

30-025-43930

COG OPERATING, LLC

Lea County, NM (NAD27) NMEZ

White Falcon 16 Federal COM

#11H

OH

Design: OH

Standard Survey Report

14 February, 2018

Survey Report

Company:	COG OPERATING, LLC	Local Co-ordinate Reference:	Well #11H
Project:	Lea County, NM (NAD27) NMEZ	TVD Reference:	RKB @ 3271.50usft (Latshaw 44 - KB=25')
Site:	White Falcon 16 Federal COM	MD Reference:	RKB @ 3271.50usft (Latshaw 44 - KB=25')
Well:	#11H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.14 Single User Db

Project	Lea County, NM (NAD27) NMEZ		
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	White Falcon 16 Federal COM			
Site Position:		Northing:	414,844.60 usft	Latitude: 32° 8' 12.801 N
From:	Map	Easting:	796,941.60 usft	Longitude: 103° 22' 26.517 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.51 °

Well	#11H			
Well Position	+N-S	0.00 usft	Northing:	414,844.20 usft
	+E-W	0.00 usft	Easting:	796,901.60 usft
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft
			Ground Level:	3,246.50 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	11/17/17	6.81	60.01	47,865.23393528

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	179.48	

Survey Program	Date	02/14/18			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	11,600.00	Survey #1 - Gyro (OH)	GYD_DP_MS	Gyrodata gyro-compassing and drop	
11,723.00	22,161.00	Survey #2 - VON MWD (OH)	MWD	MWD v3: standard declination	
22,213.00	22,213.00	Survey #3 - PTB (OH)	MWD	MWD v3: standard declination	

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	
100.00	0.30	124.91	100.00	-0.15	0.21	0.15	0.30	0.30	0.00	
125.00	0.32	135.43	125.00	-0.24	0.32	0.24	0.24	0.08	42.08	
150.00	0.36	142.19	150.00	-0.35	0.41	0.35	0.23	0.16	27.04	
175.00	0.34	146.16	175.00	-0.47	0.50	0.48	0.13	-0.08	15.88	
200.00	0.37	135.99	200.00	-0.59	0.60	0.60	0.28	0.12	-40.68	
225.00	0.37	128.78	225.00	-0.70	0.72	0.71	0.19	0.00	-28.84	
250.00	0.35	123.88	250.00	-0.79	0.85	0.80	0.15	-0.08	-19.60	
275.00	0.37	124.43	275.00	-0.88	0.98	0.89	0.08	0.08	2.20	

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well #11H
RKB @ 3271.50usft (Latshaw 44 - KB=25')
RKB @ 3271.50usft (Latshaw 44 - KB=25')
Grid
Minimum Curvature
EDM 5000.14 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)
300.00	0.32	110.21	300.00	-0.95	1.11	0.96	0.40	-0.20	-56.88
325.00	0.33	99.33	325.00	-0.99	1.25	1.00	0.25	0.04	-43.52
350.00	0.36	89.36	349.99	-1.00	1.39	1.01	0.27	0.12	-39.88
375.00	0.26	88.23	374.99	-1.00	1.53	1.01	0.40	-0.40	-4.52
400.00	0.32	85.61	399.99	-0.99	1.66	1.00	0.25	0.24	-10.48
425.00	0.42	64.53	424.99	-0.94	1.81	0.96	0.67	0.40	-84.32
450.00	0.35	77.34	449.99	-0.89	1.97	0.91	0.44	-0.28	51.24
475.00	0.35	70.95	474.99	-0.85	2.11	0.87	0.16	0.00	-25.56
500.00	0.33	84.05	499.99	-0.81	2.26	0.83	0.32	-0.08	52.40
525.00	0.24	78.08	524.99	-0.80	2.38	0.82	0.38	-0.36	-23.88
550.00	0.42	65.04	549.99	-0.75	2.51	0.77	0.78	0.72	-52.16
575.00	0.33	78.95	574.99	-0.69	2.67	0.72	0.51	-0.36	55.64
600.00	0.23	86.74	599.99	-0.68	2.79	0.70	0.43	-0.40	31.16
625.00	0.30	85.39	624.99	-0.67	2.90	0.70	0.28	0.28	-5.40
650.00	0.36	84.00	649.99	-0.66	3.05	0.68	0.24	0.24	-5.56
675.00	0.49	103.00	674.99	-0.67	3.23	0.70	0.76	0.52	76.00
700.00	0.42	96.93	699.99	-0.71	3.42	0.74	0.34	-0.28	-24.28
725.00	0.49	95.38	724.99	-0.73	3.62	0.76	0.28	0.28	-6.20
750.00	0.65	83.31	749.99	-0.72	3.87	0.76	0.80	0.64	-48.28
775.00	0.69	97.35	774.98	-0.72	4.16	0.76	0.67	0.16	56.16
800.00	0.73	88.99	799.98	-0.74	4.47	0.78	0.44	0.16	-33.44
825.00	0.83	89.22	824.98	-0.73	4.81	0.78	0.40	0.40	0.92
850.00	0.96	90.61	849.98	-0.73	5.20	0.78	0.53	0.52	5.56
875.00	0.95	88.27	874.97	-0.73	5.61	0.78	0.16	-0.04	-9.36
900.00	0.94	87.37	899.97	-0.71	6.03	0.77	0.07	-0.04	-3.60
925.00	0.85	95.43	924.97	-0.72	6.42	0.78	0.62	-0.36	32.24
950.00	0.82	82.63	949.97	-0.72	6.78	0.78	0.75	-0.12	-51.20
975.00	0.89	75.44	974.96	-0.65	7.14	0.71	0.51	0.28	-28.76
1,000.00	0.83	68.37	999.96	-0.53	7.50	0.60	0.49	-0.24	-28.28
1,025.00	0.75	51.55	1,024.96	-0.36	7.80	0.43	0.98	-0.32	-67.28
1,050.00	0.79	36.69	1,049.95	-0.12	8.03	0.19	0.81	0.16	-59.44
1,075.00	0.70	23.23	1,074.95	0.16	8.19	-0.08	0.78	-0.36	-53.84
1,100.00	0.57	352.16	1,099.95	0.42	8.23	-0.35	1.45	-0.52	-124.28
1,125.00	0.69	355.11	1,124.95	0.69	8.20	-0.62	0.50	0.48	11.80
1,150.00	0.69	350.28	1,149.95	0.99	8.17	-0.92	0.23	0.00	-19.32
1,175.00	0.68	351.80	1,174.95	1.29	8.12	-1.21	0.08	-0.04	6.08
1,200.00	0.69	349.87	1,199.94	1.58	8.07	-1.51	0.10	0.04	-7.72
1,225.00	0.76	358.58	1,224.94	1.90	8.04	-1.82	0.52	0.28	34.84
1,250.00	0.79	351.43	1,249.94	2.23	8.01	-2.16	0.40	0.12	-28.60
1,275.00	0.64	343.76	1,274.94	2.54	7.95	-2.46	0.71	-0.60	-30.68
1,300.00	0.68	349.97	1,299.94	2.82	7.88	-2.75	0.33	0.16	24.84
1,325.00	0.64	349.01	1,324.93	3.10	7.83	-3.03	0.17	-0.16	-3.84
1,350.00	0.61	351.62	1,349.93	3.37	7.78	-3.30	0.17	-0.12	10.44

