



COG Operating, LLC

Lea County, NM

Sec 29, T24-S, R35-E

Viking Helmet State Com #1H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

04 April, 2017



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Project	Lea County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Sec 29, T24-S, R35-E		
Site Position:		Northing:	435,988.30 usft
From:	Map	Easting:	792,772.40 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 11' 42.385 N
		Longitude:	103° 23' 12.837 W
		Grid Convergence:	0.50 °

Well	Viking Helmet State Com #1H		
Well Position	+N/-S	0.0 usft	Northing: 436,002.49 usft
	+E/-W	0.0 usft	Easting: 794,372.30 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 11' 42.386 N
		Longitude:	103° 22' 54.219 W
		Ground Level:	3,309.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	3/3/2017	6.89
			Dip Angle (°)
			60.07
			Field Strength (nT)
			47,972

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°)
			179.51

Survey Program	Date 4/4/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.0	11,637.0	Gyros (Wellbore #1)	GYRO-NS
11,637.0	19,500.0	MWD Surveys (Wellbore #1)	MWD+IFR1+MS
			Description
			Gyrocompass Gyro
			OWSG MWD + IFR1 + Multi-Station Correction

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	436,002.49	794,372.30	32° 11' 42.386 N	103° 22' 54.219 W
100.0	0.13	51.18	100.0	0.1	0.1	436,002.56	794,372.39	32° 11' 42.387 N	103° 22' 54.218 W
125.0	0.16	23.48	125.0	0.1	0.1	436,002.61	794,372.42	32° 11' 42.387 N	103° 22' 54.217 W
150.0	0.10	94.87	150.0	0.2	0.2	436,002.64	794,372.46	32° 11' 42.387 N	103° 22' 54.217 W
175.0	0.13	115.75	175.0	0.1	0.2	436,002.62	794,372.51	32° 11' 42.387 N	103° 22' 54.216 W
200.0	0.17	80.58	200.0	0.1	0.3	436,002.62	794,372.57	32° 11' 42.387 N	103° 22' 54.216 W
225.0	0.37	113.96	225.0	0.1	0.4	436,002.59	794,372.68	32° 11' 42.387 N	103° 22' 54.214 W
250.0	0.38	104.50	250.0	0.1	0.5	436,002.54	794,372.83	32° 11' 42.386 N	103° 22' 54.213 W
275.0	0.45	108.83	275.0	0.0	0.7	436,002.48	794,373.00	32° 11' 42.386 N	103° 22' 54.211 W
300.0	0.49	116.75	300.0	-0.1	0.9	436,002.40	794,373.19	32° 11' 42.385 N	103° 22' 54.209 W
325.0	0.49	124.26	325.0	-0.2	1.1	436,002.29	794,373.38	32° 11' 42.384 N	103° 22' 54.206 W

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Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
350.0	0.46	121.79	350.0	-0.3	1.3	436,002.18	794,373.55	32° 11' 42.383 N	103° 22' 54.204 W	
375.0	0.46	115.46	375.0	-0.4	1.4	436,002.09	794,373.73	32° 11' 42.382 N	103° 22' 54.202 W	
400.0	0.56	123.78	400.0	-0.5	1.6	436,001.97	794,373.92	32° 11' 42.381 N	103° 22' 54.200 W	
425.0	0.60	128.60	425.0	-0.7	1.8	436,001.83	794,374.12	32° 11' 42.379 N	103° 22' 54.198 W	
450.0	0.58	134.52	450.0	-0.8	2.0	436,001.65	794,374.32	32° 11' 42.378 N	103° 22' 54.196 W	
475.0	0.51	132.32	475.0	-1.0	2.2	436,001.49	794,374.49	32° 11' 42.376 N	103° 22' 54.194 W	
500.0	0.56	127.48	500.0	-1.1	2.4	436,001.34	794,374.67	32° 11' 42.374 N	103° 22' 54.191 W	
525.0	0.58	127.25	525.0	-1.3	2.6	436,001.19	794,374.86	32° 11' 42.373 N	103° 22' 54.189 W	
550.0	0.64	136.28	550.0	-1.5	2.8	436,001.01	794,375.06	32° 11' 42.371 N	103° 22' 54.187 W	
575.0	0.59	135.10	575.0	-1.7	3.0	436,000.82	794,375.25	32° 11' 42.369 N	103° 22' 54.185 W	
600.0	0.55	132.95	600.0	-1.8	3.1	436,000.65	794,375.43	32° 11' 42.367 N	103° 22' 54.183 W	
625.0	0.60	128.05	625.0	-2.0	3.3	436,000.49	794,375.62	32° 11' 42.366 N	103° 22' 54.180 W	
650.0	0.61	127.80	650.0	-2.2	3.5	436,000.32	794,375.83	32° 11' 42.364 N	103° 22' 54.178 W	
675.0	0.61	135.76	675.0	-2.3	3.7	436,000.15	794,376.02	32° 11' 42.362 N	103° 22' 54.176 W	
700.0	0.58	135.62	700.0	-2.5	3.9	435,999.96	794,376.21	32° 11' 42.361 N	103° 22' 54.174 W	
725.0	0.56	127.86	725.0	-2.7	4.1	435,999.80	794,376.39	32° 11' 42.359 N	103° 22' 54.172 W	
750.0	0.63	130.13	750.0	-2.9	4.3	435,999.63	794,376.59	32° 11' 42.357 N	103° 22' 54.169 W	
775.0	0.67	135.61	775.0	-3.0	4.5	435,999.44	794,376.80	32° 11' 42.355 N	103° 22' 54.167 W	
800.0	0.62	132.85	800.0	-3.2	4.7	435,999.24	794,377.00	32° 11' 42.353 N	103° 22' 54.165 W	
825.0	0.59	137.23	825.0	-3.4	4.9	435,999.06	794,377.19	32° 11' 42.352 N	103° 22' 54.162 W	
850.0	0.59	132.73	850.0	-3.6	5.1	435,998.87	794,377.37	32° 11' 42.350 N	103° 22' 54.160 W	
875.0	0.64	127.88	875.0	-3.8	5.3	435,998.70	794,377.57	32° 11' 42.348 N	103° 22' 54.158 W	
900.0	0.59	132.24	900.0	-4.0	5.5	435,998.53	794,377.78	32° 11' 42.346 N	103° 22' 54.156 W	
925.0	0.51	133.62	925.0	-4.1	5.7	435,998.37	794,377.96	32° 11' 42.345 N	103° 22' 54.153 W	
950.0	0.39	130.07	950.0	-4.3	5.8	435,998.23	794,378.10	32° 11' 42.343 N	103° 22' 54.152 W	
975.0	0.27	119.19	975.0	-4.3	5.9	435,998.15	794,378.22	32° 11' 42.343 N	103° 22' 54.150 W	
1,000.0	0.26	122.60	1,000.0	-4.4	6.0	435,998.09	794,378.32	32° 11' 42.342 N	103° 22' 54.149 W	
1,025.0	0.18	114.93	1,025.0	-4.4	6.1	435,998.04	794,378.40	32° 11' 42.341 N	103° 22' 54.148 W	
1,050.0	0.11	129.02	1,050.0	-4.5	6.2	435,998.01	794,378.46	32° 11' 42.341 N	103° 22' 54.148 W	
1,075.0	0.07	167.40	1,075.0	-4.5	6.2	435,997.98	794,378.48	32° 11' 42.341 N	103° 22' 54.147 W	
1,100.0	0.04	225.07	1,100.0	-4.5	6.2	435,997.96	794,378.47	32° 11' 42.341 N	103° 22' 54.148 W	
1,125.0	0.08	284.20	1,125.0	-4.5	6.2	435,997.96	794,378.45	32° 11' 42.341 N	103° 22' 54.148 W	
1,150.0	0.17	323.29	1,150.0	-4.5	6.1	435,997.99	794,378.41	32° 11' 42.341 N	103° 22' 54.148 W	
1,175.0	0.14	350.50	1,175.0	-4.4	6.1	435,998.05	794,378.38	32° 11' 42.342 N	103° 22' 54.149 W	
1,200.0	0.11	349.88	1,200.0	-4.4	6.1	435,998.11	794,378.38	32° 11' 42.342 N	103° 22' 54.149 W	
1,225.0	0.02	65.16	1,225.0	-4.4	6.1	435,998.13	794,378.38	32° 11' 42.342 N	103° 22' 54.149 W	
1,250.0	0.06	313.90	1,250.0	-4.3	6.1	435,998.14	794,378.37	32° 11' 42.342 N	103° 22' 54.149 W	
1,275.0	0.06	258.46	1,275.0	-4.3	6.0	435,998.15	794,378.35	32° 11' 42.342 N	103° 22' 54.149 W	
1,300.0	0.04	315.51	1,300.0	-4.3	6.0	435,998.15	794,378.33	32° 11' 42.343 N	103° 22' 54.149 W	
1,325.0	0.16	337.34	1,325.0	-4.3	6.0	435,998.19	794,378.31	32° 11' 42.343 N	103° 22' 54.149 W	
1,350.0	0.08	356.40	1,350.0	-4.2	6.0	435,998.24	794,378.29	32° 11' 42.343 N	103° 22' 54.150 W	
1,375.0	0.07	217.13	1,375.0	-4.2	6.0	435,998.25	794,378.28	32° 11' 42.343 N	103° 22' 54.150 W	
1,400.0	0.09	276.01	1,400.0	-4.2	6.0	435,998.24	794,378.26	32° 11' 42.343 N	103° 22' 54.150 W	
1,425.0	0.04	25.08	1,425.0	-4.2	5.9	435,998.25	794,378.24	32° 11' 42.343 N	103° 22' 54.150 W	
1,450.0	0.09	110.48	1,450.0	-4.2	6.0	435,998.25	794,378.26	32° 11' 42.343 N	103° 22' 54.150 W	
1,475.0	0.03	191.97	1,475.0	-4.3	6.0	435,998.23	794,378.28	32° 11' 42.343 N	103° 22' 54.150 W	
1,500.0	0.11	359.96	1,500.0	-4.2	6.0	435,998.25	794,378.28	32° 11' 42.344 N	103° 22' 54.150 W	
1,525.0	0.10	75.46	1,525.0	-4.2	6.0	435,998.28	794,378.30	32° 11' 42.344 N	103° 22' 54.150 W	
1,550.0	0.07	76.29	1,550.0	-4.2	6.0	435,998.29	794,378.33	32° 11' 42.344 N	103° 22' 54.149 W	
1,575.0	0.08	60.42	1,575.0	-4.2	6.1	435,998.30	794,378.36	32° 11' 42.344 N	103° 22' 54.149 W	
1,600.0	0.17	45.59	1,600.0	-4.1	6.1	435,998.34	794,378.41	32° 11' 42.344 N	103° 22' 54.148 W	
