



Project: Roosevelt Co., NM (NAD 83)  
Site: Sec 21-6S-34E  
Well: Domino 21-16 State #5H  
Wellbore: HZ [315037]  
Design: Plan #2 (11.18.17 AT)



Azimuths to Grid North  
True North: -0.48°  
Magnetic North: 6.76°

Magnetic Field  
Strength: 48875.3snT  
Dip Angle: 61.43°  
Date: 11/6/2017  
Model: HDGM

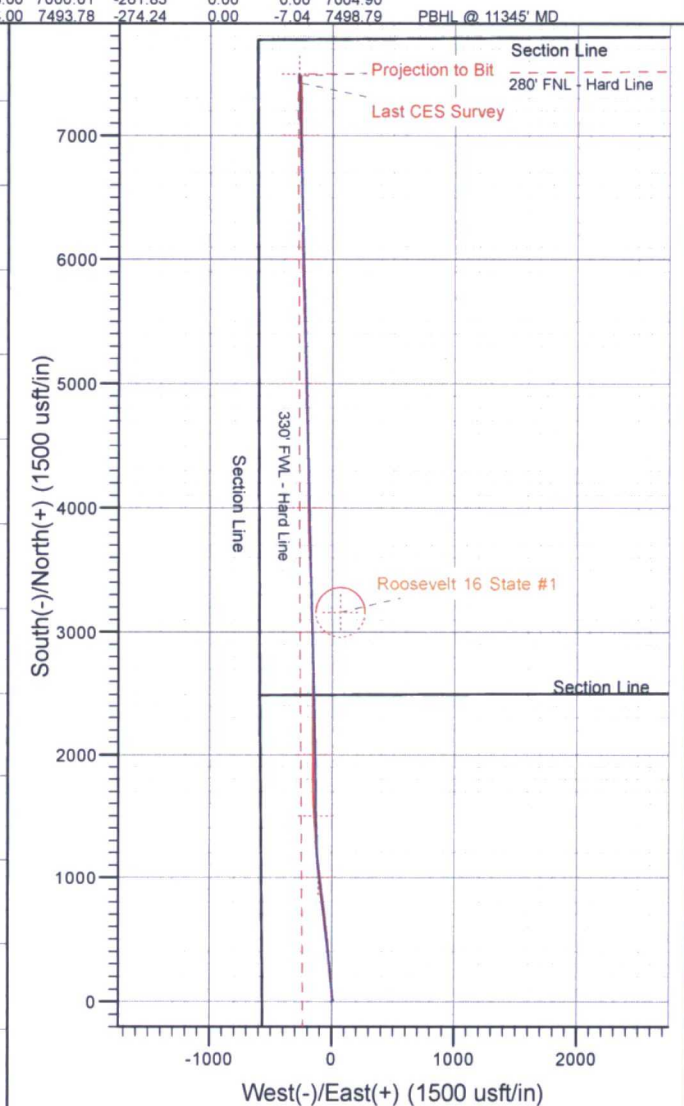
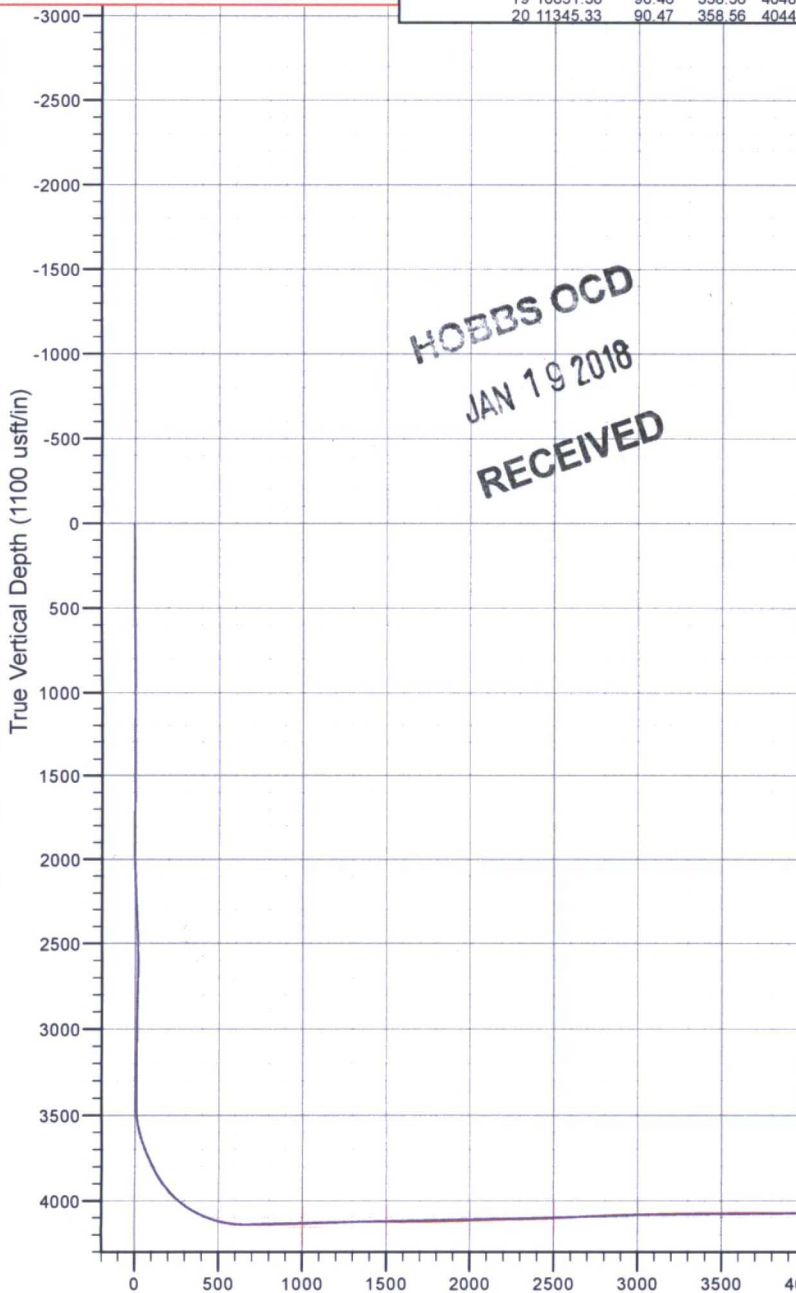
LP TARGET LINE  
91.73° INC @ 4141' TVD @ 500' VS  
10' Up / 10' Down  
30' Left / 30' Right (0' VS - 6K' VS)  
10' Left / 50' Right (6K' VS - TD)

