

PATRIOT DRILLING, LLC

3001543005

OPERATOR: COG Operating, LLC
WELL/LEASE: Graham Cracker 16 State 9H
COUNTY: Eddy Co., New Mexico
Sec. 16, T 26S, R 28E

**STATE OF NEW MEXICO
DEVIATION REPORT**

<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
530	1 3/4	5,616	1 1/2
1,086	1 1/4	6,090	1 1/2
1,466	1	6,559	1 1/2
1,938	1	7,041	2 3/4
2,412	1 3/4	7,295	1 1/4
2,802	1 1/2	7,773	3
3,278	3/4	8,018	1 1/2
3,751	1	8,534	1 1/2
4,229	1 1/4		
4,701	1 1/4		
5,174	1		

NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 30 2015

RECEIVED

Patriot Drilling, LLC

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 8th day of June, 2015 by
M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2015



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



June 4, 2015

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

NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 30 2015

RECEIVED

Attn: Kanicia Castillo

RE: **Graham Cracker 16 State 9H**

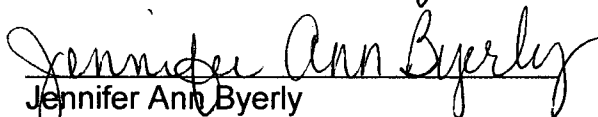
Please find enclosed a copy of the survey from 0' to 7800' ran on the above referenced well.

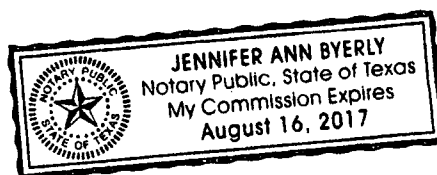
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 4 day of June,
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho
Lease/Well: Graham Cracker 16 State/9H

Rig Name: Patriot 2
State/County: New Mexico/Eddy
VS-Azi: 0.00 Degrees

Latitude: 32.04942, Longitude: -104.09936
Grid Convergence Applied = -0.12 degs
Grid North = True North -0.12 degs



NM OIL CONSERVATION
ARTESIA DISTRICT
JUL 30 2015
RECEIVED

Depth Reference : RKB= 20

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: graham cracker 16-de_01.ut

Minimum Curvature Method

Report Date/Time: 6/4/2015 / 16:13

VES Survey International
Ft. Worth, Texas
817-741-3610

Surveyor: Gregg Wilson
Graham Cracker 16 State 9H / API 30-015-43005

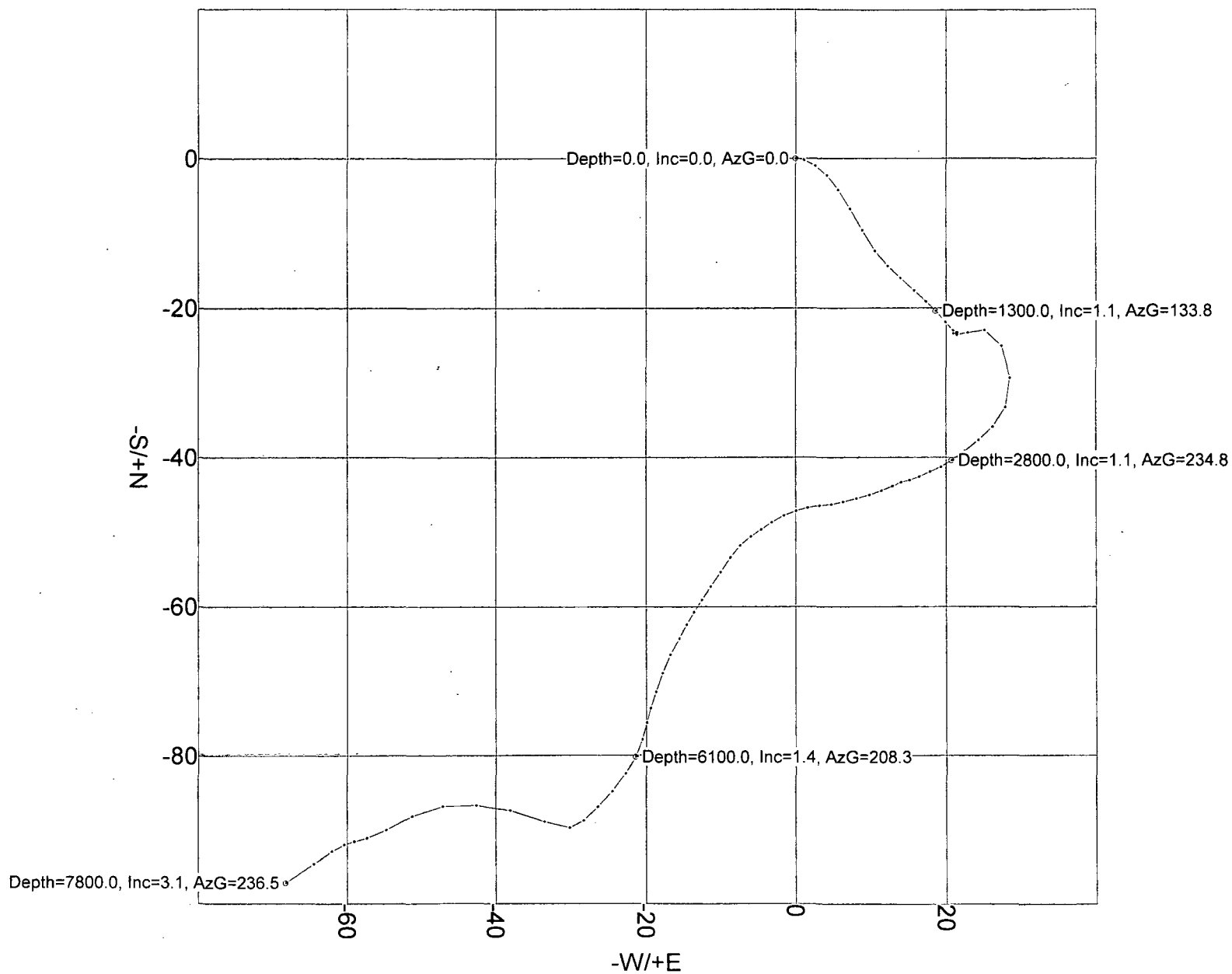
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.23	69.37	100.00	0.07	0.19	0.07	0.20	69.37	0.23
200.00	0.94	116.21	199.99	-0.22	1.11	-0.22	1.13	101.20	0.80
300.00	1.04	116.96	299.98	-0.99	2.65	-0.99	2.83	110.52	0.10
400.00	1.25	138.77	399.96	-2.22	4.17	-2.22	4.73	118.04	0.48
500.00	1.57	146.50	499.93	-4.19	5.65	-4.19	7.03	126.55	0.37
600.00	1.88	149.77	599.88	-6.75	7.23	-6.75	9.89	133.01	0.32
700.00	1.87	151.72	699.83	-9.60	8.83	-9.60	13.05	137.39	0.06
800.00	1.84	144.86	799.78	-12.35	10.53	-12.35	16.23	139.55	0.22
900.00	1.25	132.31	899.74	-14.40	12.26	-14.40	18.91	139.58	0.67
1000.00	1.40	134.24	999.71	-15.99	13.95	-15.99	21.22	138.90	0.15
1100.00	1.40	131.04	1099.69	-17.64	15.74	-17.64	23.65	138.26	0.08
1200.00	1.07	134.76	1199.66	-19.10	17.33	-19.10	25.79	137.79	0.34
1300.00	1.06	133.83	1299.64	-20.40	18.66	-20.40	27.64	137.55	0.02
1400.00	1.17	144.93	1399.63	-21.87	19.91	-21.87	29.57	137.69	0.24
1500.00	0.60	123.10	1499.61	-22.99	20.93	-22.99	31.09	137.69	0.65
1600.00	0.15	99.53	1599.61	-23.29	21.50	-23.29	31.70	137.30	0.46

