



PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

NM OIL CONSERVATION
ARTESIA DISTRICT

JUN 13 2016

RECEIVED

April 5, 2016

30-015-43417

COG, LLC
One Concho Center
600 W. Illinois Ave.
Midland, TX 79701

RE: Bone Yard 11 Fee 11H
120' FNL & 170' FWL
Sec. 11, T20S, R25E
Eddy County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

Very truly yours,

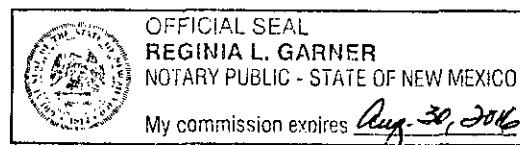
A handwritten signature in cursive script, appearing to read "Chris Graham".

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 5th day of April, 2016.

A handwritten signature in cursive script, appearing to read "Regina L. Garner".

Notary Public

Bone Yard 11 Fee 11H

Date	Depth	Deviation	Direction
3/27/2016	153	1.20	23.30
3/27/2016	244	2.80	50.30
3/27/2016	331	4.40	52.10
3/27/2016	507	6.90	55.90
3/27/2016	599	7.30	56.90
3/27/2016	688	7.90	56.50
3/27/2016	750	7.80	59.40
3/27/2016	812	7.30	63.40
3/27/2016	906	6.60	68.20
3/29/2016	1213	7.30	73.00
3/29/2016	1307	5.60	64.70
3/29/2016	1400	5.30	65.50
3/29/2016	1494	5.30	64.10
3/29/2016	1587	5.20	63.20
3/29/2016	1680	5.40	60.30
3/29/2016	1774	5.40	61.40
3/29/2016	1871	5.51	60.21
3/29/2016	1960	5.40	60.70
3/29/2016	2053	3.80	55.20
3/29/2016	2146	2.30	39.10
3/29/2016	2239	0.90	55.50
3/29/2016	2270	0.70	77.10
3/29/2016	2301	0.40	57.80
3/29/2016	2332	1.30	171.10
3/29/2016	2363	5.00	173.80
3/29/2016	2426	13.10	173.80
3/29/2016	2457	17.30	174.70
3/30/2016	2519	24.00	172.80
3/30/2016	2613	32.70	175.10
3/30/2016	2706	42.70	179.40
3/30/2016	2799	51.60	182.00
3/30/2016	2830	54.40	181.70
3/30/2016	2861	57.90	181.50
3/30/2016	2892	61.40	181.40
3/30/2016	2923	64.80	181.40
3/30/2016	2955	68.80	182.00
3/30/2016	2969	68.80	182.32
3/30/2016	2986	71.60	182.30
3/30/2016	3017	74.30	182.30
3/30/2016	3048	76.90	182.10
3/30/2016	3079	79.00	182.10
3/30/2016	3110	80.90	182.00

Date	Depth	Deviation	Direction
3/30/2016	3142	83.20	182.20
3/30/2016	3173	85.00	181.70
3/30/2016	3204	85.70	181.10
3/30/2016	3235	87.30	180.80
3/30/2016	3266	87.40	179.60
3/30/2016	3328	87.30	179.40
3/30/2016	3360	87.50	179.30
3/30/2016	3390	87.40	179.30
3/30/2016	3421	87.50	179.40
3/30/2016	3514	89.60	180.70
3/31/2016	3825	89.60	177.20
3/31/2016	3919	90.20	177.50
3/31/2016	4012	90.90	177.90
3/31/2016	4105	91.20	178.30
3/31/2016	4198	91.60	178.60
3/31/2016	4413	89.60	177.30
3/31/2016	4507	90.00	177.30
3/31/2016	4600	90.20	179.70
3/31/2016	4694	90.30	180.20
3/31/2016	4725	90.80	182.70
3/31/2016	4882	90.50	185.20
3/31/2016	4915	90.20	185.20
4/1/2016	5069	90.30	183.20
4/1/2016	5162	90.10	185.70
4/1/2016	5255	90.20	183.70
4/1/2016	5349	88.80	184.40
4/1/2016	5442	89.70	182.00
4/1/2016	5535	91.30	181.10
4/1/2016	5628	90.80	179.20
4/1/2016	5722	90.80	179.00
4/1/2016	5816	90.80	179.30
4/1/2016	5904	90.80	179.40
4/1/2016	6002	90.80	179.60
4/1/2016	6095	90.40	179.80
4/1/2016	6189	90.50	180.20
4/1/2016	6283	90.30	180.40
4/1/2016	6376	90.30	180.40
4/1/2016	6562	89.80	180.60
4/2/2016	6654	90.80	179.90
4/2/2016	6934	90.00	179.70
4/2/2016	7121	91.70	180.10
4/2/2016	7214	91.30	181.30
4/2/2016	7307	90.90	181.70
4/2/2016	7401	91.00	181.60
4/2/2016	7495	90.80	181.60



