



COG Operating, LLC

Lea County, NM

Sec 30, T24-S,R35E

Fascinator Fed Com #702H

Wellbore #1

Design: Wellbore #1

QES Survey Report

24 January, 2019

HOBBS OCD
OCT 18 2019
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Survey Report



Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 30, T24-S,R35E
Well: Fascinator Fed Com #702H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Fascinator Fed Com #702H
TVD Reference: RKB @ 3375.0usft (Noram #21)
MD Reference: RKB @ 3375.0usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project	Lea 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	Sec 30, T24-S,R35E		
Site Position:		Northing:	430,949.60 usft
From:	Map	Easting:	787,533.30 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 10' 52.979 N
		Longitude:	103° 24' 14.307 W
		Grid Convergence:	0.50 °

Well	Fascinator Fed Com #702H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	
			usft
		Latitude:	32° 11' 42.172 N
		Longitude:	103° 24' 28.449 W
		Ground Level:	3,346.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	User Defined	12/10/2018	6.71
			Dip Angle
			(°)
			59.89
			Field Strength
			(nT)
			47,912.00000000

Design	Wellbore #1		
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
			(°)
			180.36

Survey Program	Date 1/24/2019		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	11,730.0	Definitive Keeper Gyro Survey (Wellbore #	GYRO-NS
11,755.0	22,620.0	QES MWD Surveys (Wellbore #1)	MWD+IFR1+MS
			Description
			OWSG Gyrocompass Gyro
			OWSG MWD + IFR1 + Multi-Station Correction

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.47	167.09	100.0	-0.4	0.1	0.4	0.47	0.47	0.00
125.0	0.49	162.59	125.0	-0.6	0.1	0.6	0.17	0.08	-18.00
150.0	0.43	164.85	150.0	-0.8	0.2	0.8	0.25	-0.24	9.04
175.0	0.53	163.39	175.0	-1.0	0.3	1.0	0.40	0.40	-5.84
200.0	0.54	166.93	200.0	-1.2	0.3	1.2	0.14	0.04	14.16
225.0	0.54	162.84	225.0	-1.4	0.4	1.4	0.15	0.00	-16.36
250.0	0.48	170.96	250.0	-1.7	0.4	1.7	0.38	-0.24	32.48
275.0	0.61	168.16	275.0	-1.9	0.5	1.9	0.53	0.52	-11.20
300.0	0.53	158.67	300.0	-2.1	0.5	2.1	0.49	-0.32	-37.96



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North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
325.0	0.53	156.89	325.0	-2.4	0.6	2.3	0.07	0.00	-7.12
350.0	0.39	157.11	350.0	-2.5	0.7	2.5	0.56	-0.56	0.88
375.0	0.38	155.53	375.0	-2.7	0.8	2.7	0.06	-0.04	-6.32
400.0	0.41	160.18	400.0	-2.8	0.8	2.8	0.18	0.12	18.60
425.0	0.42	156.96	425.0	-3.0	0.9	3.0	0.10	0.04	-12.88
450.0	0.39	156.29	450.0	-3.2	1.0	3.2	0.12	-0.12	-2.68
475.0	0.39	159.65	475.0	-3.3	1.0	3.3	0.09	0.00	13.44
500.0	0.47	161.52	500.0	-3.5	1.1	3.5	0.32	0.32	7.48
525.0	0.47	153.18	525.0	-3.7	1.2	3.7	0.27	0.00	-33.36
550.0	0.42	155.00	550.0	-3.9	1.3	3.9	0.21	-0.20	7.28
575.0	0.40	155.99	575.0	-4.0	1.3	4.0	0.08	-0.08	3.96
600.0	0.41	159.85	600.0	-4.2	1.4	4.2	0.12	0.04	15.44
625.0	0.36	158.89	625.0	-4.4	1.5	4.4	0.20	-0.20	-3.84
650.0	0.33	164.80	650.0	-4.5	1.5	4.5	0.19	-0.12	23.64
675.0	0.30	141.95	675.0	-4.6	1.6	4.6	0.51	-0.12	-91.40
700.0	0.33	147.95	700.0	-4.7	1.7	4.7	0.18	0.12	24.00
725.0	0.31	150.94	725.0	-4.9	1.7	4.8	0.10	-0.08	11.96
750.0	0.20	137.50	750.0	-4.9	1.8	4.9	0.50	-0.44	-53.76
775.0	0.16	139.44	775.0	-5.0	1.8	5.0	0.16	-0.16	7.76
800.0	0.06	196.19	800.0	-5.0	1.9	5.0	0.55	-0.40	227.00
825.0	0.04	143.02	825.0	-5.1	1.9	5.1	0.19	-0.08	-212.68
850.0	0.05	94.74	850.0	-5.1	1.9	5.1	0.15	0.04	-193.12
875.0	0.06	143.11	875.0	-5.1	1.9	5.1	0.18	0.04	193.48
900.0	0.06	185.00	900.0	-5.1	1.9	5.1	0.17	0.00	167.56
925.0	0.06	261.87	925.0	-5.1	1.9	5.1	0.30	0.00	307.48
950.0	0.06	314.69	950.0	-5.1	1.9	5.1	0.21	0.00	211.28
975.0	0.06	278.89	975.0	-5.1	1.8	5.1	0.15	0.00	-143.20
1,000.0	0.10	287.24	1,000.0	-5.1	1.8	5.1	0.17	0.16	33.40
1,025.0	0.16	323.91	1,025.0	-5.1	1.8	5.1	0.40	0.24	146.68
1,050.0	0.05	315.19	1,050.0	-5.0	1.7	5.0	0.44	-0.44	-34.88
1,075.0	0.33	333.75	1,075.0	-5.0	1.7	4.9	1.13	1.12	74.24
1,100.0	0.44	337.06	1,100.0	-4.8	1.6	4.8	0.45	0.44	13.24
1,125.0	0.44	334.62	1,125.0	-4.6	1.6	4.6	0.07	0.00	-9.76
1,150.0	0.50	335.43	1,150.0	-4.4	1.5	4.4	0.24	0.24	3.24
1,175.0	0.46	339.75	1,175.0	-4.2	1.4	4.2	0.22	-0.16	17.28
1,200.0	0.42	336.44	1,200.0	-4.1	1.3	4.1	0.19	-0.16	-13.24
1,225.0	0.59	339.08	1,225.0	-3.9	1.2	3.9	0.69	0.68	10.56
1,250.0	0.39	337.87	1,250.0	-3.7	1.2	3.7	0.80	-0.80	-4.84
1,275.0	0.55	329.23	1,275.0	-3.5	1.1	3.5	0.70	0.64	-34.56
1,300.0	0.72	326.18	1,300.0	-3.2	0.9	3.2	0.69	0.68	-12.20
1,325.0	0.96	323.09	1,325.0	-3.0	0.7	2.9	0.98	0.96	-12.36
1,350.0	1.18	323.54	1,350.0	-2.6	0.4	2.6	0.88	0.88	1.80
1,375.0	1.24	321.83	1,375.0	-2.2	0.1	2.2	0.28	0.24	-6.84

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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)
1,400.0	1.16	319.13	1,400.0	-1.8	-0.2	1.8	0.39	-0.32	-10.80
1,425.0	1.17	317.50	1,424.9	-1.4	-0.6	1.4	0.14	0.04	-6.52
1,450.0	1.21	317.20	1,449.9	-1.0	-0.9	1.0	0.16	0.16	-1.20
1,475.0	1.23	319.19	1,474.9	-0.6	-1.3	0.6	0.19	0.08	7.96
1,500.0	1.15	317.40	1,499.9	-0.2	-1.6	0.2	0.35	-0.32	-7.16
1,525.0	1.14	319.13	1,524.9	0.2	-2.0	-0.2	0.14	-0.04	6.92
1,550.0	1.19	319.75	1,549.9	0.6	-2.3	-0.5	0.21	0.20	2.48
1,575.0	1.15	318.95	1,574.9	0.9	-2.6	-0.9	0.17	-0.16	-3.20
1,600.0	1.15	319.37	1,599.9	1.3	-2.9	-1.3	0.03	0.00	1.68
1,625.0	1.22	321.15	1,624.9	1.7	-3.3	-1.7	0.32	0.28	7.12
1,650.0	1.11	319.56	1,649.9	2.1	-3.6	-2.1	0.46	-0.44	-6.36
1,675.0	1.13	317.99	1,674.9	2.5	-3.9	-2.5	0.15	0.08	-6.28
1,700.0	1.06	320.67	1,699.9	2.8	-4.2	-2.8	0.35	-0.28	10.72
1,725.0	1.00	320.25	1,724.9	3.2	-4.5	-3.2	0.24	-0.24	-1.68
1,750.0	1.19	321.70	1,749.9	3.6	-4.8	-3.5	0.77	0.76	5.80
1,775.0	1.04	320.58	1,774.9	3.9	-5.1	-3.9	0.61	-0.60	-4.48
1,800.0	0.93	322.55	1,799.9	4.3	-5.4	-4.2	0.46	-0.44	7.88
1,825.0	0.99	317.19	1,824.9	4.6	-5.7	-4.6	0.43	0.24	-21.44
1,850.0	0.92	319.99	1,849.9	4.9	-5.9	-4.9	0.34	-0.28	11.20
1,875.0	0.83	317.08	1,874.9	5.2	-6.2	-5.1	0.40	-0.36	-11.64
1,900.0	0.72	311.69	1,899.9	5.4	-6.4	-5.4	0.53	-0.44	-21.56
1,925.0	0.67	311.21	1,924.9	5.6	-6.7	-5.6	0.20	-0.20	-1.92
1,950.0	0.72	308.13	1,949.9	5.8	-6.9	-5.8	0.25	0.20	-12.32
1,975.0	0.75	309.22	1,974.9	6.0	-7.1	-6.0	0.13	0.12	4.36
2,000.0	0.69	312.34	1,999.9	6.2	-7.4	-6.2	0.29	-0.24	12.48
2,025.0	0.65	307.73	2,024.9	6.4	-7.6	-6.4	0.27	-0.16	-18.44
2,050.0	0.59	303.56	2,049.9	6.6	-7.8	-6.5	0.30	-0.24	-16.68
2,075.0	0.48	302.40	2,074.9	6.7	-8.0	-6.6	0.44	-0.44	-4.64
2,100.0	0.64	304.90	2,099.8	6.8	-8.2	-6.8	0.65	0.64	10.00
2,125.0	0.54	303.28	2,124.8	7.0	-8.4	-6.9	0.41	-0.40	-6.48
2,150.0	0.50	297.56	2,149.8	7.1	-8.6	-7.0	0.26	-0.16	-22.88
2,175.0	0.50	297.20	2,174.8	7.2	-8.8	-7.1	0.01	0.00	-1.44
2,200.0	0.64	293.80	2,199.8	7.3	-9.0	-7.2	0.58	0.56	-13.60
2,225.0	0.56	300.64	2,224.8	7.4	-9.3	-7.4	0.43	-0.32	27.36
2,250.0	0.47	293.84	2,249.8	7.5	-9.5	-7.5	0.43	-0.36	-27.20
2,275.0	0.44	291.63	2,274.8	7.6	-9.7	-7.5	0.14	-0.12	-8.84
2,300.0	0.45	289.15	2,299.8	7.7	-9.8	-7.6	0.09	0.04	-9.92
2,325.0	0.44	293.40	2,324.8	7.7	-10.0	-7.7	0.14	-0.04	17.00
2,350.0	0.37	292.73	2,349.8	7.8	-10.2	-7.7	0.28	-0.28	-2.68
2,375.0	0.33	289.56	2,374.8	7.9	-10.3	-7.8	0.18	-0.16	-12.68
2,400.0	0.22	282.63	2,399.8	7.9	-10.4	-7.8	0.46	-0.44	-27.72
2,425.0	0.26	286.02	2,424.8	7.9	-10.5	-7.9	0.17	0.16	13.56
2,450.0	0.37	293.04	2,449.8	8.0	-10.7	-7.9	0.47	0.44	28.08