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	0.30	270.54	1699.61	-23.31	21.37	-23.31	31.62	137.49	0.45
1800.00	0.20	239.45	1799.61	-23.40	20.95	-23.40	31.41	138.16	0.16
1900.00	0.70	98.83	1899.61	-23.59	21.41	-23.59	31.85	137.78	0.87
2000.00	1.09	66.42	1999.60	-23.30	22.88	-23.30	32.66	135.53	0.62
2100.00	1.54	93.18	2099.57	-23.00	25.09	-23.00	34.03	132.51	0.75
2200.00	2.57	153.82	2199.52	-25.09	27.42	-25.09	37.16	132.46	2.26
2300.00	2.60	176.39	2299.42	-29.36	28.55	-29.36	40.96	135.80	1.01
2400.00	2.08	203.77	2399.34	-33.28	27.96	-33.28	43.47	139.97	1.22
2500.00	1.57	225.95	2499.29	-35.89	26.25	-35.89	44.47	143.82	0.86
2600.00	1.43	228.09	2599.25	-37.68	24.33	-37.68	44.86	147.15	0.15
2700.00	1.27	234.91	2699.22	-39.16	22.49	-39.16	45.16	150.13	0.23
2800.00	1.13	234.82	2799.20	-40.36	20.78	-40.36	45.40	152.76	0.14
2900.00	0.84	242.23	2899.19	-41.28	19.32	-41.28	45.57	154.92	0.31
3000.00	0.94	250.33	2999.17	-41.90	17.90	-41.90	45.56	156.87	0.16
3100.00	0.89	238.59	3099.16	-42.58	16.46	-42.58	45.65	158.87	0.19
3200.00	0.72	262.75	3199.15	-43.06	15.17	-43.06	45.66	160.59	0.38
3300.00	0.63	247.84	3299.15	-43.35	14.04	-43.35	45.56	162.05	0.20
3400.00	0.83	245.75	3399.14	-43.85	12.87	-43.85	45.70	163.64	0.20
3500.00	0.99	248.36	3499.12	-44.47	11.41	-44.47	45.91	165.61	0.17
3600.00	0.96	251.88	3599.11	-45.04	9.81	-45.04	46.10	167.71	0.07
3700.00	1.13	258.96	3699.09	-45.49	8.05	-45.49	46.20	169.96	0.22
3800.00	0.98	249.28	3799.08	-45.98	6.28	-45.98	46.41	172.22	0.23
3900.00	0.91	267.19	3899.06	-46.33	4.69	-46.33	46.56	174.22	0.30
4000.00	0.87	261.97	3999.05	-46.47	3.14	-46.47	46.58	176.14	0.09
4100.00	0.95	257.85	4099.04	-46.75	1.57	-46.75	46.78	178.07	0.10
4200.00	0.86	250.87	4199.03	-47.17	0.06	-47.17	47.17	179.93	0.15
4300.00	1.14	247.17	4299.01	-47.80	-1.56	-47.80	47.83	181.87	0.29
4400.00	1.02	233.98	4398.99	-48.71	-3.20	-48.71	48.82	183.76	0.27
4500.00	0.94	236.43	4498.98	-49.69	-4.61	-49.69	49.90	185.30	0.09
4600.00	1.01	236.69	4598.96	-50.63	-6.02	-50.63	50.98	186.79	0.07
4700.00	1.14	225.09	4698.95	-51.81	-7.46	-51.81	52.34	188.19	0.25
4800.00	1.25	214.47	4798.93	-53.41	-8.78	-53.41	54.13	189.34	0.25
4900.00	1.44	212.73	4898.90	-55.37	-10.08	-55.37	56.28	190.32	0.19
5000.00	1.23	216.67	4998.87	-57.29	-11.40	-57.29	58.41	191.25	0.23
5100.00	1.23	208.86	5098.85	-59.09	-12.56	-59.09	60.41	192.00	0.17
5200.00	1.05	218.79	5198.83	-60.75	-13.65	-60.75	62.26	192.67	0.27
5300.00	1.16	201.69	5298.81	-62.40	-14.60	-62.40	64.08	193.17	0.35
5400.00	1.27	211.87	5398.79	-64.28	-15.56	-64.28	66.14	193.61	0.24
5500.00	1.57	207.27	5498.76	-66.45	-16.77	-66.45	68.53	194.17	0.31