Planned Bottom Hole Location  
280' FNL / 340' FWL (Lease)  
0' FNL / 10' FWL (Hard Line)

4355.00  
+N/-S 0.00 +E/-W 0.00 Northing 1012963.29 Easting 801582.90 Latitude 33.781493 Longitude -103.476839

#### SECTION DETAILS

| Sec | MD       | Inc   | Azi    | TVD     | +N/-S   | +E/-W   | Dleg | TFace  | Vsect   | Annotation             |
|-----|----------|-------|--------|---------|---------|---------|------|--------|---------|------------------------|
| 1   | 3754.00  | 24.20 | 355.20 | 3742.26 | 80.51   | 0.90    | 0.00 | 0.00   | 80.42   | Tie On @ 3754' MD      |
| 2   | 3811.00  | 25.80 | 355.00 | 3793.92 | 104.51  | -1.16   | 2.81 | -3.11  | 104.48  | PTB/Start 9.32° Build  |
| 3   | 4518.59  | 91.73 | 352.96 | 4140.95 | 673.07  | -65.13  | 9.32 | -2.23  | 675.01  | LP @ 4140' TVD; 91.73° |
| 4   | 4848.15  | 91.73 | 352.96 | 4131.00 | 1000.01 | -105.50 | 0.00 | 0.00   | 1003.20 | Start 2.4° Drop/Turn   |
| 5   | 5073.30  | 90.97 | 358.33 | 4125.69 | 1224.35 | -122.59 | 2.41 | 97.96  | 1228.02 | EOD; 90.97°            |
| 6   | 5349.10  | 90.97 | 358.33 | 4121.00 | 1500.00 | -130.64 | 0.00 | 0.00   | 1503.78 | Start 2° Build         |
| 7   | 5404.73  | 91.16 | 359.42 | 4119.97 | 1555.61 | -131.73 | 2.00 | 80.55  | 1559.39 | EOB; 91.16°            |
| 8   | 5849.24  | 91.16 | 359.42 | 4111.00 | 2000.01 | -136.19 | 0.00 | 0.00   | 2003.65 | Start 2° Drop/Turn     |
| 9   | 5893.54  | 91.14 | 358.54 | 4110.11 | 2044.29 | -136.98 | 2.00 | -90.69 | 2047.93 | EOD; 91.14°            |
| 10  | 6349.49  | 91.14 | 358.54 | 4101.00 | 2500.00 | -148.60 | 0.00 | 0.00   | 2503.77 | Start 2° Build         |
| 11  | 6391.33  | 91.98 | 358.54 | 4099.86 | 2541.81 | -149.67 | 2.00 | 0.29   | 2545.58 | EOB; 91.98°            |
| 12  | 6849.95  | 91.98 | 358.54 | 4084.00 | 3000.01 | -161.32 | 0.00 | 0.00   | 3003.90 | Start 2° Drop          |
| 13  | 6923.07  | 90.52 | 358.56 | 4082.40 | 3073.08 | -163.17 | 2.00 | 179.29 | 3077.00 | EOD; 90.52°            |
| 14  | 7850.32  | 90.52 | 358.56 | 4074.00 | 4000.01 | -186.45 | 0.00 | 0.00   | 4004.15 | Start 2° Build         |
| 15  | 7853.00  | 90.57 | 358.56 | 4073.97 | 4002.68 | -186.52 | 2.00 | -0.71  | 4006.83 | EOB; 90.57°            |
| 16  | 8850.69  | 90.57 | 358.56 | 4064.00 | 5000.01 | -211.52 | 0.00 | 0.00   | 5004.40 | Start 2° Drop          |
| 17  | 8856.44  | 90.46 | 358.56 | 4063.95 | 5005.75 | -211.52 | 2.00 | 179.71 | 5010.15 | EOD; 90.46°            |
| 18  | 9851.04  | 90.46 | 358.56 | 4056.00 | 6000.01 | -236.70 | 0.00 | 0.00   | 6004.65 |                        |
| 19  | 10851.38 | 90.46 | 358.56 | 4048.00 | 7000.01 | -261.83 | 0.00 | 0.00   | 7004.90 |                        |
| 20  | 11345.33 | 90.47 | 358.56 | 4044.00 | 7493.78 | -274.24 | 0.00 | -7.04  | 7498.79 | PBHL @ 11345' MD       |



Vertical Section at 357.90° (1100 usft/in)



# Cathedral Energy Services

## Survey Report

|                  |                            |                                     |                                      |
|------------------|----------------------------|-------------------------------------|--------------------------------------|
| <b>Company:</b>  | Manzano LLC                | <b>Local Co-ordinate Reference:</b> | Well Domino 21-16 State #5H          |
| <b>Project:</b>  | Roosevelt Co., NM (NAD 83) | <b>TVD Reference:</b>               | 21' KB @ 4376.00usft (Silver Oak #7) |
| <b>Site:</b>     | Sec 21-6S-34E              | <b>MD Reference:</b>                | 21' KB @ 4376.00usft (Silver Oak #7) |
| <b>Well:</b>     | Domino 21-16 State #5H     | <b>North Reference:</b>             | Grid                                 |
| <b>Wellbore:</b> | HZ [315037]                | <b>Survey Calculation Method:</b>   | Minimum Curvature                    |
| <b>Design:</b>   | HZ                         | <b>Database:</b>                    | USA EDM 5000 Multi Users DB          |

|                    |                            |                      |                |
|--------------------|----------------------------|----------------------|----------------|
| <b>Project</b>     | Roosevelt Co., NM (NAD 83) |                      |                |
| <b>Map System:</b> | US State Plane 1983        | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | North American Datum 1983  |                      |                |
| <b>Map Zone:</b>   | New Mexico Eastern Zone    |                      |                |

