

Smalls Federal #1H**30-025-43001****Sec 28-T22S-R34E****HOBBS OCD****JUL 18 2016****RECEIVED**

<u>Perfs</u>	<u>15% Acid (Gal)</u>	<u>Sand (#)</u>	<u>Fluid (Gal)</u>
1	4116	236139	362712
2	3024	236757	343224
3	3024	233881	338520
4	3024	235914	342100
5	3024	236809	342468
6	3024	245169	344652
7	3024	233115	341040
8	3024	236713	334572
9	3024	236867	351372
10	3024	235221	341208
11	3012	235278	342876
12	3024	235949	337302
13	3024	235607	341712
14	3024	235451	339192
15	3024	236142	347634
16	3024	234458	353094
17	3024	235432	339990
18	3024	236827	334110
19	3024	237149	342468
20	3024	235024	339444
21	3024	236792	350364
22	3024	235039	338352
23	3066	236163	337541
24	3012	236007	336912
25	3024	234785	352548
26	3024	235025	339738
27	3024	235046	337974
28	3024	235182	336000
29	2982	235332	332346
30	3066	235587	334404
31	3024	236151	335806
32	3108	235823	335076
33	2982	236208	332262
34	3024	231885	329952
35	2982	224587	329616
Totals	106,950	8,243,514	11,918,580

(entered data to be carried to each stage)			Fluid Database			Proppant Database			Chemical Database		
Date	9500		1	Treated Water		1	100 Mesh		1	DCA	
Pressure test			2	15 % Acid		2	40/70 White		2		
Well Name/number	Smalls Federal #1H		3	Slick Water					3	CLA-WEB	
Casing 1 size	5.5 17#	Casing 2 size	4						4	SCALETROL	
Capacity-bbls/lin. ft.	0.02324	Capacity-bbls/lin. ft.	5						5	FDP	
Top of Casing	0	Top of Casing	6						6	OPTIKLEEN	
TD of casing	14,815	TD of casing	7						7	OPTIFLO	
TVD	10,354		8						8	Parasorb	
AFE	6397		9						9	Scalecheck	
			10						10		
			11								
			12								
Shallowest Plug	10,816										

From Bottom to Top	Stage 1	Distance Between Perfs	Shots	Stage 2	Distance Between Perfs	Shots	Stage 3	Distance Between Perfs	Shots	Stage 4	Distance Between Perfs	Shots	Stage 5	Distance Between Perfs	Shots
	14,658	38	14	14,535	45	14	14,421	40	14	14,301	40	14	14,182	39	14
	14,620	40	12	14,501	40	12	14,381	40	12	14,267	46	12	14,142	40	12
	14,580		10	14,461		10	14,341		10	14,221		10	14,102		10
	Plug to Plug	110	36	Plug to Plug	125	36	Plug to Plug	114	36	Plug to Plug	120	36	Plug to Plug	114	36
	Frac Plug	14,670	Total Shots	Frac Plug	14,560	Total Shots	Frac Plug	14,435	Total Shots	Frac Plug	14,321	Total Shots	Frac Plug	14,201	Total Shots

From Bottom to Top	Stage 6	Distance Between Perfs	Shots	Stage 7	Distance Between Perfs	Shots	Stage 8	Distance Between Perfs	Shots	Stage 9	Distance Between Perfs	Shots	Stage 10	Distance Between Perfs	Shots
	14,062	40	14	13,944	34	14	13,823	40	14	13,703	40	14	13,583	41	14
	14,022	44	12	13,902	39	12	13,783	40	12	13,658	34	12	13,544	40	12
	13,978		10	13,863		10	13,743		10	13,624		10	13,504		10
	Plug to Plug	125	36	Plug to Plug	124	36	Plug to Plug	115	36	Plug to Plug	120	36	Plug to Plug	135	36
	Frac Plug	14,087	Total Shots	Frac Plug	13,962	Total Shots	Frac Plug	13,838	Total Shots	Frac Plug	13,723	Total Shots	Frac Plug	13,603	Total Shots

From Bottom to Top	Stage 11	Distance Between Perfs	Shots	Stage 12	Distance Between Perfs	Shots	Stage 13	Distance Between Perfs	Shots	Stage 14	Distance Between Perfs	Shots	Stage 15	Distance Between Perfs	Shots
	13,450	54	14	13,336	48	14	13,227	36	14	13,105	40	14	12,985	40	14
	13,424	40	12	13,304	41	12	13,185	40	12	13,065	40	12	12,942	34	12
	13,384		10	13,263		10	13,145		10	13,025		10	12,908		10
	Plug to Plug	119	36	Plug to Plug	105	36	Plug to Plug	122	36	Plug to Plug	117	36	Plug to Plug	119	36
	Frac Plug	13,468	Total Shots	Frac Plug	13,349	Total Shots	Frac Plug	13,244	Total Shots	Frac Plug	13,122	Total Shots	Frac Plug	13,005	Total Shots

From Bottom to Top	Stage 16	Distance Between Perfs	Shots	Stage 17	Distance Between Perfs	Shots	Stage 18	Distance Between Perfs	Shots	Stage 19	Distance Between Perfs	Shots	Stage 20	Distance Between Perfs	Shots
	12,866	42	14	12,736	50	14	12,619	46	14	12,507	40	14	12,387	40	14
	12,824	38	12	12,706	41	12	12,587	40	12	12,467	40	12	12,342	33	12
	12,786		10	12,665		10	12,547		10	12,427		10	12,309		10
	Plug to Plug	134	36	Plug to Plug	106	36	Plug to Plug	122	36	Plug to Plug	117	36	Plug to Plug	120	36
	Frac Plug	12,886	Total Shots	Frac Plug	12,752	Total Shots	Frac Plug	12,646	Total Shots	Frac Plug	12,524	Total Shots	Frac Plug	12,407	Total Shots

From Bottom to Top	Stage 21	Distance Between Perfs	Shots	Stage 22	Distance Between Perfs	Shots	Stage 23	Distance Between Perfs	Shots	Stage 24	Distance Between Perfs	Shots	Stage 25	Distance Between Perfs	Shots
	12,268	41	14	12,140	48	14	12,024	44	14	11,909	40	14	11,789	40	14
	12,228	40	12	12,108	40	12	11,990	41	12	11,869	40	12	11,749	38	12
	12,188		10	12,068		10	11,949		10	11,829		10	11,711		10
	Plug to Plug	129	36	Plug to Plug	110	36	Plug to Plug	122	36	Plug to Plug	116	36	Plug to Plug	121	36
	Frac Plug	12,287	Total Shots	Frac Plug	12,158	Total Shots	Frac Plug	12,048	Total Shots	Frac Plug	11,926	Total Shots	Frac Plug	11,810	Total Shots

From Bottom to Top	Stage 26	Distance Between Perfs	Shots	Stage 27	Distance Between Perfs	Shots	Stage 28	Distance Between Perfs	Shots	Stage 29	Distance Between Perfs	Shots	Stage 30	Distance Between Perfs	Shots
	11,669	42	14	11,543	47	14	11,422	48	14	11,311	41	14	11,181	50	14
	11,630	40	12	11,510	40	12	11,384	32	12	11,271	40	12	11,151	32	12
	11,590		10	11,470		10	11,352		10	11,231		10	11,119		10
	Plug to Plug	131	36	Plug to Plug	108	36	Plug to Plug	120	36	Plug to Plug	134	36	Plug to Plug	105	36
	Frac Plug	11,689	Total Shots	Frac Plug	11,558	Total Shots	Frac Plug	11,450	Total Shots	Frac Plug	11,330	Total Shots	Frac Plug	11,196	Total Shots

