

COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 35, T 24 S. , R 32 E

Eider Federal 104H

HOBBS OCD

MAY 01 2019

RECEIVED

Wellbore #1

Design: Wellbore #1

Standard Survey Report

25 July, 2018

Survey Report

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 35, T 24 S. , R 32 E
Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (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. 35, T 24 S. , R 32 E			
Site Position:		Northing:	425,243.29 usft	Latitude:	32.16727
From:	Map	Easting:	711,320.50 usft	Longitude:	-103.65041
Position Uncertainty:	5.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.36 °

Well	Eider Federal 104H, ACTIVE					
Well Position	+N/-S	0.00 ft	Northing:	425,284.00 usf	Latitude:	32.16736
	+E/-W	0.00 ft	Easting:	712,420.30 usf	Longitude:	-103.64685
Position Uncertainty		0.00 ft.	Wellhead Elevation:	0.00 ft	Ground Level:	3,526.10 ft

Wellbore	Wellbore #1					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)	
	HDGM	7/19/2018	6.77	59.85	47,936	

Design	Wellbore #1					
Audit Notes:						
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)		
	0.00	0.00	0.00	1.56		

Survey Program	Date 7/25/2018				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
100.00	8,583.00	keeper gyro (Wellbore #1)	Keeper	Standard Wireline Keeper ver 1.0.2	
8,711.00	16,583.00	MWD Surveys (Wellbore #1)	MWD	MWD - Standard	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	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	0.36	334.12	100.00	0.28	-0.14	0.28	0.36	0.36	0.00
125.00	0.41	348.40	125.00	0.44	-0.19	0.44	0.43	0.20	57.12
150.00	0.44	341.08	150.00	0.62	-0.24	0.61	0.25	0.12	-29.28
175.00	0.43	338.60	175.00	0.80	-0.30	0.79	0.09	-0.04	-9.92
200.00	0.34	352.94	200.00	0.96	-0.35	0.95	0.52	-0.36	57.36
225.00	0.44	343.76	225.00	1.12	-0.38	1.11	0.47	0.40	-36.72
250.00	0.36	348.27	250.00	1.29	-0.43	1.28	0.34	-0.32	18.04
275.00	0.33	349.63	275.00	1.44	-0.45	1.43	0.12	-0.12	5.44
300.00	0.37	350.74	299.99	1.59	-0.48	1.58	0.16	0.16	4.44

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Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
325.00	0.45	351.70	324.99	1.77	-0.51	1.75	0.32	0.32	3.84
350.00	0.34	355.21	349.99	1.94	-0.53	1.92	0.45	-0.44	14.04
375.00	0.24	2.19	374.99	2.07	-0.53	2.05	0.42	-0.40	27.92
400.00	0.15	18.82	399.99	2.15	-0.52	2.13	0.42	-0.36	66.52
425.00	0.17	32.54	424.99	2.21	-0.49	2.20	0.17	0.08	54.88
450.00	0.18	2.85	449.99	2.28	-0.47	2.27	0.36	0.04	-118.76
475.00	0.09	355.41	474.99	2.34	-0.47	2.33	0.37	-0.36	-29.76
500.00	0.09	345.55	499.99	2.38	-0.47	2.37	0.06	0.00	-39.44
525.00	0.09	285.16	524.99	2.40	-0.50	2.39	0.36	0.00	-241.56
550.00	0.12	235.00	549.99	2.39	-0.54	2.38	0.37	0.12	-200.64
575.00	0.09	228.02	574.99	2.37	-0.57	2.35	0.13	-0.12	-27.92
600.00	0.07	235.88	599.99	2.34	-0.60	2.33	0.09	-0.08	31.44
625.00	0.10	213.89	624.99	2.32	-0.63	2.30	0.18	0.12	-87.96
650.00	0.11	181.31	649.99	2.27	-0.64	2.26	0.24	0.04	-130.32
675.00	0.17	214.50	674.99	2.22	-0.66	2.20	0.39	0.24	132.76
700.00	0.09	175.54	699.99	2.17	-0.68	2.15	0.46	-0.32	-155.84
725.00	0.17	252.42	724.99	2.14	-0.71	2.12	0.69	0.32	307.52
750.00	0.24	227.57	749.99	2.09	-0.79	2.07	0.45	0.28	-99.40
775.00	0.21	212.56	774.99	2.02	-0.85	1.99	0.26	-0.12	-60.04
800.00	0.18	237.55	799.99	1.96	-0.91	1.93	0.36	-0.12	99.96
825.00	0.18	234.47	824.99	1.92	-0.97	1.89	0.04	0.00	-12.32
850.00	0.19	229.88	849.99	1.87	-1.04	1.84	0.07	0.04	-18.36
875.00	0.22	220.86	874.99	1.80	-1.10	1.77	0.18	0.12	-36.08
900.00	0.19	227.73	899.99	1.74	-1.16	1.71	0.15	-0.12	27.48
925.00	0.15	221.14	924.99	1.69	-1.21	1.65	0.18	-0.16	-26.36
950.00	0.23	218.96	949.99	1.62	-1.27	1.59	0.32	0.32	-8.72
975.00	0.22	225.63	974.99	1.55	-1.33	1.51	0.11	-0.04	26.68
1,000.00	0.21	244.54	999.99	1.50	-1.41	1.46	0.29	-0.04	75.64
1,025.00	0.19	217.89	1,024.99	1.44	-1.48	1.40	0.38	-0.08	-106.60
1,050.00	0.30	240.88	1,049.99	1.38	-1.56	1.34	0.58	0.44	91.96
1,075.00	0.21	231.41	1,074.99	1.32	-1.65	1.27	0.40	-0.36	-37.88
1,100.00	0.26	244.27	1,099.99	1.27	-1.74	1.22	0.29	0.20	51.44
1,125.00	0.27	227.31	1,124.99	1.20	-1.83	1.15	0.32	0.04	-67.84
1,150.00	0.34	235.93	1,149.99	1.12	-1.94	1.07	0.33	0.28	34.48
1,175.00	0.33	243.27	1,174.99	1.05	-2.06	0.99	0.18	-0.04	29.36
1,200.00	0.30	236.59	1,199.99	0.98	-2.18	0.92	0.19	-0.12	-26.72
1,225.00	0.29	246.51	1,224.99	0.92	-2.30	0.85	0.21	-0.04	39.68
1,250.00	0.24	234.13	1,249.99	0.86	-2.40	0.79	0.30	-0.20	-49.52
1,275.00	0.21	246.86	1,274.99	0.81	-2.48	0.74	0.23	-0.12	50.92
1,300.00	0.24	242.09	1,299.99	0.77	-2.57	0.70	0.14	0.12	-19.08
1,325.00	0.28	245.28	1,324.99	0.72	-2.67	0.65	0.17	0.16	12.76
1,350.00	0.28	269.83	1,349.99	0.69	-2.79	0.62	0.48	0.00	98.20
1,375.00	0.26	249.86	1,374.99	0.67	-2.90	0.59	0.38	-0.08	-79.88