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Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
1,375.00	0.62	346.52	1,374.93	3.63	7.73	-3.56	0.22	0.04	-20.40
1,400.00	0.74	350.29	1,399.93	3.92	7.67	-3.85	0.51	0.48	15.08
1,425.00	0.71	348.13	1,424.93	4.23	7.61	-4.16	0.16	-0.12	-8.64
1,450.00	0.68	338.95	1,449.93	4.52	7.53	-4.45	0.46	-0.12	-36.72
1,475.00	0.79	352.21	1,474.92	4.83	7.45	-4.76	0.81	0.44	53.04
1,500.00	0.79	349.16	1,499.92	5.17	7.40	-5.11	0.17	0.00	-12.20
1,525.00	0.85	347.84	1,524.92	5.52	7.33	-5.46	0.25	0.24	-5.28
1,550.00	0.83	345.62	1,549.92	5.88	7.24	-5.81	0.15	-0.08	-8.88
1,575.00	0.89	352.00	1,574.91	6.25	7.17	-6.18	0.45	0.24	25.52
1,600.00	0.90	352.93	1,599.91	6.63	7.12	-6.57	0.07	0.04	3.72
1,625.00	0.89	349.93	1,624.91	7.02	7.06	-6.96	0.19	-0.04	-12.00
1,650.00	1.07	358.02	1,649.90	7.44	7.02	-7.38	0.91	0.72	32.36
1,675.00	0.99	348.51	1,674.90	7.89	6.97	-7.83	0.75	-0.32	-38.04
1,700.00	1.00	351.34	1,699.90	8.32	6.89	-8.25	0.20	0.04	11.32
1,725.00	0.89	344.28	1,724.89	8.72	6.81	-8.66	0.64	-0.44	-28.24
1,750.00	1.00	349.22	1,749.89	9.12	6.71	-9.06	0.55	0.44	19.76
1,775.00	0.99	349.37	1,774.89	9.55	6.63	-9.49	0.04	-0.04	0.60
1,800.00	0.96	347.20	1,799.88	9.96	6.55	-9.90	0.19	-0.12	-8.68
1,825.00	1.03	348.97	1,824.88	10.39	6.46	-10.33	0.31	0.28	7.08
1,850.00	1.01	350.81	1,849.87	10.83	6.38	-10.77	0.15	-0.08	7.36
1,875.00	1.06	351.65	1,874.87	11.27	6.31	-11.22	0.21	0.20	3.36
1,900.00	0.98	350.36	1,899.87	11.71	6.24	-11.66	0.33	-0.32	-5.16
1,925.00	1.00	350.11	1,924.86	12.14	6.17	-12.08	0.08	0.08	-1.00
1,950.00	1.02	353.51	1,949.86	12.57	6.10	-12.52	0.25	0.08	13.60
1,975.00	1.00	349.85	1,974.85	13.01	6.04	-12.95	0.27	-0.08	-14.64
2,000.00	1.06	354.58	1,999.85	13.46	5.98	-13.40	0.42	0.24	18.92
2,025.00	1.09	355.18	2,024.85	13.92	5.94	-13.87	0.13	0.12	2.40
2,050.00	1.05	353.69	2,049.84	14.39	5.89	-14.33	0.19	-0.16	-5.96
2,075.00	0.99	354.21	2,074.84	14.83	5.85	-14.78	0.24	-0.24	2.08
2,100.00	1.05	351.81	2,099.83	15.27	5.79	-15.22	0.29	0.24	-9.60
2,125.00	1.15	359.41	2,124.83	15.75	5.76	-15.70	0.71	0.40	30.40
2,150.00	1.09	349.36	2,149.82	16.23	5.71	-16.18	0.82	-0.24	-40.20
2,175.00	1.14	352.08	2,174.82	16.71	5.63	-16.66	0.29	0.20	10.88
2,200.00	1.04	351.40	2,199.82	17.18	5.56	-17.13	0.40	-0.40	-2.72
2,225.00	1.11	353.95	2,224.81	17.65	5.50	-17.60	0.34	0.28	10.20
2,250.00	1.04	354.16	2,249.81	18.12	5.46	-18.07	0.28	-0.28	0.84
2,275.00	1.09	355.49	2,274.80	18.58	5.41	-18.53	0.22	0.20	5.32
2,300.00	1.10	352.08	2,299.80	19.05	5.36	-19.00	0.26	0.04	-13.64
2,325.00	1.12	355.94	2,324.79	19.53	5.31	-19.49	0.31	0.08	15.44
2,350.00	1.03	349.49	2,349.79	20.00	5.25	-19.95	0.60	-0.36	-25.80
2,375.00	0.90	344.68	2,374.79	20.41	5.16	-20.36	0.61	-0.52	-19.24
2,400.00	0.75	334.83	2,399.78	20.75	5.04	-20.70	0.82	-0.60	-39.40
2,425.00	0.63	313.93	2,424.78	20.99	4.87	-20.95	1.11	-0.48	-83.60

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 Single User Db

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)
2,450.00	0.67	282.03	2,449.78	21.12	4.63	-21.07	1.44	0.16	-127.60
2,475.00	0.83	265.28	2,474.78	21.13	4.30	-21.09	1.08	0.64	-67.00
2,500.00	0.87	262.82	2,499.77	21.09	3.94	-21.06	0.22	0.16	-9.84
2,525.00	0.81	266.40	2,524.77	21.06	3.57	-21.02	0.32	-0.24	14.32
2,550.00	0.84	270.67	2,549.77	21.05	3.21	-21.02	0.27	0.12	17.08
2,575.00	0.86	267.35	2,574.77	21.04	2.84	-21.02	0.21	0.08	-13.28
2,600.00	0.82	270.57	2,599.76	21.04	2.47	-21.01	0.25	-0.16	12.88
2,625.00	0.89	265.84	2,624.76	21.02	2.10	-21.00	0.40	0.28	-18.92
2,650.00	0.96	272.82	2,649.76	21.02	1.70	-21.00	0.53	0.28	27.92
2,675.00	0.89	263.45	2,674.75	21.01	1.30	-21.00	0.67	-0.28	-37.48
2,700.00	0.87	267.09	2,699.75	20.98	0.92	-20.97	0.24	-0.08	14.56
2,725.00	0.91	265.19	2,724.75	20.95	0.53	-20.94	0.20	0.16	-7.60
2,750.00	0.90	264.82	2,749.75	20.92	0.13	-20.91	0.05	-0.04	-1.48
2,775.00	0.83	264.12	2,774.74	20.88	-0.24	-20.88	0.28	-0.28	-2.80
2,800.00	0.87	271.48	2,799.74	20.87	-0.61	-20.87	0.46	0.16	29.44
2,825.00	0.77	267.20	2,824.74	20.86	-0.97	-20.87	0.47	-0.40	-17.12
2,850.00	0.74	270.76	2,849.74	20.86	-1.30	-20.87	0.22	-0.12	14.24
2,875.00	0.73	272.95	2,874.73	20.87	-1.62	-20.88	0.12	-0.04	8.76
2,900.00	0.78	270.14	2,899.73	20.88	-1.95	-20.89	0.25	0.20	-11.24
2,925.00	0.82	273.22	2,924.73	20.89	-2.30	-20.91	0.23	0.16	12.32
2,950.00	0.82	270.51	2,949.73	20.90	-2.65	-20.92	0.16	0.00	-10.84
2,975.00	0.77	273.55	2,974.72	20.91	-3.00	-20.94	0.26	-0.20	12.16
3,000.00	0.76	274.08	2,999.72	20.93	-3.33	-20.96	0.05	-0.04	2.12
3,025.00	0.86	266.90	3,024.72	20.93	-3.69	-20.97	0.57	0.40	-28.72
3,050.00	0.79	267.66	3,049.72	20.92	-4.05	-20.95	0.28	-0.28	3.04
3,075.00	0.85	247.59	3,074.71	20.84	-4.39	-20.88	1.17	0.24	-80.28
3,100.00	1.07	227.89	3,099.71	20.61	-4.73	-20.65	1.57	0.88	-78.80
3,125.00	1.18	221.26	3,124.71	20.26	-5.08	-20.31	0.68	0.44	-26.52
3,150.00	1.18	221.54	3,149.70	19.87	-5.42	-19.92	0.02	0.00	1.12
3,175.00	1.22	220.28	3,174.69	19.48	-5.76	-19.53	0.19	0.16	-5.04
3,200.00	1.19	220.26	3,199.69	19.08	-6.10	-19.13	0.12	-0.12	-0.08
3,225.00	1.28	221.94	3,224.68	18.67	-6.45	-18.73	0.39	0.36	6.72
3,250.00	1.20	220.12	3,249.68	18.26	-6.81	-18.33	0.36	-0.32	-7.28
3,275.00	1.16	221.28	3,274.67	17.87	-7.15	-17.94	0.19	-0.16	4.64
3,300.00	1.23	222.21	3,299.67	17.48	-7.49	-17.55	0.29	0.28	3.72
3,325.00	1.20	220.03	3,324.66	17.09	-7.84	-17.16	0.22	-0.12	-8.72
3,350.00	1.25	222.36	3,349.66	16.68	-8.19	-16.76	0.28	0.20	9.32
3,375.00	1.20	221.20	3,374.65	16.29	-8.55	-16.36	0.22	-0.20	-4.64
3,400.00	1.18	214.89	3,399.64	15.88	-8.87	-15.96	0.53	-0.08	-25.24
3,425.00	1.33	202.75	3,424.64	15.40	-9.13	-15.48	1.22	0.60	-48.56
3,450.00	1.63	185.83	3,449.63	14.78	-9.28	-14.86	2.11	1.20	-67.68
3,475.00	2.06	175.79	3,474.62	13.98	-9.28	-14.06	2.15	1.72	-40.16
3,500.00	2.13	170.07	3,499.60	13.07	-9.17	-13.15	0.88	0.28	-22.88
3,525.00	2.15	169.74	3,524.58	12.15	-9.00	-12.23	0.09	0.08	-1.32

