31	5038.14	87.31	6.70 N	87.35 E	87.61	85.61	10.98	9.03	10.97
12	5088	38.8	83.5	31	5062.75	105.97	9.19 N	106.04 E	106.43	85.05	9.72	8.71	7.10
13	5119	41.8	84.5	31	5086.39	125.90	11.28 N	125.97 E	126.48	84.88	9.90	9.68	3.23
14	5150	44.8	84.8	31	5108.95	147.05	13.26 N	147.14 E	147.74	84.85	9.70	9.68	0.97
15	5181	48.2	85.3	31	5130.29	169.43	15.19 N	169.54 E	170.22	84.88	11.03	10.97	1.61
16	5213	50.8	86.0	32	5151.07	193.68	17.04 N	193.80 E	194.55	84.98	8.29	8.12	2.19
17	5244	53.1	87.4	31	5170.17	218.04	18.44 N	218.17 E	218.95	85.17	8.23	7.42	4.52
18	5275	55.6	88.4	31	5188.24	243.21	19.36 N	243.34 E	244.11	85.45	8.48	8.06	3.23
19	5306	59.1	89.6	31	5204.96	269.29	19.81 N	269.43 E	270.16	85.80	11.75	11.29	3.87
20	5337	62.9	90.2	31	5219.99	296.40	19.85 N	296.54 E	297.20	86.17	12.37	12.26	1.94
21	5368	65.8	90.2	31	5233.41	324.34	19.75 N	324.48 E	325.08	86.52	9.35	9.35	0.00
22	5400	68.2	90.4	32	5245.91	353.80	19.60 N	353.94 E	354.48	86.83	7.52	7.50	0.63
23	5431	70.1	90.4	31	5256.94	382.77	19.40 N	382.90 E	383.39	87.10	6.13	6.13	0.00
24	5462	72.6	90.5	31	5266.85	412.14	19.17 N	412.27 E	412.72	87.34	8.07	8.06	0.32
25	5494	76.0	91.0	32	5275.51	442.94	18.76 N	443.07 E	443.47	87.58	10.73	10.63	1.56
26	5525	79.2	91.8	31	5282.17	473.21	18.02 N	473.33 E	473.68	87.82	10.63	10.32	2.58
27	5556	81.7	92.3	31	5287.31	503.76	16.93 N	503.88 E	504.17	88.08	8.22	8.06	1.61
28	5587	83.5	91.3	31	5291.30	534.49	15.96 N	534.61 E	534.85	88.29	6.63	5.81	-3.23
29	5619	85.4	89.9	32	5294.40	566.34	15.63 N	566.45 E	566.67	88.42	7.36	5.94	-4.37
30	5651	88.7	89.0	32	5296.05	598.29	15.94 N	598.41 E	598.62	88.47	10.69	10.31	-2.81
31	5682	91.2	89.3	31	5296.07	629.28	16.40 N	629.40 E	629.61	88.51	8.12	8.06	0.97
32	5775	92.0	88.3	93	5293.48	722.20	18.34 N	722.34 E	722.57	88.55	1.38	0.86	-1.08
33	5869	91.3	86.4	94	5290.77	816.03	22.69 N	816.20 E	816.51	88.41	2.15	-0.74	-2.02
34	5963	90.3	86.0	94	5289.46	909.77	28.92 N	909.98 E	910.44	88.18	1.15	-1.06	-0.43
35	6058	88.1	85.7	95	5290.78	1004.46	35.79 N	1004.72 E	1005.35	87.96	2.34	-2.32	-0.32
36	6151	89.9	86.0	93	5292.41	1097.15	42.52 N	1097.45 E	1098.28	87.78	1.96	1.94	0.32
37	6244	90.1	85.3	93	5292.41	1189.83	49.57 N	1190.18 E	1191.22	87.61	0.78	0.22	-0.75

Archer

Company:	Concho Resources	**Job Number:**	03897-433-22	**Calculation Method**	Minimum Curvature
Well:	Submarine 11 FED 1 Com #2H	**Mag Decl.:**	7.56	**Proposed Azimuth**	90.4
Location:	Eddy County, New Mexico	**Dir Driller:**		**Depth Reference**	KBG
Rig:	JW #2	**MWD Eng:**	Raul Lopez	**Tie Into:**	Gyro Survey
Job Date:	09/20/12 - 09/30/12				

