HOBBS OCD

MAR 1 6 2015

RECEIVED

OPERATOR COG Operating

WELL/LEASE Picasso Federal Com 2-H

COUNTY Lea Co., NM.

## STATE OF NEW MEXICO
## DEVIATION REPORT

| | |
|---|---|
| 283 | 0.70 |
| 558 | 0.50 |
| 918 | 0.42 |
| 1208 | 0.32 |
| 1446 | 1.00 |
| 1726 | 1.30 |
| 2010 | 1.10 |
| 2293 | 1.80 |
| 2576 | 1.10 |
| 2859 | 1.30 |
| 3142 | 1.80 |
| 3425 | 1.40 |
| 3209 | 1.80 |
| 3993 | 1.20 |
| 4276 | 1.30 |
| 4559 | 2.60 |
| 4843 | 2.40 |
| 5031 | 1.50 |
| 5138 | 0.50 |
| 5240 | 0.10 |
| 5620 | 0.50 |
| 6035 | 0.70 |
| 6440 | 1.00 |
| 6850 | 1.10 |
| 7229 | 0.60 |
| 7607 | 0.80 |
| 8016 | 0.70 |
| 8426 | 1.40 |
| 8610 | 1.30 |
| 8830 | 1.60 |
| 8836 | 3.30 |

SIGNED BY: Ron Scandolari

RON SCANDOLARI, VP-CONTRACT DRILLING

STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 19 DAY OF January, 2015 ~~2014~~, BEFORE ME, R SOWELL, A NOTARY PUBLIC, PERSONALLY APPEARED RON SCANDOLARI, WHO ACKNOWLEDGED AND EXECUTED THIS DOCUMENT. WITNESS MY HAND AND OFFICIAL SEAL.

(SEAL)

NOTARY PUBLIC STATE OF TEXAS
REDA DENISE SOWELL
My Commission Expires
November 02, 2017

Reda Denise Sowell

NOTARY PUBLIC

MAR 3 1 2015

VES SURVEY INTERNATIONAL

December 18, 2014

HOBBS OCD

MAR 1 6 2015

RECEIVED

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

Attn: Kanicia Castillo

RE: **Picasso Federal 2H**

Please find enclosed a copy of the survey from 0.00' to 12093.00' ran on the above referenced well.

If I can be of any further service, please do not hesitate to call me at 800-606-4976.

Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
§
COUNTY OF NUECES §

This instrument was acknowledged before me on the 18 day of December A.D., 2014, 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, TX 78426
T (361) 767-0602 F (361) 767-0612
www.vessurvey.com

Company: Concho
Lease/Well: Picasso Federal/2H
Location: Sec9 T24S R34E
Rig Name: Basic 46
State/County: New Mexico/Lea
Latitude: 32.23, Longitude: -103.47
GRID North is 0.46 Degrees East of True North
VS-Azi: 0.00 Degrees

Depth Reference : RKB = 22 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS
Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 12/18/2014 / 11:17

VES Survey International
West Texas
(432) 563-5444
Surveyor: Noe Garza
Picasso Federal 2H / API 30-025-41905



| 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 | 0.08 | 287.71 | 100.00 | 0.02 | -0.06 | 0.02 | 0.07 | 287.71 | 0.08 |
| 200.00 | 0.07 | 100.14 | 200.00 | 0.03 | -0.06 | 0.03 | 0.07 | 294.90 | 0.15 |
| 300.00 | 0.00 | 167.41 | 300.00 | 0.01 | 0.00 | 0.01 | 0.01 | 12.28 | 0.07 |
| 400.00 | 0.03 | 291.41 | 400.00 | 0.02 | -0.02 | 0.02 | 0.03 | 312.91 | 0.03 |
| 500.00 | 0.23 | 206.76 | 500.00 | -0.15 | -0.13 | -0.15 | 0.20 | 221.79 | 0.23 |
| 600.00 | 0.06 | 232.08 | 600.00 | -0.36 | -0.26 | -0.36 | 0.44 | 216.24 | 0.18 |
| 700.00 | 0.14 | 137.47 | 700.00 | -0.48 | -0.22 | -0.48 | 0.53 | 204.40 | 0.16 |
| 800.00 | 0.03 | 272.07 | 800.00 | -0.57 | -0.16 | -0.57 | 0.59 | 195.74 | 0.16 |
| 900.00 | 0.07 | 169.16 | 900.00 | -0.63 | -0.18 | -0.63 | 0.65 | 195.62 | 0.08 |
| 1000.00 | 0.10 | 324.95 | 1000.00 | -0.62 | -0.21 | -0.62 | 0.66 | 198.87 | 0.16 |
| 1100.00 | 0.23 | 324.23 | 1100.00 | -0.39 | -0.38 | -0.39 | 0.54 | 224.21 | 0.14 |
| 1200.00 | 0.20 | 321.95 | 1200.00 | -0.09 | -0.60 | -0.09 | 0.61 | 261.41 | 0.04 |
| 1300.00 | 0.23 | 271.89 | 1300.00 | 0.05 | -0.90 | 0.05 | 0.90 | 273.15 | 0.18 |
| 1400.00 | 0.57 | 330.70 | 1400.00 | 0.49 | -1.34 | 0.49 | 1.43 | 289.94 | 0.49 |
| 1500.00 | 0.91 | 310.52 | 1499.99 | 1.43 | -2.18 | 1.43 | 2.61 | 303.24 | 0.42 |
| 1600.00 | 1.05 | 315.42 | 1599.97 | 2.60 | -3.43 | 2.60 | 4.30 | 307.15 | 0.16 |
| 1700.00 | 0.95 | 321.65 | 1699.96 | 3.89 | -4.58 | 3.89 | 6.01 | 310.37 | 0.15 |
| 1800.00 | 1.05 | 324.10 | 1799.94 | 5.28 | -5.63 | 5.28 | 7.72 | 313.18 | 0.11 |


