



Survey Report - Geographic

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Company:	COG Operating LLC	Local.Co-ordinate Reference:	Well Queso State Well No. 3H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3644.2+26 @ 3670.20usft (Independence 205)
Site:	Queso State	MD Reference:	RKB=3644.2+26 @ 3670.20usft (Independence 205)
Well:	Queso State Well No. 3H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	Dbase Nov0914

Project	Lea County, New Mexico		
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	Queso State				
Site Position:	Northing:	457,191.00 usft	Latitude:	32° 15' 17.783930 N	
From:	Map	Easting:	719,477.50 usft	Longitude:	103° 37' 24.116600 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.38 °

Well	Queso State Well No. 3H, Surf Loc: 400 FSL 1260 FEL Sect 36					
Well Position	+N/-S	0.00 usft	Northing:	457,191.00 usft	Latitude:	32° 15' 17.783930 N
	+E/-W	0.00 usft	Easting:	719,477.50 usft	Longitude:	103° 37' 24.116600 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level:	3,644.20 usft

Wellbore	Original Hole				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2010	12/8/2014	(°)	(°)	(nT)
			7.18	60.12	48,279

Design	Surveys Original Hole				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	359.45	

Survey Program	Date	12/14/2014		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100.00	10,324.00	Gyro (Original Hole)	NS-GYRO-MS	North sensing gyrocompassing m/s
10,381.00	15,330.00	MWD (Original Hole)	MWD	MWD - Standard

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Map	Map	Latitude	Longitude
Depth	(°)	(°)	Depth	(usft)	(usft)	Northing	Easting		
(usft)			(usft)			(usft)	(usft)		
0.00	0.00	0.00	0.00	0.00	0.00	457,191.00	719,477.50	32° 15' 17.783930 N	103° 37' 24.116600 W
100.00	0.13	128.96	100.00	-0.07	0.09	457,190.93	719,477.58	32° 15' 17.783218 N	103° 37' 24.115578 W
Gyro									
200.00	0.14	96.27	200.00	-0.16	0.30	457,190.84	719,477.79	32° 15' 17.782367 N	103° 37' 24.113143 W
300.00	0.19	85.61	300.00	-0.16	0.58	457,190.84	719,478.08	32° 15' 17.782341 N	103° 37' 24.109804 W
400.00	0.40	81.39	400.00	-0.09	1.10	457,190.91	719,478.59	32° 15' 17.782951 N	103° 37' 24.103855 W
500.00	0.45	71.56	500.00	0.08	1.81	457,191.08	719,479.31	32° 15' 17.784650 N	103° 37' 24.095485 W
600.00	0.21	66.76	599.99	0.28	2.35	457,191.28	719,479.85	32° 15' 17.786559 N	103° 37' 24.089171 W
700.00	0.06	44.53	699.99	0.39	2.56	457,191.39	719,480.05	32° 15' 17.787631 N	103° 37' 24.086774 W

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Project: Lea County, New Mexico
Site: Queso State
Well: Queso State Well No. 3H
Wellbore: Original Hole
Design: Surveys Original Hole
Local Co-ordinate Reference: Well Queso State Well No. 3H
TVD Reference: RKB=3644.2+26 @ 3670.20usft (Independence 205)
MD Reference: RKB=3644.2+26 @ 3670.20usft (Independence 205)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Dbase Nov0914

