

**McVAY DRILLING COMPANY**

P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

HOBBS OCD**SEP 12 2016****RECEIVED**

Well Name and Num: Viking Helmet State Com #2H
Location: Sec 29, T24S, R35E
Operator: COG
Drilling Contractor: McVay Drilling Company

The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.70	290	0.10	6119	1.80	11600	82.50	15640
1.00	566	1.30	6406	0.80	11967	54.80	16115
0.80	843	1.10	6689	0.80	12349	89.60	16590
0.50	1208	0.80	6973	4.20	11811	87.40	16970
0.10	1585	0.70	7256	17.60	11906	87.40	17256
0.20	1963	0.40	7541	28.90	12001	87.30	17731
0.50	2340	0.40	7824	62.30	12238	89.60	17922
0.80	2718	0.50	8201	70.40	12333	89.70	18017
0.90	3095	0.80	8442	85.70	12788	88.90	18302
0.50	3473	0.60	8765	87.80	13073	94.70	18493
0.10	3850	0.50	9051	89.60	13549	90.3	18683
0.60	4228	1.30	9334	91.70	13834	89.6	18873
2.20	4605	3.10	9608	89.90	14119	87.6	19158
1.30	4983	2.60	10089	91.00	14310	85.3	19253
1.00	5178	1.10	10467	88.00	14500	85.5	19285
0.80	5360	0.50	10844	88.50	14785		
0.80	5792	0.50	11222	89.90	15164		

By: *Mark A. Benson*

Subscribed and sworn to before me this _____ day of _____, 2016

Notary Public, Lea County, New Mexico

January 22, 2016

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

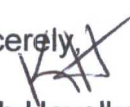
HOBBS OCD
SEP 12 2016
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Attn: Kanicia Castillo

RE: **Viking Helmet State Com No 002H**

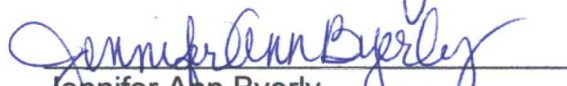
Please find enclosed a copy of the survey from 0' to 12,000' ran on the above referenced well.

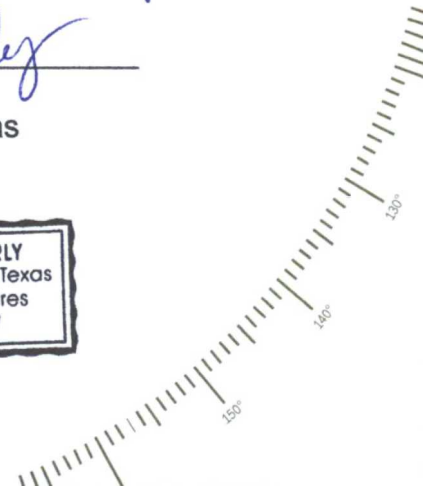
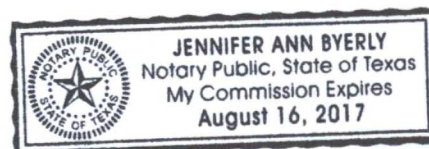
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 22 day of January
A.D., 2016, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho
Lease/Well: Viking Helmet State Com No/002H

Rig Name: McVay 8
State/County: New Mexico/Lea
VS-Azi: 179.51 Degrees
Latitude: 32.19511, Longitude: -103.38690
Grid North = True North -0.50 degs (NAD 27)
Grid Correction Applied = -0.50 degs



Depth Reference : RKB= 26ft

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ... helmet state com 2h-de_01.ut

Minimum Curvature Method

Report Date/Time: 1/22/2016 / 15:00

VES Survey International

Fort Worth, Texas

Office 817-741-3610

Surveyor: Gregg Wilson

Viking Helmet State Com No 002H / API 30-025-42783

HOBBS OCD
SEP 12 2016
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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	0.29	118.85	100.00	-0.12	0.22	0.13	0.26	118.85	0.29
200.00	0.91	148.32	199.99	-0.92	0.86	0.93	1.26	136.85	0.67
300.00	1.07	128.10	299.98	-2.18	2.02	2.19	2.97	137.14	0.38
400.00	1.14	125.50	399.96	-3.33	3.57	3.36	4.88	133.05	0.09
500.00	1.15	122.05	499.94	-4.45	5.23	4.49	6.87	130.35	0.07
600.00	1.11	122.96	599.92	-5.51	6.90	5.57	8.83	128.60	0.05
700.00	1.05	134.73	699.90	-6.68	8.36	6.75	10.70	128.61	0.23
800.00	0.87	129.11	799.89	-7.81	9.61	7.89	12.38	129.09	0.20
900.00	0.87	136.76	899.88	-8.84	10.72	8.93	13.89	129.51	0.12
1000.00	1.01	105.66	999.86	-9.63	12.09	9.73	15.45	128.54	0.52
1100.00	0.91	104.17	1099.85	-10.06	13.71	10.18	17.00	126.28	0.11
1200.00	0.70	88.67	1199.84	-10.24	15.09	10.37	18.24	124.16	0.30
1300.00	0.52	100.77	1299.84	-10.31	16.15	10.45	19.16	122.56	0.22
1400.00	0.38	126.99	1399.83	-10.60	16.86	10.74	19.91	122.15	0.24
1500.00	0.36	81.05	1499.83	-10.75	17.43	10.90	20.48	121.65	0.29
1600.00	0.02	159.57	1599.83	-10.71	17.75	10.86	20.73	121.12	0.36