VES Survey Date: 11/29/2014

| 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 |
|---|---|---|---|---|---|---|---|---|---|
| 1900.00 | 1.03 | 327.70 | 1899.93 | 6.78 | -6.64 | 6.78 | 9.49 | 315.58 | 0.07 |
| 2000.00 | 0.99 | 334.56 | 1999.91 | 8.32 | -7.49 | 8.32 | 11.19 | 317.98 | 0.13 |
| 2100.00 | 1.26 | 317.39 | 2099.89 | 9.90 | -8.61 | 9.90 | 13.12 | 319.00 | 0.43 |
| 2200.00 | 1.35 | 347.51 | 2199.87 | 11.86 | -9.60 | 11.86 | 15.26 | 320.99 | 0.68 |
| 2300.00 | 1.34 | 340.79 | 2299.84 | 14.11 | -10.24 | 14.11 | 17.43 | 324.02 | 0.16 |
| 2400.00 | 0.72 | 298.02 | 2399.82 | 15.50 | -11.18 | 15.50 | 19.12 | 324.20 | 0.94 |
| 2500.00 | 0.92 | 307.88 | 2499.81 | 16.29 | -12.37 | 16.29 | 20.46 | 322.79 | 0.24 |
| 2600.00 | 1.00 | 303.45 | 2599.80 | 17.26 | -13.73 | 17.26 | 22.05 | 321.51 | 0.11 |
| 2700.00 | 1.12 | 298.70 | 2699.78 | 18.21 | -15.31 | 18.21 | 23.79 | 319.95 | 0.15 |
| 2800.00 | 1.13 | 309.78 | 2799.76 | 19.31 | -16.92 | 19.31 | 25.67 | 318.77 | 0.22 |
| 2900.00 | 1.09 | 324.68 | 2899.75 | 20.72 | -18.23 | 20.72 | 27.59 | 318.65 | 0.29 |
| 3000.00 | 1.41 | 326.53 | 2999.72 | 22.51 | -19.45 | 22.51 | 29.76 | 319.17 | 0.33 |
| 3100.00 | 1.46 | 314.98 | 3099.69 | 24.44 | -21.03 | 24.44 | 32.25 | 319.28 | 0.29 |
| 3200.00 | 1.43 | 346.39 | 3199.66 | 26.56 | -22.23 | 26.56 | 34.63 | 320.07 | 0.78 |
| 3300.00 | 1.15 | 340.68 | 3299.63 | 28.72 | -22.86 | 28.72 | 36.70 | 321.48 | 0.32 |
| 3400.00 | 1.29 | 347.23 | 3399.61 | 30.76 | -23.44 | 30.76 | 38.67 | 322.70 | 0.20 |
| 3500.00 | 1.55 | 359.63 | 3499.58 | 33.21 | -23.69 | 33.21 | 40.79 | 324.49 | 0.40 |
| 3600.00 | 1.50 | 354.29 | 3599.55 | 35.86 | -23.83 | 35.86 | 43.06 | 326.39 | 0.15 |
| 3700.00 | 1.57 | 353.35 | 3699.51 | 38.53 | -24.12 | 38.53 | 45.45 | 327.95 | 0.07 |
| 3800.00 | 1.16 | 340.90 | 3799.48 | 40.84 | -24.61 | 40.84 | 47.68 | 328.93 | 0.50 |
| 3900.00 | 1.11 | 343.06 | 3899.46 | 42.72 | -25.22 | 42.72 | 49.61 | 329.44 | 0.07 |
| 4000.00 | 1.05 | 358.95 | 3999.44 | 44.56 | -25.52 | 44.56 | 51.35 | 330.20 | 0.30 |
| 4100.00 | 1.24 | 5.43 | 4099.42 | 46.55 | -25.44 | 46.55 | 53.05 | 331.35 | 0.23 |
| 4200.00 | 1.24 | 3.02 | 4199.40 | 48.71 | -25.28 | 48.71 | 54.88 | 332.57 | 0.05 |
| 4300.00 | 1.23 | 11.20 | 4299.38 | 50.84 | -25.01 | 50.84 | 56.66 | 333.80 | 0.18 |
| 4400.00 | 2.24 | 31.28 | 4399.33 | 53.57 | -23.79 | 53.57 | 58.61 | 336.06 | 1.17 |
| 4500.00 | 2.45 | 52.71 | 4499.25 | 56.53 | -21.07 | 56.53 | 60.33 | 339.56 | 0.90 |
| 4600.00 | 2.30 | 66.39 | 4599.16 | 58.63 | -17.53 | 58.63 | 61.20 | 343.36 | 0.59 |
| 4700.00 | 1.54 | 67.61 | 4699.11 | 59.95 | -14.44 | 59.95 | 61.67 | 346.45 | 0.76 |
| 4800.00 | 2.01 | 79.93 | 4799.06 | 60.77 | -11.47 | 60.77 | 61.84 | 349.31 | 0.60 |
| 4900.00 | 2.18 | 96.92 | 4898.99 | 60.85 | -7.85 | 60.85 | 61.35 | 352.65 | 0.64 |
| 5000.00 | 1.35 | 112.14 | 4998.95 | 60.18 | -4.87 | 60.18 | 60.37 | 355.37 | 0.95 |
| 5100.00 | 0.79 | 102.68 | 5098.93 | 59.58 | -3.11 | 59.58 | 59.66 | 357.01 | 0.58 |
| 5200.00 | 0.26 | 86.16 | 5198.92 | 59.44 | -2.20 | 59.44 | 59.49 | 357.88 | 0.55 |
| 5300.00 | 0.22 | 97.20 | 5298.92 | 59.44 | -1.79 | 59.44 | 59.46 | 358.28 | 0.06 |
| 5400.00 | 0.37 | 290.87 | 5398.92 | 59.53 | -1.90 | 59.53 | 59.56 | 358.17 | 0.58 |
| 5500.00 | 0.44 | 277.33 | 5498.92 | 59.69 | -2.58 | 59.69 | 59.75 | 357.53 | 0.12 |
| 5600.00 | 0.36 | 276.48 | 5598.92 | 59.77 | -3.27 | 59.77 | 59.86 | 356.87 | 0.08 |
| 5700.00 | 0.11 | 277.27 | 5698.92 | 59.82 | -3.68 | 59.82 | 59.93 | 356.48 | 0.24 |



