



CONCHO

COG Operating L L C

Lea County, NM (NAD27 NME)

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

Little Bear Federal Com 3H

HOBBS OCD

AUG 01 2019

Wellbore #1

RECEIVED

Design: Wellbore #1

Standard Survey Report

27 December, 2018





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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandril Freedom)
MD Reference: KB=26' @ 3831.20usft (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	Latitude: 32.52332
From:	Map	Easting:	738,982.00 usft	Longitude: -103.55799
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.42 °

Well	Little Bear Federal Com 3H, ACTIVE					
Well Position	+N/-S	0.00 usft	Northing:	555,243.20 usft	Latitude:	32.52412
	+E/-W	0.00 usft	Easting:	737,377.40 usft	Longitude:	-103.56319
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,805.20 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/21/2018	6.67	60.42	48,161

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	358.36	

Survey Program	Date 12/27/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	10,800.00	Gyros (Wellbore #1)	Keeper	Standard Wireline Keeper ver 1.0.2
10,834.00	18,492.00	MWD Surveys (Wellbore #1)	MWD	MWD - Standard

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.99	2.19	100.00	0.86	0.03	0.86	0.99	0.99	0.00
125.00	1.10	19.94	124.99	1.30	0.12	1.30	1.36	0.44	71.00
150.00	1.29	24.89	149.99	1.79	0.32	1.78	0.86	0.76	19.80
175.00	1.22	27.48	174.98	2.28	0.56	2.26	0.36	-0.28	10.36
200.00	0.98	39.12	199.97	2.68	0.82	2.65	1.31	-0.96	46.56
225.00	0.97	32.89	224.97	3.02	1.07	2.99	0.43	-0.04	-24.92
250.00	0.89	20.33	249.97	3.38	1.25	3.34	0.87	-0.32	-50.24
275.00	0.72	18.66	274.97	3.71	1.37	3.67	0.69	-0.68	-6.68
300.00	0.92	11.28	299.96	4.06	1.46	4.02	0.90	0.80	-29.52



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandrift Freedom)
MD Reference: KB=26' @ 3831.20usft (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)
325.00	0.99	15.56	324.96	4.46	1.56	4.42	0.40	0.28	17.12
350.00	0.81	26.35	349.96	4.83	1.70	4.78	0.99	-0.72	43.16
375.00	0.84	6.93	374.95	5.17	1.80	5.12	1.12	0.12	-77.68
400.00	0.91	14.70	399.95	5.54	1.87	5.49	0.55	0.28	31.08
425.00	0.96	32.83	424.95	5.91	2.03	5.85	1.19	0.20	72.52
450.00	0.79	26.12	449.94	6.24	2.22	6.18	0.79	-0.68	-26.84
475.00	0.78	25.13	474.94	6.55	2.37	6.48	0.07	-0.04	-3.96
500.00	0.76	56.42	499.94	6.80	2.58	6.72	1.66	-0.08	125.16
525.00	1.02	41.12	524.94	7.06	2.86	6.97	1.40	1.04	-61.20
550.00	0.71	47.80	549.93	7.33	3.13	7.24	1.30	-1.24	26.72
575.00	0.61	59.60	574.93	7.50	3.36	7.40	0.67	-0.40	47.20
600.00	0.54	44.36	599.93	7.65	3.55	7.55	0.67	-0.28	-60.96
625.00	0.51	50.65	624.93	7.81	3.72	7.70	0.26	-0.12	25.16
650.00	0.44	16.67	649.93	7.97	3.83	7.86	1.14	-0.28	-135.92
675.00	0.61	33.39	674.93	8.17	3.94	8.06	0.91	0.68	66.88
700.00	0.66	33.57	699.93	8.40	4.09	8.28	0.20	0.20	0.72
725.00	0.76	19.54	724.93	8.68	4.22	8.55	0.80	0.40	-56.12
750.00	0.64	34.27	749.92	8.95	4.36	8.82	0.86	-0.48	58.92
775.00	0.65	36.05	774.92	9.18	4.52	9.05	0.09	0.04	7.12
800.00	0.74	41.17	799.92	9.42	4.71	9.28	0.44	0.36	20.48
825.00	0.59	53.71	824.92	9.61	4.92	9.47	0.83	-0.60	50.16
850.00	0.56	74.30	849.92	9.72	5.14	9.57	0.83	-0.12	82.36
875.00	0.43	10.44	874.92	9.85	5.27	9.69	2.14	-0.52	-255.44
900.00	0.42	7.39	899.92	10.03	5.30	9.88	0.10	-0.04	-12.20
925.00	0.15	321.69	924.92	10.15	5.30	9.99	1.33	-1.08	-182.80
950.00	0.23	315.74	949.92	10.21	5.24	10.06	0.33	0.32	-23.80
975.00	0.33	313.11	974.91	10.30	5.15	10.14	0.40	0.40	-10.52
1,000.00	0.51	310.54	999.91	10.42	5.02	10.27	0.72	0.72	-10.28
1,025.00	0.44	327.35	1,024.91	10.57	4.88	10.43	0.62	-0.28	67.24
1,050.00	0.60	323.63	1,049.91	10.76	4.75	10.62	0.65	0.64	-14.88
1,075.00	0.40	349.78	1,074.91	10.95	4.66	10.81	1.19	-0.80	104.60
1,100.00	0.21	299.25	1,099.91	11.06	4.60	10.92	1.25	-0.76	-202.12
1,125.00	0.02	306.01	1,124.91	11.08	4.56	10.95	0.76	-0.76	27.04
1,150.00	0.46	160.44	1,149.91	10.99	4.59	10.85	1.91	1.76	-582.28
1,175.00	0.30	200.83	1,174.91	10.83	4.60	10.70	1.21	-0.64	161.56
1,200.00	0.32	215.13	1,199.91	10.72	4.53	10.58	0.32	0.08	57.20
1,225.00	0.48	270.76	1,224.91	10.66	4.39	10.53	1.60	0.64	222.52
1,250.00	0.60	279.88	1,249.91	10.68	4.16	10.56	0.59	0.48	36.48
1,275.00	0.18	323.91	1,274.91	10.74	4.00	10.62	1.95	-1.68	176.12
1,300.00	0.25	127.57	1,299.91	10.74	4.02	10.62	1.70	0.28	654.64
1,325.00	0.42	147.05	1,324.91	10.63	4.12	10.50	0.81	0.68	77.92
1,350.00	0.37	157.93	1,349.91	10.47	4.20	10.35	0.36	-0.20	43.52
1,375.00	0.30	207.93	1,374.91	10.34	4.20	10.22	1.16	-0.28	200.00



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandrift Freedom)
MD Reference: KB=26' @ 3831.20usft (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)
1,400.00	0.30	185.91	1,399.91	10.22	4.16	10.10	0.46	0.00	-88.08
1,425.00	0.21	269.30	1,424.91	10.15	4.11	10.03	1.38	-0.36	333.56
1,450.00	0.47	300.62	1,449.91	10.20	3.97	10.09	1.24	1.04	125.28
1,475.00	0.23	11.59	1,474.90	10.31	3.89	10.19	1.80	-0.96	283.88
1,500.00	0.21	77.34	1,499.90	10.37	3.95	10.25	0.96	-0.08	263.00
1,525.00	0.22	128.32	1,524.90	10.35	4.03	10.23	0.74	0.04	203.92
1,550.00	0.21	156.21	1,549.90	10.27	4.09	10.15	0.42	-0.04	111.56
1,575.00	0.25	246.69	1,574.90	10.21	4.06	10.09	1.31	0.16	361.92
1,600.00	0.25	272.63	1,599.90	10.19	3.95	10.07	0.45	0.00	103.76
1,625.00	0.39	291.68	1,624.90	10.23	3.82	10.11	0.70	0.56	76.20
1,650.00	0.31	304.38	1,649.90	10.29	3.68	10.19	0.44	-0.32	50.80
1,675.00	0.03	33.56	1,674.90	10.34	3.63	10.23	1.24	-1.12	356.72
1,700.00	0.15	61.31	1,699.90	10.36	3.66	10.25	0.50	0.48	111.00
1,725.00	0.22	76.17	1,724.90	10.39	3.74	10.28	0.34	0.28	59.44
1,750.00	0.29	42.96	1,749.90	10.44	3.83	10.33	0.64	0.28	-132.84
1,775.00	0.32	81.20	1,774.90	10.50	3.94	10.38	0.81	0.12	152.96
1,800.00	0.41	127.34	1,799.90	10.46	4.08	10.34	1.19	0.36	184.56
1,825.00	0.25	177.27	1,824.90	10.35	4.15	10.23	1.26	-0.64	199.72
1,850.00	0.42	184.47	1,849.90	10.20	4.15	10.08	0.70	0.68	28.80
1,875.00	0.28	113.83	1,874.90	10.09	4.20	9.96	1.68	-0.56	-282.56
1,900.00	0.14	63.22	1,899.90	10.08	4.28	9.95	0.88	-0.56	-202.44
1,925.00	0.70	122.42	1,924.90	10.01	4.44	9.88	2.56	2.24	236.80
1,950.00	0.75	158.25	1,949.90	9.77	4.63	9.64	1.79	0.20	143.32
1,975.00	0.79	158.01	1,974.90	9.46	4.75	9.32	0.16	0.16	-0.96
2,000.00	0.85	175.87	1,999.89	9.12	4.83	8.98	1.05	0.24	71.44
2,025.00	0.85	158.15	2,024.89	8.76	4.91	8.62	1.05	0.00	-70.88
2,050.00	1.01	149.55	2,049.89	8.40	5.09	8.25	0.85	0.64	-34.40
2,075.00	1.15	149.33	2,074.88	7.99	5.33	7.84	0.56	0.56	-0.88
2,100.00	1.19	155.50	2,099.88	7.54	5.57	7.38	0.53	0.16	24.68
2,125.00	1.37	148.68	2,124.87	7.05	5.83	6.88	0.94	0.72	-27.28
2,150.00	1.47	159.57	2,149.86	6.49	6.10	6.32	1.15	0.40	43.56
2,175.00	1.18	166.15	2,174.86	5.94	6.27	5.76	1.31	-1.16	26.32
2,200.00	0.86	156.86	2,199.85	5.52	6.41	5.34	1.44	-1.28	-37.16
2,225.00	1.22	152.58	2,224.85	5.11	6.60	4.92	1.47	1.44	-17.12
2,250.00	1.28	158.35	2,249.84	4.62	6.83	4.42	0.56	0.24	23.08
2,275.00	1.35	164.71	2,274.84	4.07	7.01	3.87	0.65	0.28	25.44
2,300.00	1.05	170.38	2,299.83	3.56	7.13	3.36	1.29	-1.20	22.68
2,325.00	1.22	150.52	2,324.83	3.11	7.30	2.90	1.70	0.68	-79.44
2,350.00	1.22	153.04	2,349.82	2.64	7.55	2.42	0.21	0.00	10.08
2,375.00	1.45	153.67	2,374.81	2.12	7.81	1.89	0.92	0.92	2.52
2,400.00	1.51	149.24	2,399.81	1.55	8.12	1.32	0.52	0.24	-17.72
2,425.00	1.66	153.75	2,424.80	0.94	8.45	0.70	0.78	0.60	18.04
2,450.00	1.61	159.52	2,449.79	0.29	8.73	0.04	0.69	-0.20	23.08