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
800.00	0.11	26.70	799.99	0.51	2.64	457,191.51	719,480.13	32° 15' 17.788844 N	103° 37' 24.085835 W
900.00	0.37	15.66	899.99	0.91	2.77	457,191.91	719,480.26	32° 15' 17.792760 N	103° 37' 24.084287 W
1,000.00	0.40	6.54	999.99	1.57	2.90	457,192.57	719,480.39	32° 15' 17.799260 N	103° 37' 24.082758 W
1,100.00	0.30	3.49	1,099.99	2.18	2.95	457,193.18	719,480.45	32° 15' 17.805274 N	103° 37' 24.082063 W
1,200.00	0.61	359.62	1,199.98	2.97	2.96	457,193.97	719,480.46	32° 15' 17.813127 N	103° 37' 24.081857 W
1,300.00	0.87	347.94	1,299.98	4.24	2.80	457,195.25	719,480.30	32° 15' 17.825751 N	103° 37' 24.083647 W
1,400.00	0.62	352.69	1,399.97	5.52	2.57	457,196.52	719,480.07	32° 15' 17.838424 N	103° 37' 24.086198 W
1,500.00	0.90	346.13	1,499.96	6.82	2.32	457,197.82	719,479.81	32° 15' 17.851296 N	103° 37' 24.089092 W
1,600.00	0.91	338.35	1,599.95	8.32	1.84	457,199.32	719,479.33	32° 15' 17.866176 N	103° 37' 24.094580 W
1,700.00	0.28	319.16	1,699.94	9.25	1.38	457,200.25	719,478.88	32° 15' 17.875339 N	103° 37' 24.099781 W
1,800.00	0.13	335.84	1,799.94	9.53	1.18	457,200.54	719,478.67	32° 15' 17.878206 N	103° 37' 24.102160 W
1,900.00	0.07	335.36	1,899.94	9.69	1.11	457,200.69	719,478.60	32° 15' 17.879784 N	103° 37' 24.102985 W
2,000.00	0.29	332.94	1,999.94	9.97	0.96	457,200.97	719,478.46	32° 15' 17.882573 N	103° 37' 24.104601 W
2,100.00	0.45	333.62	2,099.94	10.55	0.67	457,201.55	719,478.17	32° 15' 17.888303 N	103° 37' 24.107929 W
2,200.00	0.30	325.08	2,199.93	11.12	0.35	457,202.12	719,477.85	32° 15' 17.893930 N	103° 37' 24.111662 W
2,300.00	0.14	312.71	2,299.93	11.42	0.11	457,202.42	719,477.61	32° 15' 17.896890 N	103° 37' 24.114429 W
2,400.00	0.24	320.82	2,399.93	11.66	-0.11	457,202.66	719,477.38	32° 15' 17.899331 N	103° 37' 24.116997 W
2,500.00	0.27	316.48	2,499.93	11.99	-0.41	457,202.99	719,477.09	32° 15' 17.902648 N	103° 37' 24.120401 W
2,600.00	0.70	317.61	2,599.93	12.62	-0.98	457,203.62	719,476.52	32° 15' 17.908840 N	103° 37' 24.127038 W
2,700.00	0.48	334.64	2,699.92	13.45	-1.57	457,204.45	719,475.93	32° 15' 17.917089 N	103° 37' 24.133858 W
2,800.00	0.39	320.33	2,799.92	14.09	-1.97	457,205.09	719,475.53	32° 15' 17.923453 N	103° 37' 24.138428 W
2,900.00	0.32	352.42	2,899.92	14.63	-2.22	457,205.63	719,475.27	32° 15' 17.928801 N	103° 37' 24.141345 W
3,000.00	0.59	342.09	2,999.92	15.39	-2.42	457,206.39	719,475.08	32° 15' 17.936401 N	103° 37' 24.143559 W
3,100.00	0.70	1.76	3,099.91	16.49	-2.56	457,207.49	719,474.94	32° 15' 17.947300 N	103° 37' 24.145100 W
3,200.00	0.42	11.82	3,199.90	17.46	-2.46	457,208.46	719,475.03	32° 15' 17.956886 N	103° 37' 24.143932 W
3,300.00	0.24	49.50	3,299.90	17.96	-2.23	457,208.96	719,475.27	32° 15' 17.961766 N	103° 37' 24.141165 W
