



COG Operating, LLC

Lea County, NM

Sec 19, T19-S, R33-E

Geronimo Federal Com 11H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

25 February, 2017

HOBBS OCD

JUN 29 2017

RECEIVED



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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 19, T19-S, R33-E		
Site Position:		Northing:	597,166.40 usft
From:	Map	Easting:	692,087.80 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 38' 24.583 N
		Longitude:	103° 42' 33.536 W
		Grid Convergence:	0.34 °

Well	Geronimo Federal Com 11H		
Well Position	+N/-S	0.0 usft	Northing: 597,166.40 usft
	+E/-W	0.0 usft	Easting: 692,087.80 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Ground Level:	3,600.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	1/18/2017	7.09
			Dip Angle (°)
			60.43
			Field Strength (nT)
			48,212

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 (°)
			180.04

Survey Program	Date 2/25/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.0	9,235.0	Gyro #2 (Wellbore #1)	Good_gyro
9,346.0	20,728.0	MWD Surveys (Wellbore #1)	MWD default
			Description
			Good Gyro
			MWD - Standard

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	597,166.40	692,087.80	32° 38' 24.583 N	103° 42' 33.536 W	
100.0	0.53	56.30	100.0	0.3	0.4	597,166.66	692,088.18	32° 38' 24.585 N	103° 42' 33.531 W	
125.0	0.50	63.09	125.0	0.4	0.6	597,166.77	692,088.37	32° 38' 24.587 N	103° 42' 33.529 W	
150.0	0.49	49.61	150.0	0.5	0.8	597,166.89	692,088.55	32° 38' 24.588 N	103° 42' 33.527 W	
175.0	0.50	52.07	175.0	0.6	0.9	597,167.03	692,088.72	32° 38' 24.589 N	103° 42' 33.525 W	
200.0	0.52	46.61	200.0	0.8	1.1	597,167.17	692,088.89	32° 38' 24.591 N	103° 42' 33.523 W	
225.0	0.51	42.27	225.0	0.9	1.3	597,167.33	692,089.05	32° 38' 24.592 N	103° 42' 33.521 W	
250.0	0.51	45.94	250.0	1.1	1.4	597,167.49	692,089.20	32° 38' 24.594 N	103° 42' 33.519 W	
275.0	0.53	44.29	275.0	1.3	1.6	597,167.65	692,089.36	32° 38' 24.595 N	103° 42' 33.517 W	
300.0	0.50	50.20	300.0	1.4	1.7	597,167.81	692,089.53	32° 38' 24.597 N	103° 42' 33.515 W	
325.0	0.47	51.78	325.0	1.5	1.9	597,167.94	692,089.69	32° 38' 24.598 N	103° 42' 33.514 W	

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Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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	0.57	37.96	350.0	1.7	2.1	597,168.10	692,089.85	32° 38' 24.600 N	103° 42' 33.512 W	
375.0	0.49	40.07	375.0	1.9	2.2	597,168.28	692,089.99	32° 38' 24.601 N	103° 42' 33.510 W	
400.0	0.37	54.58	400.0	2.0	2.3	597,168.41	692,090.13	32° 38' 24.603 N	103° 42' 33.508 W	
425.0	0.41	51.59	425.0	2.1	2.5	597,168.51	692,090.26	32° 38' 24.604 N	103° 42' 33.507 W	
450.0	0.42	51.21	450.0	2.2	2.6	597,168.62	692,090.40	32° 38' 24.605 N	103° 42' 33.505 W	
475.0	0.43	50.28	475.0	2.3	2.8	597,168.74	692,090.55	32° 38' 24.606 N	103° 42' 33.503 W	
500.0	0.32	64.29	500.0	2.4	2.9	597,168.83	692,090.68	32° 38' 24.607 N	103° 42' 33.502 W	
525.0	0.31	69.56	525.0	2.5	3.0	597,168.89	692,090.81	32° 38' 24.607 N	103° 42' 33.500 W	
550.0	0.29	77.26	550.0	2.5	3.1	597,168.92	692,090.93	32° 38' 24.608 N	103° 42' 33.499 W	
575.0	0.30	80.70	575.0	2.5	3.3	597,168.95	692,091.06	32° 38' 24.608 N	103° 42' 33.497 W	
600.0	0.24	84.32	600.0	2.6	3.4	597,168.96	692,091.18	32° 38' 24.608 N	103° 42' 33.496 W	
625.0	0.31	85.90	625.0	2.6	3.5	597,168.97	692,091.30	32° 38' 24.608 N	103° 42' 33.495 W	
650.0	0.28	88.85	650.0	2.6	3.6	597,168.98	692,091.43	32° 38' 24.608 N	103° 42' 33.493 W	
675.0	0.28	84.81	675.0	2.6	3.8	597,168.99	692,091.55	32° 38' 24.608 N	103° 42' 33.492 W	
700.0	0.27	78.15	700.0	2.6	3.9	597,169.00	692,091.67	32° 38' 24.608 N	103° 42' 33.490 W	
725.0	0.30	80.85	725.0	2.6	4.0	597,169.03	692,091.79	32° 38' 24.609 N	103° 42' 33.489 W	
750.0	0.31	83.08	750.0	2.6	4.1	597,169.05	692,091.92	32° 38' 24.609 N	103° 42' 33.487 W	
775.0	0.31	88.80	775.0	2.7	4.3	597,169.06	692,092.05	32° 38' 24.609 N	103° 42' 33.486 W	
800.0	0.26	95.37	800.0	2.6	4.4	597,169.05	692,092.18	32° 38' 24.609 N	103° 42' 33.484 W	
825.0	0.22	99.16	825.0	2.6	4.5	597,169.04	692,092.28	32° 38' 24.609 N	103° 42' 33.483 W	
850.0	0.14	82.21	850.0	2.6	4.6	597,169.03	692,092.36	32° 38' 24.609 N	103° 42' 33.482 W	
875.0	0.10	91.28	875.0	2.6	4.6	597,169.04	692,092.41	32° 38' 24.609 N	103° 42' 33.482 W	
900.0	0.11	103.93	900.0	2.6	4.7	597,169.03	692,092.46	32° 38' 24.609 N	103° 42' 33.481 W	
925.0	0.01	217.92	925.0	2.6	4.7	597,169.02	692,092.48	32° 38' 24.609 N	103° 42' 33.481 W	
950.0	0.10	335.05	950.0	2.6	4.7	597,169.04	692,092.47	32° 38' 24.609 N	103° 42' 33.481 W	
975.0	0.22	347.84	975.0	2.7	4.7	597,169.11	692,092.45	32° 38' 24.609 N	103° 42' 33.481 W	
1,000.0	0.19	344.32	1,000.0	2.8	4.6	597,169.20	692,092.43	32° 38' 24.610 N	103° 42' 33.481 W	
1,025.0	0.16	346.36	1,025.0	2.9	4.6	597,169.27	692,092.41	32° 38' 24.611 N	103° 42' 33.482 W	
1,050.0	0.20	332.67	1,050.0	2.9	4.6	597,169.34	692,092.38	32° 38' 24.612 N	103° 42' 33.482 W	
1,075.0	0.25	332.51	1,075.0	3.0	4.5	597,169.43	692,092.34	32° 38' 24.613 N	103° 42' 33.482 W	
1,100.0	0.34	347.56	1,100.0	3.1	4.5	597,169.55	692,092.29	32° 38' 24.614 N	103° 42' 33.483 W	
1,125.0	0.28	348.19	1,125.0	3.3	4.5	597,169.68	692,092.27	32° 38' 24.615 N	103° 42' 33.483 W	
1,150.0	0.24	339.35	1,150.0	3.4	4.4	597,169.79	692,092.23	32° 38' 24.616 N	103° 42' 33.484 W	
1,175.0	0.18	336.24	1,175.0	3.5	4.4	597,169.88	692,092.20	32° 38' 24.617 N	103° 42' 33.484 W	
1,200.0	0.32	344.68	1,200.0	3.6	4.4	597,169.98	692,092.17	32° 38' 24.618 N	103° 42' 33.484 W	
1,225.0	0.23	347.03	1,225.0	3.7	4.3	597,170.10	692,092.14	32° 38' 24.619 N	103° 42' 33.485 W	
1,250.0	0.30	351.63	1,250.0	3.8	4.3	597,170.21	692,092.12	32° 38' 24.620 N	103° 42' 33.485 W	
1,275.0	0.32	344.15	1,275.0	3.9	4.3	597,170.34	692,092.09	32° 38' 24.622 N	103° 42' 33.485 W	
1,300.0	0.35	343.71	1,300.0	4.1	4.3	597,170.48	692,092.05	32° 38' 24.623 N	103° 42' 33.486 W	
1,325.0	0.35	344.50	1,325.0	4.2	4.2	597,170.63	692,092.00	32° 38' 24.625 N	103° 42' 33.486 W	
1,350.0	0.20	0.49	1,350.0	4.3	4.2	597,170.75	692,091.98	32° 38' 24.626 N	103° 42' 33.486 W	
1,375.0	0.09	334.38	1,375.0	4.4	4.2	597,170.81	692,091.98	32° 38' 24.626 N	103° 42' 33.487 W	
1,400.0	0.07	7.82	1,400.0	4.4	4.2	597,170.84	692,091.97	32° 38' 24.627 N	103° 42' 33.487 W	
1,425.0	0.09	195.06	1,425.0	4.4	4.2	597,170.84	692,091.97	32° 38' 24.627 N	103° 42' 33.487 W	
1,450.0	0.06	304.33	1,450.0	4.4	4.2	597,170.83	692,091.95	32° 38' 24.626 N	103° 42' 33.487 W	
1,475.0	0.18	172.84	1,475.0	4.4	4.1	597,170.79	692,091.95	32° 38' 24.626 N	103° 42' 33.487 W	
1,500.0	0.30	182.90	1,500.0	4.3	4.2	597,170.69	692,091.95	32° 38' 24.625 N	103° 42' 33.487 W	
1,525.0	0.07	181.10	1,525.0	4.2	4.1	597,170.61	692,091.94	32° 38' 24.624 N	103° 42' 33.487 W	
1,550.0	0.28	186.58	1,550.0	4.1	4.1	597,170.53	692,091.94	32° 38' 24.624 N	103° 42' 33.487 W	
1,575.0	0.16	208.73	1,575.0	4.0	4.1	597,170.44	692,091.91	32° 38' 24.623 N	103° 42' 33.487 W	
1,600.0	0.13	230.20	1,600.0	4.0	4.1	597,170.39	692,091.87	32° 38' 24.622 N	103° 42' 33.488 W	
1,625.0	0.27	185.78	1,625.0	3.9	4.1	597,170.32	692,091.85	32° 38' 24.621 N	103° 42' 33.488 W	
1,650.0	0.22	193.90	1,650.0	3.8	4.0	597,170.21	692,091.83	32° 38' 24.620 N	103° 42' 33.488 W	
1,675.0	0.25	197.34	1,675.0	3.7	4.0	597,170.11	692,091.80	32° 38' 24.619 N	103° 42' 33.489 W	
1,700.0	0.20	198.79	1,700.0	3.6	4.0	597,170.02	692,091.77	32° 38' 24.618 N	103° 42' 33.489 W	

