## RESOLVER FEDERAL COM #2H

**30-025-42170**
**Sec 12-T23S-R32E**

| Perfs | 7 1/2% Acid (Gal) | Sand (#) | Fluid (Gal) |
|---|---|---|---|
| 13832-13930 | 4032 | 301305 | 312312 |
| 13676-13774 | 3024 | 299995 | 338268 |
| 13528-13620 | 3024 | 301396 | 321132 |
| 13372-13472 | 3024 | 235607 | 296268 |
| 13220-13321 | 3024 | 184079 | 300930 |
| 13067-13169 | 3024 | 302828 | 484218 |
| 12915-13017 | 3024 | 306692 | 285432 |
| 12763-12864 | 3024 | 300539 | 286650 |
| 12611-12704 | 3066 | 301562 | 304206 |
| 12458-12555 | 3024 | 301375 | 282984 |
| 12306-12404 | 3024 | 300835 | 288867 |
| 12158-12245 | 3024 | 305332 | 285600 |
| 12002-12103 | 3024 | 302851 | 292404 |
| 11849-11951 | 3234 | 301426 | 286272 |
| 11697-11799 | 3024 | 302142 | 280476 |
| 11545-11646 | 3024 | 300342 | 284424 |
| 11393-11494 | 3024 | 301298 | 277494 |
| 11240-11342 | 3024 | 294018 | 276570 |
| 11089-11190 | 3024 | 306591 | 285054 |
| 10936-11034 | 3024 | 304713 | 281190 |
| 10788-10885 | 3024 | 302776 | 279636 |
| 10631-10691 | 4546 | 302638 | 314833 |
| 10477-10581 | 3024 | 300791 | 282870 |
| 10327-10428 | 3024 | 303172 | 279090 |
| 10175-10276 | 3024 | 298244 | 275688 |
| 10022-10124 | 3024 | 308331 | 281652 |
| 9870-9975 | 2982 | 304745 | 389970 |
| **Totals** | **84388** | **7975623** | **8154490** |

**PATRIOT DRILLING, LLC**

OPERATOR: COG Operating, LLC
WELL/LEASE: Resolver Fed Com 2H
COUNTY: Lea Co., New Mexico
Sec. 12, T 23S, R 32E

## STATE OF NEW MEXICO
## DEVIATION REPORT

| Depth | Deviation | Depth | Deviation |
|---|---|---|---|
| 407 | 3/4 | 6,920 | 1 1/2 |
| 834 | 1/2 | 7,141 | 3/4 |
| 1,023 | 1/2 | 7,368 | 1 1/4 |
| 1,469 | 1 1/2 | 7,621 | 1 1/4 |
| 2,038 | 1 1/4 | 8,123 | 1/2 |
| 2,416 | 1 | 8,636 | 1 3/4 |
| 3,079 | 1 1/2 | 9,138 | 2 |
| 3,459 | 1 1/2 | 9,519 | 2 1/2 |
| 4,027 | 1 1/2 | 9,979 | 3 1/4 |
| 4,501 | 1 1/4 | 10,537 | 2 1/2 |
| 4,976 | 1 1/2 | 10,727 | 1 |
| 5,309 | 1 | 11,298 | 1/2 |
| 5,719 | 1 | 11,488 | 1 |
| 6,161 | 1 1/2 | 12,059 | 1 |
| 6,414 | 1/2 | 12,451 | 3/4 |

**Patriot Drilling, LLC**

M. Leroy Peterson, Executive Vice-President

The foregoing instrument was acknowledged before me on this 30th day of November 2015 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2019

LORI TERESA ROWAN
Notary Public, State of Texas
My Commission Expires
February 01, 2019

Lori T. Rowan
Notary Public for Ector Co., Texas

303 W. Wall St. Ste. 2201 • P.O. Box 1610 • Midland, Texas 79702 • 432-686-2780 • Fax 432-686-8800

VES SURVEY INTERNATIONAL

November 19, 2015

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanicia Castillo

RE: **Resolver Federal Com No 002H**

Please find enclosed a copy of the survey from 0' to 12,300' ran on the above referenced well.

Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
§
COUNTY OF NUECES §

This instrument was acknowledged before me on the 19 day of November A.D., 2015, by Keith Havelka.

Jennifer Ann Byerly
Notary Public, State of Texas

JENNIFER ANN BYERLY
Notary Public, State of Texas
My Commission Expires
August 16, 2017

**VES Survey International**
P.O. Box 261021, Corpus Christi, Texas 78426
T (361) 767-0602 F (361) 767-0612
www.vessurvey.com

Company: Cog Operating LLC
Lease/Well: Resolver Federal Com No/002H

Rig Name: Patriot 2
State/County: New Mexico /Lea
VS-Azi: 0.00 Degrees
Latitude: 32.32589, Longitude: -103.62911
Grid North = True North -0.38 degs (NAD 27)
Grid Correction Applied = -0.38 degs

Depth Reference : R.K.B = 20 FT

DRILLOG HA GYRO SURVEY CALCULATIONS
Filename: resolver federal com 2h .ut
Minimum Curvature Method
Report Date/Time: 11/19/2015 / 11:14

VES Survey International
Midland, Texas
432-563-5444
Surveyor: Javier Estrada
Resolver Federal Com No 002H / API 30-025-42170

