

M OIL CONSERVATION
ARTESIA DISTRICT

JUL 18 2016

PATRIOT DRILLING, LLC RECEIVED

OPERATOR: COG Operating, LLC
WELL/LEASE: Chopper State Cont #3H
COUNTY: Eddy Co., New Mexico
Sec. 1, T 24S, R 27E

30-015-43418

STATE OF NEW MEXICO
DEVIATION REPORT

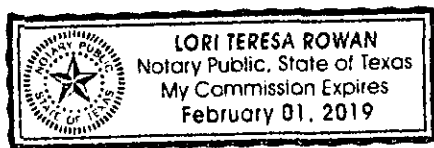
<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
400	1/2	4,549	0
798	1 1/2	4,958	1/4
1,013	1/2	5,571	1/2
1,574	3/4	5,959	1/4
2,079	1	6,500	1 3/4
2,514	1/4	7,030	1
2,955	1/4	7,454	2
3,563	1/4	8,079	1 3/4
4,132	1/4	8,420	3/4

Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 7th 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



February 24, 2016

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

NM OIL CONSERVATION
ARTESIA DISTRICT
JUL 18 2016
RECEIVED

Attn: Kanicia Castillo

RE: Chopper State Com No 003H

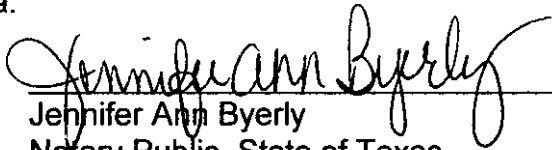
Please find enclosed a copy of the survey from 0' to 8832' ran on the above referenced well.

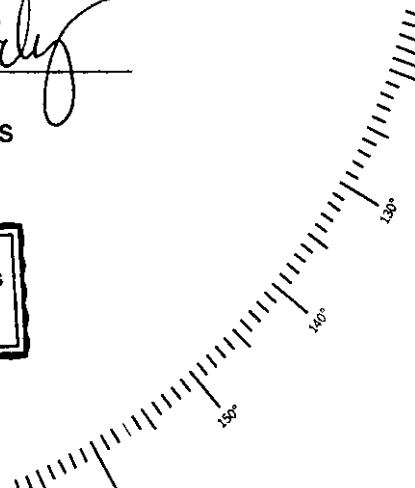
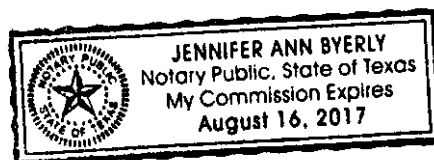
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 24th day of
February, A.D., 2016, by Keith Havelka.

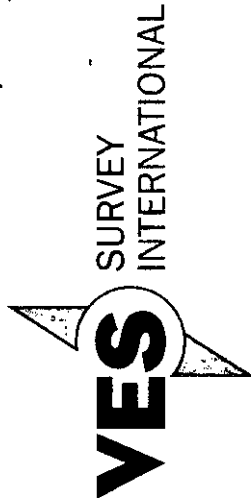

Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho

Lease/Well: Chopper State Com No/003H



Rig Name: Patriot 6

State/County: New Mexico/Eddy

VS-Azi: 180.20 Degrees

Latitude: 32.25352, Longitude: -104.14647

Grid North = True North -0.10 degs (NAD 27)

Grid Correction Applied = -0.10 degs

Depth Reference : RKB = 18 feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut