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Well:	Geronimo Federal Com 11H	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	0.16	249.87	1,725.0	3.6	3.9	597,169.97	692,091.72	32° 38' 24.618 N	103° 42' 33.490 W	
1,750.0	0.30	187.84	1,750.0	3.5	3.9	597,169.89	692,091.68	32° 38' 24.617 N	103° 42' 33.490 W	
1,775.0	0.18	207.02	1,775.0	3.4	3.9	597,169.79	692,091.66	32° 38' 24.616 N	103° 42' 33.490 W	
1,800.0	0.28	203.68	1,800.0	3.3	3.8	597,169.70	692,091.61	32° 38' 24.615 N	103° 42' 33.491 W	
1,825.0	0.32	189.60	1,825.0	3.2	3.8	597,169.57	692,091.58	32° 38' 24.614 N	103° 42' 33.491 W	
1,850.0	0.12	252.19	1,850.0	3.1	3.7	597,169.50	692,091.54	32° 38' 24.613 N	103° 42' 33.492 W	
1,875.0	0.27	194.23	1,875.0	3.0	3.7	597,169.43	692,091.50	32° 38' 24.613 N	103° 42' 33.492 W	
1,900.0	0.21	195.52	1,900.0	2.9	3.7	597,169.33	692,091.47	32° 38' 24.612 N	103° 42' 33.493 W	
1,925.0	0.06	166.28	1,925.0	2.9	3.7	597,169.27	692,091.46	32° 38' 24.611 N	103° 42' 33.493 W	
1,950.0	0.07	161.46	1,950.0	2.8	3.7	597,169.25	692,091.47	32° 38' 24.611 N	103° 42' 33.493 W	
1,975.0	0.05	213.71	1,975.0	2.8	3.7	597,169.22	692,091.47	32° 38' 24.611 N	103° 42' 33.493 W	
2,000.0	0.04	330.20	2,000.0	2.8	3.7	597,169.22	692,091.46	32° 38' 24.611 N	103° 42' 33.493 W	
2,025.0	0.10	135.49	2,025.0	2.8	3.7	597,169.21	692,091.47	32° 38' 24.611 N	103° 42' 33.493 W	
2,050.0	0.18	17.41	2,050.0	2.8	3.7	597,169.23	692,091.50	32° 38' 24.611 N	103° 42' 33.492 W	
2,075.0	0.07	67.10	2,075.0	2.9	3.7	597,169.28	692,091.52	32° 38' 24.611 N	103° 42' 33.492 W	
2,100.0	0.12	57.49	2,100.0	2.9	3.8	597,169.30	692,091.56	32° 38' 24.611 N	103° 42' 33.492 W	
2,125.0	0.13	45.24	2,125.0	2.9	3.8	597,169.33	692,091.60	32° 38' 24.612 N	103° 42' 33.491 W	
2,150.0	0.17	64.54	2,150.0	3.0	3.9	597,169.37	692,091.66	32° 38' 24.612 N	103° 42' 33.490 W	
2,175.0	0.34	45.37	2,175.0	3.0	3.9	597,169.44	692,091.74	32° 38' 24.613 N	103° 42' 33.489 W	
2,200.0	0.42	38.45	2,200.0	3.2	4.1	597,169.56	692,091.85	32° 38' 24.614 N	103° 42' 33.488 W	
2,225.0	0.45	27.95	2,225.0	3.3	4.2	597,169.72	692,091.96	32° 38' 24.616 N	103° 42' 33.487 W	
2,250.0	0.51	41.64	2,250.0	3.5	4.3	597,169.89	692,092.08	32° 38' 24.617 N	103° 42' 33.485 W	
2,275.0	0.55	33.89	2,275.0	3.7	4.4	597,170.07	692,092.22	32° 38' 24.619 N	103° 42' 33.484 W	
2,300.0	0.47	38.95	2,300.0	3.8	4.6	597,170.25	692,092.35	32° 38' 24.621 N	103° 42' 33.482 W	
2,325.0	0.45	40.19	2,325.0	4.0	4.7	597,170.40	692,092.48	32° 38' 24.622 N	103° 42' 33.481 W	
2,350.0	0.49	47.21	2,350.0	4.1	4.8	597,170.55	692,092.62	32° 38' 24.624 N	103° 42' 33.479 W	
2,375.0	0.59	43.08	2,375.0	4.3	5.0	597,170.72	692,092.78	32° 38' 24.625 N	103° 42' 33.477 W	
2,400.0	0.72	42.72	2,400.0	4.5	5.2	597,170.93	692,092.98	32° 38' 24.627 N	103° 42' 33.475 W	
2,425.0	0.75	42.92	2,425.0	4.8	5.4	597,171.16	692,093.20	32° 38' 24.630 N	103° 42' 33.472 W	
2,450.0	0.83	45.96	2,450.0	5.0	5.6	597,171.41	692,093.44	32° 38' 24.632 N	103° 42' 33.469 W	
2,475.0	0.83	48.95	2,475.0	5.3	5.9	597,171.65	692,093.70	32° 38' 24.635 N	103° 42' 33.466 W	
2,500.0	0.93	49.34	2,500.0	5.5	6.2	597,171.91	692,094.00	32° 38' 24.637 N	103° 42' 33.463 W	
2,525.0	1.01	49.92	2,524.9	5.8	6.5	597,172.18	692,094.32	32° 38' 24.640 N	103° 42' 33.459 W	
2,550.0	1.01	59.06	2,549.9	6.0	6.9	597,172.43	692,094.68	32° 38' 24.642 N	103° 42' 33.455 W	
2,575.0	1.04	61.95	2,574.9	6.3	7.3	597,172.65	692,095.06	32° 38' 24.644 N	103° 42' 33.450 W	
2,600.0	1.10	58.55	2,599.9	6.5	7.7	597,172.89	692,095.47	32° 38' 24.647 N	103° 42' 33.446 W	
2,625.0	1.15	58.56	2,624.9	6.7	8.1	597,173.14	692,095.89	32° 38' 24.649 N	103° 42' 33.441 W	
2,650.0	1.10	58.59	2,649.9	7.0	8.5	597,173.40	692,096.31	32° 38' 24.652 N	103° 42' 33.436 W	
2,675.0	1.13	58.83	2,674.9	7.2	8.9	597,173.65	692,096.72	32° 38' 24.654 N	103° 42' 33.431 W	
2,700.0	1.14	59.14	2,699.9	7.5	9.4	597,173.91	692,097.15	32° 38' 24.657 N	103° 42' 33.426 W	
2,725.0	0.93	59.20	2,724.9	7.7	9.7	597,174.14	692,097.53	32° 38' 24.659 N	103° 42' 33.421 W	
2,750.0	0.55	59.07	2,749.9	7.9	10.0	597,174.30	692,097.81	32° 38' 24.661 N	103° 42' 33.418 W	
2,775.0	0.25	60.22	2,774.9	8.0	10.2	597,174.39	692,097.96	32° 38' 24.661 N	103° 42' 33.416 W	
2,800.0	0.05	77.09	2,799.9	8.0	10.2	597,174.42	692,098.02	32° 38' 24.662 N	103° 42' 33.416 W	
2,825.0	0.03	329.99	2,824.9	8.0	10.2	597,174.43	692,098.03	32° 38' 24.662 N	103° 42' 33.416 W	
2,850.0	0.11	322.64	2,849.9	8.1	10.2	597,174.45	692,098.01	32° 38' 24.662 N	103° 42' 33.416 W	
2,875.0	0.11	352.96	2,874.9	8.1	10.2	597,174.50	692,097.99	32° 38' 24.662 N	103° 42' 33.416 W	
2,900.0	0.09	331.76	2,899.9	8.1	10.2	597,174.54	692,097.98	32° 38' 24.663 N	103° 42' 33.416 W	
2,925.0	0.06	326.75	2,924.9	8.2	10.2	597,174.57	692,097.96	32° 38' 24.663 N	103° 42' 33.416 W	
2,950.0	0.08	15.46	2,949.9	8.2	10.2	597,174.59	692,097.96	32° 38' 24.663 N	103° 42' 33.416 W	
2,975.0	0.07	351.94	2,974.9	8.2	10.2	597,174.63	692,097.96	32° 38' 24.664 N	103° 42' 33.416 W	
3,000.0	0.18	318.04	2,999.9	8.3	10.1	597,174.67	692,097.94	32° 38' 24.664 N	103° 42' 33.417 W	
3,025.0	0.20	347.16	3,024.9	8.3	10.1	597,174.74	692,097.90	32° 38' 24.665 N	103° 42' 33.417 W	
3,050.0	0.22	344.07	3,049.9	8.4	10.1	597,174.83	692,097.88	32° 38' 24.666 N	103° 42' 33.417 W	
3,075.0	0.13	334.46	3,074.9	8.5	10.1	597,174.90	692,097.85	32° 38' 24.666 N	103° 42' 33.418 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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	0.12	338.91	3,099.9	8.5	10.0	597,174.95	692,097.83	32° 38' 24.667 N	103° 42' 33.418 W	
3,125.0	0.25	343.47	3,124.9	8.6	10.0	597,175.03	692,097.80	32° 38' 24.668 N	103° 42' 33.418 W	
3,150.0	0.26	342.06	3,149.9	8.7	10.0	597,175.14	692,097.77	32° 38' 24.669 N	103° 42' 33.419 W	
3,175.0	0.32	345.62	3,174.9	8.9	9.9	597,175.26	692,097.74	32° 38' 24.670 N	103° 42' 33.419 W	
3,200.0	0.38	335.72	3,199.9	9.0	9.9	597,175.40	692,097.69	32° 38' 24.671 N	103° 42' 33.419 W	
3,225.0	0.23	323.68	3,224.9	9.1	9.8	597,175.52	692,097.62	32° 38' 24.673 N	103° 42' 33.420 W	
3,250.0	0.19	341.25	3,249.9	9.2	9.8	597,175.60	692,097.58	32° 38' 24.673 N	103° 42' 33.421 W	
3,275.0	0.23	336.83	3,274.9	9.3	9.7	597,175.68	692,097.55	32° 38' 24.674 N	103° 42' 33.421 W	
3,300.0	0.23	339.51	3,299.9	9.4	9.7	597,175.77	692,097.51	32° 38' 24.675 N	103° 42' 33.422 W	
3,325.0	0.37	329.02	3,324.9	9.5	9.7	597,175.89	692,097.45	32° 38' 24.676 N	103° 42' 33.422 W	
3,350.0	0.35	341.21	3,349.9	9.6	9.6	597,176.03	692,097.38	32° 38' 24.678 N	103° 42' 33.423 W	
3,375.0	0.38	334.11	3,374.9	9.8	9.5	597,176.18	692,097.32	32° 38' 24.679 N	103° 42' 33.424 W	
3,400.0	0.49	332.56	3,399.9	9.9	9.4	597,176.35	692,097.24	32° 38' 24.681 N	103° 42' 33.425 W	