Survey Report



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2,475.0	0.32	300.21	2,474.8	8.0	-10.8	-8.0	0.26	-0.20	28.68
2,500.0	0.27	292.06	2,499.8	8.1	-10.9	-8.0	0.26	-0.20	-32.60
2,525.0	0.25	276.97	2,524.8	8.1	-11.0	-8.1	0.28	-0.08	-60.36
2,550.0	0.21	291.46	2,549.8	8.1	-11.1	-8.1	0.28	-0.16	57.96
2,575.0	0.26	284.79	2,574.8	8.2	-11.2	-8.1	0.23	0.20	-26.68
2,600.0	0.17	265.74	2,599.8	8.2	-11.3	-8.1	0.46	-0.36	-76.20
2,625.0	0.12	245.93	2,624.8	8.2	-11.4	-8.1	0.28	-0.20	-79.24
2,650.0	0.13	285.96	2,649.8	8.2	-11.4	-8.1	0.34	0.04	160.12
2,675.0	0.13	275.97	2,674.8	8.2	-11.5	-8.1	0.09	0.00	-39.96
2,700.0	0.10	235.34	2,699.8	8.2	-11.5	-8.1	0.34	-0.12	-162.52
2,725.0	0.10	159.68	2,724.8	8.1	-11.5	-8.1	0.49	0.00	-302.64
2,750.0	0.13	153.22	2,749.8	8.1	-11.5	-8.0	0.13	0.12	-25.84
2,775.0	0.12	152.63	2,774.8	8.0	-11.5	-8.0	0.04	-0.04	-2.36
2,800.0	0.11	120.36	2,799.8	8.0	-11.5	-7.9	0.26	-0.04	-129.08
2,825.0	0.23	132.98	2,824.8	8.0	-11.4	-7.9	0.50	0.48	50.48
2,850.0	0.21	121.67	2,849.8	7.9	-11.3	-7.8	0.19	-0.08	-45.24
2,875.0	0.29	115.91	2,874.8	7.9	-11.2	-7.8	0.34	0.32	-23.04
2,900.0	0.41	126.83	2,899.8	7.8	-11.1	-7.7	0.55	0.48	43.68
2,925.0	0.39	116.37	2,924.8	7.7	-11.0	-7.6	0.30	-0.08	-41.84
2,950.0	0.44	110.18	2,949.8	7.6	-10.8	-7.5	0.27	0.20	-24.76
2,975.0	0.47	117.15	2,974.8	7.5	-10.6	-7.5	0.25	0.12	27.88
3,000.0	0.44	118.84	2,999.8	7.4	-10.4	-7.4	0.13	-0.12	6.76
3,025.0	0.49	114.96	3,024.8	7.3	-10.3	-7.3	0.24	0.20	-15.52
3,050.0	0.55	115.01	3,049.8	7.3	-10.1	-7.2	0.24	0.24	0.20
3,075.0	0.55	113.55	3,074.8	7.2	-9.8	-7.1	0.06	0.00	-5.84
3,100.0	0.41	114.12	3,099.8	7.1	-9.6	-7.0	0.56	-0.56	2.28
3,125.0	0.45	108.39	3,124.8	7.0	-9.5	-6.9	0.23	0.16	-22.92
3,150.0	0.45	108.14	3,149.8	6.9	-9.3	-6.9	0.01	0.00	-1.00
3,175.0	0.56	111.99	3,174.8	6.9	-9.1	-6.8	0.46	0.44	15.40
3,200.0	0.54	114.20	3,199.8	6.8	-8.9	-6.7	0.12	-0.08	8.84
3,225.0	0.49	107.42	3,224.8	6.7	-8.6	-6.6	0.31	-0.20	-27.12
3,250.0	0.41	107.33	3,249.8	6.6	-8.5	-6.6	0.32	-0.32	-0.36
3,275.0	0.43	115.41	3,274.8	6.6	-8.3	-6.5	0.25	0.08	32.32
3,300.0	0.45	119.42	3,299.8	6.5	-8.1	-6.4	0.15	0.08	16.04
3,325.0	0.35	121.91	3,324.8	6.4	-8.0	-6.3	0.41	-0.40	9.96
3,350.0	0.28	110.27	3,349.8	6.3	-7.8	-6.3	0.38	-0.28	-46.56
3,375.0	0.33	116.81	3,374.8	6.3	-7.7	-6.2	0.24	0.20	26.16
3,400.0	0.24	128.00	3,399.8	6.2	-7.6	-6.2	0.42	-0.36	44.76
3,425.0	0.36	120.36	3,424.8	6.1	-7.5	-6.1	0.50	0.48	-30.56
3,450.0	0.37	113.56	3,449.8	6.1	-7.4	-6.0	0.18	0.04	-27.20
3,475.0	0.31	113.91	3,474.8	6.0	-7.2	-6.0	0.24	-0.24	1.40
3,500.0	0.34	118.78	3,499.8	5.9	-7.1	-5.9	0.16	0.12	19.48
3,525.0	0.45	110.87	3,524.8	5.9	-6.9	-5.8	0.49	0.44	-31.64
3,550.0	0.44	118.11	3,549.8	5.8	-6.8	-5.7	0.23	-0.04	28.96

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Fascinator Fed Com #702H
Project:	Lea County, NM	TVD Reference:	RKB @ 3375.0usft (Noram #21)
Site:	Sec 30, T24-S,R35E	MD Reference:	RKB @ 3375.0usft (Noram #21)
Well:	Fascinator Fed Com #702H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
3,575.0	0.27	125.60	3,574.8	5.7	-6.6	-5.7	0.70	-0.68	29.96
3,600.0	0.25	160.54	3,599.8	5.6	-6.6	-5.6	0.63	-0.08	139.76
3,625.0	0.15	167.03	3,624.8	5.5	-6.5	-5.5	0.41	-0.40	25.96
3,650.0	0.24	172.59	3,649.8	5.5	-6.5	-5.4	0.37	0.36	22.24
3,675.0	0.19	175.59	3,674.8	5.4	-6.5	-5.3	0.20	-0.20	12.00
3,700.0	0.23	191.57	3,699.8	5.3	-6.5	-5.2	0.28	0.16	63.92
3,725.0	0.20	176.94	3,724.8	5.2	-6.5	-5.1	0.25	-0.12	-58.52
3,750.0	0.39	176.89	3,749.8	5.1	-6.5	-5.0	0.76	0.76	-0.20
3,775.0	0.21	305.02	3,774.8	5.0	-6.6	-5.0	2.18	-0.72	512.52
3,800.0	0.14	291.53	3,799.8	5.0	-6.6	-5.0	0.32	-0.28	-53.96
3,825.0	0.59	171.45	3,824.8	4.9	-6.6	-4.9	2.68	1.80	-480.32
3,850.0	0.17	198.56	3,849.8	4.8	-6.6	-4.7	1.78	-1.68	108.44
3,875.0	0.20	180.18	3,874.8	4.7	-6.6	-4.6	0.26	0.12	-73.52
3,900.0	0.31	176.80	3,899.8	4.6	-6.6	-4.5	0.44	0.44	-13.52
3,925.0	0.25	172.60	3,924.8	4.4	-6.6	-4.4	0.25	-0.24	-16.80
3,950.0	0.12	201.55	3,949.8	4.4	-6.6	-4.3	0.62	-0.52	115.80
3,975.0	0.32	163.67	3,974.8	4.3	-6.6	-4.2	0.95	0.80	-151.52
4,000.0	0.17	190.36	3,999.8	4.2	-6.6	-4.1	0.74	-0.60	106.76
4,025.0	0.13	194.43	4,024.8	4.1	-6.6	-4.1	0.17	-0.16	16.28
4,050.0	0.26	179.28	4,049.8	4.0	-6.6	-4.0	0.55	0.52	-60.60
4,075.0	0.20	175.55	4,074.8	3.9	-6.6	-3.9	0.25	-0.24	-14.92
4,100.0	0.14	136.26	4,099.8	3.9	-6.6	-3.8	0.51	-0.24	-157.16
4,125.0	0.08	175.60	4,124.8	3.8	-6.6	-3.8	0.37	-0.24	157.36
4,150.0	0.22	135.01	4,149.8	3.8	-6.5	-3.7	0.67	0.56	-162.36
4,175.0	0.24	126.86	4,174.8	3.7	-6.5	-3.7	0.15	0.08	-32.60
4,200.0	0.27	109.78	4,199.8	3.6	-6.4	-3.6	0.33	0.12	-68.32
4,225.0	0.34	106.66	4,224.8	3.6	-6.2	-3.6	0.29	0.28	-12.48
4,250.0	0.43	99.81	4,249.8	3.6	-6.1	-3.5	0.40	0.36	-27.40
4,275.0	0.45	100.38	4,274.8	3.5	-5.9	-3.5	0.08	0.08	2.28
4,300.0	0.54	103.05	4,299.8	3.5	-5.7	-3.5	0.37	0.36	10.68
4,325.0	0.70	92.88	4,324.8	3.5	-5.4	-3.4	0.77	0.64	-40.68
4,350.0	0.79	96.21	4,349.8	3.4	-5.1	-3.4	0.40	0.36	13.32
4,375.0	0.96	108.30	4,374.8	3.3	-4.7	-3.3	1.00	0.68	48.36
4,400.0	0.90	99.92	4,399.8	3.2	-4.3	-3.2	0.59	-0.24	-33.52
4,425.0	1.45	135.75	4,424.8	3.0	-3.9	-3.0	3.57	2.20	143.32
4,450.0	0.90	115.92	4,449.8	2.7	-3.5	-2.6	2.70	-2.20	-79.32
4,475.0	0.77	114.73	4,474.8	2.5	-3.2	-2.5	0.52	-0.52	-4.76
4,500.0	0.70	123.12	4,499.8	2.4	-2.9	-2.3	0.51	-0.28	33.56
4,525.0	0.68	211.70	4,524.8	2.2	-2.9	-2.1	3.85	-0.08	354.32
4,550.0	1.00	242.96	4,549.8	1.9	-3.1	-1.9	2.19	1.28	125.04
4,575.0	1.12	242.35	4,574.8	1.7	-3.5	-1.7	0.48	0.48	-2.44
4,600.0	1.17	248.35	4,599.8	1.5	-4.0	-1.5	0.52	0.20	24.00
4,625.0	1.19	248.47	4,624.8	1.3	-4.5	-1.3	0.08	0.08	0.48