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	1.49	196.97	5598.72	-68.90	-17.78	-68.90	71.16	194.47	0.29
5700.00	1.57	201.85	5698.68	-71.42	-18.67	-71.42	73.82	194.65	0.15
5800.00	1.11	193.62	5798.66	-73.64	-19.41	-73.64	76.15	194.77	0.50
5900.00	1.21	196.25	5898.64	-75.60	-19.93	-75.60	78.18	194.77	0.11
6000.00	1.46	193.53	5998.61	-77.85	-20.53	-77.85	80.51	194.77	0.26
6100.00	1.39	208.32	6098.58	-80.16	-21.40	-80.16	82.96	194.95	0.37
6200.00	1.70	213.17	6198.54	-82.47	-22.79	-82.47	85.56	195.45	0.34
6300.00	1.73	219.35	6298.50	-84.87	-24.55	-84.87	88.35	196.14	0.19
6400.00	1.55	226.32	6398.46	-86.97	-26.49	-86.97	90.92	196.94	0.26
6500.00	1.42	224.73	6498.42	-88.79	-28.34	-88.79	93.21	197.70	0.14
6600.00	1.18	263.46	6598.40	-89.79	-30.24	-89.79	94.74	198.61	0.89
6700.00	2.82	292.89	6698.34	-88.95	-33.53	-88.95	95.06	200.65	1.89
6800.00	2.69	283.42	6798.22	-87.45	-38.08	-87.45	95.38	203.53	0.47
6900.00	2.60	274.10	6898.12	-86.74	-42.63	-86.74	96.65	206.17	0.44
7000.00	2.58	262.27	6998.01	-86.88	-47.13	-86.88	98.84	208.48	0.53
7100.00	2.43	241.90	7097.92	-88.18	-51.23	-88.18	101.98	210.15	0.90
7200.00	2.08	243.10	7197.84	-90.00	-54.71	-90.00	105.32	211.30	0.35
7300.00	1.20	255.23	7297.80	-91.08	-57.34	-91.08	107.63	212.19	0.94
7400.00	0.82	252.17	7397.79	-91.57	-59.03	-91.57	108.95	212.81	0.38
7500.00	0.83	254.40	7497.78	-91.98	-60.41	-91.98	110.04	213.29	0.03
7600.00	1.36	234.47	7597.76	-92.86	-62.06	-92.86	111.69	213.76	0.64
7700.00	2.08	234.10	7697.71	-94.61	-64.49	-94.61	114.51	214.28	0.72
7800.00	3.07	236.54	7797.61	-97.15	-68.19	-97.15	118.70	215.07	0.99



VES Survey International
Ft. Worth, Texas
817-741-3610
Surveyor: Gregg Wilson
Graham Cracker 16 State 9H / API 30-015-43005



VES Survey Date: 5/28/2015



COG Operating LLC

Eddy County, NM

Graham Cracker 16 State

#9H

OH

Survey: MWD #1

Survey Report - Geographic

11 June, 2015



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #9H
Project:	Eddy County, NM	TVD Reference:	WELL @ 3079.0usft (Original Well Elev)
Site:	Graham Cracker 16 State	MD Reference:	WELL @ 3079.0usft (Original Well Elev)
Well:	#9H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Eddy 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	Graham Cracker 16 State		
Site Position:		Northing:	381,710.00 usft
From:	Map	Easting:	576,059.50 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 2' 57.113 N
		Longitude:	104° 5' 16.242 W
		Grid Convergence:	0.13 °

Well	#9H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 2' 56.552 N
		Longitude:	104° 5' 57.687 W
		Ground Level:	3,062.0 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	5/14/2015	7.34
			Dip Angle
			(°)
			59.84
			Field Strength
			(nT)
			48,066

Design	OH		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			178.21

Survey Program	Date 6/4/2015		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	13,611.0	MWD #1 (OH)	MWD
			Description
			MWD - Standard