Minimum Curvature Method

Report Date/Time: 2/24/2016 / 15:31

VES Survey International

Midland, Texas

432-563-5444

Surveyor: Adam Askew

Chopper State Com No 003H / API 30-015-43418

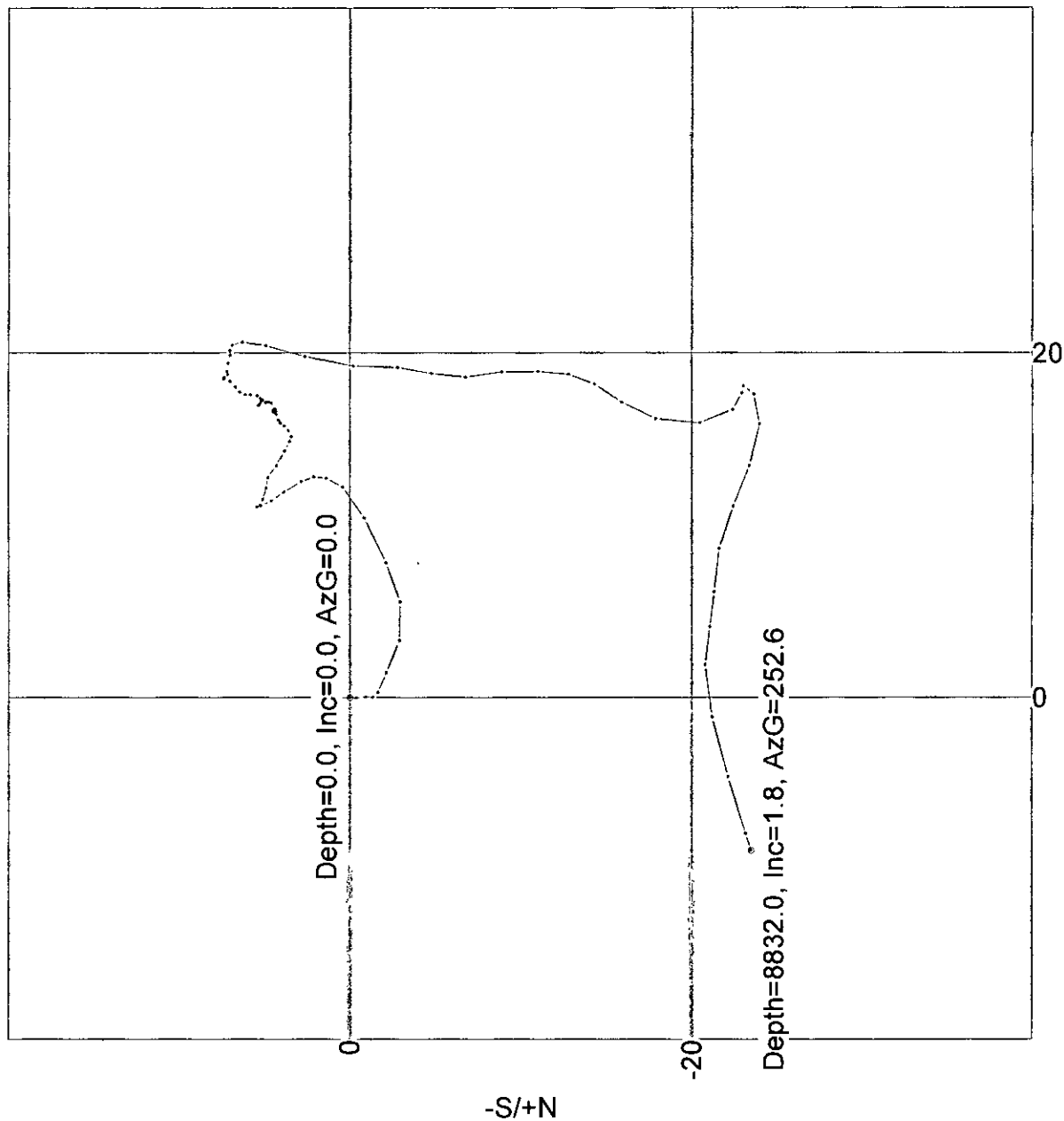
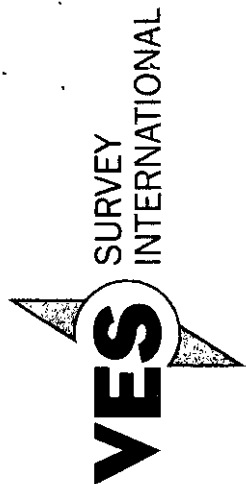
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.41	185.30	100.00	-0.36	-0.03	0.36	0.36	185.30	0.41
200.00	0.26	154.09	200.00	-0.92	0.03	0.92	0.92	178.07	0.24
300.00	0.26	211.72	300.00	-1.31	0.01	1.31	1.31	179.69	0.25
400.00	0.48	107.76	400.00	-1.64	0.29	1.64	1.66	170.03	0.61
500.00	0.94	115.23	499.99	-2.12	1.44	2.11	2.56	145.88	0.47
600.00	1.39	110.44	599.97	-2.89	3.32	2.88	4.40	131.11	0.45
700.00	1.33	70.51	699.94	-2.93	5.54	2.91	6.27	117.87	0.93
800.00	1.45	69.68	799.91	-2.10	7.82	2.08	8.09	105.07	0.12
900.00	1.88	59.21	899.87	-0.83	10.41	0.79	10.44	94.55	0.52
1000.00	0.68	44.17	999.84	0.43	12.22	-0.48	12.23	87.97	1.24
1100.00	0.62	8.83	1099.84	1.40	12.72	-1.44	12.79	83.74	0.40
1200.00	0.19	359.76	1199.83	2.10	12.80	-2.15	12.97	80.67	0.43
1300.00	0.73	334.37	1299.83	2.85	12.52	-2.89	12.84	77.20	0.56
1400.00	0.62	323.19	1399.82	3.86	11.92	-3.90	12.53	72.08	0.17
1500.00	0.40	330.90	1499.82	4.60	11.43	-4.64	12.32	68.08	0.23
1600.00	0.39	339.54	1599.82	5.22	11.14	-5.26	12.30	64.89	0.06

