# Noble Energy

**CO, Weld County (NAD 83 NZ)**
**Sec 4 Twn 6 N Rng 63 W**
**NCLP AA06-64-1AHNA Original Hole**
**05-123-39027**
**H&P 277**

PATHFINDER

A Schlumberger Company

# Final Survey Report

**29-Oct-2014**

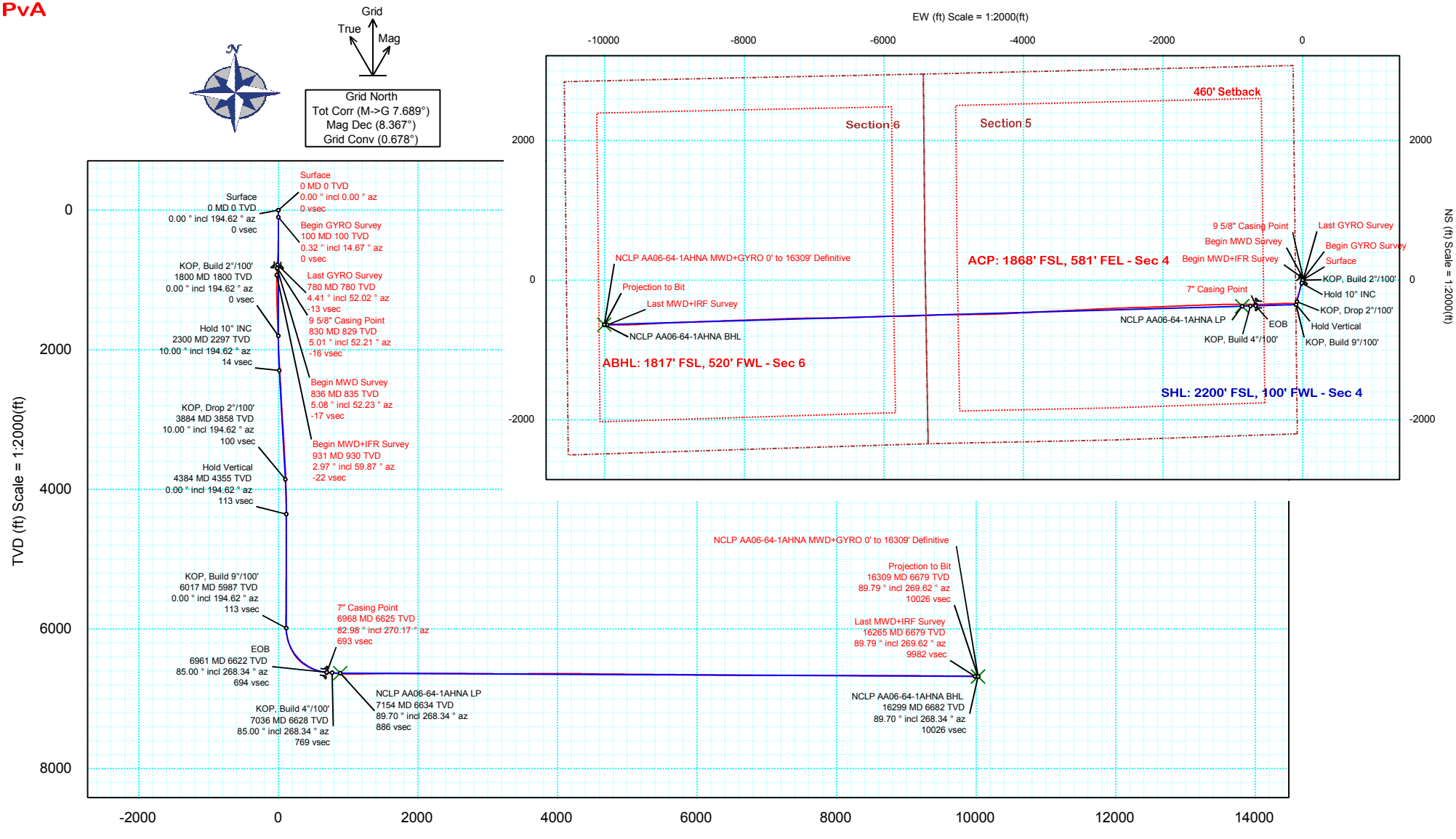
| | | |
|---|---|---|
| **Well Coordinates:** | **NAD83 CO State Plane, N Zone, US Feet** | |
| | **N 40° 30' 52.41600"** | **W 104° 27' 3.09600"** |
| | **1432020.39 usFt** | **3291695.78 usFt** |
| **Ground Level:** | **4711.00 ft MSL** | |
| **TVD Reference:** | **KB 24ft @ 4735.00 ft MSL** | |
| **Local Coordinate Origin:** | **NCLP AA06-64-1AHNA well head** | |
| **Vertical Section Azimuth:** | **266.355 ° (Grid North)** | |
| **North Reference:** | **Grid North** | |
| **DOX Version:** | **2.8** | |

# Noble Energy

| Borehole: | Well: | Field: | Structure: |
|---|---|---|---|
| Original Hole | NCLP AA06-64-1AHNA | CO, Weld County (NAD 83 NZ) | Noble 04-06N-63W (NCLP AA06 64-65 Pad) - H&P 277 |

| Gravity & Magnetic Parameters | | | | | Surface Location | NAD83 Colorado State Plane, Northern Zone, US Feet | | | | Miscellaneous | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Model: | BGGM 2014 | Dip: | 67.079° | Date: | 26-Jul-2014 | Lat: | N 40 30 52.42 | Northing: | 1432020.38ftUS | Grid Conv: | 0.6779° | Slot: | NCLP AA06-64-1AHNA | TVD Ref: | KB 24ft(4735ft above MSL) |
| MagDec: | 8.367° | FS: | 52796.563nT | Gravity FS: | 999.066mgn (9.80665 Based) | Lon: | W 104 27 3.10 | Easting: | 3291695.78ftUS | Scale Fact: | 0.99996742 | Plan: | NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' Definitive | | |