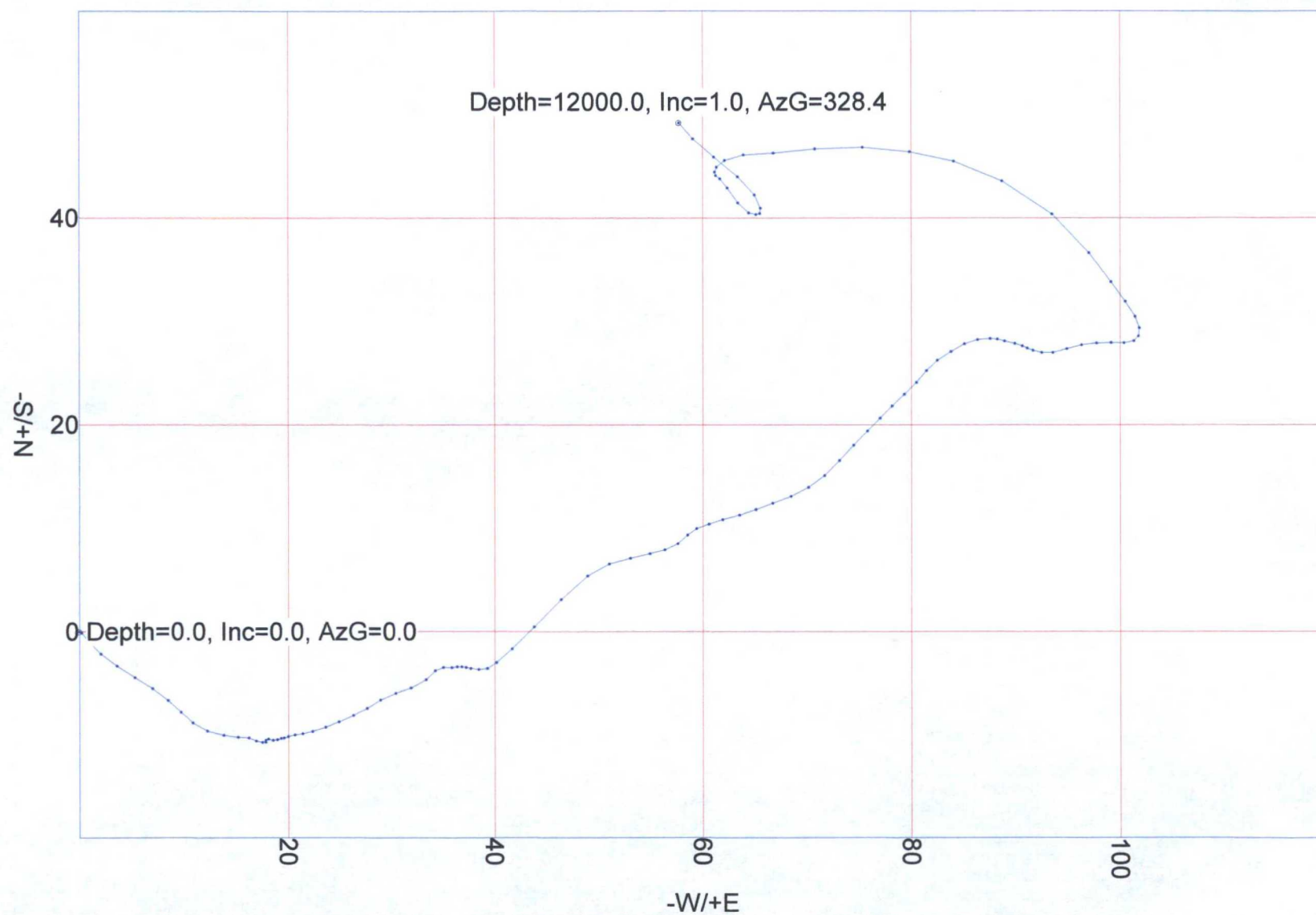
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1700.00	0.22	6.22	1699.83	-10.53	17.77	10.69	20.66	120.65	0.24
1800.00	0.28	104.75	1799.83	-10.40	18.03	10.56	20.82	119.98	0.39
1900.00	0.25	106.79	1899.83	-10.53	18.48	10.69	21.27	119.67	0.03
2000.00	0.26	58.80	1999.83	-10.48	18.89	10.64	21.60	119.01	0.21
2100.00	0.20	86.66	2099.83	-10.35	19.26	10.51	21.86	118.25	0.13
2200.00	0.14	72.89	2199.83	-10.30	19.54	10.47	22.09	117.79	0.07
2300.00	0.36	73.99	2299.82	-10.18	19.96	10.35	22.40	117.02	0.22
2400.00	0.42	77.61	2399.82	-10.01	20.61	10.19	22.92	115.91	0.07
2500.00	0.44	84.46	2499.82	-9.90	21.35	10.08	23.53	114.88	0.05
2600.00	0.73	74.07	2599.81	-9.69	22.34	9.88	24.35	113.45	0.31
2700.00	0.77	68.19	2699.81	-9.26	23.58	9.47	25.33	111.45	0.09
2800.00	0.86	68.65	2799.80	-8.74	24.90	8.95	26.39	109.35	0.08
2900.00	0.91	64.19	2899.78	-8.12	26.31	8.35	27.53	107.16	0.09
3000.00	0.79	61.34	2999.77	-7.45	27.63	7.68	28.62	105.08	0.13
3100.00	0.99	56.74	3099.76	-6.64	28.96	6.89	29.71	102.91	0.22
3200.00	0.86	75.92	3199.75	-5.98	30.42	6.24	31.00	101.12	0.33
3300.00	1.04	68.81	3299.73	-5.47	32.00	5.74	32.46	99.70	0.22
3400.00	0.82	49.16	3399.72	-4.67	33.39	4.96	33.71	97.96	0.39
3500.00	0.61	41.41	3499.71	-3.80	34.28	4.10	34.49	96.33	0.23
3600.00	0.51	101.51	3599.71	-3.49	35.07	3.79	35.24	95.69	0.57
3700.00	0.42	79.44	3699.71	-3.51	35.86	3.82	36.03	95.59	0.20
3800.00	0.19	83.20	3799.70	-3.43	36.38	3.74	36.55	95.38	0.23
3900.00	0.31	94.66	3899.70	-3.43	36.82	3.74	36.98	95.32	0.13
4000.00	0.17	101.02	3999.70	-3.48	37.24	3.80	37.40	95.34	0.15
4100.00	0.37	104.69	4099.70	-3.59	37.70	3.91	37.87	95.44	0.21
4200.00	0.51	92.20	4199.70	-3.69	38.46	4.02	38.64	95.48	0.17
4300.00	0.45	72.65	4299.69	-3.59	39.29	3.93	39.45	95.22	0.18
4400.00	0.80	47.77	4399.69	-3.00	40.18	3.35	40.29	94.27	0.44
4500.00	1.50	47.77	4499.67	-1.66	41.66	2.01	41.70	92.28	0.70
4600.00	1.95	43.43	4599.62	0.46	43.80	-0.08	43.80	89.40	0.47
4700.00	2.30	44.77	4699.55	3.12	46.39	-2.72	46.49	86.15	0.36
4800.00	1.62	53.10	4799.49	5.39	48.93	-4.98	49.23	83.71	0.74
4900.00	1.16	71.45	4899.47	6.56	51.01	-6.13	51.43	82.67	0.63
5000.00	1.26	78.17	4999.44	7.11	53.04	-6.65	53.52	82.37	0.18
5100.00	0.94	73.47	5099.42	7.57	54.91	-7.10	55.43	82.15	0.33
5200.00	0.75	77.71	5199.41	7.94	56.34	-7.46	56.89	81.98	0.20
5300.00	0.86	52.93	5299.40	8.53	57.58	-8.04	58.20	81.57	0.36
5400.00	0.59	42.92	5399.40	9.36	58.52	-8.85	59.26	80.92	0.30
5500.00	0.65	64.18	5499.39	9.98	59.38	-9.47	60.21	80.46	0.24