VES Survey Date: 11/29/2014

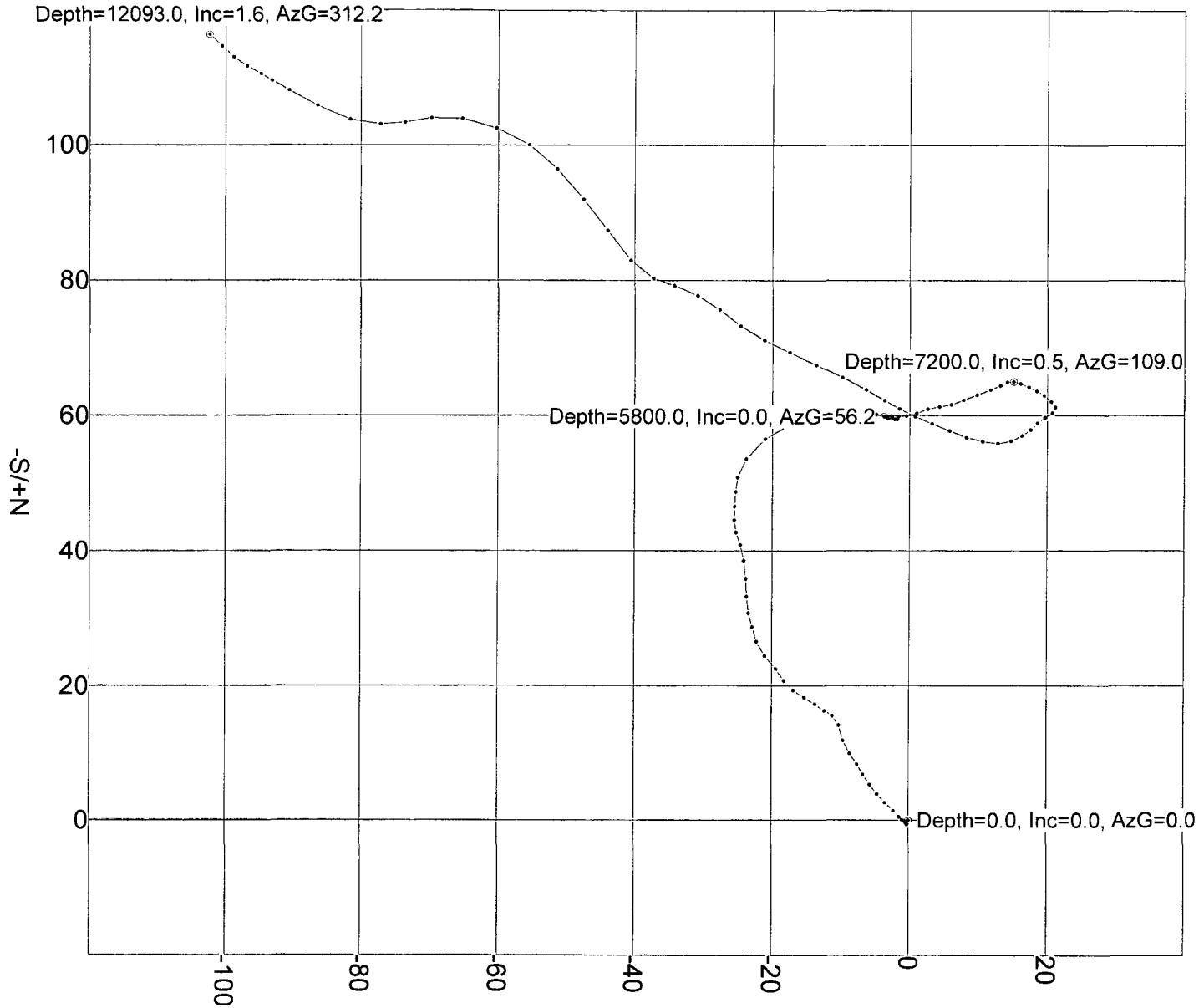
| Measured Depth FT | Incl Angle Deg | Drift Direction Deg | TVD FT | +N/-S FT | +E/-W FT | Vertical Section FT | Closure Distance FT | Closure Direction Deg | Dogleg Severity Deg/100 |
|---|---|---|---|---|---|---|---|---|---|
| 5800.00 | 0.04 | 56.16 | 5798.92 | 59.86 | -3.74 | 59.86 | 59.97 | 356.42 | 0.15 |
| 5900.00 | 0.32 | 83.57 | 5898.92 | 59.91 | -3.43 | 59.91 | 60.01 | 356.72 | 0.29 |
| 6000.00 | 0.58 | 90.21 | 5998.91 | 59.94 | -2.65 | 59.94 | 60.00 | 357.47 | 0.26 |
| 6100.00 | 0.59 | 98.50 | 6098.91 | 59.86 | -1.64 | 59.86 | 59.88 | 358.43 | 0.08 |
| 6200.00 | 0.80 | 75.67 | 6198.90 | 59.96 | -0.45 | 59.96 | 59.96 | 359.57 | 0.35 |
| 6300.00 | 0.94 | 75.04 | 6298.89 | 60.34 | 1.02 | 60.34 | 60.35 | 0.97 | 0.13 |
| 6400.00 | 1.08 | 61.09 | 6398.87 | 61.01 | 2.63 | 61.01 | 61.06 | 2.47 | 0.28 |
| 6500.00 | 1.01 | 99.19 | 6498.86 | 61.32 | 4.32 | 61.32 | 61.47 | 4.03 | 0.68 |
| 6600.00 | 1.08 | 62.13 | 6598.84 | 61.62 | 6.02 | 61.62 | 61.92 | 5.58 | 0.67 |
| 6700.00 | 1.11 | 74.98 | 6698.82 | 62.32 | 7.79 | 62.32 | 62.80 | 7.13 | 0.25 |
| 6800.00 | 1.34 | 65.98 | 6798.80 | 63.04 | 9.80 | 63.04 | 63.80 | 8.84 | 0.29 |
| 6900.00 | 1.11 | 71.26 | 6898.78 | 63.83 | 11.78 | 63.83 | 64.91 | 10.46 | 0.26 |
| 7000.00 | 0.69 | 58.00 | 6998.77 | 64.46 | 13.21 | 64.46 | 65.80 | 11.58 | 0.46 |
| 7100.00 | 0.60 | 68.82 | 7098.76 | 64.97 | 14.21 | 64.97 | 66.51 | 12.34 | 0.15 |
| 7200.00 | 0.51 | 108.96 | 7198.76 | 65.02 | 15.13 | 65.02 | 66.75 | 13.10 | 0.39 |
| 7300.00 | 0.69 | 103.97 | 7298.75 | 64.73 | 16.13 | 64.73 | 66.71 | 14.00 | 0.18 |
| 7400.00 | 0.84 | 120.25 | 7398.74 | 64.21 | 17.35 | 64.21 | 66.51 | 15.12 | 0.26 |
| 7500.00 | 0.62 | 112.29 | 7498.73 | 63.64 | 18.48 | 63.64 | 66.27 | 16.20 | 0.24 |
| 7600.00 | 0.81 | 129.40 | 7598.72 | 62.98 | 19.54 | 62.98 | 65.94 | 17.23 | 0.29 |
| 7700.00 | 0.77 | 133.41 | 7698.72 | 62.07 | 20.57 | 62.07 | 65.39 | 18.34 | 0.07 |
| 7800.00 | 0.46 | 166.00 | 7798.71 | 61.22 | 21.16 | 61.22 | 64.77 | 19.07 | 0.46 |
| 7900.00 | 0.76 | 231.85 | 7898.70 | 60.42 | 20.73 | 60.42 | 63.88 | 18.94 | 0.71 |
| 8000.00 | 0.73 | 240.68 | 7998.70 | 59.70 | 19.65 | 59.70 | 62.85 | 18.22 | 0.12 |
| 8100.00 | 0.79 | 224.53 | 8098.69 | 58.90 | 18.61 | 58.90 | 61.77 | 17.54 | 0.22 |
| 8200.00 | 0.82 | 224.99 | 8198.68 | 57.90 | 17.63 | 57.90 | 60.53 | 16.93 | 0.03 |
| 8300.00 | 0.96 | 241.96 | 8298.67 | 57.00 | 16.38 | 57.00 | 59.31 | 16.04 | 0.30 |
| 8400.00 | 1.07 | 245.98 | 8398.65 | 56.23 | 14.79 | 56.23 | 58.14 | 14.74 | 0.13 |
| 8500.00 | 1.22 | 270.97 | 8498.63 | 55.87 | 12.88 | 55.87 | 57.34 | 12.98 | 0.52 |
| 8600.00 | 1.37 | 282.76 | 8598.61 | 56.15 | 10.64 | 56.15 | 57.15 | 10.73 | 0.31 |
| 8700.00 | 1.44 | 285.84 | 8698.58 | 56.76 | 8.27 | 56.76 | 57.36 | 8.29 | 0.10 |
| 8800.00 | 1.61 | 296.46 | 8798.54 | 57.73 | 5.80 | 57.73 | 58.02 | 5.74 | 0.33 |
| 8900.00 | 1.57 | 288.80 | 8898.50 | 58.80 | 3.25 | 58.80 | 58.89 | 3.16 | 0.22 |