3,425.0	0.44	330.01	3,424.9	10.1	9.3	597,176.53	692,097.14	32° 38' 24.683 N	103° 42' 33.426 W	
3,450.0	0.53	331.13	3,449.9	10.3	9.2	597,176.71	692,097.04	32° 38' 24.684 N	103° 42' 33.427 W	
3,475.0	0.52	327.26	3,474.9	10.5	9.1	597,176.91	692,096.92	32° 38' 24.686 N	103° 42' 33.428 W	
3,500.0	0.55	332.22	3,499.9	10.7	9.0	597,177.11	692,096.80	32° 38' 24.688 N	103° 42' 33.430 W	
3,525.0	0.59	334.43	3,524.9	10.9	8.9	597,177.33	692,096.69	32° 38' 24.691 N	103° 42' 33.431 W	
3,550.0	0.57	335.20	3,549.9	11.2	8.8	597,177.56	692,096.58	32° 38' 24.693 N	103° 42' 33.432 W	
3,575.0	0.60	344.78	3,574.9	11.4	8.7	597,177.80	692,096.50	32° 38' 24.695 N	103° 42' 33.433 W	
3,600.0	0.68	2.97	3,599.9	11.7	8.7	597,178.07	692,096.47	32° 38' 24.698 N	103° 42' 33.434 W	
3,625.0	0.83	7.25	3,624.9	12.0	8.7	597,178.40	692,096.50	32° 38' 24.701 N	103° 42' 33.433 W	
3,650.0	0.86	12.97	3,649.9	12.4	8.8	597,178.76	692,096.56	32° 38' 24.705 N	103° 42' 33.432 W	
3,675.0	1.00	14.22	3,674.9	12.8	8.9	597,179.16	692,096.66	32° 38' 24.709 N	103° 42' 33.431 W	
3,700.0	1.01	15.55	3,699.9	13.2	9.0	597,179.58	692,096.77	32° 38' 24.713 N	103° 42' 33.430 W	
3,725.0	1.07	16.51	3,724.9	13.6	9.1	597,180.02	692,096.90	32° 38' 24.717 N	103° 42' 33.428 W	
3,750.0	1.04	15.11	3,749.9	14.1	9.2	597,180.46	692,097.02	32° 38' 24.722 N	103° 42' 33.427 W	
3,775.0	1.06	14.35	3,774.9	14.5	9.3	597,180.90	692,097.14	32° 38' 24.726 N	103° 42' 33.426 W	
3,800.0	1.05	15.21	3,799.9	14.9	9.5	597,181.35	692,097.26	32° 38' 24.730 N	103° 42' 33.424 W	
3,825.0	1.12	4.79	3,824.9	15.4	9.5	597,181.81	692,097.34	32° 38' 24.735 N	103° 42' 33.423 W	
3,850.0	0.98	2.89	3,849.9	15.9	9.6	597,182.27	692,097.37	32° 38' 24.739 N	103° 42' 33.423 W	
3,875.0	0.99	3.84	3,874.9	16.3	9.6	597,182.70	692,097.39	32° 38' 24.744 N	103° 42' 33.422 W	
3,900.0	1.00	1.50	3,899.9	16.7	9.6	597,183.13	692,097.41	32° 38' 24.748 N	103° 42' 33.422 W	
3,925.0	1.00	0.15	3,924.8	17.2	9.6	597,183.57	692,097.42	32° 38' 24.752 N	103° 42' 33.422 W	
3,950.0	0.94	4.61	3,949.8	17.6	9.6	597,183.99	692,097.44	32° 38' 24.756 N	103° 42' 33.422 W	
3,975.0	1.01	357.77	3,974.8	18.0	9.7	597,184.42	692,097.45	32° 38' 24.761 N	103° 42' 33.422 W	
4,000.0	1.08	0.85	3,999.8	18.5	9.6	597,184.87	692,097.44	32° 38' 24.765 N	103° 42' 33.422 W	
4,025.0	0.99	0.90	4,024.8	18.9	9.7	597,185.32	692,097.45	32° 38' 24.770 N	103° 42' 33.422 W	
4,050.0	1.05	1.66	4,049.8	19.4	9.7	597,185.77	692,097.46	32° 38' 24.774 N	103° 42' 33.421 W	
4,075.0	0.99	1.43	4,074.8	19.8	9.7	597,186.21	692,097.47	32° 38' 24.778 N	103° 42' 33.421 W	
4,100.0	1.01	3.94	4,099.8	20.2	9.7	597,186.65	692,097.49	32° 38' 24.783 N	103° 42' 33.421 W	
4,125.0	1.03	0.61	4,124.8	20.7	9.7	597,187.09	692,097.51	32° 38' 24.787 N	103° 42' 33.421 W	
4,150.0	1.18	359.67	4,149.8	21.2	9.7	597,187.58	692,097.51	32° 38' 24.792 N	103° 42' 33.421 W	
4,175.0	1.11	1.48	4,174.8	21.7	9.7	597,188.08	692,097.51	32° 38' 24.797 N	103° 42' 33.421 W	
4,200.0	1.01	6.40	4,199.8	22.1	9.7	597,188.54	692,097.54	32° 38' 24.801 N	103° 42' 33.420 W	
4,225.0	0.97	7.72	4,224.8	22.6	9.8	597,188.97	692,097.60	32° 38' 24.806 N	103° 42' 33.420 W	
4,250.0	0.98	13.25	4,249.8	23.0	9.9	597,189.38	692,097.67	32° 38' 24.810 N	103° 42' 33.419 W	
4,275.0	0.98	10.28	4,274.8	23.4	10.0	597,189.80	692,097.76	32° 38' 24.814 N	103° 42' 33.418 W	
4,300.0	1.01	11.85	4,299.8	23.8	10.0	597,190.23	692,097.84	32° 38' 24.818 N	103° 42' 33.417 W	
4,325.0	1.11	6.37	4,324.8	24.3	10.1	597,190.68	692,097.92	32° 38' 24.823 N	103° 42' 33.416 W	
4,350.0	1.02	11.93	4,349.8	24.7	10.2	597,191.14	692,097.99	32° 38' 24.827 N	103° 42' 33.415 W	
4,375.0	1.01	12.00	4,374.8	25.2	10.3	597,191.58	692,098.08	32° 38' 24.831 N	103° 42' 33.414 W	
4,400.0	1.06	10.51	4,399.8	25.6	10.4	597,192.02	692,098.17	32° 38' 24.836 N	103° 42' 33.413 W	
4,425.0	1.18	7.23	4,424.8	26.1	10.4	597,192.50	692,098.24	32° 38' 24.841 N	103° 42' 33.412 W	
4,450.0	1.18	4.36	4,449.8	26.6	10.5	597,193.01	692,098.30	32° 38' 24.846 N	103° 42' 33.411 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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	1.21	9.32	4,474.8	27.1	10.6	597,193.53	692,098.36	32° 38' 24.851 N	103° 42' 33.410 W	
4,500.0	1.25	9.21	4,499.8	27.7	10.6	597,194.06	692,098.44	32° 38' 24.856 N	103° 42' 33.409 W	
4,525.0	1.33	6.63	4,524.7	28.2	10.7	597,194.62	692,098.52	32° 38' 24.862 N	103° 42' 33.408 W	
4,550.0	1.36	6.40	4,549.7	28.8	10.8	597,195.20	692,098.59	32° 38' 24.867 N	103° 42' 33.408 W	
4,575.0	1.28	8.05	4,574.7	29.4	10.9	597,195.77	692,098.66	32° 38' 24.873 N	103° 42' 33.407 W	
4,600.0	1.29	7.94	4,599.7	29.9	10.9	597,196.33	692,098.74	32° 38' 24.878 N	103° 42' 33.406 W	
4,625.0	1.23	3.97	4,624.7	30.5	11.0	597,196.87	692,098.80	32° 38' 24.884 N	103° 42' 33.405 W	
4,650.0	1.31	7.44	4,649.7	31.0	11.1	597,197.42	692,098.85	32° 38' 24.889 N	103° 42' 33.404 W	
4,675.0	1.31	10.93	4,674.7	31.6	11.1	597,197.99	692,098.94	32° 38' 24.895 N	103° 42' 33.403 W	
4,700.0	1.32	9.75	4,699.7	32.1	11.3	597,198.55	692,099.05	32° 38' 24.900 N	103° 42' 33.402 W	
4,725.0	1.30	6.37	4,724.7	32.7	11.3	597,199.12	692,099.13	32° 38' 24.906 N	103° 42' 33.401 W	
4,750.0	1.33	8.02	4,749.7	33.3	11.4	597,199.69	692,099.20	32° 38' 24.912 N	103° 42' 33.400 W	
4,775.0	1.25	12.88	4,774.7	33.8	11.5	597,200.24	692,099.30	32° 38' 24.917 N	103° 42' 33.399 W	
4,800.0	1.34	10.83	4,799.7	34.4	11.6	597,200.79	692,099.42	32° 38' 24.923 N	103° 42' 33.398 W	
4,825.0	1.30	13.94	4,824.7	35.0	11.7	597,201.36	692,099.54	32° 38' 24.928 N	103° 42' 33.396 W	
4,850.0	1.32	11.84	4,849.7	35.5	11.9	597,201.91	692,099.67	32° 38' 24.934 N	103° 42' 33.395 W	
4,875.0	1.26	9.23	4,874.7	36.1	12.0	597,202.47	692,099.77	32° 38' 24.939 N	103° 42' 33.393 W	
4,900.0	1.27	14.75	4,899.6	36.6	12.1	597,203.01	692,099.88	32° 38' 24.944 N	103° 42' 33.392 W	
4,925.0	1.37	11.18	4,924.6	37.2	12.2	597,203.57	692,100.01	32° 38' 24.950 N	103° 42' 33.390 W	
4,950.0	1.29	16.70	4,949.6	37.7	12.4	597,204.13	692,100.15	32° 38' 24.956 N	103° 42' 33.389 W	
4,975.0	1.21	16.10	4,974.6	38.2	12.5	597,204.65	692,100.30	32° 38' 24.961 N	103° 42' 33.387 W	
5,000.0	1.31	14.69	4,999.6	38.8	12.7	597,205.18	692,100.45	32° 38' 24.966 N	103° 42' 33.385 W	
5,025.0	1.26	16.21	5,024.6	39.3	12.8	597,205.72	692,100.60	32° 38' 24.971 N	103° 42' 33.383 W	
5,050.0	1.30	10.56	5,049.6	39.9	12.9	597,206.27	692,100.73	32° 38' 24.977 N	103° 42' 33.382 W	
5,075.0	1.30	10.54	5,074.6	40.4	13.0	597,206.82	692,100.83	32° 38' 24.982 N	103° 42' 33.381 W	
5,100.0	1.25	11.71	5,099.6	41.0	13.1	597,207.37	692,100.94	32° 38' 24.988 N	103° 42' 33.379 W	
5,125.0	1.28	11.63	5,124.6	41.5	13.3	597,207.91	692,101.05	32° 38' 24.993 N	103° 42' 33.378 W	