|                              |               |                     |                   |                                 |
|------------------------------|---------------|---------------------|-------------------|---------------------------------|
| <b>Site</b>                  | Sec 21-6S-34E |                     |                   |                                 |
| <b>Site Position:</b>        |               | <b>Northing:</b>    | 1,012,963.30 usft | <b>Latitude:</b> 33.781493      |
| <b>From:</b>                 | Map           | <b>Easting:</b>     | 801,582.90 usft   | <b>Longitude:</b> -103.476839   |
| <b>Position Uncertainty:</b> | 0.00 usft     | <b>Slot Radius:</b> | 13-3/16"          | <b>Grid Convergence:</b> 0.48 ° |

|                             |                        |           |                            |                   |
|-----------------------------|------------------------|-----------|----------------------------|-------------------|
| <b>Well</b>                 | Domino 21-16 State #5H |           |                            |                   |
| <b>Well Position</b>        | <b>+N/-S</b>           | 0.00 usft | <b>Northing:</b>           | 1,012,963.29 usft |
|                             | <b>+E/-W</b>           | 0.00 usft | <b>Easting:</b>            | 801,582.90 usft   |
| <b>Position Uncertainty</b> |                        | 0.00 usft | <b>Wellhead Elevation:</b> | usft              |
|                             |                        |           | <b>Ground Level:</b>       | 4,355.00 usft     |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | HZ [315037]       |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | HDGM              | 11/6/2017          | 7.23                   | 61.43                | 48,875.30000000            |

|                          |                                |                     |                     |                      |      |
|--------------------------|--------------------------------|---------------------|---------------------|----------------------|------|
| <b>Design</b>            | HZ                             |                     |                     |                      |      |
| <b>Audit Notes:</b>      |                                |                     |                     |                      |      |
| <b>Version:</b>          | 1.0                            | <b>Phase:</b>       | ACTUAL              | <b>Tie On Depth:</b> | 0.00 |
| <b>Vertical Section:</b> | <b>Depth From (TVD) (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Direction (°)</b> |      |
|                          | 0.00                           | 0.00                | 0.00                | 357.90               |      |

|                       |                  |                             |                  |                    |  |
|-----------------------|------------------|-----------------------------|------------------|--------------------|--|
| <b>Survey Program</b> | <b>Date</b>      | 11/25/2017                  |                  |                    |  |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>    | <b>Tool Name</b> | <b>Description</b> |  |
| 84.00                 | 1,954.10         | Surface Gyros (HZ [315037]) | GyroFlex         |                    |  |
| 1,954.10              | 11,332.00        | CES MWD (HZ [315037])       | MWD+HDGM         | OWSG MWD + HDGM    |  |

|                              |                        |                    |                              |                     |                     |                                |                               |                            |                              |  |
|------------------------------|------------------------|--------------------|------------------------------|---------------------|---------------------|--------------------------------|-------------------------------|----------------------------|------------------------------|--|
| <b>Survey</b>                |                        |                    |                              |                     |                     |                                |                               |                            |                              |  |
| <b>Measured Depth (usft)</b> | <b>Inclination (°)</b> | <b>Azimuth (°)</b> | <b>Vertical Depth (usft)</b> | <b>+N/-S (usft)</b> | <b>+E/-W (usft)</b> | <b>Vertical Section (usft)</b> | <b>Dogleg Rate (°/100usf)</b> | <b>Build Rate (°/100u)</b> | <b>Formations / Comments</b> |  |
| 1,954.10                     | 0.60                   | 38.50              | 1,954.05                     | -2.41               | 0.33                | -2.42                          | 0.00                          | 0.00                       |                              |  |
| 2,135.00                     | 2.90                   | 37.10              | 2,134.85                     | 1.99                | 3.68                | 1.85                           | 1.27                          | 1.27                       |                              |  |
| 2,228.00                     | 3.20                   | 32.50              | 2,227.72                     | 6.05                | 6.50                | 5.81                           | 0.42                          | 0.32                       |                              |  |
| 2,322.00                     | 3.30                   | 34.00              | 2,321.57                     | 10.51               | 9.42                | 10.16                          | 0.14                          | 0.11                       |                              |  |
| 2,415.00                     | 2.90                   | 34.50              | 2,414.43                     | 14.67               | 12.25               | 14.21                          | 0.43                          | -0.43                      |                              |  |
| 2,509.00                     | 1.80                   | 331.10             | 2,508.36                     | 17.92               | 12.88               | 17.43                          | 2.81                          | -1.17                      |                              |  |
| 2,602.00                     | 1.60                   | 243.50             | 2,601.34                     | 18.62               | 11.01               | 18.20                          | 2.53                          | -0.22                      |                              |  |
| 2,696.00                     | 1.40                   | 237.70             | 2,695.30                     | 17.42               | 8.87                | 17.08                          | 0.27                          | -0.21                      |                              |  |
| 2,789.00                     | 1.30                   | 219.60             | 2,788.28                     | 16.00               | 7.23                | 15.72                          | 0.47                          | -0.11                      |                              |  |
| 2,882.00                     | 1.20                   | 203.20             | 2,881.26                     | 14.29               | 6.18                | 14.05                          | 0.40                          | -0.11                      |                              |  |
| 2,976.00                     | 0.60                   | 173.80             | 2,975.24                     | 12.90               | 5.84                | 12.67                          | 0.79                          | -0.64                      |                              |  |
| 3,069.00                     | 0.70                   | 163.40             | 3,068.24                     | 11.87               | 6.06                | 11.64                          | 0.17                          | 0.11                       |                              |  |



## Cathedral Energy Services

### Survey Report

|                  |                            |                                     |                                      |
|------------------|----------------------------|-------------------------------------|--------------------------------------|
| <b>Company:</b>  | Manzano LLC                | <b>Local Co-ordinate Reference:</b> | Well Domino 21-16 State #5H          |
| <b>Project:</b>  | Roosevelt Co., NM (NAD 83) | <b>TVD Reference:</b>               | 21' KB @ 4376.00usft (Silver Oak #7) |
| <b>Site:</b>     | Sec 21-6S-34E              | <b>MD Reference:</b>                | 21' KB @ 4376.00usft (Silver Oak #7) |
| <b>Well:</b>     | Domino 21-16 State #5H     | <b>North Reference:</b>             | Grid                                 |
| <b>Wellbore:</b> | HZ [315037]                | <b>Survey Calculation Method:</b>   | Minimum Curvature                    |
| <b>Design:</b>   | HZ                         | <b>Database:</b>                    | USA EDM 5000 Multi Users DB          |

#### Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usf) | Build Rate (°/100u) | Formations / Comments |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|------------------------|---------------------|-----------------------|
| 3,163.00              | 0.60            | 147.40      | 3,162.23              | 10.90        | 6.49         | 10.66                   | 0.22                   | -0.11               |                       |
| 3,256.00              | 0.40            | 180.50      | 3,255.23              | 10.17        | 6.75         | 9.91                    | 0.37                   | -0.22               |                       |
| 3,349.00              | 0.30            | 232.20      | 3,348.23              | 9.69         | 6.55         | 9.45                    | 0.34                   | -0.11               |                       |
| 3,411.00              | 0.40            | 249.80      | 3,410.23              | 9.52         | 6.22         | 9.29                    | 0.24                   | 0.16                |                       |
| 3,443.00              | 0.40            | 288.60      | 3,442.23              | 9.52         | 6.01         | 9.29                    | 0.83                   | 0.00                |                       |
| 3,474.00              | 2.40            | 343.60      | 3,473.22              | 10.17        | 5.72         | 9.96                    | 7.08                   | 6.45                |                       |
| 3,505.00              | 5.10            | 351.10      | 3,504.15              | 12.16        | 5.33         | 11.96                   | 8.83                   | 8.71                |                       |
| 3,536.00              | 8.10            | 355.60      | 3,534.94              | 15.70        | 4.95         | 15.51                   | 9.81                   | 9.68                |                       |
| 3,567.00              | 11.40           | 357.50      | 3,565.49              | 20.94        | 4.65         | 20.75                   | 10.69                  | 10.65               |                       |
| 3,598.00              | 14.20           | 358.50      | 3,595.71              | 27.80        | 4.41         | 27.62                   | 9.06                   | 9.03                |                       |
| 3,629.00              | 16.60           | 358.60      | 3,625.60              | 36.03        | 4.20         | 35.85                   | 7.74                   | 7.74                |                       |
| 3,661.00              | 19.10           | 356.20      | 3,656.05              | 45.83        | 3.75         | 45.66                   | 8.14                   | 7.81                |                       |
| 3,692.00              | 21.00           | 355.20      | 3,685.17              | 56.42        | 2.94         | 56.28                   | 6.23                   | 6.13                |                       |
| 3,723.00              | 23.30           | 355.10      | 3,713.88              | 68.07        | 1.96         | 67.95                   | 7.42                   | 7.42                |                       |
| 3,754.00              | 24.20           | 355.20      | 3,742.26              | 80.51        | 0.90         | 80.42                   | 2.91                   | 2.90                |                       |
| 3,785.00              | 25.30           | 354.00      | 3,770.41              | 93.43        | -0.32        | 93.38                   | 3.90                   | 3.55                |                       |
| 3,816.00              | 26.90           | 353.20      | 3,798.25              | 106.98       | -1.85        | 106.98                  | 5.28                   | 5.16                |                       |
| 3,847.00              | 30.00           | 352.70      | 3,825.50              | 121.63       | -3.66        | 121.69                  | 10.03                  | 10.00               |                       |
| 3,878.00              | 32.50           | 351.30      | 3,852.00              | 137.56       | -5.91        | 137.68                  | 8.40                   | 8.06                |                       |
| 3,909.00              | 34.40           | 352.00      | 3,877.87              | 154.46       | -8.39        | 154.67                  | 6.25                   | 6.13                |                       |
| 3,940.00              | 36.70           | 353.00      | 3,903.09              | 172.33       | -10.73       | 172.61                  | 7.65                   | 7.42                |                       |
| 3,971.00              | 38.50           | 354.20      | 3,927.65              | 191.13       | -12.84       | 191.47                  | 6.27                   | 5.81                |                       |
| 4,002.00              | 42.30           | 354.50      | 3,951.25              | 211.12       | -14.81       | 211.52                  | 12.27                  | 12.26               |                       |
| 4,033.00              | 47.30           | 354.70      | 3,973.24              | 232.86       | -16.87       | 233.32                  | 16.14                  | 16.13               |                       |
| 4,064.00              | 50.60           | 354.80      | 3,993.60              | 256.13       | -19.00       | 256.66                  | 10.65                  | 10.65               |                       |
| 4,096.00              | 52.00           | 354.80      | 4,013.60              | 281.00       | -21.27       | 281.59                  | 4.37                   | 4.37                |                       |
| 4,127.00              | 54.70           | 355.20      | 4,032.11              | 305.78       | -23.43       | 306.43                  | 8.77                   | 8.71                |                       |
| 4,159.00              | 58.20           | 356.20      | 4,049.79              | 332.37       | -25.43       | 333.08                  | 11.24                  | 10.94               |                       |
| 4,191.00              | 62.00           | 356.40      | 4,065.74              | 360.05       | -27.22       | 360.80                  | 11.89                  | 11.87               |                       |
| 4,222.00              | 65.10           | 355.70      | 4,079.54              | 387.73       | -29.13       | 388.54                  | 10.20                  | 10.00               |                       |
| 4,253.00              | 67.20           | 355.30      | 4,092.08              | 415.99       | -31.36       | 416.86                  | 6.88                   | 6.77                |                       |
| 4,285.00              | 69.40           | 355.10      | 4,103.91              | 445.62       | -33.84       | 446.56                  | 6.90                   | 6.87                |                       |
| 4,316.00              | 73.80           | 354.60      | 4,113.69              | 474.91       | -36.49       | 475.93                  | 14.28                  | 14.19               |                       |
| 4,348.00              | 77.10           | 354.10      | 4,121.73              | 505.73       | -39.54       | 506.84                  | 10.42                  | 10.31               |                       |
| 4,379.00              | 79.60           | 353.10      | 4,127.99              | 535.90       | -42.92       | 537.11                  | 8.66                   | 8.06                |                       |
| 4,410.00              | 82.00           | 352.60      | 4,132.95              | 566.26       | -46.73       | 567.59                  | 7.90                   | 7.74                |                       |
| 4,441.00              | 84.40           | 352.90      | 4,136.62              | 596.79       | -50.61       | 598.25                  | 7.80                   | 7.74                |                       |
| 4,473.00              | 87.20           | 353.50      | 4,138.96              | 628.48       | -54.39       | 630.05                  | 8.95                   | 8.75                |                       |
| 4,504.00              | 88.90           | 354.10      | 4,140.01              | 659.28       | -57.74       | 660.95                  | 5.82                   | 5.48                |                       |
| 4,536.00              | 89.10           | 354.20      | 4,140.57              | 691.11       | -61.00       | 692.88                  | 0.70                   | 0.62                |                       |
| 4,567.00              | 89.80           | 353.50      | 4,140.87              | 721.93       | -64.32       | 723.80                  | 3.19                   | 2.26                |                       |
| 4,598.00              | 90.90           | 353.20      | 4,140.68              | 752.72       | -67.91       | 754.70                  | 3.68                   | 3.55                |                       |
| 4,629.00              | 90.60           | 353.40      | 4,140.28              | 783.50       | -71.53       | 785.60                  | 1.16                   | -0.97               |                       |
| 4,660.00              | 90.40           | 353.00      | 4,140.01              | 814.28       | -75.20       | 816.49                  | 1.44                   | -0.65               |                       |
| 4,755.00              | 91.80           | 353.10      | 4,138.18              | 908.57       | -86.69       | 911.13                  | 1.48                   | 1.47                |                       |
| 4,848.30              | 91.11           | 352.31      | 4,135.81              | 1,001.08     | -98.53       | 1,004.02                | 1.12                   | -0.74               | T1a - Domino #5H      |
| 4,848.94              | 91.11           | 352.31      | 4,135.80              | 1,001.71     | -98.61       | 1,004.65                | 1.12                   | -0.74               | T1 P2 - Domino #5H    |
| 4,850.00              | 91.10           | 352.30      | 4,135.78              | 1,002.76     | -98.76       | 1,005.71                | 1.12                   | -0.74               |                       |
| 4,945.00              | 92.70           | 351.90      | 4,132.63              | 1,096.81     | -111.81      | 1,100.17                | 1.74                   | 1.68                |                       |
| 5,039.00              | 92.50           | 354.60      | 4,128.36              | 1,190.05     | -122.84      | 1,193.75                | 2.88                   | -0.21               |                       |
| 5,134.00              | 91.00           | 357.00      | 4,125.46              | 1,284.74     | -129.80      | 1,288.64                | 2.98                   | -1.58               |                       |
| 5,229.00              | 90.90           | 355.80      | 4,123.89              | 1,379.54     | -135.76      | 1,383.59                | 1.27                   | -0.11               |                       |
| 5,323.00              | 89.70           | 356.10      | 4,123.39              | 1,473.30     | -142.40      | 1,477.53                | 1.32                   | -1.28               |                       |