PvA



# NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' Definitive Survey
## Geodetic Report
**(Def Survey)**

| | | | |
|---|---|---|---|
| **Report Date:** | August 19, 2014 - 02:10 PM | **Survey / DLS Computation:** | Minimum Curvature / Lubinski |
| **Client:** | Noble Energy | **Vertical Section Azimuth:** | 266.355 ° (Grid North) |
| **Field:** | CO, Weld County (NAD 83 NZ) | **Vertical Section Origin:** | 0.000 ft, 0.000 ft |
| **Structure / Slot:** | Noble 04-06N-63W (NCLP AA06 64-65 Pad) - H&P 277 / NCLP AA06-64-1AHNA | **TVD Reference Datum:** | KB 24ft |
| **Well:** | NCLP AA06-64-1AHNA | **TVD Reference Elevation:** | 4735.000 ft above MSL |
| **Borehole:** | Original Hole | **Seabed / Ground Elevation:** | 4711.000 ft above MSL |
| **UWI / API#:** | Unknown / Unknown | **Magnetic Declination:** | 8.367 ° |
| **Survey Name:** | NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' Definitive | **Total Gravity Field Strength:** | 999.0659mgn (9.80665 Based) |
| **Survey Date:** | July 26, 2014 | **Gravity Model:** | GARM |
| **Tort / AHD / DDI / ERD Ratio:** | 185.459 ° / 10356.129 ft / 6.671 / 1.551 | **Total Magnetic Field Strength:** | 52796.563 nT |
| **Coordinate Reference System:** | NAD83 Colorado State Plane, Northern Zone, US Feet | **Magnetic Dip Angle:** | 67.079 ° |
| **Location Lat / Long:** | N 40° 30' 52.41600", W 104° 27' 3.09600" | **Declination Date:** | July 26, 2014 |
| **Location Grid N/E Y/X:** | N 1432020.385 ftUS, E 3291695.777 ftUS | **Magnetic Declination Model:** | BGGM 2014 |
| **CRS Grid Convergence Angle:** | 0.6779 ° | **North Reference:** | Grid North |
| **Grid Scale Factor:** | 0.99996742 | **Grid Convergence Used:** | 0.6779 ° |
| **Version / Patch:** | 2.8.551.0 | **Total Corr Mag North->Grid North:** | 7.6887 ° |
| | | **Local Coord Referenced To:** | Well Head |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | N/A | 1432020.39 | 3291695.78 | N 40 30 52.42 | W 104 27 3.10 |
| Begin GYRO Survey | 100.00 | 0.32 | 14.67 | 100.00 | -0.09 | 0.27 | 0.07 | 0.32 | 1432020.66 | 3291695.85 | N 40 30 52.42 | W 104 27 3.10 |
| | 200.00 | 0.32 | 40.77 | 200.00 | -0.37 | 0.75 | 0.32 | 0.14 | 1432021.14 | 3291696.10 | N 40 30 52.42 | W 104 27 3.09 |
| | 300.00 | 0.10 | 20.68 | 300.00 | -0.60 | 1.04 | 0.54 | 0.23 | 1432021.43 | 3291696.31 | N 40 30 52.43 | W 104 27 3.09 |
| | 400.00 | 0.55 | 26.37 | 400.00 | -0.88 | 1.56 | 0.78 | 0.45 | 1432021.94 | 3291696.56 | N 40 30 52.43 | W 104 27 3.09 |
| | 500.00 | 1.37 | 46.76 | 499.98 | -2.04 | 2.81 | 1.87 | 0.88 | 1432023.19 | 3291697.64 | N 40 30 52.44 | W 104 27 3.07 |
| | 600.00 | 2.24 | 48.31 | 599.93 | -4.50 | 4.92 | 4.20 | 0.87 | 1432025.31 | 3291699.97 | N 40 30 52.46 | W 104 27 3.04 |
| | 700.00 | 3.33 | 52.33 | 699.81 | -8.45 | 8.00 | 7.95 | 1.11 | 1432028.38 | 3291703.73 | N 40 30 52.49 | W 104 27 2.99 |
| Last GYRO Survey | 780.00 | 4.41 | 52.02 | 779.63 | -12.91 | 11.31 | 12.22 | 1.35 | 1432031.70 | 3291707.99 | N 40 30 52.53 | W 104 27 2.94 |
| *9 5/8" Casing Point* | *830.00* | *5.01* | *52.21* | *829.46* | *-16.31* | *13.83* | *15.46* | *1.20* | *1432034.22* | *3291711.23* | *N 40 30 52.55* | *W 104 27 2.89* |
| MWD Survey Begin | 836.00 | 5.08 | 52.23 | 835.43 | -16.74 | 14.16 | 15.87 | 1.20 | 1432034.54 | 3291711.65 | N 40 30 52.55 | W 104 27 2.89 |
| MWD+IFR Survey | 931.00 | 2.97 | 59.87 | 930.20 | -22.43 | 17.97 | 21.33 | 2.29 | 1432038.35 | 3291717.10 | N 40 30 52.59 | W 104 27 2.82 |
| | 1026.00 | 0.65 | 187.90 | 1025.16 | -24.52 | 18.67 | 23.38 | 3.59 | 1432039.05 | 3291719.16 | N 40 30 52.60 | W 104 27 2.79 |
| | 1119.00 | 0.59 | 190.91 | 1118.15 | -24.30 | 17.68 | 23.22 | 0.07 | 1432038.06 | 3291719.00 | N 40 30 52.59 | W 104 27 2.79 |
| | 1212.00 | 2.42 | 221.34 | 1211.12 | -22.79 | 15.73 | 21.83 | 2.08 | 1432036.12 | 3291717.61 | N 40 30 52.57 | W 104 27 2.81 |
| | 1306.00 | 2.61 | 226.28 | 1305.03 | -19.75 | 12.76 | 18.97 | 0.31 | 1432033.15 | 3291714.75 | N 40 30 52.54 | W 104 27 2.85 |
| | 1401.00 | 2.52 | 223.76 | 1399.93 | -16.56 | 9.76 | 15.97 | 0.15 | 1432030.14 | 3291711.74 | N 40 30 52.51 | W 104 27 2.89 |
| | 1494.00 | 2.32 | 225.39 | 1492.85 | -13.63 | 6.96 | 13.21 | 0.23 | 1432027.35 | 3291708.99 | N 40 30 52.48 | W 104 27 2.92 |
| | 1588.00 | 2.43 | 223.76 | 1586.77 | -10.73 | 4.19 | 10.48 | 0.14 | 1432024.57 | 3291706.26 | N 40 30 52.46 | W 104 27 2.96 |