NM OIL CONSERVATION

ARTESIA DISTRICT

JUN 13 2016

RECEIVED

COG Operating LLC

Eddy County, NM (NAD-27 2015)

Bone Yard 11 Fee #11H

API #: 30-015-43417

SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D

PP: 330' FNL, 358' FWL, Sec 11, T20S, R25E, Unit D

BHL: 376' FSL, 352' FWL, Sec 11, T20S, R25E, Unit M

Design: BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M

Standard Survey Report

04 April, 2016





TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3409.00usft (Silver Oak 3)
Site:	Bone Yard 11 Fee #11H	MD Reference:	KB @ 3409.00usft (Silver Oak 3)
Well:	SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM (NAD-27 2015)		
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	Bone Yard 11 Fee #11H		
Site Position:	Map	Northing: 580,155.40 usft	Latitude: 32° 35' 41.588 N
From:		Easting: 460,056.30 usft	Longitude: 104° 27' 46.910 W
Position Uncertainty:	0.00 usft	Slot Radius: 13.20 in	Grid Convergence: -0.07 °

Well	SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D		
Well Position	+N/-S 0.00 usft	Northing: 580,155.40 usft	Latitude: 32° 35' 41.588 N
	+E/-W 0.00 usft	Easting: 460,056.30 usft	Longitude: 104° 27' 46.910 W
Position Uncertainty	0.00 usft	Wellhead Elevation: 0.00 usft	Ground Level: 3,391.00 usft

Wellbore	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/11/2015	7.55	60.27	48,217

Design	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	178.37

Survey Program	Date 4/4/2016				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
90.00	7,586.00	Survey #1 (BHL: 350' FSL, 350' FWL, Sec	MWD	MWD - Standard	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90.00	0.40	42.70	90.00	0.23	0.21	-0.22	0.44	0.44	0.00
First TDS MWD Survey									
153.00	1.20	53.30	152.99	0.79	0.89	-0.76	1.29	1.27	16.83
244.00	2.80	50.30	243.93	2.78	3.37	-2.68	1.76	1.76	-3.30
331.00	4.40	52.10	330.76	6.18	7.63	-5.96	1.84	1.84	2.07
420.00	5.90	54.30	419.40	10.95	14.04	-10.55	1.70	1.69	2.47