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	0.13	155.74	1699.82	5.44	11.07	-5.47	12.33	63.84	0.51
1800.00	0.52	121.07	1799.81	5.10	11.50	-5.14	12.58	66.08	0.42
1900.00	0.31	83.01	1899.81	4.90	12.16	-4.94	13.11	68.05	0.34
2000.00	0.41	111.20	1999.81	4.80	12.76	-4.85	13.63	69.38	0.20
2100.00	0.60	135.20	2099.81	4.30	13.46	-4.35	14.13	72.29	0.28
2200.00	0.56	103.67	2199.80	3.81	14.31	-3.86	14.81	75.08	0.32
2300.00	0.20	152.98	2299.80	3.54	14.86	-3.59	15.28	76.60	0.45
2400.00	0.24	75.10	2399.80	3.44	15.14	-3.49	15.53	77.21	0.28
2500.00	0.20	50.76	2499.80	3.60	15.48	-3.66	15.90	76.90	0.10
2600.00	0.23	49.50	2599.80	3.85	15.77	-3.90	16.24	76.30	0.03
2700.00	0.11	359.58	2699.80	4.07	15.93	-4.13	16.44	75.65	0.18
2800.00	0.19	85.13	2799.80	4.19	16.09	-4.24	16.63	75.42	0.21
2900.00	0.23	52.78	2899.80	4.32	16.42	-4.38	16.98	75.26	0.12
3000.00	0.08	16.56	2999.80	4.51	16.60	-4.56	17.20	74.81	0.17
3100.00	0.14	213.23	3099.80	4.47	16.55	-4.53	17.15	74.89	0.21
3200.00	0.17	47.31	3199.80	4.47	16.60	-4.53	17.19	74.92	0.30
3300.00	0.13	197.08	3299.80	4.46	16.67	-4.52	17.26	75.02	0.29
3400.00	0.13	355.99	3399.80	4.47	16.63	-4.52	17.22	74.97	0.26
3500.00	0.16	165.28	3499.80	4.45	16.66	-4.51	17.24	75.04	0.29
3600.00	0.07	278.01	3599.79	4.33	16.63	-4.39	17.18	75.41	0.20
3700.00	0.21	81.33	3699.79	4.36	16.74	-4.42	17.30	75.39	0.28
3800.00	0.29	37.83	3799.79	4.59	17.08	-4.65	17.69	74.96	0.20
3900.00	0.10	263.16	3899.79	4.78	17.15	-4.84	17.80	74.44	0.36
4000.00	0.19	15.92	3999.79	4.93	17.11	-4.99	17.81	73.94	0.24
4100.00	0.12	71.34	4099.79	5.12	17.26	-5.18	18.00	73.48	0.16
4200.00	0.15	268.98	4199.79	5.15	17.22	-5.21	17.98	73.35	0.27
4300.00	0.19	330.38	4299.79	5.29	17.01	-5.35	17.81	72.72	0.18
4400.00	0.09	180.20	4399.79	5.35	16.93	-5.41	17.75	72.45	0.27
4500.00	0.18	102.43	4499.79	5.24	17.08	-5.30	17.87	72.95	0.19
4600.00	0.16	78.15	4599.79	5.23	17.37	-5.29	18.14	73.23	0.08
4700.00	0.20	6.54	4699.79	5.43	17.52	-5.49	18.34	72.77	0.21
4800.00	0.23	7.88	4799.79	5.80	17.57	-5.86	18.50	71.73	0.03
4900.00	0.15	351.95	4899.79	6.12	17.58	-6.18	18.61	70.79	0.09
5000.00	0.28	39.40	4999.79	6.44	17.71	-6.50	18.85	70.03	0.21
5100.00	0.19	64.22	5099.79	6.70	18.02	-6.76	19.22	69.60	0.14
5200.00	0.35	36.18	5199.79	7.01	18.34	-7.08	19.64	69.07	0.20
5300.00	0.17	344.27	5299.79	7.40	18.48	-7.46	19.91	68.18	0.28
5400.00	0.26	145.21	5399.79	7.35	18.57	-7.42	19.98	68.40	0.42
5500.00	0.05	115.27	5499.79	7.15	18.74	-7.22	20.06	69.12	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	0.16	67.73	5599.79	7.18	18.91	-7.25	20.23	69.20	0.13
5700.00	0.44	107.62	5699.78	7.12	19.40	-7.19	20.66	69.85	0.33
5800.00	0.11	85.57	5799.78	7.01	19.85	-7.08	21.06	70.55	0.34
5900.00	0.21	88.97	5899.78	7.02	20.13	-7.09	21.32	70.77	0.10
6000.00	0.23	138.22	5999.78	6.88	20.44	-6.95	21.57	71.41	0.18
6100.00	0.51	175.09	6099.78	6.28	20.61	-6.36	21.55	73.05	0.36
6200.00	1.09	194.24	6199.77	4.92	20.42	-4.99	21.00	76.46	0.63
6300.00	1.62	196.35	6299.74	2.64	19.78	-2.71	19.96	82.41	0.53
6400.00	1.68	185.64	6399.70	-0.18	19.24	0.11	19.24	90.53	0.31
6500.00	1.30	177.31	6499.67	-2.77	19.15	2.70	19.35	98.23	0.44
6600.00	1.08	205.67	6599.65	-4.75	18.80	4.69	19.39	104.20	0.62
6700.00	1.32	170.06	6699.63	-6.74	18.59	6.67	19.77	109.93	0.77
6800.00	1.15	173.83	6799.60	-8.87	18.89	8.81	20.87	115.16	0.19
6900.00	1.28	184.45	6899.58	-10.99	18.91	10.92	21.87	120.15	0.26
7000.00	0.79	187.08	6999.56	-12.79	18.74	12.72	22.69	124.30	0.49
7100.00	1.08	209.59	7099.55	-14.29	18.19	14.23	23.13	128.16	0.47
7200.00	1.10	217.28	7199.53	-15.88	17.14	15.82	23.37	132.81	0.15
7300.00	1.50	197.88	7299.51	-17.89	16.16	17.83	24.10	137.90	0.59
7400.00	1.54	172.53	7399.47	-20.46	15.93	20.40	25.93	142.09	0.67
7500.00	0.99	135.07	7499.45	-22.40	16.71	22.34	27.95	143.27	0.96
7600.00	0.42	78.47	7599.44	-22.93	17.68	22.87	28.96	142.38	0.83
7700.00	0.21	161.12	7699.44	-23.03	18.09	22.97	29.29	141.86	0.44
7800.00	0.80	231.25	7799.44	-23.65	17.60	23.59	29.48	143.33	0.76
7900.00	1.38	275.74	7899.42	-23.97	15.86	23.91	28.74	146.51	0.98
8000.00	1.47	290.93	7999.39	-23.39	13.46	23.34	26.98	150.08	0.39
8100.00	1.45	293.39	8099.36	-22.43	11.10	22.39	25.02	153.66	0.07
8200.00	1.52	284.14	8199.32	-21.60	8.65	21.57	23.27	158.17	0.25
8300.00	1.39	268.47	8299.29	-21.31	6.15	21.29	22.18	163.89	0.42
8400.00	1.02	288.14	8399.27	-21.06	4.10	21.05	21.46	169.00	0.55
8500.00	1.54	269.73	8499.25	-20.79	1.91	20.78	20.88	174.76	0.66
8600.00	1.99	256.98	8599.20	-21.19	-1.13	21.19	21.22	183.05	0.60
8700.00	2.13	253.18	8699.13	-22.12	-4.60	22.13	22.59	191.75	0.19
8800.00	1.84	251.43	8799.07	-23.17	-7.90	23.19	24.48	198.82	0.29
8932.00	1.81	252.64	8831.06	-23.48	-8.87	23.51	25.10	200.69	0.15



VES Survey International
Midland, Texas
432-563-5444
Surveyor: Adam Askew
Chopper State Com No 003H / API 30-015-43418



-W/+E

VES Survey Date: 2/18/2016



I Adam Askew certify that I am employed by VES Survey International. That I did on the day(s) of 02/18/16 through 02/18/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 8,832.00 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 Chopper State Com Well # 3H API # 30-015-43418 in Eddy 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 Vaughn Energy Services

A handwritten signature in black ink, appearing to read "Adam Askew", is written over a horizontal line.