| | 1683.00 | 2.60 | 227.43 | 1681.68 | -7.57 | 1.27 | 7.50 | 0.25 | 1432021.66 | 3291703.28 | N 40 30 52.43 | W 104 27 3.00 |
| | 1777.00 | 2.54 | 226.90 | 1775.58 | -4.30 | -1.59 | 4.41 | 0.07 | 1432018.79 | 3291700.19 | N 40 30 52.40 | W 104 27 3.04 |
| | 1872.00 | 4.41 | 208.63 | 1870.40 | -0.72 | -6.24 | 1.12 | 2.26 | 1432014.15 | 3291696.90 | N 40 30 52.35 | W 104 27 3.08 |
| | 1967.00 | 5.93 | 200.05 | 1965.02 | 3.20 | -14.05 | -2.31 | 1.79 | 1432006.33 | 3291693.47 | N 40 30 52.28 | W 104 27 3.13 |
| | 2061.00 | 6.06 | 199.22 | 2058.50 | 7.08 | -23.30 | -5.61 | 0.17 | 1431997.09 | 3291690.17 | N 40 30 52.19 | W 104 27 3.17 |
| | 2156.00 | 7.62 | 203.33 | 2152.82 | 11.88 | -33.82 | -9.75 | 1.72 | 1431986.57 | 3291686.02 | N 40 30 52.08 | W 104 27 3.23 |
| | 2251.00 | 9.09 | 199.15 | 2246.81 | 17.65 | -46.69 | -14.71 | 1.67 | 1431973.69 | 3291681.07 | N 40 30 51.96 | W 104 27 3.29 |
| | 2345.00 | 10.13 | 194.74 | 2339.50 | 23.13 | -61.70 | -19.25 | 1.35 | 1431958.68 | 3291676.53 | N 40 30 51.81 | W 104 27 3.35 |
| | 2440.00 | 9.74 | 194.65 | 2433.07 | 28.29 | -77.56 | -23.41 | 0.41 | 1431942.83 | 3291672.37 | N 40 30 51.65 | W 104 27 3.41 |
| | 2535.00 | 9.45 | 195.03 | 2526.74 | 33.31 | -92.86 | -27.46 | 0.31 | 1431927.52 | 3291668.31 | N 40 30 51.50 | W 104 27 3.47 |
| | 2629.00 | 9.54 | 193.92 | 2619.45 | 38.13 | -107.88 | -31.34 | 0.22 | 1431912.51 | 3291664.44 | N 40 30 51.35 | W 104 27 3.52 |
| | 2723.00 | 9.20 | 194.03 | 2712.20 | 42.77 | -122.73 | -35.03 | 0.36 | 1431897.66 | 3291660.74 | N 40 30 51.21 | W 104 27 3.57 |
| | 2818.00 | 10.34 | 192.75 | 2805.82 | 47.48 | -138.41 | -38.76 | 1.22 | 1431881.98 | 3291657.02 | N 40 30 51.05 | W 104 27 3.62 |
| | 2912.00 | 10.54 | 193.32 | 2898.26 | 52.37 | -155.01 | -42.60 | 0.24 | 1431865.38 | 3291653.18 | N 40 30 50.89 | W 104 27 3.67 |
| | 3007.00 | 10.86 | 195.85 | 2991.61 | 57.89 | -172.07 | -47.05 | 0.60 | 1431848.32 | 3291648.73 | N 40 30 50.72 | W 104 27 3.73 |
| | 3102.00 | 10.77 | 196.69 | 3084.93 | 63.96 | -189.18 | -52.04 | 0.19 | 1431831.21 | 3291643.74 | N 40 30 50.55 | W 104 27 3.80 |
| | 3196.00 | 10.90 | 197.95 | 3177.25 | 70.28 | -206.05 | -57.30 | 0.29 | 1431814.34 | 3291638.48 | N 40 30 50.39 | W 104 27 3.87 |
| | 3291.00 | 10.14 | 196.18 | 3270.65 | 76.43 | -222.63 | -62.40 | 0.87 | 1431797.77 | 3291633.38 | N 40 30 50.22 | W 104 27 3.94 |
| | 3386.00 | 9.82 | 194.68 | 3364.21 | 81.81 | -238.49 | -66.78 | 0.43 | 1431781.90 | 3291629.00 | N 40 30 50.07 | W 104 27 4.00 |
| | 3480.00 | 9.14 | 196.57 | 3456.93 | 86.91 | -253.40 | -70.94 | 0.80 | 1431766.99 | 3291624.84 | N 40 30 49.92 | W 104 27 4.05 |
| | 3575.00 | 9.35 | 192.84 | 3550.70 | 91.71 | -268.16 | -74.81 | 0.67 | 1431752.23 | 3291620.97 | N 40 30 49.78 | W 104 27 4.11 |
| | 3670.00 | 9.91 | 195.23 | 3644.36 | 96.54 | -283.57 | -78.67 | 0.72 | 1431736.82 | 3291617.11 | N 40 30 49.62 | W 104 27 4.16 |
| | 3764.00 | 8.45 | 196.06 | 3737.15 | 101.49 | -298.02 | -82.71 | 1.56 | 1431722.38 | 3291613.07 | N 40 30 49.48 | W 104 27 4.21 |
| | 3859.00 | 7.53 | 189.69 | 3831.23 | 105.28 | -310.86 | -85.69 | 1.34 | 1431709.54 | 3291610.09 | N 40 30 49.35 | W 104 27 4.25 |
| | 3953.00 | 6.40 | 186.73 | 3924.54 | 107.64 | -322.13 | -87.34 | 1.26 | 1431698.26 | 3291608.44 | N 40 30 49.24 | W 104 27 4.28 |
| | 4048.00 | 5.12 | 193.79 | 4019.06 | 109.86 | -331.51 | -88.97 | 1.54 | 1431688.89 | 3291606.81 | N 40 30 49.15 | W 104 27 4.30 |
| | 4143.00 | 3.50 | 201.50 | 4113.78 | 112.37 | -338.32 | -91.04 | 1.81 | 1431682.07 | 3291604.74 | N 40 30 49.08 | W 104 27 4.33 |
| | 4237.00 | 2.22 | 160.96 | 4207.67 | 113.10 | -342.72 | -91.50 | 2.46 | 1431677.68 | 3291604.28 | N 40 30 49.04 | W 104 27 4.33 |
| | 4332.00 | 0.48 | 26.09 | 4302.65 | 112.42 | -344.10 | -90.72 | 2.72 | 1431676.30 | 3291605.06 | N 40 30 49.03 | W 104 27 4.32 |
| | 4426.00 | 0.56 | 8.57 | 4396.65 | 112.12 | -343.29 | -90.48 | 0.19 | 1431677.11 | 3291605.30 | N 40 30 49.03 | W 104 27 4.32 |
| | 4521.00 | 0.51 | 347.50 | 4491.65 | 112.09 | -342.42 | -90.50 | 0.21 | 1431677.98 | 3291605.28 | N 40 30 49.04 | W 104 27 4.32 |
| | 4616.00 | 0.69 | 317.00 | 4586.64 | 112.52 | -341.59 | -90.99 | 0.38 | 1431678.81 | 3291604.79 | N 40 30 49.05 | W 104 27 4.33 |
| | 4711.00 | 0.59 | 278.42 | 4681.63 | 113.36 | -341.10 | -91.86 | 0.46 | 1431679.30 | 3291603.92 | N 40 30 49.06 | W 104 27 4.34 |