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Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
1,400.00	0.22	224.52	1,399.99	0.62	-2.99	0.54	0.45	-0.16	-101.36
1,425.00	0.27	217.92	1,424.99	0.54	-3.06	0.46	0.23	0.20	-26.40
1,450.00	0.27	232.42	1,449.99	0.46	-3.14	0.37	0.27	0.00	58.00
1,475.00	0.39	209.79	1,474.99	0.35	-3.23	0.26	0.70	0.48	-90.52
1,500.00	0.31	227.86	1,499.99	0.23	-3.32	0.14	0.54	-0.32	72.28
1,525.00	0.30	212.04	1,524.98	0.13	-3.41	0.03	0.34	-0.04	-63.28
1,550.00	0.33	238.43	1,549.98	0.03	-3.50	-0.06	0.59	0.12	105.56
1,575.00	0.30	245.45	1,574.98	-0.03	-3.62	-0.13	0.20	-0.12	28.08
1,600.00	0.35	233.29	1,599.98	-0.10	-3.74	-0.21	0.34	0.20	-48.64
1,625.00	0.33	249.18	1,624.98	-0.18	-3.87	-0.28	0.38	-0.08	63.56
1,650.00	0.38	248.79	1,649.98	-0.23	-4.02	-0.34	0.20	0.20	-1.56
1,675.00	0.43	257.59	1,674.98	-0.28	-4.19	-0.40	0.32	0.20	35.20
1,700.00	0.28	257.46	1,699.98	-0.31	-4.34	-0.43	0.60	-0.60	-0.52
1,725.00	0.26	316.94	1,724.98	-0.29	-4.44	-0.41	1.07	-0.08	237.92
1,750.00	0.26	3.50	1,749.98	-0.19	-4.47	-0.31	0.82	0.00	186.24
1,775.00	0.36	25.93	1,774.98	-0.06	-4.43	-0.18	0.62	0.40	89.72
1,800.00	0.34	18.74	1,799.98	0.08	-4.38	-0.04	0.19	-0.08	-28.76
1,825.00	0.39	18.75	1,824.98	0.23	-4.32	0.11	0.20	0.20	0.04
1,850.00	0.40	7.81	1,849.98	0.40	-4.29	0.28	0.30	0.04	-43.76
1,875.00	0.42	19.98	1,874.98	0.57	-4.24	0.45	0.36	0.08	48.68
1,900.00	0.46	4.84	1,899.98	0.76	-4.20	0.64	0.49	0.16	-60.56
1,925.00	0.39	8.73	1,924.98	0.94	-4.18	0.83	0.30	-0.28	15.56
1,950.00	0.41	16.10	1,949.98	1.11	-4.14	1.00	0.22	0.08	29.48
1,975.00	0.41	18.88	1,974.98	1.28	-4.09	1.17	0.08	0.00	11.12
2,000.00	0.39	15.80	1,999.98	1.45	-4.04	1.34	0.12	-0.08	-12.32
2,025.00	0.46	11.53	2,024.97	1.63	-3.99	1.52	0.31	0.28	-17.08
2,050.00	0.40	11.89	2,049.97	1.81	-3.96	1.70	0.24	-0.24	1.44
2,075.00	0.53	8.31	2,074.97	2.01	-3.92	1.90	0.53	0.52	-14.32
2,100.00	0.48	12.90	2,099.97	2.23	-3.88	2.12	0.26	-0.20	18.36
2,125.00	0.58	8.60	2,124.97	2.46	-3.84	2.35	0.43	0.40	-17.20
2,150.00	0.45	18.29	2,149.97	2.67	-3.79	2.57	0.62	-0.52	38.76
2,175.00	0.59	22.91	2,174.97	2.89	-3.71	2.78	0.58	0.56	18.48
2,200.00	0.56	23.03	2,199.97	3.12	-3.61	3.02	0.12	-0.12	0.48
2,225.00	0.66	27.98	2,224.97	3.36	-3.50	3.26	0.45	0.40	19.80
2,250.00	0.70	28.58	2,249.96	3.62	-3.35	3.52	0.16	0.16	2.40
2,275.00	0.68	24.81	2,274.96	3.89	-3.22	3.80	0.20	-0.08	-15.08
2,300.00	0.75	33.87	2,299.96	4.16	-3.07	4.07	0.53	0.28	36.24
2,325.00	0.70	31.31	2,324.96	4.42	-2.90	4.34	0.24	-0.20	-10.24
2,350.00	0.69	28.96	2,349.96	4.68	-2.74	4.61	0.12	-0.04	-9.40
2,375.00	0.58	35.51	2,374.96	4.92	-2.60	4.85	0.53	-0.44	26.20
2,400.00	0.57	34.86	2,399.95	5.12	-2.45	5.06	0.05	-0.04	-2.60
2,425.00	0.60	28.08	2,424.95	5.34	-2.32	5.28	0.30	0.12	-27.12
2,450.00	0.55	36.69	2,449.95	5.55	-2.19	5.49	0.40	-0.20	34.44