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N/-S FT | +E/-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | **** |
| 100.00 | 0.33 | 345.45 | 100.00 | 0.28 | -0.07 | 0.28 | 0.29 | 345.45 | 0.33 |
| 200.00 | 0.24 | 321.41 | 200.00 | 0.73 | -0.28 | 0.73 | 0.78 | 339.18 | 0.15 |
| 300.00 | 0.28 | 296.37 | 300.00 | 1.00 | -0.62 | 1.00 | 1.18 | 328.05 | 0.12 |
| 400.00 | 0.47 | 328.01 | 400.00 | 1.46 | -1.06 | 1.46 | 1.80 | 324.02 | 0.28 |
| 500.00 | 0.35 | 314.85 | 499.99 | 2.02 | -1.49 | 2.02 | 2.51 | 323.57 | 0.16 |
| 600.00 | 0.42 | 331.58 | 599.99 | 2.56 | -1.88 | 2.56 | 3.18 | 323.66 | 0.13 |
| 700.00 | 0.38 | 300.86 | 699.99 | 3.06 | -2.35 | 3.06 | 3.85 | 322.48 | 0.22 |
| 800.00 | 0.41 | 344.39 | 799.99 | 3.57 | -2.73 | 3.57 | 4.49 | 322.58 | 0.29 |
| 900.00 | 0.25 | 222.30 | 899.98 | 3.75 | -2.97 | 3.75 | 4.78 | 321.55 | 0.58 |
| 1000.00 | 0.38 | 335.56 | 999.98 | 3.88 | -3.26 | 3.88 | 5.07 | 319.99 | 0.53 |
| 1100.00 | 0.35 | 293.11 | 1099.98 | 4.30 | -3.68 | 4.30 | 5.66 | 319.47 | 0.27 |
| 1200.00 | 0.51 | 318.08 | 1199.98 | 4.75 | -4.26 | 4.75 | 6.38 | 318.14 | 0.24 |
| 1300.00 | 0.49 | 322.98 | 1299.98 | 5.43 | -4.81 | 5.43 | 7.25 | 318.42 | 0.04 |
| 1400.00 | 1.06 | 300.42 | 1399.97 | 6.24 | -5.87 | 6.24 | 8.56 | 316.74 | 0.63 |
| 1500.00 | 1.27 | 297.12 | 1499.95 | 7.21 | -7.65 | 7.21 | 10.51 | 313.30 | 0.22 |
| 1600.00 | 1.53 | 300.52 | 1599.92 | 8.39 | -9.79 | 8.39 | 12.89 | 310.61 | 0.27 |


V.E.S. Survey Date: 11/12/2015

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N/-S FT | +E/-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|---|---|---|---|---|---|---|---|---|---|
| 1700.00 | 1.74 | 282.75 | 1699.88 | 9.41 | -12.42 | 9.41 | 15.58 | 307.14 | 0.55 |
| 1800.00 | 1.45 | 281.38 | 1799.84 | 9.99 | -15.14 | 9.99 | 18.14 | 303.42 | 0.29 |
| 1900.00 | 1.17 | 205.24 | 1899.82 | 9.31 | -16.82 | 9.31 | 19.23 | 298.97 | 1.64 |
| 2000.00 | 0.82 | 215.59 | 1999.80 | 7.80 | -17.68 | 7.80 | 19.32 | 293.81 | 0.39 |
| 2100.00 | 1.62 | 225.54 | 2099.78 | 6.23 | -19.10 | 6.23 | 20.09 | 288.06 | 0.82 |
| 2200.00 | 0.61 | 233.32 | 2199.76 | 4.92 | -20.54 | 4.92 | 21.12 | 283.48 | 1.01 |
| 2300.00 | 0.57 | 239.37 | 2299.75 | 4.35 | -21.39 | 4.35 | 21.83 | 281.49 | 0.07 |
| 2400.00 | 0.68 | 248.01 | 2399.75 | 3.87 | -22.38 | 3.87 | 22.71 | 279.82 | 0.15 |
| 2500.00 | 0.81 | 250.60 | 2499.74 | 3.41 | -23.60 | 3.41 | 23.84 | 278.23 | 0.13 |
| 2600.00 | 0.75 | 256.29 | 2599.73 | 3.02 | -24.90 | 3.02 | 25.08 | 276.92 | 0.10 |
| 2700.00 | 0.86 | 256.15 | 2699.72 | 2.69 | -26.26 | 2.69 | 26.40 | 275.85 | 0.11 |
| 2800.00 | 1.04 | 239.38 | 2799.71 | 2.05 | -27.77 | 2.05 | 27.84 | 274.22 | [illegible] |
| 2900.00 | 1.09 | 244.85 | 2899.69 | 1.18 | -29.41 | 1.18 | 29.43 | 272.30 | [illegible] |
| 3000.00 | 1.19 | 244.23 | 2999.67 | 0.33 | -31.20 | 0.33 | 31.20 | 270.60 | 0.10 |
| 3100.00 | 1.34 | 243.71 | 3099.64 | -0.64 | -33.18 | -0.64 | 33.19 | 268.89 | 0.15 |
| 3200.00 | 1.49 | 242.31 | 3199.61 | -1.76 | -35.38 | -1.76 | 35.42 | 267.15 | 0.16 |
| 3300.00 | 1.22 | 246.57 | 3299.59 | -2.79 | -37.50 | -2.79 | 37.61 | 265.75 | 0.29 |
| 3400.00 | 1.38 | 243.39 | 3399.56 | -3.75 | -39.56 | -3.75 | 39.73 | 264.58 | 0.18 |
| 3500.00 | 1.51 | 239.87 | 3499.53 | -4.95 | -41.78 | -4.95 | 42.07 | 263.24 | 0.16 |
| 3600.00 | 1.39 | 240.50 | 3599.50 | -6.21 | -43.97 | -6.21 | 44.41 | 261.96 | 0.13 |
| 3700.00 | 1.48 | 248.20 | 3699.46 | -7.29 | -46.23 | -7.29 | 46.80 | 261.04 | 0.21 |
| 3800.00 | 1.45 | 249.20 | 3799.43 | -8.22 | -48.61 | -8.22 | 49.30 | 260.41 | 0.04 |
| 3900.00 | 1.49 | 259.81 | 3899.40 | -8.89 | -51.07 | -8.89 | 51.83 | 260.12 | 0.27 |
| 4000.00 | 1.35 | 262.21 | 3999.37 | -9.28 | -53.51 | -9.28 | 54.31 | 260.16 | 0.15 |
| 4100.00 | 1.38 | 260.59 | 4099.34 | -9.64 | -55.86 | -9.64 | 56.69 | 260.21 | 0.05 |
| 4200.00 | 1.44 | 258.27 | 4199.31 | -10.09 | -58.27 | -10.09 | 59.14 | 260.18 | 0.08 |
| 4300.00 | 1.29 | 234.85 | 4299.28 | -11.00 | -60.42 | -11.00 | 61.42 | 259.69 | [illegible] |
| 4400.00 | 1.37 | 206.93 | 4399.26 | -12.71 | -61.89 | -12.71 | 63.18 | 258.40 | 0.65 |
| 4500.00 | 1.35 | 195.42 | 4499.23 | -14.90 | -62.74 | -14.90 | 64.49 | 256.64 | 0.27 |
| 4600.00 | 1.70 | 148.01 | 4599.20 | -17.30 | -62.26 | -17.30 | 64.62 | 254.48 | 1.27 |
| 4700.00 | 1.93 | 99.57 | 4699.15 | -18.84 | -59.82 | -18.84 | 62.71 | 252.52 | 1.50 |
| 4800.00 | 1.02 | 53.84 | 4799.12 | -18.59 | -57.44 | -18.59 | 60.37 | 252.07 | 1.42 |
| 4900.00 | 1.24 | 42.04 | 4899.10 | -17.26 | -55.99 | -17.26 | 58.59 | 252.87 | 0.32 |
| 5000.00 | 1.30 | 46.42 | 4999.08 | -15.67 | -54.44 | -15.67 | 56.65 | 253.94 | 0.11 |
| 5100.00 | 1.12 | 42.59 | 5099.06 | -14.17 | -52.96 | -14.17 | 54.82 | 255.02 | 0.20 |
| 5200.00 | 0.93 | 45.13 | 5199.04 | -12.87 | -51.72 | -12.87 | 53.30 | 256.02 | 0.19 |
| 5300.00 | 0.83 | 16.45 | 5299.03 | -11.60 | -50.94 | -11.60 | 52.24 | 257.17 | 0.45 |
| 5400.00 | 0.75 | 46.54 | 5399.02 | -10.46 | -50.26 | -10.46 | 51.34 | 258.25 | 0.42 |
| 5500.00 | 0.64 | 48.67 | 5499.01 | -9.63 | -49.36 | -9.63 | 50.29 | 258.96 | 0.11 |