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	0.81	73.44	5599.38	10.43	60.57	-9.91	61.46	80.23	0.20
5700.00	0.80	71.31	5699.37	10.85	61.91	-10.32	62.85	80.06	0.03
5800.00	1.10	77.67	5799.36	11.28	63.51	-10.74	64.50	79.93	0.32
5900.00	0.84	62.45	5899.34	11.82	65.10	-11.27	66.16	79.71	0.37
6000.00	1.12	74.70	5999.33	12.42	66.69	-11.85	67.84	79.45	0.35
6100.00	1.05	63.17	6099.31	13.09	68.45	-12.51	69.69	79.17	0.23
6200.00	1.09	62.10	6199.29	13.95	70.11	-13.35	71.49	78.74	0.04
6300.00	1.14	45.74	6299.28	15.09	71.66	-14.48	73.24	78.11	0.32
6400.00	1.19	42.62	6399.26	16.55	73.08	-15.92	74.93	77.24	0.08
6500.00	1.12	43.34	6499.23	18.02	74.45	-17.39	76.60	76.39	0.06
6600.00	1.06	44.25	6599.22	19.40	75.77	-18.75	78.21	75.64	0.07
6700.00	0.95	44.08	6699.20	20.65	76.99	-19.99	79.71	74.98	0.11
6800.00	0.95	44.58	6799.19	21.83	78.14	-21.16	81.13	74.39	0.01
6900.00	0.92	47.61	6899.17	22.96	79.31	-22.28	82.57	73.85	0.06
7000.00	0.94	43.39	6999.16	24.10	80.47	-23.41	84.00	73.33	0.07
7100.00	0.80	35.72	7099.15	25.25	81.43	-24.56	85.26	72.77	0.18
7200.00	0.87	55.67	7199.14	26.24	82.46	-25.54	86.54	72.35	0.30
7300.00	0.92	58.42	7299.13	27.09	83.77	-26.37	88.04	72.08	0.07
7400.00	0.77	61.12	7399.12	27.84	85.04	-27.11	89.48	71.88	0.16
7500.00	0.81	81.98	7499.11	28.26	86.33	-27.52	90.84	71.87	0.29
7600.00	0.58	90.71	7599.10	28.35	87.53	-27.60	92.01	72.05	0.25
7700.00	0.22	109.13	7699.10	28.28	88.21	-27.53	92.64	72.22	0.38
7800.00	0.59	101.12	7799.09	28.12	88.90	-27.36	93.24	72.45	0.38
7900.00	0.58	106.97	7899.09	27.88	89.88	-27.11	94.11	72.77	0.06
8000.00	0.31	109.56	7999.09	27.64	90.62	-26.86	94.74	73.04	0.26
8100.00	0.26	120.09	8099.09	27.43	91.07	-26.65	95.12	73.24	0.08
8200.00	0.41	106.43	8199.08	27.22	91.61	-26.44	95.57	73.45	0.18
8300.00	0.59	103.39	8299.08	27.00	92.46	-26.21	96.33	73.72	0.18
8400.00	0.66	77.61	8399.07	27.00	93.53	-26.20	97.35	73.90	0.29
8500.00	0.91	73.49	8499.06	27.35	94.86	-26.54	98.72	73.92	0.26
8600.00	0.77	77.84	8599.05	27.72	96.28	-26.90	100.19	73.94	0.15
8700.00	0.89	86.73	8699.04	27.91	97.72	-27.07	101.62	74.06	0.17
8800.00	0.70	90.91	8799.03	27.94	99.10	-27.09	102.97	74.25	0.20
8900.00	0.74	91.78	8899.03	27.91	100.36	-27.05	104.17	74.46	0.04
9000.00	0.42	50.96	8999.02	28.12	101.28	-27.26	105.11	74.48	0.50
9100.00	0.33	37.06	9099.02	28.58	101.74	-27.71	105.68	74.31	0.12
9200.00	0.64	351.12	9199.02	29.37	101.83	-28.50	105.98	73.91	0.48
9300.00	0.74	328.20	9299.01	30.47	101.40	-29.60	105.88	73.27	0.29
9400.00	1.24	326.47	9398.99	31.92	100.47	-31.06	105.42	72.37	0.50

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	1.43	322.78	9498.97	33.82	99.11	-32.97	104.73	71.16	0.21
9600.00	2.61	322.98	9598.90	36.63	96.99	-35.80	103.67	69.31	1.18
9700.00	3.34	311.76	9698.77	40.38	93.45	-39.58	101.80	66.63	0.93
9800.00	3.31	295.77	9798.60	43.58	88.68	-42.82	98.81	63.83	0.92
9900.00	2.46	287.43	9898.47	45.48	84.03	-44.76	95.54	61.58	0.95
10000.00	2.51	277.13	9998.38	46.39	79.81	-45.71	92.32	59.83	0.45
10100.00	2.69	273.73	10098.28	46.81	75.31	-46.17	88.67	58.13	0.24
10200.00	2.59	261.94	10198.17	46.65	70.73	-46.04	84.73	56.59	0.55
10300.00	1.99	267.68	10298.09	46.26	66.76	-45.69	81.22	55.28	0.64
10400.00	1.29	264.30	10398.05	46.08	63.90	-45.53	78.78	54.20	0.71
10500.00	0.88	238.47	10498.03	45.57	62.13	-45.03	77.05	53.74	0.63
10600.00	0.34	209.00	10598.03	44.91	61.33	-44.38	76.02	53.79	0.61
10700.00	0.25	190.61	10698.03	44.44	61.15	-43.91	75.59	53.99	0.13
10800.00	0.21	129.09	10798.03	44.10	61.25	-43.58	75.48	54.24	0.24
10900.00	0.39	126.69	10898.02	43.78	61.67	-43.26	75.63	54.62	0.18
11000.00	0.91	147.15	10998.02	42.91	62.37	-42.38	75.71	55.47	0.57
11100.00	1.11	143.04	11098.00	41.47	63.39	-40.93	75.75	56.81	0.21
11200.00	0.56	112.85	11197.99	40.51	64.41	-39.96	76.09	57.83	0.69
11300.00	0.29	83.04	11297.99	40.35	65.11	-39.79	76.60	58.21	0.34
11400.00	0.16	65.24	11397.99	40.44	65.48	-39.88	76.97	58.30	0.15
11500.00	0.53	350.82	11497.99	40.95	65.54	-40.39	77.28	58.00	0.51
11600.00	1.09	329.45	11597.98	42.23	64.98	-41.67	77.49	56.98	0.63
11700.00	1.69	309.41	11697.95	43.99	63.35	-43.45	77.13	55.23	0.76
11800.00	1.70	310.77	11797.90	45.90	61.08	-45.37	76.40	53.08	0.04
11900.00	1.36	310.93	11897.87	47.65	59.06	-47.14	75.88	51.10	0.34
12000.00	1.00	328.36	11997.85	49.17	57.70	-48.67	75.81	49.56	0.50

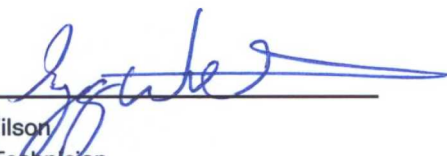


VES Survey International
Fort Worth, Texas
Office 817-741-3610
Surveyor: Gregg Wilson
Viking Helmet State Com No 002H / API 30-025-42783





I Gregg Wilson certify that I am employed by VES Survey International. That I did on the day(s) of 01/18/16 through 01/18/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 12,000.00 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 Viking Helmet State Com Well # 2H API # 30-025-42783 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.