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 Design: Wellbore #1

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
2,475.00	0.51	45.85	2,474.95	5.73	-2.03	5.67	0.37	-0.16	36.64
2,500.00	0.57	27.44	2,499.95	5.92	-1.90	5.86	0.73	0.24	-73.64
2,525.00	0.64	22.96	2,524.95	6.15	-1.79	6.10	0.34	0.28	-17.92
2,550.00	0.68	19.53	2,549.95	6.42	-1.68	6.37	0.22	0.16	-13.72
2,575.00	0.70	17.02	2,574.94	6.71	-1.59	6.66	0.14	0.08	-10.04
2,600.00	0.67	20.73	2,599.94	6.99	-1.49	6.95	0.21	-0.12	14.84
2,625.00	0.71	20.60	2,624.94	7.27	-1.38	7.23	0.16	0.16	-0.52
2,650.00	0.79	32.52	2,649.94	7.56	-1.24	7.53	0.70	0.32	47.68
2,675.00	0.73	35.06	2,674.94	7.84	-1.05	7.81	0.28	-0.24	10.16
2,700.00	0.72	41.21	2,699.93	8.09	-0.86	8.06	0.31	-0.04	24.60
2,725.00	0.68	37.11	2,724.93	8.32	-0.67	8.30	0.26	-0.16	-16.40
2,750.00	0.65	42.96	2,749.93	8.55	-0.48	8.53	0.30	-0.12	23.40
2,775.00	0.59	47.20	2,774.93	8.74	-0.29	8.73	0.30	-0.24	16.96
2,800.00	0.56	42.61	2,799.93	8.91	-0.11	8.91	0.22	-0.12	-18.36
2,825.00	0.61	49.97	2,824.93	9.09	0.07	9.09	0.36	0.20	29.44
2,850.00	0.62	50.26	2,849.93	9.26	0.28	9.27	0.04	0.04	1.16
2,875.00	0.60	47.07	2,874.92	9.44	0.48	9.45	0.16	-0.08	-12.76
2,900.00	0.58	49.02	2,899.92	9.61	0.67	9.62	0.11	-0.08	7.80
2,925.00	0.59	59.32	2,924.92	9.76	0.88	9.78	0.42	0.04	41.20
2,950.00	0.65	62.42	2,949.92	9.89	1.11	9.92	0.27	0.24	12.40
2,975.00	0.58	61.81	2,974.92	10.02	1.35	10.05	0.28	-0.28	-2.44
3,000.00	0.67	64.43	2,999.92	10.14	1.59	10.18	0.38	0.36	10.48
3,025.00	0.68	70.82	3,024.92	10.25	1.87	10.30	0.30	0.04	25.56
3,050.00	0.72	75.98	3,049.91	10.34	2.16	10.39	0.30	0.16	20.64
3,075.00	0.74	73.65	3,074.91	10.42	2.47	10.48	0.14	0.08	-9.32
3,100.00	0.79	72.80	3,099.91	10.52	2.79	10.59	0.21	0.20	-3.40
3,125.00	0.80	77.28	3,124.91	10.61	3.12	10.69	0.25	0.04	17.92
3,150.00	0.94	83.77	3,149.90	10.67	3.49	10.76	0.68	0.56	25.96
3,175.00	0.96	89.91	3,174.90	10.69	3.91	10.79	0.41	0.08	24.56
3,200.00	0.95	88.19	3,199.90	10.70	4.32	10.81	0.12	-0.04	-6.88
3,225.00	0.93	96.89	3,224.89	10.68	4.73	10.80	0.58	-0.08	34.80
3,250.00	0.88	91.45	3,249.89	10.65	5.13	10.79	0.40	-0.20	-21.76
3,275.00	0.87	100.48	3,274.89	10.61	5.50	10.76	0.55	-0.04	36.12
3,300.00	0.91	92.01	3,299.88	10.57	5.89	10.73	0.55	0.16	-33.88
3,325.00	0.96	81.20	3,324.88	10.59	6.29	10.76	0.73	0.20	-43.24
3,350.00	0.96	82.02	3,349.88	10.65	6.71	10.83	0.05	0.00	3.28
3,375.00	1.03	89.48	3,374.87	10.69	7.14	10.88	0.59	0.28	29.84
3,400.00	0.97	97.75	3,399.87	10.66	7.58	10.86	0.62	-0.24	33.08
3,425.00	0.93	95.53	3,424.87	10.61	7.99	10.83	0.22	-0.16	-8.88
3,450.00	1.02	99.74	3,449.86	10.55	8.41	10.78	0.46	0.36	16.84
3,475.00	1.22	106.81	3,474.86	10.44	8.88	10.68	0.97	0.80	28.28
3,500.00	1.21	102.25	3,499.85	10.31	9.40	10.56	0.39	-0.04	-18.24
3,525.00	1.15	105.36	3,524.85	10.18	9.90	10.45	0.35	-0.24	12.44
3,550.00	1.17	87.47	3,549.84	10.13	10.39	10.41	1.44	0.08	-71.56

Survey Report

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Project: Lea County, NM (NAD27 NME)
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Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,575.00	1.33	99.16	3,574.84	10.09	10.93	10.39	1.20	0.64	46.76
3,600.00	1.42	103.46	3,599.83	9.98	11.52	10.29	0.55	0.36	17.20
3,625.00	1.40	104.53	3,624.82	9.83	12.12	10.15	0.13	-0.08	4.28
3,650.00	1.48	107.30	3,649.81	9.65	12.72	10.00	0.42	0.32	11.08
3,675.00	1.46	98.26	3,674.81	9.51	13.35	9.87	0.93	-0.08	-36.16
3,700.00	1.72	98.10	3,699.80	9.41	14.03	9.79	1.04	1.04	-0.64
3,725.00	1.81	100.53	3,724.78	9.29	14.79	9.69	0.47	0.36	9.72
3,750.00	1.76	102.62	3,749.77	9.13	15.55	9.55	0.33	-0.20	8.36
3,775.00	1.68	102.54	3,774.76	8.97	16.29	9.41	0.32	-0.32	-0.32
3,800.00	1.67	100.70	3,799.75	8.82	17.00	9.28	0.22	-0.04	-7.36
3,825.00	1.65	98.15	3,824.74	8.70	17.72	9.18	0.31	-0.08	-10.20
3,850.00	1.66	99.92	3,849.73	8.59	18.43	9.09	0.21	0.04	7.08
3,875.00	1.64	101.51	3,874.72	8.46	19.14	8.98	0.20	-0.08	6.36
3,900.00	1.60	103.71	3,899.71	8.30	19.83	8.84	0.30	-0.16	8.80
3,925.00	1.41	106.01	3,924.70	8.13	20.46	8.69	0.80	-0.76	9.20
3,950.00	1.26	101.85	3,949.69	7.99	21.03	8.56	0.71	-0.60	-16.64
3,975.00	1.24	103.65	3,974.69	7.87	21.56	8.46	0.18	-0.08	7.20
4,000.00	1.32	99.64	3,999.68	7.76	22.10	8.36	0.48	0.32	-16.04
4,025.00	1.37	101.82	4,024.67	7.65	22.68	8.27	0.29	0.20	8.72
4,050.00	1.44	106.99	4,049.67	7.50	23.27	8.13	0.58	0.28	20.68
4,075.00	1.56	108.94	4,074.66	7.30	23.90	7.95	0.52	0.48	7.80
4,100.00	1.63	112.16	4,099.65	7.05	24.55	7.72	0.45	0.28	12.88
4,125.00	1.89	111.17	4,124.64	6.77	25.26	7.46	1.05	1.04	-3.96
4,150.00	2.09	112.29	4,149.62	6.45	26.07	7.16	0.81	0.80	4.48
4,175.00	2.33	112.05	4,174.60	6.08	26.96	6.82	0.96	0.96	-0.96
4,200.00	2.54	116.96	4,199.58	5.64	27.93	6.40	1.18	0.84	19.64
4,225.00	2.51	116.64	4,224.56	5.14	28.91	5.93	0.13	-0.12	-1.28
4,250.00	2.48	117.58	4,249.53	4.65	29.88	5.46	0.20	-0.12	3.76
4,275.00	2.31	119.95	4,274.51	4.15	30.79	4.99	0.79	-0.68	9.48
4,300.00	1.94	123.25	4,299.49	3.66	31.58	4.52	1.56	-1.48	13.20
4,325.00	1.88	124.51	4,324.48	3.20	32.28	4.08	0.29	-0.24	5.04
4,350.00	1.87	120.98	4,349.47	2.76	32.96	3.66	0.46	-0.04	-14.12
4,375.00	2.07	122.41	4,374.45	2.30	33.69	3.22	0.82	0.80	5.72
4,400.00	2.35	125.70	4,399.43	1.76	34.49	2.70	1.23	1.12	13.16
4,425.00	2.62	127.55	4,424.41	1.12	35.36	2.08	1.13	1.08	7.40
4,450.00	2.94	130.24	4,449.38	0.35	36.30	1.34	1.38	1.28	10.76
4,475.00	3.11	132.04	4,474.35	-0.51	37.30	0.50	0.78	0.68	7.20
4,500.00	3.19	132.54	4,499.31	-1.44	38.31	-0.39	0.34	0.32	2.00
4,525.00	3.38	132.21	4,524.27	-2.40	39.37	-1.33	0.76	0.76	-1.32
4,550.00	3.60	131.46	4,549.22	-3.42	40.50	-2.31	0.90	0.88	-3.00
4,575.00	3.78	132.34	4,574.17	-4.49	41.70	-3.35	0.75	0.72	3.52
4,600.00	3.75	131.59	4,599.11	-5.59	42.92	-4.42	0.23	-0.12	-3.00
4,625.00	3.68	131.06	4,624.06	-6.66	44.14	-5.45	0.31	-0.28	-2.12

