



30-015-39126

C.O.G. Operating LLC

Lea County (NAD27)

Burch Keely Unit

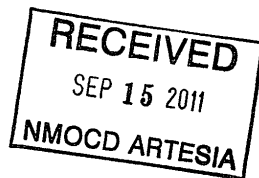
#624(SHL = 2458' FSL & 2464' FEL)

OH(BHL = 2300' FNL & 2630' FWL)

Survey: Leam MWD

Leam X&Y Report

19 July, 2011





Leam Drilling Systems
Leam X&Y Report



Company:	C.O.G. Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit
Project:	Lea County (NAD27)	TVD Reference:	WELL @ 3628.0usft (Original Well Elev)
Site:	Burch Keely Unit	MD Reference:	WELL @ 3628.0usft (Original Well Elev)
Well:	#624(SHL = 2458' FSL & 2464' FEL)	North Reference:	Grid
Wellbore:	OH(BHL = 2300' FNL & 2630' FWL)	Survey Calculation Method:	Minimum Curvature
Design:	OH(BHL = 2300' FNL & 2630' FWL)	Database:	Midland(Permian Basin) Database

Project	Lea County (NAD27)		
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	Burch Keely Unit		
Site Position:		Northing:	661,953.10 usft
From:	Map	Easting:	593,698.20 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 49' 9.930 N
		Longitude:	104° 1' 41.999 W
		Grid Convergence:	0.17 °

Well	#624(SHL = 2458' FSL & 2464' FEL)		
Well Position	+N/-S	0.0 usft	Northing: 661,953.10 usft
	+E/-W	0.0 usft	Easting: 593,698.20 usft
Position Uncertainty	0.0 usft		Latitude: 32° 49' 9.930 N
		Wellhead Elevation:	usft
			Longitude: 104° 1' 41.999 W
			Ground Level: 3,611.0 usft

Wellbore	OH(BHL = 2300' FNL & 2630' FWL)		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	07/09/11	7.83
			Dip Angle
			(°)
			60.66
			Field Strength
			(nT)
			48,916

Design	OH(BHL = 2300' FNL & 2630' FWL)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			17.65



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Survey Program		Date	07/19/11		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100 0	955 0	GYRO (OH(BHL = 2300' FNL & 2630' FWL	MWD	MWD - Standard	
1,059 0	4,828.0	Leam MWD (OH(BHL = 2300' FNL & 2630	MWD	MWD - Standard	

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	DLeg (°/100usft)	N/S (usft)	E/W (usft)	Northing (usft)	Easting (usft)
955 0	1.54	82.22	954 9	-1 6	0 00	-3 7	6 6	661,949.38	593,704.79
1,059 0	1.10	85 30	1,058 9	-0 6	0 43	-3 5	9 0	661,949.65	593,707 17
1,091.0	1.00	84.60	1,090 9	-0 3	0 32	-3 4	9 6	661,949.70	593,707 75
1,123.0	1 14	81.67	1,122 9	-0 1	0 47	-3 3	10.1	661,949 77	593,708 34
1,155 0	1 41	50 21	1,154.8	0 4	2 31	-3 0	10.8	661,950 07	593,708 96
1,187 0	2 11	31 40	1,186.8	1 3	2.81	-2 3	11.4	661,950 82	593,709.57
1,219 0	2 99	24 02	1,218.8	2 7	2.93	-1 0	12 0	661,952 09	593,710 22
1,251 0	3 87	17 16	1,250.7	4 6	3 03	0 8	12.7	661,953 88	593,710.88
1,283 0	4 57	13 30	1,282 7	6 9	2 36	3 1	13 3	661,956 15	593,711.49
1,314 0	5 28	10.31	1,313 5	9 6	2 43	5 7	13 8	661,958 76	593,712 03
1,346.0	5.90	8.90	1,345 4	12 7	1 98	8 7	14 3	661,961 83	593,712 55
1,378 0	6 42	8 20	1,377.2	16 1	1 64	12 1	14 9	661,965 23	593,713 06
1,410 0	6 77	8 38	1,409 0	19.7	1 10	15 8	15 4	661,968 87	593,713 59
1,442 0	7 12	10 13	1,440 8	23.5	1 28	19 6	16 0	661,972 68	593,714 21
1,473 0	7.47	11 89	1,471 5	27.4	1 34	23 4	16 8	661,976.55	593,714 96
1,505.0	7 91	12 42	1,503 2	31 7	1 39	27 6	17 7	661,980.73	593,715 86
1,537.0	8 30	12 40	1,534 9	36 2	1 22	32 0	18 6	661,985 14	593,716 83
1,569 0	8 20	12.50	1,566 6	40 8	0 32	36.5	19 6	661,989 62	593,717 82
1,601 0	8 60	13 40	1,598 2	45 4	1 32	41 1	20 7	661,994 18	593,718 87
1,697 0	8 00	16 20	1,693 2	59 2	0 75	54 5	24 2	662,007.58	593,722 40
1,792.0	6 70	19.20	1,787 4	71.4	1 43	66 1	27.9	662,019 16	593,726 07