V.E.S. Survey Date: 11/12/2015

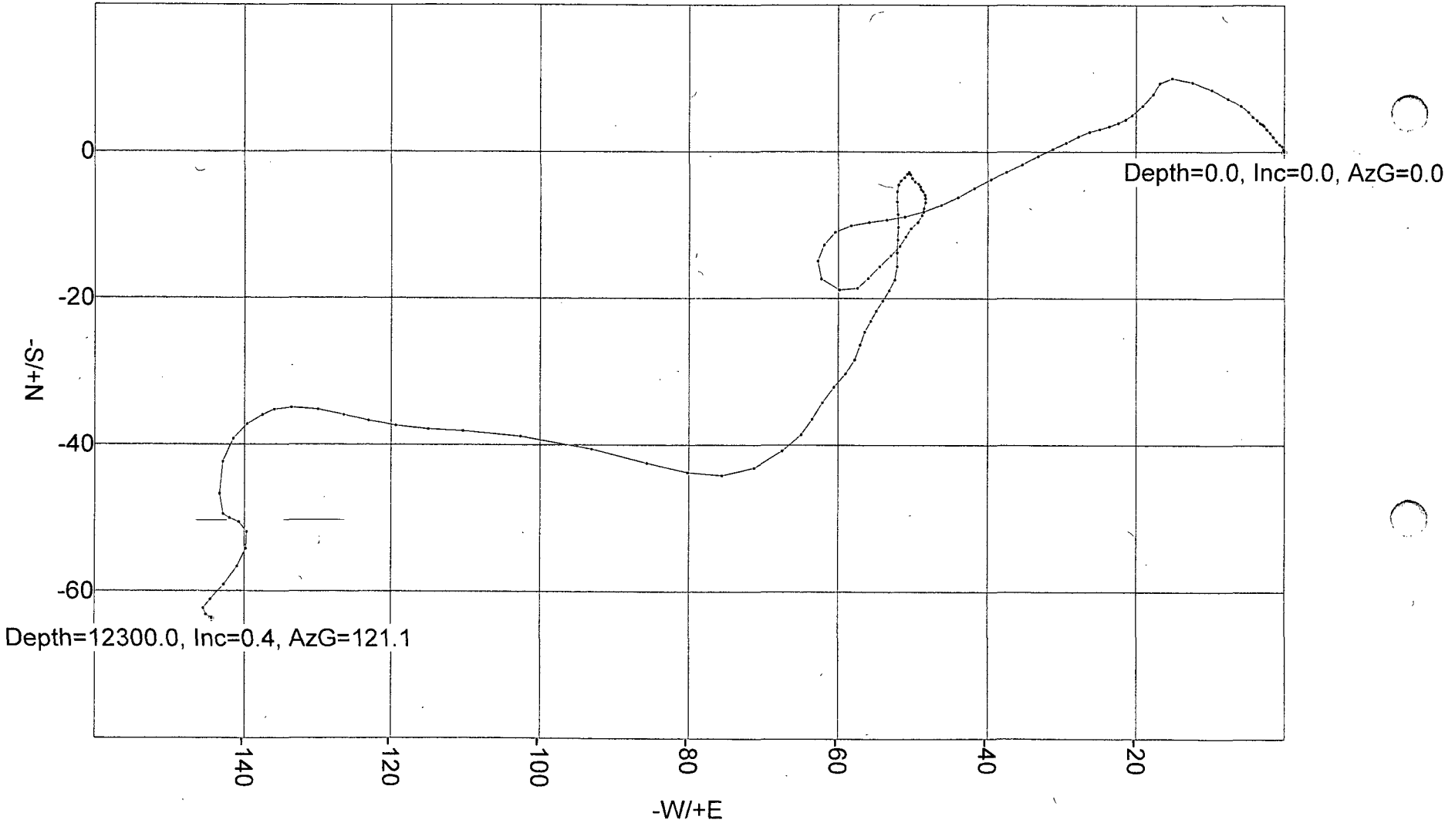
| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N/-S FT | +E/-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|---|---|---|---|---|---|---|---|---|---|
| 5600.00 | 0.67 | 13.58 | 5599.01 | -8.69 | -48.80 | -8.69 | 49.57 | 259.90 | 0.40 |
| 5700.00 | 0.47 | 19.32 | 5699.00 | -7.74 | -48.53 | -7.74 | 49.14 | 260.94 | 0.21 |
| 5800.00 | 0.49 | 6.64 | 5799.00 | -6.93 | -48.35 | -6.93 | 48.84 | 261.85 | 0.11 |
| 5900.00 | 0.20 | 352.09 | 5898.99 | -6.33 | -48.32 | -6.33 | 48.73 | 262.54 | 0.30 |
| 6000.00 | 0.36 | 346.62 | 5998.99 | -5.85 | -48.42 | -5.85 | 48.77 | 263.11 | 0.15 |
| 6100.00 | 0.26 | 309.94 | 6098.99 | -5.40 | -48.66 | -5.40 | 48.96 | 263.67 | 0.21 |
| 6200.00 | 0.18 | 327.68 | 6198.99 | -5.12 | -48.92 | -5.12 | 49.19 | 264.02 | 0.11 |
| 6300.00 | 0.28 | 356.57 | 6298.99 | -4.75 | -49.02 | -4.75 | 49.25 | 264.47 | 0.15 |
| 6400.00 | 0.28 | 297.86 | 6398.99 | -4.39 | -49.25 | -4.39 | 49.45 | 264.90 | 0.27 |
| 6500.00 | 0.36 | 306.39 | 6498.99 | -4.09 | -49.72 | -4.09 | 49.89 | 265.30 | 0.09 |
| 6600.00 | 0.36 | 337.62 | 6598.99 | -3.61 | -50.10 | -3.61 | 50.23 | 265.88 | 0.20 |
| 6700.00 | 0.33 | 337.25 | 6698.98 | -3.05 | -50.33 | -3.05 | 50.42 | 266.53 | [illegible] |
| 6800.00 | 0.08 | 277.30 | 6798.98 | -2.78 | -50.51 | -2.78 | 50.59 | 266.85 | [illegible] |
| 6900.00 | 0.35 | 216.76 | 6898.98 | -3.01 | -50.77 | -3.01 | 50.85 | 266.60 | 0.32 |
| 7000.00 | 0.34 | 218.68 | 6998.98 | -3.49 | -51.13 | -3.49 | 51.25 | 266.10 | 0.02 |
| 7100.00 | 0.40 | 232.84 | 7098.98 | -3.93 | -51.60 | -3.93 | 51.75 | 265.64 | 0.11 |
| 7200.00 | 0.41 | 188.73 | 7198.98 | -4.49 | -51.93 | -4.49 | 52.13 | 265.05 | 0.30 |
| 7300.00 | 0.66 | 188.22 | 7298.97 | -5.41 | -52.07 | -5.41 | 52.35 | 264.07 | 0.25 |
| 7400.00 | 0.95 | 176.24 | 7398.96 | -6.80 | -52.09 | -6.80 | 52.54 | 262.56 | 0.34 |
| 7500.00 | 1.02 | 176.50 | 7498.95 | -8.52 | -51.99 | -8.52 | 52.68 | 260.70 | 0.07 |
| 7600.00 | 1.00 | 180.34 | 7598.93 | -10.27 | -51.94 | -10.27 | 52.94 | 258.81 | 0.07 |
| 7700.00 | 0.99 | 185.35 | 7698.92 | -12.00 | -52.02 | -12.00 | 53.39 | 257.01 | 0.09 |
| 7800.00 | 1.03 | 180.30 | 7798.90 | -13.76 | -52.11 | -13.76 | 53.89 | 255.21 | 0.10 |
| 7900.00 | 1.15 | 179.61 | 7898.88 | -15.65 | -52.11 | -15.65 | 54.41 | 253.28 | 0.13 |
| 8000.00 | 0.95 | 202.57 | 7998.87 | -17.42 | -52.42 | -17.42 | 55.24 | 251.61 | 0.46 |
| 8100.00 | 0.97 | 209.51 | 8098.85 | -18.92 | -53.15 | -18.92 | 56.42 | 250.41 | 0.12 |
| 8200.00 | 0.93 | 213.86 | 8198.84 | -20.33 | -54.02 | -20.33 | 57.72 | 249.38 | [illegible] |
| 8300.00 | 0.94 | 211.31 | 8298.83 | -21.70 | -54.90 | -21.70 | 59.03 | 248.43 | [illegible] |
| 8400.00 | 0.87 | 205.50 | 8398.81 | -23.09 | -55.65 | -23.09 | 60.25 | 247.46 | 0.11 |
| 8500.00 | 1.00 | 210.81 | 8498.80 | -24.53 | -56.43 | -24.53 | 61.53 | 246.50 | 0.15 |
| 8600.00 | 1.18 | 190.80 | 8598.78 | -26.30 | -57.07 | -26.30 | 62.84 | 245.26 | 0.42 |
| 8700.00 | 1.31 | 207.05 | 8698.76 | -28.33 | -57.78 | -28.33 | 64.35 | 243.88 | 0.38 |
| 8800.00 | 1.32 | 217.85 | 8798.73 | -30.26 | -59.01 | -30.26 | 66.31 | 242.85 | 0.25 |
| 8900.00 | 1.42 | 221.24 | 8898.70 | -32.10 | -60.53 | -32.10 | 68.52 | 242.06 | 0.13 |
| 9000.00 | 1.58 | 212.98 | 8998.67 | -34.18 | -62.10 | -34.18 | 70.89 | 241.17 | 0.26 |
| 9100.00 | 1.48 | 208.66 | 9098.63 | -36.47 | -63.47 | -36.47 | 73.20 | 240.12 | 0.15 |
| 9200.00 | 1.50 | 221.65 | 9198.60 | -38.58 | -64.96 | -38.58 | 75.55 | 239.29 | 0.34 |
| 9300.00 | 2.40 | 232.84 | 9298.54 | -40.82 | -67.49 | -40.82 | 78.87 | 238.83 | 0.97 |
| 9400.00 | 2.66 | 243.64 | 9398.45 | -43.11 | -71.23 | -43.11 | 83.26 | 238.82 | 0.54 |