Survey Number	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates N/S (ft)	Coordinates E/W (ft)	Closure Distance (ft)	Closure Direction Azimuth	Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
38	6338	90.9	86.2	94	5291.59	1283.52	56.54 N	1283.92 E	1285.17	87.48	1.28	0.85	0.96
39	6432	91.4	87.3	94	5289.70	1377.31	61.87 N	1377.75 E	1379.14	87.43	1.29	0.53	1.17
40	6526	91.1	87.6	94	5287.65	1471.16	66.05 N	1471.63 E	1473.12	87.43	0.45	-0.32	0.32
41	6619	91.0	87.3	93	5285.94	1564.03	70.18 N	1564.53 E	1566.10	87.43	0.34	-0.11	-0.32
42	6713	91.5	88.0	94	5283.89	1657.90	74.04 N	1658.42 E	1660.08	87.44	0.91	0.53	0.74
43	6807	91.2	87.6	94	5281.68	1751.77	77.65 N	1752.33 E	1754.05	87.46	0.53	-0.32	-0.43
44	6901	91.0	86.9	94	5279.87	1845.62	82.15 N	1846.20 E	1848.03	87.45	0.77	-0.21	-0.74
45	6995	90.9	90.4	94	5278.31	1939.55	84.37 N	1940.15 E	1941.98	87.51	3.72	-0.11	3.72
46	7088	90.9	92.5	93	5276.85	2032.51	82.02 N	2033.10 E	2034.76	87.69	2.26	0.00	2.26
47	7182	91.1	92.3	94	5275.21	2126.44	78.08 N	2127.00 E	2128.44	87.90	0.30	0.21	-0.21
48	7276	91.4	92.7	94	5273.16	2220.35	73.98 N	2220.89 E	2222.12	88.09	0.53	0.32	0.43
49	7369	92.0	92.4	93	5270.40	2313.25	69.84 N	2313.76 E	2314.81	88.27	0.72	0.65	-0.32
50	7462	92.2	92.8	93	5267.00	2406.11	65.63 N	2406.60 E	2407.50	88.44	0.48	0.22	0.43
51	7556	91.6	92.7	94	5263.88	2499.98	61.12 N	2500.44 E	2501.19	88.60	0.65	-0.64	-0.11
52	7650	90.8	92.0	94	5261.91	2593.90	57.27 N	2594.34 E	2594.97	88.74	1.13	-0.85	-0.74
53	7745	91.4	91.9	95	5260.09	2688.85	54.04 N	2689.27 E	2689.81	88.85	0.64	0.63	-0.11
54	7840	92.0	92.5	95	5257.27	2783.76	50.39 N	2784.15 E	2784.61	88.96	0.89	0.63	0.63
55	7934	90.8	91.8	94	5254.97	2877.68	46.87 N	2878.06 E	2878.44	89.07	1.48	-1.28	-0.74
56	8028	91.6	91.8	94	5253.00	2971.63	43.91 N	2971.99 E	2972.31	89.15	0.85	0.85	0.00
57	8122	90.8	91.6	94	5251.04	3065.59	41.13 N	3065.93 E	3066.20	89.23	0.88	-0.85	-0.21
58	8217	91.4	91.9	95	5249.21	3160.54	38.23 N	3160.86 E	3161.10	89.31	0.71	0.63	0.32
59	8310	90.7	91.3	93	5247.51	3253.50	35.63 N	3253.81 E	3254.01	89.37	0.99	-0.75	-0.65
60	8404	91.0	92.4	94	5246.11	3347.46	32.59 N	3347.75 E	3347.91	89.44	1.21	0.32	1.17
61	8498	89.6	93.1	94	5245.62	3441.38	28.09 N	3441.64 E	3441.75	89.53	1.67	-1.49	0.74
62	8591	89.7	93.3	93	5246.19	3534.26	22.89 N	3534.49 E	3534.57	89.63	0.24	0.11	0.22
63	8685	89.5	93.4	94	5246.84	3628.13	17.40 N	3628.33 E	3628.37	89.73	0.24	-0.21	0.11
64	8779	89.5	94.0	94	5247.67	3721.97	11.34 N	3722.13 E	3722.15	89.83	0.64	0.00	0.64
65	8872	90.8	92.2	93	5247.42	3814.86	6.31 N	3814.99 E	3814.99	89.91	2.39	1.40	-1.94
66	8965	92.4	91.3	93	5244.82	3907.79	3.47 N	3907.90 E	3907.90	89.95	1.97	1.72	-0.97
67	9059	92.4	91.1	94	5240.89	4001.70	1.50 N	4001.80 E	4001.80	89.98	0.21	0.00	-0.21
68	9153	92.0	91.1	94	5237.28	4095.62	0.30 S	4095.71 E	4095.71	90.00	0.43	-0.43	0.00
69	9247	90.8	91.1	94	5234.98	4189.59	2.11 S	4189.67 E	4189.67	90.03	1.28	-1.28	0.00
70	9340	90.5	91.5	93	5233.93	4282.57	4.22 S	4282.64 E	4282.64	90.06	0.54	-0.32	0.43
71	9433	91.5	91.2	93	5232.31	4375.54	6.41 S	4375.59 E	4375.60	90.08	1.12	1.08	-0.32
72	9527	90.8	91.7	94	5230.42	4469.50	8.79 S	4469.54 E	4469.55	90.11	0.92	-0.74	0.53
73	9621	91.0	91.1	94	5228.94	4563.48	11.08 S	4563.50 E	4563.52	90.14	0.67	0.21	-0.64
74	9715	90.7	91.1	94	5227.55	4657.46	12.89 S	4657.48 E	4657.49	90.16	0.32	-0.32	0.00
75	9784	90.8	90.8	69	5226.64	4726.45	14.03 S	4726.46 E	4726.48	90.17	0.46	0.14	-0.43
Proj:	9842	90.8	90.8	58	5225.83	4784.44	14.84 S	4784.45 E	4784.47	90.18	0.00	0.00	0.00