5,150.0	1.31	9.90	5,149.6	42.1	13.4	597,208.46	692,101.16	32° 38' 24.998 N	103° 42' 33.377 W	
5,175.0	1.13	14.66	5,174.6	42.6	13.5	597,208.98	692,101.27	32° 38' 25.004 N	103° 42' 33.375 W	
5,200.0	1.23	13.67	5,199.6	43.1	13.6	597,209.48	692,101.39	32° 38' 25.008 N	103° 42' 33.374 W	
5,225.0	1.26	11.64	5,224.6	43.6	13.7	597,210.01	692,101.51	32° 38' 25.014 N	103° 42' 33.372 W	
5,250.0	1.26	12.99	5,249.6	44.1	13.8	597,210.55	692,101.63	32° 38' 25.019 N	103° 42' 33.371 W	
5,275.0	1.23	12.10	5,274.6	44.7	14.0	597,211.08	692,101.75	32° 38' 25.024 N	103° 42' 33.370 W	
5,300.0	1.24	13.50	5,299.6	45.2	14.1	597,211.61	692,101.87	32° 38' 25.029 N	103° 42' 33.368 W	
5,325.0	1.24	12.98	5,324.5	45.7	14.2	597,212.13	692,101.99	32° 38' 25.035 N	103° 42' 33.367 W	
5,350.0	1.26	14.68	5,349.5	46.3	14.3	597,212.66	692,102.12	32° 38' 25.040 N	103° 42' 33.365 W	
5,375.0	1.26	18.01	5,374.5	46.8	14.5	597,213.19	692,102.28	32° 38' 25.045 N	103° 42' 33.363 W	
5,400.0	1.16	22.68	5,399.5	47.3	14.7	597,213.68	692,102.46	32° 38' 25.050 N	103° 42' 33.361 W	
5,425.0	1.17	24.02	5,424.5	47.7	14.9	597,214.15	692,102.66	32° 38' 25.055 N	103° 42' 33.359 W	
5,450.0	1.21	21.32	5,449.5	48.2	15.1	597,214.63	692,102.86	32° 38' 25.059 N	103° 42' 33.356 W	
5,475.0	1.14	23.53	5,474.5	48.7	15.3	597,215.10	692,103.06	32° 38' 25.064 N	103° 42' 33.354 W	
5,500.0	0.94	27.59	5,499.5	49.1	15.5	597,215.51	692,103.25	32° 38' 25.068 N	103° 42' 33.352 W	
5,525.0	0.99	21.01	5,524.5	49.5	15.6	597,215.90	692,103.42	32° 38' 25.072 N	103° 42' 33.350 W	
5,550.0	0.90	20.21	5,549.5	49.9	15.8	597,216.28	692,103.57	32° 38' 25.076 N	103° 42' 33.348 W	
5,575.0	0.79	24.23	5,574.5	50.2	15.9	597,216.62	692,103.71	32° 38' 25.079 N	103° 42' 33.346 W	
5,600.0	0.73	23.33	5,599.5	50.5	16.0	597,216.93	692,103.84	32° 38' 25.082 N	103° 42' 33.345 W	
5,625.0	0.54	32.00	5,624.5	50.8	16.2	597,217.17	692,103.97	32° 38' 25.084 N	103° 42' 33.343 W	
5,650.0	0.45	48.80	5,649.5	50.9	16.3	597,217.34	692,104.10	32° 38' 25.086 N	103° 42' 33.342 W	
5,675.0	0.40	49.51	5,674.5	51.1	16.4	597,217.46	692,104.24	32° 38' 25.087 N	103° 42' 33.340 W	
5,700.0	0.34	76.58	5,699.5	51.1	16.6	597,217.53	692,104.38	32° 38' 25.088 N	103° 42' 33.338 W	
5,725.0	0.35	65.03	5,724.5	51.2	16.7	597,217.58	692,104.52	32° 38' 25.088 N	103° 42' 33.337 W	
5,750.0	0.39	47.81	5,749.5	51.3	16.9	597,217.67	692,104.65	32° 38' 25.089 N	103° 42' 33.335 W	
5,775.0	0.34	46.09	5,774.5	51.4	17.0	597,217.78	692,104.77	32° 38' 25.090 N	103° 42' 33.334 W	
5,800.0	0.42	40.45	5,799.5	51.5	17.1	597,217.90	692,104.88	32° 38' 25.092 N	103° 42' 33.332 W	
5,825.0	0.43	49.38	5,824.5	51.6	17.2	597,218.03	692,105.01	32° 38' 25.093 N	103° 42' 33.331 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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	0.36	49.30	5,849.5	51.7	17.3	597,218.15	692,105.14	32° 38' 25.094 N	103° 42' 33.329 W	
5,875.0	0.31	33.06	5,874.5	51.9	17.4	597,218.25	692,105.24	32° 38' 25.095 N	103° 42' 33.328 W	
5,900.0	0.14	27.47	5,899.5	51.9	17.5	597,218.34	692,105.29	32° 38' 25.096 N	103° 42' 33.328 W	
5,925.0	0.13	357.38	5,924.5	52.0	17.5	597,218.39	692,105.31	32° 38' 25.096 N	103° 42' 33.327 W	
5,950.0	0.20	310.18	5,949.5	52.0	17.5	597,218.45	692,105.27	32° 38' 25.097 N	103° 42' 33.328 W	
5,975.0	0.19	317.57	5,974.5	52.1	17.4	597,218.51	692,105.21	32° 38' 25.098 N	103° 42' 33.329 W	
6,000.0	0.44	325.54	5,999.5	52.2	17.3	597,218.62	692,105.13	32° 38' 25.099 N	103° 42' 33.330 W	
6,025.0	0.45	337.65	6,024.5	52.4	17.2	597,218.79	692,105.04	32° 38' 25.100 N	103° 42' 33.331 W	
6,050.0	0.27	325.15	6,049.5	52.5	17.2	597,218.93	692,104.96	32° 38' 25.102 N	103° 42' 33.331 W	
6,075.0	0.33	329.03	6,074.5	52.6	17.1	597,219.04	692,104.89	32° 38' 25.103 N	103° 42' 33.332 W	
6,100.0	0.24	335.10	6,099.5	52.7	17.0	597,219.15	692,104.83	32° 38' 25.104 N	103° 42' 33.333 W	
6,125.0	0.24	339.27	6,124.5	52.8	17.0	597,219.24	692,104.79	32° 38' 25.105 N	103° 42' 33.333 W	
6,150.0	0.24	306.68	6,149.5	52.9	16.9	597,219.32	692,104.73	32° 38' 25.106 N	103° 42' 33.334 W	
6,175.0	0.33	291.94	6,174.5	53.0	16.8	597,219.38	692,104.62	32° 38' 25.106 N	103° 42' 33.335 W	
6,200.0	0.48	309.10	6,199.5	53.1	16.7	597,219.47	692,104.48	32° 38' 25.107 N	103° 42' 33.337 W	
6,225.0	0.35	293.47	6,224.5	53.2	16.5	597,219.57	692,104.33	32° 38' 25.108 N	103° 42' 33.339 W	
6,250.0	0.53	301.39	6,249.5	53.3	16.4	597,219.66	692,104.16	32° 38' 25.109 N	103° 42' 33.341 W	
6,275.0	0.37	304.52	6,274.5	53.4	16.2	597,219.77	692,103.99	32° 38' 25.110 N	103° 42' 33.343 W	
6,300.0	0.34	301.37	6,299.5	53.4	16.1	597,219.85	692,103.86	32° 38' 25.111 N	103° 42' 33.344 W	
6,325.0	0.36	293.31	6,324.5	53.5	15.9	597,219.92	692,103.73	32° 38' 25.112 N	103° 42' 33.346 W	
6,350.0	0.41	314.70	6,349.5	53.6	15.8	597,220.02	692,103.59	32° 38' 25.113 N	103° 42' 33.347 W	
6,375.0	0.51	300.67	6,374.5	53.7	15.6	597,220.13	692,103.43	32° 38' 25.114 N	103° 42' 33.349 W	
6,400.0	0.62	316.46	6,399.5	53.9	15.4	597,220.29	692,103.24	32° 38' 25.115 N	103° 42' 33.351 W	
6,425.0	0.64	313.13	6,424.5	54.1	15.3	597,220.48	692,103.05	32° 38' 25.117 N	103° 42' 33.354 W	
6,450.0	0.62	320.99	6,449.5	54.3	15.1	597,220.68	692,102.86	32° 38' 25.119 N	103° 42' 33.356 W	
6,475.0	0.61	319.15	6,474.5	54.5	14.9	597,220.89	692,102.69	32° 38' 25.121 N	103° 42' 33.358 W	
6,500.0	0.65	319.00	6,499.5	54.7	14.7	597,221.10	692,102.51	32° 38' 25.123 N	103° 42' 33.360 W	
6,525.0	0.80	325.69	6,524.5	54.9	14.5	597,221.35	692,102.32	32° 38' 25.126 N	103° 42' 33.362 W	
6,550.0	0.75	322.36	6,549.5	55.2	14.3	597,221.62	692,102.12	32° 38' 25.129 N	103° 42' 33.364 W	
6,575.0	0.67	325.21	6,574.5	55.5	14.1	597,221.87	692,101.93	32° 38' 25.131 N	103° 42' 33.367 W	
6,600.0	0.80	323.19	6,599.5	55.7	14.0	597,222.13	692,101.75	32° 38' 25.134 N	103° 42' 33.369 W	
6,625.0	0.82	329.82	6,624.5	56.0	13.8	597,222.43	692,101.55	32° 38' 25.136 N	103° 42' 33.371 W	
6,650.0	0.96	324.18	6,649.5	56.3	13.5	597,222.75	692,101.34	32° 38' 25.140 N	103° 42' 33.374 W	
6,675.0	0.89	321.92	6,674.5	56.7	13.3	597,223.07	692,101.10	32° 38' 25.143 N	103° 42' 33.376 W	
6,700.0	0.88	326.01	6,699.5	57.0	13.1	597,223.38	692,100.87	32° 38' 25.146 N	103° 42' 33.379 W	
6,725.0	0.90	329.70	6,724.4	57.3	12.9	597,223.71	692,100.66	32° 38' 25.149 N	103° 42' 33.381 W	
6,750.0	1.10	327.51	6,749.4	57.7	12.6	597,224.09	692,100.44	32° 38' 25.153 N	103° 42' 33.384 W	
6,775.0	1.17	326.79	6,774.4	58.1	12.4	597,224.50	692,100.17	32° 38' 25.157 N	103° 42' 33.387 W	
6,800.0	1.15	329.10	6,799.4	58.5	12.1	597,224.93	692,099.90	32° 38' 25.161 N	103° 42' 33.390 W	
6,825.0	1.07	329.45	6,824.4	58.9	11.9	597,225.35	692,099.65	32° 38' 25.166 N	103° 42' 33.393 W	
6,850.0	1.08	329.66	6,849.4	59.3	11.6	597,225.75	692,099.41	32° 38' 25.170 N	103° 42' 33.396 W	