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandrill Freedom)
MD Reference: KB=26' @ 3831.20usft (Scandrill 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)
2,475.00	1.30	160.39	2,474.78	-0.31	8.95	-0.56	1.24	-1.24	3.48
2,500.00	1.14	151.37	2,499.77	-0.79	9.16	-1.06	1.00	-0.64	-36.08
2,525.00	1.37	153.80	2,524.77	-1.28	9.41	-1.55	0.94	0.92	9.72
2,550.00	1.70	146.53	2,549.76	-1.86	9.75	-2.14	1.53	1.32	-29.08
2,575.00	1.51	160.17	2,574.75	-2.48	10.06	-2.76	1.70	-0.76	54.56
2,600.00	1.45	157.40	2,599.74	-3.08	10.30	-3.37	0.37	-0.24	-11.08
2,625.00	1.25	153.18	2,624.73	-3.61	10.54	-3.91	0.89	-0.80	-16.88
2,650.00	1.35	145.18	2,649.73	-4.10	10.83	-4.41	0.83	0.40	-32.00
2,675.00	1.48	143.67	2,674.72	-4.60	11.19	-4.92	0.54	0.52	-6.04
2,700.00	1.53	150.44	2,699.71	-5.15	11.55	-5.48	0.74	0.20	27.08
2,725.00	1.69	149.72	2,724.70	-5.76	11.90	-6.10	0.65	0.64	-2.88
2,750.00	1.29	156.60	2,749.69	-6.34	12.20	-6.68	1.75	-1.60	27.52
2,775.00	0.93	156.15	2,774.69	-6.78	12.39	-7.13	1.44	-1.44	-1.80
2,800.00	0.78	146.96	2,799.68	-7.11	12.57	-7.47	0.81	-0.60	-36.76
2,825.00	0.60	123.50	2,824.68	-7.32	12.77	-7.69	1.33	-0.72	-93.84
2,850.00	0.51	126.03	2,849.68	-7.46	12.97	-7.83	0.37	-0.36	10.12
2,875.00	0.52	95.37	2,874.68	-7.54	13.17	-7.91	1.09	0.04	-122.64
2,900.00	0.49	105.57	2,899.68	-7.58	13.39	-7.96	0.38	-0.12	40.80
2,925.00	0.58	99.64	2,924.68	-7.63	13.61	-8.01	0.42	0.36	-23.72
2,950.00	0.53	109.80	2,949.68	-7.69	13.85	-8.08	0.44	-0.20	40.64
2,975.00	0.95	111.71	2,974.67	-7.80	14.15	-8.20	1.68	1.68	7.64
3,000.00	0.42	117.41	2,999.67	-7.92	14.42	-8.33	2.13	-2.12	22.80
3,025.00	0.67	128.78	3,024.67	-8.06	14.62	-8.47	1.08	1.00	45.48
3,050.00	0.80	120.81	3,049.67	-8.24	14.88	-8.66	0.66	0.52	-31.88
3,075.00	0.59	135.39	3,074.67	-8.42	15.12	-8.85	1.09	-0.84	58.32
3,100.00	0.78	98.98	3,099.67	-8.54	15.38	-8.97	1.86	0.76	-145.64
3,125.00	0.78	114.56	3,124.66	-8.63	15.70	-9.08	0.85	0.00	62.32
3,150.00	0.86	111.89	3,149.66	-8.77	16.03	-9.23	0.35	0.32	-10.68
3,175.00	0.67	114.13	3,174.66	-8.90	16.34	-9.37	0.77	-0.76	8.96
3,200.00	0.89	122.77	3,199.66	-9.07	16.64	-9.54	1.00	0.88	34.56
3,225.00	0.84	115.99	3,224.65	-9.25	16.96	-9.74	0.46	-0.20	-27.12
3,250.00	1.08	125.64	3,249.65	-9.47	17.32	-9.96	1.15	0.96	38.60
3,275.00	1.13	131.64	3,274.64	-9.77	17.70	-10.27	0.50	0.20	24.00
3,300.00	1.28	152.03	3,299.64	-10.18	18.01	-10.69	1.81	0.60	81.56
3,325.00	1.36	162.63	3,324.63	-10.71	18.23	-11.23	1.03	0.32	42.40
3,350.00	0.87	160.68	3,349.63	-11.18	18.38	-11.70	1.97	-1.96	-7.80
3,375.00	0.82	159.59	3,374.63	-11.52	18.51	-12.05	0.21	-0.20	-4.36
3,400.00	1.01	138.68	3,399.62	-11.85	18.72	-12.39	1.52	0.76	-83.64
3,425.00	1.19	144.11	3,424.62	-12.23	19.01	-12.77	0.83	0.72	21.72
3,450.00	1.25	150.19	3,449.61	-12.68	19.30	-13.22	0.57	0.24	24.32
3,475.00	1.50	147.59	3,474.60	-13.19	19.61	-13.75	1.03	1.00	-10.40
3,500.00	1.37	152.95	3,499.60	-13.73	19.92	-14.30	0.75	-0.52	21.44
3,525.00	1.31	144.58	3,524.59	-14.23	20.22	-14.80	0.82	-0.24	-33.48
3,550.00	1.35	130.79	3,549.58	-14.66	20.61	-15.24	1.29	0.16	-55.16



