

30-025-41137

HOBBS OCD

APR 30 2015

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COG Operating, LLC.

Lea County, N.M.

Section 12 T21-S R33-E Bobwhite 12 State Com #3H

Bobwhite 12 State Com #3H

Original Hole

Design: Original Hole

Survey Report - Geographic

20 February, 2015

MAY 04 2015

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Stryker Directional Survey Report - Geographic

Company:	COG Operating, LLC.	Local Co-ordinate Reference:	Well Bobwhite 12 State Com #3H
Project:	Lea County, N.M.	TVD Reference:	GL 3777+26 @ 3803.0usft (Precision 590)
Site:	Section 12 T21-S R33-E Bobwhite 12 State Com #3H	MD Reference:	GL 3777+26 @ 3803.0usft (Precision 590)
Well:	Bobwhite 12 State Com #3H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Original Hole	Database:	Stryker_EDM

Project	Lea County, N.M.		
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	Section 12 T21-S R33-E Bobwhite 12 State Com #3H				
Site Position:		Northing:	546,577.50 usft	Latitude:	32° 30' 0.052 N
From:	Map	Easting:	751,167.25 usft	Longitude:	103° 31' 7.184 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.44 °

Well	Bobwhite 12 State Com #3H					
Well Position	+N/-S	0.0 usft	Northing:	546,577.50 usft	Latitude:	32° 30' 0.052 N
	+E/-W	0.0 usft	Easting:	751,167.25 usft	Longitude:	103° 31' 7.184 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,777.0 usft

Wellbore	Original Hole				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/20/2015	7.21	60.36	48,354

Design	Original Hole				
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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	187.99

Survey Program		Date 2/20/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
117.0	11,032.0	KP Gyro Survey (Original Hole)	NSG-GYC_WL	Gyro in gyrocompassing mode on wireline	
11,075.0	16,135.0	Stryker MWD Survey (Original Hole)	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	546,577.50	751,167.25	32° 30' 0.052 N	103° 31' 7.184 W
117.0	0.09	194.64	117.0	-0.1	0.0	546,577.41	751,167.22	32° 30' 0.051 N	103° 31' 7.184 W
273.0	0.22	226.63	273.0	-0.4	-0.3	546,577.09	751,166.97	32° 30' 0.048 N	103° 31' 7.187 W
376.0	0.31	310.49	376.0	-0.4	-0.6	546,577.13	751,166.62	32° 30' 0.049 N	103° 31' 7.191 W
487.0	0.40	323.89	487.0	0.1	-1.1	546,577.64	751,166.16	32° 30' 0.054 N	103° 31' 7.197 W
578.0	0.09	25.37	578.0	0.5	-1.2	546,577.96	751,166.01	32° 30' 0.057 N	103° 31' 7.199 W
674.0	0.09	349.89	674.0	0.6	-1.2	546,578.11	751,166.02	32° 30' 0.058 N	103° 31' 7.198 W
765.0	0.40	340.06	765.0	1.0	-1.3	546,578.47	751,165.90	32° 30' 0.062 N	103° 31' 7.200 W
853.0	0.62	7.13	853.0	1.7	-1.4	546,579.24	751,165.86	32° 30' 0.069 N	103° 31' 7.200 W
954.0	0.49	29.30	954.0	2.7	-1.1	546,580.15	751,166.14	32° 30' 0.079 N	103° 31' 7.197 W

Stryker Directional

Survey Report - Geographic

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Project:	Lea County, N.M.	TVD Reference:	GL 3777+26 @ 3803.0usft (Precision 590)
Site:	Section 12 T21-S R33-E Bobwhite 12 State Com #3H	MD Reference:	GL 3777+26 @ 3803.0usft (Precision 590)
Well:	Bobwhite 12 State Com #3H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Original Hole	Database:	Stryker_EDM