6,875.0	1.13	329.30	6,874.4	59.8	11.4	597,226.17	692,099.17	32° 38' 25.174 N	103° 42' 33.399 W	
6,900.0	1.11	328.89	6,899.4	60.2	11.1	597,226.59	692,098.92	32° 38' 25.178 N	103° 42' 33.402 W	
6,925.0	1.20	327.81	6,924.4	60.6	10.9	597,227.01	692,098.65	32° 38' 25.182 N	103° 42' 33.405 W	
6,950.0	1.16	325.96	6,949.4	61.0	10.6	597,227.45	692,098.37	32° 38' 25.186 N	103° 42' 33.408 W	
6,975.0	1.21	330.56	6,974.4	61.5	10.3	597,227.89	692,098.10	32° 38' 25.191 N	103° 42' 33.411 W	
7,000.0	1.16	327.93	6,999.4	61.9	10.0	597,228.33	692,097.84	32° 38' 25.195 N	103° 42' 33.414 W	
7,025.0	1.24	326.65	7,024.4	62.4	9.8	597,228.77	692,097.55	32° 38' 25.200 N	103° 42' 33.417 W	
7,050.0	1.37	329.57	7,049.4	62.9	9.5	597,229.25	692,097.25	32° 38' 25.204 N	103° 42' 33.421 W	
7,075.0	1.51	330.65	7,074.4	63.4	9.1	597,229.80	692,096.94	32° 38' 25.210 N	103° 42' 33.424 W	
7,100.0	1.51	325.48	7,099.4	64.0	8.8	597,230.36	692,096.59	32° 38' 25.215 N	103° 42' 33.429 W	
7,125.0	1.53	326.93	7,124.4	64.5	8.4	597,230.91	692,096.22	32° 38' 25.221 N	103° 42' 33.433 W	
7,150.0	1.67	329.35	7,149.3	65.1	8.1	597,231.50	692,095.86	32° 38' 25.227 N	103° 42' 33.437 W	
7,175.0	1.80	328.09	7,174.3	65.7	7.7	597,232.15	692,095.46	32° 38' 25.233 N	103° 42' 33.442 W	
7,200.0	1.74	327.54	7,199.3	66.4	7.3	597,232.80	692,095.05	32° 38' 25.240 N	103° 42' 33.446 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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	1.80	328.14	7,224.3	67.1	6.8	597,233.46	692,094.64	32° 38' 25.246 N	103° 42' 33.451 W
7,250.0	1.75	327.38	7,249.3	67.7	6.4	597,234.11	692,094.23	32° 38' 25.253 N	103° 42' 33.456 W
7,275.0	1.72	326.52	7,274.3	68.3	6.0	597,234.74	692,093.81	32° 38' 25.259 N	103° 42' 33.461 W
7,300.0	1.66	328.27	7,299.3	69.0	5.6	597,235.37	692,093.42	32° 38' 25.265 N	103° 42' 33.465 W
7,325.0	1.61	329.12	7,324.3	69.6	5.3	597,235.97	692,093.05	32° 38' 25.271 N	103° 42' 33.470 W
7,350.0	1.62	330.76	7,349.3	70.2	4.9	597,236.58	692,092.69	32° 38' 25.277 N	103° 42' 33.474 W
7,375.0	1.48	333.56	7,374.2	70.8	4.6	597,237.18	692,092.38	32° 38' 25.283 N	103° 42' 33.477 W
7,400.0	1.55	336.82	7,399.2	71.4	4.3	597,237.78	692,092.10	32° 38' 25.289 N	103° 42' 33.481 W
7,425.0	1.54	335.88	7,424.2	72.0	4.0	597,238.40	692,091.83	32° 38' 25.295 N	103° 42' 33.484 W
7,450.0	1.43	339.05	7,449.2	72.6	3.8	597,239.00	692,091.58	32° 38' 25.301 N	103° 42' 33.487 W
7,475.0	1.49	343.79	7,474.2	73.2	3.6	597,239.60	692,091.38	32° 38' 25.307 N	103° 42' 33.489 W
7,500.0	1.46	341.73	7,499.2	73.8	3.4	597,240.22	692,091.19	32° 38' 25.313 N	103° 42' 33.491 W
7,525.0	1.56	342.90	7,524.2	74.4	3.2	597,240.84	692,090.99	32° 38' 25.319 N	103° 42' 33.493 W
7,550.0	1.31	351.47	7,549.2	75.0	3.1	597,241.45	692,090.85	32° 38' 25.325 N	103° 42' 33.495 W
7,575.0	1.27	350.30	7,574.2	75.6	3.0	597,242.01	692,090.76	32° 38' 25.331 N	103° 42' 33.496 W
7,600.0	1.38	355.50	7,599.2	76.2	2.9	597,242.58	692,090.69	32° 38' 25.337 N	103° 42' 33.497 W
7,625.0	1.33	359.08	7,624.2	76.8	2.9	597,243.17	692,090.66	32° 38' 25.342 N	103° 42' 33.497 W
7,650.0	1.41	1.73	7,649.2	77.4	2.9	597,243.77	692,090.66	32° 38' 25.348 N	103° 42' 33.497 W
7,675.0	1.40	11.24	7,674.2	78.0	2.9	597,244.37	692,090.73	32° 38' 25.354 N	103° 42' 33.496 W
7,700.0	1.42	10.27	7,699.1	78.6	3.1	597,244.98	692,090.85	32° 38' 25.360 N	103° 42' 33.495 W
7,725.0	1.52	14.52	7,724.1	79.2	3.2	597,245.60	692,090.98	32° 38' 25.366 N	103° 42' 33.493 W
7,750.0	1.65	18.37	7,749.1	79.9	3.4	597,246.27	692,091.18	32° 38' 25.373 N	103° 42' 33.491 W
7,775.0	1.73	25.72	7,774.1	80.5	3.7	597,246.95	692,091.46	32° 38' 25.380 N	103° 42' 33.487 W
7,800.0	1.92	28.78	7,799.1	81.3	4.0	597,247.66	692,091.82	32° 38' 25.387 N	103° 42' 33.483 W
7,825.0	1.89	30.17	7,824.1	82.0	4.4	597,248.38	692,092.23	32° 38' 25.394 N	103° 42' 33.478 W
7,850.0	1.90	34.49	7,849.1	82.7	4.9	597,249.08	692,092.67	32° 38' 25.401 N	103° 42' 33.473 W
7,875.0	1.60	37.56	7,874.1	83.3	5.3	597,249.70	692,093.12	32° 38' 25.407 N	103° 42' 33.468 W
7,900.0	0.80	45.29	7,899.1	83.7	5.7	597,250.09	692,093.46	32° 38' 25.411 N	103° 42' 33.464 W
7,925.0	0.58	37.99	7,924.1	83.9	5.9	597,250.32	692,093.66	32° 38' 25.413 N	103° 42' 33.461 W
7,950.0	0.59	33.29	7,949.1	84.1	6.0	597,250.52	692,093.81	32° 38' 25.415 N	103° 42' 33.460 W
7,975.0	0.68	28.47	7,974.1	84.4	6.2	597,250.76	692,093.95	32° 38' 25.417 N	103° 42' 33.458 W
8,000.0	0.82	13.00	7,999.1	84.7	6.3	597,251.07	692,094.06	32° 38' 25.420 N	103° 42' 33.457 W
8,025.0	1.08	8.91	8,024.1	85.1	6.3	597,251.47	692,094.14	32° 38' 25.424 N	103° 42' 33.456 W
8,050.0	1.33	354.82	8,049.0	85.6	6.4	597,252.00	692,094.15	32° 38' 25.430 N	103° 42' 33.456 W
8,075.0	1.43	353.31	8,074.0	86.2	6.3	597,252.60	692,094.09	32° 38' 25.435 N	103° 42' 33.456 W
8,100.0	1.79	349.98	8,099.0	86.9	6.2	597,253.29	692,093.98	32° 38' 25.442 N	103° 42' 33.457 W
8,125.0	1.64	348.10	8,124.0	87.6	6.0	597,254.02	692,093.84	32° 38' 25.450 N	103° 42' 33.459 W
8,150.0	1.88	348.93	8,149.0	88.4	5.9	597,254.78	692,093.69	32° 38' 25.457 N	103° 42' 33.461 W
8,175.0	1.86	349.61	8,174.0	89.2	5.7	597,255.58	692,093.54	32° 38' 25.465 N	103° 42' 33.463 W
8,200.0	1.89	348.94	8,199.0	90.0	5.6	597,256.38	692,093.38	32° 38' 25.473 N	103° 42' 33.464 W
8,225.0	2.00	348.76	8,224.0	90.8	5.4	597,257.21	692,093.22	32° 38' 25.481 N	103° 42' 33.466 W
8,250.0	1.90	348.65	8,249.0	91.6	5.3	597,258.05	692,093.05	32° 38' 25.489 N	103° 42' 33.468 W
8,275.0	1.80	349.38	8,273.9	92.4	5.1	597,258.84	692,092.90	32° 38' 25.497 N	103° 42' 33.470 W
8,300.0	1.80	349.23	8,298.9	93.2	5.0	597,259.61	692,092.75	32° 38' 25.505 N	103° 42' 33.471 W
8,325.0	1.83	347.43	8,323.9	94.0	4.8	597,260.39	692,092.59	32° 38' 25.513 N	103° 42' 33.473 W
8,350.0	1.97	350.07	8,348.9	94.8	4.6	597,261.20	692,092.43	32° 38' 25.521 N	103° 42' 33.475 W
8,375.0	2.04	356.16	8,373.9	95.7	4.5	597,262.07	692,092.33	32° 38' 25.529 N	103° 42' 33.476 W
8,400.0	2.15	357.99	8,398.9	96.6	4.5	597,262.98	692,092.28	32° 38' 25.538 N	103° 42' 33.477 W
8,425.0	2.08	357.11	8,423.8	97.5	4.4	597,263.90	692,092.24	32° 38' 25.547 N	103° 42' 33.477 W
8,450.0	1.89	359.25	8,448.8	98.4	4.4	597,264.77	692,092.21	32° 38' 25.556 N	103° 42' 33.477 W
8,475.0	1.84	359.97	8,473.8	99.2	4.4	597,265.58	692,092.21	32° 38' 25.564 N	103° 42' 33.477 W
8,500.0	1.87	357.33	8,498.8	100.0	4.4	597,266.39	692,092.19	32° 38' 25.572 N	103° 42' 33.478 W
8,525.0	1.93	355.07	8,523.8	100.8	4.3	597,267.22	692,092.13	32° 38' 25.580 N	103° 42' 33.478 W
8,550.0	2.18	350.96	8,548.8	101.7	4.2	597,268.11	692,092.02	32° 38' 25.589 N	103° 42' 33.479 W
8,575.0	2.10	346.42	8,573.8	102.6	4.0	597,269.02	692,091.84	32° 38' 25.598 N	103° 42' 33.481 W