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
3,550.00	2.14	169.95	3,549.57	11.23	-8.84	-11.31	0.05	-0.04	0.84
3,575.00	2.14	167.64	3,574.55	10.31	-8.66	-10.39	0.35	0.00	-9.24
3,600.00	2.05	164.78	3,599.53	9.43	-8.44	-9.50	0.55	-0.36	-11.44
3,625.00	1.87	157.41	3,624.52	8.62	-8.17	-8.69	1.24	-0.72	-29.48
3,650.00	1.80	140.46	3,649.50	7.94	-7.76	-8.01	2.18	-0.28	-67.80
3,675.00	1.78	132.19	3,674.49	7.38	-7.22	-7.44	1.04	-0.08	-33.08
3,700.00	1.77	133.69	3,699.48	6.85	-6.65	-6.91	0.19	-0.04	6.00
3,725.00	1.77	132.42	3,724.47	6.32	-6.09	-6.38	0.16	0.00	-5.08
3,750.00	1.76	128.30	3,749.46	5.82	-5.50	-5.87	0.51	-0.04	-16.48
3,775.00	1.74	129.09	3,774.44	5.35	-4.91	-5.39	0.13	-0.08	3.16
3,800.00	1.48	125.21	3,799.43	4.92	-4.35	-4.96	1.13	-1.04	-15.52
3,825.00	1.07	110.70	3,824.43	4.65	-3.87	-4.69	2.08	-1.64	-58.04
3,850.00	1.02	64.87	3,849.42	4.66	-3.45	-4.69	3.26	-0.20	-183.32
3,875.00	1.09	41.45	3,874.42	4.94	-3.09	-4.96	1.73	0.28	-93.68
3,900.00	1.15	36.44	3,899.42	5.32	-2.78	-5.34	0.46	0.24	-20.04
3,925.00	1.21	33.81	3,924.41	5.74	-2.49	-5.76	0.32	0.24	-10.52
3,950.00	1.26	33.05	3,949.40	6.19	-2.19	-6.21	0.21	0.20	-3.04
3,975.00	1.35	31.76	3,974.40	6.67	-1.88	-6.68	0.38	0.36	-5.16
4,000.00	1.39	33.43	3,999.39	7.17	-1.56	-7.18	0.23	0.16	6.68
4,025.00	1.41	31.59	4,024.38	7.69	-1.23	-7.70	0.20	0.08	-7.36
4,050.00	1.58	31.69	4,049.38	8.24	-0.89	-8.25	0.68	0.68	0.40
4,075.00	1.58	32.48	4,074.37	8.83	-0.53	-8.83	0.09	0.00	3.16
4,100.00	1.41	29.66	4,099.36	9.38	-0.19	-9.38	0.74	-0.68	-11.28
4,125.00	1.49	30.36	4,124.35	9.93	0.13	-9.93	0.33	0.32	2.80
4,150.00	1.44	32.81	4,149.34	10.48	0.46	-10.47	0.32	-0.20	9.80
4,175.00	1.43	30.96	4,174.33	11.01	0.79	-11.00	0.19	-0.04	-7.40
4,200.00	1.29	30.46	4,199.33	11.52	1.10	-11.51	0.56	-0.56	-2.00
4,225.00	0.99	27.13	4,224.32	11.95	1.34	-11.94	1.23	-1.20	-13.32
4,250.00	0.83	23.69	4,249.32	12.31	1.51	-12.30	0.68	-0.64	-13.76
4,275.00	0.75	27.11	4,274.32	12.62	1.66	-12.61	0.37	-0.32	13.68
4,300.00	0.62	26.64	4,299.31	12.89	1.79	-12.87	0.52	-0.52	-1.88
4,325.00	0.62	26.80	4,324.31	13.13	1.91	-13.11	0.01	0.00	0.64
4,350.00	0.76	35.18	4,349.31	13.39	2.07	-13.37	0.69	0.56	33.52
4,375.00	0.85	56.22	4,374.31	13.62	2.32	-13.60	1.23	0.36	84.16
4,400.00	1.00	66.34	4,399.30	13.82	2.67	-13.79	0.88	0.60	40.48
4,425.00	1.03	74.43	4,424.30	13.96	3.09	-13.93	0.59	0.12	32.36
4,450.00	1.18	74.38	4,449.30	14.09	3.55	-14.06	0.60	0.60	-0.20
4,475.00	1.28	71.13	4,474.29	14.25	4.07	-14.21	0.49	0.40	-13.00
4,500.00	1.28	71.38	4,499.28	14.43	4.59	-14.39	0.02	0.00	1.00
4,525.00	1.18	74.09	4,524.28	14.59	5.11	-14.54	0.46	-0.40	10.84
4,550.00	1.32	72.82	4,549.27	14.75	5.63	-14.70	0.57	0.56	-5.08
4,575.00	1.31	73.68	4,574.27	14.91	6.18	-14.86	0.09	-0.04	3.44
4,600.00	1.24	75.31	4,599.26	15.06	6.71	-15.00	0.32	-0.28	6.52

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
4,625.00	1.27	74.60	4,624.25	15.20	7.24	-15.14	0.14	0.12	-2.84
4,650.00	1.26	71.84	4,649.25	15.36	7.77	-15.29	0.25	-0.04	-11.04
4,675.00	1.26	74.18	4,674.24	15.52	8.30	-15.45	0.21	0.00	9.36
4,700.00	1.20	79.15	4,699.24	15.65	8.82	-15.57	0.49	-0.24	19.88
4,725.00	1.23	75.52	4,724.23	15.76	9.34	-15.68	0.33	0.12	-14.52
4,750.00	1.22	73.58	4,749.22	15.91	9.85	-15.82	0.17	-0.04	-7.76
4,775.00	0.92	65.78	4,774.22	16.06	10.29	-15.97	1.33	-1.20	-31.20
4,800.00	0.37	30.20	4,799.22	16.22	10.51	-16.12	2.62	-2.20	-142.32
4,825.00	0.65	304.67	4,824.22	16.37	10.44	-16.27	2.89	1.12	-342.12
4,850.00	0.74	290.88	4,849.22	16.50	10.17	-16.41	0.76	0.36	-55.16
4,875.00	0.72	289.08	4,874.21	16.61	9.87	-16.52	0.12	-0.08	-7.20
4,900.00	0.66	295.73	4,899.21	16.73	9.59	-16.64	0.40	-0.24	26.60
4,925.00	0.72	284.53	4,924.21	16.83	9.31	-16.74	0.59	0.24	-44.80
4,950.00	0.68	276.47	4,949.21	16.89	9.01	-16.80	0.42	-0.16	-32.24
4,975.00	0.59	262.80	4,974.21	16.89	8.74	-16.81	0.70	-0.36	-54.68
5,000.00	0.57	262.49	4,999.21	16.85	8.48	-16.78	0.08	-0.08	-1.24
5,025.00	0.54	281.15	5,024.20	16.86	8.25	-16.78	0.73	-0.12	74.64
5,050.00	0.56	259.74	5,049.20	16.86	8.01	-16.79	0.82	0.08	-85.64
5,075.00	0.55	261.84	5,074.20	16.82	7.77	-16.75	0.09	-0.04	8.40
5,100.00	0.55	265.00	5,099.20	16.79	7.53	-16.73	0.12	0.00	12.64
5,125.00	0.49	264.32	5,124.20	16.77	7.31	-16.71	0.24	-0.24	-2.72
5,150.00	0.48	265.73	5,149.20	16.76	7.10	-16.69	0.06	-0.04	5.64
5,175.00	0.60	261.85	5,174.20	16.73	6.86	-16.67	0.50	0.48	-15.52
5,200.00	0.59	261.41	5,199.20	16.69	6.60	-16.63	0.04	-0.04	-1.76
5,225.00	0.52	258.29	5,224.20	16.65	6.37	-16.59	0.30	-0.28	-12.48
5,250.00	0.61	253.32	5,249.19	16.59	6.13	-16.53	0.41	0.36	-19.88
5,275.00	0.59	263.48	5,274.19	16.53	5.87	-16.48	0.43	-0.08	40.64
5,300.00	0.61	265.46	5,299.19	16.51	5.61	-16.46	0.12	0.08	7.92
5,325.00	0.63	262.93	5,324.19	16.48	5.34	-16.43	0.14	0.08	-10.12
5,350.00	0.61	265.84	5,349.19	16.46	5.07	-16.41	0.15	-0.08	11.64
5,375.00	0.75	256.68	5,374.19	16.41	4.78	-16.36	0.71	0.56	-36.64
5,400.00	0.78	264.25	5,399.18	16.35	4.45	-16.31	0.42	0.12	30.28
5,425.00	0.72	258.99	5,424.18	16.31	4.13	-16.27	0.37	-0.24	-21.04
5,450.00	0.72	261.84	5,449.18	16.25	3.82	-16.22	0.14	0.00	11.40
5,475.00	0.70	268.00	5,474.18	16.23	3.51	-16.19	0.32	-0.08	24.64
5,500.00	0.72	265.27	5,499.18	16.21	3.20	-16.18	0.16	0.08	-10.92
5,525.00	0.67	264.47	5,524.17	16.18	2.90	-16.15	0.20	-0.20	-3.20
5,550.00	0.78	256.14	5,549.17	16.13	2.59	-16.10	0.61	0.44	-33.32
5,575.00	0.87	254.53	5,574.17	16.04	2.24	-16.01	0.37	0.36	-6.44
5,600.00	0.75	263.74	5,599.17	15.97	1.90	-15.95	0.71	-0.48	36.84
5,625.00	0.72	262.14	5,624.17	15.93	1.58	-15.91	0.15	-0.12	-6.40
5,650.00	0.73	265.44	5,649.16	15.89	1.26	-15.88	0.17	0.04	13.20
5,675.00	0.76	264.64	5,674.16	15.87	0.94	-15.86	0.13	0.12	-3.20