V.E.S. Survey Date: 11/12/2015

| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N/-S FT | +E/-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|---|---|---|---|---|---|---|---|---|---|
| 9500.00 | 2.62 | 269.17 | 9498.34 | -44.17 | -75.59 | -44.17 | 87.55 | 239.70 | 1.17 |
| 9600.00 | 2.70 | 281.30 | 9598.24 | -43.74 | -80.19 | -43.74 | 91.34 | 241.39 | 0.57 |
| 9700.00 | 3.70 | 284.51 | 9698.08 | -42.47 | -85.62 | -42.47 | 95.58 | 243.62 | 1.02 |
| 9800.00 | 5.12 | 284.16 | 9797.78 | -40.57 | -93.08 | -40.57 | 101.54 | 246.45 | 1.42 |
| 9900.00 | 6.07 | 277.16 | 9897.30 | -38.82 | -102.65 | -38.82 | 109.74 | 249.28 | 1.17 |
| 10000.00 | 2.83 | 271.84 | 9996.99 | -38.08 | -110.36 | -38.08 | 116.75 | 250.96 | 3.26 |
| 10100.00 | 2.58 | 273.51 | 10096.88 | -37.87 | -115.07 | -37.87 | 121.14 | 251.79 | 0.27 |
| 10200.00 | 2.35 | 280.06 | 10196.79 | -37.37 | -119.34 | -37.37 | 125.05 | 252.61 | 0.36 |
| 10300.00 | 2.07 | 279.42 | 10296.71 | -36.72 | -123.13 | -36.72 | 128.49 | 253.40 | 0.29 |
| 10400.00 | 1.90 | 285.86 | 10396.65 | -35.97 | -126.51 | -35.97 | 131.52 | 254.13 | 0.28 |
| 10500.00 | 2.23 | 279.54 | 10496.59 | -35.20 | -130.02 | -35.20 | 134.70 | 254.85 | 0.40 |
| 10600.00 | 2.00 | 267.93 | 10596.52 | -34.94 | -133.67 | -34.94 | 138.16 | 255.35 | [illegible] |
| 10700.00 | 0.71 | 250.23 | 10696.49 | -35.21 | -135.99 | -35.21 | 140.48 | 255.48 | [illegible] |
| 10800.00 | 1.27 | 240.45 | 10796.48 | -35.96 | -137.54 | -35.96 | 142.16 | 255.35 | 0.58 |
| 10900.00 | 1.54 | 238.34 | 10896.45 | -37.22 | -139.65 | -37.22 | 144.52 | 255.08 | 0.28 |
| 11000.00 | 1.71 | 210.17 | 10996.41 | -39.21 | -141.54 | -39.21 | 146.87 | 254.52 | 0.81 |
| 11100.00 | 2.23 | 198.76 | 11096.35 | -42.34 | -142.91 | -42.34 | 149.05 | 253.50 | 0.65 |
| 11200.00 | 2.86 | 176.34 | 11196.25 | -46.67 | -143.38 | -46.67 | 150.78 | 251.97 | 1.17 |
| 11300.00 | 0.50 | 132.19 | 11296.20 | -49.45 | -142.90 | -49.45 | 151.21 | 250.91 | 2.53 |
| 11400.00 | 0.68 | 113.10 | 11396.20 | -49.97 | -142.03 | -49.97 | 150.57 | 250.62 | 0.26 |
| 11500.00 | 0.92 | 114.32 | 11496.19 | -50.54 | -140.75 | -50.54 | 149.55 | 250.25 | 0.25 |
| 11600.00 | 1.22 | 162.76 | 11596.17 | -51.89 | -139.70 | -51.89 | 149.03 | 249.62 | 0.92 |
| 11700.00 | 1.55 | 198.82 | 11696.14 | -54.18 | -139.82 | -54.18 | 149.95 | 248.82 | 0.91 |
| 11800.00 | 1.53 | 212.09 | 11796.11 | -56.59 | -140.97 | -56.59 | 151.90 | 248.13 | 0.36 |
| 11900.00 | 1.98 | 219.56 | 11896.06 | -59.05 | -142.78 | -59.05 | 154.51 | 247.53 | 0.51 |
| 12000.00 | 1.16 | 226.69 | 11996.02 | -61.08 | -144.62 | -61.08 | 156.99 | 247.10 | 0.84 |
| 12100.00 | 0.65 | 200.41 | 12096.01 | -62.31 | -145.55 | -62.31 | 158.33 | 246.82 | [illegible] |
| 12200.00 | 0.70 | 122.62 | 12196.01 | -63.17 | -145.23 | -63.17 | 158.38 | 246.49 | 0.85 |
| 12300.00 | 0.38 | 121.14 | 12296.00 | -63.68 | -144.43 | -63.68 | 157.84 | 246.21 | 0.32 |


V.E.S. Survey Date: 11/12/2015

VES Survey International
Midland, Texas
432-563-5444
Surveyor: Javier Estrada
Resolver Federal Com No 002H / API 30-025-42170




V.E.S. Survey Date: 11/12/2015

CONCHO

# COG Operating LLC

**Lea County, NM (NAD27 NME)**
**Resolver Federal Com**
**#2H**

**OH**

**Survey: MWD #1**

# Survey Report - Geographic

**25 November, 2015**

CONCHO

# Wellplanning

## Survey Report - Geographic

| | | | |
|---|---|---|---|
| **Company:** | COG Operating LLC | **Local Co-ordinate Reference:** | Well #2H |
| **Project:** | Lea County, NM (NAD27 NME) | **TVD Reference:** | WELL @ 3774.3usft (Original Well Elev) |
| **Site:** | Resolver Federal Com | **MD Reference:** | WELL @ 3774.3usft (Original Well Elev) |
| **Well:** | #2H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 5000.1 Single User Db |

| | | | |
|---|---|---|---|
| **Project** | Lea County, NM (NAD27 NME) | | |
| **Map System:** | US State Plane 1927 (Exact solution) | **System Datum:** | Mean Sea Level |
| **Geo Datum:** | NAD 1927 (NADCON CONUS) | | |
| **Map Zone:** | New Mexico East 3001 | | |

| | | | | | |
|---|---|---|---|---|---|
| **Site** | Resolver Federal Com | | | | |
| **Site Position:** | | **Northing:** | 482,989.80 usft | **Latitude:** | 32° 19' 33.203 N |
| **From:** | Map | **Easting:** | 717,531.80 usft | **Longitude:** | 103° 37' 44.801 W |
| **Position Uncertainty:** | 3.0 usft | **Slot Radius:** | 13-3/16 " | **Grid Convergence:** | 0.38 ° |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Well** | #2H | | | | | |
| **Well Position** | **+N/-S** | 0.0 usft | **Northing:** | 482,989.80 usft | **Latitude:** | 32° 19' 33.203 N |
| | **+E/-W** | 0.0 usft | **Easting:** | 717,531.80 usft | **Longitude:** | 103° 37' 44.801 W |
| **Position Uncertainty** | | 0.0 usft | **Wellhead Elevation:** | usft | **Ground Level:** | 3,754.3 usft |