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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	2.04	343.73	8,598.7	103.5	3.8	597,269.89	692,091.61	32° 38' 25.607 N	103° 42' 33.484 W
8,625.0	2.05	341.79	8,623.7	104.3	3.5	597,270.74	692,091.34	32° 38' 25.615 N	103° 42' 33.487 W
8,650.0	2.03	342.62	8,648.7	105.2	3.3	597,271.59	692,091.07	32° 38' 25.624 N	103° 42' 33.490 W
8,675.0	1.95	337.44	8,673.7	106.0	3.0	597,272.41	692,090.78	32° 38' 25.632 N	103° 42' 33.494 W
8,700.0	1.63	335.04	8,698.7	106.7	2.7	597,273.12	692,090.46	32° 38' 25.639 N	103° 42' 33.497 W
8,725.0	1.19	322.90	8,723.7	107.2	2.4	597,273.65	692,090.16	32° 38' 25.644 N	103° 42' 33.501 W
8,750.0	1.17	317.30	8,748.7	107.6	2.0	597,274.05	692,089.83	32° 38' 25.648 N	103° 42' 33.505 W
8,775.0	1.17	313.14	8,773.7	108.0	1.7	597,274.41	692,089.47	32° 38' 25.652 N	103° 42' 33.509 W
8,800.0	1.19	309.84	8,798.7	108.3	1.3	597,274.75	692,089.08	32° 38' 25.655 N	103° 42' 33.513 W
8,825.0	1.11	302.49	8,823.7	108.6	0.9	597,275.05	692,088.68	32° 38' 25.658 N	103° 42' 33.518 W
8,850.0	1.11	305.82	8,848.7	108.9	0.5	597,275.32	692,088.28	32° 38' 25.661 N	103° 42' 33.523 W
8,875.0	1.10	301.85	8,873.6	109.2	0.1	597,275.59	692,087.88	32° 38' 25.663 N	103° 42' 33.527 W
8,900.0	1.07	302.34	8,898.6	109.4	-0.3	597,275.84	692,087.48	32° 38' 25.666 N	103° 42' 33.532 W
8,925.0	0.86	296.81	8,923.6	109.6	-0.7	597,276.05	692,087.11	32° 38' 25.668 N	103° 42' 33.536 W
8,950.0	0.74	295.66	8,948.6	109.8	-1.0	597,276.20	692,086.80	32° 38' 25.669 N	103° 42' 33.540 W
8,975.0	0.76	298.97	8,973.6	109.9	-1.3	597,276.35	692,086.51	32° 38' 25.671 N	103° 42' 33.543 W
9,000.0	0.67	293.86	8,998.6	110.1	-1.6	597,276.49	692,086.23	32° 38' 25.672 N	103° 42' 33.547 W
9,025.0	0.62	300.49	9,023.6	110.2	-1.8	597,276.62	692,085.98	32° 38' 25.674 N	103° 42' 33.549 W
9,050.0	0.87	304.40	9,048.6	110.4	-2.1	597,276.79	692,085.71	32° 38' 25.675 N	103° 42' 33.553 W
9,075.0	0.70	304.38	9,073.6	110.6	-2.4	597,276.99	692,085.42	32° 38' 25.677 N	103° 42' 33.556 W
9,100.0	0.82	310.50	9,098.6	110.8	-2.6	597,277.19	692,085.16	32° 38' 25.679 N	103° 42' 33.559 W
9,125.0	0.76	309.81	9,123.6	111.0	-2.9	597,277.41	692,084.90	32° 38' 25.682 N	103° 42' 33.562 W
9,150.0	0.80	309.24	9,148.6	111.2	-3.2	597,277.63	692,084.64	32° 38' 25.684 N	103° 42' 33.565 W
9,175.0	0.92	315.79	9,173.6	111.5	-3.4	597,277.88	692,084.36	32° 38' 25.686 N	103° 42' 33.568 W
9,200.0	0.83	318.29	9,198.6	111.8	-3.7	597,278.16	692,084.10	32° 38' 25.689 N	103° 42' 33.571 W
9,225.0	0.79	321.85	9,223.6	112.0	-3.9	597,278.43	692,083.87	32° 38' 25.692 N	103° 42' 33.574 W
9,235.0	0.96	326.90	9,233.6	112.2	-4.0	597,278.56	692,083.79	32° 38' 25.693 N	103° 42' 33.575 W
Gyro Tie In @ 9235' MD / 9234' TVD									
9,346.0	0.30	231.70	9,344.6	112.8	-4.7	597,279.16	692,083.05	32° 38' 25.699 N	103° 42' 33.584 W
9,394.0	6.60	175.30	9,392.5	109.9	-4.6	597,276.33	692,083.18	32° 38' 25.671 N	103° 42' 33.582 W
9,441.0	14.00	176.70	9,438.7	101.5	-4.1	597,267.95	692,083.73	32° 38' 25.588 N	103° 42' 33.576 W
9,489.0	18.90	178.50	9,484.7	88.0	-3.5	597,254.37	692,084.26	32° 38' 25.454 N	103° 42' 33.571 W
9,536.0	22.80	177.80	9,528.6	71.3	-3.0	597,237.66	692,084.81	32° 38' 25.288 N	103° 42' 33.566 W
9,583.0	27.30	177.90	9,571.2	51.4	-2.2	597,217.77	692,085.56	32° 38' 25.091 N	103° 42' 33.558 W
9,630.0	32.40	178.90	9,612.0	28.0	-1.6	597,194.40	692,086.20	32° 38' 24.860 N	103° 42' 33.553 W
9,677.0	37.20	180.10	9,650.5	1.2	-1.4	597,167.58	692,086.41	32° 38' 24.595 N	103° 42' 33.552 W
9,724.0	40.80	181.10	9,687.1	-28.4	-1.7	597,138.01	692,086.09	32° 38' 24.302 N	103° 42' 33.558 W
9,771.0	46.20	181.00	9,721.1	-60.7	-2.3	597,105.68	692,085.50	32° 38' 23.982 N	103° 42' 33.567 W
9,818.0	52.00	180.80	9,751.9	-96.2	-2.8	597,070.17	692,084.95	32° 38' 23.631 N	103° 42' 33.576 W
9,866.0	57.20	181.10	9,779.7	-135.3	-3.5	597,031.07	692,084.29	32° 38' 23.244 N	103° 42' 33.586 W
9,913.0	61.30	182.20	9,803.7	-175.7	-4.7	596,990.70	692,083.12	32° 38' 22.845 N	103° 42' 33.602 W
9,960.0	64.70	182.30	9,825.1	-217.5	-6.3	596,948.86	692,081.48	32° 38' 22.431 N	103° 42' 33.625 W
10,007.0	68.60	182.20	9,843.7	-260.7	-8.0	596,905.75	692,079.79	32° 38' 22.004 N	103° 42' 33.647 W
10,052.0	73.50	181.40	9,858.3	-303.2	-9.3	596,863.23	692,078.45	32° 38' 21.584 N	103° 42' 33.666 W
10,097.0	75.90	180.40	9,870.2	-346.6	-10.0	596,819.83	692,077.77	32° 38' 21.154 N	103° 42' 33.677 W
10,144.0	79.60	180.30	9,880.1	-392.5	-10.3	596,773.91	692,077.49	32° 38' 20.700 N	103° 42' 33.683 W
10,191.0	84.60	180.10	9,886.6	-439.0	-10.5	596,727.37	692,077.33	32° 38' 20.239 N	103° 42' 33.688 W
10,286.0	89.20	179.80	9,891.7	-533.9	-10.4	596,632.53	692,077.42	32° 38' 19.301 N	103° 42' 33.694 W
10,380.0	90.50	179.40	9,892.0	-627.9	-9.7	596,538.54	692,078.07	32° 38' 18.371 N	103° 42' 33.693 W
10,474.0	91.60	178.10	9,890.3	-721.8	-7.7	596,444.58	692,080.12	32° 38' 17.441 N	103° 42' 33.675 W
10,569.0	93.50	177.90	9,886.0	-816.7	-4.4	596,349.74	692,083.43	32° 38' 16.502 N	103° 42' 33.643 W
10,664.0	92.90	178.90	9,880.7	-911.5	-1.7	596,254.92	692,086.08	32° 38' 15.564 N	103° 42' 33.618 W
10,759.0	90.20	179.20	9,878.2	-1,006.4	-0.1	596,159.98	692,087.66	32° 38' 14.624 N	103° 42' 33.607 W
10,853.0	88.40	180.30	9,879.3	-1,100.4	0.3	596,065.99	692,088.07	32° 38' 13.694 N	103° 42' 33.608 W
10,948.0	90.50	181.30	9,880.2	-1,195.4	-1.1	595,971.01	692,086.74	32° 38' 12.754 N	103° 42' 33.630 W