| | 4805.00 | 0.63 | 253.46 | 4775.63 | 114.34 | -341.17 | -92.83 | 0.28 | 1431679.22 | 3291602.95 | N 40 30 49.06 | W 104 27 4.35 |
| | 4900.00 | 0.35 | 147.60 | 4870.63 | 114.71 | -341.57 | -93.18 | 0.84 | 1431678.83 | 3291602.60 | N 40 30 49.05 | W 104 27 4.35 |
| | 4995.00 | 0.37 | 141.58 | 4965.63 | 114.39 | -342.05 | -92.83 | 0.05 | 1431678.34 | 3291602.95 | N 40 30 49.05 | W 104 27 4.35 |
| | 5090.00 | 0.48 | 138.44 | 5060.62 | 113.97 | -342.59 | -92.38 | 0.12 | 1431677.81 | 3291603.40 | N 40 30 49.04 | W 104 27 4.34 |
| | 5185.00 | 0.58 | 133.51 | 5155.62 | 113.40 | -343.22 | -91.77 | 0.12 | 1431677.18 | 3291604.01 | N 40 30 49.04 | W 104 27 4.34 |
| | 5279.00 | 0.83 | 127.29 | 5249.61 | 112.56 | -343.96 | -90.88 | 0.28 | 1431676.44 | 3291604.90 | N 40 30 49.03 | W 104 27 4.33 |
| | 5374.00 | 0.71 | 101.11 | 5344.60 | 111.47 | -344.49 | -89.75 | 0.39 | 1431675.91 | 3291606.03 | N 40 30 49.02 | W 104 27 4.31 |
| | 5469.00 | 0.53 | 72.50 | 5439.60 | 110.48 | -344.47 | -88.76 | 0.37 | 1431675.93 | 3291607.02 | N 40 30 49.02 | W 104 27 4.30 |
| | 5564.00 | 0.14 | 78.72 | 5534.60 | 109.94 | -344.32 | -88.22 | 0.41 | 1431676.08 | 3291607.55 | N 40 30 49.02 | W 104 27 4.29 |
| | 5658.00 | 0.56 | 43.89 | 5628.59 | 109.48 | -343.96 | -87.79 | 0.48 | 1431676.43 | 3291607.99 | N 40 30 49.03 | W 104 27 4.29 |
| | 5753.00 | 0.36 | 34.80 | 5723.59 | 108.96 | -343.38 | -87.30 | 0.22 | 1431677.01 | 3291608.48 | N 40 30 49.03 | W 104 27 4.28 |
| | 5848.00 | 0.40 | 38.09 | 5818.59 | 108.55 | -342.88 | -86.93 | 0.05 | 1431677.52 | 3291608.85 | N 40 30 49.04 | W 104 27 4.27 |
| | 5942.00 | 0.51 | 44.84 | 5912.59 | 108.02 | -342.32 | -86.43 | 0.13 | 1431678.07 | 3291609.35 | N 40 30 49.04 | W 104 27 4.27 |
| | 6035.00 | 3.49 | 287.44 | 6005.53 | 110.35 | -341.18 | -88.84 | 4.03 | 1431679.22 | 3291606.94 | N 40 30 49.06 | W 104 27 4.30 |
| | 6129.00 | 11.22 | 278.71 | 6098.69 | 121.96 | -338.93 | -100.62 | 8.29 | 1431681.46 | 3291595.16 | N 40 30 49.08 | W 104 27 4.45 |
| | 6224.00 | 18.17 | 274.77 | 6190.53 | 145.68 | -336.30 | -124.55 | 7.39 | 1431684.10 | 3291571.23 | N 40 30 49.11 | W 104 27 4.76 |
| | 6319.00 | 24.80 | 272.25 | 6278.88 | 180.19 | -334.28 | -159.26 | 7.03 | 1431686.11 | 3291536.52 | N 40 30 49.13 | W 104 27 5.21 |
| | 6414.00 | 33.21 | 270.05 | 6361.89 | 226.05 | -333.48 | -205.26 | 8.93 | 1431686.92 | 3291490.52 | N 40 30 49.14 | W 104 27 5.80 |
| | 6508.00 | 42.97 | 268.43 | 6435.79 | 283.89 | -334.33 | -263.17 | 10.44 | 1431686.06 | 3291432.61 | N 40 30 49.14 | W 104 27 6.55 |
| | 6603.00 | 54.46 | 267.54 | 6498.37 | 355.13 | -336.88 | -334.39 | 12.11 | 1431683.51 | 3291361.40 | N 40 30 49.13 | W 104 27 7.48 |
| | 6698.00 | 62.01 | 268.72 | 6548.35 | 435.80 | -339.48 | -415.06 | 8.02 | 1431680.92 | 3291280.74 | N 40 30 49.11 | W 104 27 8.52 |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6792.00 | 70.04 | 266.86 | 6586.52 | 521.59 | -342.83 | -500.80 | 8.73 | 1431677.56 | 3291194.99 | N 40 30 49.09 | W 104 27 9.63 |
| | 6887.00 | 78.25 | 267.47 | 6612.45 | 612.88 | -347.34 | -592.00 | 8.67 | 1431673.05 | 3291103.80 | N 40 30 49.05 | W 104 27 10.81 |
| | 6919.00 | 80.85 | 268.67 | 6618.25 | 644.34 | -348.40 | -623.45 | 8.92 | 1431671.99 | 3291072.35 | N 40 30 49.05 | W 104 27 11.22 |
| *7" Casing Point* | *6968.00* | *82.98* | *270.17* | *6625.14* | *692.78* | *-348.89* | *-671.95* | *5.30* | *1431671.51* | *3291023.85* | *N 40 30 49.05* | *W 104 27 11.85* |
| | 7002.00 | 84.46 | 271.21 | 6628.86 | 726.47 | -348.48 | -705.75 | 5.30 | 1431671.91 | 3290990.05 | N 40 30 49.06 | W 104 27 12.29 |
| | 7097.00 | 85.18 | 270.66 | 6637.44 | 820.78 | -346.94 | -800.34 | 0.95 | 1431673.45 | 3290895.46 | N 40 30 49.08 | W 104 27 13.51 |
| | 7192.00 | 87.08 | 270.08 | 6643.85 | 915.33 | -346.33 | -895.12 | 2.09 | 1431674.07 | 3290800.69 | N 40 30 49.10 | W 104 27 14.74 |
| | 7287.00 | 88.97 | 269.71 | 6647.13 | 1010.09 | -346.50 | -990.06 | 2.03 | 1431673.89 | 3290705.75 | N 40 30 49.11 | W 104 27 15.97 |
| | 7381.00 | 90.93 | 269.25 | 6647.22 | 1103.94 | -347.36 | -1084.05 | 2.14 | 1431673.04 | 3290611.76 | N 40 30 49.11 | W 104 27 17.18 |
| | 7476.00 | 91.44 | 268.81 | 6645.25 | 1198.82 | -348.97 | -1179.02 | 0.71 | 1431671.43 | 3290516.80 | N 40 30 49.11 | W 104 27 18.41 |