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|---|---|---|---|---|---|
| **Wellbore** | OH | | | | |
| **Magnetics** | **Model Name** | **Sample Date** | **Declination (°)** | **Dip Angle (°)** | **Field Strength (nT)** |
| | IGRF2010 | 10/6/2015 | 7.09 | 60.16 | 48,238 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Design** | OH | | | | | |
| **Audit Notes:** | | | | | | |
| **Version:** | 1.0 | **Phase:** | ACTUAL | **Tie On Depth:** | | 0.0 |
| **Vertical Section:** | **Depth From (TVD) (usft)** | **+N/-S (usft)** | **+E/-W (usft)** | **Direction (°)** | | |
| | 0.0 | 0.0 | 0.0 | 179.62 | | |

**Survey Program** **Date** 11/25/2015

| From (usft) | To (usft) | Survey (Wellbore) | Tool Name | Description |
|---|---|---|---|---|
| 100.0 | 9,000.0 | GYRO (OH) | NS-GYRO-MS | North sensing gyrocompassing m/s |
| 9,205.0 | 14,096.0 | MWD #1 (OH) | MWD | 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 |
|---|---|---|---|---|---|---|---|---|---|
| 9,000.0 | 1.58 | 212.98 | 8,998.7 | -34.2 | -62.1 | 482,955.57 | 717,469.68 | 32° 19' 32.869 N | 103° 37' 45.527 W |
| 9,205.0 | 7.80 | 185.20 | 9,202.9 | -50.5 | -64.9 | 482,939.33 | 717,466.88 | 32° 19' 32.708 N | 103° 37' 45.561 W |
| 9,236.0 | 11.80 | 184.20 | 9,233.4 | -55.7 | -65.3 | 482,934.07 | 717,466.46 | 32° 19' 32.656 N | 103° 37' 45.566 W |
| 9,268.0 | 15.20 | 184.10 | 9,264.6 | -63.2 | -65.9 | 482,926.62 | 717,465.92 | 32° 19' 32.583 N | 103° 37' 45.573 W |
| 9,300.0 | 18.20 | 183.50 | 9,295.2 | -72.4 | -66.5 | 482,917.44 | 717,465.31 | 32° 19' 32.492 N | 103° 37' 45.581 W |
| 9,332.0 | 21.10 | 183.40 | 9,325.3 | -83.1 | -67.1 | 482,906.70 | 717,464.67 | 32° 19' 32.386 N | 103° 37' 45.589 W |
| 9,363.0 | 23.90 | 182.90 | 9,354.0 | -94.9 | -67.8 | 482,894.86 | 717,464.02 | 32° 19' 32.268 N | 103° 37' 45.598 W |
| 9,395.0 | 26.10 | 181.90 | 9,383.0 | -108.5 | -68.3 | 482,881.35 | 717,463.46 | 32° 19' 32.135 N | 103° 37' 45.605 W |
| 9,427.0 | 27.10 | 183.50 | 9,411.6 | -122.8 | -69.0 | 482,867.04 | 717,462.78 | 32° 19' 31.993 N | 103° 37' 45.614 W |
| 9,458.0 | 29.30 | 184.30 | 9,438.9 | -137.4 | -70.0 | 482,852.42 | 717,461.78 | 32° 19' 31.849 N | 103° 37' 45.627 W |
| 9,490.0 | 32.70 | 184.20 | 9,466.3 | -153.8 | -71.2 | 482,835.99 | 717,460.56 | 32° 19' 31.686 N | 103° 37' 45.643 W |

| | | | |
|---|---|---|---|
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| **Project:** | Lea County, NM (NAD27 NME) | **TVD Reference:** | WELL @ 3774.3usft (Original Well Elev) |
| **Site:** | Resolver Federal Com | **MD Reference:** | WELL @ 3774.3usft (Original Well Elev) |
| **Well:** | #2H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 5000.1 Single User Db |

