



CONCHO

COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 33, T 20 S. , R 34 E

Little Bear Federal Com #8H

Wellbore #1

Design: Wellbore #1

Standard Survey Report

18 February, 2019

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AUG 15 2019
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Survey Report



Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 33, T 20 S., R 34 E
Well: Little Bear Federal Com #8H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com #8H
TVD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
MD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Project	Lea County, NM (NAD27 NME)		
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. 33, T 20 S., R 34 E		
Site Position:		Northing:	554,965.50 usft
From:	Map	Easting:	738,982.00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.52332
		Longitude:	-103.55799
		Grid Convergence:	0.42 °

Well	Little Bear Federal Com #8H, ACTIVE		
Well Position	+N/-S	0.00 usft	Northing: 555,242.90 usft
	+E/-W	0.00 usft	Easting: 737,347.40 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	32.52412
		Longitude:	-103.56328
		Ground Level:	3,804.50 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/31/2018	6.67	60.42	48,148

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	353.13	

Survey Program	Date 2/18/2019				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	10,845.00	Keeper Gyro (Wellbore #1)	Keeper	Standard Wireline Keeper ver 1.0.2	
11,002.00	18,693.00	MWD Surveys (Wellbore #1)	MWD	MWD - Standard	

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	0.41	22.97	100.00	0.33	0.14	0.31	0.41	0.41	0.00
125.00	0.45	29.17	125.00	0.50	0.22	0.47	0.25	0.16	24.80
150.00	0.44	26.35	150.00	0.67	0.31	0.63	0.10	-0.04	-11.28
175.00	0.47	28.88	175.00	0.85	0.40	0.79	0.14	0.12	10.12
200.00	0.55	35.68	200.00	1.03	0.52	0.96	0.40	0.32	27.20
225.00	0.38	22.92	225.00	1.21	0.63	1.12	0.79	-0.68	-51.04
250.00	0.55	29.14	249.99	1.39	0.72	1.29	0.71	0.68	24.88
275.00	0.42	20.88	274.99	1.58	0.81	1.47	0.59	-0.52	-33.04
300.00	0.68	24.38	299.99	1.80	0.90	1.68	1.05	1.04	14.00



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Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
325.00	0.31	10.99	324.99	2.00	0.98	1.87	1.54	-1.48	-53.56
350.00	0.37	19.03	349.99	2.14	1.02	2.01	0.31	0.24	32.16
375.00	0.29	23.33	374.99	2.28	1.07	2.13	0.33	-0.32	17.20
400.00	0.18	31.40	399.99	2.37	1.11	2.22	0.46	-0.44	32.28
425.00	0.14	216.02	424.99	2.38	1.12	2.23	1.28	-0.16	-701.52
450.00	0.07	66.27	449.99	2.36	1.11	2.21	0.81	-0.28	-599.00
475.00	0.12	173.00	474.99	2.34	1.13	2.19	0.62	0.20	426.92
500.00	0.15	127.00	499.99	2.29	1.16	2.14	0.44	0.12	-184.00
525.00	0.17	180.84	524.99	2.24	1.18	2.08	0.58	0.08	215.36
550.00	0.22	183.59	549.99	2.15	1.18	2.00	0.20	0.20	11.00
575.00	0.26	173.38	574.99	2.05	1.18	1.89	0.23	0.16	-40.84
600.00	0.25	185.00	599.99	1.94	1.19	1.78	0.21	-0.04	46.48
625.00	0.26	181.40	624.99	1.83	1.18	1.67	0.08	0.04	-14.40
650.00	0.19	191.13	649.99	1.73	1.17	1.58	0.32	-0.28	38.92
675.00	0.22	200.35	674.99	1.64	1.14	1.49	0.18	0.12	36.88
700.00	0.28	195.65	699.99	1.54	1.11	1.39	0.25	0.24	-18.80
725.00	0.27	198.91	724.99	1.42	1.08	1.29	0.07	-0.04	13.04
750.00	0.33	206.86	749.99	1.30	1.02	1.17	0.29	0.24	31.80
775.00	0.33	195.69	774.99	1.17	0.97	1.05	0.26	0.00	-44.68
800.00	0.35	185.29	799.99	1.03	0.95	0.90	0.26	0.08	-41.60
825.00	0.24	168.58	824.99	0.90	0.95	0.78	0.55	-0.44	-66.84
850.00	0.32	182.09	849.99	0.78	0.96	0.66	0.41	0.32	54.04
875.00	0.36	183.28	874.99	0.63	0.95	0.51	0.16	0.16	4.76
900.00	0.22	174.55	899.99	0.50	0.95	0.39	0.59	-0.56	-34.92
925.00	0.25	165.64	924.99	0.40	0.97	0.28	0.19	0.12	-35.64
950.00	0.24	161.90	949.99	0.30	1.00	0.18	0.08	-0.04	-14.96
975.00	0.19	143.06	974.99	0.22	1.04	0.09	0.34	-0.20	-75.36
1,000.00	0.30	189.52	999.98	0.12	1.05	-0.01	0.87	0.44	185.84
1,025.00	0.23	186.92	1,024.98	0.00	1.04	-0.12	0.28	-0.28	-10.40
1,050.00	0.20	174.20	1,049.98	-0.09	1.03	-0.21	0.22	-0.12	-50.88
1,075.00	0.18	168.98	1,074.98	-0.17	1.05	-0.29	0.11	-0.08	-20.88
1,100.00	0.25	171.47	1,099.98	-0.26	1.06	-0.39	0.28	0.28	9.96
1,125.00	0.20	148.06	1,124.98	-0.35	1.09	-0.48	0.41	-0.20	-93.64
1,150.00	0.22	134.25	1,149.98	-0.42	1.15	-0.56	0.22	0.08	-55.24
1,175.00	0.19	136.06	1,174.98	-0.49	1.21	-0.63	0.12	-0.12	7.24
1,200.00	0.17	134.61	1,199.98	-0.54	1.27	-0.69	0.08	-0.08	-5.80
1,225.00	0.14	156.12	1,224.98	-0.60	1.31	-0.75	0.26	-0.12	86.04
1,250.00	0.19	120.01	1,249.98	-0.65	1.36	-0.80	0.45	0.20	-144.44
1,275.00	0.19	152.96	1,274.98	-0.70	1.41	-0.87	0.43	0.00	131.80
1,300.00	0.12	106.34	1,299.98	-0.75	1.45	-0.92	0.55	-0.28	-186.48
1,325.00	0.13	66.51	1,324.98	-0.74	1.51	-0.92	0.34	0.04	-159.32
1,350.00	0.10	55.38	1,349.98	-0.72	1.55	-0.90	0.15	-0.12	-44.52
1,375.00	0.06	91.94	1,374.98	-0.71	1.58	-0.89	0.25	-0.16	146.24

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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)
1,400.00	0.16	22.61	1,399.98	-0.68	1.61	-0.86	0.60	0.40	-277.32
1,425.00	0.22	25.70	1,424.98	-0.60	1.64	-0.79	0.24	0.24	12.36
1,450.00	0.05	333.75	1,449.98	-0.55	1.66	-0.74	0.77	-0.68	-207.80
1,475.00	0.21	17.18	1,474.98	-0.50	1.67	-0.69	0.71	0.64	173.72
1,500.00	0.16	12.53	1,499.98	-0.42	1.69	-0.62	0.21	-0.20	-18.60
1,525.00	0.12	11.23	1,524.98	-0.36	1.70	-0.56	0.16	-0.16	-5.20
1,550.00	0.17	2.42	1,549.98	-0.29	1.71	-0.50	0.22	0.20	-35.24
1,575.00	0.13	356.84	1,574.98	-0.23	1.71	-0.43	0.17	-0.16	-22.32
1,600.00	0.11	311.94	1,599.98	-0.19	1.69	-0.39	0.37	-0.08	-179.60
1,625.00	0.10	351.18	1,624.98	-0.15	1.67	-0.35	0.28	-0.04	156.96
1,650.00	0.16	20.58	1,649.98	-0.09	1.68	-0.29	0.35	0.24	117.60
1,675.00	0.04	333.67	1,674.98	-0.05	1.68	-0.25	0.54	-0.48	-187.64
1,700.00	0.08	51.61	1,699.98	-0.03	1.69	-0.24	0.33	0.16	311.76
1,725.00	0.12	58.26	1,724.98	-0.01	1.73	-0.22	0.17	0.16	26.60
1,750.00	0.14	46.21	1,749.98	0.03	1.77	-0.19	0.14	0.08	-48.20
1,775.00	0.10	70.61	1,774.98	0.05	1.82	-0.16	0.26	-0.16	97.60
1,800.00	0.18	59.70	1,799.98	0.08	1.87	-0.14	0.34	0.32	-43.64
1,825.00	0.12	98.10	1,824.98	0.10	1.93	-0.13	0.46	-0.24	153.60
1,850.00	0.27	85.66	1,849.98	0.10	2.02	-0.14	0.62	0.60	-49.76
1,875.00	0.86	89.49	1,874.98	0.10	2.26	-0.17	2.36	2.36	15.32
1,900.00	1.14	80.88	1,899.98	0.15	2.69	-0.18	1.27	1.12	-34.44
1,925.00	1.23	80.47	1,924.97	0.23	3.21	-0.16	0.36	0.36	-1.64
1,950.00	1.21	83.78	1,949.97	0.30	3.73	-0.15	0.29	-0.08	13.24
1,975.00	1.25	82.03	1,974.96	0.37	4.26	-0.14	0.22	0.16	-7.00
2,000.00	1.12	84.46	1,999.95	0.43	4.78	-0.14	0.56	-0.52	9.72
2,025.00	1.28	74.53	2,024.95	0.53	5.29	-0.11	1.05	0.64	-39.72
2,050.00	1.06	81.31	2,049.94	0.64	5.79	-0.06	1.04	-0.88	27.12
2,075.00	1.08	74.09	2,074.94	0.74	6.24	-0.02	0.54	0.08	-28.88
2,100.00	0.73	63.19	2,099.94	0.87	6.61	0.08	1.55	-1.40	-43.60
2,125.00	0.59	57.14	2,124.93	1.01	6.86	0.19	0.62	-0.56	-24.20
2,150.00	0.54	47.82	2,149.93	1.16	7.06	0.31	0.42	-0.20	-37.28
2,175.00	0.45	42.72	2,174.93	1.31	7.21	0.44	0.40	-0.36	-20.40
2,200.00	0.49	38.43	2,199.93	1.47	7.34	0.58	0.21	0.16	-17.16
2,225.00	0.41	37.67	2,224.93	1.63	7.47	0.72	0.32	-0.32	-3.04
2,250.00	0.45	40.97	2,249.93	1.77	7.58	0.85	0.19	0.16	13.20
2,275.00	0.44	43.86	2,274.93	1.91	7.72	0.98	0.10	-0.04	11.56
2,300.00	0.43	30.83	2,299.93	2.06	7.83	1.11	0.40	-0.04	-52.12
2,325.00	0.30	342.78	2,324.93	2.21	7.86	1.25	1.28	-0.52	-192.20
2,350.00	0.49	355.04	2,349.93	2.38	7.83	1.42	0.83	0.76	49.04
2,375.00	0.40	347.24	2,374.93	2.57	7.80	1.62	0.43	-0.36	-31.20
2,400.00	0.44	344.61	2,399.93	2.74	7.76	1.80	0.18	0.16	-10.52
2,425.00	0.50	324.04	2,424.93	2.93	7.67	1.99	0.71	0.24	-82.28
2,450.00	0.77	301.74	2,449.92	3.10	7.46	2.19	1.44	1.08	-89.20