Adam Askew
Service Technician
Vaughn Energy Services

COG Operating LLC

Eddy County, NM (NAD 27 NME)

Chopper State Com

#3H

OH

Design: OH

Survey Report - Geographic

04 March, 2016

IDS

Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Chopper State Com
Project:	Eddy County, NM (NAD 27 NME)	TVD Reference:	WELL @ 3145.6usft (Original Well Elev)
Site:	Chopper State Com	MD Reference:	WELL @ 3145.6usft (Original Well Elev)
Well:	#3H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM (NAD 27 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	Chopper State Com		
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Site Position:		Northing:	456,000.20 usft	Latitude:	32° 15' 12.684 N
From:	Map	Easting:	557,767.20 usft	Longitude:	104° 8' 47.287 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.10 °

Well	#3H				
Well Position	+N/-S	0.0 usft	Northing:	456,000.20 usft	Latitude: 32° 15' 12.684 N
	+E/-W	0.0 usft	Easting:	557,767.20 usft	Longitude: 104° 8' 47.287 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level: 3,127.6 usft

Wellbore	OH				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/4/2016	7.38	60.01	48,045

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	181.15

Survey Program		Date 3/4/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	8,832.0	GYRO (OH)	VESSI_GYROFLEX	VESSI Gyroflex Gyro	
8,898.0	14,012.0	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	456,000.20	557,767.20	32° 15' 12.684 N	104° 8' 47.287 W
100.0	0.41	185.30	100.0	-0.4	0.0	455,999.84	557,767.17	32° 15' 12.680 N	104° 8' 47.287 W
First Gyro									
200.0	0.26	154.09	200.0	-0.9	0.0	455,999.28	557,767.24	32° 15' 12.675 N	104° 8' 47.286 W
300.0	0.26	211.72	300.0	-1.3	0.0	455,998.89	557,767.22	32° 15' 12.671 N	104° 8' 47.286 W
400.0	0.48	107.76	400.0	-1.6	0.3	455,998.57	557,767.49	32° 15' 12.668 N	104° 8' 47.283 W
500.0	0.94	115.23	500.0	-2.1	1.4	455,998.09	557,768.64	32° 15' 12.663 N	104° 8' 47.270 W
600.0	1.39	110.44	600.0	-2.9	3.3	455,997.32	557,770.51	32° 15' 12.655 N	104° 8' 47.248 W
700.0	1.33	70.51	699.9	-2.9	5.5	455,997.28	557,772.75	32° 15' 12.655 N	104° 8' 47.222 W
800.0	1.45	69.68	799.9	-2.1	7.8	455,998.11	557,775.03	32° 15' 12.663 N	104° 8' 47.196 W
900.0	1.88	59.21	899.9	-0.8	10.4	455,999.38	557,777.62	32° 15' 12.676 N	104° 8' 47.165 W