1,625.0	0.10	50.00	1,625.0	-4.1	6.2	435,998.38	794,378.45	32° 11' 42.345 N	103° 22' 54.148 W	
1,650.0	0.16	128.31	1,650.0	-4.1	6.2	435,998.37	794,378.49	32° 11' 42.345 N	103° 22' 54.147 W	
1,675.0	0.14	106.26	1,675.0	-4.1	6.3	435,998.34	794,378.55	32° 11' 42.344 N	103° 22' 54.147 W	
1,700.0	0.09	111.83	1,700.0	-4.2	6.3	435,998.32	794,378.60	32° 11' 42.344 N	103° 22' 54.146 W	

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Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
1,725.0	0.12	89.32	1,725.0	-4.2	6.3	435,998.32	794,378.64	32° 11' 42.344 N	103° 22' 54.146 W	
1,750.0	0.23	128.92	1,750.0	-4.2	6.4	435,998.29	794,378.71	32° 11' 42.344 N	103° 22' 54.145 W	
1,775.0	0.13	29.12	1,775.0	-4.2	6.5	435,998.28	794,378.76	32° 11' 42.344 N	103° 22' 54.144 W	
1,800.0	0.20	35.06	1,800.0	-4.1	6.5	435,998.34	794,378.80	32° 11' 42.344 N	103° 22' 54.144 W	
1,825.0	0.14	37.15	1,825.0	-4.1	6.5	435,998.40	794,378.84	32° 11' 42.345 N	103° 22' 54.143 W	
1,850.0	0.13	112.15	1,850.0	-4.1	6.6	435,998.41	794,378.89	32° 11' 42.345 N	103° 22' 54.143 W	
1,875.0	0.21	122.96	1,875.0	-4.1	6.7	435,998.38	794,378.95	32° 11' 42.345 N	103° 22' 54.142 W	
1,900.0	0.08	68.49	1,900.0	-4.1	6.7	435,998.36	794,379.01	32° 11' 42.345 N	103° 22' 54.141 W	
1,925.0	0.17	52.52	1,925.0	-4.1	6.8	435,998.39	794,379.05	32° 11' 42.345 N	103° 22' 54.141 W	
1,950.0	0.16	11.28	1,950.0	-4.0	6.8	435,998.44	794,379.09	32° 11' 42.345 N	103° 22' 54.140 W	
1,975.0	0.13	76.89	1,975.0	-4.0	6.8	435,998.49	794,379.12	32° 11' 42.346 N	103° 22' 54.140 W	
2,000.0	0.14	118.82	2,000.0	-4.0	6.9	435,998.48	794,379.18	32° 11' 42.346 N	103° 22' 54.139 W	
2,025.0	0.10	87.31	2,025.0	-4.0	6.9	435,998.46	794,379.23	32° 11' 42.346 N	103° 22' 54.139 W	
2,050.0	0.19	108.34	2,050.0	-4.0	7.0	435,998.45	794,379.29	32° 11' 42.345 N	103° 22' 54.138 W	
2,075.0	0.12	97.08	2,075.0	-4.0	7.1	435,998.44	794,379.35	32° 11' 42.345 N	103° 22' 54.137 W	
2,100.0	0.22	53.05	2,100.0	-4.0	7.1	435,998.46	794,379.42	32° 11' 42.345 N	103° 22' 54.136 W	
2,125.0	0.16	58.10	2,125.0	-4.0	7.2	435,998.51	794,379.48	32° 11' 42.346 N	103° 22' 54.136 W	
2,150.0	0.16	94.40	2,150.0	-4.0	7.3	435,998.52	794,379.55	32° 11' 42.346 N	103° 22' 54.135 W	
2,175.0	0.20	76.06	2,175.0	-4.0	7.3	435,998.53	794,379.63	32° 11' 42.346 N	103° 22' 54.134 W	
2,200.0	0.28	44.69	2,200.0	-3.9	7.4	435,998.59	794,379.71	32° 11' 42.347 N	103° 22' 54.133 W	
2,225.0	0.28	55.75	2,225.0	-3.8	7.5	435,998.66	794,379.81	32° 11' 42.347 N	103° 22' 54.132 W	
2,250.0	0.31	38.51	2,250.0	-3.7	7.6	435,998.75	794,379.90	32° 11' 42.348 N	103° 22' 54.131 W	
2,275.0	0.33	77.10	2,275.0	-3.7	7.7	435,998.82	794,380.01	32° 11' 42.349 N	103° 22' 54.130 W	
2,300.0	0.26	87.43	2,300.0	-3.6	7.8	435,998.84	794,380.14	32° 11' 42.349 N	103° 22' 54.128 W	
2,325.0	0.35	72.88	2,325.0	-3.6	8.0	435,998.86	794,380.27	32° 11' 42.349 N	103° 22' 54.127 W	
2,350.0	0.27	80.22	2,350.0	-3.6	8.1	435,998.90	794,380.40	32° 11' 42.350 N	103° 22' 54.125 W	
2,375.0	0.37	69.11	2,375.0	-3.6	8.2	435,998.93	794,380.53	32° 11' 42.350 N	103° 22' 54.123 W	
2,400.0	0.33	79.59	2,400.0	-3.5	8.4	435,998.98	794,380.68	32° 11' 42.350 N	103° 22' 54.122 W	
2,425.0	0.38	73.11	2,425.0	-3.5	8.5	435,999.01	794,380.83	32° 11' 42.351 N	103° 22' 54.120 W	
2,450.0	0.38	83.04	2,450.0	-3.4	8.7	435,999.05	794,380.99	32° 11' 42.351 N	103° 22' 54.118 W	
2,475.0	0.38	74.32	2,475.0	-3.4	8.9	435,999.08	794,381.15	32° 11' 42.351 N	103° 22' 54.116 W	
2,500.0	0.38	79.23	2,500.0	-3.4	9.0	435,999.12	794,381.31	32° 11' 42.352 N	103° 22' 54.114 W	
2,525.0	0.40	60.08	2,525.0	-3.3	9.2	435,999.18	794,381.47	32° 11' 42.352 N	103° 22' 54.113 W	
2,550.0	0.43	81.88	2,550.0	-3.3	9.3	435,999.23	794,381.64	32° 11' 42.353 N	103° 22' 54.111 W	
2,575.0	0.37	77.54	2,575.0	-3.2	9.5	435,999.26	794,381.81	32° 11' 42.353 N	103° 22' 54.109 W	
2,600.0	0.46	82.36	2,600.0	-3.2	9.7	435,999.30	794,381.99	32° 11' 42.354 N	103° 22' 54.106 W	
2,625.0	0.39	73.65	2,625.0	-3.2	9.9	435,999.33	794,382.17	32° 11' 42.354 N	103° 22' 54.104 W	
2,650.0	0.43	73.17	2,650.0	-3.1	10.0	435,999.38	794,382.34	32° 11' 42.354 N	103° 22' 54.102 W	
2,675.0	0.40	86.73	2,675.0	-3.1	10.2	435,999.42	794,382.52	32° 11' 42.355 N	103° 22' 54.100 W	
2,700.0	0.44	69.27	2,700.0	-3.0	10.4	435,999.45	794,382.69	32° 11' 42.355 N	103° 22' 54.098 W	
2,725.0	0.42	60.88	2,725.0	-3.0	10.6	435,999.53	794,382.86	32° 11' 42.356 N	103° 22' 54.096 W	
2,750.0	0.50	75.74	2,749.9	-2.9	10.8	435,999.60	794,383.05	32° 11' 42.356 N	103° 22' 54.094 W	
2,775.0	0.44	70.90	2,774.9	-2.8	10.9	435,999.66	794,383.25	32° 11' 42.357 N	103° 22' 54.092 W	
2,800.0	0.49	64.29	2,799.9	-2.7	11.1	435,999.74	794,383.43	32° 11' 42.358 N	103° 22' 54.090 W	
2,825.0	0.46	81.00	2,824.9	-2.7	11.3	435,999.80	794,383.63	32° 11' 42.358 N	103° 22' 54.087 W	
2,850.0	0.49	79.45	2,849.9	-2.6	11.5	435,999.84	794,383.83	32° 11' 42.359 N	103° 22' 54.085 W	
2,875.0	0.48	75.90	2,874.9	-2.6	11.7	435,999.88	794,384.04	32° 11' 42.359 N	103° 22' 54.083 W	
2,900.0	0.51	65.85	2,899.9	-2.5	11.9	435,999.95	794,384.24	32° 11' 42.360 N	103° 22' 54.080 W	
2,925.0	0.51	84.79	2,924.9	-2.5	12.2	436,000.01	794,384.46	32° 11' 42.360 N	103° 22' 54.078 W	
2,950.0	0.43	78.68	2,949.9	-2.4	12.4	436,000.04	794,384.66	32° 11' 42.361 N	103° 22' 54.075 W	
2,975.0	0.54	67.11	2,974.9	-2.4	12.6	436,000.10	794,384.86	32° 11' 42.361 N	103° 22' 54.073 W	
3,000.0	0.54	70.39	2,999.9	-2.3	12.8	436,000.19	794,385.08	32° 11' 42.362 N	103° 22' 54.070 W	
3,025.0	0.47	80.11	3,024.9	-2.2	13.0	436,000.25	794,385.29	32° 11' 42.363 N	103° 22' 54.068 W	
3,050.0	0.58	70.90	3,049.9	-2.2	13.2	436,000.30	794,385.51	32° 11' 42.363 N	103° 22' 54.065 W	
3,075.0	0.52	72.94	3,074.9	-2.1	13.4	436,000.38	794,385.74	32° 11' 42.364 N	103° 22' 54.063 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,100.0	0.57	75.37	3,099.9	-2.0	13.7	436,000.44	794,385.97	32° 11' 42.365 N	103° 22' 54.060 W
3,125.0	0.54	80.11	3,124.9	-2.0	13.9	436,000.50	794,386.20	32° 11' 42.365 N	103° 22' 54.057 W
3,150.0	0.56	69.34	3,149.9	-1.9	14.1	436,000.56	794,386.43	32° 11' 42.366 N	103° 22' 54.055 W
3,175.0	0.53	79.28	3,174.9	-1.9	14.4	436,000.62	794,386.66	32° 11' 42.366 N	103° 22' 54.052 W
3,200.0	0.59	79.73	3,199.9	-1.8	14.6	436,000.67	794,386.90	32° 11' 42.367 N	103° 22' 54.049 W
3,225.0	0.56	80.04	3,224.9	-1.8	14.9	436,000.71	794,387.15	32° 11' 42.367 N	103° 22' 54.046 W
3,250.0	0.61	78.60	3,249.9	-1.7	15.1	436,000.76	794,387.40	32° 11' 42.368 N	103° 22' 54.043 W
3,275.0	0.47	79.82	3,274.9	-1.7	15.3	436,000.80	794,387.63	32° 11' 42.368 N	103° 22' 54.041 W
3,300.0	0.53	81.12	3,299.9	-1.6	15.5	436,000.84	794,387.85	32° 11' 42.368 N	103° 22' 54.038 W
3,325.0	0.45	75.05	3,324.9	-1.6	15.8	436,000.88	794,388.06	32° 11' 42.369 N	103° 22' 54.036 W
3,350.0	0.52	86.84	3,349.9	-1.6	16.0	436,000.91	794,388.26	32° 11' 42.369 N	103° 22' 54.033 W
3,375.0	0.47	82.53	3,374.9	-1.6	16.2	436,000.93	794,388.48	32° 11' 42.369 N	103° 22' 54.031 W
3,400.0	0.51	85.52	3,399.9	-1.5	16.4	436,000.96	794,388.69	32° 11' 42.369 N	103° 22' 54.028 W
3,425.0	0.45	76.42	3,424.9	-1.5	16.6	436,000.99	794,388.90	32° 11' 42.370 N	103° 22' 54.026 W
