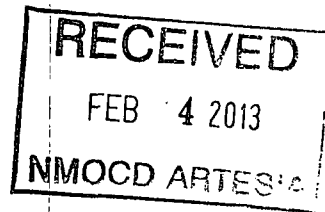


30-015-40358



Archer

Archer Directional Drilling Services.
911 Regional Park Drive
Houston, Texas 77060
Tel: 281-934-9600
Fax: 281-951-2101

MWD Survey Certification

State of New Mexico
County of Eddy

I, Martin Campbell, certify that; I am employed by Archer Directional Drilling Services; that I did on the day(s) of 08/30/12 through 09/09/12, conduct or supervise the taking of MWD surveys from a depth of 4646 feet to a depth of 9970 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Archer Directional Drilling Services; that I am authorized and qualified to make this report; that these surveys were conducted at the request of Concho Resources for the Submarine 10 Federal Com #2H (Well ID: 30-015-40358), Well located in Eddy County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Archer Directional Drilling Services.

Martin Campbell
MWD Coordinator

Company: Concho ResourcesWell: Submarine 10 Fed Com #2HLocation: Eddy County, New MexicoRig: JW #2Job Date: 08/30/12 - 09/09/12Job Number: 03863-433-22Mag Decl.: Dir Driller: MWD Eng: Raul Lopez

Calculation Method

Proposed Azimuth

Depth Reference

Tie Into: Gyro Survey

Minimum Curvature

269.7KBG

Survey Number	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Direction Azimuth			
Tie In	4630.00	0.37	59.67	0	0	0	0.00	0					
1	4646	0.4	14.8	16	16.00	-0.06	0.08 N	0.06 E	0.10	36.31	1.84	0.19	-280.44
2	4678	0.7	313.8	32	48.00	0.05	0.32 N	0.05 W	0.33	350.57	1.92	0.94	934.38
3	4720	1.8	293.5	42	89.99	0.84	0.76 N	0.84 W	1.14	312.16	2.78	2.62	-48.33
4	4752	3.5	290.5	32	121.95	2.21	1.31 N	2.22 W	2.58	300.48	5.33	5.31	-9.38
5	4783	5.0	289.0	31	152.87	4.37	2.08 N	4.38 W	4.85	295.36	4.85	4.84	-4.84
6	4814	6.9	288.3	31	183.70	7.41	3.10 N	7.43 W	8.05	292.67	6.13	6.13	-2.26
7	4845	10.1	288.8	31	214.35	11.74	4.56 N	11.77 W	12.62	291.19	10.33	10.32	1.61
8	4876	14.5	288.6	31	244.63	17.99	6.68 N	18.03 W	19.22	290.33	14.19	14.19	-0.65
9	4907	19.0	287.3	31	274.31	26.47	9.42 N	26.53 W	28.15	289.55	14.57	14.52	-4.19