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
5,700.00	0.77	265.83	5,699.16	15.84	0.61	-15.83	0.08	0.04	4.76
5,725.00	0.72	260.65	5,724.16	15.80	0.28	-15.80	0.34	-0.20	-20.72
5,750.00	0.77	260.52	5,749.16	15.75	-0.04	-15.75	0.20	0.20	-0.52
5,775.00	0.71	259.43	5,774.15	15.69	-0.35	-15.69	0.25	-0.24	-4.36
5,800.00	0.83	259.94	5,799.15	15.63	-0.68	-15.64	0.48	0.48	2.04
5,825.00	0.84	258.66	5,824.15	15.56	-1.04	-15.57	0.08	0.04	-5.12
5,850.00	0.81	259.89	5,849.15	15.50	-1.40	-15.51	0.14	-0.12	4.92
5,875.00	0.82	262.05	5,874.14	15.44	-1.75	-15.46	0.13	0.04	8.64
5,900.00	0.77	259.06	5,899.14	15.38	-2.09	-15.40	0.26	-0.20	-11.96
5,925.00	0.92	255.09	5,924.14	15.30	-2.45	-15.32	0.64	0.60	-15.88
5,950.00	0.91	258.13	5,949.13	15.21	-2.84	-15.23	0.20	-0.04	12.16
5,975.00	0.79	260.99	5,974.13	15.14	-3.20	-15.17	0.51	-0.48	11.44
6,000.00	0.82	258.69	5,999.13	15.08	-3.55	-15.11	0.18	0.12	-9.20
6,025.00	0.83	257.26	6,024.13	15.00	-3.90	-15.04	0.09	0.04	-5.72
6,050.00	0.90	256.12	6,049.12	14.92	-4.27	-14.95	0.29	0.28	-4.56
6,075.00	0.90	256.40	6,074.12	14.82	-4.65	-14.86	0.02	0.00	1.12
6,100.00	0.81	258.04	6,099.12	14.74	-5.01	-14.78	0.37	-0.36	6.56
6,125.00	0.85	263.01	6,124.12	14.68	-5.37	-14.73	0.33	0.16	19.88
6,150.00	0.84	255.28	6,149.11	14.61	-5.73	-14.66	0.46	-0.04	-30.92
6,175.00	0.90	256.69	6,174.11	14.52	-6.10	-14.57	0.25	0.24	5.64
6,200.00	0.86	257.17	6,199.11	14.43	-6.47	-14.49	0.16	-0.16	1.92
6,225.00	0.89	255.24	6,224.10	14.34	-6.84	-14.40	0.17	0.12	-7.72
6,250.00	0.84	259.25	6,249.10	14.26	-7.21	-14.32	0.31	-0.20	16.04
6,275.00	0.77	256.88	6,274.10	14.19	-7.55	-14.25	0.31	-0.28	-9.48
6,300.00	0.87	254.18	6,299.10	14.10	-7.90	-14.17	0.43	0.40	-10.80
6,325.00	0.92	254.02	6,324.09	13.99	-8.28	-14.06	0.20	0.20	-0.64
6,350.00	0.93	255.67	6,349.09	13.88	-8.66	-13.96	0.11	0.04	6.60
6,375.00	0.84	257.74	6,374.09	13.79	-9.04	-13.88	0.38	-0.36	8.28
6,400.00	0.86	260.69	6,399.08	13.72	-9.40	-13.81	0.19	0.08	11.80
6,425.00	0.88	254.43	6,424.08	13.64	-9.77	-13.73	0.39	0.08	-25.04
6,450.00	0.84	258.22	6,449.08	13.55	-10.14	-13.65	0.28	-0.16	15.16
6,475.00	0.85	258.70	6,474.08	13.48	-10.50	-13.57	0.05	0.04	1.92
6,500.00	0.86	253.23	6,499.07	13.39	-10.86	-13.49	0.33	0.04	-21.88
6,525.00	0.86	256.99	6,524.07	13.29	-11.22	-13.39	0.23	0.00	15.04
6,550.00	0.79	258.30	6,549.07	13.22	-11.58	-13.32	0.29	-0.28	5.24
6,575.00	0.82	256.58	6,574.07	13.14	-11.92	-13.25	0.15	0.12	-6.88
6,600.00	0.83	256.52	6,599.06	13.06	-12.27	-13.17	0.04	0.04	-0.24
6,625.00	0.80	256.20	6,624.06	12.97	-12.61	-13.09	0.12	-0.12	-1.28
6,650.00	0.88	254.69	6,649.06	12.88	-12.97	-13.00	0.33	0.32	-6.04
6,675.00	0.78	258.86	6,674.05	12.80	-13.32	-12.92	0.47	-0.40	16.68
6,700.00	0.74	261.68	6,699.05	12.74	-13.65	-12.86	0.22	-0.16	11.28
6,725.00	0.83	255.44	6,724.05	12.67	-13.98	-12.80	0.50	0.36	-24.96
6,750.00	0.85	252.91	6,749.05	12.57	-14.34	-12.70	0.17	0.08	-10.12
6,775.00	0.82	259.17	6,774.04	12.48	-14.69	-12.62	0.38	-0.12	25.04

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latslaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latslaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
6,800.00	0.82	263.63	6,799.04	12.43	-15.04	-12.57	0.26	0.00	17.84
6,825.00	0.80	254.58	6,824.04	12.36	-15.39	-12.50	0.52	-0.08	-36.20
6,850.00	0.81	255.52	6,849.04	12.27	-15.73	-12.41	0.07	0.04	3.76
6,875.00	0.78	256.26	6,874.03	12.19	-16.06	-12.33	0.13	-0.12	2.96
6,900.00	0.77	255.98	6,899.03	12.11	-16.39	-12.25	0.04	-0.04	-1.12
6,925.00	0.80	259.91	6,924.03	12.04	-16.73	-12.19	0.25	0.12	15.72
6,950.00	0.75	263.52	6,949.03	11.99	-17.06	-12.14	0.28	-0.20	14.44
6,975.00	0.74	262.72	6,974.03	11.95	-17.38	-12.10	0.06	-0.04	-3.20
7,000.00	0.78	257.13	6,999.02	11.89	-17.71	-12.05	0.34	0.16	-22.36
7,025.00	0.77	257.75	7,024.02	11.82	-18.04	-11.98	0.05	-0.04	2.48
7,050.00	0.77	254.67	7,049.02	11.74	-18.37	-11.90	0.17	0.00	-12.32
7,075.00	0.81	260.78	7,074.02	11.66	-18.70	-11.83	0.37	0.16	24.44
7,100.00	0.81	257.25	7,099.01	11.60	-19.05	-11.77	0.20	0.00	-14.12
7,125.00	0.71	253.80	7,124.01	11.51	-19.37	-11.69	0.44	-0.40	-13.80
7,150.00	0.80	264.23	7,149.01	11.45	-19.69	-11.63	0.66	0.36	41.72
7,175.00	0.82	257.38	7,174.01	11.40	-20.04	-11.58	0.40	0.08	-27.40
7,200.00	0.84	258.68	7,199.00	11.32	-20.40	-11.51	0.11	0.08	5.20
7,225.00	0.83	254.79	7,224.00	11.24	-20.75	-11.43	0.23	-0.04	-15.56
7,250.00	0.87	252.70	7,249.00	11.13	-21.11	-11.32	0.20	0.16	-8.36
7,275.00	0.92	248.67	7,274.00	11.00	-21.47	-11.20	0.32	0.20	-16.12
7,300.00	0.83	247.59	7,298.99	10.86	-21.83	-11.06	0.37	-0.36	-4.32
7,325.00	0.88	245.83	7,323.99	10.71	-22.17	-10.91	0.23	0.20	-7.04
7,350.00	0.86	228.27	7,348.99	10.51	-22.49	-10.71	1.07	-0.08	-70.24
7,375.00	0.93	221.92	7,373.98	10.23	-22.76	-10.44	0.49	0.28	-25.40
7,400.00	0.82	222.57	7,398.98	9.95	-23.02	-10.16	0.44	-0.44	2.60
7,425.00	0.93	222.76	7,423.98	9.67	-23.28	-9.88	0.44	0.44	0.76
7,450.00	0.92	224.04	7,448.98	9.38	-23.55	-9.59	0.09	-0.04	5.12
7,475.00	0.88	222.45	7,473.97	9.09	-23.82	-9.31	0.19	-0.16	-6.36
7,500.00	0.87	221.68	7,498.97	8.81	-24.08	-9.03	0.06	-0.04	-3.08
7,525.00	0.96	221.27	7,523.97	8.51	-24.34	-8.73	0.36	0.36	-1.64
7,550.00	0.92	220.88	7,548.96	8.20	-24.61	-8.42	0.16	-0.16	-1.56
7,575.00	0.90	222.98	7,573.96	7.91	-24.88	-8.13	0.16	-0.08	8.40
7,600.00	0.94	220.24	7,598.96	7.61	-25.14	-7.83	0.24	0.16	-10.96
7,625.00	0.94	217.86	7,623.95	7.29	-25.40	-7.52	0.16	0.00	-9.52
7,650.00	1.12	205.69	7,648.95	6.90	-25.63	-7.14	1.13	0.72	-48.68
7,675.00	1.10	206.60	7,673.94	6.47	-25.85	-6.70	0.11	-0.08	3.64
7,700.00	1.08	204.44	7,698.94	6.04	-26.05	-6.28	0.18	-0.08	-8.64
7,725.00	1.18	206.56	7,723.94	5.60	-26.27	-5.83	0.43	0.40	8.48
7,750.00	1.13	206.56	7,748.93	5.15	-26.49	-5.39	0.20	-0.20	0.00
7,775.00	1.16	210.40	7,773.93	4.71	-26.73	-4.95	0.33	0.12	15.36
7,800.00	1.11	206.68	7,798.92	4.27	-26.97	-4.52	0.36	-0.20	-14.88
7,825.00	1.14	208.17	7,823.92	3.84	-27.19	-4.08	0.17	0.12	5.96
7,850.00	1.09	208.02	7,848.91	3.41	-27.42	-3.66	0.20	-0.20	-0.60

