



# Oxy Iridium MDP1 28-21 Federal Com 4H Gyro + IFR 0-21036 MD Survey

## Geodetic Report

(Def Survey)

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| <b>Report Date:</b> March 25, 2019 - 11:32 AM<br><b>Client:</b> OXY<br><b>Field:</b> NM Eddy County (NAD 83)<br><b>Structure / Slot:</b> Oxy Iridium MDP1 28-21 Federal Com 4H / Oxy Iridium MDP1 28-21 Federal Com 4H<br><b>Well:</b> Oxy Iridium MDP1 28-21 Federal Com 4H<br><b>Borehole:</b> Original Borehole<br><b>UW / API#:</b> Unknown / 30-015-45245<br><b>Survey Name:</b> Oxy Iridium MDP1 28-21 Federal Com 4H Gyro + IFR 0-21036 MD<br><b>Survey Date:</b> February 21, 2019<br><b>Tort / AHD / DDI / ERD Ratio:</b> 265.298' / 11511.008 ft / 6.800 / 1.130<br><b>Coordinate Reference System:</b> NAD83 New Mexico State Plane, Eastern Zone, US Feet<br><b>Location Lat / Long:</b> N 32° 16' 2.99254", W 103° 46' 59.82800"<br><b>Location Grid N/E Y/X:</b> N 461484.480 IUS, E 711349.990 IUS<br><b>CRS Grid Convergence Angle:</b> 0.2937°<br><b>Grid Scale Factor:</b> 0.99994219<br><b>Version / Patch:</b> 2.10.753.0 | <b>Survey / DLS Computation:</b> Minimum Curvature / Lubinski<br><b>Vertical Section Azimuth:</b> 0.694° (Grid North)<br><b>Vertical Section Origin:</b> 0.000 ft, 0.000 ft<br><b>TVD Reference Datum:</b> RKB=26.5'<br><b>TVD Reference Elevation:</b> 3413.200 ft above MSL<br><b>Seabed / Ground Elevation:</b> 3386.700 ft above MSL<br><b>Magnetic Declination:</b> 6.844°<br><b>Total Gravity Field Strength:</b> 988.4499mgm (9.80665 Based)<br><b>Gravity Model:</b> GARM<br><b>Total Magnetic Field Strength:</b> 48000.200 nT<br><b>Magnetic Dip Angle:</b> 59.992°<br><b>Declination Date:</b> February 22, 2019<br><b>Magnetic Declination Model:</b> IFR1<br><b>North Reference:</b> Grid North<br><b>Grid Convergence Used:</b> 0.2937°<br><b>Total Corr Mag North-&gt;Grid North:</b> 6.5503°<br><b>Local Coord Referenced To:</b> Well Head |  |
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| Comments   | MD<br>(ft) | Incl<br>(°) | Azim Grid<br>(°) | TVD<br>(ft) | VSEC<br>(ft) | NS<br>(ft) | EW<br>(ft) | DLS<br>(°/100ft) | Northing<br>(IUS) | Easting<br>(IUS) | Latitude<br>(N/S ° ' ") | Longitude<br>(E/W ° ' ") |
|------------|------------|-------------|------------------|-------------|--------------|------------|------------|------------------|-------------------|------------------|-------------------------|--------------------------|
| RKB<br>SHL | 0.00       | 0.00        | 0.00             | 0.00        | 0.00         | 0.00       | 0.00       | N/A              | 461484.48         | 711349.99        | N 32 16 2.99            | W 103 46 59.83           |
|            | 26.50      | 0.00        | 0.00             | 26.50       | 0.00         | 0.00       | 0.00       | 0.00             | 461484.48         | 711349.99        | N 32 16 2.99            | W 103 46 59.83           |
|            | 98.50      | 0.24        | 104.96           | 98.50       | -0.04        | -0.04      | 0.15       | 0.33             | 461484.44         | 711350.14        | N 32 16 2.99            | W 103 46 59.83           |
| Last Gyro  | 130.50     | 0.20        | 115.26           | 130.50      | -0.08        | -0.08      | 0.26       | 0.18             | 461484.40         | 711350.25        | N 32 16 2.99            | W 103 46 59.82           |
|            | 214.50     | 0.19        | 150.65           | 214.50      | -0.26        | -0.26      | 0.46       | 0.14             | 461484.22         | 711350.45        | N 32 16 2.99            | W 103 46 59.82           |
|            | 303.50     | 0.28        | 241.21           | 303.50      | -0.49        | -0.50      | 0.34       | 0.38             | 461483.98         | 711350.33        | N 32 16 2.99            | W 103 46 59.82           |
|            | 397.50     | 0.33        | 249.77           | 397.50      | -0.70        | -0.70      | -0.11      | 0.07             | 461483.78         | 711349.88        | N 32 16 2.99            | W 103 46 59.83           |
|            | 492.50     | 0.48        | 250.41           | 492.49      | -0.94        | -0.93      | -0.74      | 0.16             | 461483.55         | 711349.25        | N 32 16 2.98            | W 103 46 59.84           |
|            | 586.50     | 0.70        | 274.89           | 586.49      | -1.03        | -1.01      | -1.69      | 0.35             | 461483.47         | 711348.30        | N 32 16 2.98            | W 103 46 59.85           |
|            | 672.50     | 0.85        | 260.96           | 672.48      | -1.10        | -1.07      | -2.84      | 0.28             | 461483.41         | 711347.15        | N 32 16 2.98            | W 103 46 59.86           |
|            | 777.00     | 0.29        | 242.49           | 776.98      | -1.36        | -1.31      | -3.84      | 0.56             | 461483.17         | 711346.15        | N 32 16 2.98            | W 103 46 59.87           |
|            | 867.00     | 0.22        | 256.36           | 866.98      | -1.51        | -1.46      | -4.21      | 0.10             | 461483.02         | 711345.78        | N 32 16 2.98            | W 103 46 59.88           |
|            | 956.00     | 0.19        | 290.27           | 955.98      | -1.50        | -1.45      | -4.51      | 0.14             | 461483.03         | 711345.48        | N 32 16 2.98            | W 103 46 59.88           |
|            | 1048.00    | 0.22        | 56.94            | 1047.97     | -1.35        | -1.30      | -4.51      | 0.40             | 461483.18         | 711345.48        | N 32 16 2.98            | W 103 46 59.88           |