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,049.0	0.31	11.05	1,049.0	3.3	-0.9	546,580.76	751,166.39	32° 30' 0.085 N	103° 31' 7.194 W
1,145.0	0.09	79.75	1,145.0	3.5	-0.7	546,581.03	751,166.51	32° 30' 0.087 N	103° 31' 7.192 W
1,239.0	0.31	64.11	1,239.0	3.7	-0.4	546,581.15	751,166.81	32° 30' 0.088 N	103° 31' 7.189 W
1,333.0	0.62	130.78	1,333.0	3.4	0.2	546,580.93	751,167.42	32° 30' 0.086 N	103° 31' 7.182 W
1,426.0	0.80	112.23	1,426.0	2.9	1.2	546,580.36	751,168.41	32° 30' 0.080 N	103° 31' 7.170 W
1,520.0	0.62	141.49	1,520.0	2.2	2.1	546,579.71	751,169.33	32° 30' 0.074 N	103° 31' 7.160 W
1,613.0	1.19	182.21	1,613.0	0.9	2.4	546,578.35	751,169.61	32° 30' 0.060 N	103° 31' 7.156 W
1,703.0	1.50	187.15	1,702.9	-1.3	2.2	546,576.25	751,169.42	32° 30' 0.040 N	103° 31' 7.159 W
1,781.0	1.33	192.57	1,780.9	-3.1	1.9	546,574.35	751,169.10	32° 30' 0.021 N	103° 31' 7.163 W
1,894.0	0.88	214.69	1,893.9	-5.1	1.1	546,572.36	751,168.32	32° 30' 0.001 N	103° 31' 7.172 W
2,081.0	0.62	162.86	2,080.9	-7.3	0.6	546,570.21	751,167.80	32° 29' 59.980 N	103° 31' 7.178 W
2,174.0	0.22	177.19	2,173.9	-7.9	0.7	546,569.55	751,167.96	32° 29' 59.974 N	103° 31' 7.177 W
2,269.0	0.31	208.69	2,268.9	-8.4	0.6	546,569.15	751,167.84	32° 29' 59.969 N	103° 31' 7.178 W
2,356.0	0.31	234.17	2,355.9	-8.7	0.3	546,568.80	751,167.54	32° 29' 59.966 N	103° 31' 7.181 W
2,450.0	0.00	13.43	2,449.9	-8.8	0.1	546,568.65	751,167.33	32° 29' 59.965 N	103° 31' 7.184 W
2,543.0	0.49	95.49	2,542.9	-8.9	0.5	546,568.62	751,167.73	32° 29' 59.964 N	103° 31' 7.179 W
2,636.0	0.40	114.13	2,635.9	-9.1	1.2	546,568.44	751,168.42	32° 29' 59.962 N	103° 31' 7.171 W
2,730.0	0.62	64.59	2,729.9	-9.0	1.9	546,568.53	751,169.18	32° 29' 59.963 N	103° 31' 7.162 W
2,823.0	0.40	92.75	2,822.9	-8.8	2.7	546,568.73	751,169.96	32° 29' 59.965 N	103° 31' 7.153 W
2,910.0	0.40	92.36	2,909.9	-8.8	3.3	546,568.70	751,170.57	32° 29' 59.965 N	103° 31' 7.146 W
3,003.0	1.41	57.59	3,002.8	-8.2	4.6	546,569.30	751,171.86	32° 29' 59.971 N	103° 31' 7.131 W
3,097.0	2.30	80.72	3,096.8	-7.3	7.4	546,570.23	751,174.70	32° 29' 59.980 N	103° 31' 7.098 W
3,190.0	3.00	83.85	3,189.7	-6.7	11.7	546,570.79	751,178.96	32° 29' 59.985 N	103° 31' 7.048 W
3,268.0	2.60	87.90	3,267.6	-6.4	15.5	546,571.07	751,182.75	32° 29' 59.987 N	103° 31' 7.004 W
3,360.0	2.10	101.90	3,359.5	-6.7	19.2	546,570.80	751,186.49	32° 29' 59.984 N	103° 31' 6.960 W
3,453.0	1.40	100.70	3,452.5	-7.3	22.0	546,570.24	751,189.27	32° 29' 59.979 N	103° 31' 6.928 W
3,545.0	0.40	91.20	3,544.5	-7.5	23.5	546,570.02	751,190.70	32° 29' 59.976 N	103° 31' 6.911 W