**Survey**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| 9,522.0 | 36.40 | 184.10 | 9,492.7 | -171.9 | -72.5 | 482,817.89 | 717,459.25 | 32° 19' 31.507 N | 103° 37' 45.659 W |
| 9,553.0 | 39.10 | 183.60 | 9,517.2 | -190.8 | -73.8 | 482,798.96 | 717,457.98 | 32° 19' 31.320 N | 103° 37' 45.676 W |
| 9,585.0 | 41.90 | 182.30 | 9,541.5 | -211.6 | -74.9 | 482,778.21 | 717,456.91 | 32° 19' 31.115 N | 103° 37' 45.690 W |
| 9,617.0 | 42.30 | 180.00 | 9,565.3 | -233.0 | -75.3 | 482,756.76 | 717,456.48 | 32° 19' 30.902 N | 103° 37' 45.696 W |
| 9,649.0 | 42.00 | 179.60 | 9,589.0 | -254.5 | -75.2 | 482,735.29 | 717,456.56 | 32° 19' 30.690 N | 103° 37' 45.697 W |
| 9,680.0 | 43.70 | 180.30 | 9,611.7 | -275.6 | -75.2 | 482,714.20 | 717,456.57 | 32° 19' 30.481 N | 103° 37' 45.698 W |
| 9,712.0 | 47.90 | 180.20 | 9,634.0 | -298.5 | -75.3 | 482,691.27 | 717,456.48 | 32° 19' 30.254 N | 103° 37' 45.701 W |
| 9,744.0 | 52.60 | 180.60 | 9,654.5 | -323.1 | -75.5 | 482,666.67 | 717,456.30 | 32° 19' 30.011 N | 103° 37' 45.705 W |
| 9,775.0 | 57.70 | 181.40 | 9,672.2 | -348.6 | -75.9 | 482,641.25 | 717,455.85 | 32° 19' 29.759 N | 103° 37' 45.712 W |
| 9,807.0 | 63.30 | 182.80 | 9,687.9 | -376.4 | -77.0 | 482,613.43 | 717,454.82 | 32° 19' 29.484 N | 103° 37' 45.727 W |
| 9,839.0 | 69.10 | 183.90 | 9,700.8 | -405.6 | -78.7 | 482,584.21 | 717,453.11 | 32° 19' 29.195 N | 103° 37' 45.749 W |
| 9,870.0 | 74.20 | 182.90 | 9,710.6 | -435.0 | -80.4 | 482,554.85 | 717,451.36 | 32° 19' 28.905 N | 103° 37' 45.771 W |
| 9,899.0 | 79.20 | 180.90 | 9,717.3 | -463.1 | -81.4 | 482,526.65 | 717,450.43 | 32° 19' 28.626 N | 103° 37' 45.784 W |
| 9,931.0 | 82.20 | 179.60 | 9,722.4 | -494.7 | -81.5 | 482,495.08 | 717,450.30 | 32° 19' 28.313 N | 103° 37' 45.788 W |
| 9,962.0 | 83.50 | 179.60 | 9,726.3 | -525.5 | -81.3 | 482,464.32 | 717,450.51 | 32° 19' 28.009 N | 103° 37' 45.788 W |
| 9,994.0 | 85.10 | 178.80 | 9,729.5 | -557.3 | -80.8 | 482,432.48 | 717,450.96 | 32° 19' 27.694 N | 103° 37' 45.786 W |
| 10,026.0 | 87.60 | 177.90 | 9,731.5 | -589.2 | -79.9 | 482,400.56 | 717,451.88 | 32° 19' 27.378 N | 103° 37' 45.777 W |
| 10,058.0 | 88.60 | 177.70 | 9,732.6 | -621.2 | -78.7 | 482,368.61 | 717,453.11 | 32° 19' 27.062 N | 103° 37' 45.765 W |
| 10,090.0 | 88.70 | 177.70 | 9,733.3 | -653.2 | -77.4 | 482,336.64 | 717,454.39 | 32° 19' 26.745 N | 103° 37' 45.753 W |
| 10,185.0 | 89.40 | 177.70 | 9,734.9 | -748.1 | -73.6 | 482,241.73 | 717,458.20 | 32° 19' 25.806 N | 103° 37' 45.716 W |
| 10,280.0 | 89.10 | 176.90 | 9,736.1 | -843.0 | -69.1 | 482,146.84 | 717,462.68 | 32° 19' 24.867 N | 103° 37' 45.671 W |
| 10,375.0 | 90.40 | 176.60 | 9,736.6 | -937.8 | -63.7 | 482,052.00 | 717,468.06 | 32° 19' 23.928 N | 103° 37' 45.615 W |
| 10,470.0 | 88.50 | 177.10 | 9,737.5 | -1,032.6 | -58.5 | 481,957.15 | 717,473.28 | 32° 19' 22.989 N | 103° 37' 45.562 W |
| 10,565.0 | 88.90 | 176.60 | 9,739.6 | -1,127.5 | -53.3 | 481,862.32 | 717,478.50 | 32° 19' 22.050 N | 103° 37' 45.508 W |
| 10,660.0 | 89.10 | 178.30 | 9,741.3 | -1,222.4 | -49.1 | 481,767.43 | 717,482.73 | 32° 19' 21.111 N | 103° 37' 45.466 W |
| 10,756.0 | 90.00 | 177.80 | 9,742.0 | -1,318.3 | -45.8 | 481,671.49 | 717,485.99 | 32° 19' 20.161 N | 103° 37' 45.435 W |
| 10,851.0 | 90.30 | 178.00 | 9,741.8 | -1,413.2 | -42.3 | 481,576.56 | 717,489.47 | 32° 19' 19.221 N | 103° 37' 45.402 W |