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandril Freedom)
MD Reference: KB=26' @ 3831.20usft (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	1.62	133.30	3,574.57	-15.09	21.09	-15.69	1.11	1.08	10.04
3,600.00	1.59	132.42	3,599.57	-15.57	21.61	-16.18	0.16	-0.12	-3.52
3,625.00	1.65	130.28	3,624.56	-16.03	22.14	-16.66	0.34	0.24	-8.64
3,650.00	1.41	132.44	3,649.55	-16.48	22.64	-17.12	0.99	-0.96	8.72
3,675.00	1.46	129.71	3,674.54	-16.89	23.11	-17.54	0.34	0.20	-10.92
3,700.00	1.57	123.71	3,699.53	-17.28	23.64	-17.95	0.77	0.44	-24.00
3,725.00	1.43	123.09	3,724.52	-17.64	24.19	-18.32	0.56	-0.56	-2.48
3,750.00	1.23	120.49	3,749.51	-17.95	24.68	-18.65	0.84	-0.80	-10.40
3,775.00	1.01	126.23	3,774.51	-18.21	25.09	-18.92	0.99	-0.88	22.96
3,800.00	0.88	131.88	3,799.51	-18.47	25.41	-19.19	0.64	-0.52	22.60
3,825.00	0.86	166.07	3,824.50	-18.78	25.60	-19.51	2.05	-0.08	136.76
3,850.00	0.88	196.58	3,849.50	-19.15	25.59	-19.87	1.83	0.08	122.04
3,875.00	1.40	204.79	3,874.50	-19.61	25.40	-20.33	2.17	2.08	32.84
3,900.00	1.53	200.39	3,899.49	-20.20	25.16	-20.91	0.69	0.52	-17.60
3,925.00	1.53	203.11	3,924.48	-20.82	24.91	-21.52	0.29	0.00	10.88
3,950.00	1.64	211.69	3,949.47	-21.43	24.59	-22.12	1.04	0.44	34.32
3,975.00	1.53	204.12	3,974.46	-22.04	24.27	-22.72	0.95	-0.44	-30.28
4,000.00	1.50	191.34	3,999.45	-22.66	24.07	-23.34	1.35	-0.12	-51.12
4,025.00	1.47	196.22	4,024.44	-23.29	23.92	-23.97	0.52	-0.12	19.52
4,050.00	1.60	198.13	4,049.43	-23.93	23.72	-24.60	0.56	0.52	7.64
4,075.00	1.70	193.24	4,074.42	-24.63	23.52	-25.29	0.69	0.40	-19.56
4,100.00	1.51	206.85	4,099.41	-25.28	23.29	-25.94	1.70	-0.76	54.44
4,125.00	0.92	210.72	4,124.41	-25.75	23.04	-26.40	2.38	-2.36	15.48
4,150.00	1.08	173.60	4,149.40	-26.15	22.96	-26.80	2.62	0.64	-148.48
4,175.00	1.22	190.99	4,174.40	-26.65	22.94	-27.29	1.50	0.56	69.56
4,200.00	1.16	205.10	4,199.39	-27.14	22.78	-27.78	1.19	-0.24	56.44
4,225.00	1.00	208.40	4,224.39	-27.56	22.57	-28.19	0.69	-0.64	13.20
4,250.00	0.83	182.18	4,249.39	-27.93	22.46	-28.56	1.79	-0.68	-104.88
4,275.00	0.88	168.99	4,274.38	-28.30	22.49	-28.93	0.81	0.20	-52.76
4,300.00	0.98	171.28	4,299.38	-28.70	22.56	-29.34	0.43	0.40	9.16
4,325.00	1.01	178.80	4,324.38	-29.13	22.59	-29.77	0.54	0.12	30.08
4,350.00	0.87	198.17	4,349.37	-29.53	22.54	-30.17	1.38	-0.56	77.48
4,375.00	0.56	184.58	4,374.37	-29.84	22.47	-30.47	1.41	-1.24	-54.36
4,400.00	0.59	158.49	4,399.37	-30.08	22.51	-30.71	1.04	0.12	-104.36
4,425.00	0.79	170.92	4,424.37	-30.37	22.58	-31.00	0.99	0.80	49.72
4,450.00	0.63	187.58	4,449.37	-30.67	22.59	-31.31	1.04	-0.64	66.64
4,475.00	0.52	216.35	4,474.37	-30.90	22.51	-31.53	1.22	-0.44	115.08
4,500.00	0.31	150.75	4,499.36	-31.05	22.47	-31.68	1.93	-0.84	-262.40
4,525.00	0.54	185.66	4,524.36	-31.23	22.49	-31.86	1.35	0.92	139.64
4,550.00	0.78	172.57	4,549.36	-31.51	22.50	-32.15	1.13	0.96	-52.36
4,575.00	0.98	169.56	4,574.36	-31.89	22.56	-32.53	0.82	0.80	-12.04
4,600.00	0.82	185.07	4,599.36	-32.28	22.59	-32.92	1.16	-0.64	62.04
4,625.00	0.98	207.85	4,624.35	-32.65	22.47	-33.28	1.55	0.64	91.12



Survey Report

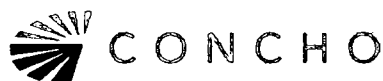


Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 33, T 20 S., R 34 E
Well: Little Bear Federal Com 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandril Freedom)
MD Reference: KB=26' @ 3831.20usft (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)
4,650.00	0.95	219.01	4,649.35	-33.00	22.24	-33.62	0.76	-0.12	44.64
4,675.00	0.78	246.48	4,674.35	-33.23	21.95	-33.84	1.77	-0.68	109.88
4,700.00	0.36	169.25	4,699.35	-33.37	21.81	-33.98	3.13	-1.68	-308.92
4,725.00	0.33	185.58	4,724.35	-33.52	21.82	-34.13	0.41	-0.12	65.32
4,750.00	0.13	190.30	4,749.35	-33.62	21.81	-34.23	0.80	-0.80	18.88
4,775.00	0.19	346.31	4,774.35	-33.61	21.79	-34.22	1.25	0.24	624.04
4,800.00	0.34	334.33	4,799.34	-33.50	21.75	-34.11	0.64	0.60	-47.92
4,825.00	0.11	336.16	4,824.34	-33.41	21.71	-34.02	0.92	-0.92	7.32
4,850.00	0.25	333.31	4,849.34	-33.34	21.68	-33.95	0.56	0.56	-11.40
4,875.00	0.30	334.47	4,874.34	-33.24	21.62	-33.84	0.20	0.20	4.64
4,900.00	0.22	321.90	4,899.34	-33.14	21.57	-33.74	0.39	-0.32	-50.28
4,925.00	0.63	350.49	4,924.34	-32.97	21.51	-33.57	1.80	1.64	114.36
4,950.00	0.39	353.39	4,949.34	-32.75	21.48	-33.35	0.97	-0.96	11.60
4,975.00	0.21	338.56	4,974.34	-32.62	21.45	-33.22	0.78	-0.72	-59.32
5,000.00	0.77	293.31	4,999.34	-32.51	21.28	-33.10	2.56	2.24	-181.00
5,025.00	0.67	304.04	5,024.34	-32.36	21.01	-32.95	0.67	-0.40	42.92
5,050.00	1.47	260.59	5,049.33	-32.33	20.57	-32.91	4.34	3.20	-173.80
5,075.00	1.49	254.79	5,074.33	-32.47	19.94	-33.03	0.60	0.08	-23.20
5,100.00	1.96	259.30	5,099.32	-32.63	19.21	-33.17	1.96	1.88	18.04
5,125.00	1.88	259.98	5,124.30	-32.78	18.38	-33.30	0.33	-0.32	2.72
5,150.00	1.93	265.70	5,149.29	-32.89	17.56	-33.38	0.79	0.20	22.88
5,175.00	1.96	261.96	5,174.27	-32.98	16.72	-33.44	0.52	0.12	-14.96
5,200.00	2.27	260.45	5,199.26	-33.12	15.80	-33.56	1.26	1.24	-6.04
5,225.00	2.31	253.63	5,224.24	-33.34	14.83	-33.76	1.10	0.16	-27.28
5,250.00	2.55	252.54	5,249.21	-33.65	13.82	-34.03	0.98	0.96	-4.36
5,275.00	2.53	256.54	5,274.19	-33.95	12.75	-34.30	0.71	-0.08	16.00
5,300.00	2.70	262.21	5,299.16	-34.16	11.63	-34.48	1.24	0.68	22.68
5,325.00	2.20	261.29	5,324.14	-34.31	10.57	-34.60	2.01	-2.00	-3.68
5,350.00	2.33	254.16	5,349.12	-34.52	9.61	-34.78	1.24	0.52	-28.52
5,375.00	2.49	251.64	5,374.10	-34.83	8.61	-35.06	0.77	0.64	-10.08
5,400.00	2.55	259.84	5,399.07	-35.10	7.54	-35.30	1.46	0.24	32.80
5,425.00	2.28	257.79	5,424.05	-35.30	6.51	-35.47	1.13	-1.08	-8.20
5,450.00	2.35	256.62	5,449.03	-35.53	5.53	-35.67	0.34	0.28	-4.68
5,475.00	2.75	262.28	5,474.01	-35.73	4.43	-35.84	1.89	1.60	22.64
5,500.00	2.20	260.84	5,498.98	-35.88	3.36	-35.96	2.21	-2.20	-5.76
5,525.00	2.35	248.56	5,523.96	-36.15	2.41	-36.20	2.04	0.60	-49.12
5,550.00	2.38	255.19	5,548.94	-36.47	1.43	-36.49	1.10	0.12	26.52
5,575.00	2.17	259.18	5,573.92	-36.69	0.47	-36.69	1.05	-0.84	15.96
5,600.00	2.36	254.57	5,598.90	-36.91	-0.49	-36.88	1.05	0.76	-18.44
5,625.00	2.39	255.33	5,623.88	-37.18	-1.49	-37.12	0.17	0.12	3.04
5,650.00	2.29	256.76	5,648.86	-37.43	-2.48	-37.34	0.46	-0.40	5.72
5,675.00	2.12	249.73	5,673.84	-37.70	-3.40	-37.59	1.28	-0.68	-28.12
5,700.00	2.48	254.09	5,698.82	-38.01	-4.36	-37.87	1.60	1.44	17.44