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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	
11,042.0	89.10	181.50	9,880.5	-1,289.4	-3.4	595,877.04	692,084.44	32° 38' 11.825 N	103° 42' 33.664 W	
11,137.0	88.50	181.40	9,882.5	-1,384.3	-5.8	595,782.10	692,082.04	32° 38' 10.885 N	103° 42' 33.698 W	
11,231.0	87.20	180.50	9,886.1	-1,478.2	-7.3	595,688.18	692,080.48	32° 38' 9.956 N	103° 42' 33.723 W	
11,326.0	88.20	180.70	9,889.9	-1,573.1	-8.3	595,593.26	692,079.49	32° 38' 9.017 N	103° 42' 33.741 W	
11,420.0	87.60	180.30	9,893.3	-1,667.1	-9.1	595,499.33	692,078.67	32° 38' 8.088 N	103° 42' 33.757 W	
11,515.0	89.00	179.90	9,896.1	-1,762.0	-9.3	595,404.37	692,078.50	32° 38' 7.148 N	103° 42' 33.765 W	
11,609.0	88.10	180.10	9,898.5	-1,856.0	-9.3	595,310.40	692,078.50	32° 38' 6.218 N	103° 42' 33.772 W	
11,704.0	89.80	180.80	9,900.3	-1,951.0	-10.0	595,215.43	692,077.76	32° 38' 5.278 N	103° 42' 33.787 W	
11,798.0	88.30	180.80	9,901.8	-2,045.0	-11.4	595,121.45	692,076.44	32° 38' 4.349 N	103° 42' 33.809 W	
11,893.0	90.50	181.20	9,902.8	-2,139.9	-13.0	595,026.48	692,074.79	32° 38' 3.409 N	103° 42' 33.835 W	
11,987.0	88.30	179.60	9,903.8	-2,233.9	-13.7	594,932.49	692,074.13	32° 37' 2.479 N	103° 42' 33.849 W	
12,081.0	88.30	179.70	9,906.6	-2,327.9	-13.1	594,838.54	692,074.70	32° 38' 1.549 N	103° 42' 33.849 W	
12,176.0	90.50	179.40	9,907.6	-2,422.9	-12.3	594,743.55	692,075.45	32° 38' 0.609 N	103° 42' 33.847 W	
12,271.0	88.80	180.30	9,908.2	-2,517.8	-12.1	594,648.56	692,075.70	32° 37' 59.669 N	103° 42' 33.850 W	
12,366.0	90.30	180.10	9,908.9	-2,612.8	-12.4	594,553.56	692,075.37	32° 37' 58.729 N	103° 42' 33.861 W	
12,461.0	87.90	177.80	9,910.4	-2,707.8	-10.7	594,458.60	692,077.11	32° 37' 57.790 N	103° 42' 33.847 W	
12,556.0	89.20	177.30	9,912.8	-2,802.7	-6.6	594,363.72	692,081.17	32° 37' 56.850 N	103° 42' 33.806 W	
12,651.0	91.10	177.60	9,912.6	-2,897.6	-2.4	594,268.82	692,085.39	32° 37' 55.911 N	103° 42' 33.763 W	
12,746.0	89.50	179.40	9,912.1	-2,992.5	0.1	594,173.86	692,087.88	32° 37' 54.971 N	103° 42' 33.740 W	
12,840.0	87.30	180.70	9,914.7	-3,086.5	0.0	594,079.91	692,087.80	32° 37' 54.042 N	103° 42' 33.748 W	
12,935.0	87.90	180.70	9,918.7	-3,181.4	-1.2	593,985.00	692,086.64	32° 37' 53.103 N	103° 42' 33.768 W	
13,030.0	89.10	180.50	9,921.1	-3,276.4	-2.2	593,890.04	692,085.64	32° 37' 52.163 N	103° 42' 33.786 W	
13,125.0	90.20	180.10	9,921.7	-3,371.4	-2.6	593,795.04	692,085.15	32° 37' 51.223 N	103° 42' 33.798 W	
13,219.0	88.00	179.90	9,923.2	-3,465.3	-2.6	593,701.06	692,085.15	32° 37' 50.293 N	103° 42' 33.805 W	
13,314.0	88.80	180.50	9,925.9	-3,560.3	-3.0	593,606.10	692,084.82	32° 37' 49.353 N	103° 42' 33.815 W	
13,409.0	90.50	180.30	9,926.4	-3,655.3	-3.6	593,511.11	692,084.15	32° 37' 48.413 N	103° 42' 33.829 W	
13,504.0	92.40	180.10	9,924.0	-3,750.3	-4.0	593,416.14	692,083.82	32° 37' 47.474 N	103° 42' 33.840 W	
13,599.0	90.40	179.70	9,921.7	-3,845.2	-3.8	593,321.18	692,083.99	32° 37' 46.534 N	103° 42' 33.844 W	
13,694.0	92.30	179.70	9,919.5	-3,940.2	-3.3	593,226.21	692,084.48	32° 37' 45.594 N	103° 42' 33.845 W	
13,789.0	91.70	179.60	9,916.2	-4,035.1	-2.7	593,131.27	692,085.06	32° 37' 44.655 N	103° 42' 33.845 W	
13,884.0	88.90	179.60	9,915.7	-4,130.1	-2.1	593,036.28	692,085.73	32° 37' 43.715 N	103° 42' 33.844 W	
13,978.0	86.30	178.80	9,919.6	-4,224.0	-0.8	592,942.38	692,087.04	32° 37' 42.786 N	103° 42' 33.835 W	
14,073.0	86.30	179.20	9,925.7	-4,318.8	0.9	592,847.59	692,088.69	32° 37' 41.848 N	103° 42' 33.822 W	
14,167.0	87.60	178.10	9,930.7	-4,412.6	3.1	592,753.76	692,090.90	32° 37' 40.919 N	103° 42' 33.802 W	
14,262.0	88.40	177.30	9,934.0	-4,507.5	6.9	592,658.89	692,094.71	32° 37' 39.980 N	103° 42' 33.764 W	
14,357.0	89.40	177.80	9,935.9	-4,602.4	11.0	592,564.00	692,098.77	32° 37' 39.041 N	103° 42' 33.723 W	
14,452.0	90.50	178.80	9,935.9	-4,697.4	13.8	592,469.04	692,101.59	32° 37' 38.101 N	103° 42' 33.697 W	
14,547.0	91.70	178.50	9,934.1	-4,792.3	16.0	592,374.09	692,103.83	32° 37' 37.161 N	103° 42' 33.677 W	
14,642.0	89.60	180.80	9,933.0	-4,887.3	16.6	592,279.11	692,104.41	32° 37' 36.222 N	103° 42' 33.677 W	
14,737.0	89.70	180.80	9,933.6	-4,982.3	15.3	592,184.12	692,103.08	32° 37' 35.282 N	103° 42' 33.699 W	
14,829.0	90.80	181.20	9,933.2	-5,074.3	13.7	592,092.14	692,101.48	32° 37' 34.372 N	103° 42' 33.724 W	
14,923.0	90.30	183.20	9,932.3	-5,168.2	10.1	591,998.22	692,097.87	32° 37' 33.442 N	103° 42' 33.773 W	
15,018.0	89.30	183.30	9,932.7	-5,263.0	4.7	591,903.37	692,092.48	32° 37' 32.504 N	103° 42' 33.842 W	
15,112.0	90.30	181.60	9,933.0	-5,356.9	0.7	591,809.46	692,088.47	32° 37' 31.575 N	103° 42' 33.896 W	
15,207.0	91.00	182.60	9,931.9	-5,451.9	-2.8	591,714.53	692,084.99	32° 37' 30.636 N	103° 42' 33.943 W	
15,301.0	88.50	183.60	9,932.3	-5,545.7	-7.9	591,620.68	692,079.90	32° 37' 29.708 N	103° 42' 34.009 W	
15,395.0	89.80	183.10	9,933.7	-5,639.6	-13.4	591,526.85	692,074.41	32° 37' 28.780 N	103° 42' 34.080 W	
15,489.0	91.20	182.30	9,932.9	-5,733.4	-17.8	591,432.96	692,069.98	32° 37' 27.851 N	103° 42' 34.138 W	
15,584.0	91.20	180.80	9,930.9	-5,828.4	-20.4	591,338.02	692,067.41	32° 37' 26.911 N	103° 42' 34.174 W	
15,678.0	90.10	180.30	9,929.8	-5,922.4	-21.3	591,244.03	692,066.51	32° 37' 25.981 N	103° 42' 34.191 W	
15,773.0	87.80	180.20	9,931.6	-6,017.3	-21.7	591,149.06	692,066.10	32° 37' 25.042 N	103° 42' 34.203 W	
15,867.0	89.10	180.10	9,934.1	-6,111.3	-21.9	591,055.09	692,065.85	32° 37' 24.112 N	103° 42' 34.212 W	
15,961.0	89.70	179.00	9,935.1	-6,205.3	-21.2	590,961.10	692,066.59	32° 37' 23.182 N	103° 42' 34.210 W	
16,056.0	90.60	177.70	9,934.9	-6,300.3	-18.5	590,866.15	692,069.32	32° 37' 22.242 N	103° 42' 34.184 W	