Survey										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Map	Map			
Depth	(°)	(°)	Depth	(usft)	(usft)	Northing	Easting	Latitude	Longitude	
(usft)			(usft)			(usft)	(usft)			
0.0	0.00	0.00	0.0	0.0	0.0	381,645.40	572,492.70	32° 2' 56.552 N	104° 5' 57.687 W	
100.0	0.23	69.37	100.0	0.1	0.2	381,645.47	572,492.89	32° 2' 56.553 N	104° 5' 57.685 W	
200.0	0.94	116.21	200.0	-0.2	1.1	381,645.18	572,493.81	32° 2' 56.550 N	104° 5' 57.674 W	
300.0	1.04	116.96	300.0	-1.0	2.7	381,644.40	572,495.36	32° 2' 56.542 N	104° 5' 57.656 W	
400.0	1.25	138.77	400.0	-2.2	4.2	381,643.17	572,496.89	32° 2' 56.530 N	104° 5' 57.639 W	
500.0	1.57	146.50	499.9	-4.2	5.7	381,641.21	572,498.36	32° 2' 56.510 N	104° 5' 57.622 W	
600.0	1.88	149.77	599.9	-6.7	7.2	381,638.65	572,499.94	32° 2' 56.485 N	104° 5' 57.603 W	
700.0	1.87	151.72	699.8	-9.6	8.8	381,635.80	572,501.54	32° 2' 56.457 N	104° 5' 57.585 W	
800.0	1.84	144.86	799.8	-12.4	10.5	381,633.05	572,503.24	32° 2' 56.430 N	104° 5' 57.565 W	
900.0	1.25	132.31	899.7	-14.4	12.3	381,631.00	572,504.97	32° 2' 56.409 N	104° 5' 57.545 W	
1,000.0	1.40	134.24	999.7	-16.0	13.9	381,629.41	572,506.65	32° 2' 56.393 N	104° 5' 57.526 W	
1,100.0	1.40	131.04	1,099.7	-17.6	15.7	381,627.76	572,508.45	32° 2' 56.377 N	104° 5' 57.505 W	