IDS
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Chopper State Com
Project:	Eddy County, NM (NAD 27 NME)	TVD Reference:	WELL @ 3145.6usft (Original Well Elev)
Site:	Chopper State Com	MD Reference:	WELL @ 3145.6usft (Original Well Elev)
Well:	#3H	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
1,000.0	0.68	44.17	999.8	0.4	12.2	456,000.65	557,779.44	32° 15' 12.688 N	104° 8' 47.144 W
1,100.0	0.62	8.83	1,099.8	1.4	12.7	456,001.61	557,779.94	32° 15' 12.698 N	104° 8' 47.138 W
1,200.0	0.19	359.76	1,199.8	2.1	12.8	456,002.31	557,780.02	32° 15' 12.705 N	104° 8' 47.137 W
1,300.0	0.73	334.37	1,299.8	2.9	12.5	456,003.05	557,779.75	32° 15' 12.712 N	104° 8' 47.140 W
1,400.0	0.62	323.19	1,399.8	3.9	11.9	456,004.06	557,779.15	32° 15' 12.722 N	104° 8' 47.147 W
1,500.0	0.40	330.90	1,499.8	4.6	11.5	456,004.80	557,778.65	32° 15' 12.729 N	104° 8' 47.153 W
1,600.0	0.39	339.54	1,599.8	5.2	11.2	456,005.42	557,778.36	32° 15' 12.735 N	104° 8' 47.156 W
1,700.0	0.13	155.74	1,699.8	5.4	11.1	456,005.64	557,778.29	32° 15' 12.738 N	104° 8' 47.157 W
1,800.0	0.52	121.07	1,799.8	5.1	11.5	456,005.30	557,778.73	32° 15' 12.734 N	104° 8' 47.152 W
1,900.0	0.31	83.01	1,899.8	4.9	12.2	456,005.10	557,779.38	32° 15' 12.732 N	104° 8' 47.145 W
2,000.0	0.41	111.20	1,999.8	4.8	12.8	456,005.00	557,779.99	32° 15' 12.731 N	104° 8' 47.138 W
2,100.0	0.60	135.20	2,099.8	4.3	13.5	456,004.50	557,780.69	32° 15' 12.726 N	104° 8' 47.129 W
2,200.0	0.56	103.67	2,199.8	3.8	14.3	456,004.01	557,781.53	32° 15' 12.721 N	104° 8' 47.120 W
2,300.0	0.20	152.98	2,299.8	3.5	14.9	456,003.74	557,782.09	32° 15' 12.719 N	104° 8' 47.113 W
2,400.0	0.24	75.10	2,399.8	3.4	15.2	456,003.64	557,782.37	32° 15' 12.718 N	104° 8' 47.110 W
2,500.0	0.20	50.76	2,499.8	3.6	15.5	456,003.80	557,782.71	32° 15' 12.719 N	104° 8' 47.106 W
2,600.0	0.23	49.50	2,599.8	3.8	15.8	456,004.04	557,782.99	32° 15' 12.722 N	104° 8' 47.103 W
2,700.0	0.11	359.58	2,699.8	4.1	15.9	456,004.27	557,783.15	32° 15' 12.724 N	104° 8' 47.101 W
2,800.0	0.19	85.13	2,799.8	4.2	16.1	456,004.38	557,783.31	32° 15' 12.725 N	104° 8' 47.099 W
2,900.0	0.23	52.78	2,899.8	4.3	16.4	456,004.52	557,783.64	32° 15' 12.726 N	104° 8' 47.095 W
3,000.0	0.08	16.56	2,999.8	4.5	16.6	456,004.70	557,783.82	32° 15' 12.728 N	104° 8' 47.093 W
3,100.0	0.14	213.23	3,099.8	4.5	16.6	456,004.67	557,783.77	32° 15' 12.728 N	104° 8' 47.094 W
3,200.0	0.17	47.31	3,199.8	4.5	16.6	456,004.67	557,783.81	32° 15' 12.728 N	104° 8' 47.093 W
3,300.0	0.13	197.08	3,299.8	4.5	16.7	456,004.66	557,783.89	32° 15' 12.728 N	104° 8' 47.092 W
3,400.0	0.13	355.99	3,399.8	4.5	16.6	456,004.66	557,783.84	32° 15' 12.728 N	104° 8' 47.093 W
3,500.0	0.16	165.28	3,499.8	4.4	16.7	456,004.64	557,783.87	32° 15' 12.728 N	104° 8' 47.092 W
3,600.0	0.07	278.01	3,599.8	4.3	16.6	456,004.52	557,783.85	32° 15' 12.726 N	104° 8' 47.093 W
3,700.0	0.21	81.33	3,699.8	4.4	16.8	456,004.55	557,783.97	32° 15' 12.727 N	104° 8' 47.091 W
3,800.0	0.29	37.83	3,799.8	4.6	17.1	456,004.78	557,784.30	32° 15' 12.729 N	104° 8' 47.087 W
3,900.0	0.10	263.16	3,899.8	4.8	17.2	456,004.97	557,784.37	32° 15' 12.731 N	104° 8' 47.087 W
4,000.0	0.19	15.92	3,999.8	4.9	17.1	456,005.12	557,784.33	32° 15' 12.732 N	104° 8' 47.087 W
4,100.0	0.12	71.34	4,099.8	5.1	17.3	456,005.31	557,784.48	32° 15' 12.734 N	104° 8' 47.085 W
4,200.0	0.15	268.98	4,199.8	5.1	17.2	456,005.34	557,784.44	32° 15' 12.735 N	104° 8' 47.086 W
4,300.0	0.19	330.38	4,299.8	5.3	17.0	456,005.48	557,784.23	32° 15' 12.736 N	104° 8' 47.088 W
4,400.0	0.09	180.20	4,399.8	5.4	16.9	456,005.55	557,784.15	32° 15' 12.737 N	104° 8' 47.089 W
4,500.0	0.18	102.43	4,499.8	5.2	17.1	456,005.44	557,784.30	32° 15' 12.735 N	104° 8' 47.087 W
4,600.0	0.16	78.15	4,599.8	5.2	17.4	456,005.43	557,784.59	32° 15' 12.735 N	104° 8' 47.084 W
4,700.0	0.20	6.54	4,699.8	5.4	17.5	456,005.63	557,784.75	32° 15' 12.737 N	104° 8' 47.082 W
4,800.0	0.23	7.88	4,799.8	5.8	17.6	456,006.01	557,784.80	32° 15' 12.741 N	104° 8' 47.082 W
4,900.0	0.15	351.95	4,899.8	6.1	17.6	456,006.34	557,784.81	32° 15' 12.744 N	104° 8' 47.081 W
5,000.0	0.28	39.40	4,999.8	6.5	17.7	456,006.65	557,784.94	32° 15' 12.748 N	104° 8' 47.080 W
5,100.0	0.19	64.22	5,099.8	6.7	18.0	456,006.91	557,785.25	32° 15' 12.750 N	104° 8' 47.076 W
5,200.0	0.35	36.18	5,199.8	7.0	18.4	456,007.23	557,785.58	32° 15' 12.753 N	104° 8' 47.072 W
5,300.0	0.17	344.27	5,299.8	7.4	18.5	456,007.62	557,785.72	32° 15' 12.757 N	104° 8' 47.071 W
5,400.0	0.26	145.21	5,399.8	7.4	18.6	456,007.58	557,785.81	32° 15' 12.757 N	104° 8' 47.070 W
5,500.0	0.05	115.27	5,499.8	7.2	18.8	456,007.37	557,785.97	32° 15' 12.755 N	104° 8' 47.068 W
5,600.0	0.16	67.73	5,599.8	7.2	18.9	456,007.41	557,786.14	32° 15' 12.755 N	104° 8' 47.066 W
5,700.0	0.44	107.62	5,699.8	7.1	19.4	456,007.35	557,786.64	32° 15' 12.754 N	104° 8' 47.060 W
5,800.0	0.11	85.57	5,799.8	7.0	19.9	456,007.24	557,787.10	32° 15' 12.753 N	104° 8' 47.055 W
5,900.0	0.21	88.97	5,899.8	7.0	20.2	456,007.25	557,787.38	32° 15' 12.753 N	104° 8' 47.051 W
6,000.0	0.23	138.22	5,999.8	6.9	20.5	456,007.10	557,787.70	32° 15' 12.752 N	104° 8' 47.048 W
6,100.0	0.51	175.09	6,099.8	6.3	20.7	456,006.51	557,787.87	32° 15' 12.746 N	104° 8' 47.046 W
6,200.0	1.09	194.24	6,199.8	4.9	20.5	456,005.14	557,787.67	32° 15' 12.733 N	104° 8' 47.048 W
6,300.0	1.62	196.35	6,299.7	2.7	19.8	456,002.86	557,787.04	32° 15' 12.710 N	104° 8' 47.056 W
6,400.0	1.68	185.64	6,399.7	-0.2	19.3	456,000.05	557,786.50	32° 15' 12.682 N	104° 8' 47.062 W