Company: COG Operating, LLC
 Project: Lea County, NM
 Site: Sec 30, T24-S,R35E
 Well: Fascinator Fed Com #702H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Fascinator Fed Com #702H
 TVD Reference: RKB @ 3375.0usft (Noram #21)
 MD Reference: RKB @ 3375.0usft (Noram #21)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 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)
4,650.0	1.18	247.75	4,649.8	1.1	-4.9	-1.1	0.07	-0.04	-2.88
4,675.0	1.21	245.36	4,674.8	0.9	-5.4	-0.9	0.23	0.12	-9.56
4,700.0	1.39	258.11	4,699.7	0.7	-6.0	-0.7	1.36	0.72	51.00
4,725.0	1.55	274.42	4,724.7	0.7	-6.6	-0.7	1.78	0.64	65.24
4,750.0	1.59	280.66	4,749.7	0.8	-7.3	-0.8	0.70	0.16	24.96
4,775.0	1.68	285.11	4,774.7	1.0	-8.0	-0.9	0.62	0.36	17.80
4,800.0	1.72	295.21	4,799.7	1.2	-8.7	-1.2	1.21	0.16	40.40
4,825.0	1.87	312.61	4,824.7	1.6	-9.3	-1.6	2.25	0.60	69.60
4,850.0	1.86	321.01	4,849.7	2.2	-9.9	-2.2	1.09	-0.04	33.60
4,875.0	1.91	321.88	4,874.7	2.9	-10.4	-2.8	0.23	0.20	3.48
4,900.0	1.85	322.45	4,899.7	3.5	-10.9	-3.5	0.25	-0.24	2.28
4,925.0	1.76	321.45	4,924.6	4.2	-11.4	-4.1	0.38	-0.36	-4.00
4,950.0	1.50	314.55	4,949.6	4.7	-11.8	-4.6	1.30	-1.04	-27.60
4,975.0	1.31	305.87	4,974.6	5.1	-12.3	-5.0	1.14	-0.76	-34.72
5,000.0	1.10	297.80	4,999.6	5.4	-12.7	-5.3	1.08	-0.84	-32.28
5,025.0	1.02	289.59	5,024.6	5.5	-13.2	-5.5	0.69	-0.32	-32.84
5,050.0	0.99	281.25	5,049.6	5.7	-13.6	-5.6	0.60	-0.12	-33.36
5,075.0	1.09	284.93	5,074.6	5.8	-14.0	-5.7	0.48	0.40	14.72
5,100.0	0.86	273.35	5,099.6	5.8	-14.4	-5.7	1.21	-0.92	-46.32
5,125.0	0.95	273.94	5,124.6	5.9	-14.8	-5.8	0.36	0.36	2.36
5,150.0	0.82	276.87	5,149.6	5.9	-15.2	-5.8	0.55	-0.52	11.72
5,175.0	0.85	275.89	5,174.6	5.9	-15.6	-5.8	0.13	0.12	-3.92
5,200.0	0.89	276.31	5,199.6	6.0	-16.0	-5.9	0.16	0.16	1.68
5,225.0	0.82	282.85	5,224.6	6.0	-16.3	-5.9	0.48	-0.28	26.16
5,250.0	0.79	280.18	5,249.6	6.1	-16.7	-6.0	0.19	-0.12	-10.68
5,275.0	1.05	305.37	5,274.6	6.3	-17.0	-6.2	1.90	1.04	100.76
5,300.0	1.07	317.65	5,299.6	6.6	-17.4	-6.5	0.91	0.08	49.12
5,325.0	1.23	318.10	5,324.6	7.0	-17.7	-6.8	0.64	0.64	1.80
5,350.0	1.15	317.59	5,349.6	7.3	-18.1	-7.2	0.32	-0.32	-2.04
5,375.0	1.14	321.88	5,374.6	7.7	-18.4	-7.6	0.35	-0.04	17.16
5,400.0	1.18	321.09	5,399.6	8.1	-18.7	-8.0	0.17	0.16	-3.16
5,425.0	1.19	317.17	5,424.6	8.5	-19.0	-8.4	0.33	0.04	-15.68
5,450.0	1.11	320.31	5,449.6	8.9	-19.4	-8.8	0.41	-0.32	12.56
5,475.0	1.13	324.11	5,474.5	9.3	-19.7	-9.1	0.31	0.08	15.20
5,500.0	1.04	323.72	5,499.5	9.6	-19.9	-9.5	0.36	-0.36	-1.56
5,525.0	0.98	323.59	5,524.5	10.0	-20.2	-9.9	0.24	-0.24	-0.52
5,550.0	0.96	325.34	5,549.5	10.3	-20.4	-10.2	0.14	-0.08	7.00
5,575.0	0.88	317.00	5,574.5	10.7	-20.7	-10.5	0.62	-0.32	-33.36
5,600.0	0.95	321.47	5,599.5	11.0	-21.0	-10.8	0.40	0.28	17.88
5,625.0	0.95	324.70	5,624.5	11.3	-21.2	-11.2	0.21	0.00	12.92
5,650.0	1.04	323.21	5,649.5	11.6	-21.5	-11.5	0.37	0.36	-5.96
5,675.0	1.06	322.24	5,674.5	12.0	-21.7	-11.9	0.11	0.08	-3.88
5,700.0	0.98	321.56	5,699.5	12.4	-22.0	-12.2	0.32	-0.32	-2.72

Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 30, T24-S,R35E
Well: Fascinator Fed Com #702H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Fascinator Fed Com #702H
TVD Reference: RKB @ 3375.0usft (Noram #21)
MD Reference: RKB @ 3375.0usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
5,725.0	0.91	323.14	5,724.5	12.7	-22.3	-12.5	0.30	-0.28	6.32
5,750.0	0.95	323.89	5,749.5	13.0	-22.5	-12.9	0.17	0.16	3.00
5,775.0	0.87	319.15	5,774.5	13.3	-22.8	-13.2	0.44	-0.32	-18.96
5,800.0	0.82	320.07	5,799.5	13.6	-23.0	-13.5	0.21	-0.20	3.68
5,825.0	0.91	321.82	5,824.5	13.9	-23.2	-13.8	0.38	0.36	7.00
5,850.0	0.91	324.10	5,849.5	14.2	-23.5	-14.1	0.14	0.00	9.12
5,875.0	0.94	324.98	5,874.5	14.5	-23.7	-14.4	0.13	0.12	3.52
5,900.0	0.95	323.89	5,899.5	14.9	-23.9	-14.7	0.08	0.04	-4.36
5,925.0	0.93	324.02	5,924.5	15.2	-24.2	-15.1	0.08	-0.08	0.52
5,950.0	0.93	327.57	5,949.5	15.5	-24.4	-15.4	0.23	0.00	14.20
5,975.0	0.71	327.56	5,974.5	15.8	-24.6	-15.7	0.88	-0.88	-0.04
6,000.0	0.77	320.96	5,999.5	16.1	-24.8	-16.0	0.42	0.24	-26.40
6,025.0	0.70	329.54	6,024.5	16.4	-25.0	-16.2	0.52	-0.28	34.32
6,050.0	0.69	330.76	6,049.5	16.6	-25.1	-16.5	0.07	-0.04	4.88
6,075.0	0.49	336.85	6,074.5	16.9	-25.2	-16.7	0.84	-0.80	24.36
6,100.0	0.54	338.10	6,099.5	17.1	-25.3	-16.9	0.20	0.20	5.00
6,125.0	0.55	334.50	6,124.5	17.3	-25.4	-17.1	0.14	0.04	-14.40
6,150.0	0.54	335.83	6,149.5	17.5	-25.5	-17.3	0.06	-0.04	5.32
6,175.0	0.50	330.83	6,174.5	17.7	-25.6	-17.5	0.24	-0.16	-20.00
6,200.0	0.44	334.00	6,199.5	17.9	-25.7	-17.7	0.26	-0.24	12.68
6,225.0	0.56	332.49	6,224.5	18.1	-25.8	-17.9	0.48	0.48	-6.04
6,250.0	0.48	335.77	6,249.5	18.3	-25.9	-18.1	0.34	-0.32	13.12
6,275.0	0.41	328.42	6,274.5	18.5	-26.0	-18.3	0.36	-0.28	-29.40
6,300.0	0.60	332.51	6,299.5	18.7	-26.1	-18.5	0.77	0.76	16.36
6,325.0	0.40	341.12	6,324.5	18.8	-26.2	-18.7	0.85	-0.80	34.44
6,350.0	0.54	339.79	6,349.5	19.0	-26.3	-18.9	0.56	0.56	-5.32
6,375.0	0.38	338.05	6,374.5	19.2	-26.3	-19.1	0.64	-0.64	-6.96
6,400.0	0.49	345.64	6,399.5	19.4	-26.4	-19.2	0.50	0.44	30.36
6,425.0	0.48	336.87	6,424.5	19.6	-26.5	-19.4	0.30	-0.04	-35.08
6,450.0	0.49	340.42	6,449.5	19.8	-26.5	-19.6	0.13	0.04	14.20
6,475.0	0.44	339.99	6,474.5	20.0	-26.6	-19.8	0.20	-0.20	-1.72
6,500.0	0.46	341.50	6,499.5	20.2	-26.7	-20.0	0.09	0.08	6.04
6,525.0	0.35	340.06	6,524.5	20.4	-26.7	-20.2	0.44	-0.44	-5.76
6,550.0	0.49	336.89	6,549.5	20.5	-26.8	-20.4	0.57	0.56	-12.68
6,575.0	0.48	342.42	6,574.5	20.7	-26.9	-20.5	0.19	-0.04	22.12
6,600.0	0.33	316.24	6,599.5	20.9	-27.0	-20.7	0.94	-0.60	-104.72
6,625.0	0.43	297.80	6,624.5	21.0	-27.1	-20.8	0.63	0.40	-73.76
6,650.0	0.31	273.68	6,649.5	21.0	-27.2	-20.8	0.78	-0.48	-96.48
6,675.0	0.24	269.97	6,674.5	21.0	-27.4	-20.8	0.29	-0.28	-14.84
6,700.0	0.36	269.45	6,699.5	21.0	-27.5	-20.8	0.48	0.48	-2.08
6,725.0	0.27	275.45	6,724.4	21.0	-27.6	-20.8	0.38	-0.36	24.00
6,750.0	0.21	278.73	6,749.4	21.0	-27.7	-20.9	0.25	-0.24	13.12
6,775.0	0.34	272.16	6,774.4	21.0	-27.9	-20.9	0.53	0.52	-26.28
6,800.0	0.33	262.42	6,799.4	21.0	-28.0	-20.9	0.23	-0.04	-38.96

Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 30, T24-S,R35E
Well: Fascinator Fed Com #702H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Fascinator Fed Com #702H
TVD Reference: RKB @ 3375.0usft (Noram #21)
MD Reference: RKB @ 3375.0usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
6,825.0	0.31	268.10	6,824.4	21.0	-28.1	-20.8	0.15	-0.08	22.72
6,850.0	0.32	261.76	6,849.4	21.0	-28.3	-20.8	0.14	0.04	-25.36
6,875.0	0.38	272.96	6,874.4	21.0	-28.4	-20.8	0.36	0.24	44.80
6,900.0	0.42	271.15	6,899.4	21.0	-28.6	-20.8	0.17	0.16	-7.24
6,925.0	0.33	271.88	6,924.4	21.0	-28.8	-20.8	0.36	-0.36	2.92
6,950.0	0.29	273.83	6,949.4	21.0	-28.9	-20.8	0.17	-0.16	7.80
6,975.0	0.29	289.67	6,974.4	21.1	-29.0	-20.9	0.32	0.00	63.36
7,000.0	0.32	304.41	6,999.4	21.1	-29.1	-20.9	0.33	0.12	58.96
7,025.0	0.38	312.07	7,024.4	21.2	-29.3	-21.0	0.30	0.24	30.64
7,050.0	0.38	311.04	7,049.4	21.3	-29.4	-21.1	0.03	0.00	-4.12
7,075.0	0.31	322.09	7,074.4	21.4	-29.5	-21.2	0.39	-0.28	44.20
7,100.0	0.32	331.07	7,099.4	21.5	-29.6	-21.4	0.20	0.04	35.92
7,125.0	0.42	325.51	7,124.4	21.7	-29.7	-21.5	0.42	0.40	-22.24
7,150.0	0.44	324.75	7,149.4	21.8	-29.8	-21.6	0.08	0.08	-3.04
7,175.0	0.42	323.67	7,174.4	22.0	-29.9	-21.8	0.09	-0.08	-4.32
7,200.0	0.37	321.20	7,199.4	22.1	-30.0	-21.9	0.21	-0.20	-9.88
7,225.0	0.37	323.62	7,224.4	22.2	-30.1	-22.1	0.06	0.00	9.68
7,250.0	0.31	320.79	7,249.4	22.4	-30.2	-22.2	0.25	-0.24	-11.32
7,275.0	0.36	327.31	7,274.4	22.5	-30.2	-22.3	0.25	0.20	26.08
7,300.0	0.36	327.23	7,299.4	22.6	-30.3	-22.4	0.00	0.00	-0.32
7,325.0	0.37	323.59	7,324.4	22.7	-30.4	-22.6	0.10	0.04	-14.56
7,350.0	0.44	322.08	7,349.4	22.9	-30.5	-22.7	0.28	0.28	-6.04
7,375.0	0.36	324.02	7,374.4	23.0	-30.6	-22.8	0.32	-0.32	7.76
7,400.0	0.30	325.65	7,399.4	23.1	-30.7	-22.9	0.24	-0.24	6.52
7,425.0	0.39	330.53	7,424.4	23.3	-30.8	-23.1	0.38	0.36	19.52
7,450.0	0.31	332.49	7,449.4	23.4	-30.9	-23.2	0.32	-0.32	7.84
7,475.0	0.46	330.21	7,474.4	23.6	-31.0	-23.4	0.60	0.60	-9.12
7,500.0	0.29	321.63	7,499.4	23.7	-31.0	-23.5	0.71	-0.68	-34.32
7,525.0	0.17	333.46	7,524.4	23.8	-31.1	-23.6	0.51	-0.48	47.32
7,550.0	0.21	336.03	7,549.4	23.8	-31.1	-23.7	0.16	0.16	10.28
7,575.0	0.22	341.40	7,574.4	23.9	-31.2	-23.7	0.09	0.04	21.48
7,600.0	0.09	328.37	7,599.4	24.0	-31.2	-23.8	0.54	-0.52	-52.12
7,625.0	0.16	318.91	7,624.4	24.0	-31.2	-23.8	0.29	0.28	-37.84
7,650.0	0.31	325.11	7,649.4	24.1	-31.3	-23.9	0.61	0.60	24.80
7,675.0	0.23	336.42	7,674.4	24.2	-31.3	-24.0	0.38	-0.32	45.24
7,700.0	0.36	329.97	7,699.4	24.3	-31.4	-24.1	0.54	0.52	-25.80
7,725.0	0.32	330.70	7,724.4	24.5	-31.5	-24.3	0.16	-0.16	2.92
7,750.0	0.48	341.08	7,749.4	24.6	-31.5	-24.4	0.70	0.64	41.52
7,775.0	0.25	347.35	7,774.4	24.8	-31.6	-24.6	0.93	-0.92	25.08
7,800.0	0.16	7.94	7,799.4	24.9	-31.6	-24.7	0.46	-0.36	82.36
7,825.0	0.19	1.44	7,824.4	24.9	-31.6	-24.7	0.14	0.12	-26.00
7,850.0	0.16	358.20	7,849.4	25.0	-31.6	-24.8	0.13	-0.12	-12.96
7,875.0	0.15	8.21	7,874.4	25.1	-31.6	-24.9	0.12	-0.04	40.04

Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 30, T24-S,R35E
Well: Fascinator Fed Com #702H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Fascinator Fed Com #702H
TVD Reference: RKB @ 3375.0usft (Noram #21)
MD Reference: RKB @ 3375.0usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
7,900.0	0.15	355.93	7,899.4	25.2	-31.6	-25.0	0.13	0.00	-49.12
7,925.0	0.26	330.49	7,924.4	25.2	-31.6	-25.0	0.56	0.44	-101.76
7,950.0	0.16	342.24	7,949.4	25.3	-31.7	-25.1	0.43	-0.40	47.00
7,975.0	0.19	3.34	7,974.4	25.4	-31.7	-25.2	0.28	0.12	84.40
8,000.0	0.19	40.75	7,999.4	25.5	-31.6	-25.3	0.49	0.00	149.64
8,025.0	0.18	10.69	8,024.4	25.5	-31.6	-25.3	0.39	-0.04	-120.24
8,050.0	0.18	18.78	8,049.4	25.6	-31.6	-25.4	0.10	0.00	32.36
8,075.0	0.26	27.43	8,074.4	25.7	-31.5	-25.5	0.35	0.32	34.60
8,100.0	0.17	26.09	8,099.4	25.8	-31.5	-25.6	0.36	-0.36	-5.36
8,125.0	0.17	13.16	8,124.4	25.8	-31.5	-25.7	0.15	0.00	-51.72
8,150.0	0.17	31.91	8,149.4	25.9	-31.4	-25.7	0.22	0.00	75.00
8,175.0	0.26	34.19	8,174.4	26.0	-31.4	-25.8	0.36	0.36	9.12
8,200.0	0.20	18.56	8,199.4	26.1	-31.3	-25.9	0.35	-0.24	-62.52
8,225.0	0.20	36.81	8,224.4	26.2	-31.3	-26.0	0.25	0.00	73.00
8,250.0	0.17	38.89	8,249.4	26.2	-31.3	-26.0	0.12	-0.12	8.32
8,275.0	0.23	13.98	8,274.4	26.3	-31.2	-26.1	0.42	0.24	-99.64
8,300.0	0.29	37.20	8,299.4	26.4	-31.2	-26.2	0.48	0.24	92.88
8,325.0	0.19	40.71	8,324.4	26.5	-31.1	-26.3	0.40	-0.40	14.04
8,350.0	0.16	15.64	8,349.4	26.5	-31.1	-26.4	0.33	-0.12	-100.28
8,375.0	0.22	40.94	8,374.4	26.6	-31.0	-26.4	0.41	0.24	101.20
8,400.0	0.22	38.45	8,399.4	26.7	-31.0	-26.5	0.04	0.00	-9.96
8,425.0	0.26	23.83	8,424.4	26.8	-30.9	-26.6	0.29	0.16	-58.48
8,450.0	0.17	28.44	8,449.4	26.9	-30.9	-26.7	0.37	-0.36	18.44
8,475.0	0.24	36.39	8,474.4	26.9	-30.8	-26.7	0.30	0.28	31.80
8,500.0	0.20	33.54	8,499.4	27.0	-30.8	-26.8	0.17	-0.16	-11.40
8,525.0	0.25	34.55	8,524.4	27.1	-30.7	-26.9	0.20	0.20	4.04
8,550.0	0.19	29.89	8,549.4	27.2	-30.7	-27.0	0.25	-0.24	-18.64
8,575.0	0.20	50.31	8,574.4	27.2	-30.6	-27.1	0.28	0.04	81.68
8,600.0	0.25	55.59	8,599.4	27.3	-30.5	-27.1	0.22	0.20	21.12
8,625.0	0.36	43.40	8,624.4	27.4	-30.4	-27.2	0.51	0.44	-48.76
8,650.0	0.42	54.84	8,649.4	27.5	-30.3	-27.3	0.39	0.24	45.76
8,675.0	0.37	54.75	8,674.4	27.6	-30.2	-27.4	0.20	-0.20	-0.36
8,700.0	0.39	58.25	8,699.4	27.7	-30.0	-27.5	0.12	0.08	14.00
8,725.0	0.45	58.02	8,724.4	27.8	-29.9	-27.6	0.24	0.24	-0.92
8,750.0	0.48	69.28	8,749.4	27.9	-29.7	-27.7	0.38	0.12	45.04
8,775.0	0.51	74.01	8,774.4	27.9	-29.5	-27.8	0.20	0.12	18.92
8,800.0	0.60	64.97	8,799.4	28.0	-29.3	-27.8	0.50	0.36	-36.16
8,825.0	0.54	67.50	8,824.4	28.1	-29.0	-27.9	0.26	-0.24	10.12
8,850.0	0.55	65.39	8,849.4	28.2	-28.8	-28.0	0.09	0.04	-8.44
8,875.0	0.55	64.70	8,874.4	28.3	-28.6	-28.1	0.03	0.00	-2.76
8,900.0	0.66	71.95	8,899.4	28.4	-28.3	-28.2	0.54	0.44	29.00
8,925.0	0.64	66.44	8,924.4	28.5	-28.1	-28.3	0.26	-0.08	-22.04
8,950.0	0.62	66.93	8,949.4	28.6	-27.8	-28.5	0.08	-0.08	1.96