Survey Report

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 35, T 24 S., R 32 E
Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
4,650.00	3.20	130.40	4,649.02	-7.64	45.27	-6.40	1.93	-1.92	-2.64
4,675.00	2.49	128.76	4,673.99	-8.43	46.23	-7.17	2.86	-2.84	-6.56
4,700.00	2.24	123.76	4,698.96	-9.04	47.06	-7.76	1.30	-1.00	-20.00
4,725.00	2.12	121.18	4,723.95	-9.56	47.86	-8.24	0.62	-0.48	-10.32
4,750.00	2.16	119.47	4,748.93	-10.03	48.67	-8.69	0.30	0.16	-6.84
4,775.00	2.13	121.91	4,773.91	-10.50	49.47	-9.15	0.38	-0.12	9.76
4,800.00	2.20	119.67	4,798.89	-10.99	50.28	-9.61	0.44	0.28	-8.96
4,825.00	2.20	123.14	4,823.87	-11.49	51.10	-10.09	0.53	0.00	13.88
4,850.00	2.02	121.54	4,848.86	-11.98	51.88	-10.56	0.76	-0.72	-6.40
4,875.00	2.05	119.94	4,873.84	-12.43	52.64	-10.99	0.26	0.12	-6.40
4,900.00	2.08	119.20	4,898.83	-12.88	53.43	-11.41	0.16	0.12	-2.96
4,925.00	2.09	118.44	4,923.81	-13.32	54.22	-11.83	0.12	0.04	-3.04
4,950.00	2.11	123.06	4,948.79	-13.78	55.01	-12.28	0.68	0.08	18.48
4,975.00	2.02	120.29	4,973.78	-14.26	55.78	-12.73	0.54	-0.36	-11.08
5,000.00	1.98	118.35	4,998.76	-14.68	56.54	-13.14	0.31	-0.16	-7.76
5,025.00	2.02	118.33	5,023.75	-15.10	57.30	-13.53	0.16	0.16	-0.08
5,050.00	2.14	117.33	5,048.73	-15.52	58.11	-13.93	0.50	0.48	-4.00
5,075.00	2.14	120.52	5,073.71	-15.97	58.92	-14.36	0.48	0.00	12.76
5,100.00	2.07	120.43	5,098.70	-16.44	59.71	-14.80	0.28	-0.28	-0.36
5,125.00	2.03	120.23	5,123.68	-16.89	60.49	-15.23	0.16	-0.16	-0.80
5,150.00	1.94	117.33	5,148.66	-17.31	61.24	-15.63	0.54	-0.36	-11.60
5,175.00	1.98	117.51	5,173.65	-17.70	62.00	-16.00	0.16	0.16	0.72
5,200.00	1.98	115.60	5,198.63	-18.09	62.78	-16.37	0.26	0.00	-7.64
5,225.00	2.01	113.93	5,223.62	-18.45	63.57	-16.71	0.26	0.12	-6.68
5,250.00	2.05	114.82	5,248.60	-18.82	64.37	-17.05	0.20	0.16	3.56
5,275.00	2.12	115.19	5,273.59	-19.20	65.20	-17.42	0.29	0.28	1.48
5,300.00	2.05	116.83	5,298.57	-19.60	66.01	-17.79	0.37	-0.28	6.56
5,325.00	2.02	117.82	5,323.55	-20.01	66.80	-18.18	0.18	-0.12	3.96
5,350.00	1.92	114.06	5,348.54	-20.38	67.58	-18.53	0.65	-0.40	-15.04
5,375.00	1.89	113.87	5,373.53	-20.72	68.33	-18.85	0.12	-0.12	-0.76
5,400.00	1.87	114.25	5,398.51	-21.06	69.08	-19.16	0.09	-0.08	1.52
5,425.00	1.86	112.36	5,423.50	-21.38	69.83	-19.46	0.25	-0.04	-7.56
5,450.00	1.89	111.85	5,448.49	-21.69	70.59	-19.75	0.14	0.12	-2.04
5,475.00	1.85	112.12	5,473.47	-21.99	71.35	-20.04	0.16	-0.16	1.08
5,500.00	1.91	112.82	5,498.46	-22.31	72.10	-20.33	0.26	0.24	2.80
5,525.00	1.83	110.86	5,523.45	-22.61	72.86	-20.61	0.41	-0.32	-7.84
5,550.00	1.86	110.08	5,548.43	-22.89	73.61	-20.87	0.16	0.12	-3.12
5,575.00	1.77	111.19	5,573.42	-23.17	74.36	-21.13	0.39	-0.36	4.44
5,600.00	1.73	107.32	5,598.41	-23.42	75.08	-21.36	0.50	-0.16	-15.48
5,625.00	1.70	111.52	5,623.40	-23.67	75.78	-21.59	0.52	-0.12	16.80
5,650.00	1.70	109.74	5,648.39	-23.93	76.47	-21.83	0.21	0.00	-7.12
5,675.00	1.68	109.23	5,673.38	-24.18	77.17	-22.06	0.10	-0.08	-2.04
5,700.00	1.65	108.92	5,698.37	-24.41	77.86	-22.28	0.13	-0.12	-1.24