| 10,946.0 | 91.80 | 178.00 | 9,740.1 | -1,508.2 | -39.0 | 481,481.63 | 717,492.79 | 32° 19' 18.282 N | 103° 37' 45.371 W |
| 11,041.0 | 90.30 | 177.70 | 9,738.3 | -1,603.1 | -35.4 | 481,386.72 | 717,496.35 | 32° 19' 17.343 N | 103° 37' 45.337 W |
| 11,136.0 | 89.60 | 177.50 | 9,738.4 | -1,698.0 | -31.5 | 481,291.80 | 717,500.33 | 32° 19' 16.403 N | 103° 37' 45.297 W |
| 11,231.0 | 85.70 | 179.20 | 9,742.3 | -1,792.9 | -28.7 | 481,196.94 | 717,503.06 | 32° 19' 15.464 N | 103° 37' 45.273 W |
| 11,326.0 | 86.40 | 179.30 | 9,748.8 | -1,887.6 | -27.5 | 481,102.18 | 717,504.31 | 32° 19' 14.526 N | 103° 37' 45.266 W |
| 11,421.0 | 88.10 | 179.30 | 9,753.4 | -1,982.5 | -26.3 | 481,007.30 | 717,505.46 | 32° 19' 13.587 N | 103° 37' 45.259 W |
| 11,516.0 | 88.70 | 179.90 | 9,756.0 | -2,077.5 | -25.7 | 480,912.34 | 717,506.13 | 32° 19' 12.648 N | 103° 37' 45.259 W |
| 11,612.0 | 89.00 | 179.90 | 9,758.0 | -2,173.4 | -25.5 | 480,816.36 | 717,506.29 | 32° 19' 11.698 N | 103° 37' 45.264 W |
| 11,707.0 | 89.60 | 179.50 | 9,759.1 | -2,268.4 | -25.0 | 480,721.37 | 717,506.79 | 32° 19' 10.758 N | 103° 37' 45.266 W |
| 11,802.0 | 90.00 | 179.10 | 9,759.5 | -2,363.4 | -23.8 | 480,626.38 | 717,507.95 | 32° 19' 9.818 N | 103° 37' 45.260 W |
| 11,897.0 | 91.00 | 179.20 | 9,758.6 | -2,458.4 | -22.4 | 480,531.39 | 717,509.36 | 32° 19' 8.878 N | 103° 37' 45.250 W |
| 11,992.0 | 89.40 | 179.30 | 9,758.3 | -2,553.4 | -21.2 | 480,436.40 | 717,510.61 | 32° 19' 7.938 N | 103° 37' 45.243 W |
| 12,087.0 | 89.40 | 179.90 | 9,759.3 | -2,648.4 | -20.5 | 480,341.41 | 717,511.27 | 32° 19' 6.998 N | 103° 37' 45.243 W |
| 12,182.0 | 89.70 | 179.80 | 9,760.0 | -2,743.4 | -20.3 | 480,246.41 | 717,511.52 | 32° 19' 6.058 N | 103° 37' 45.247 W |
| 12,277.0 | 89.40 | 179.80 | 9,760.8 | -2,838.4 | -19.9 | 480,151.42 | 717,511.85 | 32° 19' 5.118 N | 103° 37' 45.251 W |
| 12,372.0 | 90.10 | 179.20 | 9,761.2 | -2,933.4 | -19.1 | 480,056.42 | 717,512.68 | 32° 19' 4.178 N | 103° 37' 45.248 W |
| 12,468.0 | 91.10 | 178.30 | 9,760.2 | -3,029.3 | -17.0 | 479,960.45 | 717,514.77 | 32° 19' 3.228 N | 103° 37' 45.231 W |
| 12,563.0 | 92.00 | 177.70 | 9,757.6 | -3,124.3 | -13.7 | 479,865.55 | 717,518.09 | 32° 19' 2.288 N | 103° 37' 45.200 W |
| 12,658.0 | 90.60 | 176.90 | 9,755.5 | -3,219.1 | -9.2 | 479,770.68 | 717,522.56 | 32° 19' 1.349 N | 103° 37' 45.155 W |
| 12,753.0 | 89.50 | 177.30 | 9,755.4 | -3,314.0 | -4.4 | 479,675.80 | 717,527.37 | 32° 19' 0.410 N | 103° 37' 45.106 W |
| 12,849.0 | 88.40 | 177.00 | 9,757.1 | -3,409.9 | 0.3 | 479,579.94 | 717,532.14 | 32° 18' 59.461 N | 103° 37' 45.058 W |
| 12,944.0 | 88.90 | 176.70 | 9,759.4 | -3,504.7 | 5.6 | 479,485.11 | 717,537.36 | 32° 18' 58.523 N | 103° 37' 45.004 W |
| 13,039.0 | 89.90 | 175.90 | 9,760.4 | -3,599.5 | 11.7 | 479,390.32 | 717,543.49 | 32° 18' 57.584 N | 103° 37' 44.940 W |
| 13,134.0 | 89.00 | 175.80 | 9,761.3 | -3,694.2 | 18.6 | 479,295.57 | 717,550.36 | 32° 18' 56.646 N | 103° 37' 44.867 W |
| 13,230.0 | 87.80 | 175.50 | 9,764.0 | -3,789.9 | 25.8 | 479,199.89 | 717,557.64 | 32° 18' 55.699 N | 103° 37' 44.790 W |
| 13,324.0 | 86.70 | 176.40 | 9,768.5 | -3,883.6 | 32.5 | 479,106.23 | 717,564.27 | 32° 18' 54.772 N | 103° 37' 44.720 W |
| 13,419.0 | 88.00 | 177.90 | 9,772.9 | -3,978.3 | 37.2 | 479,011.46 | 717,568.99 | 32° 18' 53.833 N | 103° 37' 44.672 W |
| 13,514.0 | 88.80 | 177.60 | 9,775.5 | -4,073.2 | 40.9 | 478,916.57 | 717,572.72 | 32° 18' 52.894 N | 103° 37' 44.636 W |