Survey Report



Company: COG Operating, LLC
Project: Lea County, NM
Site: Sec 30, T24-S,R35E
Well: Fascinator Fed Com #702H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Fascinator Fed Com #702H
TVD Reference: RKB @ 3375.0usft (Noram #21)
MD Reference: RKB @ 3375.0usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
8,975.0	0.54	68.65	8,974.4	28.7	-27.6	-28.6	0.33	-0.32	6.88
9,000.0	0.61	73.02	8,999.4	28.8	-27.4	-28.6	0.33	0.28	17.48
9,025.0	0.61	66.85	9,024.4	28.9	-27.1	-28.7	0.26	0.00	-24.68
9,050.0	0.72	72.18	9,049.4	29.0	-26.8	-28.8	0.50	0.44	21.32
9,075.0	0.60	69.33	9,074.4	29.1	-26.6	-28.9	0.50	-0.48	-11.40
9,100.0	0.73	67.13	9,099.4	29.2	-26.3	-29.0	0.53	0.52	-8.80
9,125.0	0.60	69.06	9,124.4	29.3	-26.0	-29.1	0.53	-0.52	7.72
9,150.0	0.74	74.77	9,149.4	29.4	-25.8	-29.2	0.62	0.56	22.84
9,175.0	0.86	73.60	9,174.4	29.5	-25.4	-29.3	0.48	0.48	-4.68
9,200.0	0.70	67.80	9,199.4	29.6	-25.1	-29.4	0.71	-0.64	-23.20
9,225.0	0.72	64.65	9,224.4	29.7	-24.8	-29.6	0.18	0.08	-12.60
9,250.0	0.75	74.13	9,249.4	29.8	-24.5	-29.7	0.50	0.12	37.92
9,275.0	0.61	86.87	9,274.4	29.9	-24.2	-29.7	0.82	-0.56	50.96
9,300.0	0.71	136.32	9,299.4	29.8	-24.0	-29.6	2.24	0.40	197.80
9,325.0	0.79	144.69	9,324.4	29.5	-23.8	-29.4	0.54	0.32	33.48
9,350.0	0.74	143.34	9,349.4	29.3	-23.6	-29.1	0.21	-0.20	-5.40
9,375.0	0.89	150.45	9,374.4	29.0	-23.4	-28.8	0.72	0.60	28.44
9,400.0	0.77	141.29	9,399.4	28.7	-23.2	-28.5	0.71	-0.48	-36.64
9,425.0	0.74	149.14	9,424.4	28.4	-23.0	-28.3	0.43	-0.12	31.40
9,450.0	0.82	149.92	9,449.4	28.1	-22.8	-28.0	0.32	0.32	3.12
9,475.0	0.82	144.31	9,474.4	27.8	-22.6	-27.7	0.32	0.00	-22.44
9,500.0	0.78	144.48	9,499.4	27.5	-22.4	-27.4	0.16	-0.16	0.68
9,525.0	0.76	142.71	9,524.4	27.3	-22.2	-27.1	0.12	-0.08	-7.08
9,550.0	0.71	138.74	9,549.4	27.0	-22.0	-26.9	0.29	-0.20	-15.88
9,575.0	0.65	140.17	9,574.4	26.8	-21.8	-26.6	0.25	-0.24	5.72
9,600.0	0.66	141.65	9,599.4	26.6	-21.7	-26.4	0.08	0.04	5.92
9,625.0	0.57	140.82	9,624.4	26.3	-21.5	-26.2	0.36	-0.36	-3.32
9,650.0	0.53	135.27	9,649.4	26.2	-21.3	-26.0	0.27	-0.16	-22.20
9,675.0	0.33	133.51	9,674.4	26.0	-21.2	-25.9	0.80	-0.80	-7.04
9,700.0	0.28	130.80	9,699.4	25.9	-21.1	-25.8	0.21	-0.20	-10.84
9,725.0	0.29	132.54	9,724.4	25.9	-21.0	-25.7	0.05	0.04	6.96
9,750.0	0.29	127.23	9,749.4	25.8	-20.9	-25.7	0.11	0.00	-21.24
9,775.0	0.24	107.99	9,774.4	25.7	-20.8	-25.6	0.41	-0.20	-76.96
9,800.0	0.17	94.48	9,799.4	25.7	-20.7	-25.6	0.34	-0.28	-54.04
9,825.0	0.14	131.01	9,824.4	25.7	-20.7	-25.6	0.40	-0.12	146.12
9,850.0	0.21	107.65	9,849.4	25.7	-20.6	-25.5	0.39	0.28	-93.44
9,875.0	0.17	91.29	9,874.4	25.6	-20.5	-25.5	0.27	-0.16	-65.44
9,900.0	0.11	90.36	9,899.4	25.6	-20.4	-25.5	0.24	-0.24	-3.72
9,925.0	0.14	113.07	9,924.4	25.6	-20.4	-25.5	0.23	0.12	90.84
9,950.0	0.17	110.92	9,949.4	25.6	-20.3	-25.5	0.12	0.12	-8.60
9,975.0	0.13	130.77	9,974.4	25.6	-20.3	-25.4	0.26	-0.16	79.40
10,000.0	0.23	92.78	9,999.4	25.5	-20.2	-25.4	0.60	0.40	-151.96
10,025.0	0.15	87.42	10,024.4	25.5	-20.1	-25.4	0.33	-0.32	-21.44
10,050.0	0.14	92.50	10,049.4	25.5	-20.1	-25.4	0.07	-0.04	20.32



Survey Report



Company: COG Operating, LLC
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Wellbore: Wellbore #1
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Local Co-ordinate Reference: Well Fascinator Fed Com #702H
TVD Reference: RKB @ 3375.0usft (Noram #21)
MD Reference: RKB @ 3375.0usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
10,075.0	0.12	53.89	10,074.4	25.6	-20.0	-25.4	0.35	-0.08	-154.44
10,100.0	0.10	87.39	10,099.4	25.6	-20.0	-25.5	0.26	-0.08	134.00
10,125.0	0.17	62.02	10,124.4	25.6	-19.9	-25.5	0.36	0.28	-101.48
10,150.0	0.18	48.94	10,149.4	25.6	-19.8	-25.5	0.16	0.04	-52.32
10,175.0	0.19	40.64	10,174.4	25.7	-19.8	-25.6	0.11	0.04	-33.20
10,200.0	0.32	27.85	10,199.4	25.8	-19.7	-25.7	0.56	0.52	-51.16
10,225.0	0.37	17.08	10,224.4	25.9	-19.7	-25.8	0.33	0.20	-43.08
10,250.0	0.35	13.44	10,249.4	26.1	-19.6	-26.0	0.12	-0.08	-14.56
10,275.0	0.39	5.63	10,274.4	26.2	-19.6	-26.1	0.26	0.16	-31.24
10,300.0	0.37	15.95	10,299.4	26.4	-19.6	-26.3	0.28	-0.08	41.28
10,325.0	0.34	359.56	10,324.4	26.6	-19.6	-26.4	0.42	-0.12	-65.56
10,350.0	0.36	22.48	10,349.4	26.7	-19.5	-26.6	0.56	0.08	91.68
10,375.0	0.41	16.41	10,374.4	26.9	-19.5	-26.7	0.26	0.20	-24.28
10,400.0	0.42	11.10	10,399.4	27.0	-19.4	-26.9	0.16	0.04	-21.24
10,425.0	0.42	4.91	10,424.4	27.2	-19.4	-27.1	0.18	0.00	-24.76
10,450.0	0.42	9.33	10,449.3	27.4	-19.4	-27.3	0.13	0.00	17.68
10,475.0	0.43	11.88	10,474.3	27.6	-19.3	-27.5	0.09	0.04	10.20
10,500.0	0.45	10.33	10,499.3	27.8	-19.3	-27.6	0.09	0.08	-6.20
10,525.0	0.34	13.42	10,524.3	27.9	-19.3	-27.8	0.45	-0.44	12.36
10,550.0	0.34	17.57	10,549.3	28.1	-19.2	-28.0	0.10	0.00	16.60
10,575.0	0.37	7.12	10,574.3	28.2	-19.2	-28.1	0.28	0.12	-41.80
10,600.0	0.34	9.21	10,599.3	28.4	-19.2	-28.3	0.13	-0.12	8.36
10,625.0	0.24	335.39	10,624.3	28.5	-19.2	-28.4	0.78	-0.40	-135.28
10,650.0	0.22	327.01	10,649.3	28.6	-19.2	-28.5	0.16	-0.08	-33.52
10,675.0	0.17	349.99	10,674.3	28.7	-19.3	-28.5	0.37	-0.20	91.92
10,700.0	0.25	323.10	10,699.3	28.7	-19.3	-28.6	0.50	0.32	-107.56
10,725.0	0.15	309.46	10,724.3	28.8	-19.4	-28.7	0.44	-0.40	-54.56
10,750.0	0.13	354.04	10,749.3	28.9	-19.4	-28.7	0.43	-0.08	178.32
10,775.0	0.15	334.97	10,774.3	28.9	-19.4	-28.8	0.20	0.08	-76.28
10,800.0	0.18	318.30	10,799.3	29.0	-19.5	-28.9	0.23	0.12	-66.68
10,825.0	0.12	274.69	10,824.3	29.0	-19.5	-28.9	0.50	-0.24	-174.44
10,850.0	0.09	313.53	10,849.3	29.0	-19.5	-28.9	0.30	-0.12	155.36
10,875.0	0.09	323.07	10,874.3	29.1	-19.6	-28.9	0.06	0.00	38.16
10,900.0	0.09	357.64	10,899.3	29.1	-19.6	-29.0	0.21	0.00	138.28
10,925.0	0.20	285.88	10,924.3	29.1	-19.6	-29.0	0.77	0.44	-287.04
10,950.0	0.11	315.06	10,949.3	29.2	-19.7	-29.0	0.47	-0.36	116.72
10,975.0	0.13	306.18	10,974.3	29.2	-19.7	-29.1	0.11	0.08	-35.52
11,000.0	0.14	300.41	10,999.3	29.2	-19.8	-29.1	0.07	0.04	-23.08
11,025.0	0.17	319.81	11,024.3	29.3	-19.8	-29.1	0.24	0.12	77.60
11,050.0	0.08	316.45	11,049.3	29.3	-19.9	-29.2	0.36	-0.36	-13.44
11,075.0	0.19	305.10	11,074.3	29.3	-19.9	-29.2	0.45	0.44	-45.40
11,100.0	0.10	314.78	11,099.3	29.4	-20.0	-29.3	0.37	-0.36	38.72
11,125.0	0.13	297.94	11,124.3	29.4	-20.0	-29.3	0.18	0.12	-67.36