IDS

Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Chopper State Com
Project:	Eddy County, NM (NAD 27 NME)	TVD Reference:	WELL @ 3145.6usft (Original Well Elev)
Site:	Chopper State Com	MD Reference:	WELL @ 3145.6usft (Original Well Elev)
Well:	#3H	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	
6,500.0	1.30	177.31	6,499.7	-2.7	19.2	455,997.46	557,786.41	32° 15' 12.656 N	104° 8' 47.063 W	
6,600.0	1.08	205.67	6,599.6	-4.7	18.8	455,995.47	557,786.05	32° 15' 12.637 N	104° 8' 47.067 W	
6,700.0	1.32	170.06	6,699.6	-6.7	18.6	455,993.49	557,785.84	32° 15' 12.617 N	104° 8' 47.070 W	
6,800.0	1.15	173.83	6,799.6	-8.8	18.9	455,991.36	557,786.15	32° 15' 12.596 N	104° 8' 47.066 W	
6,900.0	1.28	184.45	6,899.6	-11.0	19.0	455,989.25	557,786.17	32° 15' 12.575 N	104° 8' 47.066 W	
7,000.0	0.79	187.08	6,999.6	-12.8	18.8	455,987.45	557,786.00	32° 15' 12.557 N	104° 8' 47.068 W	
7,100.0	1.08	209.59	7,099.5	-14.3	18.2	455,985.95	557,785.45	32° 15' 12.543 N	104° 8' 47.074 W	
7,200.0	1.10	217.28	7,199.5	-15.8	17.2	455,984.36	557,784.40	32° 15' 12.527 N	104° 8' 47.087 W	
7,300.0	1.50	197.88	7,299.5	-17.8	16.2	455,982.35	557,783.42	32° 15' 12.507 N	104° 8' 47.098 W	
7,400.0	1.54	172.53	7,399.5	-20.4	16.0	455,979.77	557,783.19	32° 15' 12.482 N	104° 8' 47.101 W	
7,500.0	0.99	135.07	7,499.4	-22.4	16.8	455,977.83	557,783.98	32° 15' 12.462 N	104° 8' 47.092 W	
7,600.0	0.42	78.47	7,599.4	-22.9	17.7	455,977.29	557,784.95	32° 15' 12.457 N	104° 8' 47.080 W	
7,700.0	0.21	161.12	7,699.4	-23.0	18.2	455,977.19	557,785.36	32° 15' 12.456 N	104° 8' 47.076 W	
7,800.0	0.80	231.25	7,799.4	-23.6	17.7	455,976.58	557,784.88	32° 15' 12.450 N	104° 8' 47.081 W	
7,900.0	1.38	275.74	7,899.4	-23.9	15.9	455,976.27	557,783.14	32° 15' 12.447 N	104° 8' 47.102 W	
8,000.0	1.47	290.93	7,999.4	-23.4	13.5	455,976.84	557,780.74	32° 15' 12.453 N	104° 8' 47.129 W	
8,100.0	1.45	293.39	8,099.4	-22.4	11.2	455,977.80	557,778.38	32° 15' 12.462 N	104° 8' 47.157 W	
8,200.0	1.52	284.14	8,199.3	-21.6	8.7	455,978.63	557,775.93	32° 15' 12.470 N	104° 8' 47.185 W	
8,300.0	1.39	268.47	8,299.3	-21.3	6.2	455,978.92	557,773.44	32° 15' 12.473 N	104° 8' 47.214 W	
8,400.0	1.02	288.14	8,399.3	-21.0	4.2	455,979.17	557,771.38	32° 15' 12.476 N	104° 8' 47.238 W	
8,500.0	1.54	269.73	8,499.2	-20.8	2.0	455,979.44	557,769.19	32° 15' 12.478 N	104° 8' 47.264 W	
8,600.0	1.99	256.98	8,599.2	-21.2	-1.1	455,979.04	557,766.15	32° 15' 12.475 N	104° 8' 47.299 W	
8,700.0	2.13	253.18	8,699.1	-22.1	-4.5	455,978.11	557,762.68	32° 15' 12.465 N	104° 8' 47.340 W	
8,800.0	1.84	251.43	8,799.1	-23.1	-7.8	455,977.06	557,759.38	32° 15' 12.455 N	104° 8' 47.378 W	
8,832.0	1.81	252.64	8,831.1	-23.5	-8.8	455,976.75	557,758.41	32° 15' 12.452 N	104° 8' 47.389 W	
Final Gyro										
8,898.0	2.00	243.40	8,897.0	-24.3	-10.8	455,975.92	557,756.39	32° 15' 12.444 N	104° 8' 47.413 W	
First MWD Survey										
8,930.0	2.40	217.50	8,929.0	-25.1	-11.7	455,975.14	557,755.48	32° 15' 12.436 N	104° 8' 47.424 W	
8,961.0	4.30	191.70	8,959.9	-26.7	-12.4	455,973.49	557,754.85	32° 15' 12.420 N	104° 8' 47.431 W	
8,992.0	6.60	182.30	8,990.8	-29.6	-12.7	455,970.57	557,754.54	32° 15' 12.391 N	104° 8' 47.435 W	
9,023.0	9.10	176.50	9,021.5	-33.9	-12.6	455,966.34	557,754.62	32° 15' 12.349 N	104° 8' 47.434 W	
9,055.0	11.30	173.10	9,053.0	-39.5	-12.1	455,960.70	557,755.15	32° 15' 12.293 N	104° 8' 47.428 W	
9,086.0	13.80	173.30	9,083.3	-46.2	-11.3	455,954.01	557,755.95	32° 15' 12.227 N	104° 8' 47.419 W	
9,118.0	17.30	171.90	9,114.1	-54.7	-10.1	455,945.51	557,757.06	32° 15' 12.143 N	104° 8' 47.406 W	
9,149.0	20.20	171.90	9,143.4	-64.6	-8.7	455,935.65	557,758.47	32° 15' 12.045 N	104° 8' 47.390 W	
9,181.0	23.10	172.40	9,173.2	-76.2	-7.1	455,923.95	557,760.08	32° 15' 11.929 N	104° 8' 47.371 W	
9,212.0	25.40	174.00	9,201.4	-88.9	-5.6	455,911.31	557,761.58	32° 15' 11.804 N	104° 8' 47.354 W	
9,244.0	28.40	174.80	9,230.0	-103.3	-4.2	455,896.90	557,762.98	32° 15' 11.662 N	104° 8' 47.338 W	
9,276.0	31.60	175.70	9,257.7	-119.2	-2.9	455,880.96	557,764.30	32° 15' 11.504 N	104° 8' 47.323 W	
9,307.0	34.80	176.20	9,283.6	-136.2	-1.7	455,864.03	557,765.50	32° 15' 11.336 N	104° 8' 47.309 W	
9,338.0	38.30	176.80	9,308.5	-154.6	-0.6	455,845.60	557,766.62	32° 15' 11.154 N	104° 8' 47.296 W	
9,370.0	42.70	178.80	9,332.8	-175.4	0.2	455,824.84	557,767.40	32° 15' 10.949 N	104° 8' 47.288 W	
9,402.0	47.40	182.70	9,355.5	-198.0	-0.1	455,802.21	557,767.07	32° 15' 10.725 N	104° 8' 47.292 W	
9,433.0	53.30	185.80	9,375.2	-221.8	-1.9	455,778.43	557,765.28	32° 15' 10.489 N	104° 8' 47.313 W	
9,465.0	60.20	186.80	9,392.8	-248.4	-4.9	455,751.85	557,762.33	32° 15' 10.226 N	104° 8' 47.348 W	
9,496.0	64.90	186.00	9,407.0	-275.7	-7.9	455,724.52	557,759.27	32° 15' 9.956 N	104° 8' 47.385 W	
9,528.0	68.60	184.00	9,419.7	-305.0	-10.5	455,695.23	557,756.72	32° 15' 9.666 N	104° 8' 47.415 W	
9,559.0	72.40	182.00	9,430.0	-334.1	-12.0	455,666.06	557,755.19	32° 15' 9.377 N	104° 8' 47.433 W	
9,591.0	76.70	180.70	9,438.5	-365.0	-12.7	455,635.23	557,754.47	32° 15' 9.072 N	104° 8' 47.442 W	
9,622.0	81.10	179.50	9,444.5	-395.4	-12.8	455,604.82	557,754.42	32° 15' 8.771 N	104° 8' 47.443 W	
9,654.0	84.60	179.30	9,448.5	-427.1	-12.4	455,573.08	557,754.75	32° 15' 8.457 N	104° 8' 47.440 W	
9,722.0	88.70	178.20	9,452.5	-495.0	-11.0	455,505.22	557,756.24	32° 15' 7.786 N	104° 8' 47.424 W	
9,817.0	90.90	178.80	9,452.8	-589.9	-8.5	455,410.26	557,758.72	32° 15' 6.846 N	104° 8' 47.397 W	
9,911.0	91.80	180.70	9,450.6	-683.9	-8.1	455,316.29	557,759.13	32° 15' 5.916 N	104° 8' 47.394 W	