Survey Report

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 35, T 24 S., R 32 E
Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,725.00	1.65	106.92	5,723.36	-24.64	78.54	-22.48	0.23	0.00	-8.00
5,750.00	1.75	112.54	5,748.34	-24.89	79.24	-22.71	0.78	0.40	22.48
5,775.00	1.55	111.58	5,773.33	-25.16	79.90	-22.97	0.81	-0.80	-3.84
5,800.00	1.39	108.58	5,798.33	-25.38	80.51	-23.17	0.71	-0.64	-12.00
5,825.00	1.68	112.06	5,823.32	-25.61	81.13	-23.39	1.22	1.16	13.92
5,850.00	1.59	111.14	5,848.31	-25.88	81.80	-23.63	0.37	-0.36	-3.68
5,875.00	1.63	110.23	5,873.30	-26.12	82.45	-23.86	0.19	0.16	-3.64
5,900.00	1.86	104.70	5,898.28	-26.35	83.18	-24.07	1.14	0.92	-22.12
5,925.00	2.06	98.67	5,923.27	-26.52	84.02	-24.22	1.15	0.80	-24.12
5,950.00	2.34	92.63	5,948.25	-26.61	84.97	-24.28	1.45	1.12	-24.16
5,975.00	2.47	90.84	5,973.23	-26.64	86.02	-24.28	0.60	0.52	-7.16
6,000.00	2.39	92.06	5,998.21	-26.67	87.08	-24.28	0.38	-0.32	4.88
6,025.00	2.46	91.45	6,023.18	-26.70	88.14	-24.29	0.30	0.28	-2.44
6,050.00	2.48	92.62	6,048.16	-26.74	89.21	-24.29	0.22	0.08	4.68
6,075.00	2.52	91.19	6,073.14	-26.78	90.30	-24.30	0.30	0.16	-5.72
6,100.00	2.48	93.28	6,098.11	-26.82	91.39	-24.31	0.40	-0.16	8.36
6,125.00	2.61	92.72	6,123.09	-26.88	92.50	-24.34	0.53	0.52	-2.24
6,150.00	2.60	95.37	6,148.06	-26.96	93.63	-24.39	0.48	-0.04	10.60
6,175.00	2.65	95.20	6,173.04	-27.06	94.77	-24.46	0.20	0.20	-0.68
6,200.00	2.63	93.78	6,198.01	-27.15	95.92	-24.52	0.27	-0.08	-5.68
6,225.00	2.73	96.57	6,222.98	-27.26	97.09	-24.60	0.66	0.40	11.16
6,250.00	3.02	98.32	6,247.95	-27.42	98.33	-24.73	1.21	1.16	7.00
6,275.00	3.10	102.82	6,272.92	-27.67	99.64	-24.94	1.01	0.32	18.00
6,300.00	3.11	103.52	6,297.88	-27.98	100.96	-25.21	0.16	0.04	2.80
6,325.00	3.64	108.51	6,322.84	-28.39	102.37	-25.58	2.42	2.12	19.96
6,350.00	3.64	108.48	6,347.79	-28.89	103.87	-26.04	0.01	0.00	-0.12
6,375.00	3.61	107.06	6,372.74	-29.37	105.38	-26.48	0.38	-0.12	-5.68
6,400.00	3.69	107.74	6,397.69	-29.85	106.90	-26.92	0.36	0.32	2.72
6,425.00	3.72	108.36	6,422.63	-30.35	108.43	-27.38	0.20	0.12	2.48
6,450.00	3.71	108.46	6,447.58	-30.86	109.97	-27.85	0.05	-0.04	0.40
6,475.00	3.84	114.91	6,472.53	-31.47	111.50	-28.41	1.78	0.52	25.80
6,500.00	3.89	116.54	6,497.47	-32.20	113.02	-29.10	0.48	0.20	6.52
6,525.00	4.10	120.41	6,522.41	-33.03	114.55	-29.89	1.37	0.84	15.48
6,550.00	3.93	120.45	6,547.35	-33.92	116.05	-30.74	0.68	-0.68	0.16
6,575.00	4.08	120.62	6,572.29	-34.81	117.56	-31.58	0.60	0.60	0.68
6,600.00	4.06	120.64	6,597.22	-35.71	119.09	-32.44	0.08	-0.08	0.08
6,625.00	4.12	119.69	6,622.16	-36.60	120.63	-33.30	0.36	0.24	-3.80
6,650.00	4.18	119.94	6,647.09	-37.50	122.20	-34.15	0.25	0.24	1.00
6,675.00	4.12	119.52	6,672.03	-38.40	123.77	-35.01	0.27	-0.24	-1.68
6,700.00	4.11	119.11	6,696.96	-39.28	125.33	-35.84	0.12	-0.04	-1.64
6,725.00	4.30	119.52	6,721.90	-40.18	126.93	-36.70	0.77	0.76	1.64
6,750.00	4.03	118.96	6,746.83	-41.06	128.51	-37.54	1.09	-1.08	-2.24
6,775.00	4.00	119.64	6,771.77	-41.92	130.04	-38.36	0.23	-0.12	2.72
6,800.00	4.00	120.46	6,796.71	-42.79	131.55	-39.19	0.23	0.00	3.28