|            | 1140.00    | 0.19        | 348.57           | 1139.97     | -1.11        | -1.05      | -4.39      | 0.25             | 461483.43         | 711345.60        | N 32 16 2.98            | W 103 46 59.88           |
|            | 1231.00    | 0.14        | 26.17            | 1230.97     | -0.86        | -0.80      | -4.37      | 0.13             | 461483.68         | 711345.62        | N 32 16 2.98            | W 103 46 59.88           |
|            | 1323.00    | 0.19        | 132.34           | 1322.97     | -0.86        | -0.81      | -4.21      | 0.29             | 461483.67         | 711345.78        | N 32 16 2.98            | W 103 46 59.88           |
|            | 1415.00    | 0.14        | 238.91           | 1414.97     | -1.02        | -0.97      | -4.19      | 0.29             | 461483.51         | 711345.80        | N 32 16 2.98            | W 103 46 59.88           |
|            | 1507.00    | 0.19        | 119.19           | 1506.97     | -1.15        | -1.10      | -4.16      | 0.31             | 461483.38         | 711345.83        | N 32 16 2.98            | W 103 46 59.88           |
|            | 1597.00    | 0.24        | 68.09            | 1596.97     | -1.15        | -1.10      | -3.85      | 0.21             | 461483.38         | 711346.14        | N 32 16 2.98            | W 103 46 59.87           |
|            | 1692.00    | 0.17        | 204.00           | 1691.97     | -1.20        | -1.16      | -3.72      | 0.40             | 461483.32         | 711346.27        | N 32 16 2.98            | W 103 46 59.87           |
|            | 1786.00    | 0.06        | 326.08           | 1785.97     | -1.29        | -1.24      | -3.81      | 0.22             | 461483.24         | 711346.18        | N 32 16 2.98            | W 103 46 59.87           |
|            | 1880.00    | 0.19        | 356.97           | 1879.97     | -1.09        | -1.05      | -3.84      | 0.15             | 461483.43         | 711346.15        | N 32 16 2.98            | W 103 46 59.87           |
|            | 1975.00    | 0.14        | 167.86           | 1974.97     | -1.05        | -1.00      | -3.83      | 0.35             | 461483.48         | 711346.16        | N 32 16 2.98            | W 103 46 59.87           |
|            | 2069.00    | 0.19        | 12.20            | 2068.97     | -1.01        | -0.96      | -3.77      | 0.34             | 461483.52         | 711346.22        | N 32 16 2.98            | W 103 46 59.87           |
|            | 2163.00    | 0.16        | 98.40            | 2162.97     | -0.87        | -0.83      | -3.61      | 0.26             | 461483.65         | 711346.38        | N 32 16 2.98            | W 103 46 59.87           |
|            | 2258.00    | 0.16        | 111.25           | 2257.97     | -0.94        | -0.90      | -3.35      | 0.04             | 461483.58         | 711346.64        | N 32 16 2.98            | W 103 46 59.87           |
|            | 2352.00    | 0.24        | 331.77           | 2351.97     | -0.81        | -0.77      | -3.32      | 0.40             | 461483.71         | 711346.67        | N 32 16 2.99            | W 103 46 59.87           |
|            | 2446.00    | 0.14        | 239.52           | 2445.97     | -0.70        | -0.66      | -3.52      | 0.30             | 461483.82         | 711346.47        | N 32 16 2.99            | W 103 46 59.87           |
|            | 2635.00    | 0.16        | 150.33           | 2634.97     | -1.05        | -1.00      | -3.58      | 0.11             | 461483.48         | 711346.41        | N 32 16 2.98            | W 103 46 59.87           |
|            | 2730.00    | 0.19        | 98.67            | 2729.97     | -1.18        | -1.14      | -3.36      | 0.16             | 461483.34         | 711346.63        | N 32 16 2.98            | W 103 46 59.87           |
|            | 2824.00    | 0.14        | 346.43           | 2823.97     | -1.09        | -1.05      | -3.24      | 0.29             | 461483.43         | 711346.75        | N 32 16 2.98            | W 103 46 59.87           |
|            | 2918.00    | 0.19        | 190.96           | 2917.97     | -1.13        | -1.09      | -3.29      | 0.34             | 461483.39         | 711346.70        | N 32 16 2.98            | W 103 46 59.87           |
|            | 3012.00    | 0.14        | 353.86           | 3011.97     | -1.17        | -1.13      | -3.33      | 0.35             | 461483.35         | 711346.66        | N 32 16 2.98            | W 103 46 59.87           |
|            | 3107.00    | 0.24        | 41.28            | 3106.97     | -0.91        | -0.87      | -3.22      | 0.19             | 461483.61         | 711346.77        | N 32 16 2.98            | W 103 46 59.87           |
|            | 3201.00    | 0.11        | 211.04           | 3200.97     | -0.84        | -0.80      | -3.13      | 0.37             | 461483.68         | 711346.86        | N 32 16 2.98            | W 103 46 59.86           |
|            | 3295.00    | 0.05        | 153.01           | 3294.97     | -0.95        | -0.91      | -3.16      | 0.10             | 461483.57         | 711346.83        | N 32 16 2.98            | W 103 46 59.86           |
|            | 3389.00    | 0.27        | 126.50           | 3388.97     | -1.12        | -1.08      | -2.96      | 0.24             | 461483.40         | 711347.03        | N 32 16 2.98            | W 103 46 59.86           |
|            | 3484.00    | 0.27        | 166.99           | 3483.97     | -1.46        | -1.43      | -2.73      | 0.20             | 461483.05         | 711347.26        | N 32 16 2.98            | W 103 46 59.86           |