Company: COG Operating, LLC
Project: Lea County, NM
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Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Fascinator Fed Com #702H
TVD Reference: RKB @ 3375.0usft (Noram #21)
MD Reference: RKB @ 3375.0usft (Noram #21)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
11,150.0	0.08	9.36	11,149.3	29.4	-20.0	-29.3	0.52	-0.20	285.68
11,175.0	0.07	283.59	11,174.3	29.5	-20.0	-29.3	0.41	-0.04	-343.08
11,200.0	0.08	298.92	11,199.3	29.5	-20.1	-29.3	0.09	0.04	61.32
11,225.0	0.08	291.06	11,224.3	29.5	-20.1	-29.4	0.04	0.00	-31.44
11,250.0	0.10	271.01	11,249.3	29.5	-20.1	-29.4	0.15	0.08	-80.20
11,275.0	0.07	264.59	11,274.3	29.5	-20.2	-29.4	0.13	-0.12	-25.68
11,300.0	0.06	281.97	11,299.3	29.5	-20.2	-29.4	0.09	-0.04	69.52
11,325.0	0.07	298.75	11,324.3	29.5	-20.2	-29.4	0.09	0.04	67.12
11,350.0	0.08	350.27	11,349.3	29.5	-20.2	-29.4	0.26	0.04	206.08
11,375.0	0.13	241.74	11,374.3	29.5	-20.3	-29.4	0.69	0.20	-434.12
11,400.0	0.13	234.11	11,399.3	29.5	-20.3	-29.4	0.07	0.00	-30.52
11,425.0	0.12	280.29	11,424.3	29.5	-20.4	-29.4	0.39	-0.04	184.72
11,450.0	0.18	249.42	11,449.3	29.5	-20.4	-29.4	0.39	0.24	-123.48
11,475.0	0.17	269.82	11,474.3	29.5	-20.5	-29.3	0.25	-0.04	81.60
11,500.0	0.20	257.76	11,499.3	29.5	-20.6	-29.3	0.20	0.12	-48.24
11,525.0	0.20	251.46	11,524.3	29.4	-20.7	-29.3	0.09	0.00	-25.20
11,550.0	0.16	233.50	11,549.3	29.4	-20.7	-29.3	0.27	-0.16	-71.84
11,575.0	0.14	265.05	11,574.3	29.4	-20.8	-29.2	0.34	-0.08	126.20
11,600.0	0.23	228.23	11,599.3	29.3	-20.9	-29.2	0.58	0.36	-147.28
11,625.0	0.41	261.01	11,624.3	29.3	-21.0	-29.2	1.00	0.72	131.12
11,650.0	0.25	234.68	11,649.3	29.2	-21.1	-29.1	0.87	-0.64	-105.32
11,675.0	0.31	229.82	11,674.3	29.2	-21.2	-29.0	0.26	0.24	-19.44
11,700.0	0.21	217.97	11,699.3	29.1	-21.3	-29.0	0.45	-0.40	-47.40
11,725.0	0.32	231.58	11,724.3	29.0	-21.4	-28.9	0.50	0.44	54.44
Gyro Tie In @ 11730.0' MD / 11729.3' TVD									
11,730.0	0.26	226.93	11,729.3	29.0	-21.4	-28.9	1.29	-1.20	-93.00
11,755.0	0.30	214.30	11,754.3	28.9	-21.5	-28.8	0.29	0.16	-50.52
11,808.0	0.40	186.40	11,807.3	28.6	-21.6	-28.5	0.37	0.19	-52.64
11,886.0	0.59	172.13	11,885.3	27.9	-21.5	-27.8	0.29	0.24	-18.29
11,950.0	0.87	169.24	11,949.3	27.1	-21.4	-27.0	0.44	0.44	-4.52
11,982.0	0.93	179.31	11,981.3	26.6	-21.4	-26.5	0.53	0.19	31.47
12,014.0	1.33	185.77	12,013.3	26.0	-21.4	-25.9	1.31	1.25	20.19
12,046.0	2.31	194.18	12,045.3	25.0	-21.6	-24.9	3.17	3.06	26.28
12,077.0	5.44	188.37	12,076.2	22.9	-22.0	-22.8	10.16	10.10	-18.74
12,109.0	7.41	189.56	12,108.0	19.4	-22.5	-19.3	6.17	6.16	3.72
12,140.0	10.16	190.68	12,138.7	14.8	-23.4	-14.6	8.89	8.87	3.61
12,172.0	12.62	192.51	12,170.0	8.6	-24.6	-8.4	7.77	7.69	5.72
12,204.0	15.42	192.09	12,201.1	1.0	-26.3	-0.8	8.76	8.75	-1.31
12,235.0	18.31	191.38	12,230.7	-7.8	-28.1	8.0	9.35	9.32	-2.29
12,267.0	21.33	191.09	12,260.8	-18.5	-30.2	18.6	9.44	9.44	-0.91
12,299.0	24.34	190.93	12,290.3	-30.6	-32.6	30.8	9.41	9.41	-0.50
12,330.0	27.18	190.86	12,318.2	-43.9	-35.1	44.1	9.16	9.16	-0.23
12,362.0	30.10	189.64	12,346.3	-59.0	-37.9	59.2	9.31	9.13	-3.81



Survey Report



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North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
12,393.0	32.15	191.39	12,372.9	-74.7	-40.8	75.0	7.23	6.61	5.65
12,425.0	34.95	190.52	12,399.5	-92.1	-44.2	92.4	8.88	8.75	-2.72
12,457.0	38.73	188.87	12,425.1	-111.0	-47.4	111.3	12.21	11.81	-5.16
FTP Crossed @ 12472.2'MD / 12436.9' TVD									
12,472.2	39.82	188.59	12,436.9	-120.5	-48.8	120.8	7.29	7.19	-1.85
12,488.0	40.96	188.31	12,448.9	-130.6	-50.3	130.9	7.29	7.20	-1.77
12,520.0	42.34	188.40	12,472.8	-151.7	-53.4	152.0	4.32	4.31	0.28
12,552.0	45.02	187.75	12,496.0	-173.5	-56.5	173.9	8.49	8.38	-2.03
12,584.0	47.57	188.54	12,518.1	-196.4	-59.8	196.8	8.17	7.97	2.47
12,615.0	50.20	188.77	12,538.5	-219.5	-63.3	219.9	8.50	8.48	0.74
12,647.0	52.29	190.36	12,558.5	-244.1	-67.5	244.6	7.59	6.53	4.97
12,678.0	55.01	191.27	12,576.9	-268.7	-72.2	269.1	9.09	8.77	2.94
12,710.0	57.24	192.00	12,594.7	-294.7	-77.5	295.2	7.22	6.97	2.28
12,741.0	59.74	191.74	12,610.9	-320.5	-83.0	321.0	8.10	8.06	-0.84
12,773.0	61.79	190.52	12,626.5	-347.9	-88.3	348.5	7.22	6.41	-3.81
12,805.0	63.37	188.59	12,641.3	-375.9	-93.1	376.5	7.28	4.94	-6.03
12,839.0	64.46	187.76	12,656.2	-406.2	-97.4	406.8	3.88	3.21	-2.44
12,871.0	66.72	186.87	12,669.5	-435.1	-101.1	435.7	7.50	7.06	-2.78
12,903.0	69.76	187.07	12,681.3	-464.6	-104.7	465.2	9.52	9.50	0.63
12,934.0	71.98	187.11	12,691.5	-493.6	-108.3	494.3	7.16	7.16	0.13
12,966.0	72.63	187.87	12,701.2	-523.9	-112.3	524.5	3.04	2.03	2.38
12,997.0	74.65	187.21	12,709.9	-553.3	-116.2	554.1	6.83	6.52	-2.13
13,029.0	76.87	186.49	12,717.8	-584.1	-119.9	584.9	7.27	6.94	-2.25
13,061.0	79.90	185.84	12,724.2	-615.3	-123.3	616.1	9.68	9.47	-2.03
13,092.0	81.82	185.68	12,729.2	-645.7	-126.3	646.5	6.21	6.19	-0.52
13,124.0	84.51	184.76	12,733.0	-677.4	-129.2	678.2	8.88	8.41	-2.88
13,155.0	87.51	184.15	12,735.1	-708.2	-131.6	709.0	9.87	9.68	-1.97
13,219.0	90.11	181.27	12,736.5	-772.1	-134.6	772.9	6.06	4.06	-4.50
13,314.0	90.76	179.35	12,735.7	-867.1	-135.2	867.9	2.13	0.68	-2.02
13,408.0	91.17	179.40	12,734.2	-961.1	-134.1	961.9	0.44	0.44	0.05
13,503.0	90.81	179.31	12,732.5	-1,056.1	-133.1	1,056.9	0.39	-0.38	-0.09
13,597.0	91.40	179.48	12,730.7	-1,150.0	-132.1	1,150.8	0.65	0.63	0.18
13,692.0	90.45	178.37	12,729.2	-1,245.0	-130.3	1,245.8	1.54	-1.00	-1.17
13,786.0	91.04	178.89	12,727.9	-1,339.0	-128.0	1,339.7	0.84	0.63	0.55
13,881.0	89.50	179.33	12,727.5	-1,434.0	-126.6	1,434.7	1.69	-1.62	0.46
13,975.0	89.50	179.42	12,728.3	-1,527.9	-125.5	1,528.7	0.10	0.00	0.10
14,069.0	89.97	179.49	12,728.8	-1,621.9	-124.7	1,622.7	0.51	0.50	0.07
14,164.0	90.19	179.41	12,728.6	-1,716.9	-123.7	1,717.7	0.25	0.23	-0.08
14,258.0	89.39	179.53	12,729.0	-1,810.9	-122.9	1,811.7	0.86	-0.85	0.13
14,353.0	87.14	180.25	12,731.8	-1,905.9	-122.7	1,906.6	2.49	-2.37	0.76
14,447.0	87.43	180.56	12,736.3	-1,999.8	-123.4	2,000.5	0.45	0.31	0.33
14,542.0	87.87	180.90	12,740.2	-2,094.7	-124.6	2,095.4	0.59	0.46	0.36
14,636.0	88.10	181.11	12,743.5	-2,188.6	-126.2	2,189.4	0.33	0.24	0.22
14,730.0	88.57	181.02	12,746.2	-2,282.6	-128.0	2,283.3	0.51	0.50	-0.10