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3409.00usft (Silver Oak 3)
Site:	Bone Yard 11 Fee #11H	MD Reference:	KB @ 3409.00usft (Silver Oak 3)
Well:	SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
507.00	6.90	55.90	505.85	16.49	22.00	-15.86	1.17	1.15	1.84
599.00	7.30	56.90	597.15	22.78	31.47	-21.88	0.46	0.43	1.09
688.00	7.90	56.50	685.37	29.24	41.31	-28.06	0.68	0.67	-0.45
750.00	7.80	59.40	746.79	33.74	48.49	-32.34	0.66	-0.16	4.68
812.00	7.30	63.40	808.25	37.64	55.63	-36.04	1.17	-0.81	6.45
906.00	6.60	68.20	901.56	42.32	65.99	-40.43	0.97	-0.74	5.11
999.00	6.90	68.40	993.91	46.36	76.14	-44.18	0.32	0.32	0.22
1,062.00	7.10	70.10	1,056.44	49.08	83.32	-46.69	0.46	0.32	2.70
1,152.00	7.30	72.70	1,145.73	52.68	94.01	-49.98	0.42	0.22	2.89
1,213.00	7.30	73.00	1,206.24	54.96	101.42	-52.05	0.06	0.00	0.49
1,307.00	5.60	64.70	1,299.64	58.67	111.28	-55.48	2.06	-1.81	-8.83
1,400.00	5.30	65.50	1,392.22	62.39	119.29	-58.97	0.33	-0.32	0.86
1,494.00	5.30	64.10	1,485.82	66.09	127.14	-62.44	0.14	0.00	-1.49
1,587.00	5.20	63.20	1,578.43	69.86	134.77	-66.00	0.14	-0.11	-0.97
1,680.00	5.40	60.30	1,671.03	73.93	142.33	-69.85	0.36	0.22	-3.12
1,774.00	5.40	61.40	1,764.62	78.24	150.06	-73.94	0.11	0.00	1.17
1,867.00	5.50	60.20	1,857.20	82.55	157.77	-78.03	0.16	0.11	-1.29
1,960.00	5.40	60.70	1,949.78	86.90	165.45	-82.16	0.12	-0.11	0.54
2,053.00	3.80	55.20	2,042.47	90.81	171.80	-85.88	1.78	-1.72	-5.91
2,146.00	2.30	39.10	2,135.34	94.01	175.50	-88.98	1.84	-1.61	-17.31
2,239.00	0.90	85.80	2,228.31	95.51	177.41	-90.43	1.94	-1.51	50.22
2,270.00	0.70	77.10	2,259.30	95.57	177.84	-90.48	0.75	-0.65	-28.06
2,301.00	0.40	57.80	2,290.30	95.67	178.11	-90.57	1.12	-0.97	-62.26
2,332.00	1.30	171.10	2,321.30	95.38	178.26	-90.28	4.85	2.90	365.48
2,363.00	5.00	173.80	2,352.25	93.69	178.46	-88.58	11.94	11.94	8.71
2,395.00	9.00	174.20	2,384.00	89.82	178.86	-84.69	12.50	12.50	1.25
2,426.00	13.10	173.80	2,414.42	83.91	179.49	-78.77	13.23	13.23	-1.29
2,457.00	17.30	174.70	2,444.33	75.82	180.29	-70.66	13.57	13.55	2.90
2,488.00	21.20	174.30	2,473.59	65.65	181.28	-60.47	12.59	12.58	-1.29
2,519.00	24.00	172.80	2,502.21	53.82	182.62	-48.60	9.22	9.03	-4.84
2,550.00	26.50	172.20	2,530.24	40.71	184.35	-35.45	8.11	8.06	-1.94
2,581.00	29.30	173.80	2,557.64	26.31	186.11	-21.01	9.35	9.03	5.16
2,613.00	32.70	175.10	2,585.06	9.91	187.70	-4.57	10.83	10.63	4.06
2,644.00	36.70	176.20	2,610.54	-7.68	189.02	13.06	13.06	12.90	3.55
2,675.00	39.90	177.80	2,634.87	-26.87	190.02	32.26	10.81	10.32	5.16
2,706.00	42.70	179.40	2,658.16	-47.32	190.51	52.72	9.65	9.03	5.16
2,737.00	45.70	180.60	2,680.38	-68.93	190.51	74.32	10.05	9.68	3.87
2,768.00	48.20	181.70	2,701.54	-91.57	190.05	96.94	8.47	8.06	3.55
2,799.00	51.60	182.00	2,721.51	-115.27	189.28	120.61	10.99	10.97	0.97
2,830.00	54.40	181.70	2,740.16	-140.01	188.48	145.32	9.07	9.03	-0.97
2,861.00	57.90	181.50	2,757.42	-165.74	187.76	171.02	11.30	11.29	-0.65