|            | 3578.00    | 0.10        | 49.36            | 3577.97     | -1.63        | -1.59      | -2.62      | 0.35             | 461482.89         | 711347.37        | N 32 16 2.98            | W 103 46 59.86           |
|            | 3673.00    | 0.16        | 221.44           | 3672.97     | -1.67        | -1.64      | -2.65      | 0.27             | 461482.84         | 711347.34        | N 32 16 2.98            | W 103 46 59.86           |
|            | 3767.00    | 0.20        | 178.65           | 3766.97     | -1.93        | -1.90      | -2.73      | 0.15             | 461482.58         | 711347.26        | N 32 16 2.97            | W 103 46 59.86           |
|            | 3862.00    | 0.08        | 208.08           | 3861.97     | -2.16        | -2.13      | -2.76      | 0.14             | 461482.35         | 711347.23        | N 32 16 2.97            | W 103 46 59.86           |
|            | 4050.00    | 0.27        | 29.23            | 4049.97     | -1.89        | -1.85      | -2.60      | 0.19             | 461482.63         | 711347.39        | N 32 16 2.97            | W 103 46 59.86           |
|            | 4145.00    | 0.22        | 14.55            | 4144.96     | -1.51        | -1.48      | -2.45      | 0.08             | 461483.00         | 711347.54        | N 32 16 2.98            | W 103 46 59.86           |
|            | 4225.00    | 0.17        | 293.14           | 4224.96     | -1.32        | -1.29      | -2.52      | 0.32             | 461483.19         | 711347.47        | N 32 16 2.98            | W 103 46 59.86           |
|            | 4417.00    | 0.13        | 244.99           | 4416.96     | -1.30        | -1.27      | -2.98      | 0.07             | 461483.21         | 711347.01        | N 32 16 2.98            | W 103 46 59.86           |
|            | 4521.00    | 0.06        | 253.69           | 4520.96     | -1.37        | -1.33      | -3.14      | 0.07             | 461483.15         | 711346.85        | N 32 16 2.98            | W 103 46 59.86           |
|            | 4710.00    | 0.08        | 287.30           | 4709.96     | -1.36        | -1.32      | -3.36      | 0.02             | 461483.16         | 711346.63        | N 32 16 2.98            | W 103 46 59.87           |
|            | 4898.00    | 0.06        | 19.18            | 4897.96     | -1.23        | -1.19      | -3.45      | 0.05             | 461483.29         | 711346.54        | N 32 16 2.98            | W 103 46 59.87           |
|            | 4993.00    | 0.08        | 172.72           | 4992.96     | -1.25        | -1.21      | -3.42      | 0.14             | 461483.27         | 711346.57        | N 32 16 2.98            | W 103 46 59.87           |
|            | 5087.00    | 0.08        | 93.25            | 5086.96     | -1.32        | -1.28      | -3.35      | 0.11             | 461483.20         | 711346.64        | N 32 16 2.98            | W 103 46 59.87           |
|            | 5181.00    | 0.96        | 160.95           | 5180.96     | -2.06        | -2.03      | -3.03      | 0.99             | 461482.45         | 711346.96        | N 32 16 2.97            | W 103 46 59.86           |
| 5276.00    | 2.36       | 163.46      | 5275.92          | -4.68       | -4.65        | -2.21      | 1.48       | 461479.83        | 711347.78         | N 32 16 2.95     | W 103 46 59.85          |                          |
| 5370.00    | 4.00       | 162.11      | 5369.77          | -9.64       | -9.63        | -0.65      | 1.75       | 461474.85        | 711349.34         | N 32 16 2.90     | W 103 46 59.84          |                          |
| 5465.00    | 6.02       | 161.47      | 5464.40          | -17.48      | -17.51       | 1.95       | 2.13       | 461466.98        | 711351.94         | N 32 16 2.82     | W 103 46 59.81          |                          |
| 5653.00    | 6.83       | 157.64      | 5651.22          | -37.08      | -37.19       | 9.33       | 0.49       | 461447.29        | 711359.32         | N 32 16 2.62     | W 103 46 59.72          |                          |
| 5842.00    | 7.02       | 155.13      | 5838.84          | -57.84      | -58.06       | 18.47      | 0.19       | 461426.42        | 711368.45         | N 32 16 2.42     | W 103 46 59.62          |                          |
| 6031.00    | 6.51       | 157.19      | 6026.52          | -78.08      | -78.42       | 27.48      | 0.30       | 461406.07        | 711377.47         | N 32 16 2.22     | W 103 46 59.51          |                          |
| 6220.00    | 6.97       | 157.69      | 6214.22          | -98.46      | -98.90       | 35.98      | 0.25       | 461385.58        | 711385.97         | N 32 16 2.01     | W 103 46 59.41          |                          |
| 6408.00    | 6.77       | 159.10      | 6400.87          | -119.26     | -119.81      | 44.27      | 0.14       | 461364.68        | 711394.25         | N 32 16 1.80     | W 103 46 59.32          |                          |
| 6503.00    | 7.17       | 160.62      | 6495.17          | -130.04     | -130.63      | 48.23      | 0.46       | 461353.86        | 711398.22         | N 32 16 1.70     | W 103 46 59.27          |                          |
| 6691.00    | 5.77       | 161.58      | 6681.96          | -149.99     | -150.67      | 55.11      | 0.75       | 461333.82        | 711405.10         | N 32 16 1.50     | W 103 46 59.20          |                          |
| 6786.00    | 4.64       | 163.15      | 6776.57          | -158.17     | -158.88      | 57.73      | 1.20       | 461325.61        | 711407.72         | N 32 16 1.42     | W 103 46 59.17          |                          |