3,400.00	0.44	75.79	3,399.90	18.19	-1.70	457,209.19	719,475.80	32° 15' 17.964010 N	103° 37' 24.134959 W
3,500.00	1.08	94.11	3,499.89	18.21	-0.38	457,209.21	719,477.11	32° 15' 17.964189 N	103° 37' 24.119676 W
3,600.00	1.07	128.57	3,599.88	17.56	1.29	457,208.56	719,478.78	32° 15' 17.957651 N	103° 37' 24.100280 W
3,700.00	1.35	148.70	3,699.85	15.98	2.63	457,206.98	719,480.12	32° 15' 17.941842 N	103° 37' 24.084775 W
3,800.00	1.48	146.11	3,799.82	13.90	3.96	457,204.90	719,481.46	32° 15' 17.921186 N	103° 37' 24.069424 W
3,900.00	1.14	149.59	3,899.80	11.97	5.18	457,202.97	719,482.68	32° 15' 17.902008 N	103° 37' 24.055324 W
4,000.00	1.29	159.59	3,999.77	10.05	6.08	457,201.05	719,483.58	32° 15' 17.883021 N	103° 37' 24.045037 W
4,100.00	1.34	161.32	4,099.75	7.89	6.85	457,198.89	719,484.34	32° 15' 17.861570 N	103° 37' 24.036271 W
4,200.00	1.50	150.23	4,199.72	5.65	7.87	457,196.65	719,485.37	32° 15' 17.839299 N	103° 37' 24.024516 W
4,300.00	2.33	140.78	4,299.66	2.94	9.81	457,193.94	719,487.30	32° 15' 17.812346 N	103° 37' 24.002190 W
4,400.00	2.16	137.09	4,399.58	-0.02	12.37	457,190.98	719,489.87	32° 15' 17.782935 N	103° 37' 23.972510 W
4,500.00	1.57	148.01	4,499.53	-2.56	14.38	457,188.44	719,491.88	32° 15' 17.757648 N	103° 37' 23.949314 W
4,600.00	1.24	147.85	4,599.50	-4.64	15.68	457,186.36	719,493.18	32° 15' 17.737000 N	103° 37' 23.934318 W
4,700.00	1.49	144.19	4,699.47	-6.61	17.02	457,184.39	719,494.52	32° 15' 17.717413 N	103° 37' 23.918907 W
4,800.00	0.82	146.72	4,799.45	-8.26	18.17	457,182.74	719,495.67	32° 15' 17.700985 N	103° 37' 23.905604 W
4,900.00	0.29	195.73	4,899.45	-9.10	18.50	457,181.90	719,495.99	32° 15' 17.692633 N	103° 37' 23.901895 W
5,000.00	0.07	183.73	4,999.45	-9.41	18.43	457,181.59	719,495.92	32° 15' 17.689624 N	103° 37' 23.902764 W
5,100.00	0.09	171.76	5,099.45	-9.55	18.43	457,181.45	719,495.93	32° 15' 17.688252 N	103° 37' 23.902690 W
5,200.00	0.12	154.99	5,199.45	-9.72	18.49	457,181.28	719,495.98	32° 15' 17.686540 N	103° 37' 23.902057 W
5,300.00	0.13	141.38	5,299.45	-9.90	18.60	457,181.10	719,496.10	32° 15' 17.684716 N	103° 37' 23.900731 W
5,400.00	0.18	132.54	5,399.45	-10.10	18.79	457,180.90	719,496.29	32° 15' 17.682776 N	103° 37' 23.898574 W
5,500.00	0.19	129.41	5,499.45	-10.31	19.03	457,180.69	719,496.53	32° 15' 17.680867 N	103° 37' 23.895750 W
5,600.00	0.14	124.62	5,599.44	-10.48	19.26	457,180.52	719,496.76	32° 15' 17.678924 N	103° 37' 23.893101 W
5,700.00	0.18	120.50	5,699.44	-10.63	19.50	457,180.37	719,496.99	32° 15' 17.677432 N	103° 37' 23.890366 W
5,800.00	0.15	124.12	5,799.44	-10.79	19.74	457,180.21	719,497.24	32° 15' 17.675901 N	103° 37' 23.887540 W
5,900.00	0.27	109.97	5,899.44	-10.94	20.07	457,180.06	719,497.57	32° 15' 17.674357 N	103° 37' 23.883711 W
6,000.00	0.12	70.17	5,999.44	-10.99	20.39	457,180.02	719,497.89	32° 15' 17.673891 N	103° 37' 23.879989 W