| 9000.00 | 1.52 | 298.17 | 8998.47 | 59.86 | 0.79 | 59.86 | 59.87 | 0.75 | 0.26 |
| 9100.00 | 1.38 | 295.09 | 9098.43 | 61.00 | -1.47 | 61.00 | 61.02 | 358.62 | 0.16 |
| 9200.00 | 1.48 | 302.25 | 9198.40 | 62.20 | -3.65 | 62.20 | 62.31 | 356.64 | 0.20 |
| 9300.00 | 2.13 | 299.22 | 9298.35 | 63.79 | -6.37 | 63.79 | 64.11 | 354.30 | 0.65 |
| 9400.00 | 2.41 | 296.81 | 9398.27 | 65.64 | -9.86 | 65.64 | 66.38 | 351.46 | 0.29 |
| 9500.00 | 2.50 | 294.08 | 9498.18 | 67.48 | -13.72 | 67.48 | 68.86 | 348.51 | 0.15 |
| 9600.00 | 2.39 | 298.05 | 9598.09 | 69.35 | -17.55 | 69.35 | 71.53 | 345.80 | 0.20 |


VES Survey Date: 11/29/2014

| 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 |
|---|---|---|---|---|---|---|---|---|---|
| 9700.00 | 2.28 | 294.89 | 9698.01 | 71.16 | -21.19 | 71.16 | 74.25 | 343.42 | 0.17 |
| 9800.00 | 2.39 | 307.69 | 9797.93 | 73.27 | -24.64 | 73.27 | 77.30 | 341.42 | 0.53 |
| 9900.00 | 2.10 | 308.81 | 9897.85 | 75.70 | -27.71 | 75.70 | 80.61 | 339.89 | 0.29 |
| 10000.00 | 2.31 | 296.85 | 9997.78 | 77.76 | -30.94 | 77.76 | 83.69 | 338.30 | 0.51 |
| 10100.00 | 1.85 | 291.64 | 10097.71 | 79.26 | -34.25 | 79.26 | 86.34 | 336.63 | 0.50 |
| 10200.00 | 1.85 | 285.79 | 10197.66 | 80.30 | -37.30 | 80.30 | 88.54 | 335.09 | 0.19 |
| 10300.00 | 3.21 | 322.32 | 10297.57 | 82.95 | -40.56 | 82.95 | 92.33 | 333.94 | 2.04 |
| 10400.00 | 3.20 | 322.62 | 10397.41 | 87.38 | -43.96 | 87.38 | 97.81 | 333.29 | 0.02 |
| 10500.00 | 3.47 | 321.84 | 10497.24 | 91.97 | -47.52 | 91.97 | 103.52 | 332.68 | 0.28 |
| 10600.00 | 3.33 | 316.27 | 10597.06 | 96.45 | -51.40 | 96.45 | 109.29 | 331.95 | 0.36 |
| 10700.00 | 2.96 | 305.93 | 10696.91 | 100.06 | -55.49 | 100.06 | 114.42 | 330.99 | 0.68 |
| 10800.00 | 3.30 | 289.41 | 10796.77 | 102.53 | -60.29 | 102.53 | 118.94 | 329.54 | 0.96 |
| 10900.00 | 2.65 | 281.59 | 10896.63 | 103.95 | -65.27 | 103.95 | 122.74 | 327.88 | 0.77 |
| 11000.00 | 2.60 | 260.58 | 10996.53 | 104.04 | -69.77 | 104.04 | 125.27 | 326.15 | 0.96 |
| 11100.00 | 1.89 | 260.16 | 11096.45 | 103.39 | -73.63 | 103.39 | 126.93 | 324.54 | 0.72 |
| 11200.00 | 2.21 | 270.02 | 11196.39 | 103.11 | -77.18 | 103.11 | 128.80 | 323.18 | 0.48 |
| 11300.00 | 2.93 | 285.09 | 11296.29 | 103.77 | -81.58 | 103.77 | 132.00 | 321.83 | 0.98 |
| 11400.00 | 3.13 | 300.37 | 11396.15 | 105.82 | -86.41 | 105.82 | 136.62 | 320.76 | 0.83 |
| 11500.00 | 2.37 | 296.06 | 11496.03 | 108.11 | -90.63 | 108.11 | 141.07 | 320.03 | 0.78 |
| 11600.00 | 0.98 | 307.35 | 11595.99 | 109.54 | -93.17 | 109.54 | 143.80 | 319.62 | 1.43 |
| 11700.00 | 1.24 | 297.15 | 11695.97 | 110.55 | -94.81 | 110.55 | 145.64 | 319.38 | 0.33 |
| 11800.00 | 1.44 | 299.49 | 11795.94 | 111.66 | -96.87 | 111.66 | 147.83 | 319.06 | 0.21 |
| 11900.00 | 1.25 | 310.38 | 11895.92 | 112.99 | -98.80 | 112.99 | 150.10 | 318.83 | 0.32 |
| 12000.00 | 1.51 | 314.73 | 11995.89 | 114.63 | -100.57 | 114.63 | 152.49 | 318.74 | 0.28 |
| 12093.00 | 1.59 | 312.20 | 12088.85 | 116.36 | -102.39 | 116.36 | 154.99 | 318.65 | 0.11 |