10	4939	23.2	284.9	32	304.16	37.52	12.59 N	37.60 W	39.65	288.51	13.40	13.13	-7.50
11	4970	27.5	282.7	31	332.17	50.39	15.73 N	50.49 W	52.88	287.31	14.20	13.87	-7.10
12	5001	31.9	281.4	31	359.09	65.39	18.93 N	65.50 W	68.18	286.12	14.34	14.19	-4.19
13	5032	36.2	279.6	31	384.77	82.44	22.08 N	82.57 W	85.47	284.97	14.25	13.87	-5.81
14	5063	40.2	277.3	31	409.13	101.38	24.87 N	101.53 W	104.53	283.77	13.69	12.90	-7.42
15	5095	44.4	276.3	32	432.79	122.75	27.42 N	122.91 W	125.93	282.58	13.29	13.13	-3.13
16	5126	48.9	275.4	31	454.07	145.15	29.71 N	145.33 W	148.33	281.55	14.67	14.52	-2.90
17	5158	53.5	274.4	32	474.11	169.98	31.83 N	170.17 W	173.12	280.59	14.58	14.38	-3.13
18	5189	58.0	273.5	31	491.55	195.53	33.59 N	195.72 W	198.59	279.74	14.71	14.52	-2.90
19	5220	62.5	272.3	31	506.93	222.39	34.94 N	222.60 W	225.32	278.92	14.90	14.52	-3.87
20	5251	66.7	270.8	31	520.23	250.37	35.69 N	250.58 W	253.11	278.11	14.24	13.55	-4.84
21	5283	70.9	269.7	32	531.80	280.20	35.82 N	280.41 W	282.69	277.28	13.51	13.13	-3.44
22	5314	74.4	269.9	31	541.04	309.78	35.72 N	309.99 W	312.04	276.57	11.31	11.29	0.65
23	5345	77.0	270.4	31	548.70	339.82	35.80 N	340.03 W	341.91	276.01	8.53	8.39	1.61
24	5376	79.3	270.7	31	555.06	370.15	36.09 N	370.37 W	372.12	275.57	7.48	7.42	0.97
25	5407	81.7	270.4	31	560.18	400.72	36.38 N	400.94 W	402.58	275.19	7.80	7.74	-0.97
26	5438	84.9	269.8	31	563.80	431.50	36.44 N	431.72 W	433.26	274.82	10.50	10.32	-1.94
27	5469	87.4	269.4	31	565.88	462.43	36.22 N	462.65 W	464.06	274.48	8.17	8.06	-1.29
28	5500	88.8	269.2	31	566.90	493.41	35.84 N	493.63 W	494.93	274.15	4.56	4.52	-0.65
29	5594	91.0	268.5	94	567.07	587.40	33.95 N	587.60 W	588.58	273.31	2.46	2.34	-0.74
30	5688	91.3	268.5	94	565.18	681.36	31.49 N	681.55 W	682.28	272.65	0.32	0.32	0.00
31	5782	91.6	268.2	94	562.80	775.30	28.79 N	775.48 W	776.02	272.13	0.45	0.32	-0.32
32	5875	90.2	268.4	93	561.34	868.26	26.03 N	868.43 W	868.82	271.72	1.52	-1.51	0.22
33	5969	90.1	268.0	94	561.10	962.23	23.08 N	962.38 W	962.66	271.37	0.44	-0.11	-0.43
34	6062	89.8	267.7	93	561.18	1055.18	19.59 N	1055.31 W	1055.50	271.06	0.46	-0.32	-0.32