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Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Queso State Well No. 3H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3644.2+26 @ 3670.20usft (Independence 205)
Site:	Queso State	MD Reference:	RKB=3644.2+26 @ 3670.20usft (Independence 205)
Well:	Queso State Well No. 3H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	Dbase Nov0914

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,100.00	0.14	65.13	6,099.44	-10.90	20.60	457,180.10	719,498.10	32° 15' 17.674737 N	103° 37' 23.877544 W
6,200.00	0.07	54.15	6,199.44	-10.81	20.76	457,180.19	719,498.26	32° 15' 17.675589 N	103° 37' 23.875670 W
6,300.00	0.13	44.30	6,299.44	-10.69	20.89	457,180.31	719,498.39	32° 15' 17.676738 N	103° 37' 23.874162 W
6,400.00	0.10	24.94	6,399.44	-10.53	21.01	457,180.47	719,498.50	32° 15' 17.678317 N	103° 37' 23.872799 W
6,500.00	0.11	19.24	6,499.44	-10.36	21.08	457,180.64	719,498.57	32° 15' 17.679992 N	103° 37' 23.871989 W
6,600.00	0.06	14.30	6,599.44	-10.22	21.12	457,180.78	719,498.62	32° 15' 17.681388 N	103° 37' 23.871459 W
6,700.00	0.07	3.09	6,699.44	-10.11	21.14	457,180.89	719,498.63	32° 15' 17.682493 N	103° 37' 23.871261 W
6,800.00	0.39	346.13	6,799.44	-9.72	21.06	457,181.28	719,498.55	32° 15' 17.686371 N	103° 37' 23.872143 W
6,900.00	0.44	307.29	6,899.44	-9.16	20.67	457,181.84	719,498.17	32° 15' 17.691968 N	103° 37' 23.876607 W
7,000.00	0.56	282.73	6,999.43	-8.82	19.89	457,182.18	719,497.38	32° 15' 17.695387 N	103° 37' 23.885688 W
7,100.00	0.48	271.10	7,099.43	-8.70	18.99	457,182.30	719,496.49	32° 15' 17.696591 N	103° 37' 23.896107 W
7,200.00	0.35	306.35	7,199.43	-8.51	18.33	457,182.49	719,495.82	32° 15' 17.698505 N	103° 37' 23.903833 W
7,300.00	0.53	331.12	7,299.42	-7.93	17.86	457,183.07	719,495.35	32° 15' 17.704335 N	103° 37' 23.909254 W
7,400.00	0.64	285.27	7,399.42	-7.37	17.10	457,183.63	719,494.59	32° 15' 17.709848 N	103° 37' 23.918086 W
7,500.00	0.98	271.36	7,499.41	-7.21	15.70	457,183.79	719,493.20	32° 15' 17.711596 N	103° 37' 23.934303 W
7,600.00	0.76	250.24	7,599.40	-7.41	14.22	457,183.59	719,491.72	32° 15' 17.709675 N	103° 37' 23.951542 W
7,700.00	0.52	206.19	7,699.39	-8.04	13.40	457,182.96	719,490.90	32° 15' 17.703480 N	103° 37' 23.961191 W
7,800.00	0.47	165.48	7,799.39	-8.85	13.30	457,182.15	719,490.80	32° 15' 17.695528 N	103° 37' 23.962387 W
7,900.00	0.47	174.81	7,899.39	-9.65	13.44	457,181.35	719,490.94	32° 15' 17.687548 N	103° 37' 23.960820 W
8,000.00	0.75	158.09	7,999.38	-10.67	13.72	457,180.33	719,491.22	32° 15' 17.677479 N	103° 37' 23.957622 W
8,100.00	0.57	160.94	8,099.37	-11.74	14.13	457,179.26	719,491.63	32° 15' 17.666791 N	103° 37' 23.952970 W
8,200.00	0.53	183.69	8,199.37	-12.68	14.26	457,178.32	719,491.76	32° 15' 17.657563 N	103° 37' 23.951497 W
8,300.00	0.93	179.92	8,299.36	-13.95	14.23	457,177.05	719,491.73	32° 15' 17.644967 N	103° 37' 23.951928 W
8,400.00	0.72	174.72	8,399.35	-15.39	14.29	457,175.61	719,491.79	32° 15' 17.630741 N	103° 37' 23.951352 W