Gregg Wilson
Service Technician
VES Survey International

HOBBS OCD

SEP 12 2016

RECEIVED



HOBBS OCD

SEP 12 2016

RECEIVED

COG Operating, LLC

Lea County, NM

Sec 29, T24-S, R35-E

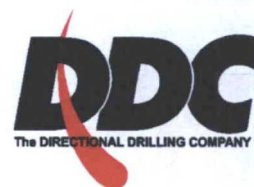
Viking Helmet State COM #2H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

05 February, 2016





DDC
Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State COM #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3346.0usft (McVay #8)
Site:	Sec 29, T24-S, R35-E	MD Reference:	Well @ 3346.0usft (McVay #8)
Well:	Viking Helmet State COM #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Lea County, NM		
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	Sec 29, T24-S, R35-E		
Site Position:		Northing:	435,988.30 usft
From:	Map	Easting:	792,772.40 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 11' 42.385 N
		Longitude:	103° 23' 12.837 W
		Grid Convergence:	0.50 °

Well	Viking Helmet State COM #2H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	3,346.0 usft
		Latitude:	32° 11' 42.385 N
		Longitude:	103° 23' 12.837 W
		Ground Level:	3,320.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	12/22/2015	7.03
			Dip Angle (°)
			60.09
			Field Strength (nT)
			48,094

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°)
			179.51

Survey Program	Date 2/5/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.0	11,800.0	Gyro (Wellbore #1)	Good_gyro
11,811.0	19,480.0	MWD (Wellbore #1)	MWD default
			Description
			Good Gyro
			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	435,988.30	792,772.40	32° 11' 42.385 N	103° 23' 12.837 W
100.0	0.29	118.85	100.0	-0.1	0.2	435,988.18	792,772.62	32° 11' 42.384 N	103° 23' 12.835 W
200.0	0.91	148.32	200.0	-0.9	0.9	435,987.38	792,773.26	32° 11' 42.376 N	103° 23' 12.827 W
300.0	1.07	128.10	300.0	-2.2	2.0	435,986.13	792,774.41	32° 11' 42.364 N	103° 23' 12.814 W
400.0	1.14	125.50	400.0	-3.3	3.6	435,984.97	792,775.95	32° 11' 42.352 N	103° 23' 12.796 W
500.0	1.15	122.05	499.9	-4.4	5.2	435,983.86	792,777.61	32° 11' 42.341 N	103° 23' 12.777 W
600.0	1.11	122.96	599.9	-5.5	6.9	435,982.80	792,779.28	32° 11' 42.330 N	103° 23' 12.758 W
700.0	1.05	134.73	699.9	-6.7	8.3	435,981.63	792,780.74	32° 11' 42.319 N	103° 23' 12.741 W
800.0	0.87	129.11	799.9	-7.8	9.6	435,980.51	792,781.98	32° 11' 42.307 N	103° 23' 12.726 W
900.0	0.87	136.76	899.9	-8.8	10.7	435,979.48	792,783.09	32° 11' 42.297 N	103° 23' 12.714 W
1,000.0	1.01	105.66	999.9	-9.6	12.1	435,978.69	792,784.46	32° 11' 42.289 N	103° 23' 12.698 W

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State COM #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3346.0usft (McVay #8)
Site:	Sec 29, T24-S, R35-E	MD Reference:	Well @ 3346.0usft (McVay #8)
Well:	Viking Helmet State COM #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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	0.91	104.17	1,099.9	-10.0	13.7	435,978.25	792,786.08	32° 11' 42.285 N	103° 23' 12.679 W
1,200.0	0.70	88.67	1,199.8	-10.2	15.1	435,978.07	792,787.46	32° 11' 42.283 N	103° 23' 12.663 W
1,300.0	0.52	100.77	1,299.8	-10.3	16.1	435,978.00	792,788.52	32° 11' 42.282 N	103° 23' 12.651 W
1,400.0	0.38	126.99	1,399.8	-10.6	16.8	435,977.72	792,789.23	32° 11' 42.279 N	103° 23' 12.642 W
1,500.0	0.36	81.05	1,499.8	-10.7	17.4	435,977.57	792,789.80	32° 11' 42.278 N	103° 23' 12.636 W
1,600.0	0.02	159.57	1,599.8	-10.7	17.7	435,977.60	792,790.12	32° 11' 42.278 N	103° 23' 12.632 W
1,700.0	0.22	6.22	1,699.8	-10.5	17.7	435,977.77	792,790.14	32° 11' 42.280 N	103° 23' 12.632 W
1,800.0	0.28	104.75	1,799.8	-10.4	18.0	435,977.90	792,790.40	32° 11' 42.281 N	103° 23' 12.629 W
1,900.0	0.25	106.79	1,899.8	-10.5	18.4	435,977.78	792,790.85	32° 11' 42.280 N	103° 23' 12.624 W
2,000.0	0.26	58.80	1,999.8	-10.5	18.9	435,977.83	792,791.25	32° 11' 42.280 N	103° 23' 12.619 W
2,100.0	0.20	86.66	2,099.8	-10.3	19.2	435,977.96	792,791.62	32° 11' 42.281 N	103° 23' 12.615 W
2,200.0	0.14	72.89	2,199.8	-10.3	19.5	435,978.01	792,791.91	32° 11' 42.282 N	103° 23' 12.611 W