| | 7571.00 | 91.20 | 268.12 | 6643.05 | 1293.73 | -351.51 | -1273.96 | 0.77 | 1431668.88 | 3290421.86 | N 40 30 49.09 | W 104 27 19.64 |
| | 7666.00 | 91.03 | 268.12 | 6641.20 | 1388.66 | -354.63 | -1368.89 | 0.18 | 1431665.77 | 3290326.94 | N 40 30 49.07 | W 104 27 20.87 |
| | 7760.00 | 91.10 | 267.81 | 6639.45 | 1482.61 | -357.96 | -1462.81 | 0.34 | 1431662.44 | 3290233.02 | N 40 30 49.05 | W 104 27 22.09 |
| | 7855.00 | 90.76 | 267.82 | 6637.92 | 1577.57 | -361.58 | -1557.73 | 0.36 | 1431658.82 | 3290138.10 | N 40 30 49.02 | W 104 27 23.32 |
| | 7949.00 | 90.38 | 267.57 | 6636.98 | 1671.54 | -365.35 | -1651.65 | 0.48 | 1431655.04 | 3290044.18 | N 40 30 49.00 | W 104 27 24.53 |
| | 8044.00 | 90.00 | 267.88 | 6636.67 | 1766.51 | -369.12 | -1746.57 | 0.52 | 1431651.28 | 3289949.26 | N 40 30 48.97 | W 104 27 25.76 |
| | 8139.00 | 89.69 | 267.66 | 6636.93 | 1861.48 | -372.81 | -1841.50 | 0.40 | 1431647.59 | 3289854.34 | N 40 30 48.95 | W 104 27 26.99 |
| | 8233.00 | 89.42 | 267.58 | 6637.66 | 1955.45 | -376.71 | -1935.42 | 0.31 | 1431643.69 | 3289760.43 | N 40 30 48.92 | W 104 27 28.21 |
| | 8328.00 | 89.86 | 267.55 | 6638.26 | 2050.43 | -380.75 | -2030.33 | 0.47 | 1431639.65 | 3289665.52 | N 40 30 48.89 | W 104 27 29.44 |
| | 8423.00 | 90.14 | 267.80 | 6638.26 | 2145.40 | -384.60 | -2125.25 | 0.39 | 1431635.79 | 3289570.60 | N 40 30 48.86 | W 104 27 30.67 |
| | 8518.00 | 90.03 | 267.87 | 6638.12 | 2240.37 | -388.19 | -2220.18 | 0.13 | 1431632.21 | 3289475.67 | N 40 30 48.84 | W 104 27 31.90 |
| | 8613.00 | 90.62 | 268.59 | 6637.57 | 2335.32 | -391.13 | -2315.14 | 0.98 | 1431629.27 | 3289380.72 | N 40 30 48.82 | W 104 27 33.13 |
| | 8707.00 | 90.31 | 268.79 | 6636.81 | 2429.24 | -393.28 | -2409.11 | 0.39 | 1431627.11 | 3289286.75 | N 40 30 48.81 | W 104 27 34.35 |
| | 8802.00 | 89.59 | 268.14 | 6636.90 | 2524.17 | -395.83 | -2504.07 | 1.02 | 1431624.57 | 3289191.79 | N 40 30 48.80 | W 104 27 35.57 |
| | 8897.00 | 89.48 | 268.16 | 6637.67 | 2619.12 | -398.89 | -2599.02 | 0.11 | 1431621.51 | 3289096.85 | N 40 30 48.78 | W 104 27 36.80 |
| | 8991.00 | 89.21 | 267.07 | 6638.74 | 2713.09 | -402.80 | -2692.93 | 1.20 | 1431617.60 | 3289002.94 | N 40 30 48.75 | W 104 27 38.02 |
| | 9086.00 | 89.90 | 267.49 | 6639.48 | 2808.08 | -407.30 | -2787.82 | 0.85 | 1431613.10 | 3288908.05 | N 40 30 48.72 | W 104 27 39.25 |
| | 9181.00 | 90.14 | 267.78 | 6639.45 | 2903.05 | -411.22 | -2882.74 | 0.39 | 1431609.18 | 3288813.14 | N 40 30 48.69 | W 104 27 40.48 |
| | 9276.00 | 89.17 | 266.80 | 6640.02 | 2998.03 | -415.71 | -2977.63 | 1.45 | 1431604.69 | 3288718.25 | N 40 30 48.65 | W 104 27 41.71 |
| | 9370.00 | 88.59 | 266.49 | 6641.86 | 3092.02 | -421.22 | -3071.45 | 0.71 | 1431599.18 | 3288624.43 | N 40 30 48.61 | W 104 27 42.92 |
| | 9465.00 | 89.93 | 267.26 | 6643.08 | 3187.00 | -426.40 | -3166.30 | 1.63 | 1431594.00 | 3288529.59 | N 40 30 48.57 | W 104 27 44.15 |
| | 9560.00 | 90.10 | 267.43 | 6643.05 | 3281.99 | -430.79 | -3261.20 | 0.25 | 1431589.61 | 3288434.69 | N 40 30 48.54 | W 104 27 45.38 |
| | 9655.00 | 90.10 | 267.31 | 6642.88 | 3376.97 | -435.15 | -3356.10 | 0.13 | 1431585.25 | 3288339.80 | N 40 30 48.51 | W 104 27 46.61 |
| | 9749.00 | 90.45 | 267.59 | 6642.43 | 3470.95 | -439.34 | -3450.00 | 0.47 | 1431581.06 | 3288245.90 | N 40 30 48.48 | W 104 27 47.83 |
| | 9844.00 | 90.34 | 267.34 | 6641.78 | 3565.93 | -443.54 | -3544.91 | 0.28 | 1431576.86 | 3288150.99 | N 40 30 48.45 | W 104 27 49.06 |
| | 9939.00 | 90.82 | 266.98 | 6640.81 | 3660.92 | -448.25 | -3639.78 | 0.64 | 1431572.15 | 3288056.12 | N 40 30 48.41 | W 104 27 50.29 |
| | 10034.00 | 90.45 | 266.77 | 6639.75 | 3755.91 | -453.43 | -3734.64 | 0.45 | 1431566.97 | 3287961.27 | N 40 30 48.37 | W 104 27 51.51 |
| | 10129.00 | 89.79 | 266.99 | 6639.55 | 3850.90 | -458.60 | -3829.49 | 0.73 | 1431561.80 | 3287866.41 | N 40 30 48.33 | W 104 27 52.74 |
| | 10223.00 | 89.73 | 267.07 | 6639.95 | 3944.90 | -463.47 | -3923.37 | 0.11 | 1431556.94 | 3287772.54 | N 40 30 48.29 | W 104 27 53.96 |
| | 10318.00 | 89.83 | 267.04 | 6640.32 | 4039.89 | -468.34 | -4018.24 | 0.11 | 1431552.06 | 3287677.67 | N 40 30 48.25 | W 104 27 55.19 |
| | 10413.00 | 89.66 | 266.91 | 6640.75 | 4134.88 | -473.36 | -4113.11 | 0.23 | 1431547.04 | 3287582.81 | N 40 30 48.22 | W 104 27 56.42 |
| | 10508.00 | 89.93 | 267.14 | 6641.09 | 4229.87 | -478.29 | -4207.98 | 0.38 | 1431542.11 | 3287487.94 | N 40 30 48.18 | W 104 27 57.65 |