Survey Report

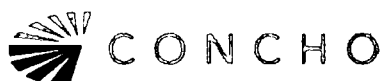


Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 33, T 20 S., R 34 E
Well: Little Bear Federal Com 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandrell Freedom)
MD Reference: KB=26' @ 3831.20usft (Scandrell 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)
5,725.00	2.42	249.91	5,723.80	-38.34	-5.37	-38.17	0.75	-0.24	-16.72
5,750.00	2.08	252.66	5,748.78	-38.66	-6.30	-38.46	1.43	-1.36	11.00
5,775.00	1.89	245.95	5,773.77	-38.96	-7.11	-38.74	1.20	-0.76	-26.84
5,800.00	2.10	243.39	5,798.75	-39.33	-7.90	-39.09	0.91	0.84	-10.24
5,825.00	2.12	243.13	5,823.73	-39.75	-8.72	-39.48	0.09	0.08	-1.04
5,850.00	2.18	239.87	5,848.72	-40.20	-9.54	-39.91	0.54	0.24	-13.04
5,875.00	2.21	245.00	5,873.70	-40.64	-10.39	-40.33	0.79	0.12	20.52
5,900.00	2.34	246.32	5,898.68	-41.05	-11.30	-40.71	0.56	0.52	5.28
5,925.00	2.18	250.18	5,923.66	-41.41	-12.21	-41.05	0.88	-0.64	15.44
5,950.00	1.94	253.64	5,948.64	-41.69	-13.06	-41.30	1.08	-0.96	13.84
5,975.00	2.06	239.60	5,973.63	-42.04	-13.86	-41.63	2.01	0.48	-56.16
6,000.00	2.08	239.27	5,998.61	-42.50	-14.64	-42.06	0.09	0.08	-1.32
6,025.00	2.18	245.27	6,023.59	-42.93	-15.46	-42.47	0.98	0.40	24.00
6,050.00	2.24	242.73	6,048.57	-43.35	-16.32	-42.87	0.46	0.24	-10.16
6,075.00	2.33	243.63	6,073.55	-43.80	-17.21	-43.29	0.39	0.36	3.60
6,100.00	2.32	245.04	6,098.53	-44.24	-18.13	-43.71	0.23	-0.04	5.64
6,125.00	2.40	239.26	6,123.51	-44.72	-19.04	-44.16	1.00	0.32	-23.12
6,150.00	2.38	235.65	6,148.49	-45.28	-19.91	-44.70	0.61	-0.08	-14.44
6,175.00	2.74	228.64	6,173.47	-45.97	-20.79	-45.36	1.91	1.44	-28.04
6,200.00	3.13	223.30	6,198.43	-46.86	-21.71	-46.22	1.90	1.56	-21.36
6,225.00	2.84	213.25	6,223.40	-47.88	-22.52	-47.21	2.39	-1.16	-40.20
6,250.00	3.28	211.42	6,248.36	-49.01	-23.23	-48.32	1.80	1.76	-7.32
6,275.00	3.44	214.29	6,273.32	-50.24	-24.02	-49.53	0.93	0.64	11.48
6,300.00	3.52	215.91	6,298.28	-51.48	-24.90	-50.74	0.51	0.32	6.48
6,325.00	3.46	218.01	6,323.23	-52.69	-25.81	-51.93	0.56	-0.24	8.40
6,350.00	3.31	218.10	6,348.19	-53.86	-26.72	-53.07	0.60	-0.60	0.36
6,375.00	3.06	214.55	6,373.15	-54.97	-27.54	-54.16	1.27	-1.00	-14.20
6,400.00	3.25	209.12	6,398.11	-56.14	-28.27	-55.31	1.42	0.76	-21.72
6,425.00	3.42	210.80	6,423.07	-57.40	-28.99	-56.55	0.78	0.68	6.72
6,450.00	3.48	212.05	6,448.02	-58.69	-29.78	-57.81	0.38	0.24	5.00
6,475.00	3.52	210.70	6,472.97	-59.99	-30.57	-59.09	0.37	0.16	-5.40
6,500.00	3.45	213.50	6,497.93	-61.28	-31.38	-60.35	0.74	-0.28	11.20
6,525.00	3.48	212.18	6,522.88	-62.55	-32.20	-61.60	0.34	0.12	-5.28
6,550.00	3.57	210.37	6,547.84	-63.86	-33.00	-62.89	0.57	0.36	-7.24
6,575.00	3.61	213.85	6,572.79	-65.18	-33.83	-64.19	0.89	0.16	13.92
6,600.00	3.99	213.48	6,597.73	-66.56	-34.75	-65.54	1.52	1.52	-1.48
6,625.00	3.86	216.14	6,622.67	-67.97	-35.72	-66.92	0.89	-0.52	10.64
6,650.00	3.78	213.95	6,647.62	-69.33	-36.68	-68.25	0.67	-0.32	-8.76
6,675.00	3.71	217.56	6,672.56	-70.66	-37.63	-69.55	0.98	-0.28	14.44
6,700.00	3.85	216.11	6,697.51	-71.98	-38.62	-70.84	0.68	0.56	-5.80
6,725.00	3.82	215.27	6,722.45	-73.33	-39.60	-72.17	0.25	-0.12	-3.36
6,750.00	3.75	216.22	6,747.40	-74.67	-40.56	-73.48	0.38	-0.28	3.80
6,775.00	3.91	211.31	6,772.34	-76.06	-41.49	-74.84	1.46	0.64	-19.64
6,800.00	3.89	214.05	6,797.29	-77.49	-42.40	-76.25	0.75	-0.08	10.96



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandril Freedom)
MD Reference: KB=26' @ 3831.20usft (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)
6,825.00	3.75	213.00	6,822.23	-78.88	-43.32	-77.61	0.63	-0.56	-4.20
6,850.00	3.92	211.88	6,847.17	-80.29	-44.22	-78.99	0.74	0.68	-4.48
6,875.00	3.89	212.28	6,872.12	-81.73	-45.12	-80.41	0.16	-0.12	1.60
6,900.00	3.89	211.82	6,897.06	-83.17	-46.02	-81.82	0.12	0.00	-1.84
6,925.00	3.91	214.60	6,922.00	-84.59	-46.96	-83.22	0.76	0.08	11.12
6,950.00	3.98	215.92	6,946.94	-86.00	-47.95	-84.59	0.46	0.28	5.28
6,975.00	4.07	214.97	6,971.88	-87.43	-48.97	-85.99	0.45	0.36	-3.80
7,000.00	3.78	214.45	6,996.82	-88.83	-49.94	-87.37	1.17	-1.16	-2.08
7,025.00	3.53	211.15	7,021.77	-90.17	-50.81	-88.68	1.31	-1.00	-13.20
7,050.00	2.91	213.15	7,046.73	-91.36	-51.55	-89.85	2.52	-2.48	8.00
7,075.00	3.01	208.53	7,071.70	-92.47	-52.21	-90.94	1.03	0.40	-18.48
7,100.00	3.19	206.82	7,096.66	-93.67	-52.84	-92.12	0.81	0.72	-6.84
7,125.00	2.84	209.55	7,121.63	-94.83	-53.46	-93.26	1.51	-1.40	10.92
7,150.00	2.87	208.53	7,146.59	-95.92	-54.06	-94.33	0.24	0.12	-4.08
7,175.00	2.90	208.90	7,171.56	-97.02	-54.67	-95.42	0.14	0.12	1.48
7,200.00	2.90	210.78	7,196.53	-98.12	-55.30	-96.49	0.38	0.00	7.52
7,225.00	3.08	209.07	7,221.50	-99.25	-55.95	-97.61	0.80	0.72	-6.84
7,250.00	2.87	210.96	7,246.46	-100.37	-56.59	-98.71	0.93	-0.84	7.56
7,275.00	3.08	210.63	7,271.43	-101.48	-57.26	-99.81	0.84	0.84	-1.32
7,300.00	2.89	208.40	7,296.40	-102.62	-57.90	-100.92	0.89	-0.76	-8.92
7,325.00	3.10	208.64	7,321.36	-103.76	-58.52	-102.05	0.84	0.84	0.96
7,350.00	2.91	207.76	7,346.33	-104.92	-59.14	-103.18	0.78	-0.76	-3.52
7,375.00	3.12	210.73	7,371.29	-106.07	-59.79	-104.31	1.05	0.84	11.88
7,400.00	3.08	210.48	7,396.26	-107.23	-60.48	-105.46	0.17	-0.16	-1.00
7,425.00	3.10	210.17	7,421.22	-108.39	-61.16	-106.60	0.10	0.08	-1.24
7,450.00	3.09	211.96	7,446.18	-109.55	-61.85	-107.73	0.39	-0.04	7.16
7,475.00	3.24	208.36	7,471.14	-110.74	-62.54	-108.91	1.00	0.60	-14.40
7,500.00	3.32	211.42	7,496.10	-111.98	-63.26	-110.13	0.77	0.32	12.24
7,525.00	3.35	207.94	7,521.06	-113.24	-63.98	-111.37	0.82	0.12	-13.92
7,550.00	3.23	209.35	7,546.02	-114.50	-64.66	-112.61	0.58	-0.48	5.64
7,575.00	3.33	206.92	7,570.98	-115.77	-65.34	-113.85	0.68	0.40	-9.72
7,600.00	3.45	208.58	7,595.94	-117.07	-66.03	-115.14	0.62	0.48	6.64
7,625.00	3.30	207.80	7,620.89	-118.37	-66.72	-116.41	0.63	-0.60	-3.12
7,650.00	3.22	207.56	7,645.85	-119.63	-67.38	-117.65	0.32	-0.32	-0.96
7,675.00	3.36	208.41	7,670.81	-120.90	-68.06	-118.90	0.59	0.56	3.40
7,700.00	3.25	208.87	7,695.77	-122.16	-68.75	-120.14	0.45	-0.44	1.84
7,725.00	3.02	207.98	7,720.73	-123.36	-69.40	-121.33	0.94	-0.92	-3.56
7,750.00	3.06	211.78	7,745.70	-124.51	-70.06	-122.46	0.82	0.16	15.20
7,775.00	2.95	213.17	7,770.66	-125.62	-70.76	-123.54	0.53	-0.44	5.56
7,800.00	2.92	209.20	7,795.63	-126.71	-71.42	-124.62	0.82	-0.12	-15.88
7,825.00	2.99	209.21	7,820.60	-127.84	-72.05	-125.72	0.28	0.28	0.04
7,850.00	2.99	203.56	7,845.56	-129.00	-72.63	-126.87	1.18	0.00	-22.60
7,875.00	3.03	205.57	7,870.53	-130.20	-73.18	-128.05	0.45	0.16	8.04