# Cathedral Energy Services

## Survey Report

|                  |                            |                                     |                                      |
|------------------|----------------------------|-------------------------------------|--------------------------------------|
| <b>Company:</b>  | Manzano LLC                | <b>Local Co-ordinate Reference:</b> | Well Domino 21-16 State #5H          |
| <b>Project:</b>  | Roosevelt Co., NM (NAD 83) | <b>TVD Reference:</b>               | 21' KB @ 4376.00usft (Silver Oak #7) |
| <b>Site:</b>     | Sec 21-6S-34E              | <b>MD Reference:</b>                | 21' KB @ 4376.00usft (Silver Oak #7) |
| <b>Well:</b>     | Domino 21-16 State #5H     | <b>North Reference:</b>             | Grid                                 |
| <b>Wellbore:</b> | HZ [315037]                | <b>Survey Calculation Method:</b>   | Minimum Curvature                    |
| <b>Design:</b>   | HZ                         | <b>Database:</b>                    | USA EDM 5000 Multi Users DB          |

### Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usf) | Build Rate (°/100u) | Formations / Comments |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|------------------------|---------------------|-----------------------|
| 5,348.91              | 89.64           | 356.32      | 4,123.54              | 1,499.16     | -144.11      | 1,503.43                | 0.88                   | -0.21               | 1500' Tgt             |
| 5,417.00              | 89.50           | 356.90      | 4,124.05              | 1,567.12     | -148.14      | 1,571.50                | 0.88                   | -0.21               |                       |
| 5,511.00              | 90.20           | 358.80      | 4,124.30              | 1,661.05     | -151.66      | 1,665.49                | 2.15                   | 0.74                |                       |
| 5,605.00              | 91.30           | 0.10        | 4,123.07              | 1,755.04     | -152.57      | 1,759.45                | 1.81                   | 1.17                |                       |
| 5,699.00              | 90.30           | 358.40      | 4,121.75              | 1,849.01     | -153.80      | 1,853.41                | 2.10                   | -1.06               |                       |
| 5,793.00              | 92.50           | 0.80        | 4,119.46              | 1,942.97     | -154.45      | 1,947.33                | 3.46                   | 2.34                |                       |
| 5,850.20              | 92.44           | 0.43        | 4,116.99              | 2,000.12     | -153.84      | 2,004.41                | 0.65                   | -0.11               | T2a - Domino #5H      |
| 5,850.44              | 92.44           | 0.43        | 4,116.98              | 2,000.36     | -153.84      | 2,004.65                | 0.00                   | 0.00                | T2 P2 - Domino #5H    |
| 5,886.00              | 92.40           | 0.20        | 4,115.48              | 2,035.88     | -153.64      | 2,040.14                | 0.66                   | -0.11               |                       |
| 5,979.00              | 91.20           | 359.40      | 4,112.56              | 2,128.83     | -153.97      | 2,133.05                | 1.55                   | -1.29               |                       |
| 6,073.00              | 89.80           | 359.70      | 4,111.74              | 2,222.82     | -154.70      | 2,227.00                | 1.52                   | -1.49               |                       |
| 6,084.00              | 89.90           | 359.80      | 4,111.77              | 2,233.82     | -154.75      | 2,237.99                | 1.29                   | 0.91                |                       |
| 6,177.00              | 91.80           | 0.30        | 4,110.39              | 2,326.81     | -154.67      | 2,330.91                | 2.11                   | 2.04                |                       |
| 6,271.00              | 92.50           | 0.10        | 4,106.86              | 2,420.74     | -154.34      | 2,424.77                | 0.77                   | 0.74                |                       |
| 6,350.44              | 92.76           | 359.93      | 4,103.22              | 2,500.10     | -154.32      | 2,504.08                | 0.39                   | 0.32                | 2500' Tgt             |
| 6,364.00              | 92.80           | 359.90      | 4,102.56              | 2,513.64     | -154.34      | 2,517.61                | 0.39                   | 0.32                |                       |
| 6,458.00              | 93.10           | 359.90      | 4,097.72              | 2,607.52     | -154.51      | 2,611.43                | 0.32                   | 0.32                |                       |
| 6,551.00              | 93.10           | 359.90      | 4,092.70              | 2,700.38     | -154.67      | 2,704.24                | 0.00                   | 0.00                |                       |
| 6,645.00              | 92.20           | 358.60      | 4,088.35              | 2,794.27     | -155.90      | 2,798.11                | 1.68                   | -0.96               |                       |
| 6,740.00              | 92.00           | 358.60      | 4,084.87              | 2,889.18     | -158.22      | 2,893.03                | 0.21                   | -0.21               |                       |
| 6,833.00              | 91.70           | 358.50      | 4,081.87              | 2,982.10     | -160.57      | 2,985.98                | 0.34                   | -0.32               |                       |
| 6,850.85              | 91.70           | 358.40      | 4,081.34              | 2,999.94     | -161.05      | 3,003.82                | 0.54                   | 0.00                | T3a - Domino #5H      |
| 6,926.00              | 91.70           | 358.00      | 4,079.11              | 3,075.01     | -163.41      | 3,078.94                | 0.54                   | 0.00                |                       |