8,500.00	0.67	203.45	8,499.34	-16.55	14.12	457,174.45	719,491.61	32° 15' 17.619254 N	103° 37' 23.953478 W
8,600.00	0.85	192.66	8,599.33	-17.81	13.72	457,173.19	719,491.22	32° 15' 17.606811 N	103° 37' 23.958177 W
8,700.00	0.74	190.75	8,699.33	-19.17	13.44	457,171.83	719,490.94	32° 15' 17.593390 N	103° 37' 23.961577 W
8,800.00	0.30	195.16	8,799.32	-20.05	13.25	457,170.95	719,490.75	32° 15' 17.584624 N	103° 37' 23.963846 W
8,900.00	0.51	200.49	8,899.32	-20.72	13.03	457,170.28	719,490.52	32° 15' 17.578012 N	103° 37' 23.966508 W
9,000.00	0.31	204.62	8,999.32	-21.39	12.76	457,169.61	719,490.25	32° 15' 17.571471 N	103° 37' 23.969686 W
9,100.00	0.64	197.07	9,099.31	-22.17	12.48	457,168.83	719,489.98	32° 15' 17.563772 N	103° 37' 23.972967 W
9,200.00	0.80	198.28	9,199.30	-23.36	12.10	457,167.64	719,489.59	32° 15' 17.551954 N	103° 37' 23.977518 W
9,300.00	0.74	249.47	9,299.30	-24.25	11.27	457,166.75	719,488.77	32° 15' 17.543208 N	103° 37' 23.987179 W
9,400.00	0.76	234.57	9,399.29	-24.86	10.13	457,166.14	719,487.63	32° 15' 17.537237 N	103° 37' 24.000560 W
9,500.00	1.26	222.83	9,499.27	-26.05	8.84	457,164.95	719,486.34	32° 15' 17.525538 N	103° 37' 24.015648 W
9,600.00	2.17	200.35	9,599.23	-28.63	7.44	457,162.37	719,484.93	32° 15' 17.500085 N	103° 37' 24.032218 W
9,700.00	2.91	193.91	9,699.13	-32.87	6.17	457,158.13	719,483.66	32° 15' 17.458220 N	103° 37' 24.047317 W
9,800.00	1.86	189.39	9,799.04	-36.94	5.29	457,154.06	719,482.79	32° 15' 17.418050 N	103° 37' 24.057819 W
9,900.00	2.06	196.25	9,898.98	-40.27	4.52	457,150.73	719,482.02	32° 15' 17.385181 N	103° 37' 24.067015 W
10,000.00	2.98	201.32	9,998.88	-44.41	3.08	457,146.59	719,480.57	32° 15' 17.344238 N	103° 37' 24.084196 W
10,100.00	3.64	202.85	10,098.72	-49.76	0.90	457,141.24	719,478.39	32° 15' 17.291471 N	103° 37' 24.109967 W
10,200.00	3.31	206.34	10,198.53	-55.27	-1.61	457,135.73	719,475.88	32° 15' 17.237087 N	103° 37' 24.139661 W
10,324.00	1.85	209.85	10,322.40	-60.22	-4.20	457,130.78	719,473.30	32° 15' 17.188329 N	103° 37' 24.170139 W
10,381.00	1.80	215.00	10,379.38	-61.75	-5.17	457,129.25	719,472.33	32° 15' 17.173239 N	103° 37' 24.181569 W
MWD surveys									
10,413.00	1.10	317.30	10,411.37	-61.93	-5.67	457,129.07	719,471.83	32° 15' 17.171431 N	103° 37' 24.187366 W
10,444.00	4.00	354.50	10,442.34	-60.64	-5.97	457,130.36	719,471.52	32° 15' 17.184268 N	103° 37' 24.190824 W
10,475.00	7.60	1.90	10,473.17	-57.51	-6.01	457,133.49	719,471.49	32° 15' 17.215206 N	103° 37' 24.190999 W
10,507.00	11.40	3.00	10,504.73	-52.24	-5.77	457,138.76	719,471.72	32° 15' 17.267390 N	103° 37' 24.187847 W
10,538.00	13.90	0.90	10,534.97	-45.45	-5.55	457,145.55	719,471.94	32° 15' 17.334504 N	103° 37' 24.184776 W
10,569.00	15.80	359.10	10,564.94	-37.51	-5.56	457,153.49	719,471.93	32° 15' 17.413112 N	103° 37' 24.184255 W
10,601.00	17.60	358.10	10,595.59	-28.32	-5.79	457,162.68	719,471.71	32° 15' 17.504087 N	103° 37' 24.186212 W
10,632.00	21.80	357.70	10,624.77	-17.88	-6.18	457,173.12	719,471.32	32° 15' 17.607426 N	103° 37' 24.189910 W