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandril Freedom)
MD Reference: KB=26' @ 3831.20usft (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)
7,900.00	2.67	201.61	7,895.50	-131.33	-73.68	-129.17	1.64	-1.44	-15.84
7,925.00	3.55	204.89	7,920.46	-132.58	-74.22	-130.40	3.59	3.52	13.12
7,950.00	3.16	205.73	7,945.42	-133.90	-74.84	-131.71	1.57	-1.56	3.36
7,975.00	3.41	208.08	7,970.38	-135.18	-75.49	-132.96	1.14	1.00	9.40
8,000.00	3.60	209.64	7,995.33	-136.52	-76.23	-134.28	0.85	0.76	6.24
8,025.00	3.53	208.82	8,020.28	-137.87	-76.99	-135.61	0.35	-0.28	-3.28
8,050.00	3.48	208.87	8,045.23	-139.21	-77.73	-136.93	0.20	-0.20	0.20
8,075.00	3.47	208.38	8,070.19	-140.54	-78.45	-138.24	0.13	-0.04	-1.96
8,100.00	3.52	208.15	8,095.14	-141.88	-79.17	-139.56	0.21	0.20	-0.92
8,125.00	3.52	207.83	8,120.09	-143.24	-79.89	-140.90	0.08	0.00	-1.28
8,150.00	3.55	207.71	8,145.05	-144.60	-80.61	-142.24	0.12	0.12	-0.48
8,175.00	3.53	206.92	8,170.00	-145.97	-81.32	-143.59	0.21	-0.08	-3.16
8,200.00	3.50	208.49	8,194.95	-147.33	-82.03	-144.92	0.40	-0.12	6.28
8,225.00	3.59	208.04	8,219.90	-148.69	-82.77	-146.26	0.38	0.36	-1.80
8,250.00	3.61	209.39	8,244.85	-150.07	-83.52	-147.62	0.35	0.08	5.40
8,275.00	3.61	208.69	8,269.81	-151.45	-84.28	-148.97	0.18	0.00	-2.80
8,300.00	3.51	209.33	8,294.76	-152.80	-85.04	-150.31	0.43	-0.40	2.56
8,325.00	3.52	208.73	8,319.71	-154.14	-85.78	-151.63	0.15	0.04	-2.40
8,350.00	3.47	208.90	8,344.66	-155.48	-86.51	-152.94	0.20	-0.20	0.68
8,375.00	3.36	208.82	8,369.62	-156.78	-87.23	-154.22	0.44	-0.44	-0.32
8,400.00	3.44	210.81	8,394.57	-158.07	-87.97	-155.49	0.57	0.32	7.96
8,425.00	3.47	210.25	8,419.53	-159.37	-88.74	-156.76	0.18	0.12	-2.24
8,450.00	3.48	209.61	8,444.48	-160.68	-89.49	-158.05	0.16	0.04	-2.56
8,475.00	3.30	208.17	8,469.44	-161.97	-90.21	-159.33	0.80	-0.72	-5.76
8,500.00	3.36	204.99	8,494.40	-163.27	-90.86	-160.61	0.78	0.24	-12.72
8,525.00	3.37	205.79	8,519.35	-164.60	-91.49	-161.91	0.19	0.04	3.20
8,550.00	3.52	205.62	8,544.31	-165.95	-92.14	-163.25	0.60	0.60	-0.68
8,575.00	3.42	207.25	8,569.26	-167.31	-92.81	-164.58	0.56	-0.40	6.52
8,600.00	3.21	205.96	8,594.22	-168.60	-93.46	-165.86	0.89	-0.84	-5.16
8,625.00	3.50	205.19	8,619.18	-169.92	-94.09	-167.16	1.17	1.16	-3.08
8,650.00	3.44	205.67	8,644.13	-171.29	-94.74	-168.51	0.27	-0.24	1.92
8,675.00	3.46	207.21	8,669.09	-172.63	-95.41	-169.83	0.38	0.08	6.16
8,700.00	3.35	207.12	8,694.04	-173.95	-96.09	-171.13	0.44	-0.44	-0.36
8,725.00	3.23	207.89	8,719.00	-175.23	-96.75	-172.39	0.51	-0.48	3.08
8,750.00	3.29	206.07	8,743.96	-176.49	-97.39	-173.63	0.48	0.24	-7.28
8,775.00	3.39	206.14	8,768.92	-177.80	-98.03	-174.92	0.40	0.40	0.28
8,800.00	3.45	205.63	8,793.87	-179.14	-98.69	-176.25	0.27	0.24	-2.04
8,825.00	3.35	204.90	8,818.83	-180.48	-99.32	-177.57	0.44	-0.40	-2.92
8,850.00	3.29	205.82	8,843.79	-181.79	-99.94	-178.86	0.32	-0.24	3.68
8,875.00	3.12	205.54	8,868.75	-183.05	-100.54	-180.10	0.68	-0.68	-1.12
8,900.00	3.29	205.04	8,893.71	-184.31	-101.14	-181.35	0.69	0.68	-2.00
8,925.00	3.12	201.09	8,918.67	-185.60	-101.69	-182.61	1.11	-0.68	-15.80
8,950.00	2.82	196.84	8,943.64	-186.82	-102.11	-183.83	1.49	-1.20	-17.00



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandrell Freedom)
MD Reference: KB=26' @ 3831.20usft (Scandrell 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	2.68	199.47	8,968.61	-187.96	-102.49	-184.95	0.75	-0.56	10.52
9,000.00	2.58	200.70	8,993.58	-189.04	-102.88	-186.02	0.46	-0.40	4.92
9,025.00	2.58	201.28	9,018.56	-190.09	-103.28	-187.06	0.10	0.00	2.32
9,050.00	2.65	202.51	9,043.53	-191.15	-103.71	-188.10	0.36	0.28	4.92
9,075.00	2.54	202.35	9,068.51	-192.20	-104.14	-189.14	0.44	-0.44	-0.64
9,100.00	2.55	200.92	9,093.48	-193.23	-104.55	-190.16	0.26	0.04	-5.72
9,125.00	2.77	203.18	9,118.45	-194.30	-104.99	-191.22	0.97	0.88	9.04
9,150.00	2.89	200.81	9,143.42	-195.45	-105.45	-192.35	0.67	0.48	-9.48
9,175.00	2.95	201.41	9,168.39	-196.63	-105.91	-193.52	0.27	0.24	2.40
9,200.00	2.92	200.01	9,193.36	-197.83	-106.36	-194.71	0.31	-0.12	-5.60
9,225.00	2.73	198.13	9,218.33	-199.00	-106.76	-195.86	0.85	-0.76	-7.52
9,250.00	2.92	201.05	9,243.30	-200.16	-107.18	-197.01	0.95	0.76	11.68
9,275.00	3.11	207.30	9,268.26	-201.35	-107.72	-198.19	1.52	0.76	25.00
9,300.00	3.18	211.25	9,293.23	-202.55	-108.39	-199.36	0.91	0.28	15.80
9,325.00	3.28	212.01	9,318.19	-203.75	-109.12	-200.54	0.44	0.40	3.04
9,350.00	3.24	213.21	9,343.15	-204.94	-109.89	-201.72	0.32	-0.16	4.80
9,375.00	3.12	216.71	9,368.11	-206.08	-110.68	-202.83	0.91	-0.48	14.00
9,400.00	3.05	218.61	9,393.07	-207.15	-111.51	-203.87	0.50	-0.28	7.60
9,425.00	2.98	219.84	9,418.04	-208.17	-112.34	-204.87	0.38	-0.28	4.92
9,450.00	3.05	218.92	9,443.00	-209.18	-113.17	-205.86	0.34	0.28	-3.68
9,475.00	3.11	219.02	9,467.97	-210.23	-114.02	-206.88	0.24	0.24	0.40
9,500.00	3.07	220.44	9,492.93	-211.26	-114.88	-207.89	0.35	-0.16	5.68
9,525.00	3.12	220.55	9,517.89	-212.29	-115.75	-208.89	0.20	0.20	0.44
9,550.00	3.03	220.90	9,542.86	-213.31	-116.63	-209.88	0.37	-0.36	1.40
9,575.00	3.00	218.41	9,567.82	-214.32	-117.47	-210.87	0.54	-0.12	-9.96
9,600.00	2.71	217.73	9,592.79	-215.30	-118.24	-211.83	1.17	-1.16	-2.72
9,625.00	2.68	215.88	9,617.76	-216.24	-118.94	-212.75	0.37	-0.12	-7.40
9,650.00	2.63	215.20	9,642.74	-217.18	-119.61	-213.67	0.24	-0.20	-2.72
9,675.00	2.63	216.03	9,667.71	-218.11	-120.28	-214.58	0.15	0.00	3.32
9,700.00	2.71	217.67	9,692.68	-219.04	-120.98	-215.49	0.44	0.32	6.56
9,725.00	2.73	217.03	9,717.65	-219.99	-121.70	-216.42	0.15	0.08	-2.56
9,750.00	2.70	216.83	9,742.63	-220.93	-122.41	-217.34	0.13	-0.12	-0.80
9,775.00	2.86	213.61	9,767.60	-221.93	-123.11	-218.31	0.89	0.64	-12.88
9,800.00	2.91	210.82	9,792.57	-222.99	-123.78	-219.36	0.60	0.20	-11.16
9,825.00	3.06	208.70	9,817.53	-224.12	-124.43	-220.47	0.74	0.60	-8.48
9,850.00	3.06	207.55	9,842.50	-225.30	-125.05	-221.63	0.25	0.00	-4.60
9,875.00	3.19	205.55	9,867.46	-226.52	-125.66	-222.83	0.68	0.52	-8.00
9,900.00	3.19	207.04	9,892.42	-227.76	-126.28	-224.06	0.33	0.00	5.96
9,925.00	3.27	206.22	9,917.38	-229.02	-126.91	-225.30	0.37	0.32	-3.28
9,950.00	3.32	206.29	9,942.34	-230.31	-127.55	-226.57	0.20	0.20	0.28
9,975.00	3.38	205.49	9,967.30	-231.63	-128.18	-227.86	0.30	0.24	-3.20
10,000.00	3.39	203.65	9,992.25	-232.97	-128.80	-229.19	0.44	0.04	-7.36
10,025.00	3.37	201.60	10,017.21	-234.33	-129.37	-230.53	0.49	-0.08	-8.20
10,050.00	3.22	198.66	10,042.17	-235.68	-129.86	-231.87	0.90	-0.60	-11.76