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3409.00usft (Silver Oak 3)
Site:	Bone Yard 11 Fee #11H	MD Reference:	KB @ 3409.00usft (Silver Oak 3)
Well:	SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D	North Reference:	Grid
Wellbore:	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,892.00	61.40	181.40	2,773.09	-192.48	187.09	197.73	11.29	11.29	-0.32
2,923.00	64.80	182.00	2,787.11	-220.11	186.27	225.32	11.10	10.97	1.94
2,955.00	68.80	182.30	2,799.71	-249.50	185.16	254.66	12.53	12.50	0.94
2,986.00	71.60	182.30	2,810.21	-278.64	183.99	283.76	9.03	9.03	0.00
3,017.00	74.30	182.10	2,819.30	-308.25	182.85	313.33	8.73	8.71	-0.65
3,048.00	76.90	182.10	2,827.01	-338.25	181.75	343.29	8.39	8.39	0.00
3,079.00	79.00	182.00	2,833.48	-368.55	180.67	373.54	6.78	6.77	-0.32
3,110.00	80.90	182.20	2,838.89	-399.05	179.55	404.00	6.16	6.13	0.65
3,142.00	83.20	181.70	2,843.32	-430.72	178.47	435.63	7.35	7.19	-1.56
3,173.00	85.00	181.10	2,846.50	-461.55	177.72	466.42	6.12	5.81	-1.94
3,204.00	85.70	180.80	2,849.02	-492.44	177.21	497.28	2.46	2.26	-0.97
3,235.00	87.30	179.60	2,850.91	-523.38	177.10	528.21	6.45	5.16	-3.87
3,266.00	87.40	179.40	2,852.34	-554.35	177.37	559.17	0.72	0.32	-0.65
3,360.00	87.50	179.30	2,856.52	-648.25	178.44	653.06	0.15	0.11	-0.11
3,453.00	89.50	180.90	2,858.96	-741.21	178.27	745.98	2.75	2.15	1.72
3,546.00	89.80	180.90	2,859.53	-834.20	176.81	838.89	0.32	0.32	0.00
3,639.00	90.20	181.00	2,859.53	-927.18	175.27	931.79	0.44	0.43	0.11
3,732.00	90.20	178.60	2,859.20	-1,020.18	175.59	1,024.76	2.58	0.00	-2.58
3,825.00	89.60	177.20	2,859.36	-1,113.11	179.00	1,117.75	1.64	-0.65	-1.51
3,919.00	90.20	177.50	2,859.53	-1,207.01	183.35	1,211.74	0.71	0.64	0.32
4,012.00	90.90	177.90	2,858.64	-1,299.93	187.08	1,304.72	0.87	0.75	0.43
4,105.00	91.20	178.30	2,856.93	-1,392.86	190.16	1,397.71	0.54	0.32	0.43
4,198.00	91.60	178.60	2,854.66	-1,485.80	192.68	1,490.68	0.54	0.43	0.32
4,291.00	91.30	177.50	2,852.31	-1,578.71	195.84	1,583.65	1.23	-0.32	-1.18
4,351.00	90.00	177.30	2,851.63	-1,638.65	198.56	1,643.63	2.19	-2.17	-0.33
4,413.00	89.60	177.30	2,851.84	-1,700.58	201.48	1,705.62	0.65	-0.65	0.00
4,507.00	90.00	177.30	2,852.17	-1,794.47	205.91	1,799.60	0.43	0.43	0.00
4,600.00	90.20	179.70	2,852.01	-1,887.43	208.35	1,892.60	2.59	0.22	2.58
4,694.00	90.30	180.20	2,851.60	-1,981.43	208.43	1,986.56	0.54	0.11	0.53
4,788.00	90.80	182.70	2,850.69	-2,075.39	206.05	2,080.41	2.71	0.53	2.66
4,882.00	90.50	185.20	2,849.63	-2,169.15	199.58	2,173.95	2.68	-0.32	2.66
4,975.00	90.20	185.20	2,849.06	-2,261.77	191.15	2,266.29	0.32	-0.32	0.00
5,069.00	90.30	185.20	2,848.65	-2,355.38	182.63	2,359.62	0.11	0.11	0.00
5,162.00	90.10	185.70	2,848.33	-2,447.96	173.79	2,451.91	0.58	-0.22	0.54
5,255.00	90.20	185.70	2,848.08	-2,540.50	164.56	2,544.15	0.11	0.11	0.00
5,349.00	88.80	184.40	2,848.90	-2,634.13	156.28	2,637.51	2.03	-1.49	-1.38
5,442.00	89.70	182.00	2,850.12	-2,726.97	151.09	2,730.16	2.76	0.97	-2.58
5,535.00	91.30	181.10	2,849.31	-2,819.93	148.58	2,823.01	1.97	1.72	-0.97
5,628.00	90.80	179.20	2,847.60	-2,912.90	148.34	2,915.95	2.11	-0.54	-2.04
5,722.00	90.80	179.00	2,846.29	-3,006.88	149.81	3,009.93	0.21	0.00	-0.21
5,816.00	90.80	179.30	2,844.98	-3,100.86	151.21	3,103.91	0.32	0.00	0.32