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #9H
Project:	Eddy County, NM	TVD Reference:	WELL @ 3079.0usft (Original Well Elev)
Site:	Graham Cracker 16 State	MD Reference:	WELL @ 3079.0usft (Original Well Elev)
Well:	#9H	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
1,200.0	1.07	134.76	1,199.7	-19.1	17.3	381,626.30	572,510.03	32° 2' 56.363 N	104° 5' 57.486 W
1,300.0	1.06	133.83	1,299.6	-20.4	18.7	381,625.00	572,511.36	32° 2' 56.350 N	104° 5' 57.471 W
1,400.0	1.17	144.93	1,399.6	-21.9	19.9	381,623.52	572,512.62	32° 2' 56.335 N	104° 5' 57.456 W
1,500.0	0.60	123.10	1,499.6	-23.0	20.9	381,622.40	572,513.64	32° 2' 56.324 N	104° 5' 57.445 W
1,600.0	0.15	99.53	1,599.6	-23.3	21.5	381,622.10	572,514.21	32° 2' 56.321 N	104° 5' 57.438 W
1,700.0	0.30	270.54	1,699.6	-23.3	21.4	381,622.08	572,514.08	32° 2' 56.321 N	104° 5' 57.439 W
1,800.0	0.20	239.45	1,799.6	-23.4	21.0	381,621.99	572,513.67	32° 2' 56.320 N	104° 5' 57.444 W
1,900.0	0.70	98.83	1,899.6	-23.6	21.4	381,621.81	572,514.12	32° 2' 56.318 N	104° 5' 57.439 W
2,000.0	1.09	66.42	1,999.6	-23.3	22.9	381,622.09	572,515.59	32° 2' 56.321 N	104° 5' 57.422 W
2,100.0	1.54	93.18	2,099.6	-23.0	25.1	381,622.40	572,517.81	32° 2' 56.324 N	104° 5' 57.396 W
2,200.0	2.57	153.82	2,199.5	-25.1	27.4	381,620.31	572,520.14	32° 2' 56.303 N	104° 5' 57.369 W
2,300.0	2.60	176.39	2,299.4	-29.4	28.6	381,616.04	572,521.27	32° 2' 56.261 N	104° 5' 57.356 W
2,400.0	2.08	203.77	2,399.3	-33.3	28.0	381,612.11	572,520.68	32° 2' 56.222 N	104° 5' 57.363 W
2,500.0	1.57	225.95	2,499.3	-35.9	26.3	381,609.50	572,518.97	32° 2' 56.196 N	104° 5' 57.383 W
2,600.0	1.43	228.09	2,599.3	-37.7	24.4	381,607.71	572,517.05	32° 2' 56.179 N	104° 5' 57.405 W
2,700.0	1.27	234.91	2,699.2	-39.2	22.5	381,606.24	572,515.22	32° 2' 56.164 N	104° 5' 57.427 W
2,800.0	1.13	234.82	2,799.2	-40.4	20.8	381,605.04	572,513.50	32° 2' 56.152 N	104° 5' 57.447 W
2,900.0	0.84	242.23	2,899.2	-41.3	19.3	381,604.13	572,512.05	32° 2' 56.143 N	104° 5' 57.463 W
3,000.0	0.94	250.33	2,999.2	-41.9	17.9	381,603.51	572,510.63	32° 2' 56.137 N	104° 5' 57.480 W
3,100.0	0.89	238.59	3,099.2	-42.6	16.5	381,602.83	572,509.19	32° 2' 56.130 N	104° 5' 57.497 W
3,200.0	0.72	262.75	3,199.2	-43.1	15.2	381,602.35	572,507.91	32° 2' 56.126 N	104° 5' 57.512 W
3,300.0	0.63	247.84	3,299.1	-43.3	14.1	381,602.06	572,506.78	32° 2' 56.123 N	104° 5' 57.525 W
3,400.0	0.83	245.75	3,399.1	-43.8	12.9	381,601.55	572,505.61	32° 2' 56.118 N	104° 5' 57.538 W
3,500.0	0.99	248.36	3,499.1	-44.5	11.4	381,600.94	572,504.14	32° 2' 56.112 N	104° 5' 57.555 W
3,600.0	0.96	251.88	3,599.1	-45.0	9.8	381,600.36	572,502.54	32° 2' 56.106 N	104° 5' 57.574 W
3,700.0	1.13	258.96	3,699.1	-45.5	8.1	381,599.91	572,500.78	32° 2' 56.102 N	104° 5' 57.595 W
3,800.0	0.98	249.28	3,799.1	-46.0	6.3	381,599.42	572,499.01	32° 2' 56.097 N	104° 5' 57.615 W
3,900.0	0.91	267.19	3,899.1	-46.3	4.7	381,599.08	572,497.42	32° 2' 56.093 N	104° 5' 57.634 W
4,000.0	0.87	261.97	3,999.1	-46.5	3.2	381,598.93	572,495.87	32° 2' 56.092 N	104° 5' 57.652 W
4,100.0	0.95	257.85	4,099.0	-46.7	1.6	381,598.65	572,494.31	32° 2' 56.089 N	104° 5' 57.670 W
4,200.0	0.86	250.87	4,199.0	-47.2	0.1	381,598.23	572,492.79	32° 2' 56.085 N	104° 5' 57.687 W
4,300.0	1.14	247.17	4,299.0	-47.8	-1.5	381,597.60	572,491.17	32° 2' 56.079 N	104° 5' 57.706 W
4,400.0	1.02	233.98	4,399.0	-48.7	-3.2	381,596.69	572,489.53	32° 2' 56.070 N	104° 5' 57.725 W
4,500.0	0.94	236.43	4,499.0	-49.7	-4.6	381,595.71	572,488.13	32° 2' 56.060 N	104° 5' 57.742 W
4,600.0	1.01	236.69	4,599.0	-50.6	-6.0	381,594.77	572,486.71	32° 2' 56.051 N	104° 5' 57.758 W
4,700.0	1.14	225.09	4,698.9	-51.8	-7.4	381,593.59	572,485.27	32° 2' 56.039 N	104° 5' 57.775 W
4,800.0	1.25	214.47	4,798.9	-53.4	-8.8	381,591.99	572,483.94	32° 2' 56.024 N	104° 5' 57.790 W
4,900.0	1.44	212.73	4,898.9	-55.4	-10.1	381,590.03	572,482.65	32° 2' 56.004 N	104° 5' 57.805 W
5,000.0	1.23	216.67	4,998.9	-57.3	-11.4	381,588.11	572,481.33	32° 2' 55.985 N	104° 5' 57.821 W
5,100.0	1.23	208.86	5,098.8	-59.1	-12.5	381,586.31	572,480.17	32° 2' 55.967 N	104° 5' 57.834 W
5,200.0	1.05	218.79	5,198.8	-60.7	-13.6	381,584.66	572,479.08	32° 2' 55.951 N	104° 5' 57.847 W
5,300.0	1.16	201.69	5,298.8	-62.4	-14.6	381,583.00	572,478.13	32° 2' 55.935 N	104° 5' 57.858 W
5,400.0	1.27	211.87	5,398.8	-64.3	-15.5	381,581.12	572,477.17	32° 2' 55.916 N	104° 5' 57.869 W
5,500.0	1.57	207.27	5,498.8	-66.4	-16.7	381,578.96	572,475.96	32° 2' 55.895 N	104° 5' 57.884 W
5,600.0	1.49	196.97	5,598.7	-68.9	-17.8	381,576.50	572,474.95	32° 2' 55.871 N	104° 5' 57.895 W
5,700.0	1.57	201.85	5,698.7	-71.4	-18.6	381,573.99	572,474.06	32° 2' 55.846 N	104° 5' 57.906 W
5,800.0	1.11	193.62	5,798.7	-73.6	-19.4	381,571.77	572,473.32	32° 2' 55.824 N	104° 5' 57.914 W
5,900.0	1.21	196.25	5,898.6	-75.6	-19.9	381,569.82	572,472.80	32° 2' 55.804 N	104° 5' 57.920 W
6,000.0	1.46	193.53	5,998.6	-77.8	-20.5	381,567.57	572,472.20	32° 2' 55.782 N	104° 5' 57.927 W
6,100.0	1.39	208.32	6,098.6	-80.1	-21.4	381,565.26	572,471.33	32° 2' 55.759 N	104° 5' 57.938 W
6,200.0	1.70	213.17	6,198.5	-82.4	-22.8	381,562.95	572,469.94	32° 2' 55.737 N	104° 5' 57.954 W
6,300.0	1.73	219.35	6,298.5	-84.9	-24.5	381,560.54	572,468.17	32° 2' 55.713 N	104° 5' 57.974 W
6,400.0	1.55	226.32	6,398.5	-87.0	-26.5	381,558.44	572,466.24	32° 2' 55.692 N	104° 5' 57.997 W
6,500.0	1.42	224.73	6,498.4	-88.8	-28.3	381,556.63	572,464.39	32° 2' 55.674 N	104° 5' 58.018 W
6,600.0	1.18	263.46	6,598.4	-89.8	-30.2	381,555.63	572,462.49	32° 2' 55.664 N	104° 5' 58.040 W