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandril Freedom)
MD Reference: KB=26' @ 3831.20usft (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	3.11	199.07	10,067.13	-236.98	-130.31	-233.16	0.45	-0.44	1.64
10,100.00	2.96	201.46	10,092.09	-238.22	-130.76	-234.39	0.78	-0.60	9.56
10,125.00	2.89	200.79	10,117.06	-239.41	-131.22	-235.56	0.31	-0.28	-2.68
10,150.00	2.74	200.96	10,142.03	-240.56	-131.66	-236.70	0.60	-0.60	0.68
10,175.00	2.67	200.29	10,167.00	-241.67	-132.08	-237.79	0.31	-0.28	-2.68
10,200.00	2.51	199.92	10,191.98	-242.73	-132.47	-238.84	0.64	-0.64	-1.48
10,225.00	2.64	199.37	10,216.95	-243.78	-132.84	-239.88	0.53	0.52	-2.20
10,250.00	2.60	199.51	10,241.93	-244.86	-133.22	-240.95	0.16	-0.16	0.56
10,275.00	2.57	199.79	10,266.90	-245.92	-133.60	-242.00	0.13	-0.12	1.12
10,300.00	2.64	198.83	10,291.88	-247.00	-133.98	-243.06	0.33	0.28	-3.84
10,325.00	2.58	198.33	10,316.85	-248.08	-134.34	-244.13	0.26	-0.24	-2.00
10,350.00	2.56	196.45	10,341.82	-249.14	-134.68	-245.19	0.35	-0.08	-7.52
10,375.00	2.21	194.95	10,366.80	-250.15	-134.96	-246.18	1.42	-1.40	-6.00
10,400.00	2.41	196.03	10,391.78	-251.12	-135.23	-247.15	0.82	0.80	4.32
10,425.00	2.35	198.51	10,416.76	-252.11	-135.54	-248.13	0.48	-0.24	9.92
10,450.00	2.39	194.95	10,441.74	-253.10	-135.83	-249.11	0.61	0.16	-14.24
10,475.00	2.34	195.39	10,466.72	-254.09	-136.10	-250.10	0.21	-0.20	1.76
10,500.00	2.21	198.42	10,491.70	-255.04	-136.39	-251.04	0.71	-0.52	12.12
10,525.00	2.05	193.58	10,516.68	-255.93	-136.65	-251.92	0.96	-0.64	-19.36
10,550.00	1.94	189.17	10,541.67	-256.79	-136.82	-252.77	0.76	-0.44	-17.64
10,575.00	2.10	193.03	10,566.65	-257.65	-136.99	-253.63	0.84	0.64	15.44
10,600.00	1.92	195.42	10,591.64	-258.50	-137.21	-254.47	0.79	-0.72	9.56
10,625.00	1.87	192.67	10,616.62	-259.30	-137.41	-255.27	0.42	-0.20	-11.00
10,650.00	1.95	192.07	10,641.61	-260.12	-137.59	-256.07	0.33	0.32	-2.40
10,675.00	2.02	196.25	10,666.59	-260.96	-137.80	-256.91	0.64	0.28	16.72
10,700.00	2.12	191.53	10,691.58	-261.83	-138.01	-257.78	0.79	0.40	-18.88
10,725.00	2.37	193.05	10,716.56	-262.79	-138.22	-258.73	1.03	1.00	6.08
10,750.00	2.60	195.88	10,741.53	-263.84	-138.49	-259.77	1.04	0.92	11.32
10,775.00	2.89	192.20	10,766.51	-265.00	-138.78	-260.92	1.36	1.16	-14.72
10,800.00	3.05	195.40	10,791.47	-266.26	-139.09	-262.17	0.92	0.64	12.80
10,834.00	4.00	199.01	10,825.41	-268.25	-139.72	-264.14	2.87	2.79	10.62
First MWD Survey @ 10834'MD									
10,847.00	4.08	201.05	10,838.37	-269.11	-140.03	-264.99	1.27	0.62	15.69
10,865.00	4.08	202.61	10,856.33	-270.30	-140.51	-266.17	0.62	0.00	8.67
10,896.00	3.41	208.03	10,887.26	-272.13	-141.37	-267.97	2.44	-2.16	17.48
10,959.00	6.33	2.81	10,950.16	-270.31	-142.08	-266.14	15.12	4.63	245.68
10,991.00	12.37	9.75	10,981.72	-265.17	-141.41	-261.01	19.17	18.88	21.69
11,053.00	20.06	4.37	11,041.21	-247.99	-139.47	-243.90	12.62	12.40	-8.68
11,100.00	24.19	359.40	11,084.75	-230.32	-138.96	-226.25	9.64	8.79	-10.57
11,147.00	28.82	358.43	11,126.80	-209.35	-139.37	-205.28	9.89	9.85	-2.06
11,194.00	33.59	358.15	11,166.98	-185.02	-140.10	-180.94	10.15	10.15	-0.60
11,241.00	39.03	356.56	11,204.84	-157.23	-141.41	-153.12	11.75	11.57	-3.38
11,288.00	45.96	354.50	11,239.48	-125.60	-143.92	-121.44	15.04	14.74	-4.38