From Bottom to Top	Stage 31	Distance Between Perfs	Shots	Stage 32	Distance Between Perfs	Shots	Stage 33	Distance Between Perfs	Shots	Stage 34	Distance Between Perfs	Shots	Stage 35	Distance Between Perfs	Shots
	11,073	46	14	10,950	42	14	10,831	41	14	10,712	40	14	10,593	40	14
	11,031	39	12	10,912	40	12	10,785	33	12	10,673	40	12	10,552	39	12
	10,992		10	10,872		10	10,752		10	10,633		10	10,513		10
	Plug to Plug	125	36	Plug to Plug	114	36	Plug to Plug	120	36	Plug to Plug	116	36	Plug to Plug	103	36
	Frac Plug	11,091	Total Shots	Frac Plug	10,966	Total Shots	Frac Plug	10,852	Total Shots	Frac Plug	10,732	Total Shots	Frac Plug	10,616	Total Shots



HOBBS OCD

JUL 18 2016

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PATRIOT DRILLING, LLC

OPERATOR: COG Operating, LLC
WELL/LEASE: Smalls Federal #1H
COUNTY: Lea Co., New Mexico
Sec. 28, T 22S, R 34E

**STATE OF NEW MEXICO
DEVIATION REPORT**

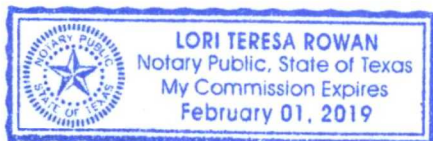
<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
533	1	5,757	3/4
916	1 3/4	6,005	1
1,462	1 1/2	6,510	1/2
2,036	1 1/4	7,000	3/4
2,531	3 1/4	7,548	1 1/4
3,100	2 1/2	8,053	3/4
3,479	1 1/4	8,446	1/2
4,105	1/4	9,029	1 3/4
4,515	3/4	9,531	1 1/4
5,082	1 3/4	10,022	1 1/4
5,476	1	10,665	2 3/4

Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 2nd day of March 2016 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2019


Lori T. Rowan
Notary Public for Ector Co., Texas

HOBBS OCD

JUL 18 2016

RECEIVED

February 18, 2016

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

Attn: Kanicia Castillo

RE: Smalls Federal No 001H

Please find enclosed a copy of the survey from 0' to 10,900' ran on the above referenced well.

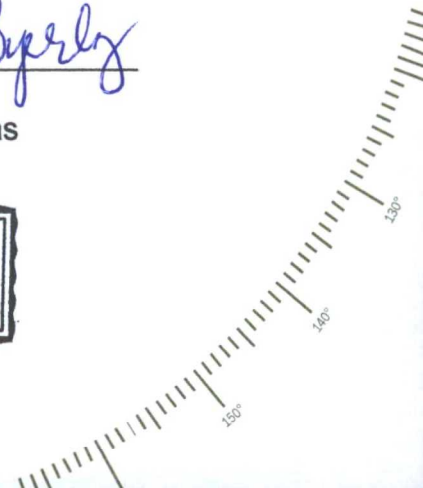
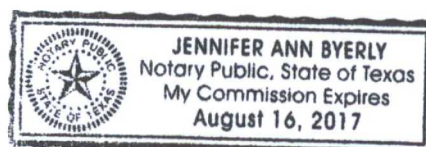
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 18th day of
February, A.D., 2016, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho
Lease/Well: Smalls Federal No/001H

Rig Name: Patriot 2
State/County: New Mexico/Lea
VS-Azi: 0.00 Degrees
Latitude: 32.35582, Longitude: -103.46782
Grid North = True North -0.46 degs (NAD 27)
Grid Correction Applied = -0.46 degs



HOBBS OCD

JUL 18 2016

RECEIVED

Depth Reference : RKB = 18 Foot

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: smalls federal 1h_gyro survey.ut

Minimum Curvature Method

Report Date/Time: 2/18/2016 / 14:01

VES Survey International

West Texas

(432) 563-5444

Surveyor: Gene Heiss

Smalls Federal No 001H / API 30-025-43001

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	0.27	322.02	100.00	0.18	-0.14	0.18	0.23	322.02	0.27
200.00	0.48	355.35	200.00	0.78	-0.32	0.78	0.85	337.81	0.30
300.00	0.78	16.16	299.99	1.85	-0.16	1.85	1.86	354.92	0.37
400.00	0.87	36.58	399.98	3.12	0.48	3.12	3.15	8.72	0.31
500.00	0.89	38.08	499.97	4.34	1.41	4.34	4.57	18.02	0.03
600.00	1.03	40.64	599.96	5.64	2.48	5.64	6.16	23.73	0.14
700.00	1.27	46.65	699.94	7.08	3.87	7.08	8.07	28.65	0.27
800.00	1.39	46.46	799.91	8.67	5.55	8.67	10.30	32.62	0.13
900.00	1.52	44.09	899.88	10.46	7.35	10.46	12.79	35.10	0.14
1000.00	1.81	38.02	999.83	12.66	9.25	12.66	15.68	36.15	0.34
1100.00	2.06	42.63	1099.78	15.23	11.44	15.23	19.05	36.92	0.29
1200.00	2.27	40.69	1199.71	18.06	13.95	18.06	22.82	37.70	0.22
1300.00	1.84	43.28	1299.64	20.73	16.35	20.73	26.40	38.26	0.44
1400.00	1.55	38.34	1399.60	22.96	18.28	22.96	29.35	38.54	0.33
1500.00	1.63	27.99	1499.56	25.27	19.79	25.27	32.09	38.07	0.30
1600.00	1.62	48.37	1599.52	27.46	21.51	27.46	34.89	38.07	0.57