3,637.0	0.50	66.50	3,636.5	-7.3	24.1	546,570.18	751,191.39	32° 29' 59.978 N	103° 31' 6.903 W
3,729.0	0.50	59.90	3,728.5	-7.0	24.9	546,570.54	751,192.10	32° 29' 59.981 N	103° 31' 6.895 W
3,822.0	0.80	86.60	3,821.5	-6.7	25.9	546,570.78	751,193.10	32° 29' 59.984 N	103° 31' 6.883 W
3,914.0	0.90	85.50	3,913.4	-6.6	27.2	546,570.87	751,194.46	32° 29' 59.985 N	103° 31' 6.867 W
4,006.0	0.90	86.60	4,005.4	-6.5	28.7	546,570.97	751,195.90	32° 29' 59.985 N	103° 31' 6.850 W
4,098.0	1.10	103.90	4,097.4	-6.7	30.2	546,570.80	751,197.48	32° 29' 59.984 N	103° 31' 6.832 W
4,191.0	1.40	97.50	4,190.4	-7.1	32.2	546,570.44	751,199.48	32° 29' 59.980 N	103° 31' 6.808 W
4,283.0	1.10	95.90	4,282.4	-7.3	34.2	546,570.20	751,201.47	32° 29' 59.977 N	103° 31' 6.785 W
4,375.0	0.90	98.50	4,374.4	-7.5	35.8	546,570.01	751,203.06	32° 29' 59.975 N	103° 31' 6.767 W
4,467.0	0.80	88.10	4,466.3	-7.6	37.2	546,569.92	751,204.42	32° 29' 59.974 N	103° 31' 6.751 W
4,544.0	0.40	114.83	4,543.3	-7.7	38.0	546,569.83	751,205.20	32° 29' 59.973 N	103° 31' 6.742 W
4,607.0	0.49	163.88	4,606.3	-8.0	38.2	546,569.47	751,205.47	32° 29' 59.970 N	103° 31' 6.738 W
4,657.0	0.40	162.86	4,656.3	-8.4	38.3	546,569.10	751,205.58	32° 29' 59.966 N	103° 31' 6.737 W
4,751.0	0.49	117.34	4,750.3	-8.9	38.8	546,568.60	751,206.04	32° 29' 59.961 N	103° 31' 6.732 W
4,844.0	0.40	114.83	4,843.3	-9.2	39.4	546,568.29	751,206.69	32° 29' 59.958 N	103° 31' 6.724 W
4,938.0	0.09	343.54	4,937.3	-9.3	39.7	546,568.22	751,206.96	32° 29' 59.957 N	103° 31' 6.721 W
5,027.0	0.31	2.53	5,026.3	-9.0	39.7	546,568.53	751,206.95	32° 29' 59.960 N	103° 31' 6.721 W
5,120.0	0.09	139.68	5,119.3	-8.8	39.8	546,568.72	751,207.01	32° 29' 59.962 N	103° 31' 6.721 W
5,213.0	0.31	91.17	5,212.3	-8.8	40.1	546,568.66	751,207.31	32° 29' 59.962 N	103° 31' 6.717 W
5,307.0	0.22	8.23	5,306.3	-8.7	40.3	546,568.83	751,207.59	32° 29' 59.963 N	103° 31' 6.714 W
5,397.0	0.49	0.99	5,396.3	-8.1	40.4	546,569.39	751,207.62	32° 29' 59.969 N	103° 31' 6.713 W
5,489.0	0.40	37.93	5,488.3	-7.5	40.6	546,570.04	751,207.83	32° 29' 59.975 N	103° 31' 6.711 W
5,625.0	0.22	198.87	5,624.3	-7.3	40.8	546,570.16	751,208.03	32° 29' 59.977 N	103° 31' 6.709 W
5,676.0	0.22	80.33	5,675.3	-7.4	40.9	546,570.09	751,208.10	32° 29' 59.976 N	103° 31' 6.708 W
5,770.0	0.22	222.31	5,769.3	-7.5	40.9	546,569.98	751,208.16	32° 29' 59.975 N	103° 31' 6.707 W
5,862.0	0.09	132.59	5,861.3	-7.7	40.8	546,569.80	751,208.09	32° 29' 59.973 N	103° 31' 6.708 W
5,955.0	0.09	200.45	5,954.3	-7.8	40.9	546,569.69	751,208.12	32° 29' 59.972 N	103° 31' 6.708 W