2,300.0	0.36	73.99	2,299.8	-10.2	19.9	435,978.13	792,792.33	32° 11' 42.283 N	103° 23' 12.606 W
2,400.0	0.42	77.61	2,399.8	-10.0	20.6	435,978.29	792,792.99	32° 11' 42.284 N	103° 23' 12.599 W
2,500.0	0.44	84.46	2,499.8	-9.9	21.3	435,978.41	792,793.73	32° 11' 42.286 N	103° 23' 12.590 W
2,600.0	0.73	74.07	2,599.8	-9.7	22.3	435,978.62	792,794.72	32° 11' 42.288 N	103° 23' 12.578 W
2,700.0	0.77	68.19	2,699.8	-9.3	23.6	435,979.05	792,795.96	32° 11' 42.292 N	103° 23' 12.564 W
2,800.0	0.86	68.65	2,799.8	-8.7	24.9	435,979.57	792,797.28	32° 11' 42.297 N	103° 23' 12.548 W
2,900.0	0.91	64.19	2,899.8	-8.1	26.3	435,980.19	792,798.70	32° 11' 42.303 N	103° 23' 12.532 W
3,000.0	0.79	61.34	2,999.8	-7.4	27.6	435,980.86	792,800.02	32° 11' 42.309 N	103° 23' 12.517 W
3,100.0	0.99	56.74	3,099.8	-6.6	28.9	435,981.67	792,801.34	32° 11' 42.317 N	103° 23' 12.501 W
3,200.0	0.86	75.92	3,199.7	-6.0	30.4	435,982.33	792,802.79	32° 11' 42.324 N	103° 23' 12.484 W
3,300.0	1.04	68.81	3,299.7	-5.5	32.0	435,982.84	792,804.37	32° 11' 42.328 N	103° 23' 12.466 W
3,400.0	0.82	49.16	3,399.7	-4.7	33.4	435,983.63	792,805.75	32° 11' 42.336 N	103° 23' 12.449 W
3,500.0	0.61	41.41	3,499.7	-3.8	34.3	435,984.50	792,806.65	32° 11' 42.345 N	103° 23' 12.439 W
3,600.0	0.51	101.51	3,599.7	-3.5	35.0	435,984.81	792,807.44	32° 11' 42.348 N	103° 23' 12.430 W
3,700.0	0.42	79.44	3,699.7	-3.5	35.8	435,984.79	792,808.23	32° 11' 42.347 N	103° 23' 12.421 W
3,800.0	0.19	83.20	3,799.7	-3.4	36.4	435,984.87	792,808.76	32° 11' 42.348 N	103° 23' 12.414 W
3,900.0	0.31	94.66	3,899.7	-3.4	36.8	435,984.87	792,809.19	32° 11' 42.348 N	103° 23' 12.409 W
4,000.0	0.17	101.02	3,999.7	-3.5	37.2	435,984.82	792,809.61	32° 11' 42.348 N	103° 23' 12.405 W
4,100.0	0.37	104.69	4,099.7	-3.6	37.7	435,984.71	792,810.07	32° 11' 42.346 N	103° 23' 12.399 W
4,200.0	0.51	92.20	4,199.7	-3.7	38.4	435,984.61	792,810.82	32° 11' 42.345 N	103° 23' 12.390 W
4,300.0	0.45	72.65	4,299.7	-3.6	39.2	435,984.71	792,811.64	32° 11' 42.346 N	103° 23' 12.381 W
4,400.0	0.80	47.77	4,399.7	-3.0	40.1	435,985.30	792,812.53	32° 11' 42.352 N	103° 23' 12.370 W
4,500.0	1.50	47.77	4,499.7	-1.7	41.6	435,986.65	792,814.02	32° 11' 42.365 N	103° 23' 12.353 W
4,600.0	1.95	43.43	4,599.6	0.5	43.8	435,988.76	792,816.16	32° 11' 42.386 N	103° 23' 12.328 W
4,700.0	2.30	44.77	4,699.6	3.1	46.3	435,991.42	792,818.74	32° 11' 42.412 N	103° 23' 12.298 W
4,800.0	1.62	53.10	4,799.5	5.4	48.9	435,993.70	792,821.28	32° 11' 42.434 N	103° 23' 12.268 W
4,900.0	1.16	71.45	4,899.5	6.6	51.0	435,994.87	792,823.37	32° 11' 42.446 N	103° 23' 12.243 W
5,000.0	1.26	78.17	4,999.4	7.1	53.0	435,995.42	792,825.41	32° 11' 42.451 N	103° 23' 12.220 W
5,100.0	0.94	73.47	5,099.4	7.6	54.9	435,995.87	792,827.27	32° 11' 42.455 N	103° 23' 12.198 W
5,200.0	0.75	77.71	5,199.4	7.9	56.3	435,996.25	792,828.70	32° 11' 42.459 N	103° 23' 12.181 W
5,300.0	0.86	52.93	5,299.4	8.5	57.5	435,996.84	792,829.94	32° 11' 42.465 N	103° 23' 12.167 W
5,400.0	0.59	42.92	5,399.4	9.4	58.5	435,997.67	792,830.89	32° 11' 42.473 N	103° 23' 12.156 W
5,500.0	0.65	64.18	5,499.4	10.0	59.4	435,998.29	792,831.75	32° 11' 42.479 N	103° 23' 12.146 W
5,600.0	0.81	73.44	5,599.4	10.4	60.5	435,998.74	792,832.94	32° 11' 42.483 N	103° 23' 12.132 W
5,700.0	0.80	71.31	5,699.4	10.9	61.9	435,999.17	792,834.27	32° 11' 42.487 N	103° 23' 12.116 W
5,800.0	1.10	77.67	5,799.4	11.3	63.5	435,999.59	792,835.87	32° 11' 42.492 N	103° 23' 12.097 W
5,900.0	0.84	62.45	5,899.3	11.8	65.1	436,000.14	792,837.46	32° 11' 42.497 N	103° 23' 12.079 W
6,000.0	1.12	74.70	5,999.3	12.4	66.7	436,000.74	792,839.05	32° 11' 42.503 N	103° 23' 12.060 W
6,100.0	1.05	63.17	6,099.3	13.1	68.4	436,001.41	792,840.81	32° 11' 42.509 N	103° 23' 12.040 W
6,200.0	1.09	62.10	6,199.3	14.0	70.1	436,002.27	792,842.47	32° 11' 42.517 N	103° 23' 12.020 W
6,300.0	1.14	45.74	6,299.3	15.1	71.6	436,003.40	792,844.03	32° 11' 42.529 N	103° 23' 12.002 W
6,400.0	1.19	42.62	6,399.3	16.6	73.0	436,004.86	792,845.44	32° 11' 42.543 N	103° 23' 11.986 W
6,500.0	1.12	43.34	6,499.2	18.0	74.4	436,006.34	792,846.81	32° 11' 42.557 N	103° 23' 11.969 W