| 7,020.00              | 91.30           | 358.50      | 4,076.65              | 3,168.94     | -166.28      | 3,172.90                | 0.68                   | -0.43               |                       |
| 7,115.00              | 90.30           | 358.80      | 4,075.32              | 3,263.90     | -168.52      | 3,267.88                | 1.10                   | -1.05               |                       |
| 7,209.00              | 90.30           | 358.30      | 4,074.83              | 3,357.87     | -170.90      | 3,361.88                | 0.53                   | 0.00                |                       |
| 7,302.00              | 90.50           | 358.00      | 4,074.18              | 3,450.82     | -173.90      | 3,454.87                | 0.39                   | 0.22                |                       |
| 7,396.00              | 90.40           | 357.70      | 4,073.44              | 3,544.75     | -177.42      | 3,548.87                | 0.34                   | -0.11               |                       |
| 7,490.00              | 90.90           | 357.70      | 4,072.37              | 3,638.67     | -181.20      | 3,642.86                | 0.53                   | 0.53                |                       |
| 7,584.00              | 89.80           | 358.10      | 4,071.80              | 3,732.60     | -184.64      | 3,736.86                | 1.25                   | -1.17               |                       |
| 7,677.00              | 90.00           | 357.90      | 4,071.96              | 3,825.54     | -187.89      | 3,829.86                | 0.30                   | 0.22                |                       |
| 7,770.00              | 90.50           | 357.90      | 4,071.56              | 3,918.48     | -191.29      | 3,922.86                | 0.54                   | 0.54                |                       |
| 7,851.41              | 89.63           | 359.37      | 4,071.46              | 3,999.86     | -193.23      | 4,004.25                | 2.10                   | -1.06               | T4a - Domino #5H      |
| 7,864.00              | 89.50           | 359.60      | 4,071.56              | 4,012.45     | -193.34      | 4,016.84                | 2.10                   | -1.06               |                       |
| 7,957.00              | 89.80           | 0.00        | 4,072.12              | 4,105.45     | -193.67      | 4,109.79                | 0.54                   | 0.32                |                       |
| 8,050.00              | 89.80           | 359.50      | 4,072.45              | 4,198.45     | -194.07      | 4,202.74                | 0.54                   | 0.00                |                       |
| 8,144.00              | 89.80           | 359.30      | 4,072.78              | 4,292.44     | -195.06      | 4,296.71                | 0.21                   | 0.00                |                       |
| 8,237.00              | 89.80           | 358.60      | 4,073.10              | 4,385.43     | -196.76      | 4,389.69                | 0.75                   | 0.00                |                       |
| 8,299.00              | 90.00           | 358.70      | 4,073.21              | 4,447.41     | -198.22      | 4,451.69                | 0.36                   | 0.32                |                       |
| 8,392.00              | 89.70           | 358.50      | 4,073.45              | 4,540.38     | -200.50      | 4,544.68                | 0.39                   | -0.32               |                       |
| 8,484.00              | 90.80           | 357.90      | 4,073.05              | 4,632.33     | -203.39      | 4,636.67                | 1.36                   | 1.20                |                       |
| 8,578.00              | 91.10           | 358.00      | 4,071.49              | 4,726.26     | -206.75      | 4,730.66                | 0.34                   | 0.32                |                       |
| 8,671.00              | 91.40           | 358.20      | 4,069.46              | 4,819.19     | -209.83      | 4,823.64                | 0.39                   | 0.32                |                       |
| 8,766.00              | 91.40           | 357.80      | 4,067.14              | 4,914.10     | -213.15      | 4,918.61                | 0.42                   | 0.00                |                       |
| 8,851.87              | 90.20           | 359.00      | 4,065.94              | 4,999.93     | -215.54      | 5,004.47                | 1.98                   | -1.40               | T5a - Domino #5H      |
| 8,859.00              | 90.10           | 359.10      | 4,065.93              | 5,007.05     | -215.66      | 5,011.59                | 1.98                   | -1.40               |                       |
| 8,953.00              | 90.50           | 359.40      | 4,065.43              | 5,101.04     | -216.89      | 5,105.57                | 0.53                   | 0.43                |                       |
| 9,047.00              | 90.40           | 358.80      | 4,064.70              | 5,195.03     | -218.37      | 5,199.54                | 0.65                   | -0.11               |                       |
| 9,141.00              | 90.30           | 357.90      | 4,064.12              | 5,288.99     | -221.07      | 5,293.54                | 0.96                   | -0.11               |                       |
| 9,234.00              | 89.90           | 357.50      | 4,063.96              | 5,381.91     | -224.81      | 5,386.54                | 0.61                   | -0.43               |                       |
| 9,328.00              | 90.90           | 358.20      | 4,063.30              | 5,475.84     | -228.33      | 5,480.53                | 1.30                   | 1.06                |                       |
| 9,421.00              | 91.70           | 358.60      | 4,061.19              | 5,568.78     | -230.93      | 5,573.50                | 0.96                   | 0.86                |                       |
| 9,515.00              | 91.60           | 358.20      | 4,058.49              | 5,662.70     | -233.55      | 5,667.46                | 0.44                   | -0.11               |                       |