| 6880.00    | 3.31       | 167.69      | 6870.34          | -164.43     | -165.17      | 59.42      | 1.45       | 461319.32        | 711409.40         | N 32 16 1.36     | W 103 46 59.15          |                          |
| 6975.00    | 2.55       | 160.26      | 6965.22          | -169.09     | -169.84      | 60.71      | 0.89       | 461314.66        | 711410.70         | N 32 16 1.31     | W 103 46 59.13          |                          |
| 7069.00    | 2.37       | 156.78      | 7059.13          | -172.82     | -173.59      | 62.19      | 0.25       | 461310.90        | 711412.17         | N 32 16 1.27     | W 103 46 59.11          |                          |
| 7164.00    | 2.12       | 153.15      | 7154.06          | -176.18     | -176.96      | 63.75      | 0.30       | 461307.53        | 711413.74         | N 32 16 1.24     | W 103 46 59.10          |                          |
| 7258.00    | 1.62       | 146.59      | 7248.01          | -178.82     | -179.62      | 65.27      | 0.58       | 461304.87        | 711415.28         | N 32 16 1.21     | W 103 46 59.08          |                          |
| 7352.00    | 1.16       | 162.28      | 7341.98          | -180.82     | -181.64      | 66.29      | 0.63       | 461302.85        | 711416.28         | N 32 16 1.19     | W 103 46 59.07          |                          |
| 7447.00    | 1.10       | 169.89      | 7436.96          | -182.63     | -183.45      | 66.75      | 0.17       | 461301.04        | 711416.73         | N 32 16 1.17     | W 103 46 59.06          |                          |
| 7541.00    | 0.66       | 203.94      | 7530.95          | -184.01     | -184.84      | 66.68      | 0.71       | 461299.66        | 711416.67         | N 32 16 1.16     | W 103 46 59.06          |                          |
| 7636.00    | 0.10       | 336.69      | 7625.95          | -184.44     | -185.26      | 66.43      | 0.77       | 461299.23        | 711416.42         | N 32 16 1.16     | W 103 46 59.06          |                          |
| 7730.00    | 0.69       | 149.17      | 7719.95          | -184.85     | -185.67      | 66.69      | 0.84       | 461298.82        | 711416.67         | N 32 16 1.15     | W 103 46 59.07          |                          |
| 7825.00    | 4.50       | 159.46      | 7814.83          | -188.81     | -189.65      | 68.29      | 4.02       | 461294.84        | 711418.27         | N 32 16 1.11     | W 103 46 59.04          |                          |
| 7919.00    | 8.14       | 156.30      | 7908.25          | -198.31     | -199.20      | 72.26      | 3.89       | 461285.29        | 711422.24         | N 32 16 1.02     | W 103 46 59.00          |                          |
| 8013.00    | 10.69      | 153.85      | 8009.97          | -212.15     | -213.12      | 78.78      | 2.75       | 461271.37        | 711428.76         | N 32 16 0.88     | W 103 46 58.92          |                          |
| 8202.00    | 8.65       | 148.89      | 8187.28          | -239.88     | -241.03      | 9          |            |                  |                   |                  |                         |                          |

| Comments                           | MD<br>(ft) | Incl<br>(°) | Azim Grid<br>(°) | TVD<br>(ft) | VSEC<br>(ft) | NS<br>(ft) | EW<br>(ft) | DLS<br>(°/100ft) | Northing<br>(ftUS) | Easting<br>(ftUS) | Latitude<br>(N/S ° ' '') | Longitude<br>(E/W ° ' '') |
|------------------------------------|------------|-------------|------------------|-------------|--------------|------------|------------|------------------|--------------------|-------------------|--------------------------|---------------------------|
|                                    | 8296.00    | 7.36        | 148.76           | 8280.36     | -250.99      | -252.23    | 100.62     | 1.37             | 461232.26          | 711450.61         | N 32 16 0.49 W           | 103 46 56.67              |
|                                    | 8485.00    | 7.02        | 161.48           | 8467.89     | -272.18      | -273.53    | 110.57     | 0.86             | 461210.96          | 711460.55         | N 32 16 0.28 W           | 103 46 58.56              |
|                                    | 8674.00    | 5.93        | 158.57           | 8655.68     | -292.13      | -293.57    | 117.81     | 0.60             | 461190.92          | 711467.79         | N 32 16 0.08 W           | 103 46 58.47              |
|                                    | 8863.00    | 4.81        | 145.43           | 8843.86     | -307.64      | -309.19    | 125.87     | 0.88             | 461175.31          | 711475.85         | N 32 15 59.93 W          | 103 46 58.38              |
|                                    | 8957.00    | 4.25        | 118.15           | 8937.57     | -312.47      | -314.08    | 131.18     | 2.34             | 461170.42          | 711481.16         | N 32 15 59.88 W          | 103 46 58.32              |
|                                    | 9052.00    | 3.69        | 107.01           | 9032.34     | -314.95      | -316.63    | 137.20     | 1.00             | 461167.87          | 711487.19         | N 32 15 59.85 W          | 103 46 58.25              |
|                                    | 9146.00    | 3.40        | 95.04            | 9126.17     | -316.01      | -317.76    | 142.87     | 0.84             | 461166.74          | 711492.86         | N 32 15 59.84 W          | 103 46 58.18              |