3,450.0	0.46	90.49	3,449.9	-1.5	16.8	436,001.01	794,389.09	32° 11' 42.370 N	103° 22' 54.024 W
3,475.0	0.46	91.54	3,474.9	-1.5	17.0	436,001.01	794,389.29	32° 11' 42.370 N	103° 22' 54.021 W
3,500.0	0.42	97.52	3,499.9	-1.5	17.2	436,000.99	794,389.49	32° 11' 42.370 N	103° 22' 54.019 W
3,525.0	0.34	90.66	3,524.9	-1.5	17.4	436,000.98	794,389.65	32° 11' 42.369 N	103° 22' 54.017 W
3,550.0	0.38	99.71	3,549.9	-1.5	17.5	436,000.96	794,389.81	32° 11' 42.369 N	103° 22' 54.015 W
3,575.0	0.39	92.60	3,574.9	-1.5	17.7	436,000.95	794,389.97	32° 11' 42.369 N	103° 22' 54.013 W
3,600.0	0.49	124.07	3,599.9	-1.6	17.8	436,000.88	794,390.15	32° 11' 42.368 N	103° 22' 54.011 W
3,625.0	0.38	93.47	3,624.9	-1.7	18.0	436,000.82	794,390.32	32° 11' 42.368 N	103° 22' 54.009 W
3,650.0	0.40	107.34	3,649.9	-1.7	18.2	436,000.79	794,390.48	32° 11' 42.368 N	103° 22' 54.007 W
3,675.0	0.35	104.65	3,674.9	-1.7	18.3	436,000.74	794,390.64	32° 11' 42.367 N	103° 22' 54.006 W
3,700.0	0.55	106.83	3,699.9	-1.8	18.5	436,000.69	794,390.83	32° 11' 42.367 N	103° 22' 54.003 W
3,725.0	1.10	94.04	3,724.9	-1.8	18.9	436,000.64	794,391.18	32° 11' 42.366 N	103° 22' 53.999 W
3,750.0	1.44	89.08	3,749.9	-1.9	19.4	436,000.62	794,391.74	32° 11' 42.366 N	103° 22' 53.993 W
3,775.0	1.97	89.33	3,774.9	-1.9	20.2	436,000.63	794,392.48	32° 11' 42.366 N	103° 22' 53.984 W
3,800.0	2.51	87.79	3,799.9	-1.8	21.2	436,000.66	794,393.46	32° 11' 42.366 N	103° 22' 53.973 W
3,825.0	2.97	87.31	3,824.8	-1.8	22.4	436,000.71	794,394.65	32° 11' 42.366 N	103° 22' 53.959 W
3,850.0	3.63	87.97	3,849.8	-1.7	23.8	436,000.77	794,396.09	32° 11' 42.367 N	103° 22' 53.942 W
3,875.0	4.21	88.19	3,874.7	-1.7	25.5	436,000.83	794,397.80	32° 11' 42.367 N	103° 22' 53.922 W
3,900.0	4.81	88.08	3,899.7	-1.6	27.5	436,000.89	794,399.76	32° 11' 42.368 N	103° 22' 53.899 W
3,925.0	5.21	87.33	3,924.6	-1.5	29.6	436,000.98	794,401.94	32° 11' 42.368 N	103° 22' 53.874 W
3,950.0	5.62	87.56	3,949.5	-1.4	32.0	436,001.08	794,404.30	32° 11' 42.369 N	103° 22' 53.847 W
3,975.0	5.87	87.41	3,974.3	-1.3	34.5	436,001.19	794,406.80	32° 11' 42.370 N	103° 22' 53.818 W
4,000.0	6.28	88.05	3,999.2	-1.2	37.1	436,001.30	794,409.44	32° 11' 42.371 N	103° 22' 53.787 W
4,025.0	6.28	87.81	4,024.0	-1.1	39.9	436,001.40	794,412.18	32° 11' 42.372 N	103° 22' 53.755 W
4,050.0	6.66	88.12	4,048.9	-1.0	42.7	436,001.50	794,414.99	32° 11' 42.372 N	103° 22' 53.722 W
4,075.0	6.76	86.55	4,073.7	-0.9	45.6	436,001.63	794,417.91	32° 11' 42.373 N	103° 22' 53.688 W
4,100.0	6.85	85.73	4,098.5	-0.7	48.6	436,001.83	794,420.87	32° 11' 42.375 N	103° 22' 53.654 W
4,125.0	6.99	84.74	4,123.4	-0.4	51.6	436,002.08	794,423.87	32° 11' 42.377 N	103° 22' 53.619 W
4,150.0	6.99	83.72	4,148.2	-0.1	54.6	436,002.39	794,426.89	32° 11' 42.380 N	103° 22' 53.584 W
4,175.0	7.05	81.89	4,173.0	0.3	57.6	436,002.77	794,429.93	32° 11' 42.384 N	103° 22' 53.548 W
4,200.0	6.91	80.79	4,197.8	0.7	60.6	436,003.23	794,432.93	32° 11' 42.388 N	103° 22' 53.513 W
4,225.0	6.61	79.10	4,222.6	1.3	63.5	436,003.74	794,435.83	32° 11' 42.393 N	103° 22' 53.480 W
4,250.0	6.07	75.72	4,247.5	1.9	66.2	436,004.34	794,438.52	32° 11' 42.398 N	103° 22' 53.448 W
4,275.0	5.33	73.83	4,272.3	2.5	68.6	436,004.99	794,440.92	32° 11' 42.405 N	103° 22' 53.420 W
4,300.0	4.83	72.57	4,297.3	3.1	70.7	436,005.63	794,443.04	32° 11' 42.411 N	103° 22' 53.395 W
4,325.0	4.38	72.85	4,322.2	3.7	72.7	436,006.22	794,444.95	32° 11' 42.417 N	103° 22' 53.373 W
4,350.0	4.16	70.67	4,347.1	4.3	74.4	436,006.81	794,446.72	32° 11' 42.422 N	103° 22' 53.352 W
4,375.0	3.92	68.92	4,372.0	4.9	76.1	436,007.41	794,448.37	32° 11' 42.428 N	103° 22' 53.333 W
4,400.0	3.64	65.62	4,397.0	5.6	77.6	436,008.05	794,449.89	32° 11' 42.434 N	103° 22' 53.315 W
4,425.0	3.28	62.63	4,421.9	6.2	79.0	436,008.70	794,451.25	32° 11' 42.441 N	103° 22' 53.300 W
4,450.0	2.95	59.73	4,446.9	6.9	80.1	436,009.36	794,452.44	32° 11' 42.447 N	103° 22' 53.286 W

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
4,475.0	2.47	51.76	4,471.9	7.5	81.1	436,010.02	794,453.42	32° 11' 42.453 N	103° 22' 53.274 W	
4,500.0	2.06	37.85	4,496.9	8.2	81.8	436,010.70	794,454.12	32° 11' 42.460 N	103° 22' 53.266 W	
4,525.0	1.92	26.85	4,521.8	8.9	82.3	436,011.43	794,454.58	32° 11' 42.467 N	103° 22' 53.260 W	
4,550.0	1.95	16.39	4,546.8	9.7	82.6	436,012.21	794,454.89	32° 11' 42.475 N	103° 22' 53.257 W	
4,575.0	2.09	11.64	4,571.8	10.6	82.8	436,013.07	794,455.11	32° 11' 42.483 N	103° 22' 53.254 W	
4,600.0	2.40	11.85	4,596.8	11.5	83.0	436,014.03	794,455.30	32° 11' 42.493 N	103° 22' 53.252 W	
4,625.0	2.61	14.79	4,621.8	12.6	83.3	436,015.09	794,455.56	32° 11' 42.503 N	103° 22' 53.249 W	
4,650.0	3.04	23.16	4,646.7	13.8	83.7	436,016.25	794,455.96	32° 11' 42.515 N	103° 22' 53.244 W	
4,675.0	3.61	33.41	4,671.7	15.0	84.4	436,017.52	794,456.66	32° 11' 42.527 N	103° 22' 53.236 W	
4,700.0	4.07	39.74	4,696.6	16.4	85.4	436,018.86	794,457.66	32° 11' 42.540 N	103° 22' 53.224 W	
4,725.0	4.17	43.17	4,721.6	17.7	86.5	436,020.20	794,458.85	32° 11' 42.554 N	103° 22' 53.210 W	
4,750.0	4.26	47.95	4,746.5	19.0	87.9	436,021.49	794,460.16	32° 11' 42.566 N	103° 22' 53.195 W	
4,775.0	4.29	52.69	4,771.4	20.2	89.3	436,022.67	794,461.59	32° 11' 42.578 N	103° 22' 53.178 W	
4,800.0	4.63	61.13	4,796.4	21.2	90.9	436,023.73	794,463.22	32° 11' 42.588 N	103° 22' 53.159 W	
4,825.0	4.52	65.87	4,821.3	22.1	92.7	436,024.62	794,465.00	32° 11' 42.597 N	103° 22' 53.138 W	
4,850.0	4.06	71.07	4,846.2	22.8	94.4	436,025.31	794,466.74	32° 11' 42.603 N	103° 22' 53.118 W	
4,875.0	3.45	79.79	4,871.2	23.2	96.0	436,025.73	794,468.32	32° 11' 42.608 N	103° 22' 53.099 W	
4,900.0	2.83	86.61	4,896.1	23.4	97.4	436,025.90	794,469.67	32° 11' 42.609 N	103° 22' 53.083 W	
4,925.0	2.18	97.42	4,921.1	23.4	98.5	436,025.87	794,470.76	32° 11' 42.609 N	103° 22' 53.071 W	
4,950.0	1.79	107.67	4,946.1	23.2	99.3	436,025.69	794,471.60	32° 11' 42.607 N	103° 22' 53.061 W	
4,975.0	1.63	112.01	4,971.1	23.0	100.0	436,025.44	794,472.30	32° 11' 42.604 N	103° 22' 53.053 W	
5,000.0	1.57	111.97	4,996.1	22.7	100.7	436,025.18	794,472.95	32° 11' 42.602 N	103° 22' 53.045 W	
5,025.0	1.60	113.07	5,021.1	22.4	101.3	436,024.92	794,473.59	32° 11' 42.599 N	103° 22' 53.038 W	
5,050.0	1.58	113.06	5,046.0	22.2	101.9	436,024.64	794,474.23	32° 11' 42.596 N	103° 22' 53.031 W	
5,075.0	1.59	111.75	5,071.0	21.9	102.6	436,024.38	794,474.87	32° 11' 42.594 N	103° 22' 53.023 W	
5,100.0	1.60	110.90	5,096.0	21.6	103.2	436,024.13	794,475.52	32° 11' 42.591 N	103° 22' 53.016 W	
5,125.0	1.49	112.10	5,121.0	21.4	103.8	436,023.88	794,476.14	32° 11' 42.589 N	103° 22' 53.008 W	
5,150.0	1.55	112.77	5,146.0	21.1	104.5	436,023.63	794,476.76	32° 11' 42.586 N	103° 22' 53.001 W	
5,175.0	1.60	112.90	5,171.0	20.9	105.1	436,023.36	794,477.39	32° 11' 42.583 N	103° 22' 52.994 W	
5,200.0	1.58	113.37	5,196.0	20.6	105.7	436,023.09	794,478.03	32° 11' 42.581 N	103° 22' 52.986 W	
5,225.0	1.67	111.78	5,221.0	20.3	106.4	436,022.82	794,478.68	32° 11' 42.578 N	103° 22' 52.979 W	
5,250.0	1.66	111.85	5,246.0	20.1	107.1	436,022.55	794,479.36	32° 11' 42.575 N	103° 22' 52.971 W	
5,275.0	1.59	110.61	5,271.0	19.8	107.7	436,022.29	794,480.02	32° 11' 42.572 N	103° 22' 52.963 W	