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2,475.00	0.90	291.12	2,474.92	3.26	7.13	2.38	0.81	0.52	-42.48
2,500.00	0.94	290.11	2,499.92	3.40	6.76	2.57	0.17	0.16	-4.04
2,525.00	0.89	291.44	2,524.91	3.54	6.39	2.75	0.22	-0.20	5.32
2,550.00	0.91	292.61	2,549.91	3.69	6.02	2.94	0.11	0.08	4.68
2,575.00	1.06	285.56	2,574.91	3.83	5.62	3.13	0.77	0.60	-28.20
2,600.00	1.20	286.72	2,599.90	3.97	5.14	3.32	0.57	0.56	4.64
2,625.00	1.28	292.41	2,624.90	4.15	4.63	3.56	0.59	0.32	22.76
2,650.00	1.56	288.27	2,649.89	4.36	4.05	3.85	1.19	1.12	-16.56
2,675.00	1.61	287.81	2,674.88	4.58	3.39	4.14	0.21	0.20	-1.84
2,700.00	1.86	283.20	2,699.87	4.78	2.66	4.42	1.14	1.00	-18.44
2,725.00	1.90	281.42	2,724.85	4.95	1.86	4.69	0.28	0.16	-7.12
2,750.00	1.92	281.96	2,749.84	5.12	1.05	4.96	0.11	0.08	2.16
2,775.00	2.03	280.83	2,774.83	5.29	0.20	5.23	0.47	0.44	-4.52
2,800.00	2.09	279.08	2,799.81	5.44	-0.68	5.49	0.35	0.24	-7.00
2,825.00	2.28	274.50	2,824.79	5.56	-1.63	5.71	1.03	0.76	-18.32
2,850.00	2.34	271.90	2,849.77	5.61	-2.63	5.89	0.48	0.24	-10.40
2,875.00	2.39	271.00	2,874.75	5.64	-3.67	6.04	0.25	0.20	-3.60
2,900.00	2.55	266.04	2,899.73	5.61	-4.74	6.14	1.07	0.64	-19.84
2,925.00	2.56	267.85	2,924.70	5.55	-5.85	6.21	0.33	0.04	7.24
2,950.00	2.58	266.16	2,949.68	5.49	-6.97	6.29	0.31	0.08	-6.76
2,975.00	2.50	267.57	2,974.65	5.43	-8.08	6.36	0.41	-0.32	5.64
3,000.00	2.63	264.18	2,999.63	5.35	-9.19	6.41	0.80	0.52	-13.56
3,025.00	2.79	260.31	3,024.60	5.19	-10.37	6.39	0.97	0.64	-15.48
3,050.00	2.87	260.14	3,049.57	4.98	-11.58	6.33	0.32	0.32	-0.68
3,075.00	2.88	259.01	3,074.54	4.75	-12.81	6.25	0.23	0.04	-4.52
3,100.00	2.94	257.30	3,099.51	4.49	-14.06	6.14	0.42	0.24	-6.84
3,125.00	2.88	257.59	3,124.47	4.21	-15.30	6.01	0.25	-0.24	1.16
3,150.00	2.77	256.71	3,149.44	3.94	-16.50	5.89	0.47	-0.44	-3.52
3,175.00	2.85	254.81	3,174.41	3.64	-17.68	5.73	0.49	0.32	-7.60
3,200.00	2.82	252.94	3,199.38	3.30	-18.87	5.53	0.39	-0.12	-7.48
3,225.00	2.79	251.42	3,224.35	2.92	-20.04	5.30	0.32	-0.12	-6.08
3,250.00	2.73	251.59	3,249.32	2.54	-21.18	5.05	0.24	-0.24	0.68
3,275.00	2.77	250.15	3,274.29	2.15	-22.31	4.80	0.32	0.16	-5.76
3,300.00	2.78	249.74	3,299.27	1.73	-23.45	4.52	0.09	0.04	-1.64
3,325.00	2.72	247.98	3,324.24	1.30	-24.57	4.23	0.41	-0.24	-7.04
3,350.00	2.89	243.60	3,349.21	0.80	-25.68	3.86	1.09	0.68	-17.52
3,375.00	2.84	241.54	3,374.18	0.22	-26.79	3.42	0.46	-0.20	-8.24
3,400.00	2.84	241.81	3,399.14	-0.37	-27.88	2.97	0.05	0.00	1.08
3,425.00	2.97	239.47	3,424.11	-0.99	-28.98	2.49	0.70	0.52	-9.36
3,450.00	3.09	238.81	3,449.08	-1.67	-30.12	1.95	0.50	0.48	-2.64
3,475.00	3.41	236.70	3,474.04	-2.42	-31.32	1.34	1.37	1.28	-8.44
3,500.00	3.59	235.88	3,498.99	-3.27	-32.59	0.65	0.75	0.72	-3.28
3,525.00	3.57	235.56	3,523.94	-4.15	-33.88	-0.07	0.11	-0.08	-1.28
3,550.00	3.60	235.93	3,548.89	-5.03	-35.17	-0.79	0.15	0.12	1.48