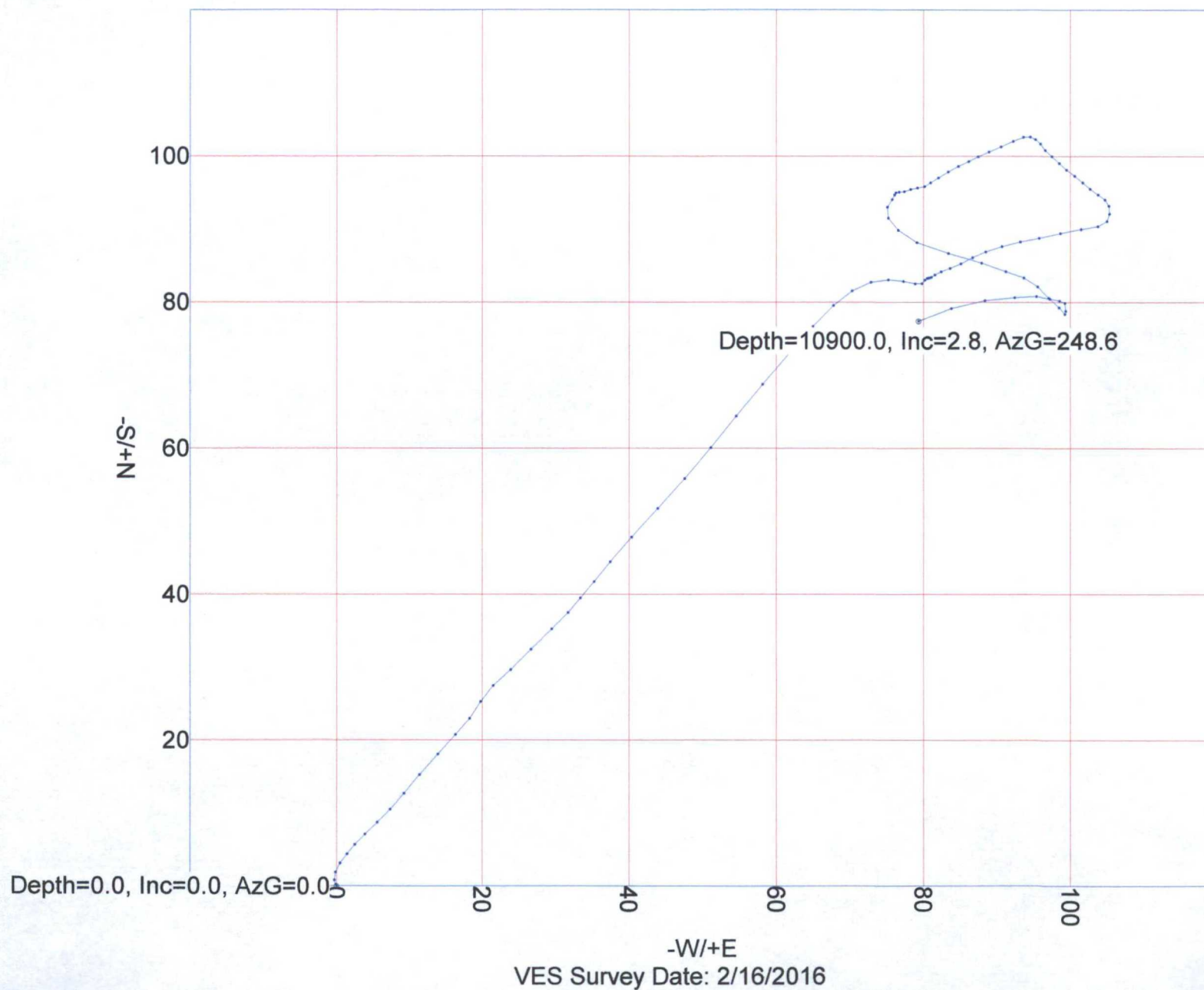
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1700.00	2.07	46.15	1699.47	29.66	23.88	29.66	38.07	38.84	0.46
1800.00	2.43	43.52	1799.39	32.45	26.64	32.45	41.98	39.39	0.37
1900.00	2.13	47.48	1899.31	35.24	29.47	35.24	45.94	39.90	0.34
2000.00	1.49	40.62	1999.26	37.48	31.68	37.48	49.08	40.21	0.68
2100.00	1.54	39.77	2099.23	39.50	33.39	39.50	51.72	40.21	0.06
2200.00	1.79	39.44	2199.18	41.73	35.24	41.73	54.62	40.17	0.25
2300.00	2.22	38.45	2299.12	44.46	37.43	44.46	58.12	40.10	0.44
2400.00	2.89	42.80	2399.02	47.83	40.35	47.83	62.57	40.16	0.69
2500.00	3.20	41.31	2498.88	51.77	43.90	51.77	67.88	40.30	0.32
2600.00	3.11	42.23	2598.73	55.87	47.57	55.87	73.38	40.41	0.10
2700.00	3.22	38.36	2698.58	60.08	51.14	60.08	78.90	40.40	0.24
2800.00	3.12	38.75	2798.42	64.41	54.58	64.41	84.42	40.28	0.10
2900.00	3.36	39.85	2898.26	68.78	58.16	68.78	90.07	40.22	0.25
3000.00	3.01	40.75	2998.11	73.01	61.75	73.01	95.62	40.22	0.35
3100.00	2.58	41.88	3097.99	76.68	64.97	76.68	100.50	40.27	0.43
3200.00	2.01	46.81	3197.91	79.56	67.75	79.56	104.50	40.42	0.60
3300.00	1.72	57.76	3297.86	81.56	70.30	81.56	107.68	40.76	0.46
3400.00	1.53	73.49	3397.82	82.74	72.86	82.74	110.25	41.37	0.48
3500.00	1.26	91.79	3497.79	83.09	75.24	83.09	112.09	42.16	0.52
3600.00	1.06	99.91	3597.77	82.89	77.25	82.89	113.31	42.98	0.26
3700.00	0.83	105.89	3697.75	82.54	78.86	82.54	114.15	43.70	0.25
3800.00	0.38	46.71	3797.75	82.56	79.80	82.56	114.82	44.02	0.72
3900.00	0.34	34.77	3897.75	83.03	80.21	83.03	115.44	44.01	0.08
4000.00	0.14	83.47	3997.75	83.29	80.50	83.29	115.83	44.02	0.27
4100.00	0.06	73.30	4097.75	83.32	80.66	83.32	115.97	44.07	0.09
4200.00	0.13	82.81	4197.75	83.35	80.82	83.35	116.10	44.12	0.07
4300.00	0.19	67.27	4297.74	83.43	81.09	83.43	116.34	44.19	0.08
4400.00	0.48	50.89	4397.74	83.76	81.57	83.76	116.91	44.24	0.30
4500.00	0.64	70.23	4497.74	84.21	82.42	84.21	117.83	44.38	0.24
4600.00	0.84	70.29	4597.73	84.65	83.64	84.65	119.00	44.66	0.20
4700.00	0.99	62.81	4697.72	85.29	85.10	85.29	120.48	44.94	0.19
4800.00	1.07	61.60	4797.70	86.13	86.69	86.13	122.20	45.19	0.09
4900.00	1.19	70.46	4897.68	86.92	88.49	86.92	124.04	45.51	0.21
5000.00	1.48	72.46	4997.65	87.66	90.70	87.66	126.13	45.98	0.30
5100.00	1.47	79.14	5097.62	88.29	93.19	88.29	128.37	46.55	0.17
5200.00	1.53	78.95	5197.59	88.79	95.77	88.79	130.59	47.17	0.06
5300.00	1.87	75.85	5297.54	89.44	98.66	89.44	133.17	47.81	0.35
5400.00	1.42	81.97	5397.50	90.01	101.46	90.01	135.63	48.42	0.49
5500.00	1.22	77.86	5497.47	90.41	103.72	90.41	137.60	48.92	0.22