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #9H
Project:	Eddy County, NM	TVD Reference:	WELL @ 3079.0usft (Original Well Elev)
Site:	Graham Cracker 16 State	MD Reference:	WELL @ 3079.0usft (Original Well Elev)
Well:	#9H	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	
6,700.0	2.82	292.89	6,698.3	-88.9	-33.5	381,556.47	572,459.20	32° 2' 55.673 N	104° 5' 58.079 W	
6,800.0	2.69	283.42	6,798.2	-87.4	-38.0	381,557.97	572,454.66	32° 2' 55.688 N	104° 5' 58.132 W	
6,900.0	2.60	274.10	6,898.1	-86.7	-42.6	381,558.68	572,450.11	32° 2' 55.695 N	104° 5' 58.184 W	
7,000.0	2.58	262.27	6,998.0	-86.9	-47.1	381,558.54	572,445.62	32° 2' 55.693 N	104° 5' 58.237 W	
7,100.0	2.43	241.90	7,097.9	-88.2	-51.2	381,557.23	572,441.52	32° 2' 55.681 N	104° 5' 58.284 W	
7,200.0	2.08	243.10	7,197.8	-90.0	-54.7	381,555.42	572,438.03	32° 2' 55.663 N	104° 5' 58.325 W	
7,300.0	1.20	255.23	7,297.8	-91.1	-57.3	381,554.33	572,435.40	32° 2' 55.652 N	104° 5' 58.355 W	
7,400.0	0.82	252.17	7,397.8	-91.6	-59.0	381,553.84	572,433.71	32° 2' 55.647 N	104° 5' 58.375 W	
7,500.0	0.83	254.40	7,497.8	-92.0	-60.4	381,553.43	572,432.33	32° 2' 55.643 N	104° 5' 58.391 W	
7,600.0	1.36	234.47	7,597.8	-92.9	-62.0	381,552.54	572,430.66	32° 2' 55.634 N	104° 5' 58.410 W	
7,700.0	2.08	234.10	7,697.7	-94.6	-64.5	381,550.79	572,428.23	32° 2' 55.617 N	104° 5' 58.439 W	
7,800.0	3.07	236.54	7,797.6	-97.2	-68.2	381,548.25	572,424.52	32° 2' 55.592 N	104° 5' 58.482 W	
7,922.0	2.70	241.70	7,919.5	-100.3	-73.4	381,545.08	572,419.27	32° 2' 55.561 N	104° 5' 58.543 W	
8,018.0	1.50	231.40	8,015.4	-102.2	-76.4	381,543.23	572,416.29	32° 2' 55.542 N	104° 5' 58.578 W	
8,113.0	1.10	227.10	8,110.4	-103.6	-78.0	381,541.83	572,414.65	32° 2' 55.529 N	104° 5' 58.597 W	
8,208.0	1.20	230.30	8,205.3	-104.8	-79.5	381,540.58	572,413.22	32° 2' 55.516 N	104° 5' 58.613 W	
8,303.0	1.10	226.60	8,300.3	-106.1	-80.9	381,539.31	572,411.79	32° 2' 55.504 N	104° 5' 58.630 W	
8,398.0	1.30	225.40	8,395.3	-107.5	-82.3	381,537.93	572,410.36	32° 2' 55.490 N	104° 5' 58.647 W	
8,534.0	1.30	229.30	8,531.3	-109.6	-84.6	381,535.84	572,408.10	32° 2' 55.470 N	104° 5' 58.673 W	
8,591.0	1.20	228.20	8,588.3	-110.4	-85.5	381,535.02	572,407.16	32° 2' 55.461 N	104° 5' 58.684 W	
8,622.0	1.20	229.70	8,619.2	-110.8	-86.0	381,534.60	572,406.67	32° 2' 55.457 N	104° 5' 58.690 W	
8,654.0	2.20	193.50	8,651.2	-111.6	-86.4	381,533.78	572,406.27	32° 2' 55.449 N	104° 5' 58.694 W	
8,686.0	4.50	187.60	8,683.2	-113.5	-86.7	381,531.94	572,405.96	32° 2' 55.431 N	104° 5' 58.698 W	
8,718.0	5.20	201.50	8,715.1	-116.1	-87.4	381,529.35	572,405.26	32° 2' 55.405 N	104° 5' 58.706 W	
8,749.0	5.70	211.50	8,745.9	-118.7	-88.8	381,526.73	572,403.95	32° 2' 55.379 N	104° 5' 58.722 W	
8,782.0	7.30	204.20	8,778.7	-122.0	-90.5	381,523.42	572,402.23	32° 2' 55.347 N	104° 5' 58.742 W	