Stryker Directional

Survey Report - Geographic

Company:	COG Operating, LLC.	Local Co-ordinate Reference:	Well Bobwhite 12 State Com #3H
Project:	Lea County, N.M.	TVD Reference:	GL 3777+26 @ 3803.0usft (Precision 590)
Site:	Section 12 T21-S R33-E Bobwhite 12 State Com #3H	MD Reference:	GL 3777+26 @ 3803.0usft (Precision 590)
Well:	Bobwhite 12 State Com #3H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Original Hole	Database:	Stryker_EDM

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,045.0	0.09	268.05	6,044.3	-7.9	40.8	546,569.62	751,208.02	32° 29' 59.971 N	103° 31' 6.709 W
6,138.0	0.09	271.75	6,137.3	-7.9	40.6	546,569.62	751,207.88	32° 29' 59.971 N	103° 31' 6.710 W
6,231.0	0.09	172.21	6,230.3	-8.0	40.6	546,569.55	751,207.81	32° 29' 59.970 N	103° 31' 6.711 W
6,323.0	0.09	195.56	6,322.3	-8.1	40.6	546,569.41	751,207.80	32° 29' 59.969 N	103° 31' 6.711 W
6,415.0	0.22	197.37	6,414.3	-8.3	40.5	546,569.17	751,207.73	32° 29' 59.967 N	103° 31' 6.712 W
6,506.0	0.22	283.48	6,505.3	-8.5	40.3	546,569.04	751,207.51	32° 29' 59.965 N	103° 31' 6.715 W
6,599.0	0.22	236.06	6,598.3	-8.5	39.9	546,568.98	751,207.19	32° 29' 59.965 N	103° 31' 6.719 W
6,693.0	0.22	314.98	6,692.3	-8.5	39.7	546,569.01	751,206.91	32° 29' 59.965 N	103° 31' 6.722 W
6,786.0	0.22	314.76	6,785.3	-8.2	39.4	546,569.26	751,206.66	32° 29' 59.968 N	103° 31' 6.725 W
6,879.0	0.00	254.83	6,878.3	-8.1	39.3	546,569.39	751,206.53	32° 29' 59.969 N	103° 31' 6.726 W
6,969.0	0.31	302.25	6,968.3	-8.0	39.1	546,569.52	751,206.32	32° 29' 59.970 N	103° 31' 6.729 W
7,061.0	0.40	269.24	7,060.3	-7.9	38.5	546,569.65	751,205.79	32° 29' 59.972 N	103° 31' 6.735 W
7,154.0	0.31	216.23	7,153.3	-8.1	38.1	546,569.44	751,205.32	32° 29' 59.970 N	103° 31' 6.740 W
7,245.0	0.40	219.40	7,244.3	-8.5	37.7	546,569.00	751,204.97	32° 29' 59.965 N	103° 31' 6.744 W
7,338.0	0.71	208.47	7,337.3	-9.3	37.2	546,568.24	751,204.49	32° 29' 59.958 N	103° 31' 6.750 W
7,431.0	0.80	220.90	7,430.3	-10.3	36.5	546,567.24	751,203.79	32° 29' 59.948 N	103° 31' 6.758 W
7,525.0	0.80	211.21	7,524.3	-11.3	35.8	546,566.18	751,203.02	32° 29' 59.938 N	103° 31' 6.767 W
7,618.0	0.88	219.62	7,617.3	-12.4	35.0	546,565.08	751,202.23	32° 29' 59.927 N	103° 31' 6.777 W
7,708.0	0.62	210.68	7,707.3	-13.4	34.3	546,564.13	751,201.54	32° 29' 59.917 N	103° 31' 6.785 W
7,801.0	0.71	200.37	7,800.3	-14.3	33.8	546,563.15	751,201.08	32° 29' 59.908 N	103° 31' 6.790 W
7,894.0	0.88	212.88	7,893.3	-15.5	33.2	546,562.01	751,200.50	32° 29' 59.896 N	103° 31' 6.797 W
7,988.0	0.88	211.78	7,987.3	-16.7	32.5	546,560.80	751,199.72	32° 29' 59.884 N	103° 31' 6.806 W
8,081.0	0.80	213.59	8,080.2	-17.9	31.7	546,559.65	751,198.99	32° 29' 59.873 N	103° 31' 6.815 W
8,174.0	0.80	213.50	8,173.2	-18.9	31.0	546,558.56	751,198.27	32° 29' 59.862 N	103° 31' 6.824 W