5,300.0	1.66	109.46	5,295.9	19.6	108.4	436,022.05	794,480.68	32° 11' 42.570 N	103° 22' 52.956 W	
5,325.0	1.64	109.38	5,320.9	19.3	109.1	436,021.81	794,481.36	32° 11' 42.568 N	103° 22' 52.948 W	
5,350.0	1.57	109.48	5,345.9	19.1	109.7	436,021.57	794,482.02	32° 11' 42.565 N	103° 22' 52.940 W	
5,375.0	1.65	110.01	5,370.9	18.9	110.4	436,021.34	794,482.68	32° 11' 42.563 N	103° 22' 52.932 W	
5,400.0	1.65	111.49	5,395.9	18.6	111.1	436,021.08	794,483.36	32° 11' 42.560 N	103° 22' 52.925 W	
5,425.0	1.72	109.44	5,420.9	18.3	111.7	436,020.83	794,484.05	32° 11' 42.558 N	103° 22' 52.917 W	
5,450.0	1.69	108.62	5,445.9	18.1	112.5	436,020.58	794,484.75	32° 11' 42.555 N	103° 22' 52.909 W	
5,475.0	1.62	108.00	5,470.9	17.9	113.1	436,020.36	794,485.43	32° 11' 42.553 N	103° 22' 52.901 W	
5,500.0	1.67	107.22	5,495.9	17.7	113.8	436,020.14	794,486.12	32° 11' 42.551 N	103° 22' 52.893 W	
5,525.0	1.70	106.61	5,520.9	17.4	114.5	436,019.92	794,486.82	32° 11' 42.548 N	103° 22' 52.884 W	
5,550.0	1.64	108.15	5,545.8	17.2	115.2	436,019.71	794,487.52	32° 11' 42.546 N	103° 22' 52.876 W	
5,575.0	1.65	107.95	5,570.8	17.0	115.9	436,019.48	794,488.20	32° 11' 42.544 N	103° 22' 52.869 W	
5,600.0	1.76	106.40	5,595.8	16.8	116.6	436,019.27	794,488.91	32° 11' 42.542 N	103° 22' 52.860 W	
5,625.0	1.71	105.61	5,620.8	16.6	117.3	436,019.06	794,489.64	32° 11' 42.540 N	103° 22' 52.852 W	
5,650.0	1.71	106.34	5,645.8	16.4	118.1	436,018.85	794,490.35	32° 11' 42.538 N	103° 22' 52.843 W	
5,675.0	1.66	106.45	5,670.8	16.2	118.8	436,018.64	794,491.06	32° 11' 42.535 N	103° 22' 52.835 W	
5,700.0	1.67	106.14	5,695.8	16.0	119.5	436,018.44	794,491.76	32° 11' 42.533 N	103° 22' 52.827 W	
5,725.0	1.75	106.16	5,720.8	15.7	120.2	436,018.23	794,492.47	32° 11' 42.531 N	103° 22' 52.819 W	
5,750.0	1.70	108.13	5,745.8	15.5	120.9	436,018.01	794,493.19	32° 11' 42.529 N	103° 22' 52.811 W	
5,775.0	1.70	107.02	5,770.7	15.3	121.6	436,017.79	794,493.90	32° 11' 42.527 N	103° 22' 52.802 W	
5,800.0	1.70	107.59	5,795.7	15.1	122.3	436,017.57	794,494.61	32° 11' 42.524 N	103° 22' 52.794 W	
5,825.0	1.72	106.28	5,820.7	14.9	123.0	436,017.35	794,495.32	32° 11' 42.522 N	103° 22' 52.786 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
5,850.0	1.75	108.80	5,845.7	14.6	123.7	436,017.12	794,496.04	32° 11' 42.520 N	103° 22' 52.777 W	
5,875.0	1.54	126.50	5,870.7	14.3	124.4	436,016.80	794,496.67	32° 11' 42.517 N	103° 22' 52.770 W	
5,900.0	1.47	145.69	5,895.7	13.8	124.8	436,016.33	794,497.13	32° 11' 42.512 N	103° 22' 52.765 W	
5,925.0	1.48	148.29	5,920.7	13.3	125.2	436,015.79	794,497.48	32° 11' 42.507 N	103° 22' 52.761 W	
5,950.0	1.54	151.29	5,945.7	12.7	125.5	436,015.22	794,497.81	32° 11' 42.501 N	103° 22' 52.757 W	
5,975.0	1.55	151.80	5,970.7	12.1	125.8	436,014.63	794,498.13	32° 11' 42.495 N	103° 22' 52.753 W	
6,000.0	1.58	150.64	5,995.7	11.5	126.2	436,014.03	794,498.46	32° 11' 42.489 N	103° 22' 52.750 W	
6,025.0	1.55	152.90	6,020.6	10.9	126.5	436,013.43	794,498.78	32° 11' 42.483 N	103° 22' 52.746 W	
6,050.0	1.56	152.50	6,045.6	10.3	126.8	436,012.83	794,499.09	32° 11' 42.477 N	103° 22' 52.742 W	
6,075.0	1.59	150.17	6,070.6	9.7	127.1	436,012.23	794,499.42	32° 11' 42.471 N	103° 22' 52.739 W	
6,100.0	1.63	151.78	6,095.6	9.1	127.5	436,011.61	794,499.76	32° 11' 42.465 N	103° 22' 52.735 W	
6,125.0	1.58	150.09	6,120.6	8.5	127.8	436,011.00	794,500.10	32° 11' 42.459 N	103° 22' 52.731 W	
6,150.0	1.61	148.40	6,145.6	7.9	128.2	436,010.40	794,500.46	32° 11' 42.453 N	103° 22' 52.727 W	
6,175.0	1.64	146.81	6,170.6	7.3	128.5	436,009.80	794,500.84	32° 11' 42.447 N	103° 22' 52.722 W	
6,200.0	1.64	145.95	6,195.6	6.7	128.9	436,009.21	794,501.23	32° 11' 42.441 N	103° 22' 52.718 W	
6,225.0	1.67	145.82	6,220.6	6.1	129.3	436,008.61	794,501.64	32° 11' 42.435 N	103° 22' 52.713 W	
6,250.0	1.65	146.77	6,245.6	5.5	129.7	436,008.01	794,502.04	32° 11' 42.429 N	103° 22' 52.709 W	
6,275.0	1.71	145.22	6,270.5	4.9	130.2	436,007.40	794,502.45	32° 11' 42.423 N	103° 22' 52.704 W	
6,300.0	1.62	147.73	6,295.5	4.3	130.6	436,006.80	794,502.85	32° 11' 42.417 N	103° 22' 52.699 W	
6,325.0	1.66	145.56	6,320.5	3.7	130.9	436,006.20	794,503.24	32° 11' 42.411 N	103° 22' 52.695 W	
6,350.0	1.66	143.60	6,345.5	3.1	131.4	436,005.61	794,503.66	32° 11' 42.405 N	103° 22' 52.690 W	
6,375.0	1.65	142.84	6,370.5	2.5	131.8	436,005.03	794,504.10	32° 11' 42.400 N	103° 22' 52.685 W	
6,400.0	1.68	145.16	6,395.5	2.0	132.2	436,004.44	794,504.52	32° 11' 42.394 N	103° 22' 52.680 W	
6,425.0	1.64	143.36	6,420.5	1.4	132.6	436,003.85	794,504.95	32° 11' 42.388 N	103° 22' 52.675 W	
6,450.0	1.67	145.51	6,445.5	0.8	133.1	436,003.27	794,505.37	32° 11' 42.382 N	103° 22' 52.670 W	
6,475.0	1.68	142.59	6,470.5	0.2	133.5	436,002.68	794,505.80	32° 11' 42.376 N	103° 22' 52.665 W	
6,500.0	1.65	143.17	6,495.4	-0.4	133.9	436,002.10	794,506.23	32° 11' 42.370 N	103° 22' 52.660 W	
6,525.0	1.60	144.14	6,520.4	-1.0	134.4	436,001.53	794,506.65	32° 11' 42.365 N	103° 22' 52.656 W	
6,550.0	1.59	145.56	6,545.4	-1.5	134.8	436,000.96	794,507.05	32° 11' 42.359 N	103° 22' 52.651 W	
6,575.0	1.66	141.50	6,570.4	-2.1	135.2	436,000.39	794,507.48	32° 11' 42.353 N	103° 22' 52.646 W	
6,600.0	1.62	145.46	6,595.4	-2.7	135.6	435,999.81	794,507.90	32° 11' 42.348 N	103° 22' 52.641 W	
6,625.0	1.74	141.35	6,620.4	-3.3	136.0	435,999.23	794,508.34	32° 11' 42.342 N	103° 22' 52.636 W	
6,650.0	1.61	143.82	6,645.4	-3.8	136.5	435,998.65	794,508.78	32° 11' 42.336 N	103° 22' 52.631 W	
6,675.0	1.69	142.36	6,670.4	-4.4	136.9	435,998.07	794,509.22	32° 11' 42.330 N	103° 22' 52.626 W	
6,700.0	1.60	142.59	6,695.4	-5.0	137.4	435,997.50	794,509.65	32° 11' 42.325 N	103° 22' 52.621 W	
6,725.0	1.28	140.27	6,720.4	-5.5	137.7	435,997.01	794,510.04	32° 11' 42.320 N	103° 22' 52.617 W	
6,750.0	0.78	134.78	6,745.4	-5.8	138.0	435,996.67	794,510.34	32° 11' 42.316 N	103° 22' 52.613 W	
6,775.0	0.26	146.50	6,770.4	-6.0	138.2	435,996.51	794,510.49	32° 11' 42.315 N	103° 22' 52.611 W	
6,800.0	0.05	243.33	6,795.4	-6.0	138.2	435,996.45	794,510.52	32° 11' 42.314 N	103° 22' 52.611 W	
6,825.0	0.25	288.67	6,820.4	-6.0	138.2	435,996.47	794,510.45	32° 11' 42.314 N	103° 22' 52.612 W	
6,850.0	0.19	290.60	6,845.4	-6.0	138.1	435,996.50	794,510.36	32° 11' 42.315 N	103° 22' 52.613 W	
6,875.0	0.21	290.19	6,870.4	-6.0	138.0	435,996.53	794,510.28	32° 11' 42.315 N	103° 22' 52.614 W	
6,900.0	0.22	286.17	6,895.4	-5.9	137.9	435,996.56	794,510.19	32° 11' 42.315 N	103° 22' 52.615 W	
6,925.0	0.22	292.56	6,920.4	-5.9	137.8	435,996.59	794,510.10	32° 11' 42.316 N	103° 22' 52.616 W	
6,950.0	0.28	288.72	6,945.4	-5.9	137.7	435,996.63	794,510.00	32° 11' 42.316 N	103° 22' 52.617 W	
6,975.0	0.21	295.31	6,970.4	-5.8	137.6	435,996.67	794,509.90	32° 11' 42.316 N	103° 22' 52.618 W	
7,000.0	0.25	295.88	6,995.4	-5.8	137.5	435,996.71	794,509.81	32° 11' 42.317 N	103° 22' 52.619 W	
7,025.0	0.23	291.14	7,020.4	-5.7	137.4	435,996.75	794,509.72	32° 11' 42.317 N	103° 22' 52.620 W	
7,050.0	0.20	284.54	7,045.4	-5.7	137.3	435,996.78	794,509.63	32° 11' 42.317 N	103° 22' 52.622 W	
7,075.0	0.25	282.76	7,070.4	-5.7	137.2	435,996.81	794,509.53	32° 11' 42.318 N	103° 22' 52.623 W	
7,100.0	0.19	274.50	7,095.4	-5.7	137.1	435,996.82	794,509.44	32° 11' 42.318 N	103° 22' 52.624 W	