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Project: Lea County, NM (NAD27 NME)
Site: Sec. 33, T 20 S., R 34 E
Well: Little Bear Federal Com #8H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com #8H
TVD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
MD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
3,575.00	3.62	236.07	3,573.84	-5.91	-36.47	-1.50	0.09	0.08	0.56
3,600.00	3.71	235.36	3,598.79	-6.81	-37.79	-2.24	0.40	0.36	-2.84
3,625.00	3.96	234.17	3,623.74	-7.78	-39.16	-3.04	1.05	1.00	-4.76
3,650.00	4.03	233.24	3,648.68	-8.81	-40.56	-3.89	0.38	0.28	-3.72
3,675.00	4.02	233.20	3,673.61	-9.86	-41.97	-4.77	0.04	-0.04	-0.16
3,700.00	3.88	232.37	3,698.55	-10.90	-43.34	-5.64	0.60	-0.56	-3.32
3,725.00	4.04	230.57	3,723.49	-11.97	-44.69	-6.54	0.81	0.64	-7.20
3,750.00	4.04	230.34	3,748.43	-13.10	-46.05	-7.49	0.06	0.00	-0.92
3,775.00	4.07	230.05	3,773.37	-14.23	-47.41	-8.46	0.15	0.12	-1.16
3,800.00	4.06	229.83	3,798.31	-15.37	-48.76	-9.43	0.07	-0.04	-0.88
3,825.00	4.03	229.27	3,823.24	-16.51	-50.10	-10.40	0.20	-0.12	-2.24
3,850.00	4.00	228.56	3,848.18	-17.66	-51.42	-11.38	0.23	-0.12	-2.84
3,875.00	3.95	228.85	3,873.12	-18.81	-52.73	-12.36	0.22	-0.20	-1.16
3,900.00	3.78	228.64	3,898.07	-19.92	-53.99	-13.32	0.68	-0.68	-0.84
3,925.00	3.44	230.90	3,923.02	-20.93	-55.19	-14.18	1.47	-1.36	9.04
3,950.00	3.27	232.42	3,947.97	-21.84	-56.34	-14.95	0.77	-0.68	6.08
3,975.00	3.14	234.80	3,972.93	-22.67	-57.47	-15.64	0.74	-0.52	9.52
4,000.00	3.13	236.27	3,997.90	-23.45	-58.59	-16.27	0.32	-0.04	5.88
4,025.00	2.99	234.52	4,022.86	-24.20	-59.69	-16.89	0.67	-0.56	-7.00
4,050.00	2.91	239.40	4,047.83	-24.90	-60.77	-17.46	1.05	-0.32	19.52
4,075.00	2.85	238.23	4,072.80	-25.55	-61.84	-17.97	0.34	-0.24	-4.68
4,100.00	2.66	243.01	4,097.77	-26.15	-62.89	-18.44	1.19	-0.76	19.12
4,125.00	2.45	246.81	4,122.74	-26.62	-63.90	-18.79	1.08	-0.84	15.20
4,150.00	2.39	247.71	4,147.72	-27.03	-64.87	-19.07	0.28	-0.24	3.60
4,175.00	2.39	247.45	4,172.70	-27.42	-65.83	-19.35	0.04	0.00	-1.04
4,200.00	2.39	248.10	4,197.68	-27.82	-66.80	-19.63	0.11	0.00	2.60
4,225.00	2.39	248.74	4,222.66	-28.20	-67.77	-19.89	0.11	0.00	2.56
4,250.00	2.44	250.05	4,247.63	-28.57	-68.75	-20.14	0.30	0.20	5.24
4,275.00	2.45	250.92	4,272.61	-28.93	-69.76	-20.38	0.15	0.04	3.48
4,300.00	2.50	251.48	4,297.59	-29.28	-70.78	-20.60	0.22	0.20	2.24
4,325.00	2.32	253.35	4,322.57	-29.60	-71.78	-20.80	0.79	-0.72	7.48
4,350.00	2.17	256.59	4,347.55	-29.85	-72.73	-20.94	0.79	-0.60	12.96
4,375.00	1.92	259.54	4,372.53	-30.04	-73.60	-21.02	1.08	-1.00	11.80
4,400.00	1.87	264.55	4,397.52	-30.15	-74.42	-21.03	0.69	-0.20	20.04
4,425.00	1.87	268.68	4,422.50	-30.20	-75.23	-20.98	0.54	0.00	16.52
4,450.00	1.87	269.29	4,447.49	-30.21	-76.05	-20.90	0.08	0.00	2.44
4,475.00	1.90	269.80	4,472.48	-30.22	-76.87	-20.81	0.14	0.12	2.04
4,500.00	1.94	269.18	4,497.46	-30.23	-77.71	-20.72	0.18	0.16	-2.48
4,525.00	2.01	265.32	4,522.45	-30.27	-78.57	-20.65	0.60	0.28	-15.44
4,550.00	2.18	261.67	4,547.43	-30.37	-79.47	-20.65	0.86	0.68	-14.60
4,575.00	2.38	259.34	4,572.41	-30.54	-80.46	-20.70	0.88	0.80	-9.32
4,600.00	2.53	260.29	4,597.39	-30.73	-81.51	-20.76	0.62	0.60	3.80
4,625.00	2.77	257.43	4,622.36	-30.95	-82.64	-20.85	1.10	0.96	-11.44

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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
4,650.00	3.02	256.38	4,647.33	-31.24	-83.87	-20.98	1.02	1.00	-4.20
4,675.00	3.34	257.81	4,672.29	-31.55	-85.22	-21.13	1.32	1.28	5.72
4,700.00	3.47	257.08	4,697.25	-31.87	-86.67	-21.28	0.55	0.52	-2.92
4,725.00	3.57	259.77	4,722.20	-32.18	-88.18	-21.40	0.77	0.40	10.76
4,750.00	3.60	259.28	4,747.15	-32.46	-89.71	-21.50	0.17	0.12	-1.96
4,775.00	3.66	259.28	4,772.10	-32.76	-91.27	-21.61	0.24	0.24	0.00
4,800.00	3.65	258.88	4,797.05	-33.06	-92.83	-21.72	0.11	-0.04	-1.60
4,825.00	3.65	258.95	4,822.00	-33.36	-94.40	-21.83	0.02	0.00	0.28
4,850.00	3.54	259.47	4,846.95	-33.66	-95.94	-21.94	0.46	-0.44	2.08
4,875.00	3.49	260.85	4,871.90	-33.92	-97.45	-22.02	0.39	-0.20	5.52
4,900.00	3.50	261.71	4,896.86	-34.15	-98.95	-22.07	0.21	0.04	3.44
4,925.00	3.60	260.25	4,921.81	-34.39	-100.48	-22.13	0.54	0.40	-5.84
4,950.00	3.43	261.82	4,946.76	-34.63	-102.00	-22.19	0.78	-0.68	6.28
4,975.00	3.40	259.82	4,971.72	-34.87	-103.46	-22.25	0.49	-0.12	-8.00
5,000.00	3.48	259.92	4,996.67	-35.13	-104.94	-22.33	0.32	0.32	0.40
5,025.00	3.21	262.81	5,021.63	-35.36	-106.38	-22.38	1.27	-1.08	11.56
5,050.00	3.17	265.68	5,046.59	-35.49	-107.77	-22.35	0.66	-0.16	11.48
5,075.00	3.09	262.66	5,071.55	-35.63	-109.12	-22.33	0.73	-0.32	-12.08
5,100.00	3.07	264.65	5,096.52	-35.78	-110.46	-22.31	0.44	-0.08	7.96
5,125.00	3.08	262.37	5,121.48	-35.93	-111.79	-22.30	0.49	0.04	-9.12
5,150.00	3.08	263.68	5,146.45	-36.10	-113.12	-22.31	0.28	0.00	5.24
5,175.00	3.21	264.61	5,171.41	-36.24	-114.49	-22.28	0.56	0.52	3.72
5,200.00	3.29	265.36	5,196.37	-36.36	-115.90	-22.24	0.36	0.32	3.00
5,225.00	3.53	265.35	5,221.32	-36.48	-117.38	-22.18	0.96	0.96	-0.04
5,250.00	3.91	266.95	5,246.27	-36.59	-119.00	-22.09	1.58	1.52	6.40
5,275.00	4.22	266.01	5,271.21	-36.70	-120.77	-21.99	1.27	1.24	-3.76
5,300.00	4.39	264.73	5,296.14	-36.85	-122.64	-21.92	0.78	0.68	-5.12
5,325.00	4.38	265.76	5,321.06	-37.01	-124.55	-21.85	0.32	-0.04	4.12
5,350.00	4.62	265.22	5,345.99	-37.16	-126.50	-21.77	0.97	0.96	-2.16
5,375.00	4.76	265.66	5,370.90	-37.32	-128.54	-21.68	0.58	0.56	1.76
5,400.00	4.84	265.36	5,395.82	-37.49	-130.62	-21.60	0.34	0.32	-1.20
5,425.00	4.95	266.62	5,420.72	-37.64	-132.75	-21.49	0.62	0.44	5.04
5,450.00	5.11	267.41	5,445.63	-37.75	-134.94	-21.34	0.70	0.64	3.16
5,475.00	5.22	268.88	5,470.53	-37.82	-137.19	-21.14	0.69	0.44	5.88
5,500.00	5.30	267.78	5,495.42	-37.89	-139.48	-20.94	0.51	0.32	-4.40
5,525.00	5.35	268.81	5,520.31	-37.96	-141.80	-20.73	0.43	0.20	4.12
5,550.00	5.64	268.66	5,545.20	-38.01	-144.19	-20.49	1.16	1.16	-0.60
5,575.00	5.73	270.15	5,570.08	-38.04	-146.67	-20.22	0.69	0.36	5.96
5,600.00	5.86	270.81	5,594.95	-38.02	-149.19	-19.90	0.58	0.52	2.64
5,625.00	5.98	271.80	5,619.81	-37.96	-151.77	-19.53	0.63	0.48	3.96
5,650.00	6.02	271.84	5,644.68	-37.87	-154.38	-19.14	0.16	0.16	0.16
5,675.00	6.12	272.30	5,669.54	-37.78	-157.02	-18.73	0.44	0.40	1.84
5,700.00	6.19	271.67	5,694.39	-37.69	-159.70	-18.31	0.39	0.28	-2.52