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
7,875.00	1.11	208.72	7,873.91	2.98	-27.65	-3.24	0.10	0.08	2.80
7,900.00	1.09	207.72	7,898.90	2.56	-27.88	-2.81	0.11	-0.08	-4.00
7,925.00	1.12	211.45	7,923.90	2.14	-28.11	-2.40	0.31	0.12	14.92
7,950.00	1.06	210.57	7,948.89	1.74	-28.36	-1.99	0.25	-0.24	-3.52
7,975.00	1.02	213.88	7,973.89	1.35	-28.60	-1.61	0.29	-0.16	13.24
8,000.00	1.09	211.47	7,998.88	0.96	-28.85	-1.23	0.33	0.28	-9.64
8,025.00	1.11	215.02	8,023.88	0.56	-29.11	-0.83	0.28	0.08	14.20
8,050.00	1.08	218.16	8,048.87	0.18	-29.40	-0.45	0.27	-0.12	12.56
8,075.00	1.01	218.67	8,073.87	-0.18	-29.68	-0.09	0.28	-0.28	2.04
8,100.00	0.99	216.60	8,098.87	-0.52	-29.95	0.25	0.17	-0.08	-8.28
8,125.00	1.12	216.51	8,123.86	-0.89	-30.22	0.62	0.52	0.52	-0.36
8,150.00	0.99	224.54	8,148.86	-1.24	-30.52	0.97	0.79	-0.52	32.12
8,175.00	0.90	219.66	8,173.86	-1.55	-30.79	1.27	0.48	-0.36	-19.52
8,200.00	0.98	221.20	8,198.85	-1.86	-31.06	1.58	0.34	0.32	6.16
8,225.00	0.80	221.63	8,223.85	-2.15	-31.32	1.87	0.72	-0.72	1.72
8,250.00	0.92	222.60	8,248.85	-2.43	-31.57	2.14	0.48	0.48	3.88
8,275.00	0.99	225.51	8,273.84	-2.73	-31.86	2.44	0.34	0.28	11.64
8,300.00	0.93	224.14	8,298.84	-3.03	-32.15	2.73	0.26	-0.24	-5.48
8,325.00	0.85	224.42	8,323.84	-3.30	-32.42	3.01	0.32	-0.32	1.12
8,350.00	0.93	223.57	8,348.83	-3.58	-32.69	3.29	0.32	0.32	-3.40
8,375.00	0.83	225.57	8,373.83	-3.86	-32.96	3.56	0.42	-0.40	8.00
8,400.00	1.00	214.23	8,398.83	-4.16	-33.22	3.86	0.99	0.68	-45.36
8,425.00	1.12	212.18	8,423.82	-4.55	-33.47	4.25	0.50	0.48	-8.20
8,450.00	1.03	208.99	8,448.82	-4.95	-33.71	4.65	0.43	-0.36	-12.76
8,475.00	1.05	209.92	8,473.81	-5.35	-33.93	5.04	0.10	0.08	3.72
8,500.00	1.15	206.38	8,498.81	-5.77	-34.16	5.46	0.48	0.40	-14.16
8,525.00	1.13	203.45	8,523.80	-6.22	-34.37	5.91	0.25	-0.08	-11.72
8,550.00	1.22	202.74	8,548.80	-6.70	-34.57	6.38	0.36	0.36	-2.84
8,575.00	1.19	202.42	8,573.79	-7.18	-34.77	6.87	0.12	-0.12	-1.28
8,600.00	1.19	193.78	8,598.79	-7.67	-34.93	7.36	0.72	0.00	-34.56
8,625.00	1.13	190.45	8,623.78	-8.17	-35.04	7.85	0.36	-0.24	-13.32
8,650.00	1.17	195.02	8,648.78	-8.66	-35.15	8.34	0.40	0.16	18.28
8,675.00	1.22	195.40	8,673.77	-9.16	-35.28	8.84	0.20	0.20	1.52
8,700.00	1.03	193.99	8,698.77	-9.63	-35.41	9.31	0.77	-0.76	-5.64
8,725.00	1.08	189.37	8,723.76	-10.09	-35.50	9.76	0.39	0.20	-18.48
8,750.00	1.15	191.26	8,748.76	-10.56	-35.59	10.24	0.32	0.28	7.56
8,775.00	1.12	190.94	8,773.75	-11.05	-35.68	10.73	0.12	-0.12	-1.28
8,800.00	1.13	193.36	8,798.75	-11.53	-35.79	11.20	0.19	0.04	9.68
8,825.00	0.99	189.94	8,823.74	-11.98	-35.88	11.66	0.61	-0.56	-13.68
8,850.00	1.00	188.86	8,848.74	-12.41	-35.95	12.08	0.09	0.04	-4.32
8,875.00	0.95	199.99	8,873.74	-12.82	-36.06	12.49	0.78	-0.20	44.52
8,900.00	0.79	201.24	8,898.73	-13.18	-36.19	12.85	0.64	-0.64	5.00
8,925.00	0.89	203.37	8,923.73	-13.51	-36.33	13.18	0.42	0.40	8.52

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
8,950.00	0.72	209.86	8,948.73	-13.83	-36.49	13.50	0.77	-0.68	25.96
8,975.00	0.67	220.49	8,973.73	-14.08	-36.66	13.74	0.55	-0.20	42.52
9,000.00	0.67	229.28	8,998.73	-14.28	-36.86	13.95	0.41	0.00	35.16
9,025.00	0.80	239.52	9,023.72	-14.47	-37.13	14.13	0.74	0.52	40.96
9,050.00	0.75	253.29	9,048.72	-14.60	-37.43	14.26	0.77	-0.20	55.08
9,075.00	0.89	268.17	9,073.72	-14.66	-37.78	14.31	1.01	0.56	59.52
9,100.00	1.02	275.23	9,098.72	-14.64	-38.20	14.29	0.70	0.52	28.24
9,125.00	1.14	280.08	9,123.71	-14.58	-38.67	14.23	0.60	0.48	19.40
9,150.00	1.31	283.63	9,148.71	-14.47	-39.19	14.11	0.74	0.68	14.20
9,175.00	1.42	284.80	9,173.70	-14.32	-39.76	13.96	0.45	0.44	4.68
9,200.00	1.55	291.41	9,198.69	-14.12	-40.38	13.75	0.86	0.52	26.44
9,225.00	1.51	290.89	9,223.68	-13.88	-41.00	13.50	0.17	-0.16	-2.08
9,250.00	1.37	305.93	9,248.67	-13.58	-41.55	13.21	1.61	-0.56	60.16
9,275.00	1.37	329.06	9,273.67	-13.15	-41.95	12.77	2.20	0.00	92.52
9,300.00	1.34	341.22	9,298.66	-12.62	-42.19	12.24	1.15	-0.12	48.64
9,325.00	1.38	342.94	9,323.65	-12.05	-42.38	11.67	0.23	0.16	6.88
9,350.00	1.35	340.49	9,348.65	-11.49	-42.56	11.10	0.26	-0.12	-9.80
9,375.00	1.35	340.88	9,373.64	-10.93	-42.76	10.55	0.04	0.00	1.56
9,400.00	1.39	342.69	9,398.63	-10.37	-42.95	9.98	0.24	0.16	7.24
9,425.00	1.44	346.03	9,423.62	-9.77	-43.11	9.38	0.39	0.20	13.36
9,450.00	1.39	343.61	9,448.62	-9.18	-43.27	8.78	0.31	-0.20	-9.68
9,475.00	1.36	344.32	9,473.61	-8.60	-43.44	8.20	0.14	-0.12	2.84
9,500.00	1.37	342.96	9,498.60	-8.03	-43.61	7.63	0.14	0.04	-5.44
9,525.00	1.41	344.62	9,523.59	-7.45	-43.78	7.05	0.23	0.16	6.64
9,550.00	1.37	341.38	9,548.59	-6.87	-43.95	6.47	0.35	-0.16	-12.96
9,575.00	1.40	342.72	9,573.58	-6.29	-44.14	5.89	0.18	0.12	5.36
9,600.00	1.44	348.60	9,598.57	-5.69	-44.29	5.29	0.60	0.16	23.52
9,625.00	1.38	344.74	9,623.56	-5.09	-44.43	4.69	0.45	-0.24	-15.44
9,650.00	1.44	347.04	9,648.56	-4.50	-44.58	4.09	0.33	0.24	9.20
9,675.00	1.40	352.52	9,673.55	-3.89	-44.69	3.48	0.57	-0.16	21.92
9,700.00	1.39	353.07	9,698.54	-3.28	-44.77	2.88	0.07	-0.04	2.20
9,725.00	1.25	355.83	9,723.54	-2.71	-44.83	2.30	0.61	-0.56	11.04
9,750.00	1.22	355.98	9,748.53	-2.17	-44.86	1.77	0.12	-0.12	0.60
9,775.00	1.20	356.45	9,773.52	-1.65	-44.90	1.24	0.09	-0.08	1.88
9,800.00	1.20	0.32	9,798.52	-1.12	-44.91	0.72	0.32	0.00	15.48
9,825.00	1.02	4.65	9,823.51	-0.64	-44.89	0.23	0.79	-0.72	17.32
9,850.00	0.91	2.99	9,848.51	-0.22	-44.87	-0.19	0.45	-0.44	-6.64
9,875.00	1.03	7.83	9,873.51	0.20	-44.82	-0.61	0.58	0.48	19.36
9,900.00	1.02	5.62	9,898.50	0.64	-44.77	-1.05	0.16	-0.04	-8.84
9,925.00	0.84	2.71	9,923.50	1.05	-44.74	-1.46	0.74	-0.72	-11.64
9,950.00	0.93	1.69	9,948.50	1.44	-44.73	-1.84	0.37	0.36	-4.08
9,975.00	0.98	5.03	9,973.49	1.85	-44.70	-2.26	0.30	0.20	13.36
10,000.00	0.97	8.18	9,998.49	2.27	-44.65	-2.68	0.22	-0.04	12.60
10,025.00	0.95	5.28	10,023.49	2.69	-44.60	-3.09	0.21	-0.08	-11.60