Survey Report

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 35, T 24 S., R 32 E
Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,825.00	3.91	118.92	6,821.65	-43.65	133.05	-40.00	0.56	-0.36	-6.16
6,850.00	3.97	118.80	6,846.59	-44.48	134.55	-40.79	0.24	0.24	-0.48
6,875.00	3.88	120.30	6,871.53	-45.32	136.04	-41.59	0.55	-0.36	6.00
6,900.00	3.85	120.01	6,896.47	-46.17	137.50	-42.40	0.14	-0.12	-1.16
6,925.00	3.79	119.37	6,921.42	-46.99	138.95	-43.18	0.29	-0.24	-2.56
6,950.00	3.69	118.56	6,946.37	-47.78	140.37	-43.93	0.45	-0.40	-3.24
6,975.00	3.75	118.85	6,971.31	-48.56	141.79	-44.67	0.25	0.24	1.16
7,000.00	3.75	119.62	6,996.26	-49.36	143.22	-45.43	0.20	0.00	3.08
7,025.00	3.74	119.77	7,021.21	-50.17	144.64	-46.20	0.06	-0.04	0.60
7,050.00	3.69	119.95	7,046.15	-50.98	146.04	-46.97	0.21	-0.20	0.72
7,075.00	3.62	119.73	7,071.10	-51.77	147.43	-47.72	0.29	-0.28	-0.88
7,100.00	3.55	119.79	7,096.05	-52.55	148.78	-48.46	0.28	-0.28	0.24
7,125.00	3.57	119.58	7,121.01	-53.31	150.13	-49.20	0.10	0.08	-0.84
7,150.00	3.55	118.89	7,145.96	-54.07	151.49	-49.92	0.19	-0.08	-2.76
7,175.00	3.59	118.67	7,170.91	-54.82	152.85	-50.63	0.17	0.16	-0.88
7,200.00	3.50	118.09	7,195.86	-55.56	154.21	-51.33	0.39	-0.36	-2.32
7,225.00	3.58	119.19	7,220.81	-56.30	155.57	-52.03	0.42	0.32	4.40
7,250.00	3.47	118.19	7,245.77	-57.03	156.91	-52.73	0.50	-0.44	-4.00
7,275.00	3.50	116.79	7,270.72	-57.74	158.26	-53.39	0.36	0.12	-5.60
7,300.00	3.56	118.19	7,295.67	-58.45	159.63	-54.07	0.42	0.24	5.60
7,325.00	3.46	117.39	7,320.63	-59.16	160.98	-54.74	0.45	-0.40	-3.20
7,350.00	3.59	117.73	7,345.58	-59.87	162.34	-55.42	0.53	0.52	1.36
7,375.00	3.62	116.69	7,370.53	-60.59	163.74	-56.10	0.29	0.12	-4.16
7,400.00	3.61	117.76	7,395.48	-61.31	165.14	-56.78	0.27	-0.04	4.28
7,425.00	3.59	118.22	7,420.43	-62.05	166.53	-57.48	0.14	-0.08	1.84
7,450.00	3.52	117.63	7,445.38	-62.77	167.90	-58.17	0.32	-0.28	-2.36
7,475.00	3.47	116.75	7,470.33	-63.47	169.26	-58.83	0.29	-0.20	-3.52
7,500.00	3.46	117.62	7,495.29	-64.16	170.60	-59.48	0.21	-0.04	3.48
7,525.00	3.47	117.66	7,520.24	-64.86	171.94	-60.14	0.04	0.04	0.16
7,550.00	3.52	118.86	7,545.20	-65.58	173.28	-60.83	0.35	0.20	4.80
7,575.00	3.38	118.83	7,570.15	-66.31	174.60	-61.52	0.56	-0.56	-0.12
7,600.00	3.33	119.16	7,595.11	-67.02	175.88	-62.19	0.21	-0.20	1.32
7,625.00	3.33	120.05	7,620.07	-67.74	177.14	-62.87	0.21	0.00	3.56
7,650.00	3.45	120.14	7,645.02	-68.48	178.42	-63.58	0.48	0.48	0.36
7,675.00	3.46	121.02	7,669.98	-69.24	179.72	-64.31	0.22	0.04	3.52
7,700.00	3.46	121.87	7,694.93	-70.03	181.00	-65.06	0.21	0.00	3.40
7,725.00	3.46	122.45	7,719.89	-70.83	182.28	-65.83	0.14	0.00	2.32
7,750.00	3.56	123.31	7,744.84	-71.66	183.57	-66.63	0.45	0.40	3.44
7,775.00	3.54	122.24	7,769.79	-72.50	184.87	-67.43	0.28	-0.08	-4.28
7,800.00	3.61	123.22	7,794.74	-73.35	186.18	-68.24	0.37	0.28	3.92
7,825.00	3.53	123.08	7,819.69	-74.20	187.48	-69.05	0.32	-0.32	-0.56
7,850.00	3.61	122.66	7,844.65	-75.04	188.79	-69.86	0.34	0.32	-1.68
7,875.00	3.67	124.64	7,869.60	-75.92	190.11	-70.70	0.56	0.24	7.92

Survey Report

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 35, T 24 S., R 32 E
Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
7,900.00	3.58	122.87	7,894.55	-76.80	191.42	-71.54	0.57	-0.36	-7.08
7,925.00	3.71	122.98	7,919.49	-77.66	192.76	-72.37	0.52	0.52	0.44
7,950.00	3.58	122.73	7,944.44	-78.53	194.09	-73.20	0.52	-0.52	-1.00
7,975.00	3.44	122.87	7,969.40	-79.35	195.38	-73.99	0.56	-0.56	0.56
8,000.00	3.59	125.87	7,994.35	-80.22	196.64	-74.82	0.95	0.60	12.00
8,025.00	3.63	124.25	8,019.30	-81.12	197.93	-75.69	0.44	0.16	-6.48
8,050.00	3.62	123.72	8,044.25	-82.01	199.24	-76.54	0.14	-0.04	-2.12
8,075.00	3.40	122.15	8,069.20	-82.84	200.53	-77.33	0.96	-0.88	-6.28
8,100.00	3.47	125.09	8,094.16	-83.67	201.77	-78.13	0.76	0.28	11.76
8,125.00	3.51	125.06	8,119.11	-84.54	203.02	-78.97	0.16	0.16	-0.12
8,150.00	3.43	124.01	8,144.07	-85.40	204.27	-79.79	0.41	-0.32	-4.20
8,175.00	3.38	125.02	8,169.02	-86.24	205.49	-80.60	0.31	-0.20	4.04
8,200.00	3.39	126.40	8,193.98	-87.11	206.69	-81.43	0.33	0.04	5.52
8,225.00	3.51	125.63	8,218.93	-87.99	207.90	-82.28	0.51	0.48	-3.08
8,250.00	3.30	124.92	8,243.89	-88.85	209.12	-83.11	0.86	-0.84	-2.84
8,275.00	3.33	128.06	8,268.85	-89.71	210.28	-83.93	0.74	0.12	12.56
8,300.00	3.42	127.77	8,293.80	-90.61	211.44	-84.80	0.37	0.36	-1.16
8,325.00	3.43	125.59	8,318.76	-91.50	212.64	-85.66	0.52	0.04	-8.72
8,350.00	3.42	128.06	8,343.71	-92.40	213.83	-86.53	0.59	-0.04	9.88
8,375.00	3.50	128.52	8,368.67	-93.33	215.02	-87.43	0.34	0.32	1.84
8,400.00	3.50	125.87	8,393.62	-94.26	216.23	-88.32	0.65	0.00	-10.60
8,425.00	3.45	127.63	8,418.58	-95.16	217.45	-89.19	0.47	-0.20	7.04
8,450.00	3.59	128.27	8,443.53	-96.11	218.66	-90.10	0.58	0.56	2.56
8,475.00	3.49	125.85	8,468.48	-97.04	219.89	-91.00	0.72	-0.40	-9.68
8,500.00	3.37	128.77	8,493.44	-97.94	221.08	-91.87	0.85	-0.48	11.68
8,525.00	3.44	127.96	8,518.39	-98.86	222.24	-92.76	0.34	0.28	-3.24
8,550.00	3.28	125.33	8,543.35	-99.74	223.42	-93.60	0.89	-0.64	-10.52
8,575.00	3.29	127.91	8,568.31	-100.59	224.57	-94.42	0.59	0.04	10.32
8,583.00	3.33	128.71	8,576.30	-100.88	224.93	-94.70	0.76	0.50	10.00
Tie in to Gyro @ 8583'MD									
8,711.00	3.28	108.07	8,704.09	-104.34	231.31	-97.99	0.93	-0.04	-16.13
First MWD Survey @ 8711'MD									
8,758.00	7.22	50.74	8,750.91	-102.89	234.88	-96.44	12.99	8.38	-121.98
8,805.00	12.07	36.91	8,797.23	-97.08	240.12	-90.49	11.36	10.32	-29.43
8,853.00	17.64	20.69	8,843.63	-86.25	245.71	-79.51	14.38	11.60	-33.79
8,899.00	22.54	7.40	8,886.84	-70.97	249.31	-64.14	14.50	10.65	-28.89
8,945.00	25.46	5.23	8,928.86	-52.38	251.35	-45.50	6.63	6.35	-4.72
8,992.00	27.54	6.42	8,970.92	-31.52	253.49	-24.59	4.57	4.43	2.53
9,039.00	32.03	3.16	9,011.70	-8.26	255.39	-1.29	10.15	9.55	-6.94
9,086.00	39.32	0.42	9,049.86	19.11	256.19	26.10	15.88	15.51	-5.83
9,133.00	45.60	358.42	9,084.52	50.82	255.83	57.78	13.67	13.36	-4.26
9,179.00	52.60	359.06	9,114.62	85.56	255.08	92.49	15.25	15.22	1.39
9,187.63	53.29	359.58	9,119.82	92.44	255.00	99.37	9.32	7.97	6.06
FTP @ 9187'MD (330'FSL)									