8,814.0	10.70	192.80	8,810.3	-126.7	-92.0	381,518.66	572,400.74	32° 2' 55.300 N	104° 5' 58.759 W	
8,845.0	15.00	182.20	8,840.5	-133.6	-92.8	381,511.84	572,399.95	32° 2' 55.232 N	104° 5' 58.768 W	
8,877.0	20.30	179.90	8,871.0	-143.2	-92.9	381,502.15	572,399.80	32° 2' 55.136 N	104° 5' 58.770 W	
8,909.0	25.80	178.50	8,900.5	-155.8	-92.7	381,489.63	572,399.99	32° 2' 55.012 N	104° 5' 58.768 W	
8,940.0	30.50	174.50	8,927.8	-170.4	-91.8	381,475.04	572,400.92	32° 2' 54.868 N	104° 5' 58.758 W	
8,972.0	34.10	170.60	8,954.8	-187.3	-89.5	381,458.10	572,403.16	32° 2' 54.700 N	104° 5' 58.732 W	
9,004.0	38.20	168.40	8,980.7	-205.8	-86.1	381,439.55	572,406.62	32° 2' 54.517 N	104° 5' 58.693 W	
9,035.0	42.50	167.20	9,004.3	-225.5	-81.8	381,419.94	572,410.87	32° 2' 54.322 N	104° 5' 58.644 W	
9,067.0	46.70	165.60	9,027.1	-247.3	-76.5	381,398.11	572,416.16	32° 2' 54.108 N	104° 5' 58.583 W	
9,099.0	51.30	164.40	9,048.1	-270.6	-70.3	381,374.79	572,422.42	32° 2' 53.875 N	104° 5' 58.511 W	
9,131.0	55.10	163.40	9,067.2	-295.2	-63.2	381,350.18	572,429.53	32° 2' 53.632 N	104° 5' 58.429 W	
9,162.0	59.10	163.40	9,084.1	-320.2	-55.7	381,325.24	572,436.96	32° 2' 53.385 N	104° 5' 58.343 W	
9,194.0	62.80	163.80	9,099.6	-347.0	-47.8	381,298.41	572,444.86	32° 2' 53.119 N	104° 5' 58.252 W	
9,226.0	66.50	164.00	9,113.3	-374.8	-39.8	381,270.63	572,452.88	32° 2' 52.844 N	104° 5' 58.159 W	
9,257.0	69.80	165.40	9,124.8	-402.5	-32.2	381,242.88	572,460.46	32° 2' 52.569 N	104° 5' 58.072 W	
9,289.0	73.70	166.70	9,134.8	-432.0	-24.9	381,213.39	572,467.79	32° 2' 52.277 N	104° 5' 57.988 W	
9,314.0	77.50	167.30	9,141.1	-455.6	-19.5	381,189.80	572,473.23	32° 2' 52.044 N	104° 5' 57.925 W	
9,346.0	80.20	167.20	9,147.2	-486.2	-12.5	381,159.18	572,480.16	32° 2' 51.740 N	104° 5' 57.845 W	
9,378.0	81.00	166.60	9,152.5	-517.0	-5.4	381,128.44	572,487.31	32° 2' 51.436 N	104° 5' 57.763 W	
9,410.0	83.30	166.60	9,156.8	-547.8	2.0	381,097.60	572,494.66	32° 2' 51.131 N	104° 5' 57.678 W	
9,441.0	85.70	166.90	9,159.8	-577.8	9.0	381,067.57	572,501.73	32° 2' 50.833 N	104° 5' 57.597 W	
9,473.0	87.00	168.50	9,161.9	-609.0	15.8	381,036.37	572,508.53	32° 2' 50.524 N	104° 5' 57.519 W	
9,505.0	87.80	169.20	9,163.3	-640.4	22.0	381,005.00	572,514.72	32° 2' 50.214 N	104° 5' 57.448 W	
9,537.0	89.30	170.20	9,164.1	-671.9	27.7	380,973.53	572,520.44	32° 2' 49.902 N	104° 5' 57.382 W	
9,568.0	89.10	169.70	9,164.5	-702.4	33.1	380,943.01	572,525.84	32° 2' 49.600 N	104° 5' 57.320 W	
9,664.0	89.40	170.20	9,165.8	-796.9	49.9	380,848.49	572,542.60	32° 2' 48.664 N	104° 5' 57.128 W	
9,759.0	89.50	169.00	9,166.7	-890.3	67.0	380,755.06	572,559.74	32° 2' 47.739 N	104° 5' 56.931 W	
9,854.0	89.80	167.10	9,167.3	-983.3	86.7	380,662.12	572,579.41	32° 2' 46.819 N	104° 5' 56.705 W	
9,949.0	89.80	168.80	9,167.6	-1,076.2	106.5	380,569.22	572,599.25	32° 2' 45.899 N	104° 5' 56.476 W	