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)	
10,050.00	0.93	2.69	10,048.48	3.10	-44.58	-3.50	0.19	-0.08	-10.36	
10,075.00	0.99	2.94	10,073.48	3.52	-44.56	-3.92	0.24	0.24	1.00	
10,100.00	0.81	7.09	10,098.48	3.91	-44.52	-4.31	0.77	-0.72	16.60	
10,125.00	0.81	13.42	10,123.47	4.25	-44.46	-4.66	0.36	0.00	25.32	
10,150.00	0.74	13.77	10,148.47	4.58	-44.38	-4.99	0.28	-0.28	1.40	
10,175.00	0.81	12.66	10,173.47	4.91	-44.30	-5.31	0.29	0.28	-4.44	
10,200.00	0.75	3.86	10,198.47	5.25	-44.25	-5.65	0.54	-0.24	-35.20	
10,225.00	0.75	2.17	10,223.46	5.58	-44.24	-5.98	0.09	0.00	-6.76	
10,250.00	0.73	358.02	10,248.46	5.90	-44.24	-6.30	0.23	-0.08	-16.60	
10,275.00	0.66	350.08	10,273.46	6.20	-44.27	-6.60	0.48	-0.28	-31.76	
10,300.00	0.69	343.56	10,298.46	6.49	-44.33	-6.89	0.33	0.12	-26.08	
10,325.00	0.59	334.35	10,323.46	6.75	-44.43	-7.15	0.57	-0.40	-36.84	
10,350.00	0.65	328.54	10,348.46	6.98	-44.56	-7.39	0.35	0.24	-23.24	
10,375.00	0.71	327.20	10,373.45	7.23	-44.72	-7.64	0.25	0.24	-5.36	
10,400.00	0.67	314.43	10,398.45	7.47	-44.91	-7.87	0.63	-0.16	-51.08	
10,425.00	0.68	316.34	10,423.45	7.68	-45.11	-8.08	0.10	0.04	7.64	
10,450.00	0.72	318.04	10,448.45	7.90	-45.32	-8.31	0.18	0.16	6.80	
10,475.00	0.69	313.78	10,473.45	8.12	-45.54	-8.53	0.24	-0.12	-17.04	
10,500.00	0.72	310.63	10,498.44	8.33	-45.76	-8.74	0.20	0.12	-12.60	
10,525.00	0.81	308.91	10,523.44	8.54	-46.02	-8.96	0.37	0.36	-6.88	
10,550.00	0.75	310.13	10,548.44	8.76	-46.28	-9.18	0.25	-0.24	4.88	
10,575.00	0.78	312.18	10,573.44	8.98	-46.53	-9.40	0.16	0.12	8.20	
10,600.00	0.78	306.69	10,598.44	9.19	-46.80	-9.62	0.30	0.00	-21.96	
10,625.00	0.82	308.17	10,623.43	9.40	-47.07	-9.83	0.18	0.16	5.92	
10,650.00	0.84	305.79	10,648.43	9.62	-47.36	-10.05	0.16	0.08	-9.52	
10,675.00	1.00	304.27	10,673.43	9.85	-47.69	-10.29	0.65	0.64	-6.08	
10,700.00	1.06	303.68	10,698.42	10.10	-48.06	-10.54	0.24	0.24	-2.36	
10,725.00	1.16	304.85	10,723.42	10.38	-48.46	-10.82	0.41	0.40	4.68	
10,750.00	1.16	301.46	10,748.41	10.65	-48.89	-11.10	0.27	0.00	-13.56	
10,775.00	1.23	301.23	10,773.41	10.92	-49.33	-11.37	0.28	0.28	-0.92	
10,800.00	1.28	302.44	10,798.40	11.21	-49.80	-11.66	0.23	0.20	4.84	
10,825.00	1.32	297.79	10,823.40	11.50	-50.29	-11.95	0.45	0.16	-18.60	
10,850.00	1.34	301.29	10,848.39	11.78	-50.79	-12.24	0.33	0.08	14.00	
10,875.00	1.38	300.71	10,873.38	12.09	-51.30	-12.55	0.17	0.16	-2.32	
10,900.00	1.46	298.91	10,898.37	12.40	-51.84	-12.87	0.37	0.32	-7.20	
10,925.00	1.52	302.49	10,923.37	12.73	-52.40	-13.20	0.44	0.24	14.32	
10,950.00	1.61	299.23	10,948.36	13.08	-52.98	-13.56	0.51	0.36	-13.04	
10,975.00	1.72	298.88	10,973.35	13.43	-53.62	-13.92	0.44	0.44	-1.40	
11,000.00	1.77	297.85	10,998.33	13.79	-54.29	-14.28	0.24	0.20	-4.12	
11,025.00	1.85	297.67	11,023.32	14.16	-54.99	-14.66	0.32	0.32	-0.72	
11,050.00	1.84	299.65	11,048.31	14.55	-55.69	-15.05	0.26	-0.04	7.92	
11,075.00	1.90	297.67	11,073.30	14.94	-56.41	-15.45	0.35	0.24	-7.92	
11,100.00	1.96	297.28	11,098.28	15.33	-57.16	-15.84	0.25	0.24	-1.56	

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
11,125.00	1.97	299.64	11,123.27	15.73	-57.91	-16.26	0.33	0.04	9.44
11,150.00	1.83	297.46	11,148.25	16.13	-58.64	-16.66	0.63	-0.56	-8.72
11,175.00	1.78	297.52	11,173.24	16.49	-59.34	-17.03	0.20	-0.20	0.24
11,200.00	1.80	297.53	11,198.23	16.86	-60.03	-17.40	0.08	0.08	0.04
11,225.00	1.85	300.16	11,223.22	17.24	-60.73	-17.79	0.39	0.20	10.52
11,250.00	1.93	298.86	11,248.20	17.65	-61.44	-18.20	0.36	0.32	-5.20
11,275.00	2.10	298.05	11,273.19	18.06	-62.22	-18.63	0.69	0.68	-3.24
11,300.00	2.52	280.04	11,298.17	18.38	-63.16	-18.95	3.33	1.68	-72.04
11,325.00	2.51	294.19	11,323.14	18.70	-64.20	-19.28	2.48	-0.04	56.60
11,350.00	2.61	295.03	11,348.12	19.16	-65.22	-19.75	0.43	0.40	3.36
11,375.00	2.68	293.63	11,373.09	19.64	-66.27	-20.24	0.38	0.28	-5.60
11,400.00	2.69	294.41	11,398.06	20.11	-67.34	-20.72	0.15	0.04	3.12
11,425.00	2.69	296.68	11,423.04	20.62	-68.40	-21.24	0.43	0.00	9.08
11,450.00	2.58	296.84	11,448.01	21.14	-69.42	-21.76	0.44	-0.44	0.64
11,475.00	2.46	296.85	11,472.99	21.63	-70.40	-22.27	0.48	-0.48	0.04
11,500.00	2.28	297.50	11,497.96	22.10	-71.32	-22.75	0.73	-0.72	2.60
11,525.00	2.29	297.03	11,522.94	22.56	-72.21	-23.21	0.08	0.04	-1.88
11,550.00	2.28	297.42	11,547.92	23.02	-73.10	-23.68	0.07	-0.04	1.56
11,575.00	2.33	297.63	11,572.90	23.48	-73.99	-24.15	0.20	0.20	0.84
11,600.00	2.44	294.27	11,597.88	23.94	-74.92	-24.61	0.71	0.44	-13.44
11,723.00	2.47	282.11	11,720.77	25.57	-79.90	-26.29	0.42	0.02	-9.89
11,817.00	8.00	197.42	11,814.43	19.74	-83.85	-20.50	8.67	5.88	-90.10
KOP: 11817.00' MD, 11814.43' TVD									
11,848.00	12.78	189.12	11,844.91	14.29	-85.04	-15.07	16.12	15.42	-26.77
11,880.00	17.95	184.83	11,875.76	5.88	-86.01	-6.66	16.53	16.16	-13.41
11,911.00	22.08	181.83	11,904.88	-4.71	-86.60	3.92	13.72	13.32	-9.68
11,943.00	25.80	180.42	11,934.12	-17.69	-86.85	16.90	11.76	11.63	-4.41
11,974.00	27.68	175.56	11,961.81	-31.61	-86.34	30.83	9.30	6.06	-15.68
12,006.00	29.16	168.53	11,989.96	-46.67	-84.21	45.90	11.43	4.63	-21.97
12,037.00	31.71	165.93	12,016.69	-61.98	-80.73	61.24	9.26	8.23	-8.39
12,069.00	34.81	166.39	12,043.44	-79.02	-76.53	78.32	9.72	9.69	1.44
12,101.00	37.81	169.07	12,069.23	-97.53	-72.52	96.87	10.60	9.38	8.38
12,117.97	39.56	171.15	12,082.47	-107.98	-70.70	107.33	12.83	10.30	12.24
Cross 330' Offset: 12117.97' MD, 12082.47' TVD, 39.56° INC									
12,132.00	41.03	172.75	12,093.18	-116.96	-69.44	116.33	12.83	10.49	11.43
12,163.00	44.60	172.18	12,115.91	-137.84	-66.67	137.23	11.58	11.52	-1.84
12,195.00	47.81	169.91	12,138.06	-160.65	-63.06	160.07	11.26	10.03	-7.09
12,226.00	50.71	167.60	12,158.29	-183.68	-58.47	183.14	10.93	9.35	-7.45
12,258.00	53.76	168.08	12,177.88	-208.41	-53.15	207.92	9.60	9.53	1.50
12,289.00	56.53	169.69	12,195.60	-233.37	-48.25	232.92	9.90	8.94	5.19
12,321.00	58.97	170.70	12,212.67	-260.03	-43.65	259.63	8.08	7.63	3.16
12,353.00	59.98	171.00	12,228.93	-287.25	-39.26	286.88	3.26	3.16	0.94
12,384.00	61.15	171.91	12,244.16	-313.95	-35.25	313.61	4.56	3.77	2.94
12,415.00	64.23	173.16	12,258.38	-341.25	-31.68	340.95	10.56	9.94	4.03