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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)
5,725.00	6.16	270.69	5,719.25	-37.63	-162.39	-17.94	0.44	-0.12	-3.92
5,750.00	6.14	270.68	5,744.10	-37.60	-165.07	-17.59	0.08	-0.08	-0.04
5,775.00	6.16	270.99	5,768.96	-37.56	-167.75	-17.23	0.16	0.08	1.24
5,800.00	6.22	269.09	5,793.81	-37.56	-170.44	-16.90	0.85	0.24	-7.60
5,825.00	6.26	263.95	5,818.67	-37.72	-173.15	-16.74	2.24	0.16	-20.56
5,850.00	6.35	258.88	5,843.52	-38.13	-175.86	-16.83	2.26	0.36	-20.28
5,875.00	6.32	255.78	5,868.36	-38.74	-178.56	-17.10	1.37	-0.12	-12.40
5,900.00	6.25	248.17	5,893.21	-39.58	-181.15	-17.63	3.34	-0.28	-30.44
5,925.00	6.69	236.06	5,918.05	-40.90	-183.62	-18.65	5.72	1.76	-48.44
5,950.00	6.77	234.51	5,942.88	-42.57	-186.03	-20.01	0.79	0.32	-6.20
5,975.00	6.85	234.25	5,967.71	-44.30	-188.44	-21.44	0.34	0.32	-1.04
6,000.00	6.78	233.77	5,992.53	-46.04	-190.84	-22.88	0.36	-0.28	-1.92
6,025.00	6.82	233.72	6,017.35	-47.79	-193.23	-24.34	0.16	0.16	-0.20
6,050.00	6.51	234.67	6,042.18	-49.49	-195.58	-25.74	1.32	-1.24	3.80
6,075.00	6.42	234.44	6,067.03	-51.12	-197.88	-27.09	0.37	-0.36	-0.92
6,100.00	6.37	234.06	6,091.87	-52.75	-200.14	-28.43	0.26	-0.20	-1.52
6,125.00	6.39	234.37	6,116.72	-54.37	-202.39	-29.77	0.16	0.08	1.24
6,150.00	6.33	234.46	6,141.56	-55.98	-204.64	-31.11	0.24	-0.24	0.36
6,175.00	6.23	234.51	6,166.41	-57.57	-206.87	-32.42	0.40	-0.40	0.20
6,200.00	6.27	233.84	6,191.26	-59.17	-209.07	-33.73	0.33	0.16	-2.68
6,225.00	6.22	233.41	6,216.11	-60.78	-211.26	-35.07	0.27	-0.20	-1.72
6,250.00	6.08	233.54	6,240.97	-62.37	-213.42	-36.40	0.56	-0.56	0.52
6,275.00	5.77	231.82	6,265.84	-63.94	-215.47	-37.71	1.43	-1.24	-6.88
6,300.00	5.40	230.79	6,290.72	-65.46	-217.37	-38.99	1.53	-1.48	-4.12
6,325.00	4.97	228.11	6,315.62	-66.92	-219.08	-40.24	1.97	-1.72	-10.72
6,350.00	4.81	227.76	6,340.52	-68.35	-220.67	-41.47	0.65	-0.64	-1.40
6,375.00	4.73	227.51	6,365.44	-69.75	-222.20	-42.67	0.33	-0.32	-1.00
6,400.00	4.75	226.60	6,390.35	-71.16	-223.72	-43.89	0.31	0.08	-3.64
6,425.00	4.70	227.30	6,415.27	-72.56	-225.22	-45.11	0.31	-0.20	2.80
6,450.00	4.65	227.22	6,440.18	-73.95	-226.72	-46.30	0.20	-0.20	-0.32
6,475.00	4.56	227.50	6,465.10	-75.31	-228.19	-47.47	0.37	-0.36	1.12
6,500.00	4.54	227.89	6,490.03	-76.64	-229.66	-48.62	0.15	-0.08	1.56
6,525.00	4.55	228.51	6,514.95	-77.96	-231.14	-49.76	0.20	0.04	2.48
6,550.00	4.52	227.79	6,539.87	-79.28	-232.61	-50.89	0.26	-0.12	-2.88
6,575.00	4.45	227.77	6,564.79	-80.59	-234.06	-52.02	0.28	-0.28	-0.08
6,600.00	4.33	227.48	6,589.72	-81.88	-235.47	-53.13	0.49	-0.48	-1.16
6,625.00	4.33	227.50	6,614.65	-83.16	-236.86	-54.23	0.01	0.00	0.08
6,650.00	4.34	227.02	6,639.58	-84.44	-238.25	-55.34	0.15	0.04	-1.92
6,675.00	4.29	226.11	6,664.50	-85.74	-239.62	-56.46	0.34	-0.20	-3.64
6,700.00	4.24	225.93	6,689.44	-87.03	-240.95	-57.58	0.21	-0.20	-0.72
6,725.00	4.23	225.23	6,714.37	-88.32	-242.27	-58.71	0.21	-0.04	-2.80
6,750.00	4.25	224.88	6,739.30	-89.62	-243.58	-59.85	0.13	0.08	-1.40
6,775.00	4.19	225.16	6,764.23	-90.92	-244.88	-60.98	0.25	-0.24	1.12
6,800.00	4.11	226.74	6,789.17	-92.18	-246.18	-62.08	0.56	-0.32	6.32

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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)
6,825.00	4.21	224.62	6,814.10	-93.45	-247.48	-63.18	0.73	0.40	-8.48
6,850.00	4.12	225.04	6,839.03	-94.74	-248.76	-64.30	0.38	-0.36	1.68
6,875.00	4.04	225.27	6,863.97	-95.99	-250.02	-65.40	0.33	-0.32	0.92
6,900.00	3.96	226.29	6,888.91	-97.21	-251.27	-66.46	0.43	-0.32	4.08
6,925.00	4.02	226.29	6,913.85	-98.41	-252.53	-67.50	0.24	0.24	0.00
6,950.00	4.00	225.46	6,938.79	-99.63	-253.78	-68.56	0.25	-0.08	-3.32
6,975.00	4.05	226.46	6,963.73	-100.85	-255.04	-69.62	0.34	0.20	4.00
7,000.00	4.02	228.47	6,988.66	-102.04	-256.34	-70.64	0.58	-0.12	8.04
7,025.00	4.16	232.01	7,013.60	-103.18	-257.71	-71.61	1.15	0.56	14.16
7,050.00	4.28	238.28	7,038.53	-104.22	-259.22	-72.47	1.91	0.48	25.08
7,075.00	4.39	239.91	7,063.46	-105.19	-260.84	-73.24	0.66	0.44	6.52
7,100.00	4.42	239.79	7,088.39	-106.16	-262.50	-74.00	0.13	0.12	-0.48
7,125.00	4.34	240.72	7,113.31	-107.11	-264.16	-74.74	0.43	-0.32	3.72
7,150.00	4.33	240.68	7,138.24	-108.03	-265.81	-75.46	0.04	-0.04	-0.16
7,175.00	4.32	241.34	7,163.17	-108.94	-267.45	-76.17	0.20	-0.04	2.64
7,200.00	4.28	241.07	7,188.10	-109.85	-269.10	-76.87	0.18	-0.16	-1.08
7,225.00	4.24	240.82	7,213.03	-110.75	-270.72	-77.57	0.18	-0.16	-1.00
7,250.00	4.13	241.19	7,237.97	-111.63	-272.32	-78.26	0.45	-0.44	1.48
7,275.00	4.10	241.61	7,262.90	-112.49	-273.89	-78.93	0.17	-0.12	1.68
7,300.00	4.08	239.77	7,287.84	-113.37	-275.45	-79.61	0.53	-0.08	-7.36
7,325.00	4.11	240.93	7,312.77	-114.25	-277.00	-80.30	0.35	0.12	4.64
7,350.00	4.10	241.17	7,337.71	-115.11	-278.56	-80.97	0.08	-0.04	0.96
7,375.00	4.14	240.49	7,362.64	-115.99	-280.13	-81.65	0.25	0.16	-2.72
7,400.00	4.24	240.72	7,387.58	-116.89	-281.72	-82.35	0.41	0.40	0.92
7,425.00	4.70	240.18	7,412.50	-117.85	-283.42	-83.10	1.85	1.84	-2.16
7,450.00	5.16	240.84	7,437.41	-118.91	-285.29	-83.93	1.85	1.84	2.64
7,475.00	5.42	239.88	7,462.30	-120.05	-287.29	-84.82	1.10	1.04	-3.84
7,500.00	5.36	239.97	7,487.19	-121.22	-289.32	-85.75	0.24	-0.24	0.36
7,525.00	5.41	240.13	7,512.08	-122.39	-291.36	-86.67	0.21	0.20	0.64
7,550.00	5.42	240.50	7,536.97	-123.56	-293.41	-87.58	0.15	0.04	1.48
7,575.00	5.30	240.24	7,561.86	-124.72	-295.44	-88.49	0.49	-0.48	-1.04
7,600.00	5.26	240.35	7,586.76	-125.86	-297.43	-89.38	0.17	-0.16	0.44
7,625.00	5.28	240.96	7,611.65	-126.98	-299.44	-90.26	0.24	0.08	2.44
7,650.00	5.27	240.50	7,636.54	-128.11	-301.44	-91.13	0.17	-0.04	-1.84
7,675.00	5.18	241.13	7,661.44	-129.22	-303.43	-92.00	0.43	-0.36	2.52
7,700.00	5.18	240.73	7,686.34	-130.31	-305.40	-92.85	0.14	0.00	-1.60
7,725.00	5.12	240.96	7,711.24	-131.41	-307.36	-93.70	0.25	-0.24	0.92
7,750.00	4.98	241.10	7,736.14	-132.47	-309.29	-94.53	0.56	-0.56	0.56
7,775.00	4.92	241.78	7,761.05	-133.50	-311.18	-95.33	0.34	-0.24	2.72
7,800.00	4.97	241.33	7,785.95	-134.53	-313.08	-96.12	0.25	0.20	-1.80
7,825.00	4.94	241.81	7,810.86	-135.56	-314.97	-96.91	0.20	-0.12	1.92
7,850.00	4.88	240.77	7,835.77	-136.59	-316.85	-97.71	0.43	-0.24	-4.16
7,875.00	4.79	241.42	7,860.68	-137.60	-318.70	-98.50	0.42	-0.36	2.60