16,150.0	89.00	179.40	9,935.2	-6,394.2	-16.1	590,772.18	692,071.70	32° 37' 21.312 N	103° 42' 34.163 W	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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	
16,245.0	88.70	179.50	9,937.1	-6,489.2	-15.2	590,677.21	692,072.62	32° 37' 20.372 N	103° 42' 34.159 W	
16,340.0	89.80	178.00	9,938.3	-6,584.2	-13.1	590,582.24	692,074.69	32° 37' 19.432 N	103° 42' 34.141 W	
16,435.0	90.10	177.00	9,938.4	-6,679.1	-9.0	590,487.33	692,078.83	32° 37' 18.493 N	103° 42' 34.099 W	
16,530.0	89.50	177.70	9,938.7	-6,774.0	-4.6	590,392.44	692,083.22	32° 37' 17.554 N	103° 42' 34.054 W	
16,625.0	89.10	178.10	9,939.9	-6,868.9	-1.1	590,297.51	692,086.70	32° 37' 16.614 N	103° 42' 34.020 W	
16,720.0	90.60	178.20	9,940.2	-6,963.8	2.0	590,202.56	692,089.77	32° 37' 15.675 N	103° 42' 33.991 W	
16,814.0	89.20	179.30	9,940.3	-7,057.8	4.0	590,108.59	692,091.82	32° 37' 14.745 N	103° 42' 33.973 W	
16,901.0	87.80	181.00	9,942.6	-7,144.8	3.8	590,021.62	692,091.59	32° 37' 13.884 N	103° 42' 33.982 W	
16,995.0	87.30	181.80	9,946.6	-7,238.7	1.5	589,927.74	692,089.30	32° 37' 12.955 N	103° 42' 34.015 W	
17,090.0	87.30	182.10	9,951.1	-7,333.5	-1.7	589,832.90	692,086.07	32° 37' 12.017 N	103° 42' 34.059 W	
17,185.0	87.30	182.30	9,955.6	-7,428.3	-5.4	589,738.07	692,082.43	32° 37' 11.079 N	103° 42' 34.109 W	
17,280.0	87.60	182.30	9,959.8	-7,523.2	-9.2	589,643.24	692,078.62	32° 37' 10.141 N	103° 42' 34.160 W	
17,375.0	86.80	180.40	9,964.4	-7,618.0	-11.4	589,548.39	692,076.38	32° 37' 9.202 N	103° 42' 34.192 W	
17,469.0	88.40	184.10	9,968.4	-7,711.8	-15.1	589,454.56	692,072.70	32° 37' 8.274 N	103° 42' 34.242 W	
17,564.0	90.10	183.60	9,969.6	-7,806.6	-21.5	589,359.79	692,066.32	32° 37' 7.337 N	103° 42' 34.323 W	
17,658.0	90.10	182.60	9,969.4	-7,900.5	-26.6	589,265.93	692,061.23	32° 37' 6.408 N	103° 42' 34.389 W	
17,752.0	90.40	180.30	9,969.0	-7,994.4	-28.9	589,171.97	692,058.86	32° 37' 5.478 N	103° 42' 34.423 W	
17,847.0	90.00	179.70	9,968.7	-8,089.4	-28.9	589,076.97	692,058.86	32° 37' 4.538 N	103° 42' 34.430 W	
17,942.0	89.70	179.20	9,969.0	-8,184.4	-28.0	588,981.97	692,059.77	32° 37' 3.598 N	103° 42' 34.425 W	
18,036.0	89.50	179.10	9,969.6	-8,278.4	-26.6	588,887.99	692,061.16	32° 37' 2.668 N	103° 42' 34.416 W	
18,130.0	89.10	179.30	9,970.8	-8,372.4	-25.3	588,794.00	692,062.47	32° 37' 1.738 N	103° 42' 34.407 W	
18,225.0	88.80	179.00	9,972.5	-8,467.4	-23.9	588,699.03	692,063.88	32° 37' 0.798 N	103° 42' 34.397 W	
18,319.0	89.00	179.20	9,974.3	-8,561.3	-22.4	588,605.06	692,065.36	32° 36' 59.868 N	103° 42' 34.386 W	
18,414.0	90.00	180.90	9,975.1	-8,656.3	-22.5	588,510.07	692,065.28	32° 36' 58.928 N	103° 42' 34.393 W	
18,508.0	89.40	180.70	9,975.6	-8,750.3	-23.8	588,416.08	692,063.96	32° 36' 57.999 N	103° 42' 34.415 W	
18,603.0	89.70	180.10	9,976.4	-8,845.3	-24.5	588,321.08	692,063.30	32° 36' 57.059 N	103° 42' 34.429 W	
18,697.0	90.10	179.70	9,976.5	-8,939.3	-24.3	588,227.08	692,063.47	32° 36' 56.128 N	103° 42' 34.434 W	
18,792.0	91.80	178.60	9,975.0	-9,034.3	-22.9	588,132.11	692,064.87	32° 36' 55.189 N	103° 42' 34.424 W	
18,886.0	93.00	178.40	9,971.0	-9,128.2	-20.5	588,038.23	692,067.33	32° 36' 54.259 N	103° 42' 34.402 W	
18,980.0	90.30	177.70	9,968.3	-9,222.1	-17.3	587,944.33	692,070.53	32° 36' 53.330 N	103° 42' 34.371 W	
19,074.0	90.90	178.20	9,967.3	-9,316.0	-13.9	587,850.40	692,073.89	32° 36' 52.400 N	103° 42' 34.338 W	
19,168.0	89.20	180.60	9,967.3	-9,410.0	-12.9	587,756.41	692,074.88	32° 36' 51.470 N	103° 42' 34.333 W	
19,263.0	89.50	181.00	9,968.3	-9,505.0	-14.2	587,661.43	692,073.55	32° 36' 50.531 N	103° 42' 34.355 W	
19,357.0	87.70	181.70	9,970.6	-9,598.9	-16.5	587,567.49	692,071.34	32° 36' 49.601 N	103° 42' 34.387 W	
19,451.0	87.10	181.80	9,974.9	-9,692.8	-19.3	587,473.63	692,068.47	32° 36' 48.673 N	103° 42' 34.427 W	
19,546.0	88.30	182.10	9,978.7	-9,787.6	-22.6	587,378.76	692,065.24	32° 36' 47.734 N	103° 42' 34.471 W	
19,640.0	89.90	182.00	9,980.2	-9,881.6	-25.9	587,284.84	692,061.88	32° 36' 46.805 N	103° 42' 34.517 W	
19,734.0	90.40	181.90	9,979.9	-9,975.5	-29.1	587,190.89	692,058.68	32° 36' 45.875 N	103° 42' 34.561 W	
19,828.0	89.40	179.50	9,980.1	-10,069.5	-30.3	587,096.91	692,057.53	32° 36' 44.945 N	103° 42' 34.581 W	
19,922.0	89.40	179.20	9,981.1	-10,163.5	-29.2	587,002.92	692,058.60	32° 36' 44.015 N	103° 42' 34.575 W	
20,016.0	89.70	178.70	9,981.8	-10,257.5	-27.5	586,908.94	692,060.32	32° 36' 43.085 N	103° 42' 34.561 W	
20,110.0	90.60	178.50	9,981.6	-10,351.4	-25.2	586,814.97	692,062.61	32° 36' 42.155 N	103° 42' 34.541 W	
20,204.0	89.30	178.10	9,981.7	-10,445.4	-22.4	586,721.01	692,065.40	32° 36' 41.225 N	103° 42' 34.515 W	
20,298.0	90.50	178.30	9,981.8	-10,539.3	-19.4	586,627.06	692,068.36	32° 36' 40.296 N	103° 42' 34.487 W	
20,392.0	92.00	178.40	9,979.8	-10,633.3	-16.7	586,533.12	692,071.06	32° 36' 39.366 N	103° 42' 34.461 W	
20,486.0	90.10	178.90	9,978.0	-10,727.2	-14.5	586,439.17	692,073.28	32° 36' 38.436 N	103° 42' 34.442 W	
20,580.0	90.40	178.70	9,977.6	-10,821.2	-12.6	586,345.19	692,075.24	32° 36' 37.506 N	103° 42' 34.425 W	
20,728.0	90.40	178.70	9,976.6	-10,969.2	-9.2	586,197.23	692,078.60	32° 36' 36.042 N	103° 42' 34.396 W	
TD @ 20728' MD / 9977' TVD										

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Geronimo Federal Com 11H
Project:	Lea County, NM	TVD Reference:	Well @ 3629.0usft (Noram #21)
Site:	Sec 19, T19-S, R33-E	MD Reference:	Well @ 3629.0usft (Noram #21)
Well:	Geronimo Federal Com 11H	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)	
9,235.0	9,233.6	112.2	-4.0	Gyro Tie In @ 9235' MD / 9234' TVD
20,728.0	9,976.6	-10,969.2	-9.2	TD @ 20728' MD / 9977' TVD