7,125.0	0.25	273.20	7,120.4	-5.7	137.0	435,996.83	794,509.34	32° 11' 42.318 N	103° 22' 52.625 W	
7,150.0	0.25	266.55	7,145.4	-5.7	136.9	435,996.83	794,509.23	32° 11' 42.318 N	103° 22' 52.626 W	
7,175.0	0.22	272.88	7,170.4	-5.7	136.8	435,996.83	794,509.13	32° 11' 42.318 N	103° 22' 52.627 W	
7,200.0	0.25	256.22	7,195.4	-5.7	136.7	435,996.82	794,509.03	32° 11' 42.318 N	103° 22' 52.628 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
7,225.0	0.30	264.82	7,220.4	-5.7	136.6	435,996.80	794,508.91	32° 11' 42.318 N	103° 22' 52.630 W	
7,250.0	0.24	263.05	7,245.4	-5.7	136.5	435,996.78	794,508.79	32° 11' 42.318 N	103° 22' 52.631 W	
7,275.0	0.27	274.08	7,270.4	-5.7	136.4	435,996.78	794,508.68	32° 11' 42.318 N	103° 22' 52.633 W	
7,300.0	0.16	279.84	7,295.4	-5.7	136.3	435,996.79	794,508.59	32° 11' 42.318 N	103° 22' 52.634 W	
7,325.0	0.29	266.19	7,320.3	-5.7	136.2	435,996.79	794,508.49	32° 11' 42.318 N	103° 22' 52.635 W	
7,350.0	0.24	268.34	7,345.3	-5.7	136.1	435,996.79	794,508.38	32° 11' 42.318 N	103° 22' 52.636 W	
7,375.0	0.23	264.51	7,370.3	-5.7	136.0	435,996.78	794,508.27	32° 11' 42.318 N	103° 22' 52.637 W	
7,400.0	0.22	266.93	7,395.3	-5.7	135.9	435,996.77	794,508.18	32° 11' 42.318 N	103° 22' 52.638 W	
7,425.0	0.21	266.96	7,420.3	-5.7	135.8	435,996.77	794,508.08	32° 11' 42.317 N	103° 22' 52.639 W	
7,450.0	0.22	255.09	7,445.3	-5.7	135.7	435,996.75	794,507.99	32° 11' 42.317 N	103° 22' 52.641 W	
7,475.0	0.15	250.92	7,470.3	-5.8	135.6	435,996.73	794,507.91	32° 11' 42.317 N	103° 22' 52.641 W	
7,500.0	0.16	243.47	7,495.3	-5.8	135.6	435,996.71	794,507.85	32° 11' 42.317 N	103° 22' 52.642 W	
7,525.0	0.17	245.07	7,520.3	-5.8	135.5	435,996.67	794,507.79	32° 11' 42.317 N	103° 22' 52.643 W	
7,550.0	0.17	251.86	7,545.3	-5.8	135.4	435,996.65	794,507.72	32° 11' 42.316 N	103° 22' 52.644 W	
7,575.0	0.17	249.15	7,570.3	-5.9	135.3	435,996.62	794,507.65	32° 11' 42.316 N	103° 22' 52.645 W	
7,600.0	0.21	259.18	7,595.3	-5.9	135.3	435,996.60	794,507.57	32° 11' 42.316 N	103° 22' 52.645 W	
7,625.0	0.16	244.81	7,620.3	-5.9	135.2	435,996.58	794,507.49	32° 11' 42.316 N	103° 22' 52.646 W	
7,650.0	0.21	249.20	7,645.3	-5.9	135.1	435,996.55	794,507.42	32° 11' 42.315 N	103° 22' 52.647 W	
7,675.0	0.19	249.03	7,670.3	-6.0	135.0	435,996.51	794,507.33	32° 11' 42.315 N	103° 22' 52.648 W	
7,700.0	0.23	249.91	7,695.3	-6.0	135.0	435,996.48	794,507.25	32° 11' 42.315 N	103° 22' 52.649 W	
7,725.0	0.23	256.09	7,720.3	-6.0	134.9	435,996.45	794,507.15	32° 11' 42.314 N	103° 22' 52.650 W	
7,750.0	0.20	240.59	7,745.3	-6.1	134.8	435,996.42	794,507.07	32° 11' 42.314 N	103° 22' 52.651 W	
7,775.0	0.31	254.52	7,770.3	-6.1	134.7	435,996.38	794,506.96	32° 11' 42.314 N	103° 22' 52.653 W	
7,800.0	0.25	247.71	7,795.3	-6.1	134.5	435,996.34	794,506.85	32° 11' 42.313 N	103° 22' 52.654 W	
7,825.0	0.28	241.82	7,820.3	-6.2	134.4	435,996.29	794,506.74	32° 11' 42.313 N	103° 22' 52.655 W	
7,850.0	0.26	228.20	7,845.3	-6.3	134.3	435,996.23	794,506.65	32° 11' 42.312 N	103° 22' 52.656 W	
7,875.0	0.28	229.34	7,870.3	-6.3	134.3	435,996.15	794,506.56	32° 11' 42.311 N	103° 22' 52.657 W	
7,900.0	0.23	212.16	7,895.3	-6.4	134.2	435,996.07	794,506.49	32° 11' 42.311 N	103° 22' 52.658 W	
7,925.0	0.30	219.21	7,920.3	-6.5	134.1	435,995.97	794,506.42	32° 11' 42.310 N	103° 22' 52.659 W	
7,950.0	0.25	202.30	7,945.3	-6.6	134.1	435,995.87	794,506.36	32° 11' 42.309 N	103° 22' 52.660 W	
7,975.0	0.31	210.78	7,970.3	-6.7	134.0	435,995.76	794,506.30	32° 11' 42.308 N	103° 22' 52.660 W	
8,000.0	0.30	201.32	7,995.3	-6.8	133.9	435,995.64	794,506.24	32° 11' 42.306 N	103° 22' 52.661 W	
8,025.0	0.42	175.73	8,020.3	-7.0	133.9	435,995.49	794,506.22	32° 11' 42.305 N	103° 22' 52.661 W	
8,050.0	0.38	169.52	8,045.3	-7.2	133.9	435,995.32	794,506.25	32° 11' 42.303 N	103° 22' 52.661 W	
8,075.0	0.26	173.16	8,070.3	-7.3	134.0	435,995.18	794,506.27	32° 11' 42.302 N	103° 22' 52.661 W	
8,100.0	0.36	173.65	8,095.3	-7.4	134.0	435,995.05	794,506.28	32° 11' 42.301 N	103° 22' 52.661 W	
8,125.0	0.38	164.29	8,120.3	-7.6	134.0	435,994.89	794,506.32	32° 11' 42.299 N	103° 22' 52.660 W	
8,150.0	0.31	159.37	8,145.3	-7.7	134.1	435,994.75	794,506.36	32° 11' 42.298 N	103° 22' 52.660 W	
8,175.0	0.33	163.26	8,170.3	-7.9	134.1	435,994.61	794,506.41	32° 11' 42.296 N	103° 22' 52.659 W	
8,200.0	0.33	153.81	8,195.3	-8.0	134.2	435,994.48	794,506.46	32° 11' 42.295 N	103° 22' 52.659 W	
8,225.0	0.30	157.70	8,220.3	-8.1	134.2	435,994.35	794,506.52	32° 11' 42.294 N	103° 22' 52.658 W	
8,250.0	0.37	149.08	8,245.3	-8.3	134.3	435,994.22	794,506.58	32° 11' 42.292 N	103° 22' 52.657 W	
8,275.0	0.33	140.41	8,270.3	-8.4	134.4	435,994.10	794,506.67	32° 11' 42.291 N	103° 22' 52.656 W	
8,300.0	0.40	146.90	8,295.3	-8.5	134.5	435,993.97	794,506.76	32° 11' 42.290 N	103° 22' 52.655 W	
8,325.0	0.42	130.81	8,320.3	-8.6	134.6	435,993.84	794,506.88	32° 11' 42.289 N	103° 22' 52.654 W	
8,350.0	0.39	139.95	8,345.3	-8.8	134.7	435,993.71	794,507.00	32° 11' 42.287 N	103° 22' 52.652 W	
8,375.0	0.38	130.07	8,370.3	-8.9	134.8	435,993.59	794,507.12	32° 11' 42.286 N	103° 22' 52.651 W	
8,400.0	0.41	136.26	8,395.3	-9.0	134.9	435,993.48	794,507.25	32° 11' 42.285 N	103° 22' 52.650 W	
8,425.0	0.48	131.01	8,420.3	-9.1	135.1	435,993.34	794,507.39	32° 11' 42.284 N	103° 22' 52.648 W	
8,450.0	0.37	138.12	8,445.3	-9.3	135.2	435,993.21	794,507.52	32° 11' 42.282 N	103° 22' 52.646 W	
8,475.0	0.43	130.92	8,470.3	-9.4	135.3	435,993.09	794,507.65	32° 11' 42.281 N	103° 22' 52.645 W	
8,500.0	0.36	140.47	8,495.3	-9.5	135.5	435,992.97	794,507.77	32° 11' 42.280 N	103° 22' 52.644 W	
8,525.0	0.43	129.29	8,520.3	-9.6	135.6	435,992.85	794,507.89	32° 11' 42.279 N	103° 22' 52.642 W	
8,550.0	0.39	135.40	8,545.3	-9.8	135.7	435,992.73	794,508.02	32° 11' 42.278 N	103° 22' 52.641 W	
8,575.0	0.41	131.84	8,570.3	-9.9	135.8	435,992.61	794,508.15	32° 11' 42.276 N	103° 22' 52.639 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
8,600.0	0.40	137.42	8,595.3	-10.0	136.0	435,992.49	794,508.27	32° 11' 42.275 N	103° 22' 52.638 W	
8,625.0	0.40	133.07	8,620.3	-10.1	136.1	435,992.36	794,508.40	32° 11' 42.274 N	103° 22' 52.636 W	
8,650.0	0.46	139.59	8,645.3	-10.3	136.2	435,992.23	794,508.52	32° 11' 42.272 N	103° 22' 52.635 W	
8,675.0	0.37	143.79	8,670.3	-10.4	136.3	435,992.09	794,508.64	32° 11' 42.271 N	103° 22' 52.634 W	
8,700.0	0.42	141.89	8,695.3	-10.5	136.4	435,991.95	794,508.74	32° 11' 42.270 N	103° 22' 52.632 W	
8,725.0	0.43	150.21	8,720.3	-10.7	136.5	435,991.79	794,508.85	32° 11' 42.268 N	103° 22' 52.631 W	
8,750.0	0.39	142.42	8,745.3	-10.8	136.6	435,991.65	794,508.94	32° 11' 42.267 N	103° 22' 52.630 W	
8,775.0	0.46	146.80	8,770.3	-11.0	136.8	435,991.49	794,509.05	32° 11' 42.265 N	103° 22' 52.629 W	
8,800.0	0.34	148.38	8,795.3	-11.1	136.8	435,991.35	794,509.14	32° 11' 42.264 N	103° 22' 52.628 W	
8,825.0	0.37	137.18	8,820.3	-11.3	136.9	435,991.22	794,509.24	32° 11' 42.263 N	103° 22' 52.627 W	
8,850.0	0.40	147.90	8,845.3	-11.4	137.0	435,991.09	794,509.34	32° 11' 42.261 N	103° 22' 52.625 W	
8,875.0	0.38	143.85	8,870.3	-11.5	137.1	435,990.95	794,509.43	32° 11' 42.260 N	103° 22' 52.624 W	