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 33, T 20 S., R 34 E
Well: Little Bear Federal Com #8H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com #8H
TVD Reference: KB=26' @ 3830.50usft (Scandrift Freedom)
MD Reference: KB=26' @ 3830.50usft (Scandrift Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
7,900.00	4.78	241.86	7,885.59	-138.59	-320.53	-99.26	0.15	-0.04	1.76
7,925.00	4.72	241.44	7,910.51	-139.58	-322.35	-100.02	0.28	-0.24	-1.68
7,950.00	4.61	241.46	7,935.42	-140.55	-324.14	-100.77	0.44	-0.44	0.08
7,975.00	4.59	242.05	7,960.34	-141.50	-325.90	-101.50	0.21	-0.08	2.36
8,000.00	4.58	241.89	7,985.26	-142.44	-327.67	-102.22	0.06	-0.04	-0.64
8,025.00	4.53	242.73	8,010.18	-143.36	-329.43	-102.93	0.33	-0.20	3.36
8,050.00	4.50	241.12	8,035.11	-144.29	-331.16	-103.64	0.52	-0.12	-6.44
8,075.00	4.44	241.97	8,060.03	-145.21	-332.88	-104.36	0.36	-0.24	3.40
8,100.00	4.46	240.88	8,084.95	-146.14	-334.58	-105.08	0.35	0.08	-4.36
8,125.00	4.43	240.76	8,109.88	-147.09	-336.27	-105.81	0.13	-0.12	-0.48
8,150.00	4.32	241.56	8,134.81	-148.01	-337.94	-106.52	0.50	-0.44	3.20
8,175.00	4.32	240.98	8,159.74	-148.91	-339.59	-107.23	0.17	0.00	-2.32
8,200.00	4.37	240.83	8,184.66	-149.83	-341.25	-107.94	0.21	0.20	-0.60
8,225.00	4.38	241.30	8,209.59	-150.76	-342.92	-108.66	0.15	0.04	1.88
8,250.00	4.29	241.13	8,234.52	-151.67	-344.57	-109.36	0.36	-0.36	-0.68
8,275.00	4.27	242.60	8,259.45	-152.55	-346.22	-110.04	0.45	-0.08	5.88
8,300.00	4.24	244.01	8,284.38	-153.38	-347.88	-110.67	0.44	-0.12	5.64
8,325.00	4.08	243.67	8,309.32	-154.18	-349.50	-111.27	0.65	-0.64	-1.36
8,350.00	4.12	244.86	8,334.25	-154.95	-351.11	-111.85	0.38	0.16	4.76
8,375.00	4.04	245.43	8,359.19	-155.70	-352.73	-112.40	0.36	-0.32	2.28
8,400.00	4.01	245.95	8,384.13	-156.42	-354.33	-112.92	0.19	-0.12	2.08
8,425.00	3.94	245.80	8,409.07	-157.13	-355.91	-113.44	0.28	-0.28	-0.60
8,450.00	3.97	246.18	8,434.01	-157.83	-357.48	-113.94	0.16	0.12	1.52
8,475.00	3.91	246.45	8,458.95	-158.52	-359.06	-114.44	0.25	-0.24	1.08
8,500.00	3.92	245.16	8,483.89	-159.22	-360.61	-114.95	0.35	0.04	-5.16
8,525.00	3.79	243.42	8,508.83	-159.95	-362.13	-115.49	0.70	-0.52	-6.96
8,550.00	3.78	243.13	8,533.78	-160.69	-363.60	-116.05	0.09	-0.04	-1.16
8,575.00	3.80	243.38	8,558.72	-161.44	-365.08	-116.61	0.10	0.08	1.00
8,600.00	3.78	240.97	8,583.67	-162.21	-366.54	-117.20	0.64	-0.08	-9.64
8,625.00	3.69	242.91	8,608.62	-162.98	-367.98	-117.79	0.62	-0.36	7.76
8,650.00	3.77	241.11	8,633.56	-163.74	-369.41	-118.38	0.57	0.32	-7.20
8,675.00	3.74	238.41	8,658.51	-164.56	-370.83	-119.03	0.72	-0.12	-10.80
8,700.00	3.60	237.23	8,683.46	-165.42	-372.18	-119.71	0.64	-0.56	-4.72
8,725.00	3.61	236.30	8,708.41	-166.28	-373.49	-120.41	0.24	0.04	-3.72
8,750.00	3.54	236.61	8,733.36	-167.14	-374.79	-121.11	0.29	-0.28	1.24
8,775.00	3.59	237.48	8,758.31	-167.98	-376.10	-121.79	0.29	0.20	3.48
8,800.00	3.68	236.10	8,783.26	-168.85	-377.42	-122.50	0.50	0.36	-5.52
8,825.00	3.56	236.68	8,808.21	-169.73	-378.74	-123.21	0.50	-0.48	2.32
8,850.00	3.36	238.57	8,833.17	-170.53	-380.01	-123.86	0.92	-0.80	7.56
8,875.00	3.03	241.08	8,858.13	-171.24	-381.22	-124.41	1.43	-1.32	10.04
8,900.00	2.95	244.59	8,883.09	-171.83	-382.38	-124.86	0.80	-0.32	14.04
8,925.00	2.82	245.44	8,908.06	-172.36	-383.52	-125.25	0.55	-0.52	3.40
8,950.00	2.77	251.04	8,933.03	-172.81	-384.65	-125.57	1.11	-0.20	22.40

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 33, T 20 S., R 34 E
Well: Little Bear Federal Com #8H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com #8H
TVD Reference: KB=26' @ 3830.50usft (Scandrift Freedom)
MD Reference: KB=26' @ 3830.50usft (Scandrift Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
8,975.00	2.79	249.41	8,958.00	-173.22	-385.79	-125.84	0.33	0.08	-6.52
9,000.00	2.78	251.93	8,982.97	-173.63	-386.93	-126.10	0.49	-0.04	10.08
9,025.00	2.68	249.56	9,007.94	-174.02	-388.06	-126.36	0.60	-0.40	-9.48
9,050.00	2.54	251.54	9,032.92	-174.40	-389.13	-126.60	0.67	-0.56	7.92
9,075.00	2.44	253.37	9,057.89	-174.73	-390.17	-126.81	0.51	-0.40	7.32
9,100.00	2.45	252.36	9,082.87	-175.04	-391.18	-127.00	0.18	0.04	-4.04
9,125.00	2.47	253.82	9,107.85	-175.35	-392.21	-127.18	0.26	0.08	5.84
9,150.00	2.52	253.37	9,132.82	-175.66	-393.26	-127.36	0.21	0.20	-1.80
9,175.00	2.75	259.52	9,157.80	-175.93	-394.37	-127.49	1.46	0.92	24.60
9,200.00	2.76	260.71	9,182.77	-176.13	-395.56	-127.56	0.23	0.04	4.76
9,225.00	2.73	259.74	9,207.74	-176.34	-396.74	-127.62	0.22	-0.12	-3.88
9,250.00	3.19	255.66	9,232.71	-176.61	-397.99	-127.74	2.02	1.84	-16.32
9,275.00	3.71	248.53	9,257.66	-177.08	-399.42	-128.04	2.69	2.08	-28.52
9,300.00	3.76	247.97	9,282.61	-177.69	-400.93	-128.46	0.25	0.20	-2.24
9,325.00	3.82	247.64	9,307.55	-178.31	-402.46	-128.89	0.26	0.24	-1.32
9,350.00	3.80	249.86	9,332.50	-178.91	-404.01	-129.31	0.60	-0.08	8.88
9,375.00	3.57	247.35	9,357.45	-179.50	-405.51	-129.71	1.12	-0.92	-10.04
9,400.00	3.43	248.54	9,382.40	-180.07	-406.92	-130.11	0.63	-0.56	4.76
9,425.00	3.22	251.10	9,407.36	-180.57	-408.28	-130.44	1.03	-0.84	10.24
9,450.00	3.13	251.36	9,432.32	-181.02	-409.59	-130.73	0.36	-0.36	1.04
9,475.00	3.01	250.21	9,457.28	-181.46	-410.86	-131.01	0.54	-0.48	-4.60
9,500.00	3.00	249.95	9,482.25	-181.90	-412.09	-131.31	0.07	-0.04	-1.04
9,525.00	3.09	248.66	9,507.21	-182.37	-413.33	-131.63	0.45	0.36	-5.16
9,550.00	3.19	246.47	9,532.18	-182.90	-414.60	-132.00	0.62	0.40	-8.76
9,575.00	3.42	243.56	9,557.14	-183.51	-415.90	-132.44	1.14	0.92	-11.64
9,600.00	3.63	242.12	9,582.09	-184.21	-417.27	-132.98	0.91	0.84	-5.76
9,625.00	3.58	241.94	9,607.04	-184.95	-418.66	-133.54	0.21	-0.20	-0.72
9,650.00	3.62	241.83	9,631.99	-185.69	-420.04	-134.11	0.16	0.16	-0.44
9,675.00	3.71	241.86	9,656.94	-186.44	-421.45	-134.69	0.36	0.36	0.12
9,700.00	3.75	241.34	9,681.89	-187.21	-422.88	-135.29	0.21	0.16	-2.08
9,725.00	4.46	244.79	9,706.82	-188.02	-424.48	-135.90	3.01	2.84	13.80
9,750.00	5.12	246.94	9,731.73	-188.87	-426.39	-136.52	2.74	2.64	8.60
9,775.00	5.24	246.58	9,756.63	-189.76	-428.46	-137.15	0.50	0.48	-1.44
9,800.00	5.34	247.37	9,781.53	-190.66	-430.58	-137.79	0.49	0.40	3.16
9,825.00	5.14	246.90	9,806.42	-191.55	-432.68	-138.42	0.82	-0.80	-1.88
9,850.00	5.00	246.24	9,831.32	-192.43	-434.71	-139.05	0.61	-0.56	-2.64
9,875.00	4.97	246.68	9,856.23	-193.30	-436.70	-139.68	0.19	-0.12	1.76
9,900.00	4.93	246.38	9,881.14	-194.15	-438.68	-140.29	0.19	-0.16	-1.20
9,925.00	4.85	246.21	9,906.04	-195.01	-440.63	-140.91	0.33	-0.32	-0.68
9,950.00	4.80	245.70	9,930.96	-195.87	-442.55	-141.53	0.26	-0.20	-2.04
9,975.00	4.65	244.98	9,955.87	-196.73	-444.43	-142.16	0.65	-0.60	-2.88
10,000.00	4.63	243.75	9,980.79	-197.60	-446.25	-142.81	0.41	-0.08	-4.92
10,025.00	4.66	244.82	10,005.71	-198.48	-448.07	-143.46	0.37	0.12	4.28
10,050.00	4.59	245.32	10,030.63	-199.33	-449.90	-144.09	0.32	-0.28	2.00