|                                    | 9241.00    | 3.75        | 83.50            | 9220.98     | -315.83      | -317.66    | 148.77     | 0.84             | 461166.84          | 711498.75         | N 32 15 59.84 W          | 103 46 58.11              |
|                                    | 9335.00    | 4.06        | 66.48            | 9314.77     | -314.08      | -315.98    | 154.87     | 1.27             | 461168.52          | 711504.85         | N 32 15 59.86 W          | 103 46 58.04              |
| 2nd Bone<br>Spring<br>Intersection | 9355.29    | 4.18        | 64.03            | 9335.00     | -313.46      | -315.37    | 156.20     | 1.05             | 461169.13          | 711506.18         | N 32 15 59.86 W          | 103 46 58.03              |
| KOP Actual                         | 9424.00    | 4.64        | 56.75            | 9403.51     | -310.78      | -312.75    | 160.77     | 1.05             | 461171.75          | 711510.75         | N 32 15 59.89 W          | 103 46 57.97              |
|                                    | 9586.00    | 3.71        | 41.73            | 9565.08     | -303.17      | -305.25    | 169.74     | 0.88             | 461179.25          | 711519.72         | N 32 15 59.96 W          | 103 46 57.87              |
|                                    | 9651.00    | 8.31        | 36.93            | 9629.71     | -297.79      | -299.92    | 173.97     | 7.11             | 461184.58          | 711523.94         | N 32 16 0.02 W           | 103 46 57.82              |
|                                    | 9745.00    | 17.79       | 23.93            | 9721.20     | -279.07      | -281.32    | 183.90     | 10.50            | 461203.18          | 711533.87         | N 32 16 0.20 W           | 103 46 57.70              |
|                                    | 9840.00    | 23.79       | 19.26            | 9809.98     | -247.54      | -249.93    | 196.11     | 6.55             | 461234.56          | 711546.09         | N 32 16 0.51 W           | 103 46 57.56              |
|                                    | 9935.00    | 35.91       | 11.11            | 9892.25     | -201.79      | -204.32    | 207.85     | 13.43            | 461280.17          | 711557.83         | N 32 16 0.96 W           | 103 46 57.42              |
|                                    | 10029.00   | 44.22       | 2.20             | 9964.19     | -141.75      | -144.36    | 214.44     | 10.72            | 461340.13          | 711564.42         | N 32 16 1.55 W           | 103 46 57.34              |
|                                    | 10124.00   | 49.63       | 1.61             | 10029.05    | -72.40       | -75.03     | 216.73     | 5.71             | 461409.45          | 711566.71         | N 32 16 2.24 W           | 103 46 57.31              |
|                                    | 10219.00   | 53.23       | 1.32             | 10088.27    | 1.86         | -0.79      | 218.62     | 3.80             | 461483.69          | 711568.60         | N 32 16 2.97 W           | 103 46 57.28              |
|                                    | 10314.00   | 66.36       | 359.53           | 10135.96    | 83.77        | 81.12      | 219.14     | 13.92            | 461565.60          | 711569.12         | N 32 16 3.78 W           | 103 46 57.27              |
|                                    | 10408.00   | 80.25       | 358.98           | 10162.90    | 173.56       | 170.93     | 217.96     | 14.79            | 461655.40          | 711567.94         | N 32 16 4.67 W           | 103 46 57.28              |
|                                    | 10503.00   | 90.03       | 358.22           | 10170.93    | 268.04       | 265.45     | 215.65     | 10.33            | 461749.91          | 711565.62         | N 32 16 5.61 W           | 103 46 57.30              |
|                                    | 10541.00   | 90.17       | 357.37           | 10170.87    | 305.99       | 303.42     | 214.18     | 2.27             | 461787.88          | 711564.16         | N 32 16 5.98 W           | 103 46 57.32              |
| 100' FSL                           | 10587.50   | 90.17       | 359.45           | 10170.73    | 352.45       | 349.90     | 212.90     | 4.48             | 461834.36          | 711562.87         | N 32 16 6.44 W           | 103 46 57.33              |
|                                    | 10643.00   | 90.17       | 1.94             | 10170.57    | 407.95       | 405.39     | 213.57     | 4.48             | 461889.84          | 711563.55         | N 32 16 6.99 W           | 103 46 57.32              |
|                                    | 10738.00   | 91.10       | 1.32             | 10169.51    | 502.93       | 500.34     | 216.27     | 1.18             | 461984.79          | 711566.25         | N 32 16 7.93 W           | 103 46 57.28              |
|                                    | 10832.00   | 91.54       | 355.46           | 10167.35    | 586.78       | 584.24     | 213.63     | 6.25             | 462078.68          | 711563.61         | N 32 16 8.86 W           | 103 46 57.30              |
|                                    | 10927.00   | 90.10       | 355.64           | 10165.99    | 691.39       | 688.94     | 207.85     | 1.53             | 462173.38          | 711556.24         | N 32 16 9.80 W           | 103 46 57.38              |
|                                    | 11022.00   | 85.87       | 354.18           | 10169.24    | 785.83       | 783.49     | 197.84     | 4.61             | 462267.92          | 711547.82         | N 32 16 10.74 W          | 103 46 57.48              |