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Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	DLeg (°/100usft)	N/S (usft)	E/W (usft)	Northing (usft)	Easting (usft)	
1,888.0	6.50	18.30	1,882.8	82.4	0.23	76.5	31.4	662,029.61	593,729.61	
1,983.0	7.60	13.90	1,977.1	94.1	1.29	87.7	34.6	662,040.81	593,732.81	
2,079.0	8.60	14.30	2,072.1	107.6	1.04	100.8	37.9	662,053.93	593,736.11	
2,174.0	9.20	14.90	2,166.0	122.3	0.64	115.1	41.6	662,068.15	593,739.82	
2,270.0	8.60	14.90	2,260.8	137.1	0.62	129.4	45.4	662,082.50	593,743.64	
2,366.0	9.40	15.60	2,355.6	152.1	0.84	143.9	49.4	662,096.99	593,747.59	
2,461.0	9.20	15.90	2,449.4	167.4	0.22	158.7	53.6	662,111.77	593,751.76	
2,557.0	8.80	15.40	2,544.2	182.4	0.42	173.1	57.6	662,126.23	593,755.81	
2,653.0	9.60	17.90	2,639.0	197.8	0.93	187.8	62.0	662,140.92	593,760.22	
2,748.0	9.20	17.30	2,732.7	213.3	0.43	202.6	66.7	662,155.71	593,764.91	
2,844.0	9.10	17.20	2,827.5	228.6	0.11	217.2	71.2	662,170.29	593,769.44	
2,939.0	9.10	18.20	2,921.3	243.6	0.17	231.5	75.8	662,184.61	593,774.01	
3,035.0	9.00	18.60	3,016.1	258.7	0.12	245.8	80.6	662,198.93	593,778.77	
3,130.0	8.80	18.90	3,109.9	273.4	0.22	259.8	85.3	662,212.85	593,783.50	
3,226.0	9.50	18.60	3,204.7	288.6	0.73	274.2	90.2	662,227.31	593,788.40	
3,322.0	10.80	17.20	3,299.2	305.6	1.38	290.3	95.4	662,243.41	593,793.59	
3,418.0	10.40	20.70	3,393.6	323.2	0.79	307.0	101.1	662,260.11	593,799.31	
3,513.0	9.50	21.40	3,487.1	339.6	0.96	322.3	107.0	662,275.43	593,805.20	
3,609.0	9.20	17.30	3,581.9	355.2	0.76	337.0	112.2	662,290.13	593,810.38	
3,705.0	9.00	16.60	3,676.7	370.4	0.24	351.6	116.6	662,304.65	593,814.81	
3,800.0	9.00	17.00	3,770.5	385.2	0.07	365.8	120.9	662,318.88	593,819.10	
3,896.0	8.80	15.80	3,865.3	400.1	0.28	380.0	125.1	662,333.13	593,823.30	
3,992.0	8.80	15.60	3,960.2	414.7	0.03	394.2	129.1	662,347.27	593,827.27	
4,087.0	9.00	15.80	4,054.1	429.4	0.21	408.3	133.0	662,361.42	593,831.25	
4,182.0	9.00	16.10	4,147.9	444.3	0.05	422.6	137.1	662,375.70	593,835.33	
4,278.0	9.20	14.90	4,242.7	459.5	0.29	437.2	141.2	662,390.33	593,839.39	
4,374.0	9.50	15.80	4,337.4	475.0	0.35	452.3	145.3	662,405.37	593,843.52	



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4,469.0	9.60	16.80	4,431.1	490.8	0.20	467.4	149.7	662,420.50	593,847.94	
4,565.0	9.20	15.60	4,525.8	506.5	0.46	482.5	154.1	662,435.56	593,852.32	
4,660.0	8.80	17.20	4,619.6	521.3	0.50	496.7	158.3	662,449.81	593,856.51	
4,775.0	8.10	10.00	4,733.4	538.2	1.10	513.1	162.3	662,466.20	593,860.52	
4,828.0	8.10	10.00	4,785.9	545.6	0.00	520.4	163.6	662,473.55	593,861.81	
BHL - 4828.0'MD, 8.10°INC, 10.00°AZI, 4785.9'TVD,520.4'N,163.6'E										

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,828.0	4,785.9	520.4	163.6	BHL - 4828.0'MD, 8.10°INC, 10.00°AZI, 4785.9'TVD,520.4'N,163.6'E

Checked By: _____ Approved By: _____ Date: _____