| | 10602.00 | 89.42 | 267.74 | 6641.62 | 4323.85 | -482.49 | -4301.88 | 0.84 | 1431537.91 | 3287394.04 | N 40 30 48.15 | W 104 27 58.86 |
| | 10697.00 | 89.45 | 268.23 | 6642.56 | 4418.81 | -485.83 | -4396.82 | 0.52 | 1431534.57 | 3287299.11 | N 40 30 48.13 | W 104 28 0.09 |
| | 10791.00 | 89.14 | 268.83 | 6643.72 | 4512.74 | -488.24 | -4490.78 | 0.72 | 1431532.16 | 3287205.15 | N 40 30 48.11 | W 104 28 1.31 |
| | 10885.00 | 89.00 | 269.19 | 6645.24 | 4606.62 | -489.86 | -4584.75 | 0.41 | 1431530.55 | 3287111.18 | N 40 30 48.11 | W 104 28 2.53 |
| | 10979.00 | 89.55 | 269.17 | 6646.42 | 4700.50 | -491.20 | -4678.74 | 0.59 | 1431529.20 | 3287017.20 | N 40 30 48.11 | W 104 28 3.74 |
| | 11074.00 | 89.76 | 269.66 | 6646.99 | 4795.36 | -492.16 | -4773.73 | 0.56 | 1431528.24 | 3286922.21 | N 40 30 48.11 | W 104 28 4.97 |
| | 11168.00 | 89.35 | 269.64 | 6647.73 | 4889.20 | -492.73 | -4867.73 | 0.44 | 1431527.67 | 3286828.22 | N 40 30 48.11 | W 104 28 6.19 |
| | 11260.00 | 89.38 | 269.87 | 6648.75 | 4981.04 | -493.13 | -4959.72 | 0.25 | 1431527.27 | 3286736.23 | N 40 30 48.12 | W 104 28 7.38 |
| | 11355.00 | 89.79 | 269.05 | 6649.43 | 5075.89 | -494.02 | -5054.71 | 0.96 | 1431526.38 | 3286641.24 | N 40 30 48.12 | W 104 28 8.61 |
| | 11449.00 | 89.52 | 268.26 | 6649.99 | 5169.81 | -496.23 | -5148.68 | 0.90 | 1431524.17 | 3286547.27 | N 40 30 48.11 | W 104 28 9.83 |
| | 11542.00 | 89.55 | 267.63 | 6650.75 | 5262.78 | -499.56 | -5241.62 | 0.67 | 1431520.84 | 3286454.34 | N 40 30 48.09 | W 104 28 11.03 |
| | 11636.00 | 89.45 | 267.80 | 6651.57 | 5356.75 | -503.31 | -5335.54 | 0.21 | 1431517.09 | 3286360.42 | N 40 30 48.06 | W 104 28 12.25 |
| | 11728.00 | 89.48 | 267.61 | 6652.42 | 5448.72 | -506.99 | -5427.46 | 0.21 | 1431513.41 | 3286268.50 | N 40 30 48.04 | W 104 28 13.44 |
| | 11821.00 | 89.66 | 267.32 | 6653.12 | 5541.70 | -511.10 | -5520.37 | 0.36 | 1431509.30 | 3286175.60 | N 40 30 48.01 | W 104 28 14.64 |
| | 11916.00 | 89.07 | 267.84 | 6654.17 | 5636.67 | -515.12 | -5615.28 | 0.83 | 1431505.29 | 3286080.69 | N 40 30 47.98 | W 104 28 15.87 |
| | 12011.00 | 89.31 | 269.68 | 6655.51 | 5731.57 | -517.17 | -5710.24 | 1.95 | 1431503.23 | 3285985.73 | N 40 30 47.97 | W 104 28 17.10 |
| | 12106.00 | 89.24 | 269.78 | 6656.71 | 5826.40 | -517.62 | -5805.23 | 0.13 | 1431502.78 | 3285890.74 | N 40 30 47.97 | W 104 28 18.33 |
| | 12201.00 | 89.28 | 269.87 | 6657.93 | 5921.22 | -517.91 | -5900.23 | 0.10 | 1431502.49 | 3285795.76 | N 40 30 47.98 | W 104 28 19.56 |
| | 12295.00 | 89.52 | 268.51 | 6658.92 | 6015.09 | -519.24 | -5994.21 | 1.47 | 1431501.16 | 3285701.78 | N 40 30 47.98 | W 104 28 20.78 |
| | 12390.00 | 89.24 | 267.99 | 6659.94 | 6110.04 | -522.15 | -6089.16 | 0.62 | 1431498.25 | 3285606.83 | N 40 30 47.96 | W 104 28 22.01 |
| | 12485.00 | 89.31 | 267.72 | 6661.14 | 6205.00 | -525.71 | -6184.08 | 0.29 | 1431494.69 | 3285511.91 | N 40 30 47.94 | W 104 28 23.24 |
| | 12580.00 | 89.45 | 267.92 | 6662.16 | 6299.96 | -529.32 | -6279.01 | 0.26 | 1431491.08 | 3285416.98 | N 40 30 47.91 | W 104 28 24.47 |
| | 12675.00 | 89.24 | 267.99 | 6663.25 | 6394.92 | -532.71 | -6373.94 | 0.23 | 1431487.69 | 3285322.05 | N 40 30 47.89 | W 104 28 25.70 |
| | 12770.00 | 89.45 | 267.77 | 6664.33 | 6489.88 | -536.22 | -6468.87 | 0.32 | 1431484.18 | 3285227.13 | N 40 30 47.87 | W 104 28 26.93 |
| | 12864.00 | 89.66 | 267.88 | 6665.06 | 6583.84 | -539.78 | -6562.80 | 0.25 | 1431480.62 | 3285133.20 | N 40 30 47.84 | W 104 28 28.14 |
| | 12959.00 | 89.83 | 269.27 | 6665.49 | 6678.77 | -542.15 | -6657.77 | 1.47 | 1431478.26 | 3285038.24 | N 40 30 47.83 | W 104 28 29.37 |
| | 13054.00 | 89.86 | 269.51 | 6665.74 | 6773.63 | -543.16 | -6752.76 | 0.26 | 1431477.24 | 3284943.25 | N 40 30 47.83 | W 104 28 30.60 |
| | 13149.00 | 90.00 | 269.71 | 6665.86 | 6868.48 | -543.81 | -6847.76 | 0.25 | 1431476.59 | 3284848.25 | N 40 30 47.83 | W 104 28 31.83 |
| | 13243.00 | 89.83 | 269.87 | 6666.00 | 6962.31 | -544.16 | -6941.76 | 0.25 | 1431476.24 | 3284754.26 | N 40 30 47.84 | W 104 28 33.05 |
| | 13338.00 | 89.76 | 269.82 | 6666.34 | 7057.13 | -544.42 | -7036.76 | 0.09 | 1431475.99 | 3284659.26 | N 40 30 47.85 | W 104 28 34.28 |
| | 13432.00 | 90.38 | 269.38 | 6666.23 | 7150.98 | -545.07 | -7130.76 | 0.81 | 1431475.33 | 3284565.27 | N 40 30 47.85 | W 104 28 35.50 |