|                                    | 11116.00   | 82.86       | 355.12           | 10178.39    | 878.85       | 876.62     | 189.12     | 3.45             | 462361.05          | 711539.10         | N 32 16 11.66 W          | 103 46 57.57              |
|                                    | 11211.00   | 87.15       | 359.68           | 10186.66    | 973.28       | 971.12     | 184.84     | 5.58             | 462455.54          | 711534.82         | N 32 16 12.59 W          | 103 46 57.62              |
|                                    | 11306.00   | 88.80       | 1.09             | 10190.02    | 1068.22      | 1066.05    | 185.48     | 2.28             | 462550.47          | 711535.46         | N 32 16 13.53 W          | 103 46 57.60              |
|                                    | 11401.00   | 90.38       | 0.28             | 10190.70    | 1163.21      | 1161.04    | 186.62     | 0.92             | 462645.45          | 711536.59         | N 32 16 14.47 W          | 103 46 57.59              |
|                                    | 11496.00   | 90.21       | 0.12             | 10190.21    | 1258.21      | 1256.03    | 186.95     | 0.25             | 462740.44          | 711536.93         | N 32 16 15.41 W          | 103 46 57.58              |
|                                    | 11591.00   | 90.28       | 359.23           | 10189.81    | 1353.19      | 1351.03    | 186.41     | 0.94             | 462835.43          | 711536.39         | N 32 16 16.35 W          | 103 46 57.58              |
|                                    | 11780.00   | 90.79       | 359.53           | 10188.04    | 1542.13      | 1540.01    | 184.36     | 0.31             | 463024.40          | 711534.34         | N 32 16 18.22 W          | 103 46 57.59              |
|                                    | 11875.00   | 90.42       | 359.76           | 10187.04    | 1637.11      | 1635.00    | 183.78     | 0.46             | 463119.39          | 711533.75         | N 32 16 19.16 W          | 103 46 57.59              |
|                                    | 11970.00   | 90.38       | 359.75           | 10186.37    | 1732.09      | 1730.00    | 183.37     | 0.04             | 463214.38          | 711533.35         | N 32 16 20.10 W          | 103 46 57.59              |
|                                    | 12065.00   | 89.86       | 358.89           | 10186.18    | 1827.07      | 1824.99    | 182.24     | 1.06             | 463309.36          | 711532.22         | N 32 16 21.04 W          | 103 46 57.60              |
|                                    | 12160.00   | 90.24       | 358.58           | 10186.09    | 1922.01      | 1919.97    | 180.14     | 0.52             | 463404.33          | 711530.12         | N 32 16 21.98 W          | 103 46 57.62              |
|                                    | 12254.00   | 90.66       | 358.99           | 10185.35    | 2015.95      | 2013.94    | 178.15     | 0.62             | 463498.30          | 711528.13         | N 32 16 22.91 W          | 103 46 57.63              |
|                                    | 12349.00   | 89.52       | 358.24           | 10185.20    | 2110.89      | 2108.91    | 175.85     | 1.44             | 463593.27          | 711525.83         | N 32 16 23.85 W          | 103 46 57.65              |
|                                    | 12444.00   | 90.31       | 0.43             | 10185.35    | 2205.86      | 2203.90    | 174.75     | 2.45             | 463688.25          | 711524.73         | N 32 16 24.79 W          | 103 46 57.66              |
|                                    | 12539.00   | 89.66       | 359.65           | 10185.37    | 2300.85      | 2298.90    | 174.82     | 1.07             | 463783.24          | 711524.80         | N 32 16 25.73 W          | 103 46 57.65              |
|                                    | 12633.00   | 89.45       | 357.24           | 10186.10    | 2394.77      | 2392.86    | 172.27     | 2.57             | 463877.19          | 711522.25         | N 32 16 26.66 W          | 103 46 57.68              |
|                                    | 12728.00   | 90.31       | 357.98           | 10186.30    | 2489.63      | 2487.77    | 168.31     | 1.19             | 463972.10          | 711518.29         | N 32 16 27.60 W          | 103 46 57.72              |
|                                    | 12823.00   | 90.52       | 0.30             | 10185.61    | 2584.58      | 2582.75    | 166.88     | 2.45             | 464067.08          | 711516.86         | N 32 16 28.54 W          | 103 46 57.73              |
|                                    | 12917.00   | 90.42       | 1.43             | 10184.84    | 2678.58      | 2676.74    | 168.30     | 1.21             | 464161.06          | 711518.28         | N 32 16 29.47 W          | 103 46 57.71              |
|                                    | 13012.00   | 90.55       | 1.67             | 10184.04    | 2773.56      | 2771.70    | 170.87     | 0.29             | 464256.01          | 711520.85         | N 32 16 30.41 W          | 103 46 57.67              |
|                                    | 13107.00   | 90.45       | 1.89             | 10183.21    | 2868.54      | 2866.65    | 173.82     | 0.25             | 464350.96          | 711523.80         | N 32 16 31.35 W          | 103 46 57.63              |
|                                    | 13296.00   | 89.56       | 1.20             | 10183.19    | 3057.52      | 3055.58    | 178.92     | 0.60             | 464539.87          | 711528.90         | N 32 16 33.22 W          | 103 46 57.56              |