8,261.0	0.62	207.68	8,260.2	-19.9	30.5	546,557.64	751,197.72	32° 29' 59.853 N	103° 31' 6.830 W
8,355.0	0.80	228.52	8,354.2	-20.7	29.7	546,556.76	751,196.99	32° 29' 59.845 N	103° 31' 6.839 W
8,448.0	1.02	233.86	8,447.2	-21.7	28.6	546,555.84	751,195.83	32° 29' 59.836 N	103° 31' 6.852 W
8,541.0	0.80	231.57	8,540.2	-22.6	27.4	546,554.95	751,194.66	32° 29' 59.827 N	103° 31' 6.866 W
8,635.0	1.19	227.16	8,634.2	-23.6	26.2	546,553.88	751,193.43	32° 29' 59.816 N	103° 31' 6.881 W
8,728.0	0.88	234.47	8,727.2	-24.7	24.9	546,552.80	751,192.14	32° 29' 59.806 N	103° 31' 6.896 W
8,816.0	0.80	257.92	8,815.2	-25.2	23.7	546,552.28	751,190.99	32° 29' 59.801 N	103° 31' 6.909 W
8,909.0	0.80	292.42	8,908.1	-25.1	22.5	546,552.39	751,189.75	32° 29' 59.802 N	103° 31' 6.924 W
9,022.0	0.71	322.78	9,021.1	-24.2	21.4	546,553.25	751,188.60	32° 29' 59.811 N	103° 31' 6.937 W
9,095.0	0.80	320.49	9,094.1	-23.5	20.8	546,554.01	751,188.00	32° 29' 59.818 N	103° 31' 6.944 W
9,188.0	0.88	313.09	9,187.1	-22.5	19.8	546,554.99	751,187.07	32° 29' 59.828 N	103° 31' 6.955 W
9,282.0	0.80	288.81	9,281.1	-21.8	18.7	546,555.70	751,185.92	32° 29' 59.835 N	103° 31' 6.968 W
9,369.0	1.50	287.71	9,368.1	-21.3	17.0	546,556.24	751,184.26	32° 29' 59.841 N	103° 31' 6.987 W
9,462.0	1.72	289.82	9,461.1	-20.4	14.5	546,557.08	751,181.79	32° 29' 59.849 N	103° 31' 7.016 W
9,555.0	2.12	284.31	9,554.0	-19.5	11.6	546,557.98	751,178.81	32° 29' 59.858 N	103° 31' 7.051 W
9,646.0	1.72	286.91	9,645.0	-18.7	8.6	546,558.80	751,175.87	32° 29' 59.866 N	103° 31' 7.085 W
9,739.0	1.41	273.25	9,737.9	-18.2	6.1	546,559.27	751,173.39	32° 29' 59.871 N	103° 31' 7.114 W
9,830.0	1.02	266.47	9,828.9	-18.2	4.2	546,559.28	751,171.47	32° 29' 59.872 N	103° 31' 7.136 W
9,923.0	0.88	263.95	9,921.9	-18.3	2.7	546,559.15	751,169.93	32° 29' 59.870 N	103° 31' 7.154 W
10,015.0	0.88	263.25	10,013.9	-18.5	1.3	546,559.00	751,168.53	32° 29' 59.869 N	103° 31' 7.171 W
10,195.0	0.88	236.99	10,193.9	-19.4	-1.3	546,558.08	751,165.99	32° 29' 59.860 N	103° 31' 7.200 W
10,286.0	1.10	222.53	10,284.8	-20.4	-2.4	546,557.06	751,164.82	32° 29' 59.850 N	103° 31' 7.214 W
10,382.0	1.50	206.09	10,380.8	-22.3	-3.6	546,555.25	751,163.64	32° 29' 59.832 N	103° 31' 7.228 W
10,471.0	2.03	207.59	10,469.8	-24.7	-4.8	546,552.81	751,162.40	32° 29' 59.808 N	103° 31' 7.243 W
10,561.0	2.03	206.98	10,559.7	-27.5	-6.3	546,549.97	751,160.94	32° 29' 59.780 N	103° 31' 7.260 W
10,653.0	1.33	193.36	10,651.7	-30.0	-7.3	546,547.48	751,159.95	32° 29' 59.756 N	103° 31' 7.272 W
10,744.0	0.31	74.11	10,742.7	-31.0	-7.3	546,546.52	751,159.94	32° 29' 59.746 N	103° 31' 7.272 W
10,843.0	0.62	150.53	10,841.7	-31.4	-6.8	546,546.13	751,160.47	32° 29' 59.742 N	103° 31' 7.266 W
10,934.0	0.71	128.27	10,932.7	-32.2	-6.1	546,545.35	751,161.15	32° 29' 59.735 N	103° 31' 7.258 W