| | 13526.00 | 90.31 | 268.87 | 6665.67 | 7244.87 | -546.51 | -7224.74 | 0.55 | 1431473.90 | 3284471.28 | N 40 30 47.85 | W 104 28 36.71 |
| | 13621.00 | 89.83 | 268.18 | 6665.55 | 7339.80 | -548.95 | -7319.71 | 0.88 | 1431471.45 | 3284376.32 | N 40 30 47.84 | W 104 28 37.94 |
| | 13716.00 | 89.72 | 267.77 | 6665.92 | 7434.76 | -552.31 | -7414.65 | 0.45 | 1431468.10 | 3284281.38 | N 40 30 47.81 | W 104 28 39.17 |
| | 13810.00 | 90.00 | 268.03 | 6666.15 | 7528.73 | -555.75 | -7508.59 | 0.41 | 1431464.65 | 3284187.45 | N 40 30 47.79 | W 104 28 40.39 |
| | 13905.00 | 89.62 | 267.95 | 6666.46 | 7623.69 | -559.08 | -7603.53 | 0.41 | 1431461.33 | 3284092.51 | N 40 30 47.77 | W 104 28 41.62 |
| | 13999.00 | 89.62 | 267.96 | 6667.08 | 7717.65 | -562.43 | -7697.47 | 0.00 | 1431457.97 | 3283998.58 | N 40 30 47.75 | W 104 28 42.83 |
| | 14093.00 | 89.86 | 267.99 | 6667.50 | 7811.61 | -565.76 | -7791.41 | 0.26 | 1431454.64 | 3283904.64 | N 40 30 47.72 | W 104 28 44.05 |
| | 14188.00 | 89.97 | 267.96 | 6667.65 | 7906.57 | -569.12 | -7886.35 | 0.11 | 1431451.28 | 3283809.70 | N 40 30 47.70 | W 104 28 45.28 |
| | 14283.00 | 90.31 | 268.25 | 6667.42 | 8001.53 | -572.26 | -7981.29 | 0.47 | 1431448.14 | 3283714.76 | N 40 30 47.68 | W 104 28 46.51 |
| | 14377.00 | 89.69 | 268.11 | 6667.42 | 8095.48 | -575.25 | -8075.25 | 0.68 | 1431445.15 | 3283620.81 | N 40 30 47.66 | W 104 28 47.73 |
| | 14472.00 | 89.73 | 267.98 | 6667.90 | 8190.44 | -578.50 | -8170.19 | 0.14 | 1431441.91 | 3283525.87 | N 40 30 47.64 | W 104 28 48.96 |
| | 14567.00 | 89.86 | 267.87 | 6668.24 | 8285.40 | -581.93 | -8265.13 | 0.18 | 1431438.47 | 3283430.94 | N 40 30 47.62 | W 104 28 50.19 |
| | 14662.00 | 89.79 | 267.95 | 6668.53 | 8380.37 | -585.40 | -8360.06 | 0.11 | 1431435.01 | 3283336.00 | N 40 30 47.60 | W 104 28 51.42 |
| | 14757.00 | 89.86 | 268.08 | 6668.81 | 8475.33 | -588.70 | -8455.00 | 0.15 | 1431431.71 | 3283241.06 | N 40 30 47.57 | W 104 28 52.65 |
| | 14852.00 | 89.76 | 268.40 | 6669.13 | 8570.27 | -591.61 | -8549.96 | 0.36 | 1431428.79 | 3283146.11 | N 40 30 47.56 | W 104 28 53.88 |
| | 14947.00 | 89.69 | 267.41 | 6669.58 | 8665.24 | -595.09 | -8644.89 | 1.05 | 1431425.32 | 3283051.18 | N 40 30 47.53 | W 104 28 55.11 |
| | 15041.00 | 89.73 | 267.76 | 6670.06 | 8759.21 | -599.05 | -8738.81 | 0.38 | 1431421.35 | 3282957.27 | N 40 30 47.50 | W 104 28 56.32 |
| | 15136.00 | 89.90 | 267.91 | 6670.38 | 8854.18 | -602.64 | -8833.74 | 0.24 | 1431417.76 | 3282862.34 | N 40 30 47.48 | W 104 28 57.55 |
| | 15231.00 | 89.79 | 267.89 | 6670.63 | 8949.15 | -606.12 | -8928.68 | 0.11 | 1431414.28 | 3282767.41 | N 40 30 47.45 | W 104 28 58.78 |
| | 15326.00 | 89.73 | 267.50 | 6671.03 | 9044.12 | -609.95 | -9023.60 | 0.42 | 1431410.46 | 3282672.49 | N 40 30 47.43 | W 104 29 0.01 |
| | 15420.00 | 89.69 | 267.67 | 6671.51 | 9138.10 | -613.91 | -9117.51 | 0.19 | 1431406.50 | 3282578.58 | N 40 30 47.40 | W 104 29 1.23 |
| | 15515.00 | 89.52 | 266.95 | 6672.17 | 9233.08 | -618.36 | -9212.41 | 0.78 | 1431402.05 | 3282483.69 | N 40 30 47.37 | W 104 29 2.46 |
| | 15610.00 | 89.45 | 266.92 | 6673.02 | 9328.07 | -623.43 | -9307.27 | 0.08 | 1431396.97 | 3282388.83 | N 40 30 47.33 | W 104 29 3.68 |
| | 15705.00 | 89.55 | 267.32 | 6673.85 | 9423.06 | -628.21 | -9402.14 | 0.43 | 1431392.20 | 3282293.96 | N 40 30 47.29 | W 104 29 4.91 |
| | 15800.00 | 89.35 | 266.57 | 6674.76 | 9518.05 | -633.27 | -9497.00 | 0.82 | 1431387.14 | 3282199.10 | N 40 30 47.25 | W 104 29 6.14 |
| | 15895.00 | 89.07 | 268.18 | 6676.07 | 9613.02 | -637.63 | -9591.89 | 1.72 | 1431382.78 | 3282104.22 | N 40 30 47.22 | W 104 29 7.37 |
| | 15990.00 | 89.55 | 269.20 | 6677.21 | 9707.94 | -639.79 | -9686.86 | 1.19 | 1431380.61 | 3282009.25 | N 40 30 47.21 | W 104 29 8.60 |
| | 16085.00 | 89.69 | 269.84 | 6677.83 | 9802.79 | -640.59 | -9781.85 | 0.68 | 1431379.82 | 3281914.26 | N 40 30 47.21 | W 104 29 9.83 |
| | 16180.00 | 89.69 | 269.78 | 6678.35 | 9897.61 | -640.90 | -9876.85 | 0.06 | 1431379.50 | 3281819.27 | N 40 30 47.22 | W 104 29 11.06 |
| Last MWD+IFR Survey | 16265.00 | 89.79 | 269.62 | 6678.73 | 9982.47 | -641.35 | -9961.85 | 0.23 | 1431379.06 | 3281734.27 | N 40 30 47.22 | W 104 29 12.16 |
| Projection to Bit | 16309.00 | 89.79 | 269.62 | 6678.89 | 10026.40 | -641.64 | -10005.85 | 0.01 | 1431378.76 | 3281690.28 | N 40 30 47.23 | W 104 29 12.73 |