VES Survey Date: 11/29/2014

VES Survey International
West Texas
(432) 563-5444
Surveyor: Noe Garza
Picasso Federal 2H / API 30-025-41905




VES Survey Date: 11/29/2014

# COG Operating LLC

**Lea County, NM**
**Picasso Federal Com**
**#2H**

**ST #1**

**Design: ST #1**

# Survey Report - Geographic

**23 December, 2014**

TERRA DIRECTIONAL SERVICES, L.L.C.

| | | | |
|---|---|---|---|
| **Company:** | COG Operating LLC | **Local Co-ordinate Reference:** | Well #2H |
| **Project:** | Lea County, NM | **TVD Reference:** | KB @ 3552.8usft |
| **Site:** | Picasso Federal Com | **MD Reference:** | KB @ 3552.8usft |
| **Well:** | #2H | **North Reference:** | Grid |
| **Wellbore:** | ST #1 | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | ST #1 | **Database:** | EDM 5000.1 Single User Db |

| **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** | Picasso Federal Com | | | | |
|---|---|---|---|---|---|
| **Site Position:** | | **Northing:** | 446,721.50 usft | **Latitude:** | 32° 13' 30.746 N |
| **From:** | Map | **Easting:** | 766,914.40 usft | **Longitude:** | 103° 28' 12.728 W |
| **Position Uncertainty:** | 0.0 usft | **Slot Radius:** | 13-3/16 " | **Grid Convergence:** | 0.46 ° |

| **Well** | #2H | | | | | |
|---|---|---|---|---|---|---|
| **Well Position** | **+N/-S** | 0.0 usft | **Northing:** | 446,721.50 usft | **Latitude:** | 32° 13' 30.746 N |
| | **+E/-W** | 0.0 usft | **Easting:** | 766,914.40 usft | **Longitude:** | 103° 28' 12.728 W |
| **Position Uncertainty** | | 0.0 usft | **Wellhead Elevation:** | 0.0 usft | **Ground Level:** | 3,530.8 usft |

| **Wellbore** | ST #1 | | | | |
|---|---|---|---|---|---|
| **Magnetics** | **Model Name** | **Sample Date** | **Declination (°)** | **Dip Angle (°)** | **Field Strength (nT)** |
| | IGRF2010 | 12/14/2014 | 7.11 | 60.12 | 48,277 |

| **Design** | ST #1 | | | | |
|---|---|---|---|---|---|
| **Audit Notes:** | | | | | |
| **Version:** | 1.0 | **Phase:** | ACTUAL | **Tie On Depth:** | 8,800.0 |

| **Vertical Section:** | **Depth From (TVD) (usft)** | **+N/-S (usft)** | **+E/-W (usft)** | **Direction (°)** |
|---|---|---|---|---|
| | 0.0 | 0.0 | 0.0 | 348.38 |

**Survey Program** **Date** 12/23/2014

| **From (usft)** | **To (usft)** | **Survey (Wellbore)** | **Tool Name** | **Description** |
|---|---|---|---|---|
| 100.0 | 8,800.0 | GYRO #1 (OH) | Good_gyro | Good Gyro |
| 8,836.0 | 14,084.0 | MWD #1 (ST #1) | 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** |
|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 0.00 | 0.00 | 0.0 | 0.0 | 0.0 | 446,721.50 | 766,914.40 | 32° 13' 30.746 N | 103° 28' 12.728 W |
| 100.0 | 0.08 | 287.71 | 100.0 | 0.0 | -0.1 | 446,721.52 | 766,914.33 | 32° 13' 30.746 N | 103° 28' 12.729 W |
| 200.0 | 0.07 | 100.14 | 200.0 | 0.0 | -0.1 | 446,721.53 | 766,914.32 | 32° 13' 30.746 N | 103° 28' 12.729 W |
| 300.0 | 0.00 | 167.41 | 300.0 | 0.0 | 0.0 | 446,721.52 | 766,914.38 | 32° 13' 30.746 N | 103° 28' 12.728 W |
| 400.0 | 0.03 | 291.41 | 400.0 | 0.0 | 0.0 | 446,721.53 | 766,914.36 | 32° 13' 30.746 N | 103° 28' 12.728 W |
| 500.0 | 0.23 | 206.76 | 500.0 | -0.1 | -0.2 | 446,721.36 | 766,914.25 | 32° 13' 30.745 N | 103° 28' 12.730 W |
| 600.0 | 0.06 | 232.08 | 600.0 | -0.4 | -0.3 | 446,721.15 | 766,914.11 | 32° 13' 30.743 N | 103° 28' 12.731 W |
| 700.0 | 0.14 | 137.47 | 700.0 | -0.5 | -0.2 | 446,721.03 | 766,914.15 | 32° 13' 30.741 N | 103° 28' 12.731 W |
| 800.0 | 0.03 | 272.07 | 800.0 | -0.6 | -0.2 | 446,720.94 | 766,914.21 | 32° 13' 30.740 N | 103° 28' 12.730 W |
| 900.0 | 0.07 | 169.16 | 900.0 | -0.6 | -0.2 | 446,720.88 | 766,914.20 | 32° 13' 30.740 N | 103° 28' 12.730 W |
| 1,000.0 | 0.10 | 324.95 | 1,000.0 | -0.6 | -0.2 | 446,720.89 | 766,914.16 | 32° 13' 30.740 N | 103° 28' 12.731 W |