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 120' FNL, 170' FWL, Sec 11, T20S, R25E, Unit D
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Wellbore:	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FSL, 350' FWL, Sec 11, T20S, R25E, Unit M	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,909.00	90.80	179.40	2,843.68	-3,193.85	152.26	3,196.89	0.11	0.00	0.11
6,002.00	90.80	179.60	2,842.38	-3,286.84	153.07	3,289.86	0.22	0.00	0.22
6,095.00	90.40	179.80	2,841.41	-3,379.83	153.56	3,382.83	0.48	-0.43	0.22
6,189.00	90.50	180.20	2,840.67	-3,473.83	153.56	3,476.79	0.44	0.11	0.43
6,283.00	90.30	180.40	2,840.01	-3,567.82	153.07	3,570.73	0.30	-0.21	0.21
6,376.00	90.30	180.40	2,839.53	-3,660.82	152.42	3,663.67	0.00	0.00	0.00
6,469.00	90.30	180.50	2,839.04	-3,753.82	151.69	3,756.61	0.11	0.00	0.11
6,562.00	89.80	180.60	2,838.96	-3,846.81	150.79	3,849.54	0.55	-0.54	0.11
6,654.00	90.80	179.90	2,838.48	-3,938.81	150.39	3,941.49	1.33	1.09	-0.76
6,748.00	90.40	179.40	2,837.49	-4,032.80	150.97	4,035.46	0.68	-0.43	-0.53
6,841.00	90.20	179.70	2,837.01	-4,125.80	151.70	4,128.44	0.39	-0.22	0.32
6,934.00	90.00	179.70	2,836.84	-4,218.79	152.18	4,221.42	0.22	-0.22	0.00
7,028.00	90.90	179.70	2,836.10	-4,312.79	152.68	4,315.39	0.96	0.96	0.00
7,121.00	91.70	180.10	2,833.99	-4,405.76	152.84	4,408.33	0.96	0.86	0.43
7,214.00	91.30	181.30	2,831.56	-4,498.72	151.70	4,501.22	1.36	-0.43	1.29
7,307.00	90.90	181.70	2,829.77	-4,591.67	149.27	4,594.06	0.61	-0.43	0.43
7,401.00	91.00	181.60	2,828.22	-4,685.62	146.56	4,687.89	0.15	0.11	-0.11
7,495.00	90.80	181.60	2,826.74	-4,779.57	143.94	4,781.73	0.21	-0.21	0.00
Final TDS MWD Survey									
7,586.00	90.80	181.60	2,825.47	-4,870.53	141.40	4,872.58	0.00	0.00	0.00
Projection to Bit/VD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
90.00	90.00	0.23	0.21	First TDS MWD Survey
7,495.00	2,826.74	-4,779.57	143.94	Final TDS MWD Survey
7,586.00	2,825.47	-4,870.53	141.40	Projection to Bit/VD

Checked By: _____ Approved By: _____ Date: _____