Stryker Directional

Survey Report - Geographic

Company:	COG Operating, LLC.	Local Co-ordinate Reference:	Well Bobwhite 12 State Com #3H
Project:	Lea County, N.M.	TVD Reference:	GL 3777+26 @ 3803.0usft (Precision 590)
Site:	Section 12 T21-S R33-E Bobwhite 12 State Com #3H	MD Reference:	GL 3777+26 @ 3803.0usft (Precision 590)
Well:	Bobwhite 12 State Com #3H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Original Hole	Database:	Stryker_EDM

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,032.0	0.62	131.58	11,030.7	-32.9	-5.2	546,544.62	751,162.02	32° 29' 59.727 N	103° 31' 7.248 W
11032' MD Gyro Survey									
11,075.0	0.40	180.70	11,073.7	-33.2	-5.1	546,544.32	751,162.20	32° 29' 59.724 N	103° 31' 7.246 W
11,106.0	2.80	193.90	11,104.6	-34.0	-5.2	546,543.48	751,162.01	32° 29' 59.716 N	103° 31' 7.248 W
11,137.0	6.70	193.00	11,135.5	-36.5	-5.8	546,540.98	751,161.42	32° 29' 59.691 N	103° 31' 7.255 W
11,167.0	11.70	189.60	11,165.1	-41.2	-6.7	546,536.27	751,160.52	32° 29' 59.645 N	103° 31' 7.266 W
11,198.0	16.10	187.60	11,195.2	-48.6	-7.8	546,528.91	751,159.43	32° 29' 59.572 N	103° 31' 7.280 W
11,229.0	18.90	185.90	11,224.8	-57.9	-8.9	546,519.65	751,158.34	32° 29' 59.480 N	103° 31' 7.293 W
11,260.0	21.20	183.20	11,253.9	-68.4	-9.7	546,509.06	751,157.51	32° 29' 59.376 N	103° 31' 7.304 W
11,290.0	23.50	181.30	11,281.6	-79.8	-10.2	546,497.66	751,157.08	32° 29' 59.263 N	103° 31' 7.310 W
11,321.0	26.50	180.40	11,309.7	-92.9	-10.4	546,484.56	751,156.89	32° 29' 59.133 N	103° 31' 7.313 W
11,352.0	28.60	181.20	11,337.2	-107.3	-10.6	546,470.23	751,156.68	32° 29' 58.992 N	103° 31' 7.317 W
11,383.0	32.30	181.60	11,363.9	-123.0	-10.9	546,454.52	751,156.30	32° 29' 58.836 N	103° 31' 7.323 W
11,414.0	36.40	180.60	11,389.5	-140.5	-11.3	546,437.04	751,155.97	32° 29' 58.663 N	103° 31' 7.328 W
11,444.0	40.90	180.00	11,413.0	-159.2	-11.4	546,418.31	751,155.88	32° 29' 58.478 N	103° 31' 7.331 W
11,475.0	43.90	179.80	11,435.8	-180.1	-11.3	546,397.41	751,155.91	32° 29' 58.271 N	103° 31' 7.332 W
11,506.0	46.50	179.60	11,457.7	-202.1	-11.2	546,375.41	751,156.03	32° 29' 58.053 N	103° 31' 7.333 W
11,536.0	49.00	179.90	11,477.9	-224.3	-11.1	546,353.21	751,156.13	32° 29' 57.834 N	103° 31' 7.334 W
11,567.0	51.30	179.20	11,497.7	-248.1	-10.9	546,329.41	751,156.31	32° 29' 57.598 N	103° 31' 7.334 W
11,598.0	54.00	178.20	11,516.5	-272.7	-10.4	546,304.78	751,156.88	32° 29' 57.354 N	103° 31' 7.330 W
11,629.0	57.60	178.10	11,533.9	-298.3	-9.5	546,279.16	751,157.71	32° 29' 57.101 N	103° 31' 7.322 W
11,659.0	60.50	178.00	11,549.4	-324.1	-8.7	546,253.44	751,158.58	32° 29' 56.846 N	103° 31' 7.314 W
11,690.0	62.90	178.20	11,564.1	-351.3	-7.8	546,226.17	751,159.49	32° 29' 56.576 N	103° 31' 7.306 W
11,721.0	65.60	178.40	11,577.5	-379.2	-6.9	546,198.26	751,160.31	32° 29' 56.300 N	103° 31' 7.299 W
11,752.0	68.40	178.90	11,589.6	-407.8	-6.3	546,169.74	751,160.98	32° 29' 56.018 N	103° 31' 7.294 W