Survey Report

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Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
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MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 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)
12,447.00	67.92	173.89	12,271.36	-370.31	-28.38	370.04	11.72	11.53	2.28
12,478.00	70.48	173.09	12,282.37	-399.10	-25.10	398.86	8.60	8.26	-2.58
12,510.00	72.99	171.69	12,292.39	-429.22	-21.07	429.01	8.88	7.84	-4.38
12,541.00	76.45	171.00	12,300.56	-458.78	-16.57	458.61	11.37	11.16	-2.23
12,573.00	80.19	171.05	12,307.04	-489.73	-11.68	489.60	11.69	11.69	0.16
12,604.00	84.04	172.92	12,311.29	-520.13	-7.40	520.04	13.78	12.42	6.03
12,636.00	85.35	174.72	12,314.25	-551.80	-3.97	551.74	6.94	4.09	5.63
12,651.71	86.23	175.27	12,315.40	-567.41	-2.61	567.36	6.60	5.61	3.49
FTP(WF11H)									
12,667.00	87.09	175.80	12,316.29	-582.63	-1.42	582.59	6.60	5.61	3.48
EOC: 12667.00' MD, 12316.29' TVD, 87.09° INC, 175.80° AZ, 582.59' VS									
12,699.00	88.83	177.34	12,317.43	-614.55	0.50	614.53	7.26	5.44	4.81
12,775.00	89.59	177.79	12,318.48	-690.47	3.72	690.48	1.16	1.00	0.59
12,870.00	89.12	176.62	12,319.55	-785.35	8.36	785.39	1.33	-0.49	-1.23
12,964.00	88.11	176.43	12,321.82	-879.15	14.05	879.24	1.09	-1.07	-0.20
13,058.00	89.02	177.28	12,324.18	-972.98	19.21	973.11	1.32	0.97	0.90
13,153.00	89.87	178.31	12,325.10	-1,067.90	22.86	1,068.06	1.41	0.89	1.08
13,247.00	89.31	178.52	12,325.77	-1,161.86	25.46	1,162.04	0.64	-0.60	0.22
13,342.00	90.32	177.66	12,326.08	-1,256.80	28.63	1,257.01	1.40	1.06	-0.91
13,437.00	91.60	179.13	12,324.49	-1,351.75	31.29	1,351.98	2.05	1.35	1.55
13,531.00	92.82	181.28	12,320.86	-1,445.67	30.95	1,445.89	2.63	1.30	2.29
13,626.00	93.14	180.96	12,315.92	-1,540.52	29.10	1,540.73	0.48	0.34	-0.34
13,721.00	93.13	180.38	12,310.73	-1,635.38	27.99	1,635.56	0.61	-0.01	-0.61
13,816.00	93.47	180.37	12,305.26	-1,730.22	27.37	1,730.39	0.36	0.36	-0.01
13,910.00	93.92	181.07	12,299.20	-1,824.01	26.19	1,824.17	0.88	0.48	0.74
14,005.00	93.71	182.47	12,292.88	-1,918.75	23.26	1,918.89	1.49	-0.22	1.47
14,100.00	89.83	182.42	12,289.94	-2,013.60	19.21	2,013.70	4.08	-4.08	-0.05
14,195.00	87.99	181.50	12,291.75	-2,108.53	15.96	2,108.58	2.17	-1.94	-0.97
14,289.00	88.38	181.09	12,294.73	-2,202.45	13.84	2,202.49	0.60	0.41	-0.44
14,384.00	87.66	181.11	12,298.01	-2,297.38	12.02	2,297.39	0.76	-0.76	0.02
14,479.00	88.06	181.49	12,301.56	-2,392.29	9.86	2,392.28	0.58	0.42	0.40
14,574.00	89.12	180.54	12,303.90	-2,487.24	8.18	2,487.21	1.50	1.12	-1.00
14,668.00	89.39	179.46	12,305.12	-2,581.23	8.18	2,581.20	1.18	0.29	-1.15
14,763.00	90.39	178.61	12,305.30	-2,676.22	9.78	2,676.20	1.38	1.05	-0.89
14,857.00	90.97	179.02	12,304.19	-2,770.19	11.73	2,770.18	0.76	0.62	0.44
14,953.00	91.39	179.78	12,302.21	-2,866.16	12.73	2,866.16	0.90	0.44	0.79
15,047.00	91.13	179.42	12,300.14	-2,960.14	13.39	2,960.14	0.47	-0.28	-0.38
15,141.00	91.47	179.82	12,298.01	-3,054.11	14.01	3,054.11	0.56	0.36	0.43
15,235.00	91.09	179.28	12,295.91	-3,148.08	14.75	3,148.09	0.70	-0.40	-0.57
15,329.00	91.04	179.28	12,294.16	-3,242.06	15.93	3,242.07	0.05	-0.05	0.00
15,422.00	90.75	178.95	12,292.71	-3,335.04	17.37	3,335.06	0.47	-0.31	-0.35
15,516.00	90.80	178.80	12,291.44	-3,429.01	19.21	3,429.05	0.17	0.05	-0.16
15,610.00	89.61	178.89	12,291.10	-3,522.99	21.11	3,523.04	1.27	-1.27	0.10