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
5600.00	0.60	24.19	5597.46	91.11	104.98	91.11	139.00	49.05	0.99
5700.00	0.63	12.45	5697.46	92.13	105.31	92.13	139.93	48.82	0.13
5800.00	0.64	339.68	5797.45	93.19	105.24	93.19	140.57	48.47	0.36
5900.00	0.54	314.49	5897.45	94.04	104.71	94.04	140.74	48.07	0.27
6000.00	0.81	299.63	5997.44	94.72	103.76	94.72	140.50	47.61	0.32
6100.00	0.75	312.92	6097.43	95.52	102.67	95.52	140.23	47.06	0.19
6200.00	0.77	310.44	6197.42	96.40	101.67	96.40	140.11	46.52	0.04
6300.00	0.84	307.93	6297.41	97.29	100.58	97.29	139.94	45.95	0.08
6400.00	0.74	307.10	6397.40	98.14	99.48	98.14	139.74	45.39	0.10
6500.00	0.77	317.97	6497.39	99.03	98.51	99.03	139.68	44.85	0.15
6600.00	0.84	309.43	6597.38	99.99	97.50	99.99	139.66	44.28	0.14
6700.00	0.55	320.01	6697.38	100.83	96.62	100.83	139.65	43.78	0.32
6800.00	0.69	324.10	6797.37	101.69	95.96	101.69	139.81	43.34	0.15
6900.00	0.42	290.26	6897.37	102.30	95.26	102.30	139.79	42.96	0.42
7000.00	0.49	299.99	6997.36	102.64	94.54	102.64	139.55	42.65	0.11
7100.00	0.68	246.15	7097.36	102.62	93.63	102.62	138.91	42.38	0.56
7200.00	1.06	250.03	7197.35	102.06	92.22	102.06	137.55	42.10	0.39
7300.00	1.03	241.09	7297.33	101.31	90.56	101.31	135.89	41.79	0.17
7400.00	1.04	251.33	7397.31	100.59	88.91	100.59	134.25	41.48	0.19
7500.00	0.81	238.60	7497.30	99.93	87.45	99.93	132.79	41.19	0.31
7600.00	0.87	247.23	7597.29	99.26	86.14	99.26	131.43	40.95	0.14
7700.00	0.88	242.29	7697.28	98.61	84.76	98.61	130.03	40.68	0.08
7800.00	0.92	238.78	7797.27	97.84	83.39	97.84	128.56	40.44	0.06
7900.00	0.91	239.53	7897.25	97.02	82.03	97.02	127.05	40.21	0.02
8000.00	0.51	233.64	7997.25	96.36	80.98	96.36	125.87	40.05	0.40
8100.00	0.59	242.65	8097.24	95.85	80.17	95.85	124.96	39.91	0.11
8200.00	0.61	273.59	8197.24	95.65	79.18	95.65	124.17	39.62	0.32
8300.00	0.56	239.00	8297.23	95.43	78.23	95.43	123.40	39.34	0.35
8400.00	0.47	266.63	8397.23	95.16	77.40	95.16	122.66	39.13	0.26
8500.00	0.37	261.03	8497.22	95.08	76.68	95.08	122.15	38.89	0.11
8600.00	0.13	252.77	8597.22	95.00	76.25	95.00	121.82	38.75	0.24
8700.00	0.29	193.14	8697.22	94.71	76.09	94.71	121.49	38.78	0.25
8800.00	0.54	213.68	8797.22	94.07	75.77	94.07	120.79	38.85	0.29
8900.00	0.87	213.35	8897.21	93.05	75.09	93.05	119.57	38.90	0.33
9000.00	1.19	147.13	8997.20	91.54	75.24	91.54	118.49	39.42	1.16
9100.00	1.26	135.86	9097.18	89.88	76.57	89.88	118.07	40.43	0.25
9200.00	2.27	117.05	9197.13	88.19	79.10	88.19	118.46	41.89	1.16
9300.00	3.01	102.81	9297.02	86.70	83.42	86.70	120.32	43.90	0.98
9400.00	2.38	110.41	9396.91	85.40	87.92	85.40	122.57	45.84	0.72

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
9500.00	1.63	108.46	9496.85	84.23	91.21	84.23	124.15	47.28	0.75
9600.00	1.37	108.60	9596.82	83.40	93.69	83.40	125.43	48.33	0.26
9700.00	1.29	140.05	9696.79	82.15	95.54	82.15	126.01	49.31	0.72
9800.00	1.20	129.91	9796.77	80.61	97.07	80.61	126.18	50.29	0.24
9900.00	1.02	136.88	9896.75	79.29	98.48	79.29	126.44	51.16	0.23
10000.00	0.35	145.74	9996.74	78.39	99.26	78.39	126.48	51.70	0.67
10100.00	0.80	355.81	10096.74	78.83	99.39	78.83	126.86	51.58	1.12
10200.00	0.44	348.46	10196.73	79.91	99.26	79.91	127.43	51.17	0.37
10300.00	0.75	264.82	10296.73	80.23	98.53	80.23	127.06	50.85	0.83
10400.00	0.80	296.95	10396.72	80.48	97.25	80.48	126.24	50.39	0.43
10500.00	1.42	270.64	10496.70	80.82	95.38	80.82	125.02	49.73	0.79
10600.00	1.97	264.38	10596.66	80.66	92.43	80.66	122.68	48.89	0.58
10700.00	2.72	263.71	10696.57	80.23	88.37	80.23	119.36	47.76	0.75
10800.00	2.66	249.17	10796.46	79.15	83.84	79.15	115.30	46.65	0.68
10900.00	2.83	248.58	10896.35	77.42	79.38	77.42	110.88	45.71	0.18



VES Survey International
West Texas
(432) 563-5444
Surveyor: Gene Heiss
Smalls Federal No 001H / API 30-025-43001





HOBBS OCD

JUL 18 2016

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I Gene Heiss certify that I am employed by VES Survey International. That I did on the day(s) of 02/16/16 through 02/16/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 10,900.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho for the Smalls Federal Well # 1H API # 30-025-43001 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by VES Survey International.

A handwritten signature in blue ink, appearing to read "Gene Heiss", is written over a horizontal line.

Gene Heiss
Service Technician
VES Survey International

HOBBS OCD

JUL 18 2016

RECEIVED

COG Operating LLC

Lea County, NM (NAD27 NME)

Smalls Federal

#1H

OH

Design: OH

Survey Report - Geographic

04 March, 2016

IDS

Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3423.8usft (Original Well Elev)
Site:	Smalls Federal	MD Reference:	WELL @ 3423.8usft (Original Well Elev)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM (NAD27 NME)		
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		Smalls Federal			
Site Position:		Northing:	494,242.70 usft	Latitude:	32° 21' 20.947 N
From:	Map	Easting:	767,268.60 usft	Longitude:	103° 28' 4.141 W
Position Uncertainty:	3.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.46 °

Well	#1H					
Well Position	+N/-S	0.0 usft	Northing:	494,242.70 usft	Latitude:	32° 21' 20.947 N
	+E/-W	0.0 usft	Easting:	767,268.60 usft	Longitude:	103° 28' 4.141 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,403.8 usft

Wellbore	OH				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/5/2016	7.07	60.22	48,177

Design	OH				
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Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	358.43