| Comments | MD (ft) | Incl (°) | Azim Grid (°) | TVD (ft) | VSEC (ft) | NS (ft) | EW (ft) | DLS (°/100ft) | Northing (ftUS) | Easting (ftUS) | Latitude (N/S ° ' ") | Longitude (E/W ° ' ") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Survey Type:** | Def Survey | | | | | | | | | | | |

**Survey Error Model:** ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
**Survey Program:**

| Description | Part | MD From (ft) | MD To (ft) | EOU Freq (ft) | Hole Size (in) | Casing Diameter (in) | Survey Tool Type | Borehole / Survey |
|---|---|---|---|---|---|---|---|---|
| Surface | 1 | 0.000 | 24.000 | 1/98.425 | 13.750 | 9.625 | SLB_NSG+MSHOT-Depth Only | Original Hole / NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' Definitive |
| Surface | 1 | 24.000 | 780.000 | Act Stns | 13.750 | 9.625 | SLB_NSG+MSHOT | Original Hole / NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' |
| Intermediate | 1 | 780.000 | 836.000 | Act Stns | 13.750 | 9.625 | SLB_INC_ONLY<10 | Original Hole / NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' |
| * Intermediate | 1 | 836.000 | 6968.000 | Act Stns | 8.750 | 7.000 | SLB_MWD+IFR+DMAG | Original Hole / NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' |
| * Lateral | 1 | 6968.000 | 16265.000 | Act Stns | 6.125 | 4.500 | SLB_MWD+IFR+DMAG | Original Hole / NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' |
| Bit Projection | 1 | 16265.000 | 16309.000 | Act Stns | 6.125 | 4.500 | SLB_BLIND+TREND | Original Hole / NCLP AA06-64-1AHNA MWD+GYRO 0' to 16309' |

* SLB_MWD+IFR+DMAG = MWD+IFR1+MS_WY