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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandril Freedom)
MD Reference: KB=26' @ 3831.20usft (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)
11,334.00	50.24	354.41	11,270.19	-91.53	-147.23	-87.29	9.31	9.30	-0.20
11,365.00	52.50	354.91	11,289.55	-67.42	-149.48	-63.12	7.40	7.29	1.61
11,427.00	57.27	355.39	11,325.20	-16.90	-153.76	-12.50	7.72	7.69	0.77
11,490.00	63.02	355.42	11,356.55	37.54	-158.14	42.05	9.13	9.13	0.05
11,521.00	68.15	356.05	11,369.36	65.68	-160.23	70.23	16.65	16.55	2.03
11,552.00	73.64	356.30	11,379.50	94.89	-162.18	99.49	17.73	17.71	0.81
11,579.00	78.05	356.70	11,386.10	121.02	-163.78	125.65	16.40	16.33	1.48
11,610.00	81.46	356.44	11,391.61	151.47	-165.61	156.14	11.03	11.00	-0.84
11,641.00	82.79	357.29	11,395.86	182.13	-167.28	186.84	5.08	4.29	2.74
11,734.00	86.95	1.27	11,404.18	274.71	-168.44	279.41	6.18	4.47	4.28
11,828.00	88.63	1.32	11,407.80	368.61	-166.31	373.22	1.79	1.79	0.05
11,922.00	90.87	0.20	11,408.21	462.59	-165.07	467.13	2.66	2.38	-1.19
12,016.00	91.06	0.54	11,406.63	556.58	-164.46	561.05	0.41	0.20	0.36
12,110.00	91.60	0.47	11,404.45	650.55	-163.63	654.96	0.58	0.57	-0.07
12,204.00	91.54	1.23	11,401.87	744.50	-162.24	748.84	0.81	-0.06	0.81
12,297.00	93.31	1.46	11,397.94	837.39	-160.06	841.63	1.92	1.90	0.25
12,391.00	94.29	0.37	11,391.71	931.17	-158.56	935.32	1.56	1.04	-1.16
12,484.00	94.43	0.99	11,384.64	1,023.89	-157.46	1,027.98	0.68	0.15	0.67
12,578.00	94.48	1.49	11,377.34	1,117.59	-155.43	1,121.57	0.53	0.05	0.53
12,672.00	93.28	359.66	11,370.97	1,211.36	-154.49	1,215.28	2.32	-1.28	-1.95
12,765.00	93.31	359.50	11,365.63	1,304.20	-155.17	1,308.11	0.17	0.03	-0.17
12,859.00	93.28	0.03	11,360.23	1,398.05	-155.56	1,401.92	0.56	-0.03	0.56
12,952.00	93.22	359.99	11,354.95	1,490.90	-155.54	1,494.74	0.08	-0.06	-0.04
13,046.00	93.33	359.39	11,349.58	1,584.74	-156.05	1,588.56	0.65	0.12	-0.64
13,140.00	92.30	358.79	11,344.97	1,678.61	-157.54	1,682.43	1.27	-1.10	-0.64
13,234.00	92.38	358.60	11,341.13	1,772.51	-159.68	1,776.35	0.22	0.09	-0.20
13,328.00	92.63	358.53	11,337.02	1,866.39	-162.03	1,870.26	0.28	0.27	-0.07
13,422.00	90.34	358.54	11,334.58	1,960.32	-164.43	1,964.23	2.44	-2.44	0.01
13,515.00	90.36	358.37	11,334.02	2,053.29	-166.94	2,057.22	0.18	0.02	-0.18
13,609.00	90.59	358.12	11,333.24	2,147.24	-169.82	2,151.22	0.36	0.24	-0.27
13,703.00	91.68	358.14	11,331.38	2,241.17	-172.89	2,245.20	1.16	1.16	0.02
13,796.00	92.13	358.04	11,328.28	2,334.07	-175.98	2,338.15	0.50	0.48	-0.11
13,890.00	92.33	357.74	11,324.63	2,427.93	-179.44	2,432.07	0.38	0.21	-0.32
13,983.00	90.20	357.50	11,322.57	2,520.82	-183.30	2,525.04	2.30	-2.29	-0.26
14,076.00	91.09	357.72	11,321.53	2,613.74	-187.18	2,618.02	0.99	0.96	0.24
14,170.00	91.23	356.65	11,319.62	2,707.60	-191.80	2,711.98	1.15	0.15	-1.14
14,264.00	89.36	358.76	11,319.14	2,801.52	-195.56	2,805.96	3.00	-1.99	2.24
14,357.00	88.66	1.04	11,320.75	2,894.50	-195.72	2,898.91	2.56	-0.75	2.45
14,451.00	90.56	1.37	11,321.39	2,988.47	-193.75	2,992.79	2.05	2.02	0.35
14,545.00	90.90	1.73	11,320.19	3,082.43	-191.20	3,086.63	0.53	0.36	0.38
14,638.00	90.73	1.80	11,318.87	3,175.37	-188.34	3,179.46	0.20	-0.18	0.08
14,732.00	91.76	0.32	11,316.82	3,269.33	-186.60	3,273.33	1.92	1.10	-1.57
14,825.00	92.16	0.94	11,313.64	3,362.27	-185.58	3,366.20	0.79	0.43	0.67



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandril Freedom)
MD Reference: KB=26' @ 3831.20usft (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)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
14,918.00	92.24	1.05	11,310.07	3,455.19	-183.96	3,459.04	0.15	0.09	0.12
15,012.00	92.80	0.04	11,305.94	3,549.09	-183.07	3,552.88	1.23	0.60	-1.07
15,105.00	93.05	359.49	11,301.19	3,641.97	-183.45	3,645.73	0.65	0.27	-0.59
15,199.00	93.45	359.72	11,295.86	3,735.81	-184.10	3,739.55	0.49	0.43	0.24
15,293.00	93.50	359.72	11,290.17	3,829.64	-184.56	3,833.35	0.05	0.05	0.00
15,386.00	93.64	359.43	11,284.38	3,922.46	-185.25	3,926.15	0.35	0.15	-0.31
15,479.00	93.84	359.57	11,278.31	4,015.26	-186.06	4,018.93	0.26	0.22	0.15
15,572.00	94.15	359.27	11,271.83	4,108.02	-186.99	4,111.69	0.46	0.33	-0.32
15,665.00	91.99	358.39	11,266.85	4,200.87	-188.89	4,204.55	2.51	-2.32	-0.95
15,760.00	92.52	358.39	11,263.11	4,295.75	-191.56	4,299.48	0.56	0.56	0.00
15,854.00	90.00	358.68	11,261.05	4,389.69	-193.96	4,393.45	2.70	-2.68	0.31
15,948.00	90.62	358.55	11,260.54	4,483.66	-196.23	4,487.44	0.67	0.66	-0.14
16,042.00	91.37	358.55	11,258.90	4,577.62	-198.61	4,581.43	0.80	0.80	0.00
16,136.00	89.64	359.20	11,258.08	4,671.59	-200.46	4,675.42	1.97	-1.84	0.69
16,231.00	90.67	359.60	11,257.82	4,766.59	-201.45	4,770.40	1.16	1.08	0.42
16,324.00	91.88	359.07	11,255.75	4,859.55	-202.53	4,863.36	1.42	1.30	-0.57
16,419.00	90.34	359.38	11,253.91	4,954.53	-203.82	4,958.33	1.65	-1.62	0.33
16,512.00	91.26	359.05	11,252.61	5,047.51	-205.09	5,051.31	1.05	0.99	-0.35
16,606.00	90.14	359.75	11,251.46	5,141.49	-206.07	5,145.28	1.41	-1.19	0.74
16,700.00	91.04	359.75	11,250.49	5,235.49	-206.48	5,239.25	0.96	0.96	0.00
16,794.00	90.17	0.76	11,249.50	5,329.48	-206.06	5,333.19	1.42	-0.93	1.07
16,887.00	91.01	0.41	11,248.54	5,422.47	-205.12	5,426.11	0.98	0.90	-0.38
16,981.00	89.83	0.91	11,247.86	5,516.46	-204.03	5,520.03	1.36	-1.26	0.53
17,074.00	90.53	0.51	11,247.56	5,609.45	-202.88	5,612.96	0.87	0.75	-0.43
17,168.00	88.49	0.42	11,248.37	5,703.44	-202.12	5,706.88	2.17	-2.17	-0.10
17,262.00	89.30	0.39	11,250.18	5,797.41	-201.45	5,800.81	0.86	0.86	-0.03
17,356.00	90.00	0.68	11,250.75	5,891.41	-200.58	5,894.74	0.81	0.74	0.31
17,449.00	90.67	0.50	11,250.21	5,984.40	-199.62	5,987.66	0.75	0.72	-0.19
17,542.00	91.68	0.55	11,248.30	6,077.38	-198.77	6,080.58	1.09	1.09	0.05
17,636.00	89.94	0.62	11,246.97	6,171.36	-197.81	6,174.49	1.85	-1.85	0.07
17,729.00	90.53	0.42	11,246.59	6,264.35	-196.96	6,267.42	0.67	0.63	-0.22
17,823.00	91.29	0.26	11,245.10	6,358.34	-196.40	6,361.36	0.83	0.81	-0.17
17,917.00	89.75	359.60	11,244.25	6,452.33	-196.52	6,455.31	1.78	-1.64	-0.70
18,011.00	89.27	359.38	11,245.05	6,546.32	-197.36	6,549.29	0.56	-0.51	-0.23
18,104.00	90.08	359.49	11,245.58	6,639.32	-198.27	6,642.27	0.88	0.87	0.12
18,198.00	87.62	358.62	11,247.46	6,733.28	-199.82	6,736.24	2.78	-2.62	-0.93
18,291.00	88.46	358.52	11,250.65	6,826.19	-202.14	6,829.18	0.91	0.90	-0.11
18,363.24	89.22	358.64	11,252.11	6,898.40	-203.93	6,901.41	1.07	1.05	0.17
330' FNL @ 18363.24'MD									
18,384.00	89.44	358.68	11,252.35	6,919.15	-204.41	6,922.17	1.07	1.05	0.17
Final MWD Survey @ 18384'MD									
18,492.00	89.44	358.68	11,253.41	7,027.12	-206.90	7,030.16	0.00	0.00	0.00
Projection to TD @ 18492'MD									



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 3H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Little Bear Federal Com 3H
TVD Reference: KB=26' @ 3831.20usft (Scandriil Freedom)
MD Reference: KB=26' @ 3831.20usft (Scandriil Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,834.00	10,825.41	-268.25	-139.72	First MWD Survey @ 10834'MD
18,363.24	11,252.11	6,898.40	-203.93	330' FNL @ 18363.24'MD
18,384.00	11,252.35	6,919.15	-204.41	Final MWD Survey @ 18384'MD
18,492.00	11,253.41	7,027.12	-206.90	Projection to TD @ 18492'MD