|                                    | 13390.00   | 90.42       | 1.42             | 10183.21    | 3151.51      | 3149.55    | 181.07     | 0.94             | 464633.84          | 711531.04         | N 32 16 34.15 W          | 103 46 57.53              |
|                                    | 13579.00   | 90.52       | 1.72             | 10181.66    | 3340.48      | 3338.47    | 186.24     | 0.17             | 464822.75          | 711536.22         | N 32 16 36.02 W          | 103 46 57.46              |
|                                    | 13769.00   | 89.86       | 1.15             | 10181.03    | 3530.47      | 3528.41    | 191.00     | 0.46             | 465012.68          | 711540.98         | N 32 16 37.90 W          | 103 46 57.39              |
|                                    | 13863.00   | 89.42       | 359.56           | 10181.62    | 3624.46      | 3622.40    | 191.58     | 1.76             | 465106.67          | 711541.56         | N 32 16 38.83 W          | 103 46 57.38              |
|                                    | 13958.00   | 90.07       | 358.98           | 10182.04    | 3719.43      | 3717.39    | 190.37     | 0.92             | 465201.65          | 711540.35         | N 32 16 39.77 W          | 103 46 57.39              |
|                                    | 14053.00   | 89.83       | 358.81           | 10182.12    | 3814.38      | 3812.38    | 188.54     | 0.31             | 465296.63          | 711538.52         | N 32 16 40.71 W          | 103 46 57.40              |
|                                    | 14148.00   | 90.48       | 0.02             | 10181.87    | 3909.35      | 3907.37    | 187.57     | 1.45             | 465391.62          | 711537.55         | N 32 16 41.65 W          | 103 46 57.41              |
|                                    | 14242.00   | 90.24       | 359.18           | 10181.28    | 4003.33      | 4001.36    | 186.92     | 0.93             | 465485.61          | 711536.89         | N 32 16 42.58 W          | 103 46 57.41              |
|                                    | 14337.00   | 90.28       | 358.65           | 10180.84    | 4098.29      | 4096.33    | 185.12     | 0.56             | 465580.58          | 711535.10         | N 32 16 43.52 W          | 103 46 57.43              |
|                                    | 14431.00   | 90.66       | 359.64           | 10180.07    | 4192.25      | 4190.33    | 183.71     | 1.13             | 465674.56          | 711533.69         | N 32 16 44.45 W          | 103 46 57.44              |
|                                    | 14526.00   | 90.17       | 0.68             | 10179.39    | 4287.24      | 4285.33    | 183.98     | 1.21             | 465769.55          | 711533.96         | N 32 16 45.39 W          | 103 46 57.43              |
|                                    | 14621.00   | 90.69       | 0.00             | 10178.67    | 4382.24      | 4380.32    | 184.54     | 0.90             | 465864.54          | 711534.52         | N 32 16 46.33 W          | 103 46 57.42              |
|                                    | 14716.00   | 91.58       | 1.17             | 10176.79    | 4477.21      | 4475.30    | 185.51     | 1.55             | 465959.51          | 711535.49         | N 32 16 47.27 W          | 103 46 57.40              |
|                                    | 14810.00   | 90.72       | 1.28             | 10174.90    | 4571.19      | 4569.25    | 187.52     | 0.92             | 466053.46          | 711537.50         | N 32 16 48.20 W          | 103 46 57.37              |
|                                    | 14905.00   | 89.76       | 359.43           | 10174.51    | 4666.18      | 4664.25    | 188.11     | 2.19             | 466148.45          | 711538.09         | N 32 16 49.14 W          | 103 46 57.36              |
|                                    | 14999.00   | 89.25       | 357.22           | 10175.32    | 4760.09      | 4758.20    | 185.36     | 2.41             | 466242.39          | 711535.34         | N 32 16 50.07 W          | 103 46 57.38              |
|                                    | 15094.00   | 90.31       | 359.44           | 10175.68    | 4855.00      | 4853.15    | 182.59     | 2.59             | 466337.34          | 711532.57         | N 32 16 51.00 W          | 103 46 57.41              |
|                                    | 15188.00   | 89.97       | 359.28           | 10175.45    | 4948.98      | 4947.14    | 181.54     | 0.40             | 466431.33          | 711531.52         | N 32 16 51.93 W          | 103 46 57.42              |
|                                    | 15283.00   | 90.04       | 359.38           | 10175.44    | 5043.95      | 5042.13    | 180.43     | 0.13             | 466526.31          | 711530.41         | N 32 16 52.87 W          | 103 46 57.43              |
|                                    | 15378.00   | 90.42       | 0.99             | 10175.06    | 5138.94      | 5137.13    | 180.74     | 1.74             | 466621.30          | 711530.72         | N 32 16 53.81 W          | 103 46 57.42              |
|                                    | 15473.00   | 90.14       | 359.83           | 10174.60    | 5233.94      | 5232.13    | 181.42     | 1.26             | 466716.29          | 711531.40         | N 32 16 54.75 W          | 103 46 57.40              |
|                                    | 15567.00   | 90.00       | 0.14             | 10174.48    | 5327.93      | 5326.12    | 181.40     | 0.36             | 466810.29          | 711531.37         | N 32 16 55.68 W          | 103 46 57.40              |