IDS
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Chopper State Com
Project:	Eddy County, NM (NAD 27 NME)	TVD Reference:	WELL @ 3145.6usft (Original Well Elev)
Site:	Chopper State Com	MD Reference:	WELL @ 3145.6usft (Original Well Elev)
Well:	#3H	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
10,007.0	92.70	181.80	9,446.8	-779.8	-10.2	455,220.39	557,757.04	32° 15' 4.967 N	104° 8' 47.421 W
10,101.0	92.70	182.30	9,442.4	-873.6	-13.5	455,126.56	557,753.68	32° 15' 4.038 N	104° 8' 47.462 W
10,196.0	92.10	182.10	9,438.4	-968.5	-17.2	455,031.71	557,750.04	32° 15' 3.100 N	104° 8' 47.506 W
10,291.0	90.80	181.30	9,436.0	-1,063.4	-20.0	454,936.79	557,747.22	32° 15' 2.160 N	104° 8' 47.541 W
10,386.0	90.90	181.30	9,434.6	-1,158.4	-22.1	454,841.82	557,745.07	32° 15' 1.221 N	104° 8' 47.568 W
10,481.0	89.80	181.00	9,434.0	-1,253.4	-24.0	454,746.85	557,743.16	32° 15' 0.281 N	104° 8' 47.592 W
10,576.0	91.90	182.00	9,432.6	-1,348.3	-26.5	454,651.89	557,740.67	32° 14' 59.341 N	104° 8' 47.623 W
10,671.0	91.10	181.70	9,430.1	-1,443.2	-29.6	454,556.98	557,737.61	32° 14' 58.402 N	104° 8' 47.660 W
10,766.0	89.20	181.00	9,429.9	-1,538.2	-31.8	454,462.01	557,735.37	32° 14' 57.462 N	104° 8' 47.688 W
10,861.0	90.80	181.80	9,429.9	-1,633.2	-34.2	454,367.04	557,733.05	32° 14' 56.522 N	104° 8' 47.717 W
10,956.0	91.50	182.20	9,428.0	-1,728.1	-37.5	454,272.12	557,729.73	32° 14' 55.583 N	104° 8' 47.758 W
11,051.0	90.30	182.40	9,426.5	-1,823.0	-41.3	454,177.21	557,725.92	32° 14' 54.644 N	104° 8' 47.804 W
11,145.0	90.80	181.70	9,425.6	-1,916.9	-44.6	454,083.27	557,722.56	32° 14' 53.714 N	104° 8' 47.845 W
11,241.0	90.90	181.00	9,424.1	-2,012.9	-46.9	453,987.31	557,720.30	32° 14' 52.765 N	104° 8' 47.874 W
11,335.0	92.60	181.70	9,421.3	-2,106.8	-49.1	453,893.39	557,718.08	32° 14' 51.835 N	104° 8' 47.901 W
11,431.0	92.10	180.20	9,417.3	-2,202.7	-50.7	453,797.48	557,716.49	32° 14' 50.886 N	104° 8' 47.922 W
11,526.0	92.20	180.20	9,413.8	-2,297.6	-51.0	453,702.55	557,716.16	32° 14' 49.947 N	104° 8' 47.927 W
11,621.0	92.20	180.90	9,410.1	-2,392.6	-52.0	453,607.63	557,715.25	32° 14' 49.007 N	104° 8' 47.940 W
11,716.0	92.10	180.50	9,406.6	-2,487.5	-53.1	453,512.70	557,714.09	32° 14' 48.068 N	104° 8' 47.955 W
11,811.0	91.60	180.30	9,403.5	-2,582.4	-53.8	453,417.75	557,713.43	32° 14' 47.128 N	104° 8' 47.965 W
11,906.0	90.00	180.20	9,402.2	-2,677.4	-54.2	453,322.77	557,713.02	32° 14' 46.188 N	104° 8' 47.972 W
12,001.0	91.20	179.90	9,401.2	-2,772.4	-54.3	453,227.77	557,712.93	32° 14' 45.248 N	104° 8' 47.975 W
12,095.0	91.10	181.40	9,399.3	-2,866.4	-55.3	453,133.80	557,711.87	32° 14' 44.318 N	104° 8' 47.989 W
12,190.0	89.90	181.10	9,398.5	-2,961.4	-57.4	453,038.83	557,709.79	32° 14' 43.378 N	104° 8' 48.015 W
12,286.0	90.00	181.70	9,398.5	-3,057.3	-59.8	452,942.86	557,707.45	32° 14' 42.429 N	104° 8' 48.044 W
12,381.0	91.40	181.00	9,397.4	-3,152.3	-62.0	452,847.89	557,705.21	32° 14' 41.489 N	104° 8' 48.072 W
12,475.0	90.60	180.80	9,395.7	-3,246.3	-63.5	452,753.92	557,703.73	32° 14' 40.559 N	104° 8' 48.091 W
12,570.0	91.50	179.80	9,394.0	-3,341.3	-64.0	452,658.94	557,703.24	32° 14' 39.619 N	104° 8' 48.099 W
12,665.0	90.20	180.00	9,392.6	-3,436.2	-63.8	452,563.95	557,703.40	32° 14' 38.679 N	104° 8' 48.099 W
12,760.0	90.60	180.90	9,391.9	-3,531.2	-64.5	452,468.96	557,702.66	32° 14' 37.739 N	104° 8' 48.110 W
12,855.0	89.50	180.80	9,391.8	-3,626.2	-66.0	452,373.97	557,701.25	32° 14' 36.799 N	104° 8' 48.128 W
12,949.0	89.30	181.10	9,392.8	-3,720.2	-67.5	452,279.99	557,699.69	32° 14' 35.869 N	104° 8' 48.148 W
13,044.0	89.00	182.20	9,394.2	-3,815.2	-70.2	452,185.04	557,696.95	32° 14' 34.929 N	104° 8' 48.182 W
13,139.0	90.40	182.00	9,394.7	-3,910.1	-73.7	452,090.11	557,693.47	32° 14' 33.990 N	104° 8' 48.224 W
13,234.0	91.40	181.00	9,393.2	-4,005.0	-76.2	451,995.15	557,690.99	32° 14' 33.050 N	104° 8' 48.255 W
13,328.0	92.10	183.90	9,390.4	-4,098.9	-80.2	451,901.30	557,686.97	32° 14' 32.121 N	104° 8' 48.304 W
13,455.0	91.50	183.10	9,386.4	-4,225.6	-88.0	451,774.60	557,679.22	32° 14' 30.868 N	104° 8' 48.397 W
13,550.0	90.50	181.00	9,384.7	-4,320.5	-91.4	451,679.68	557,675.82	32° 14' 29.928 N	104° 8' 48.438 W
13,645.0	90.10	181.60	9,384.2	-4,415.5	-93.5	451,584.70	557,673.67	32° 14' 28.989 N	104° 8' 48.465 W
13,740.0	89.90	180.70	9,384.2	-4,510.5	-95.4	451,489.72	557,671.76	32° 14' 28.049 N	104° 8' 48.489 W
13,834.0	88.90	180.00	9,385.2	-4,604.5	-96.0	451,395.73	557,671.19	32° 14' 27.118 N	104° 8' 48.498 W
13,967.0	91.20	179.90	9,385.1	-4,737.5	-95.9	451,262.74	557,671.30	32° 14' 25.802 N	104° 8' 48.499 W
Final MWD Survey									
14,012.0	91.20	179.90	9,384.2	-4,782.4	-95.8	451,217.75	557,671.38	32° 14' 25.357 N	104° 8' 48.499 W
Projection To TD									