Checked By: _____ Approved By: _____ Date: _____

		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots
From Bottom to Top	18,370	22	5	18,150	67	5	17,988	33	5	17,795	30	5	17,587	32	5	
	18,348	22	5	18,130	17	5	17,962	15	5	17,776	25	5	17,580	30	5	
	18,326	22	4	18,113	19	4	17,947	28	4	17,751	24	4	17,550	19	4	
	18,304	22	4	18,094	19	4	17,919	21	4	17,727	25	4	17,531	27	4	
	18,282	22	3	18,075	17	3	17,898		3	17,702	24	3	17,504	22	3	
	18,260	22	3	18,058	18	3	17,873	24	3	17,678	23	3	17,482	25	3	
	18,238	21	3	18,040	19	3	17,849	24	3	17,655	26	3	17,457	24	3	
	18,217		3	18,021		3	17,825		3	17,629		3	17,433		3	
Plug to Plug		91	30	Plug to Plug	66	30	Plug to Plug	79	30	Plug to Plug	78	30	Plug to Plug	81	30	
Frac Plug		18,395	Total Shots	Frac Plug	18,160	Total Shots	Frac Plug	17,998	Total Shots	Frac Plug	17,805	Total Shots	Frac Plug	17,612	Total Shots	

		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots
From Bottom to Top	17,399	34	5	17,205	35	5	17,009	32	5	16,813	32	5	16,614	35	5	
	17,384	25	5	17,193	30	5	16,992	25	5	16,796	29	5	16,600	25	5	
	17,359	24	4	17,163	25	4	16,967	24	4	16,767	20	4	16,575	24	4	
	17,335	25	4	17,138	24	4	16,943	25	4	16,747	26	4	16,551	25	4	
	17,310	24	3	17,114	24	3	16,918	24	3	16,721	23	3	16,526	24	3	
	17,286	25	3	17,090	25	3	16,894	25	3	16,698	25	3	16,502	25	3	
	17,261	21	3	17,065	24	3	16,869	24	3	16,673	24	3	16,477	22	3	
	17,240		3	17,041		3	16,845		3	16,649		3	16,455		3	
Plug to Plug		74	30	Plug to Plug	77	30	Plug to Plug	76	30	Plug to Plug	79	30	Plug to Plug	73	30	
Frac Plug		17,409	Total Shots	Frac Plug	17,215	Total Shots	Frac Plug	17,019	Total Shots	Frac Plug	16,826	Total Shots	Frac Plug	16,624	Total Shots	

		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots
From Bottom to Top	16,420	35	5	16,226	31	5	16,017	44	5	15,832	33	5	15,636	33	5	
	16,408	29	5	16,208	25	5	16,004	19	5	15,816	25	5	15,619	24	5	
	16,379	17	4	16,183	24	4	15,985	22	4	15,791	18	4	15,595	25	4	
	16,362	32	4	16,159	25	4	15,963	25	4	15,773	31	4	15,570	24	4	
	16,330	24	3	16,134	24	3	15,938	24	3	15,742	26	3	15,546	25	3	
	16,306	25	3	16,110	22	3	15,914	25	3	15,716	23	3	15,521	18	3	
	16,281	24	3	16,088	27	3	15,889	24	3	15,693	24	3	15,503	31	3	
	16,257		3	16,061		3	15,865		3	15,669		3	15,472		3	
Plug to Plug		68	30	Plug to Plug	77	30	Plug to Plug	64	30	Plug to Plug	69	30	Plug to Plug	76	30	
Frac Plug		16,430	Total Shots	Frac Plug	16,236	Total Shots	Frac Plug	16,027	Total Shots	Frac Plug	15,842	Total Shots	Frac Plug	15,646	Total Shots	

		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots
From Bottom to Top	15,436	36	5	15,246	31	5	15,044	40	5	14,845	39	5	14,358	330	5	
	15,423	24	5	15,222	19	5	15,025	17	5	14,830	19	5	14,634	19	5	
	15,399	25	4	15,203	26	4	15,008	26	4	14,811	25	4	14,615	26	4	
	15,374	24	4	15,177	23	4	14,982	24	4	14,786	24	4	14,589	23	4	
	15,350	25	3	15,154	25	3	14,958	25	3	14,762	25	3	14,566	25	3	
	15,325	24	3	15,129	24	3	14,933	26	3	14,737	24	3	14,541	24	3	
	15,301	24	3	15,105	21	3	14,907	23	3	14,713	25	3	14,517	25	3	
	15,277		3	15,084		3	14,884		3	14,688		3	14,492		3	
Plug to Plug		72	30	Plug to Plug	79	30	Plug to Plug	67	30	Plug to Plug	69	30	Plug to Plug	79	30	
Frac Plug		15,446	Total Shots	Frac Plug	15,256	Total Shots	Frac Plug	15,049	Total Shots	Frac Plug	14,855	Total Shots	Frac Plug	14,668	Total Shots	

		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots
From Bottom to Top	14,452	-94	5	14,254	42	5	14,068	32	5	13,872	30	5	13,679	29	5	
	14,440	21	5	14,244	21	5	14,051	24	5	13,855	24	5	13,659	24	5	
	14,419	25	4	14,223	25	4	14,027	22	4	13,831	25	4	13,635	-5	4	
	14,394	24	4	14,198	24	4	14,005	27	4	13,806	24	4	13,640	51	4	
	14,370	25	3	14,174	25	3	13,978	29	3	13,782	25	3	13,589	28	3	
	14,345	21	3	14,149	24	3	13,949	20	3	13,757	24	3	13,581	21	3	
	14,324	28	3	14,125	25	3	13,929	27	3	13,733	25	3	13,540	28	3	
	14,296		3	14,100		3	13,902		3	13,708		3	13,512		3	
Plug to Plug		76	30	Plug to Plug	66	30	Plug to Plug	73	30	Plug to Plug	76	30	Plug to Plug	48	30	
Frac Plug		14,470	Total Shots	Frac Plug	14,264	Total Shots	Frac Plug	14,078	Total Shots	Frac Plug	13,882	Total Shots	Frac Plug	13,688	Total Shots	

		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots		Distance Between Perfs		Shots
From Bottom to Top	13,470	42	5	13,284	32	5	13,090	30	5	12,886	38	5	12,680	48	5	
	13,460	21	5	13,267	25	5	13,071	25	5	12,875	25	5	12,664	19	5	
	13,439	25	4	13,242	24	4	13,046	24	4	12,850	24	4	12,645	15	4	
	13,414	24	4	13,218	25	4	13,022	25	4	12,826	21	4	12,630	25	4	
	13,390	25	3	13,193	21	3	12,997	24	3	12,805	28	3	12,605	24	3	
	13,365	24	3	13,172	28	3	12,973	25	3	12,777	29	3	12,581	25	3	
	13,341	25	3	13,144	24	3	12,948	24	3	12,748	20	3	12,556	24	3	
	13,316		3	13,120		3	12,924		3	12,728		3	12,532		3	
Plug to Plug		66	30	Plug to Plug	76	30	Plug to Plug	78	30	Plug to Plug	76	30	Plug to Plug	66	30	
Frac Plug		13,480	Total Shots	Frac Plug	13,294	Total Shots	Frac Plug	13,100	Total Shots	Frac Plug	12,902	Total Shots	Frac Plug	12,696	Total Shots	

From Bottom to Top		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots		Distance Between Perfs	Shots	Stage 35	Distance Between Perfs	Shots
	12,500	32	5	12,311	31	5	12,110	30	5	11,900	44	5	11,714	34	5
	12,483	25	5	12,286	24	5	12,091	25	5	11,890	22	5	11,699	25	5
	12,459	24	4	12,262	24	4	12,066	24	4	11,868	22	4	11,674	24	4
	12,434	25	4	12,238	25	4	12,042	24	4	11,848	25	4	11,650	25	4
	12,409	24	3	12,213	24	3	12,018	25	3	11,821	24	3	11,625	24	3
	12,385	25	3	12,189	25	3	11,993	20	3	11,797	25	3	11,601	25	3
	12,360	18	3	12,164	24	3	11,973	29	3	11,772	24	3	11,576	24	3
	12,342		3	12,140		3	11,944		3	11,748		3	11,552		3
	Plug to Plug	76	30	Plug to Plug	84	30	Plug to Plug	78	30	Plug to Plug	64	30	Plug to Plug	74	30
	Frac Plug	12,510	Total Shots	Frac Plug	12,322	Total Shots	Frac Plug	12,120	Total Shots	Frac Plug	11,910	Total Shots	Frac Plug	11,724	Total Shots

Little Bear Federal Com #3H

<u>Perfs</u>	<u>7 1/2% Acid (Gal)</u>	<u>Sand (#)</u>	<u>Fluid (Gal)</u>
1	1890	400255	349020
2	1512	400340	380100
3	1512	400012	347508
4	1512	400372	374178
5	1512	399836	360318
6	1512	402626	344820
7	1512	399951	386274
8	1596	402605	341250
9	1512	402455	334614
10	1554	401454	335916
11	1554	402945	343266
12	1512	404541	353682
13	1512	400320	332346
14	1512	400392	329616
15	1512	403233	325626
16	1512	399986	352884
17	1512	400686	338310
18	1554	399899	318990
19	1512	405002	323358
20	1512	403561	333648
21	1554	401117	326298
22	1554	401866	328482
23	1512	400875	312186
24	1512	400246	316974
25	1512	400313	326718
26	1512	399806	325920
27	1512	398786	326592
28	1512	400037	342510
29	1512	401217	317142
30	1554	401553	326130
31	1512	402360	337848
32	1512	400081	327432
33	1512	400334	321510
34	1512	401376	313572
35	1512	401416	310674
Totals	53,634	14,041,854	11,765,712