11,783.0	71.40	180.10	11,600.3	-436.9	-6.0	546,140.63	751,161.24	32° 29' 55.730 N	103° 31' 7.293 W
11,813.0	73.90	180.80	11,609.2	-465.5	-6.2	546,112.00	751,161.01	32° 29' 55.447 N	103° 31' 7.298 W
11,844.0	76.70	179.70	11,617.1	-495.5	-6.4	546,082.02	751,160.88	32° 29' 55.150 N	103° 31' 7.303 W
11,875.0	80.10	178.90	11,623.3	-525.8	-6.0	546,051.66	751,161.25	32° 29' 54.849 N	103° 31' 7.301 W
11,906.0	85.30	177.50	11,627.3	-556.6	-5.0	546,020.93	751,162.22	32° 29' 54.545 N	103° 31' 7.292 W
11,992.0	89.80	176.50	11,631.0	-642.3	-0.5	545,935.15	751,166.72	32° 29' 53.696 N	103° 31' 7.248 W
12,084.0	91.20	178.10	11,630.2	-734.2	3.8	545,843.26	751,171.05	32° 29' 52.787 N	103° 31' 7.205 W
12,176.0	90.20	179.50	11,629.0	-826.2	5.7	545,751.29	751,172.98	32° 29' 51.876 N	103° 31' 7.191 W
12,269.0	88.30	180.40	11,630.2	-919.2	5.8	545,658.31	751,173.06	32° 29' 50.956 N	103° 31' 7.198 W
12,361.0	89.10	179.70	11,632.3	-1,011.2	5.7	545,566.33	751,172.98	32° 29' 50.046 N	103° 31' 7.207 W
12,453.0	90.20	179.40	11,632.9	-1,103.2	6.5	545,474.34	751,173.70	32° 29' 49.136 N	103° 31' 7.207 W
12,546.0	88.80	179.90	11,633.7	-1,196.2	7.0	545,381.35	751,174.27	32° 29' 48.216 N	103° 31' 7.209 W
12,638.0	90.10	179.50	11,634.6	-1,288.1	7.5	545,289.35	751,174.75	32° 29' 47.305 N	103° 31' 7.211 W
12,730.0	87.30	179.00	11,636.7	-1,380.1	8.7	545,197.40	751,175.95	32° 29' 46.395 N	103° 31' 7.206 W
12,822.0	87.90	178.90	11,640.5	-1,472.0	10.4	545,105.49	751,177.64	32° 29' 45.486 N	103° 31' 7.194 W
12,915.0	89.10	178.80	11,643.0	-1,565.0	12.3	545,012.54	751,179.50	32° 29' 44.566 N	103° 31' 7.181 W
13,007.0	90.10	178.50	11,643.6	-1,656.9	14.4	544,920.57	751,181.67	32° 29' 43.656 N	103° 31' 7.163 W
13,099.0	89.60	179.40	11,643.8	-1,748.9	16.1	544,828.59	751,183.36	32° 29' 42.746 N	103° 31' 7.152 W
13,191.0	90.90	179.60	11,643.4	-1,840.9	16.9	544,736.60	751,184.16	32° 29' 41.835 N	103° 31' 7.151 W
13,284.0	88.90	180.10	11,643.6	-1,933.9	17.2	544,643.60	751,184.40	32° 29' 40.915 N	103° 31' 7.156 W
13,376.0	89.70	179.60	11,644.7	-2,025.9	17.4	544,551.61	751,184.65	32° 29' 40.005 N	103° 31' 7.162 W
13,468.0	90.50	179.00	11,644.6	-2,117.9	18.5	544,459.62	751,185.77	32° 29' 39.094 N	103° 31' 7.157 W
13,560.0	91.70	179.00	11,642.8	-2,209.9	20.1	544,367.65	751,187.37	32° 29' 38.184 N	103° 31' 7.146 W
13,653.0	92.80	178.30	11,639.2	-2,302.8	22.3	544,274.75	751,189.56	32° 29' 37.265 N	103° 31' 7.129 W
13,745.0	91.30	179.10	11,635.9	-2,394.7	24.4	544,182.84	751,191.65	32° 29' 36.355 N	103° 31' 7.113 W
13,837.0	89.50	179.00	11,635.2	-2,486.6	25.9	544,090.85	751,193.17	32° 29' 35.445 N	103° 31' 7.103 W
13,929.0	90.20	178.70	11,635.5	-2,578.6	27.8	543,998.87	751,195.02	32° 29' 34.535 N	103° 31' 7.090 W
14,022.0	90.80	178.40	11,634.6	-2,671.6	30.1	543,905.91	751,197.37	32° 29' 33.615 N	103° 31' 7.071 W
14,114.0	89.70	179.40	11,634.2	-2,763.6	31.9	543,813.93	751,199.14	32° 29' 32.704 N	103° 31' 7.058 W