IDS
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Chopper State Com
Project:	Eddy County, NM (NAD 27 NME)	TVD Reference:	WELL @ 3145.6usft (Original Well Elev)
Site:	Chopper State Com	MD Reference:	WELL @ 3145.6usft (Original Well Elev)
Well:	#3H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
PBHL(CSC#3H)	0.00	0.00	9,393.0	-4,793.7	-96.6	451,206.50	557,670.60	32° 14' 25.246 N	104° 8' 48.508 W
- actual wellpath misses target center by 14.3usft at 14012.0usft MD (9384.2 TVD, -4782.4 N, -95.8 E)									
- Point									
Loving 1 State 2 AC V	0.00	0.00	12,840.0	-4,132.0	293.5	451,868.20	558,060.70	32° 14' 31.787 N	104° 8' 43.953 W
- actual wellpath misses target center by 3468.8usft at 13239.7usft MD (9393.1 TVD, -4010.7 N, -76.3 E)									
- Circle (radius 325.0)									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
100.0	100.0	-0.4	0.0	First Gyro
8,832.0	8,831.1	-23.5	-8.8	Final Gyro
8,898.0	8,897.0	-24.3	-10.8	First MWD Survey
13,967.0	9,385.1	-4,737.5	-95.9	Final MWD Survey
14,012.0	9,384.2	-4,782.4	-95.8	Projection To TD

Checked By: _____	Approved By: _____	Date: _____
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