8,900.0	0.46	138.69	8,895.3	-11.7	137.3	435,990.81	794,509.55	32° 11' 42.258 N	103° 22' 52.623 W	
8,925.0	0.44	148.17	8,920.3	-11.8	137.4	435,990.65	794,509.67	32° 11' 42.257 N	103° 22' 52.622 W	
8,950.0	0.38	143.46	8,945.3	-12.0	137.5	435,990.50	794,509.77	32° 11' 42.255 N	103° 22' 52.621 W	
8,975.0	0.40	139.38	8,970.3	-12.1	137.6	435,990.37	794,509.87	32° 11' 42.254 N	103° 22' 52.619 W	
9,000.0	0.43	147.76	8,995.3	-12.3	137.7	435,990.22	794,509.98	32° 11' 42.253 N	103° 22' 52.618 W	
9,025.0	0.41	149.04	9,020.3	-12.4	137.8	435,990.07	794,510.08	32° 11' 42.251 N	103° 22' 52.617 W	
9,050.0	0.44	144.26	9,045.3	-12.6	137.9	435,989.91	794,510.18	32° 11' 42.249 N	103° 22' 52.616 W	
9,075.0	0.45	147.27	9,070.3	-12.7	138.0	435,989.75	794,510.29	32° 11' 42.248 N	103° 22' 52.615 W	
9,100.0	0.51	154.07	9,095.3	-12.9	138.1	435,989.57	794,510.39	32° 11' 42.246 N	103° 22' 52.613 W	
9,125.0	0.48	153.11	9,120.3	-13.1	138.2	435,989.38	794,510.48	32° 11' 42.244 N	103° 22' 52.612 W	
9,150.0	0.49	147.31	9,145.3	-13.3	138.3	435,989.19	794,510.59	32° 11' 42.242 N	103° 22' 52.611 W	
9,175.0	0.62	152.37	9,170.3	-13.5	138.4	435,988.98	794,510.71	32° 11' 42.240 N	103° 22' 52.610 W	
9,200.0	0.72	157.71	9,195.3	-13.8	138.5	435,988.72	794,510.83	32° 11' 42.238 N	103° 22' 52.608 W	
9,225.0	0.62	164.95	9,220.3	-14.0	138.6	435,988.44	794,510.93	32° 11' 42.235 N	103° 22' 52.607 W	
9,250.0	0.69	162.60	9,245.3	-14.3	138.7	435,988.17	794,511.01	32° 11' 42.232 N	103° 22' 52.606 W	
9,275.0	0.71	161.40	9,270.3	-14.6	138.8	435,987.88	794,511.10	32° 11' 42.229 N	103° 22' 52.605 W	
9,300.0	0.75	165.09	9,295.3	-14.9	138.9	435,987.57	794,511.19	32° 11' 42.226 N	103° 22' 52.604 W	
9,325.0	0.79	168.27	9,320.3	-15.2	139.0	435,987.25	794,511.27	32° 11' 42.223 N	103° 22' 52.603 W	
9,350.0	0.79	173.00	9,345.3	-15.6	139.0	435,986.91	794,511.33	32° 11' 42.220 N	103° 22' 52.603 W	
9,375.0	0.81	173.99	9,370.3	-15.9	139.1	435,986.56	794,511.37	32° 11' 42.216 N	103° 22' 52.602 W	
9,400.0	0.91	170.38	9,395.3	-16.3	139.1	435,986.19	794,511.42	32° 11' 42.212 N	103° 22' 52.602 W	
9,425.0	0.92	169.05	9,420.3	-16.7	139.2	435,985.80	794,511.49	32° 11' 42.209 N	103° 22' 52.601 W	
9,450.0	0.93	172.72	9,445.3	-17.1	139.3	435,985.40	794,511.55	32° 11' 42.205 N	103° 22' 52.600 W	
9,475.0	0.99	175.76	9,470.3	-17.5	139.3	435,984.98	794,511.59	32° 11' 42.201 N	103° 22' 52.600 W	
9,500.0	1.02	180.87	9,495.3	-17.9	139.3	435,984.54	794,511.61	32° 11' 42.196 N	103° 22' 52.600 W	
9,525.0	1.02	182.76	9,520.3	-18.4	139.3	435,984.10	794,511.59	32° 11' 42.192 N	103° 22' 52.600 W	
9,550.0	1.03	181.64	9,545.3	-18.8	139.3	435,983.65	794,511.58	32° 11' 42.187 N	103° 22' 52.600 W	
9,575.0	1.03	180.07	9,570.3	-19.3	139.3	435,983.20	794,511.57	32° 11' 42.183 N	103° 22' 52.600 W	
9,600.0	1.12	181.15	9,595.3	-19.8	139.3	435,982.73	794,511.56	32° 11' 42.178 N	103° 22' 52.600 W	
9,625.0	1.17	182.36	9,620.3	-20.3	139.3	435,982.23	794,511.55	32° 11' 42.173 N	103° 22' 52.601 W	
9,650.0	1.25	180.57	9,645.3	-20.8	139.2	435,981.71	794,511.54	32° 11' 42.168 N	103° 22' 52.601 W	
9,675.0	1.26	186.04	9,670.2	-21.3	139.2	435,981.16	794,511.50	32° 11' 42.163 N	103° 22' 52.601 W	
9,700.0	1.29	186.84	9,695.2	-21.9	139.1	435,980.61	794,511.44	32° 11' 42.157 N	103° 22' 52.602 W	
9,725.0	1.29	190.35	9,720.2	-22.4	139.1	435,980.05	794,511.36	32° 11' 42.152 N	103° 22' 52.603 W	
9,750.0	1.38	192.50	9,745.2	-23.0	138.9	435,979.48	794,511.24	32° 11' 42.146 N	103° 22' 52.605 W	
9,775.0	1.39	195.59	9,770.2	-23.6	138.8	435,978.89	794,511.09	32° 11' 42.140 N	103° 22' 52.606 W	
9,800.0	1.41	195.53	9,795.2	-24.2	138.6	435,978.31	794,510.93	32° 11' 42.135 N	103° 22' 52.608 W	
9,825.0	1.51	197.67	9,820.2	-24.8	138.5	435,977.70	794,510.75	32° 11' 42.129 N	103° 22' 52.610 W	
9,850.0	1.53	198.49	9,845.2	-25.4	138.2	435,977.07	794,510.54	32° 11' 42.122 N	103° 22' 52.613 W	
9,875.0	1.55	201.03	9,870.2	-26.1	138.0	435,976.43	794,510.32	32° 11' 42.116 N	103° 22' 52.616 W	
9,900.0	1.53	197.54	9,895.2	-26.7	137.8	435,975.80	794,510.09	32° 11' 42.110 N	103° 22' 52.618 W	
9,925.0	1.62	196.16	9,920.2	-27.3	137.6	435,975.14	794,509.89	32° 11' 42.103 N	103° 22' 52.621 W	
9,950.0	1.60	198.28	9,945.2	-28.0	137.4	435,974.47	794,509.69	32° 11' 42.097 N	103° 22' 52.623 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
9,975.0	1.59	196.96	9,970.2	-28.7	137.2	435,973.81	794,509.48	32° 11' 42.090 N	103° 22' 52.626 W	
10,000.0	1.64	199.06	9,995.1	-29.3	137.0	435,973.14	794,509.26	32° 11' 42.084 N	103° 22' 52.628 W	
10,025.0	1.74	197.36	10,020.1	-30.0	136.7	435,972.44	794,509.03	32° 11' 42.077 N	103° 22' 52.631 W	
10,050.0	1.86	197.19	10,045.1	-30.8	136.5	435,971.69	794,508.79	32° 11' 42.069 N	103° 22' 52.634 W	
10,075.0	1.89	198.71	10,070.1	-31.6	136.2	435,970.91	794,508.54	32° 11' 42.062 N	103° 22' 52.637 W	
10,100.0	1.92	199.35	10,095.1	-32.4	136.0	435,970.12	794,508.27	32° 11' 42.054 N	103° 22' 52.640 W	
10,125.0	1.94	198.47	10,120.1	-33.2	135.7	435,969.33	794,508.00	32° 11' 42.046 N	103° 22' 52.643 W	
10,150.0	1.95	197.87	10,145.1	-34.0	135.4	435,968.52	794,507.73	32° 11' 42.038 N	103° 22' 52.646 W	
10,175.0	1.93	199.89	10,170.0	-34.8	135.2	435,967.72	794,507.46	32° 11' 42.030 N	103° 22' 52.650 W	
10,200.0	1.90	200.11	10,195.0	-35.5	134.9	435,966.94	794,507.17	32° 11' 42.022 N	103° 22' 52.653 W	
10,225.0	1.96	199.59	10,220.0	-36.3	134.6	435,966.14	794,506.89	32° 11' 42.015 N	103° 22' 52.657 W	
10,250.0	1.98	200.00	10,245.0	-37.1	134.3	435,965.34	794,506.60	32° 11' 42.007 N	103° 22' 52.660 W	
10,275.0	2.00	201.20	10,270.0	-38.0	134.0	435,964.52	794,506.29	32° 11' 41.999 N	103° 22' 52.664 W	
10,300.0	1.99	202.45	10,295.0	-38.8	133.7	435,963.71	794,505.97	32° 11' 41.991 N	103° 22' 52.667 W	
10,325.0	2.01	202.84	10,320.0	-39.6	133.3	435,962.91	794,505.63	32° 11' 41.983 N	103° 22' 52.671 W	
10,350.0	2.01	202.32	10,344.9	-40.4	133.0	435,962.10	794,505.30	32° 11' 41.975 N	103° 22' 52.675 W	
10,375.0	2.03	202.67	10,369.9	-41.2	132.7	435,961.29	794,504.96	32° 11' 41.967 N	103° 22' 52.679 W	
10,400.0	2.08	201.74	10,394.9	-42.0	132.3	435,960.46	794,504.62	32° 11' 41.958 N	103° 22' 52.684 W	
10,425.0	2.09	204.57	10,419.9	-42.9	132.0	435,959.62	794,504.26	32° 11' 41.950 N	103° 22' 52.688 W	
10,450.0	1.93	204.80	10,444.9	-43.7	131.6	435,958.82	794,503.90	32° 11' 41.942 N	103° 22' 52.692 W	
10,475.0	1.78	211.69	10,469.9	-44.4	131.2	435,958.11	794,503.52	32° 11' 41.935 N	103° 22' 52.697 W	
10,500.0	1.75	212.15	10,494.9	-45.0	130.8	435,957.46	794,503.11	32° 11' 41.929 N	103° 22' 52.701 W	
10,525.0	1.51	218.83	10,519.8	-45.6	130.4	435,956.88	794,502.70	32° 11' 41.923 N	103° 22' 52.706 W	
10,550.0	1.13	234.81	10,544.8	-46.0	130.0	435,956.48	794,502.29	32° 11' 41.919 N	103° 22' 52.711 W	
10,575.0	1.15	244.07	10,569.8	-46.3	129.6	435,956.23	794,501.86	32° 11' 41.917 N	103° 22' 52.716 W	
10,600.0	1.12	241.49	10,594.8	-46.5	129.1	435,956.00	794,501.42	32° 11' 41.915 N	103° 22' 52.721 W	
10,625.0	1.12	244.42	10,619.8	-46.7	128.7	435,955.78	794,500.99	32° 11' 41.912 N	103° 22' 52.726 W	
10,650.0	1.12	255.00	10,644.8	-46.9	128.2	435,955.61	794,500.53	32° 11' 41.911 N	103° 22' 52.732 W	