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #9H
Project:	Eddy County, NM	TVD Reference:	WELL @ 3079.0usft (Original Well Elev)
Site:	Graham Cracker 16 State	MD Reference:	WELL @ 3079.0usft (Original Well Elev)
Well:	#9H	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	
10,044.0	90.00	170.70	9,167.8	-1,169.7	123.4	380,475.74	572,616.15	32° 2' 44.974 N	104° 5' 56.282 W	
10,139.0	91.30	172.40	9,166.7	-1,263.6	137.4	380,381.78	572,630.11	32° 2' 44.044 N	104° 5' 56.123 W	
10,235.0	90.20	174.40	9,165.5	-1,359.0	148.4	380,286.43	572,641.14	32° 2' 43.100 N	104° 5' 55.997 W	
10,330.0	89.80	176.30	9,165.5	-1,453.6	156.1	380,191.75	572,648.84	32° 2' 42.162 N	104° 5' 55.910 W	
10,425.0	90.10	178.60	9,165.5	-1,548.5	160.4	380,096.85	572,653.07	32° 2' 41.223 N	104° 5' 55.863 W	
10,520.0	90.20	180.10	9,165.3	-1,643.5	161.4	380,001.86	572,654.14	32° 2' 40.283 N	104° 5' 55.853 W	
10,615.0	90.70	181.20	9,164.5	-1,738.5	160.4	379,906.87	572,653.07	32° 2' 39.343 N	104° 5' 55.868 W	
10,710.0	91.60	181.10	9,162.6	-1,833.5	158.5	379,811.91	572,651.16	32° 2' 38.403 N	104° 5' 55.892 W	
10,805.0	90.90	182.50	9,160.6	-1,928.4	155.5	379,716.98	572,648.18	32° 2' 37.464 N	104° 5' 55.929 W	
10,900.0	89.60	181.60	9,160.2	-2,023.4	152.1	379,622.05	572,644.78	32° 2' 36.524 N	104° 5' 55.971 W	
10,995.0	91.20	180.80	9,159.5	-2,118.3	150.1	379,527.07	572,642.79	32° 2' 35.585 N	104° 5' 55.997 W	
11,090.0	88.60	181.00	9,159.7	-2,213.3	148.6	379,432.09	572,641.30	32° 2' 34.645 N	104° 5' 56.017 W	
11,186.0	88.40	181.10	9,162.2	-2,309.3	146.8	379,336.14	572,639.54	32° 2' 33.695 N	104° 5' 56.039 W	
11,281.0	89.10	181.80	9,164.2	-2,404.2	144.4	379,241.20	572,637.14	32° 2' 32.756 N	104° 5' 56.070 W	
11,376.0	90.30	181.10	9,164.7	-2,499.2	142.0	379,146.23	572,634.73	32° 2' 31.816 N	104° 5' 56.100 W	
11,471.0	91.00	180.40	9,163.7	-2,594.2	140.8	379,051.25	572,633.49	32° 2' 30.876 N	104° 5' 56.117 W	
11,566.0	92.00	180.10	9,161.2	-2,689.1	140.4	378,956.28	572,633.07	32° 2' 29.936 N	104° 5' 56.124 W	
11,661.0	90.70	180.10	9,158.9	-2,784.1	140.2	378,861.31	572,632.91	32° 2' 28.996 N	104° 5' 56.128 W	
11,756.0	89.50	179.80	9,158.8	-2,879.1	140.3	378,766.31	572,632.99	32° 2' 28.056 N	104° 5' 56.130 W	
11,851.0	91.10	179.70	9,158.3	-2,974.1	140.7	378,671.32	572,633.41	32° 2' 27.116 N	104° 5' 56.127 W	
11,946.0	89.90	180.10	9,157.4	-3,069.1	140.9	378,576.32	572,633.57	32° 2' 26.176 N	104° 5' 56.128 W	
12,041.0	90.80	181.80	9,156.9	-3,164.1	139.3	378,481.34	572,632.00	32° 2' 25.236 N	104° 5' 56.149 W	
12,136.0	89.50	181.90	9,156.6	-3,259.0	136.2	378,386.40	572,628.93	32° 2' 24.296 N	104° 5' 56.187 W	
12,231.0	90.60	183.00	9,156.5	-3,353.9	132.2	378,291.48	572,624.87	32° 2' 23.357 N	104° 5' 56.236 W	
12,326.0	90.30	181.50	9,155.8	-3,448.8	128.4	378,196.56	572,621.14	32° 2' 22.418 N	104° 5' 56.282 W	
12,421.0	88.70	180.90	9,156.6	-3,543.8	126.4	378,101.59	572,619.15	32° 2' 21.478 N	104° 5' 56.307 W	
12,517.0	90.20	180.80	9,157.5	-3,639.8	125.0	378,005.61	572,617.73	32° 2' 20.528 N	104° 5' 56.326 W	
12,612.0	91.70	181.20	9,156.0	-3,734.8	123.4	377,910.64	572,616.07	32° 2' 19.588 N	104° 5' 56.348 W	
12,708.0	90.60	179.90	9,154.0	-3,830.7	122.4	377,814.67	572,615.15	32° 2' 18.638 N	104° 5' 56.361 W	
12,803.0	89.70	180.10	9,153.8	-3,925.7	122.4	377,719.67	572,615.15	32° 2' 17.698 N	104° 5' 56.364 W	
12,898.0	91.30	179.70	9,153.0	-4,020.7	122.6	377,624.68	572,615.31	32° 2' 16.758 N	104° 5' 56.364 W	
12,992.0	90.90	178.30	9,151.2	-4,114.7	124.3	377,530.71	572,616.95	32° 2' 15.828 N	104° 5' 56.347 W	
13,087.0	89.70	177.90	9,150.7	-4,209.6	127.4	377,435.77	572,620.10	32° 2' 14.888 N	104° 5' 56.313 W	
13,182.0	90.50	177.50	9,150.5	-4,304.6	131.2	377,340.84	572,623.92	32° 2' 13.949 N	104° 5' 56.271 W	
13,278.0	88.20	176.50	9,151.6	-4,400.4	136.2	377,244.99	572,628.94	32° 2' 13.000 N	104° 5' 56.215 W	
13,373.0	88.50	176.40	9,154.3	-4,495.2	142.1	377,150.21	572,634.82	32° 2' 12.062 N	104° 5' 56.149 W	
13,468.0	88.60	176.40	9,156.7	-4,590.0	148.1	377,055.43	572,640.78	32° 2' 11.124 N	104° 5' 56.082 W	
13,560.0	89.40	176.90	9,158.3	-4,681.8	153.5	376,963.60	572,646.16	32° 2' 10.215 N	104° 5' 56.022 W	
13,611.0	89.40	176.90	9,158.9	-4,732.7	156.2	376,912.68	572,648.91	32° 2' 9.711 N	104° 5' 55.992 W	
PBHL(GCST#9H)										

Checked By: _____ Approved By: _____ Date: _____