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State COM #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3346.0usft (McVay #8)
Site:	Sec 29, T24-S, R35-E	MD Reference:	Well @ 3346.0usft (McVay #8)
Well:	Viking Helmet State COM #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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	1.06	44.25	6,599.2	19.4	75.7	436,007.71	792,848.13	32° 11' 42.571 N	103° 23' 11.954 W
6,700.0	0.95	44.08	6,699.2	20.7	77.0	436,008.97	792,849.35	32° 11' 42.583 N	103° 23' 11.940 W
6,800.0	0.95	44.58	6,799.2	21.9	78.1	436,010.16	792,850.51	32° 11' 42.595 N	103° 23' 11.926 W
6,900.0	0.92	47.61	6,899.2	23.0	79.3	436,011.29	792,851.69	32° 11' 42.606 N	103° 23' 11.912 W
7,000.0	0.94	43.39	6,999.2	24.1	80.4	436,012.42	792,852.84	32° 11' 42.617 N	103° 23' 11.899 W
7,100.0	0.80	35.72	7,099.2	25.3	81.4	436,013.59	792,853.81	32° 11' 42.628 N	103° 23' 11.887 W
7,200.0	0.87	55.67	7,199.1	26.3	82.5	436,014.58	792,854.85	32° 11' 42.638 N	103° 23' 11.875 W
7,300.0	0.92	58.42	7,299.1	27.1	83.8	436,015.43	792,856.16	32° 11' 42.646 N	103° 23' 11.860 W
7,400.0	0.77	61.12	7,399.1	27.9	85.0	436,016.18	792,857.43	32° 11' 42.654 N	103° 23' 11.845 W
7,500.0	0.81	81.98	7,499.1	28.3	86.3	436,016.60	792,858.72	32° 11' 42.658 N	103° 23' 11.830 W
7,600.0	0.58	90.71	7,599.1	28.4	87.5	436,016.69	792,859.93	32° 11' 42.659 N	103° 23' 11.816 W
7,700.0	0.22	109.13	7,699.1	28.3	88.2	436,016.62	792,860.61	32° 11' 42.658 N	103° 23' 11.808 W
7,800.0	0.59	101.12	7,799.1	28.2	88.9	436,016.46	792,861.30	32° 11' 42.656 N	103° 23' 11.800 W
7,900.0	0.58	106.97	7,899.1	27.9	89.9	436,016.21	792,862.29	32° 11' 42.654 N	103° 23' 11.788 W
8,000.0	0.31	109.56	7,999.1	27.7	90.6	436,015.97	792,863.03	32° 11' 42.651 N	103° 23' 11.780 W
8,100.0	0.26	120.09	8,099.1	27.5	91.1	436,015.77	792,863.48	32° 11' 42.649 N	103° 23' 11.774 W
8,200.0	0.41	106.43	8,199.1	27.3	91.6	436,015.56	792,864.02	32° 11' 42.647 N	103° 23' 11.768 W
8,300.0	0.59	103.39	8,299.1	27.0	92.5	436,015.33	792,864.86	32° 11' 42.645 N	103° 23' 11.758 W
8,400.0	0.66	77.61	8,399.1	27.0	93.5	436,015.34	792,865.93	32° 11' 42.645 N	103° 23' 11.746 W
8,500.0	0.91	73.49	8,499.1	27.4	94.9	436,015.69	792,867.25	32° 11' 42.648 N	103° 23' 11.731 W
8,600.0	0.77	77.84	8,599.1	27.8	96.3	436,016.06	792,868.67	32° 11' 42.652 N	103° 23' 11.714 W
8,700.0	0.89	86.73	8,699.0	27.9	97.7	436,016.24	792,870.10	32° 11' 42.653 N	103° 23' 11.697 W
8,800.0	0.70	90.91	8,799.0	28.0	99.1	436,016.28	792,871.49	32° 11' 42.653 N	103° 23' 11.681 W
8,900.0	0.74	91.78	8,899.0	27.9	100.3	436,016.25	792,872.74	32° 11' 42.653 N	103° 23' 11.667 W
9,000.0	0.42	50.96	8,999.0	28.2	101.3	436,016.46	792,873.67	32° 11' 42.655 N	103° 23' 11.656 W
9,100.0	0.33	37.06	9,099.0	28.6	101.7	436,016.92	792,874.13	32° 11' 42.660 N	103° 23' 11.650 W
9,200.0	0.64	351.12	9,199.0	29.4	101.8	436,017.70	792,874.22	32° 11' 42.667 N	103° 23' 11.649 W
9,300.0	0.74	328.20	9,299.0	30.5	101.4	436,018.80	792,873.79	32° 11' 42.678 N	103° 23' 11.654 W
9,400.0	1.24	326.47	9,399.0	32.0	100.5	436,020.25	792,872.85	32° 11' 42.693 N	103° 23' 11.665 W
9,500.0	1.43	322.78	9,499.0	33.8	99.1	436,022.15	792,871.50	32° 11' 42.712 N	103° 23' 11.680 W
9,600.0	2.61	322.98	9,598.9	36.7	97.0	436,024.96	792,869.38	32° 11' 42.740 N	103° 23' 11.705 W
9,700.0	3.34	311.76	9,698.8	40.4	93.4	436,028.72	792,865.83	32° 11' 42.777 N	103° 23' 11.746 W
9,800.0	3.31	295.77	9,798.6	43.6	88.7	436,031.91	792,861.06	32° 11' 42.809 N	103° 23' 11.801 W
9,900.0	2.46	287.43	9,898.5	45.5	84.0	436,033.81	792,856.41	32° 11' 42.828 N	103° 23' 11.855 W
10,000.0	2.51	277.13	9,998.4	46.4	79.8	436,034.72	792,852.19	32° 11' 42.838 N	103° 23' 11.904 W
10,100.0	2.69	273.73	10,098.3	46.8	75.3	436,035.15	792,847.68	32° 11' 42.842 N	103° 23' 11.956 W
10,200.0	2.59	261.94	10,198.2	46.7	70.7	436,034.98	792,843.10	32° 11' 42.841 N	103° 23' 12.010 W
10,300.0	1.99	267.68	10,298.1	46.3	66.7	436,034.60	792,839.13	32° 11' 42.838 N	103° 23' 12.056 W
10,400.0	1.29	264.30	10,398.1	46.1	63.9	436,034.42	792,836.27	32° 11' 42.836 N	103° 23' 12.089 W
10,500.0	0.88	238.47	10,498.0	45.6	62.1	436,033.90	792,834.50	32° 11' 42.831 N	103° 23' 12.110 W
10,600.0	0.34	209.00	10,598.0	44.9	61.3	436,033.24	792,833.70	32° 11' 42.825 N	103° 23' 12.119 W
10,700.0	0.25	190.61	10,698.0	44.5	61.1	436,032.77	792,833.51	32° 11' 42.820 N	103° 23' 12.121 W
10,800.0	0.21	129.09	10,798.0	44.1	61.2	436,032.44	792,833.62	32° 11' 42.817 N	103° 23' 12.120 W
10,900.0	0.39	126.69	10,898.0	43.8	61.6	436,032.12	792,834.03	32° 11' 42.813 N	103° 23' 12.115 W
11,000.0	0.91	147.15	10,998.0	42.9	62.3	436,031.25	792,834.74	32° 11' 42.805 N	103° 23' 12.107 W
11,100.0	1.11	143.04	11,098.0	41.5	63.4	436,029.81	792,835.75	32° 11' 42.790 N	103° 23' 12.096 W
11,200.0	0.56	112.85	11,198.0	40.5	64.4	436,028.84	792,836.78	32° 11' 42.781 N	103° 23' 12.084 W
11,300.0	0.29	83.04	11,298.0	40.4	65.1	436,028.68	792,837.48	32° 11' 42.779 N	103° 23' 12.076 W
11,400.0	0.16	65.24	11,398.0	40.5	65.5	436,028.77	792,837.86	32° 11' 42.780 N	103° 23' 12.071 W
11,500.0	0.53	350.82	11,498.0	41.0	65.5	436,029.29	792,837.91	32° 11' 42.785 N	103° 23' 12.071 W
11,600.0	1.09	329.45	11,598.0	42.3	65.0	436,030.56	792,837.36	32° 11' 42.798 N	103° 23' 12.077 W
11,700.0	1.69	309.41	11,697.9	44.0	63.3	436,032.32	792,835.73	32° 11' 42.815 N	103° 23' 12.096 W
11,800.0	1.70	310.77	11,797.9	45.9	61.1	436,034.22	792,833.47	32° 11' 42.834 N	103° 23' 12.122 W
Tie in @ 11800' MD / 11797' TVD									
11,811.0	4.20	217.10	11,808.9	45.7	60.7	436,034.01	792,833.10	32° 11' 42.832 N	103° 23' 12.126 W