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 33, T 20 S., R 34 E
Well: Little Bear Federal Com #8H
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Local Co-ordinate Reference: Well Little Bear Federal Com #8H
TVD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
MD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
10,075.00	4.54	245.43	10,055.55	-200.16	-451.71	-144.70	0.20	-0.20	0.44
10,100.00	4.43	245.66	10,080.47	-200.97	-453.49	-145.29	0.45	-0.44	0.92
10,125.00	4.46	244.49	10,105.39	-201.78	-455.25	-145.89	0.38	0.12	-4.68
10,150.00	4.27	245.78	10,130.32	-202.59	-456.97	-146.47	0.86	-0.76	5.16
10,175.00	4.16	245.18	10,155.25	-203.35	-458.64	-147.03	0.47	-0.44	-2.40
10,200.00	4.07	244.23	10,180.19	-204.11	-460.27	-147.60	0.45	-0.36	-3.80
10,225.00	3.91	244.04	10,205.13	-204.87	-461.83	-148.16	0.64	-0.64	-0.76
10,250.00	3.84	243.35	10,230.07	-205.62	-463.35	-148.73	0.34	-0.28	-2.76
10,275.00	3.81	242.64	10,255.02	-206.38	-464.83	-149.30	0.22	-0.12	-2.84
10,300.00	3.77	241.72	10,279.96	-207.15	-466.29	-149.89	0.29	-0.16	-3.68
10,325.00	3.67	240.66	10,304.91	-207.93	-467.71	-150.50	0.49	-0.40	-4.24
10,350.00	3.57	240.76	10,329.86	-208.70	-469.09	-151.10	0.40	-0.40	0.40
10,375.00	3.44	240.67	10,354.81	-209.45	-470.42	-151.68	0.52	-0.52	-0.36
10,400.00	3.45	240.97	10,379.77	-210.18	-471.74	-152.25	0.08	0.04	1.20
10,425.00	3.44	241.23	10,404.72	-210.91	-473.05	-152.82	0.07	-0.04	1.04
10,450.00	3.41	241.86	10,429.68	-211.62	-474.36	-153.37	0.19	-0.12	2.52
10,475.00	3.41	242.16	10,454.63	-212.32	-475.68	-153.90	0.07	0.00	1.20
10,500.00	3.40	243.59	10,479.59	-213.00	-477.00	-154.42	0.34	-0.04	5.72
10,525.00	3.54	244.54	10,504.54	-213.66	-478.36	-154.91	0.61	0.56	3.80
10,550.00	3.40	247.98	10,529.50	-214.27	-479.74	-155.35	1.00	-0.56	13.76
10,575.00	3.24	245.89	10,554.45	-214.83	-481.08	-155.75	0.80	-0.64	-8.36
10,600.00	3.27	246.68	10,579.41	-215.40	-482.37	-156.16	0.22	0.12	3.16
10,625.00	3.31	245.54	10,604.37	-215.99	-483.69	-156.58	0.31	0.16	-4.56
10,650.00	3.46	245.62	10,629.33	-216.60	-485.03	-157.03	0.60	0.60	0.32
10,675.00	3.83	244.18	10,654.28	-217.27	-486.47	-157.53	1.52	1.48	-5.76
10,700.00	4.48	241.76	10,679.21	-218.10	-488.08	-158.15	2.69	2.60	-9.68
10,725.00	4.92	241.08	10,704.13	-219.08	-489.88	-158.91	1.77	1.76	-2.72
10,750.00	5.15	240.60	10,729.03	-220.15	-491.80	-159.74	0.94	0.92	-1.92
10,775.00	5.34	239.68	10,753.93	-221.28	-493.78	-160.64	0.83	0.76	-3.68
10,800.00	5.06	239.43	10,778.83	-222.43	-495.73	-161.54	1.12	-1.12	-1.00
10,825.00	5.23	236.00	10,803.72	-223.63	-497.62	-162.51	1.41	0.68	-13.72
10,845.00	5.32	236.28	10,823.64	-224.65	-499.15	-163.34	0.47	0.45	1.40
11,002.00	4.47	230.51	10,980.07	-232.59	-509.93	-169.93	0.63	-0.54	-3.68
First MWD Survey @ 11002'MD									
11,065.00	4.51	230.05	11,042.87	-235.74	-513.72	-172.60	0.09	0.06	-0.73
11,096.00	5.18	244.47	11,073.76	-237.12	-515.92	-173.71	4.47	2.16	46.52
11,128.00	7.01	258.01	11,105.58	-238.15	-519.13	-174.35	7.23	5.72	42.31
11,148.00	8.17	265.59	11,125.41	-238.51	-521.74	-174.40	7.65	5.80	37.90
11,189.00	11.02	273.56	11,165.83	-238.50	-528.56	-173.56	7.65	6.95	19.44
11,221.00	17.98	274.48	11,196.79	-237.92	-536.55	-172.04	21.76	21.75	2.88
11,252.00	26.76	279.10	11,225.43	-236.44	-548.23	-169.17	28.86	28.32	14.90
11,284.00	34.71	287.32	11,252.93	-232.58	-564.07	-163.44	28.05	24.84	25.69
11,315.00	35.78	300.75	11,278.29	-225.31	-580.31	-154.28	25.20	3.45	43.32

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 33, T 20 S., R 34 E
Well: Little Bear Federal Com #8H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com #8H
TVD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
MD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Buid Rate (°/100usft)	Turn Rate (°/100usft)
11,346.00	35.44	317.55	11,303.55	-214.01	-594.20	-141.41	31.50	-1.10	54.19
11,378.00	39.72	330.76	11,328.95	-198.21	-605.48	-124.37	28.45	13.38	41.28
11,409.00	44.48	335.89	11,351.95	-179.64	-614.77	-104.82	18.93	15.35	16.55
11,441.00	47.97	336.92	11,374.08	-158.47	-624.01	-82.70	11.15	10.91	3.22
11,472.00	50.75	338.67	11,394.27	-136.69	-632.89	-60.01	9.94	8.97	5.65
11,503.00	52.88	341.16	11,413.44	-113.81	-641.25	-36.29	9.33	6.87	8.03
11,535.00	55.46	343.34	11,432.17	-89.10	-649.15	-10.82	9.77	8.06	6.81
11,545.00	56.20	343.86	11,437.79	-81.16	-651.48	-2.66	8.56	7.40	5.20
11,566.00	58.53	343.63	11,449.11	-64.19	-656.43	14.79	11.13	11.10	-1.10
11,597.00	64.68	342.04	11,463.85	-38.15	-664.49	41.60	20.34	19.84	-5.13
11,629.00	71.84	340.86	11,475.69	-9.99	-673.94	70.69	22.64	22.38	-3.69
11,661.00	74.91	341.12	11,484.85	19.00	-683.93	100.66	9.63	9.59	0.81
11,692.00	76.47	340.50	11,492.51	47.36	-693.80	130.01	5.39	5.03	-2.00
11,723.00	77.07	340.15	11,499.60	75.78	-703.96	159.43	2.23	1.94	-1.13
11,755.00	77.30	339.71	11,506.70	105.09	-714.67	189.81	1.52	0.72	-1.38
11,786.00	77.79	340.26	11,513.39	133.53	-725.03	219.29	2.35	1.58	1.77
11,850.00	81.89	342.95	11,524.67	193.29	-744.90	281.00	7.63	6.41	4.20
11,881.00	83.30	344.24	11,528.67	222.78	-753.58	311.31	6.14	4.55	4.16
11,944.00	87.41	345.81	11,533.77	283.43	-769.80	373.46	6.98	6.52	2.49
11,976.00	89.85	346.41	11,534.54	314.48	-777.48	405.21	7.85	7.63	1.88
12,071.00	90.15	348.48	11,534.54	407.20	-798.13	499.74	2.20	0.32	2.18
12,165.00	91.75	354.83	11,532.98	500.14	-811.76	593.64	6.97	1.70	6.76
12,197.00	92.42	356.03	11,531.81	532.02	-814.31	625.60	4.29	2.09	3.75
12,260.00	91.36	356.70	11,529.73	594.86	-818.30	688.46	1.99	-1.68	1.06
12,355.00	90.15	356.57	11,528.48	689.68	-823.88	783.27	1.28	-1.27	-0.14
12,450.00	91.69	358.27	11,526.96	784.57	-828.15	877.99	2.41	1.62	1.79
12,545.00	90.15	355.88	11,525.43	879.42	-833.00	972.74	2.99	-1.62	-2.52
12,639.00	93.46	358.39	11,522.47	973.24	-837.70	1,066.45	4.42	3.52	2.67
12,734.00	91.50	356.51	11,518.36	1,068.05	-841.92	1,161.08	2.86	-2.06	-1.98
12,829.00	91.27	357.14	11,516.06	1,162.87	-847.18	1,255.85	0.71	-0.24	0.66
12,923.00	91.67	357.80	11,513.65	1,256.75	-851.33	1,349.55	0.82	0.43	0.70
13,018.00	92.82	0.17	11,509.93	1,351.65	-853.01	1,443.98	2.77	1.21	2.49
13,112.00	93.41	0.46	11,504.82	1,445.51	-852.49	1,537.10	0.70	0.63	0.31
13,207.00	93.29	1.14	11,499.27	1,540.34	-851.17	1,631.09	0.73	-0.13	0.72
13,302.00	93.91	1.68	11,493.31	1,635.12	-848.84	1,724.91	0.86	0.65	0.57
13,397.00	91.30	359.07	11,488.99	1,730.01	-848.22	1,819.04	3.88	-2.75	-2.75
13,491.00	91.78	0.51	11,486.46	1,823.97	-848.56	1,912.37	1.61	0.51	1.53
13,586.00	91.58	359.61	11,483.68	1,918.93	-848.46	2,006.63	0.97	-0.21	-0.95
13,682.00	92.48	359.08	11,480.28	2,014.86	-849.56	2,102.01	1.09	0.94	-0.55
13,777.00	90.99	356.94	11,477.40	2,109.75	-852.86	2,196.61	2.74	-1.57	-2.25
13,872.00	93.41	2.69	11,473.75	2,204.63	-853.17	2,290.85	6.56	2.55	6.05
13,967.00	93.80	5.35	11,467.77	2,299.20	-846.52	2,383.95	2.82	0.41	2.80
14,061.00	91.41	1.92	11,463.50	2,392.90	-840.57	2,476.26	4.44	-2.54	-3.65