Survey Report

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 35, T 24 S. , R 32 E
Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,226.00	56.37	1.80	9,141.92	123.80	255.39	130.72	9.32	8.03	5.78
9,273.00	56.49	2.84	9,167.91	162.93	256.97	169.88	1.86	0.26	2.21
9,305.00	60.90	4.63	9,184.53	190.20	258.76	197.19	14.59	13.78	5.59
9,337.00	65.57	5.47	9,198.94	218.65	261.28	225.70	14.78	14.59	2.63
9,366.00	70.46	4.64	9,209.79	245.43	263.65	252.54	17.07	16.86	-2.86
9,398.00	76.05	3.58	9,219.01	275.98	265.84	283.14	17.75	17.47	-3.31
9,429.00	81.47	2.68	9,225.05	306.33	267.50	313.52	17.71	17.48	-2.90
9,456.00	85.89	1.22	9,228.02	333.14	268.41	340.35	17.23	16.37	-5.41
9,487.00	88.56	359.89	9,229.52	364.10	268.71	371.30	9.62	8.61	-4.29
9,580.00	90.27	358.92	9,230.47	457.09	267.74	464.23	2.11	1.84	-1.04
9,674.00	91.70	359.45	9,228.86	551.06	266.40	558.13	1.62	1.52	0.56
9,767.00	90.91	357.62	9,226.74	644.00	264.03	650.97	2.14	-0.85	-1.97
9,860.00	89.71	355.98	9,226.24	736.85	258.84	743.64	2.19	-1.29	-1.76
9,953.00	91.50	358.24	9,225.25	829.72	254.15	836.35	3.10	1.92	2.43
10,047.00	89.48	357.00	9,224.45	923.63	250.24	930.11	2.52	-2.15	-1.32
10,140.00	87.01	358.20	9,227.30	1,016.49	246.35	1,022.84	2.95	-2.66	1.29
10,233.00	90.91	359.82	9,228.99	1,109.44	244.75	1,115.71	4.54	4.19	1.74
10,327.00	92.93	0.07	9,225.84	1,203.38	244.66	1,209.62	2.17	2.15	0.27
10,420.00	88.30	0.34	9,224.84	1,296.35	244.99	1,302.56	4.99	-4.98	0.29
10,513.00	89.23	0.49	9,226.84	1,389.33	245.66	1,395.52	1.01	1.00	0.16
10,606.00	90.55	0.81	9,227.02	1,482.32	246.72	1,488.50	1.46	1.42	0.34
10,701.00	91.02	1.09	9,225.72	1,577.30	248.29	1,583.49	0.58	0.49	0.29
10,795.00	91.08	1.01	9,224.00	1,671.27	250.01	1,677.47	0.11	0.06	-0.09
10,888.00	90.63	0.89	9,222.61	1,764.24	251.56	1,770.45	0.50	-0.48	-0.13
10,981.00	91.56	0.09	9,220.83	1,857.22	252.35	1,863.42	1.32	1.00	-0.86
11,074.00	91.83	359.92	9,218.08	1,950.18	252.36	1,956.34	0.34	0.29	-0.18
11,167.00	90.94	358.59	9,215.83	2,043.14	251.15	2,049.24	1.72	-0.96	-1.43
11,261.00	89.99	356.64	9,215.07	2,137.05	247.24	2,143.00	2.31	-1.01	-2.07
11,354.00	90.21	356.37	9,214.91	2,229.88	241.57	2,235.64	0.37	0.24	-0.29
11,448.00	88.25	357.45	9,216.17	2,323.73	236.50	2,329.32	2.38	-2.09	1.15
11,541.00	87.86	358.12	9,219.33	2,416.60	232.91	2,422.06	0.83	-0.42	0.72
11,635.00	86.82	358.33	9,223.69	2,510.46	230.00	2,515.80	1.13	-1.11	0.22
11,729.00	88.47	359.42	9,227.55	2,604.35	228.16	2,609.61	2.10	1.76	1.16
11,822.00	91.55	1.86	9,227.54	2,697.33	229.20	2,702.58	4.22	3.31	2.62
11,916.00	90.99	359.04	9,225.45	2,791.29	229.93	2,796.53	3.06	-0.60	-3.00
12,009.00	89.87	359.25	9,224.75	2,884.28	228.55	2,889.44	1.23	-1.20	0.23
12,102.00	88.92	0.34	9,225.74	2,977.27	228.21	2,982.39	1.55	-1.02	1.17
12,195.00	88.03	359.59	9,228.21	3,070.24	228.16	3,075.32	1.25	-0.96	-0.81
12,289.00	88.87	359.86	9,230.75	3,164.20	227.71	3,169.24	0.94	0.89	0.29
12,383.00	88.39	359.95	9,233.00	3,258.17	227.55	3,263.17	0.52	-0.51	0.10
12,477.00	91.22	0.88	9,233.32	3,352.16	228.23	3,357.14	3.17	3.01	0.99
12,572.00	91.81	0.77	9,230.81	3,447.12	229.60	3,452.10	0.63	0.62	-0.12
12,665.00	91.98	0.28	9,227.73	3,540.06	230.45	3,545.03	0.56	0.18	-0.53