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State COM #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3346.0usft (McVay #8)
Site:	Sec 29, T24-S, R35-E	MD Reference:	Well @ 3346.0usft (McVay #8)
Well:	Viking Helmet State COM #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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
11,858.0	12.30	208.70	11,855.4	39.9	57.3	436,028.23	792,829.66	32° 11' 42.775 N	103° 23' 12.167 W
11,906.0	17.60	206.60	11,901.7	29.0	51.5	436,017.25	792,823.95	32° 11' 42.667 N	103° 23' 12.234 W
11,953.0	22.70	197.40	11,945.8	13.9	45.7	436,002.23	792,818.05	32° 11' 42.519 N	103° 23' 12.305 W
12,001.0	29.20	182.60	11,989.0	-6.6	42.3	435,981.65	792,814.74	32° 11' 42.316 N	103° 23' 12.345 W
12,048.0	34.70	176.00	12,028.9	-31.5	42.8	435,956.83	792,815.15	32° 11' 42.070 N	103° 23' 12.343 W
12,096.0	38.50	177.40	12,067.4	-60.0	44.4	435,928.26	792,816.79	32° 11' 41.787 N	103° 23' 12.327 W
12,143.0	43.10	177.40	12,103.0	-90.7	45.8	435,897.59	792,818.18	32° 11' 41.484 N	103° 23' 12.314 W
12,191.0	52.80	178.10	12,135.1	-126.3	47.2	435,862.02	792,819.56	32° 11' 41.132 N	103° 23' 12.301 W
12,207.3	56.09	178.73	12,144.6	-139.5	47.5	435,848.77	792,819.92	32° 11' 41.000 N	103° 23' 12.298 W
Crossed 330' Hardline @ 12207' MD / 12145' TVD									
12,238.0	62.30	179.80	12,160.3	-165.9	47.9	435,822.41	792,820.25	32° 11' 40.740 N	103° 23' 12.297 W
12,286.0	66.00	179.80	12,181.2	-209.1	48.0	435,779.22	792,820.41	32° 11' 40.312 N	103° 23' 12.300 W
12,333.0	70.40	180.90	12,198.7	-252.7	47.7	435,735.60	792,820.13	32° 11' 39.881 N	103° 23' 12.308 W
12,359.0	71.60	181.30	12,207.1	-277.3	47.3	435,711.02	792,819.66	32° 11' 39.637 N	103° 23' 12.316 W
12,407.0	75.30	183.00	12,220.8	-323.3	45.5	435,665.05	792,817.93	32° 11' 39.183 N	103° 23' 12.340 W
12,454.0	77.20	182.60	12,232.0	-368.8	43.3	435,619.45	792,815.70	32° 11' 38.732 N	103° 23' 12.371 W
12,502.0	82.70	181.30	12,240.4	-416.1	41.7	435,572.24	792,814.10	32° 11' 38.265 N	103° 23' 12.395 W
12,549.0	83.10	180.90	12,246.2	-462.7	40.8	435,525.60	792,813.20	32° 11' 37.803 N	103° 23' 12.410 W
12,597.0	83.40	180.90	12,251.8	-510.4	40.1	435,477.94	792,812.45	32° 11' 37.332 N	103° 23' 12.423 W
12,644.0	83.40	180.90	12,257.2	-557.0	39.3	435,431.26	792,811.72	32° 11' 36.870 N	103° 23' 12.437 W
12,692.0	83.60	180.90	12,262.6	-604.7	38.6	435,383.58	792,810.97	32° 11' 36.398 N	103° 23' 12.450 W
12,788.0	85.70	180.20	12,271.6	-700.3	37.7	435,288.00	792,810.05	32° 11' 35.453 N	103° 23' 12.471 W
12,883.0	87.80	181.30	12,277.0	-795.1	36.4	435,193.17	792,808.81	32° 11' 34.514 N	103° 23' 12.495 W
12,978.0	88.00	180.90	12,280.5	-890.0	34.6	435,098.25	792,806.99	32° 11' 33.575 N	103° 23' 12.526 W
13,073.0	87.80	180.90	12,283.9	-985.0	33.1	435,003.33	792,805.50	32° 11' 32.636 N	103° 23' 12.553 W
13,168.0	87.40	180.90	12,287.9	-1,079.9	31.6	434,908.42	792,804.01	32° 11' 31.697 N	103° 23' 12.580 W
13,263.0	89.60	180.50	12,290.4	-1,174.8	30.4	434,813.47	792,802.85	32° 11' 30.758 N	103° 23' 12.603 W
13,358.0	88.30	180.20	12,292.2	-1,269.8	29.9	434,718.49	792,802.27	32° 11' 29.818 N	103° 23' 12.620 W
13,454.0	88.50	180.20	12,294.8	-1,365.8	29.5	434,622.53	792,801.93	32° 11' 28.868 N	103° 23' 12.633 W
13,549.0	89.60	180.50	12,296.4	-1,460.8	29.0	434,527.54	792,801.35	32° 11' 27.928 N	103° 23' 12.650 W
13,644.0	87.60	178.80	12,298.7	-1,555.7	29.5	434,432.58	792,801.93	32° 11' 26.989 N	103° 23' 12.653 W
13,739.0	91.30	178.10	12,299.6	-1,650.7	32.1	434,337.64	792,804.50	32° 11' 26.049 N	103° 23' 12.633 W
13,834.0	91.70	178.40	12,297.2	-1,745.6	35.0	434,242.72	792,807.40	32° 11' 25.110 N	103° 23' 12.609 W
13,929.0	92.00	178.80	12,294.1	-1,840.5	37.3	434,147.79	792,809.72	32° 11' 24.170 N	103° 23' 12.591 W
14,024.0	91.50	181.30	12,291.2	-1,935.5	37.2	434,052.85	792,809.64	32° 11' 23.231 N	103° 23' 12.602 W
14,119.0	89.90	180.50	12,290.0	-2,030.4	35.7	433,957.87	792,808.14	32° 11' 22.291 N	103° 23' 12.629 W
14,215.0	89.90	181.30	12,290.2	-2,126.4	34.2	433,861.88	792,806.64	32° 11' 21.341 N	103° 23' 12.657 W
14,310.0	91.00	181.60	12,289.4	-2,221.4	31.8	433,766.92	792,804.23	32° 11' 20.402 N	103° 23' 12.694 W
14,405.0	86.40	180.90	12,291.6	-2,316.3	29.8	433,671.99	792,802.16	32° 11' 19.463 N	103° 23' 12.728 W
14,500.0	88.00	180.90	12,296.2	-2,411.2	28.3	433,577.12	792,800.67	32° 11' 18.524 N	103° 23' 12.755 W
14,595.0	88.50	181.90	12,299.1	-2,506.1	26.0	433,482.19	792,798.35	32° 11' 17.585 N	103° 23' 12.792 W
14,690.0	88.30	182.60	12,301.8	-2,601.0	22.2	433,387.30	792,794.62	32° 11' 16.646 N	103° 23' 12.845 W
14,785.0	88.50	179.50	12,304.4	-2,695.9	20.5	433,292.37	792,792.88	32° 11' 15.707 N	103° 23' 12.875 W
14,879.0	89.20	179.80	12,306.3	-2,789.9	21.1	433,198.39	792,793.46	32° 11' 14.777 N	103° 23' 12.878 W
14,974.0	88.70	179.10	12,308.1	-2,884.9	22.0	433,103.41	792,794.37	32° 11' 13.837 N	103° 23' 12.877 W
15,069.0	88.90	178.80	12,310.1	-2,979.9	23.7	433,008.45	792,796.11	32° 11' 12.897 N	103° 23' 12.866 W
15,164.0	89.90	178.80	12,311.1	-3,074.8	25.7	432,913.47	792,798.10	32° 11' 11.957 N	103° 23' 12.853 W
15,259.0	89.40	178.80	12,311.6	-3,169.8	27.7	432,818.50	792,800.09	32° 11' 11.017 N	103° 23' 12.840 W
15,354.0	87.60	181.30	12,314.1	-3,264.8	27.6	432,723.54	792,800.01	32° 11' 10.078 N	103° 23' 12.850 W
15,449.0	87.80	181.30	12,317.9	-3,359.7	25.5	432,628.64	792,797.85	32° 11' 9.139 N	103° 23' 12.885 W
15,545.0	86.40	179.50	12,322.8	-3,455.5	24.8	432,532.77	792,797.18	32° 11' 8.190 N	103° 23' 12.903 W
15,640.0	82.50	178.10	12,332.0	-3,550.0	26.8	432,438.26	792,799.16	32° 11' 7.255 N	103° 23' 12.889 W
15,735.0	85.00	179.80	12,342.3	-3,644.4	28.5	432,343.85	792,800.88	32° 11' 6.321 N	103° 23' 12.879 W
15,830.0	89.20	180.90	12,347.1	-3,739.3	27.9	432,249.00	792,800.30	32° 11' 5.382 N	103° 23' 12.895 W
15,925.0	91.00	181.90	12,347.0	-3,834.3	25.6	432,154.03	792,797.98	32° 11' 4.443 N	103° 23' 12.932 W