Survey Program		Date	3/2/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	9,700.0	GYRO (OH)	VESSI_GYROFLEX	VESSI Gyroflex Gyro	
9,725.0	14,831.0	MWD #1 (OH)	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
0.0	0.00	0.00	0.0	0.0	0.0	494,242.70	767,268.60	32° 21' 20.947 N	103° 28' 4.141 W
100.0	0.27	322.02	100.0	0.2	-0.1	494,242.89	767,268.45	32° 21' 20.949 N	103° 28' 4.142 W
200.0	0.48	355.35	200.0	0.8	-0.3	494,243.49	767,268.27	32° 21' 20.955 N	103° 28' 4.144 W
300.0	0.78	16.16	300.0	1.9	-0.2	494,244.56	767,268.43	32° 21' 20.965 N	103° 28' 4.143 W
400.0	0.87	36.58	400.0	3.1	0.5	494,245.82	767,269.07	32° 21' 20.978 N	103° 28' 4.135 W
500.0	0.89	38.08	500.0	4.3	1.4	494,247.05	767,270.00	32° 21' 20.990 N	103° 28' 4.124 W
600.0	1.03	40.64	600.0	5.6	2.5	494,248.34	767,271.07	32° 21' 21.003 N	103° 28' 4.111 W
700.0	1.27	46.65	699.9	7.1	3.9	494,249.78	767,272.46	32° 21' 21.017 N	103° 28' 4.095 W
800.0	1.39	46.46	799.9	8.7	5.5	494,251.38	767,274.14	32° 21' 21.032 N	103° 28' 4.075 W
900.0	1.52	44.09	899.9	10.5	7.3	494,253.17	767,275.94	32° 21' 21.050 N	103° 28' 4.054 W
1,000.0	1.81	38.02	999.8	12.7	9.2	494,255.36	767,277.84	32° 21' 21.072 N	103° 28' 4.032 W

IDS

Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3423.8usft (Original Well Elev)
Site:	Smalls Federal	MD Reference:	WELL @ 3423.8usft (Original Well Elev)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,100.0	2.06	42.63	1,099.8	15.2	11.4	494,257.93	767,280.03	32° 21' 21.097 N	103° 28' 4.006 W
1,200.0	2.27	40.69	1,199.7	18.1	13.9	494,260.75	767,282.54	32° 21' 21.125 N	103° 28' 3.977 W
1,300.0	1.84	43.28	1,299.6	20.7	16.3	494,263.42	767,284.93	32° 21' 21.151 N	103° 28' 3.948 W
1,400.0	1.55	38.34	1,399.6	23.0	18.3	494,265.65	767,286.87	32° 21' 21.173 N	103° 28' 3.926 W
1,500.0	1.63	27.99	1,499.6	25.3	19.8	494,267.97	767,288.38	32° 21' 21.195 N	103° 28' 3.908 W
1,600.0	1.62	48.37	1,599.5	27.5	21.5	494,270.16	767,290.10	32° 21' 21.217 N	103° 28' 3.888 W
1,700.0	2.07	46.15	1,699.5	29.7	23.9	494,272.36	767,292.46	32° 21' 21.239 N	103° 28' 3.860 W
1,800.0	2.43	43.52	1,799.4	32.4	26.6	494,275.14	767,295.22	32° 21' 21.266 N	103° 28' 3.827 W
1,900.0	2.13	47.48	1,899.3	35.2	29.5	494,277.94	767,298.05	32° 21' 21.293 N	103° 28' 3.794 W
2,000.0	1.49	40.62	1,999.3	37.5	31.7	494,280.18	767,300.27	32° 21' 21.315 N	103° 28' 3.768 W
2,100.0	1.54	39.77	2,099.2	39.5	33.4	494,282.20	767,301.97	32° 21' 21.335 N	103° 28' 3.748 W
2,200.0	1.79	39.44	2,199.2	41.7	35.2	494,284.44	767,303.83	32° 21' 21.357 N	103° 28' 3.726 W
2,300.0	2.22	38.45	2,299.1	44.5	37.4	494,287.16	767,306.02	32° 21' 21.384 N	103° 28' 3.700 W
2,400.0	2.89	42.80	2,399.0	47.8	40.3	494,290.53	767,308.94	32° 21' 21.417 N	103° 28' 3.666 W
2,500.0	3.20	41.31	2,498.9	51.8	43.9	494,294.47	767,312.49	32° 21' 21.456 N	103° 28' 3.624 W
2,600.0	3.11	42.23	2,598.7	55.9	47.6	494,298.58	767,316.16	32° 21' 21.496 N	103° 28' 3.581 W
2,700.0	3.22	38.36	2,698.6	60.1	51.1	494,302.79	767,319.73	32° 21' 21.538 N	103° 28' 3.539 W
2,800.0	3.12	38.75	2,798.4	64.4	54.6	494,307.11	767,323.17	32° 21' 21.580 N	103° 28' 3.499 W
2,900.0	3.36	39.85	2,898.3	68.8	58.2	494,311.49	767,326.75	32° 21' 21.623 N	103° 28' 3.456 W
3,000.0	3.01	40.75	2,998.1	73.0	61.7	494,315.73	767,330.35	32° 21' 21.665 N	103° 28' 3.414 W