10,675.0	1.26	266.59	10,669.8	-47.0	127.7	435,955.53	794,500.02	32° 11' 41.910 N	103° 22' 52.738 W	
10,700.0	1.23	267.88	10,694.8	-47.0	127.2	435,955.50	794,499.48	32° 11' 41.910 N	103° 22' 52.744 W	
10,725.0	1.28	268.03	10,719.8	-47.0	126.6	435,955.48	794,498.93	32° 11' 41.910 N	103° 22' 52.750 W	
10,750.0	1.27	269.16	10,744.8	-47.0	126.1	435,955.47	794,498.38	32° 11' 41.910 N	103° 22' 52.757 W	
10,775.0	1.24	265.80	10,769.8	-47.0	125.5	435,955.45	794,497.83	32° 11' 41.909 N	103° 22' 52.763 W	
10,800.0	1.25	268.19	10,794.8	-47.1	125.0	435,955.42	794,497.29	32° 11' 41.909 N	103° 22' 52.769 W	
10,825.0	1.24	269.29	10,819.8	-47.1	124.4	435,955.41	794,496.74	32° 11' 41.909 N	103° 22' 52.776 W	
10,850.0	1.16	280.26	10,844.8	-47.0	123.9	435,955.45	794,496.22	32° 11' 41.910 N	103° 22' 52.782 W	
10,875.0	1.08	288.08	10,869.8	-46.9	123.5	435,955.57	794,495.75	32° 11' 41.911 N	103° 22' 52.787 W	
10,900.0	0.95	287.86	10,894.8	-46.8	123.0	435,955.70	794,495.33	32° 11' 41.912 N	103° 22' 52.792 W	
10,925.0	0.86	291.24	10,919.8	-46.7	122.7	435,955.83	794,494.96	32° 11' 41.914 N	103° 22' 52.796 W	
10,950.0	0.79	291.66	10,944.8	-46.5	122.3	435,955.97	794,494.62	32° 11' 41.915 N	103° 22' 52.800 W	
10,975.0	0.66	280.02	10,969.8	-46.4	122.0	435,956.05	794,494.32	32° 11' 41.916 N	103° 22' 52.804 W	
11,000.0	0.57	282.44	10,994.8	-46.4	121.8	435,956.11	794,494.06	32° 11' 41.916 N	103° 22' 52.807 W	
11,025.0	0.62	280.04	11,019.8	-46.3	121.5	435,956.16	794,493.80	32° 11' 41.917 N	103° 22' 52.810 W	
11,050.0	0.59	285.97	11,044.8	-46.3	121.2	435,956.22	794,493.55	32° 11' 41.917 N	103° 22' 52.813 W	
11,075.0	0.59	299.99	11,069.8	-46.2	121.0	435,956.32	794,493.31	32° 11' 41.918 N	103° 22' 52.816 W	
11,100.0	0.78	326.15	11,094.7	-46.0	120.8	435,956.52	794,493.11	32° 11' 41.921 N	103° 22' 52.818 W	
11,125.0	0.90	334.00	11,119.7	-45.6	120.6	435,956.84	794,492.92	32° 11' 41.924 N	103° 22' 52.820 W	
11,150.0	1.03	337.51	11,144.7	-45.3	120.5	435,957.22	794,492.75	32° 11' 41.927 N	103° 22' 52.822 W	
11,175.0	0.97	343.04	11,169.7	-44.9	120.3	435,957.63	794,492.60	32° 11' 41.932 N	103° 22' 52.824 W	
11,200.0	0.90	357.86	11,194.7	-44.5	120.2	435,958.03	794,492.54	32° 11' 41.936 N	103° 22' 52.824 W	
11,225.0	0.81	8.45	11,219.7	-44.1	120.3	435,958.40	794,492.55	32° 11' 41.939 N	103° 22' 52.824 W	
11,250.0	0.73	29.59	11,244.7	-43.8	120.4	435,958.72	794,492.66	32° 11' 41.942 N	103° 22' 52.823 W	
11,275.0	0.72	35.10	11,269.7	-43.5	120.5	435,958.98	794,492.83	32° 11' 41.945 N	103° 22' 52.821 W	
11,300.0	0.71	44.04	11,294.7	-43.3	120.7	435,959.22	794,493.03	32° 11' 41.947 N	103° 22' 52.819 W	
11,325.0	0.70	46.75	11,319.7	-43.0	120.9	435,959.44	794,493.24	32° 11' 41.949 N	103° 22' 52.816 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
11,350.0	0.68	52.60	11,344.7	-42.9	121.2	435,959.63	794,493.47	32° 11' 41.951 N	103° 22' 52.813 W	
11,375.0	0.58	52.82	11,369.7	-42.7	121.4	435,959.80	794,493.69	32° 11' 41.953 N	103° 22' 52.811 W	
11,400.0	0.50	61.40	11,394.7	-42.6	121.6	435,959.93	794,493.89	32° 11' 41.954 N	103° 22' 52.808 W	
11,425.0	0.35	79.13	11,419.7	-42.5	121.8	435,960.00	794,494.06	32° 11' 41.955 N	103° 22' 52.806 W	
11,450.0	0.25	104.33	11,444.7	-42.5	121.9	435,960.00	794,494.19	32° 11' 41.955 N	103° 22' 52.805 W	
11,475.0	0.19	132.38	11,469.7	-42.5	122.0	435,959.95	794,494.27	32° 11' 41.954 N	103° 22' 52.804 W	
11,500.0	0.25	318.46	11,494.7	-42.5	122.0	435,959.97	794,494.27	32° 11' 41.955 N	103° 22' 52.804 W	
11,525.0	0.54	139.54	11,519.7	-42.6	122.0	435,959.92	794,494.31	32° 11' 41.954 N	103° 22' 52.804 W	
11,550.0	0.09	135.05	11,544.7	-42.7	122.1	435,959.82	794,494.40	32° 11' 41.953 N	103° 22' 52.803 W	
11,575.0	0.68	137.89	11,569.7	-42.8	122.2	435,959.69	794,494.51	32° 11' 41.952 N	103° 22' 52.801 W	
11,600.0	0.05	58.09	11,594.7	-42.9	122.3	435,959.59	794,494.62	32° 11' 41.951 N	103° 22' 52.800 W	
11,625.0	0.34	194.62	11,619.7	-43.0	122.3	435,959.52	794,494.61	32° 11' 41.950 N	103° 22' 52.800 W	
11,637.0	0.30	224.54	11,631.7	-43.0	122.3	435,959.46	794,494.58	32° 11' 41.950 N	103° 22' 52.800 W	
11,637.1	0.30	224.54	11,631.8	-43.0	122.3	435,959.46	794,494.58	32° 11' 41.950 N	103° 22' 52.800 W	
Gyro Tie-In @ 11637' MD / 11631' TVD										
11,794.0	0.50	227.50	11,788.7	-43.8	121.5	435,958.71	794,493.78	32° 11' 41.942 N	103° 22' 52.810 W	
11,840.0	1.20	218.00	11,834.7	-44.3	121.0	435,958.19	794,493.34	32° 11' 41.937 N	103° 22' 52.815 W	
11,888.0	6.20	201.40	11,882.6	-47.1	119.8	435,955.38	794,492.08	32° 11' 41.909 N	103° 22' 52.830 W	
11,936.0	11.90	198.80	11,930.0	-54.2	117.2	435,948.28	794,489.54	32° 11' 41.839 N	103° 22' 52.860 W	
11,984.0	18.20	199.30	11,976.3	-66.0	113.2	435,936.51	794,485.46	32° 11' 41.723 N	103° 22' 52.909 W	
12,031.0	24.70	203.00	12,020.0	-82.0	106.9	435,920.52	794,479.19	32° 11' 41.566 N	103° 22' 52.983 W	
12,079.0	29.10	205.40	12,062.8	-101.7	98.0	435,900.74	794,470.26	32° 11' 41.371 N	103° 22' 53.089 W	
12,127.0	31.50	206.70	12,104.3	-123.5	87.3	435,878.99	794,459.62	32° 11' 41.156 N	103° 22' 53.216 W	
12,175.0	37.20	210.40	12,143.9	-147.2	74.3	435,855.25	794,446.63	32° 11' 40.922 N	103° 22' 53.369 W	
12,222.0	44.70	209.20	12,179.4	-174.0	59.1	435,828.52	794,431.36	32° 11' 40.659 N	103° 22' 53.550 W	
12,270.0	50.00	205.40	12,211.9	-205.3	42.9	435,797.15	794,415.22	32° 11' 40.350 N	103° 22' 53.741 W	
12,318.0	55.70	202.20	12,240.9	-240.3	27.5	435,762.15	794,399.83	32° 11' 40.005 N	103° 22' 53.923 W	
12,366.0	59.20	199.20	12,266.7	-278.2	13.3	435,724.31	794,385.55	32° 11' 39.632 N	103° 22' 54.093 W	
12,414.0	62.20	197.00	12,290.2	-318.0	0.3	435,684.53	794,372.56	32° 11' 39.240 N	103° 22' 54.249 W	
12,462.0	66.30	195.30	12,311.0	-359.5	-11.8	435,643.01	794,360.55	32° 11' 38.830 N	103° 22' 54.393 W	
12,509.0	70.30	189.80	12,328.4	-402.1	-21.2	435,600.40	794,351.09	32° 11' 38.409 N	103° 22' 54.507 W	
12,557.0	75.20	184.80	12,342.6	-447.5	-27.0	435,554.96	794,345.30	32° 11' 37.960 N	103° 22' 54.579 W	
12,605.0	79.00	179.90	12,353.4	-494.2	-28.9	435,508.24	794,343.40	32° 11' 37.498 N	103° 22' 54.606 W	
12,653.0	85.80	175.10	12,359.7	-541.7	-26.8	435,460.75	794,345.49	32° 11' 37.028 N	103° 22' 54.587 W	
12,699.0	88.60	174.80	12,362.0	-587.5	-22.8	435,414.98	794,349.53	32° 11' 36.575 N	103° 22' 54.544 W	
12,734.0	88.60	174.10	12,362.8	-622.3	-19.4	435,380.16	794,352.91	32° 11' 36.230 N	103° 22' 54.509 W	
12,830.0	90.20	174.40	12,363.8	-717.8	-9.8	435,284.65	794,362.53	32° 11' 35.284 N	103° 22' 54.406 W	
12,925.0	91.30	175.90	12,362.6	-812.5	-1.7	435,190.00	794,370.56	32° 11' 34.347 N	103° 22' 54.323 W	
13,021.0	90.60	181.20	12,361.0	-908.4	0.7	435,094.08	794,372.99	32° 11' 33.397 N	103° 22' 54.304 W	
13,115.0	90.30	181.80	12,360.2	-1,002.4	-1.8	435,000.12	794,370.53	32° 11' 32.468 N	103° 22' 54.343 W	
13,209.0	89.00	179.80	12,360.8	-1,096.4	-3.1	434,906.13	794,369.22	32° 11' 31.538 N	103° 22' 54.368 W	
13,305.0	92.50	180.30	12,359.6	-1,192.3	-3.2	434,810.16	794,369.13	32° 11' 30.588 N	103° 22' 54.379 W	
13,400.0	89.40	178.80	12,358.0	-1,287.3	-2.4	434,715.19	794,369.88	32° 11' 29.648 N	103° 22' 54.380 W	