Survey Report

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Site: White Falcon 16 Federal COM
Well: #11H
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Local Co-ordinate Reference: Well #11H
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MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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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)
15,703.00	89.51	179.04	12,291.82	-3,615.97	22.79	3,616.03	0.19	-0.11	0.16
15,797.00	89.91	179.19	12,292.29	-3,709.96	24.24	3,710.03	0.45	0.43	0.16
15,892.00	89.01	178.27	12,293.19	-3,804.93	26.34	3,805.01	1.35	-0.95	-0.97
15,986.00	88.92	178.06	12,294.88	-3,898.87	29.35	3,898.97	0.24	-0.10	-0.22
16,080.00	88.53	177.59	12,296.98	-3,992.78	32.92	3,992.91	0.65	-0.41	-0.50
16,174.00	88.33	177.05	12,299.55	-4,086.64	37.31	4,086.81	0.61	-0.21	-0.57
16,268.00	88.38	176.90	12,302.25	-4,180.47	42.27	4,180.68	0.17	0.05	-0.16
16,362.00	88.69	176.93	12,304.65	-4,274.30	47.33	4,274.55	0.33	0.33	0.03
16,456.00	88.99	176.67	12,306.56	-4,368.13	52.57	4,368.43	0.42	0.32	-0.28
16,553.00	88.91	177.61	12,308.33	-4,465.00	57.41	4,465.33	0.97	-0.08	0.97
16,647.00	89.19	178.01	12,309.89	-4,558.91	61.00	4,559.28	0.52	0.30	0.43
16,742.00	89.64	179.20	12,310.86	-4,653.88	63.32	4,654.26	1.34	0.47	1.25
16,836.00	89.91	178.64	12,311.23	-4,747.86	65.09	4,748.26	0.66	0.29	-0.60
16,930.00	90.28	178.70	12,311.08	-4,841.84	67.27	4,842.25	0.40	0.39	0.06
17,024.00	91.02	180.69	12,310.01	-4,935.82	67.77	4,936.23	2.26	0.79	2.12
17,118.00	91.48	181.62	12,307.96	-5,029.78	65.88	5,030.17	1.10	0.49	0.99
17,212.00	91.62	181.89	12,305.42	-5,123.70	63.00	5,124.06	0.32	0.15	0.29
17,306.00	92.21	181.84	12,302.27	-5,217.60	59.94	5,217.93	0.63	0.63	-0.05
17,401.00	91.55	180.24	12,299.16	-5,312.53	58.22	5,312.84	1.82	-0.69	-1.68
17,495.00	91.06	180.92	12,297.02	-5,406.50	57.27	5,406.80	0.89	-0.52	0.72
17,589.00	90.00	179.92	12,296.15	-5,500.49	56.58	5,500.78	1.55	-1.13	-1.06
17,683.00	89.38	179.72	12,296.66	-5,594.49	56.87	5,594.77	0.69	-0.66	-0.21
17,777.00	89.94	180.27	12,297.21	-5,688.48	56.88	5,688.77	0.84	0.60	0.59
17,871.00	89.52	180.17	12,297.66	-5,782.48	56.52	5,782.76	0.46	-0.45	-0.11
17,965.00	90.32	180.66	12,297.79	-5,876.48	55.84	5,876.74	1.00	0.85	0.52
18,059.00	90.64	180.56	12,297.00	-5,970.47	54.84	5,970.72	0.36	0.34	-0.11
18,154.00	89.05	179.58	12,297.26	-6,065.47	54.72	6,065.71	1.97	-1.67	-1.03
18,248.00	89.25	179.56	12,298.65	-6,159.45	55.43	6,159.70	0.21	0.21	-0.02
18,342.00	90.52	179.20	12,298.84	-6,253.44	56.45	6,253.70	1.40	1.35	-0.38
18,436.00	89.86	179.45	12,298.53	-6,347.44	57.55	6,347.70	0.75	-0.70	0.27
18,530.00	89.00	179.65	12,299.46	-6,441.43	58.29	6,441.69	0.94	-0.91	0.21
18,624.00	89.35	179.54	12,300.82	-6,535.42	58.96	6,535.68	0.39	0.37	-0.12
18,719.00	89.97	178.73	12,301.38	-6,630.40	60.39	6,630.68	1.07	0.65	-0.85
18,814.00	88.50	179.69	12,302.65	-6,725.38	61.70	6,725.66	1.85	-1.55	1.01
18,909.00	88.96	179.45	12,304.76	-6,820.36	62.41	6,820.64	0.55	0.48	-0.25
19,004.00	90.00	179.13	12,305.62	-6,915.34	63.59	6,915.63	1.15	1.09	-0.34
19,099.00	89.50	178.08	12,306.03	-7,010.31	65.90	7,010.62	1.22	-0.53	-1.11
19,193.00	89.68	178.24	12,306.70	-7,104.26	68.92	7,104.59	0.26	0.19	0.17
19,288.00	91.96	177.98	12,305.35	-7,199.19	72.05	7,199.55	2.42	2.40	-0.27
19,383.00	93.29	178.62	12,300.99	-7,294.05	74.87	7,294.43	1.55	1.40	0.67
19,477.00	93.08	177.42	12,295.77	-7,387.85	78.11	7,388.25	1.29	-0.22	-1.28
19,572.00	91.19	178.82	12,292.23	-7,482.72	81.22	7,483.15	2.48	-1.99	1.47
19,667.00	91.13	180.16	12,290.31	-7,577.70	82.07	7,578.13	1.41	-0.06	1.41
19,762.00	89.25	180.92	12,289.99	-7,672.69	81.18	7,673.11	2.13	-1.98	0.80

Survey Report

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TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
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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)
19,857.00	87.71	179.48	12,292.51	-7,767.65	80.84	7,768.06	2.22	-1.62	-1.52
19,951.00	87.27	180.59	12,296.63	-7,861.56	80.79	7,861.97	1.27	-0.47	1.18
20,046.00	87.51	179.75	12,300.96	-7,956.46	80.50	7,956.86	0.92	0.25	-0.88
20,141.00	86.84	179.51	12,305.64	-8,051.34	81.12	8,051.74	0.75	-0.71	-0.25
20,236.00	87.46	180.65	12,310.36	-8,146.22	80.98	8,146.62	1.36	0.65	1.20
20,331.00	85.65	179.66	12,316.07	-8,241.04	80.73	8,241.43	2.17	-1.91	-1.04
20,425.00	88.38	179.46	12,320.97	-8,334.90	81.45	8,335.30	2.91	2.90	-0.21
20,520.00	89.80	178.25	12,322.47	-8,429.87	83.35	8,430.28	1.96	1.49	-1.27
20,615.00	90.23	176.49	12,322.45	-8,524.76	87.71	8,525.21	1.91	0.45	-1.85
20,709.00	90.50	176.83	12,321.85	-8,618.60	93.18	8,619.09	0.46	0.29	0.36
20,816.00	91.57	174.51	12,319.92	-8,725.27	101.26	8,725.83	2.39	1.00	-2.17
20,911.00	91.12	174.17	12,317.69	-8,819.78	110.62	8,820.42	0.59	-0.47	-0.36
20,942.00	91.12	174.19	12,317.08	-8,850.61	113.77	8,851.28	0.06	0.00	0.06
20,958.00	90.73	174.00	12,316.82	-8,866.53	115.41	8,867.21	2.71	-2.44	-1.19
21,005.00	89.94	175.80	12,316.55	-8,913.34	119.59	8,914.06	4.18	-1.68	3.83
21,099.00	92.52	179.96	12,314.53	-9,007.22	123.07	9,007.97	5.21	2.74	4.43
21,194.00	91.74	179.00	12,311.00	-9,102.15	123.93	9,102.90	1.30	-0.82	-1.01
21,289.00	91.34	178.92	12,308.45	-9,197.10	125.65	9,197.86	0.43	-0.42	-0.08
21,384.00	90.11	179.11	12,307.24	-9,292.08	127.29	9,292.85	1.31	-1.29	0.20
21,478.00	87.20	178.59	12,309.45	-9,386.02	129.17	9,386.81	3.14	-3.10	-0.55
21,573.00	88.15	179.04	12,313.30	-9,480.92	131.14	9,481.72	1.11	1.00	0.47
21,668.00	86.92	179.97	12,317.39	-9,575.83	131.96	9,576.63	1.62	-1.29	0.98
21,763.00	89.11	180.75	12,320.68	-9,670.76	131.36	9,671.56	2.45	2.31	0.82
21,857.00	90.84	182.46	12,320.72	-9,764.72	128.73	9,765.49	2.59	1.84	1.82
21,952.00	89.05	182.18	12,320.81	-9,859.64	124.88	9,860.37	1.91	-1.88	-0.29
22,047.00	87.42	181.17	12,323.74	-9,954.55	122.10	9,955.25	2.02	-1.72	-1.06
22,090.54	88.47	181.30	12,325.30	-9,998.05	121.17	9,998.74	2.44	2.42	0.31
Cross 330' Offset: 22090.54' MD, 12323.93' TVD, 88.47° INC									
22,142.00	89.72	181.46	12,326.11	-10,049.49	119.93	10,050.16	2.44	2.42	0.31
22,161.00	89.27	181.65	12,326.28	-10,068.48	119.41	10,069.15	2.57	-2.37	1.00
Final MWD Survey: 22161.00' MD, 12324.90' TVD									
22,213.00	89.27	181.65	12,326.94	-10,120.45	117.91	10,121.11	0.00	0.00	0.00
BHL: 22213.00' MD, 12325.57' TVD, 89.27° INC, 181.65° AZ, -10120.54' +N-S, 113.15' +E-W, 10121.15' VS - BHL: 203' FSL/ 634' FEL - PBHL									

Survey Report

Company: COG OPERATING, LLC
Project: Lea County, NM (NAD27) NMEZ
Site: White Falcon 16 Federal COM
Well: #11H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #11H
TVD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
MD Reference: RKB @ 3271.50usft (Latshaw 44 - KB=25')
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.14 Single User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,817.00	11,814.43	19.74	-83.85	KOP: 11817.00' MD, 11814.43' TVD
12,117.97	12,082.47	-107.98	-70.70	Cross 330' Offset: 12117.97' MD, 12082.47' TVD, 39.56° INC
12,667.00	12,316.29	-582.63	-1.42	EOC: 12667.00' MD, 12316.29' TVD, 87.09° INC, 175.80° AZ, 582.59' VS
22,090.54	12,325.30	-9,998.05	121.17	Cross 330' Offset: 22090.54' MD, 12323.93' TVD, 88.47° INC
22,161.00	12,326.28	-10,068.48	119.41	Final MWD Survey: 22161.00' MD, 12324.90' TVD
22,213.00	12,326.94	-10,120.45	117.91	BHL: 22213.00' MD, 12325.57' TVD, 89.27° INC, 181.65° AZ, -10120.54' +N/-S,
22,213.00	12,326.94	-10,120.45	117.91	BHL: 203' FSL/ 634' FEL

Checked By: _____ Approved By: _____ Date: _____