| | | | |
|---|---|---|---|
| **Company:** | COG Operating LLC | **Local Co-ordinate Reference:** | Well #2H |
| **Project:** | Lea County, NM (NAD27 NME) | **TVD Reference:** | WELL @ 3774.3usft (Original Well Elev) |
| **Site:** | Resolver Federal Com | **MD Reference:** | WELL @ 3774.3usft (Original Well Elev) |
| **Well:** | #2H | **North Reference:** | Grid |
| **Wellbore:** | OH | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | OH | **Database:** | EDM 5000.1 Single User Db |

**Survey**

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude | Longitude |
|---|---|---|---|---|---|---|---|---|---|
| 13,610.0 | 88.00 | 178.10 | 9,778.2 | -4,169.1 | 44.5 | 478,820.67 | 717,576.32 | 32° 18' 51.945 N | 103° 37' 44.601 W |
| 13,705.0 | 88.60 | 177.70 | 9,781.0 | -4,264.0 | 48.0 | 478,725.78 | 717,579.80 | 32° 18' 51.006 N | 103° 37' 44.568 W |
| 13,800.0 | 88.40 | 178.80 | 9,783.5 | -4,358.9 | 50.9 | 478,630.86 | 717,582.70 | 32° 18' 50.066 N | 103° 37' 44.541 W |
| 13,895.0 | 89.10 | 179.40 | 9,785.6 | -4,453.9 | 52.4 | 478,535.89 | 717,584.19 | 32° 18' 49.126 N | 103° 37' 44.531 W |
| 13,990.0 | 88.90 | 179.00 | 9,787.2 | -4,548.9 | 53.7 | 478,440.92 | 717,585.52 | 32° 18' 48.187 N | 103° 37' 44.523 W |
| 14,048.0 | 89.80 | 178.90 | 9,787.9 | -4,606.9 | 54.8 | 478,382.93 | 717,586.58 | 32° 18' 47.613 N | 103° 37' 44.515 W |
| 14,096.0 | 89.80 | 178.90 | 9,788.1 | -4,654.9 | 55.7 | 478,334.94 | 717,587.50 | 32° 18' 47.138 N | 103° 37' 44.508 W |
| **PBHL(resolver#2H)** | | | | | | | | | |

Checked By: _____ Approved By: _____ Date: _____