Survey Report - Geographic

Company: COG Operating LLC
Project: Lea County, New Mexico
Site: Queso State
Well: Queso State Well No. 3H
Wellbore: Original Hole
Design: Surveys Original Hole

Local Co-ordinate Reference: Well Queso State Well No. 3H
TVD Reference: RKB=3644.2+26 @ 3670.20usft (Independence 205)
MD Reference: RKB=3644.2+26 @ 3670.20usft (Independence 205)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Dbase Nov0914

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,663.00	25.20	0.50	10,653.19	-5.52	-6.35	457,185.48	719,471.15	32° 15' 17.729696 N	103° 37' 24.190978 W
10,695.00	28.90	1.20	10,681.69	9.03	-6.13	457,200.03	719,471.37	32° 15' 17.873644 N	103° 37' 24.187279 W
10,726.00	32.70	1.20	10,708.31	24.89	-5.80	457,215.89	719,471.70	32° 15' 18.030634 N	103° 37' 24.182187 W
10,757.00	36.10	1.60	10,733.88	42.40	-5.37	457,233.40	719,472.13	32° 15' 18.203838 N	103° 37' 24.175826 W
10,789.00	39.60	0.50	10,759.15	62.03	-5.01	457,253.03	719,472.48	32° 15' 18.398048 N	103° 37' 24.170212 W
10,820.00	42.80	359.80	10,782.47	82.44	-4.96	457,273.44	719,472.53	32° 15' 18.600076 N	103° 37' 24.168063 W
10,852.00	46.80	359.10	10,805.17	104.99	-5.19	457,295.99	719,472.31	32° 15' 18.823160 N	103° 37' 24.168904 W
10,883.00	50.90	359.50	10,825.57	128.32	-5.47	457,319.32	719,472.03	32° 15' 19.054101 N	103° 37' 24.170397 W
10,914.00	54.50	0.20	10,844.35	152.98	-5.53	457,343.98	719,471.97	32° 15' 19.298083 N	103° 37' 24.169208 W
10,946.00	58.40	359.80	10,862.03	179.64	-5.53	457,370.64	719,471.96	32° 15' 19.561935 N	103° 37' 24.167179 W
10,977.00	62.60	0.20	10,877.29	206.62	-5.53	457,397.62	719,471.97	32° 15' 19.828867 N	103° 37' 24.165079 W
11,009.00	66.70	359.80	10,890.99	235.53	-5.53	457,426.53	719,471.96	32° 15' 20.114972 N	103° 37' 24.162872 W
11,040.00	70.90	359.80	10,902.20	264.42	-5.63	457,455.42	719,471.86	32° 15' 20.400915 N	103° 37' 24.161822 W
11,071.00	74.60	359.80	10,911.39	294.02	-5.74	457,485.02	719,471.76	32° 15' 20.693834 N	103° 37' 24.160745 W
11,102.00	76.50	359.10	10,919.12	324.04	-6.02	457,515.04	719,471.47	32° 15' 20.990882 N	103° 37' 24.161798 W
11,130.00	79.00	356.30	10,925.07	351.37	-7.13	457,542.38	719,470.37	32° 15' 21.261451 N	103° 37' 24.172515 W
11,162.00	82.30	355.20	10,930.26	382.86	-9.47	457,573.86	719,468.03	32° 15' 21.573147 N	103° 37' 24.197351 W
11,193.00	85.90	356.60	10,933.45	413.61	-11.67	457,604.61	719,465.83	32° 15' 21.877591 N	103° 37' 24.220636 W
11,256.00	89.90	359.50	10,935.76	476.51	-13.81	457,667.51	719,463.69	32° 15' 22.500180 N	103° 37' 24.240707 W
11,350.00	92.90	359.50	10,933.46	570.47	-14.63	457,761.47	719,462.87	32° 15' 23.429998 N	103° 37' 24.243019 W
11,444.00	91.80	358.80	10,929.61	664.38	-16.02	457,855.38	719,461.47	32° 15' 24.359368 N	103° 37' 24.252014 W
11,538.00	90.10	358.40	10,928.05	758.33	-18.32	457,949.33	719,459.18	32° 15' 25.289261 N	103° 37' 24.271518 W
11,632.00	88.20	358.10	10,929.44	852.27	-21.19	458,043.27	719,456.31	32° 15' 26.219052 N	103° 37' 24.297706 W
11,726.00	89.40	357.30	10,931.41	946.18	-24.96	458,137.18	719,452.54	32° 15' 27.148504 N	103° 37' 24.334394 W
11,820.00	88.00	358.40	10,933.55	1,040.08	-28.49	458,231.08	719,449.01	32° 15' 28.077987 N	103° 37' 24.368218 W