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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)
14,825.0	88.35	181.23	12,748.8	-2,377.5	-129.8	2,378.3	0.32	-0.23	0.22
14,920.0	89.02	182.03	12,751.0	-2,472.4	-132.5	2,473.2	1.10	0.71	0.84
15,015.0	87.79	179.41	12,753.6	-2,567.4	-133.7	2,568.2	3.05	-1.29	-2.76
15,109.0	86.70	181.61	12,758.1	-2,661.3	-134.6	2,662.1	2.61	-1.16	2.34
15,204.0	87.25	180.49	12,763.1	-2,756.1	-136.3	2,756.9	1.31	0.58	-1.18
15,299.0	87.03	176.38	12,767.9	-2,850.9	-133.7	2,851.7	4.33	-0.23	-4.33
15,394.0	93.33	176.66	12,767.6	-2,945.7	-127.9	2,946.5	6.64	6.63	0.29
15,488.0	93.08	177.75	12,762.3	-3,039.5	-123.4	3,040.2	1.19	-0.27	1.16
15,583.0	92.83	178.31	12,757.4	-3,134.3	-120.1	3,135.0	0.64	-0.26	0.59
15,677.0	92.10	179.20	12,753.4	-3,228.2	-118.1	3,228.8	1.22	-0.78	0.95
15,772.0	88.07	179.77	12,753.2	-3,323.1	-117.2	3,323.8	4.28	-4.24	0.60
15,866.0	87.28	180.24	12,757.1	-3,417.1	-117.2	3,417.7	0.98	-0.84	0.50
15,961.0	87.79	179.80	12,761.1	-3,512.0	-117.2	3,512.6	0.71	0.54	-0.46
16,056.0	88.18	179.29	12,764.5	-3,606.9	-116.5	3,607.6	0.68	0.41	-0.54
16,150.0	85.38	177.91	12,769.8	-3,700.7	-114.2	3,701.4	3.32	-2.98	-1.47
16,244.0	89.21	176.35	12,774.2	-3,794.5	-109.5	3,795.1	4.40	4.07	-1.66
16,339.0	89.66	175.88	12,775.1	-3,889.3	-103.1	3,889.8	0.68	0.47	-0.49
16,434.0	94.01	177.20	12,772.1	-3,984.0	-97.3	3,984.5	4.78	4.58	1.39
16,528.0	90.92	178.43	12,768.1	-4,077.8	-93.8	4,078.3	3.54	-3.29	1.31
16,621.0	88.21	179.24	12,768.8	-4,170.8	-91.9	4,171.3	3.04	-2.91	0.87
16,716.0	88.01	178.66	12,771.9	-4,265.7	-90.1	4,266.2	0.65	-0.21	-0.61
16,810.0	90.53	178.69	12,773.1	-4,359.7	-87.9	4,360.2	2.68	2.68	0.03
16,905.0	92.49	178.95	12,770.6	-4,454.6	-86.0	4,455.1	2.08	2.06	0.27
17,000.0	91.93	181.23	12,766.9	-4,549.6	-86.1	4,550.0	2.47	-0.59	2.40
17,095.0	89.36	181.06	12,765.9	-4,644.5	-88.0	4,645.0	2.71	-2.71	-0.18
17,190.0	89.81	181.37	12,766.5	-4,739.5	-90.1	4,740.0	0.58	0.47	0.33
17,285.0	90.34	182.02	12,766.4	-4,834.5	-92.9	4,835.0	0.88	0.56	0.68
17,379.0	88.85	182.77	12,767.1	-4,928.4	-96.8	4,928.9	1.77	-1.59	0.80
17,475.0	88.91	183.67	12,769.0	-5,024.2	-102.2	5,024.7	0.94	0.06	0.94
17,570.0	88.91	180.61	12,770.8	-5,119.1	-105.7	5,119.7	3.22	0.00	-3.22
17,665.0	88.26	179.98	12,773.1	-5,214.1	-106.2	5,214.6	0.95	-0.68	-0.66
17,760.0	89.58	179.90	12,774.9	-5,309.1	-106.1	5,309.6	1.39	1.39	-0.08
17,854.0	87.50	179.73	12,777.3	-5,403.0	-105.8	5,403.6	2.22	-2.21	-0.18
17,949.0	87.59	179.33	12,781.4	-5,497.9	-105.0	5,498.5	0.43	0.09	-0.42
18,044.0	87.48	179.69	12,785.5	-5,592.8	-104.2	5,593.4	0.40	-0.12	0.38
18,138.0	87.28	178.97	12,789.8	-5,686.7	-103.1	5,687.3	0.79	-0.21	-0.77
18,233.0	87.48	179.09	12,794.1	-5,781.6	-101.5	5,782.1	0.25	0.21	0.13
18,328.0	87.73	179.08	12,798.1	-5,876.5	-100.0	5,877.0	0.26	0.26	-0.01
18,423.0	88.32	179.47	12,801.3	-5,971.5	-98.8	5,972.0	0.74	0.62	0.41
18,518.0	88.21	179.07	12,804.2	-6,066.4	-97.6	6,066.9	0.44	-0.12	-0.42
18,613.0	88.04	178.85	12,807.3	-6,161.3	-95.9	6,161.8	0.29	-0.18	-0.23
18,708.0	87.76	178.08	12,810.8	-6,256.2	-93.3	6,256.7	0.86	-0.29	-0.81
18,803.0	88.15	177.65	12,814.2	-6,351.1	-89.8	6,351.6	0.61	0.41	-0.45



Survey Report



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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)
18,898.0	87.56	176.92	12,817.7	-6,445.9	-85.3	6,446.4	0.99	-0.62	-0.77
18,992.0	86.75	179.85	12,822.4	-6,539.8	-82.6	6,540.2	3.23	-0.86	3.12
19,087.0	89.80	184.57	12,825.3	-6,634.6	-86.3	6,635.0	5.91	3.21	4.97
19,181.0	89.19	181.87	12,826.1	-6,728.5	-91.6	6,728.9	2.94	-0.65	-2.87
19,275.0	87.76	182.46	12,828.6	-6,822.4	-95.1	6,822.8	1.65	-1.52	0.63
19,370.0	86.36	181.21	12,833.5	-6,917.2	-98.2	6,917.7	1.97	-1.47	-1.32
19,464.0	87.31	181.50	12,838.7	-7,011.0	-100.4	7,011.5	1.06	1.01	0.31
19,559.0	87.01	180.58	12,843.4	-7,105.9	-102.1	7,106.4	1.02	-0.32	-0.97
19,655.0	87.53	181.42	12,847.9	-7,201.8	-103.8	7,202.3	1.03	0.54	0.88
19,749.0	85.94	178.42	12,853.3	-7,295.6	-103.7	7,296.1	3.61	-1.69	-3.19
19,844.0	85.57	178.12	12,860.3	-7,390.3	-100.8	7,390.8	0.50	-0.39	-0.32
19,938.0	86.44	178.33	12,866.9	-7,484.0	-97.9	7,484.5	0.95	0.93	0.22
20,032.0	87.25	177.69	12,872.1	-7,577.8	-94.6	7,578.3	1.10	0.86	-0.68
20,127.0	88.01	177.27	12,876.0	-7,672.6	-90.5	7,673.1	0.91	0.80	-0.44
20,221.0	91.46	179.83	12,876.4	-7,766.6	-88.1	7,767.0	4.57	3.67	2.72
20,316.0	91.12	179.07	12,874.3	-7,861.6	-87.2	7,861.9	0.88	-0.36	-0.80
20,411.0	91.07	178.76	12,872.5	-7,956.5	-85.4	7,956.9	0.33	-0.05	-0.33
20,505.0	89.91	178.44	12,871.7	-8,050.5	-83.1	8,050.9	1.28	-1.23	-0.34
20,600.0	88.46	178.59	12,873.0	-8,145.4	-80.6	8,145.8	1.53	-1.53	0.16
20,695.0	87.34	177.73	12,876.5	-8,240.3	-77.6	8,240.7	1.49	-1.18	-0.91
20,789.0	87.65	178.29	12,880.6	-8,334.2	-74.3	8,334.5	0.68	0.33	0.60
20,884.0	87.68	178.32	12,884.5	-8,429.1	-71.5	8,429.3	0.04	0.03	0.03
20,978.0	87.28	178.35	12,888.6	-8,522.9	-68.8	8,523.2	0.43	-0.43	0.03
21,073.0	86.80	178.10	12,893.5	-8,617.8	-65.8	8,618.0	0.57	-0.51	-0.26
21,167.0	86.89	178.40	12,898.7	-8,711.6	-63.0	8,711.8	0.33	0.10	0.32
21,262.0	89.47	177.84	12,901.7	-8,806.5	-59.9	8,806.7	2.78	2.72	-0.59
21,356.0	89.66	178.45	12,902.4	-8,900.4	-56.8	8,900.6	0.68	0.20	0.65
21,450.0	91.96	179.12	12,901.1	-8,994.4	-54.8	8,994.5	2.55	2.45	0.71
21,544.0	92.38	180.11	12,897.5	-9,088.3	-54.2	9,088.5	1.14	0.45	1.05
21,639.0	90.25	178.93	12,895.3	-9,183.3	-53.4	9,183.4	2.56	-2.24	-1.24
21,733.0	91.37	180.25	12,894.0	-9,277.3	-52.7	9,277.4	1.84	1.19	1.40
21,828.0	90.92	180.34	12,892.1	-9,372.2	-53.2	9,372.4	0.48	-0.47	0.09
21,922.0	90.03	180.30	12,891.3	-9,466.2	-53.7	9,466.4	0.95	-0.95	-0.04
22,016.0	90.84	180.54	12,890.6	-9,560.2	-54.4	9,560.4	0.90	0.86	0.26
22,111.0	89.11	180.55	12,890.7	-9,655.2	-55.3	9,655.4	1.82	-1.82	0.01
22,205.0	90.31	180.70	12,891.1	-9,749.2	-56.4	9,749.4	1.29	1.28	0.16
22,300.0	91.82	181.68	12,889.4	-9,844.2	-58.3	9,844.3	1.89	1.59	1.03
22,394.0	91.26	181.61	12,886.9	-9,938.1	-61.0	9,938.3	0.60	-0.60	-0.07
LTP Crossed @ 22478.0' MD / 12885.5' TVD									
22,478.0	90.64	181.04	12,885.5	-10,022.1	-63.0	10,022.3	1.00	-0.74	-0.67
22,489.0	90.56	180.97	12,885.3	-10,033.1	-63.2	10,033.3	1.00	-0.74	-0.67
22,564.0	89.69	180.51	12,885.2	-10,108.0	-64.1	10,108.2	1.31	-1.16	-0.61
TD @ 22620.0' MD / 12885.4' TVD									
22,620.0	89.69	180.51	12,885.5	-10,164.0	-64.6	10,164.2	0.00	0.00	0.00



Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Fascinator Fed Com #702H
Project:	Lea County, NM	TVD Reference:	RKB @ 3375.0usft (Noram #21)
Site:	Sec 30, T24-S,R35E	MD Reference:	RKB @ 3375.0usft (Noram #21)
Well:	Fascinator Fed Com #702H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
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Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,730.0	11,729.3	29.0	-21.4	Gyro Tie In @ 11730.0' MD / 11729.3' TVD
12,472.2	12,436.9	-120.5	-48.8	FTP Crossed @ 12472.2'MD / 12436.9' TVD
22,478.0	12,885.5	-10,022.1	-63.0	LTP Crossed @ 22478.0'MD / 12885.5' TVD
22,620.0	12,885.5	-10,164.0	-64.6	TD @ 22620.0' MD / 12885.4' TVD