Survey Report

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 35, T 24 S., R 32 E
Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,758.00	92.03	0.17	9,224.48	3,633.00	230.82	3,637.95	0.13	0.05	-0.12
12,852.00	89.76	0.78	9,223.01	3,726.98	231.60	3,731.91	2.50	-2.41	0.65
12,946.00	89.79	1.40	9,223.38	3,820.96	233.38	3,825.91	0.66	0.03	0.66
13,040.00	89.65	0.90	9,223.84	3,914.94	235.27	3,919.91	0.55	-0.15	-0.53
13,134.00	89.15	1.59	9,224.83	4,008.91	237.31	4,013.90	0.91	-0.53	0.73
13,228.00	87.38	0.97	9,227.67	4,102.84	239.41	4,107.85	2.00	-1.88	-0.66
13,321.00	88.56	359.10	9,230.97	4,195.78	239.47	4,200.75	2.38	1.27	-2.01
13,415.00	89.06	359.91	9,232.92	4,289.75	238.66	4,294.67	1.01	0.53	0.86
13,509.00	88.64	1.40	9,234.80	4,383.73	239.73	4,388.64	1.65	-0.45	1.59
13,603.00	88.98	358.88	9,236.76	4,477.70	239.96	4,482.58	2.70	0.36	-2.68
13,696.00	89.73	356.89	9,237.80	4,570.62	236.53	4,575.38	2.29	0.81	-2.14
13,790.00	88.72	356.60	9,239.08	4,664.46	231.19	4,669.04	1.12	-1.07	-0.31
13,883.00	91.47	358.26	9,238.92	4,757.36	227.02	4,761.78	3.45	2.96	1.78
13,976.00	90.32	357.90	9,237.47	4,850.29	223.91	4,854.60	1.30	-1.24	-0.39
14,069.00	89.85	358.03	9,237.33	4,943.23	220.60	4,947.41	0.52	-0.51	0.14
14,162.00	88.33	358.98	9,238.81	5,036.19	218.18	5,040.26	1.93	-1.63	1.02
14,256.00	89.01	358.91	9,240.99	5,130.14	216.45	5,134.14	0.73	0.72	-0.07
14,350.00	88.47	358.57	9,243.06	5,224.10	214.38	5,228.00	0.68	-0.57	-0.36
14,443.00	89.96	359.11	9,244.33	5,317.07	212.50	5,320.89	1.70	1.60	0.58
14,537.00	91.30	359.70	9,243.30	5,411.05	211.52	5,414.81	1.56	1.43	0.63
14,630.00	92.59	358.59	9,240.14	5,503.99	210.14	5,507.67	1.83	1.39	-1.19
14,723.00	92.62	0.74	9,235.91	5,596.88	209.59	5,600.52	2.31	0.03	2.31
14,817.00	91.44	1.33	9,232.58	5,690.81	211.29	5,694.45	1.40	-1.26	0.63
14,910.00	89.57	1.20	9,231.76	5,783.78	213.34	5,787.44	2.02	-2.01	-0.14
15,003.00	89.59	0.67	9,232.45	5,876.76	214.86	5,880.44	0.57	0.02	-0.57
15,097.00	89.01	0.16	9,233.59	5,970.75	215.54	5,974.41	0.82	-0.62	-0.54
15,191.00	87.77	359.06	9,236.24	6,064.71	214.90	6,068.31	1.76	-1.32	-1.17
15,284.00	90.35	359.79	9,237.76	6,157.68	213.97	6,161.23	2.88	2.77	0.78
15,377.00	91.84	0.72	9,235.98	6,250.66	214.38	6,254.18	1.89	1.60	1.00
15,471.00	90.69	1.16	9,233.91	6,344.62	215.92	6,348.15	1.31	-1.22	0.47
15,565.00	90.01	0.25	9,233.33	6,438.61	217.08	6,442.14	1.21	-0.72	-0.97
15,658.00	89.37	359.64	9,233.84	6,531.61	216.99	6,535.10	0.95	-0.69	-0.66
15,752.00	89.68	0.91	9,234.62	6,625.60	217.44	6,629.07	1.39	0.33	1.35
15,846.00	89.59	2.22	9,235.22	6,719.57	220.01	6,723.07	1.40	-0.10	1.39
15,940.00	88.59	358.85	9,236.71	6,813.53	220.89	6,817.03	3.74	-1.06	-3.59
16,033.00	90.04	359.47	9,237.82	6,906.52	219.52	6,909.93	1.70	1.56	0.67
16,127.00	90.57	359.96	9,237.32	7,000.51	219.06	7,003.88	0.77	0.56	0.52
16,221.00	90.74	0.88	9,236.25	7,094.50	219.75	7,097.86	1.00	0.18	0.98
16,315.00	89.62	359.24	9,235.95	7,188.50	219.84	7,191.82	2.11	-1.19	-1.74
16,409.00	90.01	359.26	9,236.25	7,282.49	218.61	7,285.74	0.42	0.41	0.02
16,478.58	89.51	359.30	9,236.54	7,352.06	217.74	7,355.27	0.71	-0.71	0.05
LTP @ 16478'MD (330'FNL)									
16,503.00	89.34	359.31	9,236.79	7,376.48	217.44	7,379.67	0.71	-0.71	0.05
Last MWD Survey @ 16503'MD									

Survey Report

Company: COG Operating L L C
Project: Lea County, NM (NAD27 NME)
Site: Sec. 35, T 24 S. , R 32 E
Well: Eider Federal 104H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Eider Federal 104H
TVD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
MD Reference: KB=26 @ 3552.10ft (Scandril Freedom)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
16,583.00	89.34	359.31	9,237.71	7,456.47	216.48	7,459.60	0.00	0.00	0.00
PTB @ TD @ 16583'MD									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,583.00	8,576.30	-100.88	224.93	Tie in to Gyro @ 8583'MD
8,711.00	8,704.09	-104.34	231.31	First MWD Survey @ 8711'MD
9,187.63	9,119.82	92.44	255.00	FTP @ 9187'MD (330'FSL)
16,478.58	9,236.54	7,352.06	217.74	LTP @ 16478'MD (330'FNL)
16,503.00	9,236.79	7,376.48	217.44	Last MWD Survey @ 16503'MD
16,583.00	9,237.71	7,456.47	216.48	PTB @ TD @ 16583'MD

Checked By: _____ Approved By: _____ Date: _____