Company: Concho ResourcesWell: Submarine 10 Fed Com #2HLocation: Eddy County, New MexicoRig: JW #2Job Date: 08/30/12 - 09/09/12Job Number: 03863-433-22Mag Decl.: Dir Driller: MWD Eng: Raul Lopez

Calculation Method

Proposed Azimuth

Depth Reference

Tie Into: Gyro Survey

Minimum Curvature

269.7KBG

Survey Number	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Direction Azimuth			
35	6156	90.6	268.6	94	560.85	1149.15	16.55 N	1149.26 W	1149.38	270.83	1.28	0.85	0.96
36	6250	90.4	268.2	94	560.03	1243.12	13.93 N	1243.22 W	1243.30	270.64	0.48	-0.21	-0.43
37	6344	91.1	268.3	94	558.80	1337.08	11.06 N	1337.17 W	1337.22	270.47	0.75	0.74	0.11
38	6437	90.6	267.6	93	557.42	1430.03	7.73 N	1430.10 W	1430.12	270.31	0.92	-0.54	-0.75
39	6531	90.7	267.6	94	556.35	1523.96	3.80 N	1524.01 W	1524.02	270.14	0.11	0.11	0.00
40	6624	91.4	268.5	93	554.65	1616.91	0.63 N	1616.94 W	1616.94	270.02	1.23	0.75	0.97
41	6718	92.3	270.0	94	551.61	1710.85	0.60 S	1710.88 W	1710.88	269.98	1.86	0.96	1.60
42	6812	92.2	270.3	94	547.92	1804.78	0.35 S	1804.81 W	1804.81	269.99	0.34	-0.11	0.32
43	6906	92.3	271.6	94	544.23	1898.68	1.21 N	1898.72 W	1898.72	270.04	1.39	0.11	1.38
44	7000	91.8	270.9	94	540.87	1992.58	3.25 N	1992.64 W	1992.64	270.09	0.91	-0.53	-0.74
45	7094	91.9	271.0	94	537.84	2086.51	4.81 N	2086.57 W	2086.58	270.13	0.15	0.11	0.11
46	7187	91.6	271.2	93	535.00	2179.44	6.60 N	2179.51 W	2179.52	270.17	0.39	-0.32	0.22
47	7281	91.2	271.3	94	532.70	2273.38	8.65 N	2273.46 W	2273.48	270.22	0.44	-0.43	0.11
48	7374	90.8	271.0	93	531.08	2366.33	10.51 N	2366.43 W	2366.45	270.25	0.54	-0.43	-0.32
49	7467	90.2	271.1	93	530.26	2459.30	12.22 N	2459.41 W	2459.44	270.28	0.65	-0.65	0.11
50	7560	89.8	269.6	93	530.26	2552.29	12.79 N	2552.41 W	2552.44	270.29	1.67	-0.43	-1.61
51	7654	89.1	269.3	94	531.17	2646.28	11.88 N	2646.40 W	2646.42	270.26	0.81	-0.74	-0.32
52	7747	90.3	269.8	93	531.65	2739.28	11.15 N	2739.39 W	2739.41	270.23	1.40	1.29	0.54
53	7842	91.5	269.3	95	530.16	2834.27	10.41 N	2834.37 W	2834.39	270.21	1.37	1.26	-0.53
54	7935	90.5	269.2	93	528.54	2927.25	9.19 N	2927.35 W	2927.36	270.18	1.08	-1.08	-0.11
55	8029	91.4	268.9	94	526.98	3021.23	7.63 N	3021.32 W	3021.33	270.14	1.01	0.96	-0.32
56	8123	90.8	268.9	94	525.18	3115.20	5.83 N	3115.29 W	3115.29	270.11	0.64	-0.64	0.00
57	8217	91.4	269.3	94	523.37	3209.18	4.35 N	3209.26 W	3209.26	270.08	0.77	0.64	0.43
58	8310	91.3	269.4	93	521.18	3302.15	3.30 N	3302.23 W	3302.23	270.06	0.15	-0.11	0.11
59	8403	91.2	269.3	93	519.15	3395.13	2.24 N	3395.20 W	3395.20	270.04	0.15	-0.11	-0.11
60	8497	91.0	268.9	94	517.35	3489.11	0.77 N	3489.17 W	3489.17	270.01	0.48	-0.21	-0.43
61	8591	90.9	269.2	94	515.79	3583.09	0.79 S	3583.14 W	3583.14	269.99	0.34	-0.11	0.32
62	8684	90.9	269.0	93	514.33	3676.07	2.25 S	3676.12 W	3676.12	269.96	0.22	0.00	-0.22
63	8777	92.3	268.9	93	511.73	3769.03	3.96 S	3769.07 W	3769.07	269.94	1.51	1.51	-0.11
64	8870	92.4	268.9	93	507.92	3861.94	5.74 S	3861.97 W	3861.97	269.91	0.11	0.11	0.00
65	8963	92.1	270.8	93	504.27	3954.86	5.98 S	3954.89 W	3954.90	269.91	2.07	-0.32	2.04
66	9057	92.4	271.4	94	500.58	4048.76	4.18 S	4048.80 W	4048.81	269.94	0.71	0.32	0.64
67	9151	90.9	271.8	94	497.87	4142.67	1.56 S	4142.73 W	4142.73	269.98	1.65	-1.60	0.43
68	9245	89.4	271.8	94	497.62	4236.60	1.40 N	4236.68 W	4236.68	270.02	1.60	-1.60	0.00
69	9338	89.3	271.7	93	498.68	4329.53	4.24 N	4329.63 W	4329.63	270.06	0.15	-0.11	-0.11
70	9432	89.3	271.4	94	499.83	4423.47	6.78 N	4423.59 W	4423.59	270.09	0.32	0.00	-0.32
71	9526	90.9	270.9	94	499.66	4517.44	8.66 N	4517.56 W	4517.57	270.11	1.78	1.70	-0.53
72	9620	90.7	271.1	94	498.35	4611.40	10.30 N	4611.54 W	4611.55	270.13	0.30	-0.21	0.21
73	9713	90.9	270.7	93	497.05	4704.37	11.77 N	4704.52 W	4704.53	270.14	0.48	0.22	-0.43