3,100.0	2.58	41.88	3,098.0	76.7	65.0	494,319.39	767,333.56	32° 21' 21.701 N	103° 28' 3.376 W
3,200.0	2.01	46.81	3,197.9	79.6	67.7	494,322.27	767,336.34	32° 21' 21.729 N	103° 28' 3.344 W
3,300.0	1.72	57.76	3,297.9	81.6	70.3	494,324.27	767,338.89	32° 21' 21.749 N	103° 28' 3.314 W
3,400.0	1.53	73.49	3,397.8	82.7	72.8	494,325.45	767,341.44	32° 21' 21.760 N	103° 28' 3.284 W
3,500.0	1.26	91.79	3,497.8	83.1	75.2	494,325.79	767,343.82	32° 21' 21.763 N	103° 28' 3.256 W
3,600.0	1.06	99.91	3,597.8	82.9	77.2	494,325.60	767,345.83	32° 21' 21.761 N	103° 28' 3.233 W
3,700.0	0.83	105.89	3,697.8	82.5	78.8	494,325.24	767,347.44	32° 21' 21.757 N	103° 28' 3.214 W
3,800.0	0.38	46.71	3,797.7	82.6	79.8	494,325.27	767,348.37	32° 21' 21.758 N	103° 28' 3.203 W
3,900.0	0.34	34.77	3,897.7	83.0	80.2	494,325.74	767,348.79	32° 21' 21.762 N	103° 28' 3.198 W
4,000.0	0.14	83.47	3,997.7	83.3	80.5	494,326.00	767,349.08	32° 21' 21.765 N	103° 28' 3.195 W
4,100.0	0.06	73.30	4,097.7	83.3	80.7	494,326.03	767,349.25	32° 21' 21.765 N	103° 28' 3.193 W
4,200.0	0.13	82.81	4,197.7	83.4	80.8	494,326.06	767,349.41	32° 21' 21.765 N	103° 28' 3.191 W
4,300.0	0.19	67.27	4,297.7	83.4	81.1	494,326.14	767,349.68	32° 21' 21.766 N	103° 28' 3.188 W
4,400.0	0.48	50.89	4,397.7	83.8	81.6	494,326.46	767,350.15	32° 21' 21.769 N	103° 28' 3.182 W
4,500.0	0.64	70.23	4,497.7	84.2	82.4	494,326.92	767,351.00	32° 21' 21.774 N	103° 28' 3.172 W
4,600.0	0.84	70.29	4,597.7	84.7	83.6	494,327.35	767,352.22	32° 21' 21.778 N	103° 28' 3.158 W
4,700.0	0.99	62.81	4,697.7	85.3	85.1	494,328.00	767,353.68	32° 21' 21.784 N	103° 28' 3.141 W
4,800.0	1.07	61.60	4,797.7	86.1	86.7	494,328.83	767,355.27	32° 21' 21.792 N	103° 28' 3.122 W
4,900.0	1.19	70.46	4,897.7	86.9	88.5	494,329.63	767,357.07	32° 21' 21.800 N	103° 28' 3.101 W
5,000.0	1.48	72.46	4,997.7	87.7	90.7	494,330.36	767,359.28	32° 21' 21.807 N	103° 28' 3.075 W
5,100.0	1.47	79.14	5,097.6	88.3	93.2	494,330.99	767,361.77	32° 21' 21.813 N	103° 28' 3.046 W
5,200.0	1.53	78.95	5,197.6	88.8	95.7	494,331.49	767,364.34	32° 21' 21.818 N	103° 28' 3.016 W
5,300.0	1.87	75.85	5,297.5	89.4	98.6	494,332.14	767,367.23	32° 21' 21.824 N	103° 28' 2.983 W
5,400.0	1.42	81.97	5,397.5	90.0	101.4	494,332.72	767,370.04	32° 21' 21.830 N	103° 28' 2.950 W
5,500.0	1.22	77.86	5,497.5	90.4	103.7	494,333.11	767,372.31	32° 21' 21.833 N	103° 28' 2.923 W
5,600.0	0.60	24.19	5,597.5	91.1	105.0	494,333.82	767,373.56	32° 21' 21.840 N	103° 28' 2.909 W
5,700.0	0.63	12.45	5,697.5	92.1	105.3	494,334.83	767,373.90	32° 21' 21.850 N	103° 28' 2.905 W
5,800.0	0.64	339.68	5,797.5	93.2	105.2	494,335.89	767,373.82	32° 21' 21.861 N	103° 28' 2.905 W
5,900.0	0.54	314.49	5,897.4	94.0	104.7	494,336.74	767,373.29	32° 21' 21.869 N	103° 28' 2.911 W
6,000.0	0.81	299.63	5,997.4	94.7	103.7	494,337.42	767,372.34	32° 21' 21.876 N	103° 28' 2.923 W
6,100.0	0.75	312.92	6,097.4	95.5	102.6	494,338.22	767,371.25	32° 21' 21.884 N	103° 28' 2.935 W
6,200.0	0.77	310.44	6,197.4	96.4	101.7	494,339.10	767,370.26	32° 21' 21.893 N	103° 28' 2.947 W
6,300.0	0.84	307.93	6,297.4	97.3	100.6	494,339.99	767,369.17	32° 21' 21.902 N	103° 28' 2.959 W
6,400.0	0.74	307.10	6,397.4	98.1	99.5	494,340.83	767,368.07	32° 21' 21.910 N	103° 28' 2.972 W
6,500.0	0.77	317.97	6,497.4	99.0	98.5	494,341.72	767,367.11	32° 21' 21.919 N	103° 28' 2.983 W