| | | | |
|---|---|---|---|
| **Company:** | COG Operating LLC | **Local Co-ordinate Reference:** | Well #2H |
| **Project:** | Lea County, NM | **TVD Reference:** | KB @ 3552.8usft |
| **Site:** | Picasso Federal Com | **MD Reference:** | KB @ 3552.8usft |
| **Well:** | #2H | **North Reference:** | Grid |
| **Wellbore:** | ST #1 | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | ST #1 | **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 |
|---|---|---|---|---|---|---|---|---|---|
| 1,100.0 | 0.23 | 324.23 | 1,100.0 | -0.4 | -0.4 | 446,721.12 | 766,913.99 | 32° 13' 30.742 N | 103° 28' 12.733 W |
| 1,200.0 | 0.20 | 321.95 | 1,200.0 | -0.1 | -0.6 | 446,721.43 | 766,913.77 | 32° 13' 30.745 N | 103° 28' 12.735 W |
| 1,300.0 | 0.23 | 271.89 | 1,300.0 | 0.1 | -0.9 | 446,721.57 | 766,913.46 | 32° 13' 30.747 N | 103° 28' 12.739 W |
| 1,400.0 | 0.57 | 330.70 | 1,400.0 | 0.5 | -1.4 | 446,722.01 | 766,913.01 | 32° 13' 30.751 N | 103° 28' 12.744 W |
| 1,500.0 | 0.91 | 310.52 | 1,500.0 | 1.5 | -2.2 | 446,722.96 | 766,912.17 | 32° 13' 30.761 N | 103° 28' 12.754 W |
| 1,600.0 | 1.05 | 315.42 | 1,600.0 | 2.6 | -3.5 | 446,724.13 | 766,910.92 | 32° 13' 30.772 N | 103° 28' 12.768 W |
| 1,700.0 | 0.95 | 321.65 | 1,700.0 | 3.9 | -4.6 | 446,725.43 | 766,909.76 | 32° 13' 30.785 N | 103° 28' 12.782 W |
| 1,800.0 | 1.05 | 324.10 | 1,799.9 | 5.3 | -5.7 | 446,726.82 | 766,908.71 | 32° 13' 30.799 N | 103° 28' 12.794 W |
| 1,900.0 | 1.03 | 327.70 | 1,899.9 | 6.8 | -6.7 | 446,728.32 | 766,907.69 | 32° 13' 30.814 N | 103° 28' 12.805 W |
| 2,000.0 | 0.99 | 334.56 | 1,999.9 | 8.4 | -7.6 | 446,729.86 | 766,906.84 | 32° 13' 30.829 N | 103° 28' 12.815 W |
| 2,100.0 | 1.26 | 317.39 | 2,099.9 | 10.0 | -8.7 | 446,731.45 | 766,905.73 | 32° 13' 30.845 N | 103° 28' 12.828 W |
| 2,200.0 | 1.35 | 347.51 | 2,199.9 | 11.9 | -9.7 | 446,733.41 | 766,904.73 | 32° 13' 30.865 N | 103° 28' 12.840 W |
| 2,300.0 | 1.34 | 340.79 | 2,299.8 | 14.2 | -10.3 | 446,735.67 | 766,904.09 | 32° 13' 30.887 N | 103° 28' 12.847 W |
| 2,400.0 | 0.72 | 298.02 | 2,399.8 | 15.6 | -11.2 | 446,737.07 | 766,903.15 | 32° 13' 30.901 N | 103° 28' 12.858 W |
| 2,500.0 | 0.92 | 307.88 | 2,499.8 | 16.4 | -12.4 | 446,737.86 | 766,901.96 | 32° 13' 30.909 N | 103° 28' 12.871 W |
| 2,600.0 | 1.00 | 303.45 | 2,599.8 | 17.3 | -13.8 | 446,738.83 | 766,900.60 | 32° 13' 30.919 N | 103° 28' 12.887 W |
| 2,700.0 | 1.12 | 298.70 | 2,699.8 | 18.3 | -15.4 | 446,739.78 | 766,899.01 | 32° 13' 30.928 N | 103° 28' 12.905 W |
| 2,800.0 | 1.13 | 309.78 | 2,799.8 | 19.4 | -17.0 | 446,740.88 | 766,897.40 | 32° 13' 30.939 N | 103° 28' 12.924 W |
| 2,900.0 | 1.09 | 324.68 | 2,899.7 | 20.8 | -18.3 | 446,742.29 | 766,896.09 | 32° 13' 30.953 N | 103° 28' 12.939 W |
| 3,000.0 | 1.41 | 326.53 | 2,999.7 | 22.6 | -19.5 | 446,744.09 | 766,894.86 | 32° 13' 30.971 N | 103° 28' 12.953 W |
| 3,100.0 | 1.46 | 314.98 | 3,099.7 | 24.5 | -21.1 | 446,746.02 | 766,893.28 | 32° 13' 30.990 N | 103° 28' 12.972 W |
| 3,200.0 | 1.43 | 346.39 | 3,199.7 | 26.6 | -22.3 | 446,748.13 | 766,892.09 | 32° 13' 31.011 N | 103° 28' 12.985 W |
| 3,300.0 | 1.15 | 340.68 | 3,299.6 | 28.8 | -22.9 | 446,750.29 | 766,891.46 | 32° 13' 31.033 N | 103° 28' 12.992 W |
| 3,400.0 | 1.29 | 347.23 | 3,399.6 | 30.8 | -23.5 | 446,752.33 | 766,890.88 | 32° 13' 31.053 N | 103° 28' 12.999 W |
| 3,500.0 | 1.55 | 359.63 | 3,499.6 | 33.3 | -23.8 | 446,754.78 | 766,890.62 | 32° 13' 31.077 N | 103° 28' 13.002 W |
| 3,600.0 | 1.50 | 354.29 | 3,599.5 | 35.9 | -23.9 | 446,757.44 | 766,890.48 | 32° 13' 31.103 N | 103° 28' 13.003 W |
| 3,700.0 | 1.57 | 353.35 | 3,699.5 | 38.6 | -24.2 | 446,760.10 | 766,890.20 | 32° 13' 31.130 N | 103° 28' 13.006 W |
| 3,800.0 | 1.16 | 340.90 | 3,799.5 | 40.9 | -24.7 | 446,762.42 | 766,889.71 | 32° 13' 31.153 N | 103° 28' 13.012 W |
| 3,900.0 | 1.11 | 343.06 | 3,899.5 | 42.8 | -25.3 | 446,764.30 | 766,889.09 | 32° 13' 31.172 N | 103° 28' 13.019 W |
| 4,000.0 | 1.05 | 358.95 | 3,999.4 | 44.6 | -25.6 | 446,766.14 | 766,888.79 | 32° 13' 31.190 N | 103° 28' 13.022 W |
| 4,100.0 | 1.24 | 5.43 | 4,099.4 | 46.6 | -25.5 | 446,768.14 | 766,888.88 | 32° 13' 31.209 N | 103° 28' 13.021 W |
| 4,200.0 | 1.24 | 3.02 | 4,199.4 | 48.8 | -25.4 | 446,770.30 | 766,889.04 | 32° 13' 31.231 N | 103° 28' 13.019 W |
| 4,300.0 | 1.23 | 11.20 | 4,299.4 | 50.9 | -25.1 | 446,772.43 | 766,889.30 | 32° 13' 31.252 N | 103° 28' 13.015 W |
| 4,400.0 | 2.24 | 31.28 | 4,399.3 | 53.7 | -23.9 | 446,775.15 | 766,890.53 | 32° 13' 31.279 N | 103° 28' 13.001 W |
| 4,500.0 | 2.45 | 52.71 | 4,499.2 | 56.6 | -21.2 | 446,778.12 | 766,893.24 | 32° 13' 31.308 N | 103° 28' 12.969 W |
| 4,600.0 | 2.30 | 66.39 | 4,599.2 | 58.7 | -17.6 | 446,780.22 | 766,896.78 | 32° 13' 31.328 N | 103° 28' 12.928 W |
| 4,700.0 | 1.54 | 67.61 | 4,699.1 | 60.0 | -14.5 | 446,781.53 | 766,899.86 | 32° 13' 31.341 N | 103° 28' 12.892 W |
| 4,800.0 | 2.01 | 79.93 | 4,799.1 | 60.8 | -11.6 | 446,782.35 | 766,902.83 | 32° 13' 31.349 N | 103° 28' 12.857 W |
| 4,900.0 | 2.18 | 96.92 | 4,899.0 | 60.9 | -8.0 | 446,782.43 | 766,906.45 | 32° 13' 31.349 N | 103° 28' 12.815 W |
| 5,000.0 | 1.35 | 112.14 | 4,998.9 | 60.3 | -5.0 | 446,781.75 | 766,909.43 | 32° 13' 31.343 N | 103° 28' 12.780 W |
| 5,100.0 | 0.79 | 102.68 | 5,098.9 | 59.7 | -3.2 | 446,781.16 | 766,911.19 | 32° 13' 31.337 N | 103° 28' 12.760 W |
| 5,200.0 | 0.26 | 86.16 | 5,198.9 | 59.5 | -2.3 | 446,781.02 | 766,912.09 | 32° 13' 31.335 N | 103° 28' 12.749 W |
| 5,300.0 | 0.22 | 97.20 | 5,298.9 | 59.5 | -1.9 | 446,781.01 | 766,912.50 | 32° 13' 31.335 N | 103° 28' 12.745 W |
| 5,400.0 | 0.37 | 290.87 | 5,398.9 | 59.6 | -2.0 | 446,781.10 | 766,912.39 | 32° 13' 31.336 N | 103° 28' 12.746 W |
| 5,500.0 | 0.44 | 277.33 | 5,498.9 | 59.8 | -2.7 | 446,781.27 | 766,911.71 | 32° 13' 31.338 N | 103° 28' 12.754 W |
| 5,600.0 | 0.36 | 276.48 | 5,598.9 | 59.9 | -3.4 | 446,781.35 | 766,911.02 | 32° 13' 31.339 N | 103° 28' 12.762 W |
| 5,700.0 | 0.11 | 277.27 | 5,698.9 | 59.9 | -3.8 | 446,781.40 | 766,910.61 | 32° 13' 31.339 N | 103° 28' 12.767 W |
| 5,800.0 | 0.04 | 56.16 | 5,798.9 | 59.9 | -3.9 | 446,781.43 | 766,910.54 | 32° 13' 31.339 N | 103° 28' 12.767 W |
| 5,900.0 | 0.32 | 83.57 | 5,898.9 | 60.0 | -3.5 | 446,781.48 | 766,910.85 | 32° 13' 31.340 N | 103° 28' 12.764 W |
| 6,000.0 | 0.58 | 90.21 | 5,998.9 | 60.0 | -2.8 | 446,781.51 | 766,911.63 | 32° 13' 31.340 N | 103° 28' 12.755 W |
| 6,100.0 | 0.59 | 98.50 | 6,098.9 | 59.9 | -1.7 | 446,781.43 | 766,912.65 | 32° 13' 31.339 N | 103° 28' 12.743 W |
| 6,200.0 | 0.80 | 75.67 | 6,198.9 | 60.0 | -0.6 | 446,781.53 | 766,913.84 | 32° 13' 31.340 N | 103° 28' 12.729 W |
| 6,300.0 | 0.94 | 75.04 | 6,298.9 | 60.4 | 0.9 | 446,781.92 | 766,915.30 | 32° 13' 31.344 N | 103° 28' 12.712 W |
| 6,400.0 | 1.08 | 61.09 | 6,398.9 | 61.1 | 2.5 | 446,782.58 | 766,916.92 | 32° 13' 31.350 N | 103° 28' 12.693 W |
| 6,500.0 | 1.01 | 99.19 | 6,498.9 | 61.4 | 4.2 | 446,782.90 | 766,918.62 | 32° 13' 31.353 N | 103° 28' 12.673 W |