Stryker Directional

Survey Report - Geographic

Company: COG Operating, LLC.	Local Co-ordinate Reference: Well Bobwhite 12 State Com #3H
Project: Lea County, N.M.	TVD Reference: GL 3777+26 @ 3803.0usft (Precision 590)
Site: Section 12 T21-S R33-E Bobwhite 12 State Com #3H	MD Reference: GL 3777+26 @ 3803.0usft (Precision 590)
Well: Bobwhite 12 State Com #3H	North Reference: Grid
Wellbore: Original Hole	Survey Calculation Method: Minimum Curvature
Design: Original Hole	Database: Stryker_EDM

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,206.0	90.30	179.00	11,634.2	-2,855.6	33.2	543,721.94	751,200.42	32° 29' 31.794 N	103° 31' 7.051 W
14,299.0	91.20	178.80	11,633.0	-2,948.5	35.0	543,628.96	751,202.21	32° 29' 30.874 N	103° 31' 7.039 W
14,391.0	89.80	179.90	11,632.2	-3,040.5	36.0	543,536.98	751,203.25	32° 29' 29.964 N	103° 31' 7.035 W
14,483.0	88.30	180.60	11,633.8	-3,132.5	35.6	543,444.99	751,202.85	32° 29' 29.054 N	103° 31' 7.048 W
14,575.0	88.80	180.80	11,636.1	-3,224.5	34.5	543,353.03	751,201.73	32° 29' 28.144 N	103° 31' 7.069 W
14,668.0	89.80	180.40	11,637.2	-3,317.5	33.5	543,260.04	751,200.75	32° 29' 27.224 N	103° 31' 7.089 W
14,760.0	90.70	180.00	11,636.8	-3,409.5	33.2	543,168.05	751,200.43	32° 29' 26.313 N	103° 31' 7.101 W
14,852.0	91.60	179.60	11,635.0	-3,501.4	33.5	543,076.07	751,200.75	32° 29' 25.403 N	103° 31' 7.105 W
14,944.0	90.90	180.80	11,633.0	-3,593.4	33.2	542,984.09	751,200.43	32° 29' 24.493 N	103° 31' 7.117 W
15,037.0	89.10	181.30	11,633.0	-3,686.4	31.5	542,891.11	751,198.73	32° 29' 23.573 N	103° 31' 7.145 W
15,129.0	90.10	180.80	11,633.6	-3,778.4	29.8	542,799.13	751,197.04	32° 29' 22.663 N	103° 31' 7.173 W
15,222.0	89.20	180.60	11,634.2	-3,871.4	28.7	542,706.14	751,195.91	32° 29' 21.743 N	103° 31' 7.195 W
15,314.0	89.70	180.40	11,635.1	-3,963.4	27.9	542,614.15	751,195.10	32° 29' 20.833 N	103° 31' 7.212 W
15,406.0	90.70	179.80	11,634.7	-4,055.4	27.7	542,522.15	751,194.94	32° 29' 19.923 N	103° 31' 7.222 W
15,498.0	89.60	180.40	11,634.5	-4,147.3	27.5	542,430.15	751,194.78	32° 29' 19.012 N	103° 31' 7.233 W
15,591.0	90.50	180.30	11,634.4	-4,240.3	27.0	542,337.16	751,194.22	32° 29' 18.092 N	103° 31' 7.247 W
15,683.0	89.10	180.20	11,634.7	-4,332.3	26.6	542,245.16	751,193.81	32° 29' 17.182 N	103° 31' 7.260 W
15,775.0	90.40	179.80	11,635.1	-4,424.3	26.6	542,153.16	751,193.81	32° 29' 16.272 N	103° 31' 7.269 W
15,867.0	89.20	179.80	11,635.5	-4,516.3	26.9	542,061.17	751,194.13	32° 29' 15.361 N	103° 31' 7.273 W
15,960.0	90.70	179.40	11,635.5	-4,609.3	27.5	541,968.17	751,194.78	32° 29' 14.441 N	103° 31' 7.274 W
16,052.0	92.40	178.70	11,633.0	-4,701.3	29.1	541,876.22	751,196.31	32° 29' 13.531 N	103° 31' 7.264 W
16,135.0	92.40	178.70	11,629.6	-4,784.2	30.9	541,793.31	751,198.19	32° 29' 12.711 N	103° 31' 7.250 W

16135' MD Projected to Bit

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,032.0	11,030.7	-32.9	-5.2	11032' MD Gyro Survey
16,135.0	11,629.6	-4,784.2	30.9	16135' MD Projected to Bit