13,496.0	88.80	178.20	12,359.5	-1,383.3	0.1	434,619.23	794,372.39	32° 11' 28.699 N	103° 22' 54.360 W	
13,591.0	92.10	180.10	12,358.8	-1,478.2	1.5	434,524.26	794,373.80	32° 11' 27.759 N	103° 22' 54.354 W	
13,687.0	89.40	180.10	12,357.5	-1,574.2	1.3	434,428.28	794,373.63	32° 11' 26.809 N	103° 22' 54.365 W	
13,782.0	87.80	178.80	12,359.8	-1,669.2	2.2	434,333.32	794,374.55	32° 11' 25.869 N	103° 22' 54.365 W	
13,877.0	90.70	181.30	12,361.1	-1,764.1	2.2	434,238.35	794,374.46	32° 11' 24.929 N	103° 22' 54.375 W	
13,971.0	87.10	179.70	12,362.9	-1,858.1	1.3	434,144.38	794,373.64	32° 11' 24.000 N	103° 22' 54.395 W	
14,067.0	89.10	181.50	12,366.0	-1,954.0	0.3	434,048.45	794,372.64	32° 11' 23.051 N	103° 22' 54.416 W	
14,162.0	86.90	180.10	12,369.4	-2,049.0	-1.0	433,953.53	794,371.31	32° 11' 22.111 N	103° 22' 54.441 W	
14,258.0	87.60	179.90	12,374.0	-2,144.8	-1.0	433,857.64	794,371.31	32° 11' 21.163 N	103° 22' 54.451 W	
14,352.0	88.00	178.40	12,377.6	-2,238.8	0.4	433,763.72	794,372.70	32° 11' 20.233 N	103° 22' 54.445 W	
14,446.0	89.20	177.70	12,379.9	-2,332.7	3.6	433,669.81	794,375.90	32° 11' 19.304 N	103° 22' 54.417 W	
14,541.0	90.80	177.70	12,379.9	-2,427.6	7.4	433,574.88	794,379.71	32° 11' 18.364 N	103° 22' 54.383 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude	
14,635.0	89.30	179.00	12,379.8	-2,521.6	10.1	433,480.93	794,382.42	32° 11' 17.434 N	103° 22' 54.361 W	
14,729.0	89.40	178.80	12,380.9	-2,615.5	11.9	433,386.95	794,384.22	32° 11' 16.504 N	103° 22' 54.349 W	
14,823.0	89.80	178.70	12,381.5	-2,709.5	14.0	433,292.98	794,386.27	32° 11' 15.574 N	103° 22' 54.335 W	
14,918.0	90.50	178.10	12,381.3	-2,804.5	16.6	433,198.02	794,388.93	32° 11' 14.634 N	103° 22' 54.314 W	
15,012.0	88.70	178.80	12,381.9	-2,898.4	19.2	433,104.06	794,391.47	32° 11' 13.704 N	103° 22' 54.294 W	
15,108.0	88.10	179.50	12,384.6	-2,994.4	20.6	433,008.11	794,392.89	32° 11' 12.755 N	103° 22' 54.288 W	
15,203.0	88.60	179.70	12,387.3	-3,089.3	21.3	432,913.15	794,393.56	32° 11' 11.815 N	103° 22' 54.290 W	
15,297.0	87.50	178.80	12,390.5	-3,183.3	22.5	432,819.21	794,394.79	32° 11' 10.885 N	103° 22' 54.285 W	
15,393.0	88.20	179.20	12,394.1	-3,279.2	24.2	432,723.30	794,396.46	32° 11' 9.936 N	103° 22' 54.275 W	
15,488.0	89.40	179.30	12,396.1	-3,374.2	25.4	432,628.33	794,397.70	32° 11' 8.996 N	103° 22' 54.271 W	
15,584.0	88.10	177.70	12,398.2	-3,470.1	27.9	432,532.39	794,400.22	32° 11' 8.047 N	103° 22' 54.251 W	
15,680.0	87.90	175.90	12,401.6	-3,565.9	33.3	432,436.60	794,405.57	32° 11' 7.098 N	103° 22' 54.199 W	
15,775.0	89.40	176.90	12,403.8	-3,660.7	39.2	432,341.82	794,411.53	32° 11' 6.160 N	103° 22' 54.139 W	
15,871.0	88.70	179.00	12,405.4	-3,756.6	42.7	432,245.90	794,414.97	32° 11' 5.210 N	103° 22' 54.109 W	
15,966.0	89.30	180.00	12,407.1	-3,851.6	43.5	432,150.92	794,415.80	32° 11' 4.271 N	103° 22' 54.109 W	
16,062.0	91.40	180.40	12,406.5	-3,947.6	43.2	432,054.93	794,415.46	32° 11' 3.321 N	103° 22' 54.123 W	
16,159.0	90.20	179.40	12,405.1	-4,044.5	43.3	431,957.94	794,415.63	32° 11' 2.361 N	103° 22' 54.131 W	
16,254.0	89.70	178.90	12,405.2	-4,139.5	44.7	431,862.95	794,417.04	32° 11' 1.421 N	103° 22' 54.125 W	
16,350.0	90.30	179.00	12,405.2	-4,235.5	46.5	431,766.97	794,418.80	32° 11' 0.471 N	103° 22' 54.114 W	
16,446.0	91.80	179.40	12,403.4	-4,331.5	47.8	431,670.99	794,420.14	32° 10' 59.521 N	103° 22' 54.108 W	
16,541.0	90.00	180.70	12,401.9	-4,426.5	47.8	431,576.01	794,420.06	32° 10' 58.581 N	103° 22' 54.119 W	
16,637.0	89.30	178.70	12,402.5	-4,522.5	48.3	431,480.02	794,420.56	32° 10' 57.632 N	103° 22' 54.123 W	
16,732.0	89.00	178.60	12,403.9	-4,617.4	50.5	431,385.06	794,422.80	32° 10' 56.692 N	103° 22' 54.107 W	
16,828.0	89.40	180.50	12,405.3	-4,713.4	51.3	431,289.07	794,423.55	32° 10' 55.742 N	103° 22' 54.108 W	
16,923.0	89.80	182.20	12,405.9	-4,808.4	49.0	431,194.11	794,421.31	32° 10' 54.802 N	103° 22' 54.144 W	
17,019.0	87.70	182.10	12,408.0	-4,904.3	45.4	431,098.20	794,417.71	32° 10' 53.854 N	103° 22' 54.195 W	
17,114.0	87.30	180.50	12,412.2	-4,999.2	43.3	431,003.32	794,415.56	32° 10' 52.915 N	103° 22' 54.230 W	
17,209.0	88.90	179.90	12,415.3	-5,094.1	42.9	430,908.38	794,415.23	32° 10' 51.976 N	103° 22' 54.244 W	
17,305.0	89.80	177.50	12,416.4	-5,190.1	45.1	430,812.42	794,417.40	32° 10' 51.026 N	103° 22' 54.228 W	
17,400.0	89.60	176.70	12,416.9	-5,284.9	49.9	430,717.54	794,422.21	32° 10' 50.087 N	103° 22' 54.182 W	
17,496.0	89.90	177.00	12,417.3	-5,380.8	55.2	430,621.69	794,427.49	32° 10' 49.138 N	103° 22' 54.131 W	
17,590.0	89.40	178.90	12,417.9	-5,474.7	58.6	430,527.75	794,430.85	32° 10' 48.208 N	103° 22' 54.101 W	
17,685.0	92.00	180.90	12,416.8	-5,569.7	58.7	430,432.77	794,431.01	32° 10' 47.268 N	103° 22' 54.109 W	
17,781.0	89.60	182.30	12,415.4	-5,665.7	56.0	430,336.83	794,428.33	32° 10' 46.319 N	103° 22' 54.150 W	
17,877.0	87.50	181.10	12,417.8	-5,761.6	53.2	430,240.91	794,425.49	32° 10' 45.370 N	103° 22' 54.193 W	
17,973.0	86.40	180.70	12,423.0	-5,857.4	51.7	430,145.06	794,423.98	32° 10' 44.422 N	103° 22' 54.221 W	
18,068.0	87.10	181.10	12,428.3	-5,952.3	50.2	430,050.22	794,422.49	32° 10' 43.483 N	103° 22' 54.248 W	
18,163.0	92.50	184.80	12,428.7	-6,047.1	45.3	429,955.40	794,417.60	32° 10' 42.546 N	103° 22' 54.314 W	
18,258.0	88.80	182.10	12,427.6	-6,141.9	39.6	429,860.60	794,411.89	32° 10' 41.608 N	103° 22' 54.391 W	
18,352.0	87.20	182.20	12,430.9	-6,235.8	36.1	429,766.73	794,408.37	32° 10' 40.680 N	103° 22' 54.441 W	
18,446.0	88.60	182.70	12,434.3	-6,329.6	32.1	429,672.88	794,404.35	32° 10' 39.751 N	103° 22' 54.498 W	
18,541.0	90.10	181.70	12,435.4	-6,424.5	28.4	429,577.96	794,400.70	32° 10' 38.812 N	103° 22' 54.550 W	
18,635.0	89.80	180.50	12,435.5	-6,518.5	26.6	429,483.98	794,398.90	32° 10' 37.883 N	103° 22' 54.580 W	
18,728.0	89.70	181.60	12,435.9	-6,611.5	24.9	429,391.00	794,397.20	32° 10' 36.963 N	103° 22' 54.610 W	
18,823.0	88.10	180.40	12,437.7	-6,706.4	23.2	429,296.04	794,395.54	32° 10' 36.023 N	103° 22' 54.639 W	
18,918.0	89.80	180.60	12,439.4	-6,801.4	22.4	429,201.06	794,394.71	32° 10' 35.083 N	103° 22' 54.658 W	
19,012.0	85.20	179.10	12,443.5	-6,895.3	22.7	429,107.18	794,394.95	32° 10' 34.154 N	103° 22' 54.665 W	
19,108.0	88.60	180.70	12,448.7	-6,991.1	22.8	429,011.34	794,395.12	32° 10' 33.206 N	103° 22' 54.673 W	
19,202.0	89.40	180.20	12,450.4	-7,085.1	22.1	428,917.35	794,394.38	32° 10' 32.276 N	103° 22' 54.691 W	
19,296.0	89.90	179.80	12,451.0	-7,179.1	22.1	428,823.36	794,394.38	32° 10' 31.346 N	103° 22' 54.701 W	
19,316.0	89.60	179.40	12,451.0	-7,199.1	22.2	428,803.36	794,394.52	32° 10' 31.148 N	103° 22' 54.701 W	
19,500.0	89.60	179.40	12,452.3	-7,383.1	24.1	428,619.37	794,396.45	32° 10' 29.327 N	103° 22' 54.698 W	
TD @ 19500.0' MD / 12452.3' TVD										

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Viking Helmet State Com #1H
Project:	Lea County, NM	TVD Reference:	KB @ 3338.0usft (Noram #21)
Site:	Sec 29, T24-S, R35-E	MD Reference:	KB @ 3338.0usft (Noram #21)
Well:	Viking Helmet State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,637.1	11,631.8	-43.0	122.3	Gyro Tie-In @ 11637' MD / 11631' TVD
19,500.0	12,452.3	-7,383.1	24.1	TD @ 19500.0' MD / 12452.3 ' TVD