Company: COG Operating L L C
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Wellbore: Wellbore #1
Design: Wellbore #1

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TVD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
MD Reference: KB=26' @ 3830.50usft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
14,155.00	89.37	358.39	11,462.86	2,486.87	-840.32	2,569.53	4.34	-2.17	-3.76
14,250.00	88.84	358.07	11,464.35	2,581.82	-843.25	2,664.14	0.65	-0.56	-0.34
14,345.00	90.46	0.55	11,464.93	2,676.80	-844.40	2,758.58	3.12	1.71	2.61
14,440.00	88.89	359.20	11,465.46	2,771.79	-844.60	2,852.91	2.18	-1.65	-1.42
14,534.00	90.97	1.45	11,465.58	2,865.78	-844.07	2,946.16	3.26	2.21	2.39
14,629.00	91.67	1.09	11,463.39	2,960.73	-841.97	3,040.18	0.83	0.74	-0.38
14,725.00	92.40	0.67	11,459.98	3,056.66	-840.49	3,135.24	0.88	0.76	-0.44
14,820.00	92.11	0.36	11,456.24	3,151.58	-839.64	3,229.38	0.45	-0.31	-0.33
14,915.00	91.33	358.19	11,453.39	3,246.52	-840.84	3,323.79	2.43	-0.82	-2.28
15,010.00	91.36	356.59	11,451.16	3,341.39	-845.17	3,418.49	1.68	0.03	-1.68
15,105.00	90.13	356.80	11,449.93	3,436.23	-850.64	3,513.30	1.31	-1.29	0.22
15,201.00	89.31	355.95	11,450.40	3,532.03	-856.71	3,609.14	1.23	-0.85	-0.89
15,296.00	88.98	356.70	11,451.81	3,626.82	-862.80	3,703.98	0.86	-0.35	0.79
15,391.00	89.48	357.31	11,453.09	3,721.68	-867.76	3,798.76	0.83	0.53	0.64
15,490.00	92.96	359.34	11,450.98	3,820.60	-870.66	3,897.31	4.07	3.52	2.05
15,586.00	90.74	358.89	11,447.88	3,916.53	-872.14	3,992.73	2.36	-2.31	-0.47
15,681.00	92.37	0.55	11,445.31	4,011.49	-872.60	4,087.06	2.45	1.72	1.75
15,775.00	92.82	1.22	11,441.05	4,105.38	-871.15	4,180.11	0.86	0.48	0.71
15,871.00	91.30	0.30	11,437.60	4,201.31	-869.88	4,275.19	1.85	-1.58	-0.96
15,966.00	92.17	0.49	11,434.72	4,296.26	-869.23	4,369.38	0.94	0.92	0.20
16,061.00	92.45	0.80	11,430.89	4,391.18	-868.16	4,463.49	0.44	0.29	0.33
16,157.00	91.64	0.75	11,427.47	4,487.11	-866.86	4,558.58	0.85	-0.84	-0.05
16,252.00	90.43	0.34	11,425.75	4,582.08	-865.96	4,652.76	1.34	-1.27	-0.43
16,347.00	90.24	0.50	11,425.20	4,677.08	-865.26	4,747.00	0.26	-0.20	0.17
16,442.00	91.27	0.68	11,423.94	4,772.07	-864.28	4,841.18	1.10	1.08	0.19
16,537.00	90.43	0.28	11,422.54	4,867.05	-863.49	4,935.39	0.98	-0.88	-0.42
16,632.00	90.18	359.96	11,422.03	4,962.05	-863.29	5,029.68	0.43	-0.26	-0.34
16,727.00	91.55	0.46	11,420.60	5,057.03	-862.94	5,123.94	1.54	1.44	0.53
16,823.00	91.08	1.25	11,418.39	5,153.00	-861.51	5,219.05	0.96	-0.49	0.82
16,918.00	91.22	0.66	11,416.49	5,247.96	-859.92	5,313.14	0.64	0.15	-0.62
17,013.00	88.64	359.73	11,416.60	5,342.96	-859.60	5,407.41	2.89	-2.72	-0.98
17,108.00	88.64	359.50	11,418.86	5,437.93	-860.24	5,501.78	0.24	0.00	-0.24
17,203.00	88.67	357.30	11,421.09	5,532.86	-862.89	5,596.35	2.32	0.03	-2.32
17,298.00	88.92	358.60	11,423.08	5,627.77	-866.29	5,690.99	1.39	0.26	1.37
17,393.00	89.65	359.42	11,424.27	5,722.75	-867.93	5,785.48	1.16	0.77	0.86
17,487.00	89.09	359.54	11,425.30	5,816.74	-868.78	5,878.90	0.61	-0.60	0.13
17,582.00	89.99	0.81	11,426.07	5,911.73	-868.49	5,973.17	1.64	0.95	1.34
17,676.00	89.87	0.37	11,426.18	6,005.73	-867.52	6,066.38	0.49	-0.13	-0.47
17,771.00	89.65	0.75	11,426.58	6,100.72	-866.60	6,160.58	0.46	-0.23	0.40
17,866.00	90.10	0.92	11,426.79	6,195.71	-865.21	6,254.72	0.51	0.47	0.18
17,961.00	89.20	0.46	11,427.37	6,290.70	-864.07	6,348.89	1.06	-0.95	-0.48
18,056.00	89.90	1.46	11,428.11	6,385.68	-862.48	6,443.00	1.28	0.74	1.05
18,151.00	89.23	0.95	11,428.83	6,480.66	-860.48	6,537.06	0.89	-0.71	-0.54
18,246.00	90.24	1.80	11,429.27	6,575.63	-858.20	6,631.07	1.39	1.06	0.89

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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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)
18,340.00	89.31	1.49	11,429.64	6,669.59	-855.50	6,724.03	1.04	-0.99	-0.33
18,436.00	89.15	0.64	11,430.93	6,765.56	-853.72	6,819.11	0.90	-0.17	-0.89
18,530.00	89.40	0.14	11,432.12	6,859.55	-853.08	6,912.34	0.59	0.27	-0.53
18,565.47	89.05	0.02	11,432.60	6,895.02	-853.03	6,947.55	1.04	-0.98	-0.34
North 330' Hardline Crossing @ 18565.47'MD									
18,625.00	88.47	359.82	11,433.89	6,954.53	-853.11	7,006.65	1.04	-0.98	-0.34
18,633.00	88.39	359.50	11,434.11	6,962.53	-853.16	7,014.59	4.12	-1.00	-4.00
Final MWD Survey @ 18633'MD									
18,693.00	88.39	359.50	11,435.79	7,022.51	-853.68	7,074.20	0.00	0.00	0.00
Projection to TD @ 18693'MD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,002.00	10,980.07	-232.59	-509.93	First MWD Survey @ 11002'MD
18,565.47	11,432.60	6,895.02	-853.03	North 330' Hardline Crossing @ 18565.47'MD
18,633.00	11,434.11	6,962.53	-853.16	Final MWD Survey @ 18633'MD
18,693.00	11,435.79	7,022.51	-853.68	Projection to TD @ 18693'MD