Checked By: _____	Approved By: _____	Date: _____
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From Bottom to Top	Stage 1	Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	22,458	22	4	22,213	89	5	22,064	34	5	21,867	27	5	21,670	25	5
	22,436	23	4	22,198	15	5	22,039	24	5	21,838	20	5	21,646	25	5
	22,413	22	4	22,183	15	5	22,015	25	5	21,818	25	5	21,621	29	5
	22,391	22	4	22,168	15	5	21,990	24	5	21,793	24	5	21,592	20	5
	22,369	22	4	22,153	15	4	21,966		4	21,769	25	4	21,572	25	4
	22,347	23	4	22,138	25	4	21,941	25	4	21,744	27	4	21,547	25	4
	22,324	22	3	22,113	15	4	21,916	22	4	21,717	22	4	21,522	24	4
	22,302		3	22,098		4	21,894		4	21,695		4	21,498		4
	Plug to Plug	92	30	Plug to Plug	55	36	Plug to Plug	86	36	Plug to Plug	86	36	Plug to Plug	91	36
	Frac Plug	22,483	Total Shots	Frac Plug	22,223	Total Shots	Frac Plug	22,076	Total Shots	Frac Plug	21,879	Total Shots	Frac Plug	21,683	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	21,430	68	5	21,276	25	5	21,079	27	5	20,882	25	5	20,678	32	5
	21,422	12	5	21,252	25	5	21,051	21	5	20,852	24	5	20,661	25	5
	21,410	11	5	21,227	25	5	21,030	25	5	20,828	19	5	20,636	24	5
	21,399	22	5	21,202	24	5	21,005	24	5	20,809	27	5	20,612	25	5
	21,377	27	4	21,178	25	4	20,981	25	4	20,782	23	4	20,587	28	4
	21,350	27	4	21,153	24	4	20,956	24	4	20,759	24	4	20,559	21	4
	21,323	22	4	21,129	23	4	20,932	25	4	20,735	25	4	20,538	25	4
	21,301		4	21,106		4	20,907		4	20,710		4	20,513		4
	Plug to Plug	41	36	Plug to Plug	87	36	Plug to Plug	87	36	Plug to Plug	86	36	Plug to Plug	76	36
	Frac Plug	21,440	Total Shots	Frac Plug	21,289	Total Shots	Frac Plug	21,092	Total Shots	Frac Plug	20,895	Total Shots	Frac Plug	20,688	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	20,488	25	5	20,286	30	5	20,095	24	5	19,898	32	5	19,701	31	5
	20,464	21	5	20,267	25	5	20,070	25	5	19,873	25	5	19,676	25	5
	20,443	28	5	20,242	28	5	20,045	24	5	19,848	24	5	19,651	24	5
	20,415	25	5	20,214	21	5	20,021	28	5	19,824	25	5	19,627	25	5
	20,390	25	4	20,193	27	4	19,993	22	4	19,799	11	4	19,602	24	4
	20,365	24	4	20,166	22	4	19,971	24	4	19,788	38	4	19,578	25	4
	20,341	25	4	20,144	25	4	19,947	17	4	19,750	18	4	19,553	25	4
	20,316		4	20,119		4	19,930		4	19,732		4	19,528		4
	Plug to Plug	86	36	Plug to Plug	82	36	Plug to Plug	86	36	Plug to Plug	92	36	Plug to Plug	86	36
	Frac Plug	20,501	Total Shots	Frac Plug	20,296	Total Shots	Frac Plug	20,107	Total Shots	Frac Plug	19,916	Total Shots	Frac Plug	19,713	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	19,499	29	5	19,307	28	5	19,110	24	5	18,905	32	5	18,714	27	5
	19,479	25	5	19,280	22	5	19,085	20	5	18,888	24	5	18,691	24	5
	19,454	24	5	19,258	25	5	19,065	29	5	18,864	27	5	18,667	25	5
	19,430	25	5	19,233	25	5	19,036	25	5	18,837	23	5	18,642	25	5
	19,405	24	4	19,208	24	4	19,011	24	4	18,814	24	4	18,617	23	4
	19,381	25	4	19,184	25	4	18,987	25	4	18,790	24	4	18,594	26	4
	19,356	21	4	19,159	25	4	18,962	25	4	18,766	25	4	18,568	24	4
	19,335		4	19,134		4	18,937		4	18,741		4	18,544		4
	Plug to Plug	86	36	Plug to Plug	86	36	Plug to Plug	86	36	Plug to Plug	78	36	Plug to Plug	86	36
	Frac Plug	19,516	Total Shots	Frac Plug	19,319	Total Shots	Frac Plug	19,122	Total Shots	Frac Plug	18,915	Total Shots	Frac Plug	18,728	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	18,519	25	5	18,322	25	5	18,123	27	5	17,928	25	5	17,731	25	5
	18,494	24	5	18,297	24	5	18,097	21	5	17,903	24	5	17,707	25	5
	18,470	25	5	18,273	25	5	18,076	25	5	17,879	25	5	17,682	25	5
	18,445	25	5	18,248	27	5	18,051	24	5	17,854	24	5	17,657	20	5
	18,420	24	4	18,221	22	4	18,027	25	4	17,830	27	4	17,637	29	4
	18,396	25	4	18,199	25	4	18,002	21	4	17,803	23	4	17,608	25	4
	18,371	24	4	18,174	24	4	17,981	28	4	17,780	24	4	17,583	24	4
	18,347		4	18,150		4	17,953		4	17,756		4	17,559		4
	Plug to Plug	86	36	Plug to Plug	84	36	Plug to Plug	80	36	Plug to Plug	86	36	Plug to Plug	86	36
	Frac Plug	18,531	Total Shots	Frac Plug	18,332	Total Shots	Frac Plug	18,131	Total Shots	Frac Plug	17,940	Total Shots	Frac Plug	17,743	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	17,524	35	5	17,337	25	5	17,130	35	5	16,943	25	5	16,744	27	5
	17,510	25	5	17,313	25	5	17,116	25	5	16,919	27	5	16,725	28	5
	17,485	25	5	17,288	25	5	17,091	28	5	16,892	23	5	16,697	26	5
	17,460	24	5	17,263	27	5	17,063	21	5	16,869	24	5	16,671	23	5
	17,436	25	4	17,236	22	4	17,042	25	4	16,845	25	4	16,648	25	4
	17,411	25	4	17,214	24	4	17,017	24	4	16,820	24	4	16,623	24	4
	17,386	24	4	17,190	25	4	16,993	25	4	16,796	25	4	16,599	25	4
	17,362		4	17,165		4	16,968		4	16,771		4	16,574		4
	Plug to Plug	77	36	Plug to Plug	87	36	Plug to Plug	79	36	Plug to Plug	87	36	Plug to Plug	81	36
	Frac Plug	17,537	Total Shots	Frac Plug	17,350	Total Shots	Frac Plug	17,142	Total Shots	Frac Plug	16,956	Total Shots	Frac Plug	16,752	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	16,543	31	5	16,348	30	5	16,156	24	5	15,949	34	5	15,762	22	5
	16,525	29	5	16,332	29	5	16,131	21	5	15,934	25	5	15,737	25	5
	16,496	20	5	16,303	24	5	16,110	28	5	15,909	23	5	15,712	24	5
	16,476	25	5	16,279	25	5	16,082	28	5	15,886	26	5	15,688	22	5
	16,451	25	4	16,254	25	4	16,054	22	4	15,860	30	4	15,666	27	4
	16,426	24	4	16,229	24	4	16,032	24	4	15,830	19	4	15,639	27	4
	16,402	24	4	16,205	25	4	16,008	25	4	15,811	27	4	15,612	23	4
	16,378		4	16,180		4	15,983		4	15,784		4	15,589		4
	Plug to Plug	86	36	Plug to Plug	83	36	Plug to Plug	86	36	Plug to Plug	75	36	Plug to Plug	2084	36
	Frac Plug	16,562	Total Shots	Frac Plug	16,362	Total Shots	Frac Plug	16,168	Total Shots	Frac Plug	15,961	Total Shots	Frac Plug	17,772	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	15,555	34	5	15,368	24	5	15,159	36	5	14,974	24	5	14,769	32	5
	15,540	25	5	15,343	25	5	15,142	20	5	14,949	23	5	14,750	22	5
	15,515	24	5	15,318	24	5	15,122	25	5	14,926	26	5	14,728	28	5
	15,491	25	5	15,294	21	5	15,097	25	5	14,900	30	5	14,700	22	5
	15,466	21	4	15,273	28	4	15,072	24	4	14,870	19	4	14,678	24	4
	15,445	28	4	15,245	27	4	15,048	25	4	14,851	26	4	14,654	25	4
	15,417	25	4	15,218	23	4	15,023	25	4	14,825	24	4	14,629	24	4
	15,392		4	15,195		4	14,998		4	14,801		4	14,605		4
	Plug to Plug	74	36	Plug to Plug	86	36	Plug to Plug	72	36	Plug to Plug	86	36	Plug to Plug	79	36
	Frac Plug	15,565	Total Shots	Frac Plug	15,380	Total Shots	Frac Plug	15,169	Total Shots	Frac Plug	14,986	Total Shots	Frac Plug	14,779	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	14,580	25	5	14,371	42	5	14,186	33	5	13,983	31	5	13,790	28	5
	14,555	24	5	14,350	16	5	14,161	24	5	13,964	25	5	13,767	24	5
	14,531	25	5	14,334	25	5	14,137	25	5	13,939	24	5	13,743	25	5
	14,506	30	5	14,309	25	5	14,112	24	5	13,915	24	5	13,718	24	5
	14,476	19	4	14,284	21	4	14,088	25	4	13,891	25	4	13,694	25	4
	14,457	25	4	14,263	28	4	14,063	24	4	13,866	25	4	13,669	24	4
	14,432	19	4	14,235	16	4	14,039	25	4	13,841	23	4	13,645	25	4
	14,413		4	14,219		4	14,014		4	13,818		4	13,620		4
	Plug to Plug	86	36	Plug to Plug	72	36	Plug to Plug	86	36	Plug to Plug	86	36	Plug to Plug	84	36
	Frac Plug	14,592	Total Shots	Frac Plug	14,381	Total Shots	Frac Plug	14,198	Total Shots	Frac Plug	14,001	Total Shots	Frac Plug	13,802	Total Shots

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots	Stage 49	Distance Between Perfs	Shots	Stage 50	Distance Between Perfs	Shots
	13,591	29	5	13,398	31	5	13,200	26	5		13,033			0	
	13,571	25	5	13,374	25	5	13,177	25	5						
	13,546	25	5	13,349	25	5	13,152	25	5						
	13,521	24	5	13,324	24	5	13,127	24	5						
	13,497	25	4	13,300	25	4	13,103	25	4						
	13,472	25	4	13,275	21	4	13,078	24	4						
	13,447	18	4	13,254	28	4	13,054	21	4						
	13,429		4	13,226		4	13,033		4						
	Plug to Plug	-13521	36	Plug to Plug	-13324	36	Plug to Plug	-13127	36	Plug to Plug	0	0	Plug to Plug	0	0

Fascinator Federal Com #702H

<u>Perfs</u>	<u>7 1/2% Acid (Gal)</u>	<u>Sand (#)</u>	<u>Fluid (Gal)</u>
1	1512	401190	323904
2	1500	402350	358752
3	1512	404080	484206
4	1512	403200	368760
5	1512	401250	352800
6	1500	399540	395880
7	1500	401000	363372
8	1512	401750	347214
9	1500	401440	324564
10	1500	400800	339348
11	1512	401470	328272
12	1512	400480	329112
13	1500	401300	344514
14	1512	400900	363888
15	1512	400300	339192
16	1500	401120	336114
17	1500	399900	333174
18	1512	400000	345786
19	1512	399840	340872
20	1500	401000	337962
21	1512	407400	344904
22	1500	396920	328848
23	1512	399050	348054
24	1512	392800	348348
25	1500	399870	337458
26	1500	401010	333090
27	1500	399790	344472
28	1512	400200	362418
29	1512	399320	332388
30	1500	401010	325530
31	1512	399570	340368
32	1512	400100	335244
33	1512	399940	332766
34	1512	401100	332220
35	1512	405900	317646
36	1512	400000	330918
37	1512	400220	386694
38	1512	400170	331800
39	1500	399700	334856
40	1470	399490	333018
41	1512	409690	319914
42	1500	402100	333636
43	1500	399420	333258
44	1512	402160	434148
45	1500	400600	374754
46	1512	402000	340788
47	1512	398700	432600
48	1512	432170	370146
Totals	72314.76	19,273,310	16,777,966