IDS

Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3423.8usft (Original Well Elev)
Site:	Smalls Federal	MD Reference:	WELL @ 3423.8usft (Original Well Elev)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,600.0	0.84	309.43	6,597.4	100.0	97.5	494,342.68	767,366.09	32° 21' 21.929 N	103° 28' 2.995 W
6,700.0	0.55	320.01	6,697.4	100.8	96.6	494,343.51	767,365.22	32° 21' 21.937 N	103° 28' 3.005 W
6,800.0	0.69	324.10	6,797.4	101.7	96.0	494,344.37	767,364.56	32° 21' 21.945 N	103° 28' 3.013 W
6,900.0	0.42	290.26	6,897.4	102.3	95.3	494,344.98	767,363.86	32° 21' 21.952 N	103° 28' 3.021 W
7,000.0	0.49	299.99	6,997.4	102.6	94.5	494,345.32	767,363.15	32° 21' 21.955 N	103° 28' 3.029 W
7,100.0	0.68	246.15	7,097.4	102.6	93.6	494,345.30	767,362.23	32° 21' 21.955 N	103° 28' 3.040 W
7,200.0	1.06	250.03	7,197.3	102.0	92.2	494,344.74	767,360.82	32° 21' 21.949 N	103° 28' 3.056 W
7,300.0	1.03	241.09	7,297.3	101.3	90.6	494,343.99	767,359.16	32° 21' 21.942 N	103° 28' 3.075 W
7,400.0	1.04	251.33	7,397.3	100.6	88.9	494,343.27	767,357.52	32° 21' 21.935 N	103° 28' 3.095 W
7,500.0	0.81	238.60	7,497.3	99.9	87.5	494,342.61	767,356.05	32° 21' 21.929 N	103° 28' 3.112 W
7,600.0	0.87	247.23	7,597.3	99.2	86.2	494,341.95	767,354.75	32° 21' 21.922 N	103° 28' 3.127 W
7,700.0	0.88	242.29	7,697.3	98.6	84.8	494,341.30	767,353.37	32° 21' 21.916 N	103° 28' 3.143 W
7,800.0	0.92	238.78	7,797.3	97.8	83.4	494,340.52	767,352.00	32° 21' 21.908 N	103° 28' 3.159 W
7,900.0	0.91	239.53	7,897.3	97.0	82.0	494,339.70	767,350.63	32° 21' 21.900 N	103° 28' 3.175 W
8,000.0	0.51	233.64	7,997.2	96.3	81.0	494,339.04	767,349.59	32° 21' 21.894 N	103° 28' 3.188 W
8,100.0	0.59	242.65	8,097.2	95.8	80.2	494,338.54	767,348.78	32° 21' 21.889 N	103° 28' 3.197 W
8,200.0	0.61	273.59	8,197.2	95.6	79.2	494,338.33	767,347.79	32° 21' 21.887 N	103° 28' 3.209 W
8,300.0	0.56	239.00	8,297.2	95.4	78.2	494,338.11	767,346.84	32° 21' 21.885 N	103° 28' 3.220 W
8,400.0	0.47	266.63	8,397.2	95.1	77.4	494,337.84	767,346.01	32° 21' 21.882 N	103° 28' 3.229 W
8,500.0	0.37	261.03	8,497.2	95.1	76.7	494,337.76	767,345.28	32° 21' 21.882 N	103° 28' 3.238 W
8,600.0	0.13	252.77	8,597.2	95.0	76.3	494,337.68	767,344.85	32° 21' 21.881 N	103° 28' 3.243 W
8,700.0	0.29	193.14	8,697.2	94.7	76.1	494,337.40	767,344.69	32° 21' 21.878 N	103° 28' 3.245 W
8,800.0	0.54	213.68	8,797.2	94.1	75.8	494,336.76	767,344.37	32° 21' 21.872 N	103° 28' 3.249 W
8,900.0	0.87	213.35	8,897.2	93.0	75.1	494,335.74	767,343.69	32° 21' 21.862 N	103° 28' 3.257 W
9,000.0	1.19	147.13	8,997.2	91.5	75.2	494,334.23	767,343.84	32° 21' 21.847 N	103° 28' 3.255 W
9,100.0	1.26	135.86	9,097.2	89.9	76.6	494,332.57	767,345.16	32° 21' 21.830 N	103° 28' 3.240 W
9,200.0	2.27	117.05	9,197.1	88.2	79.1	494,330.88	767,347.69	32° 21' 21.813 N	103° 28' 3.210 W
9,300.0	3.01	102.81	9,297.0	86.7	83.4	494,329.40	767,352.02	32° 21' 21.798 N	103° 28' 3.160 W
9,400.0	2.38	110.41	9,396.9	85.4	87.9	494,328.09	767,356.52	32° 21' 21.785 N	103° 28' 3.108 W
9,500.0	1.63	108.46	9,496.8	84.2	91.2	494,326.92	767,359.82	32° 21' 21.773 N	103° 28' 3.069 W
9,600.0	1.37	108.60	9,596.8	83.4	93.7	494,326.08	767,362.30	32° 21' 21.765 N	103° 28' 3.041 W
9,700.0	1.29	140.05	9,696.8	82.1	95.6	494,324.84	767,364.16	32° 21' 21.752 N	103° 28' 3.019 W
9,725.0	1.20	138.80	9,721.8	81.7	95.9	494,324.43	767,364.51	32° 21' 21.748 N	103° 28' 3.015 W
First MWD Survey									
9,756.0	1.30	136.00	9,752.8	81.2	96.4	494,323.93	767,364.97	32° 21' 21.743 N	103° 28' 3.010 W
9,787.0	1.10	130.30	9,783.8	80.8	96.8	494,323.48	767,365.44	32° 21' 21.739 N	103° 28' 3.004 W
9,820.0	1.10	127.60	9,816.8	80.4	97.3	494,323.09	767,365.93	32° 21' 21.735 N	103° 28' 2.999 W
9,850.0	0.60	321.80	9,846.8	80.3	97.5	494,323.03	767,366.06	32° 21' 21.734 N	103° 28' 2.997 W
9,882.0	6.90	320.80	9,878.7	82.0	96.1	494,324.66	767,364.74	32° 21' 21.750 N	103° 28' 3.012 W
9,913.0	12.10	326.70	9,909.2	86.1	93.2	494,328.82	767,361.78	32° 21' 21.792 N	103° 28' 3.046 W
9,945.0	15.30	327.80	9,940.3	92.5	89.1	494,335.20	767,357.69	32° 21' 21.855 N	103° 28' 3.094 W
9,977.0	19.00	328.40	9,970.9	100.5	84.1	494,343.21	767,352.71	32° 21' 21.935 N	103° 28' 3.151 W
10,009.0	22.20	332.00	10,000.9	110.3	78.5	494,352.99	767,347.14	32° 21' 22.032 N	103° 28' 3.215 W
10,041.0	23.00	331.90	10,030.4	121.1	72.8	494,363.84	767,341.36	32° 21' 22.140 N	103° 28' 3.281 W
10,073.0	24.60	334.10	10,059.7	132.6	66.9	494,375.35	767,335.50	32° 21' 22.254 N	103° 28' 3.348 W
10,104.0	28.40	333.30	10,087.4	145.0	60.8	494,387.74	767,329.37	32° 21' 22.377 N	103° 28' 3.419 W
10,135.0	32.50	330.00	10,114.1	158.8	53.3	494,401.55	767,321.89	32° 21' 22.515 N	103° 28' 3.505 W
10,166.0	36.70	327.90	10,139.6	173.9	44.2	494,416.61	767,312.80	32° 21' 22.664 N	103° 28' 3.609 W
10,198.0	39.80	328.60	10,164.8	190.8	33.8	494,433.46	767,302.38	32° 21' 22.832 N	103° 28' 3.729 W
10,229.0	43.10	330.00	10,188.0	208.4	23.3	494,451.10	767,291.91	32° 21' 23.007 N	103° 28' 3.849 W
10,260.0	46.30	332.30	10,210.0	227.5	12.8	494,470.20	767,281.40	32° 21' 23.197 N	103° 28' 3.970 W
10,292.0	50.50	334.30	10,231.3	248.9	2.1	494,491.58	767,270.66	32° 21' 23.410 N	103° 28' 4.093 W
10,323.0	54.80	336.80	10,250.1	271.3	-8.1	494,514.01	767,260.48	32° 21' 23.632 N	103° 28' 4.210 W
10,355.0	59.10	338.70	10,267.5	296.1	-18.3	494,538.83	767,250.34	32° 21' 23.879 N	103° 28' 4.326 W
10,387.0	63.00	340.80	10,283.0	322.4	-27.9	494,565.10	767,240.66	32° 21' 24.139 N	103° 28' 4.436 W