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State COM #2H
Project:	Lea County, NM	TVD Reference:	Well @ 3346.0usft (McVay #8)
Site:	Sec 29, T24-S, R35-E	MD Reference:	Well @ 3346.0usft (McVay #8)
Well:	Viking Helmet State COM #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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
16,020.0	85.30	181.60	12,350.0	-3,929.1	22.7	432,059.16	792,795.08	32° 11' 3.504 N	103° 23' 12.976 W
16,115.0	84.80	180.90	12,358.2	-4,023.8	20.6	431,964.54	792,793.02	32° 11' 2.568 N	103° 23' 13.009 W
16,210.0	87.10	179.50	12,364.9	-4,118.5	20.3	431,869.79	792,792.69	32° 11' 1.631 N	103° 23' 13.023 W
16,305.0	87.40	179.10	12,369.5	-4,213.4	21.5	431,774.91	792,793.85	32° 11' 0.692 N	103° 23' 13.019 W
16,400.0	87.60	179.10	12,373.6	-4,308.3	22.9	431,680.01	792,795.34	32° 10' 59.752 N	103° 23' 13.011 W
16,495.0	87.10	178.40	12,378.0	-4,403.2	25.0	431,585.13	792,797.41	32° 10' 58.813 N	103° 23' 12.997 W
16,590.0	89.60	180.50	12,380.8	-4,498.1	25.9	431,490.19	792,798.32	32° 10' 57.874 N	103° 23' 12.996 W
16,686.0	92.40	182.30	12,379.1	-4,594.1	23.6	431,394.25	792,795.98	32° 10' 56.925 N	103° 23' 13.033 W
16,780.0	91.10	181.60	12,376.2	-4,688.0	20.4	431,300.35	792,792.78	32° 10' 55.996 N	103° 23' 13.080 W
16,875.0	88.00	179.80	12,377.0	-4,782.9	19.2	431,205.37	792,791.62	32° 10' 55.056 N	103° 23' 13.103 W
16,970.0	87.40	179.10	12,380.8	-4,877.8	20.1	431,110.45	792,792.53	32° 10' 54.117 N	103° 23' 13.102 W
17,066.0	86.70	179.80	12,385.7	-4,973.7	21.1	431,014.59	792,793.45	32° 10' 53.168 N	103° 23' 13.101 W
17,161.0	85.20	179.10	12,392.4	-5,068.5	22.0	430,919.83	792,794.36	32° 10' 52.230 N	103° 23' 13.101 W
17,256.0	86.90	179.10	12,399.0	-5,163.2	23.4	430,825.07	792,795.85	32° 10' 51.293 N	103° 23' 13.093 W
17,351.0	87.40	178.40	12,403.7	-5,258.1	25.5	430,730.21	792,797.92	32° 10' 50.354 N	103° 23' 13.079 W
17,446.0	87.80	179.50	12,407.7	-5,353.0	27.3	430,635.32	792,799.66	32° 10' 49.415 N	103° 23' 13.068 W
17,541.0	87.60	181.90	12,411.5	-5,447.9	26.1	430,540.41	792,798.50	32° 10' 48.476 N	103° 23' 13.091 W
17,636.0	86.00	181.30	12,416.8	-5,542.7	23.5	430,445.59	792,795.85	32° 10' 47.538 N	103° 23' 13.132 W
17,731.0	87.30	180.90	12,422.3	-5,637.5	21.6	430,350.78	792,794.03	32° 10' 46.600 N	103° 23' 13.163 W
17,827.0	85.20	179.50	12,428.6	-5,733.3	21.3	430,254.99	792,793.69	32° 10' 45.652 N	103° 23' 13.176 W
17,922.0	86.60	179.10	12,435.4	-5,828.1	22.5	430,160.24	792,794.85	32° 10' 44.714 N	103° 23' 13.173 W
18,017.0	89.70	179.50	12,438.5	-5,923.0	23.6	430,065.31	792,796.01	32° 10' 43.775 N	103° 23' 13.169 W
18,112.0	87.30	178.80	12,441.0	-6,017.9	25.0	429,970.36	792,797.42	32° 10' 42.835 N	103° 23' 13.162 W
18,207.0	89.60	179.80	12,443.5	-6,112.9	26.2	429,875.41	792,798.58	32° 10' 41.895 N	103° 23' 13.158 W
18,302.0	88.90	180.50	12,444.8	-6,207.9	25.9	429,780.42	792,798.33	32° 10' 40.956 N	103° 23' 13.171 W
18,397.0	92.90	180.50	12,443.3	-6,302.8	25.1	429,685.46	792,797.50	32° 10' 40.016 N	103° 23' 13.190 W
18,493.0	94.70	180.20	12,436.9	-6,398.6	24.5	429,589.67	792,796.91	32° 10' 39.068 N	103° 23' 13.207 W
18,588.0	93.30	177.70	12,430.3	-6,493.4	26.3	429,494.93	792,798.65	32° 10' 38.131 N	103° 23' 13.196 W
18,683.0	90.30	175.60	12,427.3	-6,588.1	31.8	429,400.16	792,804.20	32° 10' 37.192 N	103° 23' 13.142 W
18,778.0	87.60	176.30	12,429.1	-6,682.9	38.5	429,305.42	792,810.91	32° 10' 36.254 N	103° 23' 13.073 W
18,873.0	89.60	174.60	12,431.4	-6,777.5	46.0	429,210.75	792,818.44	32° 10' 35.317 N	103° 23' 12.995 W
18,968.0	88.90	176.70	12,432.6	-6,872.3	53.3	429,116.04	792,825.65	32° 10' 34.379 N	103° 23' 12.921 W
19,063.0	91.50	177.70	12,432.3	-6,967.1	57.9	429,021.16	792,830.29	32° 10' 33.440 N	103° 23' 12.877 W
19,158.0	87.60	176.30	12,433.0	-7,062.0	62.9	428,926.32	792,835.26	32° 10' 32.501 N	103° 23' 12.829 W
19,253.0	85.30	176.00	12,438.9	-7,156.6	69.2	428,831.72	792,841.63	32° 10' 31.564 N	103° 23' 12.764 W
19,285.0	85.50	176.30	12,441.5	-7,188.4	71.4	428,799.90	792,843.77	32° 10' 31.249 N	103° 23' 12.743 W
19,480.0	85.50	176.30	12,456.8	-7,382.4	83.9	428,605.90	792,856.31	32° 10' 29.328 N	103° 23' 12.617 W
TD @ 19480' MD / 12456' TVD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,800.0	11,797.9	45.9	61.1	Tie In @ 11800' MD / 11797' TVD
12,207.3	12,144.6	-139.5	47.5	Crossed 330' Hardline @ 12207' MD / 12145' TVD
19,480.0	12,456.8	-7,382.4	83.9	TD @ 19480' MD / 12456' TVD

Checked By: _____ Approved By: _____ Date: _____