11,914.00	89.60	358.40	10,935.51	1,134.02	-31.11	458,325.02	719,446.39	32° 15' 29.007745 N	103° 37' 24.391540 W
12,008.00	87.80	358.80	10,937.65	1,227.96	-33.41	458,418.96	719,444.09	32° 15' 29.937522 N	103° 37' 24.411043 W
12,102.00	89.70	358.80	10,939.70	1,321.92	-35.37	458,512.92	719,442.12	32° 15' 30.867366 N	103° 37' 24.426725 W
12,197.00	88.20	359.50	10,941.44	1,416.89	-36.78	458,607.89	719,440.71	32° 15' 31.807243 N	103° 37' 24.435821 W
12,291.00	89.60	359.10	10,943.24	1,510.86	-37.93	458,701.86	719,439.56	32° 15' 32.737235 N	103° 37' 24.441955 W
12,385.00	88.30	0.50	10,944.97	1,604.84	-38.26	458,795.84	719,439.24	32° 15' 33.667235 N	103° 37' 24.438540 W
12,479.00	89.90	0.50	10,946.44	1,698.82	-37.44	458,889.82	719,440.06	32° 15' 34.597184 N	103° 37' 24.421751 W
12,573.00	87.60	359.50	10,948.49	1,792.79	-37.44	458,983.79	719,440.06	32° 15' 35.527071 N	103° 37' 24.414510 W
12,667.00	89.40	359.50	10,950.95	1,886.75	-38.26	459,077.75	719,439.24	32° 15' 36.456916 N	103° 37' 24.416822 W
12,761.00	87.80	0.20	10,953.25	1,980.72	-38.51	459,171.72	719,438.99	32° 15' 37.386798 N	103° 37' 24.412452 W
12,855.00	89.90	359.80	10,955.14	2,074.70	-38.51	459,265.70	719,438.99	32° 15' 38.316740 N	103° 37' 24.405216 W
12,949.00	89.40	0.50	10,955.71	2,168.69	-38.26	459,359.69	719,439.24	32° 15' 39.246877 N	103° 37' 24.395111 W
13,043.00	90.40	0.50	10,955.87	2,262.69	-37.44	459,453.69	719,440.06	32° 15' 40.176958 N	103° 37' 24.378319 W
13,137.00	89.70	0.20	10,955.79	2,356.69	-36.87	459,547.69	719,440.63	32° 15' 41.107078 N	103° 37' 24.364392 W
13,231.00	88.00	0.50	10,957.68	2,450.66	-36.29	459,641.66	719,441.20	32° 15' 42.036984 N	103° 37' 24.350470 W
13,325.00	88.30	358.80	10,960.71	2,544.61	-36.87	459,735.61	719,440.63	32° 15' 42.966667 N	103° 37' 24.349918 W
13,419.00	89.70	358.40	10,962.35	2,638.56	-39.16	459,829.56	719,438.33	32° 15' 43.896555 N	103° 37' 24.369423 W
13,513.00	88.70	357.70	10,963.67	2,732.50	-42.36	459,923.50	719,435.14	32° 15' 44.826300 N	103° 37' 24.399431 W
13,607.00	87.80	357.70	10,966.54	2,826.38	-46.13	460,017.38	719,431.37	32° 15' 45.755537 N	103° 37' 24.436111 W
13,701.00	89.00	357.70	10,969.16	2,920.26	-49.90	460,111.26	719,427.59	32° 15' 46.684838 N	103° 37' 24.472793 W
13,795.00	87.30	358.40	10,972.20	3,014.15	-53.10	460,205.15	719,424.40	32° 15' 47.614167 N	103° 37' 24.502792 W
13,890.00	88.30	358.10	10,975.84	3,109.04	-56.00	460,300.04	719,421.50	32° 15' 48.553290 N	103° 37' 24.529245 W
13,984.00	88.00	359.10	10,978.88	3,202.96	-58.29	460,393.96	719,419.20	32° 15' 49.482848 N	103° 37' 24.548743 W
14,078.00	90.10	358.40	10,980.44	3,296.92	-60.34	460,487.92	719,417.15	32° 15' 50.412758 N	103° 37' 24.565384 W
14,172.00	89.90	359.80	10,980.44	3,390.91	-61.82	460,581.91	719,415.68	32° 15' 51.342898 N	103° 37' 24.575339 W
14,266.00	89.00	1.20	10,981.34	3,484.89	-61.00	460,675.89	719,416.50	32° 15' 52.272916 N	103° 37' 24.558549 W
14,360.00	90.10	1.60	10,982.08	3,578.86	-58.70	460,769.86	719,418.79	32° 15' 53.202625 N	103° 37' 24.524566 W
14,454.00	88.20	1.20	10,983.47	3,672.82	-56.41	460,863.82	719,421.09	32° 15' 54.132233 N	103° 37' 24.490586 W



Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well Queso State Well No. 3H
Project:	Lea County, New Mexico	TVD Reference:	RKB=3644.2+26 @ 3670.20usft (Independence 205)
Site:	Queso State	MD Reference:	RKB=3644.2+26 @ 3670.20usft (Independence 205)
Well:	Queso State Well No. 3H	North Reference:	Grid
Wellbore:	Original Hole	Survey Calculation Method:	Minimum Curvature
Design:	Surveys Original Hole	Database:	Dbase Nov0914

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,548.00	89.60	0.50	10,985.28	3,766.79	-55.01	460,957.79	719,422.48	32° 15' 55.062021 N	103° 37' 24.467113 W
14,642.00	88.70	0.90	10,986.67	3,860.77	-53.86	461,051.77	719,423.63	32° 15' 55.991945 N	103° 37' 24.446501 W
14,736.00	88.70	0.20	10,988.80	3,954.74	-52.96	461,145.74	719,424.53	32° 15' 56.921780 N	103° 37' 24.428757 W
14,830.00	90.30	359.10	10,989.62	4,048.73	-53.54	461,239.73	719,423.96	32° 15' 57.851903 N	103° 37' 24.428204 W
14,924.00	89.00	0.20	10,990.20	4,142.72	-54.11	461,333.72	719,423.39	32° 15' 58.782053 N	103° 37' 24.427651 W
15,018.00	88.00	0.20	10,992.66	4,236.69	-53.78	461,427.69	719,423.71	32° 15' 59.711878 N	103° 37' 24.416593 W
15,113.00	89.90	359.80	10,994.40	4,331.67	-53.78	461,522.67	719,423.71	32° 16' 0.651752 N	103° 37' 24.409277 W
15,207.00	91.80	359.10	10,993.00	4,425.65	-54.68	461,616.65	719,422.81	32° 16' 1.581800 N	103° 37' 24.412542 W
15,330.00	91.80	359.10	10,989.14	4,548.57	-56.62	461,739.57	719,420.88	32° 16' 2.798329 N	103° 37' 24.425562 W
Survey projected to 15330.00 MD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,381.00	10,379.38	-61.75	-5.17	MWD surveys
15,330.00	10,989.14	4,548.57	-56.62	Survey projected to 15330.00 MD



COG Operating LLC

Well: Queso State Well No. 3H
 Site: Queso State
 Project: Lea County, New Mexico
 Design: rev3
 Rig: Independence 205

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	10324.00	1.85	209.85	10322.40	-60.22	-4.20	0.00	0.00	-60.17	Survey @ 10324.00 MD
2	10450.99	1.85	209.85	10449.33	-63.77	-6.24	0.00	0.00	-63.71	KOP Begin 12"/100' build/turn
3	11207.40	89.17	359.63	10940.00	406.53	-17.13	12.00	149.78	406.68	Begin 89.17 lateral section
4	15350.77	89.17	359.63	11000.00	4549.38	-43.81	0.00	0.00	4549.59	PBHL/TD

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
100.00	100.00	0.13	128.96	-0.07	0.09	-0.07	0.11	Gyro
10379.38	10381.00	1.80	215.00	-61.75	-5.17	-61.70	130.49	MWD surveys
10989.14	15330.00	91.80	359.10	4548.57	-56.62	4548.91	4743.05	Survey projected to 15330.00 MD

Surface Location: RKB=3644.2+26 @ 3670.20usft (Independence 205)
 US State Plane 1927 (Exact solution)
 New Mexico East 3001

Northing 457191.00 Easting 719477.50 Latitude 32° 15' 17.783930 N Longitude 103° 37' 24.116600 W
 Total Correction (M => G) To convert a Magnetic Direction to a Grid Direction, Add 6.80°



Azimuths to Grid North
 True North: -0.38°
 Magnetic North: 6.80°
 Magnetic Field
 Strength: 48279.3nT
 Dip Angle: 60.12°
 Date: 12/8/2014
 Model: IGRF2010