IDS

Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3423.8usft (Original Well Elev)
Site:	Smalls Federal	MD Reference:	WELL @ 3423.8usft (Original Well Elev)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,419.0	65.20	343.20	10,297.0	349.8	-36.8	494,592.48	767,231.77	32° 21' 24.411 N	103° 28' 4.537 W
10,450.0	68.10	345.80	10,309.3	377.2	-44.4	494,619.90	767,224.17	32° 21' 24.683 N	103° 28' 4.623 W
10,482.0	70.40	348.00	10,320.6	406.3	-51.2	494,649.04	767,217.40	32° 21' 24.972 N	103° 28' 4.699 W
10,513.0	74.30	350.10	10,330.0	435.3	-56.8	494,678.04	767,211.79	32° 21' 25.259 N	103° 28' 4.762 W
10,545.0	77.60	352.50	10,337.8	466.0	-61.5	494,708.72	767,207.10	32° 21' 25.563 N	103° 28' 4.814 W
10,577.0	81.30	354.90	10,343.6	497.3	-64.9	494,739.98	767,203.66	32° 21' 25.873 N	103° 28' 4.851 W
10,608.0	83.90	357.90	10,347.6	528.0	-66.9	494,770.65	767,201.73	32° 21' 26.176 N	103° 28' 4.871 W
10,644.0	85.80	0.70	10,350.9	563.8	-67.3	494,806.50	767,201.29	32° 21' 26.531 N	103° 28' 4.872 W
10,676.0	86.90	1.40	10,352.9	595.7	-66.7	494,838.43	767,201.88	32° 21' 26.847 N	103° 28' 4.862 W
10,708.0	89.10	1.90	10,354.0	627.7	-65.8	494,870.39	767,202.80	32° 21' 27.163 N	103° 28' 4.849 W
10,802.0	91.00	2.70	10,353.9	721.6	-62.0	494,964.31	767,206.57	32° 21' 28.092 N	103° 28' 4.796 W
10,897.0	90.20	2.10	10,353.0	816.5	-58.1	495,059.22	767,210.55	32° 21' 29.031 N	103° 28' 4.741 W
10,991.0	91.50	2.20	10,351.6	910.4	-54.5	495,153.14	767,214.07	32° 21' 29.960 N	103° 28' 4.691 W
11,085.0	91.30	2.10	10,349.3	1,004.3	-51.0	495,247.05	767,217.60	32° 21' 30.889 N	103° 28' 4.641 W
11,179.0	91.00	2.00	10,347.4	1,098.3	-47.6	495,340.97	767,220.96	32° 21' 31.818 N	103° 28' 4.593 W
11,274.0	90.80	1.40	10,345.9	1,193.2	-44.8	495,435.92	767,223.78	32° 21' 32.758 N	103° 28' 4.551 W
11,369.0	91.40	1.00	10,344.1	1,288.2	-42.8	495,530.88	767,225.77	32° 21' 33.697 N	103° 28' 4.519 W
11,463.0	91.70	0.60	10,341.5	1,382.1	-41.5	495,624.83	767,227.08	32° 21' 34.627 N	103° 28' 4.494 W
11,558.0	89.30	0.50	10,340.7	1,477.1	-40.6	495,719.82	767,227.99	32° 21' 35.566 N	103° 28' 4.475 W
11,652.0	90.50	0.70	10,340.9	1,571.1	-39.6	495,813.81	767,228.98	32° 21' 36.496 N	103° 28' 4.455 W
11,747.0	91.00	0.70	10,339.6	1,666.1	-38.5	495,908.80	767,230.14	32° 21' 37.436 N	103° 28' 4.432 W
11,842.0	91.30	0.50	10,337.7	1,761.1	-37.5	496,003.77	767,231.13	32° 21' 38.376 N	103° 28' 4.412 W
11,935.0	89.50	1.00	10,337.1	1,854.1	-36.2	496,096.76	767,232.35	32° 21' 39.296 N	103° 28' 4.389 W
12,029.0	90.00	2.00	10,337.5	1,948.0	-33.8	496,190.72	767,234.81	32° 21' 40.225 N	103° 28' 4.351 W
12,124.0	89.10	0.70	10,338.2	2,043.0	-31.6	496,285.69	767,237.05	32° 21' 41.165 N	103° 28' 4.316 W
12,217.0	88.60	0.50	10,340.1	2,136.0	-30.6	496,378.67	767,238.02	32° 21' 42.085 N	103° 28' 4.296 W
12,311.0	90.40	0.00	10,340.9	2,230.0	-30.2	496,472.66	767,238.43	32° 21' 43.015 N	103° 28' 4.282 W
12,405.0	91.50	0.00	10,339.3	2,323.9	-30.2	496,566.64	767,238.43	32° 21' 43.945 N	103° 28' 4.273 W
12,499.0	91.60	359.60	10,336.8	2,417.9	-30.5	496,660.61	767,238.10	32° 21' 44.875 N	103° 28' 4.268 W
12,593.0	91.70	359.80	10,334.1	2,511.9	-31.0	496,754.57	767,237.61	32° 21' 45.805 N	103° 28' 4.265 W
12,687.0	92.00	359.50	10,331.1	2,605.8	-31.6	496,848.52	767,237.04	32° 21' 46.734 N	103° 28' 4.263 W
12,782.0	90.50	358.20	10,329.0	2,700.8	-33.5	496,943.47	767,235.13	32° 21' 47.674 N	103° 28' 4.276 W
12,876.0	89.10	358.40	10,329.3	2,794.7	-36.3	497,037.43	767,232.34	32° 21' 48.604 N	103° 28' 4.300 W
12,971.0	88.90	358.40	10,331.0	2,889.7	-38.9	497,132.37	767,229.69	32° 21' 49.544 N	103° 28' 4.322 W
13,066.0	90.20	358.30	10,331.7	2,984.6	-41.6	497,227.33	767,226.95	32° 21' 50.483 N	103° 28' 4.345 W
13,161.0	90.10	358.20	10,331.5	3,079.6	-44.5	497,322.29	767,224.05	32° 21' 51.423 N	103° 28' 4.370 W
13,255.0	90.10	357.90	10,331.3	3,173.5	-47.7	497,416.23	767,220.85	32° 21' 52.353 N	103° 28' 4.398 W
13,349.0	90.30	357.50	10,331.0	3,267.5	-51.5	497,510.15	767,217.08	32° 21' 53.283 N	103° 28' 4.433 W
13,444.0	90.30	357.20	10,330.5	3,362.3	-55.9	497,605.05	767,212.69	32° 21' 54.222 N	103° 28' 4.476 W
13,538.0	90.50	356.40	10,329.8	3,456.2	-61.2	497,698.90	767,207.44	32° 21' 55.151 N	103° 28' 4.528 W
13,627.0	90.80	356.20	10,328.8	3,545.0	-66.9	497,787.71	767,201.70	32° 21' 56.030 N	103° 28' 4.586 W
13,721.0	91.30	356.20	10,327.1	3,638.8	-73.1	497,881.49	767,195.47	32° 21' 56.959 N	103° 28' 4.650 W
13,815.0	89.00	356.30	10,326.8	3,732.6	-79.3	497,975.28	767,189.32	32° 21' 57.887 N	103° 28' 4.713 W
13,909.0	89.30	357.10	10,328.2	3,826.4	-84.7	498,069.11	767,183.91	32° 21' 58.816 N	103° 28' 4.767 W
14,003.0	89.30	356.80	10,329.4	3,920.3	-89.7	498,162.97	767,178.91	32° 21' 59.745 N	103° 28' 4.817 W
14,096.0	88.10	356.20	10,331.5	4,013.1	-95.4	498,255.77	767,173.24	32° 22' 0.664 N	103° 28' 4.874 W
14,188.0	87.60	356.40	10,334.9	4,104.8	-101.3	498,347.52	767,167.30	32° 22' 1.572 N	103° 28' 4.935 W
14,283.0	88.70	357.70	10,338.0	4,199.6	-106.2	498,442.34	767,162.42	32° 22' 2.511 N	103° 28' 4.983 W
14,377.0	90.10	357.80	10,339.0	4,293.6	-109.9	498,536.26	767,158.73	32° 22' 3.441 N	103° 28' 5.017 W
14,472.0	89.60	357.60	10,339.2	4,388.5	-113.7	498,631.18	767,154.92	32° 22' 4.380 N	103° 28' 5.052 W
14,567.0	90.90	357.90	10,338.8	4,483.4	-117.4	498,726.10	767,151.19	32° 22' 5.320 N	103° 28' 5.087 W
14,662.0	92.40	358.80	10,336.1	4,578.3	-120.1	498,821.02	767,148.45	32° 22' 6.259 N	103° 28' 5.110 W
14,785.0	91.90	358.20	10,331.5	4,701.2	-123.4	498,943.89	767,145.23	32° 22' 7.475 N	103° 28' 5.136 W

Final MWD Survey

IDS
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	WELL @ 3423.8usft (Original Well Elev)
Site:	Smalls Federal	MD Reference:	WELL @ 3423.8usft (Original Well Elev)
Well:	#1H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,831.0	91.90	358.20	10,330.0	4,747.1	-124.8	498,989.84	767,143.79	32° 22' 7.930 N	103° 28' 5.148 W
Projection to TD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,725.0	9,721.8	81.7	95.9	First MWD Survey
14,785.0	10,331.5	4,701.2	-123.4	Final MWD Survey
14,831.0	10,330.0	4,747.1	-124.8	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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