|                                    | 15662.00   | 89.90       | 0.40             | 10174.57    | 5422.93      | 5421.12    | 181.84     | 0.29             | 466905.28          | 711531.82         | N 32 16 56.62 W          | 103 46 57.39              |
|                                    | 15756.00   | 90.31       | 0.60             | 10174.40    | 5516.93      | 5515.12    | 182.66     | 0.49             | 466999.27          | 711532.64         | N 32 16 57.56 W          | 103 46 57.37              |
|                                    | 15851.00   | 89.37       | 357.94           | 10174.99    | 5611.89      | 5610.10    | 181.45     | 3.14             | 467094.24          | 711531.43         | N 32 16 58.49 W          | 103 46 5                  |

| Comments   | MD<br>(ft) | Incl<br>(°) | Azim Grid<br>(°) | TVD<br>(ft) | VSEC<br>(ft) | NS<br>(ft) | EW<br>(ft) | DLS<br>(°/100ft) | Northing<br>(ftUS) | Easting<br>(ftUS) | Latitude<br>(N/S ° ' ") | Longitude<br>(E/W ° ' ") |
|------------|------------|-------------|------------------|-------------|--------------|------------|------------|------------------|--------------------|-------------------|-------------------------|--------------------------|
|            | 19726.00   | 89.59       | 359.60           | 10176.48    | 9484.62      | 9483.31    | 165.30     | 0.47             | 470967.22          | 711515.28         | N 32 17 36.82           | W 103 46 57.34           |
|            | 19821.00   | 89.52       | 0.10             | 10177.22    | 9579.60      | 9578.31    | 165.05     | 0.53             | 471062.21          | 711515.03         | N 32 17 37.76           | W 103 46 57.33           |
|            | 19915.00   | 89.45       | 359.86           | 10178.06    | 9673.59      | 9672.30    | 165.02     | 0.27             | 471156.20          | 711515.00         | N 32 17 38.69           | W 103 46 57.33           |
|            | 20105.00   | 89.49       | 0.56             | 10179.82    | 9863.58      | 9862.29    | 165.72     | 0.37             | 471346.18          | 711515.70         | N 32 17 40.57           | W 103 46 57.31           |
|            | 20199.00   | 89.59       | 358.43           | 10180.57    | 9957.55      | 9956.28    | 164.89     | 2.27             | 471440.16          | 711514.87         | N 32 17 41.50           | W 103 46 57.31           |
|            | 20294.00   | 89.42       | 358.60           | 10181.39    | 10052.47     | 10051.24   | 162.43     | 0.25             | 471535.12          | 711512.41         | N 32 17 42.44           | W 103 46 57.34           |
|            | 20389.00   | 89.38       | 357.86           | 10182.39    | 10147.38     | 10146.19   | 159.49     | 0.78             | 471630.07          | 711509.47         | N 32 17 43.38           | W 103 46 57.36           |
|            | 20578.00   | 89.49       | 357.93           | 10184.25    | 10336.15     | 10335.06   | 152.55     | 0.07             | 471818.92          | 711502.53         | N 32 17 45.25           | W 103 46 57.43           |
|            | 20767.00   | 89.31       | 358.04           | 10186.23    | 10524.92     | 10523.93   | 145.90     | 0.11             | 472007.78          | 711495.89         | N 32 17 47.12           | W 103 46 57.50           |
|            | 20956.00   | 89.42       | 358.22           | 10188.33    | 10713.72     | 10712.82   | 139.74     | 0.11             | 472196.66          | 711489.72         | N 32 17 48.99           | W 103 46 57.56           |
| 100' FNL   | 20957.00   | 89.42       | 358.22           | 10188.34    | 10714.72     | 10713.82   | 139.71     | 0.36             | 472197.66          | 711489.69         | N 32 17 49.00           | W 103 46 57.56           |
| Final MWD  | 20992.00   | 89.42       | 358.35           | 10188.69    | 10749.69     | 10748.80   | 138.66     | 0.36             | 472232.64          | 711488.64         | N 32 17 49.34           | W 103 46 57.57           |
| Proj to TD | 21036.00   | 89.42       | 358.35           | 10189.14    | 10793.65     | 10792.78   | 137.39     | 0.00             | 472276.61          | 711487.38         | N 32 17 49.78           | W 103 46 57.58           |

Survey Type: Def Survey

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

Survey Program:

| Description | Part | MD From<br>(ft) | MD To<br>(ft) | EOU Freq<br>(ft) | Hole Size<br>(in) | Casing Diameter<br>(in) | Survey Tool Type         | Borehole / Survey                                                                     |
|-------------|------|-----------------|---------------|------------------|-------------------|-------------------------|--------------------------|---------------------------------------------------------------------------------------|
|             | 1    | 0.000           | 26.500        | 1/98.425         | 30.000            | 30.000                  | NAL_NSG+MSHOT-Depth Only | Original Borehole / Oxy Iridium<br>MDP1 28-21 Federal Com 4H<br>Gyro + IFR 0-21036'MD |
|             | 1    | 26.500          | 26.500        | Act Stns         | 30.000            | 30.000                  | NAL_NSG+MSHOT-Depth Only | Original Borehole / Oxy Iridium<br>MDP1 28-21 Federal Com 4H<br>Gyro + IFR 0-21036'MD |
|             | 1    | 26.500          | 777.000       | Act Stns         | 30.000            | 30.000                  | NAL_NSG+MSHOT            | Original Borehole / Oxy Iridium<br>MDP1 28-21 Federal Com 4H                          |
|             | 1    | 777.000         | 21036.000     | Act Stns         | 30.000            | 30.000                  | NAL_MWD_IFR1+MS          | Original Borehole / Oxy Iridium<br>MDP1 28-21 Federal Com 4H                          |