# Cathedral Energy Services

## Survey Report

**Company:** Manzano LLC  
**Project:** Roosevelt Co., NM (NAD 83)  
**Site:** Sec 21-6S-34E  
**Well:** Domino 21-16 State #5H  
**Wellbore:** HZ [315037]  
**Design:** HZ

**Local Co-ordinate Reference:** Well Domino 21-16 State #5H  
**TVD Reference:** 21' KB @ 4376.00usft (Silver Oak #7)  
**MD Reference:** 21' KB @ 4376.00usft (Silver Oak #7)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** USA EDM 5000 Multi Users DB

### Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usf) | Build Rate (°/100u) | Formations / Comments                    |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|------------------------|---------------------|------------------------------------------|
| 9,608.00              | 92.30           | 358.50      | 4,055.32              | 5,755.61     | -236.23      | 5,760.40                | 0.82                   | 0.75                |                                          |
| 9,700.00              | 92.30           | 357.90      | 4,051.63              | 5,847.49     | -239.12      | 5,852.33                | 0.65                   | 0.00                |                                          |
| 9,793.00              | 90.80           | 358.40      | 4,049.11              | 5,940.41     | -242.12      | 5,945.29                | 1.70                   | -1.61               |                                          |
| 9,852.45              | 90.15           | 359.05      | 4,048.62              | 5,999.84     | -243.44      | 6,004.73                | 1.54                   | -1.09               | T6a - Domino #5H                         |
| 9,885.00              | 89.80           | 359.40      | 4,048.63              | 6,032.39     | -243.88      | 6,037.27                | 1.54                   | -1.09               |                                          |
| 9,977.00              | 90.50           | 0.10        | 4,048.39              | 6,124.38     | -244.28      | 6,129.22                | 1.08                   | 0.76                |                                          |
| 10,070.00             | 91.20           | 0.70        | 4,047.01              | 6,217.37     | -243.64      | 6,222.12                | 0.99                   | 0.75                |                                          |
| 10,162.00             | 89.20           | 358.70      | 4,046.69              | 6,309.36     | -244.12      | 6,314.07                | 3.07                   | -2.17               |                                          |
| 10,255.00             | 89.40           | 358.80      | 4,047.83              | 6,402.33     | -246.15      | 6,407.05                | 0.24                   | 0.22                |                                          |
| 10,347.00             | 89.30           | 358.60      | 4,048.87              | 6,494.30     | -248.23      | 6,499.03                | 0.24                   | -0.11               |                                          |
| 10,440.00             | 90.60           | 359.20      | 4,048.95              | 6,587.28     | -250.02      | 6,592.02                | 1.54                   | 1.40                |                                          |
| 10,532.00             | 91.30           | 359.40      | 4,047.43              | 6,679.26     | -251.14      | 6,683.98                | 0.79                   | 0.76                |                                          |
| 10,625.00             | 90.20           | 359.30      | 4,046.21              | 6,772.24     | -252.20      | 6,776.94                | 1.19                   | -1.18               |                                          |
| 10,718.00             | 90.20           | 358.90      | 4,045.88              | 6,865.23     | -253.66      | 6,869.92                | 0.43                   | 0.00                |                                          |
| 10,811.00             | 90.50           | 359.50      | 4,045.32              | 6,958.22     | -254.96      | 6,962.89                | 0.72                   | 0.32                |                                          |
| 10,852.76             | 90.94           | 359.76      | 4,044.79              | 6,999.97     | -255.22      | 7,004.62                | 1.23                   | 1.05                | T7a - Domino #5H                         |
| 10,906.00             | 91.50           | 0.10        | 4,043.66              | 7,053.20     | -255.29      | 7,057.82                | 1.23                   | 1.05                |                                          |
| 10,999.00             | 91.30           | 359.90      | 4,041.39              | 7,146.18     | -255.29      | 7,150.73                | 0.30                   | -0.22               |                                          |
| 11,092.00             | 90.80           | 0.00        | 4,039.68              | 7,239.16     | -255.37      | 7,243.66                | 0.55                   | -0.54               |                                          |
| 11,186.00             | 90.00           | 358.50      | 4,039.03              | 7,333.15     | -256.60      | 7,337.62                | 1.81                   | -0.85               |                                          |
| 11,275.00             | 89.60           | 358.40      | 4,039.34              | 7,422.11     | -259.01      | 7,426.62                | 0.46                   | -0.45               | Last CES Survey                          |
| 11,332.00             | 89.60           | 358.40      | 4,039.73              | 7,479.09     | -260.60      | 7,483.62                | 0.00                   | 0.00                | Projection to Bit - PBHL 1a - Domino #5H |