| | | | |
|---|---|---|---|
| **Company:** | COG Operating LLC | **Local Co-ordinate Reference:** | Well #2H |
| **Project:** | Lea County, NM | **TVD Reference:** | KB @ 3552.8usft |
| **Site:** | Picasso Federal Com | **MD Reference:** | KB @ 3552.8usft |
| **Well:** | #2H | **North Reference:** | Grid |
| **Wellbore:** | ST #1 | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | ST #1 | **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 |
|---|---|---|---|---|---|---|---|---|---|
| 6,600.0 | 1.08 | 62.13 | 6,598.8 | 61.7 | 5.9 | 446,783.20 | 766,920.32 | 32° 13' 31.356 N | 103° 28' 12.653 W |
| 6,700.0 | 1.11 | 74.98 | 6,698.8 | 62.4 | 7.7 | 446,783.89 | 766,922.09 | 32° 13' 31.363 N | 103° 28' 12.633 W |
| 6,800.0 | 1.34 | 65.98 | 6,798.8 | 63.1 | 9.7 | 446,784.62 | 766,924.09 | 32° 13' 31.370 N | 103° 28' 12.609 W |
| 6,900.0 | 1.11 | 71.26 | 6,898.8 | 63.9 | 11.7 | 446,785.40 | 766,926.08 | 32° 13' 31.377 N | 103° 28' 12.586 W |
| 7,000.0 | 0.69 | 58.00 | 6,998.8 | 64.5 | 13.1 | 446,786.03 | 766,927.51 | 32° 13' 31.384 N | 103° 28' 12.569 W |
| 7,100.0 | 0.60 | 68.82 | 7,098.8 | 65.0 | 14.1 | 446,786.54 | 766,928.50 | 32° 13' 31.388 N | 103° 28' 12.558 W |
| 7,200.0 | 0.51 | 108.96 | 7,198.8 | 65.1 | 15.0 | 446,786.59 | 766,929.41 | 32° 13' 31.389 N | 103° 28' 12.547 W |
| 7,300.0 | 0.69 | 103.97 | 7,298.7 | 64.8 | 16.0 | 446,786.30 | 766,930.42 | 32° 13' 31.386 N | 103° 28' 12.536 W |
| 7,400.0 | 0.84 | 120.25 | 7,398.7 | 64.3 | 17.2 | 446,785.78 | 766,931.64 | 32° 13' 31.381 N | 103° 28' 12.521 W |
| 7,500.0 | 0.62 | 112.29 | 7,498.7 | 63.7 | 18.4 | 446,785.21 | 766,932.77 | 32° 13' 31.375 N | 103° 28' 12.508 W |
| 7,600.0 | 0.81 | 129.40 | 7,598.7 | 63.1 | 19.4 | 446,784.55 | 766,933.82 | 32° 13' 31.368 N | 103° 28' 12.496 W |
| 7,700.0 | 0.77 | 133.41 | 7,698.7 | 62.1 | 20.5 | 446,783.64 | 766,934.85 | 32° 13' 31.359 N | 103° 28' 12.484 W |
| 7,800.0 | 0.46 | 166.00 | 7,798.7 | 61.3 | 21.0 | 446,782.79 | 766,935.44 | 32° 13' 31.351 N | 103° 28' 12.477 W |
| 7,900.0 | 0.76 | 231.85 | 7,898.7 | 60.5 | 20.6 | 446,781.99 | 766,935.01 | 32° 13' 31.343 N | 103° 28' 12.482 W |
| 8,000.0 | 0.73 | 240.68 | 7,998.7 | 59.8 | 19.5 | 446,781.27 | 766,933.93 | 32° 13' 31.336 N | 103° 28' 12.495 W |
| 8,100.0 | 0.79 | 224.53 | 8,098.7 | 59.0 | 18.5 | 446,780.47 | 766,932.90 | 32° 13' 31.328 N | 103° 28' 12.507 W |
| 8,200.0 | 0.82 | 224.99 | 8,198.7 | 58.0 | 17.5 | 446,779.47 | 766,931.91 | 32° 13' 31.318 N | 103° 28' 12.519 W |
| 8,300.0 | 0.96 | 241.96 | 8,298.7 | 57.1 | 16.3 | 446,778.57 | 766,930.66 | 32° 13' 31.309 N | 103° 28' 12.533 W |
| 8,400.0 | 1.07 | 245.98 | 8,398.6 | 56.3 | 14.7 | 446,777.80 | 766,929.07 | 32° 13' 31.302 N | 103° 28' 12.552 W |
| 8,500.0 | 1.22 | 270.97 | 8,498.6 | 55.9 | 12.8 | 446,777.43 | 766,927.15 | 32° 13' 31.298 N | 103° 28' 12.574 W |
| 8,600.0 | 1.37 | 282.76 | 8,598.6 | 56.2 | 10.5 | 446,777.72 | 766,924.92 | 32° 13' 31.301 N | 103° 28' 12.600 W |
| 8,700.0 | 1.44 | 285.84 | 8,698.6 | 56.8 | 8.1 | 446,778.32 | 766,922.55 | 32° 13' 31.308 N | 103° 28' 12.628 W |
| 8,800.0 | 1.61 | 296.46 | 8,798.5 | 57.8 | 5.7 | 446,779.29 | 766,920.08 | 32° 13' 31.317 N | 103° 28' 12.656 W |
| 8,836.0 | 3.30 | 319.00 | 8,834.5 | 58.8 | 4.6 | 446,780.30 | 766,918.95 | 32° 13' 31.327 N | 103° 28' 12.670 W |
| 8,867.0 | 5.80 | 314.10 | 8,865.4 | 60.6 | 2.8 | 446,782.06 | 766,917.24 | 32° 13' 31.345 N | 103° 28' 12.689 W |
| 8,898.0 | 8.90 | 308.30 | 8,896.1 | 63.1 | -0.2 | 446,784.64 | 766,914.23 | 32° 13' 31.371 N | 103° 28' 12.724 W |
| 8,930.0 | 11.30 | 312.10 | 8,927.6 | 66.8 | -4.4 | 446,788.28 | 766,909.96 | 32° 13' 31.407 N | 103° 28' 12.773 W |
| 8,961.0 | 15.40 | 319.70 | 8,957.8 | 72.0 | -9.4 | 446,793.46 | 766,905.04 | 32° 13' 31.459 N | 103° 28' 12.830 W |
| 8,993.0 | 17.80 | 322.40 | 8,988.5 | 79.1 | -15.1 | 446,800.57 | 766,899.31 | 32° 13' 31.530 N | 103° 28' 12.896 W |
| 9,024.0 | 19.60 | 313.50 | 9,017.8 | 86.4 | -21.8 | 446,807.91 | 766,892.64 | 32° 13' 31.603 N | 103° 28' 12.973 W |
| 9,056.0 | 22.50 | 313.70 | 9,047.7 | 94.3 | -30.1 | 446,815.83 | 766,884.32 | 32° 13' 31.682 N | 103° 28' 13.069 W |
| 9,087.0 | 26.20 | 315.10 | 9,075.9 | 103.3 | -39.2 | 446,824.78 | 766,875.20 | 32° 13' 31.771 N | 103° 28' 13.175 W |
| 9,119.0 | 30.50 | 317.40 | 9,104.1 | 114.3 | -49.7 | 446,835.77 | 766,864.71 | 32° 13' 31.881 N | 103° 28' 13.296 W |
| 9,150.0 | 34.50 | 318.60 | 9,130.2 | 126.7 | -60.8 | 446,848.15 | 766,853.58 | 32° 13' 32.004 N | 103° 28' 13.424 W |
| 9,181.0 | 38.00 | 319.00 | 9,155.2 | 140.4 | -72.9 | 446,861.94 | 766,841.51 | 32° 13' 32.141 N | 103° 28' 13.563 W |
| 9,213.0 | 41.60 | 320.30 | 9,179.8 | 156.1 | -86.1 | 446,877.56 | 766,828.25 | 32° 13' 32.297 N | 103° 28' 13.716 W |
| 9,244.0 | 44.70 | 318.40 | 9,202.4 | 172.1 | -100.0 | 446,893.63 | 766,814.44 | 32° 13' 32.457 N | 103° 28' 13.876 W |
| 9,276.0 | 48.20 | 315.80 | 9,224.5 | 189.1 | -115.8 | 446,910.60 | 766,798.64 | 32° 13' 32.626 N | 103° 28' 14.058 W |
| 9,307.0 | 51.50 | 316.50 | 9,244.5 | 206.2 | -132.2 | 446,927.69 | 766,782.23 | 32° 13' 32.797 N | 103° 28' 14.247 W |
| 9,339.0 | 55.60 | 316.70 | 9,263.5 | 224.9 | -149.8 | 446,946.39 | 766,764.55 | 32° 13' 32.983 N | 103° 28' 14.451 W |
| 9,370.0 | 59.20 | 317.10 | 9,280.2 | 244.0 | -167.7 | 446,965.46 | 766,746.71 | 32° 13' 33.173 N | 103° 28' 14.657 W |
| 9,402.0 | 62.70 | 316.80 | 9,295.7 | 264.4 | -186.8 | 446,985.90 | 766,727.62 | 32° 13' 33.377 N | 103° 28' 14.878 W |
| 9,433.0 | 63.20 | 316.40 | 9,309.8 | 284.5 | -205.7 | 447,005.96 | 766,708.65 | 32° 13' 33.577 N | 103° 28' 15.096 W |
| 9,464.0 | 66.10 | 316.10 | 9,323.1 | 304.7 | -225.1 | 447,026.19 | 766,689.28 | 32° 13' 33.779 N | 103° 28' 15.320 W |
| 9,496.0 | 71.20 | 316.80 | 9,334.7 | 326.3 | -245.6 | 447,047.79 | 766,668.75 | 32° 13' 33.994 N | 103° 28' 15.557 W |
| 9,527.0 | 75.40 | 316.70 | 9,343.6 | 347.9 | -266.0 | 447,069.41 | 766,648.41 | 32° 13' 34.210 N | 103° 28' 15.792 W |
| 9,559.0 | 80.00 | 316.10 | 9,350.4 | 370.5 | -287.5 | 447,092.04 | 766,626.86 | 32° 13' 34.435 N | 103° 28' 16.041 W |
| 9,595.0 | 85.20 | 316.70 | 9,355.1 | 396.4 | -312.2 | 447,117.89 | 766,602.25 | 32° 13' 34.693 N | 103° 28' 16.325 W |
| 9,627.0 | 89.90 | 317.30 | 9,356.4 | 419.8 | -333.9 | 447,141.26 | 766,580.45 | 32° 13' 34.926 N | 103° 28' 16.576 W |
| 9,659.0 | 93.90 | 318.80 | 9,355.4 | 443.5 | -355.3 | 447,165.04 | 766,559.07 | 32° 13' 35.163 N | 103° 28' 16.823 W |
| 9,722.0 | 95.60 | 319.30 | 9,350.2 | 491.0 | -396.5 | 447,212.46 | 766,517.93 | 32° 13' 35.636 N | 103° 28' 17.297 W |
| 9,816.0 | 90.70 | 320.10 | 9,345.0 | 562.5 | -457.2 | 447,284.02 | 766,457.24 | 32° 13' 36.349 N | 103° 28' 17.997 W |
| 9,910.0 | 91.30 | 321.30 | 9,343.4 | 635.3 | -516.7 | 447,356.75 | 766,397.71 | 32° 13' 37.073 N | 103° 28' 18.683 W |
| 10,005.0 | 91.90 | 320.50 | 9,340.7 | 708.9 | -576.6 | 447,430.44 | 766,337.82 | 32° 13' 37.807 N | 103° 28' 19.373 W |
| 10,100.0 | 90.20 | 329.60 | 9,339.0 | 786.7 | -630.9 | 447,508.22 | 766,283.47 | 32° 13' 38.581 N | 103° 28' 19.999 W |