Company: Concho ResourcesWell: Submarine 10 Fed Com #2HLocation: Eddy County, New MexicoRig: JW #2Job Date: 08/30/12 - 09/09/12Job Number: 03863-433-22Mag Decl.: Dir Driller: MWD Eng: Raul Lopez

Calculation Method

Proposed Azimuth

Depth Reference

Tie Into: Gyro Survey

Minimum Curvature

269.7KBG

Survey Number	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates		Closure		Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
							N/S (ft)	E/W (ft)	Distance (ft)	Direction Azimuth			
74	9806	91.6	270.5	93	495.02	4797.34	12.74 N	4797.49 W	4797.51	270.15	0.78	0.75	-0.22
75	9900	91.8	270.1	94	492.23	4891.29	13.23 N	4891.45 W	4891.47	270.15	0.48	0.21	-0.43
76	9907	91.8	270.2	7	492.01	4898.29	13.25 N	4898.44 W	4898.46	270.15	1.43	0.00	1.43
Proj.	9970	91.8	270.2	63	490.03	4961.25	13.47 N	4961.41 W	4961.43	270.16	0.00	0.00	0.00

Company: COG Operating, LLC (Concho)
Lease/Well: Submarine 10 Fed Com / No. 002H



Rig Name: JW 2
State/County: New Mexico / Eddy
Latitude: 32.85



GRID North is 0.15 Degrees East of True North
VS-Azi: 269.97 Degrees

Depth Reference : RKB = 17'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: submarine 10 fed com 2h_ed.ut
Minimum Curvature Method
Report Date/Time: 9/4/2012 / 11:27

Vaughn Energy Services
Fort Worth, Texas

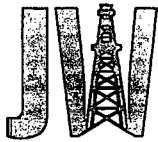
817-741-3610

Surveyor: Robert Hooper

Submarine 10 Fed Com No. 002H / API 30-015-40358

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	0.74	174.36	100.00	-0.64	0.06	-0.06	0.64	174.36	0.74
200.00	0.40	164.75	199.99	-1.62	0.22	-0.22	1.63	172.29	0.34
300.00	0.20	144.25	299.99	-2.10	0.41	-0.41	2.14	168.87	0.23
400.00	0.59	136.03	399.99	-2.61	0.87	-0.87	2.76	161.50	0.40
500.00	0.74	98.00	499.98	-3.08	1.88	-1.87	3.60	148.63	0.46
600.00	0.97	96.30	599.97	-3.26	3.36	-3.36	4.68	134.14	0.23
700.00	1.48	95.31	699.95	-3.47	5.48	-5.48	6.49	122.35	0.51
800.00	1.42	97.07	799.92	-3.74	7.99	-7.99	8.83	115.10	0.07
900.00	1.37	103.61	899.89	-4.18	10.38	-10.38	11.19	111.91	0.17
1000.00	1.05	105.33	999.86	-4.70	12.43	-12.43	13.29	110.72	0.32
1100.00	0.69	108.18	1099.85	-5.13	13.89	-13.89	14.81	110.28	0.36
1200.00	0.46	109.98	1199.85	-5.46	14.84	-14.84	15.81	110.19	0.23
1300.00	0.55	110.38	1299.84	-5.76	15.67	-15.67	16.70	110.19	0.09
1400.00	0.48	111.32	1399.84	-6.08	16.51	-16.51	17.60	110.22	0.07
1500.00	0.36	119.95	1499.84	-6.39	17.18	-17.17	18.33	110.41	0.14
1600.00	0.37	127.37	1599.83	-6.74	17.70	-17.70	18.95	110.86	0.05
1700.00	0.10	132.50	1699.83	-7.00	18.02	-18.02	19.33	111.22	0.27
1800.00	0.28	148.54	1799.83	-7.26	18.21	-18.21	19.61	111.74	0.19