# Cathedral Energy Services

## Survey Report

|           |                            |                              |                                      |
|-----------|----------------------------|------------------------------|--------------------------------------|
| Company:  | Manzano LLC                | Local Co-ordinate Reference: | Well Domino 21-16 State #5H          |
| Project:  | Roosevelt Co., NM (NAD 83) | TVD Reference:               | 21' KB @ 4376.00usft (Silver Oak #7) |
| Site:     | Sec 21-6S-34E              | MD Reference:                | 21' KB @ 4376.00usft (Silver Oak #7) |
| Well:     | Domino 21-16 State #5H     | North Reference:             | Grid                                 |
| Wellbore: | HZ [315037]                | Survey Calculation Method:   | Minimum Curvature                    |
| Design:   | HZ                         | Database:                    | USA EDM 5000 Multi Users DB          |

| Targets                                                                                           |           |          |          |          |         |              |            |           |             |
|---------------------------------------------------------------------------------------------------|-----------|----------|----------|----------|---------|--------------|------------|-----------|-------------|
| Target Name                                                                                       |           |          |          |          |         |              |            |           |             |
| - hit/miss target                                                                                 | Dip Angle | Dip Dir. | TVD      | +N/-S    | +E/-W   | Northing     | Easting    | Latitude  | Longitude   |
| - Shape                                                                                           | (°)       | (°)      | (usft)   | (usft)   | (usft)  | (usft)       | (usft)     |           |             |
| PBHL 1a - Domino #5H                                                                              | 0.00      | 0.00     | 4,044.00 | 7,493.78 | -274.24 | 1,020,457.07 | 801,308.66 | 33.802091 | -103.477537 |
| - survey misses target center by 20.49usft at 11332.00usft MD (4039.73 TVD, 7479.09 N, -260.60 E) |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| T4a - Domino #5H                                                                                  | 0.00      | 0.00     | 4,074.00 | 4,000.01 | -186.45 | 1,016,963.30 | 801,396.45 | 33.792489 | -103.477344 |
| - survey misses target center by 7.24usft at 7851.51usft MD (4071.46 TVD, 3999.96 N, -193.23 E)   |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| T1 P2 - Domino #5H                                                                                | 0.00      | 0.00     | 4,131.00 | 1,000.01 | -110.96 | 1,013,963.30 | 801,471.94 | 33.784243 | -103.477177 |
| - survey misses target center by 13.35usft at 4848.99usft MD (4135.80 TVD, 1001.77 N, -98.62 E)   |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| T1a - Domino #5H                                                                                  | 0.00      | 0.00     | 4,156.00 | 1,000.01 | -110.96 | 1,013,963.30 | 801,471.94 | 33.784243 | -103.477177 |
| - survey misses target center by 23.73usft at 4848.51usft MD (4135.81 TVD, 1001.29 N, -98.56 E)   |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| T5a - Domino #5H                                                                                  | 0.00      | 0.00     | 4,064.00 | 5,000.01 | -211.58 | 1,017,963.30 | 801,371.32 | 33.795237 | -103.477399 |
| - survey misses target center by 4.41usft at 8851.89usft MD (4065.94 TVD, 4999.95 N, -215.54 E)   |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| 1500' Tgt                                                                                         | 0.00      | 0.00     | 4,121.00 | 1,500.00 | -130.64 | 1,014,463.29 | 801,452.26 | 33.785618 | -103.477228 |
| - survey misses target center by 13.74usft at 5348.85usft MD (4123.54 TVD, 1499.09 N, -144.11 E)  |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| 2500' Tgt                                                                                         | 0.00      | 0.00     | 4,101.00 | 2,500.00 | -148.60 | 1,015,463.29 | 801,434.30 | 33.788366 | -103.477260 |
| - survey misses target center by 6.14usft at 6350.44usft MD (4103.22 TVD, 2500.10 N, -154.32 E)   |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| T3a - Domino #5H                                                                                  | 0.00      | 0.00     | 4,084.00 | 3,000.01 | -161.32 | 1,015,963.30 | 801,421.58 | 33.789740 | -103.477288 |
| - survey misses target center by 2.68usft at 6850.85usft MD (4081.34 TVD, 2999.93 N, -161.05 E)   |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| T2a - Domino #5H                                                                                  | 0.00      | 0.00     | 4,118.00 | 2,000.01 | -136.19 | 1,014,963.30 | 801,446.71 | 33.786992 | -103.477233 |
| - survey misses target center by 17.68usft at 5850.20usft MD (4116.99 TVD, 2000.12 N, -153.84 E)  |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| Roosevelt 16 State #1                                                                             | 0.00      | 0.00     | 4,155.00 | 3,159.93 | 66.96   | 1,016,123.22 | 801,649.86 | 33.790174 | -103.476533 |
| - survey misses target center by 245.62usft at 7001.82usft MD (4077.07 TVD, 3150.77 N, -165.79 E) |           |          |          |          |         |              |            |           |             |
| - Circle (radius 200.00)                                                                          |           |          |          |          |         |              |            |           |             |
| T6a - Domino #5H                                                                                  | 0.00      | 0.00     | 4,056.00 | 6,000.01 | -236.70 | 1,018,963.30 | 801,346.20 | 33.797986 | -103.477454 |
| - survey misses target center by 10.00usft at 9852.53usft MD (4048.62 TVD, 5999.92 N, -243.44 E)  |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| T7a - Domino #5H                                                                                  | 0.00      | 0.00     | 4,048.00 | 7,000.01 | -261.83 | 1,019,963.30 | 801,321.07 | 33.800734 | -103.477510 |
| - survey misses target center by 7.34usft at 10852.76usft MD (4044.79 TVD, 6999.97 N, -255.22 E)  |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |
| T2 P2 - Domino #5H                                                                                | 0.00      | 0.00     | 4,111.00 | 2,000.01 | -136.19 | 1,014,963.30 | 801,446.71 | 33.786992 | -103.477233 |
| - survey misses target center by 18.64usft at 5850.44usft MD (4116.98 TVD, 2000.36 N, -153.84 E)  |           |          |          |          |         |              |            |           |             |
| - Point                                                                                           |           |          |          |          |         |              |            |           |             |

| Survey Annotations    |                       |                   |              |                   |
|-----------------------|-----------------------|-------------------|--------------|-------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment           |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                   |
| 11,275.00             | 4,039.34              | 7,422.11          | -259.01      | Last CES Survey   |
| 11,332.00             | 4,039.73              | 7,479.09          | -260.60      | Projection to Bit |

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_