Checked By: _____ Approved By: _____ Date: _____

Little Bear Federal Com #8H

<u>Perfs</u>	<u>7 1/2% Acid (Gal)</u>	<u>Sand (#)</u>	<u>Fluid (Gal)</u>
1	1512	399482	427560
2	1512	399713	354564
3	1512	400040	335370
4	1512	399341	390600
5	1596	400005	333396
6	1512	400322	332052
7	2604	402138	373842
8	1512	401010	324828
9	1512	402030	338100
10	1512	399680	324408
11	1512	400261	379092
12	1512	401527	352884
13	1512	402364	335874
14	1512	401486	343056
15	1512	400989	321258
16	1512	403861	318276
17	1512	400904	340242
18	1554	398899	325458
19	1512	402541	335496
20	1974	400223	334362
21	1512	400439	321720
22	1512	400507	319620
23	1512	402502	326760
24	1512	400009	321846
25	1512	403820	319116
26	1512	402082	311682
27	1512	401301	313236
28	1512	400096	347760
29	1512	400953	321552
30	1512	399384	317898
31	1512	401725	322938
32	1512	400095	323190
33	1512	402896	321720
34	1554	400477	324114
35	1512	399278	332934
Totals	54,642	14,032,380	11,766,804

HOBBS OCD
AUG 15 2019
RECEIVED

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots
	18,478	7	5	18,304	36	5	18,116	30	5	17,917	33	5	17,725	28	5
	18,471	22	5	18,280	22	5	18,096	22	5	17,901	26	5	17,703	24	5
	18,449	21	4	18,268	23	4	18,074	27	4	17,875	25	4	17,679	25	4
	18,428	22	4	18,245	26	4	18,047	27	4	17,850	24	4	17,654	24	4
	18,406	21	3	18,219	28	3	18,020		3	17,826	24	3	17,630	22	3
	18,385	22	3	18,191	21	3	17,998	24	3	17,802	24	3	17,608	27	3
	18,363	23	3	18,170	24	3	17,974	24	3	17,778	25	3	17,581	16	3
	18,340		3	18,146		3	17,950		3	17,753		3	17,565		3
	Plug to Plug	52	30	Plug to Plug	69	30	Plug to Plug	79	30	Plug to Plug	77	30	Plug to Plug	82	30
	Frac Plug	18,480	Total Shots	Frac Plug	18,314	Total Shots	Frac Plug	18,126	Total Shots	Frac Plug	17,927	Total Shots	Frac Plug	17,736	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	41	5	17,322	38	5	17,125	41	5	16,934	36	5	16,732	38	5
	17,507	25	5	17,311	25	5	17,110	23	5	16,916	23	5	16,717	21	5
	17,482	24	4	17,286	27	4	17,087	22	4	16,893	25	4	16,696	22	4
	17,458	20	4	17,259	22	4	17,065	25	4	16,868	24	4	16,674	27	4
	17,438	29	3	17,237	25	3	17,040	24	3	16,844	25	3	16,647	27	3
	17,409	25	3	17,212	24	3	17,016	25	3	16,819	28	3	16,620	22	3
	17,384	24	3	17,188	22	3	16,991	21	3	16,791	21	3	16,598	24	3
	17,360		3	17,166		3	16,970		3	16,770		3	16,574		3
	Plug to Plug	76	30	Plug to Plug	73	30	Plug to Plug	76	30	Plug to Plug	76	30	Plug to Plug	68	30
	Frac Plug	17,534	Total Shots	Frac Plug	17,332	Total Shots	Frac Plug	17,141	Total Shots	Frac Plug	16,944	Total Shots	Frac Plug	16,742	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
	16,536	38	5	16,342	35	5	16,143	38	5	15,949	35	5	15,755	36	5
	16,520	18	5	16,323	20	5	16,130	23	5	15,930	13	5	15,737	23	5
	16,502	27	4	16,303	24	4	16,107	21	4	15,917	31	4	15,714	25	4
	16,475	-5	4	16,279	25	4	16,086	28	4	15,886	25	4	15,689	24	4
	16,480	54	3	16,254	24	3	16,058	26	3	15,861	24	3	15,665	25	3
	16,426	24	3	16,230	31	3	16,032	23	3	15,837	25	3	15,640	20	3
	16,402	25	3	16,199	18	3	16,009	25	3	15,812	21	3	15,620	27	3
	16,377		3	16,181		3	15,984		3	15,791		3	15,593		3
	Plug to Plug	76	30	Plug to Plug	73	30	Plug to Plug	67	30	Plug to Plug	78	30	Plug to Plug	76	30
	Frac Plug	16,551	Total Shots	Frac Plug	16,352	Total Shots	Frac Plug	16,153	Total Shots	Frac Plug	15,964	Total Shots	Frac Plug	15,765	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
	15,554	39	5	15,356	38	5	15,166	32	5	14,953	48	5	14,772	33	5
	15,540	23	5	15,340	17	5	15,149	25	5	14,940	20	5	14,756	25	5
	15,517	23	4	15,323	27	4	15,124	17	4	14,920	20	4	14,731	24	4
	15,494	26	4	15,288	27	4	15,107	32	4	14,900	21	4	14,707	25	4
	15,468	24	3	15,269	22	3	15,075	24	3	14,879	25	3	14,682	23	3
	15,444	25	3	15,247	24	3	15,051	25	3	14,854	24	3	14,659	26	3
	15,419	25	3	15,223	25	3	15,026	25	3	14,830	25	3	14,633	20	3
	15,394		3	15,198		3	15,001		3	14,805		3	14,613		3
	Plug to Plug	70	30	Plug to Plug	76	30	Plug to Plug	69	30	Plug to Plug	63	30	Plug to Plug	75	30
	Frac Plug	15,564	Total Shots	Frac Plug	15,372	Total Shots	Frac Plug	15,176	Total Shots	Frac Plug	14,963	Total Shots	Frac Plug	14,782	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
	14,576	37	5	14,364	48	5	14,184	31	5	13,981	37	5	13,787	35	5
	14,559	24	5	14,350	17	5	14,166	24	5	13,965	22	5	13,773	22	5
	14,535	25	4	14,333	19	4	14,142	22	4	13,943	22	4	13,751	27	4
	14,510	24	4	14,314	25	4	14,120	27	4	13,921	25	4	13,724	16	4
	14,486	25	3	14,289	24	3	14,093	28	3	13,896	26	3	13,708	33	3
	14,461	24	3	14,265	25	3	14,065	21	3	13,870	23	3	13,675	24	3
	14,437	25	3	14,240	25	3	14,044	26	3	13,847	25	3	13,651	25	3
	14,412		3	14,215		3	14,018		3	13,822		3	13,626		3
	Plug to Plug	76	30	Plug to Plug	60	30	Plug to Plug	74	30	Plug to Plug	76	30	Plug to Plug	78	30
	Frac Plug	14,586	Total Shots	Frac Plug	14,374	Total Shots	Frac Plug	14,194	Total Shots	Frac Plug	13,997	Total Shots	Frac Plug	13,802	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
	13,590	36	5	13,388	41	5	13,198	35	5	13,000	36	5	12,810	30	5
	13,577	25	5	13,375	19	5	13,184	30	5	12,988	25	5	12,791	23	5
	13,552	24	4	13,356	25	4	13,154	19	4	12,963	30	4	12,768	26	4
	13,528	25	4	13,331	24	4	13,135	25	4	12,933	19	4	12,742	28	4
	13,503	24	3	13,307	25	3	13,110	24	3	12,914	25	3	12,714	21	3
	13,479	25	3	13,282	24	3	13,086	25	3	12,889	24	3	12,693	25	3
	13,454	25	3	13,258	25	3	13,061	25	3	12,865	25	3	12,668	25	3
	13,429		3	13,233		3	13,036		3	12,840		3	12,643		3
	Plug to Plug	72	30	Plug to Plug	71	30	Plug to Plug	77	30	Plug to Plug	77	30	Plug to Plug	78	30
	Frac Plug	13,600	Total Shots	Frac Plug	13,402	Total Shots	Frac Plug	13,212	Total Shots	Frac Plug	13,010	Total Shots	Frac Plug	12,820	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
	12,610	33	5	12,417	30	5	12,220	30	5	12,008	46	5	11,831	30	5
	12,594	24	5	12,398	25	5	12,203	26	5	12,000	20	5	11,807	23	5
	12,570	25	4	12,373	24	4	12,177	25	4	11,980	24	4	11,784	25	4
	12,545	24	4	12,349	29	4	12,152	24	4	11,956	25	4	11,759	24	4
	12,521	28	3	12,320	20	3	12,128	25	3	11,931	24	3	11,735	25	3
	12,493	21	3	12,300	25	3	12,103	25	3	11,907	25	3	11,710	21	3
	12,472	25	3	12,275	25	3	12,078	24	3	11,882	21	3	11,689	28	3
	12,447		3	12,250		3	12,054		3	11,861		3	11,661		3
	Plug to Plug	75	30	Plug to Plug	78	30	Plug to Plug	78	30	Plug to Plug	62	30	Plug to Plug	82	30
	Frac Plug	12,620	Total Shots	Frac Plug	12,427	Total Shots	Frac Plug	12,230	Total Shots	Frac Plug	12,018	Total Shots	Frac Plug	11,841	Total Shots