| | | | |
|---|---|---|---|
| **Company:** | COG Operating LLC | **Local Co-ordinate Reference:** | Well #2H |
| **Project:** | Lea County, NM | **TVD Reference:** | KB @ 3552.8usft |
| **Site:** | Picasso Federal Com | **MD Reference:** | KB @ 3552.8usft |
| **Well:** | #2H | **North Reference:** | Grid |
| **Wellbore:** | ST #1 | **Survey Calculation Method:** | Minimum Curvature |
| **Design:** | ST #1 | **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 |
|---|---|---|---|---|---|---|---|---|---|
| 10,194.0 | 92.40 | 334.30 | 9,336.8 | 869.6 | -675.1 | 447,591.12 | 766,239.29 | 32° 13' 39.405 N | 103° 28' 20.505 W |
| 10,289.0 | 94.00 | 337.00 | 9,331.5 | 956.0 | -714.2 | 447,677.53 | 766,200.19 | 32° 13' 40.263 N | 103° 28' 20.953 W |
| 10,384.0 | 94.50 | 345.30 | 9,324.5 | 1,045.6 | -744.8 | 447,767.10 | 766,169.60 | 32° 13' 41.152 N | 103° 28' 21.300 W |
| 10,478.0 | 92.50 | 351.00 | 9,318.7 | 1,137.4 | -764.0 | 447,858.89 | 766,150.35 | 32° 13' 42.061 N | 103° 28' 21.516 W |
| 10,573.0 | 93.00 | 357.30 | 9,314.2 | 1,231.7 | -773.7 | 447,953.24 | 766,140.68 | 32° 13' 42.996 N | 103° 28' 21.619 W |
| 10,668.0 | 92.10 | 358.60 | 9,309.9 | 1,326.6 | -777.1 | 448,048.08 | 766,137.29 | 32° 13' 43.934 N | 103° 28' 21.650 W |
| 10,762.0 | 92.20 | 357.60 | 9,306.4 | 1,420.5 | -780.2 | 448,141.96 | 766,134.17 | 32° 13' 44.864 N | 103° 28' 21.678 W |
| 10,857.0 | 92.20 | 357.30 | 9,302.8 | 1,515.3 | -784.4 | 448,236.79 | 766,129.95 | 32° 13' 45.802 N | 103° 28' 21.718 W |
| 10,951.0 | 91.70 | 356.30 | 9,299.6 | 1,609.1 | -789.7 | 448,330.59 | 766,124.71 | 32° 13' 46.731 N | 103° 28' 21.770 W |
| 11,046.0 | 93.50 | 357.40 | 9,295.3 | 1,703.8 | -794.9 | 448,425.35 | 766,119.49 | 32° 13' 47.669 N | 103° 28' 21.822 W |
| 11,140.0 | 93.50 | 356.60 | 9,289.5 | 1,797.5 | -799.8 | 448,519.04 | 766,114.58 | 32° 13' 48.597 N | 103° 28' 21.871 W |
| 11,235.0 | 93.80 | 357.10 | 9,283.5 | 1,892.2 | -805.0 | 448,613.70 | 766,109.37 | 32° 13' 49.534 N | 103° 28' 21.922 W |
| 11,329.0 | 94.50 | 356.60 | 9,276.7 | 1,985.8 | -810.2 | 448,707.32 | 766,104.22 | 32° 13' 50.460 N | 103° 28' 21.974 W |
| 11,424.0 | 94.20 | 358.50 | 9,269.5 | 2,080.5 | -814.2 | 448,801.95 | 766,100.17 | 32° 13' 51.397 N | 103° 28' 22.012 W |
| 11,517.0 | 93.70 | 358.00 | 9,263.1 | 2,173.2 | -817.1 | 448,894.69 | 766,097.34 | 32° 13' 52.315 N | 103° 28' 22.036 W |
| 11,612.0 | 91.40 | 356.90 | 9,258.8 | 2,268.0 | -821.3 | 448,989.49 | 766,093.11 | 32° 13' 53.253 N | 103° 28' 22.077 W |
| 11,706.0 | 91.50 | 356.50 | 9,256.5 | 2,361.8 | -826.7 | 449,083.30 | 766,087.70 | 32° 13' 54.182 N | 103° 28' 22.131 W |
| 11,801.0 | 91.40 | 356.40 | 9,254.0 | 2,456.6 | -832.6 | 449,178.09 | 766,081.82 | 32° 13' 55.121 N | 103° 28' 22.190 W |
| 11,896.0 | 91.40 | 355.70 | 9,251.7 | 2,551.3 | -839.1 | 449,272.84 | 766,075.28 | 32° 13' 56.059 N | 103° 28' 22.258 W |
| 11,990.0 | 91.30 | 355.90 | 9,249.5 | 2,645.1 | -846.0 | 449,366.56 | 766,068.40 | 32° 13' 56.987 N | 103° 28' 22.329 W |
| 12,085.0 | 91.50 | 356.30 | 9,247.2 | 2,739.8 | -852.5 | 449,461.31 | 766,061.94 | 32° 13' 57.925 N | 103° 28' 22.396 W |
| 12,179.0 | 91.10 | 355.80 | 9,245.1 | 2,833.6 | -858.9 | 449,555.06 | 766,055.47 | 32° 13' 58.853 N | 103° 28' 22.462 W |
| 12,274.0 | 92.70 | 356.30 | 9,241.9 | 2,928.3 | -865.5 | 449,649.78 | 766,048.93 | 32° 13' 59.791 N | 103° 28' 22.529 W |
| 12,368.0 | 93.30 | 356.10 | 9,237.0 | 3,021.9 | -871.7 | 449,743.44 | 766,042.70 | 32° 14' 0.718 N | 103° 28' 22.593 W |
| 12,462.0 | 93.70 | 355.80 | 9,231.3 | 3,115.5 | -878.3 | 449,837.03 | 766,036.08 | 32° 14' 1.645 N | 103° 28' 22.662 W |
| 12,557.0 | 93.30 | 355.60 | 9,225.5 | 3,210.1 | -885.4 | 449,931.59 | 766,028.97 | 32° 14' 2.581 N | 103° 28' 22.735 W |
| 12,651.0 | 93.50 | 355.40 | 9,219.9 | 3,303.6 | -892.8 | 450,025.14 | 766,021.61 | 32° 14' 3.507 N | 103° 28' 22.812 W |
| 12,746.0 | 93.50 | 356.40 | 9,214.1 | 3,398.2 | -899.6 | 450,119.71 | 766,014.83 | 32° 14' 4.444 N | 103° 28' 22.883 W |
| 12,840.0 | 93.50 | 356.10 | 9,208.3 | 3,491.8 | -905.7 | 450,213.34 | 766,008.69 | 32° 14' 5.370 N | 103° 28' 22.945 W |
| 12,935.0 | 94.20 | 357.30 | 9,202.0 | 3,586.5 | -911.2 | 450,307.96 | 766,003.23 | 32° 14' 6.307 N | 103° 28' 23.000 W |
| 13,029.0 | 95.10 | 357.70 | 9,194.3 | 3,680.1 | -915.3 | 450,401.56 | 765,999.15 | 32° 14' 7.234 N | 103° 28' 23.039 W |
| 13,123.0 | 94.50 | 357.60 | 9,186.5 | 3,773.7 | -919.1 | 450,495.16 | 765,995.31 | 32° 14' 8.160 N | 103° 28' 23.075 W |
| 13,218.0 | 94.20 | 357.20 | 9,179.3 | 3,868.3 | -923.4 | 450,589.78 | 765,991.01 | 32° 14' 9.097 N | 103° 28' 23.116 W |
| 13,313.0 | 93.70 | 357.30 | 9,172.7 | 3,962.9 | -927.9 | 450,684.45 | 765,986.46 | 32° 14' 10.034 N | 103° 28' 23.160 W |
| 13,407.0 | 93.10 | 357.60 | 9,167.1 | 4,056.7 | -932.1 | 450,778.19 | 765,982.29 | 32° 14' 10.962 N | 103° 28' 23.200 W |
| 13,501.0 | 93.10 | 357.30 | 9,162.1 | 4,150.5 | -936.3 | 450,871.96 | 765,978.11 | 32° 14' 11.890 N | 103° 28' 23.240 W |
| 13,596.0 | 91.90 | 356.90 | 9,157.9 | 4,245.2 | -941.1 | 450,966.75 | 765,973.31 | 32° 14' 12.828 N | 103° 28' 23.287 W |
| 13,691.0 | 91.90 | 355.80 | 9,154.8 | 4,340.0 | -947.1 | 451,061.50 | 765,967.26 | 32° 14' 13.767 N | 103° 28' 23.348 W |
| 13,785.0 | 91.30 | 356.40 | 9,152.1 | 4,433.7 | -953.5 | 451,155.24 | 765,960.87 | 32° 14' 14.695 N | 103° 28' 23.414 W |
| 13,880.0 | 90.50 | 356.80 | 9,150.7 | 4,528.6 | -959.2 | 451,250.06 | 765,955.24 | 32° 14' 15.633 N | 103° 28' 23.471 W |
| 13,974.0 | 90.50 | 355.80 | 9,149.8 | 4,622.4 | -965.2 | 451,343.86 | 765,949.17 | 32° 14' 16.562 N | 103° 28' 23.533 W |
| 14,024.0 | 90.30 | 355.80 | 9,149.5 | 4,672.2 | -968.9 | 451,393.73 | 765,945.51 | 32° 14' 17.056 N | 103° 28' 23.571 W |
| **Final MWD Survey** | | | | | | | | | |
| 14,084.0 | 90.30 | 355.80 | 9,149.2 | 4,732.1 | -973.3 | 451,453.57 | 765,941.12 | 32° 14' 17.648 N | 103° 28' 23.616 W |
| **Projection to Bit** | | | | | | | | | |

**Design Annotations**

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates +N/-S (usft) | Local Coordinates +E/-W (usft) | Comment |
|---|---|---|---|---|
| 14,024.0 | 9,149.5 | 4,672.2 | -968.9 | Final MWD Survey |
| 14,084.0 | 9,149.2 | 4,732.1 | -973.3 | Projection to Bit |