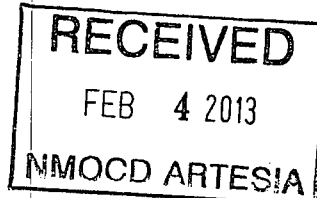
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.28	176.20	1899.83	-7.71	18.35	-18.35	19.91	112.79	0.13
2000.00	0.30	196.18	1999.83	-8.21	18.30	-18.29	20.05	114.17	0.10
2100.00	0.41	211.66	2099.83	-8.77	18.04	-18.03	20.05	115.92	0.14
2200.00	0.46	210.74	2199.83	-9.41	17.65	-17.64	20.00	118.08	0.05
2300.00	0.53	211.57	2299.82	-10.16	17.20	-17.19	19.97	120.57	0.07
2400.00	0.40	202.00	2399.82	-10.88	16.82	-16.82	20.03	122.88	0.16
2500.00	0.39	185.78	2499.82	-11.54	16.66	-16.65	20.26	124.71	0.11
2600.00	0.48	147.55	2599.81	-12.23	16.85	-16.84	20.82	125.98	0.30
2700.00	0.82	146.48	2699.81	-13.18	17.46	-17.46	21.88	127.04	0.34
2800.00	1.00	136.19	2799.79	-14.40	18.46	-18.45	23.41	127.96	0.24
2900.00	0.79	136.36	2899.78	-15.53	19.54	-19.53	24.96	128.48	0.21
3000.00	0.73	129.43	2999.77	-16.43	20.50	-20.49	26.27	128.70	0.11
3100.00	0.59	125.48	3099.77	-17.13	21.41	-21.40	27.42	128.66	0.14
3200.00	0.49	121.82	3199.76	-17.65	22.19	-22.18	28.35	128.50	0.11
3300.00	0.60	125.84	3299.76	-18.18	22.98	-22.97	29.30	128.36	0.12
3400.00	0.56	127.69	3399.75	-18.79	23.79	-23.78	30.32	128.30	0.05
3500.00	0.66	126.92	3499.75	-19.44	24.64	-24.63	31.39	128.27	0.10
3600.00	0.71	125.26	3599.74	-20.14	25.61	-25.60	32.58	128.19	0.05
3700.00	0.36	126.88	3699.74	-20.69	26.36	-26.35	33.51	128.12	0.35
3800.00	0.59	127.71	3799.73	-21.19	27.02	-27.01	34.34	128.10	0.23
3900.00	0.44	113.97	3899.73	-21.66	27.78	-27.77	35.23	127.94	0.19
4000.00	0.47	108.41	3999.72	-21.95	28.52	-28.51	35.99	127.58	0.05
4100.00	0.53	102.78	4099.72	-22.18	29.36	-29.35	36.79	127.07	0.07
4200.00	0.72	103.86	4199.71	-22.43	30.42	-30.41	37.79	126.40	0.20
4300.00	0.72	84.98	4299.71	-22.53	31.66	-31.65	38.85	125.43	0.24
4400.00	0.54	86.94	4399.70	-22.45	32.76	-32.74	39.71	124.42	0.18
4500.00	0.63	72.06	4499.70	-22.25	33.75	-33.74	40.42	123.40	0.17
4600.00	0.37	63.67	4599.69	-21.94	34.56	-34.54	40.93	122.41	0.27
4630.00	0.37	59.67	4629.69	-21.85	34.72	-34.71	41.03	122.18	0.09



DRILLING INC. Oil Well Drilling Contractor

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

September 4, 2012



COG Operating, LLC
One Concho Center 600 Illionois Ave
Midland, Texas 79701

Re: Submarine 10 Fed. Com # 2 H
Sec. 10, T-17-S, R-29-E
Eddy County, New Mexico

Attn: Jim Evans

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

220' - 0.75°	1375' - 1°	2540' - 0.75°	3976' - 0.25°
529' - 0.75°	1572' - 1°	3008' - 0.5°	4447' - 1.25°
953' - 1.25°	2072' - 1°	3478' - 0.5°	

Sincerely,

Gary W. Chappell
Contracts Manager

STATE OF NEW MEXICO)
COUNTY OF EDDY)

The foregoing was acknowledged before me this 4th day of September, 2012 by Gary W. Chappell.

NOTARY PUBLIC

